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LUFKIN

FOUNDRY & MACHINE CO.

PRESENTS

THE **modern** PUMPING UNIT

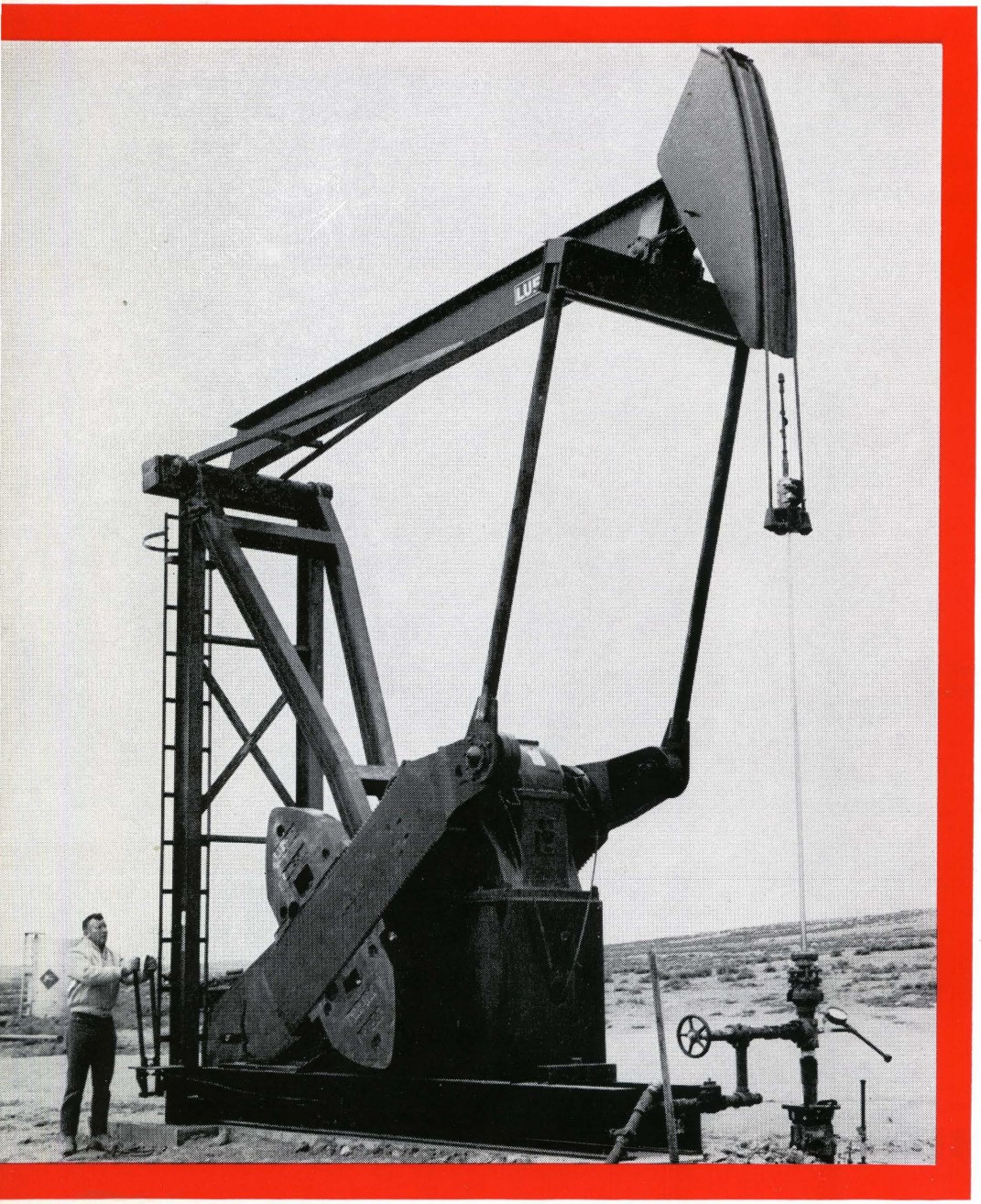


LUFKIN MARK II

UNITORQUE pumping unit

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THE LUFKIN MARK II *UNITORQUE* pumping unit



A Lufkin M-160D-200-74 Mark II Unitorque Pumping Unit in Northern Wyoming, being counterbalanced while in operation.

A NEW CONCEPT IN OILWELL PUMPING

The LUFKIN MARK II Unitorque Pumping Unit employs a new kinematic concept made of the tried and proven structural components of the conventional mechanical pumping unit. This new, simple and imaginative design of the LUFKIN MARK II furnishes one of the most advanced and trouble-free systems of rod pumping available today, providing for many money saving advantages not heretofore thought possible.

A NEW Unit with the same OLD Lufkin Ruggedness and Dependability

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the NEW LUFKIN UNITORQUE SYSTEM

How it works!

The LUFKIN MARK II Pumping Unit utilizes an ingenious patented arrangement of the regular components of the conventional crank balanced pumping unit (walking beam, samson post, gear reducer, cranks, pitmans and counterweights) to effect a more uniform loading on the gear reducer, smoothing out and decreasing peak torque as much as **40%.**

The LUFKIN MARK II uses a rotary counterweight system similar to the conventional unit, but lifts the front of the beam rather than pulling down on the tail end. The cross yoke (equalizer) is shifted forward toward the horsehead instead of placing it directly over the gear reducer. This produces an up and down stroke of 195° and 165° respectively (Fig. A). The 195° upstroke reduces the polished rod acceleration where the load is greatest and thus effects a reduction in peak polished road load. Further benefit is obtained by locating the cross yoke forward, where a greater mechanical advantage is obtained when lifting the load, while a lesser mechanical advantage is used for the reduced downstroke load, (i.e., the maximum upstroke torque factor is decreased and the maximum downstroke torque factor is increased). The counterbalance weights are offset on the crank. This produces a counterbalance torque which, at the beginning of the upstroke, "lags" the torque produced by the well load approximately 7½°. Similarly, at the beginning of the downstroke, this same offset condition produces a counterbalance torque which "leads" the well torque approximately 7½°.

Additional advantage is obtained by making the unit work over both top and bottom of the polished rod stroke while proportionately reducing both the up and down side loads.

Independently, these features would not produce a uniform torque; by working together a Unitorque system is obtained which in turn can effect a torque reduction on the gear reducer up to 40%.

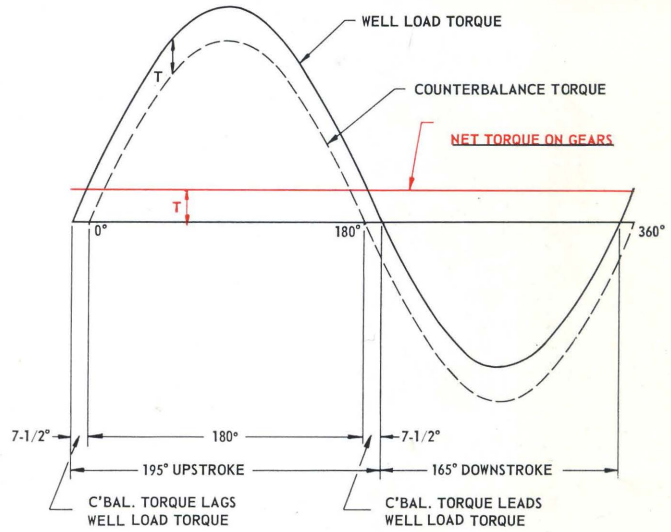


FIGURE A

Why it saves the operator money!

In most applications, this reduction in peak torque, which is an exclusive feature of the LUFKIN MARK II, permits the use of a size smaller gear reducer, generally affording a substantial first-cost savings to the operator.

Figure B below shows the calculated crank shaft torque on turnabout comparison tests between a conventional pumping unit and a LUFKIN MARK II, pumping the same well with the same electric motor, under identical well conditions. The peak torque demand of 110,000"# would require a 114-API gear reducer on conventional geometry, while the LUFKIN MARK II peak torque demand for the same job is only 65,000"#, requiring an API-80 reducer **on the same application.**

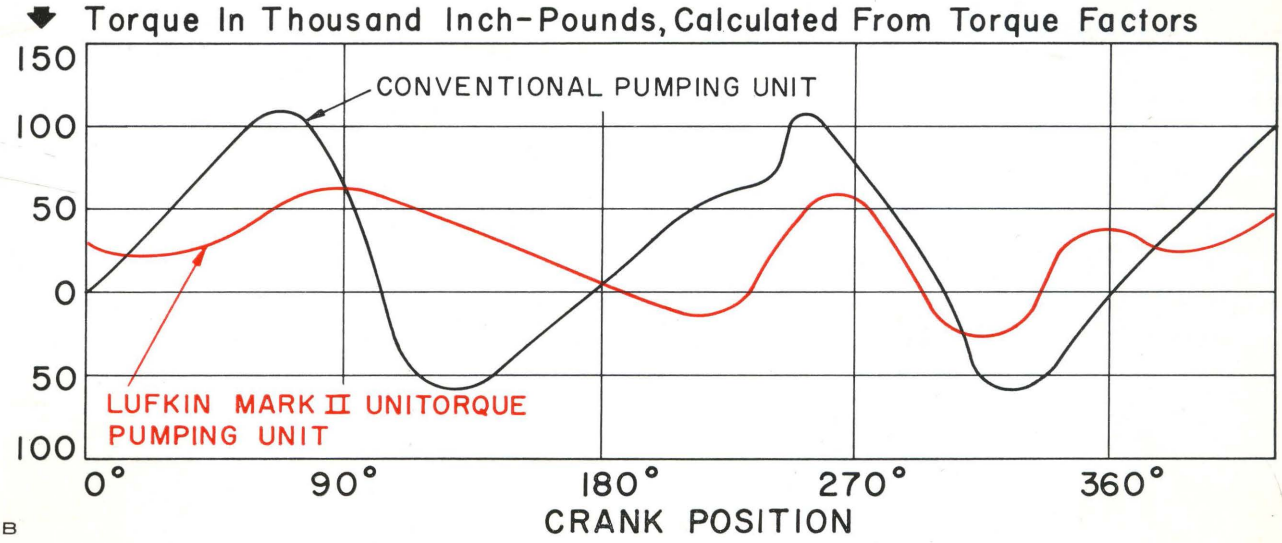
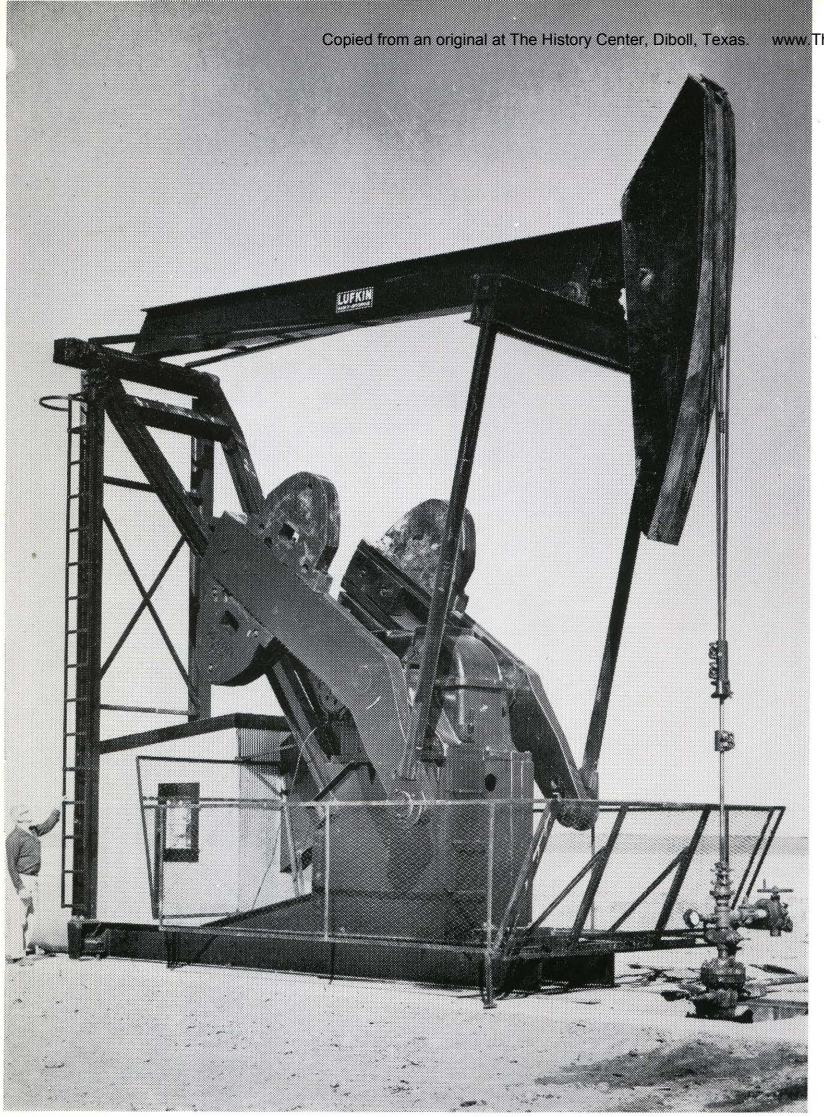


FIGURE B

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A Lufkin M-456D-253-144 Mark II unit with engine house for slow speed engine, pumping in Northern Montana.

Reduces rod loads up to 10%!

POLISHED ROD MOTION

Due to the unique geometry of the LUFKIN MARK II, the acceleration at the bottom polished rod reversal is decreased as much as **40%.** This reduces peak load up to **10%** and tends to avoid shock, resulting in longer rod life, lower servicing costs, and less production loss from rod break shutdowns.

The curves below (Figure C) show comparative accelerations at the bottom polish rod reversal for a conventional unit and the Mark II turning in synchronism. Note the Mark II's lower maximum acceleration and relatively smoother profile.

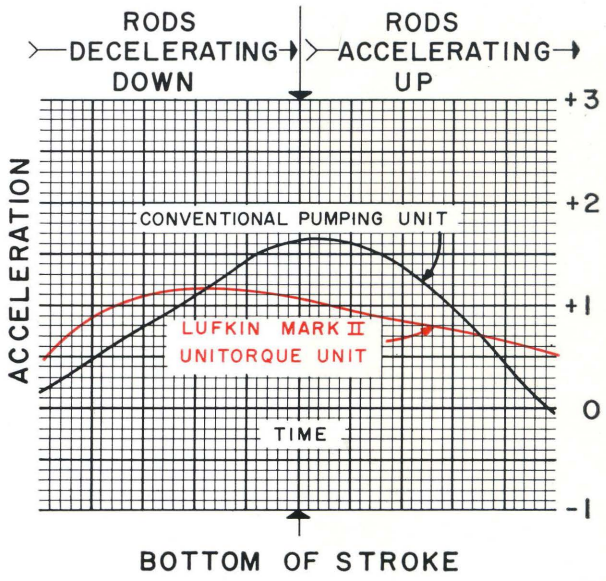


FIGURE C

The operator benefits on

- **SLIM HOLES**—Where small diameter tubing limits the size of sucker rods, the lower rod stress obtained with the LUFKIN MARK II allows the use of longer rod strings or larger pumps.
- **DEEP HOLES**—Extends range of sucker rod pumping to depths previously unattainable.
- **BIG VOLUME WELLS**—Lowered peak load conserves a greater portion of the polished rod capacity for handling additional fluid.

PRIME MOVER SAVINGS

First cost and continued operating savings!

The LUFKIN MARK II, due to its more uniform torque demand, illustrated by the following power curves (Figure D) generally permits the use of a smaller prime mover to pump any given well. In the case of a gas engine drive, the first costs savings are substantial. With an electric motor drive, additional savings are obtained, when electric power charges are based on demand or connected horsepower. The following curves show watt meter studies on a head-to-head comparative test between a conventional pumping unit and the LUFKIN MARK II, pumping the same well under identical conditions.

Where electric motors are used, the continual day-to-day savings in demand charges may, in the long run, amount to as much or more than the original first cost savings.

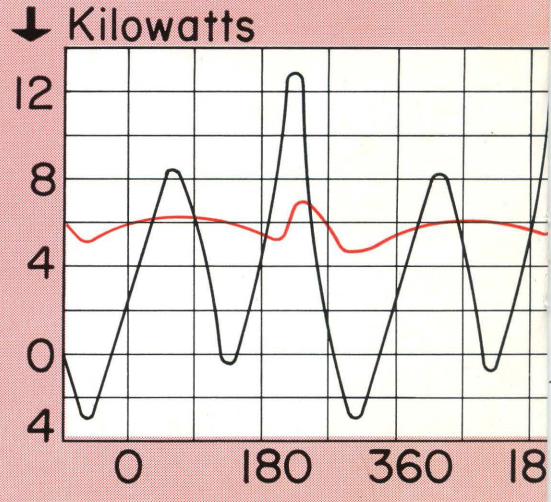


FIGURE D

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Semi-Automatic COUNTERBALANCING*

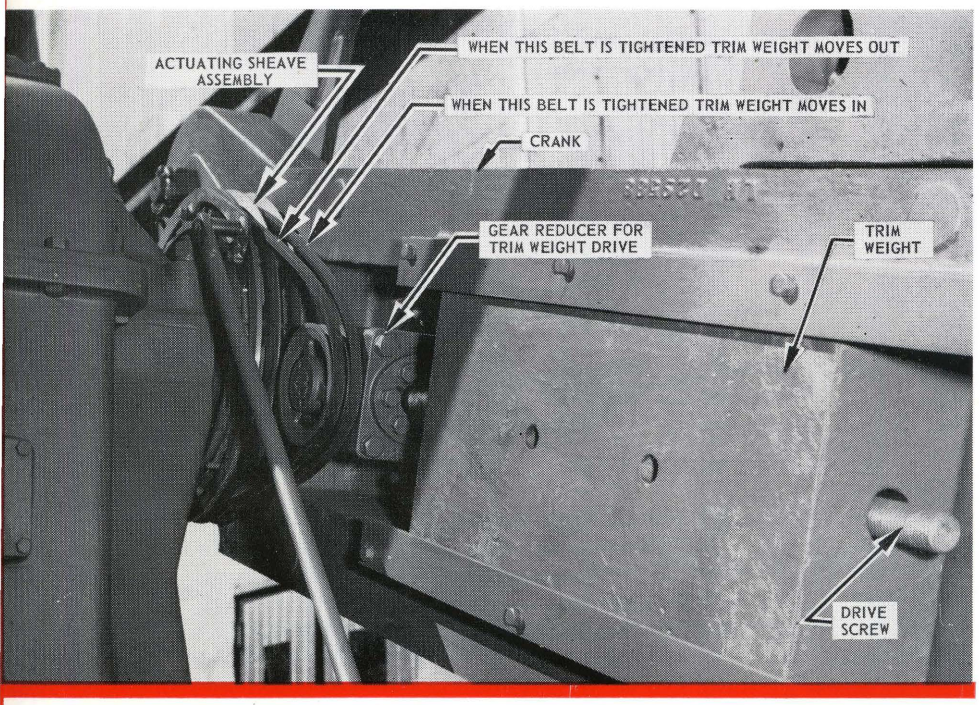


FIGURE E

For those applications where changing well conditions necessitate changing counterbalance requirements, an exclusive patented semi-automatic counterbalancing device (optional) is available on the LUFKIN MARK II Unitorque Units (Figure E). A counterbalance TRIM WEIGHT, located in each crank, can be moved either in or out, depending on whether less or more counterbalance is required. Moving the trim weights is easily accomplished while the unit is running by moving a lever either forward or backward (see Page 2). One lever actuates the right hand trim weight; the other lever operates the left hand.

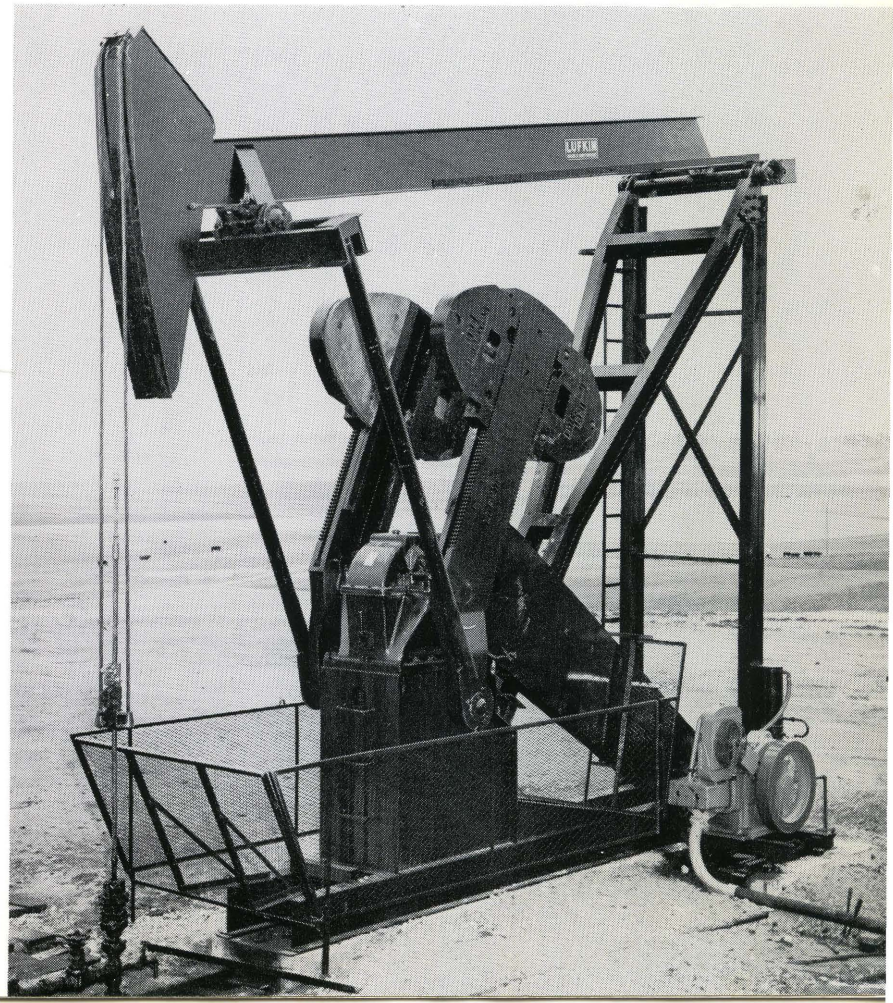
Naturally, when a radical change in counterbalance is required, such as when the stroke length is changed, the main counterweights themselves may be moved.

Additional profit accrues because...

- The Mark II can be counterbalanced while in operation, it is not necessary to shut the unit down, lose well stability, nor laboriously "cut and try" to perform this important function. The Mark II uses its own energy to drive the trim weights out or in (depending upon whether more or less counterbalance is required) thus eliminating the hazards usually associated with this operation. The expense of a maintenance man to perform this job is also reduced or eliminated.
- This safe, simple, trouble-free and easy method of keeping the unit in correct counterbalance without stopping it helps insure maximum life for all unit components and prime mover, as well as reducing power costs.



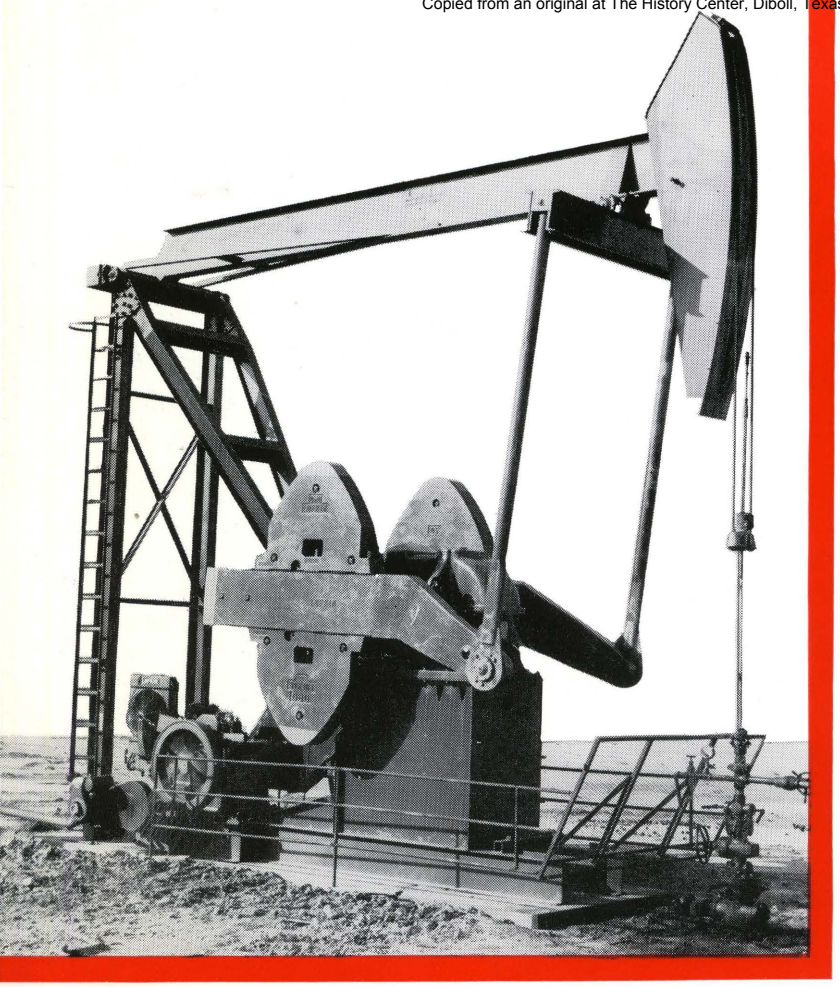
360



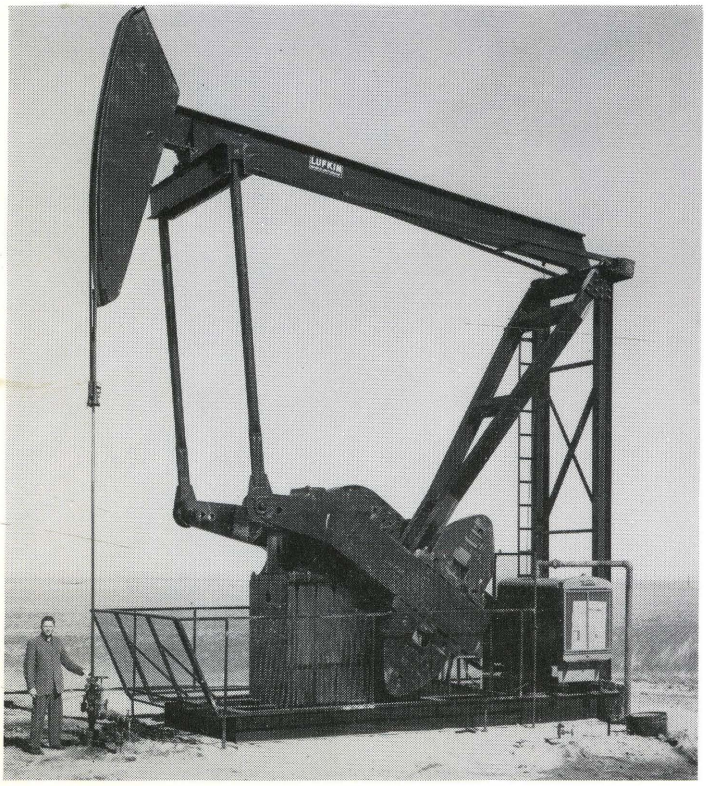
A Lufkin M-228D-256-100 Mark II Unit, pumping near Sidney, Montana, and driven by a Lufkin H-333 engine.

*(optional at additional cost)

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An M-640D-304-144 Lufkin Mark II, pumping in Southeastern Mississippi. The unit is driven by an H-795 Lufkin engine, counter-clockwise rotation, compactly mounted under the post on the main base sills.



A Lufkin M-456D-253-144 Mark II Unit operating near Sterling, Colorado. Note compactness of drive when multi-cylinder engine is mounted within the samson post.

THROUGHOUT

the past century, some of the pumping unit industry's prime targets have been to develop a simple, economical and dependable pumping unit having the following features—

- Accurate counterbalancing, regardless of prime mover, without shutting down the unit.
- Reducing and smoothing out torque loads in order to minimize gear reducer and prime mover size.
- Effecting a polish rod motion that maximizes rod life and minimizes down time and production losses.

ALL of these highly desirable features, and more, can now be found in the Lufkin Mark II Unitorque Pumping Unit, which employs a new arrangement of the same, simple, conventional components that have been tried and proven in the petroleum industry for over a century. More than ninety oil companies have successfully operated the Mark II over the past seven years, and many of them have accepted it only after the most rigorous field testing and analysis. If you are interested in maximum long run pumping unit profitability, let your nearest Lufkin representative show you how much you can save by using the new Lufkin Mark II.

THE FOLLOWING LUFKIN MARK II PUMPING UNIT ASSEMBLIES ARE AVAILABLE NOW:

M-912D-356-168
M-912D-305-168
M-912D-356-144
M-912D-304-144
M-640D-305-168
M-640D-356-144
M-640D-304-144
M-640D-253-144
M-640D-365-120
M-640D-304-120
M-640D-256-120
M-456D-305-168
M-456D-356-144
M-456D-304-144
M-456D-253-144
M-456D-365-120
M-456D-304-120
M-456D-256-120
M-320D-304-144
M-320D-253-144
M-320D-304-120
M-320D-256-120
M-320D-213-120
M-320D-298-100
M-320D-256-100
M-228D-256-120
M-228D-213-120
M-228D-256-100
M-228D-246-86
M-228D-200-86
M-228D-246-74
M-228D-200-74
M-228D-173-74
M-160D-246-86
M-160D-200-86
M-160D-173-86
M-160D-246-74
M-160D-200-74
M-160D-173-74
M-114D-143-86
M-114D-200-74
M-114D-173-74
M-114D-143-74
M-114D-169-64
M-114D-143-64

KEY TO NOMENCLATURE

M-114D-200-74

1 2 3

1. TORQUE RATING (1000 IN. LB.)
2. POLISHED ROD CAPACITY (100 LB.)
3. STROKE LENGTH (INCHES)

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CONDENSED GENERAL DIMENSIONS AND SPECIFICATIONS

GEAR REDUCER

Lufkin Standard Double Reduction Herringbone Gear Reducer (with over-sized crank shaft).

BEARINGS:

Cross Yoke, Samson Post and Crank Pin Bearings, Factory Packed, Spherical Roller Bearings.

STRUCTURAL COMPONENTS:

LUFKIN'S STANDARD DESIGN FACTORS OF SAFETY ARE EMPLOYED THROUGHOUT.

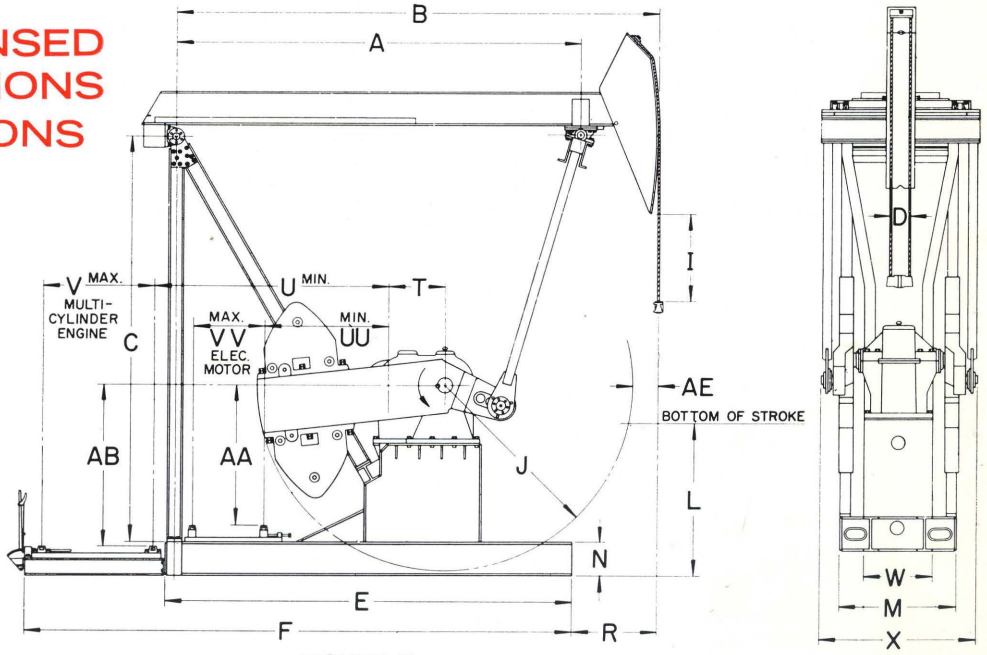


FIGURE F

DIMENSIONS

UNIT	A	B	C	D	E	F	I	J	L	M	N	R	T	U	V	W	X	AA	AB	AE	UU	VV
M-912D-356-168	22'6"	27'10"	23'07⅞"	12"	23'11½"	★	42⅝"	108"	71⅜"	69¾"	16⅛"	60"	48½"	★	★	49¾"	8'9"	7'21⅛"	★	19	6'10½"	67
M-912D-305-168	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-912D-356-144	21'6"	26'0"	21'07⅞"	"	21'71⅝"	"	39⅝"	"	76⅞"	"	"	55⅝"	"	"	"	"	"	"	"	13⅝"	6'51⅝"	55
M-912D-304-144	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	8'73⅜"	"	"	"	"	"
M-640D-305-168	22'6"	27'10"	23'07⅞"	"	23'11½"	"	42⅝"	"	71⅜"	"	"	60	41½"	"	"	46½"	8'5"	"	"	23⅞"	7'1⅛"	67
M-640D-356-144	21'-6"	26'-0"	21'-07⅞"	12"	21'-3½"	"	39⅝"	"	76⅞"	69¾"	16⅛"	60"	41½"	"	"	46½"	8'-5"	47⅞"	"	18"	29⅝"	29¾"
M-640D-304-144	"	"	"	"	"	"	63⅝"	"	"	"	"	"	"	"	"	"	8'-33⅜"	"	"	"	"	"
M-604D-253-144	"	"	"	9"	"	"	44⅜"	"	74"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-640D-365-120	"	"	"	12"	"	"	63⅝"	"	76⅞"	"	"	"	"	"	"	"	8'-5"	"	"	"	"	"
M-640D-304-120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	8'-33⅜"	"	"	"	"	"
M-640D-256-120	"	"	"	9"	"	"	69⅛"	"	73¼"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-456D-305-168	22'6"	27'10"	23'07⅞"	12"	23'11½"	"	42⅝"	"	71⅜"	"	"	"	38⅜"	"	"	"	8'5"	7'21⅛"	"	23⅞"	7'4¾"	67
M-456D-356-144	21'-6"	26'-0"	21'-07⅞"	"	21'-3½"	"	39⅝"	"	76⅞"	"	"	"	38⅜"	"	"	"	8'-5"	47⅞"	"	18"	32¾"	29¾"
M-456D-304-144	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	8'-33⅜"	"	"	"	"	"
M-456D-253-144	"	"	"	9"	"	"	44⅜"	"	74"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-456D-365-120	"	"	"	12"	"	"	63⅝"	"	76⅞"	"	"	"	"	"	"	"	8'-5"	"	"	"	"	"
M-456D-304-120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	8'-33⅜"	"	"	"	"	"
M-456D-256-120	"	"	"	9"	"	"	69⅛"	"	73¼"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-304-144	"	"	"	12"	"	"	39⅝"	"	76⅞"	"	"	"	34"	"	"	43"	7'-43⅜"	"	"	"	37⅛"	"
M-320D-253-144	"	"	"	9"	"	"	44⅜"	"	74"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-304-120	"	"	"	12"	"	"	63⅝"	"	76⅞"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-256-120	"	"	"	9"	"	"	69⅛"	"	73¼"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-213-120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-298-100	"	"	"	12"	"	"	83⅝"	"	76⅞"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-320D-256-100	"	"	"	9"	"	"	89⅛"	"	73¼"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-256-120	"	"	"	"	"	"	69⅛"	"	"	"	"	"	30"	"	"	37"	6'-93⅜"	"	"	"	41⅛"	"
M-228D-213-120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-256-100	"	"	"	"	"	"	89⅛"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-246-86	15'-6"	18'-6"	15'-83⅜"	9"	15'-6½"	21'-0"	45¼"	86⅝"	65¼"	57"	15⅞"	39"	"	103¾"	51½"	"	6'-83⅜"	65¼"	74⅞"	11⅜"	53¼"	33¼"
M-228D-200-86	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-246-74	"	"	"	"	"	"	58⅝"	"	65½"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-200-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-228D-173-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-160D-246-86	"	"	"	"	"	"	45¼"	"	65¼"	54"	"	"	26"	107¾"	"	32"	6'-03⅜"	"	"	"	57¼"	33¼"
M-160D-200-86	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-160D-173-86	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-160D-246-74	"	"	"	"	"	"	58⅝"	"	65½"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-160D-200-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-160D-173-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-114D-143-86	13'-6"	15'-9"	12'-31½"	"	13'-03¾"	18'-6¼"	143⅜"	62"	53½"	42"	12"	36"	24"	96½"	"	25"	673⅜"	44¼"	50"	16"	50"	29¾"
M-114D-200-74	15'-6"	18'-6"	15'-83⅜"	"	15'-6½"	21'-0"	58⅝"	86⅝"	65½"	54"	15⅞"	39"	"	109¾"	"	"	69"	65¼"	74⅞"	11⅜"	59¼"	33¼"
M-114D-173-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-114D-143-74	13'-6"	15'-9"	12'-31½"	"	13'-03¾"	18'-6¼"	25⅞"	62"	53"	42"	12"	36"	"	96½"	"	"	673⅜"	44¼"	50"	16"	50"	29¾"
M-114D-169-64	"	"	"	"	"	"	21"	"	67⅜"	"	"	"	"	"	"	"	"	"	"	"	"	"
M-114D-143-64	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

★ *Multi-cylinder engine mounts forward of samson post on these units.*

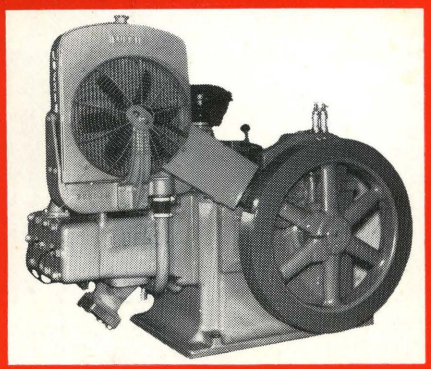
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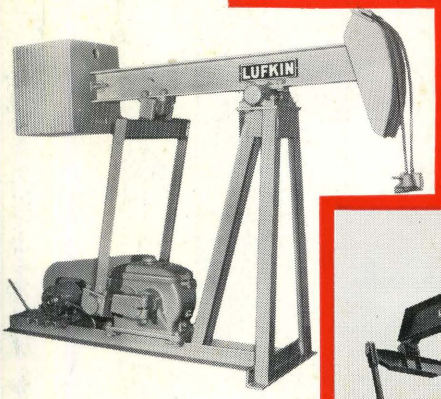
OTHER LUFKIN PUMPING EQUIPMENT . . .

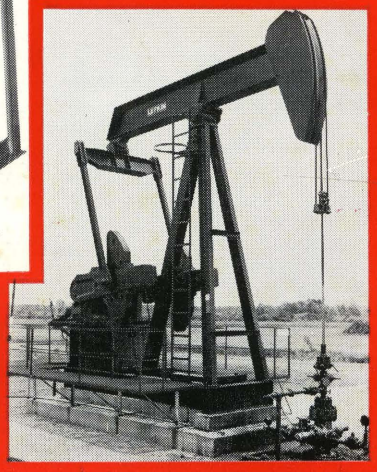


AIR BALANCED UNITS

GAS ENGINES







CONVENTIONAL PUMPING UNITS

LUFKIN OFFICES AND WAREHOUSES

*BAKERSFIELD, CALIFORNIA
2500 Parker Lane
P. O. Box 444
Phone: FAirview 7-3563

*CASPER, WYOMING
East Yellowstone Hwy.
P. O. Box 1849
Phone: 237-2670

CORPUS CHRISTI, TEXAS
1413 Casa Grande
Phone: TErminal 5-8987

DALLAS, TEXAS
800 Vaughn Building
Phone: RIverside 8-5127

DENVER, COLORADO
1700 Broadway, Suite 1423
Phone: ALpine 5-1616

*GREAT BEND, KANSAS
North Main Street
P. O. Box 82
Phone: GLadstone 3-5622

*FARMINGTON, NEW MEXICO
East Bloomfield Highway
P. O. Box 1554
Phone: DAvis 5-4261

HOBBS, NEW MEXICO
P. O. Box 104
1212 E. Lincoln Rd.
Phone: EXpress 3-5211

HOUSTON, TEXAS
1408 C. & I. Life Building
Phone: CApitol 2-0108

*KILGORE, TEXAS
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*OKLAHOMA CITY, OKLAHOMA
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P. O. Box 2337
Phone: CEntral 6-4521

PAMPA, TEXAS
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