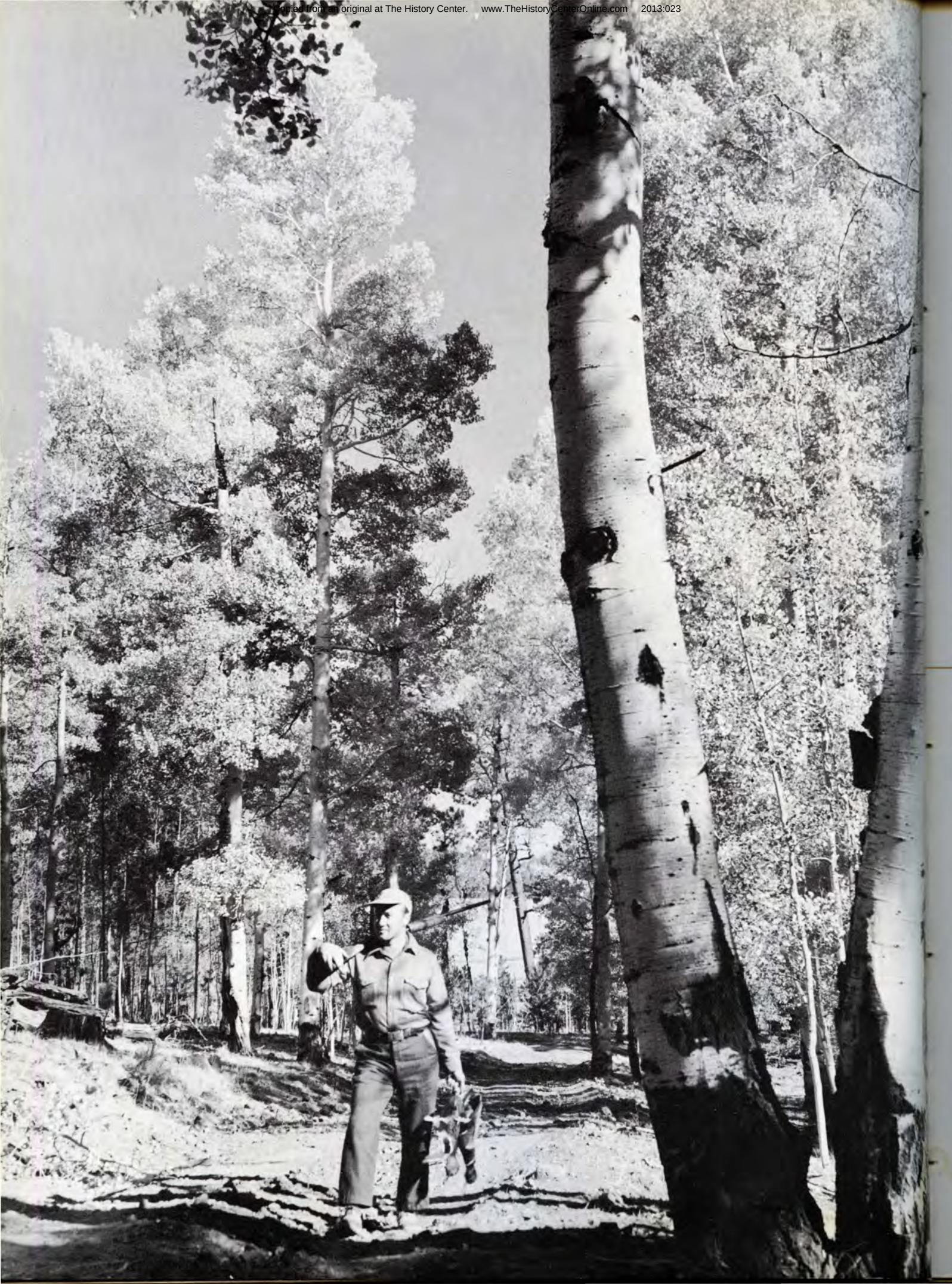




THE *Lufkin* LINE

SEPTEMBER-OCTOBER • 1957



THE *Lufkin* LINE

SEPTEMBER • OCTOBER, 1957
Volume 32 • Number 5

Published to promote Friendship and Good Will with its customers and friends and to advance the interest of its products by the Lufkin Foundry & Machine Company, Lufkin, Texas.
Virginia R. Allen, Editor

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Howard Hogue

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GEARS ... A Buyers Guide

By V. J. Fawcett

THERE is hardly a skill known to the world which is not covered these days by countless pocket editions of the "HOW TO . . ." series.

"How to Trap a Platypus"
 "How to Half Sole a Pair of Snowshoes"
 "How to Be Happy Tho' Married"
 "How to Barbecue a Hippopotamus"

These are but a few of the sparkling activities whose mysteries may be explored and whose directions may be exploited by simply making a quick trip to the corner drug store. The world is yours at two-bits per copy.

And now—"HOW TO SELECT GEARS"—surely not as fascinating, nor as exciting as the sample topics listed, but certainly one of absorbing interest to the purchasing agent, the design engineer, the plant manager, the production superintendent, or any builder of gear driven machinery. The success of his business and the performance of his equipment is vitally dependent on buying the finest gears, backed by a reputable gear manufacturer with a vigorous service organization, and at economical prices.

It is important to know about AGMA (The American Gear Manufacturers Association), a clearing house of knowledge on gears. AGMA is an association of America's leading gear manufacturers existing for the purpose of establishing standards, ratings, material, formulae, etc., to provide industry with standard, uniform methods of gear size selection. Gear firms' engineers are actively engaged in committee work, striving constantly toward these ends.

Obviously, the purpose of this body is to im-

prove gear products, to establish standard rating methods, to protect the gear user from inferior materials, to assist him in making intelligent selections through the help of its members.

Before going into some typical examples of gear selection by AGMA procedure methods, we should take time out to clarify what AGMA does not do. While it is true that "yardsticks of measurement" are pretty well established, there is no such thing as a "yardstick of value," since AGMA members are under no restrictions on how much added value (plus features) they may build into their reduction gear, gear assembly, or a single loose gear. AGMA exerts no jurisdiction over member pricing policies.

Considerable variations will be found in the construction and design of various gear manufacturers' products, but the AGMA member must conform to specific minimum standards.

A good example of how the buyer must search for and seek out the best value, for instance, would be the selection of a HERRINGBONE, DOUBLE REDUCTION, PARALLEL SHAFT GEAR REDUCER.

What conclusions can be drawn from the accompanying table? One significant fact is that although reasonably close in horsepower rating at a service factor of 1, Manufacturer "A's" gear offers more than twice the weight of "H's." The lighter gears with the smallest main shaft diameters and shorter center distances claim the greater horsepower ratings. Obviously, these gears are more closely tailored to minimum standards, and offer the buyer a minimum of reserve.

COMPARISON OF 8 LEADING MAKES GEAR REDUCERS OF APPROXIMATELY SAME CATALOG HORSEPOWER AND RATIO AT 1150 RPM INPUT

Gear Manufacturer	Ratio	Catalog Horsepower	Mainshaft Dia.	Shaft Center Distance	Weight
"A"	28.4	107	6"	30"	4,950#
"B"	28.7	117	6"	30"	4,000#
"C"	28.1	112	5 $\frac{7}{8}$ "	32 $\frac{1}{2}$ "	4,050#
"D"	26.8	115	5 $\frac{3}{4}$ "	28"	4,008#
"E"	28.6	107	5 $\frac{1}{4}$ "	34 $\frac{1}{2}$ "	3,500#
"F"	30.0	117	5 $\frac{1}{2}$ "	28"	3,400#
"G"	27.5	113	5.1875"	28"	3,100#
"H"	27.1	111	5"	25.214"	2,400#
Summary	26.8 to 30 to 1	107 to 117 Horsepower	5" to 6"	25 to 34 $\frac{1}{2}$ "	2,400# to 4,950#

All of the above gears conform to the minimum standards of AGMA.



Analysis, pricewise, would reveal considerable variation, and units offering minimum design will often bear higher price tags than their heavier, more conservatively built counter parts.

Something not to be found in most gear catalogs is bearing life. AGMA minimums will permit from 25,000 to 30,000 hours average life. The more conservatively designed of gears "A" through "H" will offer bearings of 100,000 hours or more, average life.

It will pay a gear user to screen carefully the design features offered by individual gear manufacturers. A gear possessing the greatest combination of refinements will not always necessarily be in the lower economic brackets, due to the specialization and high production by the manufacturer.

A GOOD deal of confusion and bewilderment seems to exist among users of right angle drives, when trying to compare worm gears with spiral bevels, due to the different AGMA terminology for the two types of gears, and due to differing service factors for the same kind of duty. Some illumination of this subject seems to be in order.

First of all, Worm Gears are broken down into classes for varying types and duration of duty by AGMA—such as, Class 1, Class 2, Class 3, Class 4, and Class 5, and each has a specific service factor value, except #5, which goes by torque.

Spiral Bevel drives are not so classified. Service factors for these drives are selected in the same manner as for Herringbone and Helical gear drives, e.g., by "Character of Load."

EXPLANATION OF WORM GEAR CLASSES

CLASS 1—Service Factor = 1

Normal 8-10 hours service, free from recurrent shocks, that is, shock loads that recur at even or frequent intervals. Multiply input horsepower by service factor of 1.0.

CLASS 2—Service Factor = 1.2

8-10 hours service where recurrent shock loading is encountered or 24 hour service where no shock load is experienced.

CLASS 3—Service Factor = 1.3

24 hour shock load service.

CLASS 4—Service Factor (Fractional)

Intermittent service where worm is operated at speed of 100 RPM or more, actual input horsepower is multiplied by varying factors from .6 to .9, depending upon frequency and the duration of the load.

CLASS 5

For Class 5 service, rating of gear set is always given as output torque rating. The output torque rating for worm speeds below 100 RPM is obtained by converting horsepower rating at 100 RPM to output torque.

To determine output torque rating of gear set, the following formula should be applied:

$$T = \frac{P}{n} \times 63,000 \times Mg \times N$$

Where T = Output Torque Rating in pound inches

P = Input Horsepower rating

n = Worm Speed in RPM

Mg = Gear Ratio

N = Gear Efficiency $(100 - \frac{\text{Ratio}}{2})$ percent

Efficiency of Worm Gears will run between 90% to 95% up to ratios of 10 to 1.

$$\text{Over 10 — 1 ratio efficiency} = 100 - \frac{\text{Ratio}}{2}$$

$$\begin{aligned} \text{For example: Gear Ratio} &= 60 - 1 \\ \text{Efficiency} &= 100 - \frac{60}{2} = 70\% \end{aligned}$$

Now, as a direct comparison between Worm and Spiral Bevel or Helical Gears, the following service factors are recommended for a specific type of duty:

Recommended AGMA Service Factors for Cooling Tower Induced Draft Fan Duty

Type of Gearing	Turbine Or Electric Motor	Multicylinder Gas Engine
Spiral Bevel	1.5	1.75
Helical	1.5	1.75
Worm Gear	1.2	1.3
Double Enveloping Worm ..	1.2	1.3

In the past, it is our understanding that Spiral Bevels, Herringbones, etc., were referred to by "Classes," like Worm Gears are today, but this is no longer true, as demonstrated by the foregoing tables and examples.

Horsepower and hardness go hand in hand in the rating of Spiral Bevels, just as in other types of gears. A very considerable increase in the materials factor and hence in the horsepower rating is obtained, theoretically, by going to a minimum hardness of Rockwell "C" 60.

Therefore, it is very apparent that the point of the matter is the hardness held to by the manufacturer. AGMA recognizes the impracticability of maintaining and guaranteeing the manufacture of Spiral Bevel gears beyond its published top hardness of Rockwell "C" 55 which stops with a mate-

rials factor of 1.0 and its obvious protection to the purchaser.

Conservative engineers will readily see that if it were possible to maintain the highest hardness, no gear manufacturer would offer gears except with the use of higher hardness, thereby being able to offer the highest possible horsepowers with the least material used.

FOR an example of the factors that must be considered in the catalog selection of a gear to do a given job, let's suppose you need a right angle Spiral Bevel gear to drive a 20-ft. induced draft cooling tower fan, and that the source of power is an electric motor. AGMA bulletins and manufacturers' literature based upon AGMA standards, provides tables indicating the shock loads to be expected from various drive situations.

First step is to consult such a table. The finding in this case would be that your cooling tower fan drive will be operating under moderate shock load conditions. Other tables in the same engineering literature have been set up to indicate the service factor to be expected from various prime movers under every possible duration-of-service condition for different load conditions. Using such a table and supposing the drive will be operating 24 hours per day, you would find that a service factor of 1.50 is indicated.

Next factor to be considered is horsepower catalog rating desired in the drive. The actual horsepower to be transmitted in this case is 75 horsepower. Catalog horsepower rating is determined by multiplying the transmitted horsepower by the service factor; or 1.50×75 horsepower giving you a 112 horsepower catalog rating.

Before actually referring to manufacturers' catalogs for the selection of the gear unit, you should consider the efficiency that can be expected from the type of gears involved as governed by the ratio of speed reduction. For the sake of our cooling tower fan drive example, we will use an output speed from the motor of 1750 RPM and a desired speed of the fan of 190 RPM. This ratio of reduction 9.17 to 1 can be handled by a single reduction gear unit. Engineering literature from AGMA or manufacturers of gear products lists this information. It will be found that a right angle Spiral Bevel reducer, single reduction, will perform at 98% to 98.5% efficiency.

WHEN selecting gears from manufacturers' catalogs, choose a gear size that is horsepower-rated equal to or exceeding the value you have estab-

AN OVER-ALL LOOK AT EFFICIENCIES AND RATIOS

Gear Type	Efficiencies		
	Single Reduction	Double Reduction	Triple Reduction
Herringbone, Helical, Bevel, Spur	98-98.5%	97-97.5%	96%
Worm Gears.....	(See discussion on Worm Gear Efficiency versus ratio)		
	Ratios		
	Single Reduction	Double Reduction	Triple Reduction
For Herringbone and Helical	1 to 1	11 to 1	75 to 1
Horizontal Parallel	through	through	through
Shaft Units.....	11 to 1	75 to 1	300 to 1

lished as a horsepower catalog rating for your drive.

In conclusion, we should like to make one broad recommendation to gear buyers, drawn from the sad experience of many purchasers over a period of many years: **Select a gear with a service horsepower rating which is equal to or greater than the optimum horsepower rating of your prime mover and/or your driven machine.**

Here are ten more significant points to keep in mind when you are selecting and buying gears:

1. Gears should conform to American Gear Manufacturers' Association standards.
2. Think of service. A gear product is only as useful as the organization that backs it. If the product is nationally distributed, be sure the gear manufacturer has national sales and service points.
3. Check for uniformity of selection and unit comparison.
4. Don't forget the importance of design, bearing life, case rigidity, and over-all simplicity.
5. Remember that standard ratios are desirable for better delivery on original units and replacement parts.
6. Keep the "freight allowed" angle in mind. Most AGMA members allow freight to any railroad siding in the U. S. on standard gear units.
7. Check stocking or inventory costs of your standard gear requirements with gear source.
8. Lean on a reputable gear manufacturer for guidance in gear drive design best suited to your job.
9. Seek out a gear manufacturer specializing in your particular requirements.
10. Check the responsibility of the manufacturer for:
 - (a) Repair parts' availability on old gears;
 - (b) Proven service to industry.



—Photo Courtesy Gleason Works

ZEROL BEVEL GEARS—have curved teeth with zero spiral angle and localized tooth contact. They operate with the same thrust and tooth action as straight bevels. Commonly used in aircraft propeller reduction units, instrument planetary and differential systems, marine applications, reversing gears, and paper mill and steel mill shear drives.



—Photo Courtesy Gleason Works

SPIRAL BEVEL GEARS—have curved, oblique teeth which are cut or ground to run with localized contact. Their gradual tooth engagement and overlapping tooth action results in smooth and quiet operation at high loads and speeds. This type of gear is commonly used in cooling tower fan drives, steel rod and tube mills and mining machinery, pulverizers, boring mill table drives and machine tool applications, marine propeller drives, winches and cranes, turbine drives, farm machinery, truck drives and earth moving equipment, aircraft accessory and high speed drives, helicopters, deep well pumping drives, printing presses, power hand saws, drills, nut setters, grinders, cloth cutting equipment and instruments.



—Photo Courtesy Gleason Works

HYPOID GEARS—are similar to spiral bevels except for offset between the pinion and gear axis. They operate more smoothly than spiral bevels, can be used for higher ratios, and have increased strength of pinion member.

Types of Gears



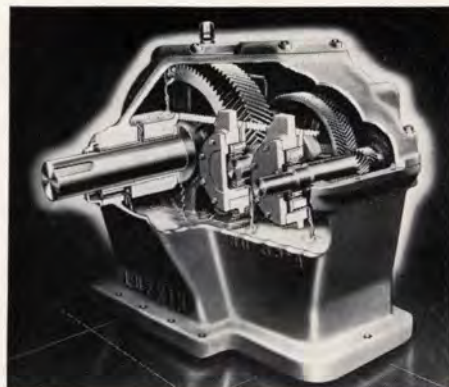
—Photo Courtesy Dodge Mfg. Co.

HELICAL GEARS—sloping teeth of a helical gear are generated in the cutting process and they provide an infinite number of thin gears in parallel, each of which comes into contact with the mating gear slightly behind the other, reducing chance of tooth error trouble. Noise problems often encountered in spur gears are eliminated with this type gear.



—Photo Courtesy J. W. Minder Chain & Gear Co.

SPUR GEARS—are relatively simple in design. Although they are usually thought of as slow speed gears, spur gears can be used at almost any speed if noise is not a consideration. Teeth, perfectly straight and parallel with the axis of rotation, may be cast or machined. Practical speed ratios run up to 10 to 1, but more-than-average noise is produced when operating at speeds over 1,000 fpm. Spur gears are available as internal as well as external units. When straight line motion is desired, it can be obtained through use of a spur gear and a rack.



HERRINGBONE GEARS—external herringbone or double helical gears are used when both high speeds and high horsepower are involved. When thrust exceeds limitations of single helical gears or plain bearings are used to support the gears, herringbone gears are used. External types have been built to carry as much as 60,000 h.p. on a single pinion and gear. This type of gear is used in oilwell pumping, paving plants, pumps, fans, compressors in refineries, conveyors, compressors, pumps in chemical plants, pulp and paper mill operations, lumber mill operations, rubber mill drives, on cranes, hoists, elevators, cement mills, pipeline pumps, in steel rolling mills.



THIS Herringbone Gear Reducer, single reduction is installed in the Pacific Coast's largest bottle and food container plant in Maywood, California. Troublesome open gearing was replaced by oil-tight, dust and abrasives proof enclosed reducer.

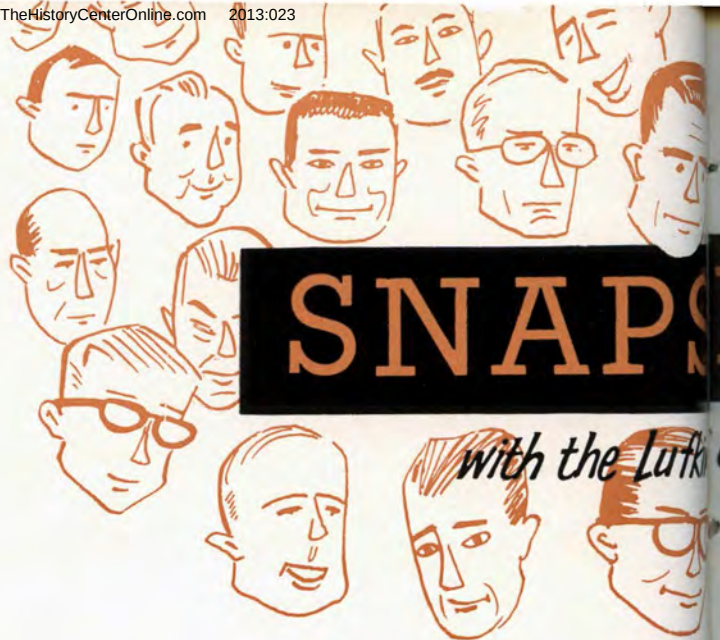
KINDS OF GEARS IN COMMON USE

PARALLEL AXES	INTERSECTING AXES	NONINTERSECTING NONPARALLEL AXES
Herringbone or helical external	Straight bevel	Crossed helical
Herringbone or helical internal	Spiral bevel	Single enveloping worm
Spur external	Zerol* bevel	Double enveloping worm
Spur internal	Face gear	Hypoid

*Registered trade name—see accompanying picture.



JOHN RIISE, left, Cushing, Oklahoma; W. W. TROUT, center, President, Lufkin Foundry, Lufkin; and BEN LaLONDE, Phillips Petroleum Co., Pauls Valley, Oklahoma.



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Santa Fe Springs, California



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Western Gulf Oil Company
Bakersfield, California



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and A. C. ANDERSON, Sohio Oil Co.;
both of Oklahoma City, Oklahoma.



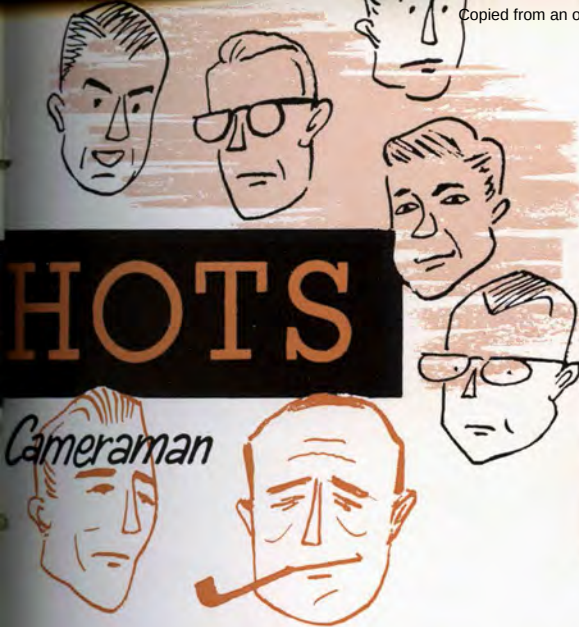
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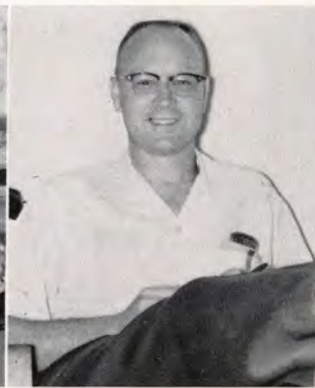
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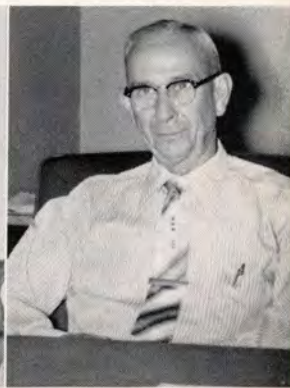
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more Snapshots



Left to right: RON OVENDEN, New Orleans, La.; THURMAN MELBY, Ventura, California; BOB ROBINSON, Bakersfield, California; all with Shell Oil Company.



Front row, left to right: FRED GRIFFIN, Lufkin Foundry, Lufkin; BOB WALKER, Shell Oil Co., Kilgore, Texas; L. A. LITTLE, Lufkin Foundry, Lufkin; SAM GIBBS, Shell Oil Co., Kilgore; ROY STROM, Shell Oil Co., Kilgore; VERNON GLENN, Lufkin Foundry, Kilgore; GENE NIXON, Lufkin Foundry, Sidney, Montana; C. J. SCHULLER, Lufkin Foundry, Lufkin. Second row, left to right: DICK DAMON, Shell Oil Co., Kilgore; W. T. CROWDER, Lufkin Foundry, Kilgore; COOPER RICHARDS, Lufkin Foundry, Lufkin; B. D. BEASLEY, GEORGE BARNES, and BOGGS MCKINNEY, all with Shell Oil Co., Kilgore. Back row, left to right: J. T. HOOD, Lufkin Foundry, Lufkin; RALPH AKERS, H. K. MCKINNON, both with Shell Oil, Kilgore; C. M. WOOTEN, Lufkin Foundry, Lufkin; MARSHALL TIBOLSKY, MILNER READ, B. J. BULLARD, HAL RUARK, JOE CAIN, DARYL GAUMER, all with Shell Oil Co., Kilgore; and NATHAN BACKLE, Delta Drilling Company, Kilgore.



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Sun Oil Company
Tulsa, Oklahoma

BOB DEWAR
Honolulu Oil Company
Taft, California

BILL RYHERD
Standard Oil Company
Taft, California

HORACE HINDREY
Shell Oil Company
Bakersfield, California

JENNINGS MUIR
Standard Oil Company
Taft, California





EARL QUAYLE
Shell Oil Company
Bakersfield, California



HARRY ABRUNS
General American Oil Company
Taft, California



Left to right: **TED CRAIG**, Duncan, Oklahoma; **S. K. MYERS**, Great Bend, Kansas; and **GORDON LEPLEY**, Tulsa, Oklahoma; all with Atlantic Refining Company.



Left to right: **BOB SPAULDING**, Lufkin; **DON SHONBERGER**, **DEAN ELLIOTT**, **DICK MILLER**; all with The Texas Co., San Ardo, California.



Left to right: **JIM HATFIELD**, Bartlesville, Oklahoma; **ORVILLE ATKINSON**, Great Bend, Kansas; **C. E. BEECHER**, Bartlesville; all with Cities Service Oil Co.; and **W. W. TROUT**, president, Lufkin Foundry, Lufkin.



Left to right: **FRANK PENDARVIS**, **BILLY SAUNDERS**, both of Bakersfield, Calif.; **GEORGE DABNEY**, Castaic, Calif.; and **TOM BYNUM**, Bakersfield; all with Humble Oil & Refining Co.



First row, left to right: **L. LOWE**, **R. WILLIAMS**, **B. SOLOMAN**, **P. PEARCE**, **B. SCOTT**, **C. MATTHEWS**, **L. SKAGGS**. Second row: **E. STEWART**, **C. MAYER**, **B. SAWYER**, **E. FORD**, **J. BARBOUR, JR.**, **B. SMITH**; all with John B. Barbour Trucking Co., Iowa Park, Texas.

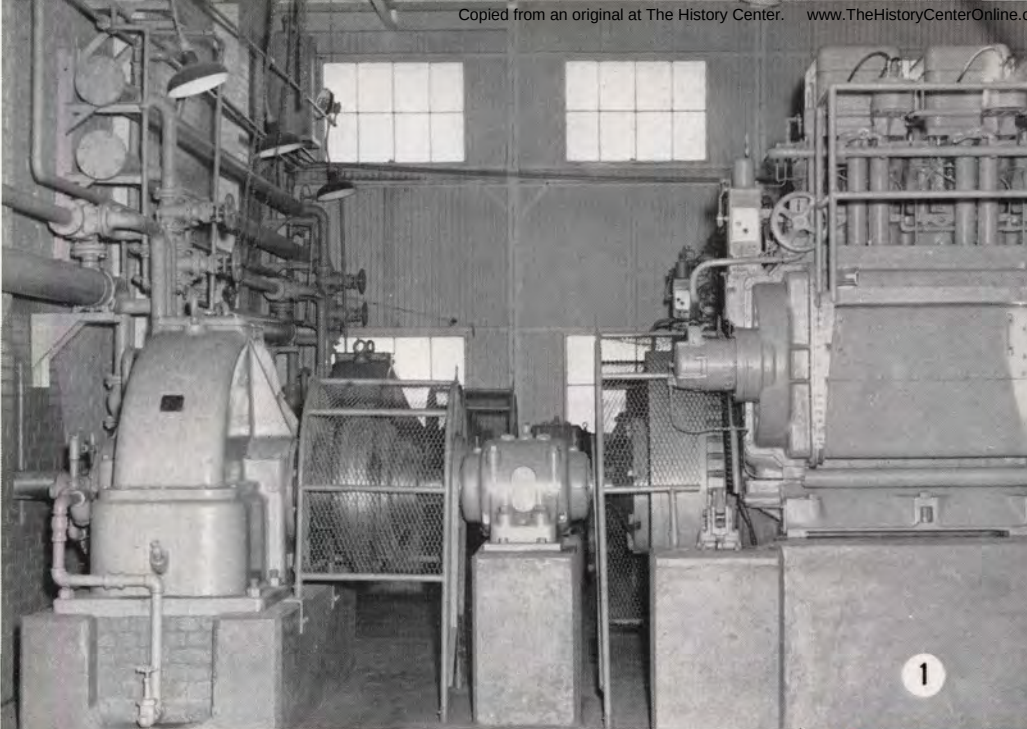
JOHN FRASER
Union Oil Company
Bakersfield, California

CLYDE ALLISON
Sunray Mid-Continent Oil
Company, Newhall, California

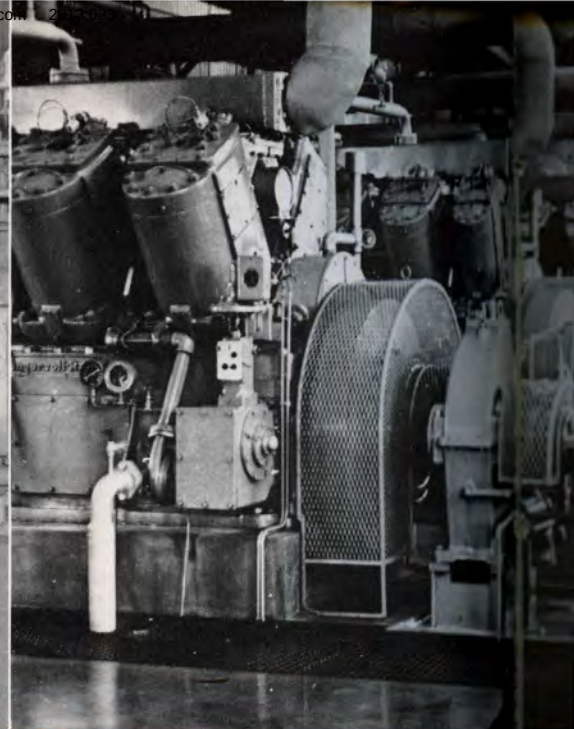
ED FRANK, JR.
Standard Oil Company
Taft, California

MASON PURTLE
Shell Oil Company
Bakersfield, California





1



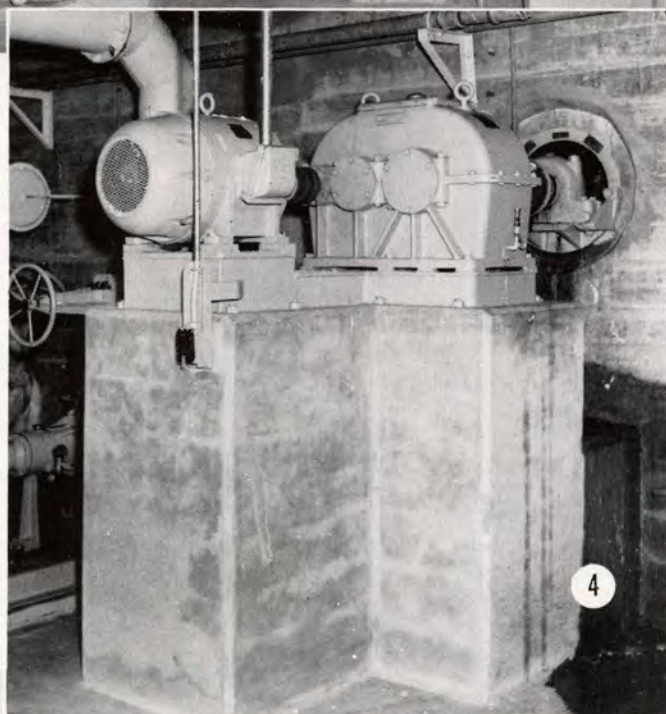
LUFKIN GEAR

1 LUFKIN N3012 Speed Increaser in Pipeline service in West Texas.

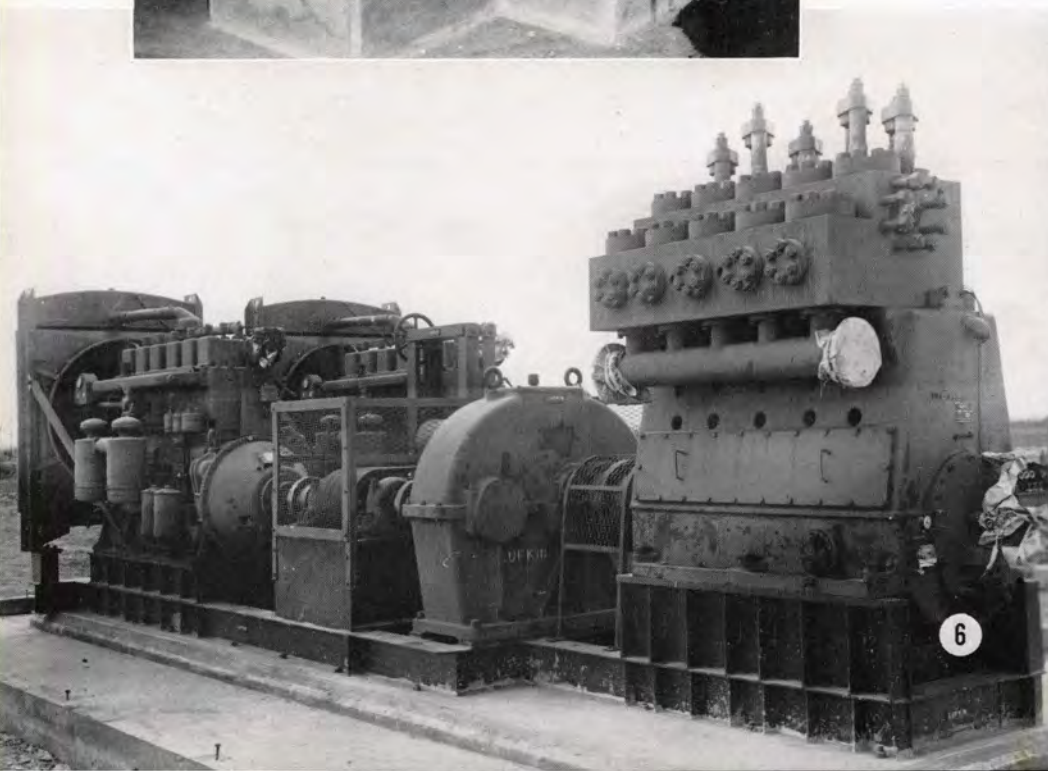
2 FOUR LUFKIN M189 Speed Increasers driving centrifugal pumps, handling input water for Burbank Water Floor, Kaw City, Oklahoma.

3 LUFKIN M105 Speed Increaser, coupled to centrifugal gas compressor, in Conroe, Texas.

4 LUFKIN D195 Speed Reducer driving agitator for stock mixer tank in a Texas Paper Mill.

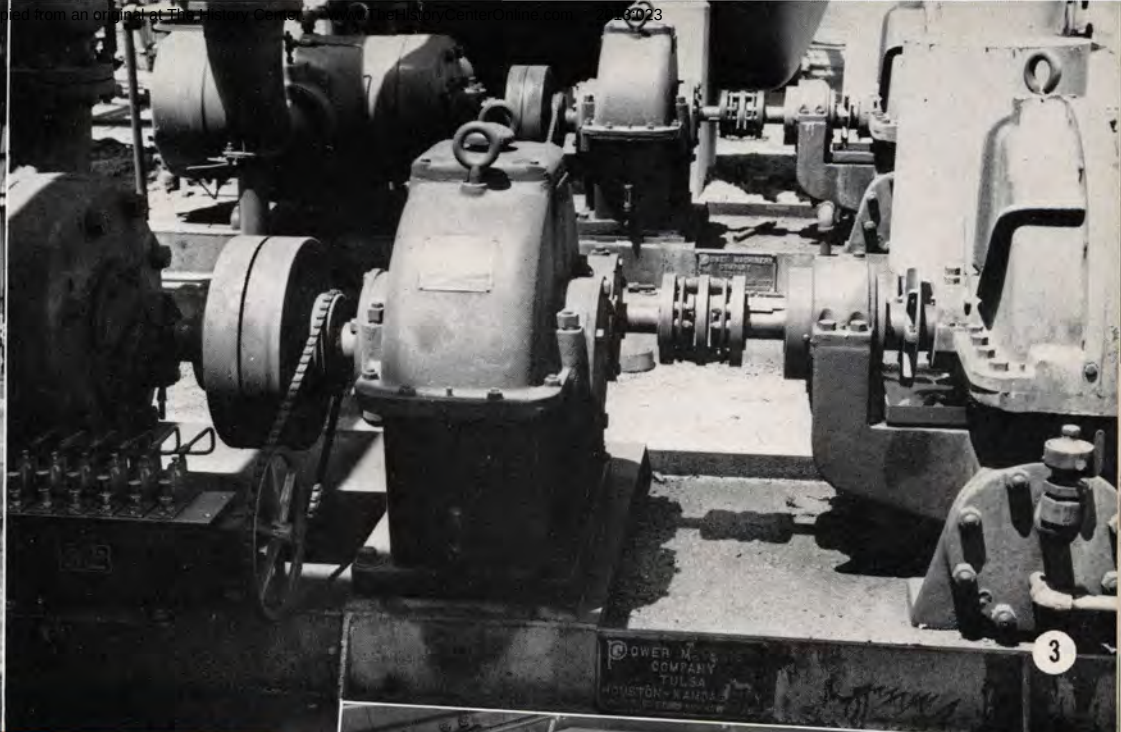


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6





R INSTALLATIONS

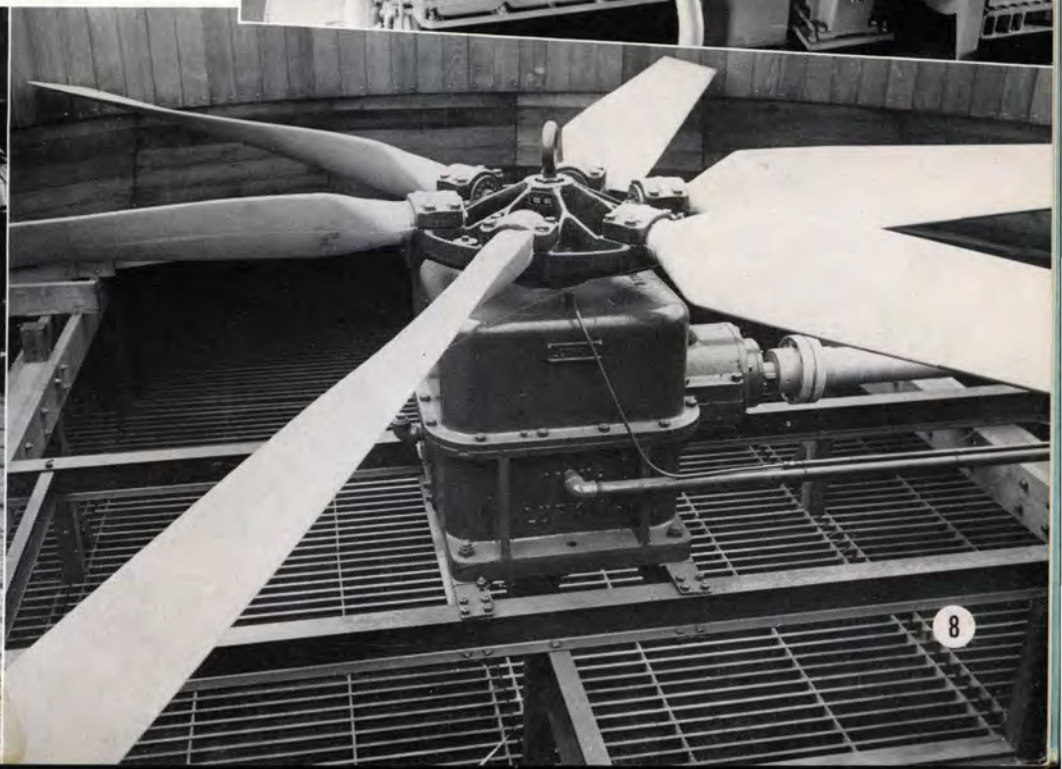
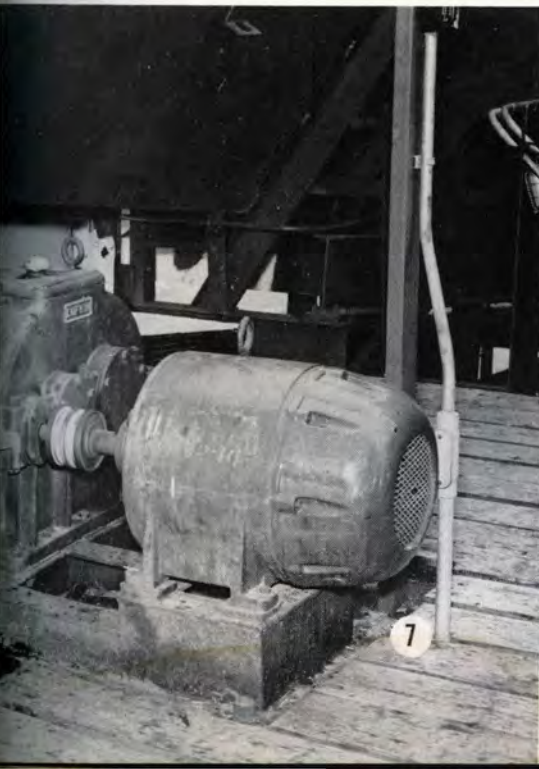
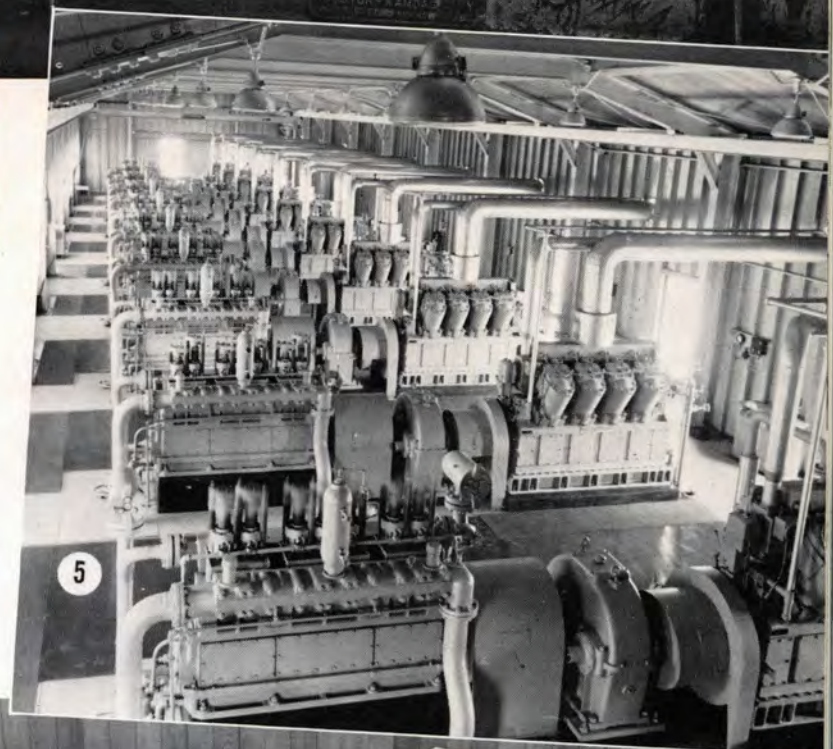
- 5 TEN LUFKIN S189A Speed Reducers driving Aldrich Septuplex Pumps in Water-flood service in West Texas.

Photo by R. B. Ward, Tulsa, Okla.

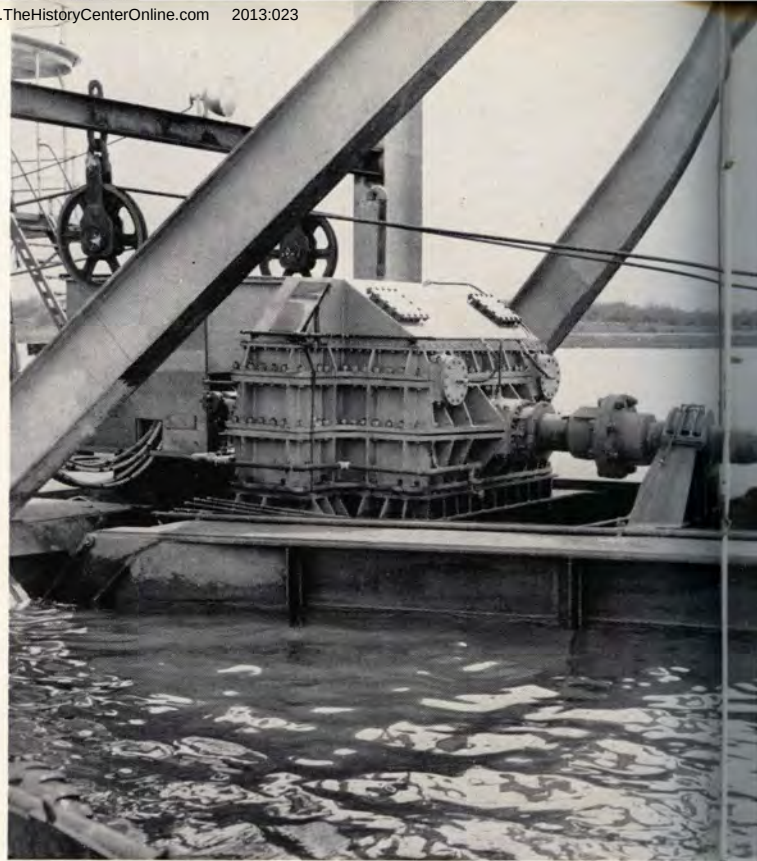
- 6 LUFKIN S2411 Speed Reducer driving Aldrich Pump.

- 7 LUFKIN D170 Speed Reducer driving log conveyor in a Texas Paper Mill.

- 8 LUFKIN 115-VB Spiral Bevel Gear Reducer driving cooling tower fan in Brea, California.



LUFKIN Gives it the Bite



THE largest gear drive manufactured by Lufkin Foundry and Machine Company was one to drive the cutterhead on a dredge for the Bauer-Smith Dredging Company of Port Lavaca.

Completed on February 1 of this year, the gear drive had a rated 1200 horsepower at 1200 r.p.m., was 12 feet long and 8 feet wide and weighed 42,000 pounds. It was twice as big as the largest gear box built for Lufkin pumping units.

The gear was installed on The "John H. Shary," a large hydraulic dredge with a 24-inch discharge. The Shary has quarters for 12 officers and 54 men. She has been used on many outstanding jobs such as the Calcasieu River channel to Lake Charles, Galveston harbor, and the widening and deepening of a section of the Houston Ship Channel. The Tule Lake extension of the Corpus Christi Turning Basin and the Mobile channel jobs were completed by the Shary after dredging some 10 million cubic yards. Bauer-Smith is the largest incorporated dredging organization with home offices on the Texas coast.

The unusual aspects of this job were the size of the gear and the fact that, until Lufkin engineers believed it could be built with herringbone gears, every one consulted on the project recommended only helical gears.

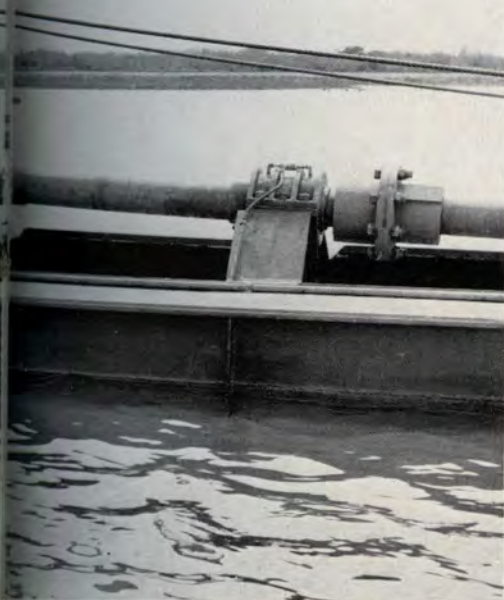
The housing for the gear was the largest fabrication job ever completed in the Structural Shop. When the gear was ready for shipment to the own-

ers, three and one-half hours were required to load the gigantic drive on a truck. Since none of the Company's cranes was big enough to lift it, it was put on skids and pulled over steel pipe by a truck winch. When it reached its destination at Port Lavaca, it was lifted off the truck by a Bauer-Smith steam loader.

The gear has been driving the cutterhead almost daily since February 3, 1957, at varying depths up to 40 feet.



THIS is largest gear drive ever built by Lufkin; it's twice as big as largest pumping unit gear.



VIEW of Lufkin gear box after being installed. It is 12 feet long, 8 feet wide, weighs 42,000 pounds

RIGHT: From gear box to cutterhead is 80 feet; diameter of cutterhead is 7 feet, length is 6½ feet

BELOW is the John H. Shary—175 ft. long, 51 ft. wide. She has quarters for 12 officers and 54 men



WHEN The Shary is working at full depth, gear is dipped into salt water. Gear box holds 155 gallons of oil, changed every six months





THE San Antonio office is located one block off Loop 13, and is easily accessible to all truck traffic

TWO NEW Trailer Offices Open...

LUFKIN Trailers are “bustin’ out all over.” This is not merely a parody on a popular song, but is fact. In September, two new and modern sales and service branch offices were formally opened.

The offices are located in Shreveport, Louisiana, and San Antonio, Texas.

“We are the first factory-owned sales and service branch in Shreveport,” said C. W. (Lefty) Alexander, sales manager of Lufkin Trailers, a division of Lufkin Foundry and Machine Company.

Designed like all other Lufkin branch offices with the standard Lufkin Pylon, the new Louisiana branch is located one mile from the city limits of Bossier City on the new four-lane Highway 80 East. William B. Wiener of Shreveport was the architect.

The San Antonio branch is located at 3343 Roosevelt, which is Highway 81 South. It is one block off Loop 13 which circles San Antonio.

Each building is constructed of steel, brick and



THE Shreveport office on new four-lane Highway 80 East is designed to serve truckers and fleet owners

masonry, and occupies 10,000 square feet of space. The properties are enclosed by chain link fence and the lots are hard-surfaced for year round convenience in parking and servicing trailers.

Adequate parts will be available at all times, and a stock of new and used equipment will be on hand for immediate delivery. All shop equipment is new and modern, with complete service facilities for repairing, altering, cleaning and painting new and used trailers.

Neil Morris is Shreveport Manager. Bob Burns covers sales in the Shreveport area, while Jimmie Walker covers Baton Rouge and Ed Morris covers Jackson, Mississippi. Don Butler is parts man and billing clerk, and Jimmie Monroe is service manager.

O. K. McCauley is San Antonio Manager. Kermit Gammill, Roscoe Weaver and Emory Horton are salesmen for the territory covered by this branch. Bobbie Wiley is parts man and Bobbie Neal is service manager.



NEW, modern shop equipment and trained personnel assure Shreveport area truckers top repair service

TRAILER OFFICES *continued*



SAN Antonio personnel stand before new offices opened in September. Left to right: Eddie Johnson, Earl Wilkinson, J. Canavacholo, Kermit Gammill, R. P. Weaver, Otis McCauley, branch manager; Jannie Baird, Emory Horton, Bob Wiley, Bob Neal

SHREVEPORT sales personnel are, left to right, Ed Morris, Jackson, Mississippi; James Walker, Lafayette, La.; Neill Morris, branch manager; and Bob Burns, Shreveport

AMPLE parking and storage space is available on the hard-surfaced lot adjoining the Shreveport offices





Snapshots

continued



OWEN W. MOREN
Western Gulf Oil Company
Bakersfield, California



MARTIN WILFERT
Tidewater Oil Company
Fellows, California



Left to right: **O. B. CROSBY, F. H. HUNTER, and G. W. WIDNER**; all with Carter Oil Company, Tulsa, Oklahoma



O. A. SCOTT, left, and TOM BYNUM; both with Humble Oil & Refining Co., Bakersfield, California.



THE CLASS OF PRODUCTION TECHNOLOGY of Kilgore College during a recent visit to the Lufkin plant. First row, left to right: **JOSE E. CALDERAS**, Creole Petroleum Co., Lagunillas, Estado, Zulia, Venezuela; **BISHOP CRADDOCK**, Honolulu Oil Corp., Sundown, Texas; **GENE NIXON**, Lufkin Foundry, Sidney, Montana; **WAYNE DEBEHNKE**, Lufkin Foundry, Lufkin; **W. LARRY ROBBINS**, The Texas Co., Palestine, Texas; **JOHN A. CHRISTIAN**, Pan American Petroleum Co., Drayton Valley, Alberta, Canada; **HENRY G. BERGEN**, Imperial Oil, Ltd., Devon, Alberta, Canada; **WENDELL POPE**, Ohio Oil Co., Sidney, Montana; **JACK JUMPER**, Lufkin Foundry, Corpus Christi, Texas. Second row, left to right: **RICHARD ETHERINGTON**, Kuwait Oil Co., Ltd., Ammadi, Kuwait, Persian Gulf; **CARLOS VAZQUES**, Creole Petroleum Co., Monagaz, Venezuela; **J. E. BRUNER**, Carter Oil Co., Pickens, Miss.; **W. T. CROWDER**, Lufkin Foundry, Kilgore, Texas; **MICHELE FERRARA**, Mene Grande Oil Co., San Tome, Anz, Venezuela; **STANLEY BECK**, Lufkin Foundry, Lufkin; **JIM BOYDSTON**, Husky Oil Co., Cody, Wyoming. Third row, left to right: **WARREN JOHNSON**, Lufkin Foundry, Lufkin; **JESSIE BLEVINS**, The Texas Co., Hobbs, N. M.; **DAVID BISHOP**, Lufkin Foundry, Lufkin; **WALTER RASMUSSEN**, Imperial Oil Co., Smiley, Saskatchewan, Canada; **HYDER EDWARD BARR**, Mene Grande Oil Co., Seminole, Oklahoma; **MYRON E. HUGGINS**, Leonard Crude Oil Co., Mt. Pleasant, Mich.; **JOHNNIE FINCHER**, Lufkin Foundry, Lufkin; **MAX FESS**, Ohio Oil Co., Orange, Texas; **CLAYTON F. BEST**, Monterey Oil Co., Bakersfield, California; **THOMAS K. PERKINS**, Atlantic Refining Co., Dallas, Texas; **L. A. LITTLE**, Lufkin Foundry, Lufkin; **RAY H. MARR**, Marr Company, Dallas; **STANLEY C. COOK**, Le Grand Limited, Calgary, Alberta, Canada; **COOPER RICHARDS**, Lufkin Foundry, Lufkin.



WAYNE DUNCAN
Franco Western Oil Company
Devils Den, California



EARL FORD, left, and BILL LEWIS, both with Reserve Oil & Gas Co., Tejon Ranch, California



BILL COMSTOCK, left, and TOM FITZGERALD, both of Bakersfield, California



First row, left to right: **COXEY EVANS**, Cities Service Oil Co., El Dorado, Kansas; **GENE NIXON**, Lufkin Foundry, Sidney, Montana; **BILL CANTRELL**, Cities Service Oil Co., El Dorado, Kansas; **OLIVER MCKAY**, Lufkin Foundry, Great Bend, Kansas. Back row, left to right: **LARRY WIGGER, MAX MAIN, BEN MEANS**, all with Cities Service Oil Co., El Dorado, Kansas.

NAT HAZELTINE
Standard Oil Company
Taft, California



BRUCE GROVER
Western Gulf Oil Company
Bakersfield, California



DAVE HOLTON
Shell Oil Company
Bakersfield, California

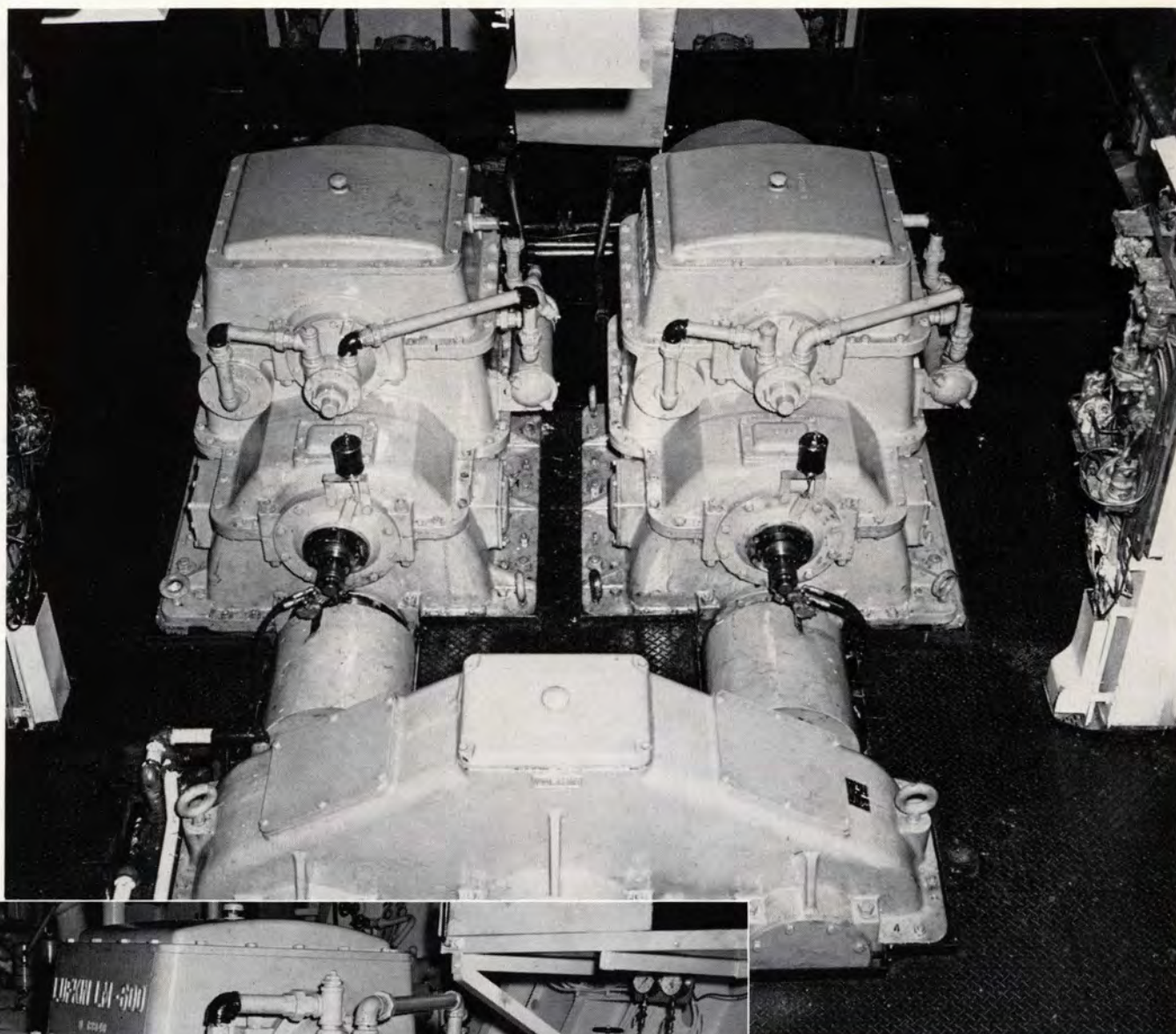


Left to right: **SAM MATTHEWS, Oklahoma City, Oklahoma; DON PRESLEY, Lindsay, Oklahoma; CARL HOFNER, Oklahoma City**; all with Cities Service Oil Co.

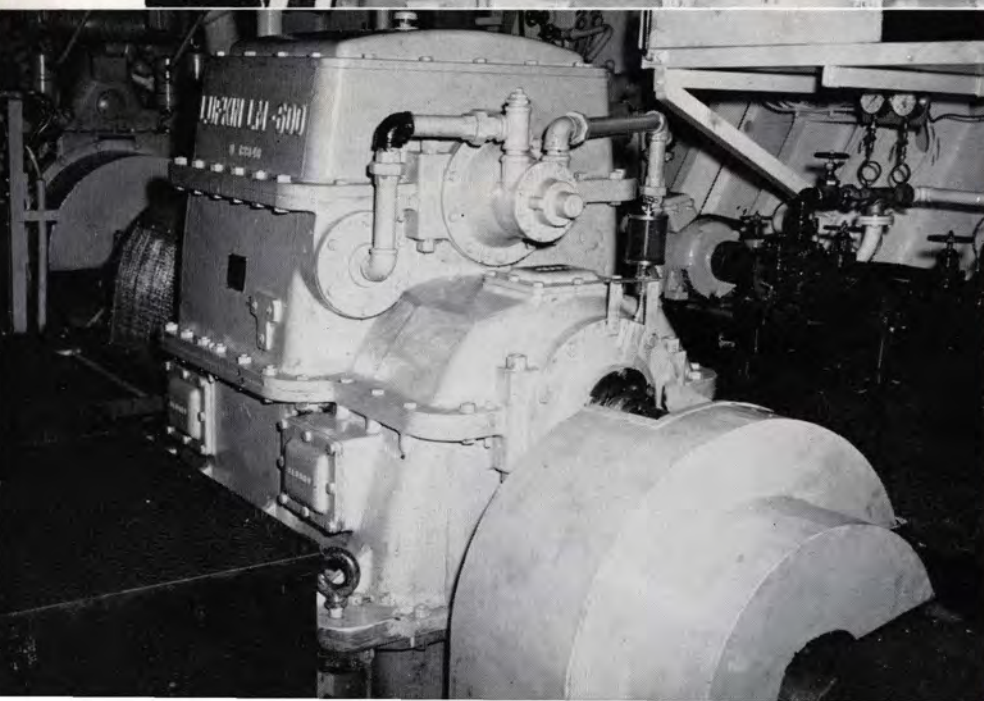




LUFKIN *Goes to Sea*



TWO LM-600-VA forward and reverse reduction gears compounded through Lufkin LM-608-C to drive center propeller of ERICKSON



LUFKIN LM-600-VA forward and reverse gears drive the starboard and portside propellers of ship



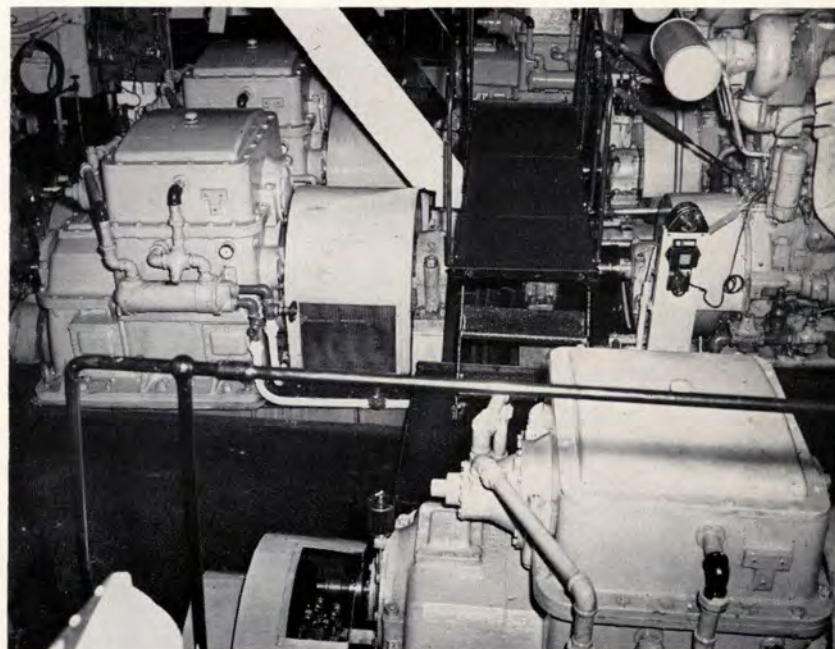
M/S CECILE ERICKSON at Berth 88, San Pedro, California, following her maiden voyage from Osaka.

THE first ship to use the new line of Lufkin Marine Reverse Reduction gears is now plying the waters between the Bahama Islands and the East Coast ports of the United States and Canada.

The M/S Cecile Erickson, a bulk cargo vessel, was built by the Osaka Shipbuilding Company, Ltd. of Osaka, Japan. She was launched December 4, 1956, and delivered to her owners, Inagua Transports, Inc., March 29, 1957, ready for her maiden voyage across the wide blue Pacific.

She sailed from Port of Osaka on March 30, and arrived at San Pedro, California, 18 days later on April 17, 1957.

This ship is the first of its type and design. She is powered by four high speed diesel engines,



STARBOARD to Port across engine room four Lufkin LM-600-VA Marine Gears are driven by diesel engines



OFFICERS of the Erickson are, left to right, Martin Dale, third engineer; Eugene Thompson, second engineer; J. J. Strokirk, captain; Erling Hansen, 4th. engineer; Alf Slagnes, chief mate

ENGINE Room Mate stands by for Captain's orders

through three propellers, with a combined normal output of 2000 B.H.P. at 1200 r.p.m.

The port and starboard propellers each are powered by one engine through a Lufkin LM-600-VA marine reversing gear. The center propeller is powered by two engines each driving through a Lufkin LM-600-VA and compounding through a Lufkin LM-608-C compound.

The ship has an over-all length of 373 feet, beam of 50.5 feet, 5592 tons (deadweight), and carries a crew of 28, captained by Joe Strokirk.

M/S Erickson departed San Pedro on April 22, bound for the Bahamas via Panama Canal. Principally, the ship will carry salt from the Islands to Brunswick, Georgia and other East Coast ports of the United States and Canada.



LUFKIN VANS

offer you these options

- MODEL ALV—ALL ALUMINUM
- MODEL FVLA—COMBINATION STEEL AND ALUMINUM
- MODEL FVL—ALL STEEL

IN DRY OR INSULATED FOR EVERY MODEL

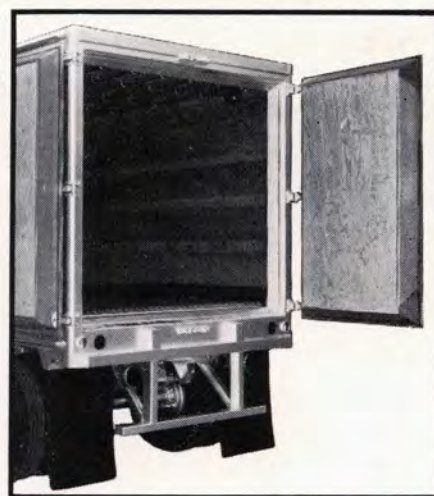


40 FEET LONG WITH SLIDING TANDEM AND DROP FRAME



Drop Frame Van with 2270 cu. ft. inside—6 inch or 24 inch radius corners optional.

→ All refrigerated and insulated models feature LUFKIN WEDGE Doors for sure, safe sealing—Let our representative explain the standard LUFKIN features on meat rails, extruded floor and other money savers for haulers of perishables.



LUFKIN TRAILERS

DIVISION OF

LUFKIN FOUNDRY & MACHINE CO.

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{ HOUSTON • DALLAS • SHREVEPORT • WACO • FORT WORTH • JACKSON, MISS.
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- REDUCTION GEARS
- CUTTERHEAD GEARS

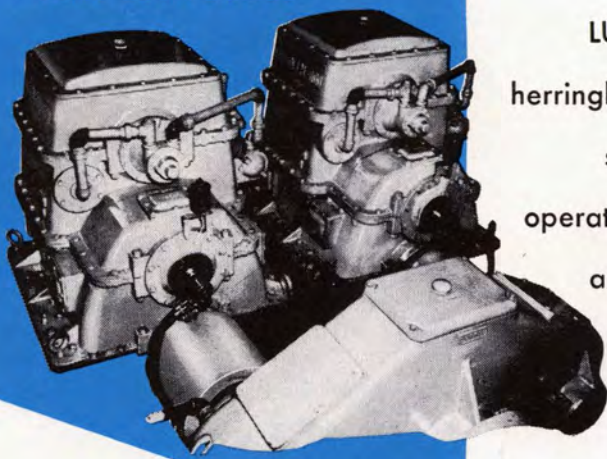
generated precision quietness
rugged dependable horsepower

LUFKIN

marine gears

For more profitable operating hours

- REVERSE-REDUCTION GEARS
- GEAR COMPOUNDS



LUFKIN marine designs feature Sykes precision generated herringbone gears throughout... mounted in heavy duty split housings... for the ultimate in quiet dependable operation... marine reduction gears, reverse reduction gears and geared compounds... a wide range of models from 450 HP to 2500 HP and standard ratios up to 5 to 1 maximum... cutterhead reduction gears... in-line vertical offset from 100 HP to 1200 HP.

On your next application, check the design advantages of LUFKIN... call or write

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FOUNDRY & MACHINE CO.
Plant & General Offices
Lufkin, Texas



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5959 South Alameda, Los Angeles, Calif.