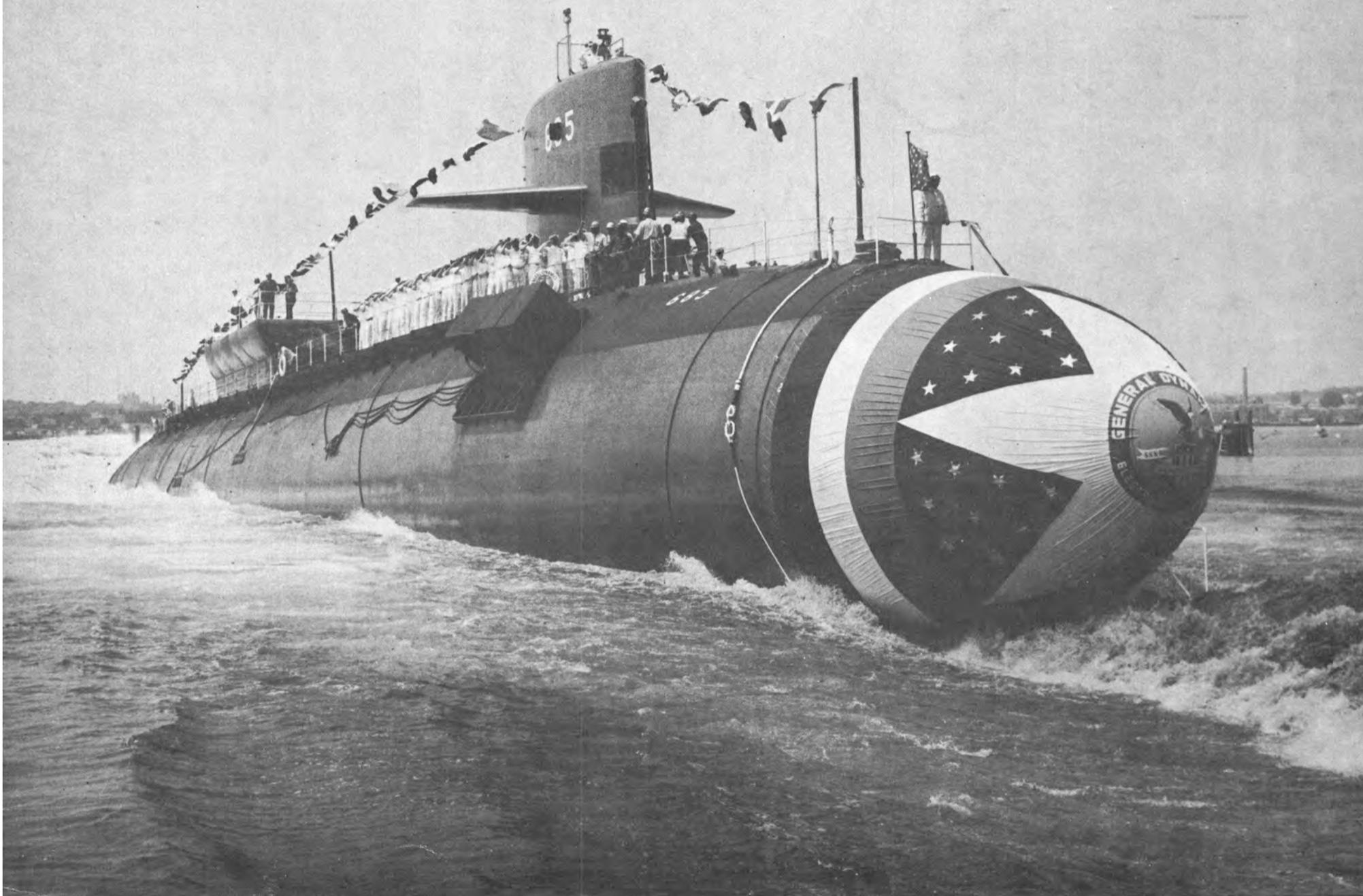


MARITIME REPORTER AND ENGINEERING NEWS

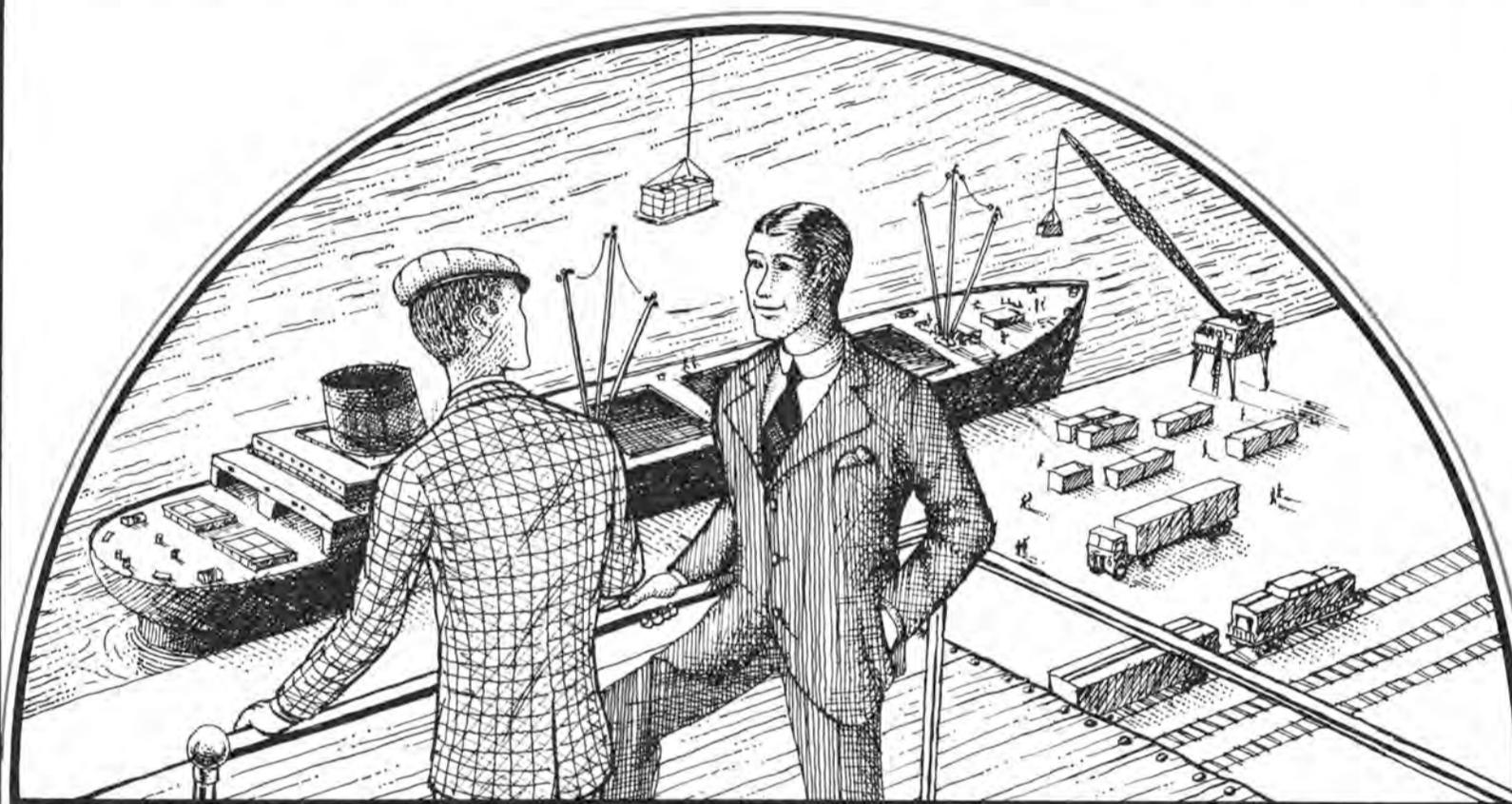


**General Dynamics' Electric Boat
Launches The Navy's "Quiet One"**

(SEE PAGE 7)

SEPTEMBER 15, 1973

TOM SWIFT and The Law of the Waterfront



"The smartest thing I ever did was to take your advice and call Midland, Tom." Tom Swift was being addressed by his friend Ned Newton as the two of them stood on a promontory observing the hectic waterfront activities.

"I knew that when it came to stevedoring, terminal operations, ship repair and maintenance, dredging and just about anything else that goes on around the waterfront, Midland could offer you exactly the coverage you needed," said Tom broadly. "Midland has the highest level of experience of any insurer in the field of Maritime risk management," he added loftily.

"True enough, Tom," said Ned, "but what I appreciated most of all was the way Midland guided me through the intricacies of the new Longshoremen's and Harbor Workers' Act."

"It's not a new law," amended Tom, "but there certainly is a great deal of confusion about the changes and about what the future will bring.

"We all know there are some companies who go in and out of the Maritime field," Tom interjected inconsistently. "But today you have to have an outfit that stays on top of the changing situation, one you can count on to have all the facts you need to know. And that describes Midland," he concluded authoritatively.

John Downey, Midland's Port Claims Control Manager, recently spoke to the AMA on the meaning of the changes in the Longshoremen's and Harbor Workers' Act. If you'd like a copy of his valuable comments, just drop him a note at 160 Water St., N.Y., N.Y. 10005.

Have you sent in your Swifties yet?

"There's been a veritable outbreak of Swifties around here lately," said Tom rashly.

It's time you caught the bug, too. Come up with a Swiftie that has something to do with insurance and submit it on your company letterhead. Every quarter, the five best entries will win Tom's latest invention. Everybody who enters will win a Tom Swift poster.

"So sharpen your pencil," reminded Tom pointedly.



P.S. Watch this space next month for names of first contest winners!

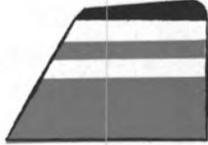


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Port Arthur Towing Co. Gets Title XI Approval For Towboats & Barges

Approval for a Title XI application in connection with two 3,200-hp river towboats and eight inland tank barges has been given to Port Arthur Towing Co., Port Arthur, Texas, by the Maritime Administration. Fredeman's Calcasieu Locks Ship Yard, Inc., Carlslyss, La., will build the towboats at a total cost of \$2.3 million. The barges, to cost \$2.5 million, will be built by Nashville Bridge Co., Nashville, Tenn.

Raymond International Awarded \$2.05 Million Puerto Rico Contract

Corporacion Raymond, S.A., a subsidiary of Raymond International Inc., Houston, Texas, has been awarded a \$2,050,000 contract to install an ocean outfall sewer line off Barceloneta on the north coast of Puerto Rico.

The one-year contract involves laying 1,000 meters of 48-inch and 36-inch-diameter concrete pipe in water up to 105 feet deep.

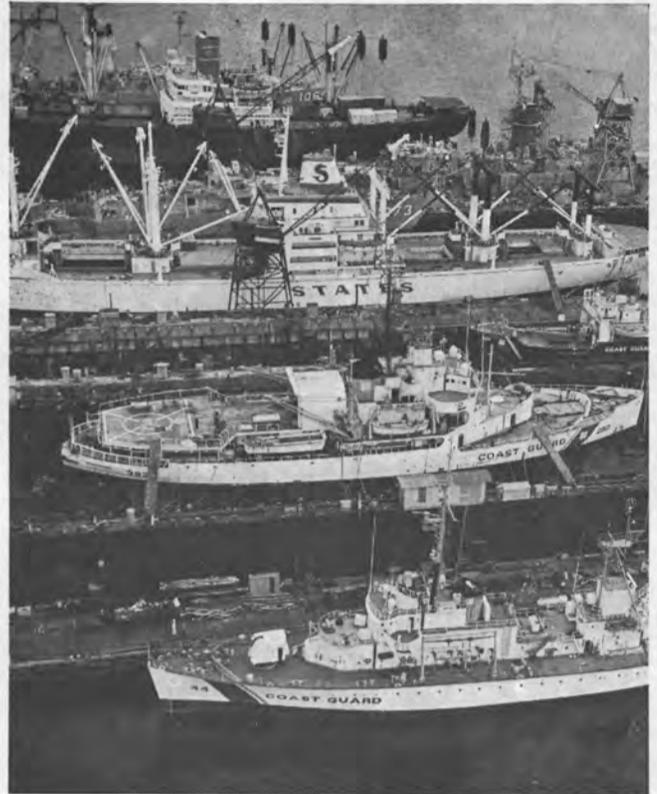
Raymond is presently completing a sewer outfall project at Ponce, Puerto Rico, under a \$3.6-million contract.

Twin City Shipyard Has 90-Barge Backlog Totaling \$11 Million

John W. Lambert, president of Twin City Barge & Towing Company, St. Paul, Minn., recently reported that its subsidiary, Twin City Shipyard, Inc., also in St. Paul, has a backlog of orders for 90 barges totaling some \$11 million in sales, which will—at a production rate of about one barge per week—consume the entire barge output of the shipyard until March of 1975.

The shipyard, which began producing 195-foot by 35-foot hopper barges in its newly expanded fabrication facility on June 15, has launched and delivered six barges.

Twin City Barge has served the Twin Cities areas since 1937, and Chicago since 1961. The diversified firm manufactures barges and other craft, maintains terminal storage facilities, provides harbor towing and barge fleet services, and operates as a carrier of dry and liquid bulk commodities. Its operations extend from the Twin Cities and Chicago through the inland river system.



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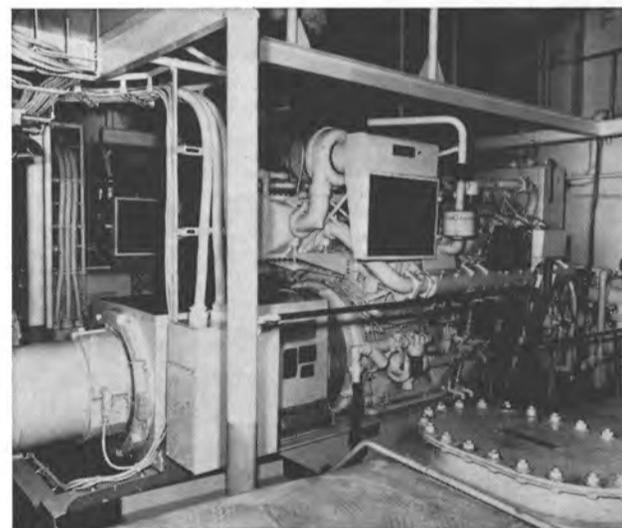
Third diesel Enginator® is added to jumbo-ized ferry to provide total of 1500 kw

The "Malaspina," owned by State of Alaska, Dept. of Public Works, Division of Marine Transportation, provides service between southeastern Alaska ports and Seattle. To fill increasing demand for deluxe service, she has had 58 feet added to her length and another 500 kw in reserve ship's service power.

The "Malaspina" was originally equipped with two Waukesha V12 diesel Enginators, each rated 500 kw at 900 rpm. When the vessel was jumbo-ized, the owners made the decision to rely again on proved Waukesha power. They added a new, updated VHP V12 diesel Enginator of the same 500 kw rating of the first two units.

The choice of Waukesha for the reserve ship's service power was a natural. In addition to complete parts interchangeability, the performance record of the two original units was exceptional.

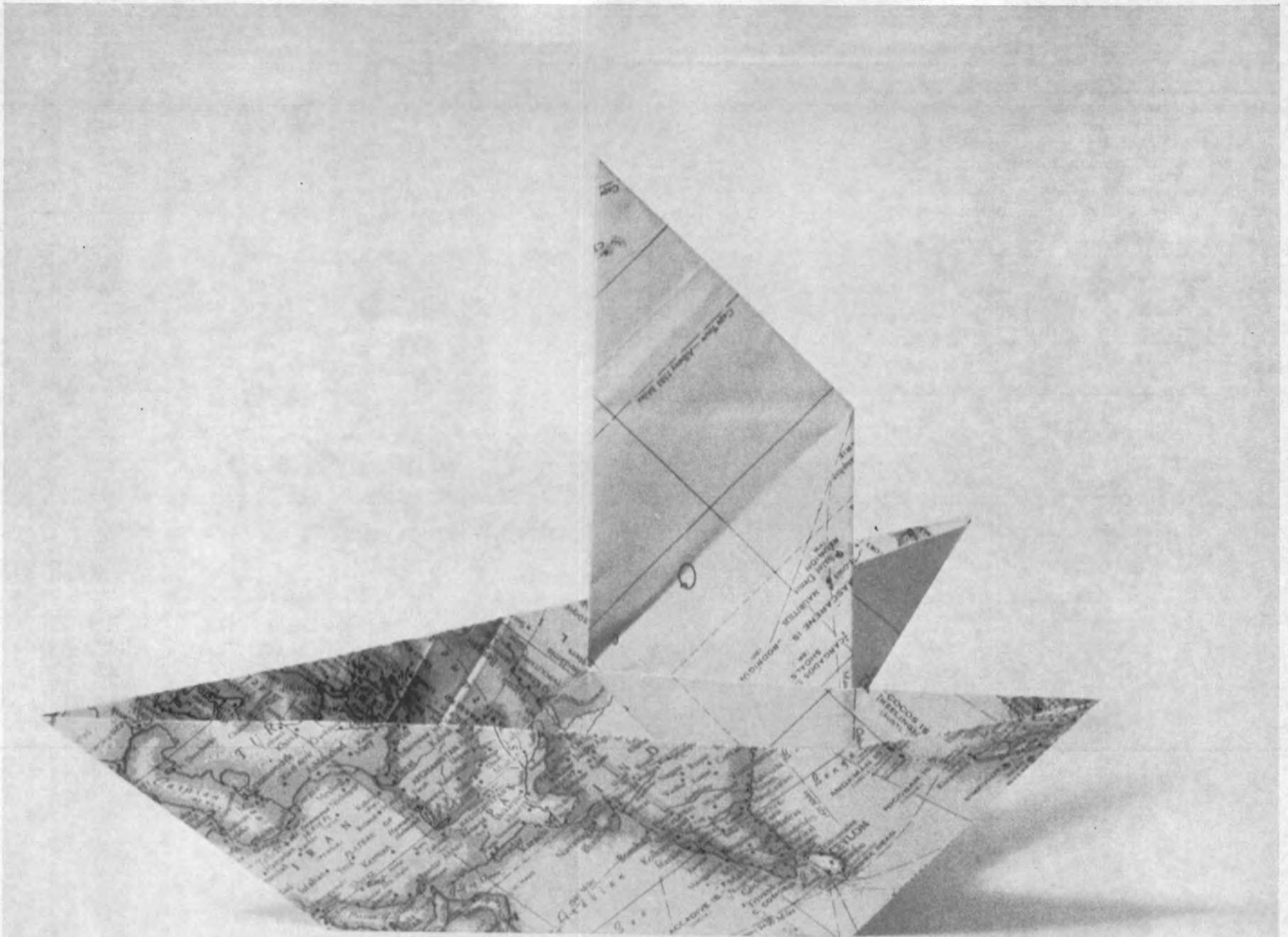
Waukesha's marine specialists have a wide range of propulsion and engine-generator sets to offer — all with Waukesha's traditional reliability and long life. For complete information, contact your authorized Waukesha distributor.



One of three VHP V12 L5790 DSIM Enginators on the "Malaspina." For ship's service power, Waukesha offers units from 47 to 1110 kw.

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For over 70 years now Sumitomo has been building vessels of every type for every purpose. And whether they are mammoth tankers, bulk carriers, combination carriers or special kinds of ships, such as LASH and liquefied gas carriers they are all built with the same attention to detail and the high technical standards that mark all Sumitomo products. And with future requirements of its customers in mind Sumitomo has

recently completed the Oppama Shipyard which includes some of the most sophisticated shipbuilding equipment and machinery in the world. In this way Sumitomo is confident that it can offer even better service to its clients.



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General Dynamics' Electric Boat Launches 'Quiet One' And Lays Keel For Attack Sub

The Navy's "quiet" submarine was launched and construction was started on a high-speed attack submarine at the General Dynamics' Electric Boat Division, Groton, Conn. During the ceremonies, top Washington officials called for strong and realistic deterrents as necessary in an era of negotiations for peace.

Melvin R. Laird, Counselor to the President for Domestic Affairs, and keynote speaker at the launching on August 4 of the Glenard P. Lipscomb, said: "Under the President's leadership, we have moved from confrontation to negotiation. We have succeeded because of our determination to remain strong. We have no alternative, if we are to safeguard our nation, but to press forward with both the programs to maintain that realistic deterrent and the negotiations necessary to permit that progress."



Mrs. Virginia Lipscomb of Washington, D.C., widow of the late California Congressman Glenard P. Lipscomb, christens "quiet" submarine that bears his name, during ceremonies August 4 at General Dynamics' Electric Boat Division, Groton, Conn. Other dignitaries include, from left: Vice Adm. H.G. Rickover, Director, Navy Nuclear Propulsion Program; David S. Lewis, chairman of the board, General Dynamics; Adm. Isaac C. Kidd, Chief of Naval Material; Secretary of the Navy John W. Warner, and Melvin R. Laird, Counselor to the President for Domestic Affairs.

"We pray," Mr. Laird continued, "for the time when the capable and resolute professional men and women who have made this launching possible, from the skilled shipyard worker to the highest level planner, can participate in producing instruments of trade and commerce."

Attorney General Elliot L. Richardson, on the previous day at keel-laying ceremonies for the USS Groton, said: "It is vital that we continue to maintain our military strength in order that we may pursue the opportunities of the era of negotiations. It is important that we perceive the structure of world peace as a structure resting on psychological attitudes. It is a structure only as stable as the confidence people have that there will not be permitted to occur the exploitation of the weak by the strong or the assertion of unilateral claims by one country against another."

Both ceremonies took place at General Dynamics' Electric Boat Division which Mr. Richardson said had "built and delivered a total of 41 of the 101 nuclear submarines in the fleet, including the world's first nuclear submarine, the Nautilus."

His wife, Anne Hazard Richardson, welded her initials in the 106-ton keel plate as it was lowered into position on the building ways.

General Dynamics has a contract for seven of the SSN 688 Los Angeles class submarines to be built for the U.S. Navy.

Mr. Richardson quipped that he should be doing the welding since he had served an apprenticeship as a welder at the Quincy shipyard, now owned by General Dynamics.

The Lipscomb is a turbine electric-drive submarine and many advanced techniques for submarine silencing have been incorporated in her design. The "quiet" sub was christened by Mrs. Virginia Lipscomb of Washington, D.C., widow of the nine-term Congressman from California.

Other participants in the two ceremonies included Secretary of the Navy John W. Warner; Adm. Isaac C. Kidd, Chief of Naval Material; Vice Adm. H.G. Rickover, Director, Navy Nuclear Propulsion Program; Rear Adm. Robert C. Gooding, Commander, Naval Ship Systems Command; David S. Lewis, chairman of the board of General Dynamics, and Joseph D. Pierce, general manager, Electric Boat Division and vice president of General Dynamics.



Mrs. Anne Hazard Richardson, wife of the Attorney General of the United States, brushes slag from steel plate after welding her initials "A.H.R." on the keel of the USS Groton. Welder Dijon Speedwell assisted Mrs. Richardson. Ceremony, honoring the city and town where more than 150 Navy submarines have been designed and built, was held on August 3 and witnessed by Secretary of the Navy John W. Warner and Atty. Gen. Elliot L. Richardson (r).

Dudley Himoff Announces Maritime Group Realignment

Through its chairman Dudley T. Himoff, the Maritime Group Inc., shipowners and operators, has announced a realignment of the company's staff with four appointments.

Allen F. Elia was named president and chief executive officer of Maritime Container Lines, which maintains regular container service in the North Atlantic. He will be headquartered in New York.

Klaus W.H. Beckman was appointed executive vice president of Himoff Maritime Enterprises Ltd., a tramp ship operation, and vice president of Navabel International Ltd., which operates Navibel Lines into the Great Lakes.

In addition, John R. Massey was named general manager-administration for the group including Navibel Lines and Maritime Container Lines, while Armand de Vlaminck has been appointed general manager of sales and operations for the same group of companies. He will have headquarters in Antwerp, Belgium.

Santa Fe Drilling Company Promotes Orr And Barnhill



Charles K. Orr



Charles L. Barnhill

Charles K. Orr, manager of Santa Fe Drilling Company's North Sea drilling operations since 1970, has been transferred to London, England, and promoted to regional manager of business development for Santa Fe International Corporation.

He is responsible for coordinating business development efforts for the company's drilling, construction and engineering divisions throughout Europe and Africa.

A petroleum engineering graduate of Texas A & M University, Mr. Orr has been chairman of the North Sea chapter of the International Association of Drilling Contractors since its establishment early this year. This is the first IADC chapter organized outside the United States.

Succeeding Mr. Orr as North Sea zone manager in Great Yarmouth is Charles L. Barnhill, operations manager there since June 1972.

Mr. Barnhill joined Santa Fe in 1971 and served as operations manager in western Venezuela before transferring to England in 1972.

In his new position, he has jurisdiction over three Santa Fe rigs currently in the zone. He will also have responsibility for two new semi-submersible rigs to be operated in the North Sea by Santa Fe-Waage Drilling Co., a U.S.-Norwegian joint venture.

PFEL And U.S. Lines Ask MarAd Aid To Convert Six Breakbulk Ships To Tankers

Pacific Far East Line Inc. has joined United States Lines in planning to convert relatively new breakbulk vessels to tankers.

The two ship conversion of surplus Mariner class freighters to tankships of 80,000-90,000-dwt is estimated by PFEL to cost from \$21 million to \$22 million each. Pacific Far East Line has applied to the Maritime Administration for both construction and operating subsidies in connection with the two conversions which were being discussed with Todd Shipyards, San Francisco.

Under the impact of containerization, employment for breakbulk ships, except for military cargoes, has diminished sharply. United States Lines wants subsidy to convert four of its C-3s to tankers, of approximately the same size, as a means of getting more profitable employment for the vessels.

The conversion cost for its four vessels is estimated by United States Lines to be about \$87.6 million of which up to 39 percent would be paid for in subsidy. United States Lines has also applied for operating subsidy.

PFEL estimates it will take 18 months to two years to complete the conversions and anticipates concluding a letter of agreement with Todd shortly covering this work.

PFEL also said it expects to have two suitable Mariners for such conversion in layup and it is the company's intent to develop this project in the shortest possible time.

Korean Yards Receive \$256 Million In Orders; Plan 4 More Shipyards

Korean shipbuilders have received orders worth \$256 million for the construction of tankers and other commercial vessels, according to the Ministry of Commerce and Industry in Seoul, Korea. An additional \$160 million of shipbuilding contracts are being negotiated,

which would bring the total of new orders to \$416 million.

Of the definite new orders, \$201 million are for construction of six tankers by Hyundai Shipbuilding and Heavy Industries. These include two 259,000-ton tankers valued at \$61.9 million, which were ordered by a Greek shipping firm. In addition, two 227,000-ton tankers worth \$139.5 million have been ordered by Japanese and Liberian

firms for delivery by 1975.

The Korea Shipbuilding and Engineering Corp., and Dae Sun Shipbuilding & Engineering Co. are also constructing 27 smaller tankers and fishing vessels worth \$55 million for foreign delivery.

Under its heavy industry development program, the Korean Government plans to build four more large shipyards on the country's southern coast.

Moran Towing Names Deely To Sales Post



Richard J. Deely

Richard J. Deely has been transferred to the sales department of the Moran Towing & Transportation Company, Inc., according to a recent announcement by Thomas E. Moran, chief executive of the company.

Mr. Deely was formerly assigned to the Seaboard Shipping Division of the Moran organization as assistant manager, with operational and administrative responsibilities.

Prior to joining the Moran division, he held various positions relating to marine transportation and traffic with the Shell Oil Company.

Mr. Deely, a graduate of the University of Notre Dame and the Fordham University School of Law, resides in Chappaqua, N.Y.

Donahue Appointed Vice President Of URS/Coverdale & Colpitts



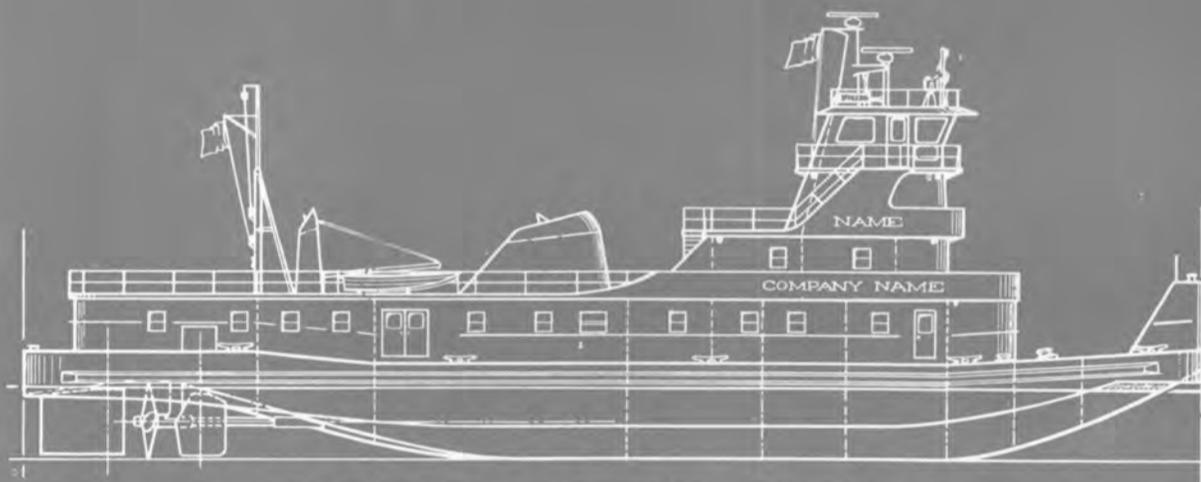
Col. Franklyn W. Donahue

Col. Franklyn W. Donahue, USA (ret.) was recently appointed vice president of URS/Coverdale & Colpitts, Inc. His major activities will be in the marine transportation field. Prior to joining URS/C&C in July 1971, he served in the U.S. Army, principally in command, administrative and planning assignments, specializing in the field of transportation. His final assignment was Deputy Commander and Chief of Staff of Fort Devens, Mass. From August 1957 to September 1958, he was assigned to URS/C&C under the Army's "Training with Industry" program.

Mr. Donahue has a B.S. degree in military science and an M.B.A. degree in transportation and marketing from the University of Maryland, in addition to specialized studies at Tulane and Stanford Universities, the U.S. Army Transportation School, and the U.S. Army Command and General Staff College.

Sometimes, one word is all you need.

HUSTLER. (hūs'lēr), noun. 1a. One who shoves; b. One who conveys forcibly or hurriedly; c. One who urges forward with untiring rapidity; 2a. One who obtains by energetic activity.



HUSTLER

Halter Marine introduces the new river towboat class HUSTLER.

Under development for two years, the new HUSTLER class towboat has overall dimensions of 140 feet x 38 feet x 11 feet 6 inches, with a draft of 8 feet 6 inches. Two of the new series are under construction now and will be powered by two Polar Nohab diesel engines that develop 4200 horsepower. Facilities are available for additional orders. This new class is the result of nearly twenty years of experience in building boats for use all over the world, on all oceans, and on the rivers of dozens of countries. There are new pollution control systems and new corrosion control coating systems incorporated in the HUSTLER class. Its powerful configuration will make your inland waterway operations more efficient and more profitable.

For complete details on the new HUSTLER class, please write or call us. HALTER MARINE SERVICES, INC., P.O. Box 29266, New Orleans, La. 70129, 504/254-1222, Telex: 584-200, Cable: HALMAR.



Todd Awarded \$32.5 Million In New Barge Business

The signing of a letter contract with St. Philip Towing & Transportation Company, Tampa, Fla., for the construction of two barges reflects the results of an intense marketing effort in recent months which has brought a surge of new barge and tug business to Todd Shipyards Corporation. A total of \$32.5 million is involved and three different yards will participate in these construction projects.

According to J.T. Gilbride, president of Todd, the St. Philip barges (proposed to be constructed through Title XI procedures of the Merchant Marine Act) will be built at the Seattle Division, the first to be completed in 16 months, and the second in 22 months. They are 22,500-dwt self-unloading bulk cargo barges.

Todd has also contracted to build 14 barges and 2 tugboats for Alamo Chemical Transportation Company, Houston, Texas; 10 of these units will be built at the Galveston Division and 6 at the Houston Division.

In addition, Todd was awarded contracts to build four barges for Steuart Transportation Company, Piney Point, Md., at the Houston Division.

A contract with Montauk Oil Transportation Company, New York, N.Y., for a barge to be built at the Houston Division brings the total of new business to 21 barges and 2 tugs.

Matson Navigation Parent Company Elects R.J. Pfeiffer



R.J. Pfeiffer

R.J. Pfeiffer, who was elected president of Matson Navigation Company in April, has been elected senior vice president of Alexander & Baldwin, Inc., Matson's parent company, it was announced by L.S. Pricher, A&B president.

Mr. Pfeiffer, who began his steamship career in Hawaii 36 years ago, has been with Matson since 1960.

J. Ray McDermott To Build Four Tugs

The Maritime Administration has approved the Title XI application from GATX Leasing for four 4,860-hp oceangoing tugs. The tugs will be built at a total cost of \$6.1 million by J. Ray McDermott & Co., Inc.

U.S. Lines Names Krich M&R Manager East Coast Division

Donald M. Krich has been named manager of maintenance and repair for United States Lines' East Coast Division, it was announced by James P. Rafter, divisional vice president for the containership company.

Mr. Krich will be responsible for

the establishment, implementation and coordination of maintenance and repair plans and procedures for the East Coast, including the company's terminals at Port Elizabeth, N.J., Baltimore, Md., and Norfolk, Va.

Before joining United States Lines, he held engineering and technical points in transportation and allied industrial fields for a number of years.

Mr. Krich attended Drexel and

Temple Universities, and served with the United States Army during the Korean Conflict as an artillery forward observer, and operations and intelligence noncommissioned officer.

United States Lines operates a fully containerized Tri-Continent service between Europe, the United States, Hawaii, Guam and the Far East, utilizing an all-modern fleet of 16 high-speed high-capacity containerships.

JacuzziJet PROVIDES LOW SPEED ADVANTAGES OVER CONVENTIONAL PROPULSION SYSTEMS

At low speeds a JacuzziJet powered craft has exceptional maneuverability. The boat is always in complete control and is able to be turned within its own length, making it easy to navigate in tight waters.

Because jet propulsion is torque-free, there is no tendency for even single engine boats to "walk" to one side or the other. And, "twisting" is not required on boats with twin jets. Since JacuzziJet is a direct drive system, it does not utilize a transmission. By simply raising or lowering the reverse gate



the conversion from forward to reverse is smooth and effortless.

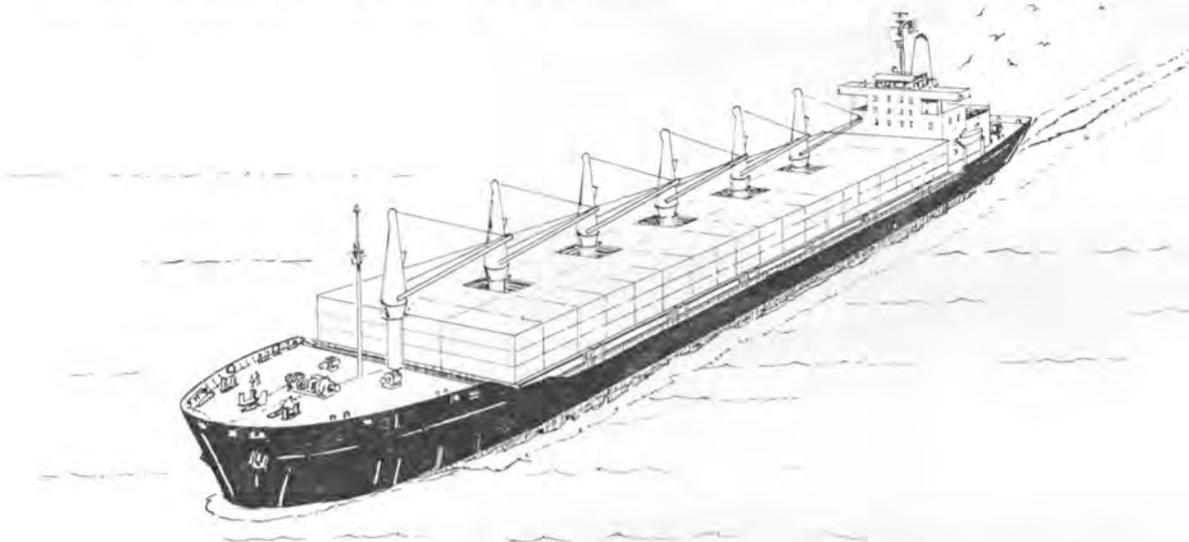
Efficient turning in either forward or reverse is accomplished by deflecting the jet stream to the right, left or center. A rudder is not necessary since the steering deflector and jet stream direct the thrust.

JacuzziJet thrust provides better low speed maneuverability than conventional propulsion systems. Try a JacuzziJet powered boat, and you'll see it's true.



JACUZZI BROS. INC. / 11511 New Benton Highway / Little Rock, Arkansas 72203

Luckenbach Announces \$56-Million U.S. Shipbuilding Program



Artist's conception of the proposed 56,000-dwt Luckenbach lumber carrier.

Edgar F. Luckenbach Jr., president of Luckenbach Steamship Company, one of America's oldest maritime firms, announced that he has notified the Federal Maritime Administration of his intention to request subsidies for the construction of two 56,000-ton dry bulk carriers. These vessels will be the largest of their class ever built in the United States.

Mr. Luckenbach stated that negotiations are in progress to build these ships, each measuring 700 feet, with the Lockheed Shipbuilding Corporation in Seattle, Wash. Donaldson, Lufkin & Jenrette, Inc., the investment banking firm, has been named by Luckenbach to negotiate the financing of the \$56-million shipbuilding program. The designs for the new Luckenbach ships, which incorporate many unique engineering features, were produced by the naval architectural firm of John J. McMullen Associates.

In announcing the new plans for his 123-year-old family-owned shipping concern, Mr. Luckenbach said: "The construction of these new ships, to sail under the American flag, will represent the largest lumber carriers in the world and is in total concert with the long-term maritime aims of our country as well as our company. In addition to pursuing expanded terminal and stevedoring operations in 12 United States ports, Luckenbach will now also concentrate on the building and operating of a number of special purpose ocean carriers designed to promote President Nixon's goal of rebuilding the United States merchant fleet."

Luckenbach Steamship Company, whose executive offices are in New York, serves the maritime community today as steamship operators, terminal owners and operators, steamship general agents, maritime brokers and consultants, international freight forwarders and stevedores.

SNAME Chesapeake Section Announces 1973-74 Program

The Chesapeake Section of The Society of Naval Architects and Marine Engineers has announced the forthcoming schedule of events for their 1973-74 technical programs.

Seth Hawkins, Naval Ship Research and Development Center, mentioned that any visiting members of SNAME from other sections who happen to be in the Washington, D.C., area on the scheduled dates are cordially invited to attend and should contact A. Landsburg, chairman of the meetings committee, for reservations, telephone (202) 254-7006.

The schedule is:

September 20, 1973, at Washington Navy Yard Officers' Club; paper: "ATS-4 Salvage Tug." Robert Jamieson (NAVSEC).

October 25, 1973, at Calhoun Marine Engineers Benevolent Association School, Baltimore, Md.; tour and lecture: Roy Luebbe (Calhoun School).

November 28, 1973, at Bethesda Naval Hospital Officers' Club; paper: "Recent Coast Guard Research into Vessel Stability," Comdr. E.L. Jones, U.S. Coast Guard.

January 7, 1974, at Washington Navy Yard Officers' Club; paper: "Offshore Terminals." Armour S. Armstrong (MarAd).

January 19, 1974, at U.S. Naval Academy; Chesapeake Sailing Yacht Symposium.

February 7, 1974, at Walter Reed Officers' Club; paper: "The MarAd Pollution Abatement Program." George Steinman (MarAd).

March 5, 1974, at Walter Reed Officers' Club; paper: "The Omega Navigation System." Comdr. J.D. Richardson (U.S. Navy).

April 10, 1974, at Washington Navy Yard

Officers' Club; paper: "Ship Mooring," Richard Douglas (Bethlehem Steel Corporation).

May 9, 1974, at Walter Reed Officers' Club; paper: "Resistance Characteristics of a Systematic Series of Planning Hull Forms—Series 65," Jacques Hadler (NSRDC), Nadine Hubble (NSRDC), and H. Holling (NSRDC).

Eller Operating New 14-Acre Marine Terminal At Tampa

Capt. Arthur E. Erb, president of Eller & Company, Inc., one of Florida's largest steamship agents and stevedoring firms, has announced that Eller & Company, Inc. has leased and is operating the 14-acre marine terminal at 13th and York Streets, Tampa, Fla., presently known as Gulf Florida Terminal. Eller's operation of this facility began September 1, 1973.

The facility has a 1,200-foot dock and warehouse space of 146,000 square feet. Nine acres of paved area are also included and will be used for open storage of lumber, steel and containers.

Edward E. Sheffield, local manager, advises that their office will be relocated from 412 Madison Street to these premises on September 15.

Gulf Florida Terminal Company will continue to operate the 2,000,000-cubic-foot cold storage warehouse adjacent to this marine terminal.

Eller & Company has been a licensed stevedore and terminal operator in the port of Tampa for several years, operating at Kreher Terminal, a public dock, and this will be a major expansion of their operation in the port.

Sun Shipbuilding & Dry Dock Names Hartman And Martinson



Frank E. Hartman



Albert M. Martinson Jr.

Sun Shipbuilding & Dry Dock Company recently named Albert M. Martinson Jr. and Frank E. Hartman as general superintendents.

In his new post, Mr. Martinson will be responsible for directing the shipyard's machinery installation, outfitting and heavy machining divisions, and Mr. Hartman will be responsible for directing the shipyard's hull, welding, plant engineering and maintenance divisions. For the present, Mr. Hartman will also continue the direction of the production control division.

Mr. Martinson joined Sun Ship in July 1971. He held the position of chief of the machinery technical section until his present appointment to general superintendent.

Born in Cambridge, Mass., Mr. Martinson is a graduate of Webb Institute of Naval Architecture with a B.S. degree in naval architecture and marine engineering.

He held a number of engineering and naval architectural posts in 17 years with the Dravo Corporation in Pittsburgh, Pa., and was chief marine engineer of the Engineering Works Division when he left the company in 1970. He was then general manager of Matton Shipyard Co., Inc. of Cohoes, N.Y., before coming to Sun Ship in July 1971 as chief of the machinery technical section.

Mr. Martinson is a member of The Society of Naval Architects and Marine Engineers, the American Society of Naval Engineers, and the Marine Historical Association.

Mr. Hartman joined Sun Ship in August 1969 as a guarantee engineer, and in July 1970 he was named general foreman of the Production Planning and Material Control Division, a post he held until his appointment to superintendent of production planning and material control in January 1972.

Mr. Hartman was born in Newport News, Va., and is a 1968 graduate of William and Mary College with a B.A. degree in accounting.

He worked in the nuclear construction and contracts divisions of Newport News Shipbuilding and Dry Dock Company for 10 years before joining Sun Ship. In January 1972, he was named superintendent of production planning and material control.

Mr. Hartman is a member of The Society of Naval Architects and Marine Engineers, and the National Ship Production Committee.

St. Lawrence Seaway Names William Spriggs

William S. Spriggs has been appointed director of operations for the St. Lawrence Seaway Development Corp., according to William H. Kennedy, resident manager at Massena, N.Y.

Mr. Spriggs has been deputy director of operations since June 1972, having joined the corporation in 1958, and subsequently serving in a number of supervisory posts. In his new post, he will be in charge of lock operations, maintenance and marine services.



Frigate "NITEROI" and sister ships
 Owners: Brazilian Ministry of Marine; Builders: Vosper Thornycroft Ltd., Portsmouth; Propellers: Two Escher Wyss Controllable Pitch Propellers. (Drawing by J. Sachse, Hamburg)

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John J. McMullen Names Field To Head Ship Motions Division

Dr. John J. McMullen, chairman of the board of John J. McMullen Associates, Inc., naval architects and marine engineers and consultants, has announced the appointment of Sheldon B. Field as a vice president of the company, in charge of the Ship Motions Division.

Mr. Field will be responsible for

the overall management of the Ship Motions Division which, in addition to conducting technical and engineering development associated with the Flume Stabilization System which controls ships' rolling, also carries out research and development concerning all types of ship motions and sea responses as they apply to conventional ship forms, offshore structures, drilling rigs, mooring buoys, etc.

Mr. Field is a graduate of the

United States Merchant Marine Academy of Kings Point, N.Y., and has done graduate work at Columbia University and Stevens Institute of Technology.

Mr. Field was with McMullen Associates as a vice president until 1969, and in the interim before rejoining the company, he served as a vice president of United States Lines and as assistant to the president of American Export Industries. He is a member of The So-

ciety of Naval Architects and Marine Engineers, a Fellow of the Royal Institute of Naval Architects, and has published several papers in the area of ship motions control. Mr. Field holds a large number of patents in passive tank stabilization.

H.O. Penn Appoints Joseph P. Donnelly



Joseph P. Donnelly

Robert Cleveland Jr., president of H.O. Penn Machinery Co., Inc., has appointed Joseph P. Donnelly the general manager of the Westbury, Long Island, N.Y., based Engine Division. H.O. Penn is the dealer for Caterpillar Tractor Co., earth-moving equipment, industrial electric sets, marine diesels, and natural gas engines in southeastern New York and Connecticut.

Mr. Donnelly will assume full responsibility for all functions of the Engine Division, including sales, parts, and service throughout the company's territory. He has been with H.O. Penn since 1956, first as a sales engineer, sales development supervisor, salesman, and sales manager.

In 1955, Mr. Donnelly received a bachelor of arts degree from Villanova University. He served as lieutenant (j.g.) with the Navy in the Far East.

Yingkei Mok Forms New Orleans Firm Of Naval Architects

A naval architectural and marine engineering firm known as Y.K. Mok, Inc. has been formed in New Orleans, La., by Yingkei Mok, formerly chief engineer of American Marine Corporation of New Orleans.

Mr. Mok, a native of Hong Kong, received a B.Sc. degree in mechanical engineering from the National Sun Yat-Sen in Canton, China, an M.S. degree in mechanical engineering from Ohio State University, and a B.S.E. degree in naval architecture from the University of Michigan.

During the 21 years with American Marine Corporation, Mr. Mok has designed various marine equipment, including offshore submersible drilling rigs, offshore supply vessels, harbor and seagoing tugs, river towboats, oceanographic seismic research vessels, trailer ships, and river and seagoing barges of all types.

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C.Y. Tung Group Acquires Interest In Dart Containerline

Dart Containerline has announced that an agreement has been reached whereby the C.Y. Tung Group will acquire a one-third interest in the Dart international consortium originally organized by the Bristol City Line, Compagnie Maritime Belge and Clarke Traffic Services.

The C.Y. Tung Group's Orient Overseas Container Line is a major containership operator in the Far East/United States and Far East/Europe trade. The association with the C.Y. Tung Group will considerably broaden the container operating and management expertise of Dart Containerline. Two founding members of the consortium, Bristol City Line and Compagnie Maritime Belge, each remain one-third partner in Dart

Containerline. Bristol City Line recently became a fully owned subsidiary of the substantial Bibby group of companies with headquarters in Liverpool, while Compagnie Maritime Belge of Antwerp is an affiliate of Societe Generale de Belgique.

Clarke Transportation Canada Ltd. of Montreal remains the Canadian Dart agent responsible in Canada for the development and the growth of Dart's share in the

Canadian trade. Likewise, the consortium general agency business will continue to be handled by Dart Containerline Incorporated in New York and Chicago for the U.S.A.; by Dart Containerline Limited in Southampton and London for the United Kingdom and Eire; and by Agence Maritime Internationale of Antwerp for the Continent of Europe.

Moore-McCormack Elects Capt. Fennick Senior Vice President



Capt. B.J. Fennick

James R. Barker, president of Moore-McCormack Lines Incorporated, has announced the election of Capt. B.J. Fennick as senior vice president. The company is the ocean shipping subsidiary of Moore and McCormack Co., Inc. (NYSE, Pacific), of which Mr. Barker is chairman and chief executive officer, and whose activities also include Pickands Mather & Co., which operates Great Lakes ore carriers, iron ore and coal mines and acts as sales agent for various materials, and Moore-McCormack Bulk Transport, Inc.

Captain Fennick has served as vice president-operations and a director of Moore-McCormack Lines since 1969. Starting his maritime career as the master of a Moore-mack vessel at the age of 23, he served at sea 12 years and was then made Lines' Port Captain-Pacific Coast.

He is a graduate of the California Maritime Academy in Vallejo, Calif.

Matson Agencies, Inc. Names H.G. Jacobs

H. George Jacobs has been appointed regional manager, agency services, for Matson Agencies, Inc., in southern California, it was announced by G.E. Bart, president.

Mr. Jacobs formerly was a southern California sales representative for Matson Navigation Company, parent company of Matson Agencies, Inc. Matson Agencies serves as general agents for NYK Line in 10 western states, including Alaska and Hawaii.

Mr. Jacobs joined Matson in 1967, after serving with steamship lines in San Francisco, Calif., New York, N.Y., and Hamburg, West Germany. He was Matson's Far East freight operations manager in San Francisco, and later became Seattle, Wash., district representative before being assigned to southern California in 1971.



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Navy Awards Ingalls \$21.3 Million For Work On Nuclear Submarine

A \$21.3-million contract for the overhaul and refueling of the nuclear-powered submarine USS Haddo has been awarded by the Navy to the Ingalls Shipbuilding Division of Litton Industries, Inc. in Pascagoula, Miss.

According to Litton's announcement in Beverly Hills, Calif., this would be the first nuclear-powered submarine it has been assigned for refueling and the seventh submarine for overhaul.

IMODCO Announces Offshore Contracts Totaling \$3.5 Million

New contracts, involving four companies, totaling \$3.5 million were announced in Los Angeles, Calif., by IMODCO, Inc.

President **Robert C. Houser** said these included offshore marine terminal systems for Yacimientos Petroliferos Fiscales, Argentine Government-owned petroleum company; for PEMEX (Petroles Mexicanos); a design and engineering contract for Hess Oil Virgin Islands Corp., and wave and current studies for the Government of India's Engineers (India) Ltd.

The YPF contract is for a Single Point Mooring terminal system to be installed at Caleta Olivia, some 400 miles south of Buenos Aires. Scheduled to become operational next May, it will be located 8,000 feet offshore from a new oil field, with crude to be shipped to the Rio Plata for refining in tankers of up to 60,000 deadweight tons. Caleta Olivia is within a few miles of Commodoro Rivadavia.

The contract marks the second to IMODCO from YPF. Mr. Houser pointed out that in the two years the initial IMODCO-designed and constructed terminal has been in operation at Puerto Rosales, close to Buenos Aires in an area of popular bathing beaches, it has handled more than 700 oil tankers without experiencing a single break or spillage of any kind.

The PEMEX contract, the second from IMODCO within a year from the Government-owned oil company, is for a Single Point Mooring terminal system to be installed offshore from Salina Cruz on Mexico's west coast, 350 miles south of Acapulco. Scheduled for completion and installation by next February, it will serve as a storage depot and distribution point with a four-grade capability—for bunker oil, two refined products, plus dirty ballast water. The earlier PEMEX mooring terminal is already in operation offshore from Tuxpan, some 100 miles south of Tampico on the Mexican Gulf coast.

The design and engineering contract from Hess Oil Virgin Islands Corp., a subsidiary of Amerada Hess Corp., looks to an offshore (SALM) marine terminal at St. Croix, Virgin Islands. Under terms of the award, the stipulated

price will be applied to a construction contract if and when a decision is made to proceed. The marine terminal would utilize the Single Anchor Leg buoy system recently licensed to IMODCO by Esso Research and Engineering Co. It would enable Hess Oil to handle supertankers of up to 500,000 deadweight tons, and thereby eliminate present costly barging operations.

Wave and current studies being undertaken by IMODCO for En-

gineers (India) Ltd. is to determine the feasibility of installing marine terminals offshore from Mangalore on India's southwest coast and in the Gulf of Kutch on the northwest coast.

The Mangalore study is to evaluate whether a mooring terminal could be located 9½ miles offshore from that location, the site of a recent iron ore discovery some 11 kilometers north of Panambur. This is an area of frequent mon-

soon rains, high winds and heavy seas from mid-May to mid-September. Iron in slurry form would be pumped aboard ore carriers along the lines pioneered by IMODCO off the coast of New Zealand during the past two years.

The Gulf of Kutch survey will determine the most logical site for the installation of a Single Point Mooring system incident to the construction of a new refinery in that area by Indian Oil Ltd.



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Tugs Of Arctic Transportation Ltd. Complete 3,700-Mile Trip Towing Barges To Tuktoyaktuk



The tugs Seaspan Commander, Seaspan Navigator, and Seaspan Mariner, all vessels of Seaspan International, Ltd., a member of the consortium, are shown sailing out of Vancouver for the trip to the Arctic.

Three tugs of Arctic Transportation Ltd., recently arrived in the Arctic off Tuktoyaktuk, Northwest Territories, Canada, towing six barges loaded with smaller river tugs and barges for use in Mackenzie River transportation.

Their arrival ended a 3,700-mile trip from Vancouver, British Columbia, that necessitated careful navigation through treacherous Arctic ice.

A team of Arctic Transportation

personnel experienced in Arctic ice reconnaissance, surveyed the ice continually from the air, noting subtle changes in its movement. The ice reconnaissance team maintained constant radio communication with the tug captains, directing navigation of the tugs through the five-mile area of dense ice floes off Point Barrow. Once beyond these ice floes, the flotilla moved slowly toward its destination, watching carefully for submerged



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icebergs that could prove disastrous if struck by a vessel.

The approaches to the western Arctic are very shallow, and from Point Barrow on past the North Slope, Prudhoe Bay and then to Tuk, the maximum allowable draft of any vessel traveling inside the ice pack and offshore is only 16 feet. Transportation in these shallow Arctic waters requires barges and ice-strengthened tugs. Arctic Transportation Ltd. groups the equipment and the experience of three major tug and barge operators, and of a worldwide shipping company. Its partners were already responsible for the delivery of 185,000 tons of pipe and other cargoes into the North Slope and other points in Alaska.

Tonnages to be moved into the western and the eastern Arctic will keep increasing over the years, due mainly to the continued prospecting efforts of the energy and mining industries and the building plans for several oil and gas pipelines. Arctic Transportation Ltd. is convinced that ocean barges will play an important role in Arctic transportation because the barges can navigate through shallow waters, can deliver the cargo onto the beach, and are ideally suited for the carriage of heavy lifts and long-length pipes.

Arctic Transportation, Ltd. is a recently formed Canadian consortium offering a transportation system that will operate from any port in the world to the western Arctic. Northern Transportation, Ltd., an Edmonton-based tug and barge firm, contracted ATL for delivery of its river tugs and barges to the Far North port.

This contract marked the first opportunity for ATL to demonstrate the combined capabilities in Arctic transportation which each of its four member companies have developed from years of experience serving these remote ice-bound areas.

The tugs involved in this initial assignment were the Seaspan Commander, Seaspan Navigator and the Seaspan Mariner, all vessels of Seaspan International, Ltd., a member of the consortium. Their trip through the ice floes off Point Barrow was closely coordinated with a flotilla from Arctic Marine Freighters, which also had to pass through the ice to deliver cargo to the northern Alaska port of Prudhoe Bay. AMF is another Arctic transportation firm which provides service only to Alaska's North Slope.

ATL, whose formation was prompted by the oil and gas activity along Alaska's North Slope and the Canadian Western Arctic, utilizes the equipment and expertise of three established towing companies and a worldwide steamship company. In addition to Seaspan International, Ltd., a long-established Canadian tug and barge firm, the consortium includes Federal Commerce and Navigation Co., Ltd., a Montreal-based shipping company with vessels as large as 33,000-ton bulk cargo carriers; and

Puget Sound Tug & Barge Co. and PAIC, both worldwide towing firms based in Seattle, Wash.

Since 1958, member companies have provided annual transportation of military and commercial cargoes to remote ports in the eastern and western Arctic. In 1970, a fleet of 56 barges and 28 tugs of member companies delivered over 200,000 tons of cargo along the Arctic coastline of Alaska.

Officers of the new consortium are: chairman, **Laurence G. Pathy**, Federal Commerce & Navigation Co., Ltd.; president, **J.C.V. Stewart**, Seaspan International, Ltd.; vice president-marketing, **Michael H. Bell**, Federal Commerce & Navigation Co., Ltd.; vice president and secretary-treasurer, **Edward Judd**, Seaspan International, Ltd.

In addition to its head office in Vancouver, ATL has offices in Calgary and Montreal.

J.G. Flaherty Jr. Joins Nicolai Joffe Corp.



James G. Flaherty Jr.

Wallace Z. Levin, vice president of Nicolai Joffe Corporation, a diversified maritime oriented organization, has announced the association of **James G. Flaherty Jr.** as a member of their Machinery Division, with headquarters in their South San Francisco, Calif., office. Nicolai Joffe Corporation is one of the largest marine machinery suppliers in the United States, selling a complete line of marine engine room and deck machinery as well as offshore drilling, floating and industrial equipment.

Mr. Flaherty graduated from the U.S. Merchant Marine Academy in 1944 and has been active in alumni affairs since graduation. He presently serves as Western Region vice president and is a past president of the San Francisco chapter of the U.S. Merchant Marine Academy Alumni Association. He is a native San Franciscan and a member of The Propeller Club, The Society of Port Engineers of San Francisco, The Marine Exchange, the U.S. Merchant Marine Academy Alumni Association, the National Maritime Council and the Olympic Club.

Before joining the Nicolai Joffe Corporation, Mr. Flaherty was affiliated with Marine Engine Specialties Corporation (California). He advanced through several stages of positions involving responsibility, and at the time of his resignation was their chief engineer.



Artist's conception of tug/supply vessels being built by Todd for Allseas of Panama, Inc. The craft will be 220 feet overall.

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Six new tug/supply vessels (and possibly six more, which are under option by Allseas) will shortly make the scene in the North Sea in support of worldwide offshore drilling and oil exploration.

They represent a breakthrough for Todd's Seattle Division in successfully competing for contracts to build these 8,000-hp craft which have traditionally been built on the Gulf Coast and abroad.

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PACECO LAYS KEEL PLATE: A keel plate was recently laid for Barge 3, a 215-foot by 76-foot by 15-foot derrick barge for Smith-Rice Derrick Barges, Inc. of San Francisco, Calif. The barge is being built by Paceco, a division of Fruehauf Corporation, also the builders of the huge 250-ton capacity revolving derrick crane which will be tub-mounted on the barge. The capacity rating of the barge crane is 250 tons over the side at a 56-foot radius. The rated capacity over the stern is 350 tons. Fitted with a Paceco-designed molded bow for fast towing, the barge is being built to ABS class for full ocean service and can be towed to work in any marine area in the world. The new barge and crane are scheduled to be available for work next summer. **John F. Martin** (left), president and general manager of Paceco, and **E.R. Rice**, vice president of Smith-Rice, are shown as they position the keel plate for the new derrick barge.

Echols And Hewitt Promoted At MonArk Boat Company



Ron K. Echols



Russell K. Hewitt

Two executive promotions have been announced at MonArk Boat Company, Monticello, Ark.

Ron K. Echols, a vice president, has been named production supervisor and manufacturing operations officer for the 14-year-old boat-building firm.

Russell K. Hewitt has been promoted to vice president of sales and marketing, a position Mr. Echols had held for the past two years.

MonArk president Zack McClendon Jr. said Mr. Echols would be in charge of all plant operations with special emphasis on production efficiency and quality control. He said Mr. Hewitt's responsibility would include advertising, sales and product development.

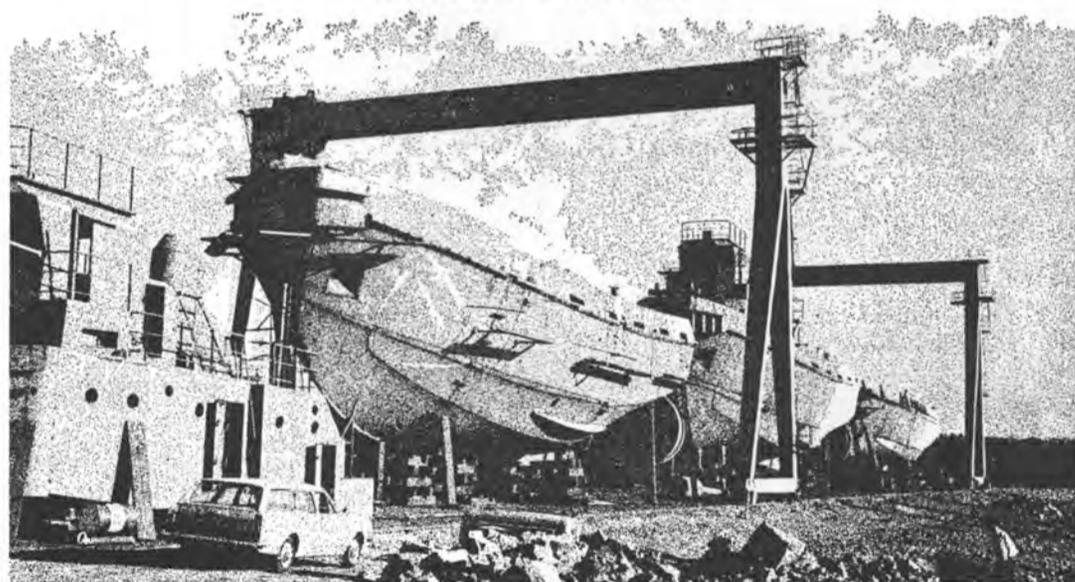
Mr. Hewitt joined MonArk as a district sales manager two years ago and for the past year had served as national sales director. Mr. Echols joined the firm eight years ago as manager of the houseboat and recreational vehicle division.

MonArk was founded in 1959 as a manufacturer of aluminum flatbottom fishing boats. MonArk products now include aluminum sport-fishing boats, runabouts, workboats, commercial boats and canoes, fiberglass fishing boats, aluminum chests and other related marine aluminum products. MonArk has over 700 franchised dealers for its recreational products across the United States.

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Executive Promotions At Central Gulf Lines



Hugo F. Hansen



E.C. Faerber



Dennis F. Hannan



Chris S. Larsen Jr.



Thomas B. Denegre III



Charles L. Rankin

The promotion of seven executives to new corporate staff positions in New Orleans, La., and Houston, Texas, has been announced by Central Gulf Lines, Inc., New Orleans-headquartered U.S.-flag owner and operator.

Central Gulf president Erik F. Johnsen said the new appointments, effective September 1, include: **Hugo F. Hansen**, vice president, with principal responsibilities for the company's \$100-million U.S.-flag LASH program now under construction; **E.C. Faerber**, vice president in charge of the company's Southwest Division, Houston; **Dennis F. Hannan**, executive vice president of Mid Gulf Stevedores, Inc., a Central Gulf subsidiary, with responsibility for all company stevedoring operations in the U.S. Gulf area; **Chris S. Larsen Jr.**, general manager, North Europe LASH Division; **Thomas B. Denegre III**, general manager, LASH Traffic Department; **Charles L. Rankin**, general manager of the Southwest Division, Houston, with principal responsibility for marketing and sales development, and **Austin M. Seay**, general manager of Mid Gulf Stevedores, Inc., Houston.

Mr. Hansen joined Central Gulf in 1965 as resident director of the company's Bombay, India, office. In 1968, he opened a Central Gulf office in Tokyo, Japan, to direct Asian operations and in 1970, he came to New Orleans as director of operations. Earlier this year, Mr. Hansen represented International House as the first member of any trade group in the southern United States to be invited to the People's Republic of China.

Mr. Faerber joined Central Gulf in New Orleans in 1956, he moved to the Houston office of the company as a traffic representative in 1958, and was named manager



Austin M. Seay

of that office in 1959. He has served as general manager of the Southwest Division since 1965. As company vice president in Houston, he will take an active part in coordinating marketing and sales activities.

Mr. Hannan, a native of New Orleans, joined Central Gulf in 1957, and served in the Operations and Stevedoring Departments. He was subsequently named operations manager of Central and since 1970, has served as general manager of the company's LASH Division.

Mr. Larsen is a native of New Orleans and a graduate of Emory University. He joined Central Gulf in 1969. He was named LASH barge dispatcher in 1970, assistant general manager of the LASH Division in 1971, and manager of the LASH Barge Department in 1972.

Mr. Denegre is a native of Biloxi, Miss., and a graduate of the University of Virginia. He joined Central Gulf in 1970, and has held various key positions in the company's Traffic Department.

Mr. Rankin joined Central Gulf in 1972 after serving in managerial positions since 1946 for two other shipping companies. He opened a new office for Central Gulf in Memphis, Tenn., and has been serving as manager of the company's Mid

South Division. He is a native of Brenham, Texas.

Mr. Seay joined Central Gulf in 1970, and has served in the company's Operations and Traffic Departments. He most recently served as West Gulf operations manager in Houston.

An affiliate of Trans Union Corporation, Central Gulf Lines is headquartered in New Orleans, and maintains offices in New York, Houston, and Memphis. The company has agents in all principal world ports.

Bethlehem Beaumont Converting CIMAVI To Drilling Vessel

The CIMAVI TAGKNOT is being converted by Bethlehem Steel Corporation's shipyard in Beaumont, Texas, to a drilling vessel for Storm Drilling Company of Houston, Texas.

Known as Hurricane, this unit is the same class as the drill ships Typhoon and Cyclone. This class of vessel has the capability of drilling in waters up to 600 feet deep.

Installation of a new midship section will increase the vessel length to 380 feet from 338 feet. She will also be widened through installation of 10-foot-wide sponsons on each side of the vessel for 250 feet. This modification will increase the beam to 70 feet from 50 feet.

The Hurricane will be fitted with two Mariner 50-foot cranes, and the mooring system will have four National 4800 double-drum winches spooling 3,250 feet of 2 3/4-inch wire rope and 830,000-lwt anchors.

Resistance to wave motion will be accomplished by installing a McMullen flume system and two roll stabilizers (oversize bilge keels), each 145 feet by 4 feet.

The Hurricane will differ from its predecessors in some respects. For example, the same power source that propels the ship will also be used for the drilling operation.

The single diesel propulsion engine has been replaced with an electric motor drive. The central power system will be three 1,500-kilowatt AC generator systems powered by GM Electro-Motive Division diesels. DC power for propulsion and rig operation will be converted from AC through an SCR system.

Delivery is scheduled for spring of 1974.

Engelhard Offers Illustrated Brochure On Hypochlorinators

A four-page illustrated brochure on CHLOROPAC electrolytic hypochlorinators for shipboard anti-fouling applications in seawater systems is now available from Engelhard Industries. Designed specifically for shipboard use, the unit's "on-board" generating cells are simple, efficient, completely

corrosion-resistant and carry a five-year warranty graded as to period of usage.

For brochure copies, write Engelhard Industries, Technical Service Department, 430 Mountain Avenue, Murray Hill, N.J. 07974.

Arthur Liley Named Gen. Manager WABCO Fluid Power Division



Arthur Liley

The appointment of **Arthur Liley** as general manager of the WABCO Fluid Power Division, Lexington, Ky., has been announced by **R.E. Spaid**, vice president and group executive of the American-Standard Power and Controls Group, Dearborn, Mich., of which the Fluid Power Division is a part.

Mr. Liley has served in managerial positions with Bellows-Valvair in the United States, Canada, and the United Kingdom. He has also served as the Parker-Hannifin Corporation's Canadian sales manager and general manager prior to joining American Standard in 1972. Most recently, he has served as vice president-general manager of American-Standard Industrial Products Ltd., Bramalea, Ontario, another division of the American-Standard Power and Controls Group.

Mr. Liley holds the Certificate of Industrial Management from the University of Toronto. He is active in the Fluid Power Society and the Institute of Directors and has been an executive committee member of the Hamilton Branch of the Canadian Manufacturer's Association. He is a native of London, Ontario.

The WABCO Fluid Power Division manufactures a complete line of pneumatic and hydraulic cylinders, pneumatic valves and related fluid power devices.

Refrigerated Express Appoints T.D. Lombard

Byron Sugahara, director of Refrigerated Express Lines, 17 Battery Place, New York, N.Y. 10004, has announced the appointment of **Thomas D. Lombard** as general manager of the firm. Prior to joining Refrigerated Express, Mr. Lombard was manager of marine operations for Prudential-Grace Lines. Refrigerated Express operates a worldwide service for refrigerated cargoes, with emphasis on trade routes between the East Coast of North America and the South Pacific.

Lufkin Promotes Lyle Carpenter



Lyle Carpenter

Lufkin Industries, Lufkin, Texas, has announced the promotion of **Lyle Carpenter** to the position of assistant to the Machinery Division sales manager.

With Lufkin since 1960, Mr. Carpenter started as a warehouseman in the Odessa office. He was then transferred to the Lufkin office in 1963.

Lufkin Industries' Machinery Division manufactures oil field pumping units and industrial and marine gears.

Marine Index Bureau Names AWO President To Board Of Advisors



James R. Smith

James R. Smith, president, The American Waterways Operators, Inc. since February 27, 1973, has been appointed to the board of advisors of the Marine Index Bureau, Inc., according to the bureau's president, **Bruno J. Augenti**. For 35 years, the bureau has been the only commercial depository for data concerning personnel illnesses and injuries for the American maritime industry. Bureau membership comprises all American-flag steamship owners and operators on the deep seas, practically every operator on the Great Lakes and inland waterways, stevedores, shipyards, the U.S. Navy's Military Sealift Command, the U.S. Maritime Administration, and others whose employees may be described as "amphibious" in the offshore oil industry and affiliated industries. The chairman of the MIB advisory board is **Hubert F. Carr, Esq.**, vice president, Moore-McCormack Lines.

Mr. Smith was appointed Assistant Secretary of the Interior by President **Nixon** in 1969. His responsibilities included serving as alternate to the chairman of the U.S. Water Resources Council and membership on the board of the Electric Power Research Insti-

tute. A native of Sioux Falls, S.D., Mr. Smith received his law degree from the University of South Dakota. The AWO president has also served as vice president and general counsel of the Mississippi Valley Association, now the Water Resources Congress. He is a member of the positions committee of the National Propeller Club of the United States, and of the western rivers committee of the American Bureau of Shipping.

IRD Mechanalysis Opens Sales-Service Center In Houston

IRD Mechanalysis, Inc., 6150 Huntley Road, Columbus, Ohio 43229, manufacturer of vibration and noise analyzers, vibration monitors and balancing machines, has announced the opening of a new Regional Sales-Service Center at 4127 Weslow, Suite 110, Houston, Texas.

This facility, now in full operation to serve industry throughout the Southwest, provides repair and calibration service for all IRD products, start-up service for IRD Monitor installations, application engineering for vibration monitor systems and balancing machines, plant-wide maintenance procedures for noise/vibration control program—including baseline machinery signatures, and assistance in solving emergency vibration and balancing problems.

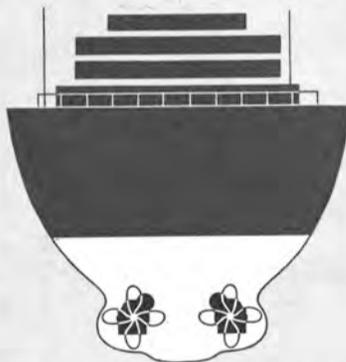


Precision grinding of the 93" diameter, 30" face width bull gear for the Laurentian Forest assures high load carrying ability.

They couldn't stretch the hull, so we shrank the gearing.

The unusual hull design for this new roll-on roll-off ship really put the squeeze on its propulsion machinery.

Two 9000 HP Pielstick diesel engines, made by Crossley Premier Engines Ltd., and their gear re-



The 20,000-ton "RO-RO" Laurentian Forest, built by Port Weller Dry Docks Ltd., St. Catharines, Ontario, for Burnett Steamship Company, will carry newsprint to Europe and return with trucks and cars.

ducers, had to fit into a pair of restricted pods.

And the gearing to reduce the engine output speed from 520 rpm to 110 rpm was specified as Lloyd's Ice Class 1. This meant 25% higher rating—actually 11,250 HP—to withstand propeller shock loading from ice in the North Atlantic.

Conventional "soft gearing" would have required a bull gear 50% greater in diameter—much larger than the available space—or alternately a face-width so extreme that problems of deflection and end loading of teeth would have made the design unsatisfactory.

The solution: Philadelphia Gear Reducers, with case-hardened and ground gearing. The bull gears were the biggest single helical hardened and ground marine gears ever made in this country. But for this application, they were unusually compact; actually, 40% smaller than "soft" gears of the same capacity, because of the extra load transmission capability of hardened and ground gears.

Before you gear up for your next ship, let's get together and reduce the problems. Write Philadelphia Gear Corporation, King of Prussia, Pa. 19406. Or call (215) 265-3000.

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APL Submits Application To MarAd For AML Merger

Announcement of the application to the Maritime Administration for approval of the merger of American Mail Line and American President Lines was made by **Norman Scott**, president of American President Lines, parent corporation of American Mail Line.

According to Mr. **Scott**, American Mail Line will continue to operate its fleet of 10 ships in the trans-Pacific trade through port cities in Washington, Oregon and British Columbia and will function as a division of American President Lines. Ships sailing in the company's Northwest service will continue to operate under the American Mail Line flag. American President Lines operates a fleet of 22 vessels on the trans-Pacific, Atlantic/Straits and round-the-world trade routes, which link

California and the U.S. East Coast ports with the Far East and Southeast Asia.

The merger request is prompted by a need to improve utilization of assets of both companies and to provide more comprehensive service to their customers. "In the case of our two companies," Mr. **Scott** said, "this need is particularly important in meeting the requirements for large investments in facilities and equipment, while also achieving operational efficiencies and customer service benefits through joint use of these investments where common operations occur."

"In addition to resources and facilities," Mr. **Scott** added, "the planned merger will permit a ready interchange of personnel between the two organizations. We also intend to eliminate duplicated or overlapping functions through a reorganization of management responsibilities."

Working relationships with American Mail Line subsidiaries, including Trans-Pacific Steamship Agencies, Ltd. of Vancouver, British Columbia, and Western Stevedoring and Terminal Corporation of Seattle, Wash., are expected to continue.

Goulds Pumps Appoints Two To Key Marketing Positions



Vincent A. Napolitano

John R. Geiger

S.A. **Bunis**, vice president-sales of Goulds Pumps, Inc., Seneca Falls, N.Y., has announced important organizational changes within the firm's sales department.

Vincent A. Napolitano has been named director-international operations. Mr. **Napolitano** formerly had two responsibilities, that of manager of marketing and product planning, and director of international sales. In making this change, Mr. **Bunis** noted the growth potential and growth aspirations in the export markets which Goulds Pumps has experienced.

Mr. **Napolitano** joined Goulds Pumps in 1963 as a sales engineer, and in 1965 became engineering line branch manager for the firm's New York office. Two years later, he was promoted to field sales manager of industrial pumps at Seneca Falls. In 1971, he assumed his former marketing responsibility and later assumed the international sales responsibilities.

Named to fill the manager of marketing and product planning post is **John R. Geiger**. Mr. **Geiger** will be responsible for coordinating the development and marketing programs of new and existing products. He has recently been the company's Chicago office engineering line branch manager.

Mr. **Geiger** joined the firm's engineering line sales group at Seneca Falls in 1959. In 1962, he became branch manager of the St. Louis, Mo., office. In 1966, he became the branch manager of the Chicago office. He has a civil engineering degree.

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3 GRAVING DOCKS AND 2 FLOATING DOCKS—CAPACITIES TO 50,000 DWT. SHIP REPAIR WORK INCLUDES PLATEWORK, PIPING, WOODWORKING, ELECTRICAL AND MECHANICAL WORK.



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24 HOUR PIERSIDE SERVICE

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"ANY OLD PORT IN A STORM, I SAY."

American Ship To Sell Great Lakes Towing

According to John H. Melchior Jr., executive vice president of American Ship Building Co., Cleveland, Ohio, the company has entered into an agreement for the sale of its Great Lakes Towing Co. subsidiary to Trans Commercial Industries, Inc. The transaction has been arranged to fulfill the obligations of American Ship under an agreement reached after extended negotiations with the U.S. Justice Department, which required the divestiture by American Ship of the towing company, the announcement states.

American Ship acquired Great Lakes Towing for approximately \$6.7 million of its convertible preferred stock in June 1972.

The Justice Department action was based on the fact that American Ship's subsidiary operations include Kinsman Marine, a Great Lakes vessel operator having a fleet of approximately 25 bulk carriers.

Great Lakes Towing, based in Cleveland, operates a fleet of 45 tugs, primarily engaged in harbor and lake towing at major U.S. Great Lakes ports.

Mr. Melchior indicated that the terms of the sale will result in a profit to American Ship, but that the transaction will have no material impact on the parent company's earnings.

Delaval Starts Production Of 20-Cyl., 12,500-HP Diesels

Delaval's Engine and Compressor Division, Oakland, Calif., has begun production of the RV Series 20-cylinder diesel or dual fuel engine available for marine use, the company announced.

Producing 12,500 horsepower at 450 rpm, the RV20 is the most powerful diesel designed and manufactured in the United States.

The first two RV20s have been purchased by the municipal utility in Homestead, Fla.

Twelve, sixteen, and now twenty-cylinder RVs are also supplied as marine power plants for such ships as tankers and bulk carriers, passenger ferries, tugs and fishing vessels.

The RV20 uses a modified crankshaft and larger flanges on the outlet shaft to handle the increased torque of the longer engine.

Delaval Turbine Inc. is a manufacturing subsidiary of the Transamerica Corporation of San Francisco, Calif.

John R. Page To Head S.F. Marine Exchange

John R. Page, veteran Pacific Coast steamship executive, has been elected president of the 124-year-old Marine Exchange of the San Francisco Bay Region.

Mr. Page, active in the maritime industry for more than four decades, is president of the Pacific Coast's largest shipping agency, General Steamship Corp., Ltd. A native Californian, born in Alameda, he joined GenSteam in 1934, after three years' experience with the American Pioneer Line. In World War II, he served in the Naval Transportation Service, returning to the company, where he was named executive vice president in 1963 and top officer in 1966.

The Golden Gate service and promotional agency's board of directors also elected Miriam Wolff, San Francisco port director, as first vice president; Lloyd O. Haefner, vice president, Johnson & Higgins of California, as second vice president; and Werner Lewald, president, Transpacific Transportation Co., as third vice president. Kenderton S. Lynch, Pacific Far East Line vice president, was reelected treasurer, and Robert H. Langner, 15-year Exchange staff head, was reelected executive director.

Mr. Page succeeds Edward D. Ransom, part-

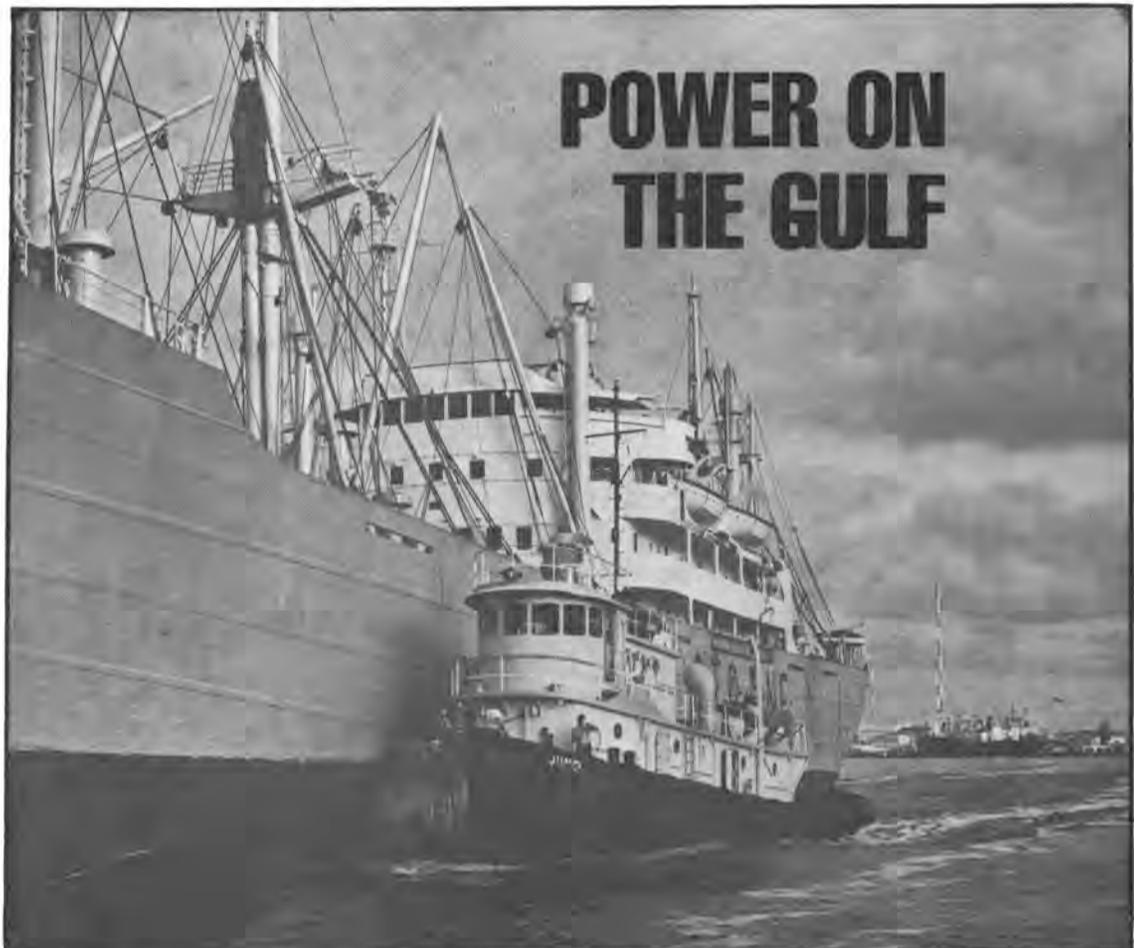
ner of Lillick, McHose, Wheat, Adams and Charles, as chief elected Exchange officer.

Established in 1849 to herald the arrival of Gold Rush sailing ships, the Marine Exchange has since diversified its services and programs, while retaining the key role as the Bay Region's shipping intelligence agency. Serving as secretariat for 11 other maritime and trade organizations, it launched in 1959 a campaign which developed into a national program to cut "red tape" afflicting commerce. Its harbor safety program resulted in establishment of the first Coast Guard radar and computer port traffic regulation system—a \$4-million installation which became operational earlier this year. It also represents all California ports in civil works navigational improvement efforts. A variety of development and promotional programs are also maintained, including publication of references.

South African Yard Names Marine Repair & Construction Sole Agent In United States

Murray & Stewart (Marine) (Pty) Ltd has appointed Marine Repair and Construction Corporation-International, 17 Battery Place, New York, N.Y. 10004, as sole agent in the United States. The announcement was made by Frederick A. Ganter, vice president of Marine Repair and Construction.

Murray & Stewart (Marine) (Pty) Ltd is a member of the Murray & Stewart Group established in South Africa in 1902. The firm has facilities for handling drydocking, classification and special surveys to all classes of merchant and naval vessels, salvage craft, barges, tugs, and tenders. They have mobile squads in all trades, able to attend to work in any part of the world.



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For over 70 years, the Suderman & Young fleet has served the Texas Gulf Coast.

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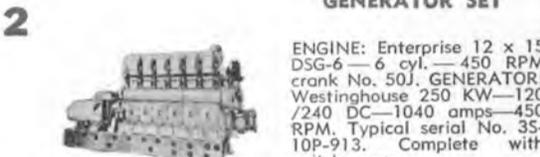
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DIESEL GENERATOR SETS



350 KW DIESEL GENERATOR SET

350 KW—120/240 volts DC—600 RPM—compound wound G.E. generator with switchgear. ENGINE: Ingersoll-Rand—heavy-duty type S—505 HP—10½x12—reconditioned to ABS.



250 KW DIESEL GENERATOR SET

ENGINE: Enterprise 12 x 15 DSG-6—6 cyl.—450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 35-10P-913. Complete with switch gear.

EMERGENCY GENERATOR SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET

With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.



UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET

GENERATOR: Delco 10 KW—120 VDC—83.3 amps—1200 RPM. ENGINE: Superl—diesel—2 cyl.—4½x5¾—15 HP—heat exchanger cooled.



500 KW—120/240 VOLT DC DIESEL GENERATOR SET EQUAL TO NEW

GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8½x10½—air starting—720 RPM. Complete with switchgear. Condition very good. Still aboard naval vessel. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.



300 KW DIESEL GENERATOR SET

ENGINE: G.M. 6-278—6-cylinder—2 cycle—8¾x10½—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators. GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

TURBO GENERATOR SETS



400 KW WESTINGHOUSE TURBO GEN SETS FOR BETH. SPARROWS PT. HULLS 400 TO 4500; QUINCY HULLS 1600

400 KW (500 KVA)—80% PF—1200 RPM—450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA—400 KW—450 volts—641 amps—80%PF—3 phase 60 cycle—1200 RPM—CR 40°—excitation amps 41—excitation voltage 120. Instruction book 5442. Switchgear available.



UNUSED 300 KW—240 VOLT DC WESTINGHOUSE LOW-PRESSURE TURBO-GENERATOR SET

GENERATOR: 300 KW—240 VDC—1250 amps—1200 RPM. GEAR: 5286/1200—frame 6x15—serial 10A-2612-4. TURBINE: Frame C-325—225 PSI—397°TF—5286 RPM—Serial 10-A-2611-4. Wt. 16,700 lbs.—complete in original factory crate.



LOW-PRESSURE UNUSED 300 KW G.E. 120/240 VOLT DC TURBO-GENERATOR SET

GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1—10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.



WESTINGHOUSE 440/3/60 200 KW UNIT

GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse—540 PSI—superheat 322°F. Test 930 PSI 800°TT. Also operate 615 PSI—850°TT.



1250 KW G.E. 10-STAGE TURBO GENERATOR SET

TURBINE: 525—615 PSI—850°TT—7938 RPM—10-stage—type FSN. GEAR: Single helix—7938/3600. GENERATOR: 1250 KW—450/3/60/3600—80 PF—type ATB with surface air cooler. Overload 25%—2 hours—1563 KW.

6 EQUAL-TO-NEW LATE TYPE 500 KW SHIPS SERVICE TURBO GENERATORS



1962—DeLaval. Very little use. Completely preserved with rotors and diaphragms crated separately. TURBINE: DeLaval—585 PSI—840°TT—6-stage—6391 RPM—class CD—Also suitable 440 lbs.—740°TT—25" vac. GEAR: 6391/1200 RPM. GENERATOR: Allis-Chalmers—450/3/60. Totally enclosed, with static exciter and voltage regulator system. Weight 17,665 lbs. Complete with latest dead front switch gear. Also available are the condensers, circulating and condenser pumps. All very up-to-date, compact construction. Turbines will easily handle 600 KW if up-grading is desired.



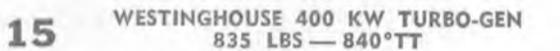
AP2 VICTORY WORTHINGTON-MOORE CROCKER-WHEELER 300 KW UNIT

TURBINE: 440 PSI—740°TT—28½" vacuum—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8½"; B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

UNUSED C-4 CROCKER-WHEELER 300 KW GENERATOR ENDS ONLY 120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

Upgraded by U.S. Navy—rewound in glass. Generator Frame and Armature—Marine 500 KW type 3-1200—dripproof enclosure—base mount. Modified from Crocker-Wheeler generator frame 152HD—240/120 volts DC—2083/521 amps—1200 RPM. Ambient temperatures 50°C. APPLICATION: For C-4-SA1; C4-SA-3; T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10. No pedestal bearing.



WESTINGHOUSE 400 KW TURBO-GEN 835 LBS—840°TT

Newport News Hulls 480—541 Esso ships. TURBINE: Westinghouse 835 lbs/840°TT—9018 RPM—6-stage—instruction book 1430-C1—serial 5A-7090-7 & 8. GEAR: 9018/1200 RPM. GENERATOR: Westinghouse 400 KW—440/3/60/1200 RPM—rewound field—instruction book 5442. EXCITER: 5.5 KW.

TWO 538 KW WESTINGHOUSE T-2 AUX. GENERATORS (COMPLETE)

TURBINE: 538 KW @ 5010 RPM—438 PSIG—750°TT—28½" vacuum. GEAR: 5010/1200 RPM. A.C. GENERATOR: 400 KW 450/3/60/1200—0.8 PF. DC EXCITER: 32.5 KW—120 volts (variable voltage)—shunt—4-pole—DC excitation 5 KW. ALWAYS WELL MAINTAINED BY MAJOR OIL CO.

TURBINES & ROTORS

MAIN PROPULSION

BETH. CLASS—13,600 H.P.

Sparrows Point & Quincy 1600 hulls. H.P. turbine casing only. Excellent blading & labyrinth packing.



H.P. & L.P. COUPLINGS

1 Set—for Beth Class 13,600 HP 4400 hulls and Quincy 1600 hulls.

G.E. 6690 HP @ 7062 RPM HIGH PRESSURE 8-STAGE TURBINE

835 lbs—840°TT—#83341—originally built for Esso Christobol—Newport News.

T-2 TURBINES & ROTORS

20 COMPLETE WESTINGHOUSE T-2 MAIN TURBINE—UNSHROUDED 6600 HP—435 PSI—750°F 28" VACUUM—3720 RPM

Instruction book IB-8345—type D—serial No. 5A-2124-6—unshrouded. Unit complete with all packing, stationary blading, linkage, governors, diaphragms, nozzles, etc. WILL SELL ROTOR SEPARATELY OR COMPLETE TURBINE CASING & ROTOR. Always well maintained by major oil company.

2 COMPLETE T-2 G.E. TURBINES

#61818 and #61834—large Lynn—all stages magnafloxed.

21 ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE Will Sell Rotors Separately

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

Large Schenectady—serial 77418—reconditioned Bethlehem Steel 1970—all stages magnafloxed.

T-2 TANKER UNUSED—4 UNITS AVAILABLE AUX. G.E. TURBO GEN. ROTORS

23 DORV — 325M — 5645 RPM — for 525 KW G.E.

VICTORY SHIP TURBINES & ROTORS

8500 H.P. 8-STAGE TURBINES FOR LARGE VICTORY SHIPS L.P. — 3509 RPM H.P. — 6159 RPM

LP Serial #77943—HP Serial #77942—Interchanges Ingalls C-3—Class 442 & Sun C-4 vessels—U.S. Navy Victory "Liberty".

LP Serial #72272—HP Serial #72271—Interchanges Ingalls C-3—10 boxes of spares.

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H.P.—8-stage—serial 78040
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27 19 STAGE WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

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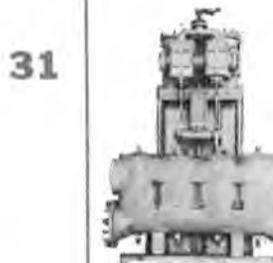
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BRONZE T2 TANKER STRIPPING PUMPS

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lbs. Suction 14" —dis-
charge 10"—steam 2 1/2"
—exhaust 4". Overall
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9'1 1/2"—depth 3'9 1/2"—
wt. approx. 10,000 lbs.



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175 GPM—35 PSIG—10 HP
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—serial E-8619—frame 324
VY—76 amps—mfg. by Elec-
tro Dynamics. With magnetic
control. Excellent condition.



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Allis-Chalmers 6 x 5 pump,
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PSI—3500 RPM. Coppo's tur-
bine type TF-22-2 1/2 — 3500
RPM. 273#—50° superheat.



34 DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

Vertical 2-stage type TDV-10—20 HP—20 GPM @
184'—3" discharge—4" suction—1775 RPM—Mau-
mee Sun. Motor: 120 volts DC—20 HP—1775 RPM.

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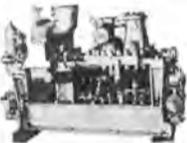
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3-stage—double suc-
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PUMP: 5" Worthington—460 GPM @ 750 PSI
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26.4 lbs HP hr. TURBINE: Sturtevant C-22—
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C-25 CARGO PUMP TURBINE SPARE GEARS

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Farrell-Birmingham — 3200 SHP. REDUCTION
GEAR: 1.81:1—handles two 1600 HP diesels
@ 720 RPM. With hydraulic couplings & Fa-
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reversing. OK for 38D8-1/8 engine.

42 2:67:1 RATIO DOUBLE IN-LINE GEARS

Farrell-Birmingham 3200 HP non-reversing —
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with hydraulic couplings, etc. Will handle two
38D8-1/8 FM diesels. Has Fawick clutch.

43 2100 HP DOUBLE INPUT SINGLE OUTPUT GEARS—3:435:1 RATIO

Farrell-Birmingham — heavy duty — originally
built for 2 heavy-duty direct-reversing engines
—300 RPM—1050 HP each. Ratio 3.435:1.

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Farrell-Birmingham — non-reversing—1600 HP
at 2.4909:1. With hydraulic couplings.

45 ANCHOR WINDLASS

Hyde 2-11/16" — 12x14 — 100 PSI — steam — 54,100
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46 SHARPLESS LUBE & DIESEL OIL PURIFIERS

Type M-34-W22-UM—15,000
RPM. BOWL MOTOR: 2 HP
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3450 RPM—250 to 300 GPH.
Originally built for C-1-A
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20" Ex. inlet—5/8" CU-NI tubes—with or without air
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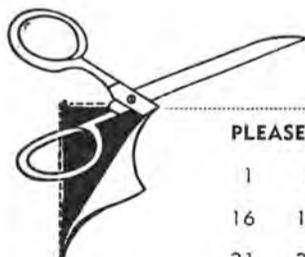


48 UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

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amps—550 RPM—55°C rise. Willcoat centers 47 1/2".
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Centralization Of Shipyard Research Recommended

"The volume and extent of shipbuilding Research and Development programs in the United States are now comparable to or greater than the most extensive such programs abroad."

That is the gist of the April 1973 report on "The Organization of Shipbuilding Research Abroad and in the United States," prepared by the Center for Maritime Studies, Webb Institute of Naval Architecture, for the National Maritime Research Center, Kings Point, N.Y., released last month by the Maritime Administration.

Among other principal conclusions and recommendations:

— Except for the recently inaugurated Japanese "automated yard" program, U.S. shipbuilding research programs "in most respects

cover ground similar to the best foreign shipbuilding research."

— Participation in shipbuilding R&D effort by various industry, Government, nonprofit research and professional organizations is similar to participation abroad.

— Volume of independent U.S., as well as foreign, shipyard R&D appears to be understated in national statistics.

— Degree of private funding in the U.S. "is, nevertheless, not sufficient to maintain an adequate R&D effort without very substantial Government support."

— "A differential in shipbuilding costs exists between the U.S. and foreign countries which is believed to justify continuing Government R&D expenditures, which will contribute to improved productivity and hence reduce subsidies."

— The most productive directions for U.S. shipbuilding research "are, in general, agreed" to be as follows: production-oriented design;

production methods and equipment; marketing; planning and production control; management techniques and personnel problems.

Noting that "foreign shipbuilding research is organized under central coordinating bodies, representing both industry and Government, which serve as points of exchange of information, guidance and, in some cases, provide programming and direction," the report urges U.S. creation of "a senior central group or Shipbuilders' Research Association" with these functions:

- "to work with R&D sponsors"
- "to be responsible for planning and organizing shipyard research"
- "to improve cohesion and coordination"
- "to perform contracting and expediting functions as needed"

Earlier this year, the Maritime Transportation Research Board (MTRB) of the National Research Council, affiliated with the National Academy of Sciences, in the report on "Shipbuilding Research and Development," prepared for the Maritime Administration and Defense Department, concluded that "the shipbuilding industry is far below other U.S. industries in research, expenditures per gross sales" and also recommended through "industrywide sponsorship, establish (ment of) a Shipbuilding Research Center similar to the British Shipbuilding Research Association (BSRA) . . . to serve as a focal point for shipbuilding research and as a source of up-to-date marketing information."

While not disagreeing with the above recommendation, John T. Gilbride, president of Todd Shipyards Corp., and J.J. Henry, president of J.J. Henry Co., Inc., MTRB members, in dissenting opinion, expressed the view that "research and development, per se" will not enhance shipbuilding productivity and stability. Their rationale:

"The emphasis of the report is on directing research toward improving the productivity of U.S. yards, which is alleged to be significantly lower than that of other leading shipbuilding nations. It is the opinion of the undersigned (Gilbride/Henry) that U.S. shipyard labor productivity is as good as the better shipyards in the world for the same types of shipbuilding work. Due to the lack of VLCC construction experience to date in the U.S., labor productivity in the U.S.A. will be lower than in Europe and Japan for the startup period. Furthermore, efforts to improve the productivity of U.S. shipbuilders might benefit from a study of allied U.S. industries, since the work techniques in shipbuilding are not that different from those in many allied American industries. Then, too, since material and components generally represent over 50 percent of a ship's costs, the supplier industries would seem equally important. Against this background, it is our opinion that Government Research and Development funds should not be directed to this area as the highest priority, but rather at ship design, marketing, and areas of related marine technology."

Tarabochia Marine Hydraulics Names Norman Jensen VP

Tarabochia Marine Hydraulics Co., Inc. has announced the appointment of Norman C. Jensen as its vice president of sales and marketing development.

Mr. Jensen is a graduate of the U.S. Merchant Marine Academy, Kings Point, N.Y., and has served as engineer on U.S. Lines, States Marine, Lykes Bros. and U.S. Navy vessels. Prior to joining TMH, Mr. Jensen served as port engineer with American President Lines.

Mr. Jensen will seek to expand the coverage of Tarabochia's services to meet the increasing demand for electrohydraulic repairs and systems modifications on U.S. Navy, and foreign and domestic commercial vessels.

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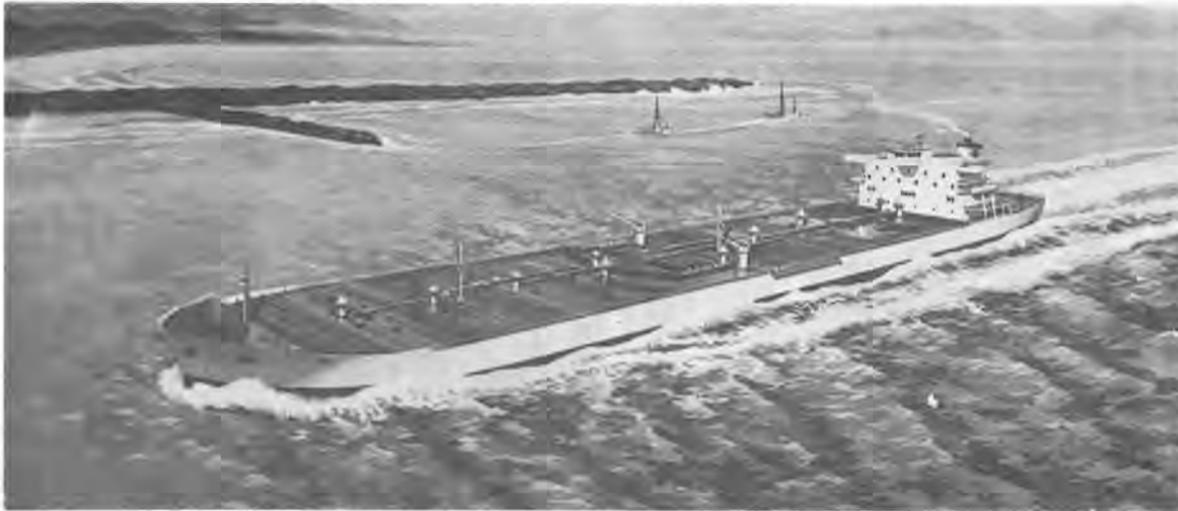
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GE Receives Two Marine Gas Turbine Orders



Artist's concept of Chevron's 35,000-dwt turbine tankers under construction at FMC Marine and Rail Equipment Division.

General Electric Company's Gas Turbine Products Division has received two separate orders to supply marine gas turbines for ships which will be used by Standard Oil Company of California (Chevron), and Union Steamship Company of New Zealand, according to **A.J. Travaly**, manager of GE's gas turbine marine sales.

Chevron, which already has a fleet of three 35,000-dwt gas turbine-powered tankers on order with GE, exercised its option for the fourth vessel. The ships are being constructed by FMC Marine and Rail Equipment Division (formerly Gunderson Inc.), Portland, Ore. This new products carrier will be the same type as the previous ones. A 12,500-hp, Model Series 3002, twin-shaft regenerative-cycle gas turbine will drive an AC salient-pole generator that will supply power to a 12,500-shp synchronous propulsion motor.

Union Steamship will be receiving its second and third GE-designed gas turbine-powered ship with this new order. GE's gas turbine

manufacturing associate in Holland, NV Motorenfabriek Thomassen, received the gas turbine order.

Union Steamship vessel will be a roll-on/roll-off type. Whyalla Shipyard in Australia is where the 12,500-dwt ship will be constructed. This makes five gas turbine ships in Whyalla.

A GE Model Series 5002, rated at 26,000-hp, will drive a generator which will provide power to two propellers. One of the unique features of this ship is the forward-end placement of the propulsion system. This will allow more cargo space and greater accessibility in utilizing the added space.

Mr. **Travaly** pointed out that these two orders bring the total number of commercial ships powered by heavy-duty gas turbines to 10. He also said: "Very soon the first modern GE gas turbine-powered ship will be at sea when Broken Hill Proprietary's Iron Monarch goes into service. The first Chevron ship will probably go into service in 1974. These two new ships will go into service in 1975."

Riley Beard Inc. Receives Maxim Evaporator Contract For Three Large Tankers

Maxim Evaporators recently received a contract from Bethlehem Steel Corporation's Sparrows Point Shipyard to supply one of the largest unfired contaminated steam generators yet for a marine application. One of these generators, with a rated capacity of 110,000#/hr of steam at 145 psig, will be installed aboard each of the three largest oil tankers to be built in any U.S. shipyard to date. Steam will be used to heat the oil storage tanks.

These ships, rated at 265,000 deadweight tons each, will be operated by MFC-Boston Tankers, Inc. Two more ships of this class have been sold to Gulf Oil Corporation, and the contract for another two to Maritime Fruit Carriers Co., Ltd. is pending Maritime Administration approval.

Each generator, which incorporates the Maxim thermal circulation design, is 6 feet in diameter and 24 feet long and will be constructed from carbon steel materials. Heating steam is supplied at 650 psig, and Maxim incorporates a second heating bundle with its own controls to permit efficient operation at low loads. With each generator, a multi-shell multi-tube pass drain cooler/feed preheater will be supplied. This heat exchanger, which is 18 inches O.D. x 21 feet long, will preheat the feed to the generator while sub-cooling the high-pressure steam drains which are returned to the ship's boiler system. All necessary controls are included in the package to provide continuous automatic operation.

Maxim is a trade name of Riley-Beard,

Inc. of Shreveport, La., a subsidiary of The Riley Company. Maxim evaporators, unfired steam generators and silencers are fabricated by Riley-Beard at their giant Shreveport facility.

Elpac Inc. Acquires Towboat From ACBL

Elpac Inc., Houston, Texas, recently acquired the 6,500-hp motor vessel Patrick Calhoun Jr., from American Commercial Barge Lines. The transaction, for approximately \$1,000,000 cash, was handled on a sale and leaseback basis. The new towboat has been added to the Weathers Towing Company, Inc. fleet for operation in the lower Mississippi River and was immediately placed into towing service under a long-term contract.

Weathers Towing of Greenville, Miss., a wholly owned subsidiary of Elpac, is now operating five large towboats on the inland waterway system, with an additional 3,200-hp new boat scheduled for delivery in mid-1974.

Elpac, basically in the oil and gas-marine transportation industries, is traded over-the-counter. The NASDAQ symbol is ELPC.

Norwegian Navy Awards Contract To ITT Mackay

An order in excess of \$300,000 for communications equipment was announced in Raleigh, N.C., by ITT Mackay Marine, a division of International Telephone and Telegraph Corporation.

The equipment, to be supplied to the Norwegian Royal Navy, consists of 100 receivers, Type 3021, for their communications requirements.

Brown & Root Announces Executive Personnel Changes



L.B. Devenney



Tony L. Gibson



Darrell W. Fariss



Billy E. Stallworth

Because of increased foreign marine construction, Brown & Root, Inc. has named two new vice presidents and announced the promotions of two other officers, according to **Herbert J. Frensey**, president and chief executive officer.

The executive changes include the promotions of **L.B. Devenney** to senior group vice president and **Tony L. Gibson** to senior vice president, both in the Middle and Far East Marine Division. Additionally, **Darrell W. Fariss** and **Billy E. Stallworth** have been elected vice presidents of the company.

Brown & Root, a Halliburton Company, is one of the world's leading engineering and construction firms.

Mr. **Devenney**, formerly senior vice president, has extensive international experience, particularly in the Middle East. He has served as vice president of the company's Eastern Hemisphere Marine Division and as construction manager and vice president of Brown & Root Overseas, Ltd. Prior to joining Brown & Root in 1962, he served for 12 years with Aramco Oil Company in Saudi Arabia.

Mr. **Gibson**, an employee of Brown & Root since 1961, was promoted from vice president, Middle and Far East Marine. He has worked as cost and field engineer at Das Island in the Middle East. Advancing through various positions in the Eastern Hemisphere Marine Division, he was manager of sales and estimating before being elected a vice president in 1972.

Mr. **Fariss**, who assumes the position of vice president, Middle and Far East marine construction, joined Brown & Root in 1961. Starting as cost engineer for highway and civil construction projects, he later transferred to the marine department where he gained experience in various operations of the company in the Middle East, London and Great Yarmouth, England. He will transfer from the Houston headquarters to the company's Bahrain office.

Mr. **Stallworth**, who had been serving as senior manager and vice president of Brown & Root (U.K.) Ltd., headquartered in London, becomes vice president-Europe and Africa Marine Division. His background in marine and heavy industrial work includes experience on projects in the United States, Venezuela, Brazil, Paraguay and the Middle East, as well as in Great Britain. His office will remain in London.

Marine Boiler Specifications

The Substantial Advances Made In The Past 10 Years In Marine Boilers Must Be Included In Specifications To Benefit The Shipyard And Owner

R.A. Grams and R. Schoen III*

The problems and concerns that are impacted by boiler design and operation on the owners and operators of ships must be periodically evaluated and the solutions to these problems must be converted into design features. This can only be accomplished by constant re-evaluation and up-dating of marine-boiler specifications.

Of prime importance are the performance characteristics to which the boilers must be designed.

Marine-boiler performance should be specified as being in accordance with the following SNAME publications:

1. T&R Bulletin No. 3-11—Recommended Practices for Preparing Marine Steam Power Plant Heat Balances.

2. T&R Bulletin No. 3-14—Boiler Furnace Performance Criteria.

Adherence to the calculation methods outlined in these bulletins will provide the purchaser with assurance that all competitive offerings are calculated in a comparable manner.

There are a number of performance items worthy of detailed comments. Many of these can have significant effect on the cost effectiveness of the boiler design.

Until the relatively recent past the only specified criterion for furnace sizing was heat release rate or liberation, stated as BTU per hour per cubic foot of furnace volume. A much more significant criterion that has come into recent use at the urging of Prof. J.T. Holm and the boiler manufacturers is firing rate per square foot of radiant heat absorbing surface (lbs. oil/RHAS) familiarly known as furnace loading. This number is directly related to furnace absorption and is an indication of heat load on the furnace and screen circuits as well as furnace exit gas temperatures. We recommend that values up to 15 pounds oil per square foot of RHAS at ABS maximum rating be considered for normal applications. Somewhat higher values can and have been used for merchant units where space limitations have necessitated it. Proper design and location of the burners is, of course, a vital considera-

tion in the design of any furnace. Naval boilers have operated for many years with full-power furnace loadings in excess of 50.

The most important consideration for boilers employing economizers is the proper selection of feedwater temperature. Economizer tube-metal temperature is, for all practical purposes, the same as the water temperature inside the tube due to the extremely high conductivity on the water side relative to the gas side. Thus, at the cold end the tube-metal temperature is the same as the feedwater temperature and is independent of gas temperature. If the feedwater temperature is below the acid dewpoint of the combustion gas, condensation will occur in the form of sulphuric acid.

In order to prevent this from happening the most logical thing is to use high enough feedwater temperature to prevent condensation from forming on the tubes. Our experience has been that we have observed no failures due to external corrosion when burning Bunker C oil when feedwater temperature has been maintained at 270° F or greater. We feel that 280° F would be a preferable minimum in view of the poor quality of many Bunker C oils being burned today.

Another solution would be to reduce the sulphur content of the oil to a maximum of 0.5 percent. The economics of this do not make this approach attractive. In some instances reduced feedwater temperatures have been used with low alloy or cast iron exposed tube surface. These materials can only retard the inevitable corrosion.

Practical attainable boiler efficiency is dependent on the type of cycle used and in the case of an economizer also on the feedwater temperature. The following remarks apply to the three basic types of cycles used:

Economizer-Steam Air Heater—Terminal temperature difference between economizer exit-gas temperature and feedwater at 30° F to 40° F is commonly specified. This results in boiler efficiencies in the range of 88.4 percent to 88.8 percent when using a 280° F feedwater temperature. Efficiency is increased slightly (about 0.1 percent to 0.2 percent) if based on 10 percent excess air rather than the customary 15 percent. It is theoretically possible to make a small further increase in efficiency by reducing the terminal temperature difference. Increases beyond these val-

ues are not practical as the amount of heating surface required becomes prohibitive.

Regenerative Air Heater—Boiler efficiencies up to about 90 percent have been used. However, this means that the average cold-end metal temperature is well below the acid dewpoint of the combustion gas. Corrosion problems can be alleviated by the use of enameled cold-end surface but it must be remembered that a wetted surface is conducive to soot buildup and scheduled water-washing periods will be required. Corrosion does not have as severe an impact as with an economizer as the air heater is not a pressure part. Potential stack corrosion must be considered when chasing after such high efficiency as the gas temperature in the stack will only be about 220° F when considering the air leakage factor in the air heater.

Tubular Air Heater—These have become virtually obsolete due primarily to the extremely large space requirements and their relatively poor metal temperature characteristics. We do not feel that efficiencies above 88.0 percent can be justified with this type of air heater inasmuch as maintenance would become prohibitive.

Substantial savings in cost and size can be made if the purchaser can tolerate an increase in desuperheater outlet temperature and in pressure drop at the design rating. We feel that in many instances this is not investigated. For example, if the desuperheater outlet temperature could be designed for 100° F of superheat and the specifications stated 50° F of superheat, it would have roughly twice as much heating surface as was really necessary. Added allowable pressure drop has a similar effect in reducing heating surface as it allows the use of increased steam mass flow with resultant increased heat-transfer rate.

Present very large crude carrier designs require considerably larger auxiliary steam demands for cargo heating and butterworth. It is possible that if these huge desuperheated steam requirements continue to increase, external desuperheaters may become a necessity.

Along with the economizer, the usual steam-plant cycle would call for a steam air heater. This type of purchased equipment is well standardized and requires little comment. However, we suggest

your heat-balance engineers re-evaluate the need for the air temperature to be within 25° F of the saturated steam temperature supplied as the source of heat for this heat exchanger. Present fuel-oil burning technology is such that a 50° F differential could be tolerated without influencing the combustion characteristics in a furnace. A reduction in steam air heater size would result if this parameter is accepted. The performance characteristics of this equipment are such that at low boiler ratings, when higher air temperatures are desirable for good combustion, the air temperature would be within 25° F of the saturated steam supplied.

Typical Specification

We will attempt to analyze a typical specification and point out several areas that should be evaluated carefully. At the present time, the only document available for guidance is Section 61 of the Maritime Administration's Standard Specification for Cargo Ship Construction. This specification, all too often, is used without modification, to the detriment of the shipyard or ship owner.

Of prime importance at the start of any machinery selection activity is the space allowed for installation. Machinery arrangement plans or at the minimum, box volume dimensions, must be provided. This would assure the prospective buyer in obtaining the most economical physical arrangement of boiler pressure parts.

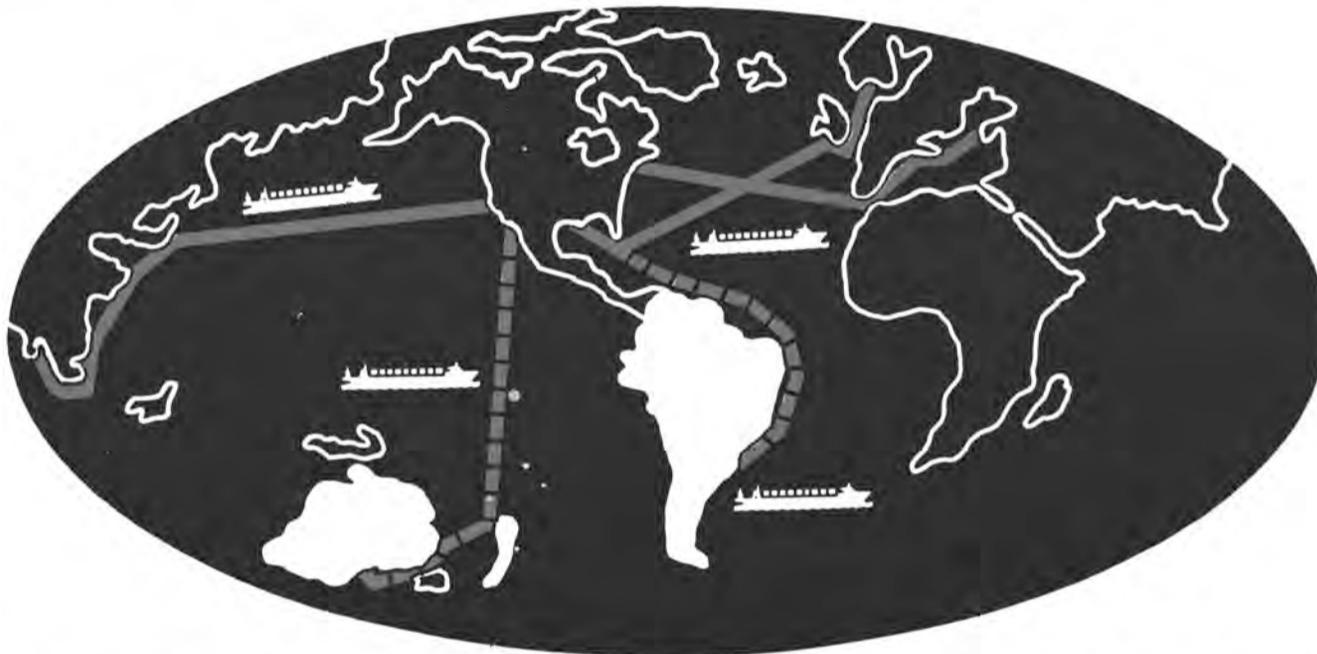
A prevalent misconception regarding boiler design is that external downcomers are a necessity for adequate boiler circulation, particularly in larger capacity units. We have argued against this and believe that internal downcomers should be used whenever possible—that is, to arrange the design to allow the last several rows of generating bank tubes to act as downcomers. In this manner the downcomers are distributed over the full length of the drum. With external downcomers the steam drum is subjected to end flow of water resulting in a water-level gradient in the drum. This gradient is additive to the effects of pitch and roll of the vessel, an undesirable feature from the standpoint of steam-water separation.

Also, external downcomers are relatively expensive and contribute nothing to reducing gas tem-

(Continued on page 34)

*Mr. Grams, manager, Functional Design, and Mr. Schoen, manager, Marine Applications, Industrial and Marine Division, Babcock & Wilcox, Barberton, Ohio, presented the paper condensed here before a meeting of the Joint California Sections of The Society of Naval Architects and Marine Engineers.

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Marine Boilers—

(Continued from page 32)

perature in the boiler. The primary limitation on internal downcomers is operating pressure, due to the reduced differential between steam and water densities as pressure increases. However, there is no question that conservative internally downcomer designs can be made up to design pressures of 1,500 psig and possibly somewhat higher.

Considering boiler pressure parts arrangements, some concern should be noted regarding boiler steam-drum size. With the demand for higher horsepower, it becomes quite evident that as boiler evaporations increase, so do furnace depths and in large boilers with long drums, the effect of trim is indeed severe. Therefore, merely stating the minimum drum diameter shall be 54 inches, no longer is adequate. As a general rule of thumb, boiler evaporations exceeding 120,000 pounds of steam per hour, should be fitted with 60-inch nominal diameter steam drums. Likewise, boilers in excess of 200,000 pounds of steam per hour should be fitted with 66-inch nominal diameter steam drums.

Boiler-bank configurations are fairly well standardized. However, waterwall arrangements should be specified in some greater detail. Tangent tube installations should be defined as tubes with $\frac{1}{4}$ inch or less clear space between adjacent tubes. Membrane-wall construction can be considered as an equally acceptable alternative. The firing wall or front wall could be constructed non-tangent if the specification called for high-grade refractory backing. As regards water-cooled burner throats, for front-firing arrangements, this could be considered an excessive requirement. However, for top-fired boilers, recent service feedback indicates that in order to minimize burner throat refractory replacement, water-cooled burner throats should be specified.

Regarding superheater arrangements, perhaps now is the time to correct a popular misconception, i.e., the cleanability of a vertical superheater arrangement versus a horizontal superheater arrangement. Cleanability is a function of fuel, type of atomization, tube material and gas temperatures. There is no significant advantage to either a vertical or horizontal arrangement with regard to cleanliness.

However, care should be taken when deciding on the superheater arrangement to be used, for as boiler sizes increase so do furnace depths. With extremely deep furnaces, horizontal superheater support problems arise and space for removal of superheater elements becomes excessive.

Slagging and corrosion potential is a function of gas temperature and the tube-metal temperature as well as the type of fuel ash characteristics. Therefore, based on our operating experience and test data we agree that a tube-metal temperature of 1,050° F is a safe operating limit.

Recently, several owners have required the inclusion of a means of monitoring gas temperatures in way of the superheater, during boiler lite-off. A well-proven operating procedure in industrial and stationary practice, this may prove a significant requirement in the future for marine applications. At a relatively low extra cost, each boiler could be furnished with a retractable thermoprobe, fitted with alarms and/or recorders for monitoring gas temperatures during lite-off. Maximum oil-firing rates during start-up could then be established safely and superheaters would not be subject to over firing at extremely low steam-flow conditions.

We do not agree that there should be a cutoff point, based on 850° F steam temperature, below which superheater tubes in the same superheater, should be rolled into superheater headers. We believe modern marine boiler superheaters should have all superheater tubes welded in a manner approved by the Coast Guard.

Reports from owners indicate superheater header handhole plate leakage to be a significant maintenance item. We therefore suggest that future specifications indicate welding of these handhole plates for 1,100 psi design pressure units and certainly for design pressures in excess of 1,100 psi.

Material selection for submerged-coil desuperheaters for supplying auxiliary steam, based on inlet steam temperature levels in existence today, (900° F to 960° F) requires a re-evaluation of potential corrosion problems. Tests of various low alloys up through Croloy 5 have shown very little, if any, improvement in corrosion resistance relative to plain carbon steel. At the present time, the only material with a proven record of superior corrosion resistance in high-temperature desuperheaters is 16-1 chromium-nickel alloy (ASTM 268 TP 430). This is a premium material which will significantly reduce the corrosion problem and should therefore become a boiler requirement.

The superheat control desuperheater can be easily located interpass in the superheater, such that its material can be specified as carbon steel.

We suggest that air-cooled thermal sleeves be the only method employed for inlet connections. Outlet connections should be fitted with steam cooled sleeves. Under no circumstance do we recommend water-cooled thermal sleeves.

We take exception to designing desuperheaters for full boiler pressure and suggest a more realistic approach of designing for differential pressure.

In designing any piece of heat-recovery equipment for use in high-efficiency applications, thought must be given to the prevention of condensation of sulphur-laden flue gases. When the uptake gas temperature and heat-transfer-metal temperature relationship is such that condensation takes place, rapid

soot buildup and corrosion of this tube metal occurs. Therefore, an acceptable metal temperature should be maintained in order to minimize corrosion. When designing an economizer the proper selection of feedwater temperature is important and the feedwater inlet temperature must be kept above the acceptable metal temperature since the tube itself is very close to the feedwater temperature.

We maintain the use of cast iron as not being satisfactory for corrosion protection as any protection offered by cast iron is due to its mass rather than superior corrosion resistance. The Bureau of Mines Report of Investigation No. 4996, dated August, 1953 contains data on corrosion resistance of various materials in a flue gas atmosphere. The report states that "the corrosion rate of cast iron was about $4\frac{1}{2}$ times that of Corten and $2\frac{1}{2}$ times that of ordinary open-hearth steel, an unexpected result."

Increasingly more apparent, as the size of boilers increases, is the duty imposed on the heat-recovery equipment. Economizer sizes are such now that strong considerations should be given to mounting this equipment separate from the boiler. Space available in the fidley area of most vessels makes this arrangement very attractive. The economizer completely assembled and air encased could be set easily and conveniently on ship structures at minimum costs.

An alternate to the economizer-steam air heater cycle is the regenerative gas-air heater cycle. The ability of the regenerative air heater to operate at lower metal temperatures than other types of heat-recovery equipment results in additional heat removed from the exit gas. This heat is transferred to the combustion air and complete combustion is more readily accomplished. When the air temperature increases, the combustion process accelerates and this process can be carried out with less excess air. If the excess air is reduced, the exit gas volume and, therefore, the heat losses are lower. Thus the efficiency of the overall boiler cycle can be increased by virtue of the lower exit gas temperature. However, great care should be exercised in establishing the designed efficiency so that the cold-end transfer surfaces are not placed in danger from the acid-corrosion phenomena.

Of major importance in any boiler design is the assurance of gas tight integrity of the boiler casings. Assurance of this gas tight integrity can only be afforded by employing double casings around the boiler. Regardless of type of construction, i.e., tangent tube or membrane wall, we strongly recommend the entire boiler be double case and pressurized. In order to attain 130° F outer casing temperature, a good circulation of cooling air must be provided external to the casings by the ship's ventilation system. An air velocity of three feet per second over the casing must be provided.

Liability considerations are such

that insistence on complete double-cased boilers is essential.

Mountings or boiler appurtenances are generally items that are clouded with confusion during the specification stage of any boiler negotiation. It is suggested that the industry standardize on what might be called a "normal scope of supply" furnished by the boiler manufacturer. This normal scope of supply would include safety valves, soot blowers and water gages, only. Other mountings as necessary could be purchased directly by the shipyard or ship owner at somewhat less cost.

A well-written specification should also include at this stage a well-defined list of equipment to be supplied by the boiler manufacturer as well as a list of equipment to be supplied by the shipyard or ship owner.

As in the case of some mountings, we feel boiler controls such as feedwater regulators, combustion controls, steam temperature controls and fuel-oil burner-management systems should be negotiated directly with control suppliers. With minimum engine-room manning and bridge control as a requirement, it is suggested that a complete package from a one source responsible supplier be investigated.

As a result of the poor grades of fuel available to the marine industry, we feel that furnace refractories should be considered in more detail. We recommend that boiler designs with spacing between adjacent furnace tubes of $\frac{1}{4}$ inch or less, PCE-33 refractory material be specified. We further recommend that designs with $\frac{1}{4}$ inch or more clear spacing between tubes and in all areas of exposed refractory, PCE-34 material be specified.

Of recent interest is the subject of stringent rules on working conditions when installing asbestos-bearing materials, imposed by the Government's Occupational Safety and Health Administration (OSHA). Many shipyards have now decided that the restrictions on the procedures used when handling asbestos-bearing materials are so difficult to comply with, that the preferable course is to eliminate asbestos-bearing material entirely. We agree with this decision and suggest that insulation specifications be revised to reflect this change.

Fuel-oil burner specifications appear to us to be adequate. However, we wish to point out that with any wide-range, internal-mix, steam-atomizing burner, it is available to start up with steam or compressed air atomization in use, rather than straight mechanical. Straight mechanical adaptation should be employed for emergency use only.

It is an objective of all design engineers to identify and measure those areas of the steam-generating system that are responsible for maintenance expense. Once identified, it is then incumbent upon the boiler design engineer to improve the situation.



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ARMCO STEEL



Bath Iron And Maryland Ship To Install Key Houston, Inc. New Concept Blasting System

A new concept that is resolving an old problem has gained Key Houston two contract awards from major East Coast shipbuilding firms.

The total \$650,000 worth of contracts for Key Houston, Inc., 1231 Shadowdale, Houston, Texas, is for equipment being installed in \$3-million worth of all-weather facilities at Bath Iron Works shipbuilding yards at Bath, Maine, and the Baltimore yards of Maryland Shipbuilding Company, a division of Fruehauf Corporation.

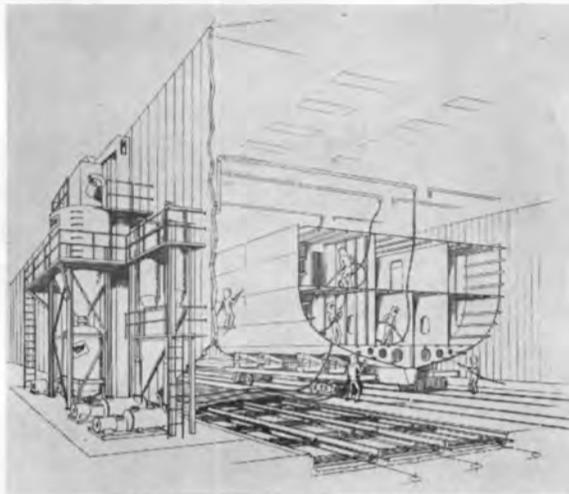
The Final Blasting Facilities System, as designed by James A. Giese, president of the Houston Manufacturing Company, is housed in a totally enclosed building about the size of a football field. A section of a ship is moved into the building and the section is then more easily blasted and coated.

The concept is quite simple, according to Mr. Giese. It incorporates a shallow subfloor as a feature element of its design, which Key has patented in the United States and 27 foreign countries. With the new concept, the shallow subfloor has only a slant at the sides. A rubber slide sweeps the shot to a conveyor and the material is quickly reclaimed. The abrasive material is shot, collected, processed, classified and readied for re-use in 90 seconds, all mechanically.

The importance of the new concept is that the enclosed facility permits continuing production even in the most inclement weather. Conventional blasting equipment had to be used outdoors, and in cold or rainy weather

production had to be shut down with subsequent production work delayed. According to Mr. Giese, the economic advantages in the factor alone are enough to warrant the installation of the system.

In addition, the facility offers ecological benefits since it greatly reduces the kind of pollutants that are emitted in open-air operations.



The system for blasting and coating is housed in a totally enclosed building. The abrasive material is reclaimed and readied for re-use in 90 seconds, all mechanically.

Key Houston, Inc. manufactures a full line of industrial blasting equipment with special emphasis on the marine industry. Its units are in use in most of the major shipyards in the United States. Several other yards are reportedly negotiating with Key for comparable systems. In Europe, Key Houston's subsidiary Key Europe is negotiating for several major facilities in Spain and Portugal.

U. Of Mich. Offers Course On Fluid Flow Considerations For Land And Sea Transportation

The University of Michigan, College of Engineering, is offering a course on "High Speed Land and Sea Transportation, Fluid Flow Considerations" on October 18 and 19, 1973.

The fee for the course is \$125, and it will be held at Chrysler Center, North Campus, The University of Michigan, Ann Arbor, Mich. 48105.

The special fluid and aerodynamic problems of high-speed land and sea transportation will be covered in this course. Fluid-dynamic effects are the principal causes of drag for both land and sea vehicles and also provide lifting forces. Propulsion systems suitable for high-speed transportation will also be included.

Midland-Ross RPC Div. Moves Marine Office To Port Chester

The RPC Division of Midland-Ross Corporation has moved its marine sales office from New York, N.Y., to 11 Rye Ridge Plaza, Port Chester, N.Y. 10573.

The office is responsible for sales of container handling and securing devices and other marine equipment.

Texas Transport & Terminal Names New Baltimore Manager

William L. McCollough has been appointed manager of Texas Transport & Terminal Co.'s Baltimore, Md., office, the company has announced. He will supervise the steamship agency's activities concerning Yamashita Shinnihon Line at Baltimore.

LGA



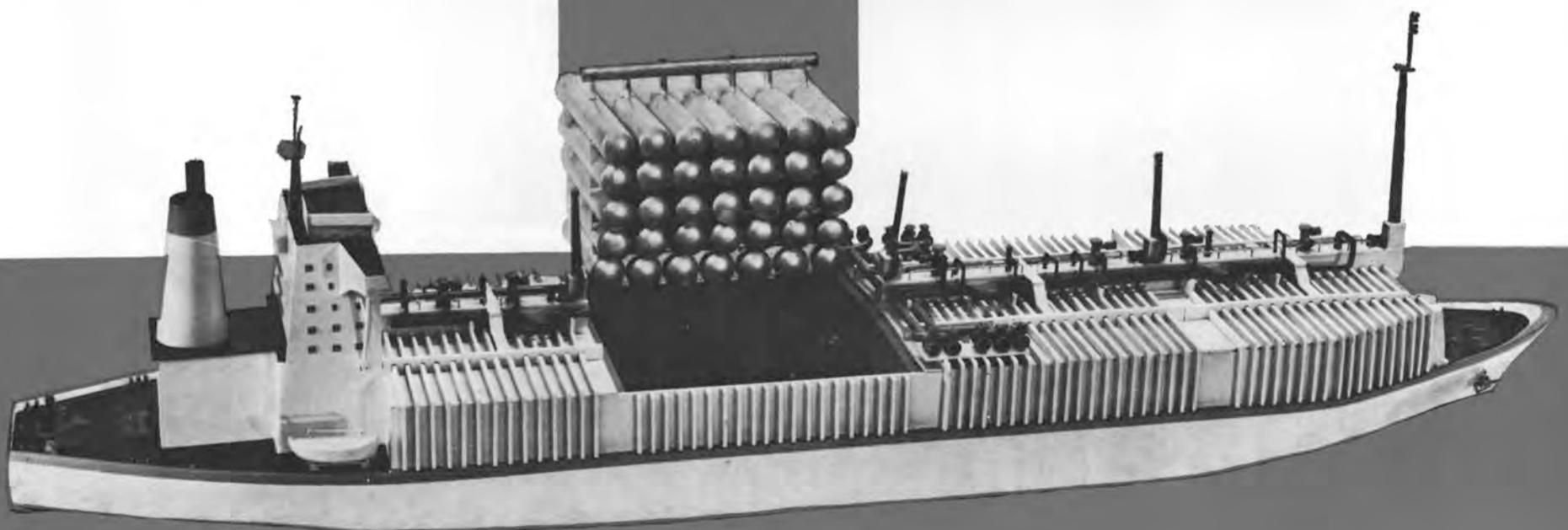
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The Gerber 1275 system duplicates hull lines, surface shapes and lofting contours, enabling the architect to "see and change" as he designs.

Once the design has been fixed, the 1275 develops hull plate layouts, generates and verifies NC tapes for cutting before a single sheet of steel is ordered or cut. The 1275 even duplicates burner operations, including torch characteristics and locating of on/off stations.

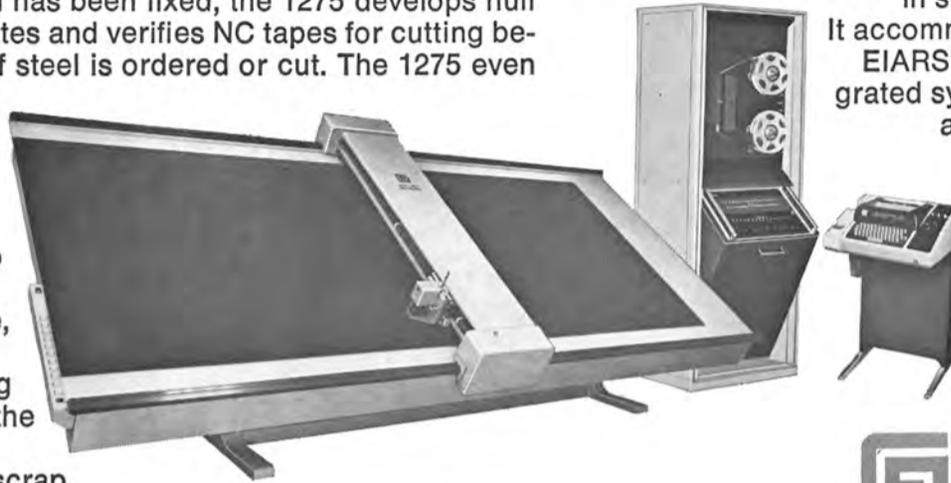
The Gerber ship shaper can drastically reduce lead time, produce substantial savings by increasing accuracy, speeding the cutting of plates and parts, and reducing scrap losses to a minimum.

In addition, the Gerber 1275 system can operate as remote job entry terminals, enabling ship builders to keep the entire job in house.

The Gerber 1275 system includes a series 1200 computer control and a Model 75 automatic drafting table, available in sizes from 5 x 8 feet to 8 x 24 feet. It accommodates all ESSI, EIA, ASCII and EIARS 244 formats. And the entire integrated system is designed, manufactured and serviced by Gerber Scientific

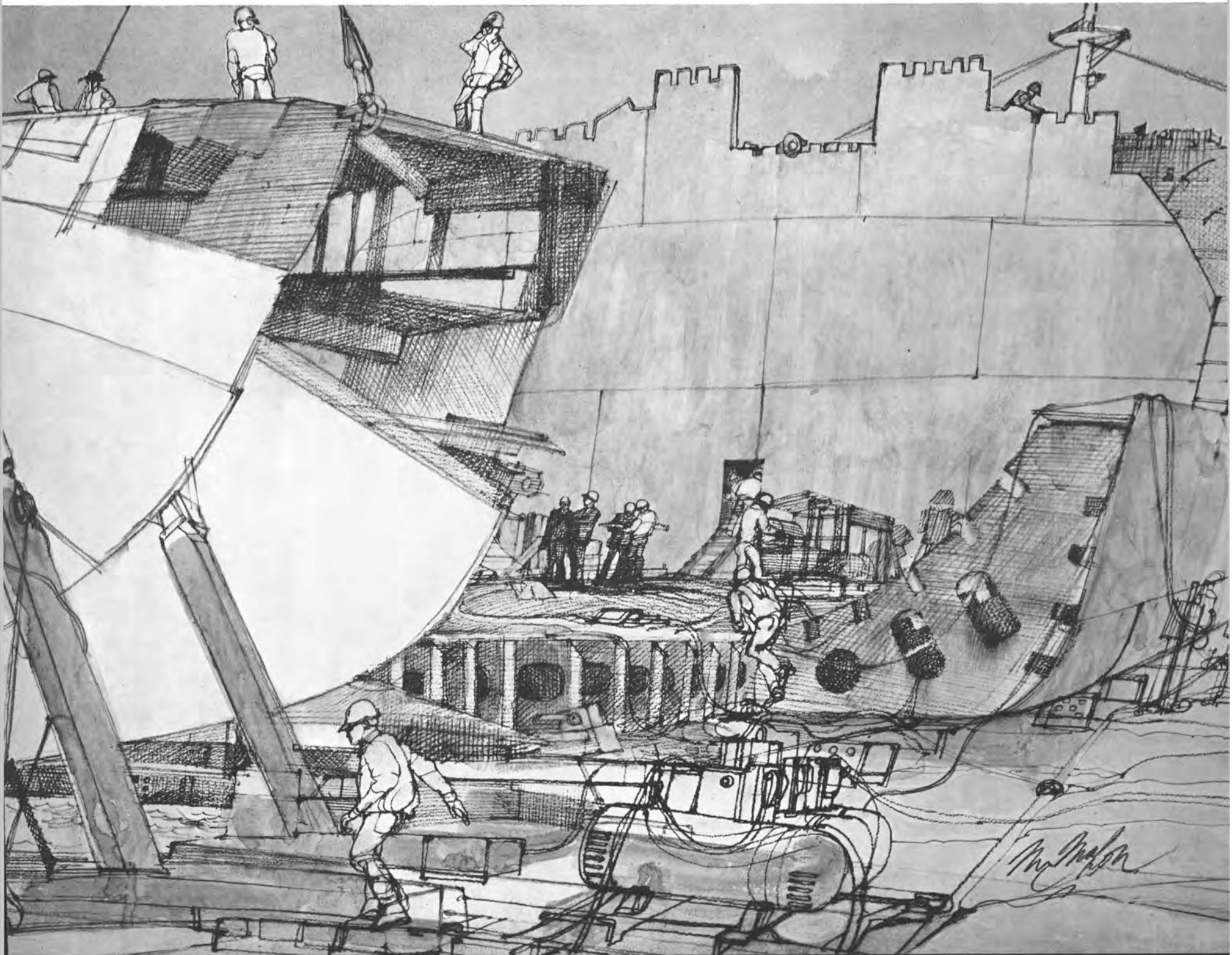
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Propeller Club Presents Liberty Ship Model To Robert J. Blackwell

In a brief ceremony on August 2 in Washington, D.C., a 5-inch Liberty Ship model was presented to **Robert J. Blackwell**, Assistant Secretary of Commerce for Maritime Affairs, by The Propeller Club, Port of New York.

Mr. Blackwell's wartime prede-

cessor, Adm. **Emory S. Land**, ordered the construction of over 2,700 Liberty Ships during World War II. The American merchant marine, now in a time of peace, is being revitalized by means of the largest construction program since the wartime effort. Capt. **Adrian P. Spidle**, president of The Propeller Club, Port of New York's governing body, directed that Mr. **Blackwell** receive the first produc-

tion model of the famous World War II Liberty Ship as recognition of his continuation of the job of building the ships our country needs.

The model presented to Mr. **Blackwell** is an authentic 5-inch Liberty scale model. Each model produced contains a trace of steel from an actual World War II Liberty Ship. The project is a fundraising effort for the Hall of Ameri-

can Maritime Enterprise.

The Hall of American Maritime Enterprise, to be located in the Smithsonian Institution, will be a tribute to our nation's seafaring heritage. It will contain exhibits portraying our country's maritime history from the days of the earliest settlers down through the present, and continuing on to projections of a dominant future position in world trade through the promulgation of President **Nixon's** maritime programs. The Hall is expected to be completed in 1976 to coincide with the bicentennial celebration.



Capt. **Thomas A. King**, left, is shown presenting the 5-inch Liberty Ship model to **Robert J. Blackwell**, Assistant Secretary of Commerce for Maritime Affairs.

Three variations of the Liberty Ship model are being offered by The Propeller Club, Port of New York in return for donations to the Hall: 5-inch Liberty Ship model, \$7.50; 5-inch Liberty Ship model on wood base, \$10, and 5-inch Liberty Ship model in lucite, \$13.

Donations will be received at the office of The Propeller Club, Port of New York, Room 3740, 26 Federal Plaza, New York, N.Y. 10007. Add 50 cents to cost for handling charges.

Overseas Enterprises Opens Branch Office In Savannah, Ga.

Thomas A. Ewig, executive vice president of Overseas Enterprises, Inc., has announced the opening of their Savannah office at P.O. Box 1646, Savannah, Ga.

Jim Brinson has been named director of container sales (South Atlantic) and will handle all sales pertaining to Sea Containers Inc., a leading worldwide leasing company specializing in containers, chassis, specialized equipment, containerships and container crane rentals.

At the same time, it was announced that **Bernard LiCausi** joined the firm's New York office as director of chassis operations, and **Carmine D'Amato** was nominated to director of accounts receivable.

Overseas Enterprises, Inc. also maintains its own office in New Orleans and counts among its representations the Great Lakes Transcaribbean Line, Deutsche Africa Linien, Ozean/Stinnis Linien, (Mexico Service), and Sea Striders Ltd. of Hamilton, Bermuda.

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Quincy Compressor Division Of Colt Names Herb Rhees



Herb Rhees

Herb Rhees has been named sales manager-industrial compressors for the Quincy Compressor Division of Colt Industries, Quincy, Ill. He will be responsible for sales of all reciprocating industrial compressors ¼ hp through 125 hp, and helical screw compressors 30 hp through 300 hp. He will also supervise industrial sales to distributors and OEM accounts through district representatives.

Mr. Rhees is a native Oklahoman, and graduated from the University of Oklahoma with a B.S. degree.

W.E. Adams Is New Riley-Beaird President



W.E. Adams

W.E. Adams has been promoted to president and general manager of Riley-Beaird, Inc., Shreveport, La. The announcement was made by Howard C. Warren, chairman of The Riley Company of which Riley-Beaird is a subsidiary. Mr. Adams succeeds D.J. Newell, who resigned.

Riley-Beaird, Inc. is a major manufacturer of capital equipment for the energy and process industries and heavy equipment manufacturers, along with proprietary equipment which includes Maxim silencers and desalination equipment.

Mr. Adams received his B.S. degree in industrial science from LeTourneau Technical Institute, joining the company in 1957 as an industrial engineer. Mr. Adams has had wide experience in heavy metal manufacturing and machining. He was vice president Government products sales in 1968, vice president marketing in 1972, and executive vice president in early 1973.

Gotaverken Orders Largest Floating Dock From Polish Shipyard

The Polish shipyard Gdanska Stocznia Remontowa has been entrusted with the construction of the world's largest floating dock to form part of Gotaverken's expanded and modernized ship repair yard at Gothenburg. The virtually new repair yard, in which approximately \$72,000,000 will be invested by 1975, will have four floating docks and one graving dock.

With a lifting capacity of 55,000 tons, a length of about 951 feet and a clear width between the walls of about 180 feet, the new floating dock will be able to accommodate ships up to 200,000 deadweight tons—the biggest that can enter the Gota River. Unusually powerful cranes, including one capable of lifting 180 tons, are among many design and equipment features intended to ensure a fast and efficient execution of tasks such as major machinery and hull repairs, as well

as routine bottom paintings. Special arrangements are being made to facilitate rudder and propeller work.

The design of the dock envisages much more extensive use of prefabricated hull sections in ship repair work.

The order was placed with the Gdansk yard through the state agency Navimor Foreign Trade Enterprise. The dock will be built to Lloyd's Class A, and is scheduled for delivery in early 1976.

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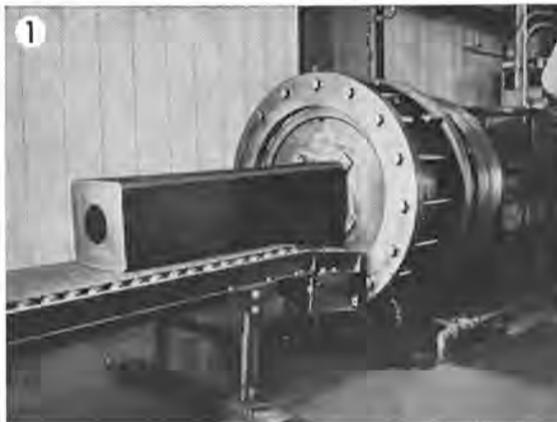
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Brochure Describes Crane Weight Indicator With Automatic Alarm

The Markload Load Moment Crane Indicator announces a new approach to a crane weight indicator system with a fully overload alarm. An analog computer is programmed for operation variables such as boom length and out-

rigger position. This data is stored in a removable plug-in cartridge called a Data Plug. Several Data Plugs can satisfy expected operating configurations. The complete system sells for approximately \$5,000.

A brochure of this new system is available from Mark Products, 10507 Kinghurst Drive, Houston, Texas 77072.

London Shipbrokers Publish Annual Series Of VLCC Reports

The eighth of its annual series of very large crude carrier (VLCC) reports has been published by E.A. Gibson, Ferguson and Wild, London shipbrokers.

The report lists every tanker and ore-oiler over 175,000 deadweight

tons already in service or on order around the world. Its various sections break down all major oil companies, independent oil companies, and privately owned tonnage by name and builder.

For the privately owned tonnage, all long-term charters and redelivery dates are noted and taken into account in a section devoted to VLCC availability between 1973 and 1980.

Copies of the report can be obtained from the Research and Development Department of E.A. Gibson, Ferguson and Wild (Shipbrokers) Ltd., P.O. Box 278, Remington House, 61-65 Holborn Viaduct, London.

G.W. Gladders Towing Appoints Simpson VP



William S. Simpson

William S. Simpson has been appointed vice president of G.W. Gladders Towing Company, Inc. according to an announcement by Thomas L. Gladders, president.

In his new position, Mr. Simpson will continue as operations manager and be responsible for personnel, purchasing, repairs, maintenance and other operational areas.

Mr. Simpson has been with the towing corporation for nine years. Headquarters are in St. Louis, Mo., at 230 South Bemiston.

United States Lines Names Edward R. Kroh For Port Of Savannah

Edward R. Kroh has been named owner's representative for United States Lines for the port of Savannah, Ga., it was announced by James P. Rafter, vice president, Eastern Division of the container-ship company.

Mr. Rafter added that sales activities would continue under the direction of B. Richard Field, account manager for Savannah.

Most recently, Mr. Kroh had served as manager of container operations for the company in Baltimore, Md. He joined United States Lines in 1958 and was appointed marine superintendent in Baltimore five years later.

Mr. Rafter said the company was increasing its personal customer services in Savannah because of accelerated traffic through that port to and from the southern states.

Hohenstein Shipping Co., at 124 West Bay Street, is the agent for United States Lines in the port.

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ITT Mackay Marine Appoints E.A. Tucker



E.A. Tucker

The appointment of **E.A. Tucker** as sales representative Atlantic Region was announced in Raleigh, N.C., by **Edward A. Engebretson**, general sales manager of ITT Mackay Marine, a division of International Telephone and Telegraph Corporation.

Mr. Tucker will be responsible for commercial and military sales. Previously, he was with Technical Materiel Corporation in Mamaronck, N.Y., as assistant vice president. He is a commander, retired, of the U.S. Navy.

Mr. Tucker has an extensive background in U.S. military and NATO communications systems.

Three Appointments To Key Positions At Zapata Exploration Co.

Zapata Exploration Company (ZAPEX), Houston, Texas, recently named three men to key operational positions. **Donald S. Hare** is vice president, drilling and production; **Carle F. Sharp Jr.**, chief engineer; and **Walter H. Speckhard**, chief geophysicist.

ZAPEX's drilling and production activities are managed by Mr. Hare. Prior to joining ZAPEX, he was vice president-drilling and production with both Pauley Petroleum in Los Angeles, Calif., and Belco Petroleum in Houston. He is a graduate of the University of California at Berkeley, with a bachelor of science degree in petroleum engineering.

Mr. Sharp assists Mr. Hare, providing engineering staff support and direction in drilling and production operations, particularly in the areas of planning, budgeting and economic analysis. Before joining ZAPEX, he was a private consultant in petroleum engineering. Previously, he was associated for 16 years with Exxon Corporation. He is a graduate of the University of Texas, with a degree in petroleum engineering.

Mr. Speckhard brings an extensive background in geophysics to ZAPEX. Prior to joining the company, he worked as an independent consultant in all phases of exploratory drilling ventures. Previously, he worked for eight years at British American Oil Products Company in an exploration management position. A graduate of the University of North Dakota, with

a bachelor of science degree, Mr. Speckhard also holds an M.B.A. degree from the University of Houston.

Zapata Exploration Company, a publicly held subsidiary of Zapata Corporation, was formed in 1972 and currently has interests in a total of 13 blocks totaling approximately 14 million gross acres in the North Sea, offshore Sicily and offshore Malagasy.

Union Mechling Opens New Houston Office

Union Mechling Corporation announced that its Houston, Texas, sales office will now be located in the Park Tower South at 1333 West Loop South, in Suite 1174.

Staffing the office will be **James A. Casey**, regional sales manager; **Dennis L. McColgin**, assistant manager-sales, and **Arch H. Sneed**,

who will specialize in heavy lift sales throughout Union Mechling's service area.

Handling operations will be dispatchers **Bruce A. Mechling** and **Arthur St. John**.

A subsidiary of Dravo Corporation, Pittsburgh, Pa., Union Mechling provides barge transportation services on the Mississippi River System and the Gulf Intracoastal Waterway.



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Hudson/Penco Division Publishes Brochure On Zero-Leakage Valve

A patented check valve that has a zero-leakage guarantee is the subject of a new brochure released by Penco Division, Hudson Engineering Company, Hoboken, N.J.

The configuration of the poppet rim and seat permits positive seating and sealing under conditions

that vary considerably. Through machining and heat treatment the metal seal lips are made flexible. The contact between the poppet and seat is such that the effectiveness of the seal is increased as back pressure increases.

Known as the Flex-Tact Valve, its flexible mating surfaces permit them to conform to almost any deflection. Whether in perfect condition or deformed, these valves

will not taper-lock nor stick closed.

On a test stand, steel chips and shavings have been pumped through a Flex-Tact Valve at high pressures, enough to damage any valve. The valve seat was chipped, the poppet badly scored and the rim split in places. Yet, this damaged valve survived 153,000 separate, repeated tests without a single failure. Test pressures in excess of 4,000 psi were maintained without any leakage.

In another test of cycle life, with pressures fluctuating from 0 to 1,800 psi, a Flex-Tact Check Valve was operated over 3,030,000 times before any failure occurred. When it did, the failure leakage was less than one drop per minute.

Standard stock sizes of flanged steel valves range from 2½ inches to 8 inches; threaded valves from stock in ½-inch through 2-inch sizes. Larger and smaller sizes are available upon application.

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Goulds Pumps Names Brien Rogers President Vertical Pump Division



Brien B. Rogers

Robert L. Tarnow, president of Goulds Pumps, Inc., Seneca Falls, N.Y., recently announced that Brien B. Rogers has been named president of the Vertical Pumps Division. Mr. Rogers, formerly assistant to Mr. Tarnow, succeeds Andrew W. Woodbury, who has resigned.

The firm's Vertical Pump Division, acquired in 1968, accounts for about \$10 million in sales for the company. A wide variety of vertical turbine pumps for the chemical, petrochemical, marine, mining and irrigation markets are manufactured in two facilities. Division offices are located in the City of Industry, Calif., and a manufacturing facility is in operation at Lubbock, Texas.

An employee of Goulds Pumps, Inc. since 1960, Mr. Rogers has held various positions in the manufacturing department. In 1965 he became manager of the standards department and three years later, assistant to the president at the main plant and headquarters in Seneca Falls.

A graduate of the University of Rochester (New York State), he later received an M.B.A. degree from the University of Pennsylvania.

USCG Names Chairman Of Towing Industry Advisory Committee

The Commandant of the United States Coast Guard in Washington, D.C., has appointed William C. McNeal as chairman of the Coast Guard's Towing Industry Advisory Committee for a two-year term, it has been recently announced. Mr. McNeal has been a member of the committee since 1968. He is also executive vice president of Oil Transport Co., Inc. of New Orleans, La.

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Before And After At Sembawang Shipyard



Bridge Deck—after fire.

Sembawang Shipyard's highly mobile electrical and joinery departments recently enabled the Singapore Yard to successfully restore the totally gutted bridge deck of the 62,065-dwt French Shell tanker *Isomeria*.

A fire of unknown origin broke out on the bridge deck, which totally destroyed the bridge, radio room, chart room, bridge annex and radio officer's cabin. During the course of firefighting operations, water damaged the amidships accommodation.

Clearing of the charred debris was taken in stages to enable classification surveyors and investigators to determine the source and cause of the fire.

On the 12th of May, 1973, the yard embarked on the actual repairs of the fire damage. The bridge front and monkey island deck, severely distorted by heat, were cropped out and renewed. New toughened glass windows and frames, specially brought in from abroad, were used.

All equipment destroyed was identified and orders placed throughout the world on a priority rating for immediate delivery by air. These included two radar systems, gyro and auto helmsman, radio station, two V.H.F.s, steering monitor, magnetic compass, telephone



Bridge Deck—after repairs.

systems, broadcast talk-back systems, speed log, Decca navigator, Common aerial system, echor-sounder, RPM indicators, telegraph, and steering indicators.

Before the arrival of the equipment on order, preparatory work proceeded on the bridge deck with the fitting of Formica finished paneling, deck covering and the manufacture of new furniture. Simultaneously, refurbishing of all the amidships accommodation furniture and fittings was also carried out and the areas repainted.

On receipt of the new equipment, the shipyard's electrical department, working round the clock, commenced installation and commissioned the whole system in record time. The work entailed tracing out of all circuits and systems and involved reeving and connecting miles and miles of cable.

Most of the more sophisticated bridge equipment was brought in from abroad, such items as the charts, flags, navigation and safety equipment were purchased locally.

On completion of sea trials, carried out to the satisfaction of the owners' and classification representatives, the *Isomeria* sailed, with her completely new set of ultramodern navigational aids, on July 8, 1973.

Sperry Vickers N.A. Names Industrial Air & Hydraulics For Dol-Fin Marine Products

Sperry Vickers North American Group has announced the appointment of Industrial Air & Hydraulics, Inc., as a sales and service distributor for its line of Dol-Fin hydraulic marine products.

Industrial Air & Hydraulics handles the Dol-Fin line at two locations—in Houston, Texas, at 5728 Hartsdale Drive, and in New Orleans, La., at 1170 Constance Street.

Industrial Air & Hydraulics will offer complete sales, service, and application support for the Dol-Fin boat roll stabilizing systems, power steering systems, Powerpak alternator systems, Powercap capstan winches, and other marine hydraulic products.

Sperry Vickers is a division of the Sperry Rand Corporation.

A.C. Hoyle Offers New Technical Brochures

A.C. Hoyle Co. has new technical brochures and designs available showing the installation of mooring and deck equipment which may be applied to the large tankers, barges, LNGs, bulk carriers, OBOs, etc. This equipment is identical to that used on the 120,000-dwt tanker *Arco Anchorage*.

Those interested should contact the A.C. Hoyle Co., Box 580, Iron Mountain, Mich. 49801.

Mobil Selects The MMC Tank Gauging System For Sumitomo New Building

Marine Moisture Control Co., Inc. of Inwood, N.Y., has announced the release of another MMC tank gauging system to Sumitomo Shipbuilding of Japan and earmarked for Mobil Hull No. 1014.

Mobil has specified this equipment for new building and retrofit installations after thorough and extensive service tests. This latest shipment represents the fifth tank gauging system destined for the Mobil fleet, with additional shipsets on order.

The MMC tank gauging system provides instantaneous and continuous digital reporting of innage and ullage, electronic specific gravity correction of the fluid being gauged, and automatic compensation for trim of the vessel as it relates to the tank level being reported.

Consistent cargo, ballast, and miscellaneous ship's tanks accuracy on the order of 0.2 percent full-scale is provided with digital readout to 1/100ths of a foot reported to a central control console. Optional remote reading stations are available as required.

The MMC tank gauging system is furnished as intrinsically safe and carries worldwide regulatory body approvals. All components are covered by the MMC five-year prorated warranty.



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AAPA 62nd Annual Convention Set For San Diego Oct. 14-18

The American Association of Port Authorities will combine a good deal of business and pleasure with hundreds of port and transportation executives from all parts of the world when they convene at the 62nd Annual Convention at the Sheraton-Harbor Island Hotel in San Diego, Calif., October 14-18, 1973. This is America's foremost port forum which features key speakers who will share new concepts and technologies for moving goods in the world's market place.

According to **John A. McWilliam**, president of AAPA and general manager of the Toledo-Lucas County Port Authority, this convention will be the first opportunity in its history to meet in San Diego—a city that offers every kind of beauty from the sparkling sea to the desert, with mile-high mountains in between.

"AAPA's meeting is expected to generate

worldwide attention," Mr. McWilliam said. "There is tremendous interest in the latest aspects of such topics as port ventures in environmental improvements, continuous flow of international trade, superport development for handling liquid bulk cargoes, the Federal policy in port affairs, the role of ports in the nation's economic development, new concepts in marine terminal designs, vessel traffic control systems, port trends in Mexico and Central America, and the Association has arranged for exceptionally qualified presenters and panels of experts to make this conference informative and stimulating."

The daily business sessions will be balanced by special luncheons, each featuring an authoritative and interesting speaker, and by local gatherings and excursions in the compelling beauty of this holiday estate. Among these is a welcoming reception at the Sheraton-Harbor Island Hotel Sunday evening, hosted by the San Diego Unified Port District. Featured

will be the multimedia presentation "What's What in San Diego." A special luncheon meeting on Monday will feature the Honorable **Helen Delich Bentley**, Chairman of the Federal Maritime Commission. "Nairobi Nights" will be a special treat for the delegates and their families—an afternoon and evening at the San Diego Wild Animal Park, hosted by the Journal of Commerce with all the fun and flavor conducive to a delightful Safari. Guests will ride the Wgasa Bush Line and see one of the world's finest collections of animal exhibits in their natural settings, and enjoy dinner in a Nairobi village setting. Tuesday's luncheon will be hosted by the Port of San Diego. A distinguished national figure has been invited to speak. On Wednesday, the Honorable **Robert J. Blackwell**, Assistant Secretary for Maritime Affairs, Department of Commerce, will be the guest speaker at the International Luncheon, with the president's reception and dinner-dance in the evening.

Enhancing the convention will be a colorful gathering of hardware and software exhibits. They will provide on-the-spot demonstrations of new techniques, equipment and know-how that radiate into every aspect of the port industry.

New Agents For Chockfast Pourable Chocking Systems

Philadelphia Resins Corp., Montgomeryville, Pa., has appointed agents for their Chockfast pourable chocking system in South Africa, Greece, and the Arabian Gulf, bringing to 24 the number of world ports outside of the United States where 24-hour chocking service is available. Chockfast is available in all major U.S. ports.

The new agent in Cape Town, South Africa, is Murray & Stewart (Marine) Pty., 73 Hertzog Boulevard. In Piraeus, Greece, the company is now represented by Marine Industrial Concerns, S.A., 8 Cherilaou Trikoupi. On Bahrain Island in the Arabian Gulf, the new representative is Bahrain Ship Repairing & Engineering Center.

The Chockfast system is approved by all major classification societies for mounting large diesel engines and other heavy equipment in engine rooms and machinery spaces during ship construction or overhaul.

According to Philadelphia Resins Corporation, shipowners and shipyards using the Chockfast pourable chocking system save 50 percent to 80 percent of the cost of chocking.

Halter Marine Delivers Supply Vessel To Jackson

Halter Marine Fabricators of Moss Point, Miss., have announced the delivery of the supply vessel Victory Moon to the Jackson Marine Corporation of Houston, Texas.

The vessel is 176 feet long, 38 feet wide and 14 feet deep.

The Victory Moon is scheduled to go to the North Sea, where it will service offshore rigs for the oil drilling industry.

EGD SpeeFlo Inc. Offers New Catalog

EGD SpeeFlo Inc. has just issued a new comprehensive catalog for their Airless Spray Equipment. The 20-page catalog describes all of the systems offered for the application of paint, mastic, inorganic zinc coatings, and includes hot spray and self-contained units. Special sections cover accessory items, airless spray guns and tips. A tip selection guide is included.

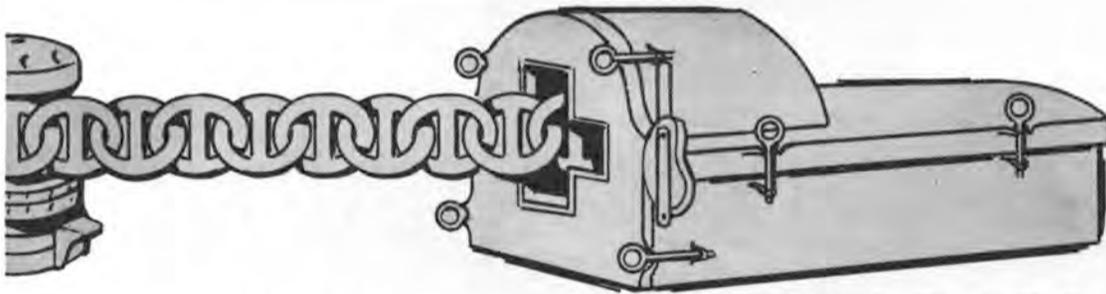
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2 Almon A. Johnson Towing Engines Model 232 wire rope included at \$19,000.00 each

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Main Propulsion: Single Screw, 1700 HP Diesel
 Auxiliary Generators: 250 KW, 230V D.C. Diesel
 Complete With All Accessories. Saw Very Little Service
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 1 lot—A large quantity of spare parts for the above engines

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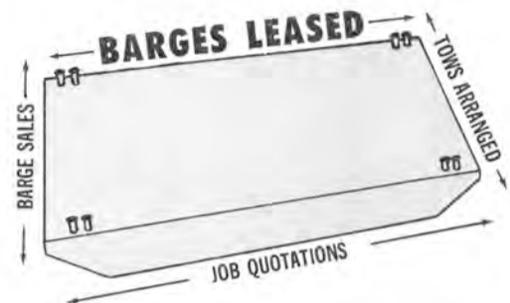


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**G.M. 3-268A
 100 KW A.C. Diesel
 Generator Set**

Like new. ENGINE: G.M. 3-268A—3 cylinder—6 1/2"x7" bore & stroke. GENERATOR: General Electric—100 KW—440 volts—3-phase—60 cycle.

\$2450

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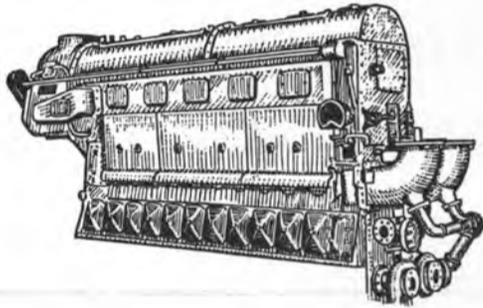
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Contact: Ralph Ingram

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MARINE DIESEL ENGINES

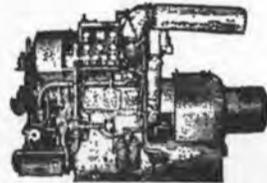


MATCHED PAIR . . . FAIRBANKS MORSE MODEL 38D8-1/8—1 Port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8 1/2" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ratio—with Hydraulic Coupling.

3—**COOPER-BESSEMER DIESEL ENGINES**, Model LS-8-DR, 1300 HP, 277 RPM, direct reversing, turbo charged.

2—**SUPERIOR DIESEL ENGINES**, Model VDSS, 1160 HP, 325 RPM.

MARINE DIESEL GENERATORS



2—**DE LAVERGNE**, Marine, 560 HP, 514 RPM, Serials #2180 and #2181, with Electric Machinery Generators, 375 KW, 450/3/60.

2—**SUPERIOR Diesel Engines**, Model GBD-8, Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100KW, 120/240 DC.

HERCULES, DOOC, 10 KW, 120 DC.

CATERPILLAR, D3400, 15 KW, 120/240 DC.

BUDA, 4 cylinder, 15 KW, 120/240 DC.

HERCULES, DJXC, 25 KW, 120 DC.

CUMMINS, WA255, 30 KW, 120 DC.

P&H, 387C-18, 45/56 KVA, 120/208/3/60.

BUDA, 6DH909, 40 KW, 120 DC.

1—**GENERAL MOTORS**, Model 3-268A, Marine, 150 BHP, 1200 RPM, 3 cylinder, with 100 KW Generator, 120/240 DC.

4—**GENERAL MOTORS**, Model 3-268A, 150 HP, 1200 RPM, 3 cylinders, with 100 KW Generators, 450/3/60.

BUDA, 6 DHG691, 60 KW, 120 DC.

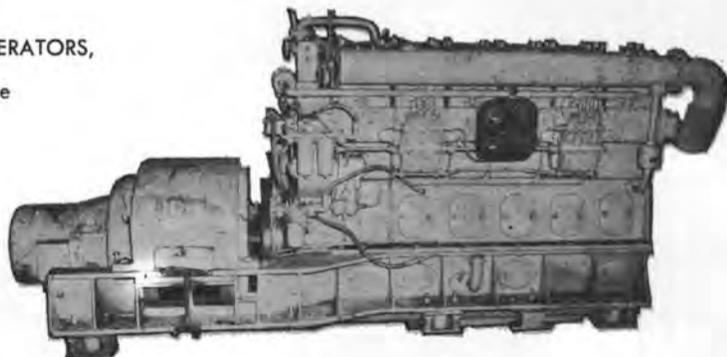
GENERAL MOTORS, 6067, 60 KW, 450/3/60.

BUDA 6DC844, 75 KW, 125-250 DC.

LORIMER, F5SS, 75KW, 120/240 DC.

CATERPILLAR, D17000, 85 KW, 220/3/60.

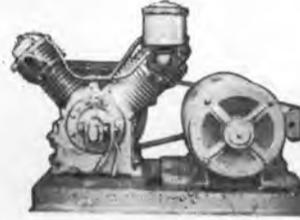
For TURBINE GENERATORS,
See Following Page



4—**COOPER-BESSEMER, Marine**

Model FSN6, 6 cylinders, 375 HP, 900 RPM, with General Electric Generators, 250 KW, 440/3/60.

AIR COMPRESSORS



2—**SULLIVAN**, Size WL60, Model A-UB-8, 100 PSI, 2 stage, with 30 HP G.E. Motors, 440/3/60.

1—**GARDNER-DENVER**, 150 CFM, 125 PSI, Class WB, Size 7x5 3/4x5, with Diehl Motors, 45 HP, 230 Volts DC, 870 RPM, 167 Amperes.

3—**INGERSOLL-RAND**, Size 5x5x4x4, 50 CFM, 150 PSI, with G.E. Motor, 20 HP, 440/3/60.

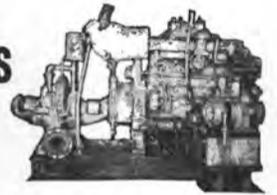
2—**WESTINGHOUSE Air Brake Steam**, Size 11 x 11 x 12, approximately 60 CFM at 100 PSI.

1—**INGERSOLL-RAND**, Model 40B, 155 CFM, 110 PSI, 870 RPM, with 40 HP Motor, 230 DC.

2—**WORTHINGTON**, 20 CFM, 3000 PSI, 4 stage, 585 RPM, with Worthington Steam Turbine, 47 HP, 5502 RPM.

MARINE PUMPS

FIRE PUMPS



2—**BUDA**, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver. Centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280' head, 6" suction and 5" discharge.

D.C. VERTICAL-ROTARY

1—**WORTHINGTON**, Size 4GRVS, with Westinghouse Motor, 15 HP, 230 Volts DC, 1310/1750 RPM.

2—**QUIMBY**, Size 5, 6 x 5, 400 GPM, 48 PSI, 25 HP, 230 DC.

2—**WORTHINGTON**, Type 3GRVS, 90 GPM, 75 PSI, 7 1/2 HP, 230 DC.

D.C. HORIZONTAL-CENTRIFUGAL

1—**WORTHINGTON**, Size 3UB1, 400 GPM, 280' head, with Westinghouse Motor, 50 HP, 230 DC.

2—**WORTHINGTON**, Size 8L1, 2100 GPM, 138.5 TDM, with Westinghouse Motors, 100 HP, 230 DC.

3—**GOULDS**, 250 GPM, 100 PSI, Figure 3380, 4"x3", with 30 HP Motors, 230 DC.

4—**WORTHINGTON**, Size 8L1, 2100 GPM, 138.5 TDM, 100 HP, 230 DC.

4—**WORTHINGTON**, Size 12LA1, 4000 GPM, 67.3 TDM, 100 HP, 230 DC.

A.C. HORIZONTAL-CENTRIFUGAL

1—**WARREN**, 600 GPM, 50 PSI, 8 1/4 HP, 440/3/60, 1135 RPM.

4—**WORTHINGTON**, 200 GPM, 100 PSI, 3 1/2" suction, 3" discharge, Size 2UB1, with Wagner Motor, 25 HP, 440/3/60.

1—**GARDNER-DENVER**, 5" suction, 3" discharge, 350 GPM, 336' head, 50 HP, 440/3/60, 3500 RPM.

1—**CARVER**, 400 GPM, 100 PSI, 3 1/2" suction, 2 1/2" discharge, 3500 RPM, 35.7 HP, 440/3/60.

2—**BUFFALO**, 250 GPM, 100 PSI, Class CCS, Size 4 x 3 1/2", with Westinghouse Motors, 25 HP, 440/3/60.

D.C. VERTICAL CENTRIFUGAL

2—**ALLIS-CHALMERS**, 170 GPM, 208' head, Type CF2V, 6" suction, 3 1/2" discharge, 20 HP, 230 DC.

2—**ALLIS-CHALMERS**, 30 GPM, 208' hd, Type CF2V, 2 1/2" suction, 1 1/2" discharge, 7 1/2 HP, 230 DC.

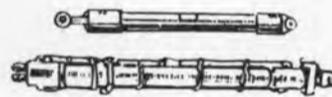
1—**ALLIS-CHALMERS**, 400 GPM, 100 PSI, 4" x 3", 50 HP, 230 DC.

1—**WORTHINGTON FIRE & BUTTERWORTH**, Size 3 UBS, 400 GPM, 200 PSI, 75 HP, 230 DC.

2—**ALLIS-CHALMERS**, Type SGV, 600 GPM, 30 PSI, 20 HP, 230 DC.

THE ABOVE LIST REPRESENTS BUT A FRACTION OF OUR STOCK. PLEASE INQUIRE ON ALL TYPES AND SIZES OF MARINE PUMPS.

HYDRAULIC CYLINDERS



Bore	Stroke	Diameter	Length	Action
10"	12"	3.75"	45 1/2"	double
10"	26"	3.75"	58 1/2"	double
2"	8"	1 1/2"	20"	double
2.5"	15"	1.12"	25 1/2"	double
3"	8"	1.37"	15 1/2"	double
6"	8"	4"	144"	double

REDUCTION GEARS

WESTINGHOUSE, as orig. used on two 1362 HP electric motors in submarine, 2 pinions, single gear.

FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on A051 Class Tankers (14 ships). Also on A097 to A0100 Tankers.

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Rebuilt
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In 440 AC, in 115 DC, and in 230 DC, and in sizes 1 HP through 20 HP. Completely reconditioned.

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Size A 1/4	Size A3	Size A8
Size A 1/2	Size A4	Size A10
Size A1	Size A5	Size A12
Size A2	Size A6	Size A16

CAPSTAN WINDLASSES



Model CWP-3, Vertical 24" Planetary Capstan Windlasses, Single Wildcat — using 1 1/4" Anchor Chain, Single Gypsy with 20 HP motor, 230 volts DC, complete with Contactor Panel, Master Switch, and Resistors.

3—HESSE-ERSTED VERTICAL, Single Wildcat—for 1 3/8" Anchor Chain, single gypsy, with 35 HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

HYDE, VERTICAL, Single Wildcat, for 1 1/8" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

ANCHOR WINDLASSES

1—HORIZONTAL, of German Mfg., double wildcat—for use with 3" anchor chain, double gypsy with 230 VDC motor, complete with electrical control equipment.

AMERICAN ENGINEERING, horizontal, double 2 1/2" Chain, 65 HP, 230 DC, complete.

2—AMERICAN HOIST AND DERRICK COMPANY horizontal, double wildcat—for 2 1/4" chain double gypsy, 70 HP, 230 Volts DC, with electric controls.

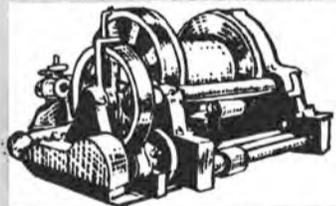
3—HESSE-ERSTED, horizontal, double wildcat, 2 1/2" chain, 60 HP, 230 DC.

1—HYDE HORIZONTAL ANCHOR WINDLASS double wildcat—for use with 2 1/2" Anchor Chain, and with General Motors Electric Motor, 60 HP, 230 volts DC, 560/1700 RPM, Type CDM 18831 AE. Complete with Contactor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

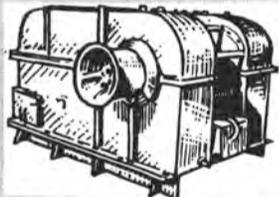
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Single drum, capacity 2000' of 2" wire rope, cylinder size 9" bore by 10" stroke.

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LAKESHORE UNIWINCHES, with Allis-Chalmers Motors, 50 HP, 230 Volts DC, complete with Control Equipment.

Single speed, double drum, 7450 # at 220 FPM.

Single speed, single drum, 7450 # at 220 FPM.

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5 ton rated, Steel, as removed from surplus ships. Manufactured by: Young, Draper, etc., 12" & 14" sizes.



\$49.50 each with pull test certificates

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Steel Hull, 328' overall, 50' extreme beam, maximum draft 14', approximate displacement 1780 tons. To be sold stripped of all machinery and deck house. Located in Portland, Oregon.

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2—GENERAL MOTORS, Model 16-278A, 1600 HP, 750 RPM.

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Used,
Good
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Frames.



Many sizes available, priced reasonable. Some Typical Prices shown below. Please inquire for other sizes.

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150 GPH—440 AC
—230 DC

350 GPH—230 DC

600 GPH—230 DC



ANCHOR CHAIN

Used, good, with or without test certificate

1-3/8" size
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2-1/16" size
2-1/4" size
2-5/8" size
2-3/4" size
3-3/8" size



TURBINE GENERATORS

1—WORTHINGTON, 225 PSI, 397°F, 6510 RPM, with Westinghouse Generator, 150 KW, 120 DC, 1250 Amperes.

6—WESTINGHOUSE, 200 PSI, with Westinghouse Generators, 60 KW, 120 DC.

4—ALLIS-CHALMERS, 440 PSI, 740°F, with Allis-Chalmers Generators, 300 KW, 240/240 DC.

1—GENERAL ELECTRIC, 525 PSI, with G.E. Generator, 250 KW, 440/3/60.

1—GENERAL ELECTRIC, with G.E. Generator, 350 KW, 440/3/60.

GENERAL ELECTRIC, Type ATB-2, 1563 KVA, 1250 KW, 450/3/60.

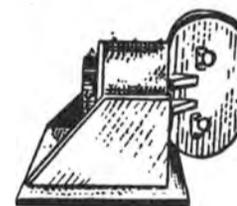
ALLIS-CHALMERS, 440 PSI, 740°F, 300 KW, 120/240 DC

JOSHUA HENDY, 300 PSI, 550°F, with Westinghouse Generator, 300 KW, 120/240 DC.

WORTHINGTON, Form S4, 440 PSI, 740°F to a Westinghouse Generator, 250 KW, 440/3/60, and to a 90 KW, 120 DC.

DELAVAL, 450 PSI, 750°F, 300 KW, 120/240 DC.

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Designed and Manufactured by
ZIDELL EXPLORATIONS, INC.

To Give You These Features:

One size fairlead with universal type sheave to accommodate wire rope sizes 1" up to and including 2".

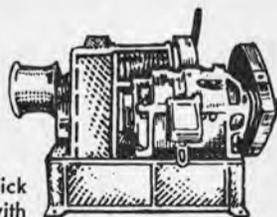
Self Aligning, Swivel Type Head.

Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.

Model Design PRICES ARE F.O.B.
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American Hoist and Derrick Company Winches with Westinghouse Motors, 50 HP, 230 Volts DC, complete with Contractor Panels, Master Switches, and Resistors.



Single Speed, Single Drum

UNIT WINCHES

American Hoist and Derrick Company

U3H—SINGLE DRUM, Single speed (4)
Line Pull: 7450# — 223 FPM,
6360# — 237 FPM,
3720# — 287 FPM.

U6H—DOUBLE DRUM, Single speed (2)
Line Pull: 7450# — 223 FPM,
6360# — 237 FPM,
3720# — 287 FPM.

Motor: Westinghouse, 50 HP, 230 Volts DC, 1900 RPM, Model 288212, 183 Amperes, compound wound, Frame 9 UW, horizontal.

Unit Winches complete with Contactor Panels, Resistors, Master Switches.

NEW WATERTIGHT DOORS



6-Dog right and left hand hinged steel doors—with frames. Built and tested to A.B.S. specifications.

SIZE	NET WT.
26"x48"	250 lbs.
26"x60"	300 lbs.
26"x66"	320 lbs.
30"x60"	330 lbs.

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IMMEDIATE DELIVERY

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100,000 lb. Almon Johnson Series 232 Constant Tension Mooring Winches



5 Available. In very good condition. Series 232 mooring & anchoring winches—automatic self-tensioning. Wide range from 100,000 lb line pull at 10 FPM to 26,000 lbs at 400 FPM. Gypsy line pull 12,000 lbs at 125 FPM. Drum detachable through spiral jaw clutch for free spooling. Driven by 50 HP—230 VDC motors—Westinghouse CK—575 RPM—1/2 hour—75°C rise—stab. shunt—181 amps—max. RPM 1900. Cutler-Hammer brake—18"—type N'M. Complete with magnetic control panel, resistor banks & remote control pedestal—mounted master switch. **Can spool up to 2000' 1 1/4" wire.**

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T2-SE-A1 T2 Tanker Jacksonville, Fla.

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T2-SE-A2 Mission Tanker Baltimore, Md.
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UNUSED 2" BRONZE STRAINERS (DUPLEX)



Flanged—mfg by Derbyshire Machine & Tool Co. Flange has 6 holes 9/16".

\$299.00

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Cargo Tank Venting Valves. Bronze—#100 2 1/2" iron pipe size screwed.

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NEW — UNUSED 10 H.P. REVERSING CAPSTANS SHIPBOARD USE

Duty 10,000 lbs. @ 60 FPM



MOTOR: 10 HP—totally enclosed—fan cooled—continuous duty—horizontal flange mounted—special shaft & oil seal fitted—220/440/3/60—1760 RPM. CONTROL: Marine type watertight pushbutton—forward/reverse/stop—watertight starter box—rated for 40 starts/hour—triple pole contactor with silver contacts, thermal overload relay & trip adjustment. DIMENSIONS: Barrel 10" diam.—flange 10" diam.—approx. 26" wide & 36" long.

\$2450

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8" x 8" WATEROUS HEAVY DUTY ROTARY CARGO PUMP



Mfg. Waterous Co.—730 GPM—pump speed 232 RPM—reduction ratio 900/232—8" suction—type P-1256—80 PSI pressure—60 HP—herringbone reduction gear—8" discharge.

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FUEL OIL OR LUBE OIL PURIFIER



DeLaval—600 G.P.M.—type B-1529C-60—with 3 H.P. 440/3/60 Motor. Mfg. by German DeLaval. Spare parts available.

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NEW 7" RADIUS PANAMA CHOCKS



(MEET PANAMA REGULATIONS)
With extended legs for welding to deck. IMMEDIATE DELIVERY FROM STOCK.

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RECONDITIONED LESLIE PUMP GOVERNOR VALVE



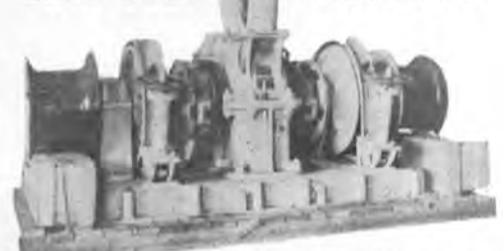
For U.S. Naval Vessels—type CT-HNS-3. For merchant vessels—type CTHS. Size 2". Typical serial 241-423. For immediate delivery.

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539-1900 (301) 355-5050

UNUSED 1 5/8" HEAVY DUTY LINK BELT WINDLASS



Below deck motor drive. Double wildcat—driven by 50 HP 230 VDC motor with vertical shaft and worm drive. Single speed—handles 7000 lb anchors and 60 fathoms of 1 5/8" chain at 7 fathoms per minute. Wildcat centers 56". Complete with all controls and warping features. Total weight 27,500 lbs. With spares.

THE BOSTON METALS COMPANY

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UNUSED ALLIS-CHALMERS FIRE & GENERAL SERVICE PUMPS



200 GPM — 180' head — 2 1/2"x2"—bronze—flange connections. MOTOR: 20 HP—115 volts DC—2400 RPM—153 amps.

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REVOLVING FIELDS



GENERAL ELECTRIC
Rewound — with A.B.S. — ex-Pioneer Valley.

WESTINGHOUSE
For T2SE-A-1 tankers—with A.B.S.—ex-Caltex J.H. MacGoregill.

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Berger-Type Deck-Mounted FAIRLEADS



For 1" wire rope—12" diameter sheave—steel frame—self-aligning—180° swing. Formerly in Naval use on LCT.

\$745 EACH

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NATIONAL METAL'S CURRENT T-2 INVENTORY

MANY OTHER ITEMS NOT LISTED • ALL ITEMS FURNISHED WITH A.B.S. OR LLOYDS'

TURBOGENERATORS

525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

Complete with L.O. Cooler. Turbine: General Electric 525 KW, Type DORV-325M, 5645 RPM. Reduction Gear: General Electric Type S-162-D, 5645/1200 RPM, single helical. Generators: General Electric. (1) Type ABT, 3 phase, 400 KW, 450 VAC, 1200 RPM. (2) Type MPC, 75 KW, 110 VDC, 1200 RPM, Exciter. (3) Type MPLI, 55 KW, 120 VDC, 1200 RPM, Generator. (4) Auxiliary DC generators.

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

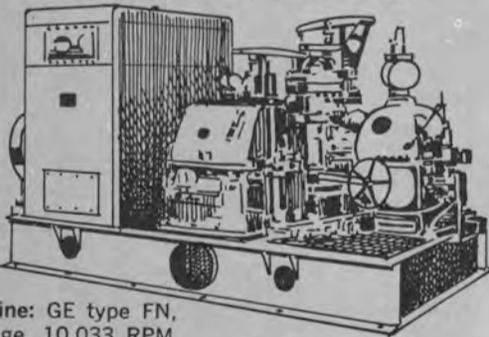
Complete with L.O. Coolers and exciters. Turbine: Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.T.T. Exhaust pressure 28 1/2 hg vac. Generators: (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter. (3) 110 KW, 125 VDC, 1200 RPM, constant voltage generator. (4) 5 KW, 125 VDC, 1200 RPM, ship's service Generator-Exciter. Reduction Gear: Ratio 5010/1200 RPM.

535 KW GENERAL ELECTRIC TURBOGENERATOR UNIT

Complete with L.O. Coolers and exciters. Turbine: General Electric Mfg. drawing P-8453535, 3 stages, type DORV-325, 5645 RPM, rating 535 KW, inlet pressure 590 lbs., Superheat 325 degrees F., exhaust pressure 1 3/4 ABS. Reduction Gear: General Electric, type S-162-D, Class, 535 KW, Mfg. dwg. T-8453535, 5645/1250 RPM. Generator: General Electric, Dwg. T-8453535, type ATB-976, KNA 500, 450 volts AC, 3 phase, 60 cycle, 400 KW, 642 amps, 1200 RPM, PF .8. Frame 976, Exciter 120 volts DC. Control panel: General Electric, Dwg. 6367270, Type XF-100492, 6 circuits, 450 volts AC.

★★ ALSO AVAILABLE!! ★★

600 KW GENERAL ELECTRIC TURBOGENERATOR UNIT



Turbine: GE type FN, 6-stage, 10,033 RPM.

Reduction gear: GE triple-helix, triple reduction, 10033/1200 RPM. Generator: GE type ATI, 600 KW, 6-pole, 0.8 pf, 450 VAC, 3 phase, 60 cycle, 1200 RPM. Exciter: GE type MPLI, 7.5 KW, 120 VDC, direct connected. Air cooler: Surface type, for generator, complete with control panel.

MAIN MOTOR FOR T2

Gen. Elect. #5690714 Type TSM-80, 6000 HP, 90 RPM, form H.L., 2300 Volts, Amps. arm. 1160, P.F. 1.0, KVA 4625 Phase 3 cycle 60, Exciter volts 120, amps field 390 contin. @ 60°C. rise.

5400 KW MAIN GENERATOR

General Electric, S/N 79938, Marks 6937958 G-4, 5F-1690-2, 164-M.

PUMP UNITS

CARGO STRIPPING PUMP

(Steam) Worthington, vertical duplex, double acting, size 14" x 14" x 12", speed 46 ft./min., 700 GPM, 150 psi operating pressure.

MAIN FEED PUMP

Pump: Coffin Turbo Pump Co., single stage, centrifugal, size CG-12A, 6980/7030 RPM, 240/280 GPM, 254/280 HP, 6" x 3", 750 psi @ 1760 ft. head, complete with turbine.

MAIN FEED PUMP

Coffin, turbine drive, Type F, 7200 RPM, 200 GPM, 150 HP, 150 psi w 1329 ft. head.

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, single stage, double suction centrifugal, 585 RPM, 16,500 GPM against TDH 25 ft. @ 30 psi, 26" x 24". Motor: General Electric, Model 5K633AP1, Frame N-6336-B, 585 RPM, 440 volts AC, 191 amps, 3 phase, 60 cycle, complete with controller.

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, size 24", 585 RPM, 14,000 GPM @ 25 ft. TDH, 26" x 24", operating pressure 15 psi. Motor: Westinghouse, Model CS, Frame 876C, 125 HP, 585 RPM, 440 volts AC, 159 amps, 3 phase, 60 cycle, complete with controller.

MAIN CARGO PUMP UNIT

Pump: Ingersoll Rand, type 2 stage horizontal, size 6-GTM, 1750 RPM, 2000 GPM, 12" x 12", 100 psi @ 280 ft. head. With motor.

FUEL AND LUBE OIL PUMP

Pump: Quimby, size 2 1/2 head screw, 1200/600 RPM, 15 GPM @ 325 psi disch. press. Motor: General Electric, Model 5KF364PP1, Frame 364, 7.5/3.75 HP, 1160/580 RPM, 440 volts AC, 10/9.7 amps, 3 phase, 60 cycle, complete with controller.

LUBE OIL SERVICE PUMP

Pump: Quimby, Type vertical rotex, size 4-B, 1150 RPM, 175 GPM @ 60 psi with 20 ft. head, 6" x 5". Motor: General Electric, Model 5KF365AJX1, Frame 365, 5 HP, 1170 RPM, 440 volts AC, 20 amps, 3 phase, 60 cycle, complete with controller.

MAIN CONDENSATE PUMP

Pump: Ingersoll Rand, size 2VHM, 1760 RPM, 180 GPM @ TDH 165 ft., 5" x 2", disch. press. 67 psi. Motor: General Electric, Model 5KF365AJN-1, Frame 365V, 20 HP, 1765 RPM, 440 volts AC, 3 phase, 60 cycle, 25.5 amps, with controller.

AIR COMPRESSORS

COMBUSTION CONTROL AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, type 30, Model 253 x 5, 20 CFM at 100 psi, 600 RPM. Motor: General Electric, Model 5KG254B2782, Frame 254, Type K, 440 volts, AC, 7.5 amps, 3 phase, 60 cycles, 5 HP, 1723 RPM, complete with controller and switch.

SHIP SERVICE AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, Type 30, Model 5 x 5 x 4, 545 CFM at 100 psi, 750 RPM. With motor and base.

VALVES

Gate: 10", 12", 14", 16", 20" and 24"
Angle: 12", 14" and 18" Crossover: 16"
High suction: 26" Low suction: 26"

TURBINE ROTORS

5400 KW GENERAL ELECTRIC TURBINE ROTOR

ABS, 6275-31, AB-142-WD-8-10-44, 1701461
T8604259, 6275-31 67-KU-102032, A853BY 21 Jan. 1967.

525 KW GENERAL ELECTRIC TURBINE ROTOR

S/N 60137, ABS 71-LA-12430-624 A624 B, Reconditioned April 21, 1971.

5400 KW WESTINGHOUSE TURBINE ROTOR

ABS report 66KU11942 A853B, 6 Sept., 1966,
Marks: 6275-45. AB-142 WD9-30-44, 170-1467,
8604259-1, 6275-45.

5400 KW WESTINGHOUSE MAIN TURBINE (Profile type):

5400 KW ELLIOTT TURBINE ROTOR

ABS, 67-LA9644-830, AB-JCB-3-31-67, 9013039-
9230P1, 66-KU-11895, A853 1071941, AB142 WDG-
4-45.

MISCELLANEOUS T-2 EQUIPMENT

MAIN AIR EJECTOR

Main air ejector, Graham Mfg. Co., type 2 stage twin, size 163B, capacity, 65 PPH of air (220 GPM cont. @ 79°F.), oper. press. 150 PPH.

MAIN CONDENSER END

Graham (waterbox).

MAIN CONDENSER END

Westinghouse (waterbox).

MAIN CONDENSER END

Westinghouse (return head).

AUXILIARY CONDENSER END

Graham (waterbox and return head), surface condenser, size 1500 sq. ft., S/N 2915, Design press Shell 15-Tubes 25, Test press Shell 30-Tubes 50.

TAIL SHAFTS

ABS 59-S1768-AB810
Reconditioned, ABS 70-LA-11901-946

RUDDER WITH STOCK (complete)

SEND NOW FOR NEW 1973 CATALOG

HUNDREDS OF OTHER ITEMS
ALSO AVAILABLE!



**National
Metal**
AND
STEEL
CORP.

691 New Dock Street, Terminal Island, California 90731
Area Code (213) 775-3321 • Telex: TWX 213-548-0990

M.G. SETS



APPROX. 1/2 KW
110/1/60 M.G. SET
NEW—UNUSED

INPUT: 115 VDC—6.1 amps—3600 RPM. AC OUTPUT: 425 watts—4.55 amps—110/1/60. Ball bearing. 13 7/8" long—7 9/16" wide—10 1/2" high. Has radio noise suppression filter. Net wt. 58 lbs—83 lbs packed for shipping.

\$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET



INPUT: Motor 25 HP — 120 VDC — 156 amps — 1800 RPM — flange-coupled to output generator.

OUTPUT: 10 KW generator — 120 volts 60 cycle single phase — 108 amps — 0.80 PF — with direct-connected 125 volt 8 amp exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

RECONDITIONED CONTINENTAL
2 KW—220 D.C. TO 120/1/60 A.C.

INPUT: 5 HP—230 VDC—20 amps. OUTPUT: 2.5 KVA — 2 KW—120/1/60 AC—0.8 PF—1800 RPM—21 amps. With controls. 38" long—15" wide—480 lbs.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

1000 GPM—125 LB
BRONZE FAIRBANKS-MORSE
FIRE & GENERAL SERVICE PUMP



PUMP: Mfg by Fairbanks-Morse. Horizontally split case — 1000 GPM—281' head — 3545 RPM. Suction pressure flooded—6" suction—5" discharge. Steelflex coupling. MOTOR: Fairbanks-Morse—440/3/60—squirrel cage—3600 RPM—class A insulation. Type KZK—continuous duty—dripproof—ambient temp. 50°C. Complete with Cutler-Hammer controller (reduced voltage magnetic starter).

DIMENSIONS: 5' 5" OAL—23" OAW—2' 11" OAH. UNIT HAS HAD VERY LITTLE USE.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

G.M. 8-268A
200 KW A.C.
DIESEL GENERATOR SETS



ENGINE: 8-268A—6 1/2" bore x 7" stroke—1200 RPM—driving 200 KW Westinghouse generator—440 volts—3-phase—60 cycle—321 amps—80% power factor at 1200 RPM.

\$3750

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ANCHORS AND ANCHOR CHAINS
Lockstad Co., Inc., 179 West 5th Street, Bayonne, N.J. 07002

AUTOMATIC DRAFTING SYSTEMS
Gerber Scientific Instruments Co., P.O. Box 305, Hartford, Conn. 06101

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

BUNKERING SERVICE
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.1., England

CLUTCHES, GEARS & BRAKES
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
EGD Spee-Flo Co., 4631 Winfield Rd., Houston, Texas 77039
International Paint Co., Inc., 21 West Street, New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Orleans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
RPC Division, Midland-Ross Corp., P.O. Box 490, Roxboro, N.C. 27573

CONTAINER LASHINGS & COMPONENTS
American Engineered Products, P.O. Box 74 Nichol Ave., McKees Rock, Pa. 15136
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

CONTROL SYSTEMS
Frederick Cowan & Co., Inc., 120 Terminal Drive, Plainview, L.I. New York 11803
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
WABCO Fluid Power Division, 1953 Mercer Road, Lexington, Kentucky 40505

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407
Mark Products, Inc., 10507 Kinghurst Dr., Houston, Texas 77072
Trans-Sonics, Inc., P.O. Box 326, Lexington, Mass. 02173

DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
A. G. Weser, Sebeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ACCESSORIES
A.G. Schoonmaker, Box 757, Sausalito, Calif. 95965

DIESEL ENGINES
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wis. 53511
DeLaval Turbine Inc., Engine & Compressor Div., 550 85th Ave., Oakland, Calif. 94621
Electro-Motive Division General Motors, La Grange, Illinois 60525
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
H.O. Penn Machinery Co., Inc., 1561 Stewart Ave., Westbury, N.Y. 11590
Waukesha Motor Co., 1000 W. St. Paul Ave., Waukesha, Wis. 53186

DIESEL ENGINE MUFFLERS
Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOCK BUILDERS
GHH Sterkrade Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004

DOORS—Watertight—Bulkhead
Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

EVAPORATORS
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Riley-Beard, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130

FAIRLEADS
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FENDERING SYSTEMS—Dock & Vessel
BJ Marine Products, subsidiary of Borg-Warner, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

FITTINGS & HARDWARE
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Rohvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

GAS ALARM SYSTEMS
Riken Keiki Fine Instrument Co., Ltd., 2-7-6 Azusawa Itabashi-ku, Tokyo, Japan

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Way-Wolff Associates, Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

INSULATION—Marine
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

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LNG SHIP DESIGN AND LICENSING
PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022

LNG TANKAGE
Gazocoon U.S.A. Inc., 125 High St., Boston, Mass. 02110
LGA—Liquid Gas Anlagen Union GmbH, c/o Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004
Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. 15225

LININGS
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Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

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Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

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Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
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Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
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Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

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Combustion Engineering, Inc., Windsor, Connecticut 06095
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Ark. 72204
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Tech Systems, Inc., 405 Watertown Rd., Thomaston, Conn. 06787
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

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Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316

MARITIME FINANCING—Leasing
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Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

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Breit Engr. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
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Christopher J. Foster, 14 Vanderventer Ave., Port Washington, N.Y. 11050
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Morris Gurainick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydraulics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Iliarucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
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T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
FGM Systems Co., P.O. Box 20778, 2525 Walnut Hill Lane, Dallas, Texas 75220
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503

Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
 Raytheon Co. Marine Products, 676 Island Pond Rd., Manchester, N.H. 03103
 Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
 Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
 Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
 Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
 Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
 The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

OILS—Marine—Additives
 Exxon Company, U.S.A., P.O. Box 2180, Houston, Texas 77001
 Exxon International Company, 1251 Avenue of the Americas, New York, N.Y. 10020
 Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
 Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
 Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017

PAINT—Marine—Protective Coatings
 Ameron Corrosion Control Div., Brea, Calif. 92621
 Corboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
 International Paint Co., 21 West St., New York, N.Y. 10006
 Patterson-Sargent, P.O. Box 494, New Brunswick, N.J.
 Transocean Marine Paint Association, P.O. Box 456, Delftseplein 37, Rotterdam, Holland

PETROLEUM SUPPLIES
 Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
 Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
 Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
 The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

PIPE—Cargo Oil
 Kubota, Ltd., 22, Funode-cho 2-chome, Naniwa-Ku, Osaka, Japan

PLASTICS—Marine Applications
 Ameron Corrosion Control Div., Brea, Calif. 92621
 Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
 Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936

PORTS
 Port of Galveston, P.O. Box 328, Galveston, Texas
 Jacksonville Port Authority, 2701 Tollyrand Ave., Jacksonville, Fla.

PROPELLERS: NEW AND RECONDITIONED
 Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
 Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
 Escher Wyss GmbH, P.O. Box 798, Ravensburg, Germany
 Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502

PUMPS
 Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
 Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
 Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

RATCHETS
 W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

REFRIGERATION—Refrigerant Valves
 Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ROPE—Manila—Nylon—Hawsers—Wire
 American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
 Du Pont Co., Room 31H1, Wilmington, Delaware 19898
 Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
 Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
 Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
 Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
 Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
 Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SANDBLASTING EQUIPMENT
 Pauli & Griffin Co., 826 Folsom St., San Francisco, Calif. 94107

SCAFFOLD BOARDS
 Howmet Corporation, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL
 Bobcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
 Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
 Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

SHAFT REVOLUTION INDICATOR EQUIP.
 Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

SHIPBOARD VENTILATION
 Coppus Engineering Corp., P.O. Box 457, Worcester, Mass. 01613
 TANK S.A.P.P. Inc., 330 Madison Avenue, New York, N.Y. 10017
 and 1020 Springfield Avenue, Mountainside, N.J. 07092

SHIPBREAKING—Salvage
 The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
 National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
 Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
 Agemar, P.O. Box 1465, Maracaibo, Venezuela
 Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
 Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y. 10006
 Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

SHIPBUILDING STEEL
 Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
 Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
 Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720
 International Nickel Co., 1 New York Plaza, New York, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
 Astilleros Espanoles, S.A. Zubano, 70, Madrid 10, Spain
 Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
 Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
 Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
 Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142
 Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
 Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
 Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
 Conrad Industries, P.O. Box 790, Morgan City, La. 70380
 Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
 Devcon Corporation, Endicott Street, Danvers, Mass. 01923
 Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
 Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
 Empresa Nacional Bazan, 65 Castellana, Madrid 1, Spain
 Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
 Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
 General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
 General Dynamics, Quincy Division, Quincy, Mass. 02169
 Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
 Havre de Grace, Havre de Grace, Md.
 Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
 Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
 Jeffboat, Inc., Jeffersonville, Ind. 47130

Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
 Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
 Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
 Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
 Littin Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
 Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
 Marathon Manufacturing Company
 Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
 Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
 Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
 Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
 Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
 Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
 Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
 Maryland Shipbuilding & Drydock, P.O. Box 537, Baltimore, Md. 21203
 Matton Shipyard Co., Inc., P.O. Box 428, Cofoes, New York 12047
 Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
 Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
 Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
 National Steel & Shipbuilding Corp., San Diego, Calif. 92112
 Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
 Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840
 Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
 Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
 Pacoco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
 Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
 Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
 St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
 Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
 Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
 Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
 Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
 Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
 Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
 Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
 Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

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 Hydronautics, Incorporated, Laurel, Maryland 20810

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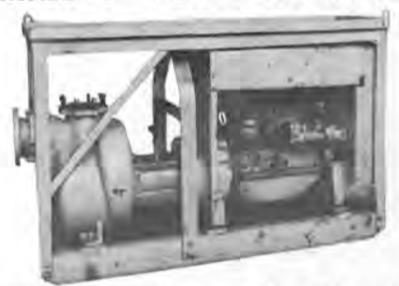
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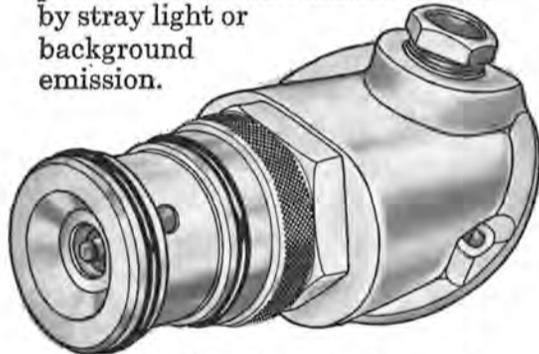
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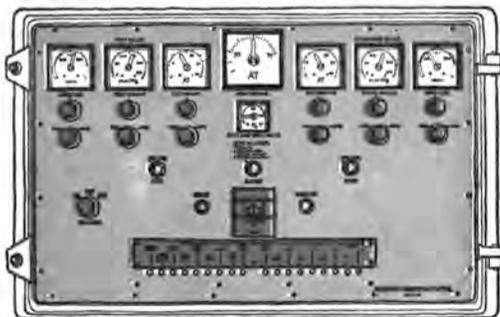
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