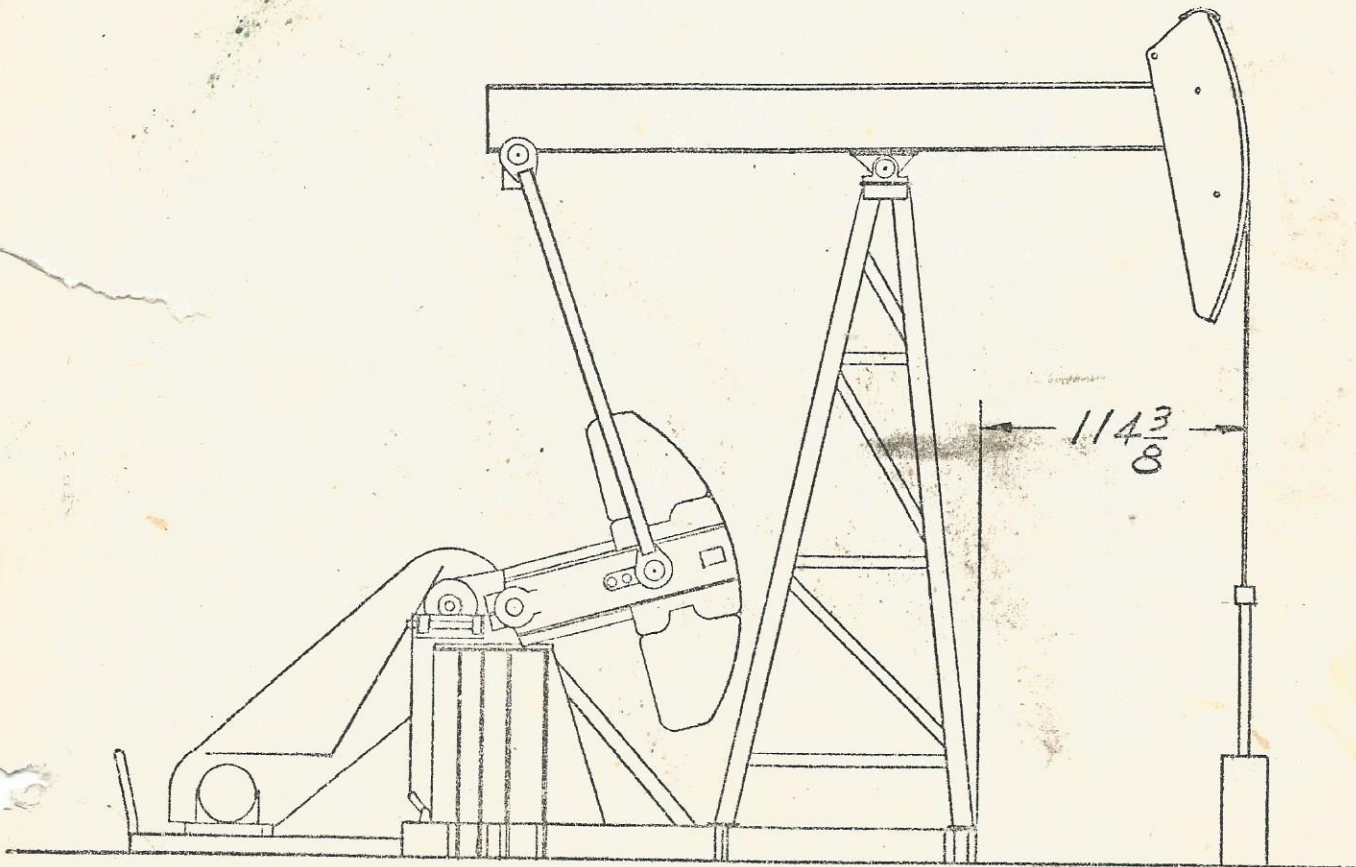


Joe C. Phillips  
3103 Red Robin Loop  
Bryan, TX 77802

# PARKERSBURG

**320 Pumping Unit**  
manufactured by  
**Permian Basin Mfg. Co.**  
**Odessa, Texas**



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## SECTION I

### INSTALLATION & OPERATION INSTRUCTIONS

#### A. Installation Instructions

##### 1. Foundation

The foundation for the Parkersburg unit will be standard 320 pumping unit type base. The base will be the portable type furnished through local suppliers.

The unit will be bolted to the base by the use of base clamps rather than bolting through the bottom flange of the beam.

##### 2. Setting of the Base

###### Standard Base

Each unit should be set and located on proper centerline with the well. Since the manufacturer of the unit base cannot fabricate a unit base absolutely flat, it is essential that the foundation be as level as possible. Metal shims should be used in areas where the unit base does not have a proper bearing with the foundation. To permit good service life from a unit base, the base should be checked at least every sixty (60) days for proper level and alignment.

##### 3. Brake Control & Engine Base

All brakes are tightened in a hold position for shipment. Proper adjustment should be made on the brake when in operation.

Never depend on the brake to hold the crank in position when working around the cranks. The brake could slip or be carelessly released. Use other means such as blocks, cables, or chains to hold the cranks in position.

##### 4. Counterbalance

- (a.) To install the wing weights on the 320 Parkersburg unit leave the cranks at the downward position and remove the Hub Bolt.

Put the wing weights onto the Crank and after the first gear has engaged, remove the band holding the gear in place. Proceed further until the back gear starts to engage, then remove the band holding it in place. Locate the weight to the desired position then install the Safety Pin. After the Safety Pin is in place, tighten all calmp bolts securely and replace Hub Bolt. Repeat this procedure for each wing weight. Grease may also be applied to insure help in assembly.

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Counterbalance (Cont'd)

- (b.) An alternate method could be to place the cranks in a horizontal position. Never depend on the brake to hold the crank in position when working around the cranks. The brake could slip or be carelessly released. Use other means such as blocks, cables, or chains to hold the cranks in position. Remove the bar lock located at the ends of each crank and install weights rotating the gears to the desired position. The weights are a rack and pinion type with a clamp shoe and clamp bolts. Instruction plates for adjustment are located on each crank of each unit. A proper wrench and hexagon stock is provided with each unit to adjust the weights.

IMPORTANT

Always check lock screws on all weights before putting units into operation regardless of whether the weights are installed at the factory or in the field.

5. Wrist Pins

Clean both wrist pin and wrist pin hold before installing the assembly onto the crank. Tighten the wrist pin nut fully by using a sledge hammer on the wings of the nut. Install the cotter pin. Never loosen the wrist pin nut to align the wrist pin nut and cotter pin. Clean the taper on the O.D. of the housing and make sure all surfaces are free of dirt and paint.

Never depend on the brake to hold the crank in position when working around the cranks. The brake could slip or be carelessly released. Use other means such as blocks, cables, or chains to hold the cranks in position.

6. Walking Beam

Install the pitman yoke assembly onto the walking beam. Hammer the yoke bolts tight. Clean and install the pitman arm onto the bearing housing, insuring all surfaces are free from dirt or paint. Thoroughly clean the tapered face on the pitman arms and the pitman yokes where they attach. Each pitman head is held onto the bearing housing with three (3) "dog head" bolts. Tighten the pitman head bolts only sufficiently to hold the arms in place. Pitman arms should be laid parallel to the beam. Excessive sideways movement could result in bearing damage.

Lift the walking beam assembly to the top of the samson post and bolt the saddle bearing to the samson post leaving bolts slightly loose. Attach the lower pitman heads to the wrist pins leaving the bolts slightly loose. Before proceeding, check that the grease reliefs are in the "up" position.

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## Walking Beam (Cont'd)

Attach the wire line to the horsehead around the top plate. After bolting the cap in place, assemble the clamp seat onto the wireline using doors and clamp bar. Attach the horsehead and the wireline to the walking beam. Install the hinge pin through the horsehead and lay back the ears on the walking beam. Care should be taken to prevent damage to the all-thread adjusting screw located through the side plates of the horsehead. Once the head is in position, check the weight operated clamp assembly to see that it is securely engaged in its seat near the lower flange of the walking beam.

### 7. Prime Mover

Before installing the prime mover make sure all bolted type belt cover brackets are in place. This is only required on direct mount bases for large single cylinder engines.

For electric motors, multi-cylinder engines, and some single cylinder engines, slide rails are furnished to permit ease of installation and belt adjustment. Direct mount bases with "TEE" slots are furnished for large single cylinder engines.

When using slide rails, first install the proper engine rails and bolts. For "TEE" slot mounting, the heads of the bolts are to be inserted from the back end of the engine base.

Install prime mover and leave bolts loose. Clean the prime mover shaft and properly install the sheave. Install the V-belts, align the engine sheave with the sheave on the reducer and properly tighten V-belts with the adjustment assembly provided with each unit. Belts too tight may cause damage to both the prime mover shaft bearings and to the reducer shaft bearings. Any mismatched belt should be replaced. Belts too loose may turn over in the sheave grooves causing both slippage and reduced belt service life.

### 8. Reducer

Fill the reducer per the specifications on the reducer name plate or the attached lubrication chart. Do not overfill. Oil level is marked by the pipe plug at the end of the reducer. Fill to this level only.

Check, and if necessary, tighten all reducers to sub-base bolts.

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9. Final Alignment

Check the unit for proper alignment with the well head. Since wind conditions usually prohibit proper alignment by the use of a plumb bob, it is suggested that alignment be checked with the well load connected to the horsehead. If the prime mover has been serviced, the cranks can be positioned on the top stroke, the mid stroke, and the bottom stroke. At each position, the proper alignment with the stuffing box should be checked by removing the stuffing box to see if the polish rod is in the center of the tubing. Centerline adjustment of  $2\frac{1}{2}$  inches overall can be made at the saddle bearing. If lateral adjustment is required, and if the unit has been installed as per print, check the well head for vertical alignment.

Check the unit for proper level at the top of the samson post and the machined face of the cranks. Further checks should be made by the checking of the distance between pitman arms and the face of the cranks. Both arms should be vertical and parallel to each other.

If, after proper alignment with the well, the wireline does not track the runner plates of the horsehead, make necessary corrections with the adjustment provided within the horsehead.

When the unit is properly aligned, tighten all bolts. Jam or lock nuts should be installed and tightened.

10. Assembly Drawings

Sufficient drawings are furnished with each unit. They should be carefully followed throughout the erection of the unit.

B. Operational Instructions

1. Prime Mover

Service the prime mover per instructions furnished by the manufacturer.

2. Stuffing Box (Well Head)

The stuffing box should be serviced with necessary packing and adjusted according to standard oil field practice. If the stuffing box is too tight, unnecessary loads will be applied to both the reducer and the prime mover.

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3. Lubrication Instructions

See lubrication section for details. All instructions should be left with the lease pumper and must be studied carefully.

4. Preventive Maintenance

After the first four to six days of operation, all bolts on the unit should be carefully checked and tightened. Also check for proper counterbalance and oil level in the bearings and the reducer.

After four to six weeks of operation check the following: prime mover, proper counterbalance, unit for proper level and alignment with the well, alignment and proper tension of V-belt, proper tightness of both engine and unit sheaves. Tighten ALL BOLTS, tighten wrist pins, check oil level in reducer, tighten polish rod clamps.

All bearings except the reducer and the saddle bearings are lubricated before shipment. Pump the grease into the wrist pin bearings through the fittings until the grease is forced out of the relief fitting which should be pointed upward. If the oil level in the saddle bearings is not correct, fill the saddle bearing with the correct oil until it reaches the level shown.

A Planned program should be followed to check these points every six months.

5. Changing Stroke Length

When it becomes necessary to change the stroke length near mid stroke from a long to a shorter stroke, it is recommended that the cranks be stopped slightly below horizontal. To change from a short to a long stroke the crank should be positioned slightly above horizontal. Never depend on the brake to hold the crank in position when working around the cranks. The brake could slip or be carelessly released. Use other means such as blocks, cables, or chains to hold the cranks in position. Loosen the dog bolts that hold the pitman head to the wrist pin housing. By turning each dog bolt 90°, the pitman can be removed from the wrist pin assembly. If the pitman head does not come free of the wrist pin housing it may be necessary to loosen only slightly the upper pitman head bolts. This will permit the pitman arm to swing free fo the wrist pin housing at the pitman yoke.

Remove the cotter pin from the wrist pin and loosen the wrist pin nut to a position where the pin does not protrude beyond the nut. To aid in removing the pin, a grease fitting is supplied at each wrist pin hole to permit hydraulic

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### Changing Stroke Length (Cont'd)

pressure to be applied with a standard hand operated grease gun. If the pin does not come free with the pressure, it may be necessary to hammer out the pin being careful not to damage the threads of the pin. Do not hammer directly on the end of the pin.

Thoroughly cleanse the desired wrist pin hole, lubricate it with a light film of oil and install the pin assembly. Tighten the wrist pin nut with a sledge hammer and insert the cotter pin. Install the pitman heads and tighten all dog bolts. Heavily grease or put a rust preventative in the wrist pin hole previously used.

#### C. Operational Reminders

Study and follow equipment instructions carefully.

Frequent visual inspection of both prime mover and unit will prevent costly down time. For example, rust around bolt heads, wrist pins, etc., may indicate looseness.

Avoid, when possible, excessive operating speeds. Such speeds are detrimental to both the rod string and the pumping unit.

When possible, make periodic Dynamometer studies to eliminate down hole conditions such as fluid pound, gas locks, leaking, standing, and traveling valves. Avoid overloading all equipment. Dynamometer studies are also most helpful as an aid to keep the unit in proper counterbalance.

When practical, anchor the tubing to prevent excessive loss of plunger travel with a net loss in production. Anchored tubing will also reduce both torque and horsepower requirements.

When ordering parts always give the serial number of the unit.

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SECTION II

GENERAL LUBRICATION INSTRUCTIONS

A. Reducer

Fill to the bottom of the 3/4 inch pipe plug at the end of the reducer. Use about twenty-three (23) gallons and do not overfill.

For use in temperatures between  $-10^{\circ}$  and  $+125^{\circ}$  fill with a good grade of S.A.E. 80 EP (Extreme Pressure) gear oil.

For longer gear life the oil should be changed after the first two thousand (2000) hours of operation. Regular oil change intervals should be one year following the first two thousand (2000) hours.

Before removing the inspection opening for any reason clean the dirt and residue away from it. Keep the drain connection tight to prevent leakage.

B. Saddle Bearings

Oil should be changed only if a leakage develops. At the end of three years the owners may wish to have a small sample analyzed for contamination and the oil changed if necessary.

C. Wrist Pin & Pitman Bearings

These should be checked regularly and filled if necessary. They will be first lubricated at the factory for storage.

D. Brake Linkage

The brake linkage should be oiled with an oil can with a good grade SAE #30 at all joints and bearing points.

E. Wireline

A wire rope is essentially a machine with moving parts that slide on each other, whenever the rope bends, twists, or straightens.

1. Lubrication for the wire rope
  - a. Freedom from either acids or alkalis,
  - b. Good adhesive strength so it will stay on the rope,
  - c. Excellent penetrating qualities,
  - d. Non-solubilities under most service conditions,
  - e. High film strength,
  - f. Resistance to oxidation and hardening,
  - g. The lubricant can be swabbed on with rags or painted with a brush. Both are quick methods that can be made part of the maintenance routine.

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### SECTION III

#### USE AND CARE OF THE SADDLE BEARINGS

The saddle bearing on your Parkersburg pumping unit is, without question, the finest bearing on the market. The service life of this bearing far exceeds any other type available.

Essentially, the bearing is nothing more than a cast iron journal running in a cast iron sleeve. The size of the bearing is such that the pressure between the moving parts is kept to a low value. The design is such that an oil film always separates the two moving parts. As long as the oil film is maintained, there is no contact of metal against metal. Thus the life of this bearing is tremendous.

Oil, instead of grease, has been selected as the lubricant. A large reservoir has been provided in the hollow journal. Thus, the oil, being fluid, can circulate in and around the grooves in the bushings. All of the oil has its turn at carrying the load. This feature has eliminated the necessity of adding lubricant to the bearings.

Also, the surface that carries the side load has been moved into the lubricated area.

The saddle bearing comes to you ready for service and, other than a periodic check on the fluid level, should require no attention for five years. At that time, the condition of the oil should be checked. The seals should be inspected closely. If required, they should be replaced. Their life will depend, to a great extent, on the reaction between the sealing element and the lubricant.

Our recommendation is that the oil be changed on the basis of the findings of the laboratory. When the time arrives for an oil change or seal replacement, we recommend the following procedure:

1. Stop the unit at the top of the stroke with the cranks hanging down. Set the hand brake.
2. Clamp off the well at the polish rod.
3. Insert a block between the top of the samson post and the bottom of the center iron of the bearing. The thickness of the block will vary from one size unit to another. If a tapered block is made, it can be used for all sizes. Insert this block from the front, small end first, and push thru until it contacts the center iron.

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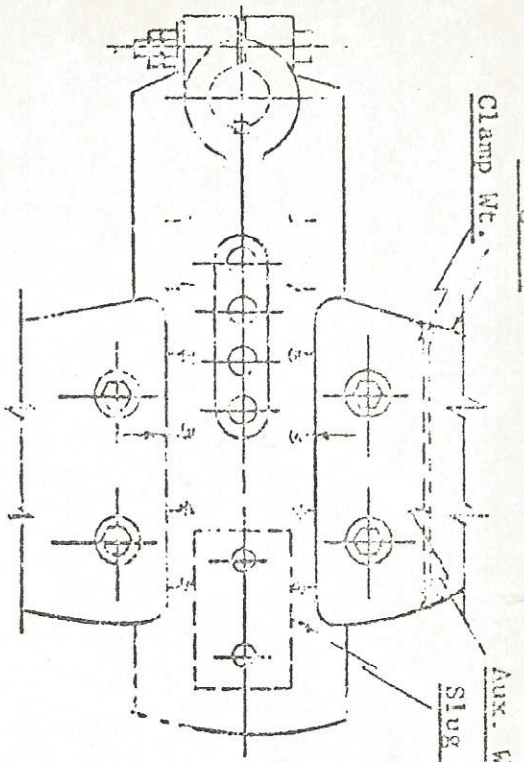
4. Loosen the bolts that fasten the bearing caps to the post. Loosen only to the point that most of the tension is removed from the lock washers.
5. Release hand brake.
6. Swing cranks, either with winch line, by standing on the weights, or by turning on the unit sheave.
7. When the back end of the beam has been raised enough to take the weight off the bearing caps and transfer it to the wedge under the center iron, the hand brake is reset.
8. Completely remove bolts on one bearing cap only. With the weight removed, the cap can be pushed off the end of the center iron.
9. On small units, the cap can be handled by hand. On large units, a winch line will be needed to lower the cap to the ground.
10. With the cap on the ground, the bearing bore and especially the oil grooves should be cleaned with flushing oil.
11. Inspect seals and replace if required.
12. Reinstall cap and repeat operation for opposite cap.
13. Release brake, remove wedge, and tighten bolts.
14. Fill to required level with SAE 90 E.P. Gear oil. Filling is through combination expansion chamber and relief valve.
15. Hook well load on unit and put in operation.

Although it would have been easier to have simply drained and refilled, any sludge that was going to form would be found in the oil grooves. Therefore, it is important to thoroughly clean the entire bearing before installing the new oil.

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PARKERSBURG PUMPING UNIT  
A.P.I. RATING FOR CRANK OVERBALANCE  
MOMENTS ABOUT CRANKSHAFT

Table No. 674



Slug Wt. Part No.	Moment (Each)	Weight (Each)
C374133	32,328	370

For total moment, add moment of 2 cranks plus moment of slug weights, main weights and auxiliary weights, in desired quantities and positions. To obtain effective c'bal. lbs., divide by torque factor w/crank at 90° and corresponding stroke, then add overbalance. (1500<sup>th</sup>)

Crank No. D374123 Crank Size 120" Strokes 84", 96", 108", 120"  
 Crank Moment 168,000 In. lbs. Weight 3875

20877 XI 10/18/68  
 10/18/68  
 10/18/68  
 10/18/68

Weight Position	1 No. 10P Wing Weight Assy.		1 No. Wing Weight Assy.		1 No. Wing Weight & Clamp Weight		1 No. 10P-0 Auxiliary Weight		1 No. 10P-1 Auxiliary Weight		1 No. 10P-2 Auxiliary Weight		1 No. 10P-3 Auxiliary Weight	
	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight
0 or Min.	30,413	1390					2891	132						
1	45,356	1390					4310	132						
2	60,298	1390					5729	132						
3	75,241	1390					7148	132						
4	90,183	1390					8567	132						
5	105,126	1390					9986	132						
			1 No. 10P-1 Wing Weight & Clamp Weight				1 No. 10P-2 Auxiliary Weight				1 No. 10P-3 Auxiliary Weight			
	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight	Moment	Weight
0 or Min.	6,242	287	10,904	518	26,236	1874								
1	9,328	287	16,472	518	46,382	1874								
2	12,413	287	22,041	518	66,527	1874								
3	15,498	287	27,817	518	86,673	1874								
4	18,583	287	33,126	518	106,818	1874								
5	21,669	287	38,695	518	126,964	1874								

Docy 5-10-68

Centers  
PE. 12' 10"  
WE. 12' 6"

PUMPING UNIT STROKE AND TORQUE FACTOR

PARKAC, INC.  
COFFEYVILLE, KANSAS

Table No. 709

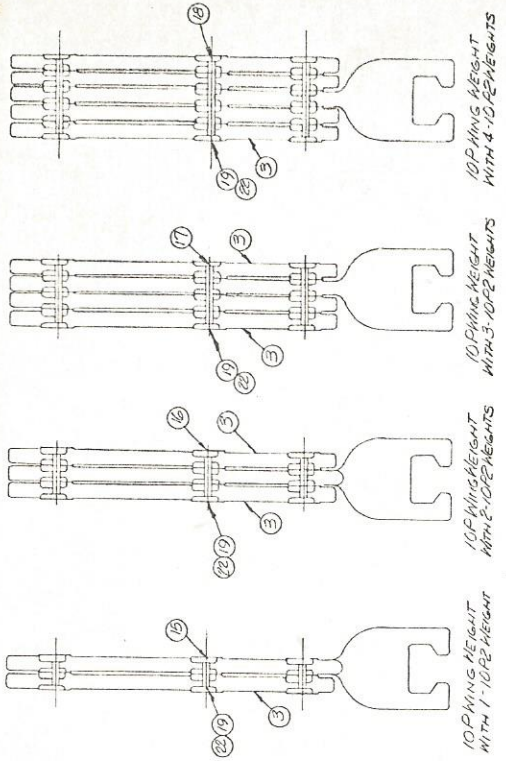
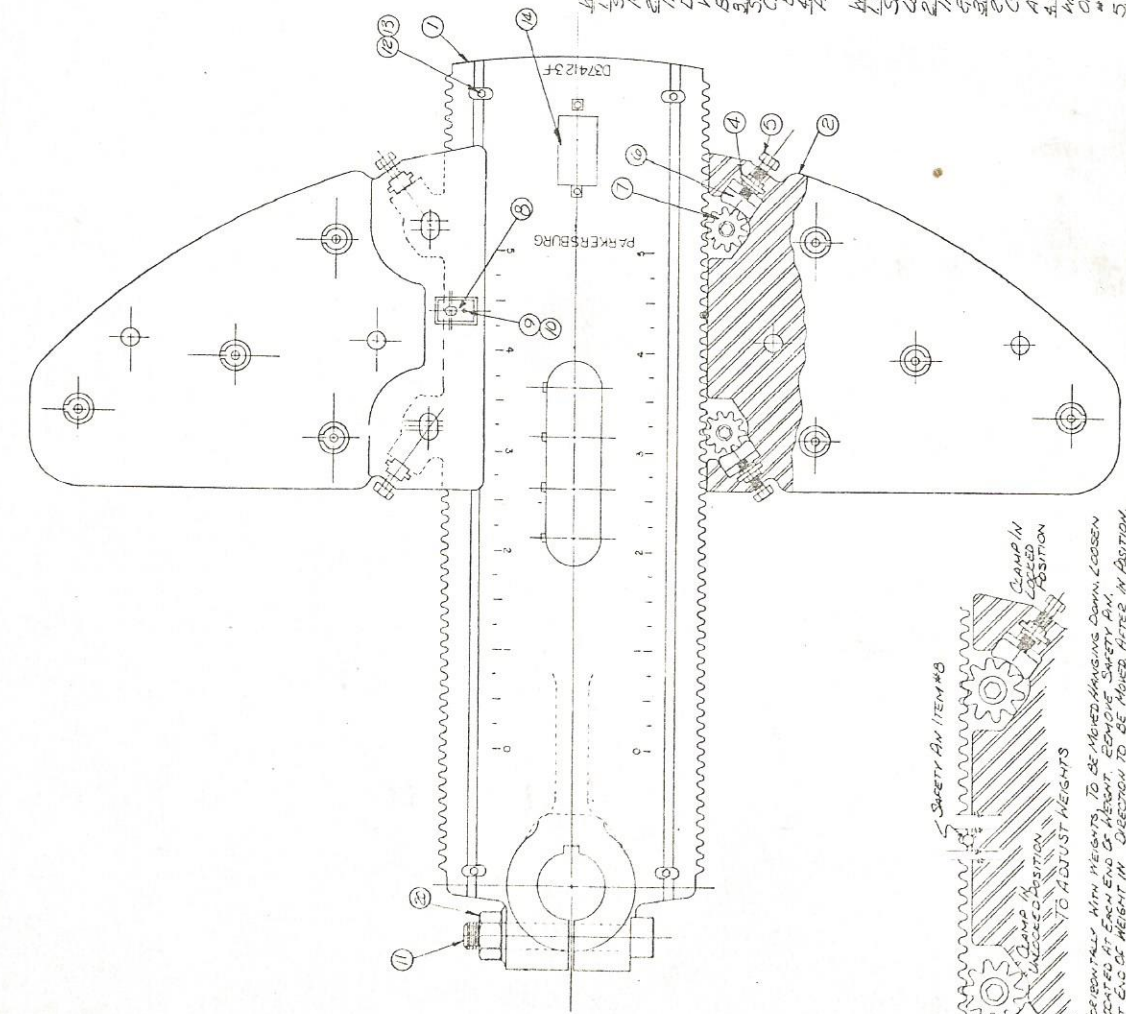
Designation of Unit 120-3324DI-25.6-25

Assy. Number U995688

1 Position of Crank Deg.	2 POSITION OF RODS				3 TORQUE FACTOR			
	Length of Stroke, In.				Length of Stroke, In.			
	84	96	108	120	84	96	108	120
	0	0	0	0	1.36	2.05	2.96	4.11
15	.017	.017	.016	.015	12.31	14.21	16.09	17.92
30	.076	.077	.077	.078	25.00	29.41	34.07	38.99
45	.172	.175	.178	.181	34.87	41.09	47.71	54.79
60	.292	.298	.304	.310	40.71	47.62	54.87	62.49
75	.425	.432	.440	.447	42.38	48.95	55.64	62.45
90	.556	.564	.571	.578	40.61	46.25	51.80	57.23
105	.679	.684	.690	.694	36.47	41.04	45.40	49.55
120	.785	.788	.791	.793	30.87	34.49	37.89	41.10
135	.873	.873	.874	.873	24.41	27.25	29.96	32.56
150	.939	.938	.936	.934	17.32	19.51	21.70	23.92
165	.982	.980	.979	.976	9.66	11.20	12.88	14.77
180	.999	.999	.998	.998	1.39	2.14	3.15	4.50
195	.990	.991	.993	.995	7.40	7.71	7.72	7.35
210	.952	.956	.960	.964	16.42	18.07	19.49	20.66
225	.886	.892	.898	.905	25.07	28.19	31.25	34.23
240	.795	.802	.809	.817	32.55	37.03	41.59	46.32
255	.683	.691	.698	.706	38.13	43.63	49.23	55.15
270	.557	.565	.572	.580	41.25	47.35	53.59	60.02
285	.425	.433	.440	.448	41.61	47.91	54.31	60.85
300	.297	.304	.311	.318	39.08	45.18	51.40	57.74
315	.182	.187	.193	.199	33.61	39.13	44.82	50.65
330	.088	.092	.096	.101	25.26	29.74	34.45	39.38
345	.025	.027	.029	.031	14.29	17.17	20.32	23.75

1. Position of the Crank is the angular displacement measured clockwise from the 12 o'clock position, viewed with the well head to the right.
2. Position is expressed as a fraction of stroke above lowermost position. O.B. = 1500'
3. Torque Factor =  $\frac{T}{W}$  where T = Torque on Pumping Unit Reducer due to Polished Rod Load W.

CALC. - 10/7/74



10 PINNING HEIGHT WITH 1-10#2 HEIGHT

10 PINNING HEIGHT WITH 2-10#2 HEIGHTS

10 PINNING HEIGHT WITH 3-10#2 HEIGHTS

10 PINNING HEIGHT WITH 4-10#2 HEIGHTS

WINCH WEIGHT ASSEMBLY FOR STRAPS

- CHECK WINCH CAVITIES TO BE CLEANED
- CHECK WINCH SHADES TO BE PROPERLY TO
- MADE PROPERLY IN CAVITIES. INSURE SHADES
- SLIDING OVER COIL NUT FROM PIECE #5
- INSURE CS AN ANCHOR NOT INTO KEYS BORE #4
- DEEP NUT KEYS RATE INTO SLOT IN WINCH
- WEIGHT. THEN SCREEN CLAMP BOLT THRU NUT
- BUT NOT AGAINST SIDE. BOTH SIDES OF WINCH WE
- 3 CHECK ANCHORS FOR SMOOTHNESS OF TEETH
- SMOOTH TEETH IF NECESSARY.
- CHECK NUT BORE TO BE SURE 1/8" CR HEX
- BAR WILL FIT SMOOTHLY
- INSURE ANCHORS INTO CAVITIES. BAND
- ANCHORS BACK TIGHT AGAINST SIDE

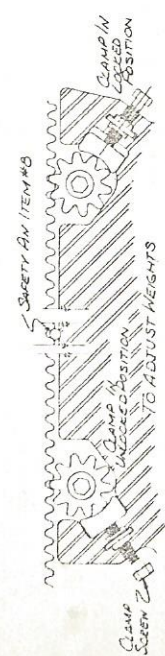
WINCH WEIGHT ASSEMBLY FROM STRAPS

- LEAVE ANCHORS BENDED AGAINST SIDE.
- SCREEN WEIGHT AND CRANKS. INSTALL BAR
- LOCKS IN PLACE ON BOTH SIDES OF CRANK
- LOCATE WEIGHT IN #5 POSITION BY
- INSERTING PIECE #5 POSITION BY
- TIGHTENING NUT AGAINST #3 BOLT. CRANK
- TIGHTEN CLAMP SCREENS. TIGHTEN ONE SCREEN
- 2 TURNS. THEN TIGHTEN THE OTHER 2 TURNS.
- CONTINUE ADJUSTING UNTIL BOTH SCREENS
- ARE SURE. BUT NOT TIGHT
- 4 CHECK TO SEE IF SAFETY ANCHORS LINE UP
- WITH SPACE BETWEEN TWO TEETH ON EACH
- OF CRANK. MOVE SIGHTLY UNTIL SAFETY AN
- #3 CAN BE INSERTED.
- FINISH TIGHTENING CLAMP SCREENS.
- 6 USE CARBORUNDUM COARSE #90 FLO TO
- FASTEN SAFETY AN IN PLACE

Q.T.Y.'S LISTED ARE PER UNIT

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QTY	PART NO	DESCRIPTION	UNIT
21	3113 201	1/4 RAINWATER	
21	3103 090	1 PINNED (NOT SHOWN)	
21	3103 100	2 - 4 INCHES LOP	
14	3113 202	1/4 TIE FLEX LOCK NUT	
17	3113 005	16 CLAMP BOLT - REF 3113 100	
17	3113 105	16 CLAMP BOLT - REF 3113 100	
25	3113 104	16 CLAMP BOLT - REF 3113 100	
14	3113 000	2 INSULATION TAPE	
17	3113 000	16 1/2 INCH MACHINE BOLT X 1 1/2	
11	3	2 BAR LOCK	
11	3	2 HUB BOLT	
10	4	12 LOCKWASHER	
9	4	12 1/2 INCH MACHINE BOLT X 1 1/2	
8	950 000	4 SAFETY AN	
7	950 000	4 CRANK	
6	950 000	4 CLAMP SHAFT	
3	3103 000	12 1/2 INCH MACHINE BOLT X 1 1/2	
3	3103 000	12 1/2 INCH MACHINE BOLT X 1 1/2	
3	3103 000	12 1/2 INCH MACHINE BOLT X 1 1/2	
2	3103 000	12 1/2 INCH MACHINE BOLT X 1 1/2	
1	3103 000	12 1/2 INCH MACHINE BOLT X 1 1/2	



CLAMP SCREEN Z

CLAMP IN POSITION TO ADJUST HEIGHTS

SAFETY AN ITEM 8

RACE CRANKS NEARLY WITH HEIGHTS. TO BE MOVED HANGING DOWN. LOOSEN CLAMP SCREENS LOCATED AT EACH END OF HUB. REMOVE SAFETY AN. STATE GEAR AT END OF HEIGHT IN DEPRESSION TO BE MOVED AFTER IN BOTTOM. USE CLAMP CLAMP SCREENS. THEN INSERT SAFETY AN. MOVE WEIGHT SLIGHTLY TO SET CLAMP SCREENS THAT WITH LIGHT BLOW ON WRENCH HANDLE.

BE SURE CLAMP SCREENS ARE TIGHT. BEFORE EDITING CRANKS.

DATE: 10/10/78

BY: JCP

DESCRIPTION: WINCH WEIGHT ASSEMBLY

QTY: 1

UNIT: PER UNIT

3510 0000

DR. PHILLIPS, INC. AND ENGINEERING, INC.

COUNTERPART ASSEMBLY

3510 0000 UNIT

STROKE= 84 IN.

WEIGHT POSITION	0		1		2		3		4		5	
	M <sub>0</sub>	ECB <sub>0</sub>	M <sub>1</sub>	ECB <sub>1</sub>	M <sub>2</sub>	ECB <sub>2</sub>	M <sub>3</sub>	ECB <sub>3</sub>	M <sub>4</sub>	ECB <sub>4</sub>	M <sub>5</sub>	ECB <sub>5</sub>
4W/ 0 10P2 AUX	457652	12769	517424	14241	577192	15713	636964	17184	696732	18656	756504	20128
4W/ 1 10P2 AUX	468556	13037	533896	14646	599233	16255	664781	17869	728858	19472	795199	21081
4W/ 2 10P2 AUX	479460	13306	550368	15052	621274	16798	692598	18554	762984	20288	833894	22034
4W/ 3 10P2 AUX	490364	13574	566840	15458	643315	17341	720415	19239	796110	21103	872589	22987
4W/ 4 10P2 AUX	501268	13843	583312	15863	665356	17884	748232	19924	829236	21919	911284	23939
4W/ 5 10P2 AUX	512172	14111	599784	16269	687397	18426	776049	20609	862362	22735	949979	24892
4W/ 6 10P2 AUX	523076	14380	616256	16674	709438	18969	803866	21294	895488	23550	988674	25845
4W/ 7 10P2 AUX	533980	14648	632728	17080	731479	19512	831683	21979	928614	24366	1027369	26798
4W/ 8 10P2 AUX	544884	14917	649200	17486	753520	20055	859500	22664	961740	25182	1066054	27751
4W/ 9 10P2 AUX	555788	15185	665672	17891	775561	20597	887317	23349	994866	25998	1104759	28704
4W/ 10 10P2 AUX	566692	15454	682144	18297	797602	21140	915134	24034	1027992	26813	1143454	29656
4W/ 11 10P2 AUX	577596	15722	698616	18703	819643	21683	942951	24719	1061118	27629	1182149	30609
4W/ 12 10P2 AUX	588500	15991	715088	19108	841684	22226	970768	25404	1094244	28445	1220844	31562
4W/ 13 10P2 AUX	599404	16260	731560	19514	863725	22768	998585	26089	1127370	29260	1259539	32515
4W/ 14 10P2 AUX	610308	16528	748032	19919	885766	23311	1026402	26774	1160496	30076	1298234	33468
4W/ 15 10P2 AUX	621212	16797	764504	20325	907807	23854	1054219	27459	1193622	30892	1336929	34421
4W/ 16 10P2 AUX	632116	17065	780976	20731	929848	24397	1082036	28144	1226748	31708	1375624	35374

NOTE:

1. 4 Wing Weights (4WW) per 10 P2 Auxiliary Set Up

2. M is the moment of the crank with the Wing Weights at the numbered positions.

ECB is the effective Counter Balance required.

Joe C. Phillips  
3103 Red Robin Loop  
Bryan, TX 77802

WEIGHT POSITION	0		1		2		3		4		5	
	M0	ECB0	M1	ECB1	M2	ECB2	M3	ECB3	M4	ECB4	M5	ECB5
4MM/ 0 10P2 AUX	457652	11395	517424	12687	577192	13979	636964	15272	696732	16564	756504	17856
4MM/ 1 10P2 AUX	458556	11630	533896	13043	599233	14456	664781	15873	729858	17280	795199	18693
4MM/ 2 10P2 AUX	479460	11866	550368	13399	621274	14932	692598	16475	762584	17996	833894	19530
4MM/ 3 10P2 AUX	490364	12102	566840	13756	643315	15409	720415	17076	796110	18713	872589	20366
4MM/ 4 10P2 AUX	501268	12338	583312	14112	665356	15886	748232	17677	829236	19429	911284	21203
4MM/ 5 10P2 AUX	512172	12573	599784	14468	687397	16362	776049	18279	862362	20145	949979	22040
4MM/ 6 10P2 AUX	523076	12809	616256	14824	709438	16839	803866	18880	895488	20861	988674	22876
4MM/ 7 10P2 AUX	533980	13045	632728	15180	731479	17315	831683	19482	928614	21578	1027369	23713
4MM/ 8 10P2 AUX	544884	13281	649200	15536	753520	17792	859500	20083	961740	22294	1066064	24550
4MM/ 9 10P2 AUX	555788	13517	665672	15892	775561	18268	887317	20685	994866	23010	1104759	25386
4MM/ 10 10P2 AUX	566692	13752	682144	16249	797602	18745	915134	21286	1027992	23726	1143454	26223
4MM/ 11 10P2 AUX	577596	13988	698616	16605	819643	19222	942951	21888	1061110	24443	1182149	27059
4MM/ 12 10P2 AUX	588500	14224	715088	16961	841684	19698	970768	22489	1094244	25159	1220844	27896
4MM/ 13 10P2 AUX	599404	14460	731560	17317	863725	20175	998585	23091	1127370	25875	1259539	28733
4MM/ 14 10P2 AUX	610308	14695	748032	17673	885766	20651	1026402	23692	1160496	26591	1298234	29569
4MM/ 15 10P2 AUX	621212	14931	764504	18029	907807	21128	1054219	24293	1193622	27308	1336929	30406
4MM/ 16 10P2 AUX	632116	15167	780976	18385	929848	21604	1082036	24895	1226748	28024	1375624	31243

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WEIGHT POSITION

	0		1		2		3		4		5	
	M0	ECB0	M1	ECB1	M2	ECB2	M3	ECB3	M4	ECB4	M5	ECB5
4MM/ 10P2 AUX	457652	10334	517424	11488	577192	12642	636964	13796	696732	14950	756504	16104
4MM/ 1 10P2 AUX	468556	10545	533896	11806	599233	13068	664781	14333	729858	15589	795199	16851
4MM/ 2 10P2 AUX	479460	10755	550368	12124	621274	13493	692598	14870	762984	16229	833894	17558
4MM/ 3 10P2 AUX	490364	10966	566840	12442	643315	13919	720415	15407	796110	16868	872569	18345
4MM/ 4 10P2 AUX	501268	11176	583312	12760	665356	14344	748232	15944	829236	17508	911284	19092
4MM/ 5 10P2 AUX	512172	11387	599784	13078	687397	14770	776049	16481	862362	18147	949979	19839
4MM/ 6 10P2 AUX	523076	11597	616256	13396	709438	15195	803866	17018	895488	18787	988674	20586
4MM/ 7 10P2 AUX	533980	11808	632728	13714	731479	15621	831683	17555	928614	19426	1027369	21333
4MM/ 8 10P2 AUX	544884	12018	649200	14032	753520	16046	859500	18092	961740	20065	1066064	22080
4MM/ 9 10P2 AUX	555788	12229	665672	14350	775561	16472	887317	18629	994866	20705	1104759	22827
4MM/ 10 10P2 AUX	566692	12440	682144	14668	797602	16897	915134	19166	1027992	21345	1143454	23574
4MM/ 11 10P2 AUX	577596	12650	698616	14986	819643	17322	942951	19703	1061118	21984	1182149	24321
4MM/ 12 10P2 AUX	588500	12861	715088	15304	841684	17748	970768	20240	1094244	22624	1220844	25068
4MM/ 13 10P2 AUX	599404	13071	731560	15622	863725	18174	998585	20777	1127370	23263	1259539	25815
4MM/ 14 10P2 AUX	610308	13282	748032	15940	885766	18599	1026402	21314	1160496	23903	1298234	26562
4MM/ 15 10P2 AUX	621212	13492	764504	16258	907807	19025	1054219	21851	1193622	24542	1336929	27309
4MM/ 16 10P2 AUX	632116	13703	780976	16576	929848	19450	1082036	22388	1226748	25182	1375624	28056

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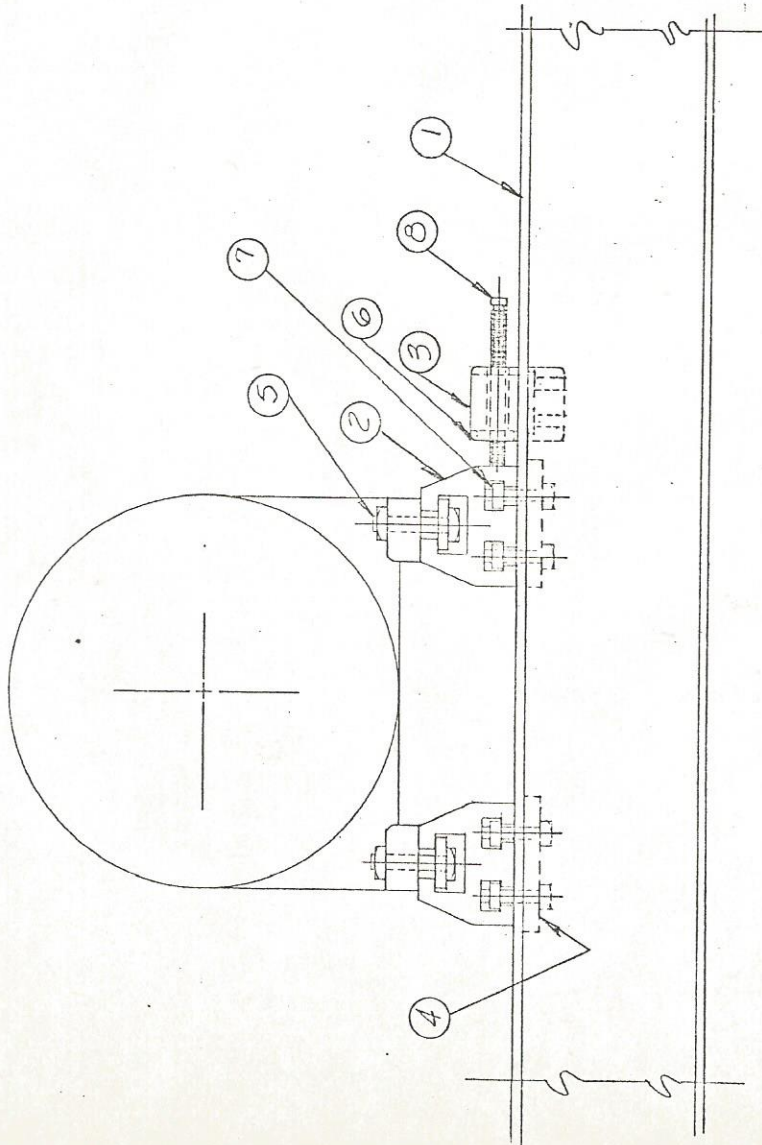
STROKE= 120 IN.

WEIGHT POSITION	0		1		2		3		4		5	
	M0	ECB0	M1	ECB1	M2	ECB2	M3	ECB3	M4	ECB4	M5	ECB5
4MM/ 0 10P2 AUX	457652	9496	517424	105441	577192	11585	636964	12629	696732	13674	756504	14718
4MM/ 1 10P2 AUX	468556	9687	533896	10828	599233	11970	664781	13115	729858	14253	795199	15394
4MM/ 2 10P2 AUX	479460	9877	550368	11116	621274	12355	692598	13602	762984	14831	833894	16070
4MM/ 3 10P2 AUX	490364	10068	566840	11404	643315	12740	720415	14088	796110	15410	872589	16747
4MM/ 4 10P2 AUX	501268	10258	583312	11692	665356	13126	748232	14574	829236	15989	911284	17423
4MM/ 5 10P2 AUX	512172	10449	599784	11980	687397	13511	776049	15060	862362	16568	949979	18099
4MM/ 6 10P2 AUX	523076	10639	616256	12268	709438	13896	803865	15546	895488	17147	988674	18775
4MM/ 7 10P2 AUX	533980	10830	632728	12555	731479	14281	831683	16032	928614	17726	1027369	19451
4MM/ 8 10P2 AUX	544884	11020	649200	12843	753520	14666	859500	16518	961740	18304	1066064	20127
4MM/ 9 10P2 AUX	555788	11211	665672	13131	775561	15051	887317	17004	994866	18883	1104759	20803
4MM/ 10 10P2 AUX	566692	11402	682144	13419	797602	15436	915134	17490	1027992	19462	1143454	21479
4MM/ 11 10P2 AUX	577596	11592	698616	13707	819643	15821	942951	17976	1061118	20041	1182149	22156
4MM/ 12 10P2 AUX	588500	11783	715088	13994	841684	16207	970768	18462	1094244	20620	1220844	22832
4MM/ 13 10P2 AUX	599404	11973	731560	14282	863725	16592	998585	18948	1127370	21198	1259539	23508
4MM/ 14 10P2 AUX	610308	12164	748032	14570	885766	16977	1026402	19434	1160496	21777	1298234	24184
4MM/ 15 10P2 AUX	621212	12354	764504	14858	907807	17362	1054219	19920	1193622	22356	1336929	24860
4MM/ 16 10P2 AUX	632116	12545	780976	15146	929848	17747	1082036	20406	1226748	22935	1375624	25536

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LOC NO	PART NO	QUANTITY	DESCRIPTION	STOCK
8		2	3/4-10NC X 8 JACKBOLT	
7		6	1/2-13NC X 3 JACK BOLT	
6		4	3/4 SQUARE NUT	
5	3109.0400	4	BOLT FOR BRACKET W/ NUT	
4	3109.0200	4	CLAMP PLATE	
3	3309.0100	2	CAST IRON ADJUSTING BLOCK	
2	3309.0500	2	CAST IRON ENGINE SKID	
1	3309.0100	1	ELECTRIC ENGINE BASE	

APPROVED	CHG	DATE	DESCRIPTION	CHG	DATE	DESCRIPTION	CHG	DATE	DESCRIPTION

UNLESS OTHERWISE SPECIFIED:  
 1 REMOVE ALL BURRS AND SHARP CORNERS  
 2 COR RADIUS  
 3 DO NOT SCALE DIMENSIONS  
 4 ALL DIMENSIONS ARE IN INCHES  
 5 MACHINE FINISH  
 6 TOLERANCES  
 .X ± .010  
 .XX ± .015  
 .XXX ± .005  
 ANGLES ± .1°  
 WITHIN 1/16" DIA

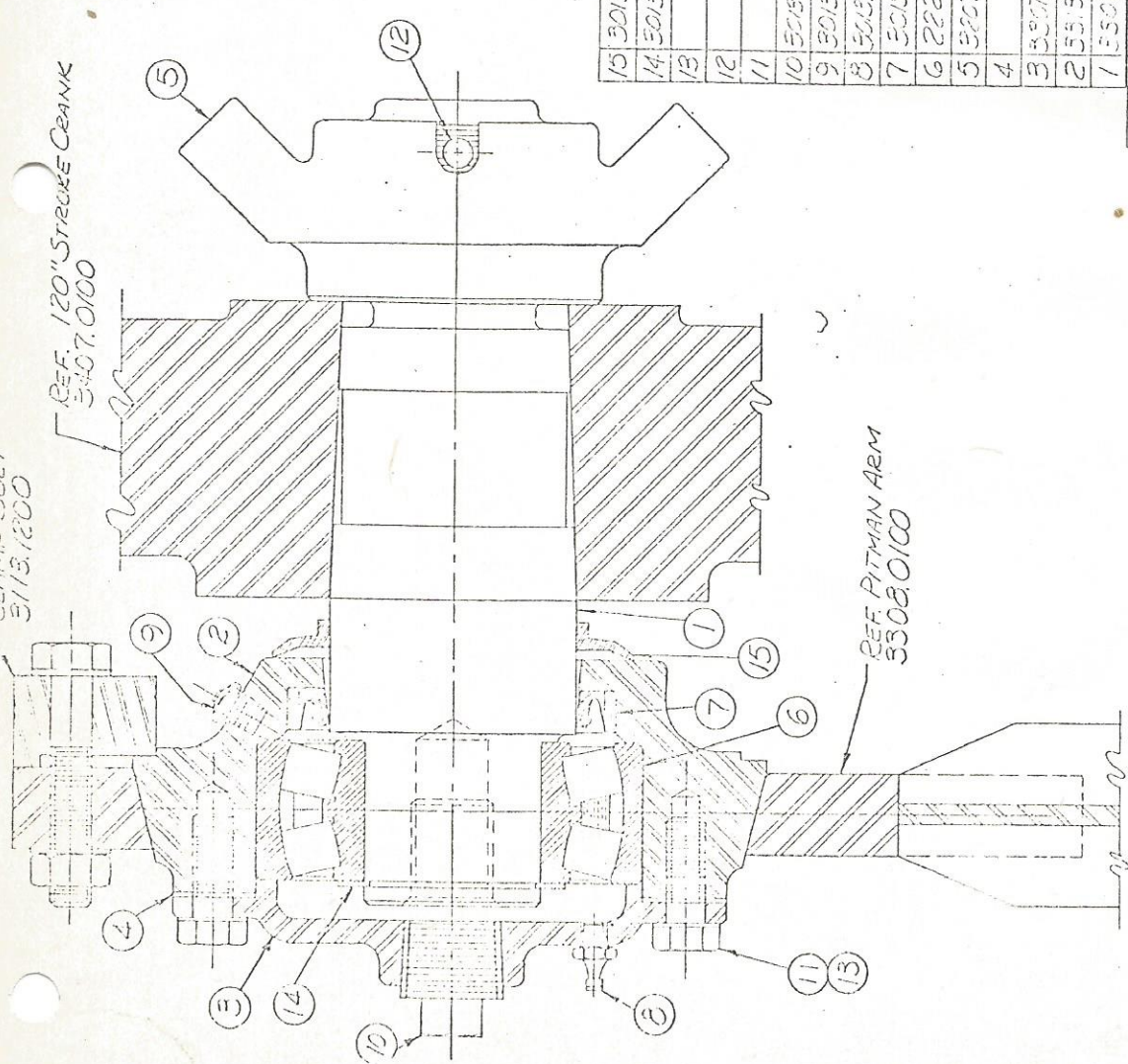
DESCRIPTION—STOCK  
 OIL INDUSTRIES MFG. AND ENGINEERING, INC.  
 E HWY. 80, QUINCY, TEXAS  
 ELECTRIC BASE ASSY.  
 WEIGHT 5.1 LBS  
 SHEET 1 OF 1  
 3309.0500





CLAMP BOLT  
3113.1200

REF. 120" STROKE CRANK  
3407.0100



REF. PITMAN ARM  
3302.0100

15	3013.2000	2	S-15943 SSW EXCLUDER SEAL
14	3013.0600	2	RETAINING RING
13		6	1/2" ID. STD. LOCK WASHER
12		2	3/8" DIA x 6" LG. COOPER PIN
11	1015013.0500	2	1/2-13 NC x 1 1/2 HEX BOLT
10	15013.0500	2	1/2" NPT. PIPE PLUG
9	15013.0400	2	GREASE RELIEF FITTING
8	15013.0300	2	GREASE FITTING
7	3013.0200	2	OIL SEAL
6	22215	2	SPHERICAL ROLLER BEARING
5	1307.0202	2	WING NUT
4		2	KEE GASKET
3	3307.0203	2	COVER PLATE
2	1513.0100	2	HOUSING
1	1507.0201	2	WRIST PIN

DATE	DESIGNER	CHK BY	DATE	DESCRIPTION
				DESCRIPTION - STOCK
				OIL INDUSTRIES MFG. AND ENGINEERING, INC.
				WRIST PIN ASSEMBLY
				REV. 1 1/4 3307.0000

UNLESS OTHERWISE SPECIFIED:

1. DIMENSIONS ARE IN INCHES

2. DIMENSIONS ARE TO BE HONED

3. DIMENSIONS ARE TO BE GRINDING

4. DIMENSIONS ARE TO BE ALL IN HOURS

5. DIMENSIONS ARE TO BE ALL IN HOURS

6. DIMENSIONS ARE TO BE ALL IN HOURS

7. DIMENSIONS ARE TO BE ALL IN HOURS

8. DIMENSIONS ARE TO BE ALL IN HOURS

9. DIMENSIONS ARE TO BE ALL IN HOURS

10. DIMENSIONS ARE TO BE ALL IN HOURS

11. DIMENSIONS ARE TO BE ALL IN HOURS

12. DIMENSIONS ARE TO BE ALL IN HOURS

13. DIMENSIONS ARE TO BE ALL IN HOURS

14. DIMENSIONS ARE TO BE ALL IN HOURS

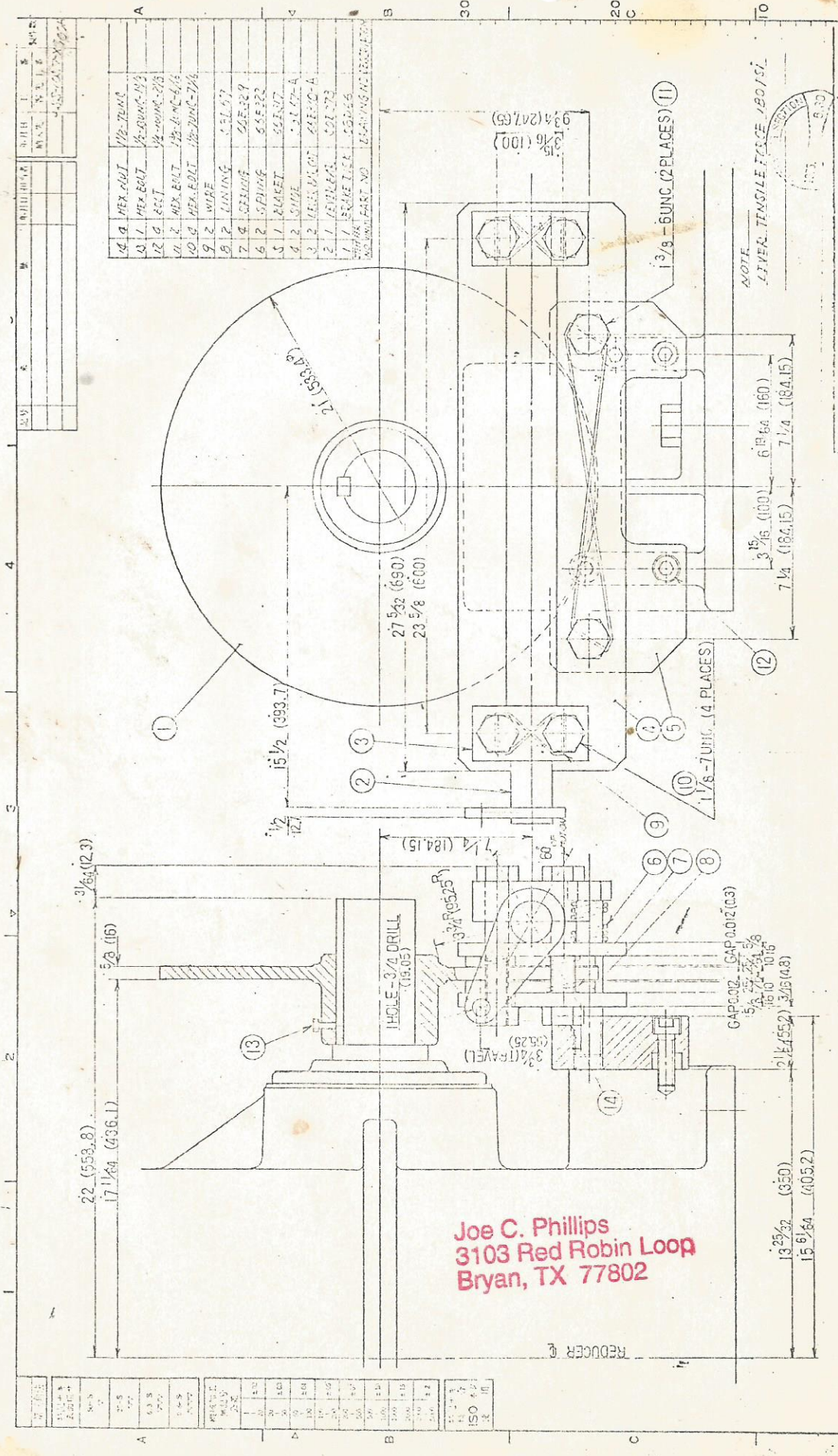
15. DIMENSIONS ARE TO BE ALL IN HOURS











QTY	DESCRIPTION	UNIT	QTY	DESCRIPTION	UNIT
14	MEX BOLT	1/2-7/16"	1	MEX BOLT	1/2-7/16"
1	MEX BOLT	1/2-7/16"	1	MEX BOLT	1/2-7/16"
12	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
10	MEX BOLT	1/2-7/16"	1	MEX BOLT	1/2-7/16"
9	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
8	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
7	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
6	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
5	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
4	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
3	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
2	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"
1	WIRE	1/2-7/16"	1	MEX BOLT	1/2-7/16"

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Bryan, TX 77802

NOTE  
LUBRICATE INSIDE FACE 180 PSI

DETAIL OF 21 DISK BEARING

GEORGIN'S LTD.