

Instruction Manual *for*

SOUTHERN CROSS

GEARED SELF-OILING POWER PUMP

Fig. 3215



INSTALLATION — OPERATION

AND

MAINTENANCE INSTRUCTIONS

FOR

SOUTHERN CROSS Fig. 3215 POWER PUMP

INSTALLATION

Assembling the Pump

Some parts have been removed from the Pump for ease of packing, and if these parts are not already assembled to the Pump, they are to be fitted as follows:—

- (a) Remove the air vessel and air vessel washers from the hessian bag, and place the air vessel washers in the recess in the top of the Pump. Bolt the air vessel in position on the top of the Pump, with the air vessel to pump bolts supplied.
- (b) Screw the Suction Chamber on to the Suction Chamber to Pump Connection, and screw the Suction Chamber to Pump Connection into the Pump Suction.
- (c) Screw Air Valve into End Plate.

Location

The Pump should be located as near as possible to the source of supply, but, if a sufficiently large Suction Pipe is used, the Pump may be situated 200 to 300 feet away. The Suction Lift from the surface of the water to the centre of the Pump must not exceed 18 feet, including friction. For convenience, the Pump should be placed so that it is acces-

sible from all sides, especially at the Pump End where sufficient space must be allowed for withdrawing the Plunger Rod and Barrel.

Foundation

The Pump should be placed on a firm, level surface. A concrete block, with the Foundation Bolts set into it, makes a suitable foundation. (Refer General Arrangement Illustration, Page 3.)

A wooden template will be necessary to hold the Pump Foundation Bolts in position while the concrete is poured. The Bolts should be positioned so that $1\frac{1}{2}$ in. of their length will protrude from the concrete, when the template is removed.

Pipe Connections.

The Suction and Discharge may be taken from either side of the Pump, or the Suction from one side and the Discharge from the other.

Piping.

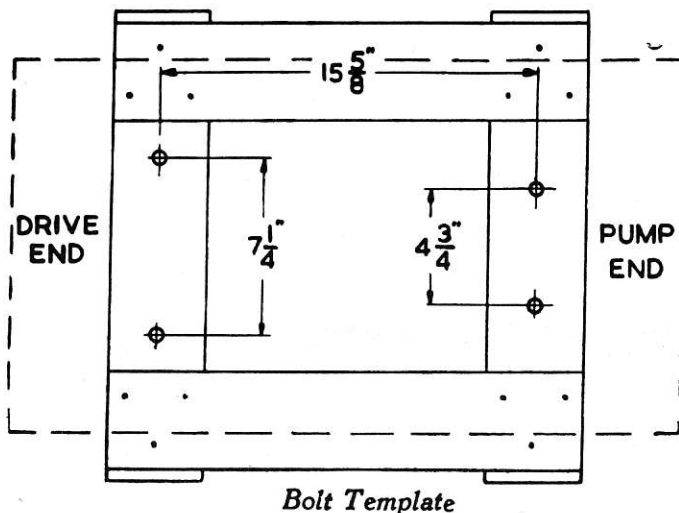
Run all piping in as direct a line as possible, avoiding unnecessary turns; check to see that all joints and connections are tight. If Pump lines are long, use a larger size Pipe than that for which the Pump is screwed. This will reduce friction and reduce the load on the Pump.

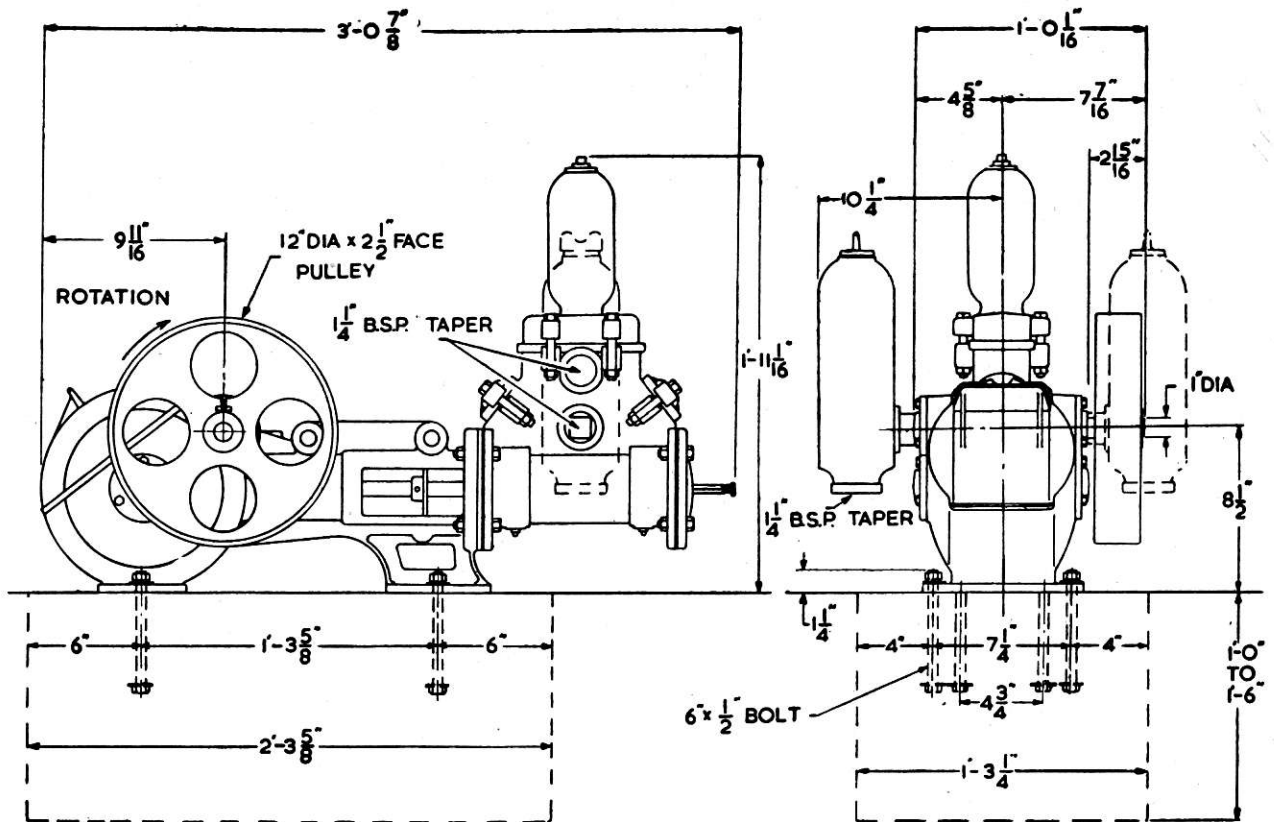
Where a long Suction or Discharge line is used a union or flanges should be fitted in the line, near the Pump for ease of uncoupling, if the Pump ever has to be moved.

The Suction Pipe should, in no case, be smaller than the size of the suction screwing of the Pump, and, if very long, it should always be larger. When laying the suction pipe, a uniform drop of not less than $\frac{6}{100}$ in. per 100 feet towards the source of supply should be maintained throughout. This will help to avoid the formation of air pockets in the suction line.

Suction Chamber.

A self-priming Suction Chamber is fitted to the power pump. The purpose of this suction chamber is to maintain a reservoir of water in the pump when stopped, to prevent the buckets from drying out, thus giving positive pumping





General Arrangement

action immediately the power pump is started up. The Suction Chamber also provides an even flow of water on the suction side of the pump, thereby preventing water hammer.

Before starting the pump for the first time, it will be necessary to prime the pump. To do this, unscrew the Suction Chamber Priming Plug and pour water into the Chamber until the reservoir is full. Replace the Priming Plug.

Air Vessel.

An Air Vessel is fitted to the top of the Pump to absorb pressure changes in the discharge line, caused by variations in the flow and to keep the water in the discharge line flowing smoothly. Without an air vessel, the discharge flow would alternately surge and slow down, causing a severe shock which can cause "water hammer". In the air vessel these shocks are absorbed by a cushion of air.

The air in the Air Vessel is gradually absorbed by the water, and the Air Vessel loses its effectiveness, so it is important that the Air Valve be left slightly open to feed air into the Vessel.

Air Valve.

To make sure that there is always air in the Air Vessel, the air valve on the end plate of the Pump should be always left slightly open so that, on each suction stroke, a small

amount of air will be drawn into the pump with the water, to feed the air cushion in the air vessel.

For most installations, an opening of $\frac{1}{8}$ to $\frac{1}{4}$ of a turn of the valve is sufficient. On pumps operating with a high suction lift, an excessive opening of the valve will allow too much air to enter the pump and prevent it from operating.

Footvalve and Strainer.

It is recommended that a footvalve and strainer be fitted to the lower end of the Suction Pipe. The Footvalve keeps the suction pipe full of water when the Pump is not operating. The strainer prevents foreign substances from being drawn into the Pump and lodging in the Pump Valves, causing clogging and damage.

Check Valve.

A Check Valve should be fitted at or near the pump in the discharge pipe to relieve the pump valves of the back pressure of water in the discharge pipe. The check valve will enable work to be carried out on the Pump without water draining back out of the discharge pipe.

WARNING: Under no circumstances fit a gate valve or globe valve in the discharge pipe instead of a check valve as the Pump will be damaged if started with the gate or globe valve closed.

MAINTENANCE

Gland.

The Gland should be just tight enough to permit a small leakage of water from it when the Pump is operating. This water will run from the drain hole at the pump end of the drive gear. If the leakage becomes excessive, the gland can be adjusted by inserting a tommy bar in one of the holes in the Packing Gland Nut and tightening. To replace the gland packing, unscrew the Packing Gland Nut and lift back the Packing Gland. Remove the worn Gland Packing and replace with new packing, pushing each ring into place with the Packing Gland. Screw the Packing Gland Nut back into position using a tommy bar.

Valves.

The Valves should be examined occasionally to see if they are seating properly. Foreign substances drawn up through the suction pipe may become lodged between the valve and seat, causing leakage and a corresponding reduction in the capacity of the pump.

To inspect the valves, remove the suction valve cover and air vessel. The valve guides can then be screwed out from the valve seats and the valves removed.

Barrel.

To remove the Barrel from the pump, remove the bolts from around the pump end plate. The threaded portion of two of the bolts is screwed into the two tapped holes in the end plate and tightened up evenly. The end plate with the barrel attached will be withdrawn. The two brass barrel to end plate screws are unscrewed and the barrel can then be removed from the end plate. When replacing the barrel, make sure that the cut away portion is to the top.

To Replace Pump Buckets.

Turn the Pump until the Plunger is in a position furthest from the Drive Gear. Remove the end plate and barrel from the pump. Unscrew the Plunger Rod Lock-nuts. The Pump Buckets, Plunger, and Cup Leather Rings can then be removed. To reassemble, reverse the above procedure.

Valve Seats.

If it is ever necessary to fit new valve seats to the Pump, proceed as follows:—

- (a) Remove air vessel and suction valve covers.
- (b) Unscrew the valve guides and remove the springs, washers, and rubbers.
- (c) Remove the valve seats with the use of a Puller. A $\frac{3}{8}$ in. Whitworth Stud of sufficient length is screwed into the valve seat. A piece of heavy section steel bar with a hole in the centre is placed over the stud. The ends of the steel bar should be supported away from the Pump Body and a nut screwed on to the Stud. By tightening the Nut, the Valve Seat will be withdrawn. To fit the new valve seats, place them in position and bump them in carefully with the squared end of a piece of timber.

Lubrication.

From the oil reservoir in the base of the gearbox, oil is carried by the gearwheel and distributed to all moving parts and returned to the gearbox reservoir. The capacity of the oil reservoir is approximately 2 pints.

Remove gearbox cover setscrews and lift off the gearbox cover. Add oil. The correct oil level is indicated on the outside of the gearbox.

Southern Cross "HD Pumphead and Drive Gear Oil" is recommended. Use S.A.E. 90 Oil for cold conditions, and S.A.E. 140 for hot conditions, when the temperature is consistently over 90° F.

Replace gearbox cover and gearbox cover setscrews, and tighten.

Electric Motor Drive for Power Pumping Unit.

The Power Pumping Unit can be fitted with slide rails for mounting an Electric Motor, if desired.

To mount the Electric Motor, proceed as follows:—

- (a) Insert the Motor Mounting Slide Rail Shafts through the bosses on the top of the Drive Gear.
- (b) On to each end of the Slide Rail Shafts attach a Slide Rail.
- (c) Bolt the motor on to the Slide Rails, through the slots in the Slide Rails, and position the motor so that the Motor Pulley and Pump Pulley are in line, and that the Driving Belts are correctly tensioned.
- (d) Lock the Slide Rails to the Slide Rail Shafts with the four cup pointed setscrews, and the Slide Rail Shafts to the Drive Gear with the two cup pointed Setscrews.

PARTS LIST

Mark KH-C Power Pump

PARTS LIST ILLUSTRATION No. 1

No. per Pump	Symbol No.	Name of Part
1	KH-C 1	Body
1	KH-C 4	Plunger
2	KH-C 5	Cup Leather Ring
4	KH-C 6	Valve Seat
4	KH-C 7	Valve Washer
4	KH-C 8	Valve Guide
1	KH-C 9	Packing Gland
1	KH-C 10	Packing Gland Nut
4	KH-C 11	Valve Spring
1	KH-C 12	Barrel
4	KH-C 13	Valve Rubber
2	KH-C 14	End Plate Sealing Gasket
2	KH-C 15	Barrel to End Plate Screw
1	KH-C 23	Air Vessel
1	KH-C 25	Plunger Rod
1	KH-C 36	Cylinder Head
2	KH-C 43	Suction Valve Cover
4	KH-C 44	Washer for Suction Valve Cover
2	KH-C 55	Pump Bucket

No. per Pump	Symbol No.	Name of Part
1	KH-C 58	End Plate
1	AN-E 71	Air Valve Screw
1	AN-E 74	Air Valve Assembly
1	AN-E 75	Air Valve Housing
1	PC193	Air Valve Spring
4		End Plate to Body Bolt (1½in. x 7/16in. Whit. Blk. M.S. Bolt)
4		Pump to Drive Gear Bolt (2in. x 7/16in. Whit. Blk. M.S. Bolt)
4		Air Vessel to Pump Bolt (3½in. x 7/16in. Whit. Blk. M.S. Bolt)
4		Suction Valve Cover Bolt (3½in. x 7/16in. Whit. Blk. M.S. Bolt)
2	A	Plunger Rod Locknut (5/8in. U.N.C. Brass Locknut)
2	C	Pump Drain Plugs (¼in. B.S.P. Blk. Plug)
1	D	Air Vessel Plug (¾in. B.S.P. Blk. Plug)
2	E	Suction and Discharge Plugs (1¼in. B.S.P. Blk. Plug)
1	F	Gland Packing (24in. x ¼in. Sq. Graphited Steam Packing)

Mark AL-C Drive Gear

PARTS LIST ILLUSTRATION No. 2

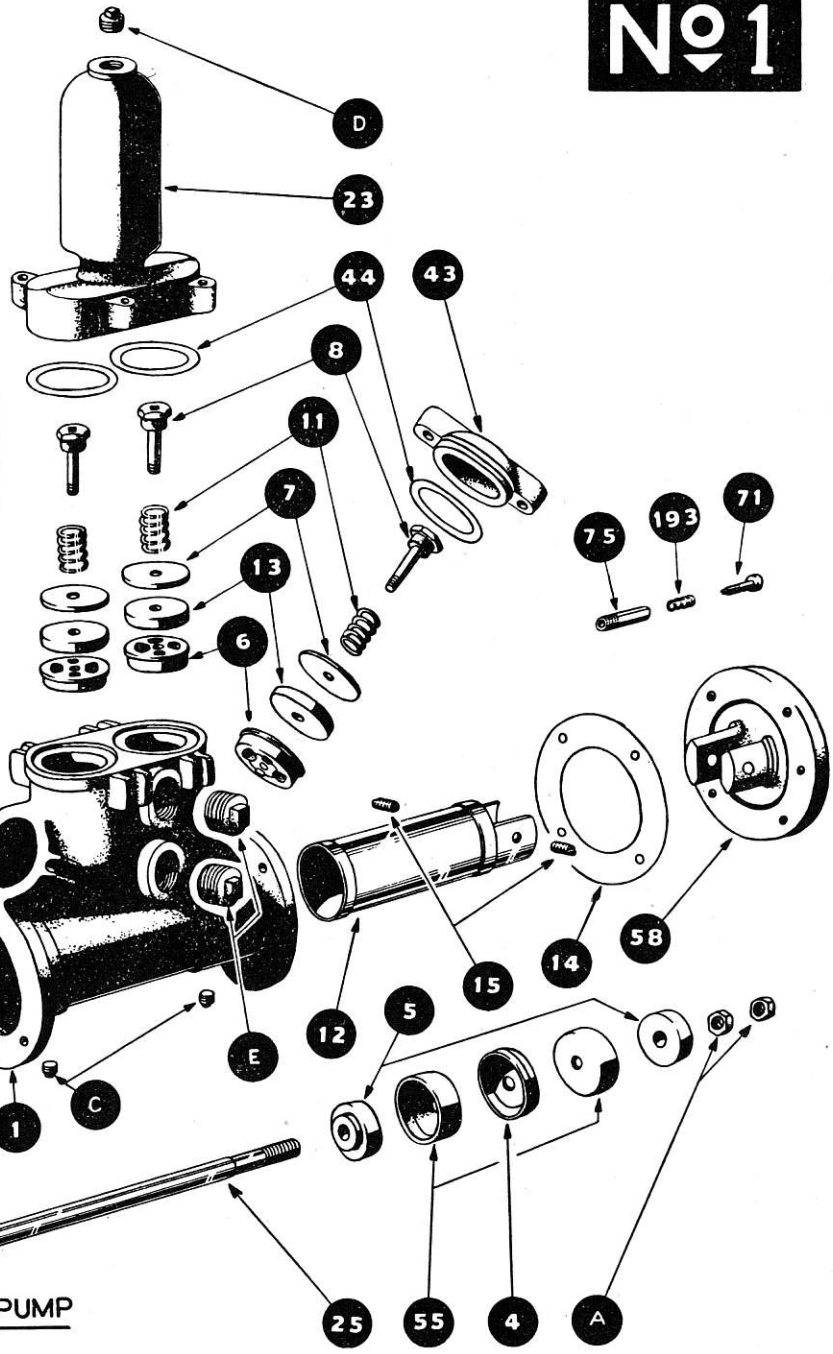
No. per Drive Gear	Symbol No.	Name of Part
1	AL-C 1B	Gearbox
1	AL-C 2B	Gearbox Cover
1	AL-C 3	Pinion and Shaft
1	AL-C 4	Gearbox Cover Gasket (not illus.)
1	AL-C 5	Pinion Shaft Bearing - Long
1	AL-C 6	Pinion Shaft Bearing - Short
1	AL-C 7	Gearwheel
1	AL-C 10	Gearwheel Shaft
2	AL-C 11	Gearwheel Shaft Bearing
1	AL-C 12	Eccentric Cover Plate
1	AL-C 13	Connecting Rod
1	AL-C 14	Connecting Rod Small End Bush
1	AL-C 15	Crosshead
1	AL-C 16	Crosshead Pin
1	AL-C 17	Oil Retainer
1	AL-C 18	Splash Guard
1	AL-C 20	Oil Scraper
2	AL-C 29	Pinion Shaft Bearing Gasket
2	AL-C 29	Gearwheel Shaft Bearing Gasket
1	AL-C 32	Pump Pulley
2	AL-C 38	Electric Motor Mounting Slide Rails
As Req'd		
2	AL-C 39	Electric Motor Mounting Slide Rail
As Req'd		
12		Shafts
		Bearings to Gearbox Setscrew (¾in. x 5/16in. U.N.C. H. Tensile Hex. Setscrew)
3		Eccentric Cover to Gearwheel Setscrew (¾in. x 5/16in. U.N.C. H. Tensile Hex. Setscrew)
2		Gearbox to Gearbox Cover Setscrew (1in. x 3/8in. - 16 U.N.C. H. Tensile)
4		Foundation Bolt (6in. x ½in. Whit. Blk. M.S. Bolt)
1		Gearwheel Locknut (3/8in. Whit. Br. M.S. Locknut)
4		Foundation Bolt Plain Washer (½in. Br. M.S. Washer)
12		Bearing Setscrew Lock Washer (5/16in. x 3/32in. x 3/32in. Blk. Spring Washer)

No. per Drive Gear	Symbol No.	Name of Part
3		Eccentric Cover Setscrew Lock Washer (5/16in. x 3/32in. x 3/32in. Blk. Spring Washer)
2		Gearbox to Gearbox Cover Setscrew Washer (3/8in. x 3/32in. x 3/32in. Blk. Spring Washer)
4		Foundation Bolt Lock Washer (½in. x 1/8in. x 1/8in. Blk. Spring Washer)
1	G	Splash Guard Locking Screw (3/8in. x ¼in. Whit. Br. M.S. Round Head Screw)
1	G	Oil Scraper Locking Screw (3/8in. x ¼in. Whit. Br. M.S. Round Head Screw)
1	J	Gearbox Drain Plug (3/8in. B.S.P. Blk. Plug)
1	J	Oil Scraper Locking Screw Plug (3/8in. B.S.P. Blk. Plug)
1	K	Crosshead Pin Locking Pin (1 1/8in. x 3/16in. M.S. Br. Cotter Pins)
4	L	Electric Motor Mounting Slide Rail Locking Screw (3/8in. x 5/16in. Whit. Knurled Point, Socket Setscrew)
As Req'd		
1	M	Pulley Locking Screw (¾in. x ½in. Whit. Knurled Point, Socket Setscrew)
1	N	Gearwheel Locking Screw (½in. x 3/8in. Knurled Point, Socket Setscrew)
2	H	Electric Motor Mounting Locking Screw (¾in. x ½in. Whit. Knurled Cup Point, Socket Setscrew)

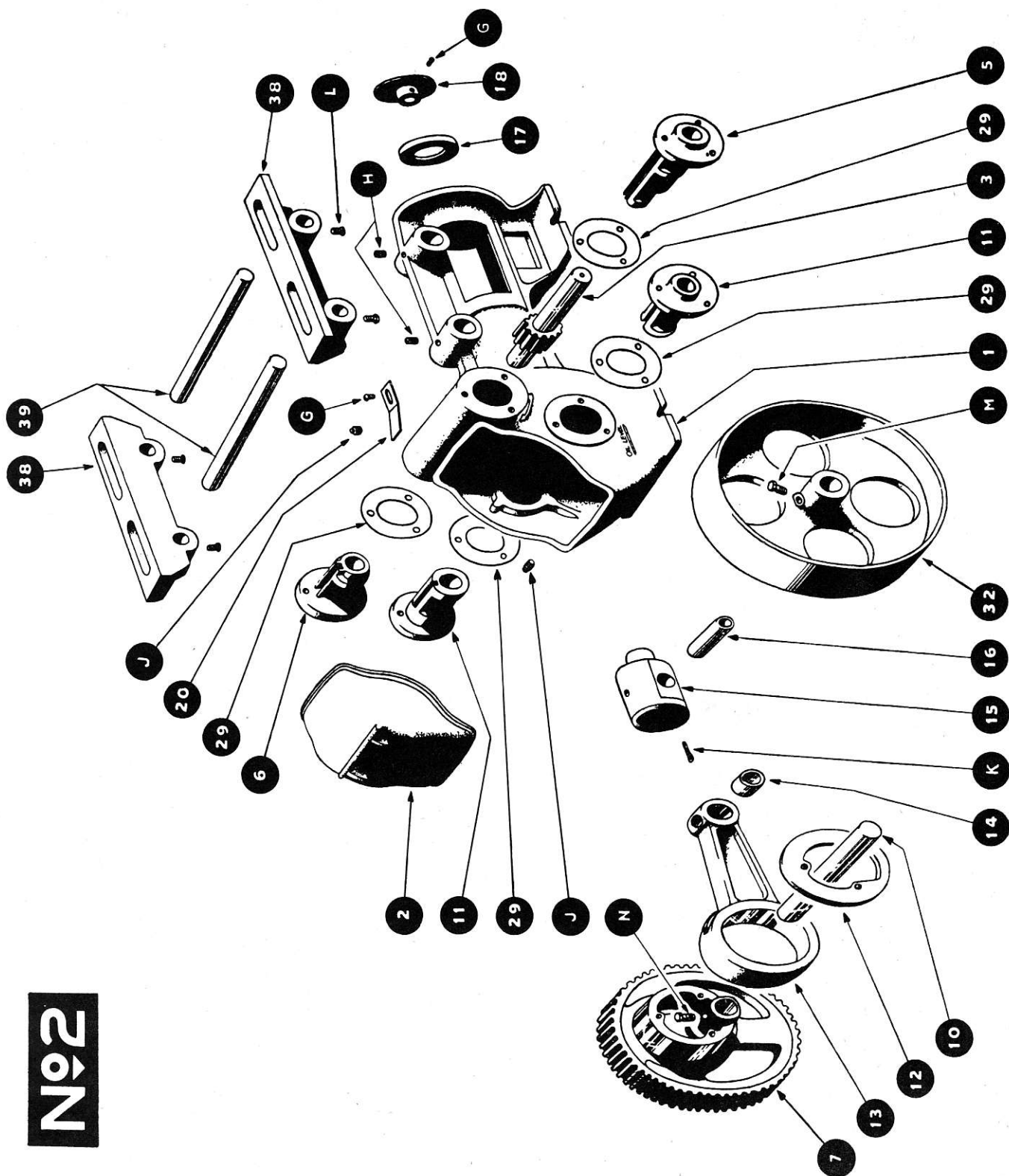
Mark KM-C Suction Chamber

PARTS LIST ILLUSTRATION No. 3

No. per Suction Chamber	Symbol No.	Name of Part
1	KM-C 1	Suction Chamber
1	KM-C 3	Suction Chamber Priming Plug
1	KM-C 4	Suction Chamber Priming Plug Gasket
1	KM-C 7	Suction Chamber to Pump Connection



MARK KH-C POWER PUMP



No 2

THE SOUTHERN CROSS ORGANISATION

SALES AND SERVICE COMPANIES

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