

LUFKIN  
OIL FIELD  
EQUIPMENT



Catalogue • 1928

# LUFKIN PUMP UNITS

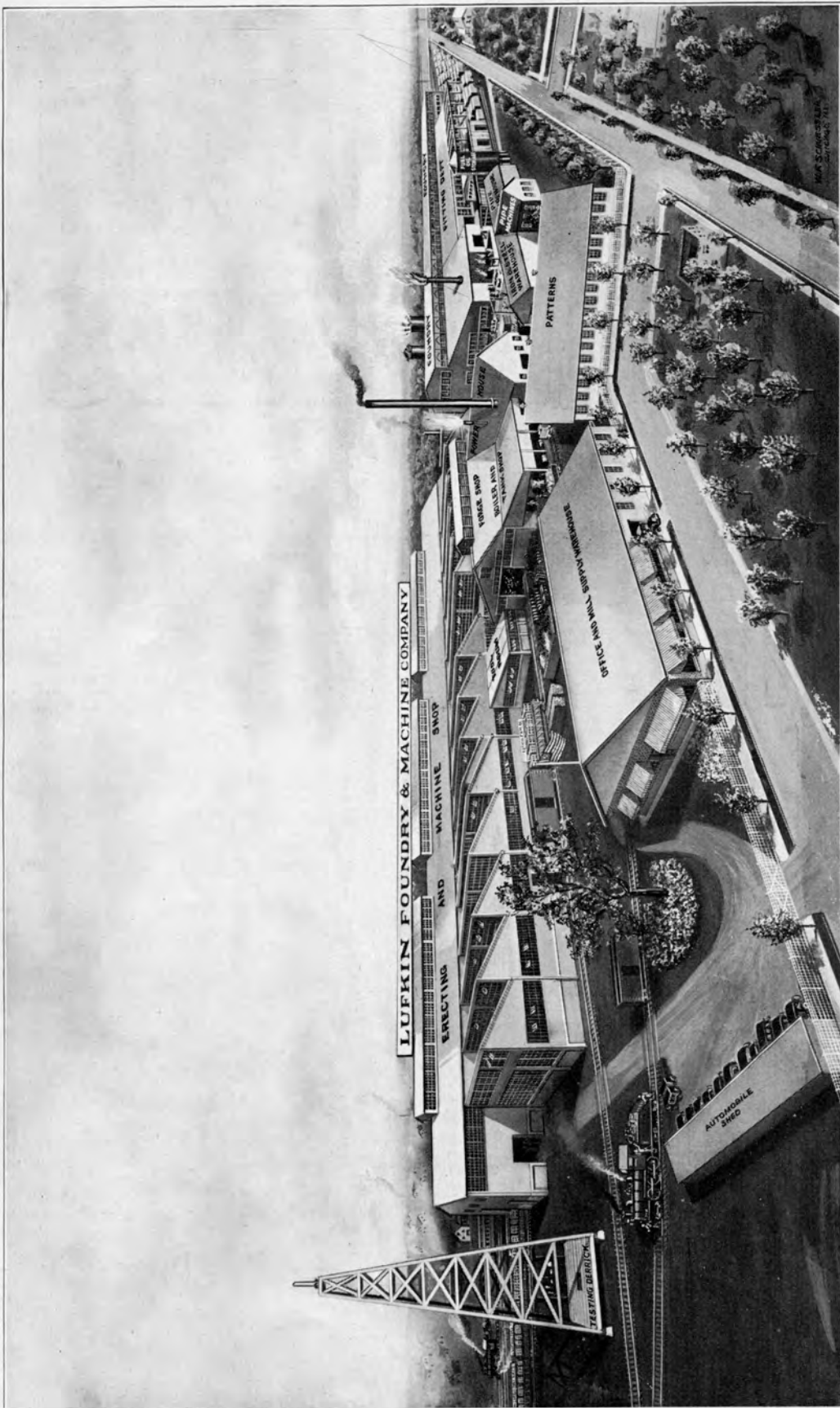
FOR  
**ECONOMICAL  
OIL PRODUCTION**

**PUMPING**  
*Rotary or Cable Tool*  
**DRILLING**

**OVER 600 RIGS IN SERVICE**

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

*Houston Tulsa Los Angeles New York City*  
*Odessa, Tex. Eldorado, Ark. Seminole, Okla.*



LUFKIN UNITS are manufactured in a most modern plant, in absolute duplication of parts by jigs and templates and with every facility to turn out a first-class product that men and machinery can possibly produce.

## Introduction



**A**FTER nearly thirty years experience manufacturing Heavy Saw Mill Machinery, this Company, with the vanishing forest, was compelled to look to new fields of endeavor, at which time our attention was called to the need of improved PUMPING EQUIPMENT FOR THE OIL FIELDS—especially something to replace the old Standard Rig, so expensive to maintain, so inefficient in the use of power, with practically no salvage value, even after a few years use. These objections are known to all operators, and with their help and suggestions the line of LUFKIN UNITS and HOISTS were put on the market.

After four years experience in pioneering GEARED UNITS, in which we have found and overcome many difficulties, we have, from the suggestions of practical operators, made many improvements, not only in the GEARED UNITS themselves, but in the HOIST and other well equipment, that has resulted today in the sale of over six hundred rigs in the various fields of the world.

Therefore, in this, our fourth Bulletin showing the development of these UNITS, we are offering a strictly STANDARDIZED PRODUCT, the acme of perfection in this type of equipment.

Many large producers have standardized on LUFKIN UNITS, and are realizing in actual practice the results we claim—high efficiency, low power cost, low upkeep expense, elimination of fire hazard, high salvage value after years of use, as well as being a time saver in working over the wells. They are doing the work in every way better than the Standard Rig.

LUFKIN UNITS are manufactured in a modern plant in absolute duplication of parts by jigs and templates, and with every facility to turn out a first-class product that men and machinery can possibly produce.

Nor does our interest cease when machinery leaves our plant. We maintain a thoroughly experienced corps in the fields whose business is not only to thoroughly acquaint the users, but to watch results so that we may continually improve our product at every opportunity.

We believe that LUFKIN EQUIPMENT should merit your every consideration.

LUFKIN FOUNDRY & MACHINE COMPANY.

Lufkin, Texas, January, 1928.

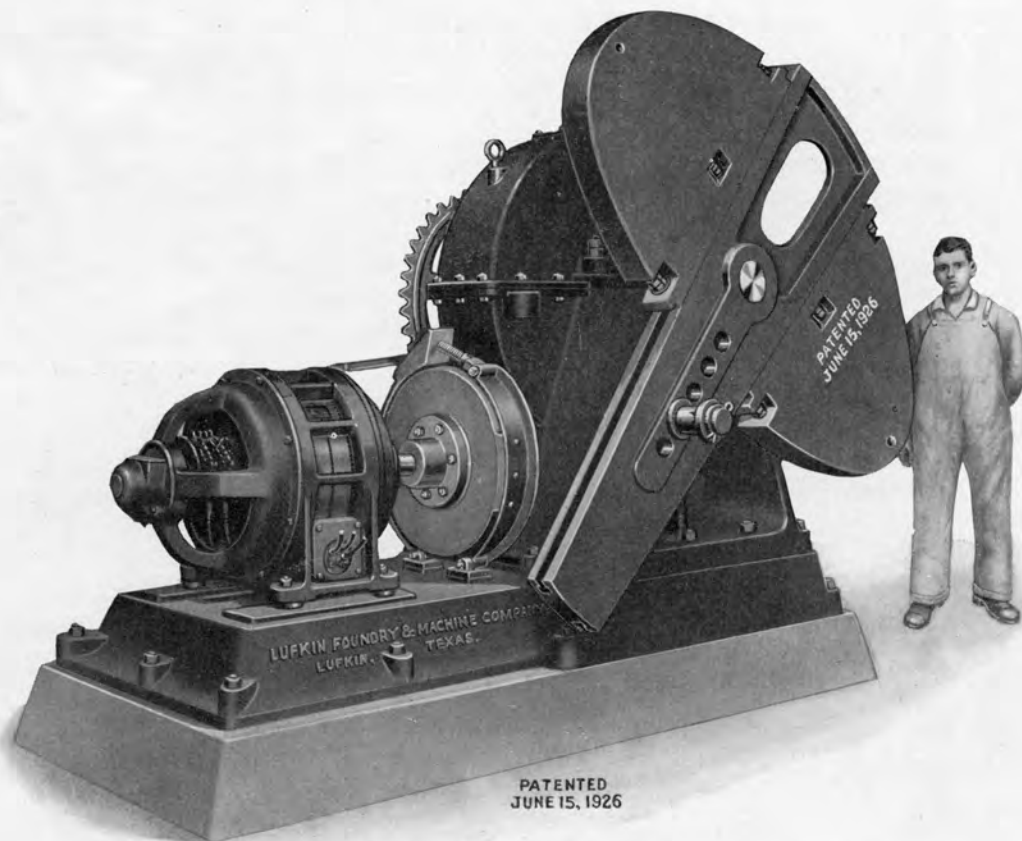
# Lufkin Units

Since the use of LUFKIN WORM GEARED UNITS have been so widely used in the various fields in the country, it is no longer necessary to point out their advantages for oil well pumping as compared to the old Standard Rig; many customers advising us that they have purchased their last equipment of this kind and in the future will depend entirely on LUFKIN GEARED UNITS.

The introduction of LUFKIN WORM GEARED UNITS has convinced oil field Engineers of the great saving in power over the

Standard Rig, which, at best, has an over all efficiency of 30%, while the geared unit, with its frictionless bearings, has shown as high as 70% and 80% from prime mover to polish rod, meaning a great reduction in electric power costs.

Our gear units alone, on shop tests, have shown 88% efficiency and have shown even higher efficiency in the testing laboratory of Cornell University, where special testing apparatus is available; so that a 70% to 80% over all efficiency can always be realized with



**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.

READ THE "WHY" OF THE WORM GEAR—PAGES 54-55.

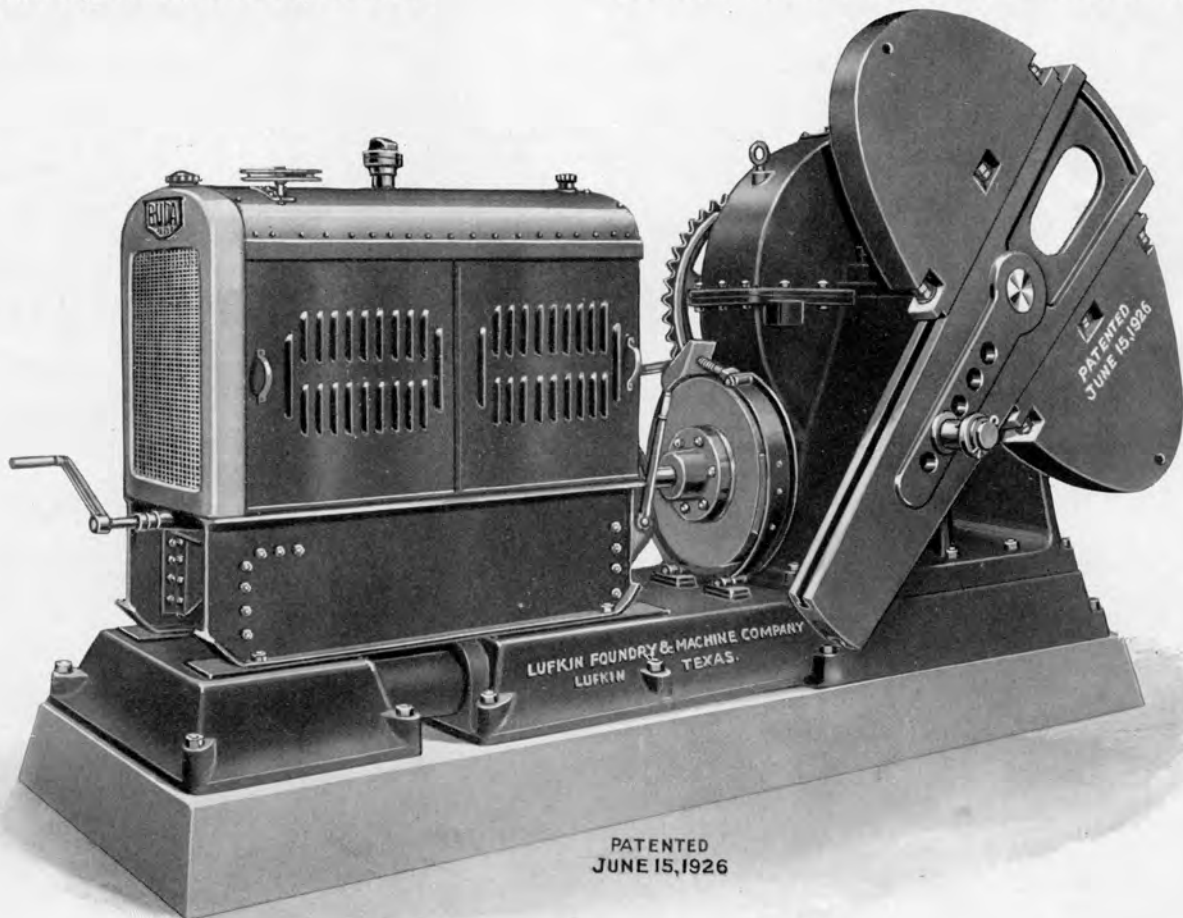
# Lufkin Units

[Continued]

worm gears. They maintain their efficiency for years.

We believe that the worm gear has proven beyond doubt that it is the best type of gear for the fluctuating load of oil well pumping. It is highly efficient, has no backlash, which insures a steady pull on the rods. (See pages 54-55.) We find, after four years use only the slightest wear with maintained efficiency and the promise of many years life, even beyond our own expectations.

The Trout Centrifugal Counter-Balance has been found, without question, to balance the heaviest wells with greater satisfaction than any known method, resulting in even tension on well rods, less rod trouble, even wear on worm gear, and practically no fluctuation of motor load. The dynamic force in this type of balance only requires about one half the dead weight that is usually employed on beam or grass-hopper to balance the well, and it has proven so satisfactory



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 may be stocked for next new field and electric motor put in its place.

READ THE "WHY" OF THE WORM GEAR. SEE PAGES 54-55.

# Lufkin Units

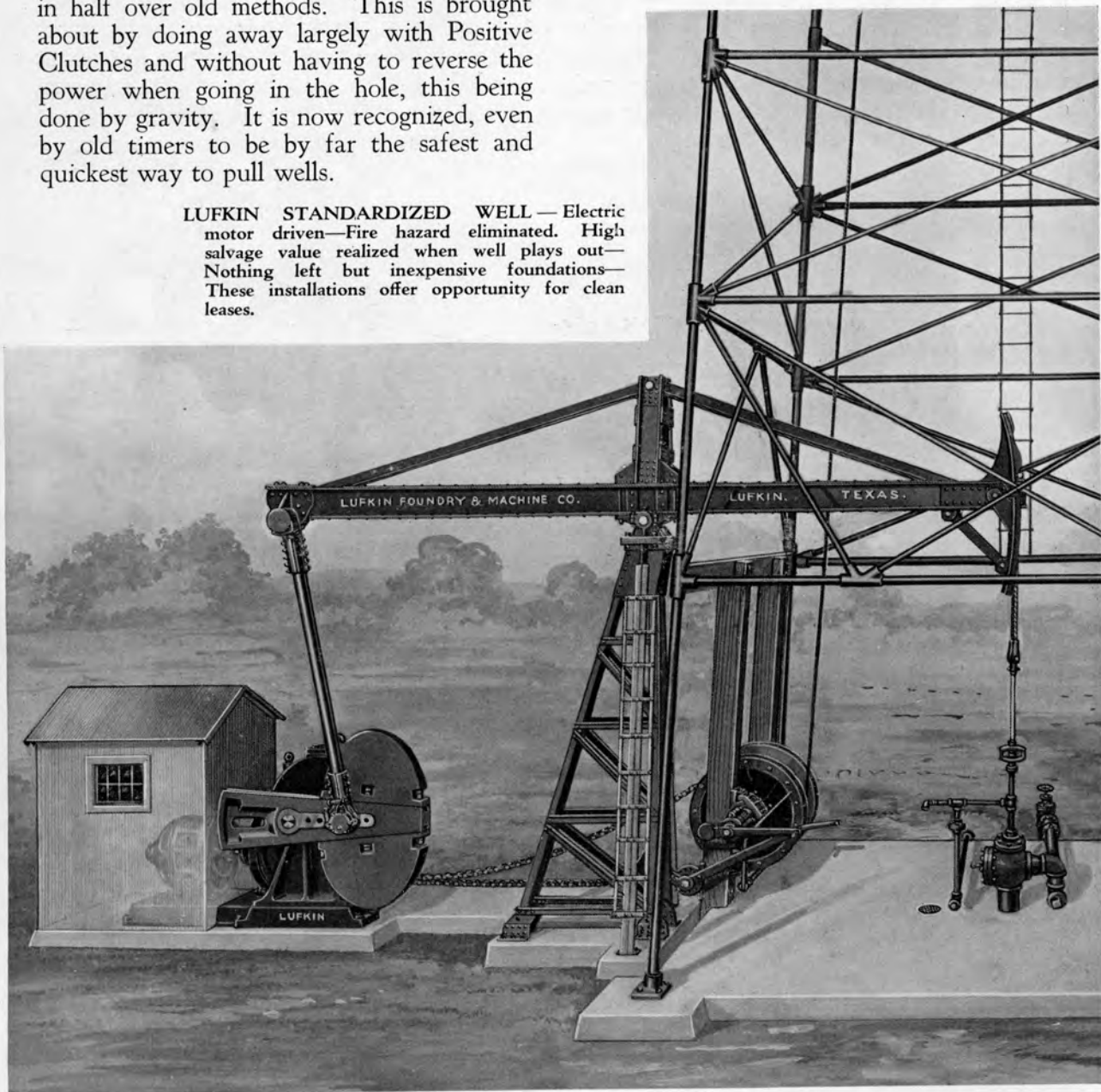
[Continued]

that we have a constant demand and sale for it on Standard Rigs. (See Pages 12 to 14.)

Our Loose Drum Friction Hoist, which was introduced by us with our units to pull rods and tubing, is cutting the "down time" in half over old methods. This is brought about by doing away largely with Positive Clutches and without having to reverse the power when going in the hole, this being done by gravity. It is now recognized, even by old timers to be by far the safest and quickest way to pull wells.

Drilling in, re-drilling and cleaning out, are every day jobs for LUFKIN HOISTS; they are being used generally for all work done by the Standard Rig, except drilling from the top of the ground. Even this has been done

**LUFKIN STANDARDIZED WELL** — Electric motor driven—Fire hazard eliminated. High salvage value realized when well plays out—Nothing left but inexpensive foundations—These installations offer opportunity for clean leases.



**GREATER SAFETY — LESS ACCIDENTS — ASK THE SAFETY COMMITTEE**

# Lufkin Units

[Continued]

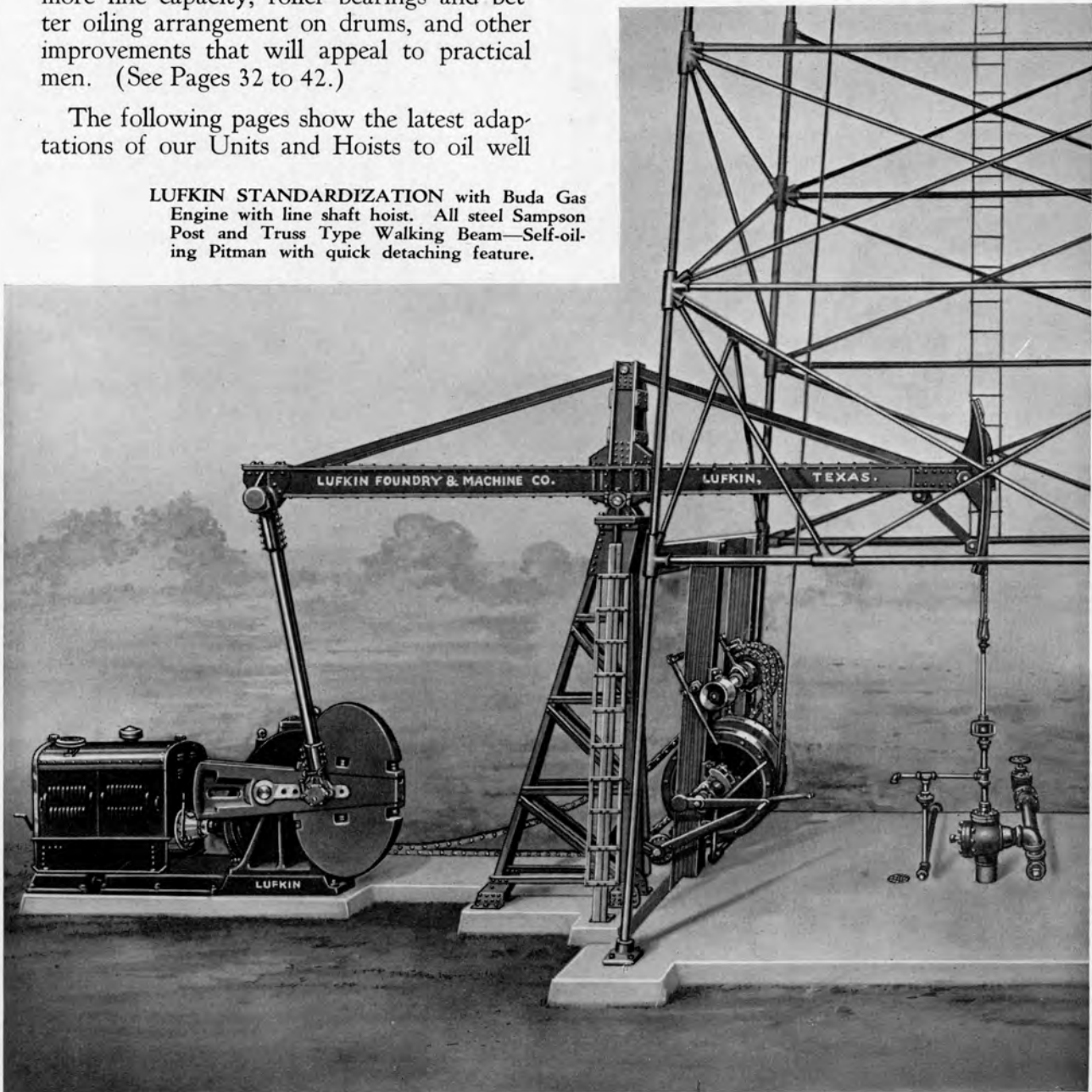
in one instance, and we are now developing some special features that we feel sure will accomplish this satisfactorily.

Our Hoists have been greatly improved; more line capacity, roller bearings and better oiling arrangement on drums, and other improvements that will appeal to practical men. (See Pages 32 to 42.)

The following pages show the latest adaptations of our Units and Hoists to oil well

service in the various fields with a more detailed description of the mechanical design and construction, general specifications, sizes, etc., that we trust will prove interesting.

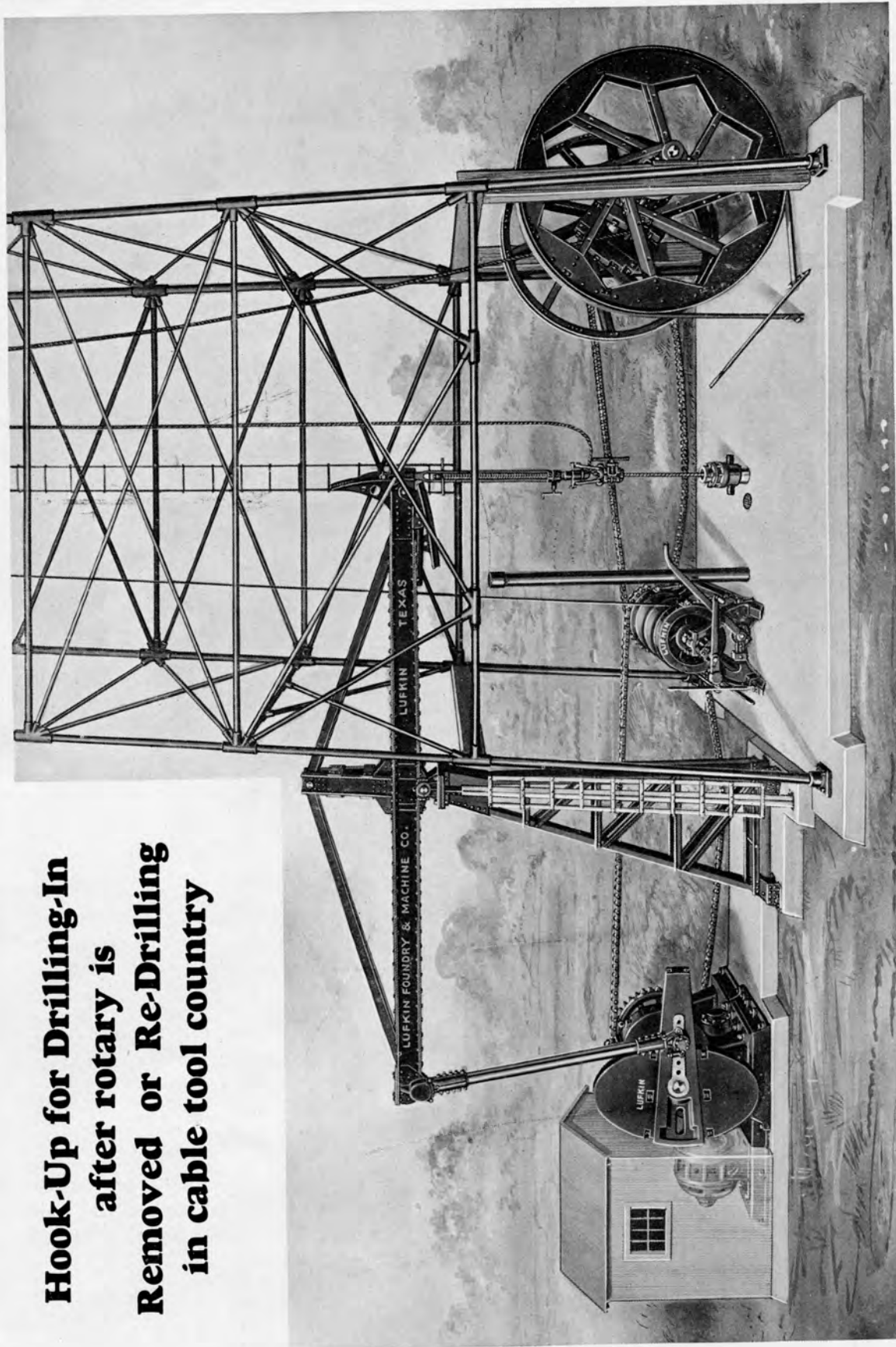
**LUFKIN STANDARDIZATION** with Buda Gas Engine with line shaft hoist. All steel Sampson Post and Truss Type Walking Beam—Self-oiling Pitman with quick detaching feature.



FOR DESCRIPTION BUDA POWER SEE PAGES 52 AND 53.

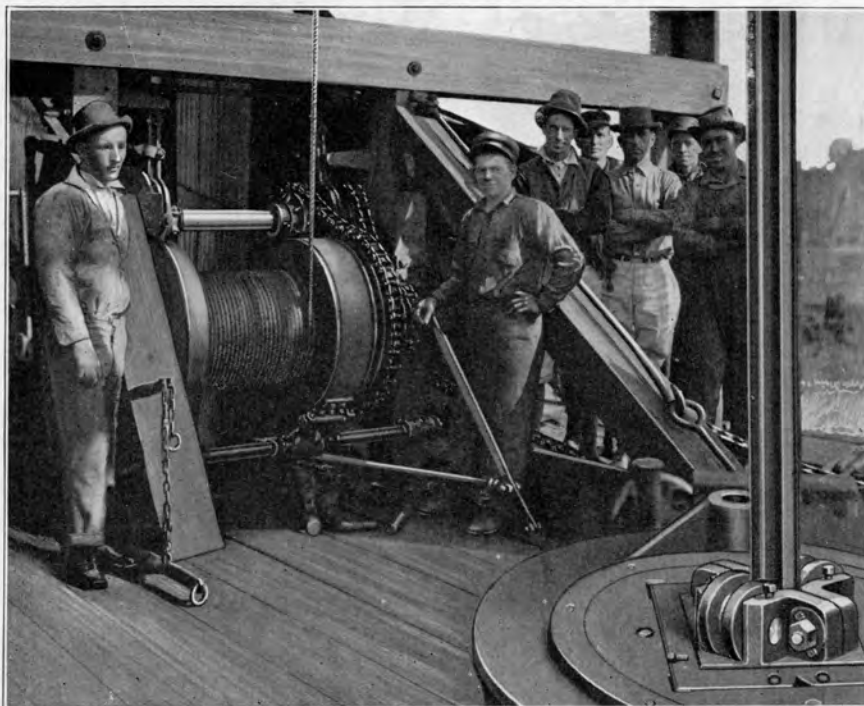


# Hook-Up for Drilling-In after rotary is Removed or Re-Drilling in cable tool country



LUFKIN STANDARDIZATION—Usual in cable tool country. The hoist shown is used as a bailer, and countershaft to drive bull wheels. One or two sets of bull wheels are kept on a lease to be set in for re-drilling or work-over service. Many wells are drilled-in with this rig after rotary is removed. For details of Hoist Sprockets see page 39.

## Something About Our Hoists



Redrilling With Rotary and Lufkin Hoist.

Where wells require pulling every day or two a line shaft hoist will soon pay for itself in the saving of time, but in order to keep down the investment on pumping wells our Two-Speed, Single-Drum Friction Hoist is used, especially where wells are seldom pulled for cleaning.

All our Hoists are now so standardized with drums and shafts the same length on all sizes of our units, that by having an extra line shaft on Lease, it can be bolted to post over the Single Drum Hoist when any special work is desired to be done on a well. Posts are dapped in and drilled for boxes. Chain

drives from Unit to Hoist are the same distance from the center of the well, either on Single Drum Hoists, or Line Shaft Hoists.

By referring to Pages 31 to 42 it will be seen that we build various styles of Hoists for both light and heavy service.

Where wells are drilled with rotary, our Unit and Hoists are set in and used as a standby in case of failure of rotary rig when drilling. If it is desired to drill in the well with cable tools, LUFKIN UNITS AND HOIST will be found very satisfactory for this service.

THERE IS NO "WHIP" IN A CENTRIFUGAL COUNTER-BALANCE

## Mechanical Construction

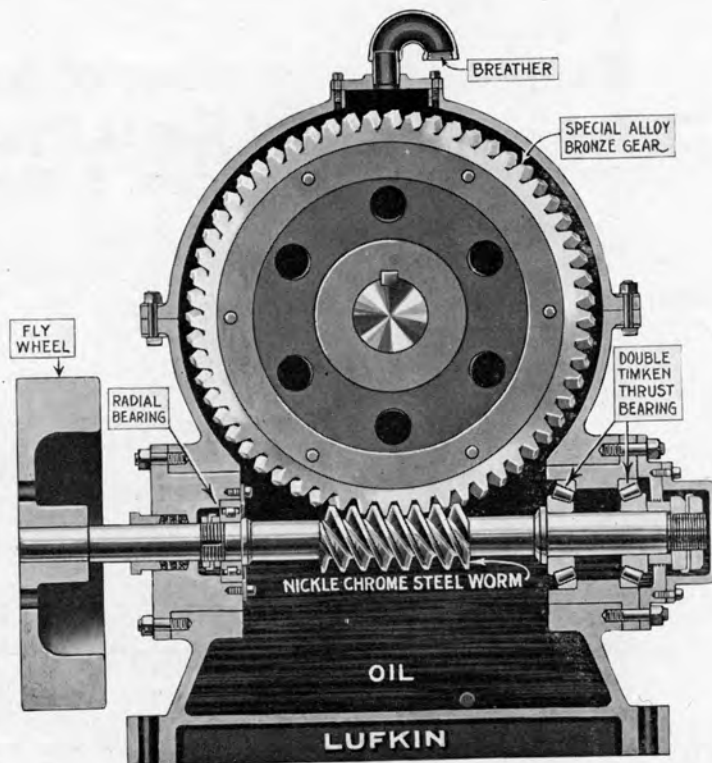
Lufkin Units are substantially built in a modern plant with up-to-date tools, of the best materials, and good workmanship.

All parts subject to wear are easily renewable.

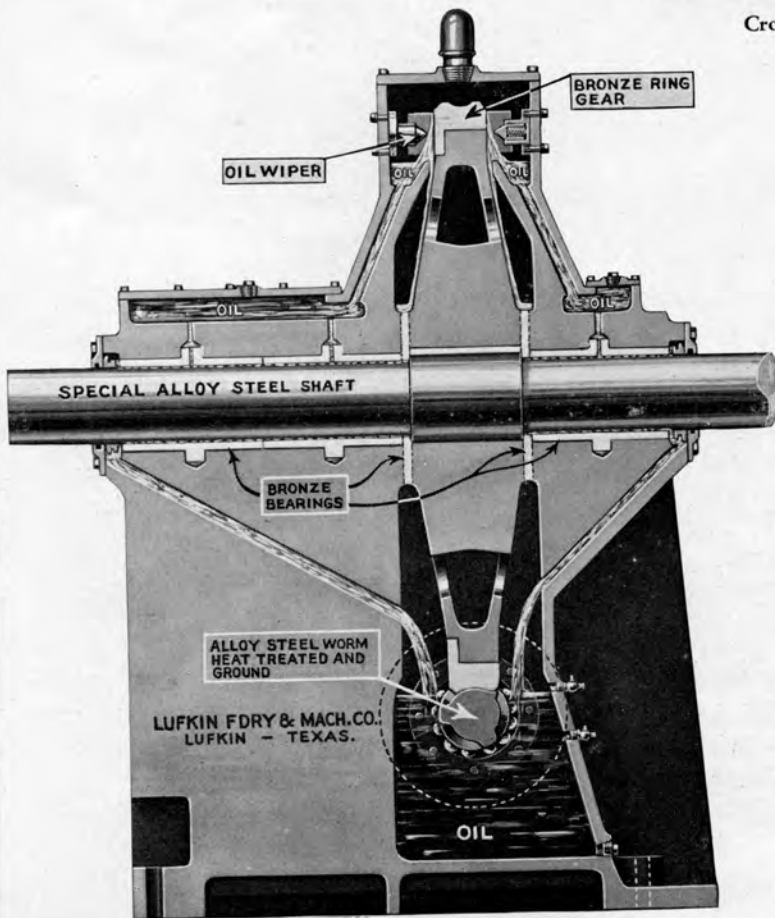
Absolutely automatic lubrication.

Crank Gear Shaft has interchangeable bronze bearings.

Worm Shaft has Timken Thrust and Roller Radial bearings.



Cross Section Lufkin Gear.



Across Shaft Section.

Thrust Bearing is adjustable without changing the oil.

A. P. I. sizes as far as possible.

Tobin Bronze Gear Ring with alloy steel worm shaft, insures long life and real service.

Units are "run in" and thoroughly tested and adjusted before shipping.

Made strictly to gauges and templates.

Read the "why" of the worm gear. Pages 54 and 55.

## Varying the Number of Strokes of the Well with Geared Units Operating Motors at Their Most Efficient Speed

On electric driven standard rigs it is common practice in varying the number of strokes to place motor on resistance, regardless of loss of power in the grids.

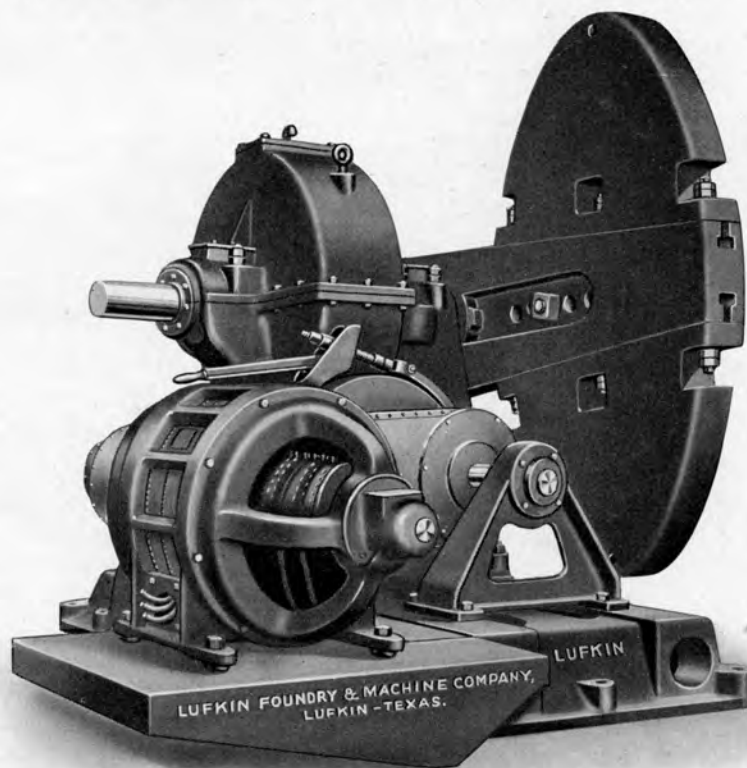
On direct driven gear units most operators have found that moving crank pin out or in one hole equals four revolutions of crank, and in most cases this answers the same purpose and gives same results as changing the number of strokes. This allows motor to operate at its rated speed of highest efficiency. This method is found satisfactory with geared units in at least 95% of the wells in the different fields.

However, a very small percentage of the

wells may require unusual treatment, either very fast or slow or the use of high-speed Squirrel Cage Induction Motors for which reason we have brought out this Auxiliary drive which is giving the best of satisfaction, either with silent chain or the Texrope drive, as may be desired.

For a very nominal sum the price of one sprocket or sheave on motor will change the speed and allow motor to run constant speed, an idea that is growing and demanded by some engineers.

This device can be applied as shown, by simply bolting a bracket to a planed pad provided on bed plate. We can also apply the device to existing units if desired.



Speed Changer or Auxiliary Drive for Constant Speed Motors

## The Trout Counter-Balanced Crank

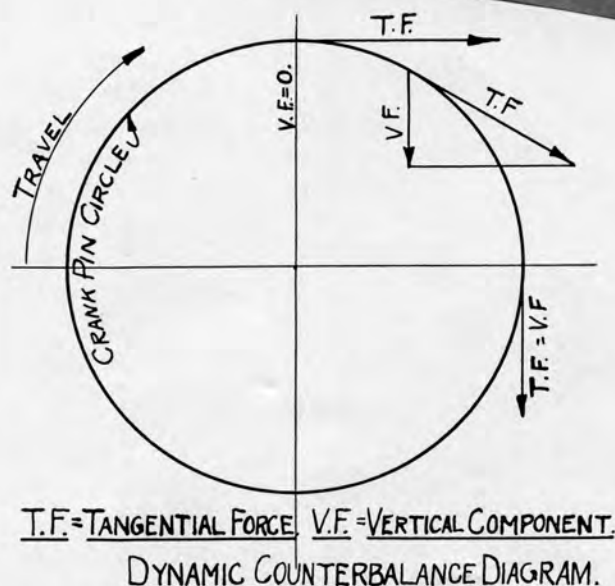
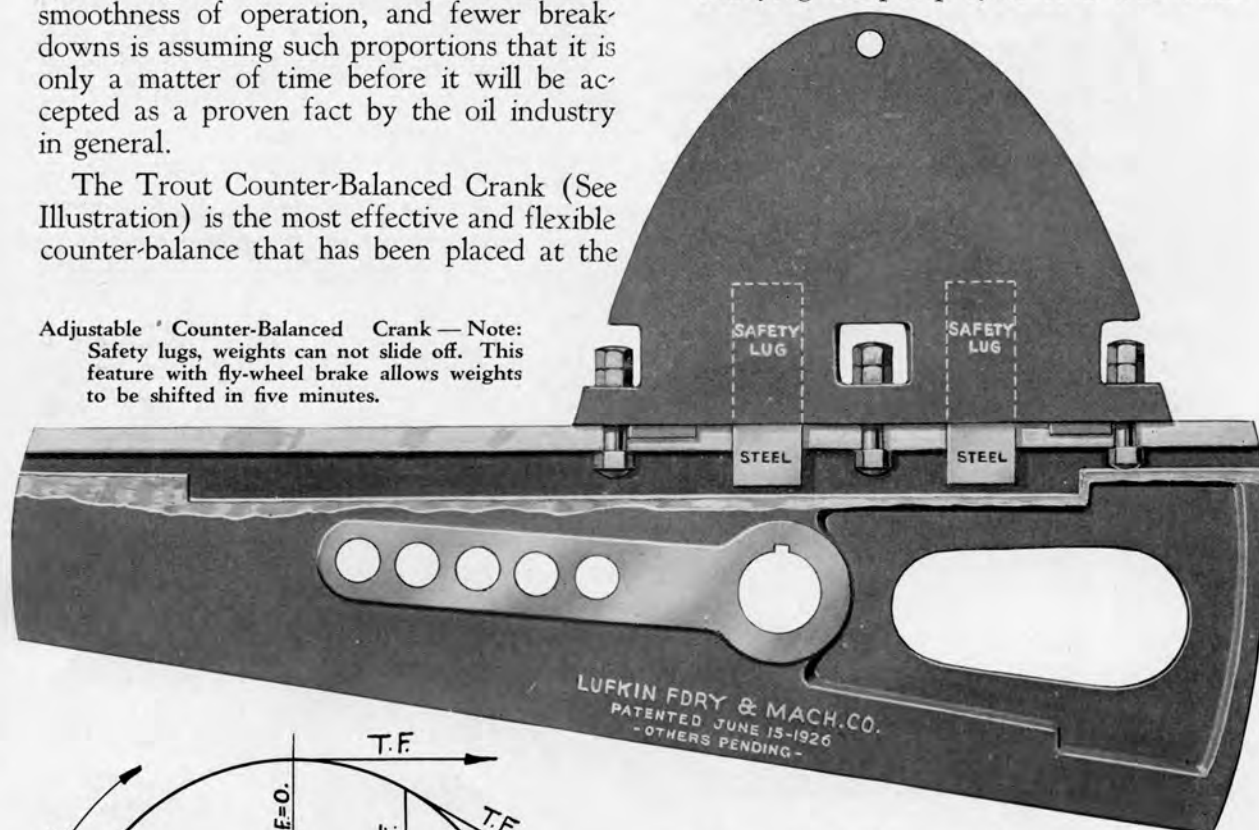
The counter-balanced crank for oil well pumping is gradually being accepted by producers and recognized by oil field equipment manufacturers as the ultimate method of balancing wells. The mass of testimony in favor of the use of counter-balances showing the savings that are effected in power, smoothness of operation, and fewer break-downs is assuming such proportions that it is only a matter of time before it will be accepted as a proven fact by the oil industry in general.

The Trout Counter-Balanced Crank (See Illustration) is the most effective and flexible counter-balance that has been placed at the

disposal of the oil industry. It is very compact and made up of a few simple parts which are fool-proof. The weights which counter-balance the well can be moved along the ways of the crank, so that any desired effective counter-balance can be easily attained.

Studying the pump cycle of a well with-

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



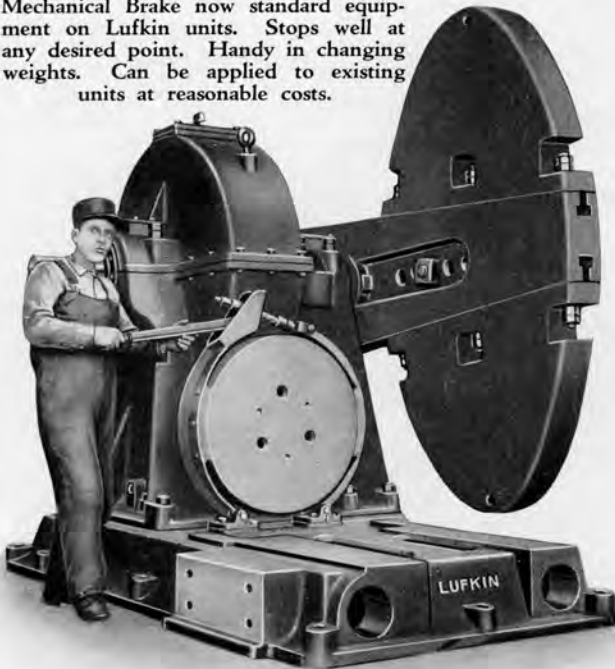
out counter-weights, we find that the work is all done during half the cycle, or in other words, on the upstroke. At the start and finish of the stroke the power required is theoretically zero as the rods are stationary. In the center of the upstroke of the rods the feet per minute or velocity at which the rods travel is a maximum and consequently the power required is maximum during this portion of the stroke. On the down stroke of the rods their own weight will carry them down and in addition to this we are wasting some of the energy or mechanical advantage

*NOTE TO PURCHASERS: We are the originators of the Crank Counter-Balance on which we have basic patents with others pending. These are openly being infringed and we hereby warn both users and manufacturers that our rights will be maintained to the full extent of the law.*

that is stored up by the position of the rods.

Studying the cycle of a counter-balanced crank, we find that it is very similar to that of an unbalanced well. The dynamic counter-balancing effect of the counter-weights is

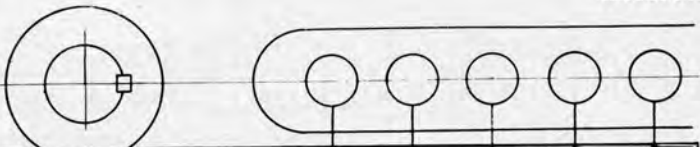
Mechanical Brake now standard equipment on Lufkin units. Stops well at any desired point. Handy in changing weights. Can be applied to existing units at reasonable costs.



the vertical component of the tangential force at the circumference of the crank pin cycle (see page 12). Therefore the dynamic counter-balancing effect of the weights at top dead center (start of the upward stroke) is zero. The dynamic counter-balancing effect of the counter-weight at right angles to the vertical (center of the upward stroke) is a maximum. Therefore, the weights are most effective in that part of the stroke where power consumption is the greatest. The other half of the cycle is similar in the reverse direction and the downward movement of the rods tend to pick the weights up as they move for top dead centers.

From the above it is evident that the waste energy of an unbalanced well is utilized. In addition to this the peak load of an unbalanced pump load is cut down by the energy stored in the counter-weights. This permits the use of smaller electrical equipment and lets the motor operate at an increased efficiency.

In counter-balancing a well the upstroke of the rods should require more power than the downstroke, so that no power will be wasted lifting the weights. In other words, it is preferable for the well to be slightly underbalanced rather than overbalanced.

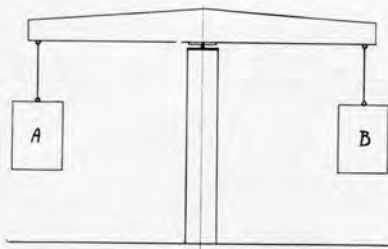


SIZE OF UNIT	PIN HOLE					
		1	2	3	4	5
6 1/2" HEAVY DUTY	STROKE	32"	42"	52"	62"	72"
	STATIC WEIGHT	14,000	10,600	8,600	7,200	6,200
5 1/2" INTERMEDIATE	STROKE	32"	42"	52"	62"	72" SPECIAL
	STATIC WEIGHT	10,300	7,800	6,300	5,200	4,550
4 1/2" STANDARD	STROKE	22 1/2"	30"	37 1/2"	45"	
	STATIC WEIGHT	8,800	6,600	5,280	4,400	
3 1/2" BABY	STROKE	12"	18"	24"	30"	
	STATIC WEIGHT	6,600	4,400	3,300	2,650	

Tabulated Static Weights on Cranks for Various Strokes. Note: Tabulated weights, as listed, are equivalent to a much greater weight attached to end of beam, due to dynamic force.

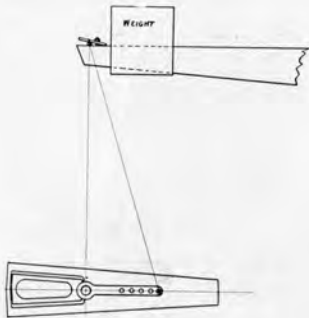
Not only is it necessary to counter-balance the well to about 95% of its load, but a great saving is made with a fly wheel on motor shaft to equalize the variable load at all points of the stroke. Ordinarily a well, direct driven by electric motor, may be so balanced that the ammeter reading will not vary over four amperes between up and down stroke.

These results cannot be obtained by any reciprocating balance, or adjustable weights on beam, that make it impossible to keep samson post and beam in alignment. The centrifugal counter-balance and fly-wheel will be found by far the most practical, economical and efficient.



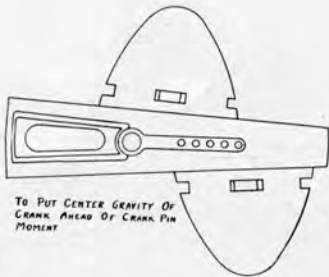
# Some Condensed Facts'

Most every producer knows the value of the Band Wheel counter balance as a power saver. Our crank balance is exactly the same in principle only on the crank where shaft is relieved of all torsional strain and there is no trouble with band wheels loosening up from side strain. The crank is the correct place for an adjustable counter-balance, and Oh! how handy.



Much propaganda is offered (mostly by those who have no crank counter balance to sell) that the beam balance like a beam scale, is the correct principle. Perhaps true theoretically (as far as scale goes) but in an oil well the power required to lift the rods VARIES the whole length of the upward stroke—and gas and water may vary every day. The weight "A" is constant dead weight that takes power to overcome inertia and places an excessive strain on rods at both ends of stroke as any dynamometer on rods will show.

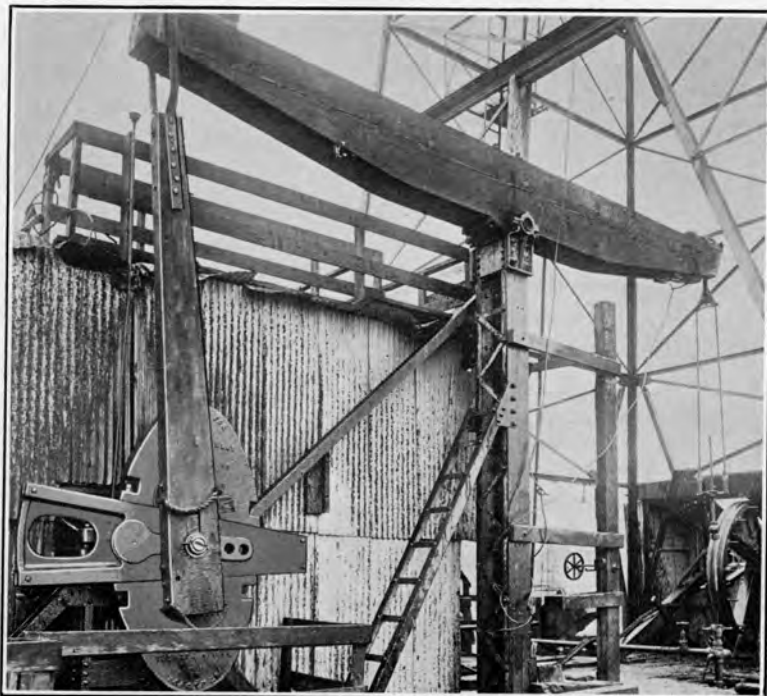
"Be from Missouri"; take off the crank weights and put a weight up on the beam and see for yourself. Note:—Don't get too heavy a well, you may not be able to get enough weight up there—the results? Well, try it.



Then for those who believe that in a centrifugal counter balance the weight should be slightly ahead of the crank pin. You can easily try it out on a Trout counter-balance as shown, setting the crank pin at half up stroke, set the top weight in, the lower one out, balancing the well with lower weight as much as possible.

You will find another idea has been exploded—and also that a counter balance to be adjustable must be on a radial line from shaft center. No adjustment around the periphery of a crank disc of a weight can in any way constitute an adjustable balance, and this can only be done by adding or taking off weights. Think it over; it's "kommon" sense spelled with a K.

TO PUT CENTER GRAVITY OF CRANK AHEAD OF CRANK PIN MOMENT



## TROUT Counter-Balanced Crank on Standard Rigs

Shaft is relieved of all strain. No tearing up of Band Wheels from side strain, and Oh! how handy to center weights.

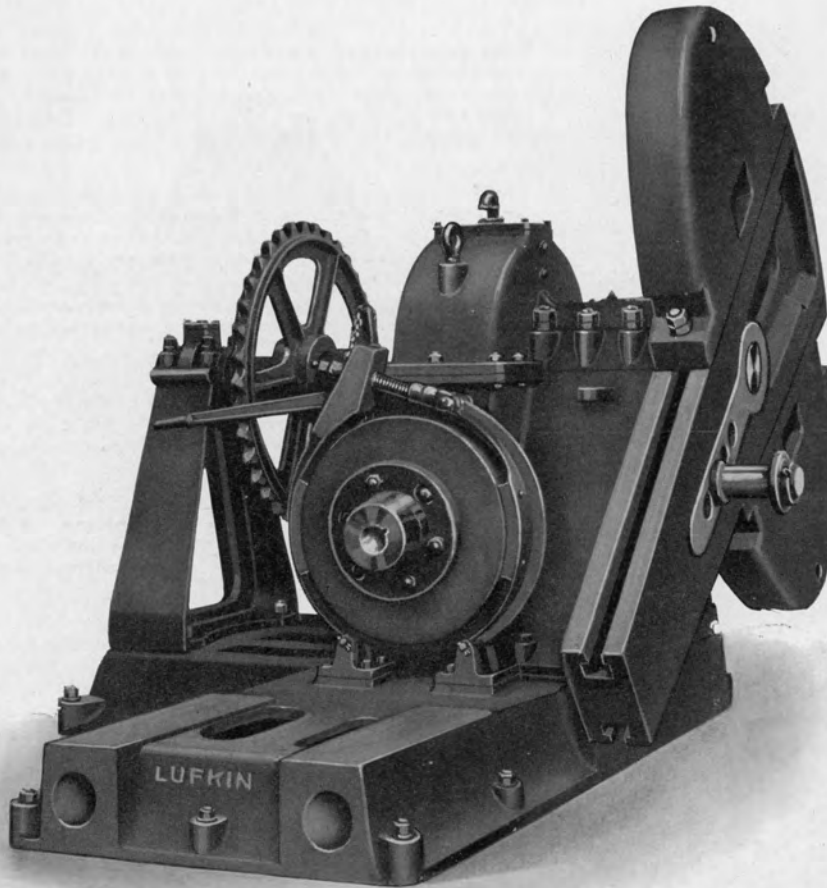
A number of our customers have installed our counter-balance crank on Standard rigs. Some where band wheel shafts break and need replacing; others preferably on new equipment in place of band wheel counter balances that are so hard to change and hold in alignment as well as loosen up the wheels.

We are prepared to furnish band wheel shafts of any make or A. P. I. Standard with crank and counter-balance on short notice.

We have some flattering testimonials on the service these cranks have given and will be pleased to send full information to any one interested.

# Standard Lufkin Pumping Unit

22½—30"—37½"—45" stroke.



*Actual Photographic Proportion*

## Specifications

*Shaft:* 4½" diameter in crank and bearings; 5½" diameter in gear.

*Bearings:* Crank side, 16" long, Sprocket side, 8" long, with Hyatt outboard bearing.

*Crank Pin:* 3½" diameter, 6" pitman bearing length.  
*Gear:* 28-3/16" pitch diameter, 3½" face, 1½" circular pitch.

*Ratios:* 19-2/3 to 1 triple thread; 29½ to 1 double thread.

*Worm:* 3-15/16" Pitch diameter.

*Flywheel:* 24" diameter, 6" face, 2-7/16" Bore.

Center of worm shaft to motor base 16".

Center of crank shaft to top of foundation 41-9/16".

Center of well to center of hoist sprocket, 6' 2".

*Note:* We can furnish a clutch hub special sprocket to drive calf wheel that will allow 6' 5½" from center of well to center of sprocket.

Power recommended: 15/35 horsepower electric motor; No. 55 or No. 75 Buda gas engine.

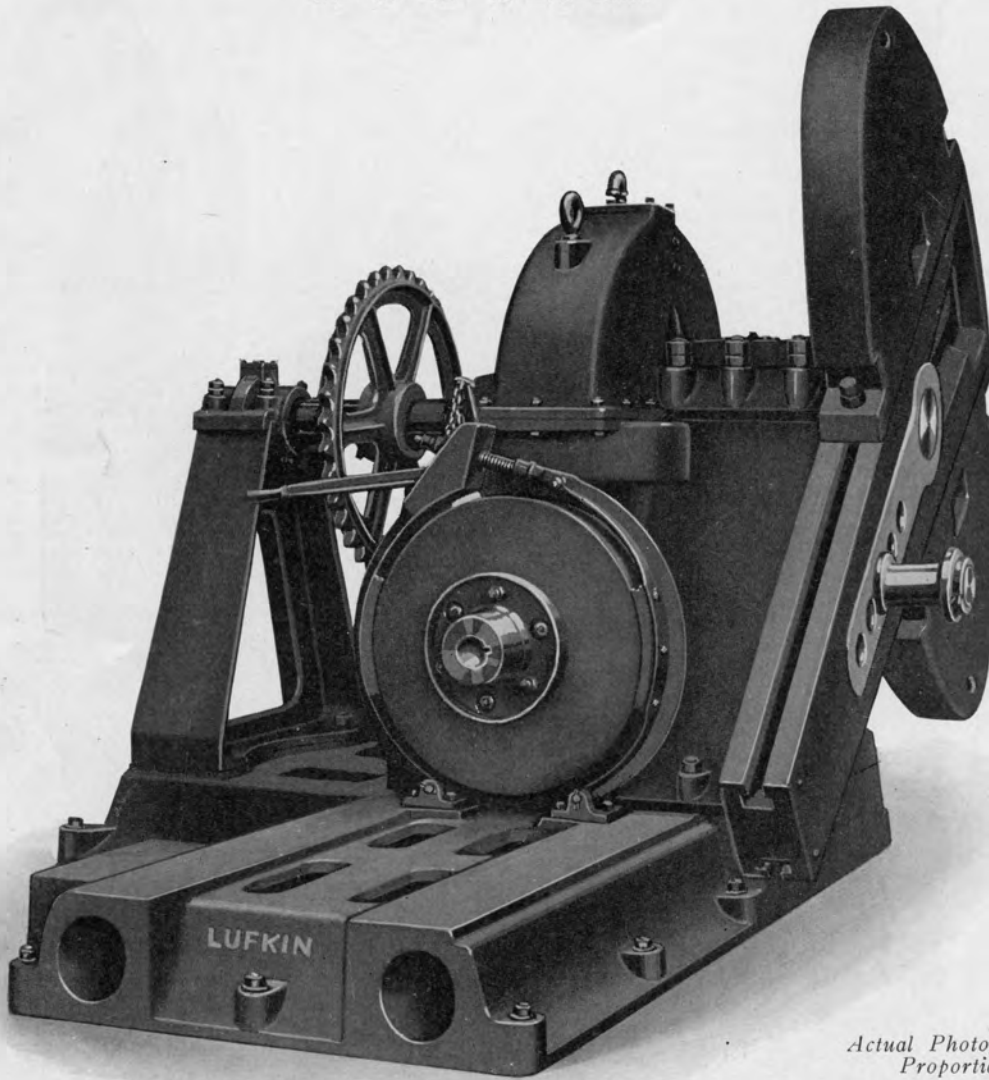
Although this unit is in use on many wells over 4000' deep, we recommend it to be used on wells not over 3500' deep, for long wear and service.

SELECTING PROPER SIZE UNIT, SEE PAGE 23.



## Intermediate Lufkin Pumping Unit

32"—42"—52"—62"—72" stroke



*Actual Photographic Proportion*

### Specifications

*Shaft:* 5½" diameter in bearings and crank; 6½" diameter in gear.  
*Bearings:* Crank side 20" long, sprocket side 10" long with Hyatt outboard bearing.  
*Crank Pin:* 4" diameter, 6" pitman bearing length.  
*Gear:* 40-7/8" pitch diameter, 3¾" face, 1⅝" circular pitch.  
*Ratios:* 26-1/3 to 1—triple thread, 19¾ to 1, quadruple thread.  
*Worm:* 4-7/8" pitch diameter  
*Flywheel:* 30" diameter, 6" face, 3-7/16" Bore.  
 Center of worm shaft to motor base 17".

Center of crank shaft to top of foundation 4' 2-3/8".  
 Center of well to center of hoist sprocket 6' 2".

*Note:* By using special sprocket with clutch hub, a distance of 6' 5⅝" may be had on this unit to drive calf wheel.

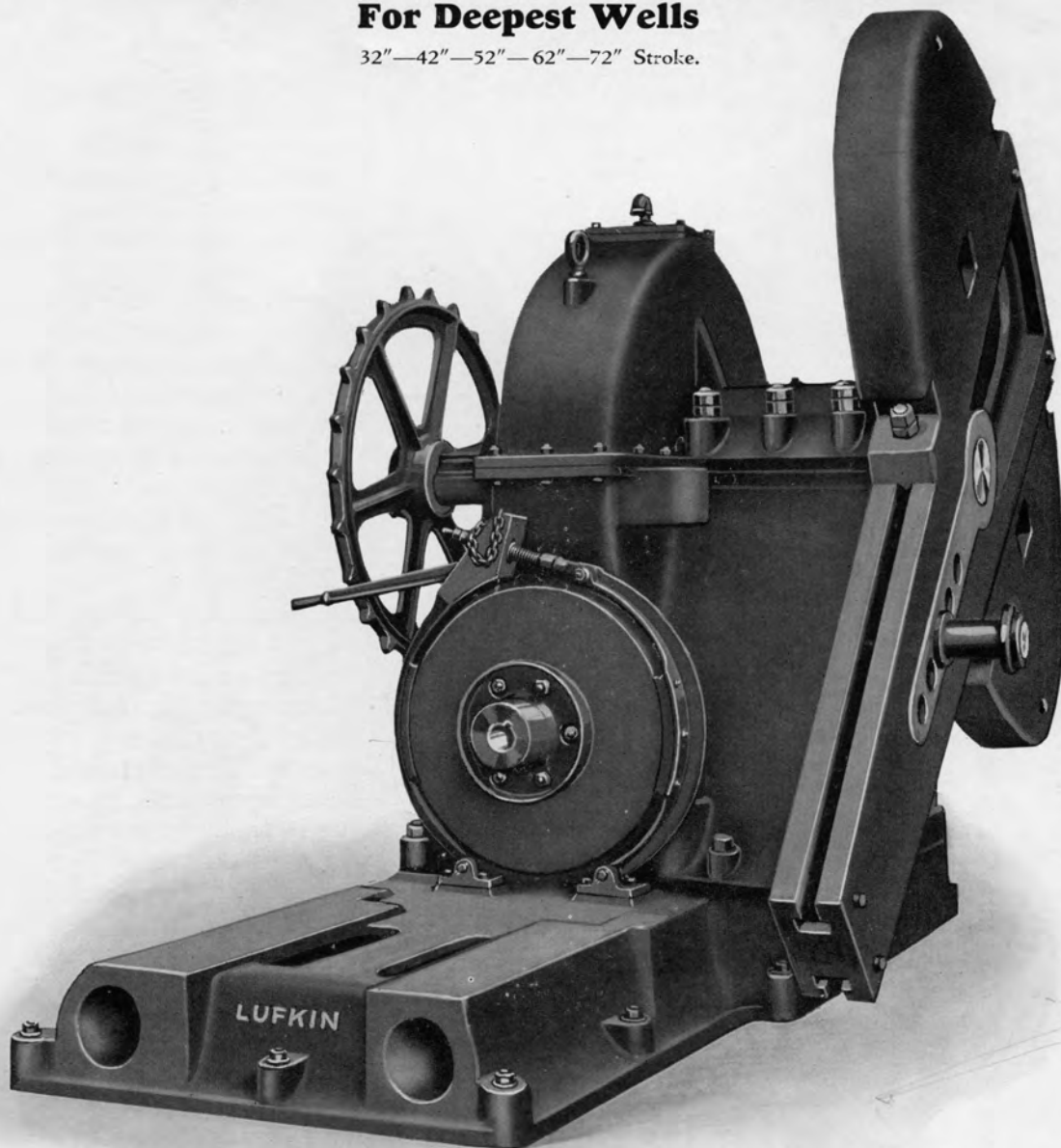
Power recommended: (To suit conditions) 15/35, 20/50 or 25/65 horsepower electric motors, or No. 75 or No. 85 Buda gas engines.

This unit was designed as a medium between our standard and heavy duty, to be used in place of the standard unit, especially where wells may be drilled deeper or considerable water may be encountered.

SELECTING PROPER SIZE UNIT, SEE PAGE 23.

## Heavy Duty Lufkin Pumping Unit For Deepest Wells

32"—42"—52"—62"—72" Stroke.



*Actual Photographic  
Proportion*

### Specifications •

*Shaft:* 6½" diameter in bearings and crank; 7½" diameter in gear.

*Bearing:* Crank side, 24" long, Sprocket side, 12" long.

*Crank Pin:* 4" diameter, 6" pitman bearing length.

*Gear:* 49½" pitch diameter, 4½" face, 1¾" circular pitch.

*Ratios:* 29-2/3 to 1 triple thread, 22½ to 1, quadruple thread.

*Worm:* 5-7/16" pitch diameter.

*Flywheel:* 30" diameter, 6" face, 3-7/16" Bore.

Center of worm shaft to motor base, 17".

Center of crank shaft to top of foundation, 4' 7¾".

Center of well to center of hoist sprocket, 6' 2".

Power recommended: 20/50 or 25/65 horsepower electric motor; No. 75 or No. 85 Buda gas engine.

*Note:* See page 19 for heavy duty special unit with clutch sprocket for driving calf wheel.

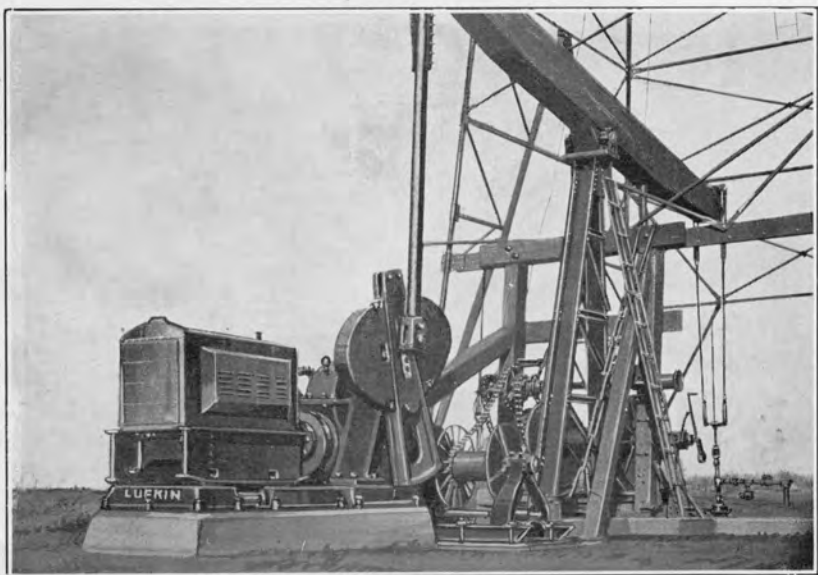
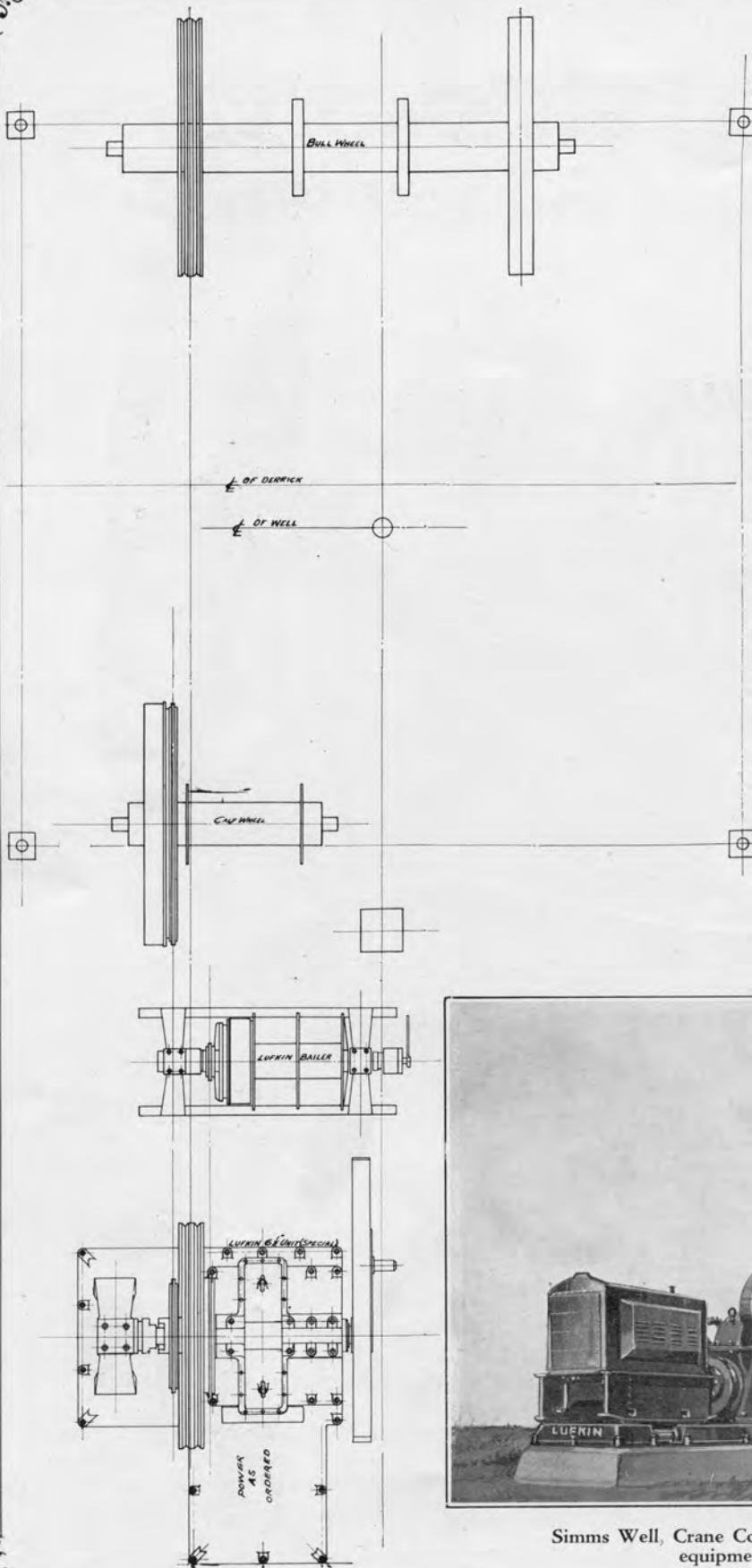
SELECTING PROPER SIZE UNIT, SEE PAGE 23.

## LUFKIN UNITS with Calf and Bull Wheels

While we do not recommend the use of the Standard Rig, excepting the occasional use of Bull Wheels, yet to take care of a demand of some concerns who have considerable "Standard Rig" equipment on hand and for those who wish to drill with cable tools from the top of the ground, the arrangement shown on this page is used.

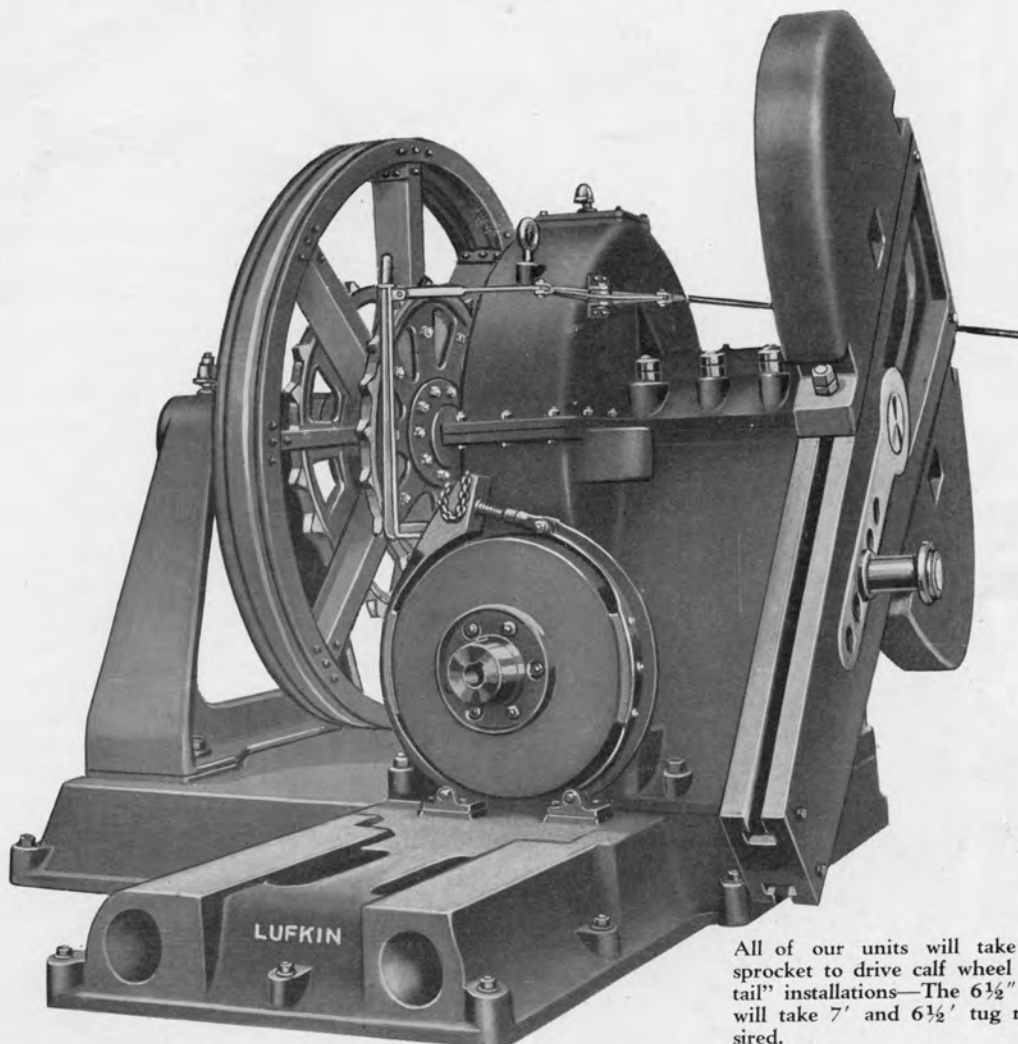
In this case our unit simply takes the place of the band-wheel shaft of the usual Standard Rig. The power may be the electric motor or the Multi-Cylinder Gas Engine.

Especially is this arrangement desirable in some fields where wells are drilled with rotary and a "bobtail" Standard Rig is hooked up for emergency. The calf wheel may be employed until the well is finished and our regular rod and tubing hoist may be installed and driven from same sprocket.



Simms Well, Crane County, drilled entirely with Lufkin equipment and cable tools.

## Heavy Duty 6 $\frac{1}{2}$ -inch Special Unit, to Use With Calf and Bull Wheels



All of our units will take a clutch sprocket to drive calf wheel for "Bobtail" installations—The 6 $\frac{1}{2}$ " and 5 $\frac{1}{2}$ " will take 7' and 6 $\frac{1}{2}$ ' tug rims if desired.

The above arrangement shows our unit used for drilling and hook up with Calf and Bull Wheels.

They are often furnished with Jaw Clutch Sprocket for calf-wheel hook up in California, where a "bobtail" rig is desired to use in emergency during rotary drilling.

When well is finished calf wheel may be taken out and a rod and tubing hoist installed, driven from same sprocket.

This arrangement calls for a special base and outboard bearing on our 6 $\frac{1}{2}$ " unit, which we will designate as "Heavy Duty 6 $\frac{1}{2}$ " Special Unit." A 7' tug rim can be applied to this unit.

The same arrangement can be had with our Intermediate Unit with a 6 $\frac{1}{2}$ ' tug rim, also a calf wheel sprocket can be applied to our standard unit, but no tug rim.

# Lufkin Baby Unit

For 5 to 15 H. P., 1200 Revolution Electric Motors  
(Induction Type)  
or either  
Novo or Buda Gas Engines



Especially designed for light wells, 2,000 feet and under, to fill a demand for individual service on wells where powers are not practical, especially in rough country.

Built along the same lines and design as

our larger units. Walking beam has a swivel head to be turned at right angles when cleaning well.

Special attention given to lubrication on walking beam and pitman—all bearings and wearing parts easily renewable.

## Description and Specifications of Baby Unit

Our BABY UNIT has been designed to meet an urgent demand for a sturdy, reliable pumping unit suitable for light wells where the initial cost or investment will be somewhat in keeping with the cost of a power with the advantage of individual service and thereby increase production.

While powers have their advantage under certain conditions, yet where electricity is available at reasonable cost there is a tremendous saving in power cost with individual units, less upkeep, less repairs, less attention, which is especially true in hilly, rough coun-

try like West Texas, where these units will be found to give complete satisfaction.

The BABY UNIT is built along the same lines, same design and construction as our larger units, all of the best material and workmanship, with the addition of samson post and walking beam, which swivels to clear well when cleaning out.

This unit will be found to be powerful, with high efficiency, require little attention, with low upkeep cost and give the same lasting service that characterizes LUFKIN PUMP-  
ING EQUIPMENT.



BABY UNIT WITH BEAM TURNED TO CLEAN WELL

### Specifications

The stroke of this unit is from 12" to 30", gear ratio 20 to 1—gear is 23½" diameter, 3" face; main shaft, 3½" diameter with 4½" in gear—worm shaft 2·5/16", sprocket ratios, 2, 2½ or 3 to 1, may be had.

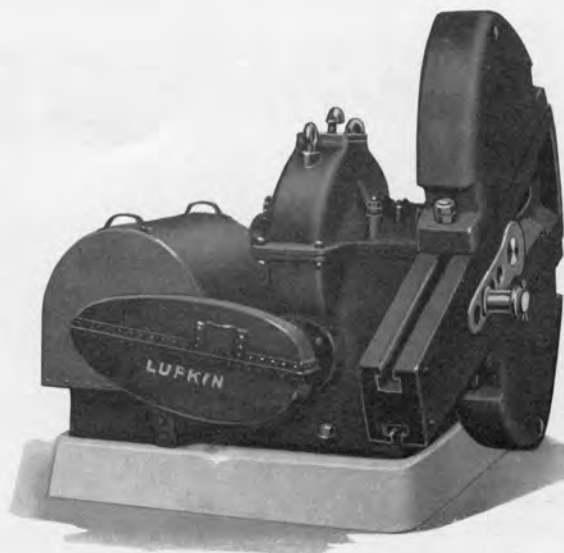
Any motor of any make from 5 to 15 H. P. of the plain induction type, 1200 speed can be used to suit conditions. Motor is completely housed.

Either Novo or Buda type gas engine, 12 to 25 H. P., can be used.

Both fly-wheel and crank counter-balance are provided with effective static counter-balance, 6,600 to 1,650 (See table, Page 13).

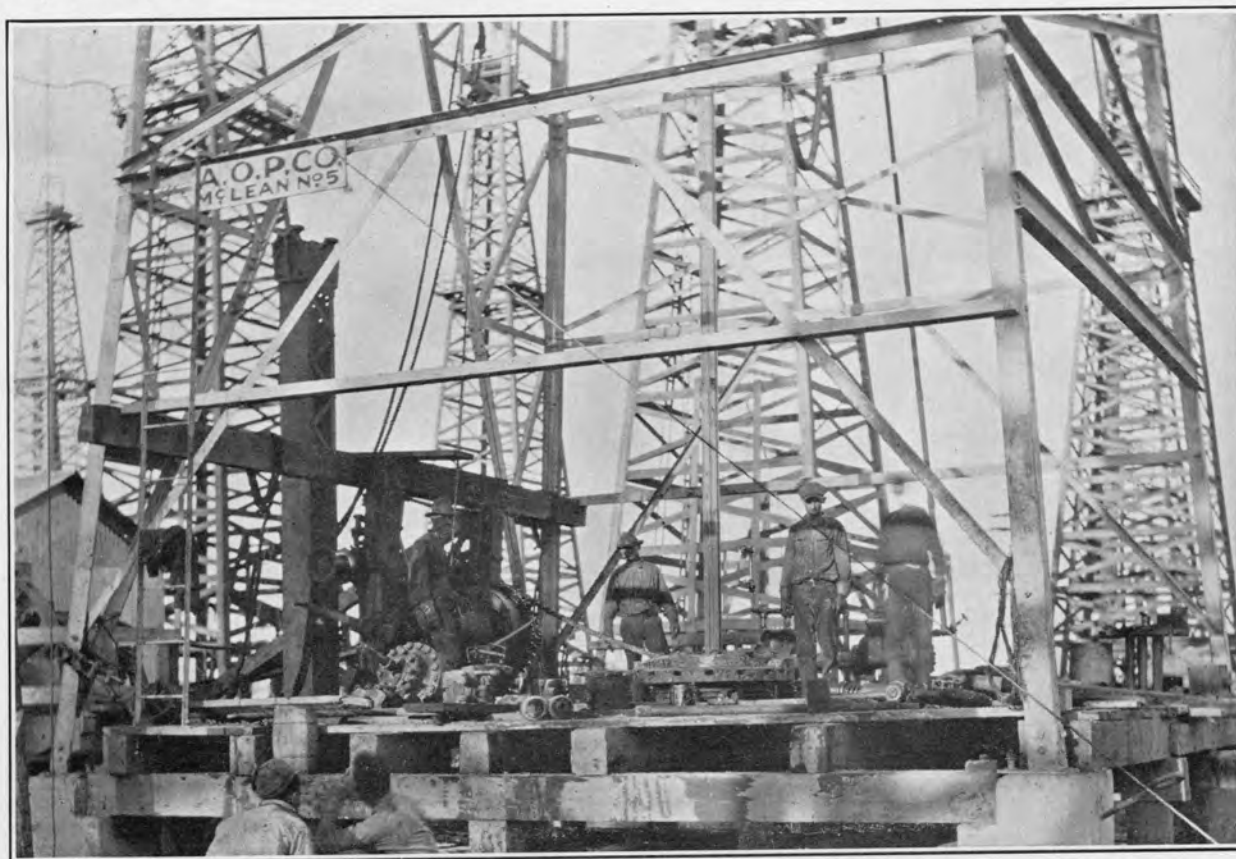
Walking beam centers, 4-ft.—all centers in line with provision for wire rope connection to polish rod. Samson Post, 7 feet high with swivel center.

At very low cost of one sprocket any speed may be had as desired.



The following crank speeds with 1200 speed motors may be had—with 20 to 1 gear:

Sprocket Ratio	Crank Rev.
2 to 1	28
2¼ to 1	25
2½ to 1	22½
3 to 1	19



REDRILLING WITH ROTARY DRIVEN BY LUFKIN HOIST.

## Selecting the Proper Size Unit

Well conditions vary to such an extent, depending on the depth, size tubing and rods, crooked holes, gravity of the oil, and fluid conditions, that no set rule can be stated that will govern every condition.

However, LUFKIN UNITS are now so extensively used in almost every important field that experience may be depended upon selecting proper size unit.

Generally speaking, our STANDARD UNIT may be depended upon to give lasting service on any well up to 3,500 feet in depth, 2½" tubing, for as a rule 90% of such wells seldom take over 15 H. P. to operate. Many of our Standard Units are pumping wells over 4,000 feet, some with 3" tubing, but we

do not recommend them, our INTERMEDIATE UNIT being designed for this service. For heavier wells, especially where a large volume of salt water is to be handled, crooked hole conditions, etc., our LARGE UNIT is found to give the best of satisfaction.

In selecting the Unit, consideration should be given to the probability of deepening the well for more prolific sands, and in this probability a larger unit should be selected than given in the table.

The following table, in a general way, is based on our experience and only where exceptional conditions exist may not be depended upon:

Size Tubing	Depth up to 2000 ft.	Depth up to 3500 ft.	Depth up to 4500 ft.	Depth over 4500 ft.
2"	Baby Unit	Standard	Intermediate	Intermediate
2½"	Standard	Standard	Intermediate	Heavy Duty
3"	Standard	Intermediate	Heavy Duty	Heavy Duty
4"	Standard	Intermediate		

## Selecting the Motor—Any Type Motor Can Be Used on Lufkin Units

Lufkin Units are designed primarily for the regular variable speed oil field type motor, which has two speeds, one for pumping (560 R.P.M. loaded) and one for pulling the well (1160 R.P.M. loaded).

These motors are built in suitable H. P. sizes and are ruggedly built, have high starting torque and will handle sudden overloads readily. From our experience in all fields it is by far the most satisfactory all around motor for oil field service.

A few producers, however, are using the "Y" and "Star Delta" type motors, which

have constant (860 R.P.M. loaded) speed, but double H. P. ratings and do especially well where wells are pulled with tractors, although we have a great many of them on wells that handle the hoist for cleaning with good results. They are also less expensive than the oil field type.

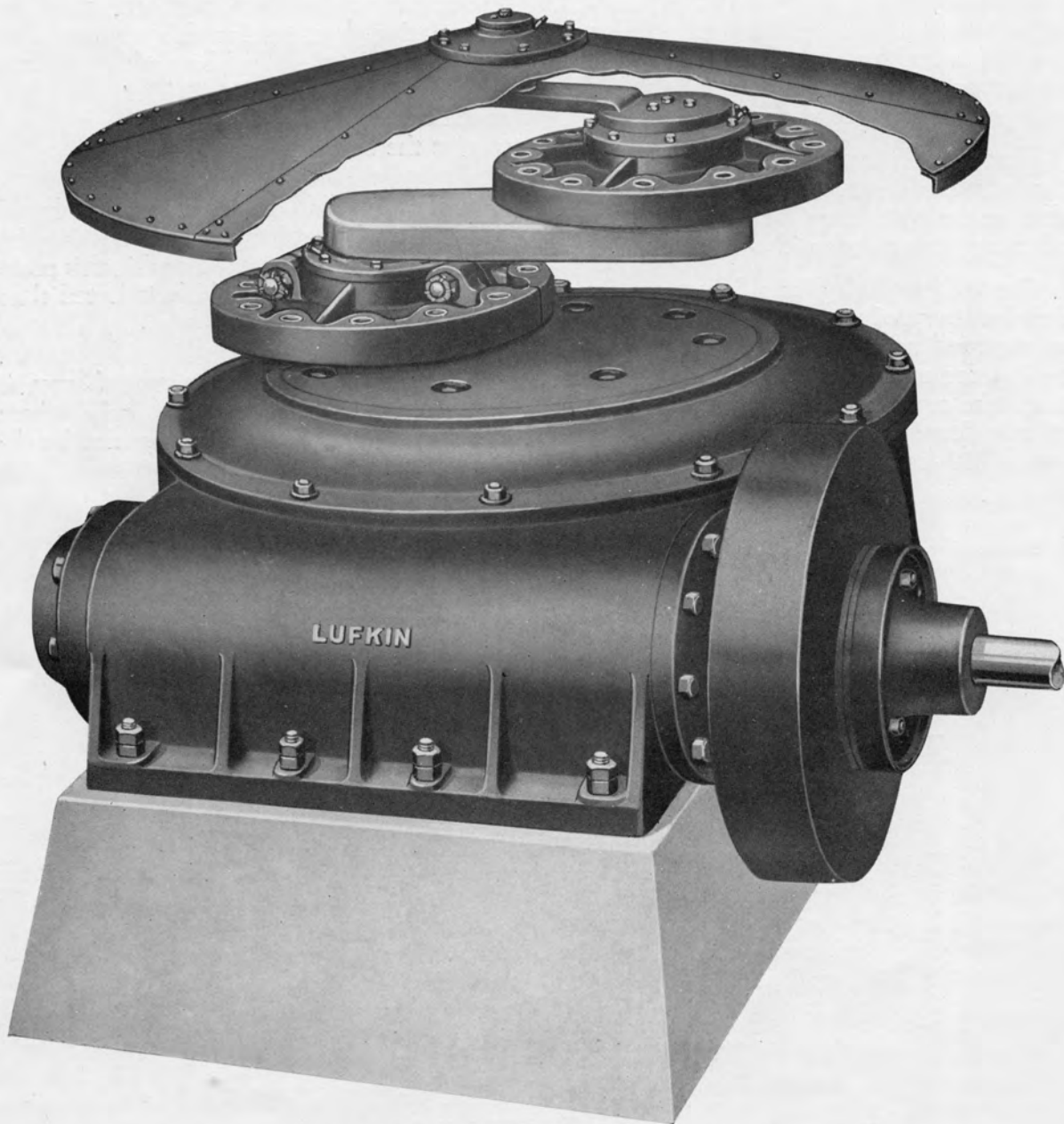
The 4½", 5½" and 6½" Units all have gear ratios to suit either type of motor.

Our 3½" "Baby Unit" is designed for plain Squirrel Cage Motors, we would advise 5, 7½ or 10 H. P. at 1200 R.P.M.

SELECTING PROPER SIZE "BUDA POWER" SEE PAGES 52 AND 53.



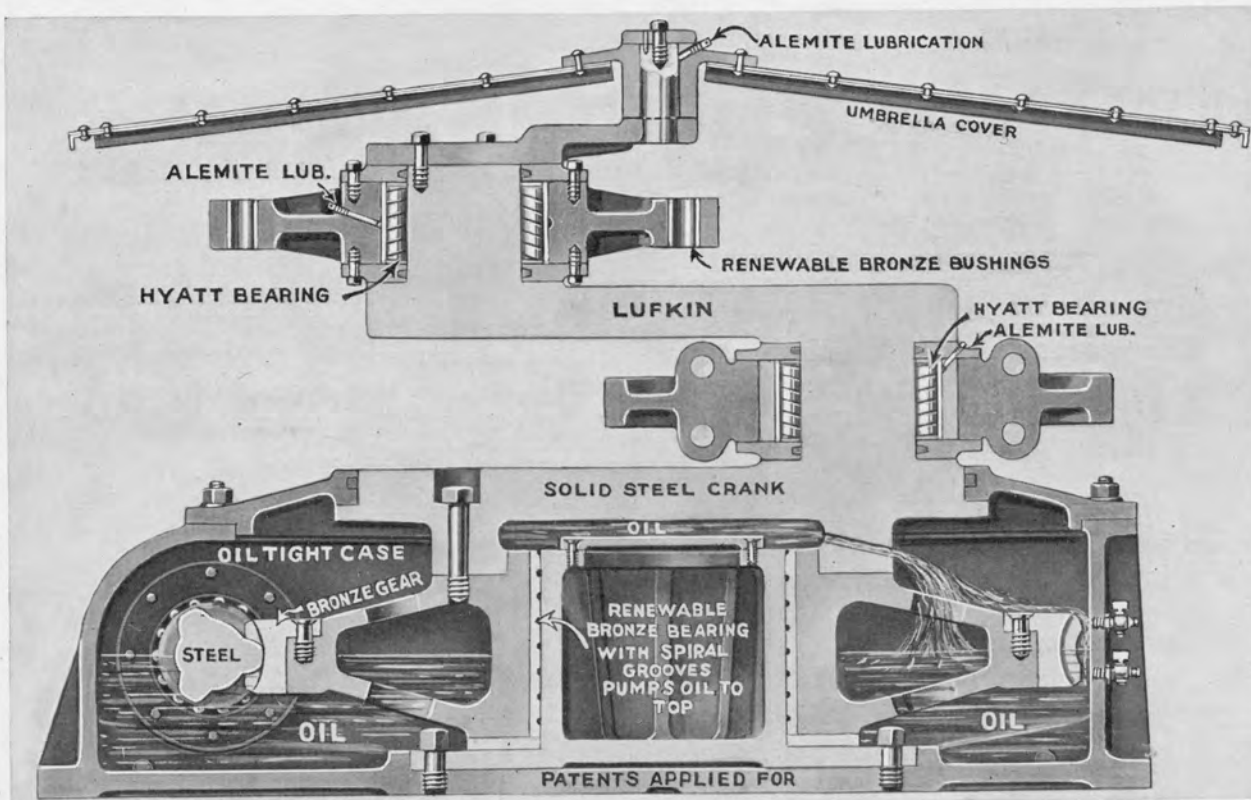
# Lufkin Pumping Power



For Electric Motor Drive or Any Type Gas Engine

No band wheels—no belts—no house necessary—automatic lubrication—requires very little attention—upkeep expense re-

duced to minimum—fire hazard eliminated—total cost less than usual old style band wheel installations.



This power will handle nearly double the load of even the best band wheel power. Line and worm shaft has Timken Bearings throughout, cranks have Hyatt Roller Bearings. Gear runs in oil bath, cranks and line shaft bearings have Alemite Lubrication so that only the minimum attention will be required.



Allows straight connections to wells in any direction except very small angle space occupied by engine.

# The Worm-Geared Power

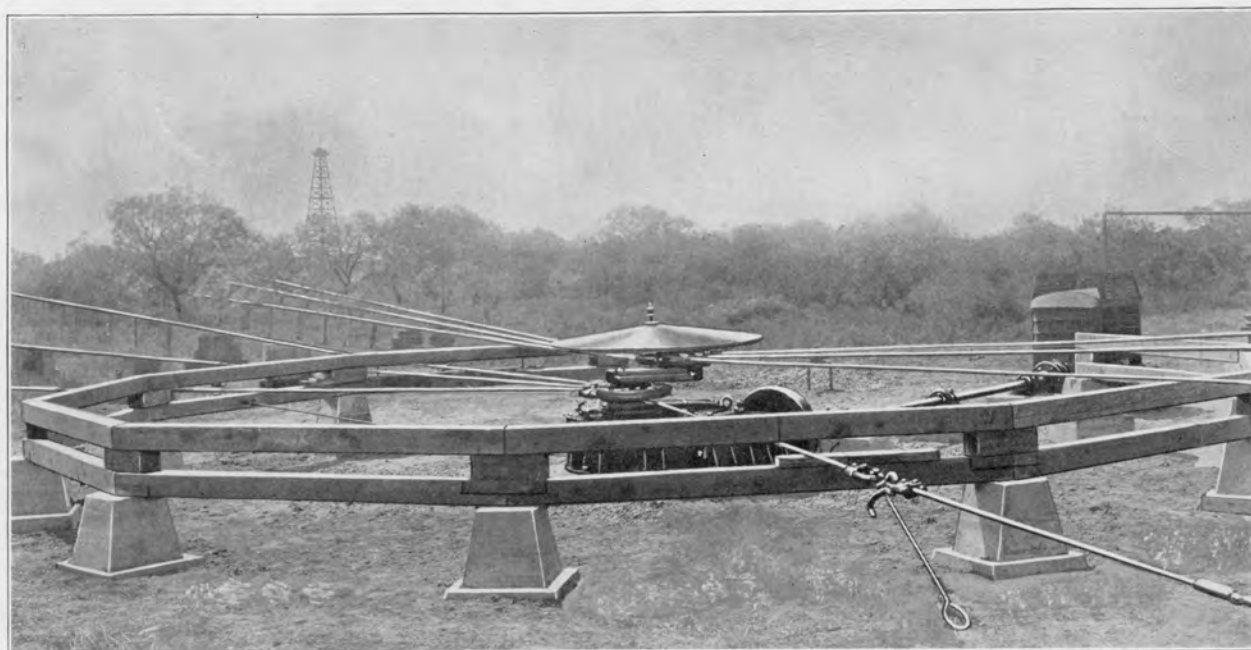
The successful experience with the worm-gear units suggested the idea of a worm-gear power taking the place of the large band wheels, long costly belts which run on quarter twist (a most abnormally inefficient drive) with high-speed tighteners, heavy friction load eccentrics, necessary large building, subsequent fire hazards are all done away with in the design of the LUFKIN WORM-GEARED POWER.

Being self-contained and set on a concrete foundation, there is no possibility for misalignment as in the present style of powers

with their numerous brace rods which sag and stretch, making it practically impossible to keep a band wheel power in line with wells or engine belts.

The power may be driven with the multi-cylinder Buda Gas Engine, the single cylinder gas engine or electric motor to suit conditions.

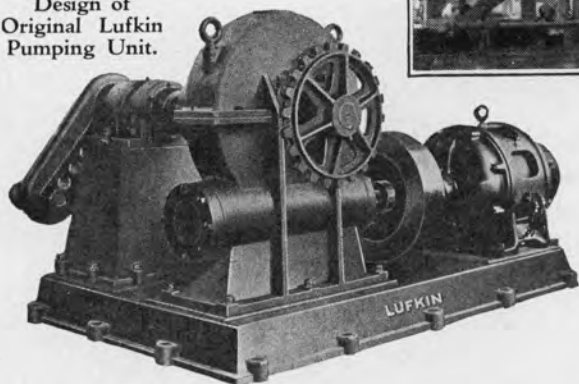
Cranks are both 24" stroke, with 30 to 1 ratio gear. Line shaft is 3-7/16, with flexible coupling connections and set in anti-friction, self-aligning bearings.



Power Used by Humble Oil & Refining Co. near Kingsville, Texas.

# Some Original Installations Four Years Ago

Design of  
Original Lufkin  
Pumping Unit.



Original installation, Goose Creek, Texas, on Humble Oil & Refining Company's well. Still going with very little signs of wear. This company now has over 100 in use.



Original installation, Shaffer Oil & Refining Company, Wewoka, Oklahoma. Seven units. Upkeep expense practically nil. Still going strong. This company has over 60 in use.

Original California installation, Baldwin Hills, on Pan American lease. This company now has a large number in operation.



# Lufkin



PIERCE JUNCTION WINDSTORM. A ROW OF STANDARD RIGS IN RUINS. NOTE LUFKIN UNITS IN EXTREME END OF PICTURE, UNINJURED.



SOUTHERN CRUDE, TYLE #7. LUFKIN UNIT RUNNING IN WATER THREE FEET DEEP



RIO BRAVO W #53, SPINDLE ON FIRE. NOTE COLUMN OF OIL ON F AND DERR ON NEXT W MELTIN DO



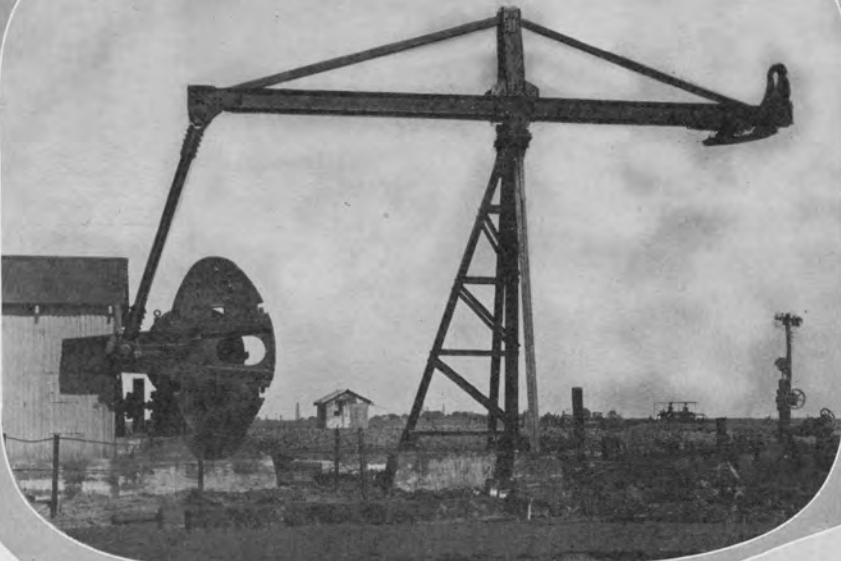
WINDSTORM AT PIERCE JUNCTION. REMAINS OF A STANDARD RIG.



RIO BRAVO WELL #5, SPINDLETOP, THIRTY FEET FROM BURNED WELL. LUFKIN UNIT INTACT. ONLY SALVAGE FROM ENTIRE EQUIPMENT.

# Supremacy

*Views showing Lufkin equipment intact and ready to run after having been through windstorm, fire and highwater.*



CYCLONES  
HAVE NO  
EFFECT ON  
LUFKIN  
UNITS



NO BRAVO WELL  
53, SPINDLETOP,  
IN FIRE.  
NOTE COLUMN  
OF OIL BY FIRE  
AND DERRICK  
IN NEXT WELL  
MELTING DOWN.

WINDSTORM AT  
PIERCE JUNCTION  
BLOWS DERRICK  
OFF FLOWING WELL  
LUFKIN EQUIP-  
MENT INTACT.  
Note New Style Walk-  
ing Beam & Primer  
with Samson Post.



MANY STANDARD RIGS  
WRECKED BY WIND-  
STORM AT PIERCE  
JUNCTION.



SPINDLETOP,  
TURNED WELL  
ONLY SAL-  
VE EQUIPMENT.

## Some Modern Installations



"SIMS OIL COMPANY STANDARDIZATION, OKMULGEE, OKLA. MORRIS LEASE COMPLETELY EQUIPPED  
In this installation every claim made for these units and hoist have been realized.

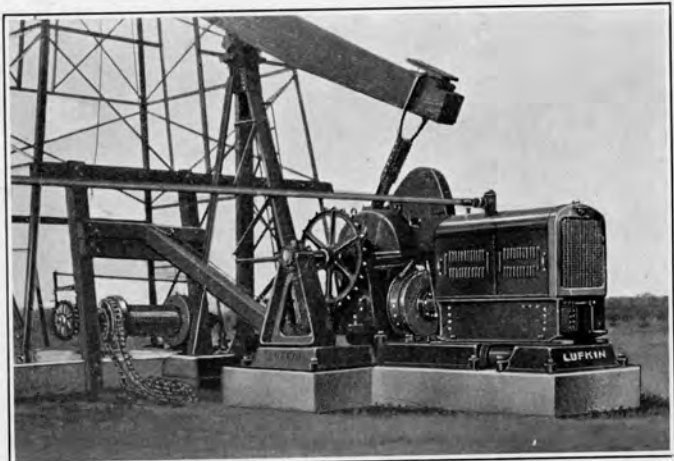
Sims Morris Lease, Okmulgee, Okla., Have Many Lufkin Equipped Wells.



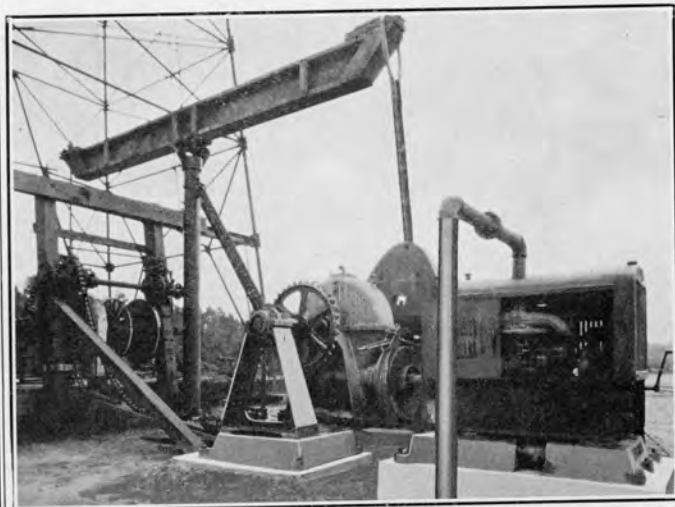
Carter Oil Company, Seminole, Okla. One of Nearly 100 Units in This Field.



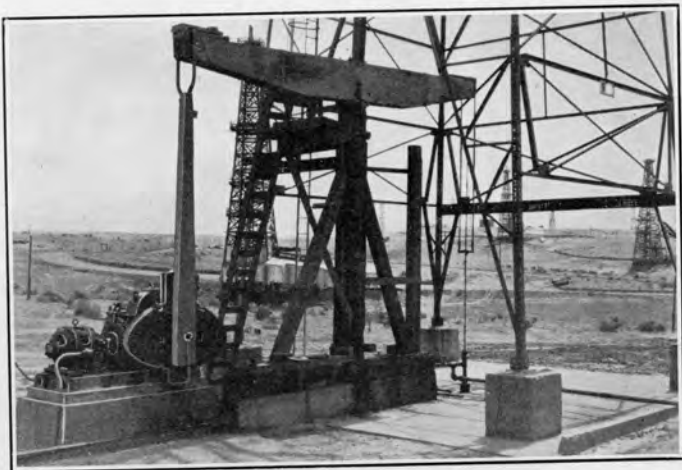
Sims—Crane County, Have Over Twenty Similar Installations



One of the Gulf Production Company's Installations in West Texas.



Installation of Ohio Oil Company Near Eldorado, Arkansas



One of Standard Oil of California's Installations in the Midway District

# Lufkin Hoists

*Especially Designed for*

## **Geared Units**

The following pages show our new line of improved hoists with more positive oiling devices, Roller Bearings in Drums, Asbestos Friction Blocks, Double Brakes with Expandible Brake Drums and other improvements which years of experience and practice have suggested.

For convenience and reference our original line of hoists so extensively used are shown on pages 44 and 45. While repairs may be had from stock, they will not be carried "completely assembled" in stock and will only be built on special order.

*The great number of our hoists in use is concrete evidence of their practicability and success.*



# Improved Lufkin Hoists

*Designed Especially for Geared Units—  
Also Used With Standard Rigs*

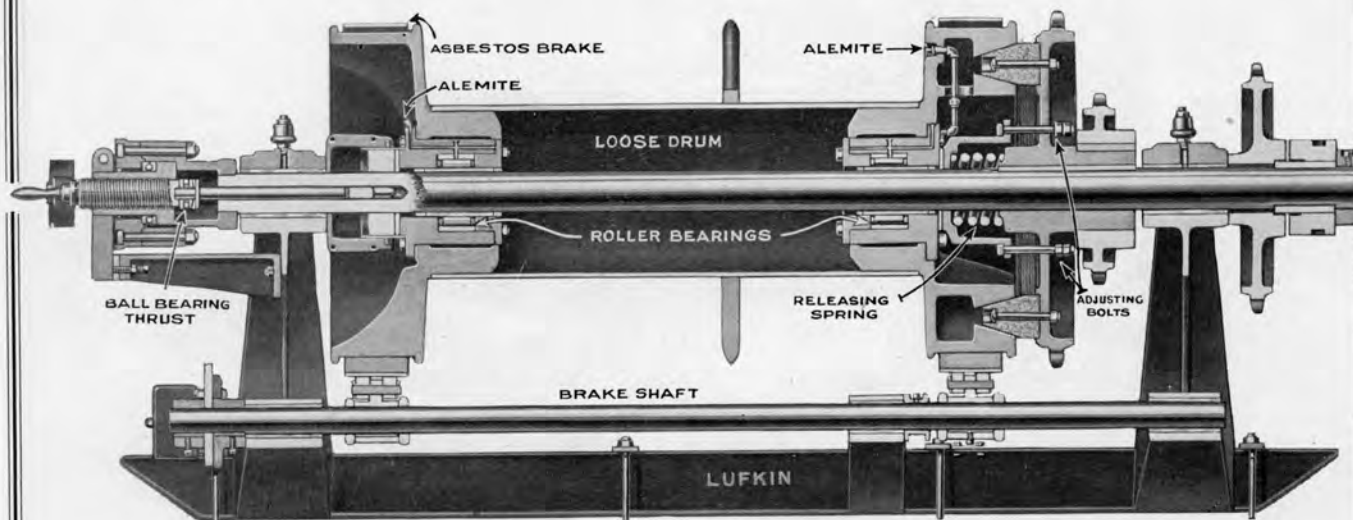
Four years experience with the loose drum, friction hoist (introduced by us for oil field use to take the place of the Bull and Calf Wheels) has convinced us, as well as every user, that we have not only simplified the work on the derrick floor, but have cut the time of handling rods and tubing in half. This requires less power, as well as being much easier on motor and equipment, than the old method of the Standard Rig.

Lufkin Hoists are all designed so that it is not necessary to reverse power, the winding drum being loose on shaft (same as all makes of hoisting engines). This feature is necessary with the multi-cylinder gas engine which does not reverse, and, while not necessary with electric power, 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, 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 herewith shows the idea that is carried out in all hoists shown in this bulletin, with the exception of the bailer. This, however, is the same principle, except that sprocket and clutch are loose, instead of the drum, largely on account of the excessive

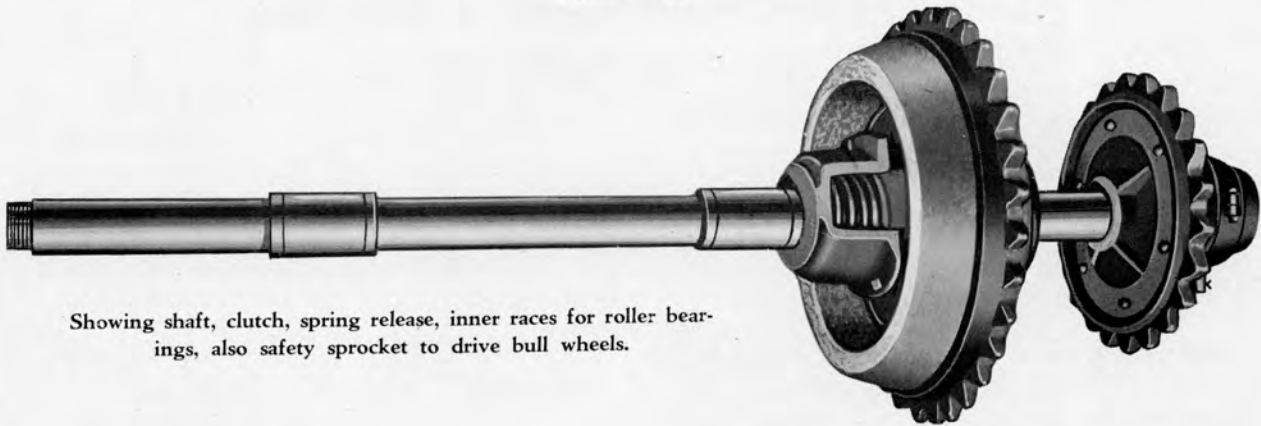


Sectional view showing Lufkin Loose Drum Type of Hoist. Friction clutch starts load easily. Sufficient brakes stops easy. Loose drum with roller bearings allows load to go into well by gravity so that no reverse power is necessary. Cuts time pulling rods and tubing in half.

UNNECESSARY TO REVERSE POWER WITH OUR HOISTS.

# Improved Lufkin Hoists

[Continued]



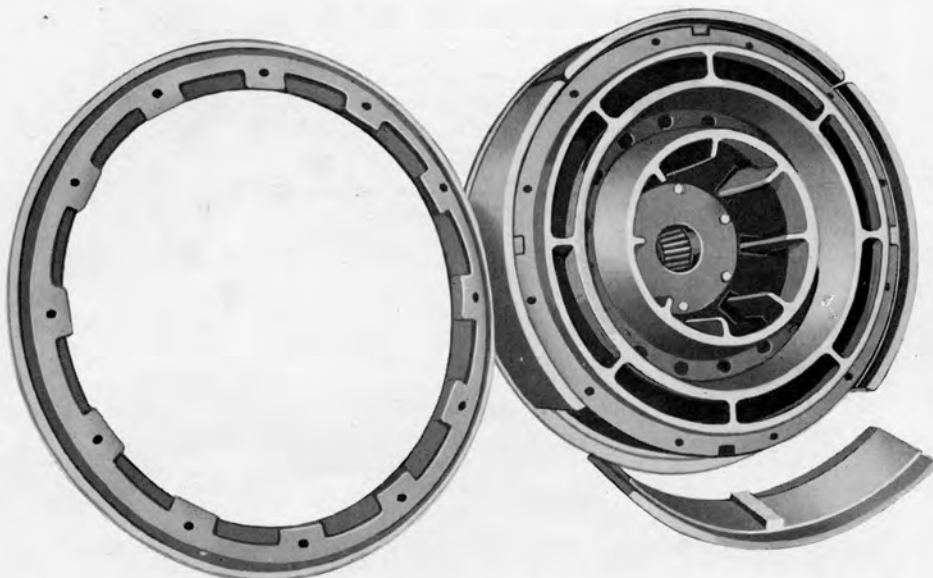
Showing shaft, clutch, spring release, inner races for roller bearings, also safety sprocket to drive bull wheels.

speed at which it is run continuously when bailing.

*While our Hoists have given decided satisfaction, we have, from actual field practice, greatly improved them; more positive oiling devices, roller bearings in drum, expansion brake drums, asbestos friction clutch blocks, are examples of improvements that will further the satisfactory use of this equipment.*

The clutches on these Hoists are surprisingly powerful. In some cases, with our No. 1 Gulf Coast Type Hoist, as much as 19,000 pounds has been handled on a single line, and our larger hoists and larger clutches work in proportion.

The following pages describe the various styles and sizes of hoists made to suit the dif-



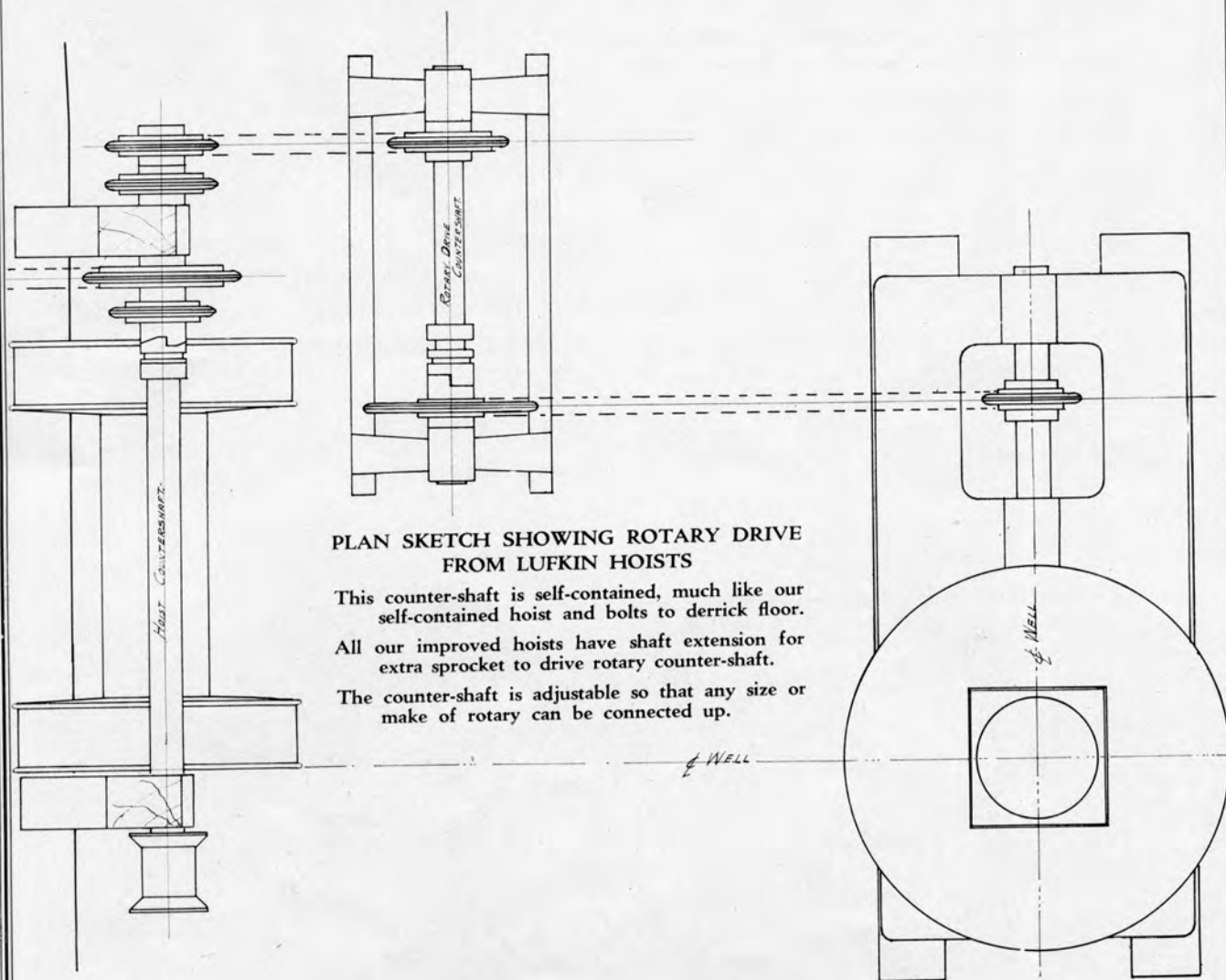
Trout's Expansion Brake Drum and Clutch. Fully patented. Absolutely proof against breaking of drum head from brake band heating.

# Improved Lufkin Hoists

[Continued]

ferent field conditions in the various sections of the country, to take care of either rotary or cable tool service. Lufkin Hoists are designed to handle rods and tubing very fast, and will be found very satisfactory. For

other service, handling casing, drill pipe or cable tools, they will give equal satisfaction, performing the service in about the same time it would be done with the ordinary Standard Rig and with a saving in labor and power.



PLAN SKETCH SHOWING ROTARY DRIVE FROM LUFKIN HOISTS

This counter-shaft is self-contained, much like our self-contained hoist and bolts to derrick floor.

All our improved hoists have shaft extension for extra sprocket to drive rotary counter-shaft.

The counter-shaft is adjustable so that any size or make of rotary can be connected up.

## Showing Method Driving Any Make Rotary With Any Line Shaft Hoist

# Features Common to All Improved Hoists

Distance center of well to center drive sprocket, 6'-2" on all hoists. Any hoist can be used with either 6 1/2", 5 1/2" or 4 1/2" unit. Note: On the 6 1/2" Special or 5 1/2" a distance of 7'-5" extreme may be had—on 4 1/2" Units a distance of 6'-5 5/8" may be realized.

All drums are loose on shafts, have roller bearings, alemite lubrication through hubs, not through shafts as formerly.

All hoist drums except Nos. 11-21-31 have expansion rims—will not break from heating.

All sprockets are for A. P. I. No. 3 chain (1030), except back gear drive on the special hoist, which is No. 4 (1240).

All hoists have double brakes, of the best J. M. asbestos lining, with adjustable levers.

All clutches have asbestos friction blocks.

Interchangeability of parts—Series 11-21-31 and 12-22-32 are interchangeable, excepting drums and length of shafts.

Hoist 14-24 and 14 Special have interchangeable parts—Back gear, No. 14 Special, can be applied to No. 14 in field, as space is provided.

All line shafts have extension right end for sprocket—to drive rotary counter-shaft. See opposite page.

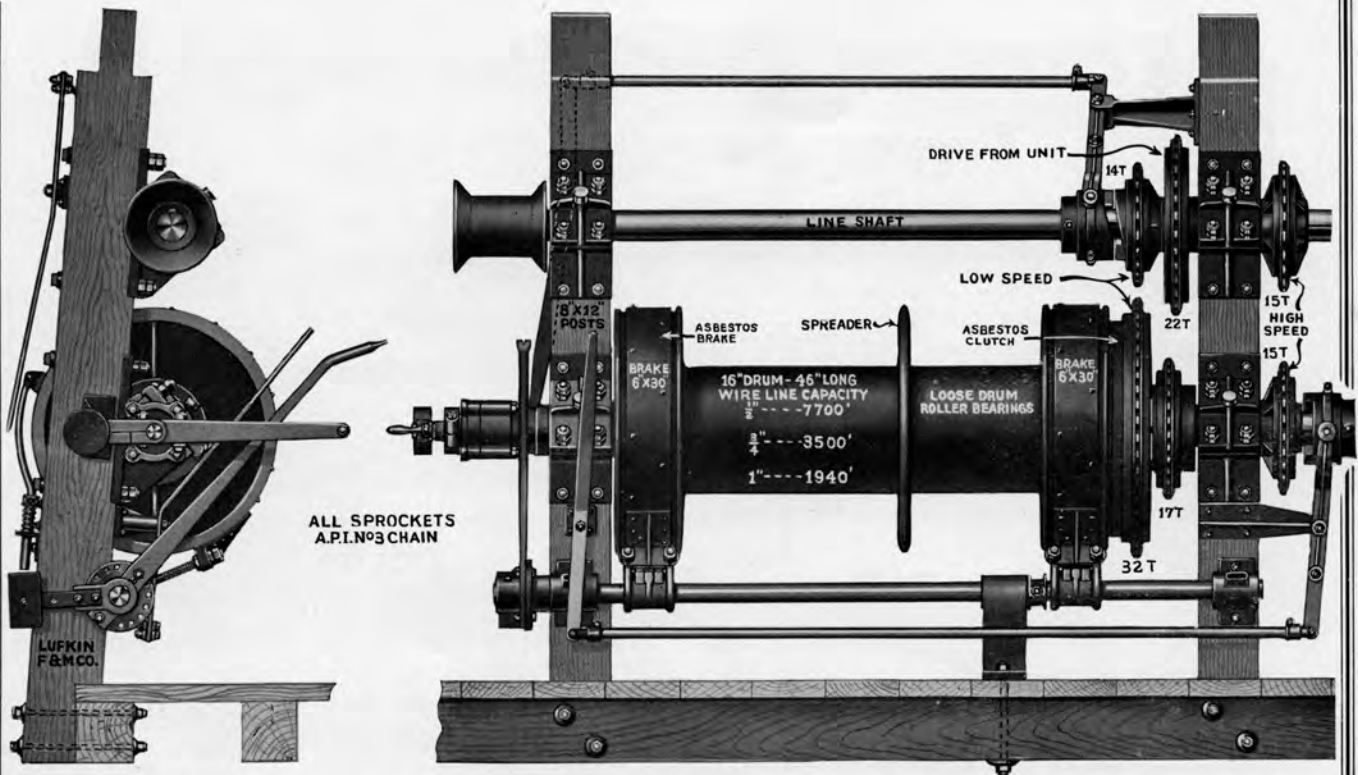
Right or left hand hoists. All hoists shown are considered left hand, and this is determined by standing at well, looking at hoist operator on left side. If desired these hoists could be furnished with operator on right side at extra cost, but we do not recommend this, as left hand hoists are known to give every satisfaction.

All posts are 14 feet long. May be shortened in field to suit any derrick.

Steel H Beam Posts can be furnished at extra prices.



New Spindle Top Field. With One Exception Every Company in This Field Standardized on Lufkin Units.



NO. 11. GULF COAST TYPE—Popular in Rotary Country, Usually with Our Standard Size Unit—(Re-designed from our No. 1 Hoist).

## High-Speed Rod and Tubing Hoist

While built especially to handle rods and tubing in about half the time required by old methods, this Hoist will be found to have a powerful clutch, lifting safely 8,000 to 10,000 pounds on a single line and may therefore be considered an all-purpose hoist, handling light drill pipe, casing, etc.

By using enough lines, very heavy strings of casing have been handled by this hoist.

Cups have been changed in 3,500-foot wells in 55 minutes, beam to beam.

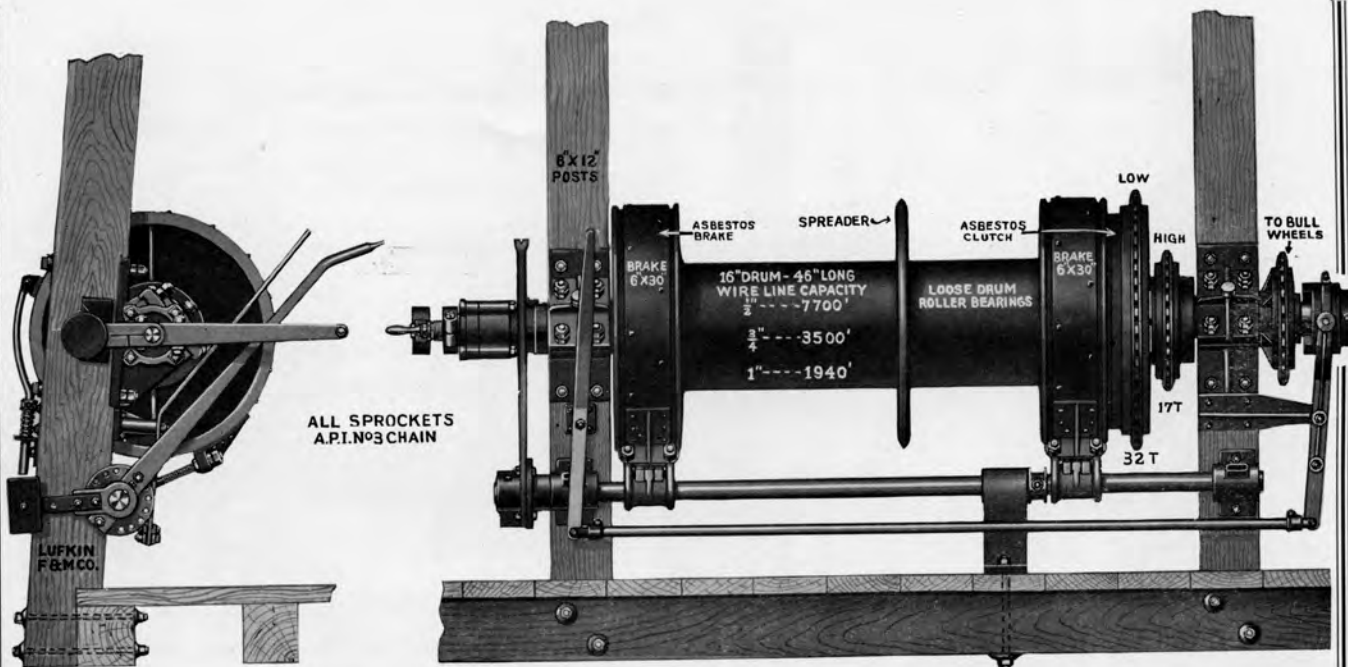
This is a design of our original No. 1 Hoist, so extensively used in the Gulf Coast

fields and elsewhere, where wells are drilled and finished with the rotary. Where more line capacity on drum is desired, we recommend our No. 12 Hoist, on page 38.

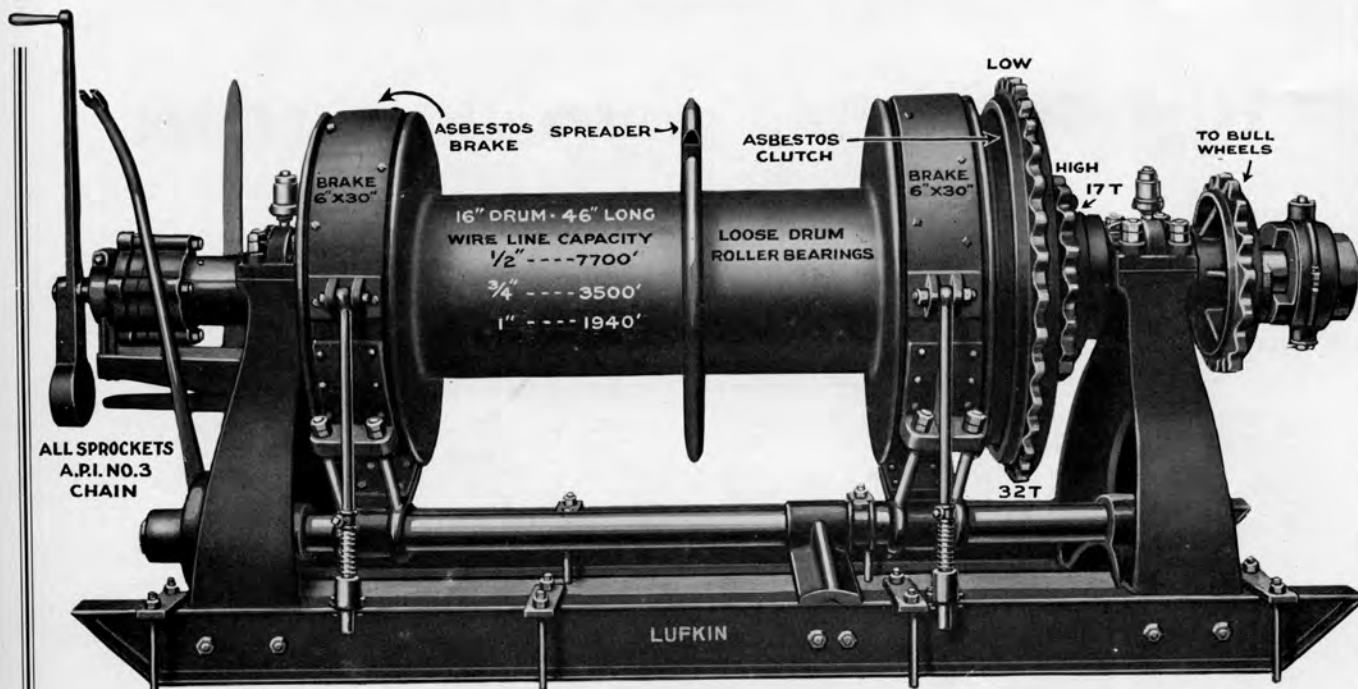
This Hoist now has double brakes, allowing absolute control of the load with ease, and this extra brake is appreciated, especially where tubing catchers are used.

Both line and drum shafts are 3-15/16" diameter, drum has well lubricated roller bearings, which are almost frictionless, allowing hook to drop quickly.

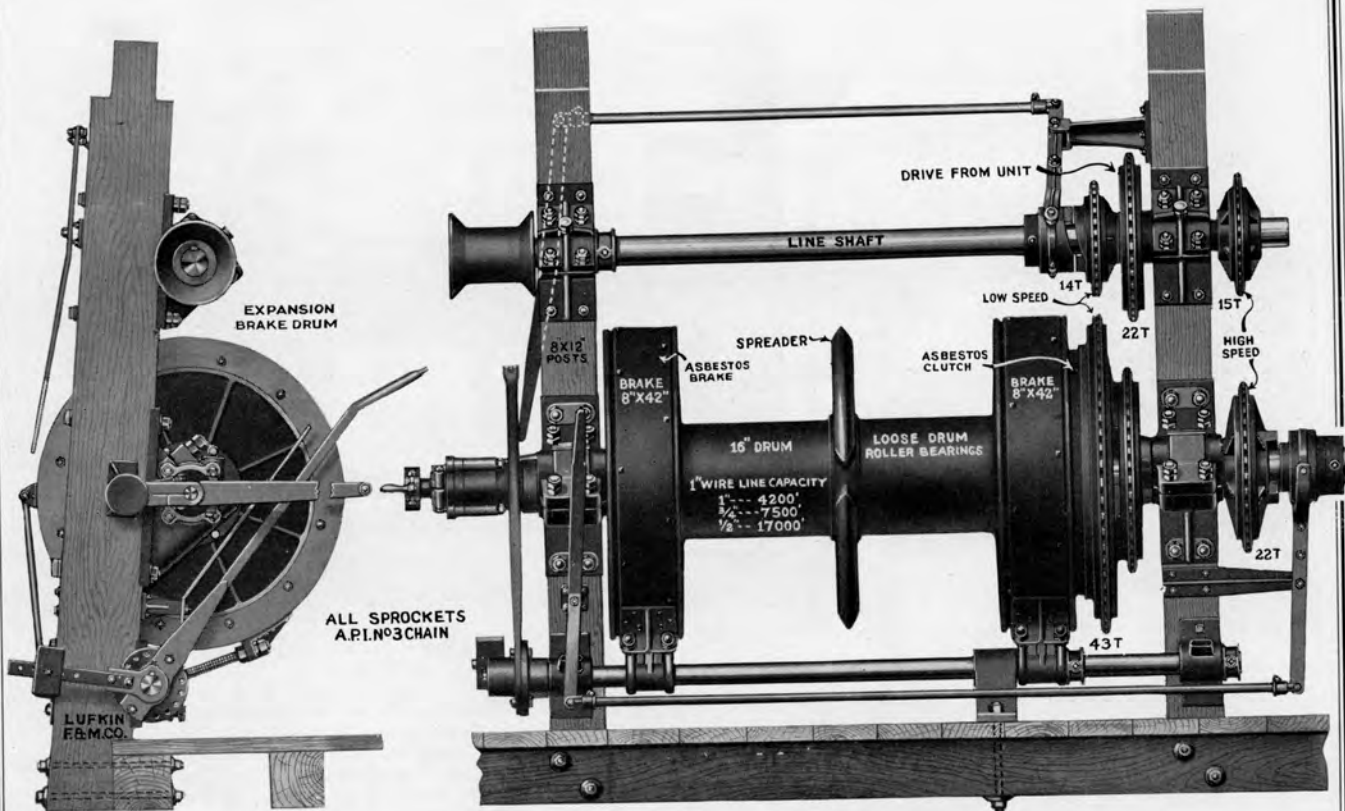
General specifications are given in illustrations.



NO. 21 HOIST; OKLAHOMA TYPE WITH TWO SPEEDS ON POSTS.—This is the drum shaft only of the No. 11 Hoist, the line shaft may be applied at any time as posts are dapped and drilled for boxes. Some operators have standardized on this type and carry an extra line shaft for heavy work-over jobs, keeping down the investment, more especially on wells that seldom have to be worked on. In territory where cups have to be changed often the line shaft hoist will easily pay for itself in time-saving alone.



NO. 31 HOIST; OKLAHOMA TYPE IN SELF-CONTAINED FRAME, (originally our No. 4).—This is the same hoist as No. 21 except being self-contained, is bolted to floor of derrick either of concrete or wood. Sprocket on right end is used to drive bull wheels for the arrangement shown on page 8—see bull wheel sprocket, page 39. Note—Nos. 11-21-31 Hoists have non-expandible brake drums.



No. 12 HOIST: ARKANSAS TYPE—(Re-designed from No. 2 Hoist)

## No. 12 Hoist

This Hoist has the same characteristics as our No. 11 Hoist, except that the drum holds more line. Brake drums are larger, with 8" brake bands, and clutch is proportionately larger, to not only handle rods and tubing fast, but as an all-around Hoist that can be used in cable tool country, as well as where the rotary is used, or both.

This Hoist will handle 12,000 to 15,000 pounds on single line, and has ample brake power to hold the load.

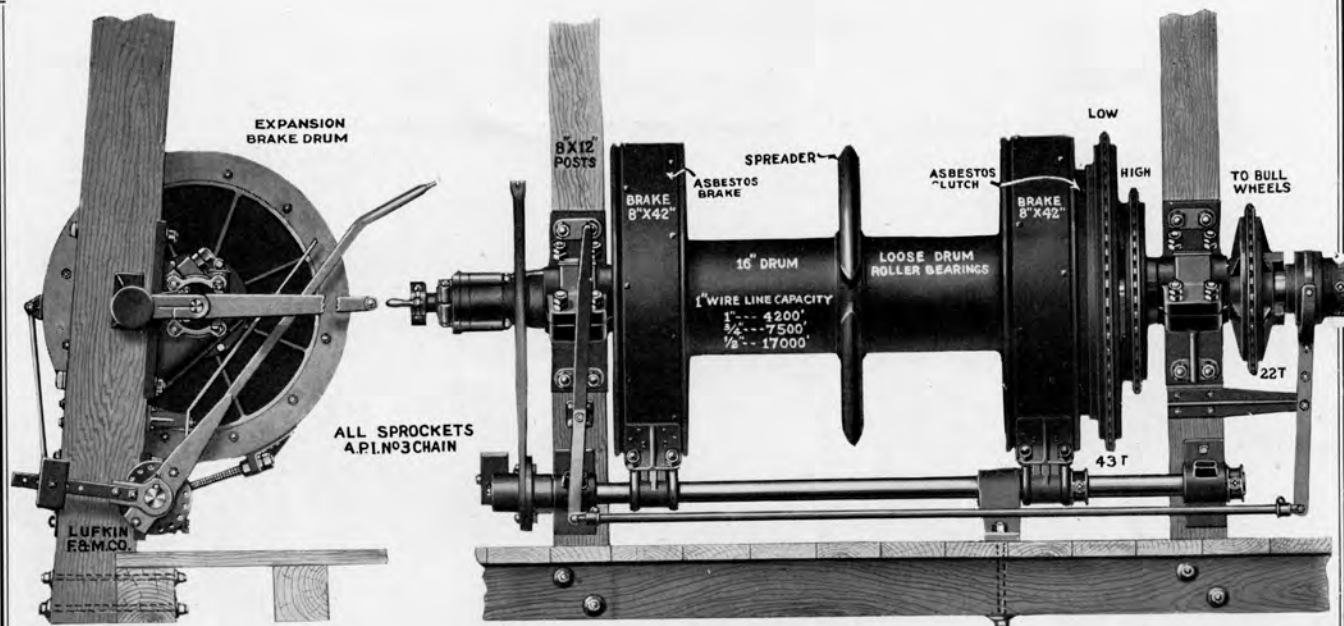
Shafts are 3-15/16", drums have expan-

sion brake safety rims, roller bearings and semi-steel drum heads. Steel heads may be furnished at extra cost.

We recommend this Hoist on all heavy wells where Intermediate and Heavy Duty Units are used and especially with the gas engine.

Friction disc may be bolted to drum flange, thus making a positive, non-slip drive for emergency pulling.

These Hoists have Trout's Expansible Safety Brake Drums.



NO. 22 HOIST; WEST TEXAS TYPE.—(Re-designed from No. 6 with double brake). This is the drum shaft of No. 12 Hoist shown opposite. It is driven from unit to either large or small sprocket according to work to be done. For the same reasons as given on page 37 for the No. 21 Hoist, many companies have standardized on this hoist with the idea of keeping down the investment, applying line shaft when special work-over jobs are necessary.

NO. 32 HOIST.—The above hoist may be furnished in a self-contained frame same as shown on page 37.

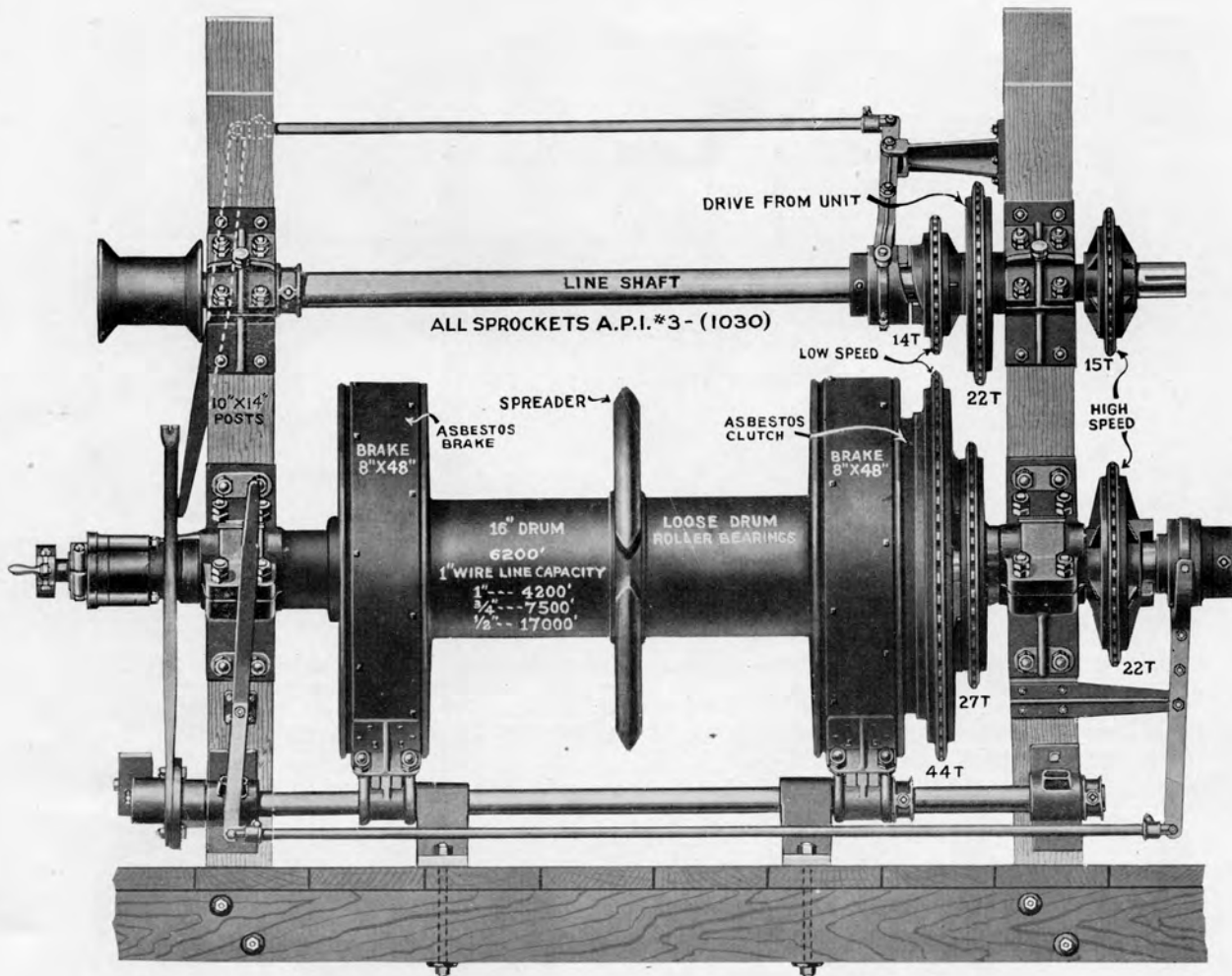
## Steel Sprocket for Bull Wheels

For hook-up see page 8.

This all-steel sprocket was designed to take the place of a cast iron split sprocket, that, owing to unevenness of pipe on bull wheels, correct pitch could not be maintained and many accidents followed. The new sprocket has solid rim and clamp hub with split bushing, sprocket being large enough to slip over rivet heads and clamp solidly on pipe. This sprocket can be furnished with 37 teeth for 18", 16" or 13" O. D. bull wheel drums.







## Heavy Duty Hoist

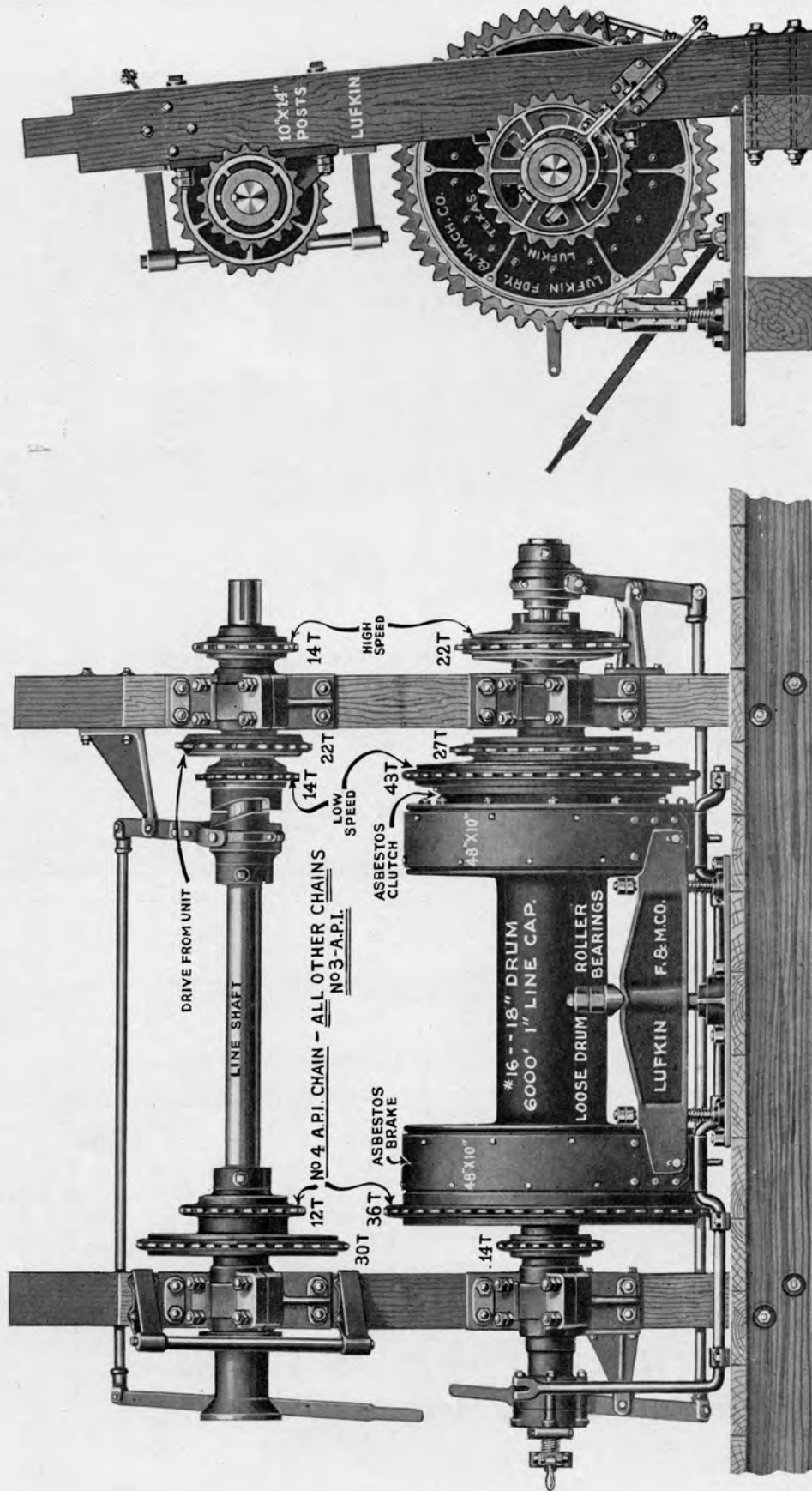
NO. 14 HEAVY DUTY HOIST—This hoist is the same design as No. 12, except having 4-15/16" shafts, 48 x 8" Expansible Brake Drums and proportionately heavier throughout. Posts are 10" x 14". SPACE IS PROVIDED TO ADD BACK GEAR IF DESIRED.

NO. 24.—Same hoist without line shaft.

NO. 14 SPECIAL HEAVY DUTY HOIST—Same as No. 14 except with Back Gear as shown on hoist next page.

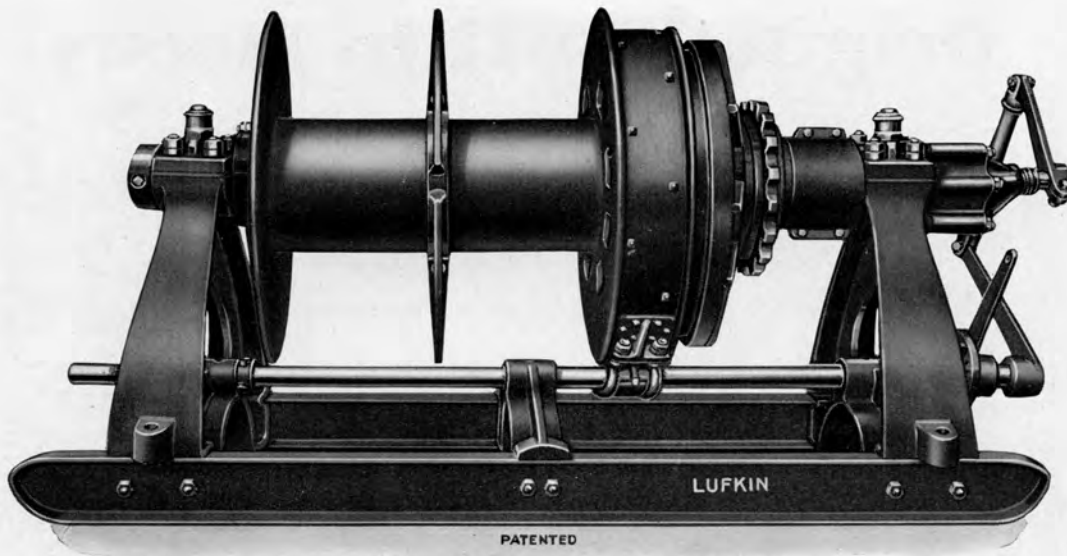
**Steel H Beam Posts Can Be Furnished  
For Any Of Our Hoists At Extra Price**

# California Type Hoist



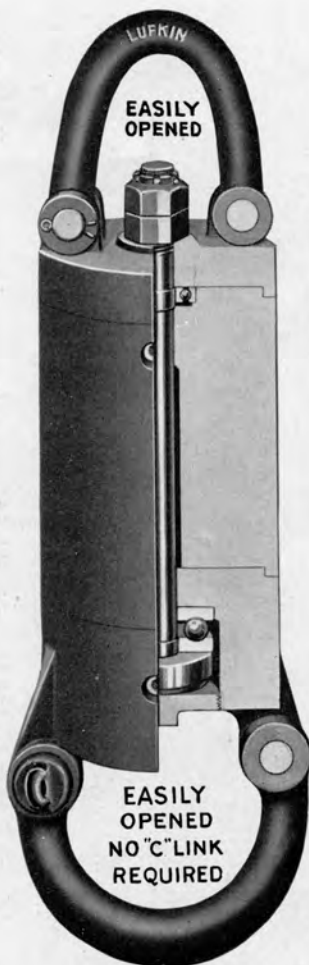
NO. 16 CALIFORNIA TYPE HOIST WITH PATENTED EXPANSION BRAKE DRUMS, DOUBLE BRAKES, DOUBLE BACK GEAR. For heavy Service. Shafts 5-15/16" in diameter, drum barrel 18" in diameter, double brakes 48" x 10" on expansion rims, roller bearings, double back gear 20 to 1 ratio, posts 12" x 14". Steel post will be furnished if so desired, at extra price.

We can furnish No. 14 Hoists in this style. Simply order No. 14 Special, if wanted.



## 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 36" flanges and will hold 6,000' -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 Rod Line Weight

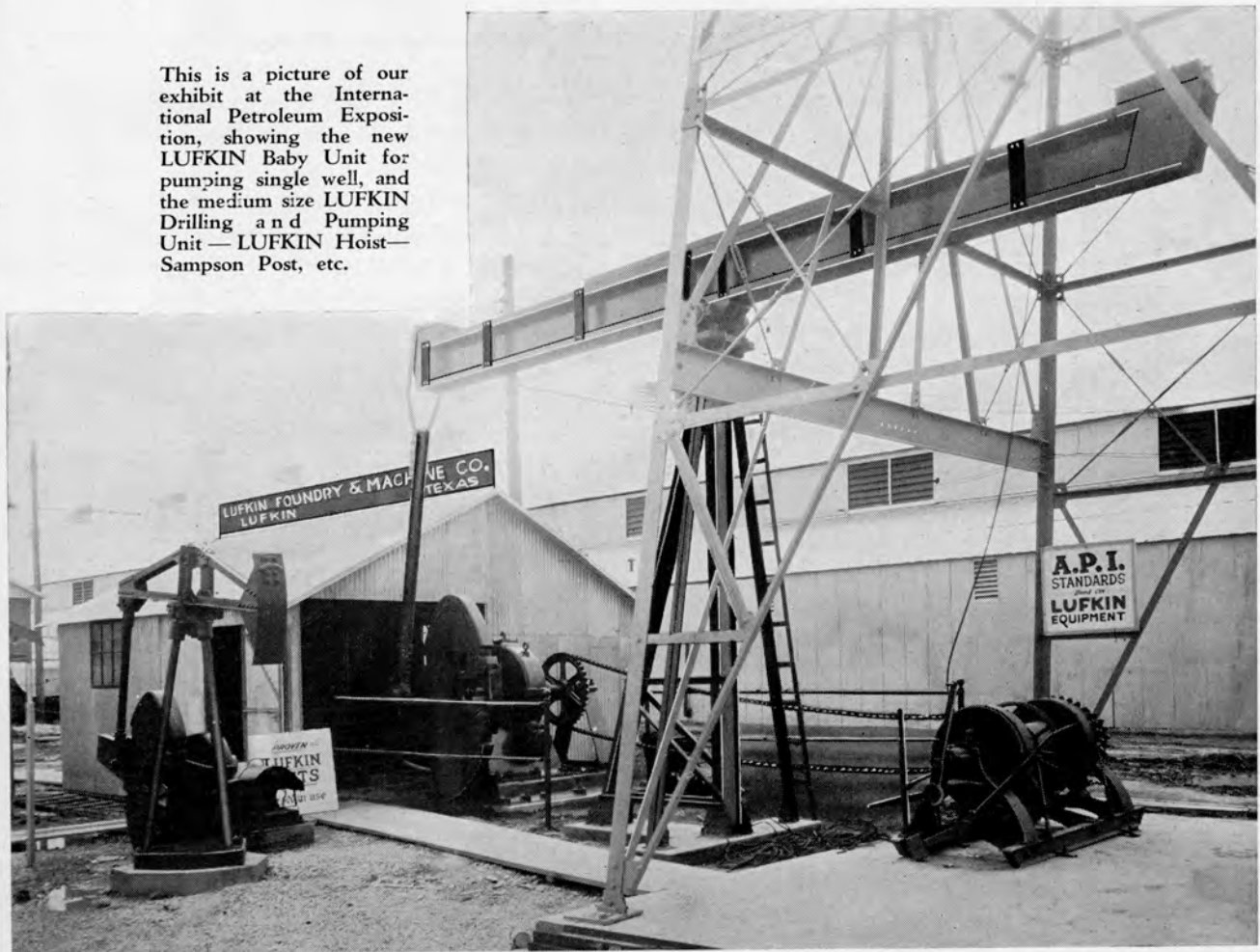
We have designed the swivel rod line weight, as shown, to be used in place of the "C" link and to give just enough weight on line to come down fast, unspooling the drum. With roller bearings in drum, this weight will act surprisingly quick and be a big time saver, especially pulling rods. It is also much handier than a "C" link, more positive and safer in changing hooks and elevators.

One pumper easily looks after more than double the number of Lufkin Units than he could standard rigs.

## Original Lufkin Hoists

**F**OR convenience and reference our original line of hoists are shown on next two pages. While repairs may be had from stock they will not be carried "completely assembled" in stock and will only be built on special order. The new line of improved hoists pages 37 to 42 will be available from stock.

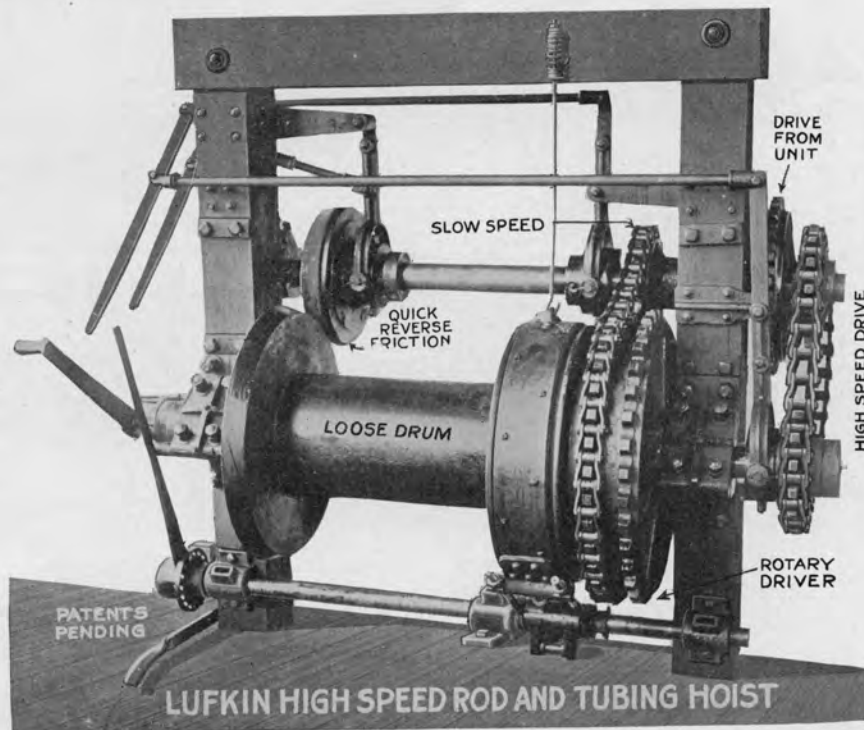
This is a picture of our exhibit at the International Petroleum Exposition, showing the new LUFKIN Baby Unit for pumping single well, and the medium size LUFKIN Drilling and Pumping Unit—LUFKIN Hoist—Sampson Post, etc.



## Original Lufkin Rod and Tubing Hoists

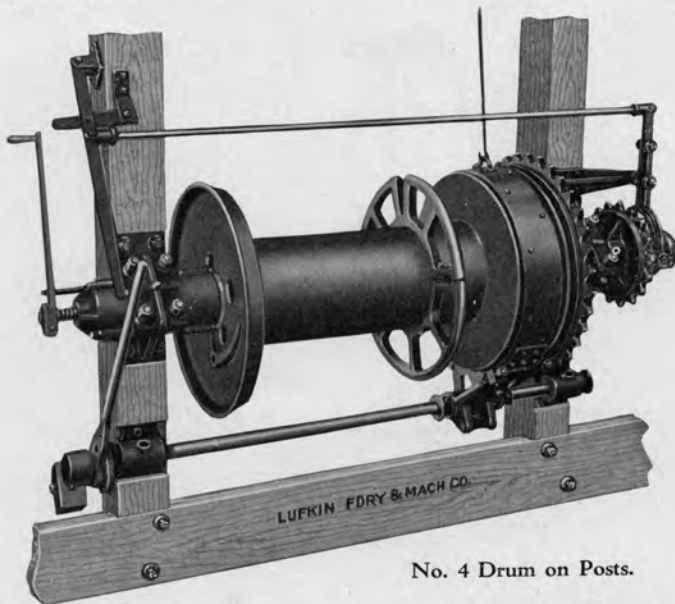
### ADVANTAGES

- 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 7,500 pounds on single line (it has lifted over 19,000 pounds) and

is used for redrilling with rotary, setting small casing, fishing, etc. Line and drum shafts are  $3\frac{15}{16}$ " diameter. Drum capacity is as follows— $9\frac{16}{16}$ "-4,500',  $\frac{5}{8}$ "-4,000',  $\frac{3}{4}$ "-3,000',  $\frac{7}{8}$ "-2,000', 1"-1,600'.

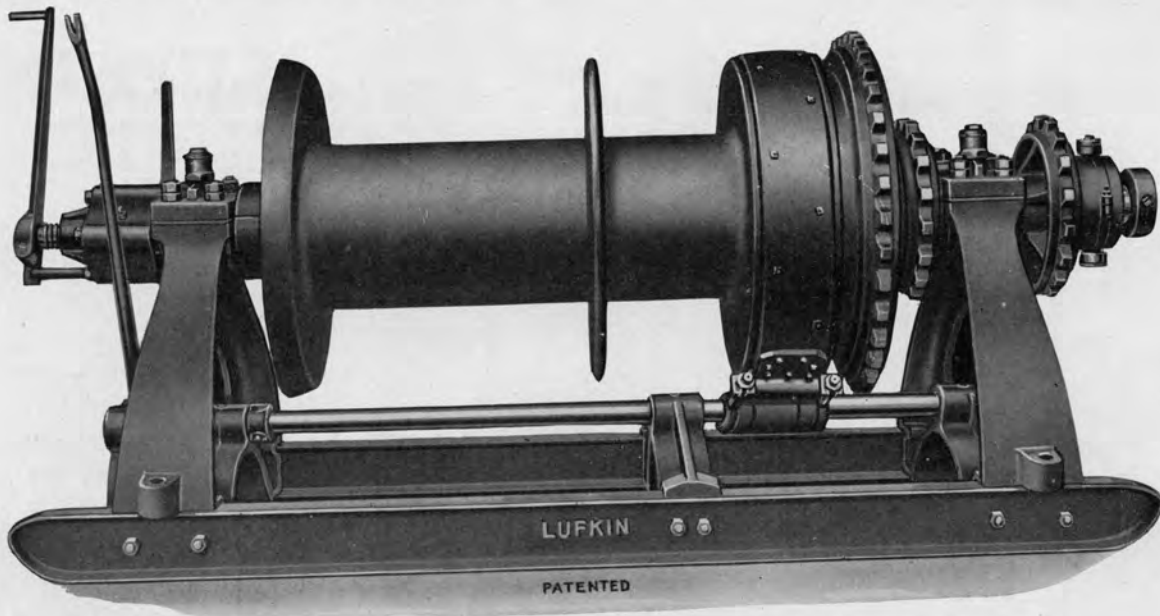


No. 4 Drum on Posts.

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  $9\frac{16}{16}$ "-11,900',  $\frac{5}{8}$ "-9,700',  $\frac{3}{4}$ "-6,700',  $\frac{7}{8}$ "-5,100', 1"-4,000'.

Oklahoma Type Hoists No. 4 on Posts—same drum shaft as on No. 1 Hoist, only drum is longer so that it will hold a bailing line, with space for tubing line.

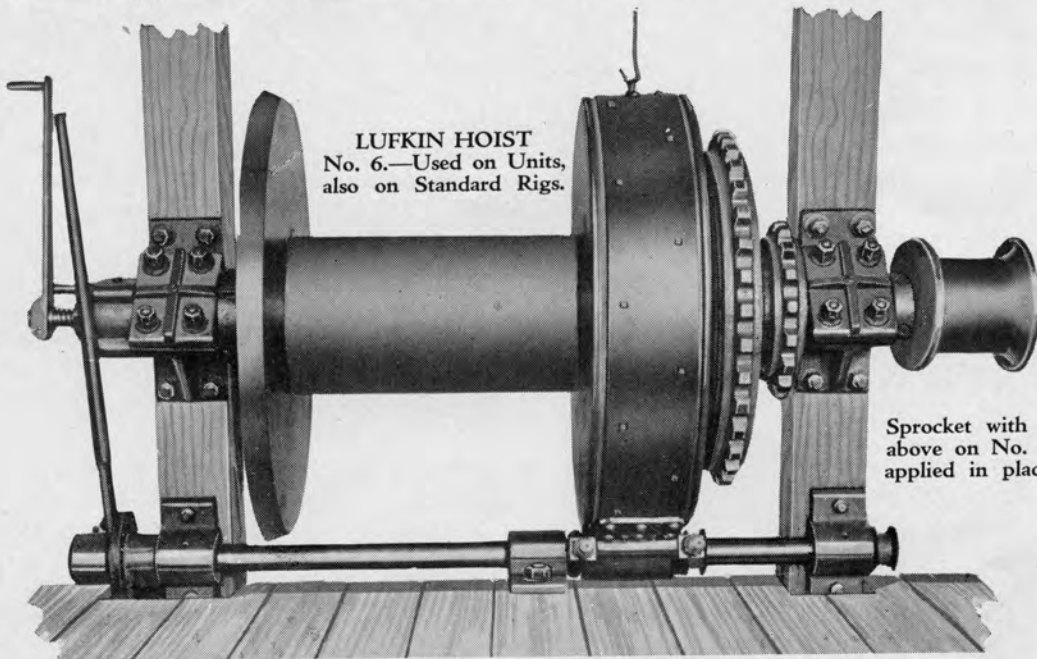
FOR IMPROVED HOISTS SEE PAGES 31 TO 42.



Original Oklahoma Type Hoist No. 4, Made With Single or Double Brake Drums, With Sprocket on End to Drive Bull Wheels.

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.



LUFKIN HOIST No. 6.—Used on Units, also on Standard Rigs.

Sprocket with clutch as shown above on No. 4 Hoist, may be applied in place of Cat Head.

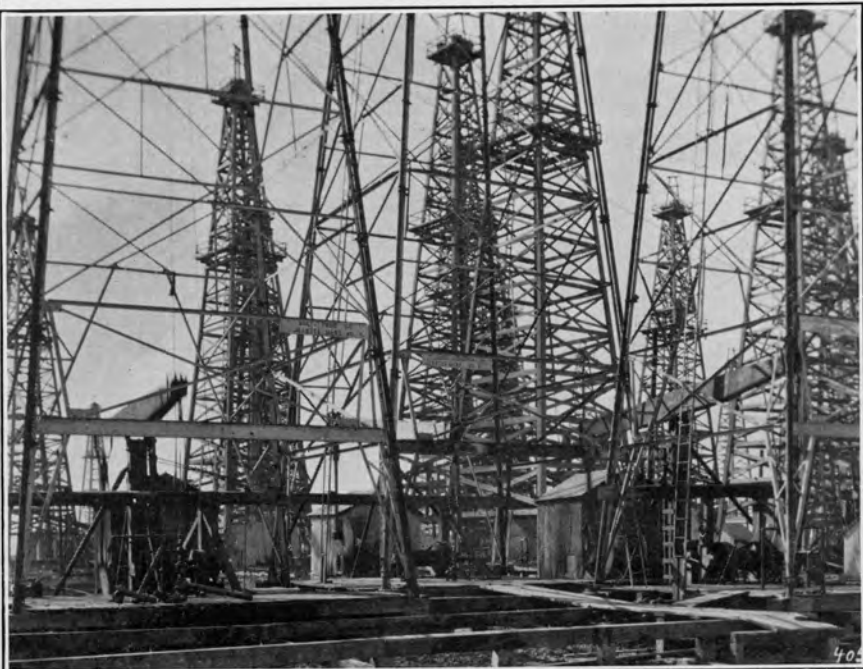
### LOOSE DRUM HOIST FOR STANDARD RIGS

No. 6 Hoist used with units or driven from calf-wheel sprocket on standard rig shaft. Shaft is 3-15/16" diameter, with 16" drum, 42"x8" brake drum of semi-steel, and

2-15/16" brake shaft.

Note: Expansible Brake Drum either of cast steel or semi-steel may be furnished at extra price.

FOR IMPROVED HOISTS SEE PAGES 31 TO 42



# LUFKIN UNITS

*Save Space*

DOUBLE THE NUMBER OF  
WELLS CAN BE PUT ON A  
LEASE THAN POSSIBLE WITH  
STANDARD RIGS

INDISPENSIBLE IN TOWN  
LOT OPERATIONS.

THREE GULF WELLS AT  
SPINDLE TOP WHERE  
DERRICK BASES MAKE A  
CONTINUOUS FLOOR  
FROM ONE TO THE  
OTHER



TWO MODERN  
INSTALLATIONS  
OF  
RIO BRAVO OIL CO.  
AT  
PIERCE JUNCTION, TEXAS

USING BOTH STANDARD  
AND TRUSS LINK TYPE  
WALKING BEAMS

# Walking Beams Steel Samson Posts Pitmans, Rig Irons, Chains, Etc.



ONLY A LUFKIN SELF-SUPPORTING POST COULD STAND THIS STRAIN

What happened on Rio Bravo Settegast "B-5" during recent storm. Derrick sill caught horse-head of walking beam as it went over, pulling over Samson Post, breaking

concrete connection between Samson Post and Unit, the section of which was 24" wide, 30" deep. The post was uninjured and was set back in place and is in regular use.

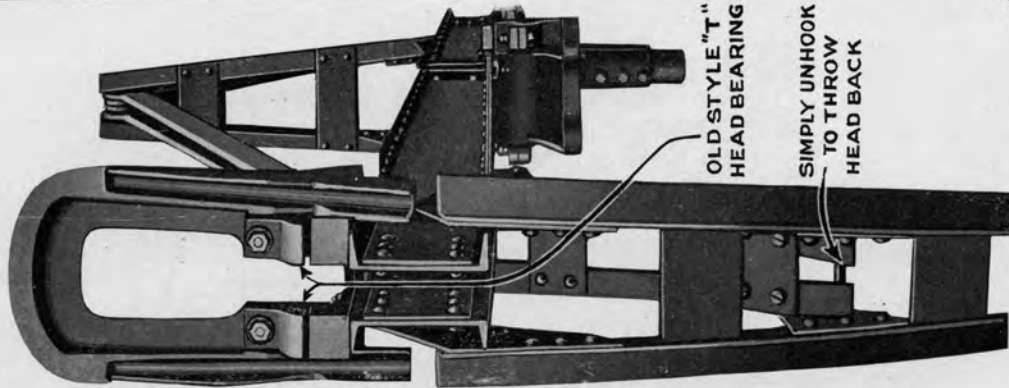
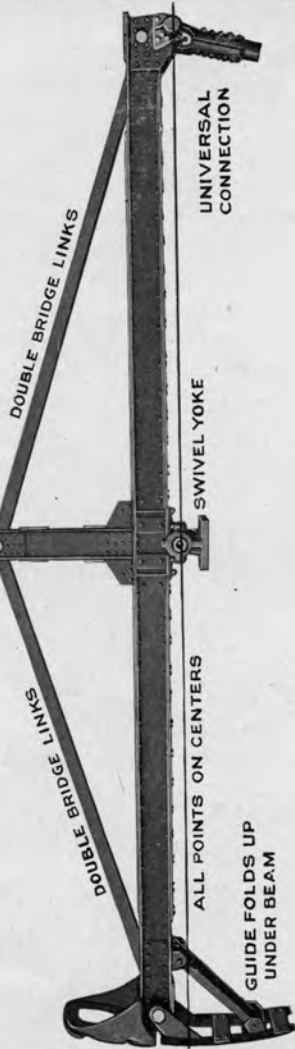
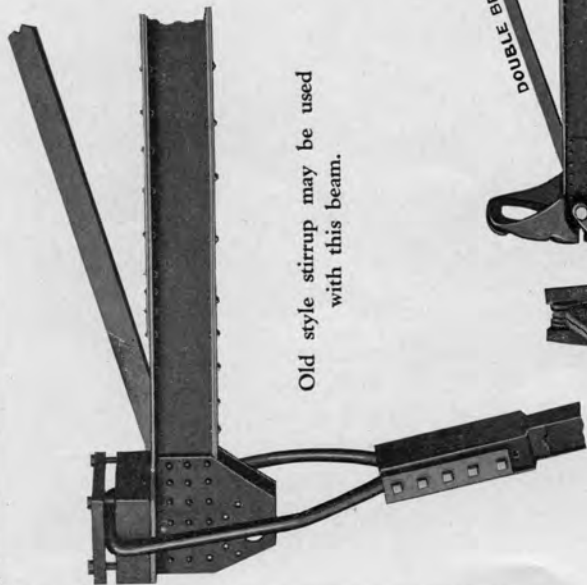


# Lufkin "Truss Link Type" Walking Beam

AND HANGER COMBINED—PATENTS PENDING.

All Points on Center Line—Means no side strain on polish rod. No sway strain on beam or Sampson post. Universal stirrup connection and universal connection to crank pin box takes care of any slight misalignment so common with old style rig irons.

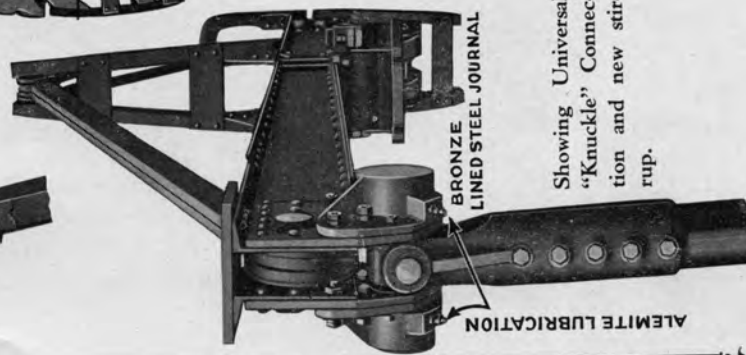
Old style stirrup may be used with this beam.



To meet a demand for a lighter yet stronger Walking Beam we have brought out this Truss Link Type Beam which after a year's test in several fields we believe we are offering the trade the acme of perfection, in a practical, more efficient beam that will outlast the severest service.

The illustrations speak for themselves. This beam can be used the same as any other on either end with the advantage of an improved Pitman connection, and a very practical "Arc" head yoke, both of which can be stripped from the beam if any other type of connection is desired.

These beams are carried in stock, 14' working centers.



# Trout Universal Pitman

Forged Steel  
Universal  
Connection

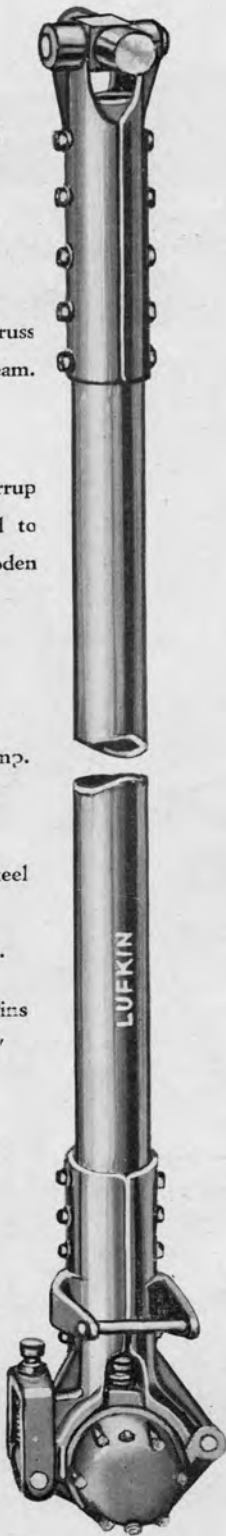
For use with "Truss  
Link Type" Beam.

Old style stirrup  
may be applied to  
attach to wooden  
beam.

Cast Steel  
Yoke and Clamp.

Entirely of Steel  
Except  
Journal Box.

For A. P. I. Pins  
3 1/2" and 4"



Unfasten one shackle bolt to take Pitman off.  
Crank Pin Box which always stays on pin, is  
self-oiling and oil tight. Ball and Socket  
Yoke connection around box.

The oil that is wasted around the ordinary crank pin on an oil well would easily lubricate the whole rig equipment. To eliminate waste oil we designed the Pitman and journal shown herewith. The journal or box always remains on the crank pin (unless pin has to be moved from one hole to another) is oil tight, has adjustable journal and carries enough oil to last a month.

The pitman yoke is detached from journal by unfastening one shackle bolt which is a safety bolt and locks into yoke casting.

The yoke clamp around journal is a ball and socket connection, also the top end has a universal connection to beam that takes care of any misalignment.

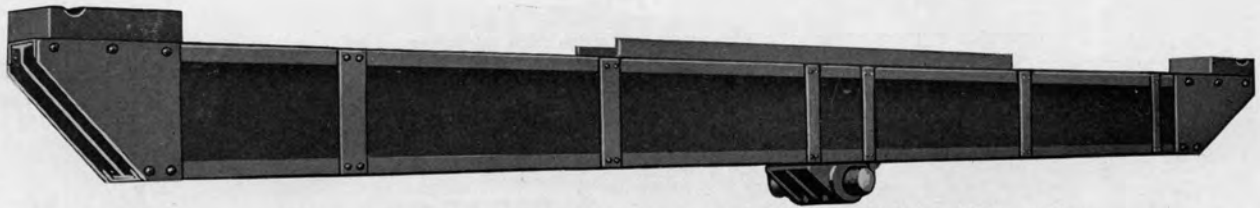
This Pitman has adjustments so that there is no knock or lost motion between beam and unit. Bearings on universal connection on top are renewable bronze. This Pitman will be found to give unusually long wear and service with the minimum upkeep and attention.

## BOYKIN PITMAN

The Boykin Steel Pitman is designed to meet a demand for a substantial pitman at reasonable price. They are made in three sizes, *light, medium* and *heavy*, and are furnished with or without stirrups.



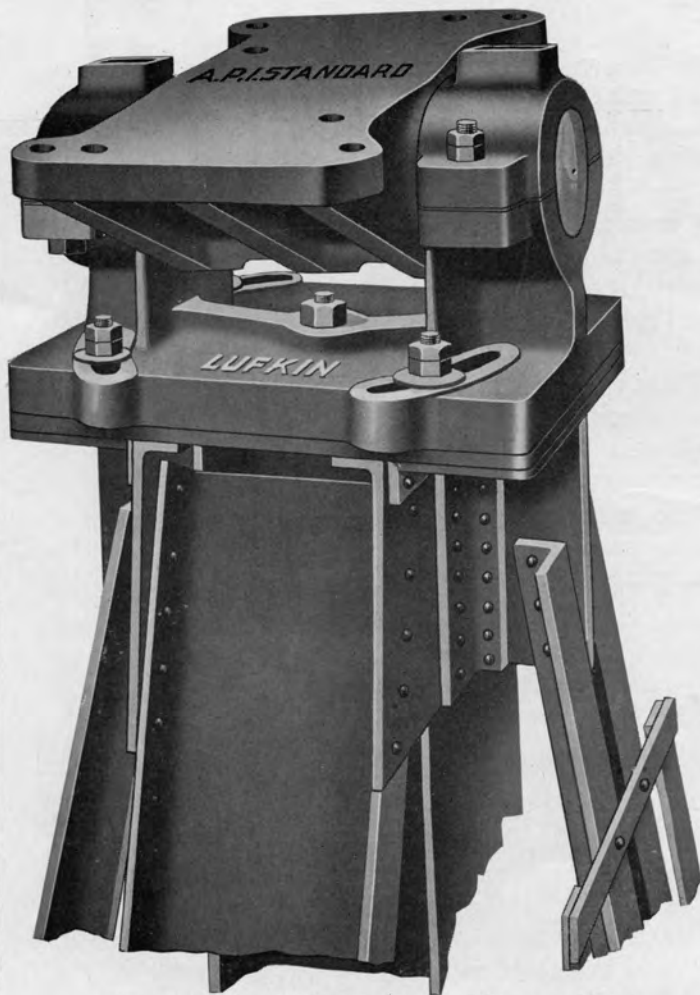
BOYKIN  
PITMAN



Standard I Beam Type Walking Beam (20" I Beam with 10" Channels) carried in stock;  
14' Working Centers.

We have furnished hundreds of this type of walking beams and so far as known none have ever broken. They are dependable and will stand the severest service. They are complete as shown.

SPECIAL attention is called to saddle iron castings with turned journals, yokes are bored with a boring bar that insures absolute alignment. They are extra strong and have good oiling facilities.



Showing "Swivel" Yoke. No mis-alignment here.



Lufkin Self Supporting Samson Post.  
Rigid, Strong and Dependable.  
Standard Post is 15'-8" Base to Center.  
Special Longer Post Made to Suit Conditions.



We are prepared to furnish genuine long leaf yellow pine walking beams with taper cut and ends finished, ready to set in place, at reasonable prices. Sizes to suit.

We can also furnish rig irons, A. P. I. Standard, with or without bolts, as desired.

**A. P. I. Chain**

Rex Chabelco 1030 steel chain has an ultimate strength of 28,000 pounds. It is the most highly developed chain for heavy duty drives and combines hardness, toughness, and light weight with great strength.



**AN ALL STEEL CHAIN FOR HEAVY DUTY DRIVE**

Rex 1030 Chabelco is the ideal steel chain for drive duty at comparatively high speeds. The entire flexing wear of Rex Chabelco Chain is confined to the pins and their bushings, while the external wear is taken by the rollers. The bearing parts (bushings and pins) are all carefully case-hardened to insure great strength, hardness and toughness.

bushing is unusually durable—no slack will develop there. No play can develop between bushing and sidebars. No bent pins to destroy pitch, no brittle pins to snap. Case-hardened pin bearing on case-hardened bushing—no wear in sidebar holes—no change in pitch. Sidebar holes are multiple punched, further assuring pitch accuracy.

Sprocket fit is maintained by rollers that resist wear. Sidebars resist elongation. The

And Rex Chabelco 1030 will fit all standard sprocket wheels. A large stock is carried at all times and immediate delivery is assured.

**REX CHABELCO**

Made by Chain Belt Company, Milwaukee, Wisc.

# Buda Power

Oil field men are fast becoming acquainted with the multi-cylinder engines. Not only are they used on Lufkin Units in the fields, but extensively used on trucks, tractors, lighting service, pick-up pumps, ditching and pipe laying machines, boat engines, and for most every service where portable power is required.

These engines are of the 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 com-



posed 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 connections 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.

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

Buda Engines are equipped with high tension magneto with impulse starters for easy starting, combination gasoline and natural gas carburetor, speed regulating governor, oil filter, air cleaner and telegraph throttle control.

## Selecting Buda Power

It is a great advantage to the buyer to purchase units with the same ratio gears as would be used with oil field type motors. This requires a slightly larger gas engine than necessary to use, but with the advantage of

operating the engine at comparatively slow speed for pumping 450 to 600 R. P. M.—with a higher speed and more power for pulling rods and tubing. Should electric motors be installed later they simply replace the engine on same bed plate.

## Specifications of Buda Engines Carried in Stock for Lufkin Units

No. 22½—Model WTU. 3¾ x 5⅞ Four Cylinder Engine complete unit with regular base with heavy duty clutch, fittings and fixtures as above. (Not I beam base). Maximum horsepower, 25 at 1200 R.P.M.

RECOMMENDED FOR BABY UNIT AT 600 TO 700 R.P.M.

No. 50—Model BTU. 5 x 6½ Four Cylinder Engine: Complete unit with above specifications also with heavy duty clutch, large radiator, sheet metal housing and steel "I" beam base.

Maximum horsepower for operating hoist, 50 at 1000 R.P.M. with gasoline fuel. Natural gas approximately 20 per cent less.

RECOMMENDED FOR PUMPING AT 450 TO 750 R.P.M. (PULLING SPEED 1200 R.P.M.) ON STANDARD UNIT FOR ORDINARY WELLS. FOR HEAVY WELLS USE NO. 75 ON STANDARD UNIT.

No. 75—Model JV. 5¾ x 7⅞, Four Cylinder Engine: Complete unit with above specifications also with heavy duty clutch, large radiator, sheet metal housing and steel "I" beam base.

Maximum horsepower for operating hoist 70, at

1000 R.P.M. with gasoline fuel. Natural gas approximately 20 per cent less.

RECOMMENDED FOR INTERMEDIATE UNIT FOR 450 TO 650 R.P.M. FOR PUMPING. PULLING SPEED 1000 R.P.M. FOR EXTRA HEAVY WELLS USE NO 85.

No. 85—Model JH. 6 x 7⅞, Four Cylinder Engine: Complete unit with above specifications, also with heavy duty clutch, large radiator, sheet metal housing, and steel "I" beam base.

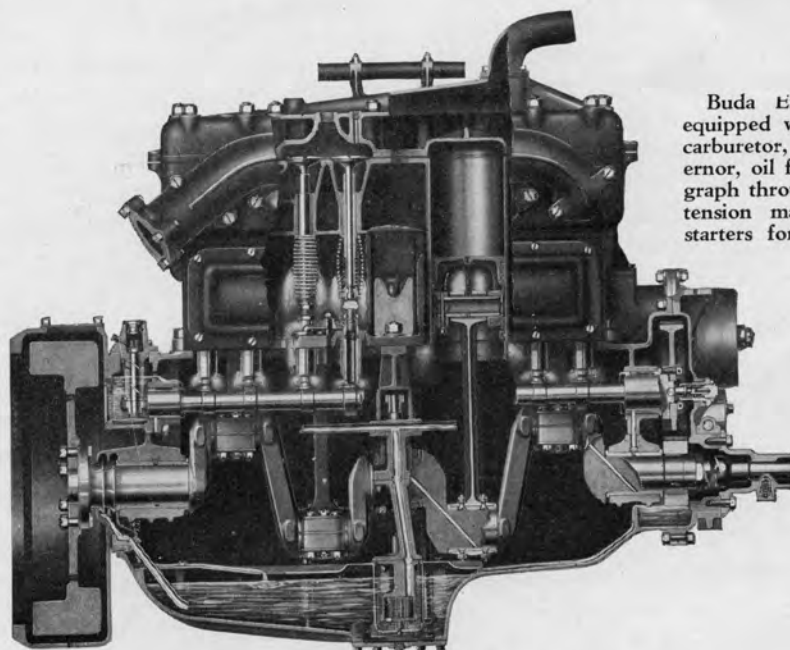
Maximum horsepower for operating hoist, 83 at 1000 R.P.M. with gasoline fuel. Natural gas approximately 20 per cent less.

RECOMMENDED FOR HEAVY DUTY UNIT. FOR 450 TO 650 R.P.M. FOR PUMPING AND 1000 R.P.M. FOR PULLING.

Model JH-6. Six cylinder Engine: Complete unit with above specifications also with sheet metal housing on steel base. Radiator cooling system, electric starting equipment and auxiliary ignition optional equipment.

Maximum horsepower, 150 at 1200 R.P.M. on gasoline, natural gas approximately 20 per cent less.

RECOMMENDED FOR DRILLING RIGS AND HEAVY DUTY SERVICE.



Sectional View Buda Engine

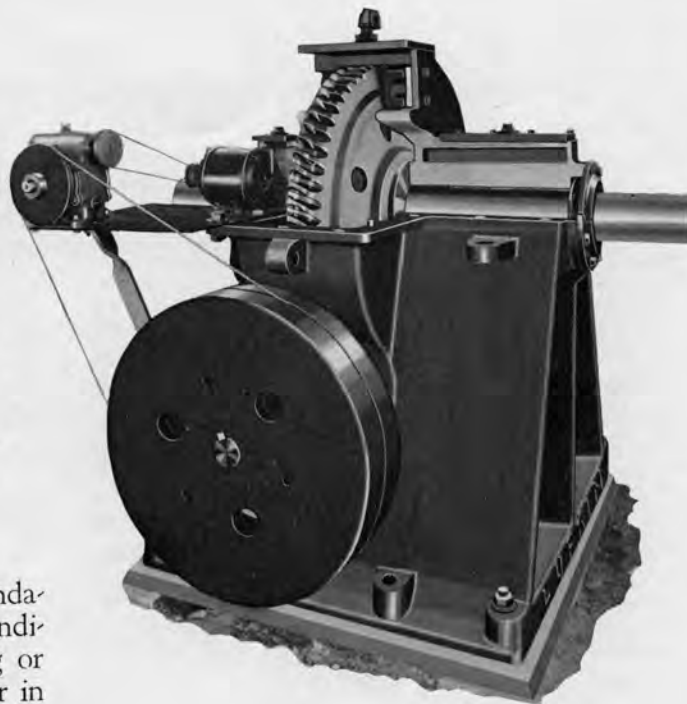
Buda Engines are regularly equipped with gas and gasoline carburetor, speed regulating governor, oil filter, air cleaner, telegraph throttle control; also high tension magneto with impulse starters for easy starting.

# Why,

- WHY: The worm gear is best adapted for oil well pumping in preference to any other type of gear.
- WHY: It maintains its original high efficiency.
- WHY: Worm gearing gives lasting service.
- WHY: More worm gears are being adopted for every dependable service—Steel Mills, Industrial and Power Plants, on cranes, hoists, pumps, compressors, automobiles, trucks, and numerous other places where efficiency and continuity of service, long life and simplicity of DESIGN are essential features.
- WHY: Lufkin worm gears are ideal for oil well pumping.

There are several salient features of fundamentals in worm gearing applied to conditions where the loads are of a pulsating or fluctuating nature, such as you encounter in pumping oil wells, where it is desirable, if not absolutely essential, under the pulsating load variations that the driven or crank shaft will not retard or drive backwards, and this is positively prevented in the worm gear reduction, due to the fact that the worm wheel cannot drive the worm. Hence, there cannot be any counter-rotative effect, which is very detrimental, not only to the pumping equipment and its connections, but is also very harmful to the prime mover, particularly if this be an electric motor, as these counter-impact loads are very apt, in time, to cause trouble with the motor windings, due to overheating, etc. The self-locking character of the worm and worm wheel positively provides against this condition, as no other form or type of gear transmission will do.

Even with the most accurately cut spur, or helical gears operating with parallel shaft axis, there must be a clearance (which is commonly called backlash) between the mating teeth to permit the gears to operate. The influence of this clearance, or lost motion, when applied to conditions where the load characteristics are variable, is to cause accelerations and decelerations when running. This action is further accentuated by any errors or inaccuracies in the circumferential



Standard Unit Driven by 1/16 H.P. Motor and Fish Line for Belt. Modern worm gears are highly efficient.

spacing of the teeth or variations in the tooth profiles, which conditions are not only possible, but very probable in most spur gears, as in the strictest sense of the term there are very few accurately cut spur gears, due to the fact that this type of gear is produced in most cases with form tooth cutters on machines with tooth to tooth indexing, where circumferential errors may be cumulative. When the accelerations are sufficient to cause the teeth to leave contact, they will come together again with an impact, the force of which may be many times as great as the applied loads. This action is not only detrimental to the connected apparatus, but has a tendency to quickly deform the original tooth profiles, resulting in resistance, rapidly decreasing efficiency, excessive noise and vibration. Whereas, the correctly designed and proportioned worm gear reductions are not only highly efficient units when new, but the efficiency does not decrease during years of service, even after considerable wear may have taken place. The reason for this is that the action of the worm on the wheel is identical to that of the hob which originally gen-

erated the worm gear teeth. As wear occurs the worm generates new correct tooth contours on the gear, with the result that the efficiency on the combined unit is unimpaired by wear; also an absolute uniformity of torque is delivered to the driven shaft at all times.

Again, in a spur or herringbone gear, the tooth action is primarily rolling, but a certain amount of sliding takes place, due to the difference in curvature of the two mating teeth. This results in a steady erosion of such teeth, which alters their contour and makes the rolling action rough, and tends toward a lowered efficiency with length of life.

The worm gear, on the other hand, has a sustained efficiency throughout its life. It is primarily a sliding gear, and the materials used in it, and to lubricate it, are all selected to afford the minimum of sliding friction. There is no such thing as perfect lubrication, but the very small amount of wear evidenced

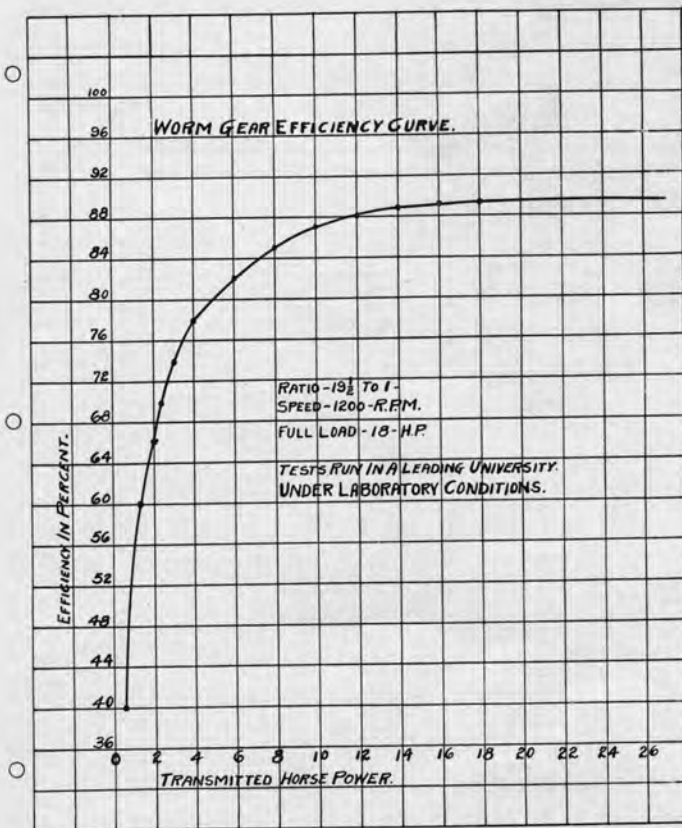
in worm gearing affords ample proof that this condition is closely approached in the worm gear, and that is the reason the efficiency is high to start with. The worm gear is made of hard bronze, which is, however, soft in comparison to the case-hardened worm. Wear, therefore, occurs on the gear alone; the worm is scarcely touched in years of operation. As a result, the wear on the gear is uniform, the tooth profile is not altered, as the unchanging worm performs the same action in its gradual wearing on the gear that the hob performed in cutting the gear.

This is in no way true of spur or herringbone gearing, where the material of the two mating parts must be selected for strength, rather than bearing qualities, and where there is no tendency to regenerate the correct tooth profile in operation.

To consider herringbone or spur gear performing the same work, a double reduction would be necessary, which, if well made would afford an efficiency of about 92% new, but this figure would not be sustained for any length of time.

The accompanying diagram indicates a curve showing 89% efficiency on our 20 to 1 ratio (exact 19½ to 1) triple thread worm gears under test by Cornell University, who state these figures are justified within 1%. We have also verified these tests in our own shop with home-made apparatus and believe that with special lubricants as high as 92% can be obtained.

An over-all efficiency from motor to Polish Rod of 70 to 80% may be realized and maintained for years with Lufkin Gears. After all, efficiency of the units is the net cost of operation at the end of the month. The cost of maintenance, loss in down time, saving in time cleaning well, all go to make the lifting cost per barrel, and only that tells the story.







New Machine Shop, 103 feet wide, 386 feet long, where Lufkin Equipment is manufactured by most modern methods. Made strictly to gauges and templates, out of the best materials and with good workmanship.

In our plant will be found a modern Foundry that can handle pieces up to 30,000 pounds. A modern Forge Plant that can forge shafts 12" diameter and under from

mill billets, a Tank and Structural Shop, a well appointed Pattern Shop, a Pipe Shop, and a modern and well stocked Mill Supply House.

*We specialize on:*

**Oil Field Equipment—**

- PUMP UNITS
- HOIST, ETC.
- ROTARY DRAW WORKS
- TAYLOR ROTARIES
- HEAVY SCREWED END AND FLANGED FITTINGS

**General—**

- HEAVY TRANSMISSION
- FLY WHEELS UP TO 12 FEET DIAMETER
- HEAVY PULLEYS
- GEARING OF ALL KINDS
- SPROCKETS AND CHAIN
- HEAVY FORGINGS

***General Supplies—Send Us Your Inquires***

