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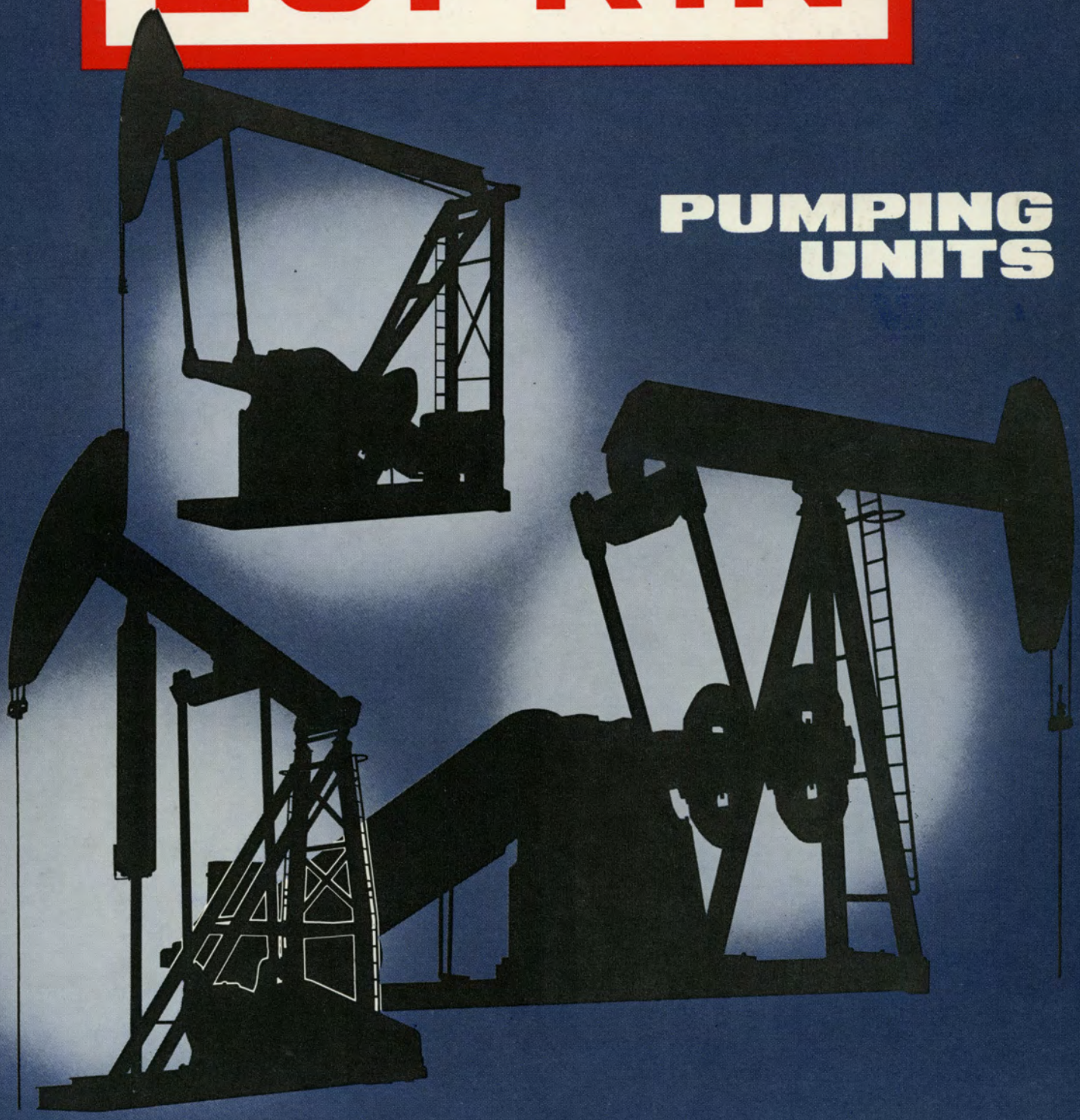
CAT. 74-75

LUFKIN

PUMPING UNITS



LUFKIN INDUSTRIES, INC.
LUFKIN, TEXAS

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LUFKIN EQUIPMENT OF ADVANCED DESIGN

1. Oil Field Pumping Units:

   A. Air Balanced Pumping Units—Pages 3340-3343

   B. Beam Balanced Pumping Units—Page 3344

   C. Crank Balanced Pumping Units—Pages 3322-3331

   D. Mark II Unitorque Pumping Units—Pages 3332-3337

2. Geared Speed Reducers and Increasers—Pages 3346-3347

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Phone: 301/879-9264

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Phone: 403/288-3073

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P. O. Box 1849
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LUFKIN INDUSTRIES, INC. **LUFKIN, TEXAS**

LUFKIN SUCKER ROD PUMPING UNITS ARE AVAILABLE TO HANDLE ALL INSTALLATION PROBLEMS AND DOWN HOLE CONDITIONS.

CONVENTIONAL UNITS

The LUFKIN Conventional Crank Balanced Unit, most widely known and accepted, is the old reliable "WORK HORSE" of the oil patch. This is the most universally adaptable unit in the "LUFKIN LINE," simple to operate and requires minimum maintenance. For all around pumping situations where dependability, ruggedness, and simplicity are prime considerations, the Conventional Unit has always been first choice.

MARK II UNITORQUE UNITS

The Mark II unit, due to its unique geometry and phased counterbalance feature, lowers peak torque and horsepower requirements in many instances when properly applied. The unusual geometry of the Mark II produces a somewhat slower up stroke and faster down stroke with reduced acceleration where the load is greatest, resulting in lower peak loads and longer rod life.

AIR BALANCED UNITS

The utilization of compressed air instead of heavy cast iron counterweights allows more accurate fingertip control of counterbalance. As a result, the weight of the unit is greatly reduced, significantly lowering transportation and installation costs. Air Balanced units have a distinct advantage in the larger sizes with long strokes, where cast iron counterweights on conventional crank counterbalanced units must be so massive that their use is practically prohibitive.

For large volume production from any depth Lufkin has developed the Hi-V Series of Air Balanced units with peak torque ratings up to 3,648,000 inch pounds, and stroke lengths up to 300 inches.

COMPACT TYPE AIR BALANCED UNITS FOR OFFSHORE PLATFORMS

Lufkin has taken advantage of the inherent compactness and light weight of the Air Balanced unit, reducing the height, width, and length to an absolute minimum. This makes this unit particularly desirable for offshore platforms where space is of greatest importance. Since all loads are approximately in the vertical plane, the destructive horizontal dynamic forces set up by rotating crank counterweights on conventional units are eliminated.

COMPUTER SERVICE IS AVAILABLE TO AID IN SIZING PUMPING UNITS, SUCKER RODS, AND PUMPS TO INSURE MAXIMUM PRODUCTION AND OPTIMUM UTILIZATION OF EQUIPMENT.

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DOUBLE REDUCTION AND TRIPLE REDUCTION GEAR UNITS

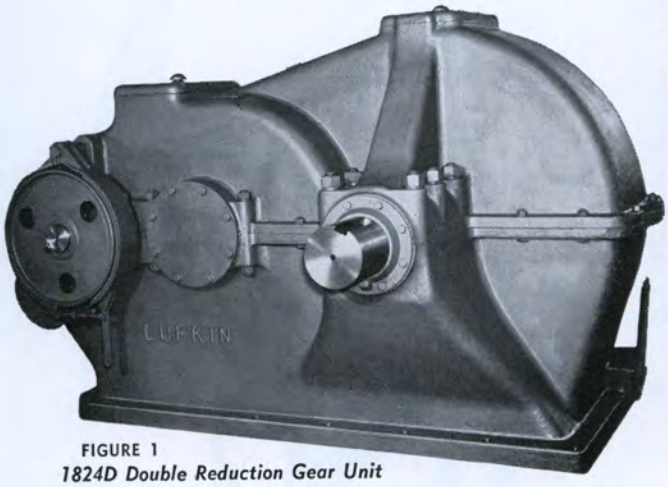

FIGURE 1
1824D Double Reduction Gear Unit

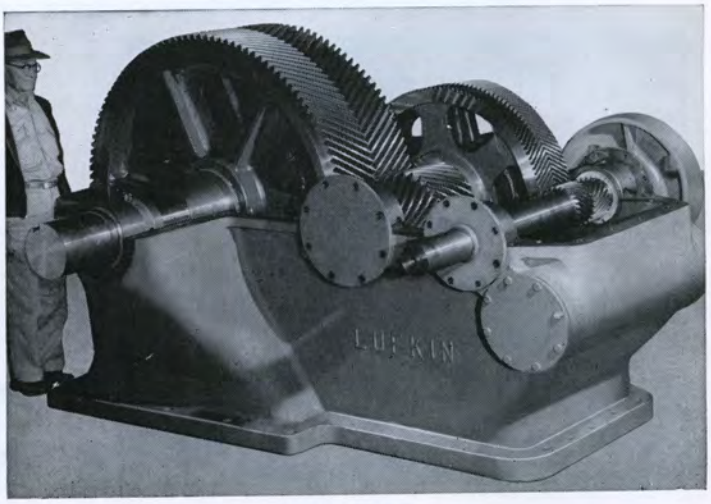

FIGURE 2
1824D Double Reduction Gear Unit, cover removed

1. Housing especially built for oil well service, of rugged construction with large factors of safety.
2. Precision cut Lufkin herringbone gears are used exclusively in all Lufkin pumping units.
3. Gear Cases are jig bored to same accuracy as gears.
4. All shafts forged from alloy steel, heat treated and precision ground.
5. Oversize Bearings on crankshafts. Easily renewable but seldom requiring replacement.
6. All pinions float on Straight Roller Bearings.
7. No Oil Pumps. Lufkin gears operate in oil bath with gear wipers to flood bearings.
8. Clam Shell Brake. No grabbing. Improved ratchet lever and stand, locomotive type.

GEAR SPECIFICATIONS

3648D GEAR REDUCER:

Double Reduction
RATING: 3,648,000 In. Lbs. Peak Torque
RATIO OF GEARS: 35.1
CRANKSHAFT DIA.: 13"
SHEAVE: 80" P.D.—18D Std.
6½" Bore
GEAR BOX OIL CAPACITY: 360 Gallons

2560D GEAR REDUCER:

Double Reduction
RATING: 2,560,000 In. Lbs. Peak Torque
RATIO OF GEARS: 34.53
CRANKSHAFT DIA.: 11¾"
SHEAVE: 68" P.D.—16D Std.
6½" Bore
GEAR BOX OIL CAPACITY: 235 Gallons

1824D GEAR REDUCER:

Double Reduction
RATING: 1,824,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.33
CRANKSHAFT DIA.: 9"
SHEAVE: 46" P.D.—11D Std.,
68" P.D. Max., 4-15/16" Bore
GEAR BOX OIL CAPACITY: 165 Gallons

1280D GEAR REDUCER:

Double Reduction
RATING: 1,280,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.05
CRANKSHAFT DIA: 8½" (Mark II, 10½")
SHEAVE: 46" P.D.—10D Std.,
68" P.D., 10D, Max., 4-15/16" Bore
GEAR BOX OIL CAPACITY: 120 Gallons

912D GEAR REDUCER:

Double Reduction
RATING: 912,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.72
CRANKSHAFT DIA.: 7" (Mark II, 9")
SHEAVE: 47.6" P.D.—8D Standard
55.2" P.D. Max., 4-3/16" Bore
GEAR BOX OIL CAPACITY: 107 Gallons

640D GEAR REDUCER:

Double Reduction
RATING: 640,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.6
CRANKSHAFT DIA.: 7" (Mark II, 9")
SHEAVE: 34" P.D.—6D Std., 47.4" or 51.4" P.D. Alt.,
55.4" P.D. Max., 3-7/16" Bore,
Crank Balanced and Mark II Units
51.4" Max. Air Balanced Units
GEAR BOX OIL CAPACITY: 70 Gallons

456D GEAR REDUCER:

Double Reduction
RATING: 456,000 In. Lbs. Peak Torque
RATIO OF GEARS: 29.04
CRANKSHAFT DIA.: 7" (Mark II, 9")
SHEAVE: 34" P.D.—6D or 8C Std., 47.4" P.D. Alt.,
51.4" P.D. Max., 3-7/16" Bore
GEAR BOX OIL CAPACITY: 55 Gallons

320D GEAR REDUCER:

Double Reduction
RATING: 320,000 In. Lbs. Peak Torque
RATIO OF GEARS: 30.12
CRANKSHAFT DIA. 6-7/16" (Mark II, 8½")
SHEAVE: 24.6" P.D.—6C or 5D Std., 29.6" P.D. Alt.,
47" P.D. Max., 2-15/16" Bore
GEAR BOX OIL CAPACITY: 50 Gallons

228D GEAR REDUCER:

Double Reduction
RATING: 228,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.45
CRANKSHAFT DIA.: 6" (Mark II, 7")
SHEAVE: 24.6" P.D.—5C or 4D Std., 29.6" P.D. Alt.,
41" P.D. Max., 2-7/16" Bore
GEAR BOX OIL CAPACITY: 34 Gallons

160D GEAR REDUCER:

Double Reduction
RATING: 160,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.67
CRANKSHAFT DIA.: 5-7/16" (Mark II, 7")
SHEAVE: 24.6" P.D.—4C or 3D Std., 29.6" P.D. Alt.,
38" P.D. Max., 2-3/16" Bore
GEAR BOX OIL CAPACITY: 22 Gallons

114D GEAR REDUCER:

Double Reduction
RATING: 114,000 In. Lbs. Peak Torque
RATIO OF GEARS: 29.4
CRANKSHAFT DIA.: 4-7/16" (Mark II, 6-7/16")
SHEAVE: 19.6" P.D.—3C Std., 24.6" or 29.6" P.D.
Alt., 33.6" P.D. Max., 1-15/16" Bore
GEAR BOX OIL CAPACITY: 17 Gallons

80D GEAR REDUCER:

Double Reduction
RATING: 80,000 In. Lbs. Peak Torque
RATIO OF GEARS: 29.15
CRANKSHAFT DIA.: 4-7/16"
SHEAVE: 19.6" P.D.—3C Std., 24.6" P.D. Alt.,
29.6" P.D. Max., 1-15/16" Bore
GEAR BOX OIL CAPACITY: 17 Gallons

57D GEAR REDUCER:

Double Reduction
RATING: 57,000 In. Lbs. Peak Torque
RATIO OF GEARS: 29.32
CRANKSHAFT DIA.: 4"
SHEAVE: 19.6" P.D.—2C Std., 24.6" P.D. Alt.,
27.5" P.D Max, 1-15/16" Bore
GEAR BOX OIL CAPACITY: 13 Gallons

40D GEAR REDUCER:

Double Reduction
RATING: 40,000 In. Lbs. Peak Torque
RATIO OF GEARS: 29.2
CRANKSHAFT DIA.: 4"
SHEAVE: 21" P.D.—2C or 3B Std.,
23.3" P.D. Max., 1-11/16" Bore
GEAR BOX OIL CAPACITY: 7 Gallons

25D GEAR REDUCER:

Double Reduction
RATING: 25,000 In. Lbs. Peak Torque
RATIO OF GEARS: 28.9
CRANKSHAFT DIA.: 3"
SHEAVE: 18" P.D.—2B or 3A Std.,
18" P.D. Max., 1⅜" Bore
GEAR BOX OIL CAPACITY: 5 Gallons

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EXPLANATION OF PUMPING UNIT DESIGNATIONS

C - 228D-200 - 74

Type Pumping Unit:
- A—Air Balanced
- B—Beam Counterbalance
- C—Conventional
- M—Mark II Unitorque

Peak Torque Rating In Thousands Of Inch Pounds

Polished Rod Load Rating In Hundreds of Pounds

D—Double Reduction Gear Reducer

Stroke Length In Inches

INSTRUCTIONS FOR ORDERING SPARE PARTS

WHEN ORDERING SPARE PARTS, THE DESIGNATION AND SERIAL NUMBER OF THE UNIT MUST BE GIVEN. This information is necessary in addition to the description of the part, part number, etc. By supplying all the information available our personnel will have a cross check on the particular part wanted and errors in typing, etc. can be circumvented.

LUBRICATION INSTRUCTIONS

LUFKIN PUMPING UNITS

GEAR REDUCER

For temperatures down to 0°F., use an SAE 90 Gear Oil, premium mineral oil with rust and oxidation inhibitors and with an anti-foam agent. Pour point of the oil should be 5°F. or lower.

For temperatures down to −30°F., use SAE 80 Gear Oil, premium straight mineral oil with rust and oxidation inhibitors and with an anti-foam agent. Pour point of the oil should be −15° F or lower.

If desired, units can be shipped with the gear reducer filled with oil that will comply with the above specifications.

Maintain the oil level above the low mark on gage but do not fill the gear reducer above the high mark on gage.

Every six months the operator should collect a typical sample of the oil in a glass jar. A visual inspection will expose possible dirt, sludge, water emulsion or other forms of contamination. If the lubricant has an abnormal appearance or smell, check with your oil supplier about replacement.

STRUCTURAL BEARINGS

All structural bearings are lubricated at the factory; however, they do require periodic relubrication as outlined below.

1. **WARM CLIMATES:** (Lowest annual temperature is above 0°F.)

Roller Bearings except Tapered Roller Crank Pin Bearings should be relubricated every 6 months. Use a premium NLGI No. 1 lithium soap base grease with lead naphthanate extreme pressure additive. Do not use soda soap grease.

Bronze Bearings and Tapered Roller Crank Pin Bearings should be relubricated as required to maintain oil level. Use an EP140 extreme pressure oil with lead naphthanate additive and a pour point of + 15°F or lower. If available, the use of a heavier oil (viscosity up to 6600 SUS at 100°F) is recommended.

2. **COLD CLIMATES:** (Lowest annual temperature down to −30°F.)

Roller Bearings except Tapered Roller Crank Pin Bearings should be relubricated every 6 months. Use a premium NLGI No. 0 lithium soap base grease with lead naphthanate extreme pressure additive. Do not use soda soap grease.

Bronze Bearings and Tapered Roller Crank Pin Bearings should be relubricated as required to maintain oil level by removing fill plug and adding oil until reservoir is full. Use an EP 80 or EP 90 extreme pressure oil with lead naphthanate additive and a pour point of −10°F. or lower.

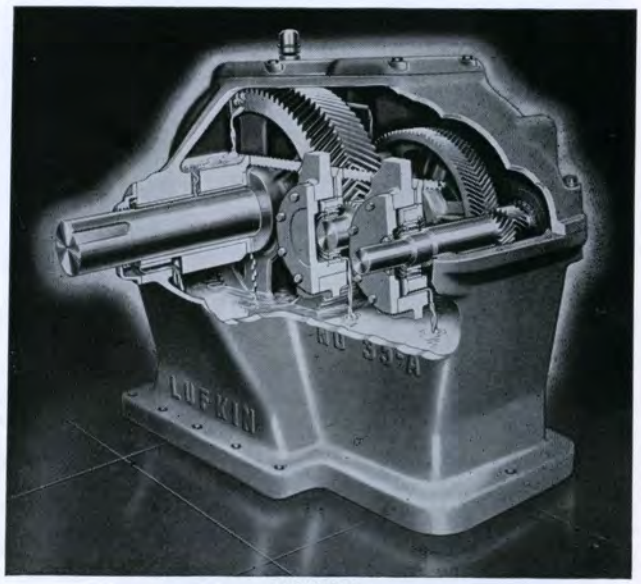

FIGURE 3

As long as the oil is maintained at the proper level, the slow speed and high speed gears dip in oil and provide continuous lubrication to the gear mesh.

Large oil wipers direct a flood of oil into oversized oil troughs which in turn provide each individual bearing with more than adequate lubrication.

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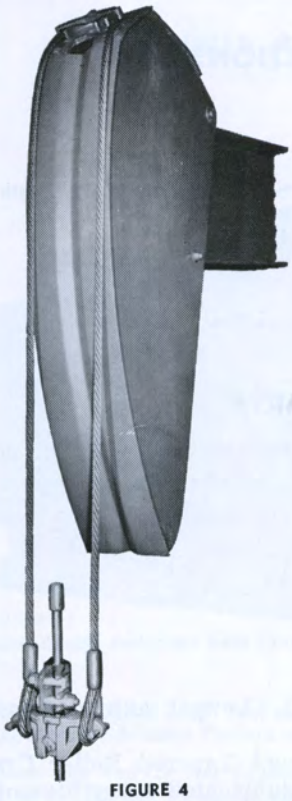

FIGURE 4

HORSEHEAD AND WIRE LINE ASSEMBLY

Easily aligned with polished rod without disconnecting well load. One-piece arc plate is used for greater strength.

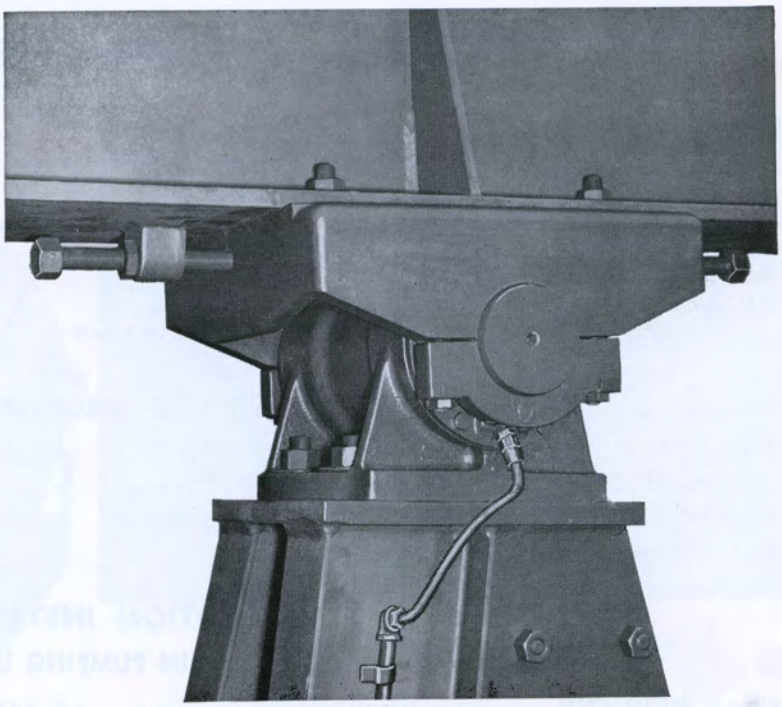

FIGURE 5

CENTER BEARING ASSEMBLY

Furnished with roller bearings on some C-80D and all larger sizes.

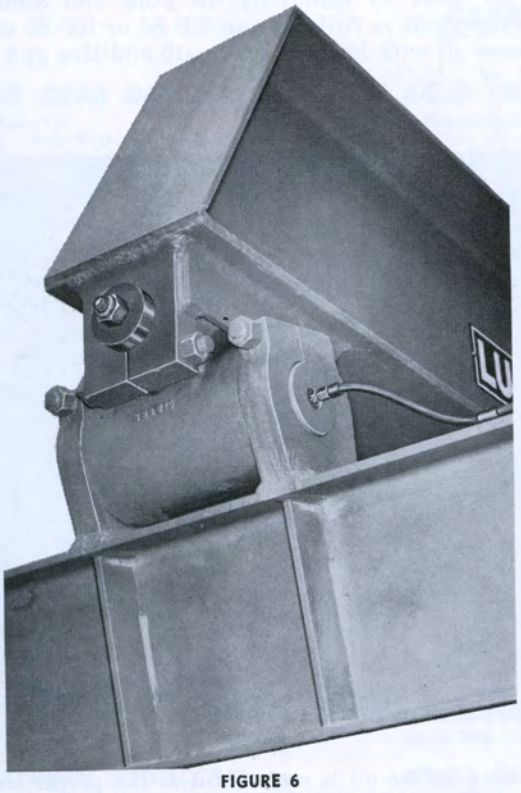

FIGURE 6

CRANK BALANCED UNIT EQUALIZER BEARING ASSEMBLY

Furnished with roller bearings on all sizes. Cross-pin type connection to walking beam is utilized.

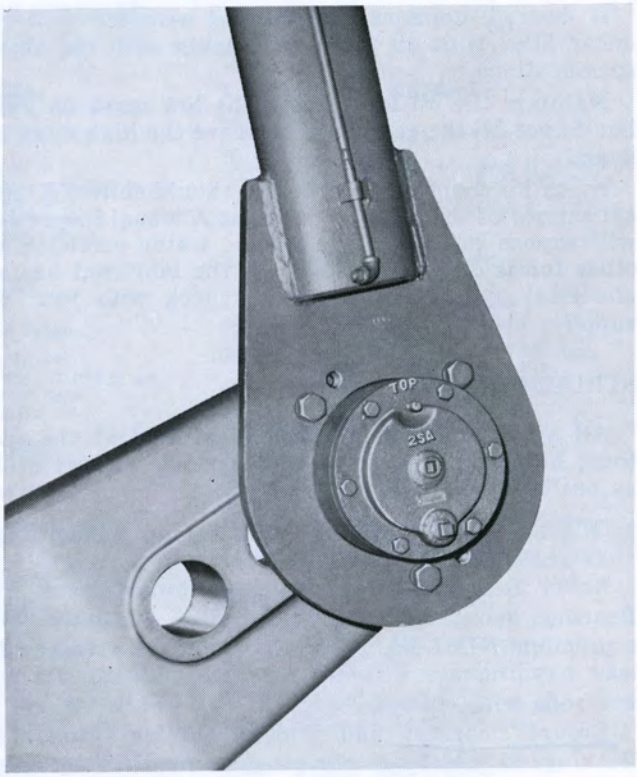

FIGURE 7

CRANK PIN ASSEMBLY

Furnished with roller bearings on some C-114D and all larger sizes.

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A WIDER RANGE OF COUNTERBALANCE AVAILABLE WITH THE TROUT COUNTERBALANCED TYPE B CRANK

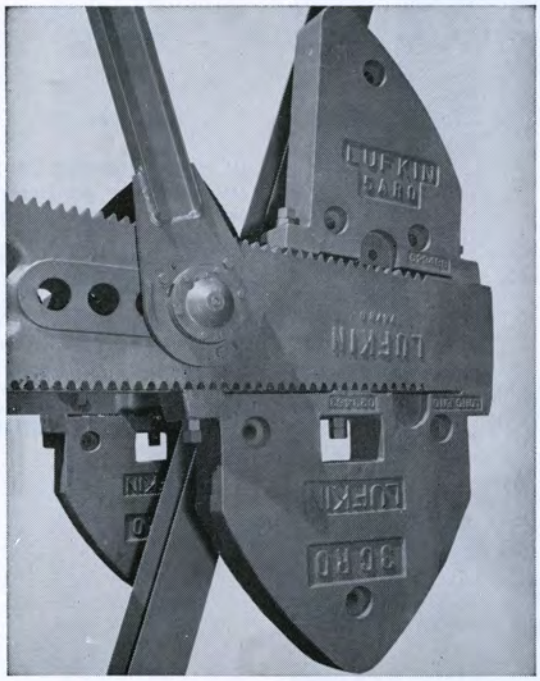

FIGURE 8—*Illustrating the wide range of counterweight sizes which can be used on one crank. Different size counterweights are not normally furnished or recommended for the same unit.*

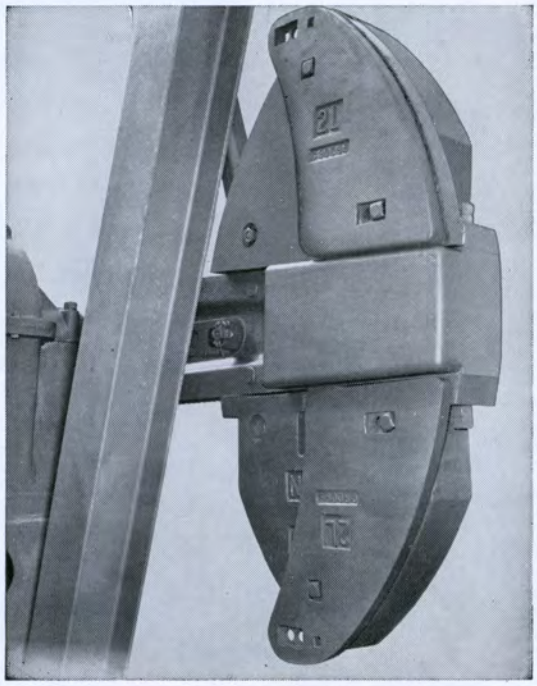

FIGURE 9—*L type auxiliary weights can be used alone or with S type auxiliary weights.*

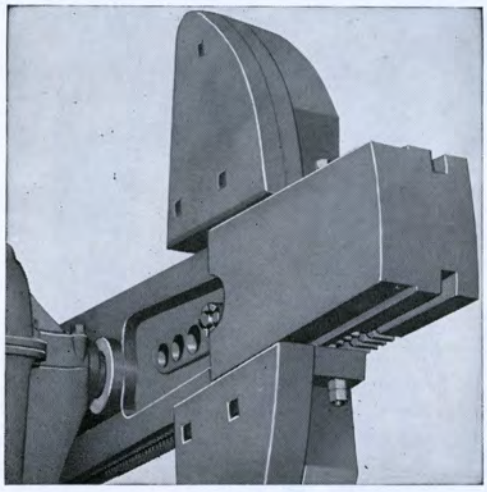

FIGURE 10—*Various combinations of type S and D auxiliary counterweights available for additional counterbalance.*

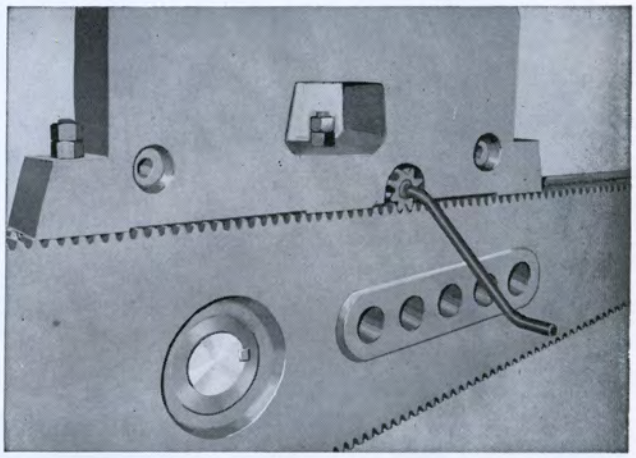

FIGURE 11—*New removable pinion (with crank handle attached) is used to adjust all counterweights.*

As shown in Figures 8, 9 and 10 a wide range of counterbalance is available on all LUFKIN units. With the various combinations of counterweights and auxiliary counterweights to choose from a very economical selection of counterbalance can be made.

Note in Figure 10 the extra counterbalance made available by the increased thickness at the end of the type B crank. With this type crank, one of two type S (single thickness) auxiliary counterweights can be added or one type D (double thickness) auxiliary counterweight can be added to each counterweight.

Also note in Figure 9 the new L type auxiliary weight. It offers counterbalance in smaller increments than has ever before been possible.

The Trout Counterbalanced Crank, using sliding weights to change the counterbalance effect, is an Original Lufkin Feature. Moving the counterweights has been made even safer and easier by the addition of a rack and pinion.

One Man Alone, using the special combination pinion and crank shown in Figure 11, can make the adjustment in a matter of minutes. All four weights can be adjusted without changing the position of the cranks.

Rack and pinion type cranks are regularly furnished on the C-40D assemblies and larger.

With the Trout Counterbalanced Crank there is no hazard to the operator or equipment as it is impossible for Trout counterweights to slide off the crank even when bolts are loosened, so long as nuts are not completely removed from bolts.

This same Safe, Simple and Easy Trout Counterbalance has been in use over a period of many years and has been installed on over ONE HUNDRED AND FIVE THOUSAND LUFKIN PUMPING UNITS.

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FIGURE 12

HI-PRIME PUMPING UNIT with elevated motor provides protection from high water and drifting sand and snow. If unit is moved to a location where electric power is not available, bolted-on motor support can be easily removed and a jointed gas engine base installed. Short foundation block reduces installation costs. Available in all structures using 40D through 912D gear reducers. Unit shown is a C-160D-200-74.

FIGURE 13

JOINTED SLOW SPEED ENGINE BASE, tailor made to fit particular prime mover. Since slide rails are not required with this type base the center of gravity is kept low, thus reducing vibration. Unit shown is a C-456D-256-144 driven by a SLOW SPEED Engine.

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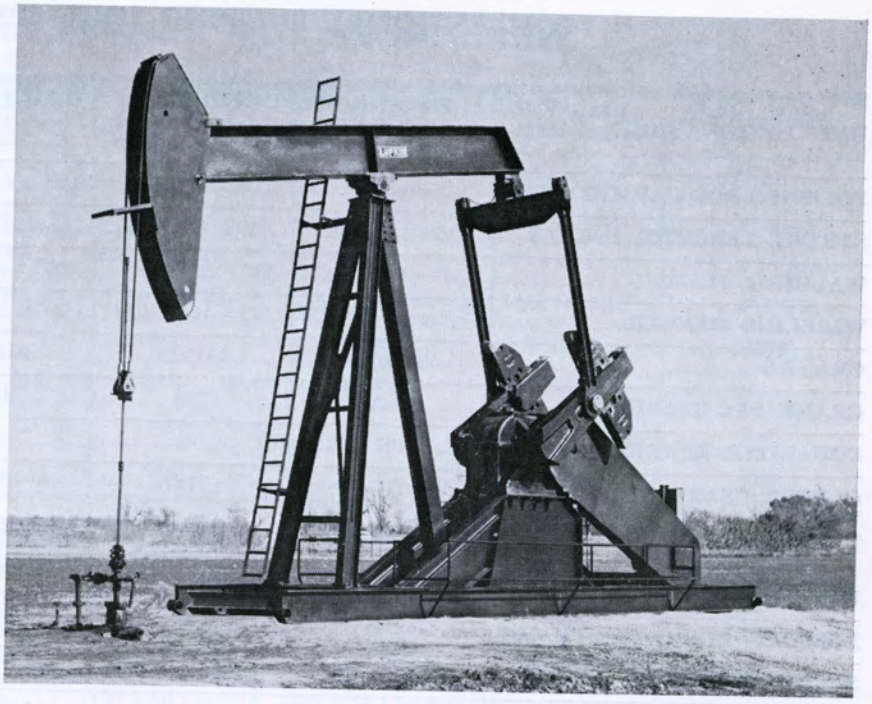

FIGURE 14

HEAVY DUTY PORTABLE "STRONGBACK" base is available for all units. Bases are also available with "Uniset" plated bottom to permit installation directly on soil with a minimum bearing capacity of 1500 pounds per square foot. Unit shown is a C-320D-256-120

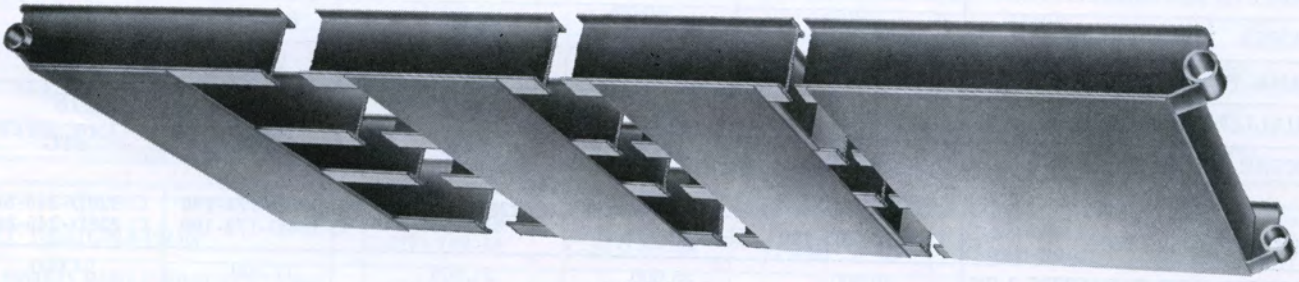

FIGURE 15

BOTTOM VIEW of Uniset portable base available with both conventional and air balanced pumping units.

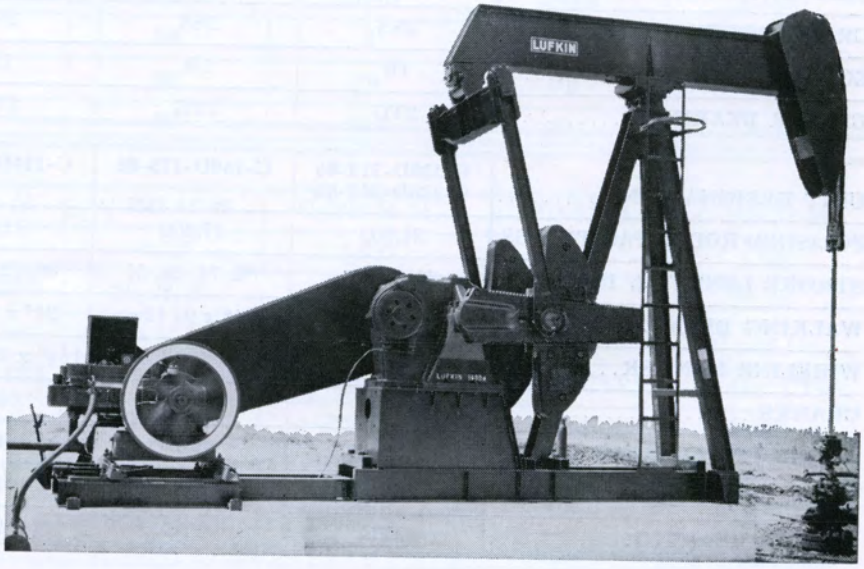

FIGURE 16

JOINTED ELL BASE adapts easily to all multi-cylinder engines by using slide rails. This type engine base can also be used with flywheel-clearing slow speed engines as shown on this C-160D-173-74 unit.

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CONVENTIONAL PUMPING UNIT SPECIFICATIONS

UNIT DESIGNATION	C-912D-365-168 C-640D-365-168	C-912D-305-168 C-640D-305-168 C-456D-305-168	C-912D-427-144	C-912D-365-144 C-640D-365-144	C-640D-305-144 C-456D-305-144
POLISHED ROD CAPACITY, LBS.	36,500	30,500	42,700	36,500	30,500
STROKE LENGTHS, INCHES	168, 145, 124	168, 145, 124	144, 124, 106	144, 124, 106	144, 124, 106
WALKING BEAM	33″ x 220 Lbs.	33″ x 200 Lbs.	33″ x 220 Lbs.	33″ x 200 Lbs.	30″ x 172 Lbs.
WIRELINE HANGER	1⅜″ x 16″ CTRS.	1¼″ x 16″ CTRS.	1⅜″ x 16″ CTRS.	1⅜″ x 16″ CTRS.	1¼″ x 16″ CTRS.
CRANKS	94110B	94110B	94110B	94110B	94110B
CRANK PIN BEARING	1SA	1SA	1SA	1SA	1SA
EQUALIZER BEARING	0R	0R	0R	0R	0R
CENTER BEARING	0TG	0TG	0TG	0TG	1TG

UNIT DESIGNATION	C-640D-256-144 C-456D-256-144 C-320D-256-144	C-456D-365-120	C-640D-305-120 C-456D-305-120	C-456D-256-120 C-320D-256-120	C-456D-213-120 C-320D-213-120 C-228D-213-120
POLISHED ROD CAPACITY, LBS.	25,600	36,500	30,500	25,600	21,300
STROKE LENGTHS, INCHES	144, 124, 106	120, 105, 90	120, 102, 85	120, 102, 85	120, 102, 85
WALKING BEAM	27″ x 160 Lbs.	30″ x 190 Lbs.	27″ x 160 Lbs.	27″ x 145 Lbs.	24″ x 130 Lbs.
WIRELINE HANGER	1¼″ x 16″ CTRS.	1⅜″ x 12″ CTRS.	1¼″ x 12″ CTRS.	1⅛″ x 12″ CTRS.	1⅛″ x 12″ CTRS.
CRANKS	94110B	94110B	8495B	8495B	8495B
CRANK PIN BEARING	1SA	1SA	2SA	2SA	2SA
EQUALIZER BEARING	0R	0R	0R	1R	1R
CENTER BEARING	1TG	0TG	1TG	2TG	2TG

UNIT DESIGNATION	C-320D-305-100	C-456D-256-100 C-320D-256-100	C-228D-213-100	C-228D-173-100 C-160D-173-100	C-320D-246-86 C-228D-246-86
POLISHED ROD CAPACITY, LBS.	30,500	25,600	21,300	17,300	24,600
STROKE LENGTHS, INCHES	100, 85, 70	100, 85, 70	100, 86, 73, 59	100, 86, 73, 59	86, 74, 61
WALKING BEAM	27″ x 160 Lbs.	27″ x 145 Lbs.	24″ x 120 Lbs.	24″ x 100 Lbs.	24″ x 120 Lbs.
WIRELINE HANGER	1¼″ x 12″ CTRS.	1⅛″ x 12″ CTRS.	1″ x 12″ CTRS.	1⅛″ x 12″ CTRS.	1⅛″ x 12″ CTRS.
CRANKS	8495B	8495B	7478B	7478B	8495B
CRANK PIN BEARING	2SA	2SA	2SA	3SB	3SB
EQUALIZER BEARING	1R	1R	1R	2RA	2RA
CENTER BEARING	2TG	2TG	2TG	2TG	2TG

UNIT DESIGNATION	C-320D-213-86 C-228D-213-86	C-160D-173-86	C-114D-119-86	C-320D-246-74	C-228D-200-74 C-160D-200-74
POLISHED ROD CAPACITY, LBS.	21,300	17,300	11,900	24,600	20,000
STROKE LENGTHS, INCHES	86, 74, 62	86, 74, 62, 51	86, 72, 59, 45	74, 64, 54	74, 64, 54
WALKING BEAM	24″ x 100 Lbs.	24″ x 94 Lbs.	24″ x 84 Lbs.	24″ x 100 Lbs.	24″ x 94 Lbs.
WIRELINE HANGER	1⅛″ x 12″ CTRS.	1⅛″ x 12″ CTRS.	1⅛″ x 12″ CTRS.	1⅛″ x 9″ CTRS.	1″ x 9″ CTRS.
CRANKS	7478B	7478B	6468B	7478B	7478B
CRANK PIN BEARING	3SB	3SB	4SB	3SB	3SB
EQUALIZER BEARING	2RA	2RA	3R	2RA	2RA
CENTER BEARING	2TG	2TG	4TG	2TG	2TG

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LUFKIN INDUSTRIES, INC. **LUFKIN, TEXAS**

CONVENTIONAL PUMPING UNIT SPECIFICATIONS

UNIT DESIGNATION	C-228D-173-74 C-160D-173-74	C-160D-143-74 C-114D-143-74	C-160D-173-64 C-114D-173-64	C-160D-143-64 C-114D-143-64	C-80D-119-64
POLISHED ROD CAPACITY, LBS.	17,300	14,300	17,300	14,300	11,900
STROKE LENGTHS, INCHES	74, 62, 51	74, 62, 51, 39	64, 54, 44	64, 52, 40	64, 53, 42, 32
WALKING BEAM	24″ x 84 Lbs.	24″ x 84 Lbs.	24″ x 84 Lbs.	18″ x 70 Lbs.	18″ x 60 Lbs.
WIRELINE HANGER	1″ x 9″ CTRS.	1″ x 9″ CTRS.	1″ x 9″ CTRS.	1″ x 9″ CTRS.	1″ x 9″ CTRS.
CRANKS	6468B	6468B	6468B	5456B	4850B
CRANK PIN BEARING	3SB	4SB	4SB	4SB	5A
EQUALIZER BEARING	2RA	3R	3R	3R	4R
CENTER BEARING	2TG	4TG	4TG	4TG	4TG

UNIT DESIGNATION	C-114D-173-54	C-114D-133-54 C-80D-133-54	C-80D-119-54	C-57D-76-54	C-80D-133-48
POLISHED ROD CAPACITY, LBS.	17,300	13,300	11,900	7,600	13,300
STROKE LENGTHS, INCHES	54, 44, 34	54, 45, 36	54, 45, 36	54, 41, 28	48, 40, 32
WALKING BEAM	18″ x 70 Lbs.	18″ x 60 Lbs.	18″ x 55 Lbs.	16″ x 36 Lbs.	16″ x 58 Lbs.
WIRELINE HANGER	1″ x 9″ CTRS.	⅞″ x 9″ CTRS.	⅞″ x 9″ CTRS.	¾″ x 9″ CTRS.	⅞″ x 9″ CTRS.
CRANKS	5456B	4850B	4850B	4246B	4850B
CRANK PIN BEARING	4SB	5A	5A	5A	5A
EQUALIZER BEARING	3R	4R	4R	5R	4R
CENTER BEARING	4TG	4TG	4TG	5C	4TG

UNIT DESIGNATION	C-80D-109-48 C-57D-109-48	C-57D-95-48	C-40D-76-48	C-57D-89-42 C-40D-89-42	C-57D-76-42 C-40D-76-42
POLISHED ROD CAPACITY, LBS.	10,900	9,500	7,600	8,900	7,600
STROKE LENGTHS, INCHES	48, 37, 25	48, 37, 25	48, 37, 27	42, 33, 23	42, 33, 23
WALKING BEAM	16″ x 45 Lbs.	16″ x 40 Lbs.	16″ x 36 Lbs.	16″ x 36 Lbs.	14″ x 34 Lbs.
WIRELINE HANGER	⅞″ x 9″ CTRS.	⅞″ x 9″ CTRS.	⅞″ x 9″ CTRS.	¾″ x 6½″ CTRS.	¾″ x 6½″ CTRS.
CRANKS	4246B	4246B	3644B	3644B	3644B
CRANK PIN BEARING	5A	5A	6	6	6
EQUALIZER BEARING	5R	5R	7R	7R	7R
CENTER BEARING	5C	5C	6CA	6CA	6CA

UNIT DESIGNATION	C-40D-89-36	C-25D-67-36	C-25D-56-36	C-25D-67-30	C-25D-53-30
POLISHED ROD CAPACITY, LBS.	8,900	6,700	5,600	6,700	5,300
STROKE LENGTHS, INCHES	36, 28, 20	36, 28, 20	36, 28, 20	30, 20	30, 20
WALKING BEAM	14″ x 34 Lbs.	12″ x 31 Lbs.	12″ x 27 Lbs.	12″ x 27 Lbs.	10″ x 25 Lbs.
WIRELINE HANGER	¾″ x 6½″ CTRS.	⅝″ x 6½″ CTRS.	⅝″ x 6½″ CTRS.	⅝″ x 6½″ CTRS.	½″ x 6½″ CTRS.
CRANKS	3644B	3644B	3644B	2436B	2436B
CRANK PIN BEARING	6	6	6	6	6
EQUALIZER BEARING	7R	7R	7R	7R	7R
CENTER BEARING	6CA	6CA	6CA	6CA	6CA

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CONVENTIONAL COUNTERBALANCE DATA

Effective Counterbalance At Polished Rod With Weights At Maximum Position, Including Structural Unbalance.
See Example below.

UNIT	C-912D-365-168 C-912D-305-168 C-640D-365-168 C-640D-305-168 C-456D-305-168	C-912D-427-144 C-912D-365-144 C-640D-365-144	C-640D-305-144 C-456D-305-144	C-640D-256-144 C-456D-256-144 C-320D-256-144	C-456D-365-120	C-640D-305-120 C-456D-305-120	C-456D-256-120 C-320D-256-120	C-456D-213-120 C-320D-213-120 C-228D-213-120
STROKE	168″	144″	144″	144″	120″	120″	120″	120″
STRUCTURAL UNBALANCE*	—1,500 Lbs.	—650 Lbs.	—520 Lbs.	—400 Lbs.	570 Lbs.	—120 Lbs.	55 Lbs.	0 Lbs.
CRANKS	94110B	94110B	94110B	94110B	94110B	8495B	8495B	8495B
C'Bal., Cranks Only	4,270	6,080	6,250	6,370	8,540	5,575	5,745	5,690
4 No. OORO Counterweights	19,675	24,065	24,325	.....	29,835	.....	.....	.....
4 No. OOS Aux. Weights	24,315	29,485	.....	.....	36,250	.....	.....	.....
4 No. OOD Aux. Weights	28,960	34,905	.....	.....	.....	.....	.....	.....
4 No. ORO Counterweights	17,690	21,750	22,000	22,120	27,090	20,800	20,965	.....
4 No. OL Aux. Weights	19,720	24,120	24,380	.....	29,900	23,185	23,350	.....
4 No. OS Aux. Weights	22,145	26,950	27,225	.....	33,250	25,855	.....	.....
4 No. OD Aux. Weights	26,600	32,150	.....	.....	39,405	.....	.....	.....
4 No. OARO Counterweights	15,600	19,310	19,550	19,670	24,205	18,635	18,800	18,745
4 No. OL Aux. Weights	17,630	21,680	21,930	22,050	27,010	21,020	21,180	.....
4 No. OAS Aux. Weights	19,110	23,405	23,665	23,785	29,055	22,675	22,840	.....
4 No. OAD Aux. Weights	22,615	27,500	27,780	.....	33,900	26,715	.....	.....
4 No. 1RO Counterweights	13,030	16,310	16,530	16,650	20,650	15,690	15,860	15,805
4 No. 2L Aux. Weights	14,345	17,845	18,070	18,190	22,465	17,245	17,410	17,355
4 No. 1S Aux. Weights	15,725	19,455	19,690	19,810	24,370	18,800	18,965	18,910
4 No. 1D Aux. Weights	18,415	22,595	22,850	22,970	28,095	21,905	22,070	.....
4 No. 2RO Counterweights	11,555	14,590	14,800	14,920	18,615	13,985	14,155	14,100
4 No. 2L Aux. Weights	12,855	16,105	16,325	16,445	20,410	15,515	15,680	15,625
4 No. 2S Aux. Weights	14,165	17,635	17,865	17,985	22,220	16,995	17,165	17,110
4 No. 2D Aux. Weights	16,780	20,685	20,930	21,050	25,830	20,010	20,175	20,120
4 No. 3CRO Counterweights	10,130	12,925	13,125	13,245	16,640	12,390	12,555	12,500
4 No. 2L Aux. Weights	11,420	14,430	14,640	14,760	18,425	13,910	14,075	14,020
4 No. 3BS Aux. Weights	12,655	15,870	16,090	16,210	20,130	15,320	15,490	15,435
4 No. 3D Aux. Weights	14,675	18,230	18,460	18,580	22,920	17,670	17,835	17,780
4 No. 5ARO Counterweights	8,510	11,035	11,225	11,345	14,405	10,550	10,720	10.665
4 No. 5L Aux. Weights	9,245	11,890	12,090	12,210	15,420	11,420	11,590	11,535
4 No. 5A Aux. Weights	10,220	13,030	13,230	13,350	16,765	12,560	12,730	12,675
4 No. 5AD Aux. Weights	11,595	14,630	14.845	14,965	18,665	14,175	14,345	14,290
4 No. 5CRO Counterweights	7,370	9,705	9,890	10,010	12,830	9,235	9,405	9,350
4 No. 5L Aux. Weights	8,105	10,560	10,750	10.870	13,840	10,100	10,270	10,215
4 No. 5C Aux. Weights	8,910	11,500	11,695	11,815	14,955	11,045	11,215	11,160
4 No. 5CD Aux. Weights	10,445	13,295	13,500	13.620	17,080	12,855	13,020	12,965

UNIT	C-228D-173-74 C-160D-173-74	C-160D-143-74 C-114D-143-74	C-160D-173-64 C-114D-173-64	C-160D-143-64 C-114D-143-64	C-80D-119-64	C-114D-173-54	C-114D-133-54 C-80D-133-54 C-80D-119-54	C-57D-76-54
STROKE	74″	74″	64″	64″	64″	54″	54″	54″
STRUCTURAL UNBALANCE*	450 Lbs.	300 Lbs.	550 Lbs.	360 Lbs.	0 Lbs.	500 Lbs.	330 Lbs.	0 Lbs.
CRANKS	6468B	6468B	6468B	5456B	4850B	5456B	4850B	4246B
C'Bal., Cranks Only	4,125	3,681	4,755	2,660	2,144	3,180	2,845	1,649
4 No. 3CRO Counterweights	11,185	11,050	12,835	8,820	.....	10,370	.....	.....
4 No. 2L Aux. Weights	12,825	12,690	14,710	10,295	.....	12,095	.....	.....
4 No. 3BS Aux. Weights	14,220	14,090	.....	11,465	.....	13,460	.....	.....
4 No. 3D Aux. Weights	.....	.....	.....	.....	.....	15,930	.....	.....
4 No. 5ARO Counterweights	9,445	9,305	10,845	7,445	6,090	8,765	7,470	5,760
4 No. 5L Aux. Weights	10,405	10,270	11,945	8,335	6,835	9,800	8,345	6,550
4 No. 5A Aux. Weights	11,605	11,470	13,315	9,390	7,695	11,035	9,360	7,440
4 No. 5AD Aux. Weights	13,335	13,205	15,295	10,950	8,990	12,855	10,875	.....
4 No. 5CRO Counterweights	8,065	7,925	9,265	6,215	5,105	7,335	6,320	4,750
4 No. 5L Aux. Weights	9,020	8,880	10,360	7,095	5,850	8,360	7,190	5,535
4 No. 5C Aux. Weights	10,015	9,880	11,495	7,980	6,575	9,390	8,040	6,285
4 No. 5C + 5L Aux. Weights	.....	10,835	12,590	8,855	7,315	10,415	8,910	7,075
4 No. 5CD Aux. Weights	11,965	11,830	13,725	9,740	8,040	11,445	9,760	.....
4 No. 6RO Counterweights	7,205	7,065	8,280	5,455	4,890	6,440	5,595	4,120
4 No. 6L Aux. Weights	7,785	7,645	8,945	5,980	4,935	7,055	6,115	4,585
4 No. 6 Aux. Weights	8,365	8,225	9,610	6,505	5,375	7,670	6,635	5,050
8 No. 6 Aux. Weights	9,525	9,390	10,940	7,560	6,265	8,900	7,675	5,985
4 No. 7RO Counterweights	6,110	5,965	7,025	4,470	3,680	5,295	4,645	3,275
4 No. 7L Aux. Weights	6,550	6,410	7,530	4,875	4,025	5,770	5,050	3,640
4 No. 7 Aux. Weights	6,995	6,855	8,040	5,280	4,370	6,245	5,460	4,005
8 No. 7 Aux. Weights	7,880	7,740	9,055	6,095	5,065	7,190	6,270	4,740

EXAMPLE:

A C-640D-305-144 Unit with 4 No. OARO Counterweights and 4 No. OAS Auxiliary Weights would have a maximum counterbalance effect of 23,665 pounds in the 144″ stroke. This effect includes a structural unbalance of —520 pounds. If the counterbalance effect is desired for the 106″ stroke, substract the structural unbalance from the effect in the 144″ stroke and multiply this difference by the ratio of 144 ÷ 106; then add the structural unbalance to this product. Thus, counterbalance effect in the 106″ stroke = [23,665 — (—520)] × 144/106 + (—520) = 24.185 × 144/106 —520 = 32,335 pounds.

*Structural Unbalance with a negative (—) sign indicates a walking beam assembly that is heavy on the well end. Structural Unbalance without the negative sign indicates a walking beam assembly that is heavy on the gear reducer end.

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CONVENTIONAL COUNTERBALANCE DATA

Effective Counterbalance At Polished Rod With Weights At Maximum Position, Including Structural Unbalance.

See Example below.

UNIT	C-456D-256-100 C-320D-256-100 C-320D-305-100	C-228D-213-100 C-228D-173-100 C-160D-173-100	C-320D-246-86 C-228D-246-86	C-320D-213-86 C-228D-213-86	C-160D-173-86	C-114D-119-86	C-320D-246-74 C-228D-200-74 C-160D-200-74
STROKE	100″	100″	86″	86″	86″	86″	74″
STRUCTURAL UNBALANCE*	550 Lbs.	0 Lbs.	800 Lbs.	450 Lbs.	450 Lbs.	115 Lbs.	800 Lbs.
CRANKS	8495B	7478B	8495B	7478B	7478B	6468B	7478B
C'Bal., Cranks Only	7,390	3,786	8,725	4,850	4,850	3,184	5,890
4 No. OARO Counterweights	23,070	.....	.....	.....	.....	.....	.....
4 No. OL Aux. Weights	25,935	.....	.....	.....	.....	.....	.....
4 No. OAS Aux. Weights	27,925	.....	.....	.....	.....	.....	.....
4 No. 1RO Counterweights	19,535	.....	22,810	.....	.....	.....	.....
4 No. 2L Aux. Weights	21,405	.....	.....	.....	.....	.....	.....
4 No. 1S Aux. Weights	23,270	.....	.....	.....	.....	.....	.....
4 No. 1D Aux. Weights	27,000	.....	.....	.....	.....	.....	.....
4 No. 2RO Counterweights	17,490	11,485	20,435	13,800	13,800	.....	16,235
4 No. 2L Aux. Weights	19,325	12,930	22,565	15,480	15,480	.....	18,175
4 No. 2S Aux. Weights	21,105	14,240	.....	17,005	17,005	.....	19,935
4 No. 2D Aux. Weights	24,720	16,995	.....	.....	.....	.....	.....
4 No. 3CRO Counterweights	15,570	10,085	18,210	12,175	12,175	9,410	14,355
4 No. 2L Aux. Weights	17,395	11,520	20,325	13,840	13,840	10,890	16,280
4 No. 3BS Aux. Weights	19,095	12,780	22,295	15,310	15,310	.....	17,975
4 No. 3D Aux. Weights	21,915	14,940	.....	17,820	.....	.....	20,880
4 No. 5ARO Counterweights	13,365	8,450	15,655	10,270	10,270	7,905	12,155
4 No. 5L Aux. Weights	14,410	9,280	16,865	11,235	11,235	8,735	13,270
4 No. 5A Aux. Weights	15,780	10,335	18,450	12,465	12,465	9,775	14,685
4 No. 5AD Aux. Weights	17,715	11,850	20,700	14,225	14,225	11,275	16,725
4 No. 5CRO Counterweights	11,780	7,230	13,820	8,855	8,855	6,710	10,515
4 No. 5L Aux. Weights	12,825	8,055	15,030	9,815	9,815	7,535	11,625
4 No. 5C Aux. Weights	13,955	8,935	16,340	10,835	10,835	8,400	12,805
4 No. 5CD Aux. Weights	16,130	10,640	18,860	12,815	12,815	10,085	15,095
4 No. 6RO Counterweights	10,795	6,465	12,675	7,965	7,965	5,965	9,490
4 No. 6L Aux. Weights	11,435	6,970	13,415	8,555	8,555	6,350	10,170
4 No. 6 Aux. Weights	12,075	7,475	14,160	9,140	9,140	6,970	10,845
8 No. 6 Aux. Weights	13,360	8,485	15,650	10,315	10,315	7,975	12,205
4 No. 7RO Counterweights	9,560	5,505	11,240	6,845	6,845	5,015	8,195
4 No. 7L Aux. Weights	10,045	5,885	11,805	7,295	7,295	5,285	8,710
4 No. 7 Aux. Weights	10,530	6,270	12,370	7,740	7,740	5,780	9,225
8 No. 7 Aux. Weights	11,500	7,040	13,495	8,635	8,635	6,550	10,260

UNIT	C-80D-133-48	C-80D-109-48	C-57D-109-48 C-57D-95-48	C-40D-76-48	C-57D-89-42 C-57D-76-42 C-40D-89-42 C-40D-76-42	C-40D-89-36 C-25D-67-36 C-25D-56-36	C-25D-67-30 C-25D-53-30
STROKE	48″	48″	48″	48″	42″	36″	30″
STRUCTURAL UNBALANCE*	440 Lbs.	320 Lbs.	320 Lbs.	0 Lbs.	150 Lbs.	275 Lbs.	150 Lbs.
CRANKS	4850B	4246B	4246B	3644B	3644B	3644B	2436B
C'Bal., Cranks Only	3,270	2,175	2,175	1,338	1,675	2,055	1,370
4 No. 5ARO Counterweights	8,475	6,800	6,800	.....	.....	.....	.....
4 No. 5L Aux. Weights	9,460	7,690	7,690	.....	.....	.....	.....
4 No. 5A Aux. Weights	10,595	8,690	8,690	.....	.....	.....	.....
4 No. 5AD Aux. Weights	12,300	10,210	.....	.....	.....	.....	.....
4 No. 5CRO Counterweights	7,175	5,665	5,665	4,525	5,300	6,285	.....
4 No. 5L Aux. Weights	8,155	6,550	6,550	5,370	6,260	7,405	.....
4 No. 5C Aux. Weights	9,115	7,395	7,395	6,160	7,165	.....	.....
4 No. 5C + 5L Aux. Weights	10,095	8,280	8,280	7,005	.....	.....	.....
4 No. 5CD Aux. Weights	11,050	9,120	9,120	.....	.....	.....	.....
4 No. 6RO Counterweights	6,365	4,955	4,955	3,995	4,700	5,580	4,400
4 No. 6L Aux. Weights	6,950	5,480	5,480	4,495	5,270	6,250	4,970
4 No. 6 Aux. Weights	7,535	6,005	6,005	5,000	5,840	6,915	5,540
8 No. 6 Aux. Weights	8,705	7,055	7,055	6,005	6,985	.....	.....
4 No. 7RO Counterweights	5,295	4,005	4,005	3,090	3,670	4,380	3,400
4 No. 7L Aux. Weights	5,750	4,415	4,415	3,485	4,120	4,905	3,860
4 No. 7 Aux. Weights	6,210	4,830	4,830	3,885	4,570	5,435	4,320
4 No. 7+7L Aux. Weights	7,125	5,655	5,655	4,280	5,020	5,960	4,780
8 No. 7 Aux. Weights	.....	.....	.....	4,675	5,475	.....	.....

EXAMPLE:

A C-160D-173-74 with 4 No. 6RO Counterweights, 3 No. 6L Auxiliary Weights and 2 No. 6 Auxiliary Weights would have a maximum counterbalance effect in the 74″ stroke of 7205 + ¾ (7785 — 7205) + ½ (8365 — 7205) = 8220 pounds. With this same combination of weights, the counterbalance effect in the 62″ stroke is (8220 — 450) × 74/62 + 450 = 9725 pounds.

To convert effective counterbalance to maximum counterbalance torque for dynamometer card analysis, multiply by the torque factor at the 90° crank position.

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CONVENTIONAL PUMPING UNIT ASSEMBLIES
GENERAL DIMENSIONS

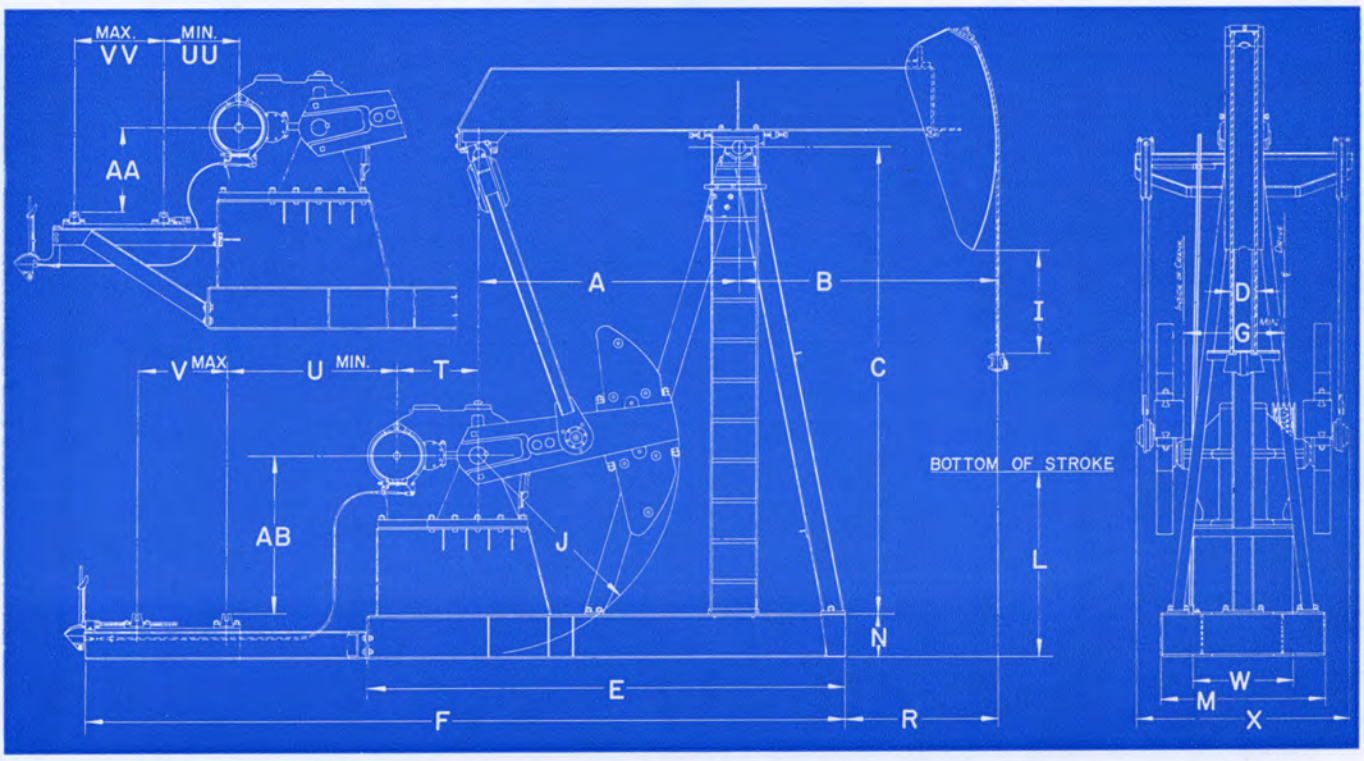

FIGURE 17

Unit	A	B	C	D	E	F	G	I	J	L	M	N	R	T	U	V	W	X	AA	AB	UU	VV
C-912D-365-168	10′-0″	17′-6″	20′-6″	16″	18′-9½″	29′-10½″	53⅛″	20½″	110″	62½″	6′-4″	16″	13′-9½″	48½″	89¼″	48½″	46¾″	8′-2½″	51¾″	93″	22½″	50½″
C-912D-305-168	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-912D-427-144	“	15′-0″	“	“	“	“	“	33¼″	“	74½″	“	“	11′-3½″	“	“	“	“	“	“	“	“	“
C-912D-365-144	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-640D-365-168	“	17′-6″	“	“	18′-6″	29′-7″	51⅜″	20½″	“	62½″	“	“	13′-9½″	41½″	92¾″	“	“	“	“	“	26¼″	“
C-640D-305-168	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-640D-365-144	“	15′-0″	“	“	“	“	“	33¼″	“	74½″	“	“	11′-3½″	“	“	“	“	“	“	“	“	“
C-640D-305-144	“	“	20′-4″	“	“	“	“	33″	“	72½″	“	“	“	“	“	“	“	“	“	“	“	“
C-640D-256-144	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-640D-305-120	9′-3″	12′-11″	18′-2″	12″	17′-6″	27′-4″	52½″	26″	95″	77¾″	70″	“	9′-5½″	“	77¾″	“	“	8′-1″	51½″	78″	26¾″	37¾″
C-456D-305-168	10′-0″	17′-6″	20′-6″	16″	18′-6″	29′-7″	51⅜″	20½″	110″	62½″	6′-4″	“	13′-9½″	38⅜″	96″	“	“	8′-2½″	51¾″	93″	29½″	50½″
C-456D-305-144	“	15′-0″	20′-4″	“	“	“	“	33″	“	72½″	“	“	11′-3½″	“	“	“	“	“	“	“	“	“
C-456D-256-144	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-456D-365-120	“	12′-8″	20′-6″	12″	“	“	“	55¾″	“	75″	“	“	8′-11½″	“	“	“	“	“	“	“	“	“
C-456D-305-120	9′-3″	12′-11″	18′-2″	“	17′-6″	27′-4″	52½″	26″	95″	77¾″	70″	“	9′-5½″	“	81″	“	“	8′-1″	51½″	78″	30″	37¾″
C-456D-256-120	“	“	18′-0″	“	“	“	“	“	“	75¾″	“	“	“	“	“	“	“	“	“	“	“	“
C-456D-213-120	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“	“
C-456D-256-100	“	10′-9″	“	“	“	“	“	46¼″	“	“	“	“	7′-3½″	“	“	“	“	“	“	“	“	“

NOTE: Do not use above dimensions for foundation. Request foundation plan.

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GENERAL DIMENSIONS Continued

UNIT	A	B	C	D	E	F	G	I	J	L	M	N	R	T	U	V	W	X	AA	AB	UU	VV
C-320D-256-144	10′-0″	15′-0″	20′-4″	16″	18′-0½″	29′-1½″	44¾″	33″	110″	72½″	6′-4″	16″	11′-3½″	34″	92½″	48½″	43″	7′-3½″	51¾″	93″	30⅜″	34¼″
C-320D-256-120	9′-3″	12′-11″	18′-0″	12″	17′-0½″	27′-4½″	"	26″	95″	75¾″	69¾″	"	9′-5½″	"	86″	"	"	7′-2″	53″	80″	"	"
C-320D-213-120	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	7′-1½″	"	"	"	"
C-320D-305-100	"	10′-9″	"	"	"	"	"	46¼″	"	"	"	"	7′-3½″	"	"	"	"	7′-2″	"	"	"	"
C-320D-256-100	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	7′-1½″	"	"	"	"
C-320D-246-86	"	9′-3″	"	"	"	"	"	60½″	"	"	"	"	69½″	"	"	"	"	"	"	"	"	"
C-320D-213-86	8′-0″	"	15′-0″	"	15′-4½″	24′-3½″	45¼″	24½″	78″	74½″	57¾″	"	6′-2½″	"	69″	"	"	"	36″	63″	"	"
C-320D-246-74	"	8′-0″	"	9″	"	"	"	35¾″	"	77¼″	"	"	59½″	"	"	"	"	"	"	"	"	"
C-228D-213-120	9′-3″	12′-11″	18′-0″	12″	16′-5½″	27′-4″	38⅝″	26″	95″	75½″	69¾″	"	9′-5½″	30″	90″	"	37″	6′-6½″	53″	80″	27⅜″	"
C-228D-213-100	8′-0″	10′-9″	15′-0″	"	14′-9½″	24′-3″	39⅛″	12″	78″	63″	57¾″	"	7′-8½″	"	72½″	"	"	"	36″	63″	"	"
C-228D-173-100	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-228D-246-86	9′-3″	9′-3″	18′-0″	"	16′-5½″	27′-4″	38⅝″	60¾″	95″	75½″	69¾″	"	69½″	"	90″	"	"	"	53″	80″	"	"
C-228D-213-86	8′-0″	"	15′-0″	"	14′-9½″	24′-3″	39⅛″	24½″	78″	74½″	57¾″	"	6′-2½″	"	72½″	"	"	"	36″	63″	"	"
C-228D-200-74	"	8′-0″	"	9″	"	"	"	35¾″	"	77¼″	"	"	59½″	"	"	"	"	"	"	"	"	"
C-228D-173-74	7′-0″	"	13′-0″	"	13′-5″	22′-10½″	"	17¼″	68″	68¼″	51¾″	12″	64″	"	"	"	"	"	26″	53″	"	"
C-160D-173-100	8′-0″	10′-9″	15′-0″	12″	14′-5″	23′-2″	33⅛″	12″	78″	63″	57¾″	16″	7′-8½″	26″	65¼″	46½″	32″	70½″	38¾″	65″	26⅝″	34¾″
C-160D-173-86	"	9′-3″	"	"	"	"	"	24½″	"	74½″	"	"	6′-2½″	"	"	"	"	"	"	"	"	"
C-160D-200-74	"	8′-0″	"	"	"	24′-1″	"	35¾″	"	77¼″	"	"	59½″	"	"	"	"	"	"	"	"	"
C-160D-173-74	7′-0″	"	13′-0″	"	13′-0½″	22′-8½″	"	17¼″	68″	68¼″	51¾″	12″	64″	"	"	"	"	"	29″	55″	"	"
C-160D-143-74	"	"	12′-9¾″	9″	"	"	"	"	"	66¼″	"	"	"	"	"	"	"	"	"	"	"	"
C-160D-173-64	"	7′-0″	"	"	"	"	"	26½″	"	66½″	"	"	52″	"	"	"	"	69¾″	"	"	"	"
C-160D-143-64	6′-0″	"	11′-0″	"	11′-1¾″	18′-11¾″	"	18¾″	56″	53¼″	50¾″	"	62¾″	"	54¼″	"	"	"	30¼″	43″	17″	30¼″
C-114D-119-86	7′-0″	9′-3″	12′-9¾″	12″	12′-7″	21′-10½″	29⅜″	16″	68″	52½″	51¾″	"	6′-7″	24″	68¼″	"	25″	66¾″	29″	55″	23″	34¾″
C-114D-143-74	"	8′-0″	"	"	"	"	"	17¼″	"	66¼″	"	"	64″	"	"	"	"	"	"	"	"	"
C-114D-173-64	"	7′-0″	"	9″	"	"	"	26¾″	"	66½″	"	"	52″	"	"	"	"	"	"	"	"	"
C-114D-143-64	6′-0″	"	11′-0″	"	10′-8¼″	18′-6¼″	"	18¾″	56″	53¼″	50¾″	"	62¾″	"	50¾″	"	"	"	30¼″	43″	13½″	30¼″
C-114D-173-54	"	6′-0″	"	"	"	"	"	20″	"	61½″	"	"	50¾″	"	"	"	"	"	"	"	"	"
C-114D-133-54	5′-4″	"	9′-8″	"	10′-0″	17′-10″	"	14¼″	50″	49¼″	46¼″	10″	51″	"	"	"	"	67¼″	24″	37″	"	"
C-80D-119-64	"	7′-0″	"	"	"	"	"	14″	"	42″	"	"	63″	22″	52¾″	"	"	"	"	"	15½″	"
C-80D-133-54	"	6′-0″	"	"	"	"	"	14¼″	"	49¼″	"	"	51″	"	"	"	"	"	"	"	"	"
C-80D-119-54	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-80D-133-48	"	5′-4″	"	"	"	"	"	15¼″	"	54½″	"	"	43″	"	"	"	"	"	"	"	"	"
C-80D-109-48	4′-8″	"	8′-9″	"	9′-3⅞″	16′-8½″	30⅝″	"	46″	43¾″	40¾″	"	"	"	"	"	"	65¼″	20″	33″	"	"
C-57D-76-54	"	6′-0″	"	"	"	"	26″	13″	"	39″	"	"	51″	20″	49¼″	"	"	58¼″	"	"	17½″	"
C-57D-109-48	"	5′-4″	"	"	"	"	"	15¼″	"	43¾″	"	"	43″	"	"	"	"	"	"	"	"	"
C-57D-95-48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-57D-89-42	4′-0″	4′-8″	8′-2½″	6½″	8′-2″	13′-8¾″	28¼″	17½″	44″	40¾″	38½″	8″	41″	"	33¾″	40½″	"	58″	18″	33¾″	"	"
C-57D-76-42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-40D-76-48	"	5′-4″	"	9″	7′-9″	13′-6″	23¾″	14½″	"	35¼″	"	"	57″	17½″	28″	44¾″	20″	51″	10¾″	"	17″	21¼″
C-40D-89-42	"	4′-8″	"	6½″	"	"	"	17¾″	"	40¾″	"	"	41″	"	"	"	"	51¼″	"	"	"	"
C-40D-76-42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-40D-89-36	"	4′-0″	"	"	"	"	"	15″	"	49½″	"	"	33″	"	"	"	"	"	"	"	"	"
C-25D-67-36	"	"	"	"	7′-4″	11′-7″	20¼″	13″	44″	50½″	"	"	"	13 9/16″	27″	26¾″	17″	47″	"	"	15½″	"
C-25D-56-36	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-25D-67-30	3′-0″	3′-9″	7′-0½″	"	6′-3″	10′-6″	20½″	"	36″	37½″	31″	6″	31″	"	"	28″	"	"	"	27¾″	"	"
C-25D-53-30	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

NOTE: Do not use above dimensions for foundation. Request foundation plan.

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LUFKIN MARK II *UNITORQUE* PUMPING UNITS

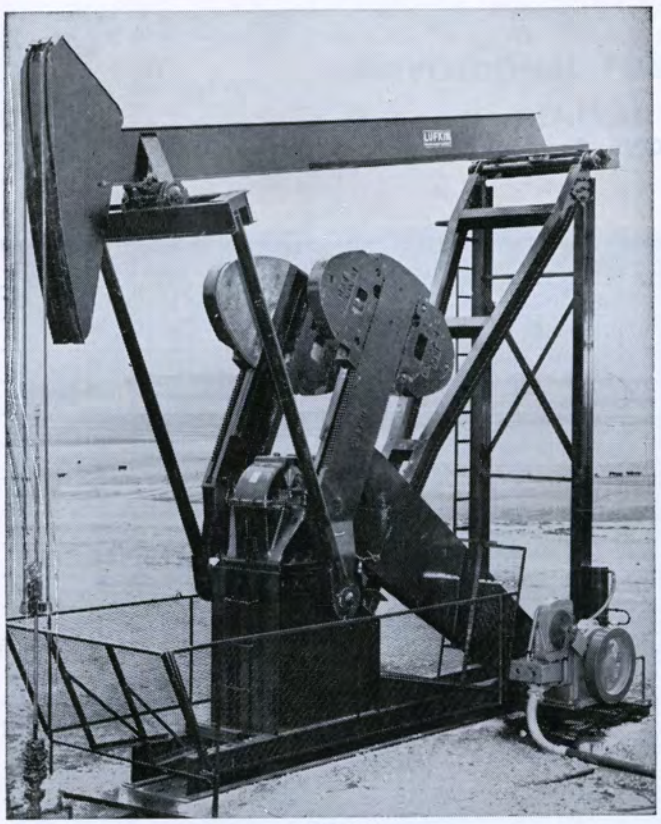

FIGURE 18
M-228D-256-100 Mark II Unit driven by a slow speed engine.

A PROVEN 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.

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.

PRIME MOVER SAVINGS

The LUFKIN MARK II, due to its more uniform torque demand illustrated in Figure 21 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 may be obtained when electric power charges are based on demand or connected horsepower.

FIGURE 19
M-456D-256-144 Mark II Unit. Note compactness of drive when a multi-cylinder engine is mounted forward of the samson post.

FIGURE 20
Lufkin M-1280D-427-216 driven by a slow speed engine.

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THE *UNITORQUE* GEOMETRY

(1) The cross yoke (equalizer) is shifted forward toward the horsehead instead of placing it directly over the gear reducer. This produces approximately a 195° upstroke and a 165° downstroke. (See Fig. 21)
The 195° upstroke reduces the acceleration where the load is greatest and thus effects a reduction in polished rod load.
By locating the cross yoke forward a greater mechanical advantage is obtained for lifting the load, and a lesser mechanical advantage is obtained for the reduced downstroke load, i.e., the maximum upstroke torque factor is decreased and the maximum downstroke torque factor is increased.

(2) The counterbalance weights are offset on the crank. This produces a counterbalance torque which at the beginning of the upstroke "lags" the well load torque approximately 7½°. Similarly, at the beginning of the downstroke this same offset condition produces a counterbalance torque which "leads" the well load torque approximately 7½°. (See Fig. 21)

Independently, these features would not produce a uniform torque, but working together a "unitorque" system is obtained which in turn can effect a torque reduction on the gear reducer up to 35%.

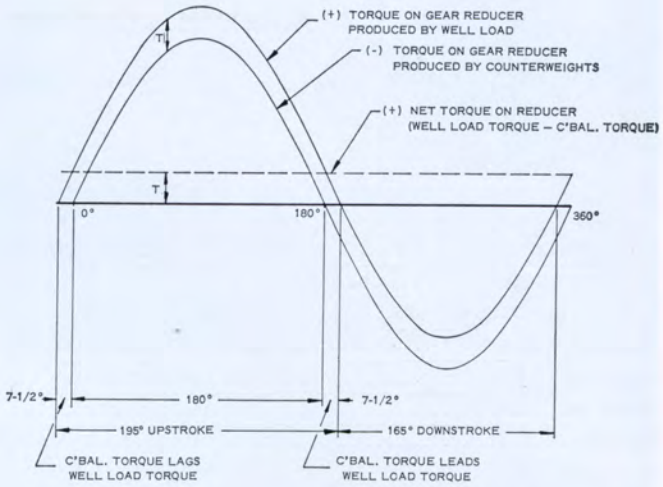

FIGURE 21

Illustration showing how a uniform torque can be obtained under ideal conditions.

NOTE: The Mark II Unit must be operated in a counter-clockwise direction. (Standing at the side of the unit with the well-head to the right.)

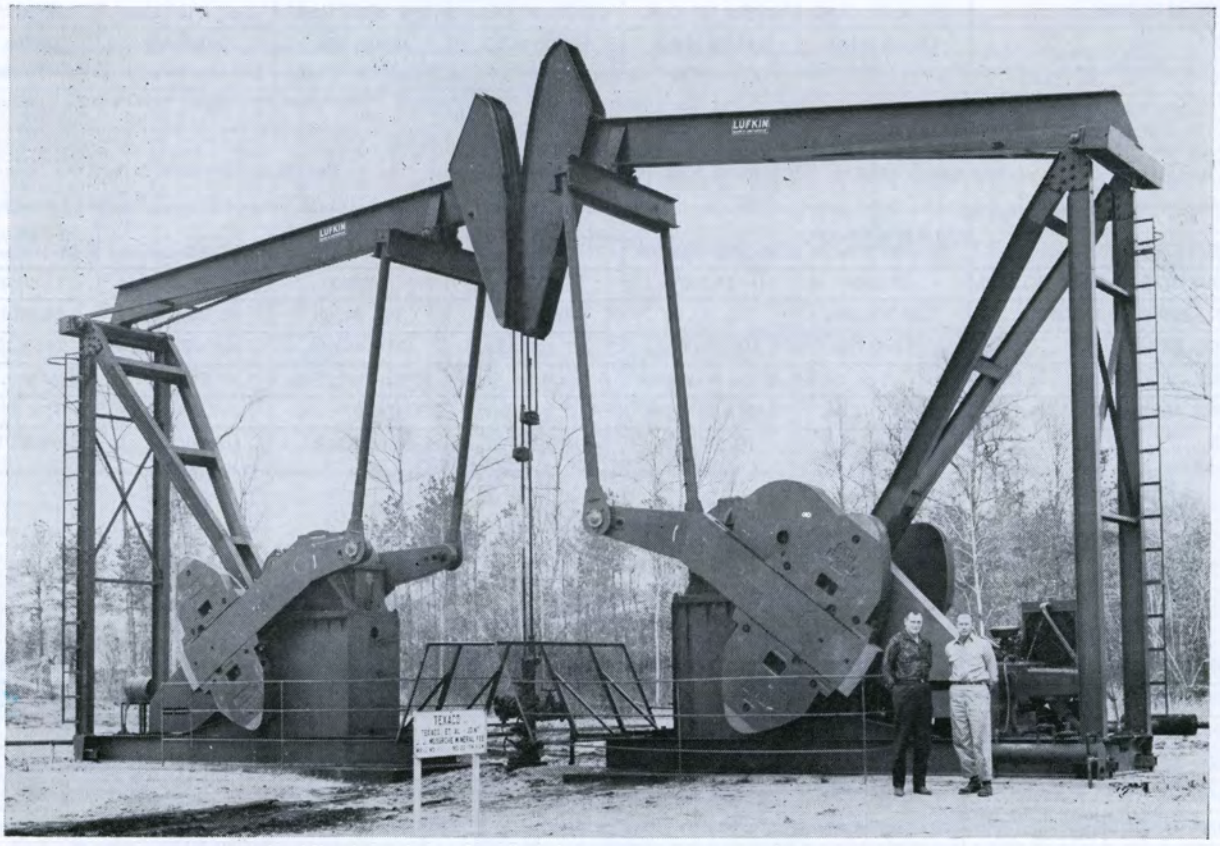

FIGURE 22

M-320D-305-120 and M-456D-305-144 Mark II Units driven by slow speed engines.

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MARK II PUMPING UNIT SPECIFICATIONS

UNIT DESIGNATION	M-1280D-427-216	M-912D-305-216	M-1280D-427-192	M-912D-305-192 M-640D-305-192 M-456D-305-192	M-912D-365-168	M-912D-305-168 M-640D-305-168 M-456D-305-168
POLISHED ROD CAPACITY, LBS.	42,700	30,500	42,700	30,500	36,500	30,500
STROKE LENGTH, INCHES	216, 192, 167	216, 192, 167	192, 168, 144	192, 168, 144	168, 149, 130	168, 149, 130
WALKING BEAM	24" x 130 Lbs.	24" x 130 Lbs.	24" 130 Lbs.	24" x 130 Lbs.	24" x 100 Lbs.	24" x 84 Lbs.
PITMANS	8" Ex. Hvy. Pipe	8" Ex. Hvy. Pipe	8" Ex. Hvy. Pipe	8" Ex. Hvy. Pipe	6" Ex. Hvy. Pipe	6" Ex. Hvy. Pipe
WIRELINE HANGER	1⅜" x 16" Ctrs.	1⅜" x 16" Ctrs.	1⅜" x 16" Ctrs.	1⅜" x 16" Ctrs.	1⅜" x 12" Ctrs.	1¼" x 12" Ctrs.
CRANKS	216130 MRO	216130 MRO	192130 MRO	192130 MRO	168108 MRO	168108 MRO

UNIT DESIGNATION	M-912D-365-144 M-640D-365-144 M-456D-365-144	M-912D-305-144 M-640D-305-144 M-456D-305-144	M-640D-256-144 M-456D-256-144 M-320D-256-144	M-456D-365-120	M-640D-305-120 M-456D-305-120 M-320D-305-120	M-456D-256-120 M-320D-256-120 M-228D-256-120
POLISHED ROD CAPACITY, LBS.	36,500	30,500	25,600	36,500	30,500	25,600
STROKE LENGTH, INCHES	144, 128, 112	144, 128, 112	144, 128, 112	120, 104, 88	120, 104, 88	120, 104, 88
WALKING BEAM	24" x 84 Lbs.	24" x 84 Lbs.	21" x 68 Lbs.	24" x 84 Lbs.	24" x 84 Lbs.	21" x 68 Lbs.
PITMANS	6" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	6" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe
WIRELINE HANGER	1⅜" x 12" Ctrs.	1¼" x 12" Ctrs.	1⅛" x 9" Ctrs.	1⅜" x 12" Ctrs.	1¼" x 12" Ctrs.	1⅛" x 9" Ctrs.
CRANKS	144108 MRO	144108 MRO	144108 MRO	120108 MR	120108 MR	120108 MR

UNIT DESIGNATION	M-320D-213-120 M-228D-213-120	M-320D-305-100	M-320D-256-100 M-228D-256-100	M-228D-173-100	M-228D-246-86	M-228D-213-86 M-160D-213-86
POLISHED ROD CAPACITY, LBS.	21,300	30,500	25,600	17,300	24,600	21,300
STROKE LENGTH, INCHES	120, 104, 88	100, 84, 68	100, 84, 68	100, 84, 68	86, 72.4, 58.6	86, 72.4, 58.6
WALKING BEAM	21" x 62 Lbs.	24" x 84 Lbs.	21" x 68 Lbs.	16" x 58 Lbs.	16" x 58 Lbs.	16" x 45 Lbs.
PITMANS	5" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	5" Ex. Hvy. Pipe	4" Std. Pipe	4" Std. Pipe
WIRELINE HANGER	1⅛" x 9" Ctrs.	1¼" x 12" Ctrs.	1⅛" x 9" Ctrs.	1⅛" x 9" Ctrs.	1⅛" x 9" Ctrs.	1" x 9" Ctrs.
CRANKS	120108 MR	100108 MR	100108 MR	100108 MR	8686 MR	8686 MR

UNIT DESIGNATION	C-160D-173-86	M-114D-143-86	M-228D-200-74 M-160D-200-74	M-228D-173-74 M-160D-173-74 M-114D-173-74	M-114D-143-74 M- 80D-143-74	M-114D-173-64	M-114D-143-64
POLISHED ROD CAPACITY, LBS.	17,300	14,300	20,000	17,300	14,300	17,300	14,300
STROKE LENGTH, INCHES	86, 72.4, 58.6	86, 74, 62	74, 60.4, 46.8	74, 60.4, 46.8	74, 60, 46	64, 52, 40	64, 52, 40
WALKING BEAM	16" x 40 Lbs.	14" x 30 Lbs.	16" x 45 Lbs.	16" x 40 Lbs.	14" x 30 Lbs.	14" x 34 Lbs.	14" x 30 Lbs.
PITMANS	4" Std. Pipe	3½" Std. Pipe	4" Std. Pipe*	4" Std. Pipe*	3½" Std. Pipe	3½" Std. Pipe	3½" Std. Pipe
WIRELINE HANGER	1" x 9" Ctrs.	1" x 9" Ctrs.	1" x 9" Ctrs.	1" x 9" Ctrs.	1" x 9" Ctrs.	1" x 9" Ctrs.	1" x 9" Ctrs.
CRANKS	8686 MR	8662 MR	7486 MR	7486 MR	7462 MR	6462 MR	6462 MR

* 3½" Ex. Hvy. Pipe Used on M-114D-173-74.

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STANDARD MARK II PUMPING UNIT ASSEMBLIES—GENERAL DIMENSIONS

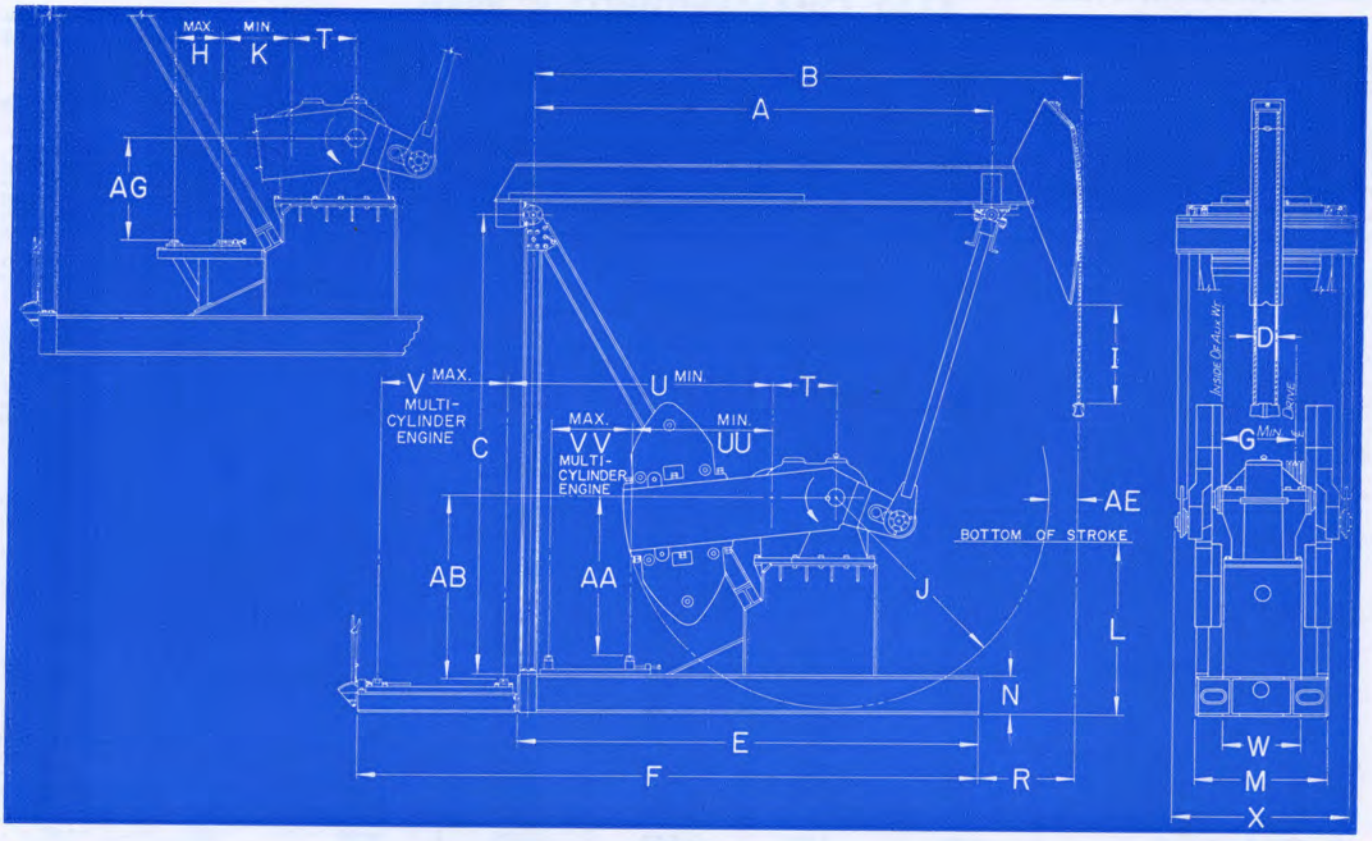

FIGURE 23

UNIT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	R	T	U	V	W	X	AA	AB	AE	AG	UU	VV
M-1280D-427-216	25′-6″	32′-0″	26′-9⅞″	16″	20′-2⅛″	29′-2″	57⅝″	55″	47¼″	130″	37½″	68⅝″	9′-4¾″	24″	36″	52½″	8′-2½″	68⅛″	9′-4¾″	9′-6″	**	9′-0⅛″	25⅝″	51″	**	**
M-1280D-427-192	"	"	"	"	"	"	"	"	72½″	"	"	71¼″	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-912D-305-216	"	"	"	"	"	"	54″	"	47¼″	"	25⅜″	68⅝″	8′-11″	"	"	48½″	8′-6½″	"	8′-11″	9′-1″	**	"	"	59⅛″	**	**
M-912D-305-192	"	"	"	"	"	"	"	"	72½″	"	"	71¼″	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-912D-365-168	22′-6″	27′-10″	23′-0⅞″	12″	23′-1½″	*	"	46¾″	42¾″	108″	"	71½″	69¾″	16″	60″	"	*	*	49¾″	8′-9″	7′-2″	*	19″	46⅛″	6′-10½″	67″
M-912D-305-168	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-912D-365-144	21′-6″	26′-0″	21′-0⅞″	"	21′-8″	*	"	"	40″	"	"	75⅛″	"	"	55½″	"	*	*	"	"	"	*	13½″	"	6′-6″	55″
M-912D-305-144	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	8′-7⅜″	"	*	"	"	"	"
M-640D-305-192	25′-6″	32′-0″	26′-9⅞″	16″	20′-2⅛″	29′-2″	50¼″	55″	72½″	130	27⅞″	71¼″	8′-6¾″	24″	36″	41½″	9′-1½″	68⅛″	8′-6¾″	8′-9″	**	9′-0⅛″	25⅝″	49¼″	**	**
M-640D-305-168	22′-6″	27′-10″	23′-0⅞″	12″	23′-1½″	*	"	46¾″	42¾″	108″	"	71½″	69¾″	16″	60″	"	*	*	46½″	8′-5″	7′-2″	*	23⅜″	46⅛″	7′-1″	67″
M-640D-365-144	21′-6″	26′-0″	21′-0⅞″	"	21′-3½″	*	"	"	40″	"	"	75⅛″	"	"	"	"	*	*	"	"	"	*	18″	"	6′-8½″	55″
M-640D-305-144	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	8′-3⅜″	"	*	"	"	"	"
M-640D-256-144	"	"	"	9″	"	*	"	"	44¼″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-640D-305-120	"	"	"	12″	"	*	"	"	64¾″	"	"	75⅛″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-456D-305-192	25′-6″	32′-0″	26′-9⅞″	16″	20′-2⅛″	29′-2″	"	55″	72½″	130″	31″	71¼″	8′-6¾″	24″	36″	38⅜″	9′-4⅝″	68⅛″	8′-6¾″	8′-9″	**	9′-0⅛″	25⅝″	49¼″	**	**
M-456D-305-168	22′-6″	27′-10″	23′-0⅞″	12″	23′-1½″	*	"	46¾″	42¾″	108″	"	71½″	69¾″	16″	60″	"	*	*	46½″	8′-5″	7′-2″	*	23⅜″	46⅛″	7′-4¼″	67″
M-456D-365-144	21′-6″	26′-0″	21′-0⅞″	"	21′-3½″	*	"	"	40″	"	"	75⅛″	"	"	"	"	*	*	"	"	"	*	18″	"	6′-11⅝″	55″
M-456D-305-144	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	8′-3⅜″	"	*	"	"	"	"
M-456D-256-144	"	"	"	9″	"	*	"	"	44¼″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-456D-365-120	"	"	"	12″	"	*	"	"	64¾″	"	"	75⅛″	"	"	"	"	*	*	"	8′-5″	"	*	"	"	"	"
M-456D-305-120	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	8′-3½″	"	*	"	"	"	"
M-456D-256-120	"	"	"	9″	"	*	"	"	69″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-320D-256-144	"	"	"	9″	"	*	44½″	33¼″	44¼″	"	35⅜″	71⅝″	"	"	"	34″	*	*	43½″	7′-4⅜″	"	*	"	"	7′-4″	51½″
M-320D-305-120	"	"	"	12″	"	*	"	"	64¾″	"	"	75⅛″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-320D-256-120	"	"	"	9″	"	*	"	"	69″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-320D-213-120	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-320D-305-100	"	"	"	12″	"	*	"	"	7′-1″	"	"	74⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-320D-256-100	"	"	"	9″	"	*	"	"	7′-5″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-228D-256-120	"	"	"	"	"	*	38⅞″	29¾″	69″	"	41⅛″	"	"	"	"	30″	*	*	37″	6′-9⅜″	"	*	"	47⅛″	7′-8″	"
M-228D-213-120	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-228D-256-100	"	"	"	"	"	*	"	"	7′-5″	"	"	71⅝″	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-228D-173-100	"	"	"	"	"	*	"	"	"	"	"	"	"	"	"	"	*	*	"	"	"	*	"	"	"	"
M-228D-246-86	15′-6″	18′-6″	15′-8⅜″	"	15′-6½″	21′-0″	"	30¼″	40¾″	86⅝″	22¼″	67⅝″	57″	"	39″	"	8′-7¾″	51½″	"	6′-8⅛″	**	6′-3″	11⅜″	40⅛″	**	**
M-228D-213-86	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-228D-200-74	"	"	"	"	"	"	"	"	52½″	"	"	68¼″	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-228D-173-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-160D-213-86	"	"	"	"	"	"	32⅞″	33¾″	40¾″	"	24½″	67⅝″	54″	"	"	26″	8′-11¾″	"	32″	6′-0⅜″	**	"	"	38¾″	**	**
M-160D-173-86	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-160D-200-74	"	"	"	"	"	"	"	"	52½″	"	"	68¼″	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-160D-173-74	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-114D-143-86	13′-6″	15′-9″	12′-3½″	"	13′-0¾″	18′-6¼″	29⅜″	30″	14¼″	62″	20⅛″	51⅝″	42¾″	12″	36″	24″	8′-0½″	"	25″	6′7⅜″	**	50″	16″	31⅛″	**	**
M-114D-173-74	15′-6″	18′-6″	15′-8⅜″	"	15′-6½″	21′-0″	"	30¾″	52½″	86⅝″	28″	68¼″	54″	16″	39″	"	9′-1¾″	"	"	69″	**	6′-3″	11⅜″	43¼″	**	**
M-114D-143-74	13′-6″	15′-9″	12′-3½″	"	13′-0¾″	18′-6¼″	"	30″	26⅛″	62″	20⅛″	51¾″	42¾″	12″	36″	"	8′-0½″	"	"	67⅜″	**	50″	16″	31⅛″	**	**
M-114D-173-64	"	"	"	"	"	"	"	"	20½″	"	"	66⅝″	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-114D-143-64	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	**	"	"	"	**	**
M-80D-143-74	"	"	"	"	"	"	"	"	26⅛″	"	"	51¾″	"	"	"	"	"	"	"	"	**	"	"	"	**	**

* On 100″, 120″, 144″ and 168″ Stroke Units, Multi-Cylinder Engines are Mounted on Main Base Beams Forward of Samson Post. See Dimensions UU, VV, andAA.
** On 64″, 74″, 86″, and 192″ Stroke Units, Multi-Cylinder Engines are Mounted Behind the Samson Post. See Dimensions U, V, and AB.

NOTE: Do not use above dimensions for foundation. Request foundation plan.

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MARK II COUNTERBALANCE DATA

Effective Counterbalance At Polished Rod With Weights At Maximum Position, Including Structural Unbalance. See Example Page 3337.

UNIT	M-1280D-427-216 M-912D-305-216	M-1280D-427-192 M-912D-305-192 M-640D-305-192 M-456D-305-192	M-912D-365-168	M-912D-305-168 M-640D-305-168 M-456D-305-168	M-912D-365-144 M-640D-365-144 M-456D-365-144	M-912D-305-144 M-640D-305-144 M-456D-305-144	M-640D-256-144 M-456D-256-144 M-320D-256-144
STROKE	216″	192″	168″	168″	144″	144″	144″
STRUCTURAL UNBALANCE	−7,450 Lbs.	−7,160 Lbs.	−5,385 Lbs.	−4,860 Lbs.	−4,680 Lbs.	−4,300 Lbs.	−4,010 Lbs.
CRANKS	216130 MRO	192130 MRO	168108 MRO	168108 MRO	144108 MRO	144108 MRO	144108 MRO
C'Bal., Cranks Only	1930	3415	490	1015	3130	3515	3805
4 No. 130RO Counterweights	21,775	25,010	.....	.....	.....	.....	.....
4 No. 130D Counterweights	32,785	36,995	.....	.....	.....	.....	.....
4 No. OORO Counterweights	18,140	21,060	16,140	16,665	21,835	22,220	22,510
4 No. OOS Aux. Weights	23,030	26,380	20,860	21,390	27,480	27,865	.....
4 No. OOD Aux. Weights	27,920	31,705	25,585	26,110	33,125	.....	.....
4 No. ORO Counterweights	16,070	18,805	14,140	14,665	19,450	19,830	20,120
4 No. OL Aux. Weights	18,155	21,075	16,215	16,740	21,925	22,310	22,600
4 No. OS Aux. Weights	20,765	23,915	18,675	19.200	24,865	25,250	.....
4 No. OD Aux. Weights	25 460	29,025	23,210	23,735	30,285	.....	.....
4 No. OARO Counterweights	13,720	16,245	12,025	12,550	16,920	17,300	17,590
4 No. OL Aux. Weights	15,795	18,510	14,100	14,625	19,400	19,780	20,070
4 No. OAS Aux. Weights	17,370	20,220	15,600	16,125	21,190	21,570	21,860
4 No. OAD Aux. Weights	21,020	24,195	19,170	19 C95	25,460	*25,840	.....
4 No. IRO Counterweights	11,080	13,375	9,465	9,990	13,860	14,245	14,530
4 No. 2L Aux. Weights	12,420	14,835	10,820	11,345	15,475	15.860	16,150
4 No. IS Aux. Weights	13,890	16,435	12,225	12,750	17,160	17,540	17,830
4 No. ID Aux. Weights	16,705	19,500	14,985	15,510	20,460	*20,840	*21,130
4 No. 2RO Counterweights	9,525	11,680	7,960	8,485	12,055	12,440	12,730
4 No. 2L Aux. Weights	10,855	13,130	9,295	9,820	13,655	14,040	14,325
4 No. 2S Aux. Weights	12,245	14,645	10,635	11,160	15,255	15,640	15,930
4 No. 2D Aux. Weights	14,970	17,605	13,310	13,835	18,455	*18,840	*19,125
4 No. 3CRO Counterweights	8,000	10,025	6,505	7,030	10,320	10,705	10,990
4 No. 2L Aux. Weights	9,325	11,465	7,835	8,360	11,910	12,290	12,580
4 No. 3BS Aux. Weights	10 620	12,875	9,100	9,620	13,420	13,800	14.090
4 No. 3D Aux. Weights	12,715	15,155	11,175	11 700	15,900	*16,285	*16,575
4 No. 5ARO Counterweights	6,285	8,160	4,850	5,375	8,345	8,725	9,015
4 No. 5L Aux. Weights	7,035	8,970	5,610	6,130	9,250	9,630	9,920
4 No. 5A Aux. Weights	8,040	10,070	6,110	7,135	10,450	10.830	11,120
4 No. 5AD Aux. Weights	9,455	11,605	8,025	8,550	12,140	*12,520	*12,810
4 No. 5CRO Counterweights	5,120	6,890	3,695	4,220	6,960	7,345	7,635
4 No. 5L Aux. Weights	5,870	7,705	4,450	4,975	7,865	8,245	8,535
4 No. 5C Aux. Weights	6,700	8,610	5,280	5,805	8,855	9,240	9,525
4 No. 5CD Aux. Weights	8,280	10,325	6,860	7,385	10,745	*11,125	*11,415
4 No. 6RO Counterweights	4,390	6,106	2,970	3,495	6,095	6,480	6,770
4 No. 6L Aux. Weights	4,860	6,605	3,440	3,965	6,655	7,040	7,330
4 No. 6 Aux. Weights	5,320	7,110	3,905	4,430	7,215	7,600	7,890
4 No. 7RO Counterweights	3,490	5,115	2,065	2,590	5,015	5,400	5,690
4 No. 7L Aux. Weights	3,840	5,495	2,420	2,945	5,440	5,820	6,110
4 No. 7 Aux. Weights	4,190	5.880	2,775	3.300	5,865	6,250	6,540

UNIT	M-320D-305-100	M-320D-256-100	M-228D-256-100	M-288D-173-100	M-228D-246-86	M-228D-213-86 M-160D-213-86	M-160D-173-86	M-114D-143-86
STROKE	100″	100″	100″	100″	86″	86″	86″	86″
STRUCTURAL UNBALANCE	−3,700 Lbs.	−3,470 Lbs.	−3,285 Lbs.	−3,175 Lbs.	−2,140 Lbs.	−2,040 Lbs.	−1,930 Lbs.	−1,535 Lbs.
CRANKS	100108 MR	100108 MR	100108 MR	100108 MR	8686 MR	8686 MR	8686 MR	8662 MR
C'Bal., Cranks Only	4710	4940	5152	5235	2740	2840	2960	1535
4 No. 1RO Counterweights	19,580	19,810	19,995	20,105	15,700	15,800	15,930	9,560
4 No. 2L Aux. Weights	21,825	22,055	22,235	22,345	17,740	17,835	17,970	10,955
4 No. 1S Aux. Weights	24,155	24,385	24,569	24,680	19,685	19,785	19,920	13,420
4 No. 2RO Counterweights	17,085	17,315	17,500	17,610	13,565	13,665	13,795	8,300
4 No. 2L Aux. Weights	19,300	19,530	19,715	19,825	15,570	15,670	15,805	9,660
4 No. 2S Aux. Weights	21,515	21,745	21,930	22,140	17,445	17,545	17,680	10,725
4 No. 3CRO Counterweights	14,675	14,905	15,090	16,000	11,570	11,670	11,795	7,220
4 No. 2L Aux. Weights	16,880	17,110	17,295	17,405	13,560	13,660	13,790	8,570
4 No. 3BS Aux. Weights	18,970	19,200	19,385	19,495	15,375	15,475	15,605	9,675
4 No. 3D Aux. Weights	22,410	22,640	22,825	22,935	18,430	18,530	18,655	11,635
4 No. 5ARO Counterweights	11,935	12,165	12,350	12,460	9,255	9,355	9,480	5,900
4 No. 5L Aux. Weights	13,190	13,420	13,605	13,715	10,405	10,505	10,630	6,700
4 No. 5AS Aux. Weights	14,855	15,085	15,270	15,380	11,890	11,990	12,120	7,675
4 No. 5AD Aux. Weights	17,195	17,425	17,610	17,720	14,010	14,110	14,235	9,105
4 No. 5CRO Counterweights	10,020	10,250	10,435	10,535	7,545	7,645	7,770	4,785
4 No. 5L Aux. Weights	11,315	11,500	11,685	11,795	8,690	8,795	8,920	5,585
4 No. 5CS Aux. Weights	12,645	12,875	13,060	13,170	9,925	10,025	10,150	6,395
4 No. 5CD Aux. Weights	15,265	15,495	15,680	15,790	12,305	12,405	12,530	8,005
4 No. 6RO Counterweights	8,820	9,050	9,235	9,345	6,480	6,580	6,705	4,095
4 No. 6L Aux. Weights	9,600	9,830	10,015	10,125	7,185	7,285	7,410	4,580
4 No. 6 Aux. Weights	10,375	10,605	10,790	10,900	7,895	7,995	8,120	5,060
4 No. 7RO Counterweights	7,325	7,555	7,740	7,850	5,135	5,235	5,355	3,190
4 No. 7L Aux. Weights	7,910	8,140	8,325	8,435	5,670	5,770	5,890	3,560
4 No. 7 Aux. Weights	8,500	8,730	8,915	9,025	6,210	6,310	6,430	3,940

* D Aux. Weights will not clear Belt Cover on M-320D unit.

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MARK II COUNTERBALANCE DATA

Effective Counterbalance At Polished Rod With Weights At Maximum Position, Including Structural Unbalance. See Example Below.

UNIT	M-456D-365-120	M-640D-305-120 M-456D-305-120 M-320D-305-120	M-456D-256-120	M-320D-256-120	M-228D-256-120	M-320D-213-120	M-228D-213-120
STROKE	120″	120″	120″	120″	120″	120″	120″
STRUCTURAL UNBALANCE	−4,510 Lbs.	−4,130 Lbs.	−3,840 Lbs.	−3,620 Lbs.	−3,435 Lbs.	−3,560 Lbs.	−3,235 Lbs.
CRANKS	120108 MR	120108 MR	120108 MR	120108 MR	120108 MR	120108 MR	120108 MR
C'Bal., Cranks Only	2,020	2,410	2,700	2,920	3,105	2,980	3,305
4 No. ORO Counterweights	21,200	21,595	21,885	22,105	22,285	.....	.....
4 No. OL Aux. Weights	24,115	24,510	24,800	25,020	25,205	.....	.....
4 No. OS Aux. Weights	27,570	27,965	.....	.....	.....	.....	.....
4 No. OARO Counterweights	18,230	18,620	18,910	19,130	19,315	19,190	19,515
4 No. OL Aux. Weights	21,145	21,535	21,825	22,045	22,230	.....	.....
4 No. OAS Aux. Weights	23,245	23,640	23,930	24,150	24,335	.....	.....
4 No. OAD Aux. Weights	28,265	28,660	.....	.....	.....	.....	.....
4 No. 1RO Counterweights	14,630	15,025	15,315	15,535	15,720	15,595	15,920
4 No. 2L Aux. Weights	16,530	16,925	17,215	17,435	17,620	17,495	17,820
4 No. 1S Aux. Weights	18,510	18,905	19,195	19,410	19,595	19,470	19,795
4 No. 1D Aux. Weights	22,390	22,780	23,070	.....	.....	.....	.....
4 No. 2RO Counerweights	12,515	12,905	13,195	13,415	13,600	13,475	13,800
4 No. 2L Aux. Weights	14,390	14,785	15,075	15,295	15,480	15,355	15,680
4 No. 2S Aux. Weights	16,275	16,665	16,955	17,175	17,360	17,235	17,560
4 No. 2D Aux. Weights	20,035	20,425	20,715	.....	.....	.....	.....
4 No. 3CRO Counterweights	10,470	10,865	11,155	11,375	11,560	11,435	11,760
4 No. 2L Aux. Weights	12,340	12,730	13,020	13,240	13,425	13,300	13,625
4 No. 3BS Aux. Weights	14,115	14,505	14,795	15,015	15,200	15,075	15,400
4 No. 3D Aux. Weights	17,030	17,425	17,715	.....	.....	.....	.....
4 No. 5ARO Counterweights	8,145	8,540	8,830	9,050	9,235	9,110	9,435
4 No. 5L Aux. Weights	9,210	9,605	9,895	10,115	10,300	10,175	10,500
4 No. 5A Aux. Weights	10,620	11,015	11,305	11,525	11,710	11,585	11,910
4 No. 5AD Aux. Weights	12,610	13,000	13,290	.....	.....	.....	.....
4 No. 5CRO Counterweights	6,520	6,915	7,205	7,425	7,610	7,485	7,810
4 No. 5L Aux. Weights	7,585	7,975	8,265	8,485	8,670	8,545	8,870
4 No. 5C Aux. Weights	8,750	9,140	9,430	9,650	9,835	9,710	10,035
4 No. 5CD Aux. Weights	10,970	11,360	11,650	.....	.....	.....	.....
4 No. 6RO Counterweights	5,505	5,900	6,190	6,410	6,595	6,470	6,790
4 No. 6L Aux. Weights	6,165	6,555	6,845	7,065	7,250	7,125	7,450
4 No. 6 Aux. Weights	6,820	7,215	7,505	7,725	7,910	7,785	8,110
4 No. 7RO Counterweights	4,235	4,630	4,920	5,140	5,325	5,200	5,525
4 No. 7L Aux. Weights	4,730	5,125	5,415	5,635	5,820	5,695	6,020
4 No. 7 Aux. Weights	5,235	5,625	5,915	6,135	6,320	6,195	6,520

* D Aux. Weights will not clear Belt Cover on M-320D Unit.

UNIT	M-228D-200-74	M-160D-200-74	M-228D-173-74 M-160D-173-74	M-114D-173-74	M-114D-143-74 M-80D-143-74	M-114D-173-64 M-114D-143-64
STROKE	74″	74″	74″	74″	74″	64″
STRUCTURAL UNBALANCE	−1,960 Lbs.	−1,890 Lbs.	−1,860 Lbs.	−1,820 Lbs.	−1,440 Lbs.	−1,420 Lbs.
CRANKS	7486 MR	7486 MR	7486 MR	7486 MR	7462 MR	6462 MR
C'Bal., Cranks Only	3,705	3,775	3,805	3,880	2,245	2,855
4 No. 2RO Counterweights	16,085	16,155	16,185	16,305	9,935	11,620
4 No. 2L Aux. Weights	18,380	18,450	18,480	.....	11,480	13,380
4 No. 2S Aux. Weights	.....	.....	.....	.....	12,690	14,760
4 No. 3CRO Counterweights	13,805	13,875	13,905	14,015	8,710	10,225
4 No. 2L Aux. Weights	16,080	16,150	16,180	16,300	10,240	11,970
4 No. 3BS Aux. Weights	18,155	18,225	18,255	18,385	11,495	13,400
4 No. 5ARO Counterweights	11,155	11,225	11,255	11,355	7,205	8,515
4 No. 5L Aux. Weights	12,470	12,540	12,570	12,675	8,115	9,550
4 No. 5AS Aux. Weights	14,165	14,235	14,265	14,380	9,225	10,815
4 No. 5AD Aux. Weights	16,610	16,680	16,710	16,810	10,845	12,660
4 No. 5CRO Counterweights	9,200	9,270	9,300	9,395	5,940	7,070
4 No. 5L Aux. Weights	10,510	10,580	10,610	10,715	6,845	8,100
4 No. 5CS Aux. Weights	11,920	11,940	12,020	12,125	7,770	9,155
4 No. 5CD Aux. Weights	14,655	14,725	14,755	14,850	9,600	9,440
4 No. 6RO Counterweights	7,985	8,055	8,085	8,175	5,155	6,175
4 No. 6L Aux. Weights	8,790	8,860	8,890	8,985	5,705	6,800
4 No. 6 Aux. Weights	9,595	9,665	9,695	9,795	6,255	7,425
4 No. 7RO Counterweights	6,440	6,510	6,540	6,625	4,125	5,005
4 No. 7L Aux. Weights	7,050	7,120	7,150	7,240	4,550	5,485
4 No. 7 Aux. Weights	7,670	7,740	7,770	7,860	4,975	5,970

EXAMPLE:

A M-456D-305-144 with 4 No. ORO Counterweights and 4 No. OS Auxiliary Weights would have a maximum counterbalance effect of 25,250 lbs. in the 144″ stroke. (See other examples, pages 3328 and 3829.

Structural Unbalance with a negative (—) sign indicates a walking beam assembly that is heavy on the well end.

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FIGURE 24

"TWO-POINT" SUSPENSION bases are available for all Lufkin Mark II Pumping Units. The "two point" base reduces concrete requirements approximately 80% by permitting the use of small salvageable precast concrete blocks in front and rear. This simple foundation assures a completely portable unit and foundation which requires a minimum of installation time.

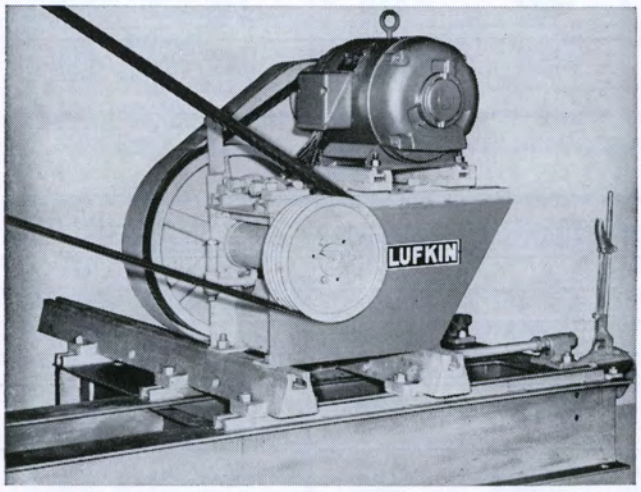

FIGURE 25

This assembly utilizes an electric motor and countershaft and provides a reduction ratio up to 4:1. This compact reduction unit package will fit on conventional slide rails and was designed for use with single reduction gear reducers where slow pumping speeds are encountered. This type assembly is manufactured in two sizes:

No. 1—25-50 HP
No. 2—up to 20 HP

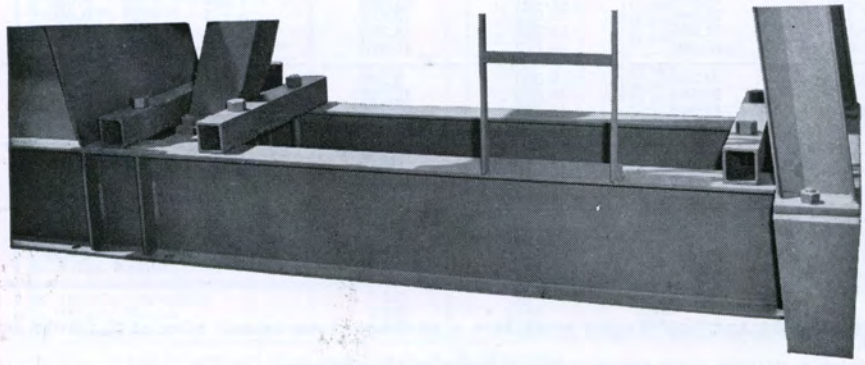

FIGURE 26

Typical top flange hold-down installation. Two bolt clamps are standard on the C-160D size and larger. One bolt clamps are standard on all smaller units. The number and location of clamps on the base is dependent on the size of the unit.

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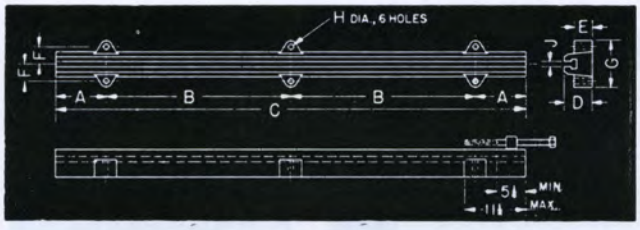

FIGURE 27

LUFKIN TYPE "A" ENGINE RAILS

Designed especially with minimum edge distance for flywheel clearance.

SIZE	A	B	C	D	E	F	G	H	J
A57 Rail...	3"	25½"	57"	4"	2½"	2⅛"	6¼"	1"	1"
A69 Rail...	3"	31½"	69"	4"	2½"	2⅛"	6¼"	1"	1"
A84 Rail...	9"	33"	84"	5"	3¼"	3⅛"	8½"	1"	1⅛"

FIGURE 28

STRUCTURAL SUB-BASE FOR HORIZONTAL ENGINES

Height to clear flywheel. Engine sits on T-slots fitted with adjusting screws. To be used when engine is mounted separately from stub-base pumping unit assembly.

FOUNDATION ANCHOR NUTS

Suspended in concrete forms before foundation is poured.

Provides flush foundation. Wide foot at base of nut insures more than adequate holding power.

Available in the following sizes:

BOLT DIA.	Length
¾".....	6"
1".....	10"
1¼".....	12"
1½".....	12"

FIGURE 31

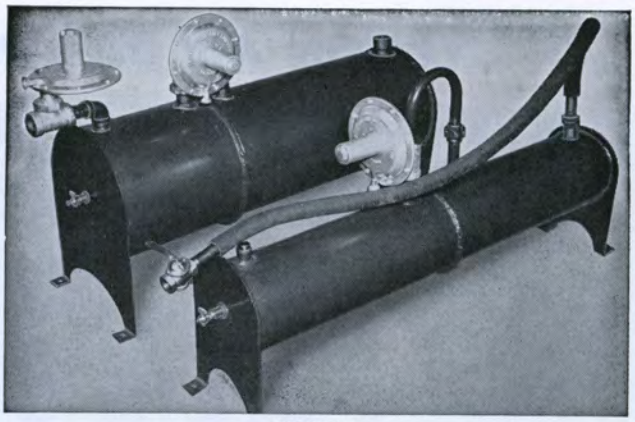

FIGURE 29

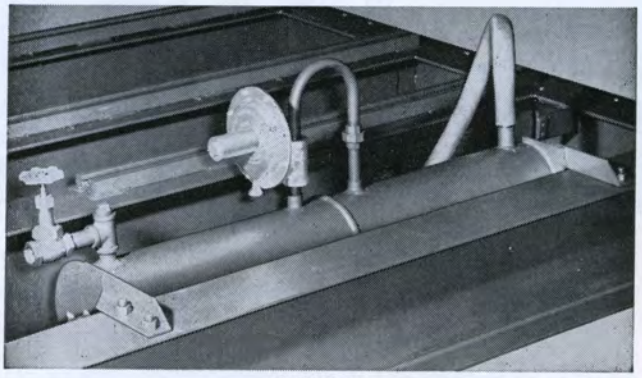

FIGURE 30

VOLUME TANK AND REGULATOR FOR GAS ENGINES

Double chamber, floor mounting, volume tanks for gas engines are furnished in two sizes. Both are equipped with regulators. The smaller size is for multi-cylinder gas engines and is 8" diameter by 48" long with partition in center. It has hose connection to engine. The larger size is recommended for slow speed engines and is 14" diameter by 42" long with a volume chamber of 2.5 cu. ft. A high pressure regulator can be furnished at inlet if necessary.

For units having a portable base, a volume tank that bolts directly to the outrigger as is shown in Fig. 30 is recommended.

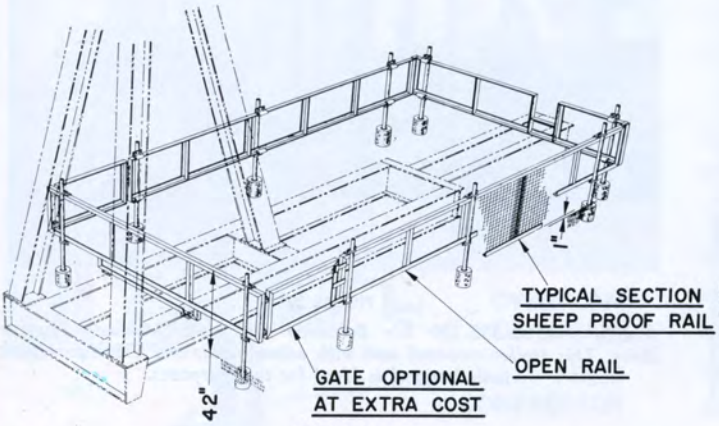

FIGURE 32

RAIL TYPE CRANK GUARDS

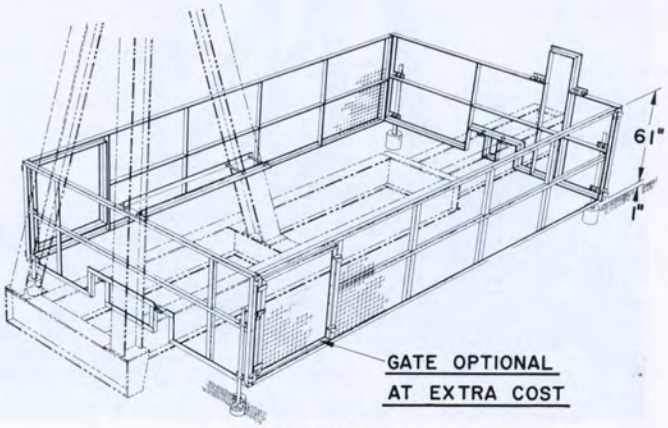

FIGURE 33

TYPE W SHEEP PROOF CRANK GUARDS

Open rail type and sheep proof crank guards are available from stock for all Lufkin Units. No holes required in Base or Post—clamps to top flange of Base and to Post—and can be fitted to any Lufkin unit. Sides are hinged and can be easily removed. Sheep Proof guards are 2 x 4 wire mesh with angle rails.

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LUFKIN AIR BALANCED PUMPING UNITS

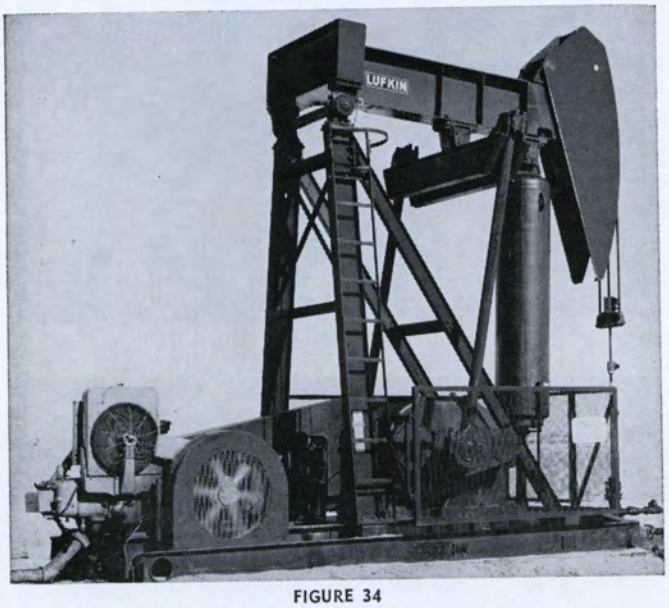

FIGURE 34
A-320D-305-100 Air Balanced Unit, Slow Speed Engine Drive.

FIGURE 35
A-320D-305-100 Air Balanced Unit, Electric Motor Drive.

FIGURE 36
A-456-365-120 Air Balanced Pumping Unit, Multi-Cylinder Engine Drive.

FIGURE 37
Mobile A-456D-365-120 Air Balanced Unit, Multi-Cylinder Engine Drive. This trailer-mounted unit with prime mover and diesel fuel tank built integral is ideal for test purposes.

Gear Reducer Data: See page 3320.
Structural Bearings: Roller Bearings.
Hanger: Horsehead, Wire Line.
Air Counterbalance Pressure: 450 P.S.I. (Max.)
Upper Pitman Connection: Rubber Cushioned.

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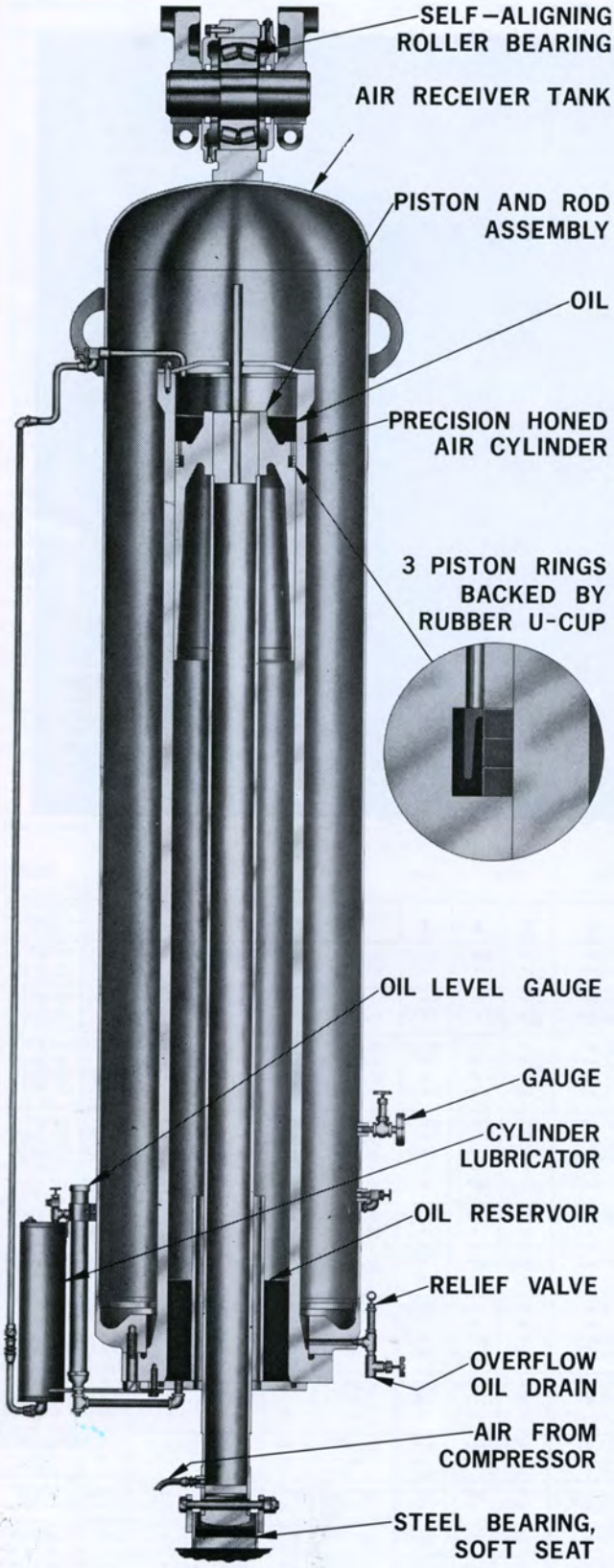

FIGURE 38

LUFKIN *AIR BALANCED* PUMPING UNITS

1. **Perfect counterbalance with finger-tip control.**
2. **Lower installation cost.**
3. **Compact and portable; ideal for well testing.**
4. **Small size and lighter weight make it ideal for export.**
5. **Stroke lengths to 25 feet for high volume production from great depths.**

These are some of the outstanding advantages of LUFKIN AIR BALANCED PUMPING UNITS. These units employ compressed air to counterbalance the well load rather than beam weights or crank weights. The air system has been so simplified that the only continuously operating parts are the balance cylinder and piston. The reservoir capacity of the cylinder is enlarged by a steel receiver which moves with the cylinder as a unit.

On engine-driven units, when the system is in need of air, an automatic regulator engages an air operated clutch (driven by one belt from the unit sheave) and replaces any lost air. The operator sets regulator, initially, at a pressure sufficient to counterbalance well load, and this pressure is maintained automatically. Should the load change appreciably, a slight adjustment of this regulator will restore perfect counterbalance.

A safety shut-off switch is available, which will ground out engine, or shut off motor, if pressure should exceed a pre-set figure or fall below a minimum pre-set figure.

For units pumping with electricity, a separate motor-driven compressor assembly is standard equipment.

Since the Lufkin Air Balanced Units are approximately 35% shorter and 40% lighter than crank-type units, they are ideal for use as portable or test units, and for installation on piling or superstructures. Since changing counterbalance effect is a matter of adjusting a valve, the air balanced unit is ideal for use in testing wells.

All the ruggedness and simplicity of the conventional Lufkin Pumping Units are incorporated in the design of the Lufkin Air Balanced Pumping Unit.

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GENERAL DIMENSIONS—Lufkin Air Balanced Pumping Units

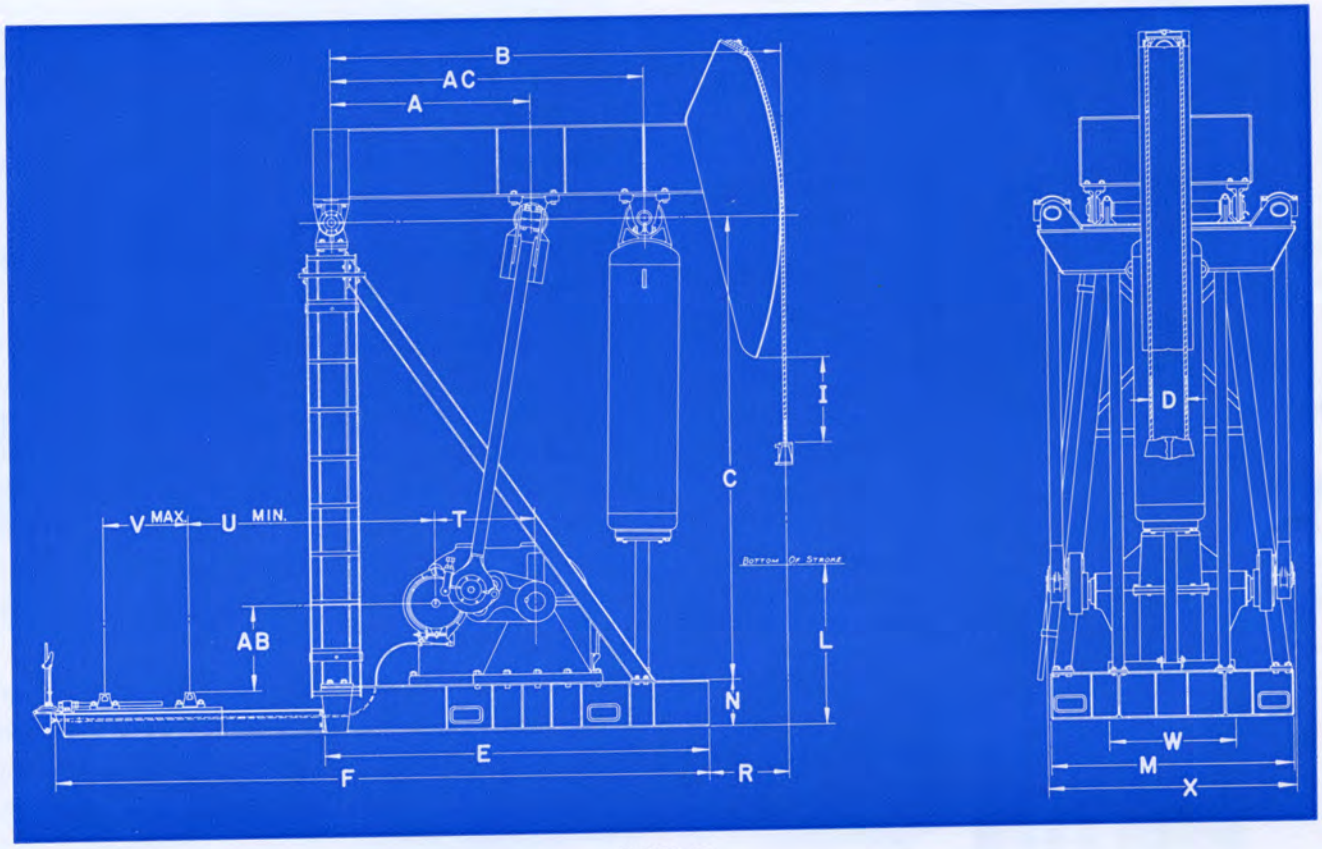

FIGURE 39

UNIT	A	B	C	D	E	F	I	L	M	N	R	T	U	V	W	X	AB	AC
A-3648D-470-300....	10′-5″	28′-6″	30′-0″	16″	*	35,-6″	19½″	54″	9′-8″	24″	48″	84½″	6′-1½″	44¾″	70¼″	11′-4½″	42″	17′-2″
A-3648D-470-240....	11′-2½″	28′-0″	25′-3½″	"	*	32′-0″	16½″	56″	9′-6″	21″	"	"	6′-11½″	"	"	"	"	19′-5½″
A-2560D-470-300....	10′-5″	28′-6″	30′-0″	"	*	35′-6″	19½″	54″	9′-8″	24″	"	70″	"	"	66¼″	11′-0½″	"	17′-2″
A-2560D-470-240....	11′-2½″	28′-0″	25′-3½″	"	*	32′-0″	16″	57½″	8′-10″	21″	"	"	7′-9½″	"	"	10′-10⅝″	36″	19′-5½″
A-1824D-470-300....	10′-5″	28′-6″	30′-0″	"	*	35′-6″	19½″	54″	9′-8″	24″	"	58⅞″	7′-10⅝″	"	50¼″	9′-9½″	42″	17′-2″
A-1824D-470-240....	11′-2½″	28′-0″	25′-3½″	"	*	32′-0″	16″	57½″	8′-0″	21″	"	"	8′-8⅝″	"	"	9′-7⅝″	30″	19′-5½″
A-1824D-427-216....	10′-1½″	25′-8″	23′-6″	"	22′-0⅝″	29′-9⅞″	18¾″	57¼″	7′-11½″	"	"	"	8′-1″	41″	"	"	34⅞″	14′-3½″
A-1824D-427-192....	"	23′-0″	21′-0″	"	19′-4⅝″	27′-1⅞″	17½″	52″	"	"	"	"	"	"	"	"	"	"
A-1280D-470-300....	10′-5″	28′-6″	30′-0″	"	*	35′-6″	19½″	54″	9′-8″	24″	"	52½″	8′-5″	44¾″	"	9′-3½″	42″	17′-2″
A-1280D-470-240....	11′-2½″	28′-0″	25′-3½″	"	*	32′-0″	16″	57½″	8′-0″	21″	"	"	9′-3″	"	"	9′-1⅝″	30″	19′-5½″
A-1280D-427-216....	10′-1½″	25′-8″	23′-6″	"	22′-0⅞″	29′-9⅞″	18¾″	57¼″	7′-11½″	"	"	"	8′-7⅜″	41″	"	"	34⅞″	14′-3½″
A-1280D-427-192....	"	23′-0″	21′-0″	"	19′-4⅝″	27′-1⅞″	17½″	52″	"	"	"	"	"	"	"	"	"	"
A-1280D-305-168....	7′-4″	19′-3″	20′-4″	"	14′-10½″	22′-0½″	16″	66½″	"	16⅛″	59″	"	6′-0″	"	"	8′-11⅛″	38⅛″	10′-11½″
A-912D-470-240.....	11′-2½″	28′-0″	25′-3½″	"	*	32′-0″	"	57½″	8′-10″	21″	48″	48½″	9′-7″	44¾″	50″	8′-6⅝″	24″	19′-5½″
A-912D-427-216.....	10′-1½″	25′-8″	23′-6″	"	22′-0⅞″	29′-9⅞″	18¾″	57¼″	"	"	"	"	9′-2″	"	"	"	28⅞″	14′-3½″
A-912D-427-192.....	"	23′-0″	21′-0″	"	19′-4⅝″	27′-1⅞″	17½″	52″	"	"	"	"	"	"	"	"	"	"
A-912D-305-168.....	7′-4″	19′-3″	20′-4″	"	14′-10½″	22′-0½″	16″	66½″	"	16⅛″	59″	"	6′-4″	"	"	8′-4⅛″	32⅛″	10′-11½″
A-912D-427-144.....	"	16′-8″	17′-10″	"	12′-3½″	19′-5½″	20½″	55″	"	"	"	"	"	"	"	"	"	"
A-640D-305-168.....	"	19′-3″	20′-4″	"	14′-10½″	22′-0½″	16″	66½″	"	"	"	41½″	7′-0″	"	46¾″	"	30⅛″	"
A-640D-427-144.....	"	16′-8″	17′-10″	"	12′-3½″	19′-5½″	20½″	55″	"	"	"	"	"	"	"	"	"	"
A-640D-305-144.....	6′-5″	17′-4″	"	12″	12′-11¼″	20′-1¼″	12½″	62½″	7′-6″	"	57″	"	71⅛″	"	"	"	"	9′-10″
A-640D-365-120.....	"	14′-7″	15′-7″	"	10′-11¾″	18′-1¾″	22″	49½″	"	"	47½″	"	"	"	"	"	"	"
A-456D-305-144.....	"	17′-4″	17′-10″	"	12′-11¼″	20′-1¼″	12½″	62½″	"	"	57″	38⅜″	6′-2″	"	"	"	"	"
A-456D-365-120.....	"	14′-7″	"	"	10′-11¾″	18′-1¾″	22″	49½″	"	"	47½″	"	"	"	"	"	"	8′-8″
A-456D-256-120.....	69″	15′-4″	15′-7″	"	11′-11¾″	19′-1″	14½″	57″	7′-1½″	"	"	"	"	"	"	"	"	"
A-320D-256-120.....	70″	14′-7″	"	"	11′-3¼″	18′-11¼″	"	"	"	"	53″	34″	6′-6″	"	43¼″	7′-3⅜″	"	8′-11″
A-320D-305-100.....	"	12′-11″	13′-4″	"	10′-0¼″	17′-8¼″	13″	53″	"	"	39″	"	"	"	"	"	"	"
A-228D-173-100.....	56″	12′-7″	12′-5″	"	8′-3¼″	15′-0¼″	17″	46¾″	6′-1½″	"	36″	30″	47″	50″	37¼″	6′-8⅜″	29⅛″	7′-3½″
A-228D-246-86.....	"	10′-11″	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
A-160D-200-74.....	50″	10′-0″	11′-9″	"	7′-11″	14′-6¾″	16½″	51″	"	9¾″	35½″	26″	57″	43½″	32″	69⅞″	22″	6′-5½″
A-114D-173-64.....	48″	9′-7″	11′-0″	9″	7′-5½″	14′-5¾″	15″	55½″	63¾″	"	36″	24″	64″	42″	25¼″	66⅞″	13¾″	6′-0½″

* Portable Base is Standard. One Piece and Portable Bases Available On All Units.

NOTE: Do not use above dimensions for foundation. Request foundation plan.

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LUFKIN INDUSTRIES, INC. **LUFKIN, TEXAS**

RATING CHART

UNIT	Peak Torque Rating, Inch Lbs.	Stroke, Inches	Polish Rod Load Class, Lbs.	Piston Dia., Inches	Effective Counter-Balance, Lbs.	Walking Beam Size	Pitman Side Member Size, Ex.-Hvy. Pipe	Wireline Hangers Dia. & Ctrs.	Floating Hub *Standard Sheave Sizes P.D. Inches	Gear Ratio	Weight, Lbs.
A-3648D-470-300..	3,648,000	300-240	47,000	17½	37,000	36 x 16½ @ 280#	10	Double 1¼" x 16"	80" (18D)	28.99	109,000
A-3648D-470-240..	"	240-200	"	14½	34,000	"	8	"	"	"	99,000
A-2560D-470-300..	2,560,000	300-240	"	17½	37,000	36 x 16½ @ 245#	10	"	68" (16D)	29.57	95,000
A-2560D-470-240..	"	240-200	"	14½	34,000	"	8	1⅜" x 16"	"	"	85,000
A-1824D-470-300..	1,824,000	300-240	"	17½	37,000	"	10	Double 1¼" x 16"	40, 46, 51, 55, 68(11D)	28.33	81,300
A-1824D-470-240..	"	240-200	"	14½	34,000	"	8	1⅜" x 16"	"	"	71,332
A-1824D-427-216..	"	216-190-162	42,700	"	24,830	33 x 15¾ @ 200#	"	"	"	"	64,306
A-1824D-427-192..	"	192-168-144	"	"	30,635	"	"	"	"	"	60,850
A-1280D-470-300..	1,280,000	300-240	47,000	17½	37,000	36 x 16½ @ 245#	10	Double 1¼" x 16"	40, 46, 51, 55, 68(10D)	28.05	78,300
A-1280D-470-240..	"	240-200	"	14½	34,000	"	8	1⅜" x 16"	"	"	68,330
A-1280D-427-216..	"	216-190-162	42,700	"	24,830	33 x 15¾ @ 200#	"	"	"	"	61,756
A-1280D-427-192..	"	192-168-144	"	"	30,635	"	"	"	"	"	58,300
A-1280D-305-168..	"	168-141-118	30,500	13	22,450	27 x 14 @ 160#	6	"	"	"	45,740
A-912D-470-240...	912,000	240-200	47,000	14½	34,000	36 x 16½ @ 245#	8	"	28, 34, 40, 46, 51 (8D)	28.72	60,000
A-912D-427-216...	"	216-190-162	42,700	"	24,830	33 x 15¾ @ 200#	"	"	"	"	53,499
A-912D-427-192...	"	192-168-144	"	"	30,635	"	"	"	"	"	50,000
A-912D-305-168...	"	168-141-118	30,500	13	22,450	24 x 14 @ 145#	6	"	28, 34, 40, 46, 51, (7D)	"	39,604
A-912D-427-144...	"	144-120-100	42,700	"	27,935	27 x 14 @ 160#	"	"	"	"	37,200
A-640D-305-168...	640,000	168-141-118	30,500	"	22,450	24 x 14 @ 145#	"	"	28, 34, 40, 46, 51 (6D)	28.6	39,104
A-640D-427-144...	"	144-120-100	42,700	"	27,935	27 x 14 @ 160#	"	"	"	"	36,200
A-640D-305-144...	"	144-120-100	30,500	12	20,200	24 x 14 @ 130#	"	1¼" x 12"	"	"	32,878
A-640D-365-120...	"	120-100-86	36,500	"	24,535	"	"	"	"	"	31,200
A-456D-305-144...	456,000	144-120-100	30,500	"	20,200	"	"	"	28, 34, 40, 46, 51 (6D or 8C)	29.04	31,560
A-456D-365-120...	"	120-100-86	36,500	"	24,535	"	"	"	"	"	29,900
A-456D-256-120...	"	"	25,600	11	18,400	24 x 12 @ 100#	"	"	"	"	27,303
A-320D-256-120...	320,000	120-104-90	"	11	18,400	"	4	"	25, 30, 36, 42, 47¼ (6C or 5D)	30.12	25,257
A-320D-305-100...	"	100-86-74	30,500	"	21,910	"	"	"	"	"	24,500
A-228D-173-100...	228,000	100-86-74	17,300	10	14,750	21 x 9 @ 82#	"	1⅛" x 12"	24¼, 30, 36, 41¼ (5C or 4D)	28.45	20,300
A-228D-246-86....	"	86-74-64	24,600	"	17,695	"	"	"	"	"	18,300
A-160D-200-74....	160,000	74-64-54	20,000	"	17,595	18 x 8¾ @ 77#	3½	"	24¼, 29¼, 33¼, 38 (4C or 3D)	28.67	14,600
A-114D-173-64....	114,000	64-54	17,300	8	11,000	16 x 8½ @ 64#	"	1" x 9"	19¼, 24, 29¼, 33¼ (3C)	29.4	11,600

* Standard Sheave Sizes Shown are Floating Hub Sheaves for Clutch Driven Compressors; Largest Size Shown is Maximum Available. For Electric Motor Driven Compressors, Use Solid Type Reducer Sheave as Shown in Crank Balance Unit Specifications.

COUNTERBALANCE DATA

Effective Counterbalance In Pounds Based On Average Pressure

UNIT	*Average Pressure, PSIG 150	175	200	225	250	275	300	325	350	375	400	410
A-3648D-470-300 A-2560D-470-300 A-1824D-470-300 A-1280D-470-300	.....	3,045	6,665	10,290	13,910	17,535	21,155	24,780	28,400	32,025	35,645	37,000
A-3648D-470-240 A-2560D-470-240 A-1824D-470-240 A-1280D-470-240 A-912D-470-240	4,135	7,005	9,875	12,745	15,615	18,485	21,355	24,225	27,095	29,965	32,835	34,000
A-1824D-427-216 A-1280D-427-216 A-912D-427-216	920	3,220	5,520	7,820	10,120	12,420	14,720	17,020	19,320	21,620	23,920	24,830
A-1824D-427-192 A-1280D-427-192 A-912D-427-192	3,905	6,475	9,045	11,615	14,185	16,755	19,325	21,895	24,465	27,035	29,605	30,635
A-1280D-305-168 A-912D-305-168 A-640D-305-168	2,810	4,700	6,585	8,475	10,365	12,250	14,140	16,030	17,915	19,805	21,695	22,450
A-912D-427-144 A-640D-427-144	5,240	7,420	9,605	11,785	13,970	16,150	18,335	20,515	22,700	24,880	27,065	27,935
A-640D-305-144 A-456D-305-144	3,520	5,125	6,725	8,330	9,935	11,540	13,145	14,745	16,350	17,955	19,560	20,200
A-640D-365-120 A-456D-365-120	4,725	6,630	8,535	10,440	12,345	14,250	16,155	18,060	19,965	21,870	23,775	24,535
A-456D-256-120 A-320D-256-120	4,035	5,415	6,795	8,175	9,560	10,940	12,320	13,700	15,085	16,465	17,845	18,400
A-320D-305-100	4,855	6,495	8,135	9,775	11,415	13,055	14,695	16,335	17,975	19,615	21,255	21,910
A-228D-173-100	2,925	4,060	5,195	6,335	7,470	8,610	9,745	10,885	12,020	13,160	14,295	14,750
A-228D-246-86	4,045	5,355	6,670	7,980	9,295	10,605	11,920	13,230	14,545	15,855	17,170	17,695
A-160D-200-74	4,410	5,680	6,945	8,215	9,480	10,750	12,015	13,285	14,550	15,820	17,085	17,595
A-114D-173-64	2,760	3,550	4,345	5,135	5,930	6,720	7,515	8,305	9,100	9,890	10,685	11,000

*Pressure Shown is Average Pressure Between Maximum and Minimum and Occurs At Approximately Beam Horizontal Position. For Counterbalance At Other Pressures Use Direct Interpolation.

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LUFKIN INDUSTRIES, INC. **LUFKIN, TEXAS**

LUFKIN BEAM BALANCED PUMPING UNIT ASSEMBLIES

STRUCTURAL SPECIFICATIONS AND DIMENSIONS

See page 3320 for GEAR Specifications

UNIT	B-57D-109-48	B-57D-109-42	B-40D-89-42	B-40D-76-42	B-40D-89-36
Polished Rod Cap., #	10,900	10,900	8,900	7,600	8,900
Stroke Length, Ins.	48, 36	42, 32	42, 32	42, 32	36, 28
Walking Beam	16" x 45 Lbs.	16" x 45 Lbs.	16" x 36 Lbs.	14" x 34 Lbs.	14" x 34 Lbs.
Equalizer Bearing	BRONZE BUSHED, OIL BATH TYPE				
Center Bearing	BRONZE BUSHED, OIL BATH TYPE				
Crank Pin Bearings	BRONZE BUSHED, OIL BATH TYPE				
Wireline Hanger	⅞" x 9" Ctrs.	⅞" x 6½" Ctrs.	¾" x 6½" Ctrs.	¾" x 6½" Ctrs.	¾" x 6½" Ctrs.
*1" thick Beam Wts., #	150	150	150	125	125
No. of Beam Weights	EFFECTIVE COUNTERBALANCE AT POLISHED ROD, LBS.				
0	400	550	420	420	550
1	700	880	710	660	830
2	1000	1205	995	895	1105
3	1300	1530	1280	1130	1380
4	1595	1850	1560	1365	1650
5	1890	2165	1835	1595	1915
6	2180	2480	2110	1825	2180
7	2490	2790	2380	2050	2440
8	2760	3100	2650	2275	2700
9	3045	3405	2915	2495	2955
10	3325	3710	3180	2715	3210
11	3605	4010	3440	2930	3460
12	3885	4300	3700	3145	3705
13	4160	4595	3955	3360	3950
14	4435	4890	4210	3570	4190
15	4705	5180	4460	3780	4430
16	4975	5470	4710	3985	4665
17	5240	5755	4955	4190	4900
18	5505	6040	5195	4390	5130
19	5765	6320	5435	4590	5360
20	6025	6600	5670	4790	5585
21	6280	6875	5905	4985	5810
22	6535	7150	6135	5180	6030
23	6785	7420	6365	5370	6250
24	7035	7685	6590	5560	6465
25	7280	7950	6815	5745	6680
26	7525	8210	7035	5930	6890
27	7770	8470	7255	6110	7100
28	8010				
29	8250				
30	8485				

Note: *3" thick Beam Weights optional for all Beam Balanced units.

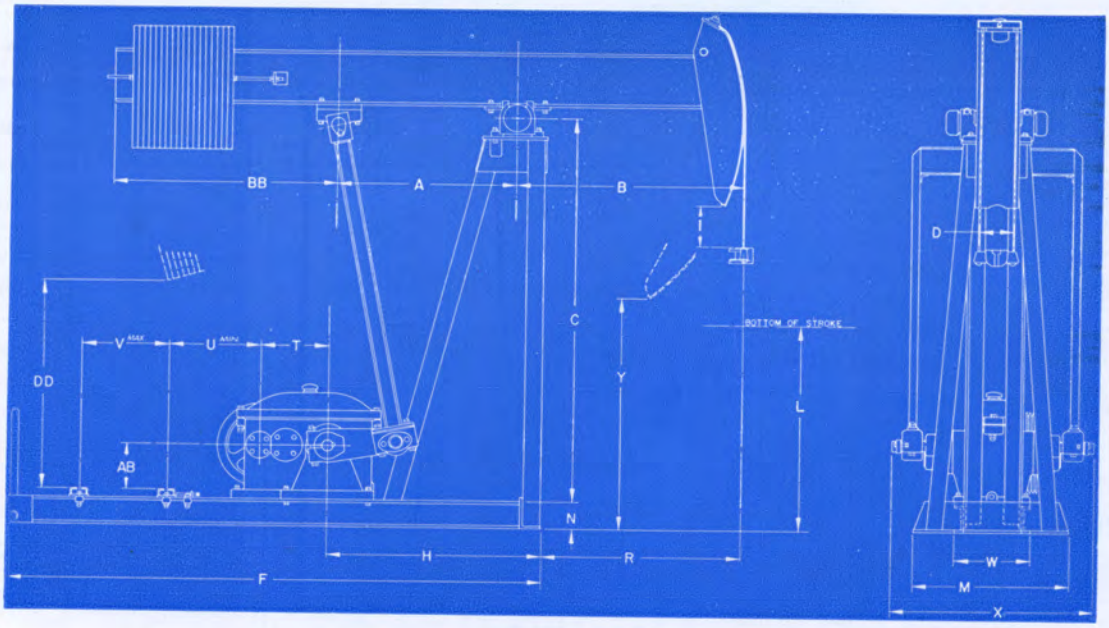

FIGURE 40

GENERAL DIMENSIONS

UNIT	A	B	C	D	F	H	I	L	M	N	R	T	U	V	W	X	Y	AB	BB	DD
B-57D-109-48	46	64	8'-9"	9	13'-3"	69	14½	43¾	40¾	10	43	20	24¼	39¾	25	57½	69¾	14¾	7'-1"	47¼
B-57D-109-42	"	56	"	6½	"	"	15½	51	"	"	35	"	"	"	"	"	75½	"	6'-6"	50
*B-40D-89-42	"	"	8'-2½"	"	11'-8½"	61	"	42	38½	8	41	17½	19	34¼	20	50¾	67	10¾	63	50¾
*B-40D-76-42	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
*B-40D-89-36	"	48	"	"	"	"	13	50½	"	"	33	"	"	"	"	"	72½	"	61½	51¼

* Base Shown Is For Electric Motor Only. For Gas Engine Drive Dim. "F" Is 13'-4". Dim. "U" Is 19, and Dim. "V" Is 53¾.

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LUFKIN INSTALLATIONS

TYPICAL OF THE MORE THAN ONE HUNDRED AND FIVE THOUSAND LUFKIN PUMPING UNITS NOW GIVING SATISFACTORY SERVICE

FIGURE 41

Lufkin M-912D-305-168 Mark II Unitorque Pumping Unit With Electric Motor Drive.

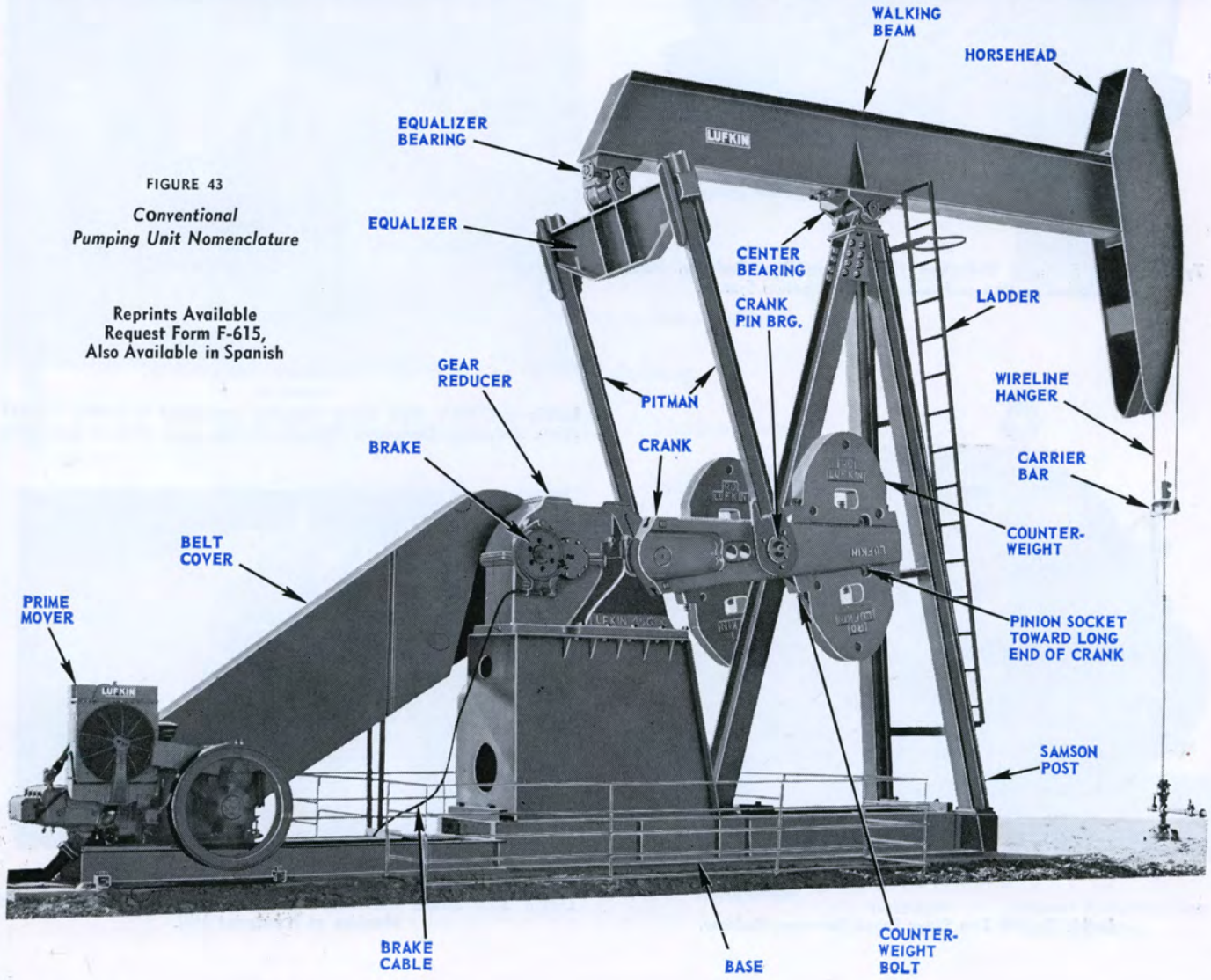
FIGURE 42

Lufkin A-1824D-427-192 Air Balanced Unit With Multi-Cylinder Engine Drive.

FIGURE 43

Conventional Pumping Unit Nomenclature

Reprints Available
Request Form F-615,
Also Available in Spanish



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LUFKIN GEAR REDUCERS

A complete line of Single, Double and Triple Reduction Herringbone Gear Reducers, also Single and Double Reduction Speed Increasers are available.

Write for Gear Catalog G-32A and G-33A.

A complete line of Marine Gears including reduction, reverse and reduction, and multiple pinion units are available. Write for Marine Gear Bulletins G-10A, G-11A, G-30 and MG-34.

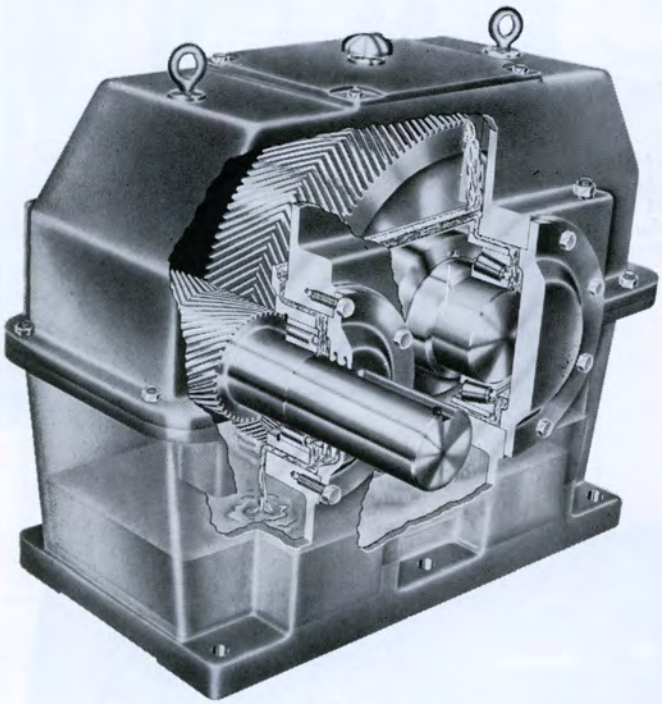

FIGURE 44
Typical Type S Single Reduction Herringbone Gear Reducer. Note simple but positive and fool-proof Lubrication System.

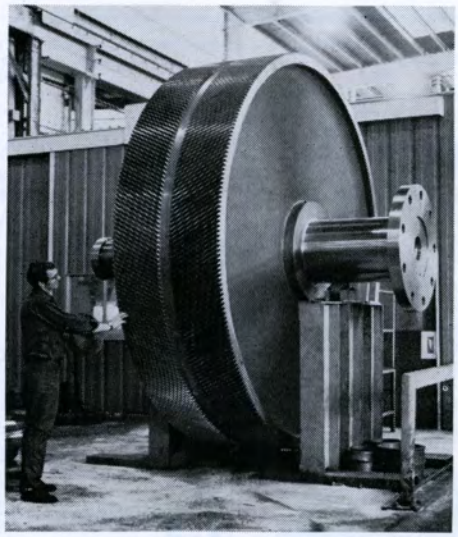

FIGURE 45
CSQ 16232S slow speed gear 138.884" outside diameter and 36" face width. Gear and shaft total weight, 50,000 lbs.

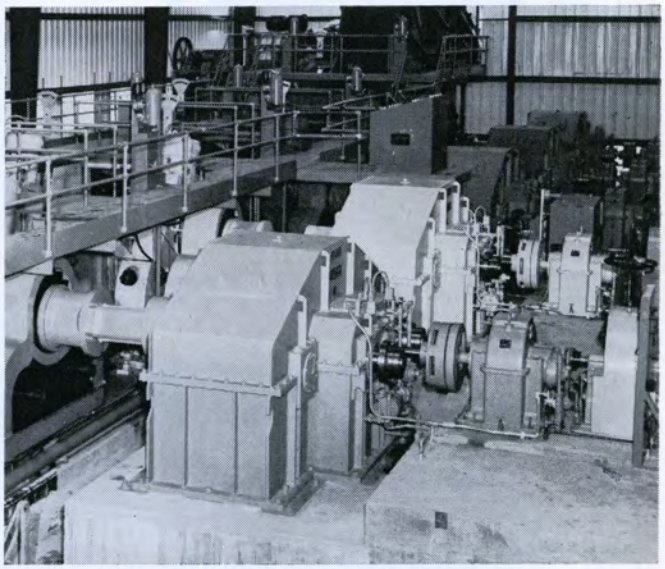

FIGURE 46
Lufkin NM1410H High Speed Reducers connected to Lufkin TC4421 Triple Reduction Compound Reducers driving sugar mills in Louisiana.

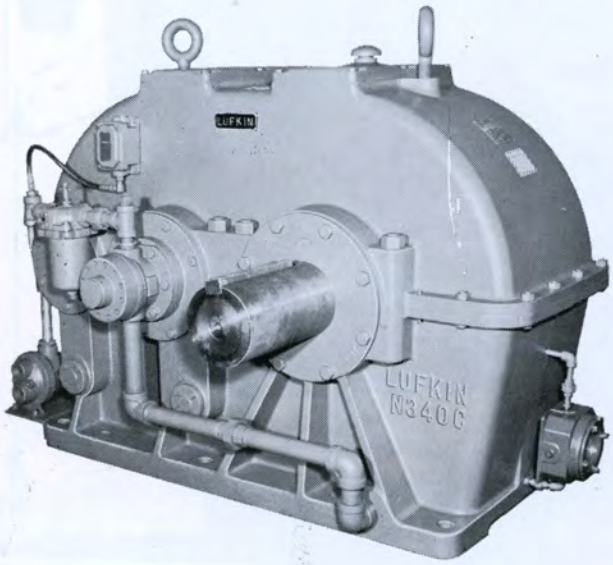

FIGURE 47
Lufkin Type N Two Stage Speed Increaser/Reducer.

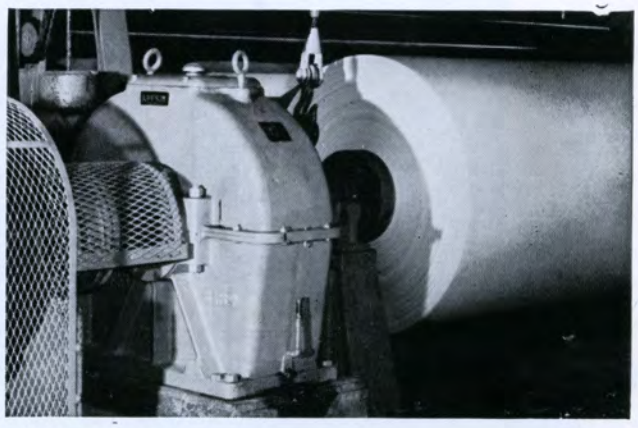

FIGURE 48
Lufkin S189 Single Reduction Herringbone Reducer Driving Rewind Machine at Newsprint Mill.

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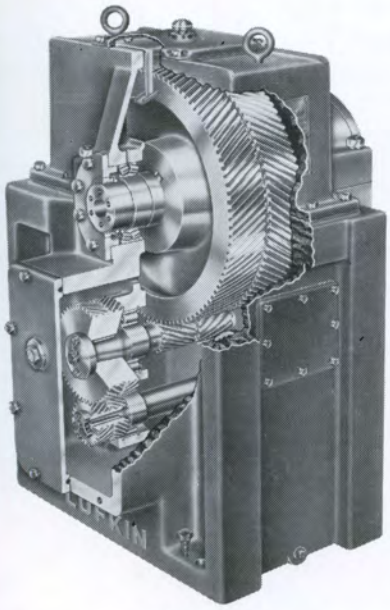

FIGURE 49
Lufkin Change Gear Extruder Drive for the plastic and rubber industries.

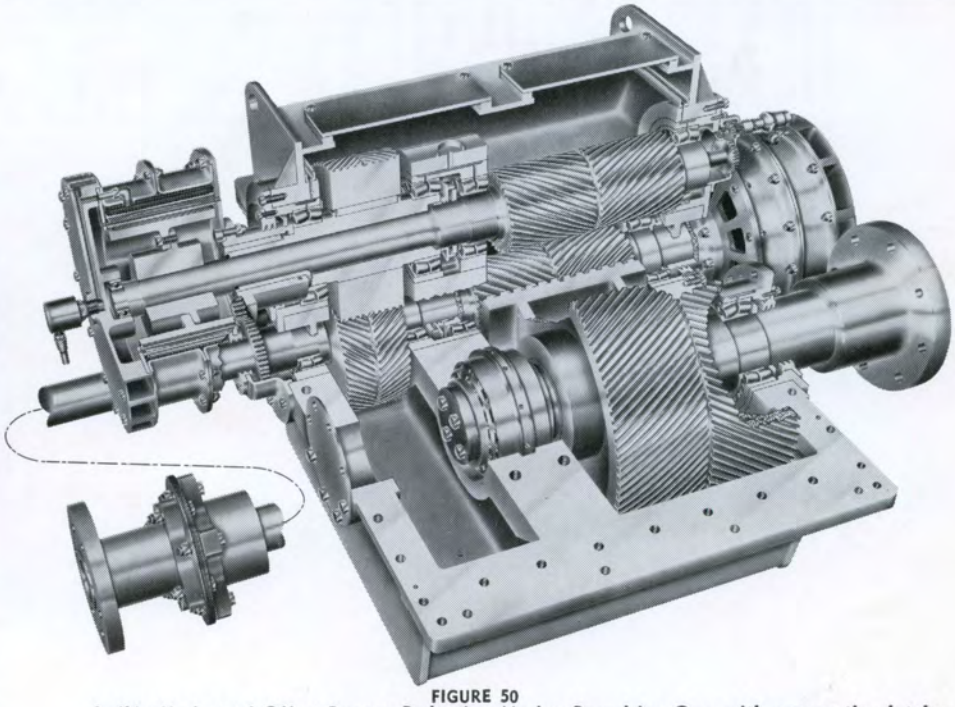

FIGURE 50
Lufkin Horizontal Offset Reverse-Reduction Marine Propulsion Gear with pneumatic clutches.

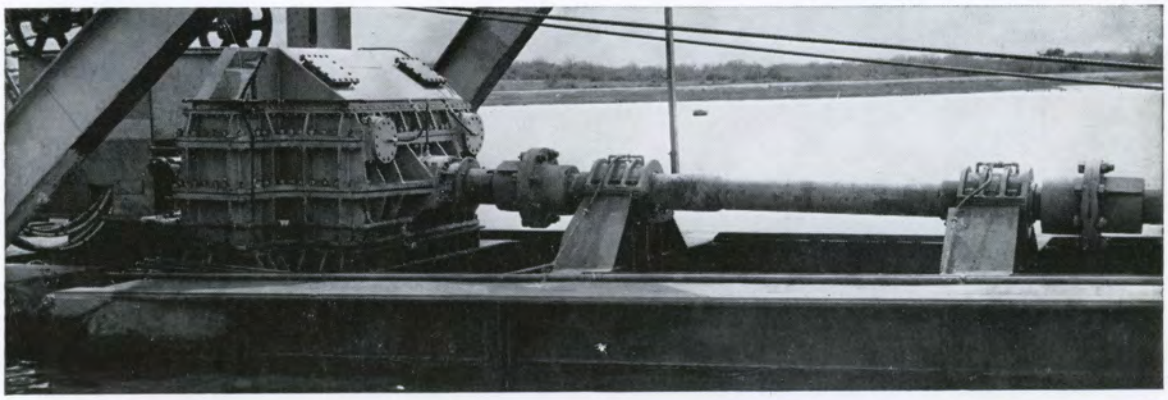

FIGURE 51
Lufkin DC3620 Dredge Cutter Reduction Gear Ratio 32. 6:1 Delivering 1200 h.p. at 1200 r.p.m.

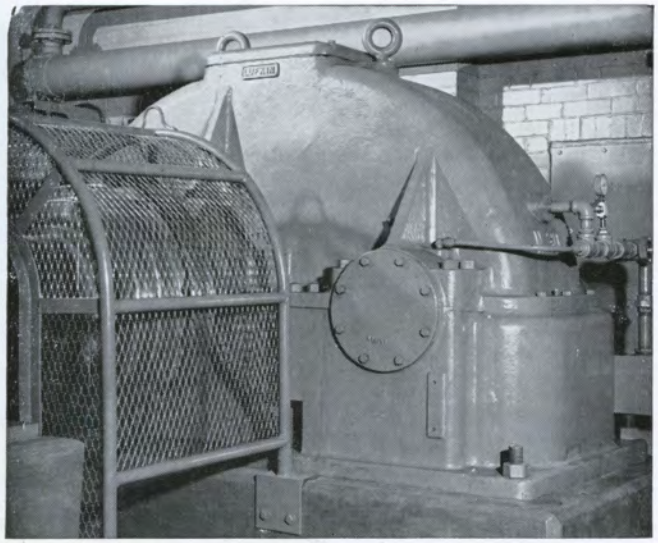

FIGURE 52
Lufkin's Big N3012 Pipe Line Pump Speed Increaser, 1060 h.p. Capacity at 3600 r.p.m. pump speed and 7:1 ratio.

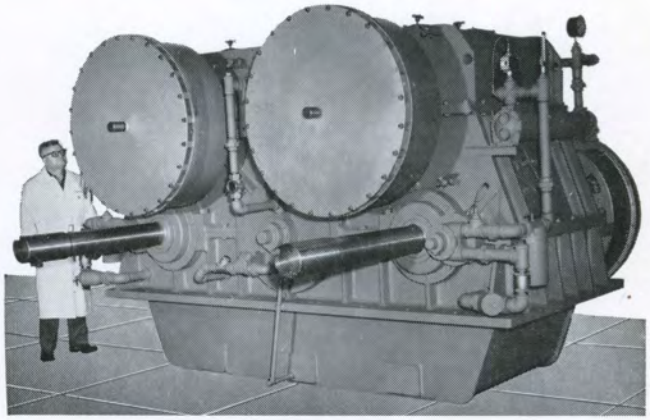

FIGURE 53
Lufkin RCS8414 Marine Reverse-Reduction Compound Propulsion Gear. Driven by two 1700 HP Diesels, 515 RPM, 3.33:1 Ratio.

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