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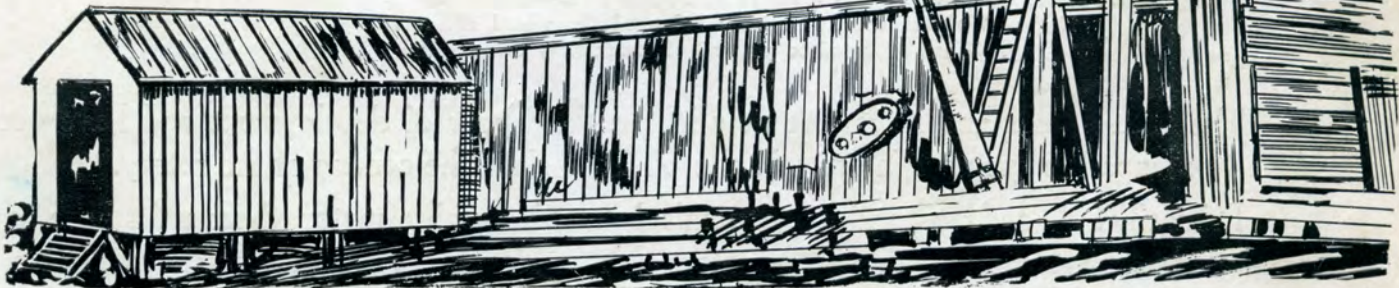
BULLETIN No. 71-B



# Taking The Place Of The Standard Rig

**LUFKIN FOUNDRY & MACHINE CO.**  
**LUFKIN... TEXAS**

**APRIL 1926**



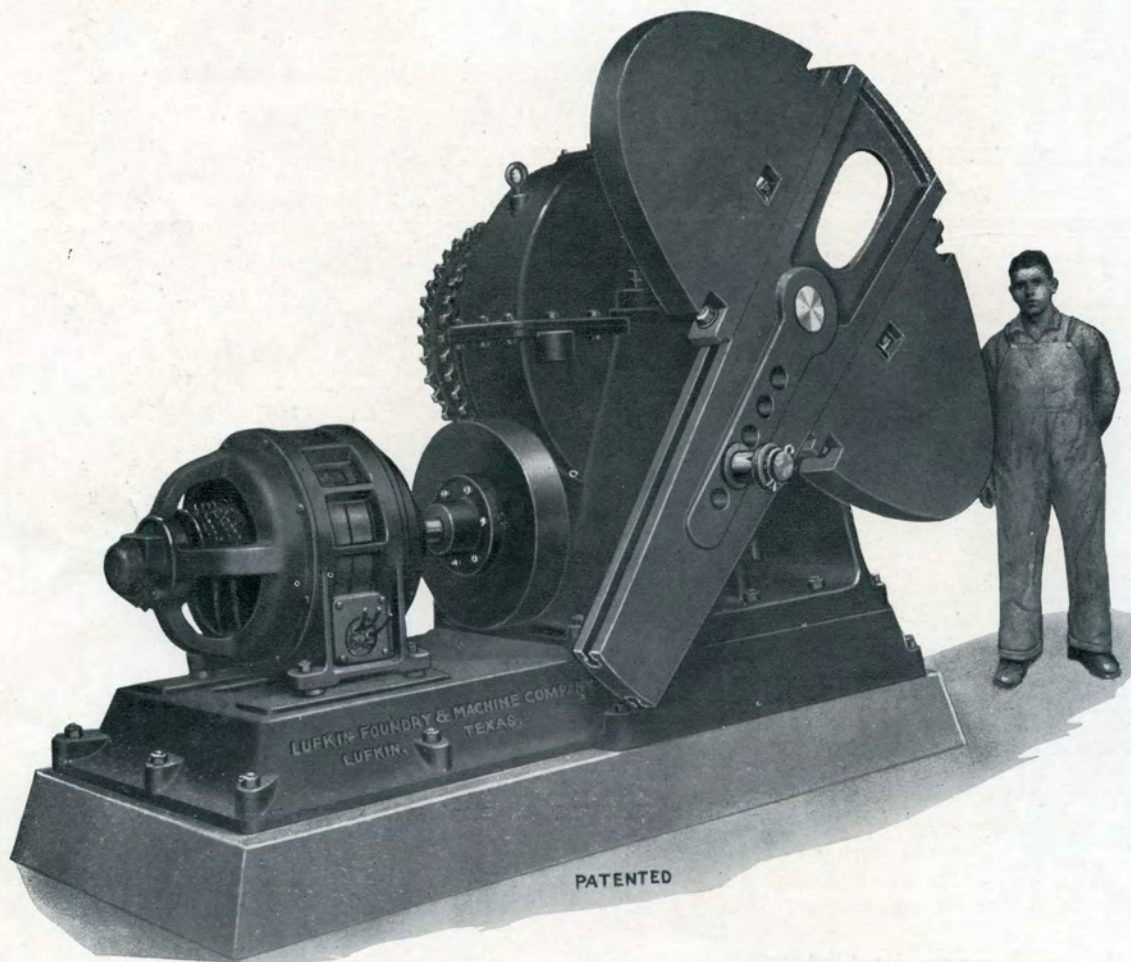
Its Days Are Numbered

# Improved Oil Field Equipment

## Taking the Place of the Standard Rig

Never in the oil field industry has there been so much interest as there is at the present time in drilling and pumping machinery, especially something that will supplant the present equipment which is so expensive to maintain, known as the Standard Rig.

Many new devices have been provided and tried out, especially to increase production, but most of these are merely attachments or additions to the present standard rig and only a few of the many are considered favorably.



**LUFKIN UNIT WITH ELECTRIC MOTOR DRIVE—COUNTER BALANCED CRANK**

Note: Weights as shown have balanced fly wheel effect for pulling rods and tubing. When adjusted to pin end of crank they balance the well.

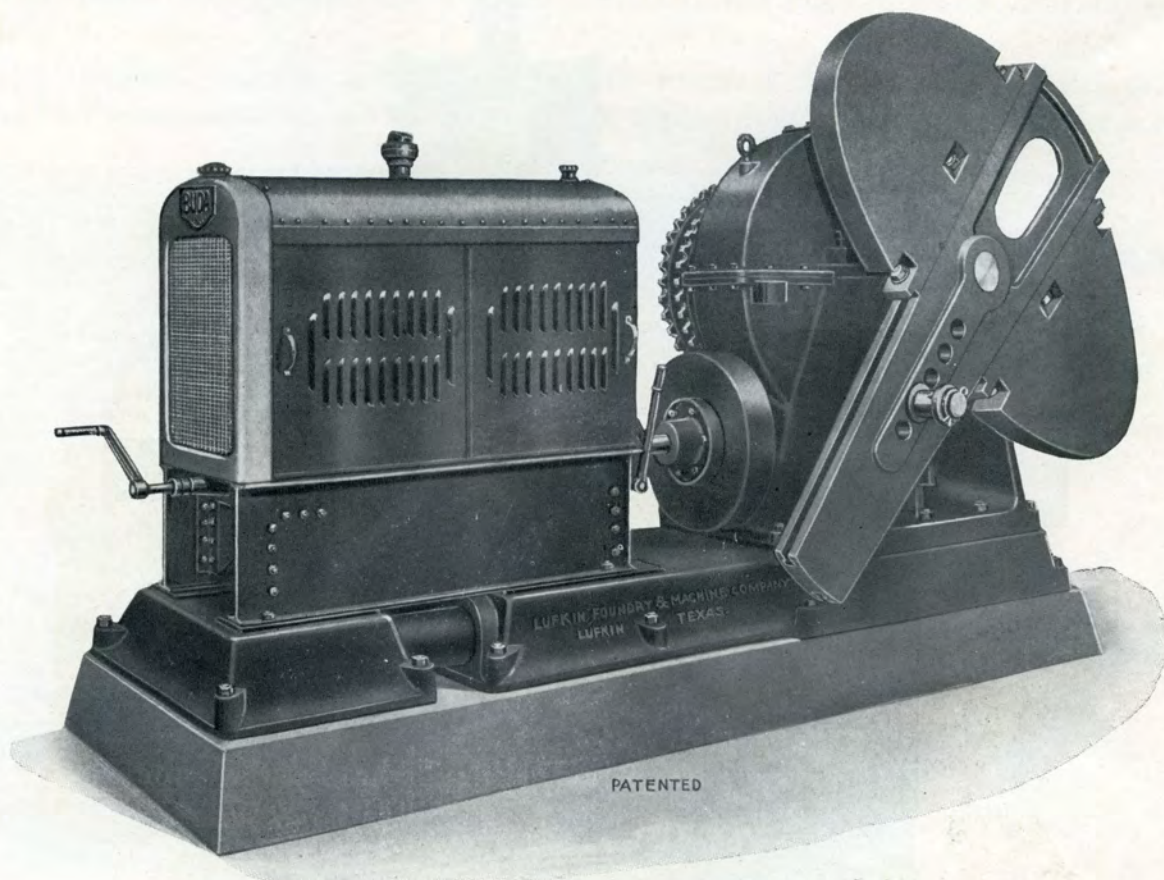
The Lufkin units and hoists are now in the third year of development and have occasioned perhaps the greatest interest in the oil fields since the coming of the rotary.

Primarily built and designed for economical pumping with a motor, these units have been developed and extended by the oil operators themselves, as the illustrations show. Not only pumping but redrilling, either with cable tools or rotary, swabbing, bailing, pulling rods and tubing, either with electric power or with four cylinder gas engines.

Field operators so used to bull wheels and so thoroughly set in their belief that this is the only way to operate an oil well, look askance on new things; for as so many have been tried and found wanting there is some foundation for this prejudice, and Lufkin equipment has been no exception to the rule.

However, every installation makes friends with the operators after it has been in operation a few days and they become acquainted with its simplicity, easy and fast operation, as well as its easy up-keep.

In the Liberty field 60 out of 90 wells were Lufkin equipped.



**LUFKIN UNIT WITH BUDA MULTI-CYLINDER GAS ENGINE.** Especially in new or remote fields where electricity is not available. These engines show the highest efficiency with natural gas for pumping over the single cylinder type engine. As the gas plays out, engine is stocked for next new field and electric motor put in its place.

In the mid-continent Oklahoma fields Lufkin rigs are going in regularly every month where they are giving satisfactory service and have convinced some of the larger operators that they are more economical for pumping and can be depended upon to the extent that some of the larger concerns are standardizing on them.

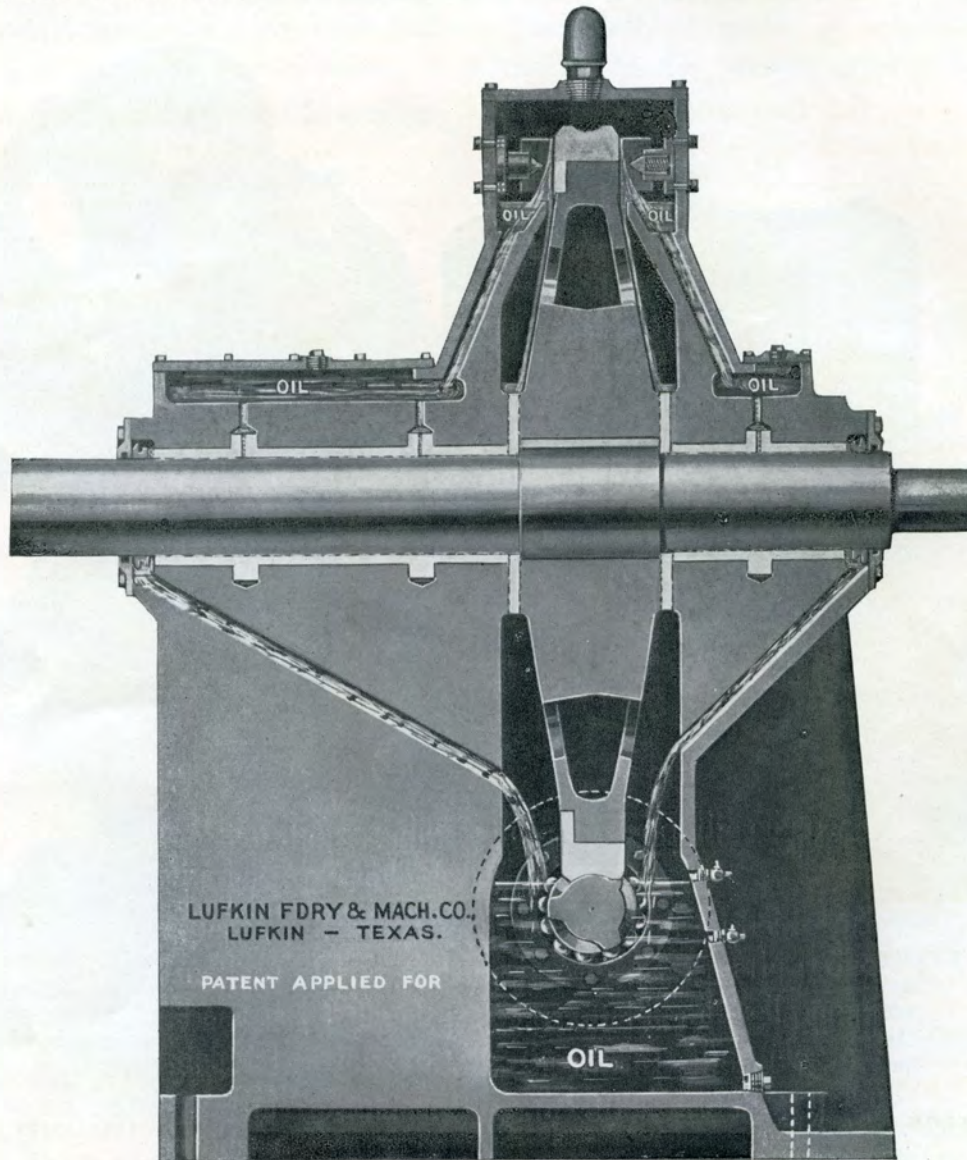
They are already being used in most every field of any importance in this country, also in many foreign countries where repeat orders indicate their favorable use.

As will be noted, while primarily built for use with electric motor, a multi-cylinder gas engine has been used extensively with surprising results by a number of the larger companies,

**MULTI-CYLINDER ENGINES HAVE MANY ADVANTAGES—See Page 18**

with the added advantage when the gas plays out in the field, the electric motor may be applied in place of the engine at the least possible cost.

The worm reduction gear itself is especially adapted for oil field work, being the simplest, most direct and quietest method of transmitting power at a greatly reduced speed, as it gives a very steady motion (no back lash) which is so essential in oil well pumping. When properly designed and run in frictionless bearings to take the thrust, they give a very high efficiency (over 90 per cent, see page 10), so that in this work there is a power saving of from 30 to 60 per cent over the old methods.



Cross-sectional view showing Bronze Bearings, Worm and Gear, with Automatic Oiling System. We recommend changing oil every 60 days, but some of our units we recently discovered had run 17 months in same oil.

Illustrations throughout this bulletin indicate the uses as well as the service and experience had by the users of this equipment, so an extended description is unnecessary. It should be said, however, that a close study in the various fields in the United States has been made, and we can offer to the oil industry equipment suitable for its needs that will give highly satisfactory results.

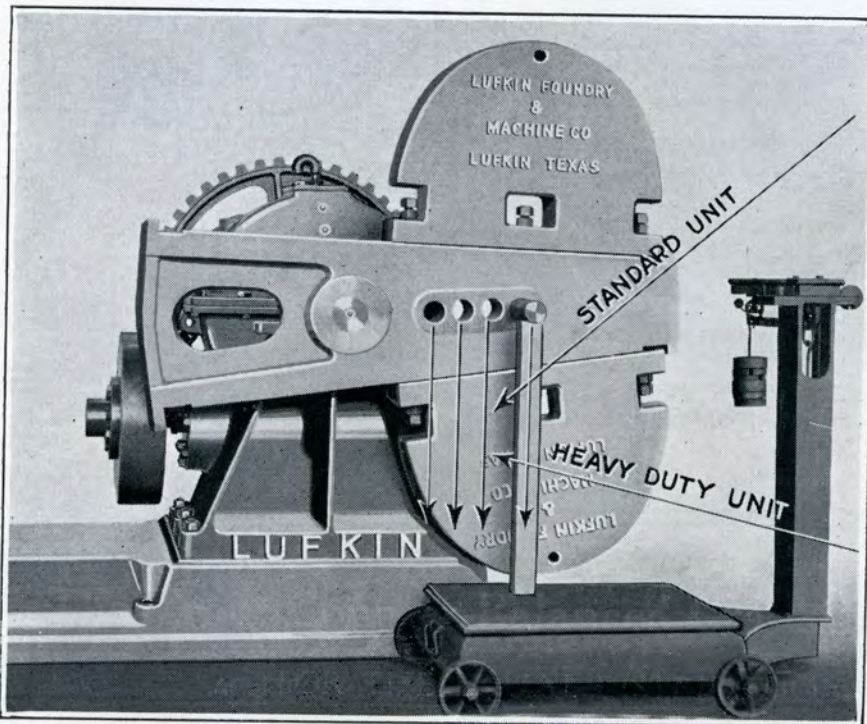
# The Trout Counter-Balanced Crank For Pumping Wells

FOR THE EQUAL DISTRIBUTION OF LOAD

While Oil Field Engineers have advocated a more perfect counter-balancing of pumping wells and the trade magazines have frequent articles on the subject, the principle is only understood by a few operators, and many still hold to the idea, as long as the power is sufficient to pump the well even irregularly, counter-balancing is unnecessary.

In new fields counter-balancing is given the last consideration when wells are hurriedly put on the beam, and are often operated for months before this can be conveniently attended to.

This condition, together with the fact that no practical counter-balancing has ever been devised for the standard rig, led us to the idea of a centrifugal counter-balance like a loco-



To slide weights place crank in horizontal position, loosen bolts and with pinch bar toe into teeth in bottom of crank slot and pinch it along. Although there is a SAFETY STOP at end of slot, bolts should be tightened thoroughly.

## Effective Static Balance

For Each Pin Hole or Crank

### Standard Unit

Hole	Stroke	Weight
1	22½"	6100
2	30"	4930
3	37½"	4020
4	45"	3540

### Heavy Duty Unit

1	32"	9340
2	42"	6770
3	52"	6100
4	62"	5330
5	72"	4520

tive driver, but adjustable to suit well conditions, at the same time to quickly slide the weights to balance the crank itself and act as a fly wheel when working over a well. All this we have accomplished in the Trout Counter-Balanced Crank.

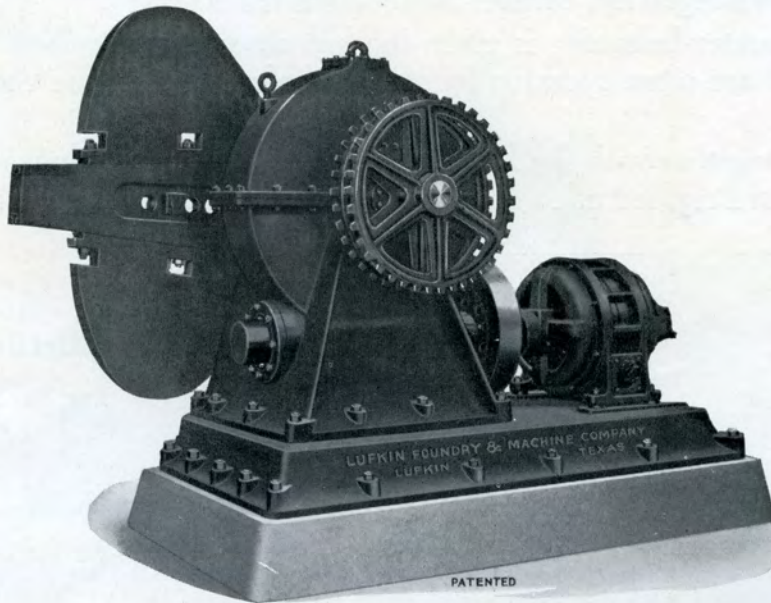
Reciprocating concrete weights suspended from the walking beam are wrong in principle even if they could be adjusted satisfactorily. Weights swinging from the shaft and attached to band wheel are correct in principle, but lack easy adjustment, and on account of side strain throw the band wheels out of line, and take too long to disconnect when pulling a well.

The Trout Counter-Balance overcomes all these objections and is ready to operate with the first stroke of the unit. It is easily adjustable so that absolutely steady motion on the well may be realized in a very few minutes.

The first well to which it was applied was one with suspended concrete weights, electric motor driven and was taking 24 amps on up stroke and only eight on down stroke. The

counter-balanced crank changed this condition to 17 amps up and 13 down, reducing the power required to pump the well from 10-1/2 K.W. to 6-1/2 K. W. and was so well in balance that the crank made five revolutions after power was shut off.

We have many examples of a similar nature since introducing this balance, and we believe that by its use a nearly ideal condition can be accomplished in pumping, where the rods rise and fall under tension at all times, on absolute steady motion without slack or back lash, so that rod trouble is largely eliminated.



REAR VIEW HEAVY DUTY LONG STROKE UNIT  
Balance Weights Set For Pumping



## Mechanical Description

After nearly three years experience in most every oil field in this country, we believe that we are offering to the oil industry a pumping unit of exceptional merit in design and practical operation.

The machine is very substantially built, the base is extra heavy, thoroughly ribbed and has a large surface on the bottom, and while a concrete foundation is recommended, they may be set on wood, as is often desirable on wells over the water. Ample foundation bolts are provided, they are not furnished however unless at extra price.

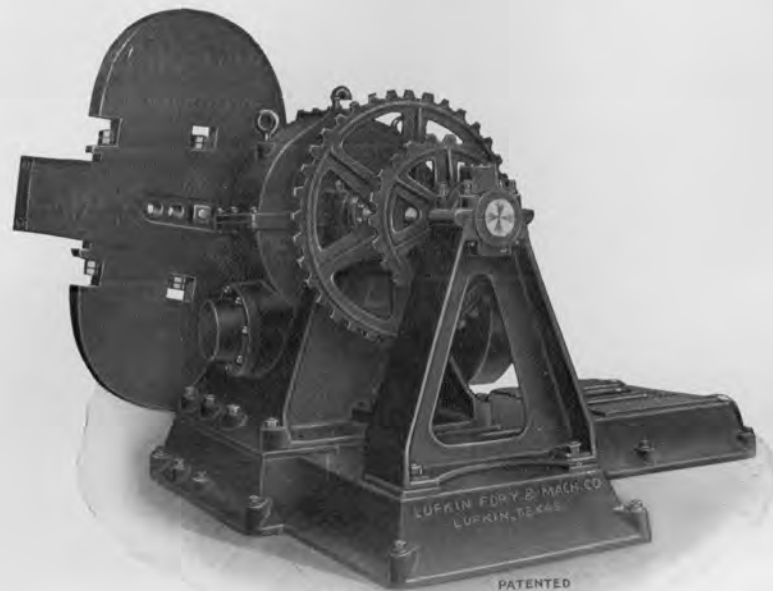
The worm housing and main bearing are cast in one solid piece, as shown in the section on page 4, being machined all over and made oil-tight throughout. As will be noted, all parts subject to wear, bearings and side thrust plates, are easily renewable. The main bearing on the standard unit is 16" long and is held in place with 8-1/4" bolts; in the large unit the main bearing is 24" long, of the same design, and with 8-1/2" bolts.

The bearing on the sprocket side of the machine is one-half the length of the main bearing, so that the bronze bearings are interchangeable.

As will be noted, the shafts are enlarged at the gear so that the key can be properly fitted; gears are pressed on and keyed and have a long bearing on the shaft.

Both gear and worm shafts are made of nickel chrome steel, forged, and the worm shaft is heat-treated. The gear shaft is easily twice the strength of ordinary steel used in rig irons, yet the sizes are about the same, or larger. The worm shaft, as will be noted, runs in frictionless bearings, a double Timken bearing being used on the front end with a double row ball, or Norma bearing at the rear end. It will also be noted that the bottom of the worm thread is larger than the shaft, and not cut into the shaft, as is done in some designs.

The gear is of Tobin bronze and as will be noted, is shrunk on and riveted to the center.



REAR VIEW STANDARD UNIT  
Showing Two Sprockets, One For Hoist and One For  
Bailer, etc., As Ordered

Special attention is called to the oiling system, which is automatic, the gear carrying the oil up to the top of the housing where it is wiped off and run through the bearings, returning to the base cavity. All bearings are practically floating in oil and the unit is oil-tight.

The fly wheel has proved to be a great stabilizer both with electric motor or gas engine and this with the centrifugal counter-balance gives uniform motion so desirable in oil well pumping. In working over wells with our loose drum hoists the power is not reversed, neither is it necessary to start under load, the fly wheel effect therefore provides a great storage of energy and a consequent saving in power.

A flexible coupling is provided to attach either an electric motor or gas engine, as may be used.

The entire unit is built of the very best material for the purpose, made strictly on a production basis to gauges and templates, with careful workmanship throughout.

**Lufkin Units Are No Longer An Experiment**  
**OVER 160 IN USE**

## Speeds, Flexibility, Etc. Motors and Gas Engines.

These units were designed primarily for the oil field type of motor. Yet many are using motors of the Star Delta type, made by the leading motor manufacturers, having double power rating about the same as the oil field type, but with a higher constant speed (860 loaded), which can be reduced 50 per cent if desired on resistance. The reduction worm gear eliminates the need of a double speed motor, as sprockets take care of the hoisting speeds.

With the 20 to 1 ratio gears, the 600 revolution motor (560 loaded speed),  $560 \div 20$  equals maximum pumping speed of 28 R.P.M. on crank, and by using the usual resistance, speed may be reduced as desired.

With the 30 to 1 ratio gears, the 900 R.P.M. Star Delta type motor (860 loaded speed)  $860 \div 30$  equals a maximum pumping speed of 28 can be had, this also may be reduced as desired.

Both motors and gear ratios are popular in the Gulf fields, while in the Oklahoma Mid-Continent field, the 30 to 1 ratio gears with 600 R.P.M. oil field type motors are used, which gives  $560 \div 30$  equals maximum pumping speed of 19 R.P.M. on crank, which can be reduced if desired, also with 860 speed motors, this ratio will give  $860 \div 30$  equals 28 R.P.M. of crank.

In using Electric motors with gears, it is very desirable and economical, when paying for power to run them at their maximum or rated speed, and not on resistance, and most operators prefer to lengthen or shorten stroke as moving crank pin, one hole is equal to increasing or decreasing crank speed four revolutions.

With gas engines the 30 to 1 ratio gears are the most satisfactory, as this gives an easy speed to engine and any pumping speed can be had—at 24 R.P.M. of the crank, the engine runs  $24 \times 30$  equals 720 R.P.M.

## Installation, Maintenance, Etc.

Mounting motors on our units will be found very easy as couplings are turned all over, fly wheel has circle marked and with adjustable mounting plates any standard motor can be lined up readily—None of the standard motors are planed on base, nor do the holes come with any degree of accuracy so that this more flexible arrangement on our new units will be found very practical. Full directions for aligning motors are sent with each unit. Buda engines are mounted, of course, in our shop, which we carry in stock. We furnish motors also if desired.

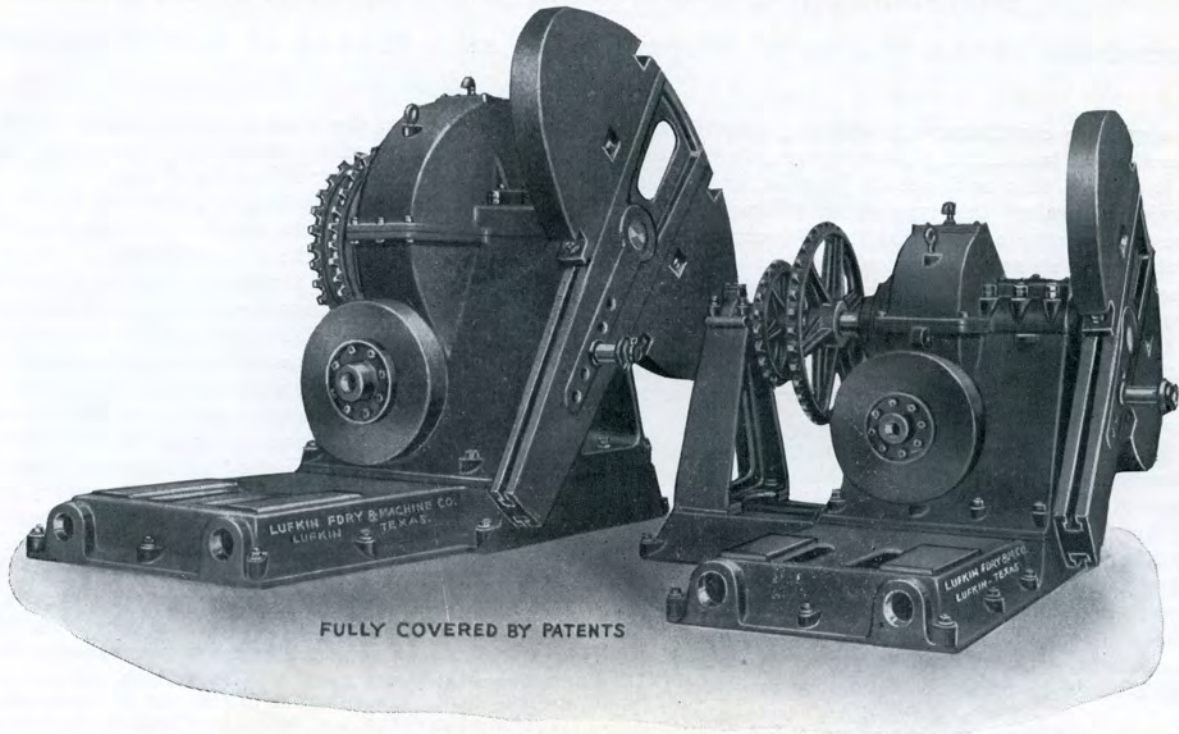
We recommend cylinder oil 600-W consistency for use in this unit, under no circumstances should grease be used. Oil level should be maintained between pet cocks, too low will cause gears to burn, and will destroy bearing surface, too high will cause oil to churn, increase the temperature, and decrease the efficiency of the drive.

Due to the compactness of a worm drive and the relative amount of radiating surface compared with the horse-power transmitted these drives will run hot under certain load, speed and ratio conditions. Our units are designed to operate with a temperature rise of 140 degrees Fahrenheit above a temperature of 60 degrees Fahrenheit.

All drives are tested before leaving our plant but several weeks of operation under normal load conditions will be necessary before the maximum efficiency is reached. During this period the teeth will acquire a high burnish following which the wear on the teeth will be practically nil.



# Lufkin Units Are Built In Two Sizes



(Photographic Proportion)

## HEAVY DUTY LONG STROKE UNIT

BUILT FOR HEAVIEST SERVICE 6-FOOT STROKE

### Specifications

- Shaft Diameter 7-7/16" and 6-7/16"
- Limit Stroke 72"
- Crank Pin A.P.I. Std. 4"x6"
- Worm Shaft 3-7/16"
- Gear Ratio 30 to 1 triple thd.

\*Center Worm Shaft to Base 17"  
 Weight as above shown 20,800 lbs.  
 Add for Gas Engine Extension 800 lbs.

## STANDARD UNIT

BUILT FOR SERVICE WHERE 5" RIG IRONS WOULD ORDINARILY BE USED

### Specifications

- Shaft Diameter 5-7/16" and 4-7/16"
- †Limit Stroke 45" A.P.I. Size Pins.
- Crank Pin A.P.I. Std. 3 1/4"x6"
- Worm Shaft 2-7/16"

Gear Ratios { 20 to 1 Triple Thd.  
 30 to 1 Double Thd.  
 \*Center Worm Shaft to Base 16"  
 Weight as shown above 12,000 lbs.  
 Add for Gas Engine Extension 500 lbs.

†Note—The stroke of 45" on Standard Unit is A.P.I. Standard and is in good proportion to diameter of gear, and we do not recommend more holes for longer stroke nor assume any responsibility when same are put in. Our Heavy Duty Unit should be used for longer strokes than 45".

\*Any oil field motor up to 25/65 will go on these units, any size up to 100 H.P. Budas can also be mounted on units with extension bed plate. However we charge extra for mounting some other makes of multi-cylinder engines on account of their height and width taking a special bed plate.

While motors and gas engines are most always mounted and aligned in fields, it is more satisfactory to have them fitted in our shop.

We can furnish motors at prevailing prices and ship complete.

Buda motors always in stock for immediate shipment.

Foundation bolts are extra—they can be shipped from stock ahead of units if desired.

Blue prints and full directions for setting are furnished.

**We Furnish Complete Pumping Equipment—Send for Bulletin "Pumping Accessories"—Steel Walking Beams, Sampson Posts, Crown Blocks, Etc.**

# The Lufkin Worm Gear Pump Unit

(A Discussion of the Merits of Worm Gears as a Means of Speed Reduction)

Worm gearing constitutes the simplest, most direct, quietest method of transmitting power at greatly reduced speeds. It is true that until recent years, there was a strong prejudice against this type of gears among engineers, due to an erroneous idea that its efficiency was low and that there was an excessive amount of friction. While this is true of the older types of gears, the modern multiple thread worms, with their correspondingly increased helix angle of the worm thread; the properly designed form of gear tooth to avoid interference, has, to a very great extent, overcome these objectionable features of old style worm gears.

Another great advantage that worm gears have over other forms of gearing is that while all other forms of gears deteriorate from wear, losing their original high efficiency; worm gears continue to give nearly their original efficiency after long wear.

As designed for the Lufkin Pumping Unit, the worm gears always have at least three teeth in contact; giving a smoothness of action, and bearing pressure distributed over a large area, with correspondingly low bearing pressure; which would be unobtainable in any other form of gear.

The friction of worm gearing is controlled largely by the Helix angle or lead of the worm thread. It has been found by experiment (see Kent 10th Ed., page 1670) by F. A. Halsey, that a worm with a Helix angle of 9 degrees or less will invariably fail in service. For Helix angles of 9 degrees to 15 degrees, the gain in the efficiency of the worm gear is very rapid, and for Helix angles greater

than 15 degrees, the gain is more gradual till a Helix angle of 45 degrees is reached, which is the point of maximum efficiency for this style of gear.

The tooth action is largely controlled by the thread angle, or the angle of the side of the thread makes with a line perpendicular to the axis of the worm. As formerly made all worms had a thread angle of  $14\frac{1}{2}$  degrees, the same as an involute spur gear. This gave almost complete sliding contact between the worm and worm gear, and the added disadvantage of interference under similar conditions that would cause interference in spur gears.

However, by increasing the thread angle, there is a minimum of sliding contact between the worm and gear; the tooth action becoming more nearly a true rolling contact. As in spiral gearing as it is commonly called, or more correctly, helical gearing, a limit of about 20 degree angle has been found to be all that is practical to use, as greater angles produce excessive thrust, tending to force the worm and gear apart. However, a thread angle of 20 degrees is sufficient to give very nearly a true rolling contact, without causing an excessive tendency to force the gears apart, and by making the root diameter of the worm thread equal to the size of worm shaft, and keeping the thrust and radial bearings as close as possible to the threaded portion of the worm, eliminates any tendency of the worm to spring away from the gear.

The use of ball and roller bearings also greatly increases the over-all efficiency of the worm gear unit, by reducing the friction losses to a minimum.

The following data pertaining to the Lufkin Standard Pumping Unit efficiency will be interesting:

## Worm Gear Data Lufkin Standard Unit

Worm—3.957" Pitch dia.  $1\frac{1}{2}$ " circular pitch  $4\frac{1}{2}$ " lead  
Helix Angle  $\frac{3.957 \times 3.1416}{4\frac{1}{2}} = 2.7625 = 190\text{-}54$

Triple thread, R.H. 20 degree thread angle.

Worm gear, 59-teeth, 28.170" pitch diameter.

Center distance of worm and gear— $16\frac{1}{16}$ "

For use with 15/35 motor, 550/1160 R.P.M. direct connected to worm.

Theoretical efficiency of worm and gear, according to F. A. Halsey Kent page 1669

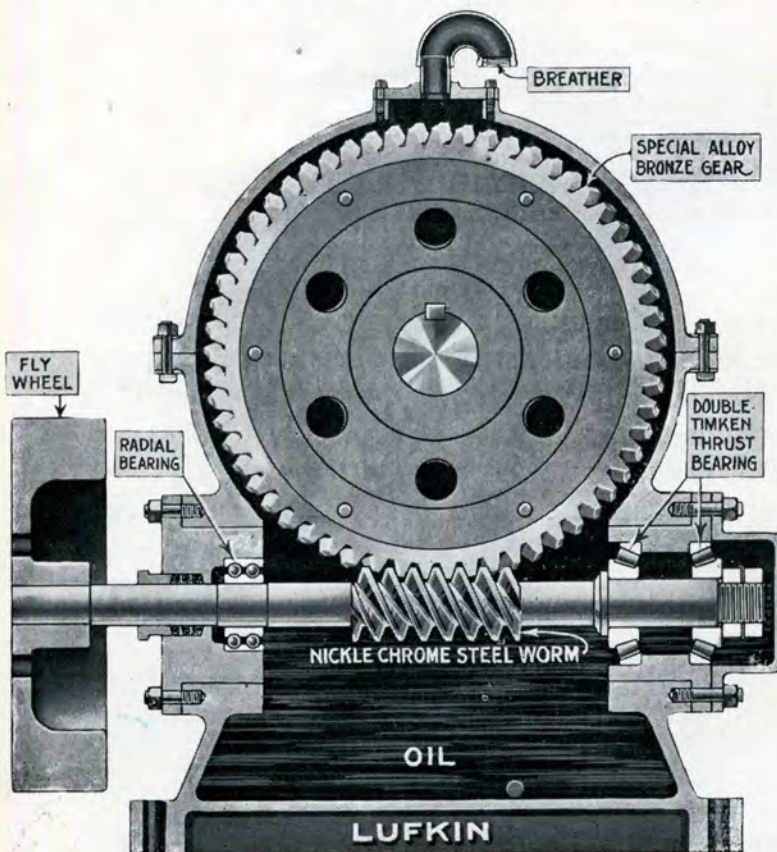
$E = \frac{\tan a}{\tan a + f}$  where E = theoretical efficiency.

A = Angle of worm thread f = co-efficient of friction = .035 to .05. using f = .03

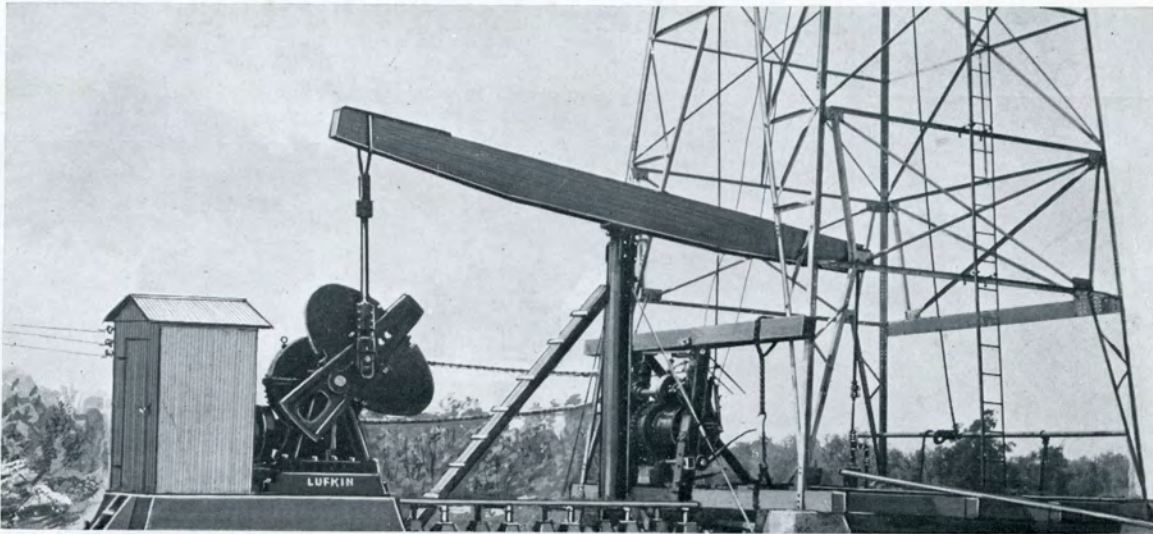
$E = \frac{.36199}{.36199 + .03} = 91$  degrees theoretical efficiency of worm and gear.

This figure agreed very closely with actual tests run on the Lufkin Pumping Unit.

We will be glad to go into this matter with any engineers interested, as we have considerable data from leading authorities who have made a special study of the worm gear drive and its many advantages.

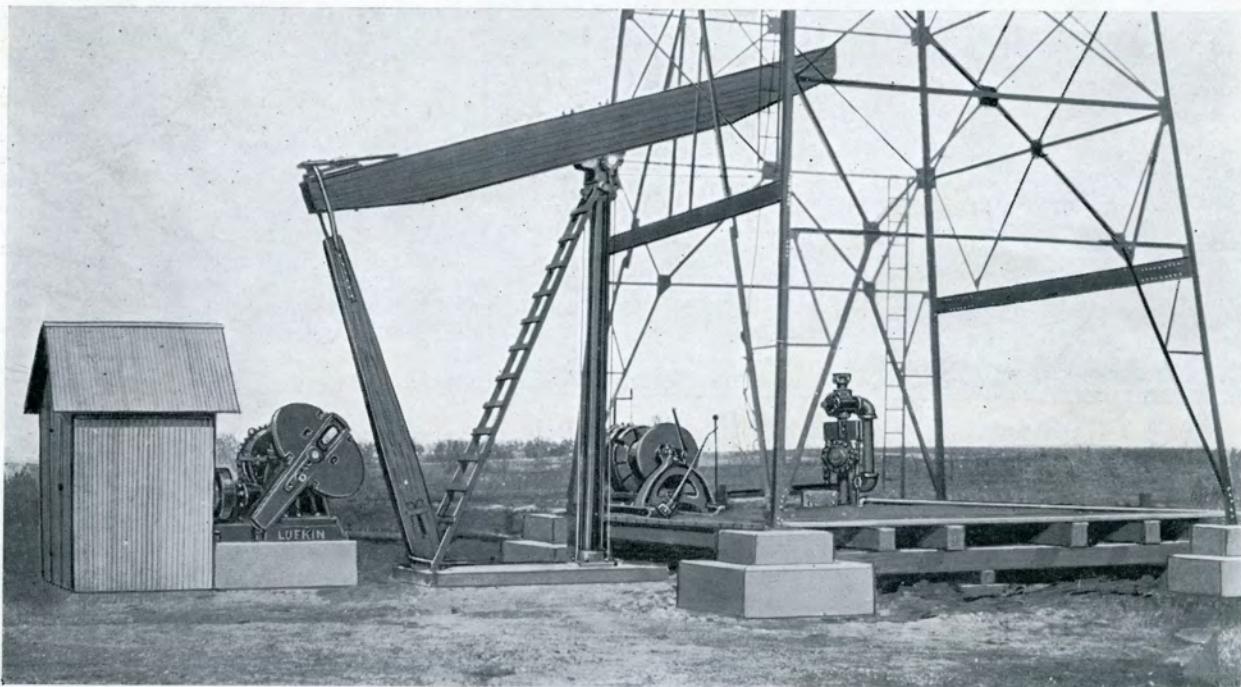


CROSS SECTION LUFKIN GEAR



HEAVY DUTY UNIT ON 4400' WELL AT WEST COLUMBIA WILSON B-1-

Typical installation electrically driven pumping unit and hoist used for rods, tubing and re-drilling, etc. These hoists are shown and described on pages 19 to 23.



TYPICAL INSTALLATION SHAFFER GOODENOUGH NO. 1, MEHAN, OKLA.

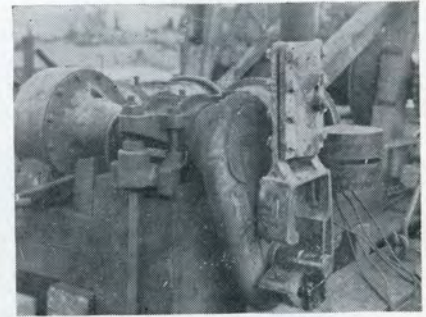
Motor Driven Unit—After rotary is taken off these wells are drilled in with our units and hoist and bailer as shown, with the addition of a set of portable bull wheels to carry drilling line. See page 22. Unit now ready for pumping after flow stops. False floor used for drilling to be removed and hoist set on concrete floor.

**PICTORIAL HISTORY LUFKIN UNITS—SEE NEXT PAGE**

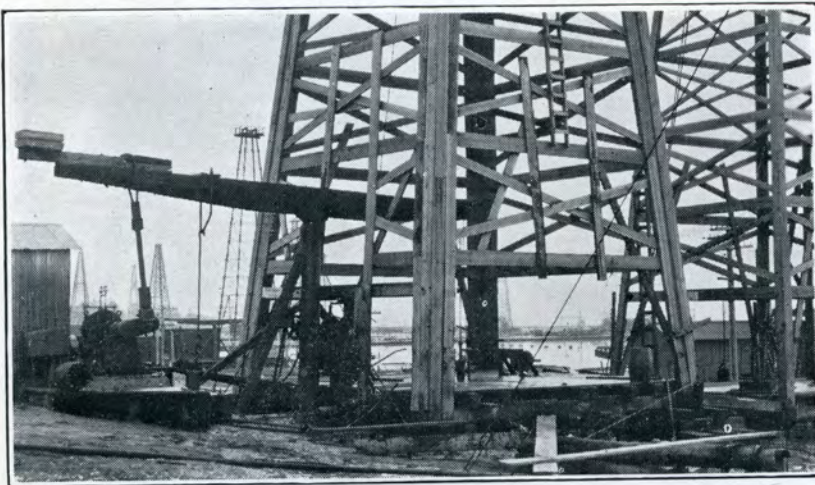
# Pictorial History Lufkin Units




**ORIGINAL UNIT FOR HUMBLE CO., GOOSE CREEK, TEXAS**—Installed January 1924—still going. Same worm shows little wear, with every evidence of giving service for years to come.

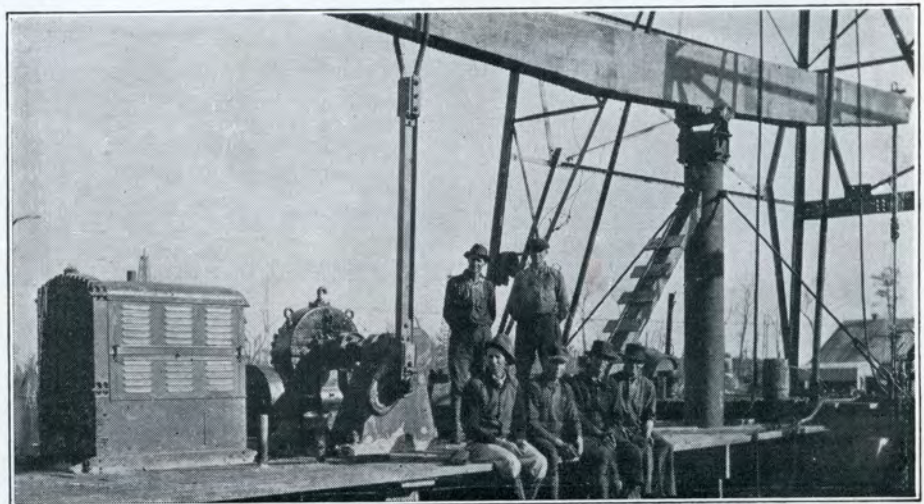


**Original Worm Gear Installation, Humble Co., Orange, Texas.**—The back end of a truck gave efficient service from which the Lufkin Unit was developed.

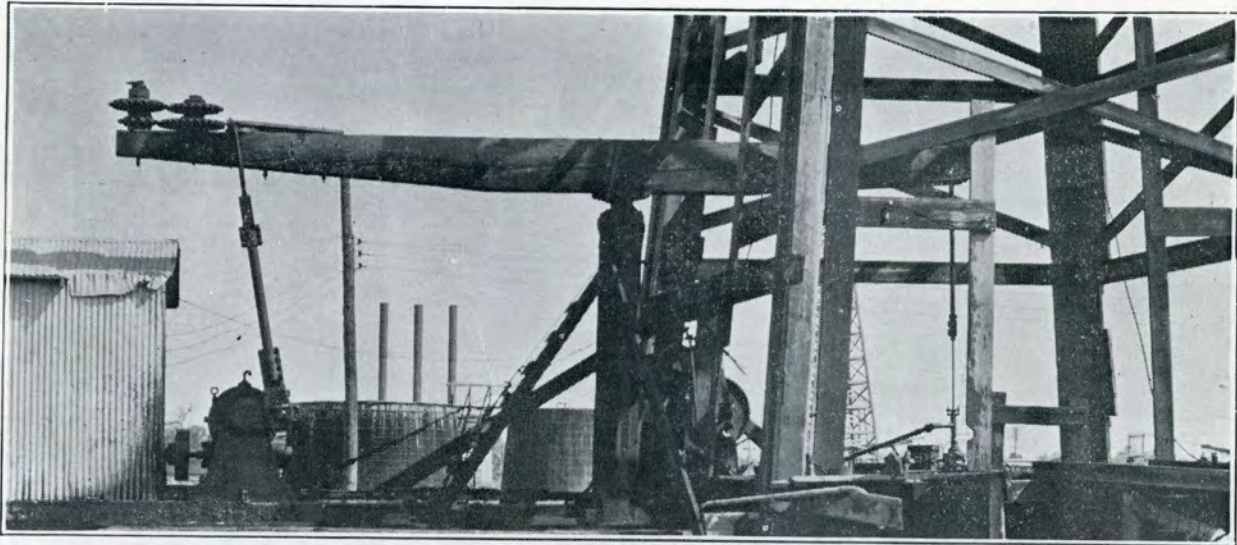


 **Pumping two wells**—Humble Tab No. 11 and No. 2, 3750 feet and 1750 feet in depth, installed June 1924, at Goose Creek, Texas. Has been in continuous operation with Electric Motor Drive with no shut downs, no repairs, and expense nil.

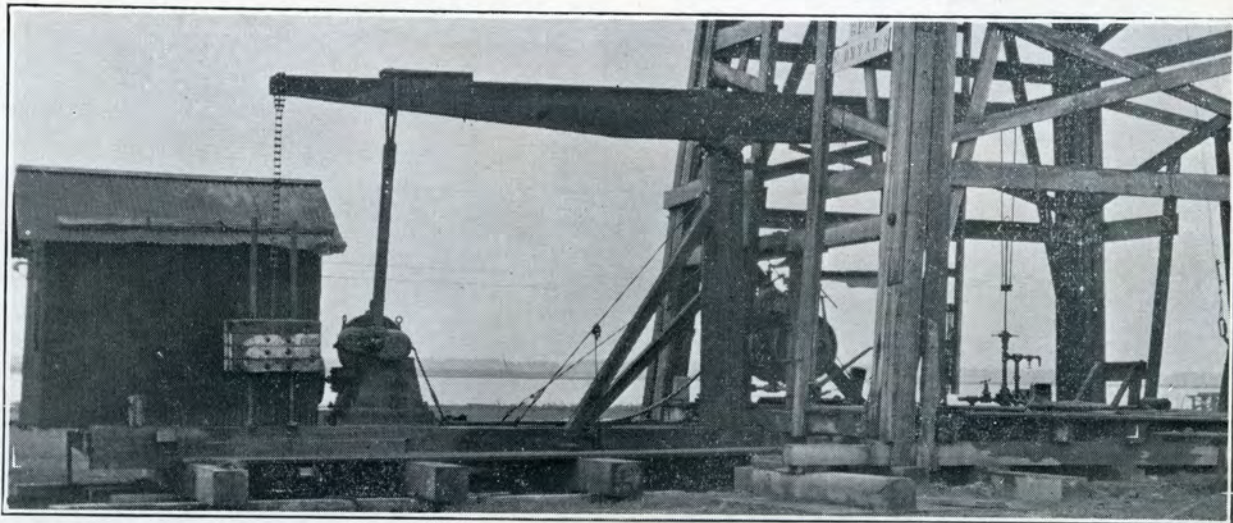
This Unit at Hull is now and has been operating on out hole at 34 strokes per minute. Humble Co. records show this to be the most economical pumping well owned by this company.



**FIRST INSTALLATION MULTI-CYLINDER GAS ENGINE**, by Humble Co., Hull, Texas, August 1924—No repairs or upkeep expense—Engine runs on gas from this well.



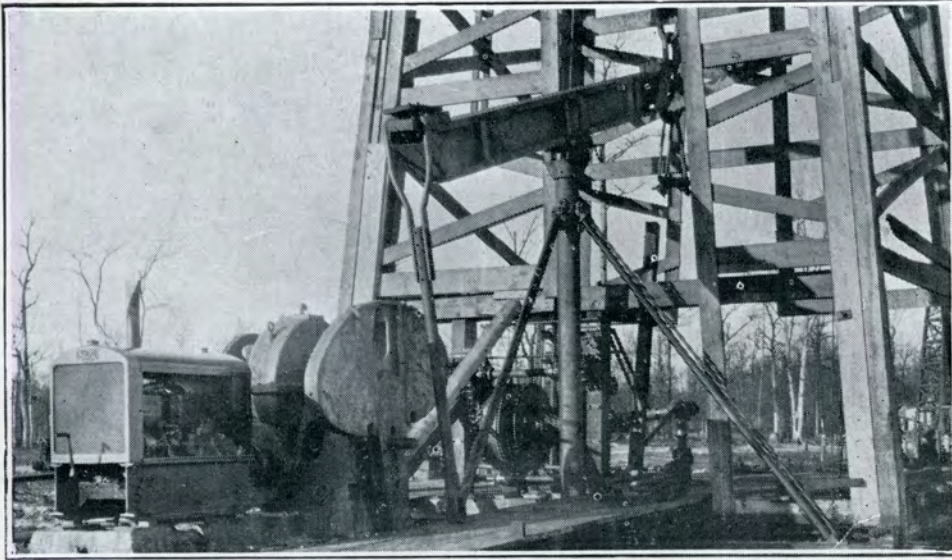
Coon No. 5, West Columbia, 4000 feet deep, about 500 barrels, 75 per cent water. With one of our First Units, 28 strokes, 44" stroke, with 900 constant speed Wagner Star Delta Motor. Note poor counterweighting—some test for unit.



Gulf Production Co., C. Bryan 8, Goose Creek, 4200 feet—One of our early installations—No expense after 18 months operation.



Vacuum Lease, Liberty, 3500'—One of our original units installed with beam balance making 28 strokes, as fast as rig could go, without "whipping" balance weights. Later, rig was equipped with Trout counterbalance, stroke increased to 36 on out hole.



Southern Crude Oil Co. Installation at Eldorado, Ark.—Heavy Duty Unit With 75 H. P. Buda Engine and Hoist

# LUFKIN UNITS

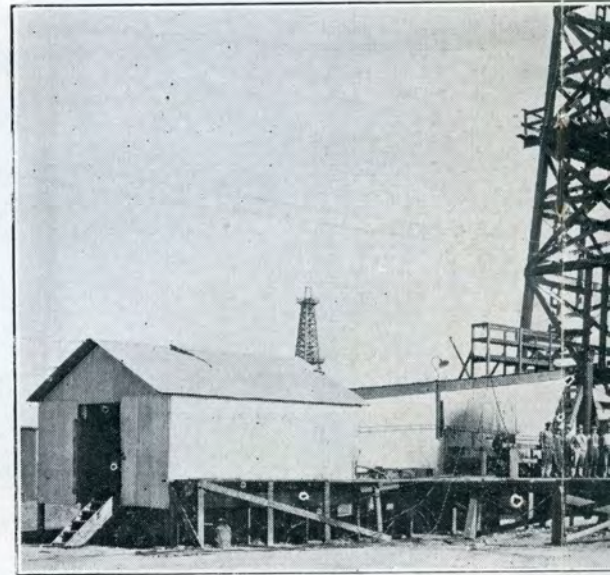
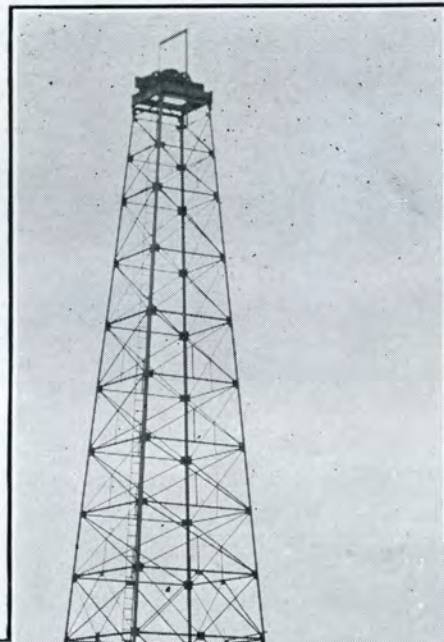
ARE SUCCESSFULLY  
USED IN ALL OIL

EITHER WITH  
Electric or Gas Engine

RESULTING IN  
Low Cost Up-Keep—Little Attention  
Highly Efficient—Low Power  
Reduced Fire Hazard—  
High Salvage Value—Reasonable

PANORAMA  
of  
SHAFFER O. & R. CO. LEASE  
Wewoka, Okla.  
Completely Equipped With  
LUFKIN UNITS

See Page 22 for Detail of  
Derrick Installation



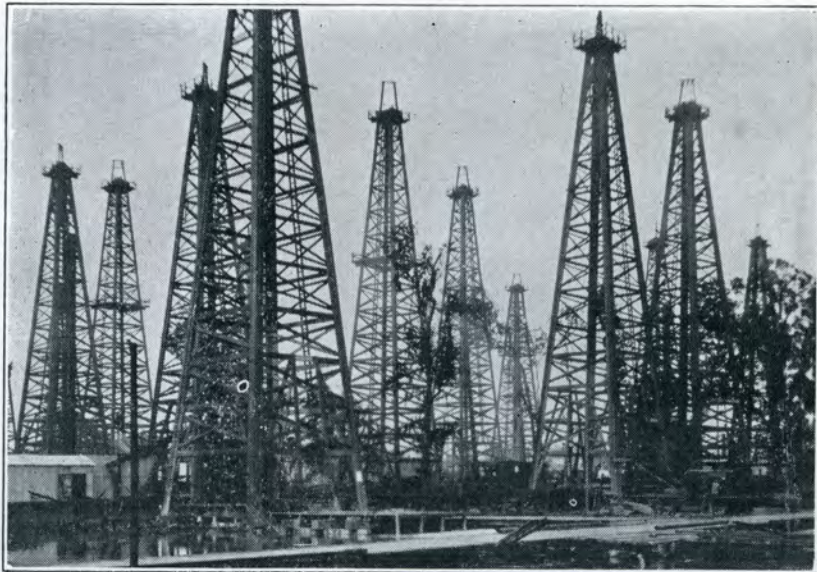
Installation General Securities Oil Corporation  
Note Comparative Size Motor



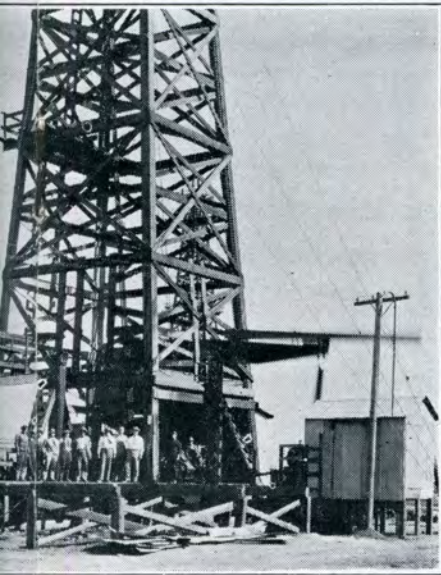
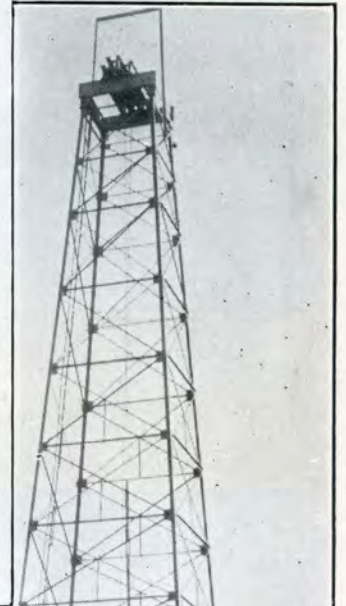
# UNITS OIL FIELDS

Engine Power

Power Costs  
Less Accidents  
First Cost



Liberty Field, Texas—60 Per Cent Lufkin Equipped



Corporation, Torrence, California.  
Motor House.

**COMPANIES  
At Liberty**

USING

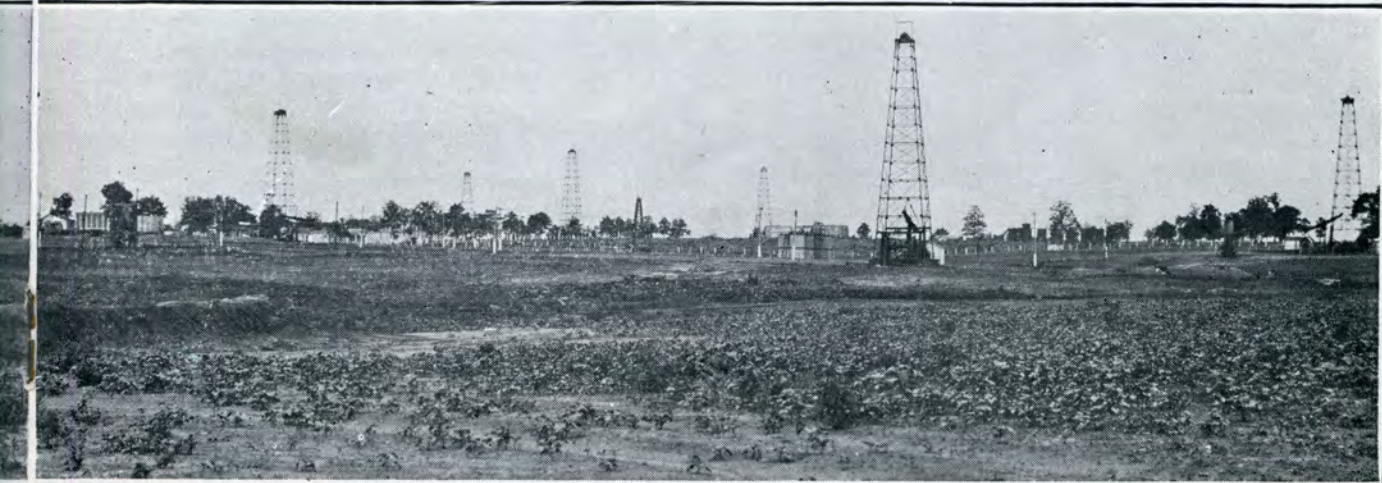
**LUFKIN UNITS**

ALMOST  
EXCLUSIVELY:

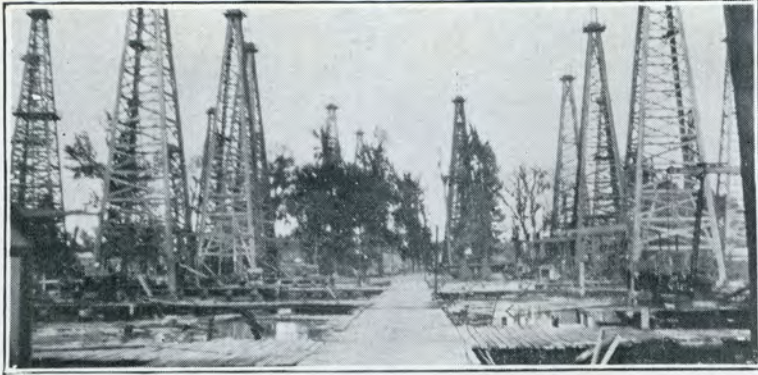
- HUMBLE,**
- MILLS BENNETT**
- NAVARRO**
- VACUUM**
- WINFREE**



Shaffer O. & R. Co., Davenport, Okla., Drilling in With Electric  
Motor and Lufkin Units.



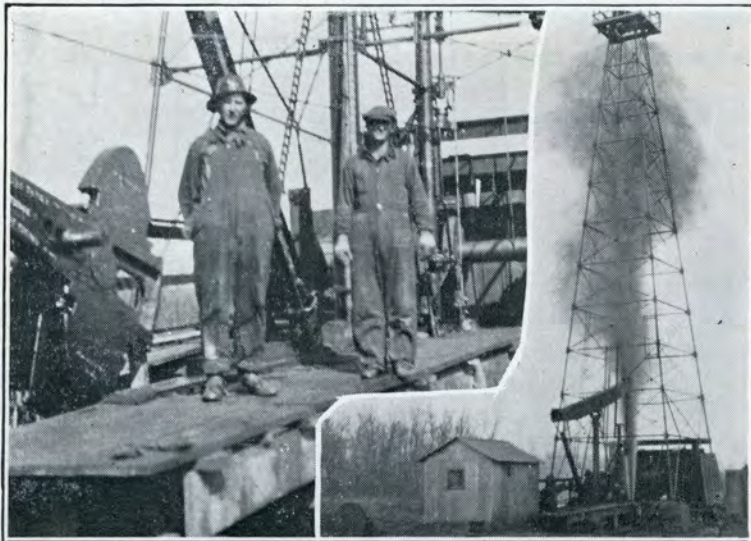
ost Eliminated. This Company Has Now Over Forty Units in Operation.



Mills Bennett and Navarro Oil Co. Leases, Liberty, Texas



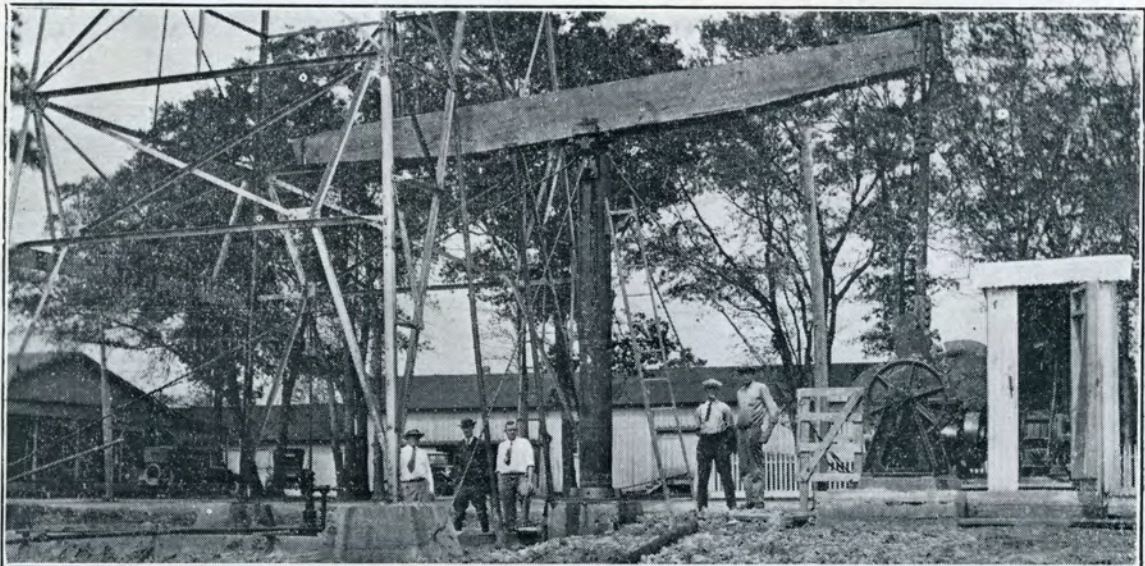
Mullberry Oil Co., Mehan, Okla.—Lufkin Unit With Gas Engine



Skelley Lease, Davenport, Okla.—Completely Equipped 8 Wells

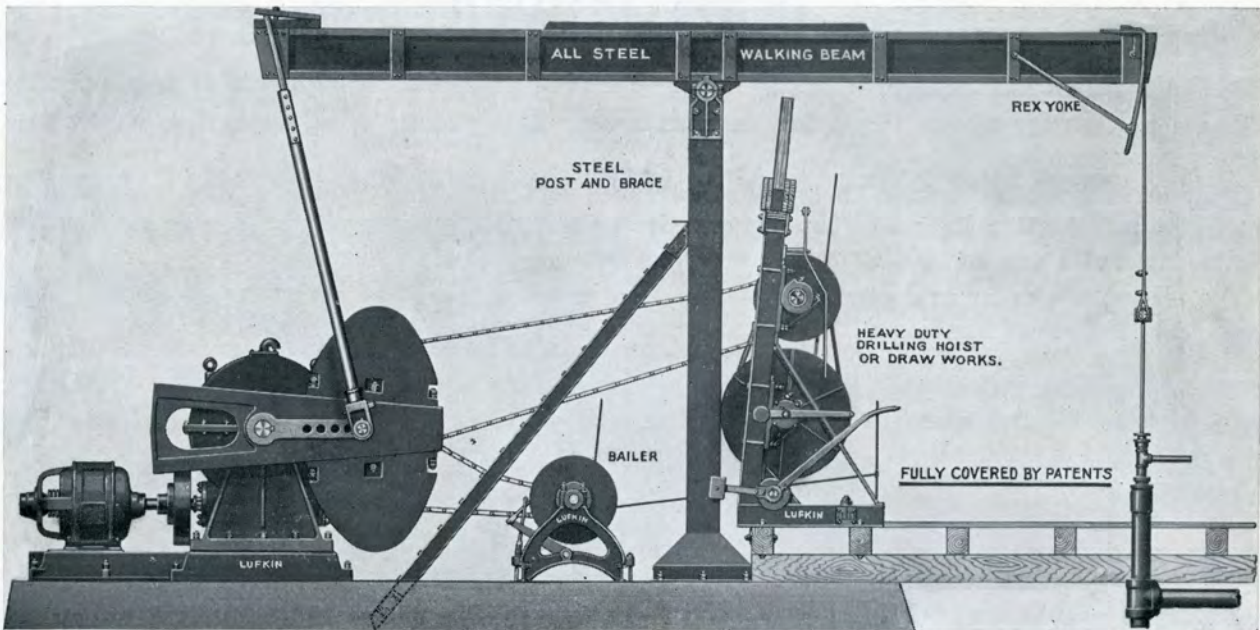
Our representatives can show you right in your office in daylight, moving pictures of the various operations of this unit, as they actually are in the fields, on request.

LOWER  
POWER  
COSTS  
WITH  
LUFKIN  
UNITS



New Humble Well at Goose Creek—No Fire Risk Here

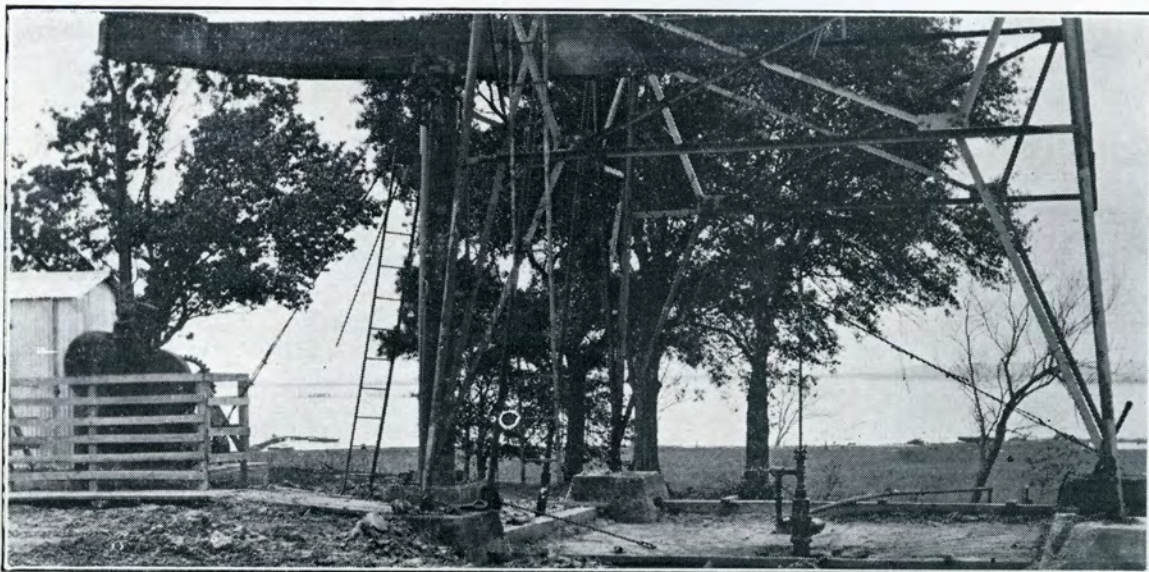




**The Lufkin Way—Combination Rotary and Cable Tool Rig.** Either electric motor or gas or gasoline engine drive. Bailer (see page 23) set between unit and derrick, but may be set on derrick floor and driven from hoist shown on page 21. Rotary also may be driven from hoist line shaft, all operated by one operator on derrick floor. The **Lufkin-Taylor Rotary**, with which reversing is unnecessary, is the ideal rotary for this rig.

**LET US TELL YOU ABOUT OUR ROTARY ALSO.**

*We Make All-Steel Equipment For Pumping Wells*  
*(Send for Accessory Bulletin)*



HUMBLE CO., GOOSE CREEK, TEXAS, SHOWING CONCRETE DERRICK FLOOR LUFKIN UNIT

Note—This unit on the street where school children pass, hence the guards; good idea any place.

# BUDA POWER

BUDA POWER is furnished with the Lufkin pumping units where engine drive is required.

These engines are of the 4 cylinder, medium speed, heavy duty type, operating on natural or residue gas, or gasoline.

They are a complete unit in themselves, having a self contained cooling system composed of an extra large radiator rigidly made, having cast iron shell. No outside piping is required for the installation, except a gas connection to the mixing valve.

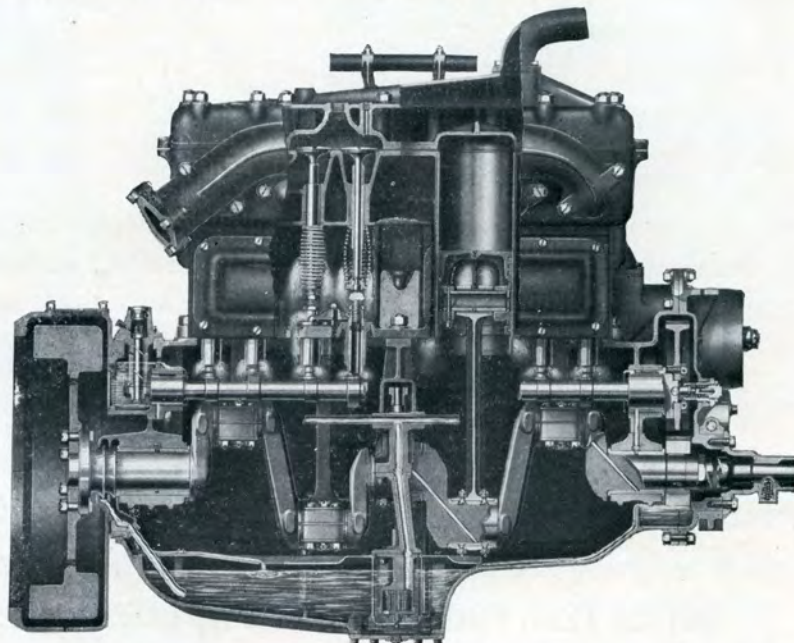
The engine is similar in design to those used in motor trucks, but of lower speed and heavier design. Any field man familiar with automobiles will understand its operation and care.

The oiling system is of the force feed type, oil under pressure being forced to the bearings by a gear pump located at the bottom of the oil pan. There are no threaded pipe connection or complicated system of tubes in the system to work loose. The main oil line is a seamless steel tube cast into the crankcase. All other oil passages are drilled through webs in the case. The crankshaft is also drilled to allow oil to reach the rod bearings under pressure.

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**For ordinary pumping and handling rods and tubing, we recommend 55 H.P. size. Where cable tools are used, 75 H.P.**

---



The clutch, used for starting purposes, is an extra large model of Twin Disc, with ample capacity for heavy loads at slow speed.

The engine may be operated either on gas or gasoline.

This type of Power Unit is much more compact and lighter in weight than the single cylinder engine now used on Standard rigs. There is considerably less work involved in making the installation, as the unit is complete with cooling system on a self contained frame.

The following comparison table will show the advantages of the four cylinder heavy duty, medium speed engine over the old fashioned single cylinder type:

## Single Cylinder Type

H. P.—30  
 Limit Speed—250  
 Weight—10,000 lbs.  
 Price per H. P.—\$58.00 approx.  
 Fuel—Natural or Residue Gas.  
 Impulses per Rev.—1-(2 cycle)  
 Oiling System—Cup and Force Feeds  
 Water Circulation Tank and Piping about \$300.00.  
 Foundation about \$150.00.  
 Upkeep requires a machine shop.

Larger percentage down time.  
 Hard to start.  
 Poor regulation.  
 Requires engine house.  
 Must have lots of water.  
 Expensive to move.  
 Durability—?????

## Buda 4-Cylinder Type

H. P.—55  
 Limit Speed—1000  
 Weight—2,900 lbs.  
 Price per H. P.—\$28.00 approx.  
 Fuel—Natural or Residue Gas or Gasoline  
 Impulses 2 each Rev. (4 cycle)  
 Oiling System—Automatic Pressure Feed  
 None.  
 None.  
 Purchase new parts nominal cost from Buda Parts Stations.  
 Extra parts available at once.  
 Cranks like a truck.  
 Steady absolute regulation.  
 No house necessary.  
 Very small amount added daily to radiator.  
 Easily portable.  
 Engine built in 1909 still going fine—automatic lubrication insures long life and few repairs.

Copied from an original at The History Center, Diboll, TX. www.TheHistoryCenterOnline.com 2013:023

# Lufkin Hoists, Bailers, Etc.

ESPECIALLY DESIGNED TO WORK WITH LUFKIN UNITS

## Some Special Features About Our Hoists

Lufkin Hoists are all designed so that it is unnecessary to reverse power, the winding drum being loose on shaft (same as all makes of hoisting engines); a feature that is necessary with the multi-cylinder gas engine which does not reverse, and while not necessary with electric power, this feature is a great saving in power and a decided advantage to motor. Therefore with this type of hoist with its wedge clutch, the operator in reality uses just as much power as necessary to lift the load and there is no jerking as with positive clutches.

While we use positive clutches as shown they are not intended to be shifted with load, only to change speeds. The line shaft and also drum shaft run continuously when hoist is in use at high or low speed as may be desired.

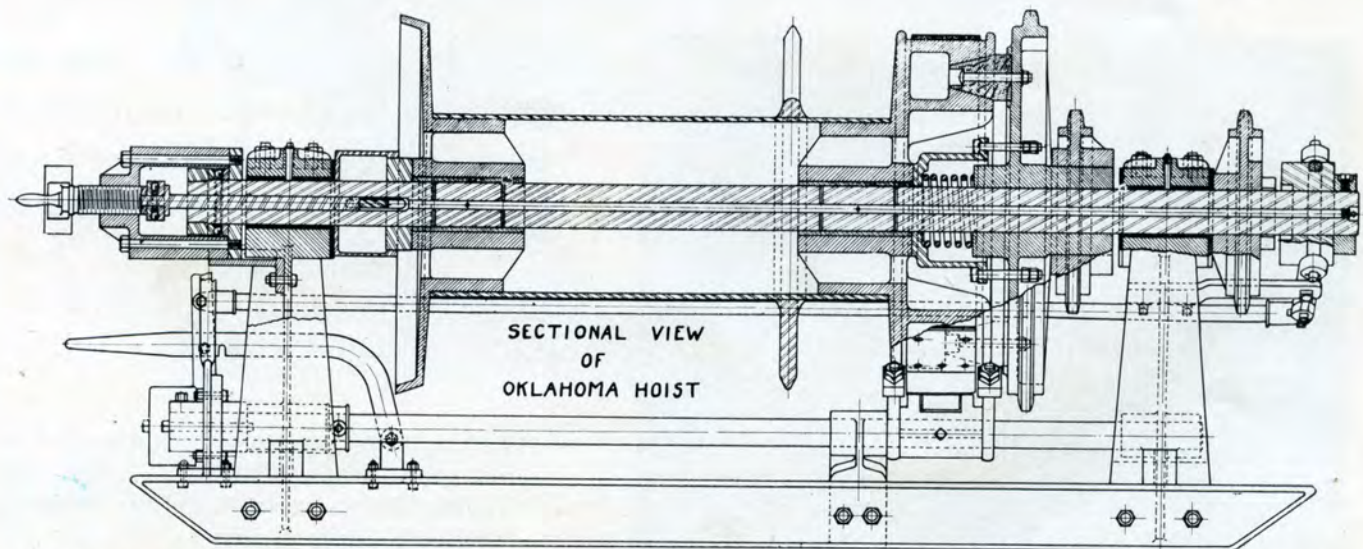
The sectional drawing of our Oklahoma Type Hoist shown below shows the idea that is carried out in all our hoists shown in this bulletin, with the exception of the bailer, which however, is the same principle, only the sprocket and clutch are loose instead of the drum, largely on account of the excessive speed at which it is run continuously when bailing.

The loose drum has long bronze bushings that practically float in oil as double provision is made for effective lubrication, which is an important feature in this design.

The clutches on these hoists are surprisingly powerful. Although Hoist No. 1 of the Gulf Coast Type was designed for handling rods and tubing especially, it has been successfully used for setting and pulling casing and found very efficient. These Hoists have handled over 10,000 pounds on a single line speedily, the larger hoists work in proportion.

It will be noted they are well designed, built on close centers for redrilling and cleaning for either cable tools or rotary. They will be found to be well made of the very best material and workmanship and are built in the following sizes—

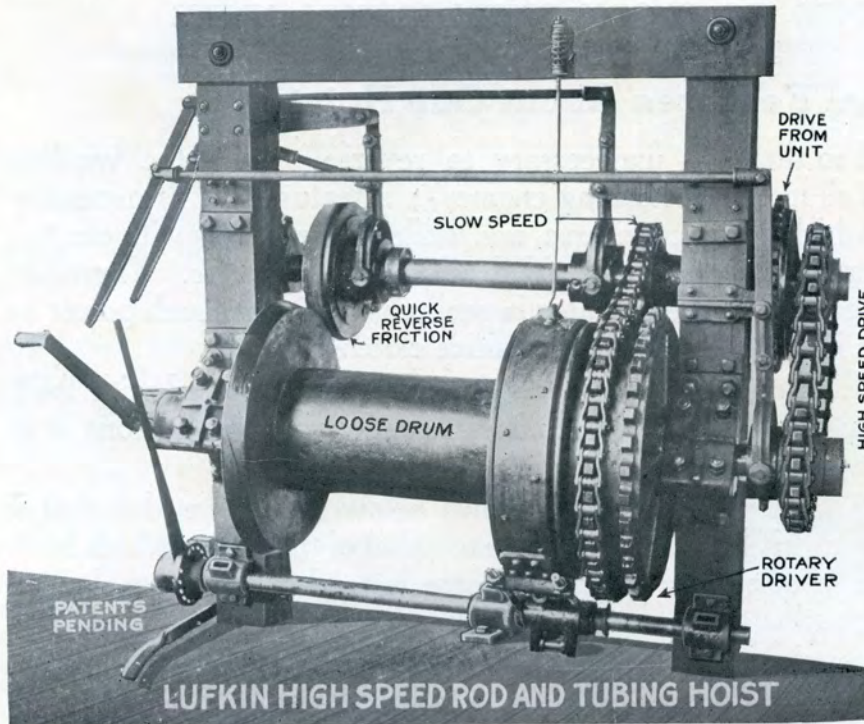
- |  |   |
|--|---|
| No. 1 Hoist 4" Gulf Coast Type, see page .19 | No. 4 Hoist 4" Oklahoma Type, see page .22    |
| No. 2 Hoist 4" Arkansas Type, see page .19   | No. 5 Bailer 4" Standard Type, see page .23   |
| No. 3 Hoist 5" California Type, see page .20 | No. 6 Hoist 4" for Standard Rig, see page .23 |



SECTIONAL VIEW—SHOWING LOOSE DRUM PRINCIPLE. It Is Not Necessary to Reverse Power in Using Lufkin Hoists.

**Description and Specifications of Hoists on Pages Following**

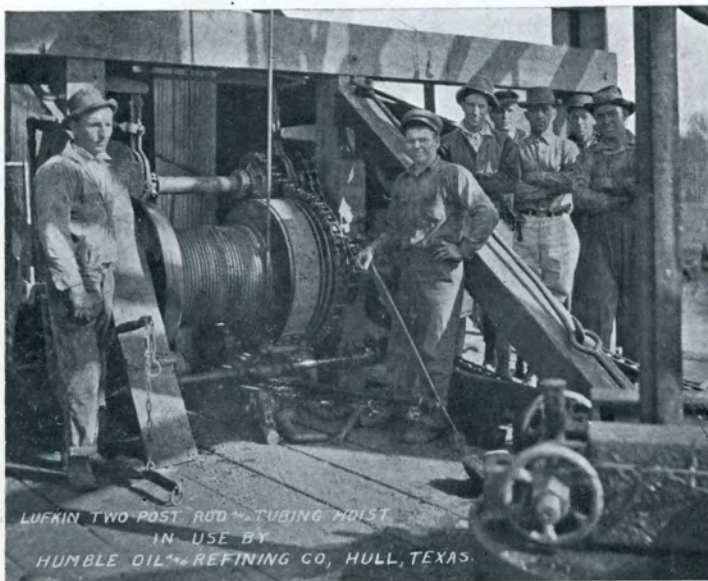
# Rod and Tubing Hoists For Speed and Real Service



## ADVANTAGES

- No reverse of power necessary.
- Powerful Hoist—2 speeds.
- Cut time Pulling Rods or Tubing in half.
- Will drive rotary for cleaning or drilling deeper.
- Can also be used with Cable tools.
- Well made—Substantially built.
- With ordinary care will last for years.
- Field men like them.

No. 1 Hoist is known as the Gulf Coast Type and is used as an all around purpose hoist for rods and tubing, but is a powerful hoist lifting safely 7500 lbs. on single line (it has lifted over 10000 lbs.) and is used for re-drilling with rotary, setting small casing, fishing, etc. Line and drum shafts are 3-15/16" diameter. Drum capacity is as follows—9/16"-4500', 5/8"-4000', 3/4"-3000', 7/8"-2000', 1"-1600'



LUFKIN TWO POST ROD & TUBING HOIST  
IN USE BY  
HUMBLE OIL REFINING CO, HULL, TEXAS.

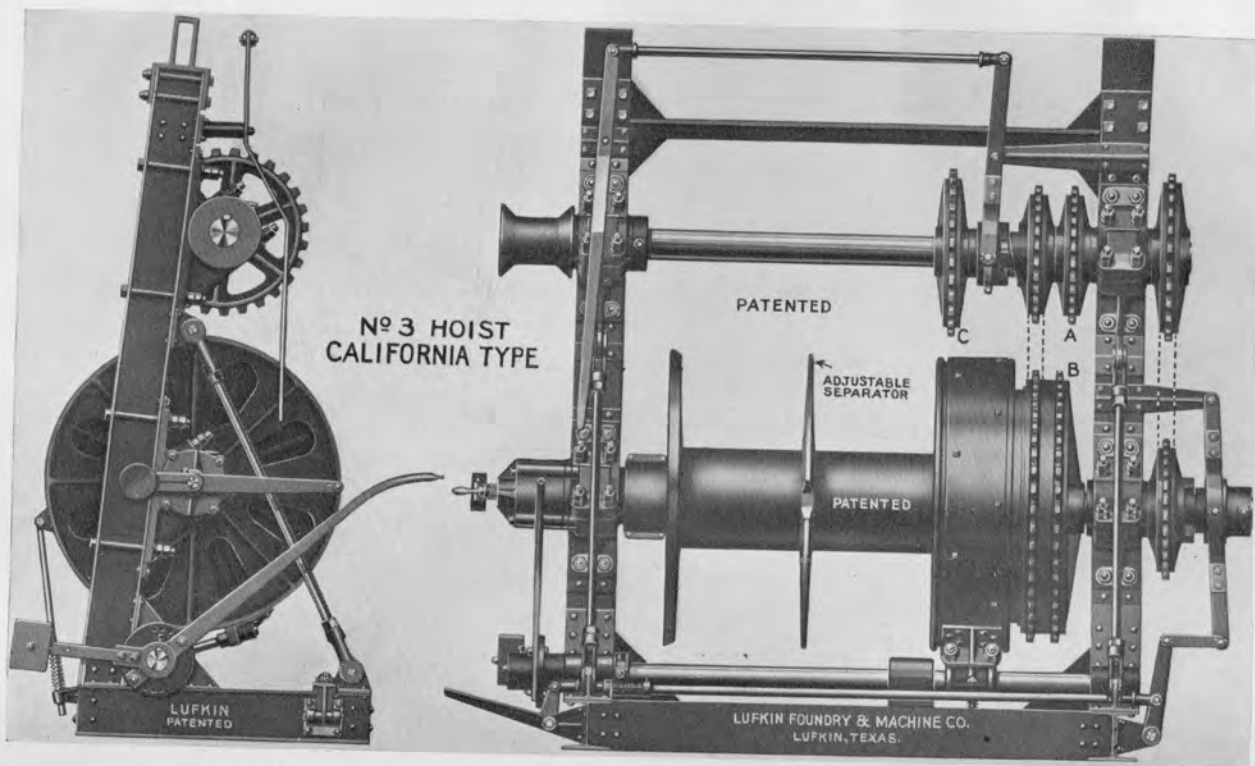
No. 2 Hoist, known as the Arkansas Type, is the same hoist except that it holds more line on drum which is longer, the flanges being larger, and it is popular in the cable tool country. Drum holds 9/16"-11900', 5/8"-9700', 3/4"-6700', 7/8"-5100', 1"-4000'

We furnish Steel Walking-Beams with Yokes, Sampson Posts, Pitmans, Crown and Tubing Blocks, also Rod Line Weights for Loose Drum Hoists.

Let Us Send You a Special Bulletin on These Accessories.

Drilling Deeper with Rotary Driven by Lufkin Hoist

## Heavy Duty Friction Hoists For Drilling, Etc.



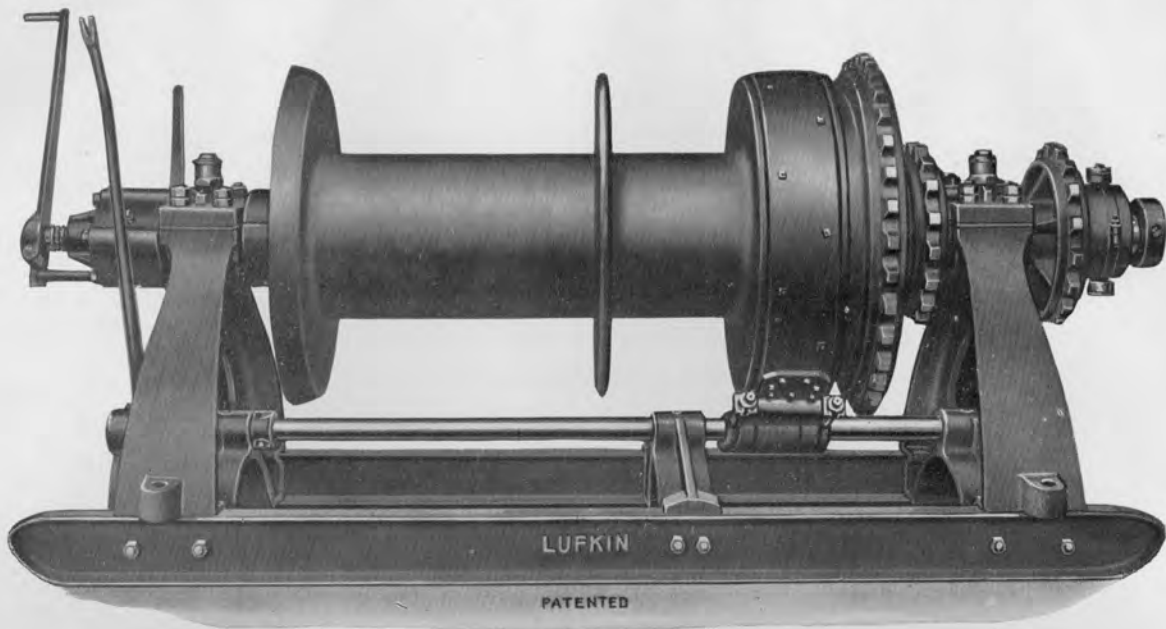
NO. 3 CALIFORNIA HOIST—For Combination Rotary and Cable Tools, With Trout Patent Expansion Drum Guaranteed Against Breakage From Heating By Brake.

This hoist has been designed as a general purpose hoist for drilling, and while not intended to take the place of a large 6" draw works, it will practically do so, as it will lift 17,500 lbs. on a single line and will handle casing or drill pipe, and if desired to use with Cable tools a set of bull wheels can be set in their usual place and chain driven from this hoist. This makes an ideal drilling rig with Buda multi-cylinder engine for dry territory where water is scarce and fuel expensive. Let us tell you more about this hoist. See page 17 for general arrangement.

### SPECIFICATIONS

- Line and drum shafts 4-15/16"—center to center 8" H. beam posts 7'-2-3/4"
- Diameter drum 16"—diameter flanges 48"—10" J. M. Asbestos lined brake bands.
- Brake shaft 3-7/16"—all sprockets cast steel for 1030 chain.
- Hoist has 2 speeds—Double sprocket B provided for bailer on derrick floor if desired, or may drive set of bull wheels; A sprocket drives from unit; C sprocket drives rotary.
- Pulling power 17,500 lbs. single line.

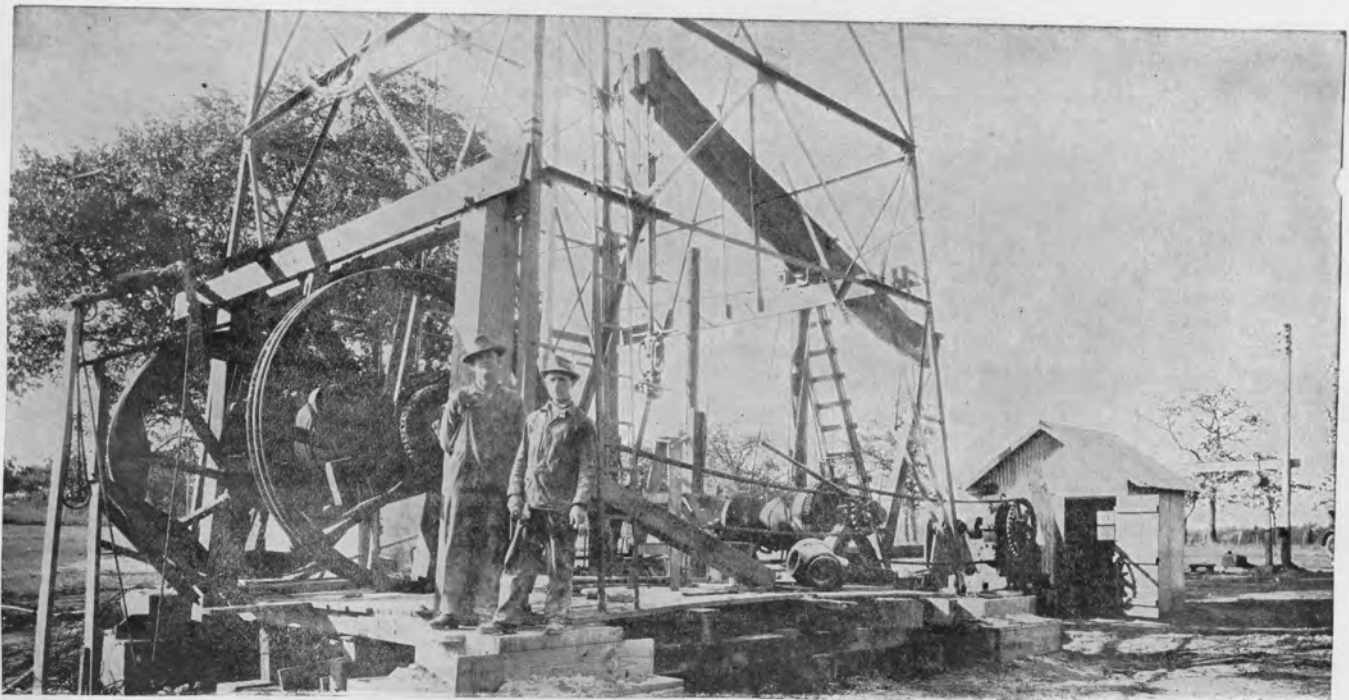
## Oklahoma Type Hoist and Bailer



NO. 4 HOIST—Self contained—loose drum type—with two speeds and with clutch sprocket to drive bull wheels. Sectional view, page 19.

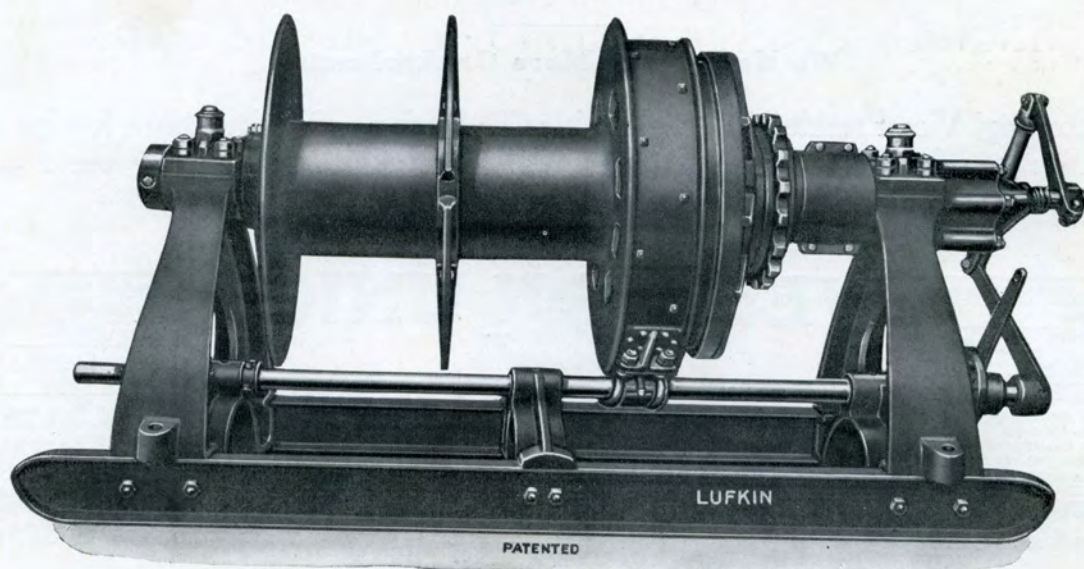
This Hoist has 16" drum, 3-15/16" shaft, 6" brake band, with 2-7/16" brake shaft. A 50 lb. weight on line brings hook down. No reverse is necessary. This hoist requires a 45-T sprocket on units having 30 to 1 gears, and 22-T with 20 to 1 gears.

Note—When ordered we furnish a 37-tooth sprocket to go on the bull wheels (16" O.D. pipe)—with clamp hub—and 22-T sprocket on hoist to drive it.

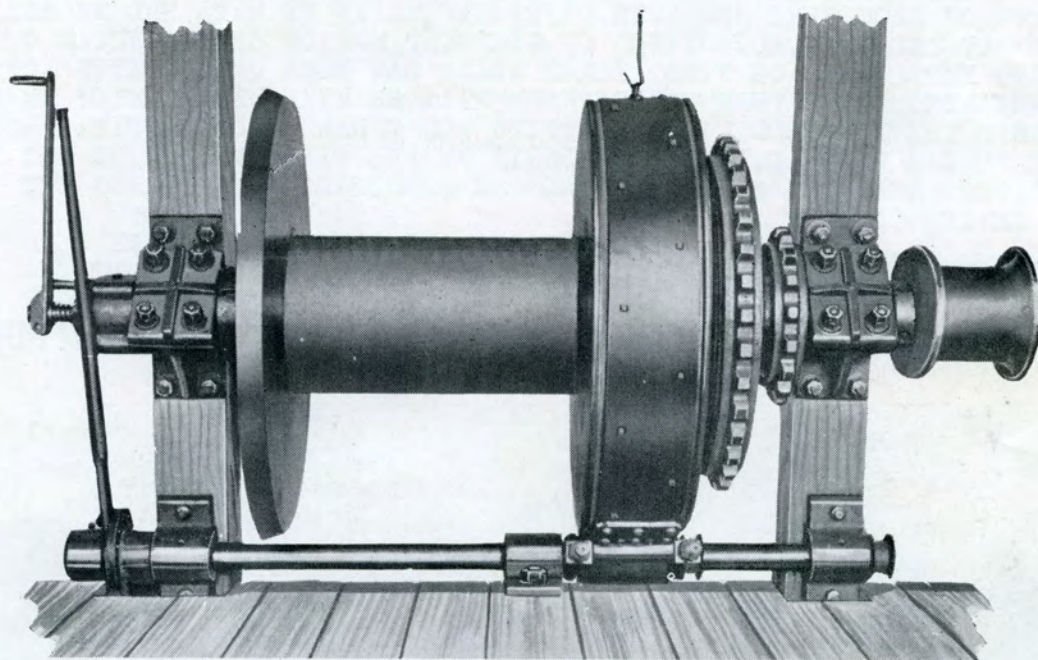


Shaffer Oil & Refining Company, Nichols No. 1, Davenport, Okla., showing installation of hoist used for bailing and rods and tubing—as well as serving as counter shaft to drive bull wheels when using tools.

## Lufkin Bailer and Hoist



**Lufkin Bailer No. 5**—Built like our Oklahoma Hoist except drum is keyed to shaft and sprocket clutch is loose, with long bronze bushing thoroughly lubricated. Otherwise this machine is the same type of construction as our Oklahoma Hoist except lighter throughout. The drum is 12" diameter with inch flanges and will hold 6000'-9/16" wire line. Shaft is 3-15/16" diameter. To those wanting a thoroughly built bailing machine, this will be found to give satisfaction.



**Lufkin Hoist No. 6 Used On Units, Also On Standard Rigs**—A number of our customers for Lufkin units have asked us for a simple quick hoist to operate from band wheel shaft on a Standard Rig for rods and tubing or even bailing. This hoist will be found substantial in every way. It has a 16" drum, 3-15/16" shaft, and 42" flanges and 2-15/16" brake shaft. We furnish this with a 48" sprocket for band wheel shaft with or without clutch for No. 1030 chain.

# Two Outstanding Testimonials

We Have Many More On Application

Mr. Sterling, Vice President of the Humble Co., having an inquiry from a foreign company as to what his experience had been with our units, asked us to have other users give their experience also, and this wire was the result of this inquiry.

Form 1204

CLASS OF SERVICE	SYMBOL
TELEGRAM	
DAY LETTER	BLUE
NIGHT MESSAGE	NITE
NIGHT LETTER	N L

If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

## WESTERN UNION TELEGRAM

CLASS OF SERVICE	SYMBOL
TELEGRAM	
DAY LETTER	BLUE
NIGHT MESSAGE	NITE
NIGHT LETTER	N L

If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

NEWCOMB CARLTON, PRESIDENT      GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

The filing time as shown in the date line on full-rate telegrams and day letters, and the time of receipt at destination as shown on all messages, is STANDARD TIME.  
**Received at** DA 223 185 BLUE 5 EXTRA 1/140      TULSA OKLA 6 323P

FRANK STERLING  
 CARE W. C. TROUT BENDER HOTEL HOUSTON TEXAS

"COPY"

AT REQUEST OF PETROLEUM ELECTRIC COMPANY WE ADVISE FOLLOWING \*OPINION CONCERNING LUFKIN GEARS AND HOISTS WE HAVE SEVEN OUTFITS INSTALLED AT WEWOKA OKLAHOMA WHICH HAVE BEEN GIVING COMPLETE SATISFACTION FOR OVER A YEAR IN HARD SERVICE AND WITHOUT APPARENT WEAR THESE ARE 3200 FOOT WELLS AND FOR PUMPING SWABBING AND CLEANING OUT WE BELIEVE EQUIPMENT BEST ON MARKET MAINTENANCE EXPENSE NIL LIFING COST AVERAGE FOR 1925 WAS SEVEN AND SEVEN TENTHS CENTS PER BARREL STOP AT DAVENPORT OKLAHOMA WE HAVE DONE SOME DRILLING WITH EIGHT INCH TOOLS AT DEPTH OF 3200 FEET AND SUCH DIFFICULTIES AS WE HAVE HAD WE BELIEVE WILL BE OVERCOME BY ADJUSTMENT OF SPROCKET RATIOS ON THE WHOLE OUR DRILLING EXPERIENCE ON FIRST THREE WELLS HAS BEEN QUITE SATISFACTORY AND INDICATIONS ARE THAT FUTURE WORK WILL BE EVEN BETTER STOP WE HAVE PURCHASED THIRTEEN ADDITIONAL OUTFITS FOR MEHAN OKLAHOMA FIELD AND EXPECT TO USE THESE OUTFITS REGULARLY WE ARE PLEASED TO GIVE YOU THIS INFORMATION AND WILL BE GLAD TO ADVISE SPECIFICALLY ANYTHING YOU MIGHT DESIRE TO KNOW.

SHAFFER OIL AND REFINING COMPANY  
 RICHARD K. HUEY GENERAL SUPT

**SINCE THIS TELEGRAM HAS BEEN RECEIVED 19 MORE UNITS HAVE BEEN PURCHASED**



ORIGINAL INSTALLATION, WEWOKA, OKLA.—This Company's General Superintendent, Huey, and Field Superintendent, Gibson, are proud of the results of these units, and of this field, which has not only been a good producer, but is one of the cleanest leases to be found anywhere. Note units painted gray and white.



# Another Company Who Believes in Advanced Methods, Less Fire Hazard, and Improved Equipment.

## HUMBLE OIL & REFINING COMPANY

F. P. STERLING,  
VICE-PRESIDENT

HOUSTON, TEXAS, April 15, 1926.

Mr. W. C. Trout, V.P. & G.M.,  
Lufkin Foundry & Machine Co.,  
Lufkin, Texas.

Dear Sir:-

In response to your request for a statement regarding our experience with the Lufkin pumping unit, beg to say that we believe that the Lufkin pumping unit, as it is now constructed, is giving us almost perfect satisfaction, and we believe that you have ironed out what little defects there were in the first units built, although, we have the original unit still running at Goose Creek and it has given very good satisfaction, and is running perfectly today. We have just examined the worm gear and it is not possible to see that the worm gear has worn any in its two years service.

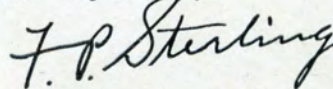
I understand that some of the competitors of the Lufkin Pumping Unit are stating, that in the Liberty Field there has been some of the units taken off their foundation and abandoned. As far as I know this is not true. We still have all our pumping units in service in the Liberty Field.

The Humble Oil & Refining Company have over fifty Lufkin pumping units in service and in my judgement, based on actual experience and operating costs, we can heartily recommend them to the oil industry, as actual experience proves that they make a decidedly favorable comparison with the old time standard rig.

The new counterbalanced cranks enables one to balance their wells almost perfectly. On our pumping wells where we have the new counterbalance, we find they will make from four to seven revolutions after the power has been cut off, and we know that a well that is properly balanced uses less power than one not properly balanced.

I feel that anyone using the Lufkin pumping units will not make any mistake and, therefore, do not hesitate to recommend them to anyone.

Yours very truly,



FPS:M

Lufkin Units and Hoists Are No Longer An Experiment—  
They Are Going Over in a Big Way.

Let Us Quote On Your Next Requirements.

# EXPERIENCE PAGE

A Few of the Actual Experiences and Service Had With Lufkin Pumping Units and Hoists reported by Our Field Men and from Letters Received from Our Customers. (Abbreviated)

Guedry No. 11, Hull Texas.—Unit with four cylinder gas engine, running 48 strokes per minute, 45" stroke, producing 1500 barrels fluid, running at this speed for the last thirteen months, well 3000' deep.

Tabb No. 11, Goose Creek, Texas—Unit pulling two wells; one 3700' deep, the other 2100' deep, for two years without expense.

Coon No. 5, West Columbia—Unit operated by constant speed motor using 3.3 K.W. per hour, pumping 3,000 feet deep, producing around 600 barrels, 75 per cent salt water; 14 months operation; no expense.

Guedry No. 10, Hull, Texas—Original unit using 10-1/2 K.W. per hour; after applying Trout counter-balanced crank, power consumption cut to 6-1/2 K.W. per hour.

Mills-Bennett, Pickett No. 11.—Fishing job, 3450 feet, using three lines, pulled 3" tubing in two readily with Gulf Coast type hoist, with four cylinder 50 H. P. gas engine.

Mills-Bennett, Pickett No. 6.—Set 3500' 4-1/2" 15 pound casing with Lufkin unit and Gulf Coast hoist, using five lines.

Mecom, Hull, Texas, Taylor No. 4.—Well drilled deeper with unit and Gulf Coast hoist; from 3800' to 4150' handling 3" drill stem with ease.

Vacuum, Liberty, Texas, Barrett No. 8.—Pulled

rods, changing cups, beam to beam, 55 minutes, rods 3275' long.

Humble, Shade No. 1.—Took off beam, pulled rods out of 3400' well in 35 minutes.

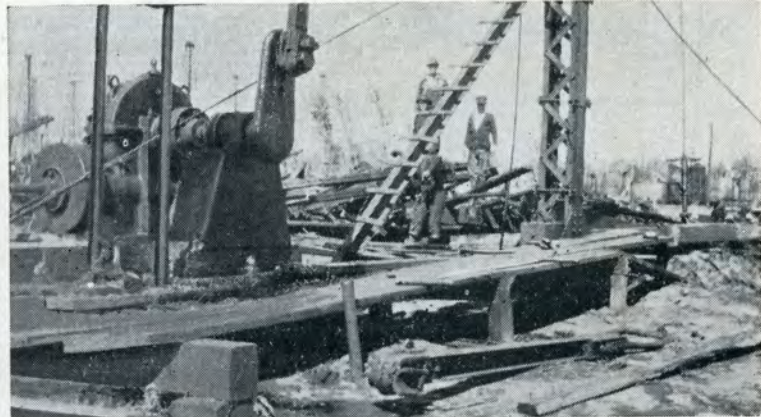
Humble, Chambers Lease.—In abandoning well, entire equipment salvaged with Lufkin Hoist, handling seven lines with comparative ease.

Oklahoma.—Unit is set after rotary drills within 100' of the pay; unit and hoist used to drill in with Cable tools, and setting of standard rig is avoided for this purpose.

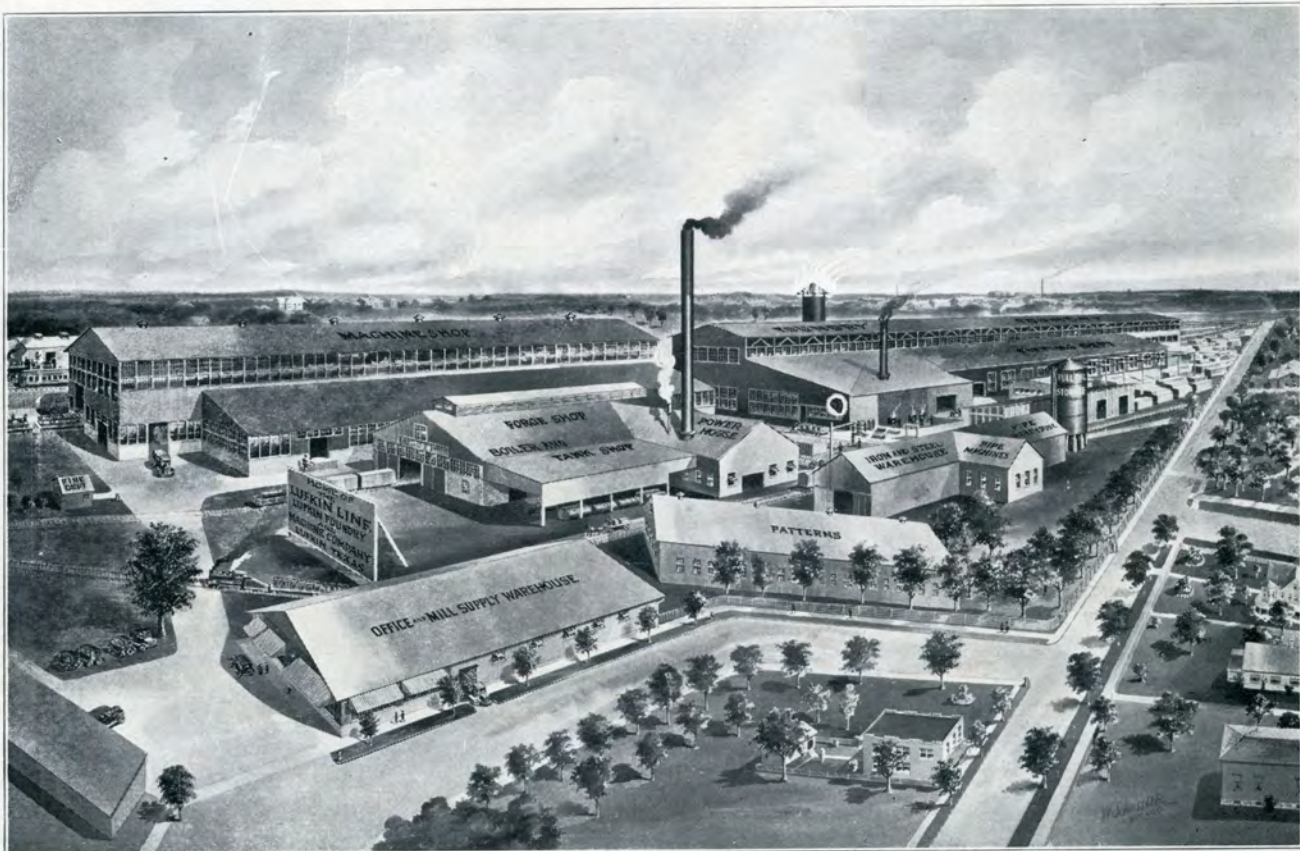
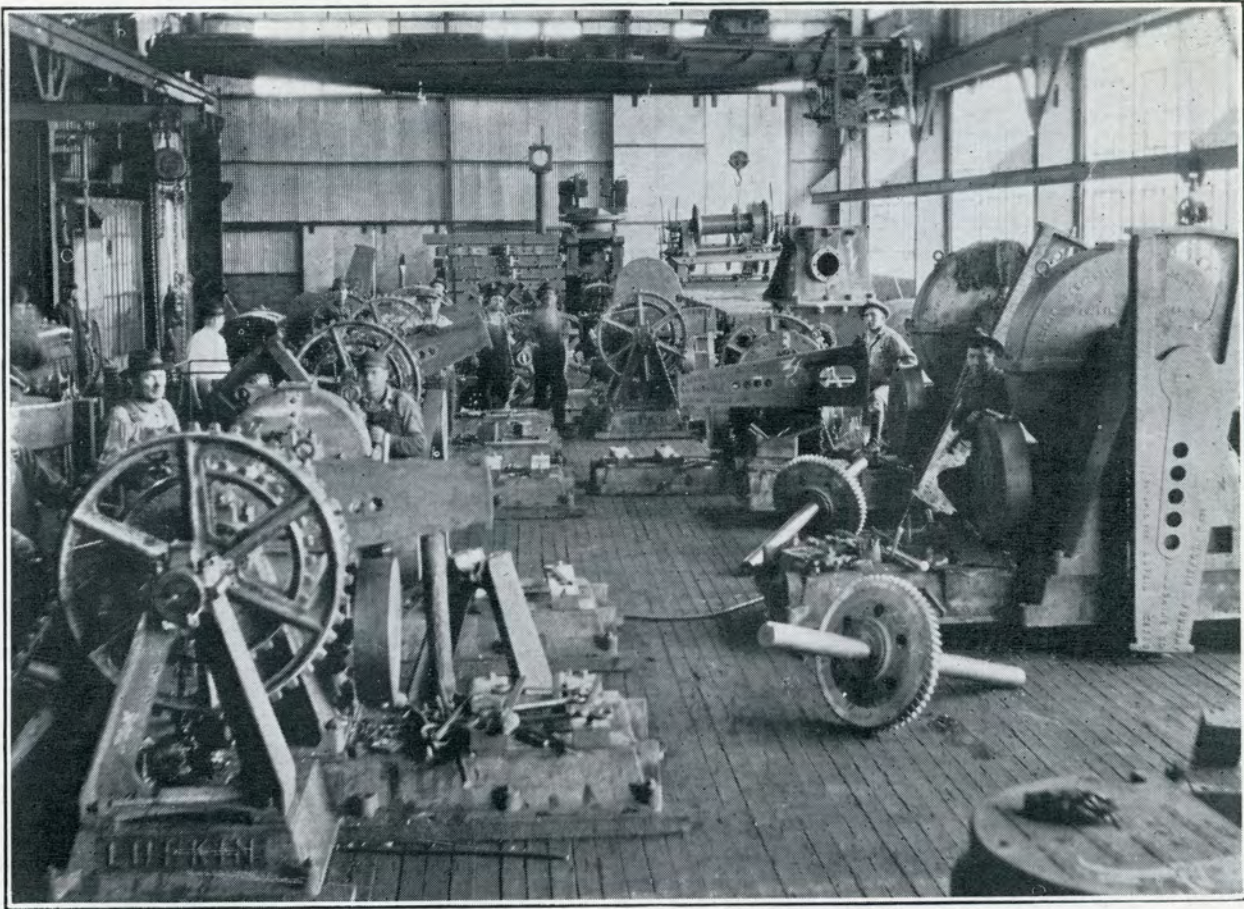
Our equipment used, did all necessary work of the standard rig; in one instance drilled through 450 feet of concrete left in casing through accident in cementing, in thirty hours with 8" tools, using standard pumping unit and 15/35 H.P. motor. On test the tools were pulled out of the well, 3800' deep, in 13 1/2 minutes, with motor showing an overload totaling 75 H.P.

Vacuum-Barrett No. 6, Liberty, Texas.—Trout balanced crank applied to original unit with reciprocating weight; speed of well was increased from 28 to 36 R. P. M. with production increased proportionately.

Mills Bennett-Pickett No. 1.—With both standard rig and Lufkin unit. Standard rig operated with 6' stroke, 24 strokes per minute, producing 550 barrels fluid; later using Lufkin unit, 45" stroke, 34 strokes per minute, producing 654 barrels fluid.



Recent Gulf Coast hurricane blew down derricks on over forty of our units, in this instance at Liberty the crown blocks fell directly on top of the unit and as in this case no damage was done to the unit on a single well. Slight damage was limited to housings of a few of the multi-cylinder gas engines and about fifty dollars worth of small repair parts to hoists. Many of the wells were in operation in FIVE HOURS without derricks as was all five wells of the Vacuum shown on right. ALL OF THE LUFKIN UNITS WERE IN OPERATION WITHIN 24 HOURS.



UPPER—North End of Erecting Shop—Fitting and Testing Units.  
 LOWER—General View Lufkin Foundry and Machine Company, Lufkin, Texas.

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## Boiled Down For Busy People

### ADVANTAGES IN USING LUFKIN UNITS

#### LOW UP-KEEP COSTS

They are built to last.  
Automatically oiled they require little attention.  
One man can look after double the number of wells.  
Greater safety—Less accidents—Ask the Safety Committee.  
Parts subject to wear easily renewable.  
**Original worm gears show practically no wear.**

#### HIGHEST EFFICIENCY

Worm gears are 85 to 95 per cent efficient.  
Worm gears maintain their high efficiency until worn out.  
There is no "back lash" on worm gears, and with Trout's Centrifugal Counter Balance an absolutely steady equalized load is maintained on rods.  
Fly wheel stabilizes and distributes motor load.  
Complete unit shows from 30 to 60 per cent efficiency over the average standard rig.  
**Power Expense Reduced Accordingly.**

#### MANY MECHANICAL ADVANTAGES—UNITS AND HOISTS

Used with electric motor or multi-cylinder gas engines.  
New fields lacking electric power may use gas engines and later replace them with electric motors at slight expense.  
Units are used for cable drilling or in combination with rotary as well as pumping.  
Lufkin Hoists do the work of the standard rig with more speed and flexibility.  
Rods and tubing handled in one half the usual time.  
All loads handled with friction clutch—Positive clutches only used in changing speeds—Loads under absolute control.  
**Not necessary to reverse power with our loose drum friction hoists.**

#### COUNTER BALANCED CRANK MEANS LESS ROD TROUBLE

Trout counter-balanced crank acts as a fly wheel when working over a well.  
When pumping it can be adjusted to an even balance with well to give absolute steady motion to sucker rods—No "back lash" or jerky motion. Wells have been "speeded up" 33 per cent higher than possible with old style reciprocating weights.  
**There is no "whip" in a centrifugal counter-balance.**

#### INSTALLATION AND COSTS

Average cost installation with concrete \$150 to \$300.  
When relocated only loss is the foundations, so **salvage value easily over 90 per cent.**  
**Fire hazard entirely eliminated.**  
**Only slightly higher in original cost than an all steel standard rig, all things considered.**

No Longer an Experiment—Over 160 in Use—We Have a Lot of Fine Testimonials—Write Us.

## LUFKIN FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

Houston, Texas

Tulsa, Okla.

Los Angeles, Cal.

New York City