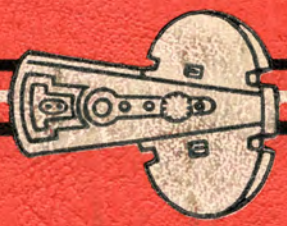
W. W. Trout
Do Not Borrow

LUFKIN OIL FIELD EQUIPMENT



CATALOG 36

Designed With Large Factors of Safety
and With Conservative Horse Power
Ratings Insuring Lasting, Efficient Service

"You CAN balance a well with a Lufkin Unit and Trout Crank"

LUFKIN FOUNDRY & MACHINE COMPANY • LUFKIN, TEXAS

LUFKIN EQUIPMENT OF ADVANCED DESIGN

LUFKIN FOUNDRY & MACHINE CO.

FACTORY AND GENERAL OFFICES

LUFKIN, TEXAS

BRANCH OFFICES AND WAREHOUSES

GULF COAST DIVISION
Houston, Texas.
806 2nd Nat'l Bank Bldg.

WAREHOUSES
Odessa, Texas

CALIFORNIA DIVISION
Los Angeles, Calif.,
5959 South Alameda

EAST TEXAS DIVISION
Henderson, Texas
Crim Crest Hill, P. O. Box 516
DALLAS, TEXAS
1504 Magnolia Bldg.

MID-CONTINENT DIVISION
Tulsa, Okla
1305 Philtower Bldg.

WAREHOUSES
Seminole, Oklahoma

EXPORT DIVISION
New York, N. Y.,
149 Broadway,
Cable address "LUFFO"

ARKANSAS-LOUISIANA DIVISION
El Dorado, Arkansas

BOILED DOWN FACTS ON LUFKIN EQUIPMENT

LUFKIN UNITS

Twelve years successful experience in designing LUFKIN UNITS, together with a close cooperation with practical field men, has developed a Standardized Product—their generally approved ADVANTAGES being:

1. Simple, rugged, construction, with
2. Large factors of safety in design.
3. Constructed of best material available.
4. Precision workmanship.
5. Interchangeable parts.
6. All wearing parts easily renewable.
7. Main bearings renewable in the field.
8. Ample bearing capacities throughout.
9. Alloy steel shafts, gears and pinions.
10. Lufkin-Sykes Herringbone Gears accurately cut from the hardest Alloy Steels.

FIGURE 1

NO FRICTION HERE

Our largest unit, No. 58, weighing 20,000 lbs. turning 20 Strokes per Minute, driven by ½ H.P. motor.

PRACTICAL OPERATING ADVANTAGES

Years of experience in rigid tests; practical inspection of our own gears and other makes in actual field operation has led us to the conclusion that the LUFKIN-SYKES **WEAR FORMULA** FOR HORSEPOWER RATINGS is conservative and correct for oil well pumping.

Lufkin Herringbone Gears are 96 to 98% efficient and with our ratings Lufkin Units will operate 5 to 10 years without appreciable loss in efficiency which is especially important when buying power.

Lufkin Units require little attention

Practically no repairs.

Large users report fifty cents to one dollar per month as repair costs on complete rigs.

Down time and rod trouble reduced to the minimum.

Accident hazard almost entirely eliminated.

100% salvage value—excepting foundation.

Lufkin Units are a permanent investment.

After all, the real cost is not determined by the purchase price but by how well the unit performs and how long it lasts!

To date no Lufkin Herringbone Gears have failed.

BOILED DOWN FACTS ABOUT LUFKIN COUNTERBALANCE CRANKS

THE TROUT COUNTERBALANCE CRANK

Rotary counterbalancing (originated by Lufkin) is now universally accepted, the idea not only reducing the power required, but due to the even strain produced on rods and walking beam, as well as the geared unit, rod trouble and beam breakage has been almost eliminated.

Cranks in several forms have since been offered, but our many customers continue to favor the Trout crank. It has ten outstanding mechanical advantages:

1. Simple, practical construction.
2. Easily adjustable from zero to maximum counterbalance.
3. Accurate balance within 2-amps on up and down stroke.

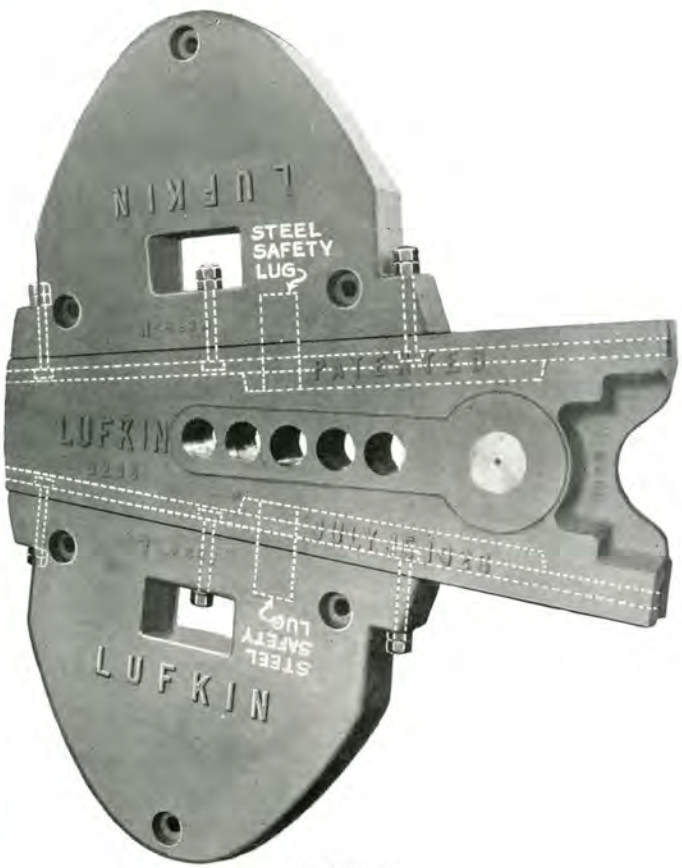


FIGURE 2

Adjustable Counterbalance Crank. — Note, Safety lugs: weights cannot slide off. This feature with fly-wheel brake allows weights to be shifted in five minutes.

4. Adjustments quickly made. Average not over five minutes, no weights to lift, add or subtract.
5. Lead or lag balance readily obtainable.
6. Safety feature—impossible to slide off—steel safety lug cast in each weight with forged steel bolts insure absolute safety. Unquestionably the safest crank to handle from the operator's standpoint.
7. When servicing well, weights in neutral position, crank has fly wheel effect which is very desirable for quick pick up on rods and tubing.
8. Trout cranks have a short radius of gyration (do not require as high concrete foundations as do those with weights on out end) consequently a better balance at top and bottom of dead center, and due to concentrated weight closer to crank pin, insures less bearing pressure and eliminates excessive strains on crank shaft.
9. Due to gas and other changing conditions frequent adjustment is necessary and advantageous in pumping oil—saving power, etc., which is readily accomplished on a Trout crank, yet very impractical on an "added to," or "subtracted from" drop crank.
10. Sufficient counterbalance proportionate to stroke readily obtainable, and is especially desirable in a three-well hook-up, see pages 848, 868-B and 868-C.
11. Counterbalance cranks aided by high speed fly wheels cut down the strain on pumping equipment, aid economical operation by permitting the use of smaller electrical equipment and lets the driving power operate at a higher efficiency.
12. You CAN balance a well with a Lufkin Unit and Trout Crank.

STEADY
MOTION

NO
VIBRATION

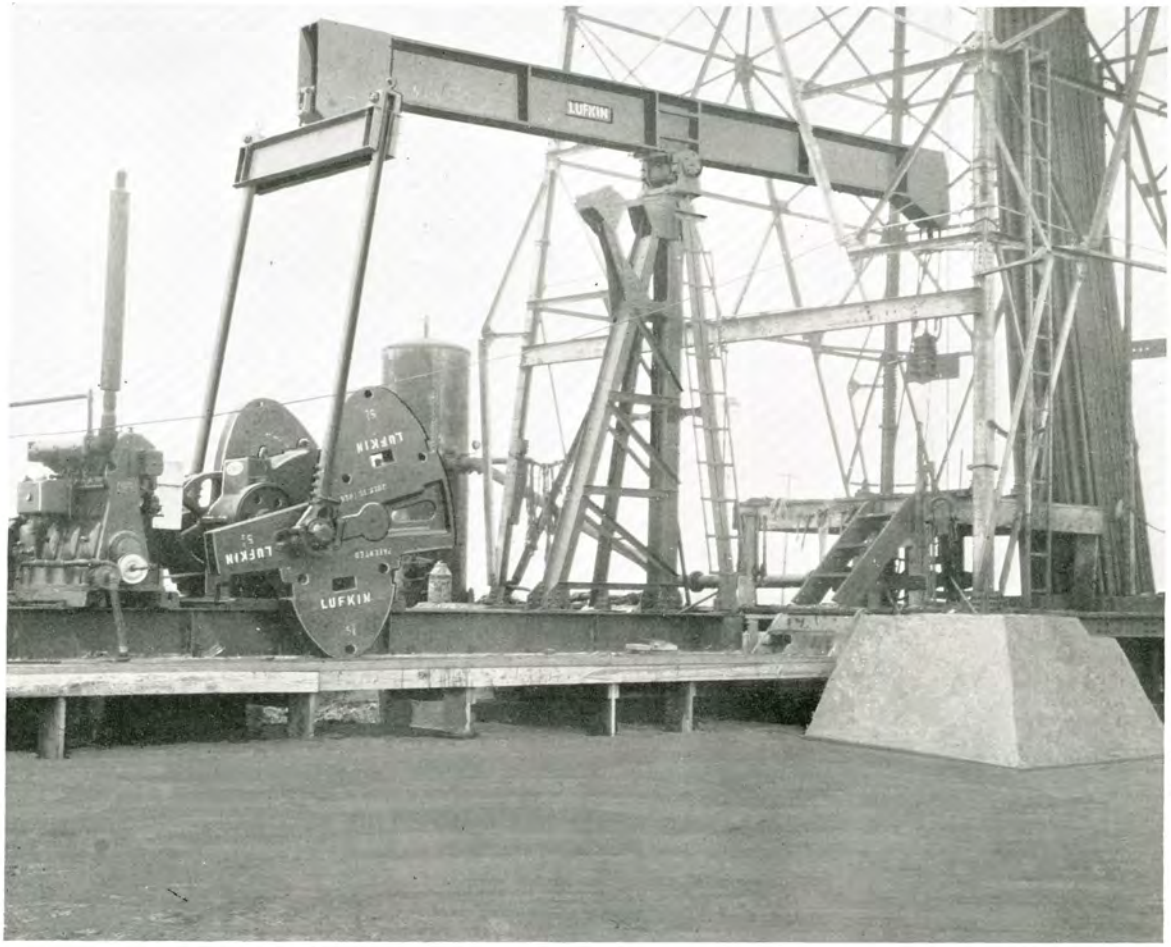
FIGURE 3

LUFKIN TWIN CRANK UNITS—TC-3-18—A Popular Size

IT'S HARD TO BEAT A SET-UP LIKE THIS

FIGURE 4

LUFKIN TWIN CRANK UNITS



Lufkin Twin Crank Unit Assembly No. 0-A-58. Oklahoma City field installation.

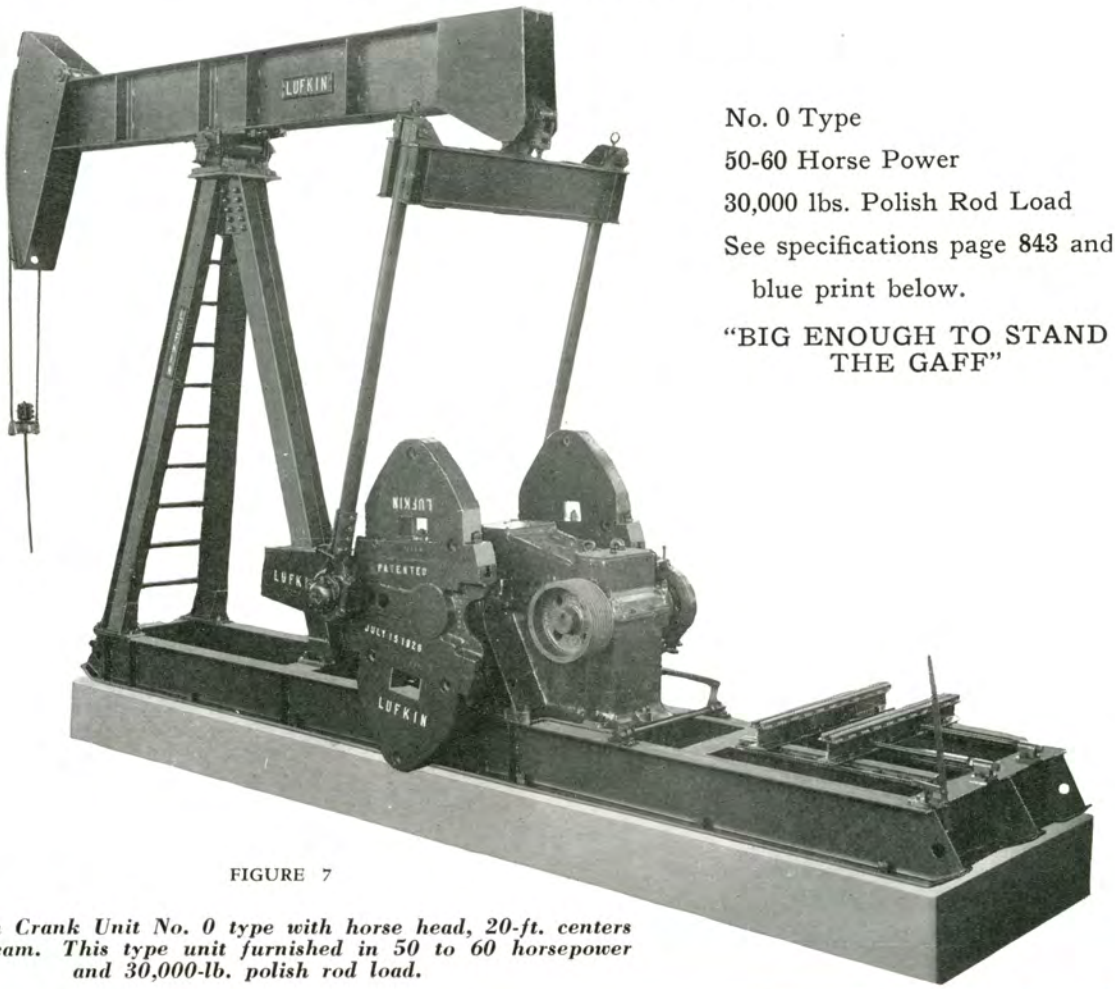
Well cleaning out easily done with Lufkin Units.

FIGURE 5

Lufkin Twin Crank Unit Assembly No. 3-18. Hundreds of these units are now in satisfactory operation.

FIGURE 6

LUFKIN TWIN CRANK UNITS



No. 0 Type
50-60 Horse Power
30,000 lbs. Polish Rod Load
See specifications page 843 and blue print below.

"BIG ENOUGH TO STAND THE GAFF"

FIGURE 7

Lufkin Twin Crank Unit No. 0 type with horse head, 20-ft. centers (130-lb.) beam. This type unit furnished in 50 to 60 horsepower and 30,000-lb. polish rod load.

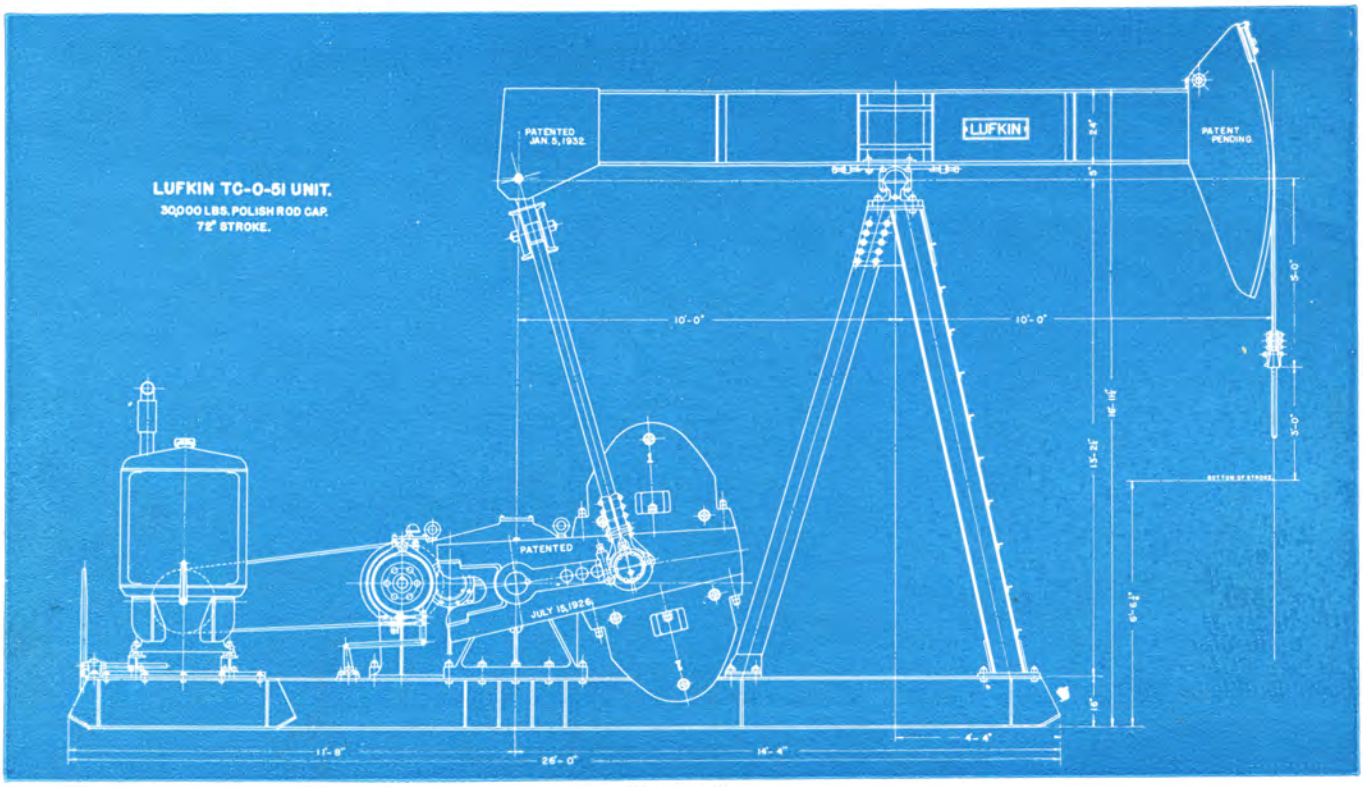


FIGURE 8

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN TWIN CRANK UNITS

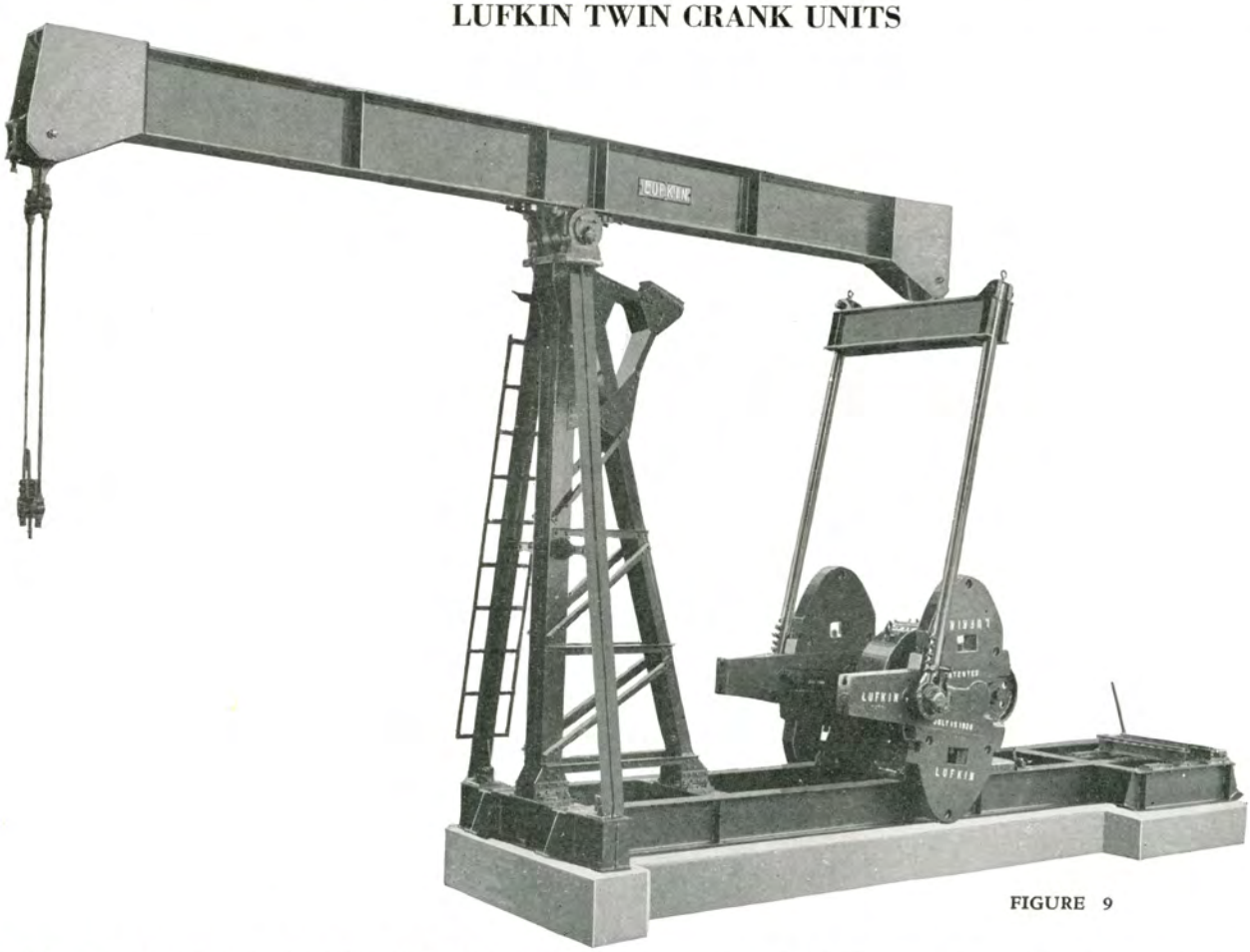


FIGURE 9

Lufkin Twin Crank Unit Assembly No. O-A-58 with long beam 28′ 0″ 130-lb. per foot, designed to clar derrick sills. See specifications page 843 and Bule Print below.

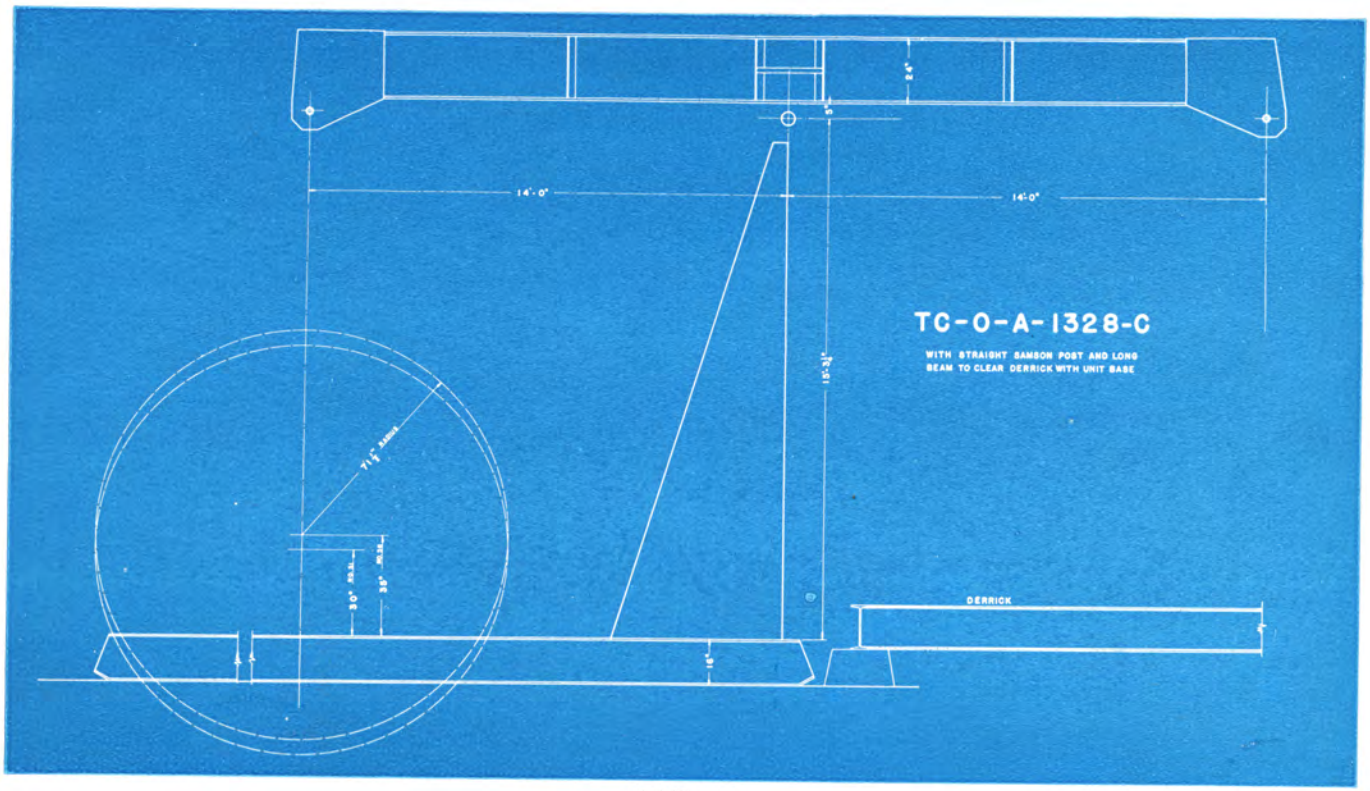


FIGURE 10

LUFKIN TWIN CRANK UNITS

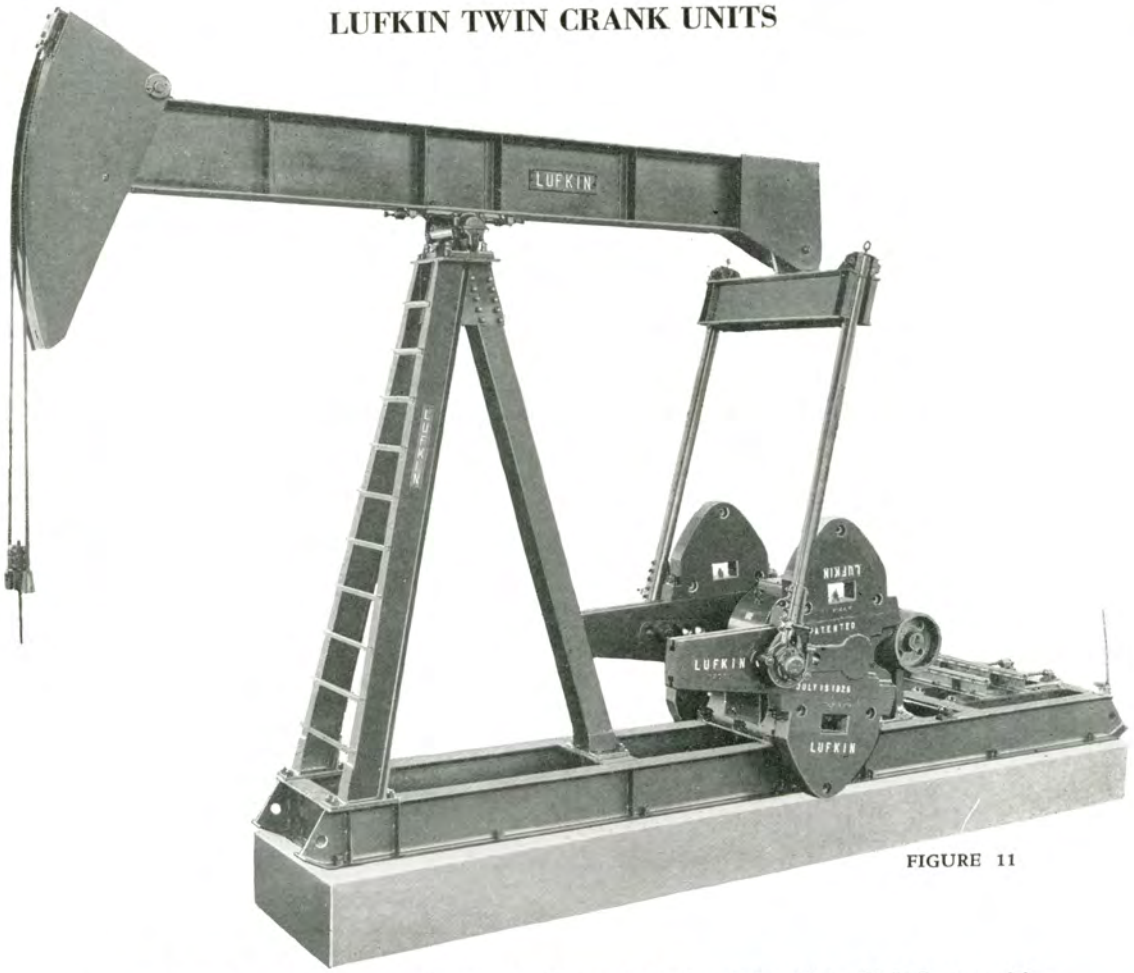


FIGURE 11

Lufkin Twin Crank Unit assembly No. 1. This unit designed for 40 to 50 H.P. capacities and 25,000 Lb. polish rod loads. See specifications page 843 and Blue Print below.

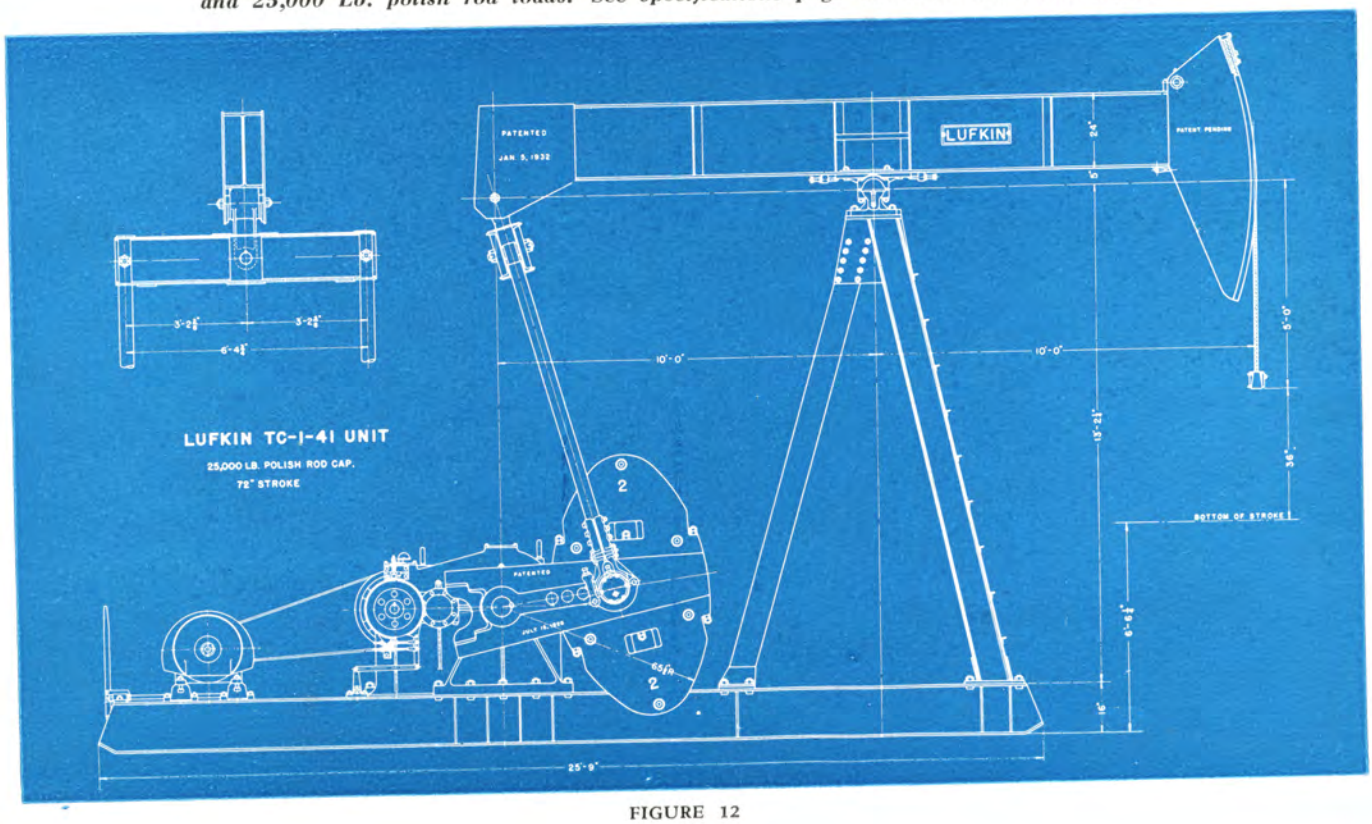


FIGURE 12

LUFKIN TWIN CRANK UNITS

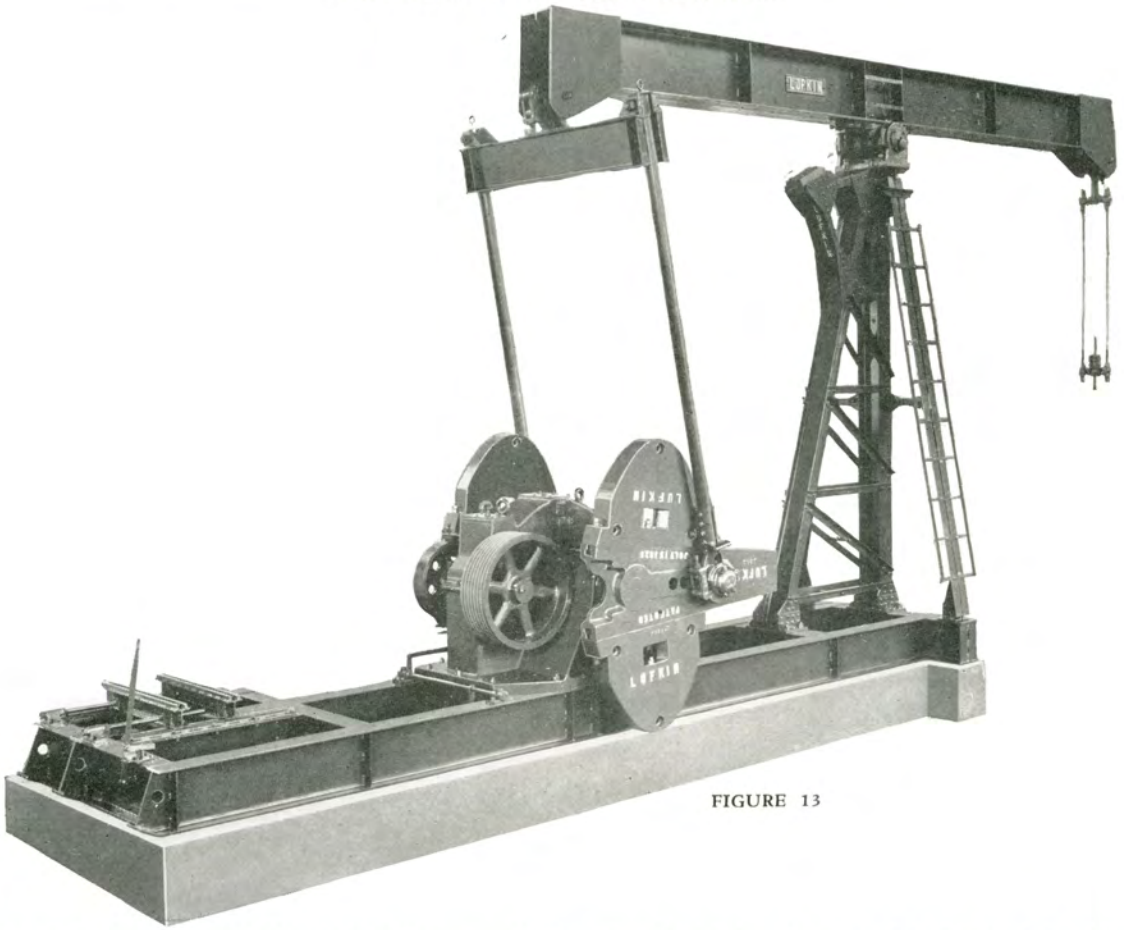


FIGURE 13

Lufkin Twin Crank Unit assembly No. 1-A. This type unit is equipped with long beam and is designed for 40- to 50-H.P. loads. Beams with 25'-0" working centers are usually furnished, however, 28'-0" beams can be furnished if desired. See specifications page 843 and Blue Print below.

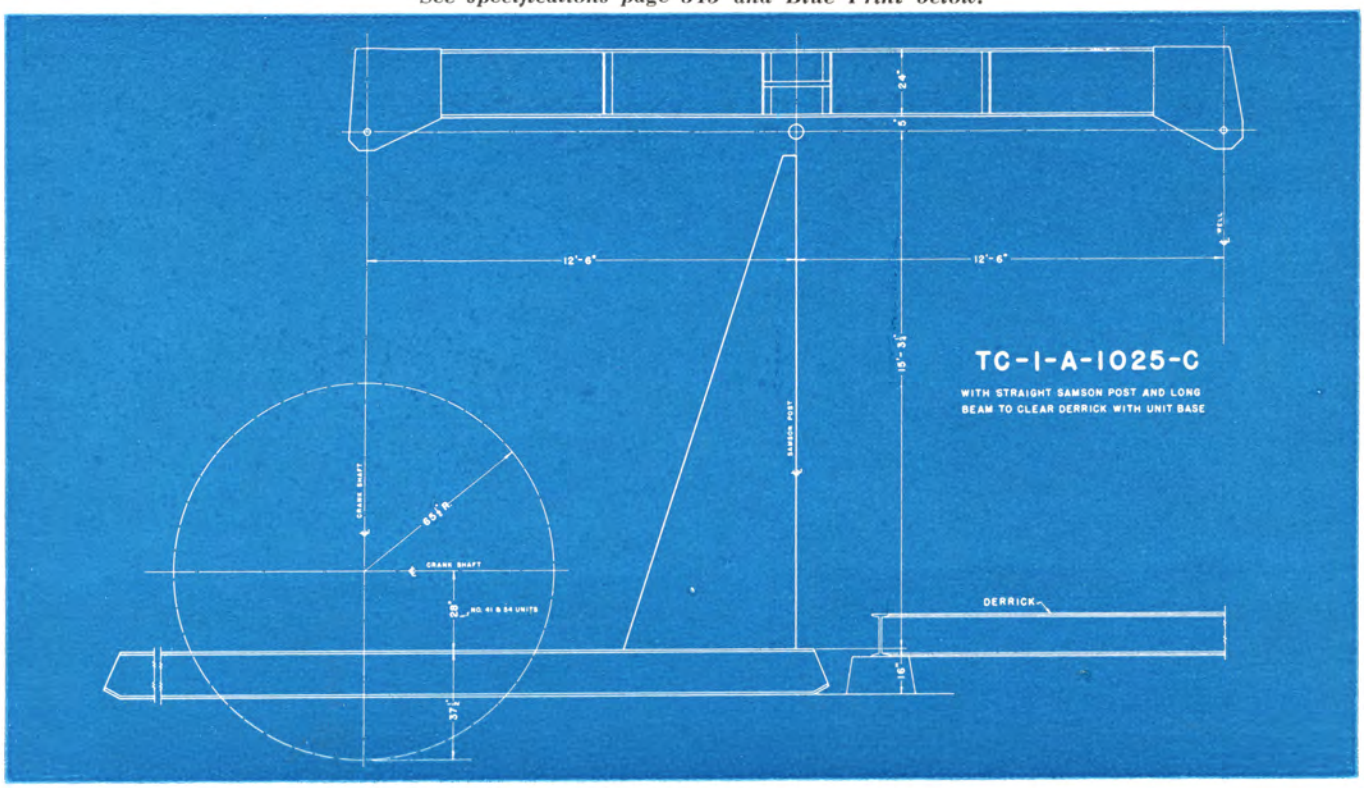


FIGURE 14

LUFKIN TWIN CRANK UNITS

FIGURE 15

Lufkin Twin Crank Unit Assembly No. 2 — 30 to 40 H.P., 20,000 lb. Polish Rod Load — 64.6" Stroke.
See specifications page 843 and Blue Print below.

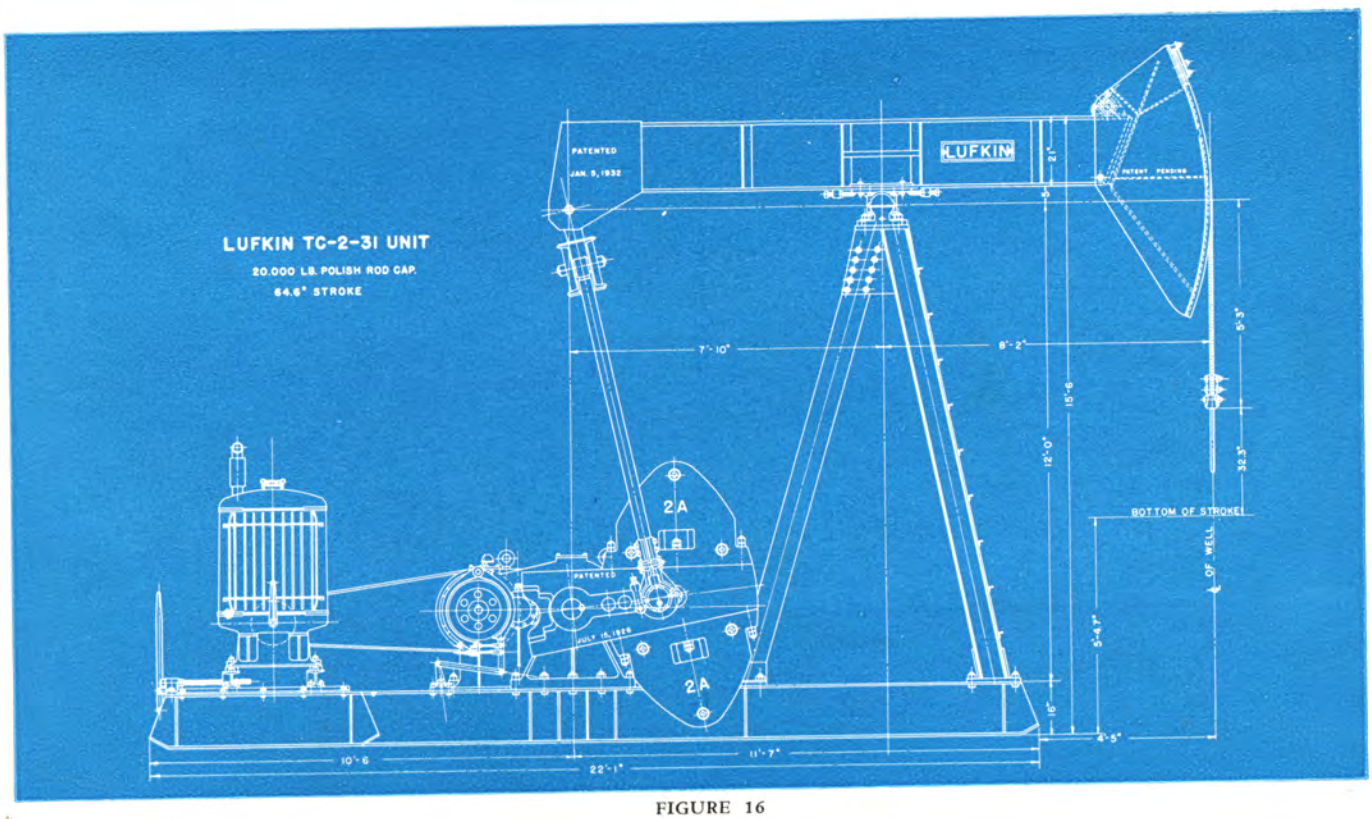


FIGURE 16

LUFKIN TWIN CRANK UNITS

FIGURE 17

Lufkin Twin Crank Unit Assembly No. 3—20 to 30 H.P.—17,000 lb. Polish Rod Load, 54" stroke. See specifications page 843 and Blue Print below.

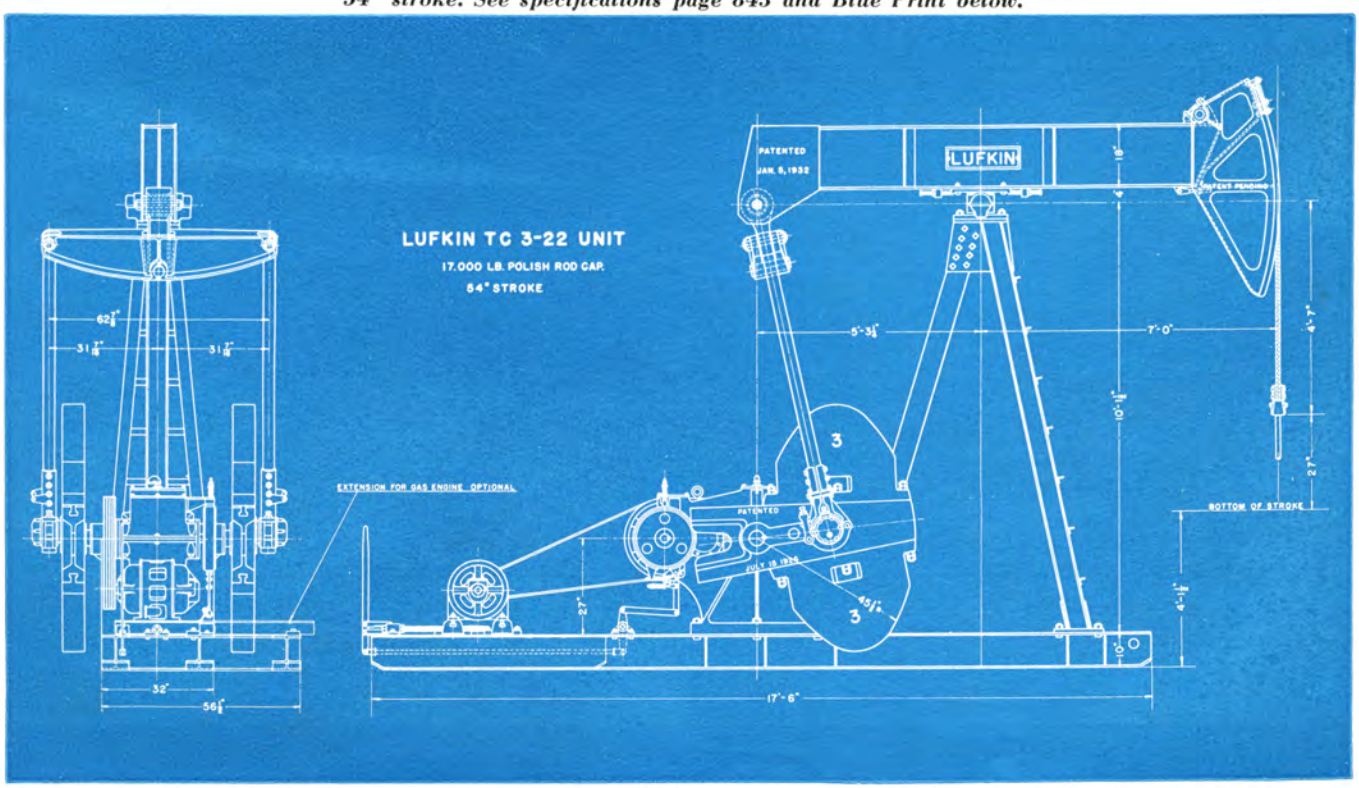


FIGURE 18

LUFKIN TWIN CRANK UNITS

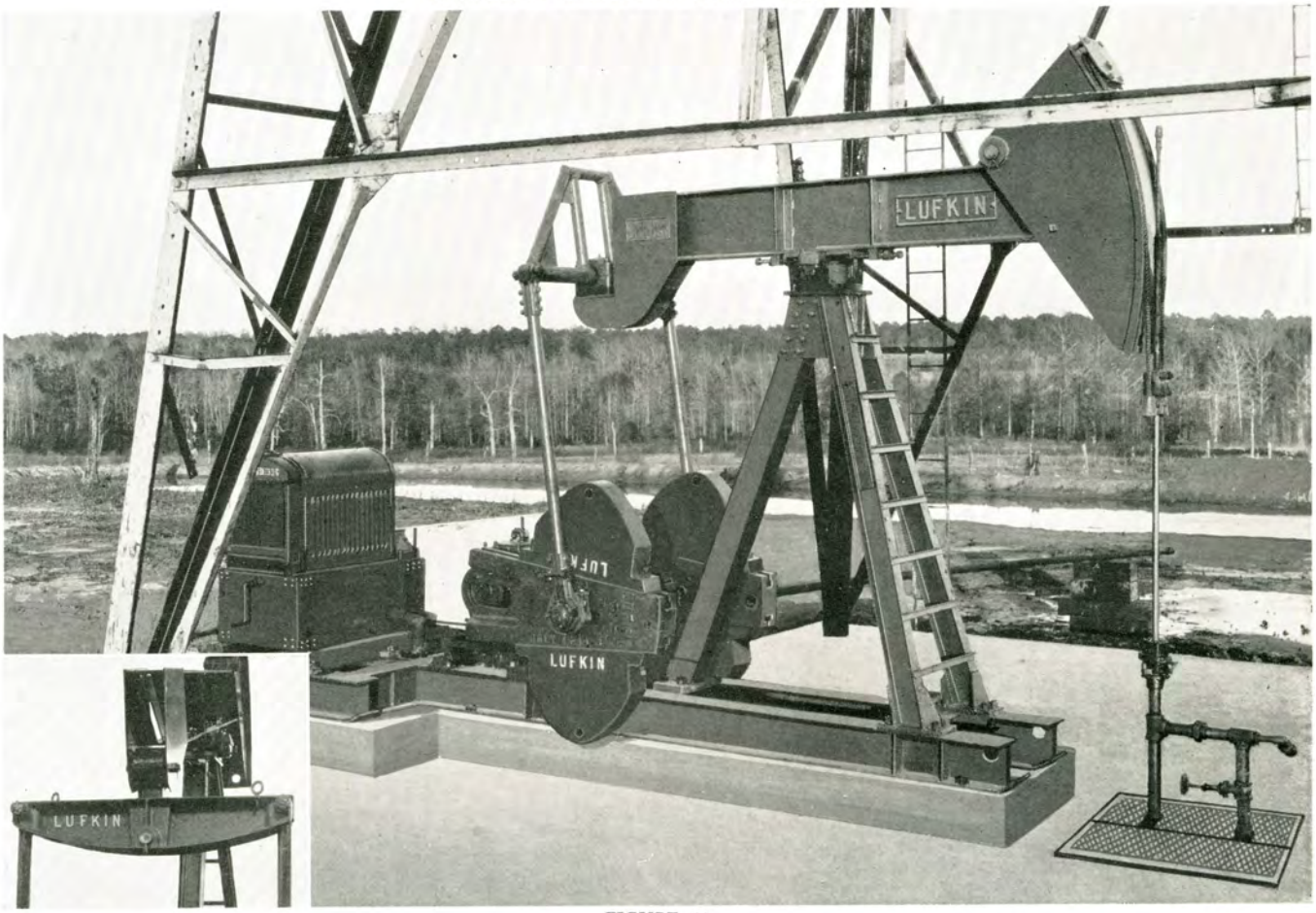


FIGURE 19

Lufkin Twin Unit Assembly No. 4. This unit furnished in from 10 to 20 H.P., has a polish rod load of 12,000 lbs. Note insert shows new style crosshead which is now regularly furnished. See specifications page 843 and Blue Print below.

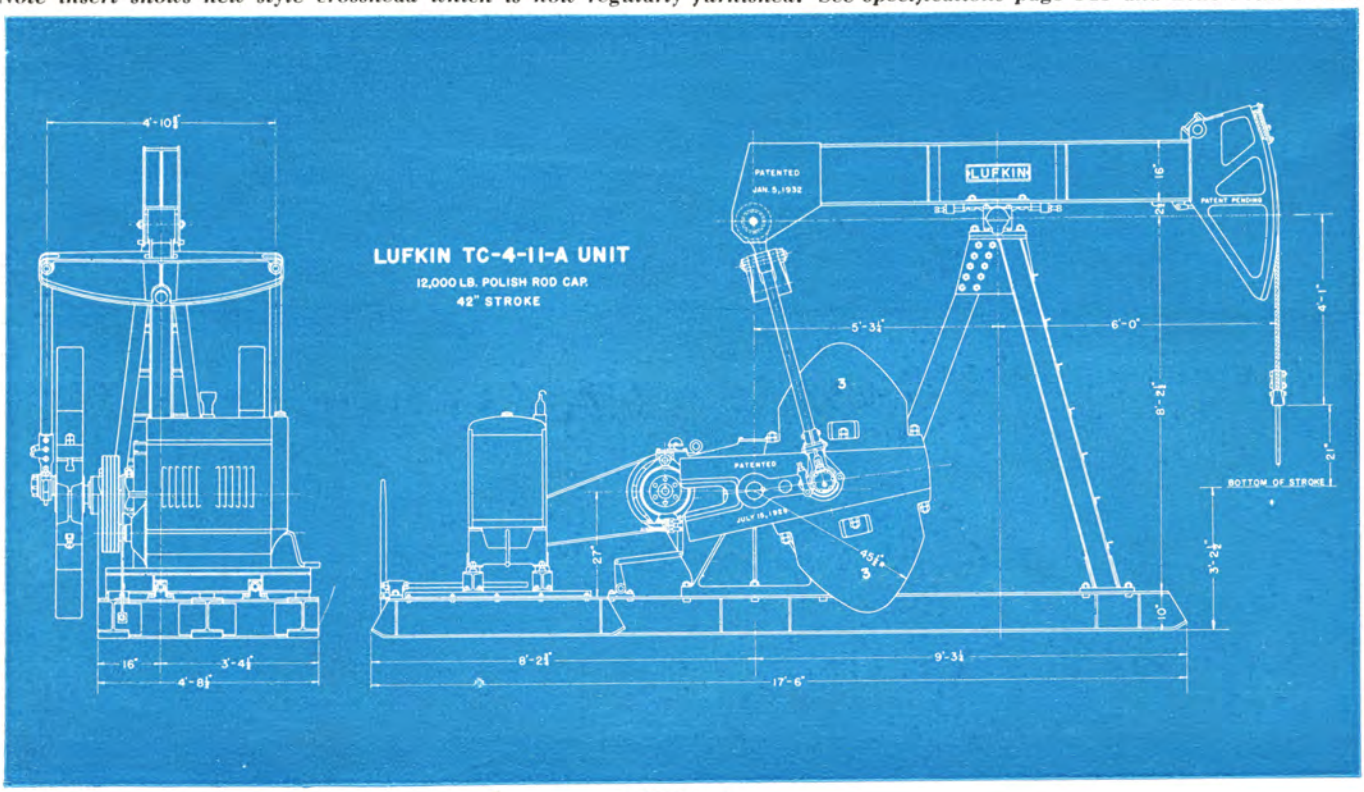


FIGURE 20

LUFKIN TWIN CRANK UNITS

FIGURE 21

Lufkin Twin Crank Unit assembly No. 5. This unit designed for horse power capacities of 5 to 10 and 10,000 pound polish rod loads. See specifications page 843 and Blue Print below.

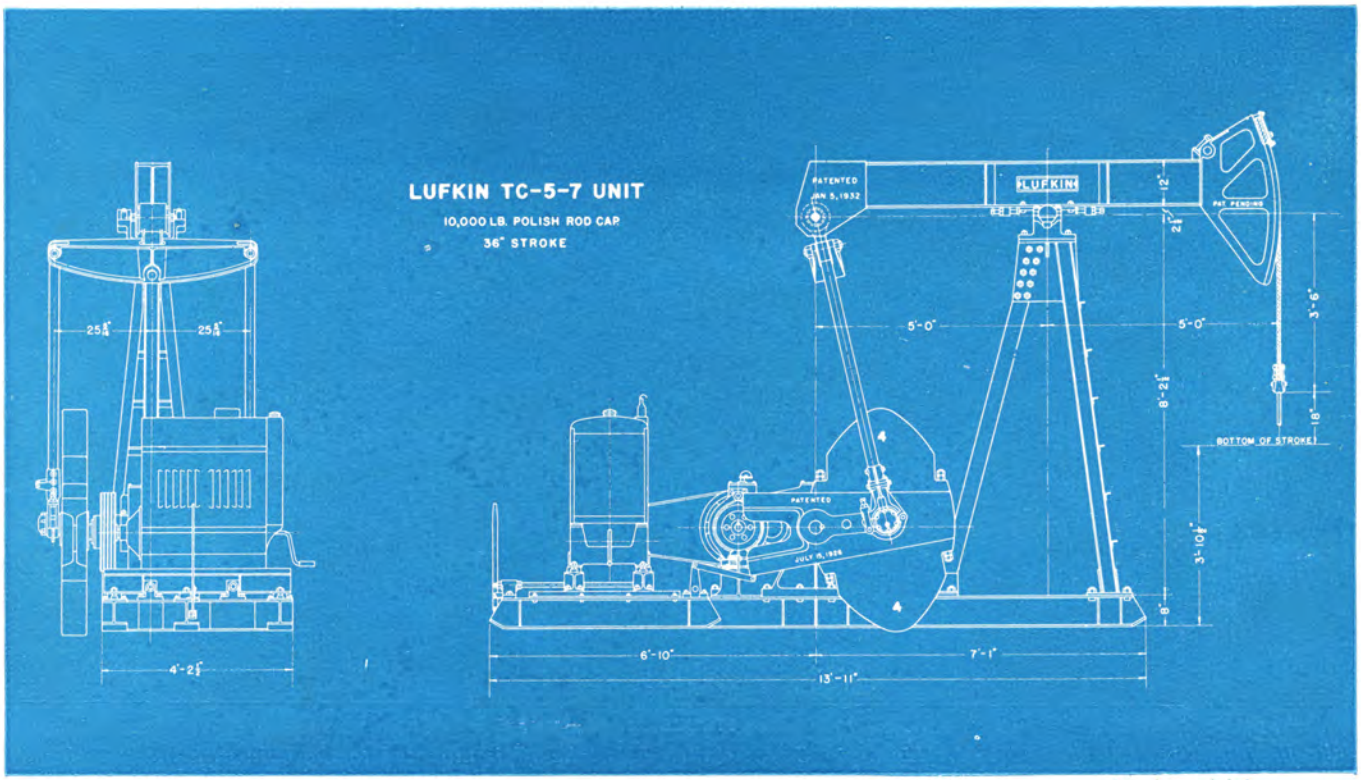


FIGURE 22

ADAPTATIONS SPECIAL TO LUFKIN TWIN CRANK UNITS

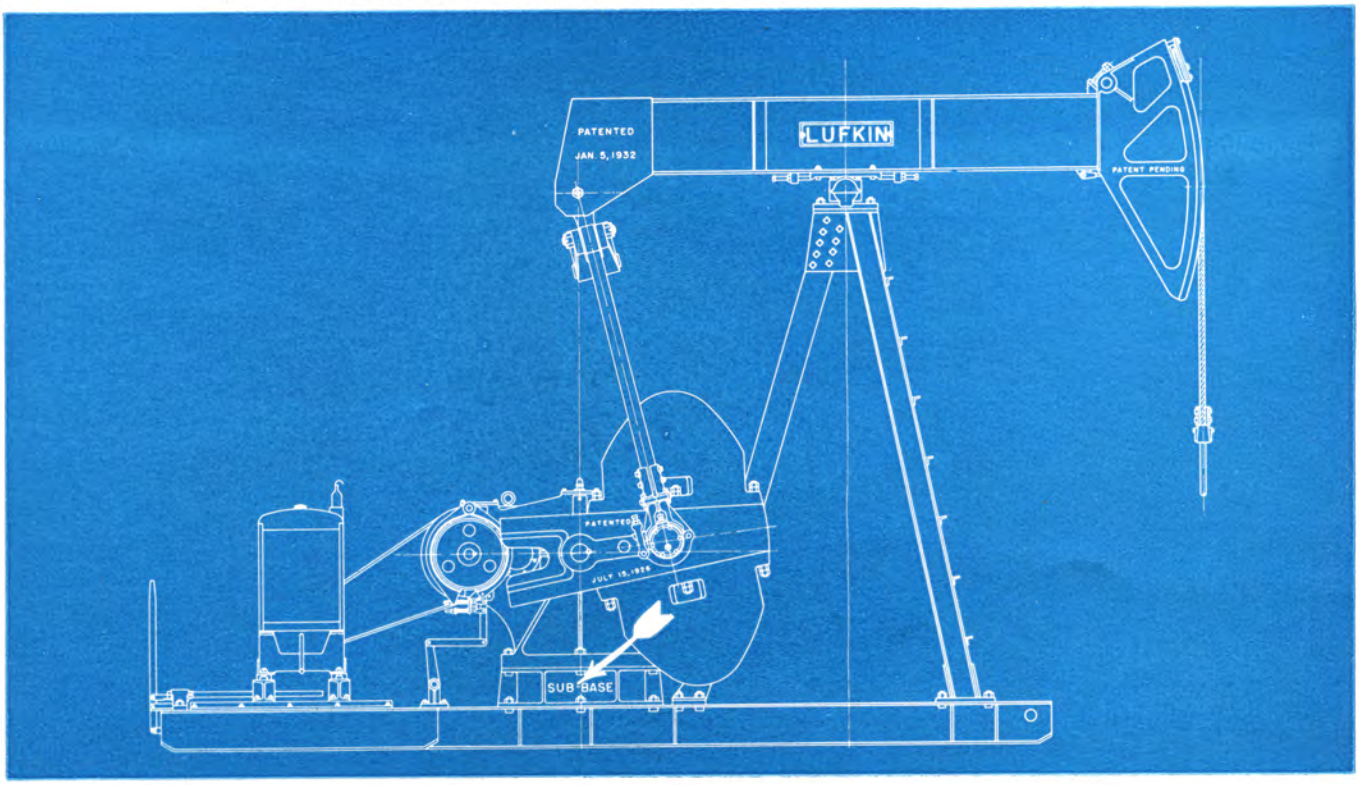


FIGURE 23

Sub bases are furnished where customer desires cranks to clear derrick floor or intends to use portable equipment to test wells. These are furnished at a slightly extra price. Operators however find it advantageous to keep unit as close to foundation as possible, decreasing angularity of pitman and securing steadier operation.

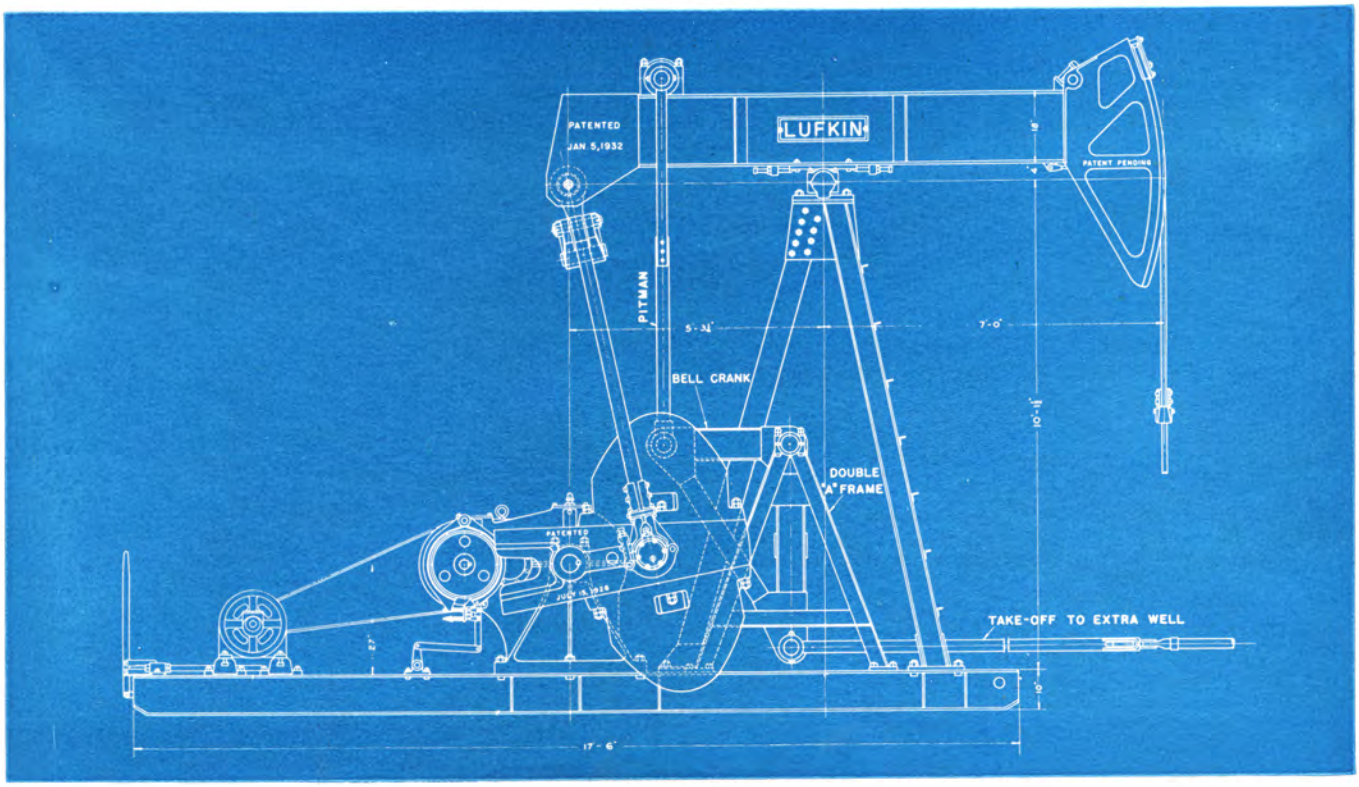


FIGURE 24

Take-off for extra well applied to Lufkin Twin Crank Units. This take-off is mounted to the base with two "A" frames, Double Bell-Crank with Ball Bearing on Beam, and bronze bearings on Rocker Shaft. Extra well helps to balance main well.

NOTES ON ORDERING TWIN CRANK UNITS

Unless otherwise ordered, drive pulleys for all T.C. units are on the left side when standing behind the unit looking toward the well.

Gas engine extensions are always to the right standing behind the unit unless otherwise ordered, and will fit most any type multi-cylinder engine. Some makes of slower speed engines, however, with special fly wheels require special construction and extra length which may be had on factory shipments at slight extra cost, they are made on order promptly.

With gas engines, double geared units run clockwise, single geared units run counter clockwise.

If no pumping speeds are specified unit will be furnished with pulleys to operate at 20-S.P.M.

A complete twin crank unit includes wire line, line hanger and polish rod clamps for 1"—1⅛"—1¼" rod, belt drive pulleys and belts with cover for same, in fact everything above base line of unit to the polish rod. Motor or gas engine pulley furnished, bored to suit.

Foundation bolts are extra, also prime mover.

Electric motors when furnished include overload relay and push button station.

Gas engines are complete except volume tank, scrubber and regulator.

NOTE: Bolts are provided on unit for either gas engine or motor, to bolt same to skids.

One of many California installations in the heavy deep producing fields where large quantities of fluid are being handled continuously.

FIGURE 25

THE NEW GEAR RATING FORMULA

Adopted Tentatively by the A.P.I. November 10, 1935, at Los Angeles, California

The tentative adoption by the American Petroleum Institute of the Gear Rating Formula together with specified rules and conditions under which gears are to be operated has had the effect of INCREASING OUR HORSE POWER RATING 25% to 30% AVERAGE. Opposite each unit will be found three horsepower ratings, the top figure representing the A.P.I. peak horsepower, the middle figure the nominal A.P.I. horsepower—and the third figure the original Lufkin Sykes Rating in horsepower, which many have found dependable in the past, and is placed herein for reference.

The new formula covers gear box design, shaft and bearing proportions which is well within the proportions of our original design, no changes in our equipment or processes are required.

Having universal rules of operation and horsepower ratings is very desirable and advantageous to the Oil Industry as well as the Manufacturer. The latter, however, is now relieved of considerable responsibility. Certain gear manufacturers supported a standard rating in an attempt to make a "grocery store item" out of a pumping unit. The customer to select the unit and if it fails in service it is his responsibility.

This company pioneered gears for oil well pumping during a period when every possible barrel of oil, and often lots of water had to be lifted. Gears had a real job to perform. We believe that the new formula smacks of too much "Research" and "Brain Trust Theories", and that the Industry has not had a long enough practical experience, especially under Proration, to approve of such an ideal set-up. Operators who have had to get the limit production a few years ago, will appreciate our view point.

Too, we believe, pumping under Proration has had a strong tendency to under-value the peak loads on an oil well, also to overlook the possibility of water, in the later life of the well, with a tendency to buy a unit with just enough power to pump under present proration conditions. We think this is a great mistake. Yet, this advice is given by suppliers of equipment who themselves lack experience, and believe that oil well ratings for gears that pump 24 hours per day with a hammer load at every stroke, are very little different from Industrial Gears that usually operate eight hours per day on a steady load.

Believing history will repeat itself, as it usually does, the time will come again when geared units will be required to work to capacity, at which time well loads and requirements can and will be better known.

We believe too much importance is given the "factor of hardness" in the new formula. The pinions are to have a hardness factor ranging from 225 to 280 Brinnel. Gears of cast steel, from 180 to 300 Brinnel. Lufkin gears are all manufactured within these limits. Alloy steel forged pinions will average 260 to 270 Brinnel. Alloy cast steel gears, 180 to 220. This is the practice of 95% of American Gear Manufacturers who heat treat not only the pinion, but the gear, and harden them before cutting. This is the only process that insures precision, accuracy, smoothness and quiet running gears without back lash. This is a policy that, having proved 100% satisfactory with us, will be continued.

We know that there is a definite relationship between hardness and wear. But we believe that the gear industry has had too little experience in hardness above 240 Brinnel on the size gear used in pumping units to include it in a standard rating. The original recommendation of the Manufacturers Committee was 225 Brinnel and it was reluctantly raised to 240 Brinnel on a compromise.

We do not believe it practical to cut cast steel gears harder than 225 Brinnel although it can be done. Hardening gears after cutting is successfully done on small gears especially in the automobile field, and on industrial gears not over 20" in diameter. Larger sizes such as they use in pumping units, cut out of soft material, are carburized and hardened, but as their makers admit, not without more or less warping. It is impossible to be otherwise.

This process precludes throwing precision to the winds, allowable back lash is necessary, and instead of smooth tooth surface with full bearing across the face sliding into one another as is our method, the tooth contacts are spotty and bumpy, resulting in noisy operation, especially in helical gears.

Such gears have their application, but hardly on an oil well where steady motion is most desirable, and where the presence of back lash in gears tends to crystallize rods readily.

While we respect hardness as a factor in considering the horsepower in the formula, we believe, that there is a limit where hardness becomes a hindrance with many negative arguments that space does not permit us to discuss. However, we believe most Engineers will discover it is, after all, simply a "smoke screen" to cover up many gear failures that some of our friends have experienced in their efforts to "get in the game" by recommending small gears —simply because hardness is their outstanding, and perhaps only feature to talk about.

Not having a gear failure since manufacturing herringbone gears, and so far as we know no excessive wear showing in any of our units that we have sold, we believe we have a right to make the above statement which should off-set what our friendly competitors say—Lufkin Units are overpowered.

After all we will depend on our experience as our safest guide and teacher, and will continue our policy of building the best product possible, advocating the purchase of Units of sufficient size rather than smaller equipment. The satisfactory record of Lufkin Units will be continued and we will give value received to our customers.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN TWIN CRANK UNIT—Table No. 26

No. 0. TWIN CRANK ASSEMBLY. Designed for 30,000 Lbs. Polish Rod Load and 72" Maximum Stroke.

GENERAL SPECIFICATIONS: Depth Base, 16"; Width Base, 49¾"; Samson Post, 13' 0" High; No. 1B Center Iron, 5" x 24" Trunnion; Walking Beam 24" x 14" x 130 Lbs.; Working Centers, 10' 0" and 10' 0", Horse Head Type; Pitman, structural }[Cross Beam Type, 4" Heavy Pipe Connection; 4" x 6" Crank Pins; 7272 Cranks, 71½" Rad.

Unit No.	Type Gears	* H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs. No. 1 Reg. Wts.	Effective Counterbalance, Lbs. C.I.Aux. Wts.
58	Single Reduction	94.7P 60.3N 48.4L	9.7	6 7/16"	3 13/16"	43¼"-11C 43¼" Max.	55"x10"	O-58; 44,000 lbs. O-A-58; 45,500 lbs.	32"	34,000	42,400
									42"	25,900	32,300
									52"	20,900	26,100
51	Double Reduction	77.2P 49.2N 43.3L	28.79	6 7/16"	3 3/16"	35"-11C 52" Max.	36"x12"	O-51; 45,000 lbs. O-A-51-1328-C; 46,500 lbs.	62"	17,550	21,900
									72"	15,100	18,850

This unit when ordered as No. 0-A will be furnished with 28-ft. 130-Lb. Center Line Beams.

No. 1. TWIN CRANK ASSEMBLY. Designed for 25,000 Lbs. Polish Rod Load and 72" Maximum Stroke.

GENERAL SPECIFICATIONS: Depth Base, 16"; Width Base, 43"; Samson Post, 13' 0" High; No. 1B Center Iron, 5" x 24" Trunnion; Walking Beam 24" x 12" x 100 Lbs.; Working Centers, 10' 0" and 10' 0", Horse Head Type; Pitman, Structural }[Crossbeam Type, 4" Heavy Pipe Connection; 4" x 6" Crank Pins; 7266 Cranks, 65½" Rad.

Unit No.	Type Gears	* H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs. No. 2 Reg. Wts.	Effective Counterbalance, Lbs. C.I.Aux. Wts.
54	Single Reduction	73.2P 46.6N 37.3L	9.4	6 7/16"	3 7/16"	35"-11C 35" Max.	47"x10"	1-54; 32,500 lbs. 1-A-54; 34,600 lbs.	32"	25,750	32,000
									42"	19,600	24,400
									52"	15,850	19,700
41	Double Reduction	63.6P 40.5N 33.8L	30.12	6 7/16"	2 13/16"	25"-8C 48" Max.	34"x10"	1-41; 32,000 lbs. 1-A-41; 34,200 lbs.	62"	13,300	16,500
									72"	11,450	14,200

This unit when ordered as No. 1-A will be furnished with 25-ft. or 28-ft. 130-Lb. Center Line Beams. #2C 5"x24"

No. 2. TWIN CRANK ASSEMBLY. Designed for 20,000 Lbs. Polish Rod Load and 65" Maximum Stroke.

GENERAL SPECIFICATIONS: Depth Base, 16"; Width Base, 37"; Samson Post, Tripod, 12' 0" High; No. 2 B Center Iron, ~~5" x 18"~~ Trunnion; Walking Beam, 21" x 9" x 82 Lbs.; Working Centers, 7' 10" and 8' 2"; Pitman Structural }[Crossbeam Type, 3" Pipe Connections; 3½" x 5" Crank Pins; 6256 Cranks, 55½" Rad. A 13" Sub Base may be furnished to clear Cranks over Foundation.

Unit No.	Type Gears	*H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs. Regular No. 2-A Wt.	Effective Counterbalance, Lbs. Regular Aux. Wt.	Effective Counterbalance, Lbs. Special No. 2 Wt.	Effective Counterbalance, Lbs. Special Aux. Wt.
26	Single Reduction	45.1P 28.7N 21.3L	10.5	5 7/16"	2 13/16"	32"-8C 32" Max	42"x8"	25,500	33.4"	16,550	20,350	18,300	22,850
									43.6"	12,650	15,600	14,000	17,500
31-B	Double Reduction	43.6P 27.8N 23.5L	28.7	6"	2 7/16"	25"-6C 40" Max.	27"x11"	24,500	54.0"	10,200	12,600	11,300	14,150
									64.4"	8,550	10,550	9,500	11,850

No. 3. TWIN CRANK ASSEMBLY. Designed for 17,000 Lb. Polish Rod Load and 54" Maximum Stroke. 5"x18"

GENERAL SPECIFICATIONS: Depth Base, 10"; Width Base, 32"; Samson Post, Tripod, 10' 0" High; No. 3 C Center Bearing, 4" x 18" Trunnion; Walking Beam 18" x 8¾" x 64 Lbs.; Working Centers, 5' 3¼" and 7' 0"; Pitman, Cast Steel Crossbeam Type, 3" Pipe Connections; 3½" x 5" Crank Pins; 4146 Cranks, 45½" Rad. A 9" Sub-Base may be furnished to clear Cranks over Foundation.

Unit No.	Type Gears	*H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs. Reg. Weights	Effective Counterbalance, Lbs. Kidney Wts.
18	Single Reduction	35.6P 22.7N 16.0L	10.5	4 7/16"	2 13/16"	34"-6C 34" Max.	42"x6"	18,600	27.9"	12,550	18,050
									41.2"	8,500	12,250
22	Double Reduction	28.6P 18.2N 14.2L	30.6	4 7/16"	2 3/16"	25"-4C 40" Max.	25"x7"	19,300	54.0"	6,500	9,350
22-B	Double Reduction	33.6P 21.4N 17.7L	28.67	4 7/16"	2 3/16"	25"-5C 40" Max.	25"x7 5/8"	19,600			

No. 4. TWIN CRANK ASSEMBLY. Designed for 12,000 Lb. Polish Rod Load and 42" Maximum ~~Stroke.~~ 4"x18"

GENERAL SPECIFICATIONS: Depth Base, 10"; Width Base, 32"; Samson Post, Tripod 8' 2½" High; No. 3B Center Bearing, 3" x 15" Trunnion; Walking Beam, 16" x 8½" x 58 Lbs.; Working Centers, 5' 3¼" and 6' 0"; Pitman, Cast Steel Cross Beam, 2½" Pipe Connections; 2½" x 4" Crank Pins; 3646 Cranks, 45½" Rad. A 9" Sub-Base may be furnished to clear Cranks over Foundation.

Unit No.	Type Gears	*H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs. Reg. Weights	Effective Counterbalance, Lbs. Kidney Wts.
11-A	Double Reduction	20.6P 13.1N 9.8L	29.24	4 7/16"	1 11/16"	20"-4C 32" Max.	22"x7"	16,200	18.6"	18,800	27,100
									30.5"	11,500	16,550
									42.0"	8,350	12,000

No. 5. TWIN CRANK ASSEMBLY. Designed for 10,000 Lb. Polish Rod Load and 36" Maximum ~~Stroke.~~ 4"x18"

GENERAL SPECIFICATIONS: Depth Base, 8"; Width Base, 25"; Samson Post Tripod 8' 2½" High; No. 3B Center Bearing 3" x 15" Trunnion; Walking Beam 12" x 8" x 40 Lbs.; Working Centers, 5' 0" and 5' 0"; Pitman, Cast Steel Cross Beam, 2½" Pipe Connections; 2½" x 4" Crank Pins; 3636 Cranks, 35½" Rad. A 10" Sub-Base may be furnished to clear Cranks over Foundation.

Unit No.	Type Gears	*H.P. @ 20 S.P.M.	Ratio	Crank Shaft Dia.	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. and Face Main Gear	Weight Complete	Polish Rod Stroke	Effective Counterbalance, Lbs Reg. Weights	Effective Counterbalance, Lbs Kidney Wts.
7	Double Reduction	11.9P 7.6N 5.4L	29.32	3 7/16"	1 11/16"	20"-3C 28" Max.	20"x5"	11,750	16"	10,750	15,350
									26"	6,600	9,450
									36"	4,800	6,800

*H.P. Ratings: Top Figure "P" Peak Rating; Second Figure "N" Nominal Rating; Third Figure "L" Lufkin-Sykes Rating. "P" and "N" are A. P. I. Ratings based on Pinion 270 Brinell and Gears 210 Brinell.

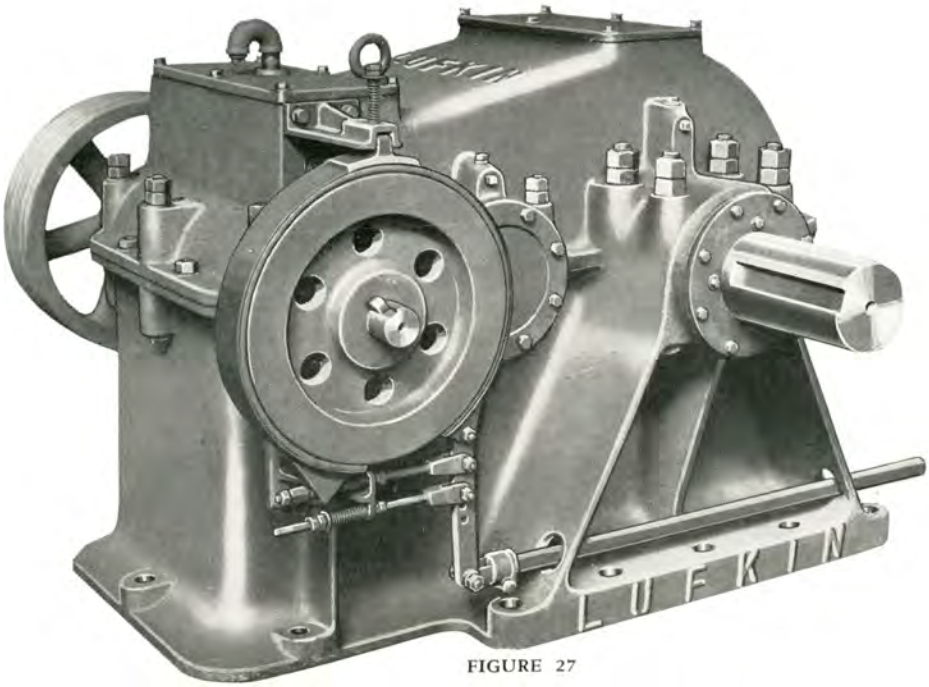


FIGURE 27

LUFKIN DOUBLE REDUCTION GEARED PUMPING UNITS

Mechanical Characteristics

Relying on past experience we have designed these Units along the same general lines as our Single Reduction Units, using two pairs of alloy steel gears, with bronze main bearings, Hyatt bearings on intermediate and high speed shafts; with large alloy steel shafts set into a rugged, well ribbed gear box that insures rigidity and positive alignment.

FULL FLOATING SELF ALIGNING GEARS

In all Lufkin Double Reduction Gear Units the main gear is held stationary by means of bronze thrust plates, the pinion and high speed gears floating into perfect alignment with the main gear, insuring equal pressure and load distribution on gear teeth.

The cantilever load action on the intermediate shaft has a distinct advantage in that the total load at the center of the shaft is less than would be the case if the slow speed pinion was in the center and straddled by single helical gears or a divided herringbone gear, or what is termed as the interleaf design. The loads on gear and pinion on intermediate shaft are in the same direction; likewise the bearing reactions are in the same direction and the slight cantilever action is due to higher tooth pressure on the low speed gears, which is a distinct advantage as the slow speed pinion is closer to the bearing and the resultant force at the center of the shaft is less. This reduces the bending moment and minimizes the undesirable spring action of this shaft under load. Likewise, the load on the high speed pinion is closer to the bearing than would be the case in the interleaf design.

Of paramount importance is the advantage of equal load distribution on the high and low speed gears. There are no two shafts perfectly parallel and, however small the error might be, it is several times less in the Herringbone Gear Units. The error occurs over the width of the gear, whereas, in the divided gears or interleaf design, the error occurs from the outer edge of the one pinion or gear to the outer edge of the other. The same applies to the divided gears that are sometimes used on the slow speed shaft. The result is an unbalanced load on the divided gears and excessive wear will occur on the side where the pitch circle is the shortest. This is almost totally eliminated in the herringbone gear design.

BEARINGS — Previous experience with both bronze and roller bearings on the slow speed shaft has led us to adopt the split bronze bearing as a standard on all types of Lufkin Units. Other than a small fraction of one percent difference in effi-

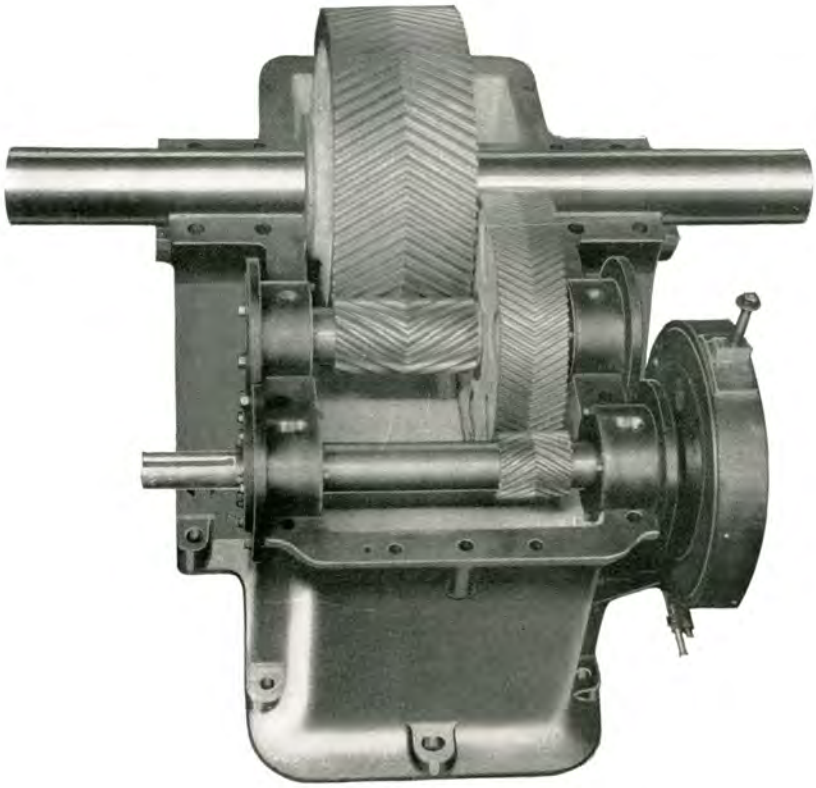


FIGURE 28

GEAR TRAIN—LUFKIN DOUBLE REDUCTION GEAR UNIT

FURNISHED IN EITHER SINGLE OR DOUBLE CRANK TYPES

ciency, the bronze bearing has many advantages. Their ability to stand shock loads, such as a well pounding fluid, when jars are used for cleaning out purposes, etc., are distinct advantages. They are easily renewed in the field, whereas, when a roller bearing has to be replaced because of defective parts or through wear it is necessary to send the shaft to a machine shop to have the crank pressed off, the bearing replaced and the crank pressed on again. This is a very expensive procedure from several angles—loss of production due to long shut down time, expensive new bearings, and the possibility that the average oil well machine shop might not make correct fitting of bearing or refitting of crank.

GEAR BOX—Lufkin Geared Pumping Units are not merely industrial gear units with a crank pressed on the slow speed shaft and called an oil well pumping unit. Gear boxes are especially designed to take care of the shock loads and vibrations of an oil well, and are rugged and ribbed heavily to take care of these loads. Renewable bronze thrust plates are used on low speed shaft to prevent wear on the gear housing due to the thrust of a single crank. This feature is not found in most herringbone gear units; ordinarily the main gear hub rubs iron to iron against gear housing, necessitating replacement of gear box when lateral motion occurs in slow speed shaft.

FLYWHEEL AND BRAKE—The energy developed by flywheels is based on three-fourths rating of gears as most units are operated at under-rated capacity.

The braking can either be handled from derrick floor or from brake lever on unit.

GENERAL—Lufkin Units are built of the very best materials, with the closest possible precision, and are built for service and not for a price. Only time and service will prove the economy in Lufkin Units.

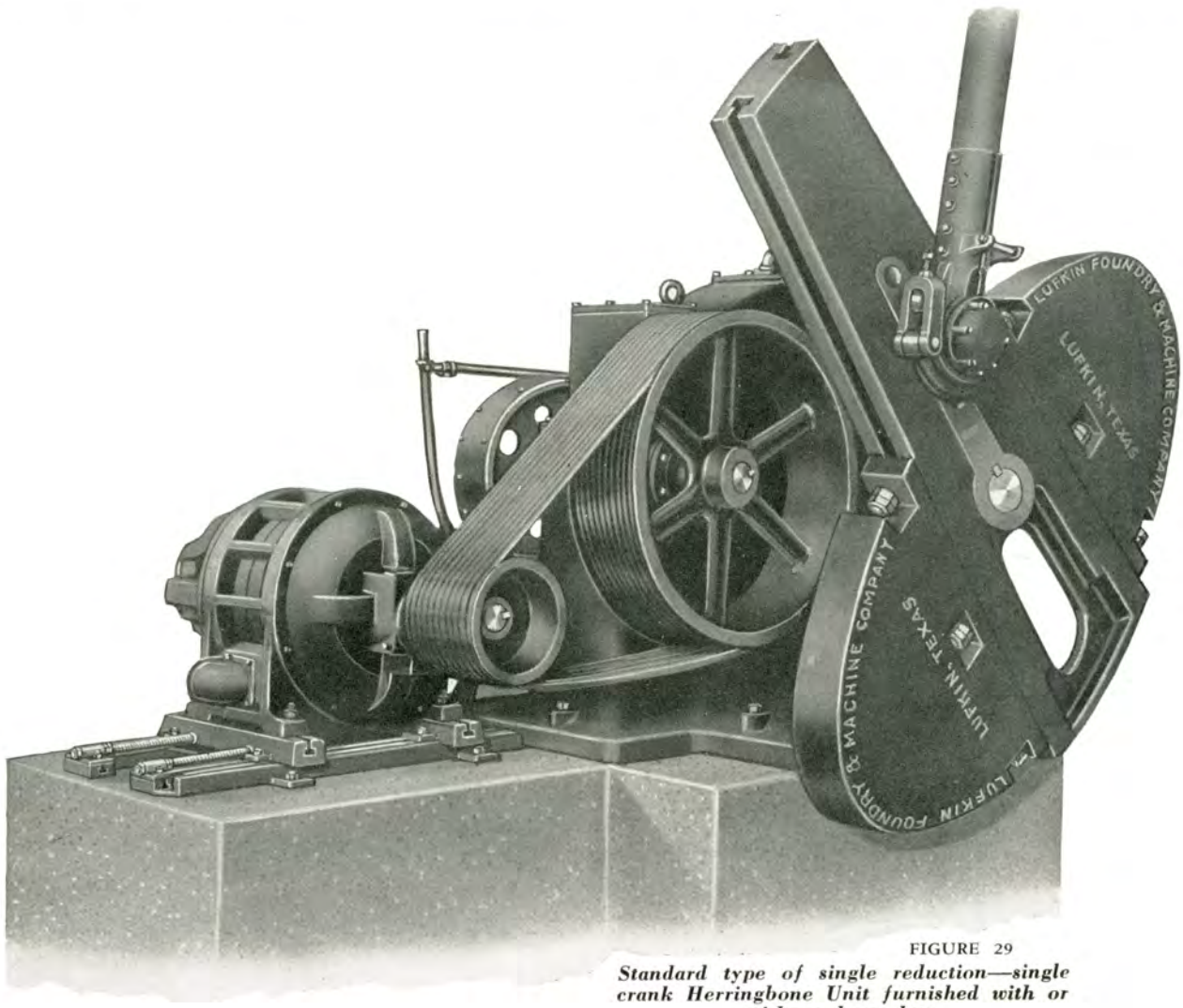


FIGURE 29

Standard type of single reduction—single crank Herringbone Unit furnished with or without base-plate.

LUFKIN SINGLE REDUCTION—SINGLE CRANK HERRINGBONE UNITS

The Lufkin single reduction—single crank herringbone units are well known to the oil industry for they were the first to be introduced. Later there appeared a demand for twin crank units and in recent years double reduction units have made their appearance. Both types of these later units are well described elsewhere in this catalogue.

All Lufkin Units of the herringbone type, whether single or double reduction, are alike in certain mechanical characteristics. The Lufkin-Sykes continuous tooth herringbone gears, used in all Lufkin Herringbone Units, have from 20% to 40% more bearing surface for width of face and at least 60% greater strength than any other type gears with which we are familiar. The teeth are precision cut and ground to match on special generators in our own plant under our control and supervision. They are silent in operation and efficient in the use of power. All gears are of cast alloy steel, and pinions are of forged chrome nickel steel S.A.E. 3245, generated integral with shaft, and are hardened and heat treated **Shafts:** Forged of S.A.E. 3130 alloy steel, turned and ground and of adequate size for carrying loads within rated capacity of unit, with large safety factor. **Bearings: Main Gear shaft bearing** is of renewable bronze; **Pinion shaft,** Hyatt Roller Bearings. **Lubrication:** Bath and splash system, simple and positive. Rotation of gears provides continuous flow of lubricant to bearings and gear teeth.

Lufkin Units are of simple design, permitting easy adaptation to any type prime mover; of strong, rigid construction and made of best materials available. Precision workmanship and interchangeability of parts are assured through the use of jigs and templates for all machine operations.

Where speeds of prime mover will permit, single reduction gears are recommended on account of lower initial cost, fewer parts, greater simplicity.

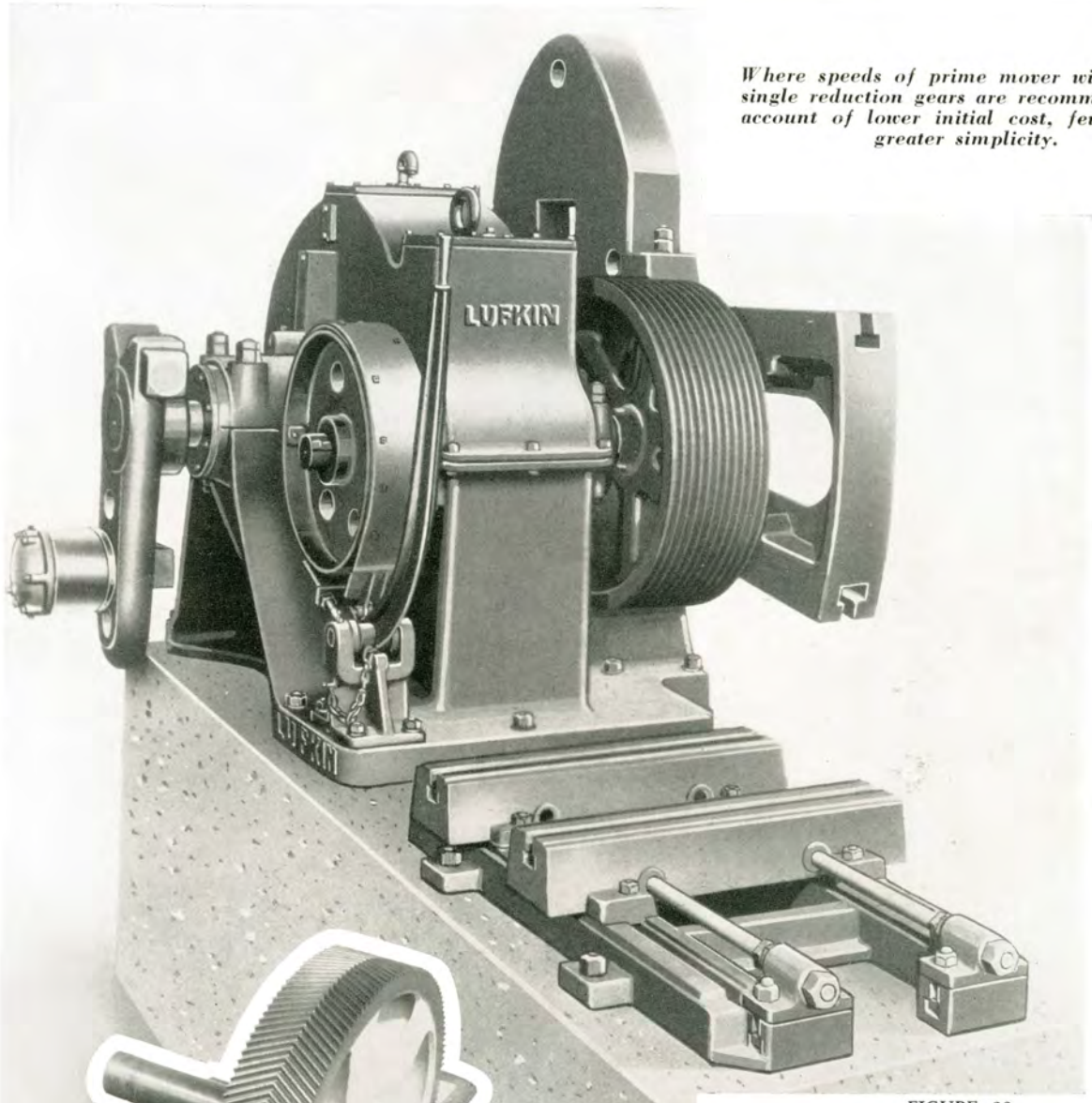


FIGURE 30

GEARS WITH A BACK-BONE

Lufkin-Sykes Herringbone Gears are often called, "The Gears with a Back-Bone." All gears used in Lufkin Units are generated on machines in our own plant under a most rigid inspection system. The gear and pinion are "mated" by a lapping in process that insures absolute elimination of "back-lash".

ADVANTAGES OF HERRINGBONE OVER HELICAL GEARS

1. Stronger teeth—due to arc-like construction, and greater load carrying capacity due to utilization of the full width of face.
2. No axial float necessary as "V" shaped herringbone teeth wedge automatically into mating gear, eliminating all sideways motion and consequent rubbing action of a screw-like nature existing in single helical gears which results in pitting at relatively low loads.
3. Uniform load across face due to balance thrusts of the opposing helices.
4. Better lubrication due to oil film formed by the wedge action of the teeth.
5. Due to the accuracy of their cutting they are more silent.
6. Silent gears cannot be produced by the hobbing process, consequently a superior generating process of absolute accuracy has necessarily to be used. The Sykes process is the answer.

FIGURE 31

Lufkin No. 58 Herringbone Gear Single Crank Unit with "Back-side" crank arrangement for pumping one or two extra wells. Note also Lufkin underslung take-off. The beam assembly is the Lufkin Center-line type—all working points in line and all bearings bronze bushed and either oil-bath or Alemite lubricated, insuring positive oiling and long wearing qualities.

FIGURE 32

Typical Lufkin Single Crank Unit installation.

FIGURE 33

Typical installation; Lufkin Herringbone Gear Unit—single cylinder gas engine drive—Lufkin Center-line Beam assembly—Lufkin Rod and Tubing Hoist. View before engine house was erected.

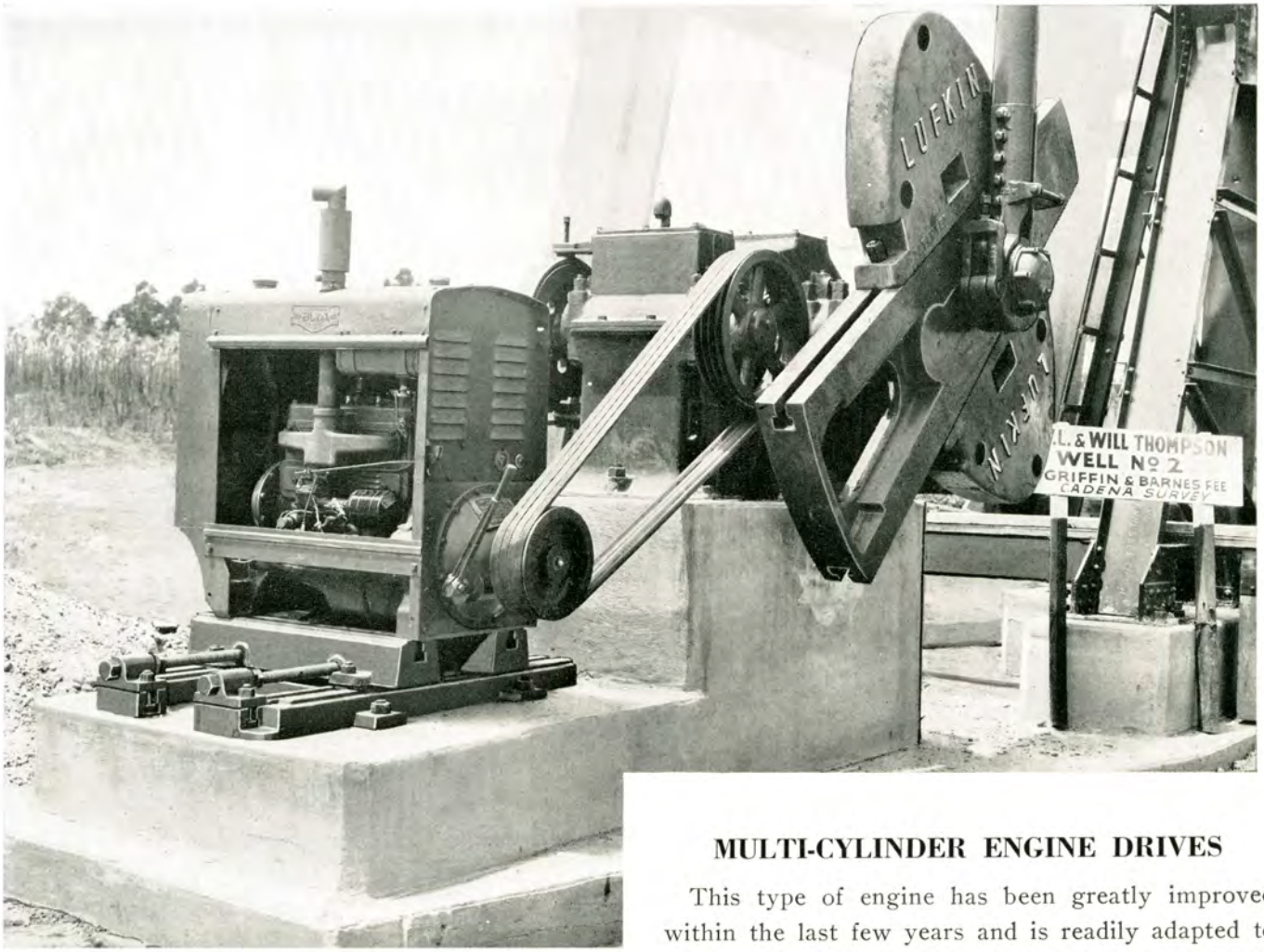


FIGURE 34

Typical East Texas installation. No. 31 Unit with Buda engine mounted on Lufkin Universal Slide Rails.

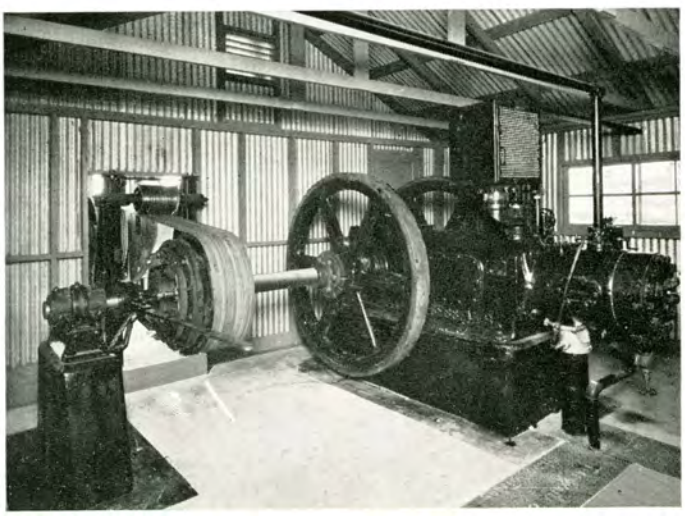


FIGURE 35

Engine Room Drive for unit on opposite page. Showing Lufkin Clutch and Cooper-Bessemer engine.

MULTI-CYLINDER ENGINE DRIVES

This type of engine has been greatly improved within the last few years and is readily adapted to oil well pumping, and when operated at moderate speeds—600 to 900 R.P.M.—will be found to give good service with low maintenance expense. This has been demonstrated by actual experience. However, where engines too small for the job have been used and in addition are run at high industrial speeds disaster has resulted. Having a gasoline rating—when used with natural gas they should be rated at a reduction of 20% and the horsepower determined at 700 R.P.M.

Manufacturers of the more popular types of engines used in oil field pumping have greatly increased the clutch and bearing capacities and are using cast iron bases and on the larger sizes are using bases that extend out under the drive pulley and provide an outboard bearing.

Larger engines operating at moderate speeds will prove good investments.

We are prepared to furnish any standard make of multi-cylinder engine from nearby stocks.

RIVER BED WELL INSTALLATIONS IN EAST TEXAS

FIGURE 36

Typical installation during high water periods.

FIGURE 37

Lufkin Single Crank Units and Hoists to individual units are advantageous during either high water or dry summer operations. Portable equipment for pulling is often impracticable for use in connection with this type equipment.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

PROPORTIONATE SIZES LUFKIN SINGLE CRANK UNITS

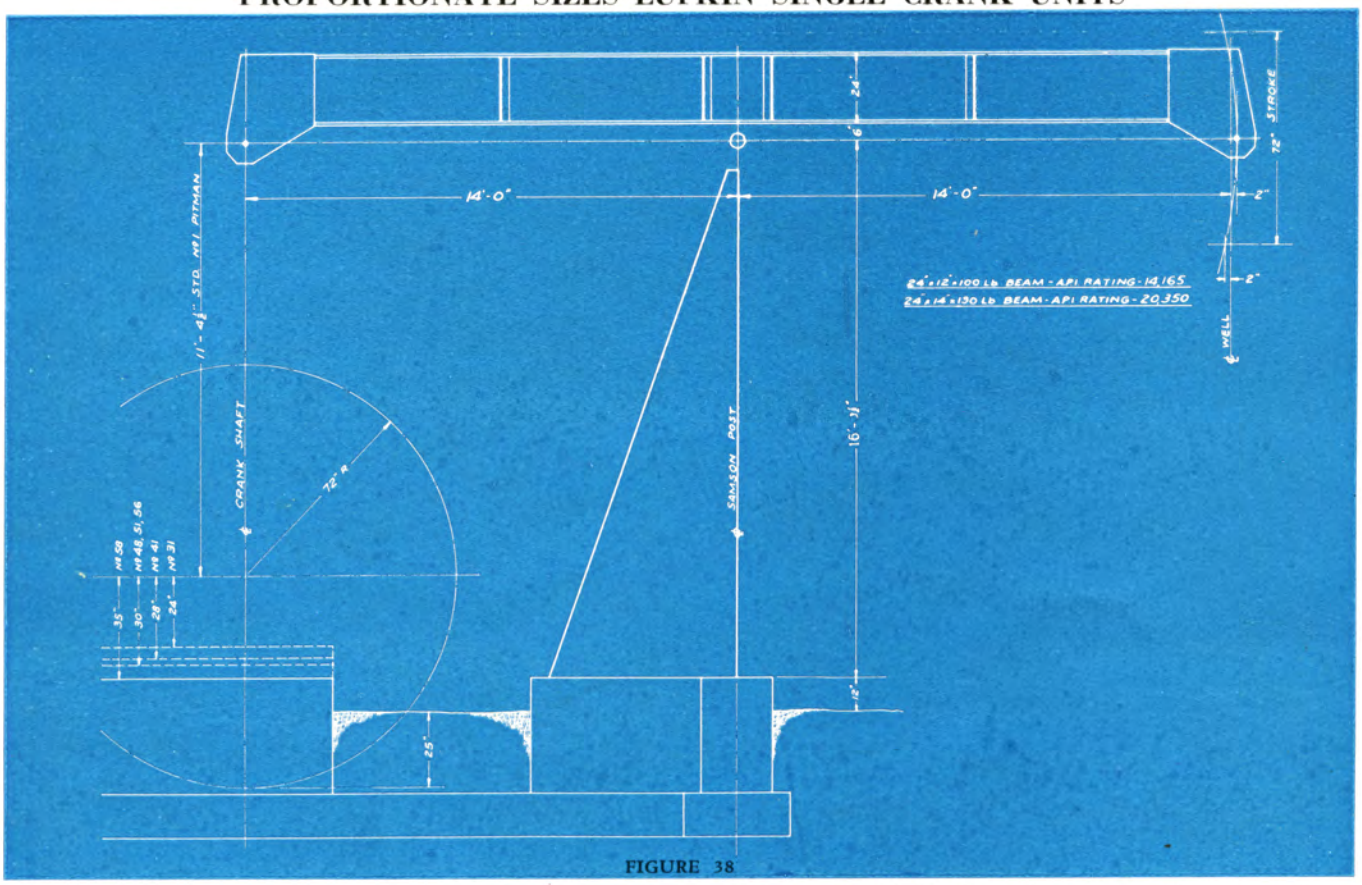


FIGURE 38

Lufkin No. SC-1 Series of Single Crank Herringbone Gear units—with 28′ Walking Beam, see table page 855

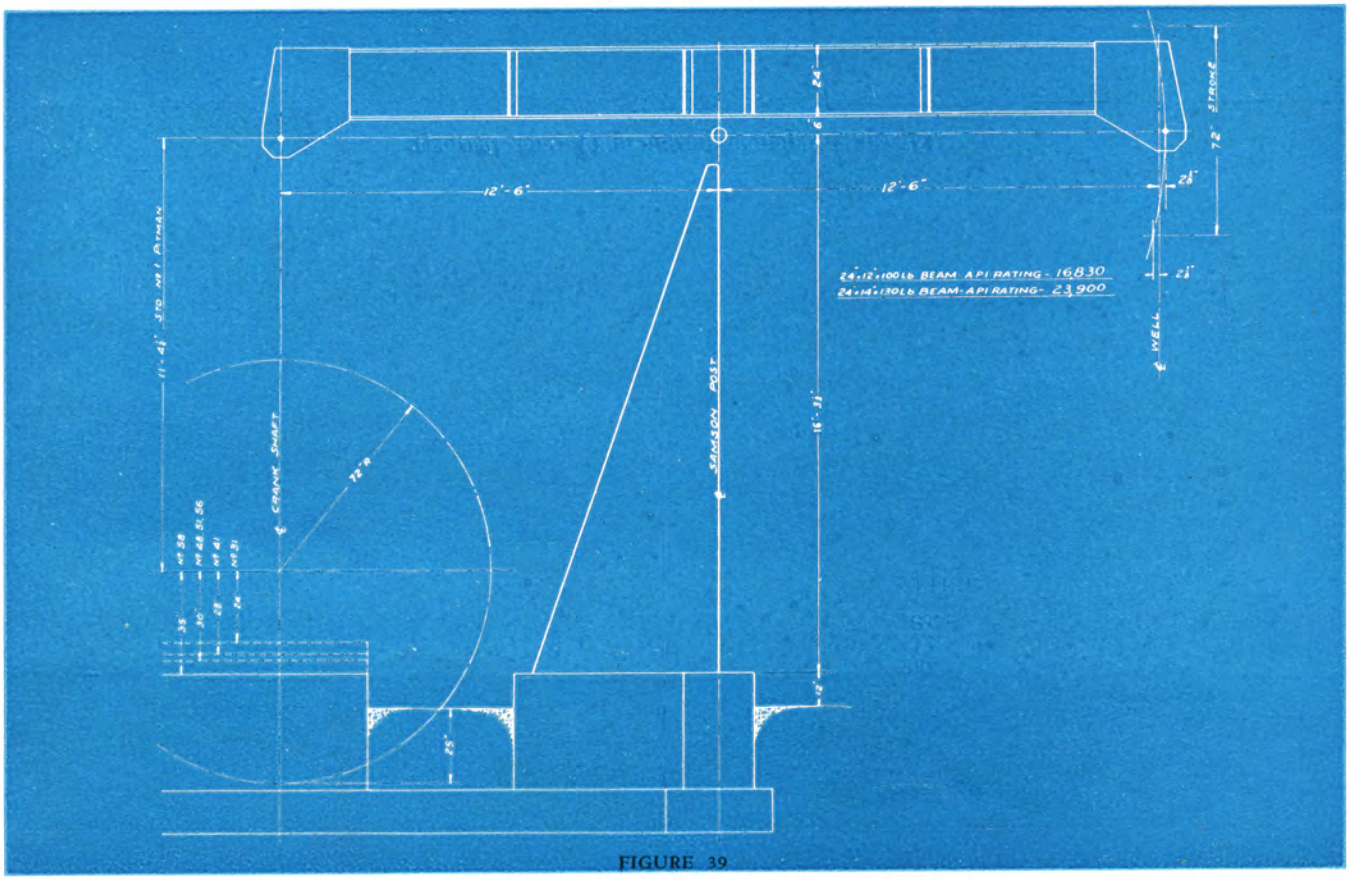


FIGURE 39

Lufkin No. SC-1 Series of Single Crank Herringbone Gear units—With 25′ Walking Beam, see table page 855.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

PROPORTIONATE SIZES LUFKIN SINGLE CRANK UNITS

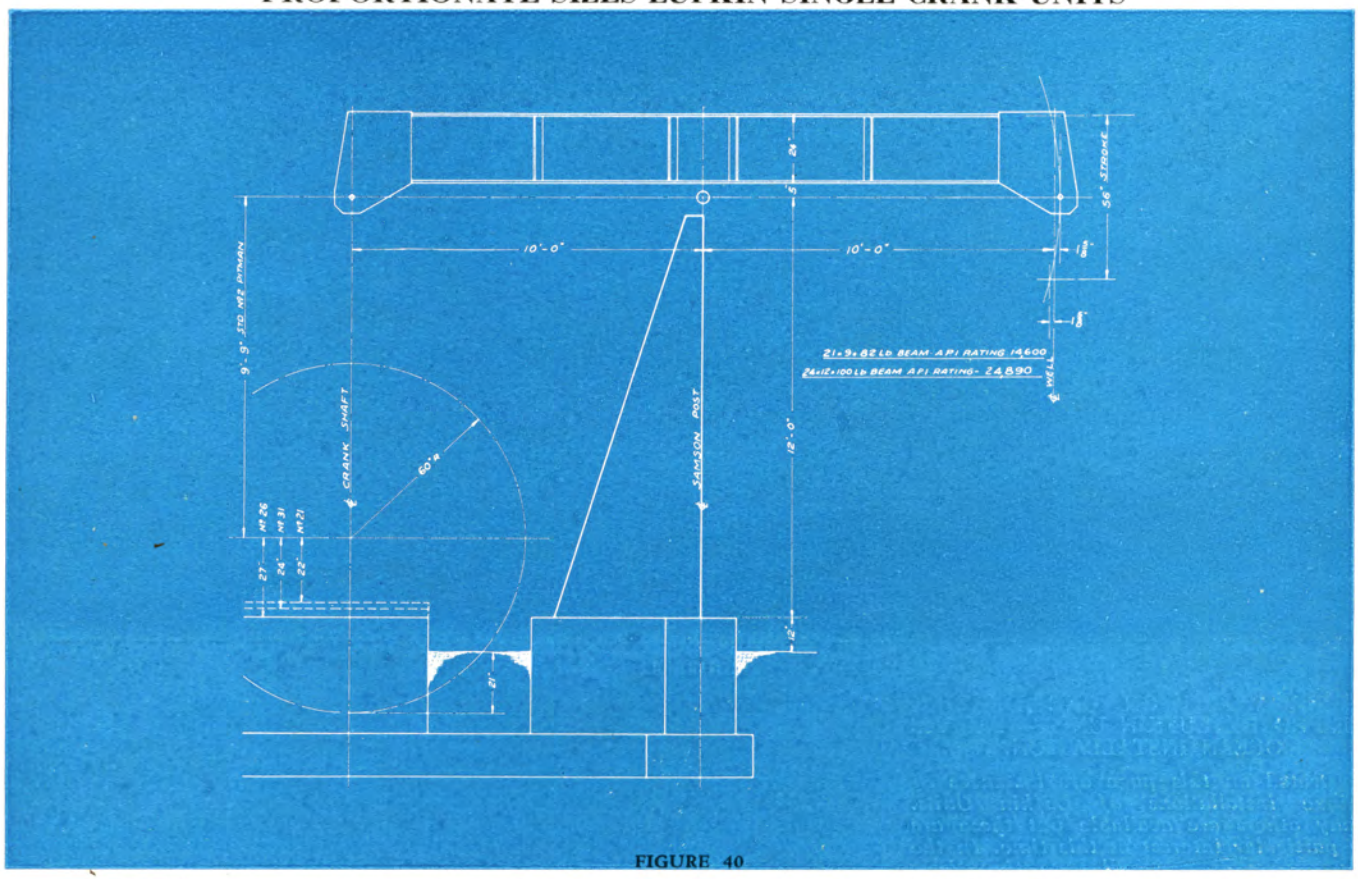


FIGURE 40

Lufkin No. SC-2 Series of Single Crank Herringbone Gear units—With 20' Walking Beam, see table page 855.

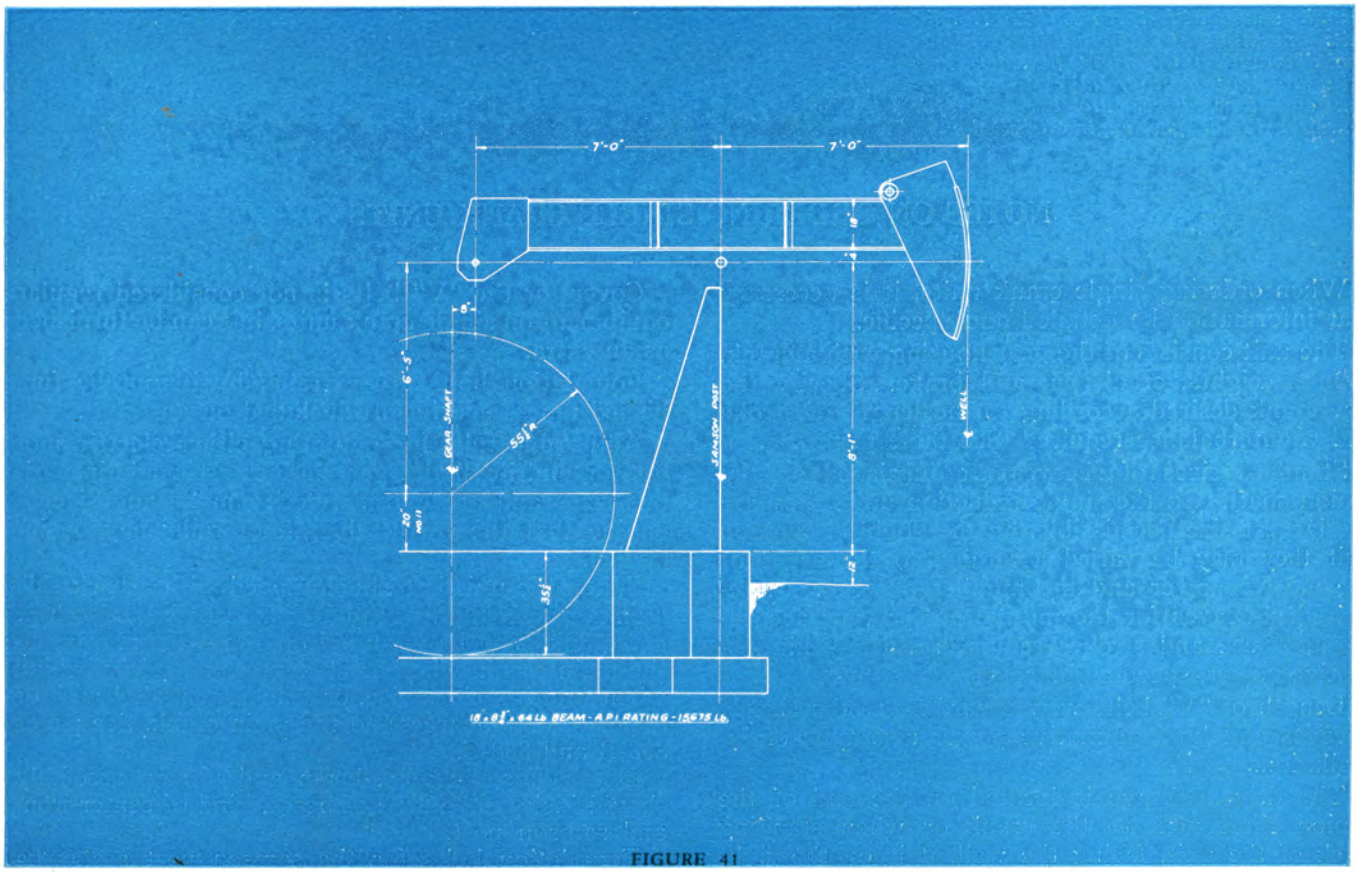


FIGURE 41

Lufkin No. SC-3 Series of Single Crank Herringbone Gear units—With 14' Walking Beam, see table page 855.

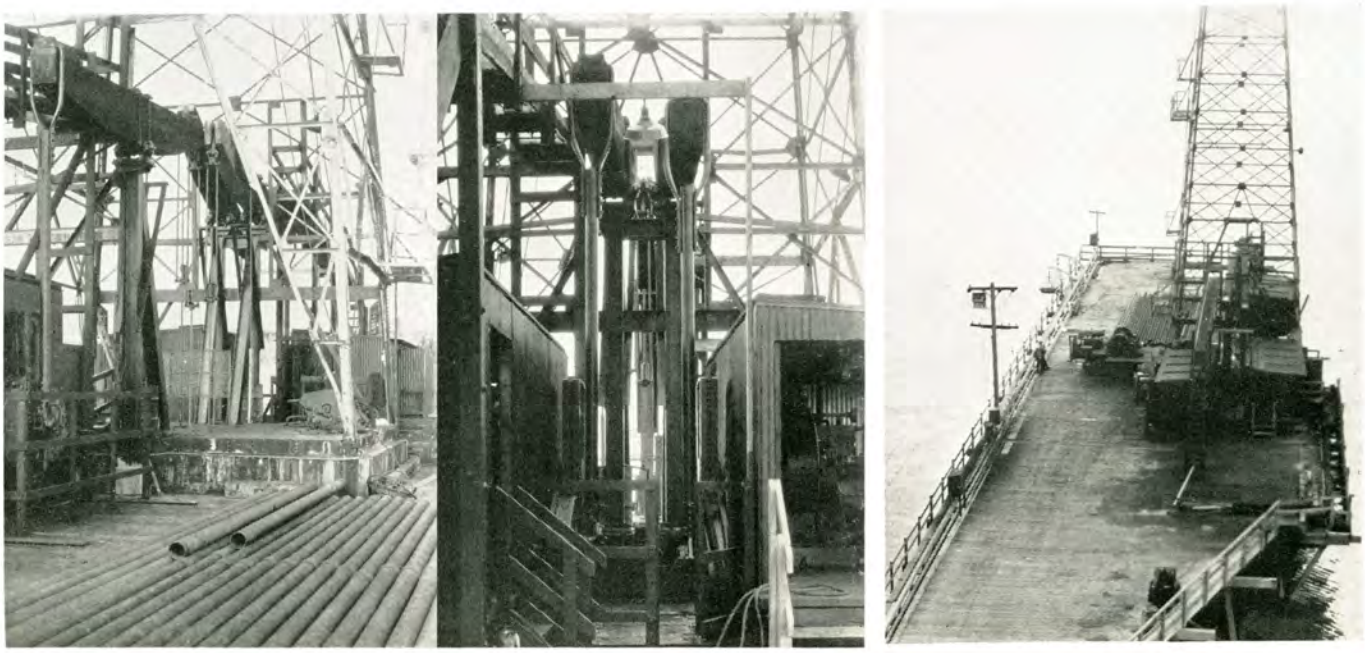
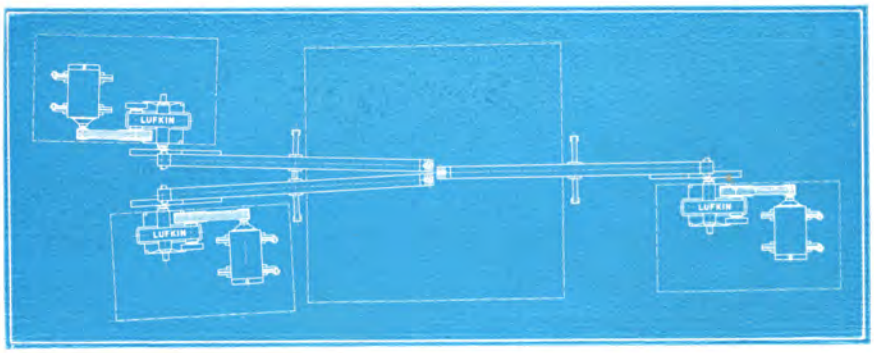


FIGURE 42

THREE WELLS ON ONE DERRICK PUMPED BY LUFKIN UNITS—PACIFIC OCEAN INSTALLATION.

Illustrated on this page are instances of unique installations of Lufkin Units. Many others are available but these are of particular interest at this time. In the upper pictures one will note that three wells have been drilled in the one derrick —the wells being located 30" apart in a triangle shape with three Lufkin No. 58 units operating as many walking beams. The diagram to the right indicates how units are placed with relation to the derrick and how drives are arranged for multi-cylinder gas engine operation.



NOTES ON ORDERING SINGLE CRANK UNITS

When ordering single crank units, it is necessary that information be detailed and specific.

The unit consists of the gear housing with a crank, counterweights, crank pin and brake. Specify the size crank desired according to the length of stroke and counterbalance required. See table page 855.

Standard sizes of sheaves are furnished on the pinion shaft. On the single reduction units they are the largest size permissible, on the double reduction unit they may be varied according to the speed of the motive power and the number of S. P. M. required. Sheaves for the motive power vary according to speed and strokes required. Specify kind of motive power, speed and strokes per minute.

Length of "V" belts vary according to the size of sheaves and kind of motive power also type of installation.

The driven sheave is located on the end of the pinion shaft next to the crank or when standing back of the unit, facing the well, it is on the right hand side.

Cover for the "V" belts is not considered regular equipment on single crank units, but can be furnished as an extra.

Foundation bolts are extra and will not be furnished unless specifically included on an order.

Adjustable rails for mounting either electric motors or multi-cylinder gas engines are made in various sizes and are extra. Specify make and size of engine that the correct length of rails may be included.

When the unit is to be equipped with a back side crank, specify the length of stroke required also how the crank is to be mounted on the shaft relative to the main crank, whether 90-degrees ahead or behind when rotating clockwise, or whether parallel with or opposite (180-degrees) to the main crank. See pages 868-B and 868-C.

Details for the post, beam and pitman assembly should include the type of beam, kind of center iron, and samson post.

Foundation bolts for the samson post are extra and will not be shipped unless specifically called for.

LUFKIN SINGLE CRANK UNITS—Table No. 43

SC—No. 1.—(See Page 852)

GENERAL SPECIFICATIONS: No. 1 Heavy Duty Samson Post, 15′-3″ high; Walking Beams as shown below; No. 1 Pitman with 5″ Pipe; 4″ x 6″ Crank Pin; No. 1B Center Bearing, 5″ x 24″ Trunnion; No. 1 Rod Hanger.

Unit No.	Type Gears	H.P. @ 20 S.P.M.*	Ratio	Crank Shaft	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. & Face Main Gear	Center Crank to Base Unit
58	Single Reduction	94.7P 60.3N 48.4L	9.7	6 1/16″	3 13/16″	43″-11-C 43″ Max.	55″x10″	35″
54 56	Single Reduction	73.2P 46.6N 37.3L	9.4	6 1/16″	3 1/16″	35″-11-C 35″ Max.	47″x10″	28″ 30″
51	Double Reduction	77.2P 49.2N 43.3L	28.79	6 1/16″	3 3/16″	35″-11-C 52″ Max.	36″x12″	30″
41	Double Reduction	63.6P 40.5N 33.8L	30.12	6 1/16″	2 13/16″	25″-8-C 48″ Max.	34″x10″	28″
31	Double Reduction	38.2P 24.3N 20.2L	29.29	6″	2 1/16″	25″-6-C 40″ Max.	28″x10″	24″
†48	Single Reduction	61.4P 39.1N 28.8L	9.4	5 1/16″	3 1/16″	37″-11-C 37″ Max.	47″x 8″	30″

Crank	Stroke	Effective C Bal. in Lbs. Reg. Wts.	Effective C Bal. in Lbs. C.I. Aux. Wts.
7272	32″	17,000	21,200
	42″	12,950	16,150
	52″	10,450	13,050
	62″	8,775	10,950
	72″	7,550	9,425
6266	32″	12,875	16,000
	42″	9,800	12,200
	52″	7,925	9,850
	62″	6,650	8,250

Walking Beam No.	Section	Working Centers	Ratings A.P.I.	Ratings A.I.S.C.
1328-C	24″x14″ 130 lb.	28′	20,350	30,525
1325-C	24″x14″ 130 lb.	25′	23,900	36,000
1028-C	24″x12″ 100 lb.	28′	14,165	21,250
1025-C	24″x12″ 100 lb.	25′	16,830	25,245

NOTE: No. 16 Heavy Duty Post 16′ 3″ high can be furnished if desired. No. 1 O B—Oil Bath Dust Proof Center Bearing—5″ x 24″ Bronze Bushed—can be furnished extra if desired. Beams with hinged horse heads furnished extra.

EXAMPLE: The No. 31 Unit, when used with the above Assembly, will be designated SC-1-31-1028C—the 31 being the number of the Unit and 1028C meaning a 100 lb. Walking Beam with 28′ Working Centers. Either 7272 or 6266 Crank will be furnished according to the counterbalance required. †No. 48 Unit is only built on order. No. 54 takes its place.

SC—No. 2—(See Page 853)

GENERAL SPECIFICATIONS: No. 12 Samson Post 12′ 0″ high; Walking Beams as shown below; No. 1 Pitman with 4″ Pipe; 4″ x 6″ Crank Pin; No. 2B Center Bearing 5″ x 18″ Trunnion; No. 1 Rod Hanger.

Unit No.	Type Gears	H.P. @ 20 S.P.M.*	Ratio	Crank Shaft	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. & Face Main Gear	Center Crank to Base Unit
31	Double Reduction	38.2P 24.3N 20.2L	29.29	6″	2 1/16″	25″-6-C 40″ Max.	28″x10″	24″
26	Single Reduction	45.1P 28.7N 21.3L	10.5	6″	2 13/16″	32″-8-C	42″x8″	27″
21-B	Double Reduction	33.6P 21.4N 17.7L	28.67	5 1/16″	2 3/16″	20″-5-C 36″ Max.	25″x7 5/8″	22″

Lufkin gear ratings are based on WEAR. 5 to 10 years operation received without appreciable loss in efficiency.

Crank	Stroke	Effective C Bal. in Lbs. Reg. Wts.	Effective C Bal. in Lbs. C.I. Aux. Wts.
6266	32″	12,875	16,000
	42″	9,800	12,200
	52″	7,925	9,850
	62″	6,650	8,250
5260	22″	15,700	19,600
	32″	10,800	13,500
	42″	8,250	10,250
	52″	6,650	8,300

Walking Beam No.	Section	Working Centers	Ratings A.P.I.	Ratings A.I.S.C.
1020-C	24″x12″ 100 lb.	20′	24,890	37,335
8220-C	21″x9″ 82 lb.	20′	14,600	21,900
8216	21″x9″ 82 lb.	16′	18,600	27,900

NOTE: Walking Beams with hinged Horse Heads may be furnished in place of Center Line Beams and will be designated thus—1020 CH.

SC—No. 3—(See Page 853)

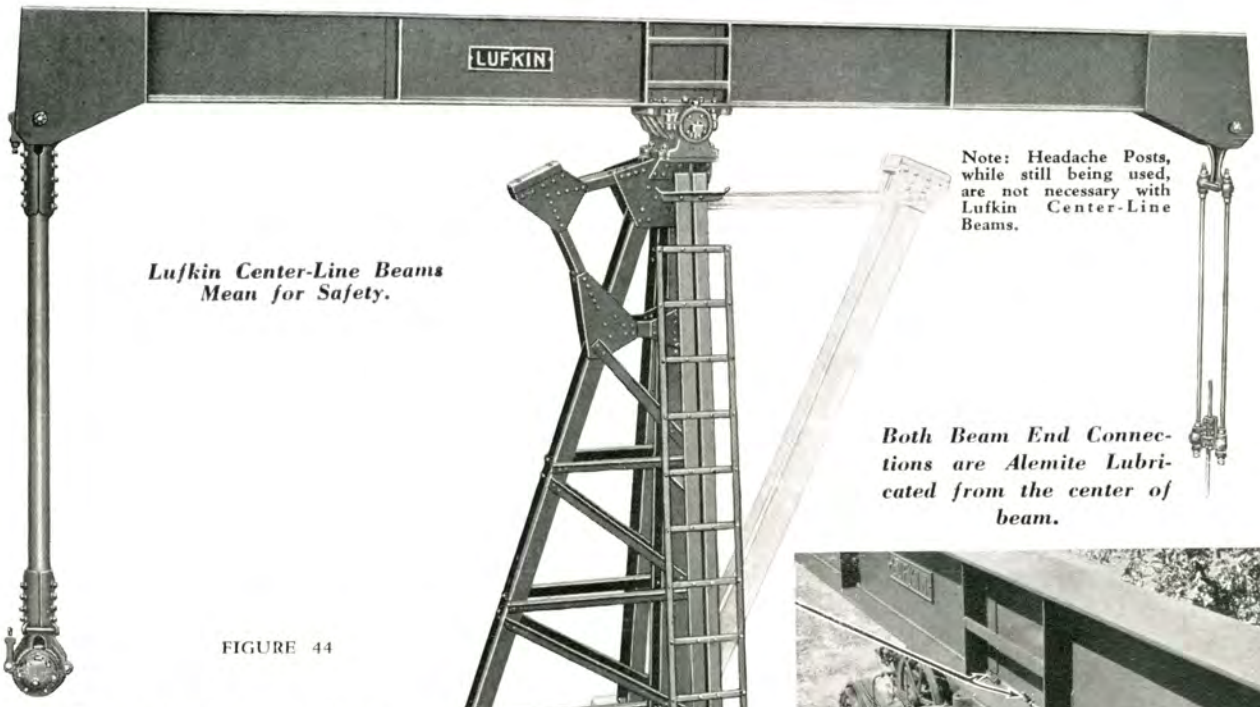
SPECIFICATIONS: No. 3 Samson Post 8′ 2″ high; Walking Beam as shown below; No. 2 Pitman, 3″ Pipe; 3½″ x 5″ Crank Pin; No. 3B Center Bearing, 4″ x 18″ Trunnion; Wire Line Hanger, Hinged Horse Head.

Unit No.	Type Gears	H.P. @ 20 S.P.M.*	Ratio	Crank Shaft	Drive Sheave Bore	Sheave Dia. & No. Grooves	Dia. & Face Main Gear	Center Crank to Base Unit
11-A	Double Reduction	20.6P 13.1N 9.8L	29.24	4 1/16″	1 11/16″	20″-4-C 32″ Max.	22″x7″	27″

Crank	Stroke	Effective C Bal. in Lbs. Reg. Wts.	Effective C Bal. in Lbs. C.I. Aux. Wts.	Effective C Bal. in Lbs. Lead Aux. Wts.
4256	22″	12,550	15,450	.....
	32″	8,650	10,650	.....
	42″	6,550	8,100	.....

Walking Beam No.	Section	Working Centers	Ratings A.P.I.	Ratings A.I.S.C.
6414-H	18″x8¾″ 64 lb.	14′	15,675	23,500

NOTE: Headache Posts may be furnished extra on al lSamson Posts. Old Style "Plain" Beams with "T" Type Hanger and Stirrup Pitman in same sizes as shown in above tables may be furnished if desired
All crank shafts are 1″ diameter larger in gear
*H. P. Ratings. Top Figure "P"=Peak Rating. Second Figure "N"=Nominal Rating. Third Figure "L"=Lufkin-Sykes Rating. "P. & N." are A.P.I. Ratings based on Pinion 270 Brinell and Gears 210 Brinell.



Lufkin Center-Line Beams Mean for Safety.

Note: Headache Posts, while still being used, are not necessary with Lufkin Center-Line Beams.

Both Beam End Connections are Alemite Lubricated from the center of beam.

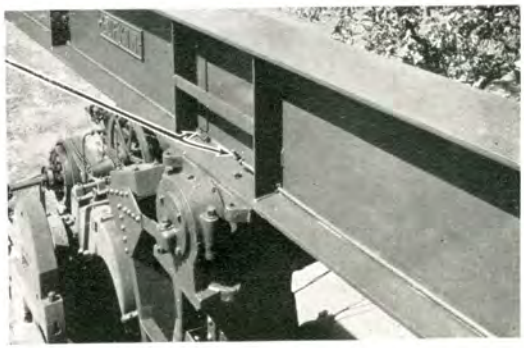


FIGURE 44

LUFKIN CENTER LINE WALKING BEAM, PITMAN, CENTER BEARING AND FULL UNIVERSAL ROD HANGER

Numerous attempts have been made to design a **Center Line Beam,** but most have met with little success. We believe this was due to the retention of the old style conventional type of friction producing stirrups and regular head connections. Engineers familiar wtih this inefficient type of design have demanded improvements.

The Lufkin Center Line Beam assembly is the answer to these problems. This new assembly consists of the regular I-beam type walking beam with all bearings **in line** and with improved pitman and rod hanger bearings.

The beam is equipped with heavy welded-on plates, arranged with steel pins and bronze bearings. Alemite lubrication to these bearings is facilitated by means of pipe connections from the center of the beam (see illustration).

Center Bearings are of three types:

1—Renewable Bronze 5″ x 24″ self oiling and dust proof. Patented—See Fig. 48, Page 858. Made in one size only.

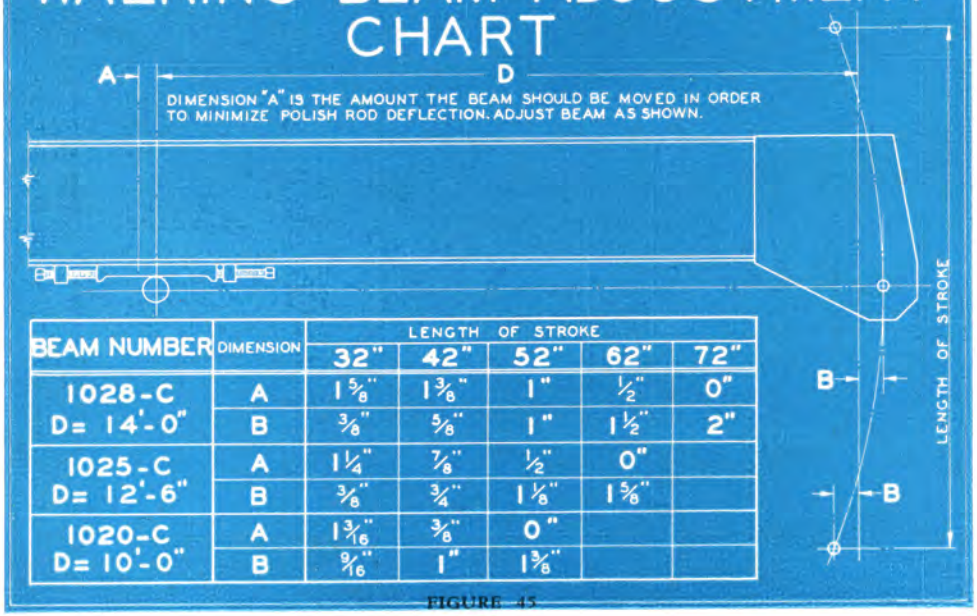
2—Babbitted, self oiling and reasonably dust proof. See Fig. 49, Page 858.

3—Cast Iron plain bored. See Fig. 50, Page 858.

Unless otherwise specified Babbitted bearings will be furnished.

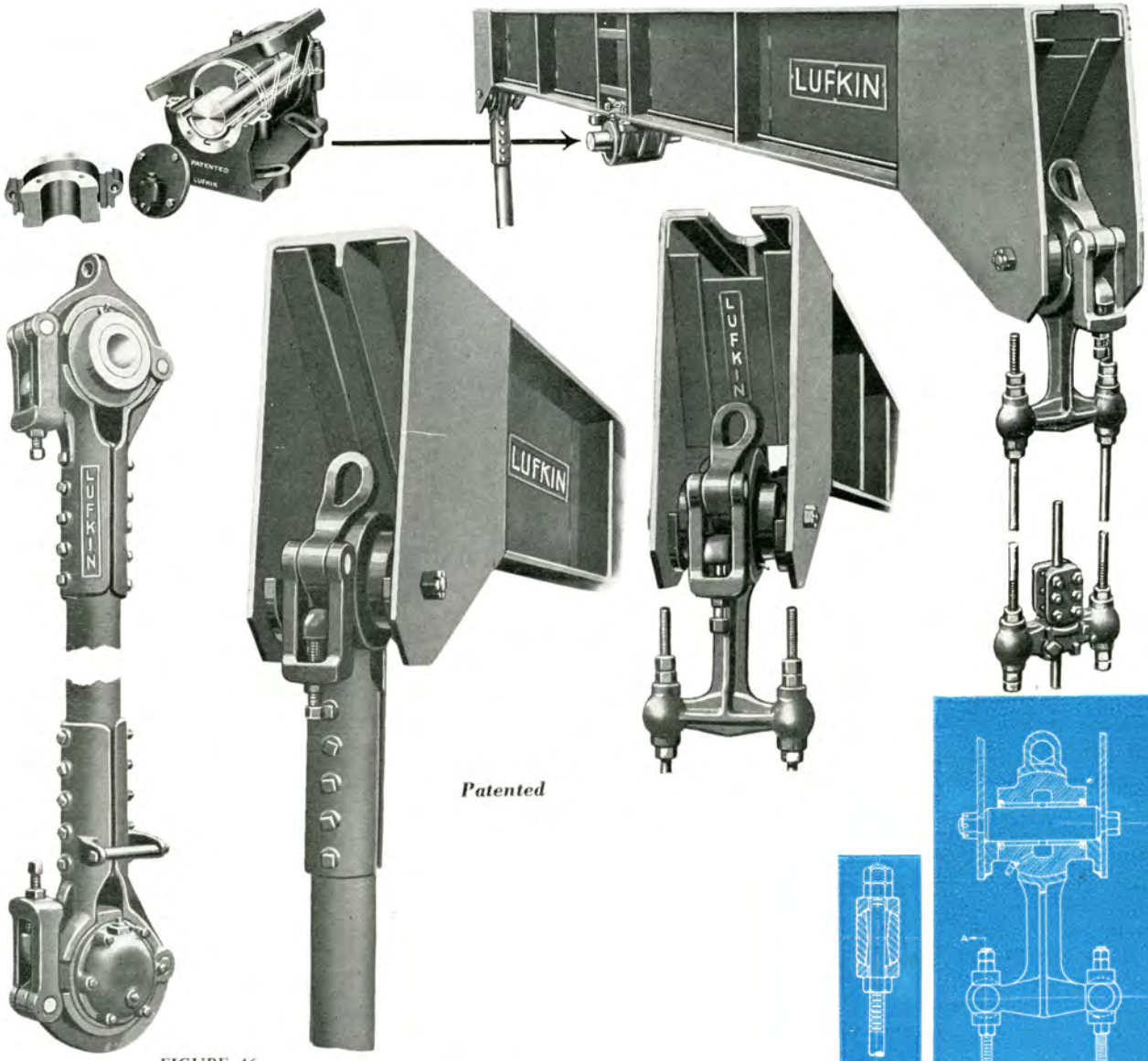
The Pitman bearings and rod hanger bearings are bronze bushed—oil tight and rust proof—and like the Trout Crank Pin bearing, stays on the pin. Connections to the pitman and rod hanger are by means of steel strap shackles which are very readily disconnected for well servicing and are also designed to accommodate any mis-alignment. See page 857, Fig. 47.

WALKING BEAM ADJUSTMENT CHART



BEAM NUMBER	DIMENSION	LENGTH OF STROKE 32″	42″	52″	62″	72″
1028-C D= 14'-0"	A	1 5/8"	1 3/8"	1"	1/2"	0"
	B	3/8"	5/8"	1"	1 1/2"	2"
1025-C D= 12'-6"	A	1 1/4"	7/8"	1/2"	0"	
	B	3/8"	3/4"	1 1/8"	1 5/8"	
1020-C D= 10'-0"	A	1 3/16"	3/8"	0"		
	B	9/16"	1"	1 3/8"		

FIGURE 45



Patented

FIGURE 46

LUFKIN UNIVERSAL, PITMAN AND ROD HANGER BEARINGS FOR CENTER-LINE BEAM ASSEMBLIES

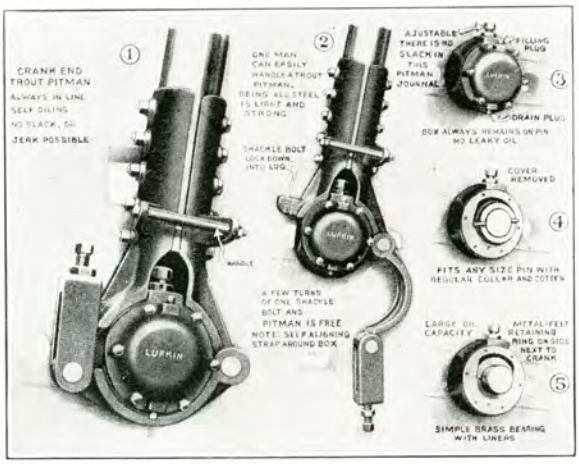
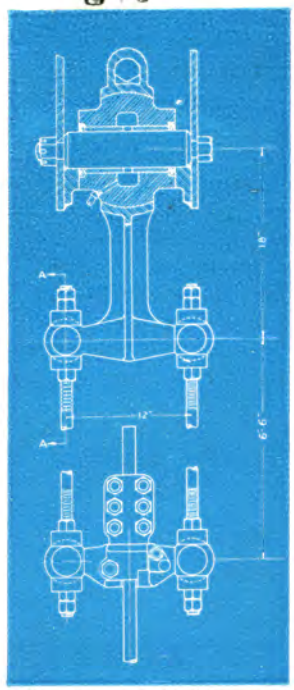


FIGURE 47

Trout Universal, Oil-Bath, Pitman (Patented)

Section "A-A"



Sectional drawing of Lufkin Universal Pitman and Rod hanger bearing connections.

See descriptive matter, page 856.

TROUT, OIL-BATH, DUST-PROOF PITMAN

The Lufkin-Trout Universal, self-aligning Pitman met with immediate acceptance by the oil industry. The Trout Pitman is oil-tight and dust-proof. The box remains on the pin as shown in the illustration. It is only necessary to loosen shackle bolts to unstrap Pitman from box to make any necessary adjustments. Made in sizes to fit any A.P.I. Pin.

NOTE—We have furnished a number of anti-friction type roller bearings with our regular pitmans, especially on twin crank jobs, all of which have proved exceptionally satisfactory. We are therefore prepared to furnish roller bearings in place of bronze bearings at a slight additional cost if desired, see page 860.

LUFKIN NO. 1-O.B.—OIL-BATH CENTER IRON

Dust Proof—Bronze Bushed

The Lufkin self-oiling, dust proof center iron provides strength where most needed and owing to its construction (rugged and bronze bushed) is designed for life-time service under the most exacting circumstances. Little care is needed during the life of the Lufkin Oil-Bath Center Iron for, as the name implies, the bearing operates in an oil bath and is also dust-proof. The bearing of high quality bronze is 5″ diameter, 24″ in length and easily renewable.

Operators using the Lufkin Oil-Bath Center Iron soon find it advantageous to standardize on this type of bearing.

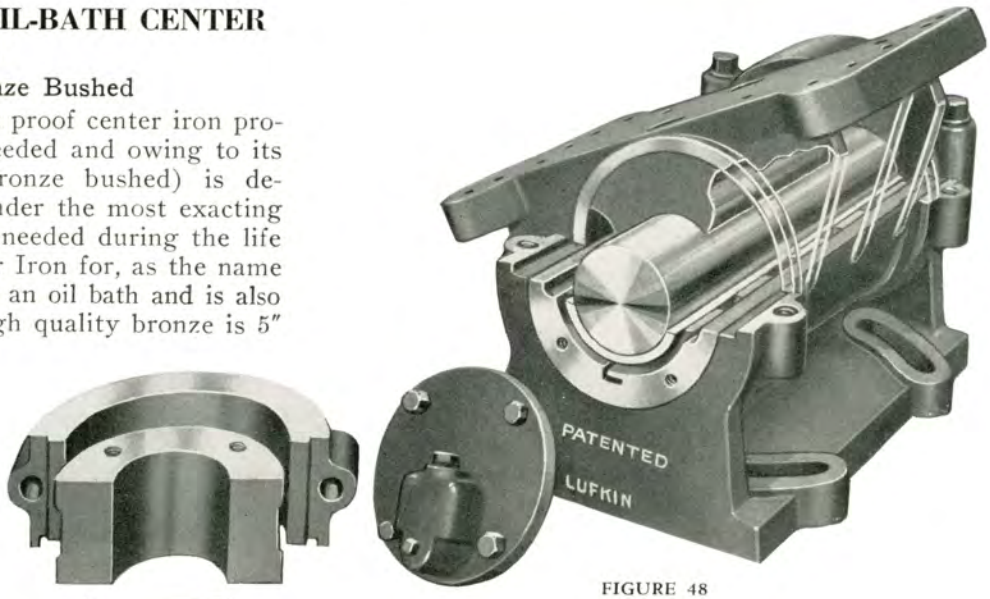


FIGURE 48

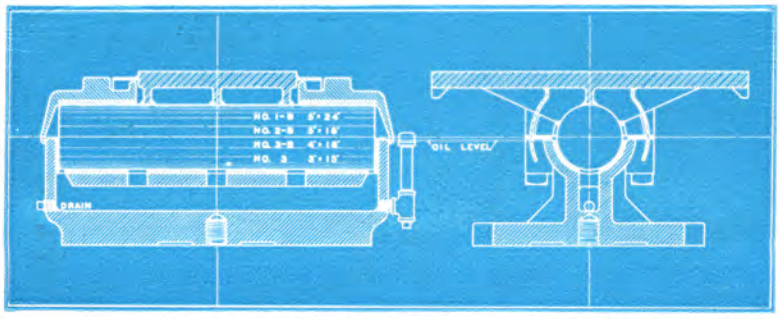
FIGURE 49

LUFKIN BABBITTED CENTER IRON

This new type center iron, while having a babbitted bearing instead of bronze bushings in the better type illustrated above, has an increased bearing surface over the old style A.P.I. standard—has an oil-bath arrangement and is reasonably dust-proof. This babbitted center iron is lined with a special high grade tin base metal to withstand very heavy load strains.

The new bearing is made in the following sizes:

No. 1-B 5″ x 24″—120 sq. inches
No. 2-B 5″ x 18″— 90 sq. inches 2C = 5"x24"
~~No. 3 3″ x 15″— 45 sq. inches.~~
No. 3-B 4″ x 18″— 72 sq. inches 3C = 5x18



Sectional drawing Lufkin Babbitted Center Iron

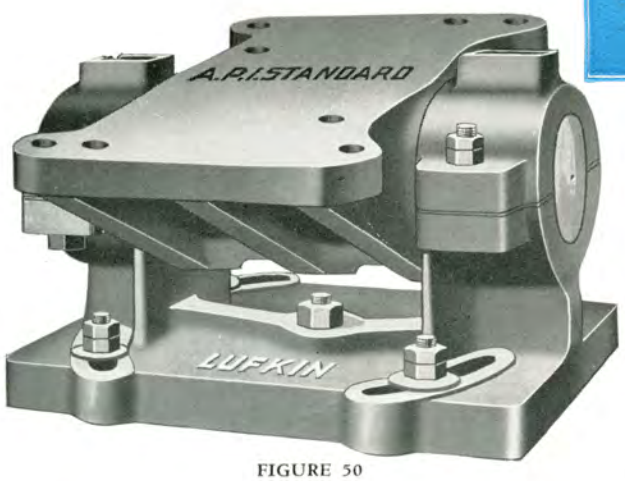


FIGURE 50

A.P.I. STANDARD CAST IRON CENTER IRON

This is the old style cast iron center iron and saddle that is still regularly furnished but not recommended, for heavy service.

This is a plain bearing and due to inadequate oiling provision is "short-lived." The Lufkin plain center iron has a swivel base to allow beam to clear when servicing well.

FIGURE 51
Hinged Horse Head showing Equalizer

LUFKIN HINGED HORSE HEAD WITH WIRE LINE HANGER

The Lufkin Hinged Horse Head type of hanger is designed to tilt back over the beam, clearing the beam when the well is being serviced.

Hinged Horse Heads are regularly furnished on all Twin Crank Units. They are also furnished on Single Crank Units where specified.

Polish Rod Hanger is of cast steel with convenient latch with wire lines solidly babbitted in place. Polish rod clamps are bored to fit 1", 1⅛" or 1¼" size Polish Rods.

LUFKIN STANDARD TYPE, BEAM, POST, PITMAN ASSEMBLY
WITH PLAIN CENTER IRONS AND STIRRUP TYPE PITMANS

This is the old style type of plain beam assembly for which there still exists a small demand. This type of Post assembly is made in standard A.P.I. sizes and only plain cast iron center irons are used as well as the conventional type of stirrup pitman. Any ordinary type of rod hanger may be applied to the well end of the beam. The chief advantage of this type of assembly is in first cost, but against this is the constant danger of accident and maintenance expense, necessary care and attention which is almost wholly eliminated in the Center-Line Beam assembly described in this catalogue on page 856 and 857.

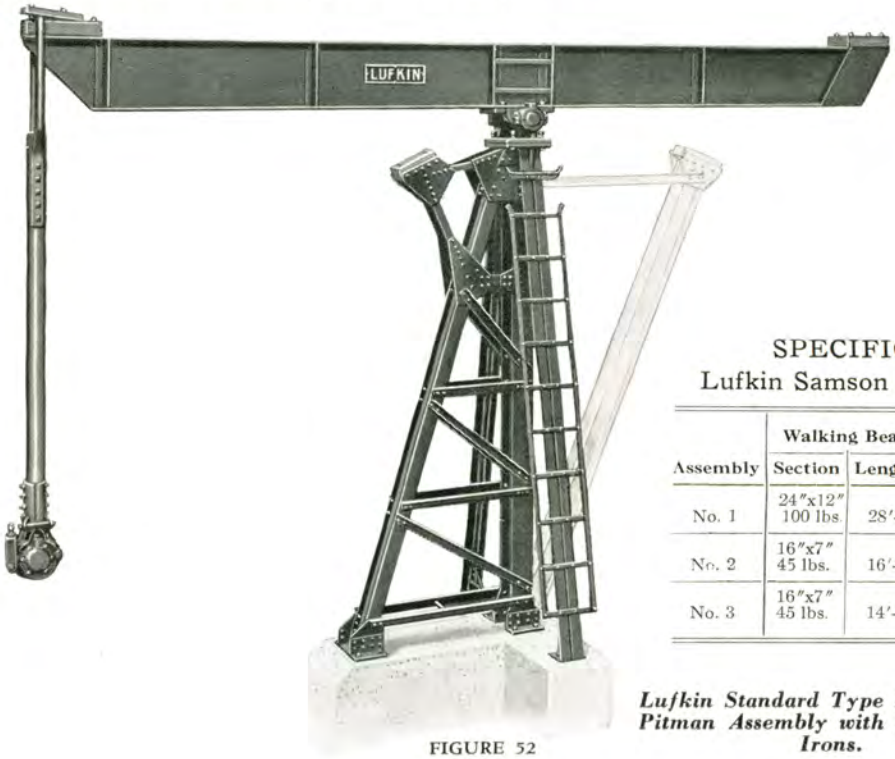


FIGURE 52

SPECIFICATIONS
Lufkin Samson Post Assemblies

Assembly	Walking Beam		Samson Post	
	Section	Length	Designation	Height
No. 1	24″x12″ 100 lbs.	28′-0″	No. 1 Std. No. 1 Hvy.	15′-3″
No. 2	16″x7″ 45 lbs.	16′-0″	No. 2	12′-0″
No. 3	16″x7″ 45 lbs.	14′-0″	No. 3	8′-2½″

Lufkin Standard Type Post, Beam, Pitman Assembly with plain A.P.I. Irons.

LUFKIN "EASY CHANGE" CRANK PIN

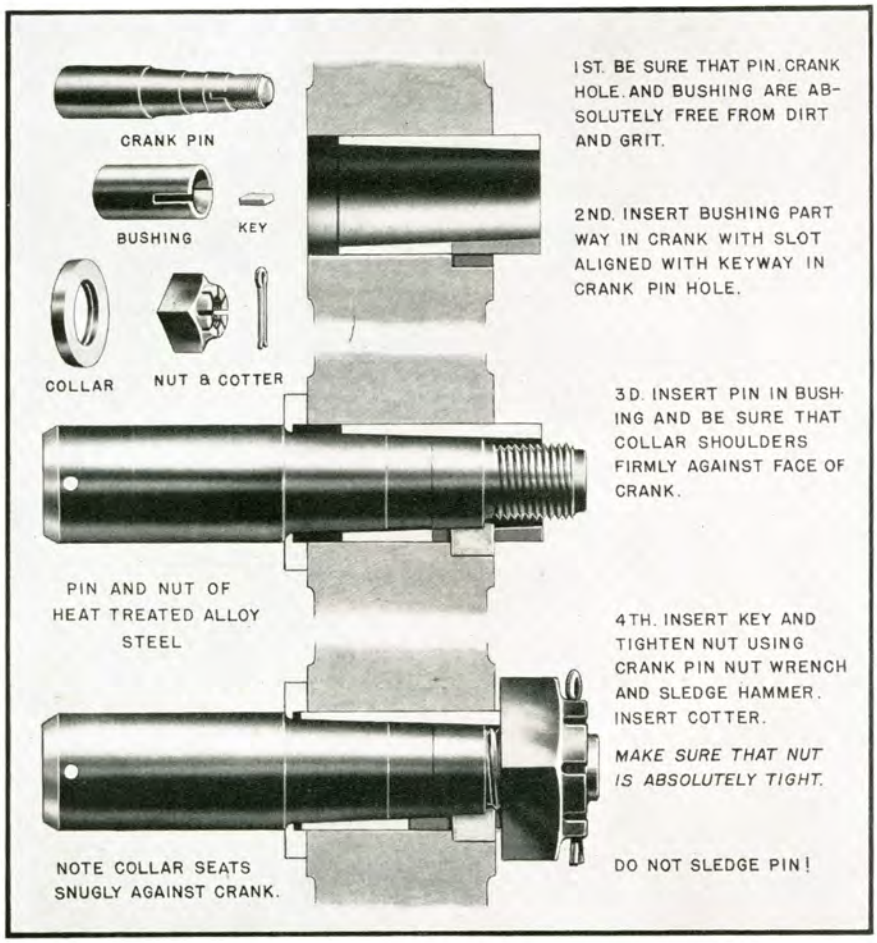


FIGURE 53

As every operator knows the crank pin is of vital importance in a pumping rig, usually giving the most trouble, and frequently the cause of accidents.

Due to better steels and heat treatment they now seldom break but still give trouble unless they are securely fastened in the pin hole.

Ten years experience with our "easy change" pin has given general satisfaction regardless of which direction the unit is operated.

A key has been provided to prevent pin from turning, also a castellated nut with a large cotter pin, that makes them DOUBLY SAFE. If pin and bushing is put in as directed and **nut tightened up** they **cannot come loose.**

Before adopting this pin years ago, many tests were made on straight and taper pins (without bushing) and we found that by the use of the wedge bushing the pin could be tightened where it was equal to a 25-ton press fit and yet it could be released with a few blows of a hammer. The straight fit pin can only be put in with a sledge and not over a one ton press fit, which is about all one man can do, and is the main reason they wallow out. Taper holes in crank were found impractical for the same reason and the fact that in case of a "wallowed out hole" it is impractical to rebore the cranks in the field.

With the "Easy Change" Pin, any damage to the hole usually comes in the bushing which is easily replaced.

Crank pin wrench, also counterbalance weight wrench are furnished with each Unit.

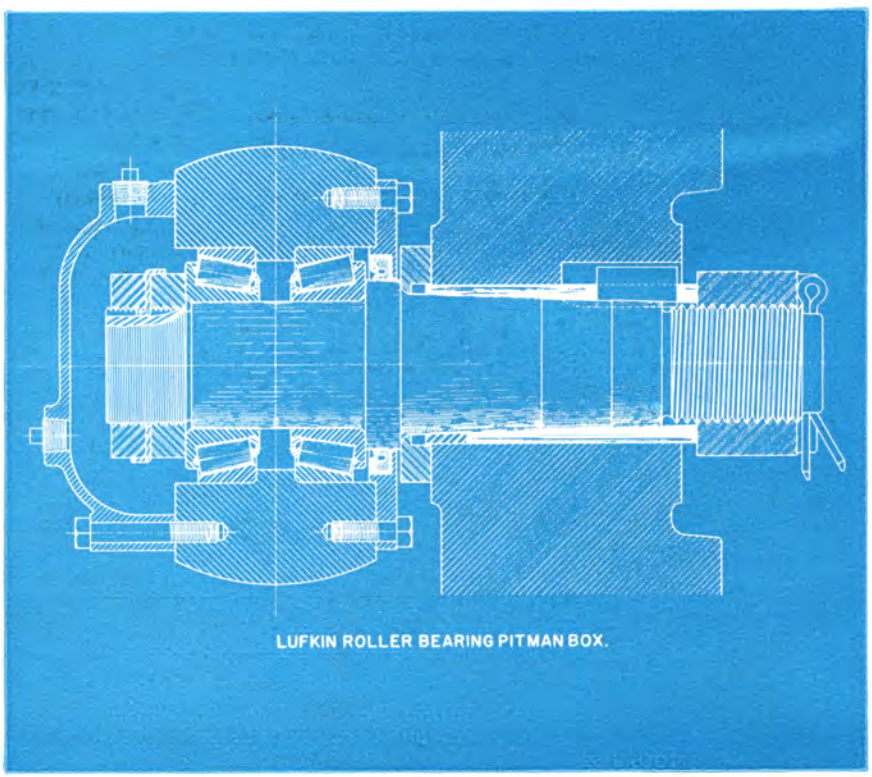


FIGURE 54

ROLLER BEARING CRANK PINS

Lufkin Roller Bearing Crank Pins, the design of which is illustrated in blue print to the left, may be furnished for any size unit upon request and at a slight increase in cost over regular bronze bearing.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN PRODUCTION HOISTS

Lufkin Engineers feel that they have reached the ultimate in operating efficiency in Production Hoists. Operation under the most severe conditions in the field over a period of years, has definitely proven the many advantages of the Lufkin "Loose-drum" roller bearing Hoists. The loose drum feature permits the Hoist to reverse without use of Power when going into the hole. This is found particularly desirable when using multi-cylinder or single cylinder engines. All Lufkin Hoists are equipped with Trout Expansion Brake Drums, which are unaffected by heat; Hyatt drum bearings; asbestos clutch blocks and asbestos brake bands of superior quality. Lufkin Hoists are ruggedly constructed and are fast and powerful in action. Time pulling rods and tubing is greatly reduced. Lufkin Hoists are furnished with either steel or wooden posts.

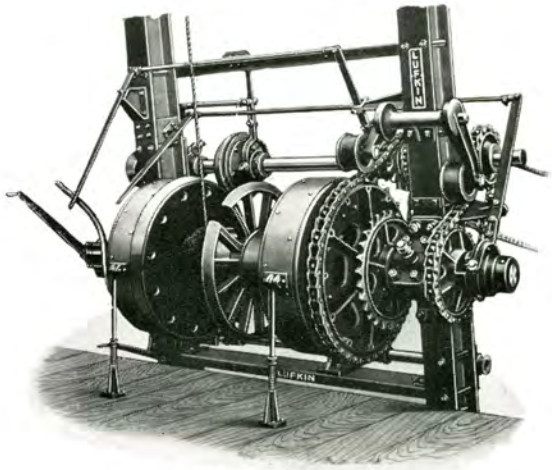


FIGURE 57
No. 52 Lufkin Production Hoist
(Same as No. 522 with line shaft added)

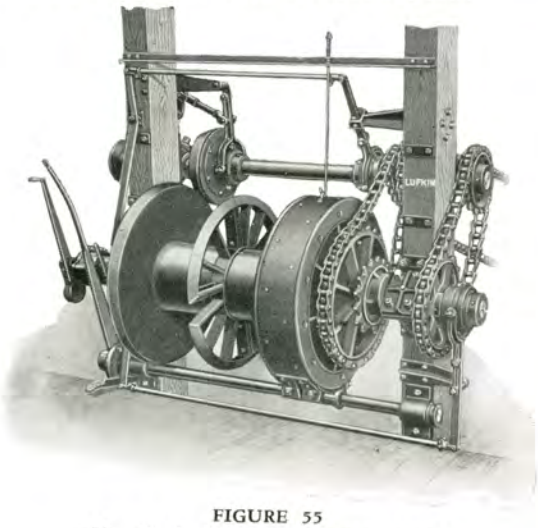


FIGURE 55
No. 2 Lufkin Production Hoist

FIGURE 56-A
Lufkin Combination Ball Bearing Rod Line Weight and "Sister Hooks"

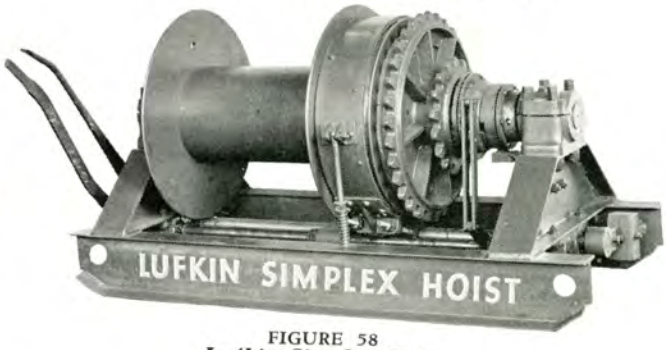


FIGURE 58
Lufkin Simplex Hoist

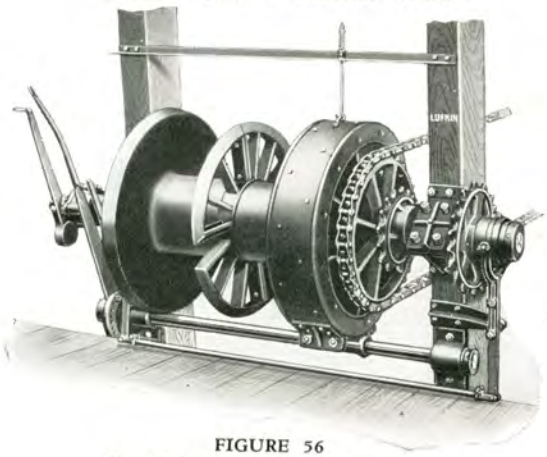


FIGURE 56
No. 6 Lufkin Production Hoist
(Same as No. 2 without line shaft)

FIGURE 59
No. 16 Lufkin Production Hoist

SPECIFICATIONS OF LUFKIN PRODUCTION HOISTS

DIMENSIONS		No. 2	No. 6 & 16	No. 52	No. 522	Simplex
Line Capacity	9/16" Line	10,000	10,000	11,000	11,000	6,400
	5/8" Line	8,500	8,500	9,000	9,000	5,200
	3/4" Line	6,000	6,000	6,400	6,400	3,600
	7/8" Line	4,400	4,400	4,600	4,600	2,600
	1" Line	3,500	3,500	3,600	3,600	2,000
Diameter Drum Shaft		4	4	5	5	4
Diameter Drum		16	16	16	16	16
Length of Drum		35	35	36	36	30
Diameter Drum Flanges		42	42	42	42	36
Diameter Line Shaft		4	None	4	None	None
Line and Drum Shaft Bearings		Babbitt	Babbitt	Babbitt	Babbitt	Babbitt
Drum or Clutch Sprocket Bearings*		Hyatt	Hyatt	Hyatt	Hyatt	Hyatt
Area Braking Surface		880 Sq. In.	880 Sq. In.	1760 Sq. In.	1760 Sq. In.	690 Sq. In.
Area Friction Clutch		443 Sq. In.	443 Sq. In.	706 Sq. In.	706 Sq. In.	443 Sq. In
Low Speed Sprocket		32T.	32T.	44T.	44T.	32T.
High Speed Sprocket		22T.	17T.	22T.	28T.	17T.
Bull Wheel Drive Sprocket		17T.	22T.	28T.	22T.	None
Weight in Pounds		7400#	6200#	12,000#	11,000#	3500#

*Clutch Sprocket Bearing on Simplex Only.

LUFKIN CENTRAL PUMPING POWERS

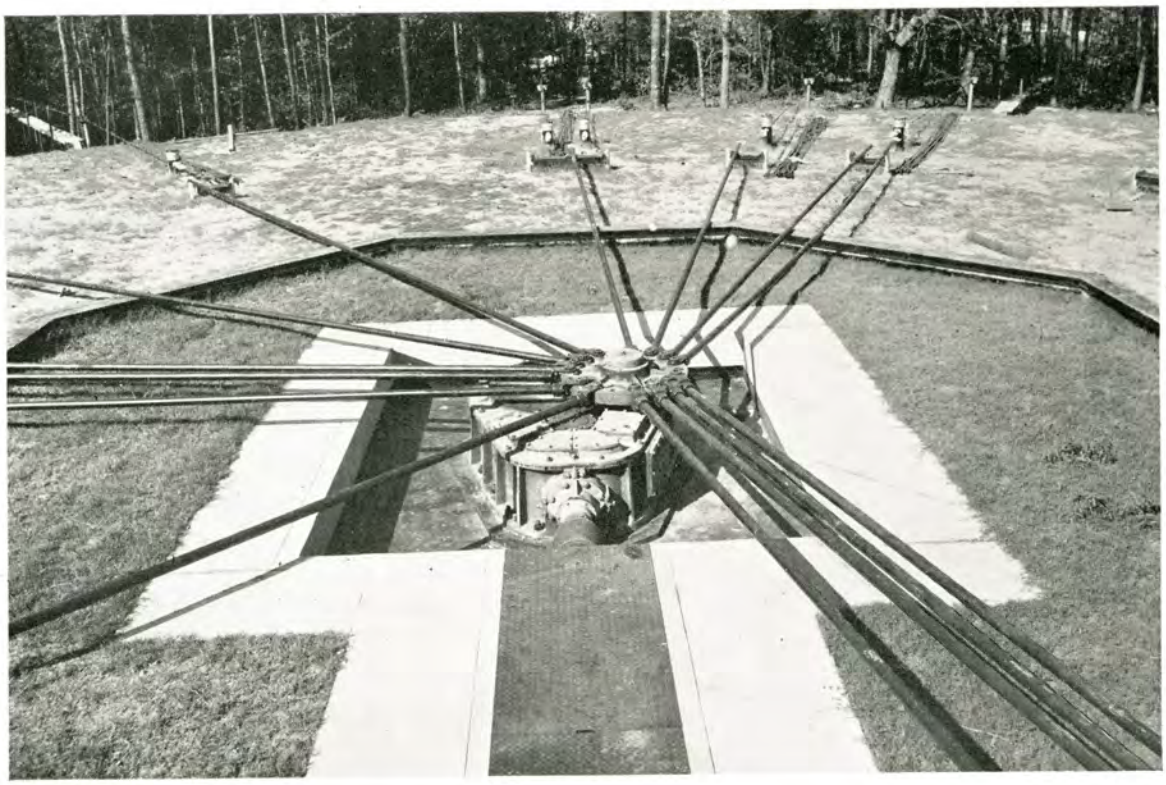


FIGURE 60

Lufkin Herringbone Geared Central Power installation in East Texas pulling 14 wells

GENERAL CHARACTERISTICS LUFKIN HERRINGBONE CENTRAL PUMPING POWERS

In general design this Power has ten years of successful operation and experience behind it. We adopted the design of the center stationary trunnion in our worm gears and LUFKIN POWERS are now carrying pumping loads that were hardly believed possible.

While pumping units are subject to high peaks and overloads, in **Central Powers** this is accentuated almost in proportion to the number of wells, and this, with the "unbalanced load" so often disregarded by operators as impractical to overcome, challenges the manufacturer of Central Powers to meet these unusual conditions. Through experience LUFKIN designs have been developed and are successfully meeting these generally unlooked-for variable loads, inherent in their operation.

Experience teaches us also that the "power required" on most installations is underestimated, especially under proration, then too often, more wells are hooked on—not only overloading the power itself, but using the motive power to its limit.

Economic conditions are largely responsible for this policy, to which there is a limit of course, but we believe LUFKIN POWERS have the "background and the backbone" to withstand the greatest loads of any Power offered for this service.

Size for size, we believe any engineer who investigates these Powers will conclude that being of the Herringbone Type there is no end thrust, (bearing down pressure as when helical gears are used)—that the gears, bearings, and rugged design of the power itself, are 50% to 100% stronger and are very conservatively rated.

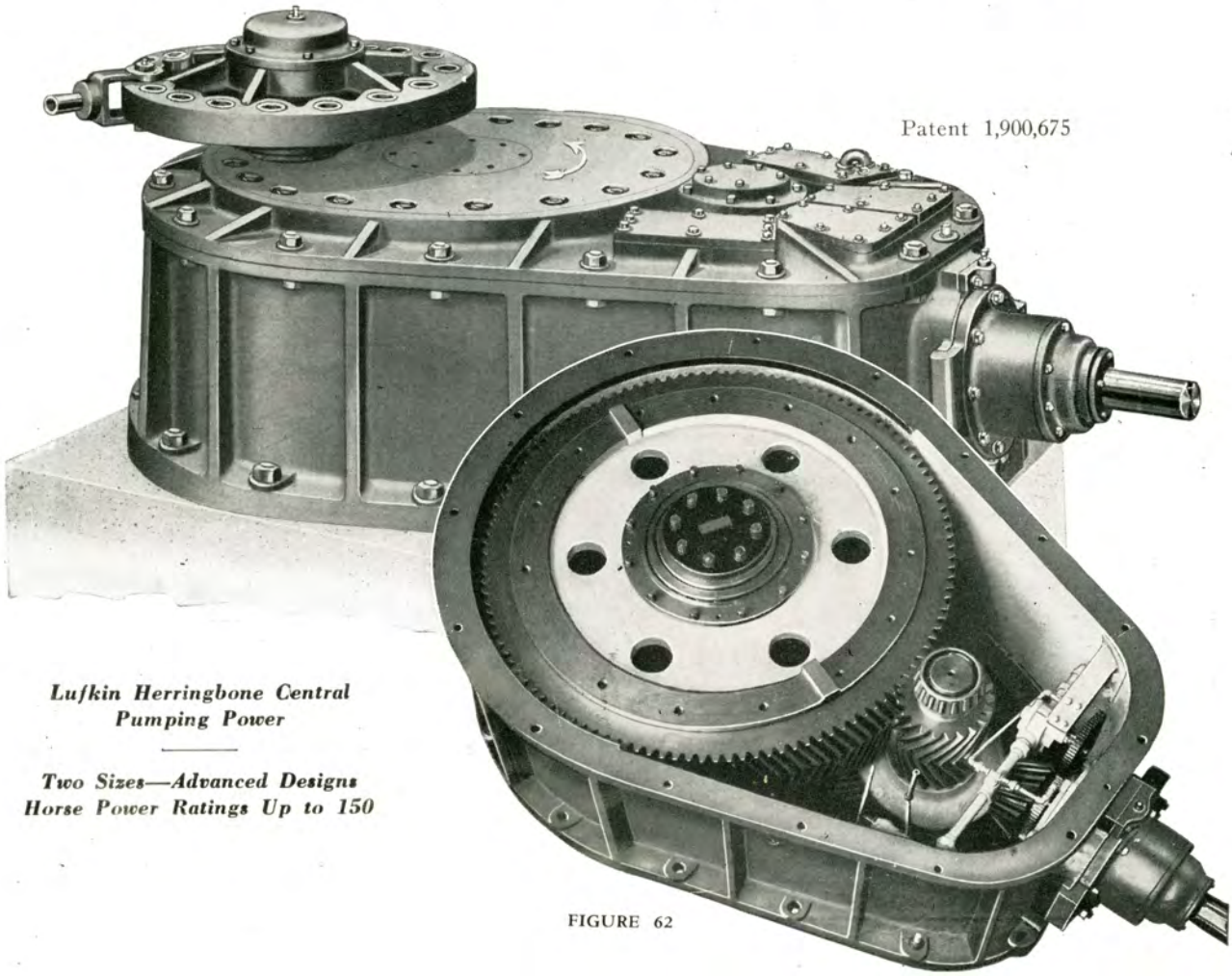
While every possible adjustment for gears and bearings are provided to take up wear, experience proves factory adjustments are seldom altered, once set, they require no further attention. All parts are immediately accessible for inspection and cleaning when cover is removed.

FIGURE 61

Typical Gas Engine Drive for Lufkin Herringbone Central Power Installation

LUFKIN HERRINGBONE GEARED CENTRAL PUMPING POWERS

Patent 1,900,675



Lufkin Herringbone Central Pumping Power

Two Sizes—Advanced Designs
Horse Power Ratings Up to 150

FIGURE 62

Cross-section Lufkin Herringbone Power No. 150. Note simplicity of design — compactness and fine bearing detail.

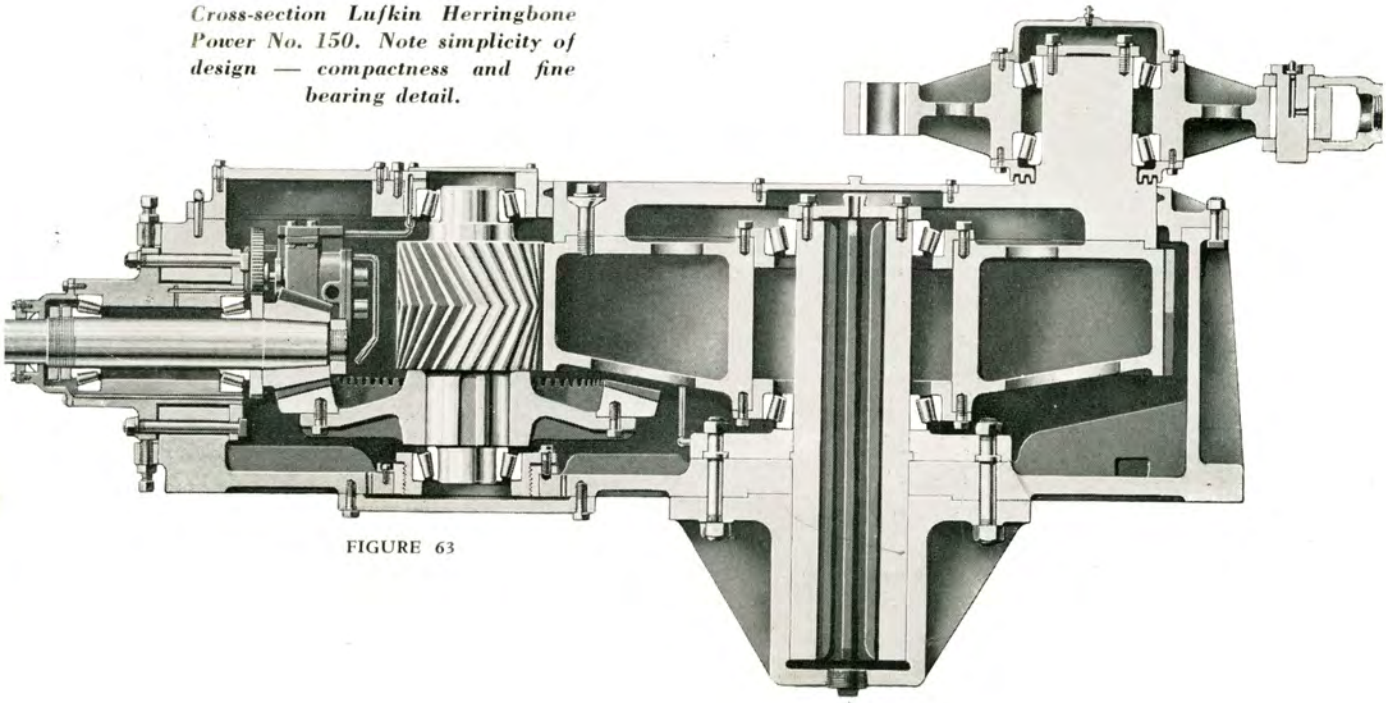
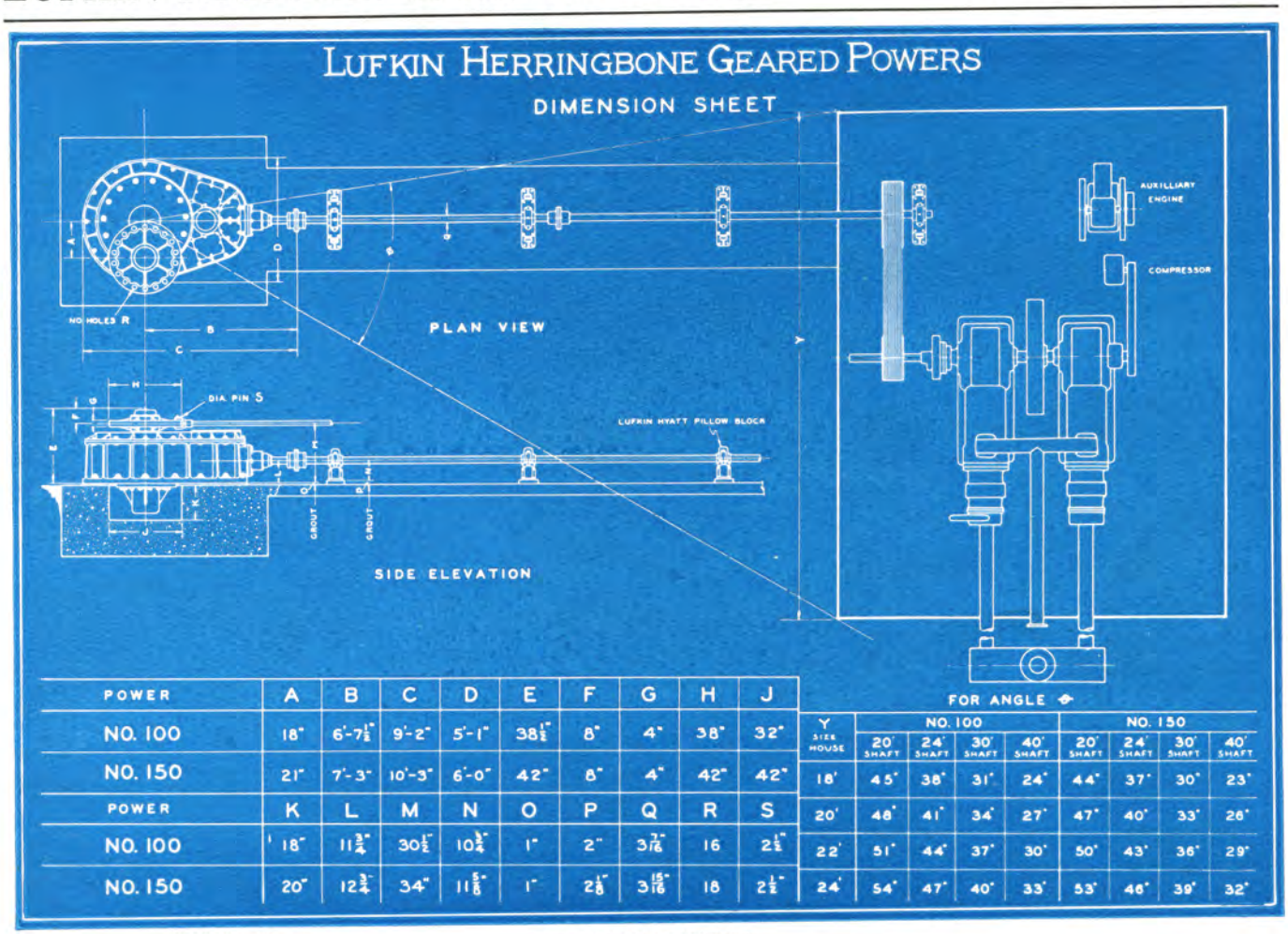


FIGURE 63



POWER	A	B	C	D	E	F	G	H	J
NO. 100	18"	6'-7⅛"	9'-2"	5'-1"	38⅛"	8"	4"	38"	32"
NO. 150	21"	7'-3"	10'-3"	6'-0"	42"	8"	4"	42"	42"
POWER	K	L	M	N	O	P	Q	R	S
NO. 100	18"	11¾"	30½"	10¼"	1"	2"	3 7/16"	16	2½"
NO. 150	20"	12¾"	34"	11 5/16"	1"	2⅛"	3 15/16"	18	2½"

Y SIZE HOUSE	NO. 100				NO. 150			
	20' SHAFT	24' SHAFT	30' SHAFT	40' SHAFT	20' SHAFT	24' SHAFT	30' SHAFT	40' SHAFT
18'	45°	38°	31°	24°	44°	37°	30°	23°
20'	48°	41°	34°	27°	47°	40°	33°	26°
22'	51°	44°	37°	30°	50°	43°	36°	29°
24'	54°	47°	40°	33°	53°	46°	39°	32°

FIGURE 64

GEAR RATINGS

Lufkin Herringbone Central Powers

Power No.	*H.P. @ 20 S.P.M.	Type Gears	Ratio	Drive Sheave Bore	Stroke	Dia. and Face Main Gear	Base To and Pull Rods	Weight
100	191.1P 121.7N 81.8L	Herringbone & Spiral Bevel	19	3 7/16"	36"	50"x10"	34"	12,200
150	286.8P 182.7N 118.8L	Herringbone & Spiral Bevel	17	3 11/16"	42"	60"x12"	38"	18,000

***Horsepower Ratings:** The Top Rating "P" is Peak Horsepower. The Second Rating "N" is Nominal Horsepower, the Third Rating "L", is Lufkin-Sykes Rated Horsepower. The two Upper Ratings are A.P.I. Ratings based on Pinion 270 Brinnell and Gears 210 Brinnell.

HERRINGBONE GEAR ELIMINATES THRUST LOAD

EASY ADJUSTABILITY

The Herringbone gear equalizes all thrust loads insuring longer bearing life. A Lufkin patented feature permits easy adjustability, in the field, of both Herringbone and Gleason Helical bevel gears.

ANTI-FRICTION BEARINGS THROUGHOUT

All bearings are Timken Roller Bearings of generous size with high load carrying capacities.

GENERAL SPECIFICATIONS

Herringbone Units

1. Lufkin-Sykes Herringbone Main Gears.
2. Gleason Helical Bevel Gears.
3. Nickel-Alloy Massive Steel Trunnion.
4. Low Center of Gravity—Compact.
5. Pressure Pump Lubrication—Positive.
6. Timken equipped throughout.
7. Crank Pin cast integral with crank.
8. No housing expense except for prime mover.
9. Designed throughout with conservative wear formulas—rugged—strong—for long lasting service.

DISTINCT FEATURES

A distinct feature characteristic of both the Lufkin Worm Gear and Herringbone Gear Powers is the design of the **center trunnion.** This massive center trunnion is an exclusive patented Lufkin feature found in no other type of geared central powers. All the shocks and strains due to unbalanced well conditions are transmitted through this center trunnion, directly to the solid concrete base. The Lufkin center trunnion is the result of ten years operating experience with various designs of geared central powers.

Lufkin Powers may be adapted to any type of prime mover.

Most engineers are familiar with these problems and can arrive at a close approximation of horsepower required for a number of wells, however, if you wish our help or suggestion in determining size of power, engine or motor, please mail us the following information:

Make a diagram of the wells to be pumped, preferably to scale, locating your idea of where Power should set, marking the length of pull rods to each well. Then letter or number each well giving depth pumped; size of tubing; size of rods; gravity of oil; production if known; oil and water if any; any general information as to ground conditions, etc., or better, have our engineer call and make up an estimate.

LUFKIN WORM GEAR CENTRAL POWERS

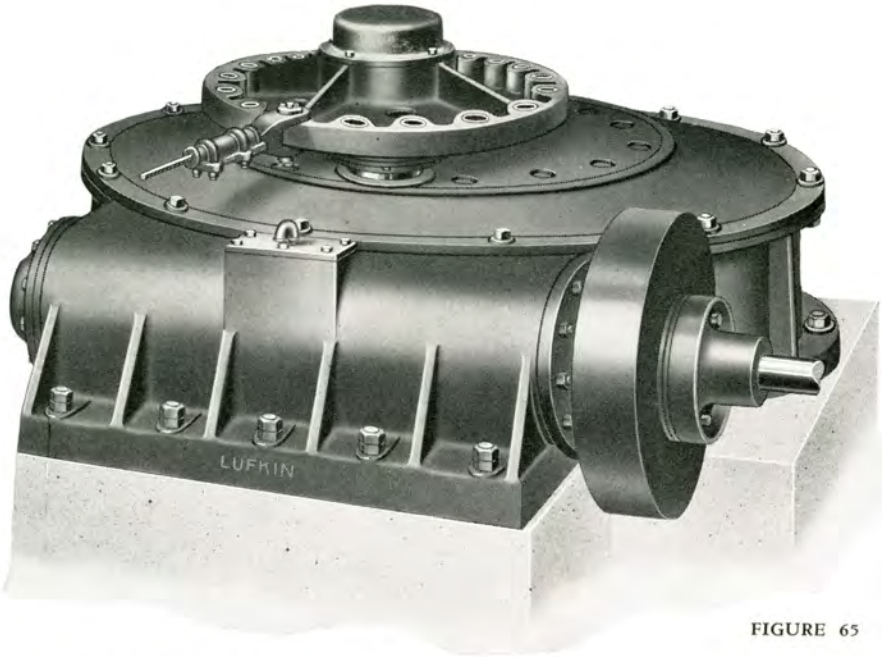


FIGURE 65

The Lufkin Giant Worm Gear Central Power—Two sizes, 50 and 125 H.P.

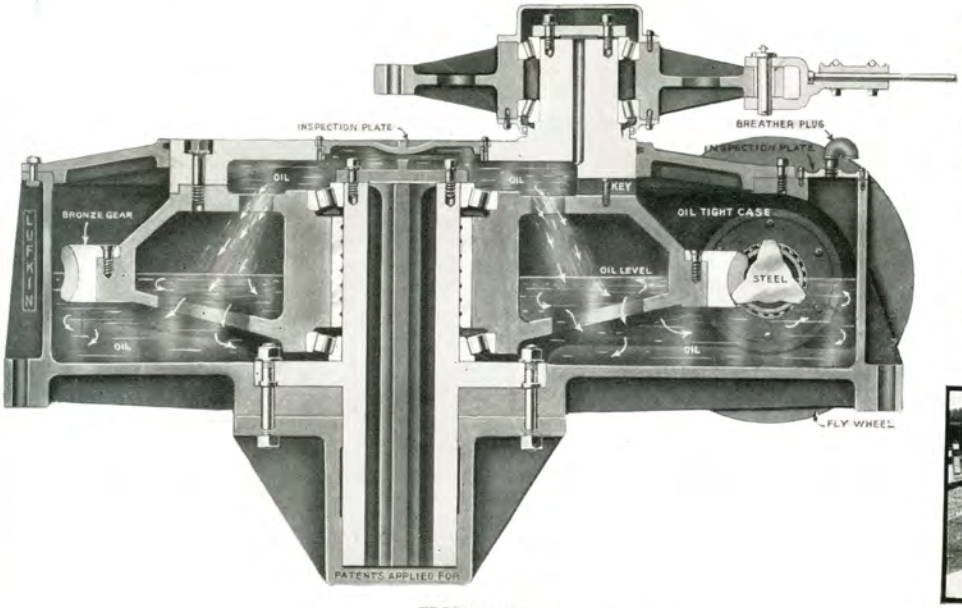


FIGURE 66
Cross-Section Lufkin Giant Power

Mechanical Characteristics

The first Lufkin Geared Powers were of the Worm Gear type. The earliest installations are today operating as efficiently as when first installed—an operating characteristic of Worm Gears, namely, sustained efficiency throughout the life of the gears.

Lufkin Worm Gear and Herringbone Gear Powers are comparable in many operating characteristics. Lufkin Worm Gear Powers, it may be said, exceed Herringbone Powers in simplicity of design—with fewer wearing parts—other mechanical features may be summed up in the following:

1. Center Trunnion of Nickel Alloy Steel.
2. Center and Crank pin bearings; Timken.
3. Worm Bearings: double Timken Thrust, Hyatt Radial.
4. Gear is of alloy bronze.
5. Worm of alloy steel heat treated.

Lufkin worm gear powers are of heavy rugged construction designed for life-time service.

Typical Lufkin Central Power Installation

GEAR RATINGS

Lufkin Worm Gear Powers

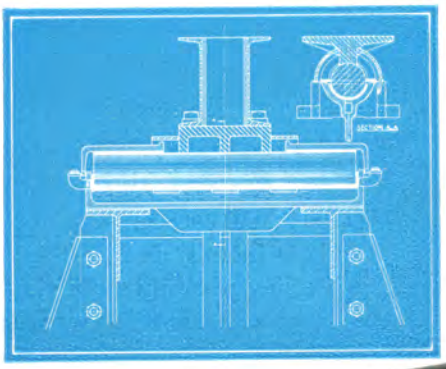
Number	H.P. @ 20 S.P.M.	Type Gears	Ratio	Drive Sheave Bore	Stroke	Dia. and Face Main Gear	Base To and Pull Rods
Standard	50	Worm	29 2/3	3 7/16"	24"	51"x4 1/2"	24"
Giant	125	Worm	29 2/3	3 11/16"	30"	71"x6"	34 5/8"

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

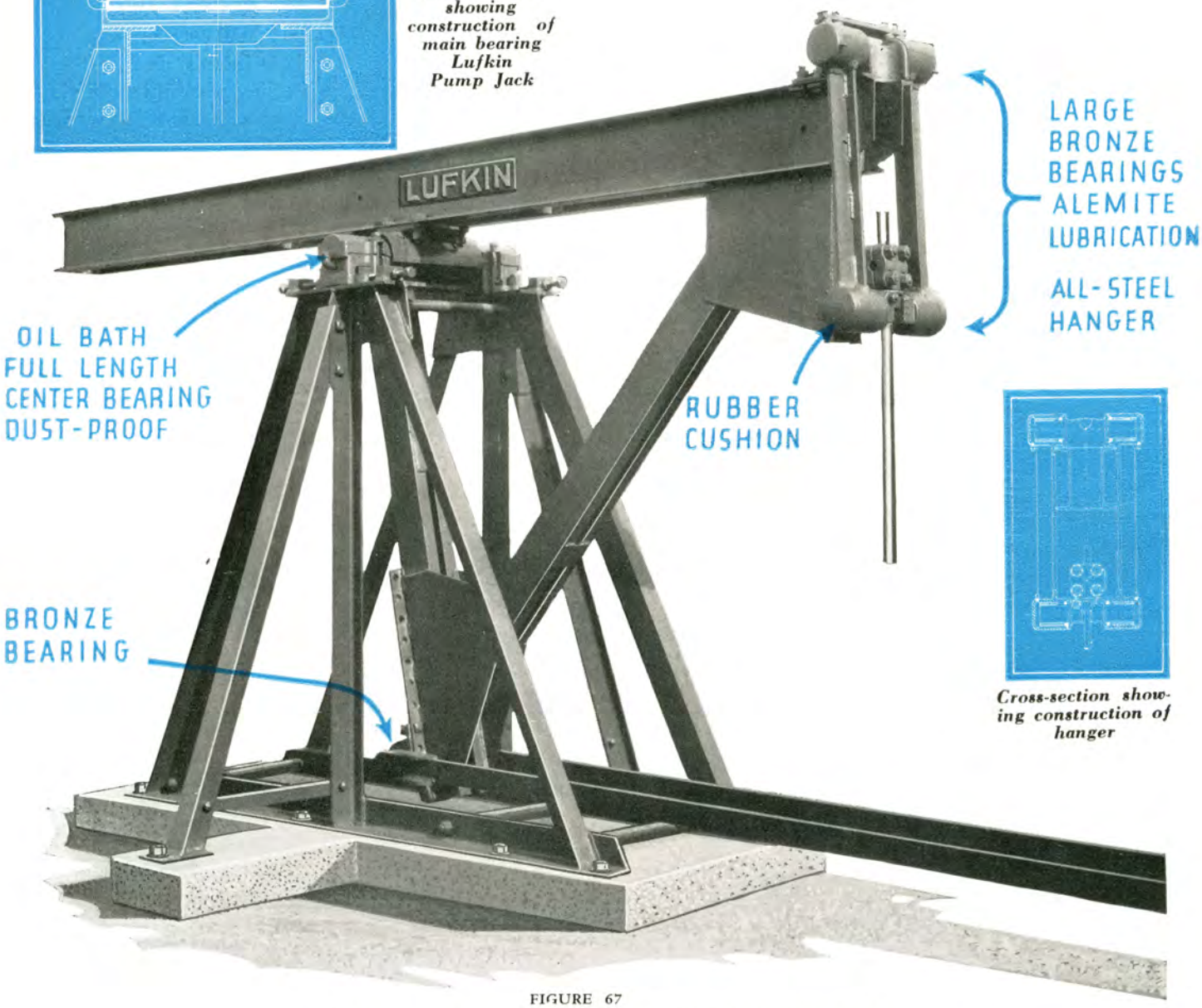
LUFKIN ARC-WELDED IMPROVED PUMP JACKS

TWO SIZES

No. 17 . . . . . 17,000 lb. Capacity
No. 10 . . . . . 10,000 lb. Capacity



Cross-section showing construction of main bearing Lufkin Pump Jack



Cross-section showing construction of hanger

FIGURE 67

LUFKIN IMPROVED ARC-WELDED PUMP JACK

After many years experience in the manufacture of Pump Jacks, and a thorough study of their operation from an engineering standpoint, we have now confined our line to two sizes, in which very definite improvements have been made.

Concentration of the best engineering practice in the design of these Jacks has made possible increased strength and rigidity where most needed. Larger bearing surfaces are provided in the main saddle and hanger bearings. Improved oiling facilities found most desirable for heavy duty service are incorporated in their design.

The frame and walking beam are of structural steel—arc-welded throughout and an unusual spread is obtained in the side braces both lengthwise and crosswise of the beam. The foundation or bolt layout corresponds with the foundation layout of the Lufkin T.C.-4-11A Unit which permits of individual well pumping without additional foundation expense should this method of pumping be found desirable at any time.

The saddle bearing is of new and novel design. (See cross-section). The saddle bearing cast in one piece ties the two side frames rigidly together. The saddle is entirely of steel with a large turned shaft provided its entire length. This bearing is babbitted with a strictly tin base metal of highest quality—is dust proof—oil-tight and has by far, the largest bearing surface of any Jack that we know of.

The Hanger is entirely of steel and is of the link hanger type, providing an ideal straight lift or motion to the polish rod. (See diagram.) The Hanger bearings are extra large and are equipped with bronze bushings, Alemite lubricated, which are easily and inexpensively replaced when worn.

The pull bars are flat steel with an equalizing bar to fasten to rod lines. The pull bar Jack bearing is adjustable, bronze bushed and Alemite lubricated.

LUFKIN JACKS will convince and satisfy the most "exacting" individual looking for practical and substantial equipment with lower maintenance cost.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN ARC-WELDED IMPROVED PUMP JACKS

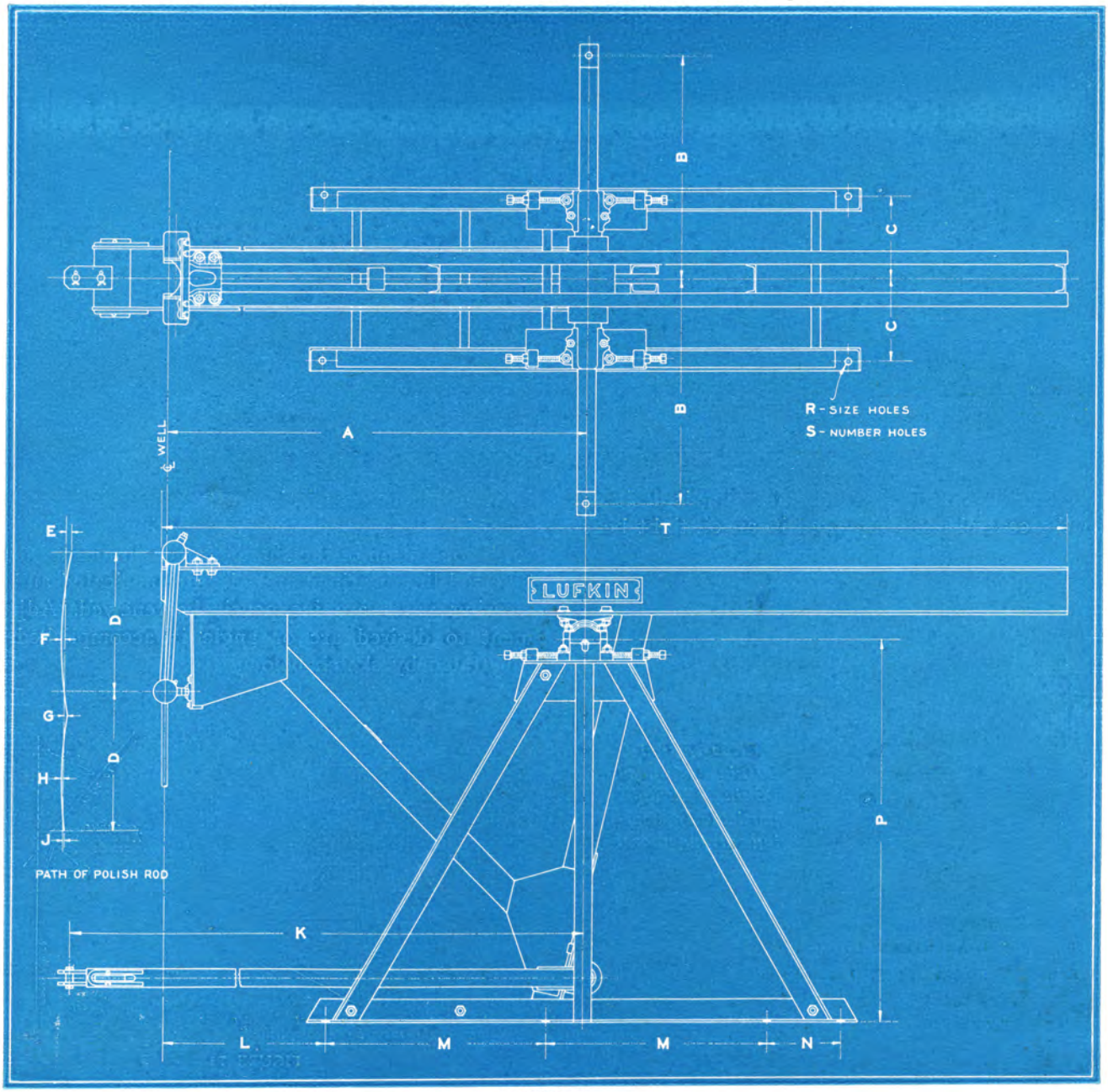


FIGURE 68

DIMENSION SHEET—LUFKIN PUMP JACKS

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
No. 10	6′–0″	3′–3″	14⅜″	2′–0″	1/16″	3/16″	3/16″	3/16″	¼″	10′–2½″	2′–9″	3′–6″	*	5′–6″	1½″	8	13′–0″
No. 17	7′–0″	3′–6″	14⅜″	2′–6″	1/16″	7/16″	5/16″	5/16″	7/16″	12′–3¾″	2′–9″	3′–6″	18″	6′–6″	1½″	10	15′–0″

*Only 8 holes for Foundation Bolts on No. 10 Jack.

GENERAL SPECIFICATIONS

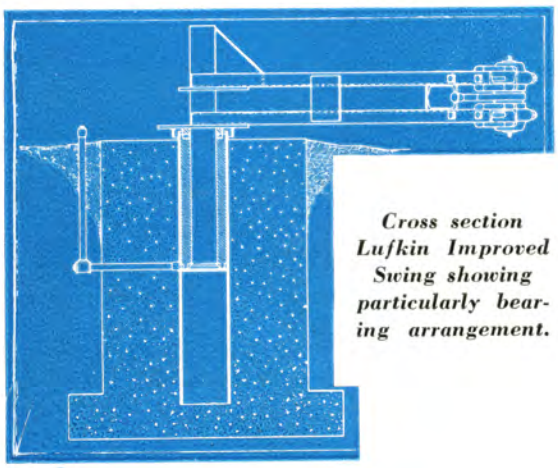
	No. 10	No. 17
Rated Polish Rod Load	10,000 lbs.	17,000 lbs.
Stroke	48″	60″
Maximum Ratio Polish Rod to Pull Rod Stroke	1.68 to 1	1.70 to 1
Minimum Ratio Polish Rod to Pull Rod Stroke	1.17 to 1	1.15 to 1
Depth Walking Beam Double Channels	8″	10″
Diameter and Length Saddle Bearing	2 1/16 x 29 3/8	3 1/16 x 29 3/8
Bearing Surface Saddle Bearing (High Grade Babbitt)	87 Sq. In.	116 Sq. In.
Bearing Surface on Hanger (Bronze)	15 Sq. In.	24 Sq. In.
Base to Bottom of Hanger at Mid-stroke	4′—8 7/8″	5′—5 1/8″
Stirrup Bearing Size	2 1/16 x 8″	3 1/16 x 8″
Number and Size Foundation Bolts	8—1¼x24″	10—1¼x24″

LUFKIN SURFACE EQUIPMENT

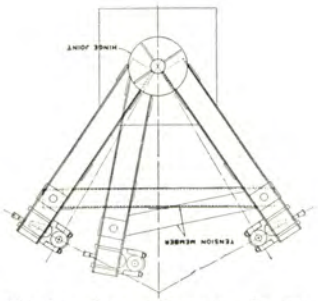
FIGURE 69

LUFKIN IMPROVED STRUCTURAL SWING

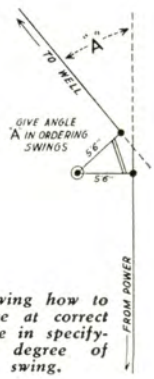
The Lufkin improved structural swing is designed with the central shaft mounted in an oil-tight bearing, set in concrete. This construction eliminates the use of braces and particularly minimizes wear due to the operation of the shaft in a continuous oil bath. The rod line bearings are Alemite lubricated and all wearing parts are inexpensively renewed. Adjustment to desired arc or angle is accomplished as illustrated by sketch below.



Cross section Lufkin Improved Swing showing particularly bearing arrangement.



Showing how adjustment in arc or angle may be accomplished.



Showing how to arrive at correct angle in specifying degree of swing.

FIGURE 71

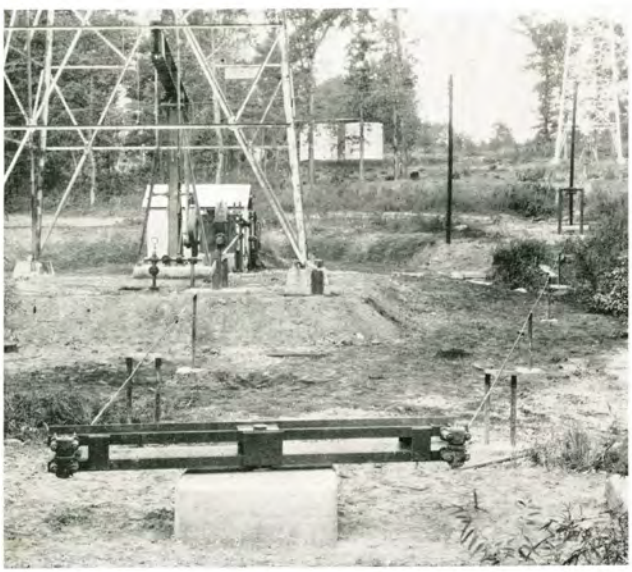


FIGURE 70

Installation of Lufkin 180-degree structural steel swing.

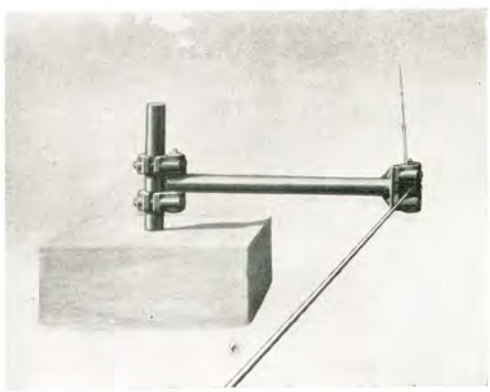


FIGURE 72

Hold-Up used for Swing where small angles are encountered.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN ROD LINE EQUIPMENT

FIGURE 73

Lufkin Roller hold-down in structural frame. Note roller hold-up in distance.

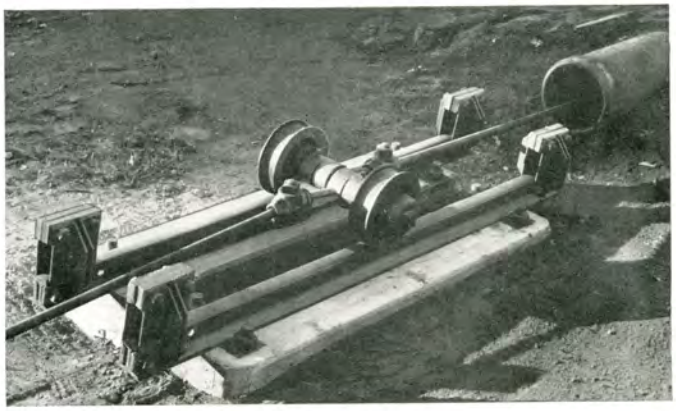
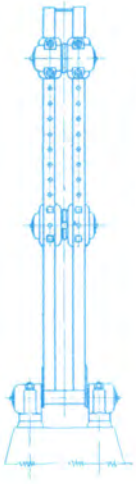


FIGURE 75

Lufkin Roller hold-up. Carriage operates on rail frame.



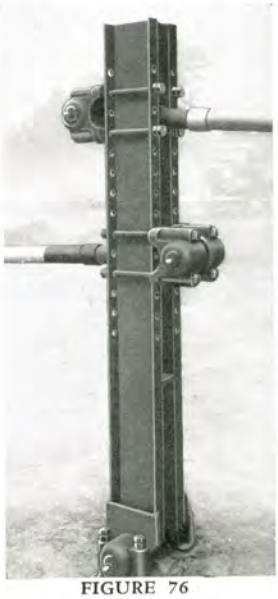


FIGURE 76

LUFKIN STROKE OR MULTIPLIER POST

This type post is commonly used when change is desired near unit. The bearings on this post, both rod connections and ground bearings are interchangeable with Lufkin hold-up and hold-downs.

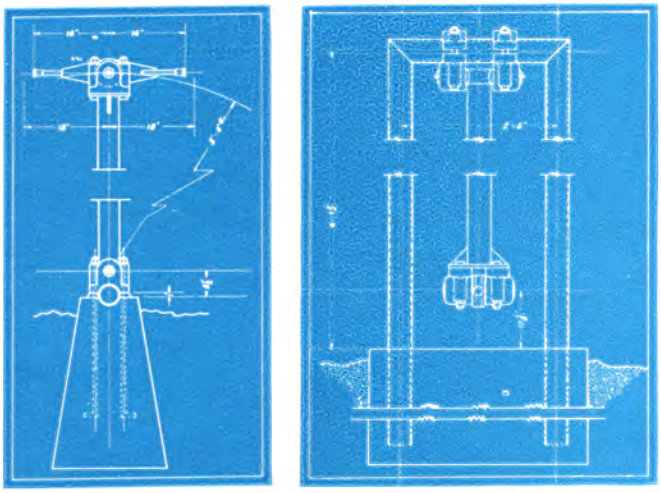


FIGURE 74

Blue print cross section of Lufkin hold-up and hold-down illustrated to the right.

FIGURE 77

FIGURE 78

Lufkin hold-up and hold-down. All bearings interchangeable and Alemite lubricated.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN "BACK-CRANK" EQUIPMENT

FIGURE 79
Lufkin Jack Type Take-Off with Rolling Counterbalance

FIGURE 80
Lufkin Vertical Type Take-off

LUFKIN JACK TYPE TAKE-OFF
With "Rolling" Counterweight

This improvement in take-off design will be found very practical and easy to adjust weight. Any individual well may be pumped under proper balance. Patents have been applied for. With this take-off the two extra wells can be balanced independent of the main well, or the "difference" in balance of the two jack wells taken care of.

LUFKIN VERTICAL TYPE TAKE-OFF
For Back Crank Pumping

The Lufkin Vertical type Take-Off, fitted with Alemite lubricated bearings, is the most efficient of all types of take-offs. The underslung feature is very desirable, keeping the rods nearer the ground. For diagram installation see page 868-C.

LUFKIN KNOCK OUT POST
Has Many Improvements

Steel notch bar has even surface to wear on cast-iron block. Post can be set any reasonable height. No danger clipping fingers with this safety device.

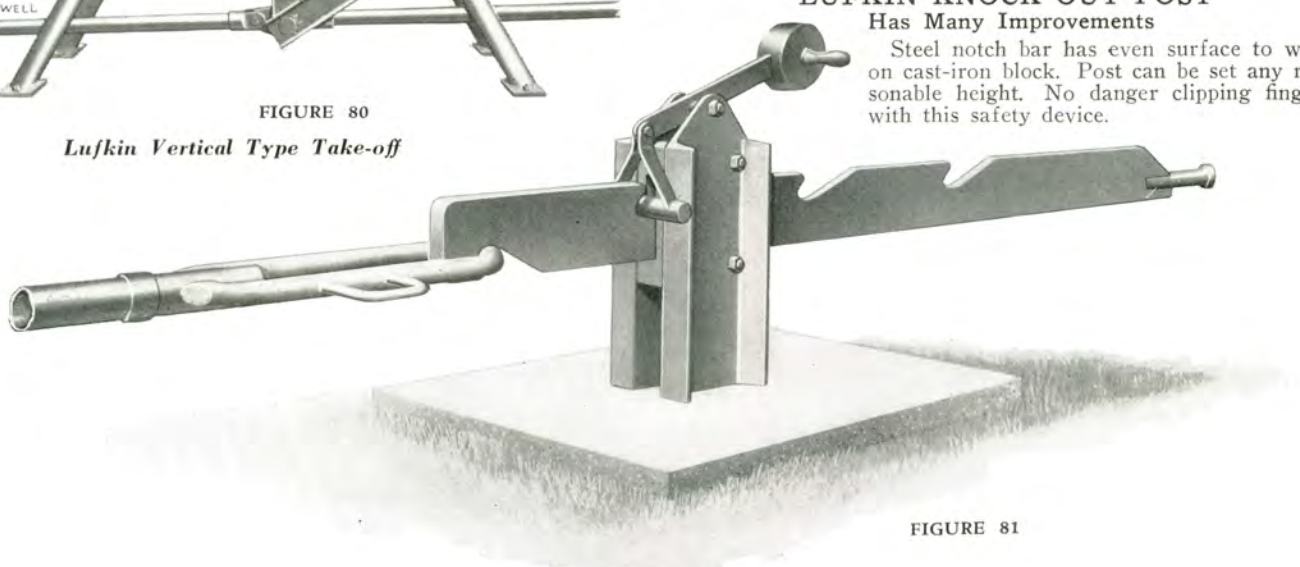
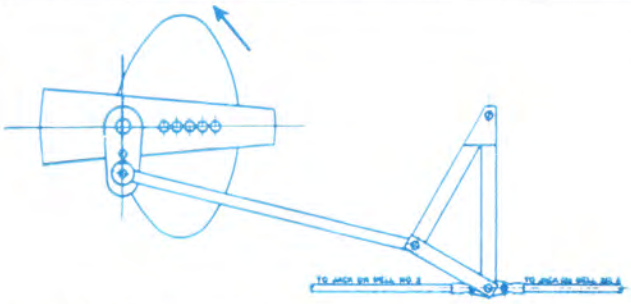
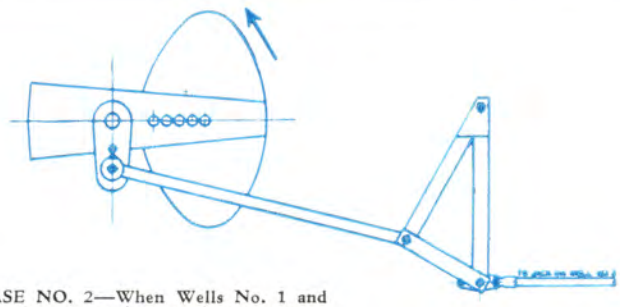


FIGURE 81

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS



CASE NO. 1—In three-well hookup when all wells are pumping, Jacks will balance each other and Trout Crank will largely affect balance on beam well only.



CASE NO. 2—When Wells No. 1 and No. 3 are pumping, maximum counterbalance is required.

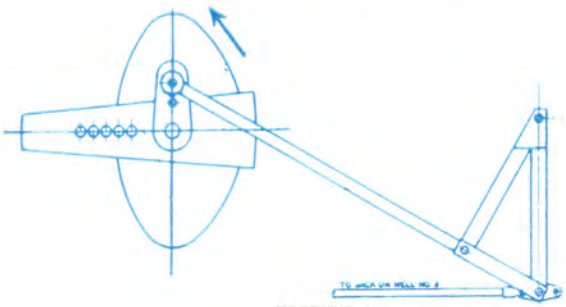


FIGURE 82

CASE NO. 3—When Wells No. 1 and No. 2 are pumping, no counterbalance is required, that is, crank weights are to be centered.

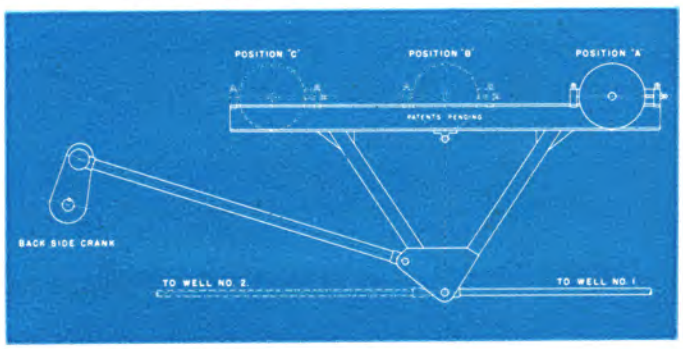


FIGURE 83

Illustrating counterbalance take-off for back-cranking two wells and permitting any one of three wells to operate as desired.

"BACK-SIDE CRANK" PUMPING

The use of "back-side or back cranks" for pumping two or more wells has become quite prevalent since the advent of the East Texas field. For this type of production Lufkin has provided especially designed equipment which has met with instant favor. Back-crank pumping is more readily adapted to Lufkin Units because of the ease with which the Trout Counterbalance crank weights are adjusted to secure the correct effective counterweight, or balance, regardless of the number of wells pumping as will be noted by referring to the diagram above.

The purpose of this diagram is to show the ease with which part-time wells may be balanced with the Lufkin Counterbalance Crank.

Fig. No. 83 shows the latest improved take-off for two extra wells. In case of a three well hookup, our regular crank can take care of the main well and the difference in balance of the two extra wells as in case 2 or 3. The improvement is being able to readily take care of either well pulled by the back crank—pulling either one at a time or the difference in balance as may be desired.

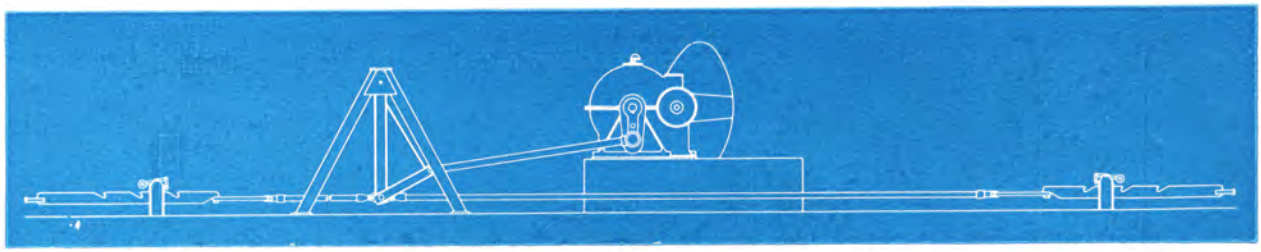


FIGURE 84

Illustrating Typical "Back-Side" Crank installation using the special Lufkin Vertical, underslung type Take-Off with Lufkin Safety Knock-Out. See also page 848.

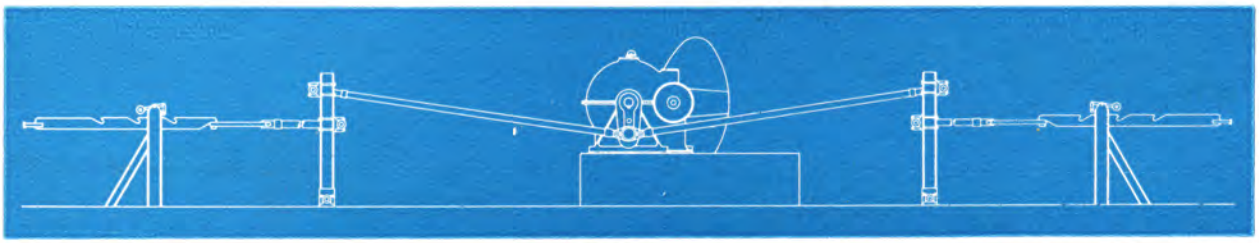


FIGURE 85

Illustrating Typical Lufkin "Back-Side" Crank installation using regular Lufkin Slide-Bar Type Knock-Outs and Multiplier Posts.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

LUFKIN SURFACE EQUIPMENT

All types of rod line equipment are available—illustrated on this page are some of the more common appliances which are, at all times, carried in stock.

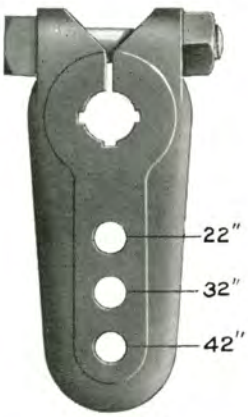


FIGURE 86
LUFKIN BACK-SIDE CRANKS

3 Hole 42" stroke—
Max. Bore 6-7/16"—No. 1910-W
3 Hole 36" stroke—
Max. Bore 5-7/16"—No. 2059-W
3 Hole 30" stroke—
Max. Bore 4-7/16"—No. 2060-W

These cranks use 4" x 6" taper pins.

FIGURE 88
Single Take-off Connector.

FIGURE 93
Double Take-off Connector.

FIGURE 89
Lufkin tapered shank crank pin with 4" x 6" bearing for use with crank as shown in Fig. 86.

FIGURE 94
Plain Safety CC Clamp, also furnished with rod ends countersunk.

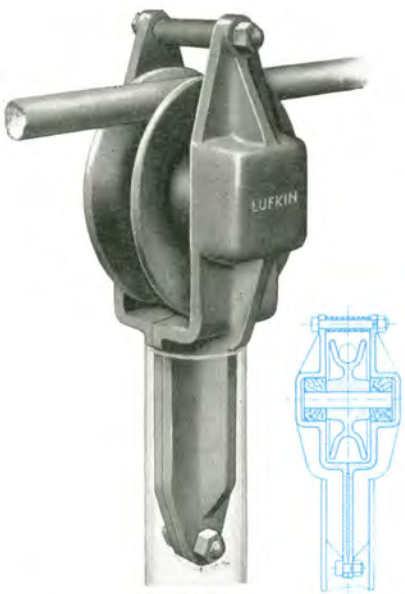


FIGURE 87
Lufkin Pull Rod Carrier; split malleable iron housing, 5" diameter gray iron sheave, paraffin maple bearings.

FIGURE 90
Lufkin Pull Rod Carrier, gray iron housing furnishing oil bath lubrication to wood carrier block either wick oiling or capillary feed.

FIGURE 95
Lufkin knock-out block, heavy construction. Electric welded.

FIGURE 91
Lufkin Improved Bull Ring bronze bushed. Alemite lubricated connections.

FIGURE 96
Lufkin C-Link

FIGURE 92

Pull Rods and Pull Rod Coupling—
any standard size.

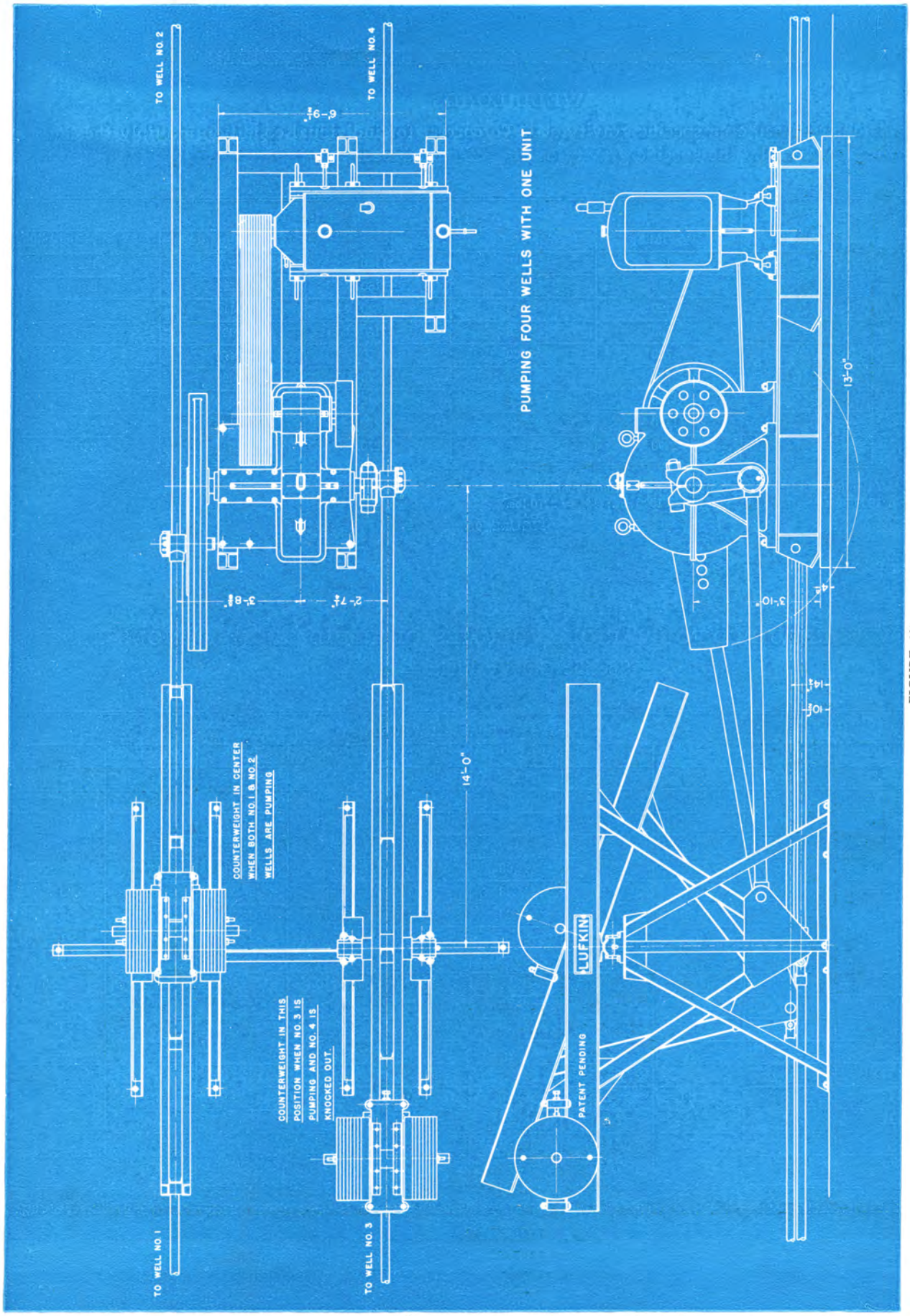


FIGURE 97

BULL DOGGING FOUR WELLS

This is a standard single crank Lufkin Herringbone Unit set to pull four wells in East Texas during proration. As the unit is standard it may later be transferred to a single well. Note the "take-off" with rolling balance weight—handy to balance on and off wells.

ENGINEERING DATA FOR THE PRACTICAL ENGINEER

WELL LOADS

Weights as listed are based on a specific gravity of 1. To correct for individual condition multiply the figures in the following columns by the specific gravity of the fluid produced.

Size Plunger	Size Rods	Weight To Be Lifted Per 1000 Feet				
		½ Fluid	All Fluid	Rods	½Fluid Plus Rods*	All Fluid Plus Rods
1 1/16"	5/8"	125	250	1150	1275	1400
1 3/4"	5/8"	442	884	1150	1592	2034
1 3/4"	3/4"	429	858	1690	2119	2548
2 1/4"	5/8"	793	1586	1150	1943	2736
2 1/4"	3/4"	780	1560	1690	2470	3250
2 1/4"	7/8"	730	1460	2270	3000	3730
2 3/4"	3/4"	1195	2390	1690	2885	4080
2 3/4"	7/8"	1170	2340	2270	3440	5610
3 3/4"	7/8"	2290	4580	2270	4560	6850

* Weight of one-half the fluid plus the rods equals the required counterbalance.
Weight of rods per 1000 Feet—5/8" = 1150 lbs.; 3/4" = 1690 bs.; 7/8" = 2270 lbs.

FIGURE 98

HORSEPOWER REQUIRED FOR VARIOUS VOLUMES OF FLUID FROM VARIOUS DEPTHS

Specific Gravity Fluid = 1

Bbls. Fluid Per Day	Horsepower at Tabulated Well Depths									
	1000'	2000'	2500'	3000'	3500'	4000'	4500'	5000'	6000'	7000'
50	.74	1.47	1.84	2.21	2.58	2.94	3.31	3.68	4.42	5.16
100	1.47	2.94	3.68	4.42	5.16	5.88	6.62	7.36	8.84	10.32
150	2.21	4.41	5.52	6.63	7.74	8.82	9.93	11.04	13.26	15.48
200	2.94	5.88	7.36	8.84	10.32	11.76	13.24	14.72	17.68	20.64
250	3.68	7.35	9.20	11.05	12.90	14.70	16.55	18.40	22.10	25.80
300	4.42	8.82	11.04	13.26	15.48	17.64	19.86	22.08	26.52	30.96
350	5.15	10.29	12.88	15.47	18.06	20.58	23.17	25.76	30.94	36.12
400	5.88	11.76	14.72	17.68	20.64	23.52	26.48	29.44	35.36	41.28
450	6.62	13.23	16.56	19.89	23.22	26.46	29.79	33.12	39.78	46.44
500	7.36	14.70	18.40	22.10	25.80	29.40	33.10	36.80	44.20	51.60
600	8.84	17.64	22.08	26.52	30.96	35.28	39.72	44.16	53.04	61.92
700	10.30	20.58	25.76	30.94	36.12	41.16	46.34	51.52	61.88	72.24
800	11.76	23.52	29.44	35.36	41.28	47.04	52.96	58.88	70.72	.....
900	13.24	26.46	33.12	39.78	46.44	52.92	59.58	66.24	79.56	.....
1000	14.72	29.40	36.80	44.20	51.60	58.80	66.20	73 60	.....	.....
1200	17.68	35.28	44.16	53.04	61.92	70.56	79.44	.....	.....	.....
1400	20.60	41.16	51.52	61.88	72.24	.....	.....	.....	.....	.....
1600	23.52	47.04	58.88	70.72	.....	.....	.....	.....	.....	.....

NOTE: Although the above table is not theoretically exact it is sufficiently accurate for most practical purposes. It is based conservatively on an overall efficiency of 50%.

FIGURE 99

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

VOLUMETRIC DISPLACEMENT—BARRELS PER DAY

Based on 100% Efficiency

Length of Stroke	Strokes per Minute	Size of Plunger				
		1 1/16"	1 3/4"	2 1/4"	2 3/4"	3 3/4"
1"	1	.132	.357	.590	.882	1.64
	10	1.32	3.57	5.90	8.82	16.40
	20	2.64	7.14	11.80	17.64	32.80
	25	3.30	8.92	14.75	22.05	41.00
22"	1	2.90	7.85	12.98	19.40	36.10
	10	29.0	78.5	129.8	194.0	361.0
	20	58.0	157.0	259.6	388.0	722.0
	25	72.5	196.3	324.5	485.0	902.5
32"	1	4.22	11.42	18.88	28.22	52.48
	10	42.2	114.2	188.8	282.2	524.8
	20	84.4	228.4	377.6	564.4	1049.6
	25	105.5	285.5	472.0	705.5	1312.0
42"	1	5.54	14.99	24.78	37.04	68.88
	10	55.4	149.9	247.8	370.4	688.8
	20	110.8	299.8	495.6	740.8	1377.6
	25	138.5	374.8	619.5	926.0	1722.0
52"	1	6.86	18.56	30.68	45.86	85.28
	10	68.6	185.6	306.8	458.6	852.8
	20	137.2	371.2	613.6	917.2	1705.6
	25	171.5	464.0	767.0	1146.5	2132.0
62"	1	8.18	22.13	36.58	54.68	101.68
	10	81.8	221.3	365.8	546.8	1016.8
	20	163.6	442.6	731.6	1093.6	2033.6
	25	204.5	553.2	914.5	1367.0	.....
72"	1	9.50	25.70	42.48	63.50	118.08
	10	95.0	257.0	424.8	635.0	1180.8
	20	190.0	514.0	849.6	1270.0	2361.6
	25	237.5	642.5	1062.0	1587.5	.....

FIGURE 100

LUFKIN GEAR RATINGS ARE BASED ON WEAR INSURING 5 TO 10 YEARS OPERATION WITHOUT APPRECIABLE LOSS IN EFFICIENCY

MOTORS—ENGINES—"V"-BELTS

ELECTRIC MOTORS AND CONTROLS — We are the general agents for General Electric Motors and can furnish from stocks at various points, any type of motors and controls ordinarily used in oil field practice.

ENGINES—We can furnish all standard makes of Multi-Cylinder Gas Engines. Lufkin Units are adaptable to any type of Single or Multi-Cylinder Engines. We use and have selling arrangements with all of the better known engine manufacturers.

"V"-BELTS AND DRIVES—We can furnish, by virtue of selling arrangements with the manufacturers, all types and brands of "V"-Belts and have license to manufacture all sizes of "V"-Belt sheaves under Geist patent No. 1,662,511.

We manufacture all types of Couplings, Gears, Pulleys, Sheaves, Clutches, Tighteners, and General Power Transmission Machinery.

LUFKIN FOUNDRY & MACHINE CO. LUFKIN, TEXAS

Below is a partial list of users of Lufkin equipment in the domestic and foreign fields. A careful check of the list will reveal that practically every major oil company is a user of Lufkin Equipment.

Such an imposing list of users, we feel, is pretty fine evidence of the acceptance and use of Lufkin Equipment. We gladly refer you to any user.

LUFKIN EQUIPMENT USERS IN UNITED STATES

Allison & George
Amerada Petroleum Corp.
American Liberty Oil Co.
Jack Appel
Arkansas Fuel Oil Corp.
Associated Oil Co.
Atlantic Oil Producing Corp.

Bankline Oil Co.
Barnsdall Oil Co.
Begol Oil Co.
Berry Asphalt Co.
Bill and Dave Oil Co.
Black & Case Oil Co.
Boone Brothers
Bradley & Fochee
Bradley, W. W.
Burton Drilling Co.
Burwyn Oil Corp.

C. B. Oil Co.
California Company
Camaroo Oil Co.
Capitol Oil Producing Co.
Capps, L. W.
Carter Oil Co.
Wm. Chandler
Cherokee Chief Oil Co.
Columbia Oil & Gas Co.
Continental Oil Co.
Cook Drilling Co.
Cosden & Company
Cox & Hamon
Crail Bros.
Cranfill & Reynolds
Crude Oil Purchasing Co.
Culp, H. C.
Cunningham Production Co.

Dalport Oil Corp.
Darby Petroleum Co.
Davis, Smith & Bradley
Dearing, R. H. & Son
Deep Rock Oil Corp.
Devonian Oil Co.
G. L. Dowlearn
W. O. Dye

E. C. R. Oil Co.
East Santa Fe Oil Co.
Empire Gas & Fuel Co.
Everett & Phillips
Exchange Oil Company
Falcon Oil Co.
F. H. & E. Oil Co.
Fifty Five Oil Co.
Florence Oil Co.
Fort Bend Oil Co.

General Petroleum Corp.
Golden Bear Oil Co.
Gordon Folwell & Dickson
Groneman & Acme
Gulf Production Co.
Gypsy Oil Co.

Hammil Oil Company
Hampton, Lewis
Harcher Oil Co.
Honolulu Oil Co.
Houston Oil Co.
Howard County Oil Co.
Humble Oil & Refg. Co.
Humphreys Oil Co.
Hunt, H. L. Production Co.
Hyland Oil Co.

Imperial Petroleum Co.
Indian Territory Illuminating Oil Co.
Ironrock Oil Co.

Jay Simmons Oil Co.
Jergins Company, A. T.
Johnson, T. A.
T. C. Johnson
Johnston & Owens

Kathleen Oil Co.
Kiowa Pet. Co.
Knox, Chas. E.
Knox, Powell & Stockton

Laurel Oil Company
Lechner & Hubbard
Lee & Burnett
Leidecker & Vaughn
Lide-Rowe Oil Co.
Lincoln Oil Co.
Lion Oil & Refg. Co.
Littleton Herrin
N. E. Locke
Lonnie Glasscock
Loring Oil Co.
Louisiana Oil & Refg. Co.
Luling Oil & Gas Co.

Magna Production Co.
Magnolia Petroleum Corp.
Manziel, Bob
Marcus Oil Co.
Mar-La-Fay Oil Corp.
Marland Oil Company
Martin, L. B.
J. H. Massey Oil Co.
McCutcheon, Alex.
McVicar & Rood
Mecon Oil Company
Menke, John G.
Merco Oil Co.
Merrick, J. F.
Mid-Continent Production Co.
Mid-Kansas Petroleum Corp.
Miller-Lacy Oil Co.
Mills Bennett Production Co.
Miramar Corporation
Mortex Petroleum Co.
Morton & Elder
Moss, H. S.
Mul-Berry Oil Co.
Murdock, C. E., Inc.
Murray & Goode
Murray, T. W.

Navarro Oil Co.
Naylor, H. M.
Nelms, H. G.
Nicholson-Terrell Oil Corp.
Nile Oil Co.

Ohio Oil Co.
Omega Oil Co.
Orchard, Chas.
Owen & Sloan Oil Co.

Pace, Geo. L.
Pan American Petroleum
Pansy Oil Co.
Pencole Pet. Company
Chas. Pettit
Petroleum Pipe Line & Storage Co.
Petroleum Securities
P. H. Pewitt
Phillips Petroleum Co.
Pilot Oil Co.
Powell, L. W.
Prairie Lea Production Co.
Pure Oil Co.

Red Iron Drilling Co.
Reese, J. T.
Reeves, G. I.
Rex Oil Co.
Richfield Oil Co.
Rio Bravo Oil Co.
Rio Grande Oil Co.
J. I. Roberts Drilling Co.
Roeser & Pendleton, Inc.
Rosemar Oil Co.
Rovenger Oil Co.
Royal Petroleum Company
J. M. Rush
Ryan Oil Co.

Seward Oil Co.
Shaffer Oil & Refining Co.
Shaw, T. G.
Shell Petroleum Co.
Simms Oil Co.
Sinclair-Prairie Oil Co.
Skelly Oil Co.
J. R. Smith Oil Properties
Smith, R. E.
Smith, Victor C.
Smith, Walter R.
Smitherman & McDonald
Sonron Oil Corp.
South Texas Oil Co.
Southern Development & Prod. Co.
Spear, H. K.
Standard Oil Co. of La.
Standard of California
Standard of Kansas
Stanolind Oil & Gas Co.
Sterling Oil & Refining Co.
Stroube & Stroube, Inc.
Sun Oil Company

Tarver, A. H.
Terminal Oil Co.
Texas Trading Co.
The Texas Company
Texas Division
California Division
The Tidal Osage Companies
Thompson, W. L. & Will
Tide Petroleum Co.
Tide-Water Companies
Top Oil Co.
Turman, L. C.

United North & South Co.
United Oil Well Supply Co.
Unity Oil Co.
Uscan Oil Co.

Vacuum Oil Co.

Weaver-Crim Oil Co.
Western Gulf Oil Co.
Wil-Day Oil Co.
Wilshire Oil Co.
Wilson Broach Oil Company
Winfree Oil Co.
Witherspoon Oil Co.
Woodley Petroleum Corp.

Yost & McDowell

FOREIGN

Anglo Mexican Petroleum Corp.
Argentine Government Oil Fields
Asiatic Petroleum Co.
Burmah Oil Co.
Cia Mexicana de Petroleo
"El Aguila"
International Petroleum Co., Ltd.
Lago Petroleum Corp.
Mitsubishi Shoji Kaisha, Ptd.
North Saghalien Petroleum Co.
Oil Well Engineering Co.
Romano Americana
Steaua Romana
Standard Oil Co. of New Jersey
Standard Oil Co. of Argentine
Standard Oil of Venezuela
Tropical Oil Co.
Venezuela Gulf Oil Co.

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