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PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION

Improvements relating to Reciprocatory Pumps

We, LEE HOWL & COMPANY LIMITED, a Company duly incorporated under the Laws of Great Britain, of Tipton Engineering Works, Tipton, in the County of Stafford, CLIFFORD HOWL, RALPH HOWL and WALTER RUSSELL SOWDEN, all British Subjects, all of the Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to reciprocatory pumps for pumping water or other liquids, and particularly hand pumps, the object of the invention being to simplify and facilitate the manufacture of such pumps.

The invention comprises the combination of a cylinder having formed integrally with it a pair of valve chests situated at opposite sides of the cylinder, a pair of end covers adapted to provide the required communicating passages between the cylinder and valves, a piston slidable in the cylinder, a piston rod passing through a gland in one of the covers, and manually operable means connected with the outer end of the rod for reciprocating the piston.

In one manner of constructing a pump in accordance with the invention, we employ a casting which forms an open-ended cylinder having combined with it a delivery valve chest and a suction valve chest, the valve chests being open at each end and being situated at the sides of and parallel with the cylinder. This casting comprises one member of the pump and is such that the cylinder and the locations for the valve seats can be bored in one setting.

The suction valve seatings are in the form of bushes which are mounted in the locations at the ends of the suction chest, and in combination with the outer end of each seating is provided a poppet valve which is held on its seating by a spring supported in the adjacent end cover. The liquid to be pumped is admitted to the interior of the suction valve chest through

an inlet connection provided at a position between the seatings.

The delivery valve seatings also comprise bushes which are mounted in the locations at the ends of the delivery chest, and in combination with the inner end of each seating is provided a poppet valve. A delivery outlet is provided on one or each side of the delivery valve chest at a position between the valves.

The ends of the cylinder and valve chest casting are closed by end covers, and each end cover has its inner surface so shaped as to provide the required passages leading from a suction valve to the adjacent cylinder end and from the latter to the corresponding delivery valve.

The piston in the cylinder is secured to a rod which passes through a gland in one of the covers, and the outer end of the rod is pivotally attached to a manually-operable actuating lever.

The cylinder and valve chests are arranged vertically. The lower cover forms the base or foot. The upper delivery valve is mounted on the upper cover and the two delivery valves are held on their seatings by separate springs. An air cushion chamber is provided by the space formed in the upper cover to accommodate the upper delivery valve, but this chamber may be extended by an additional part if desired. Further a removable cover or plug is provided adjacent to each delivery valve to give access to such valve. The actuating handle connected to the outer end of the piston rod is pivotally attached to the cylinder block by a link and may be double ended.

By this invention we are able greatly to simplify the design or construction and facilitate the manufacture of hand operated reciprocatory pumps such as are used in mine workings or for fire extinguishing and other like purposes.

Dated this 17th day of December, 1938.
MARKS & CLERK.

COMPLETE SPECIFICATION

Improvements relating to Reciprocatory Pumps

We, LEE HOWL & COMPANY LIMITED, a Company duly incorporated under the Laws of Great Britain, of Tipton Engineering Works, Tipton, in the

County of Stafford, CLIFFORD HOWL, RALPH HOWL and WALTER RUSSELL SOWDEN, all British Subjects, all of the Company's address, do hereby declare the
 5 nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to reciprocatory pumps for pumping water or other liquids, and particularly hand pumps, the object of the invention being to simplify and facilitate the manufacture of such pumps.

15 The invention comprises the combination of a casting forming a vertical cylinder and suction and delivery valve chests, the latter being situated at opposite sides of the cylinder and being provided respectively with an inlet and an outlet,
 20 a base or foot forming with the lower end of the casting passages extending between the lower ends of the cylinder and valve chests, a top cover forming with the upper end of the casting passages extending between the upper ends of the cylinder and valve chests, a piston slidable in the cylinder and having a rod which passes through a gland in the top cover, a pair of spring-loaded suction valves arranged in the casting at the upper and lower ends respectively of the suction valve chest, a pair of spring-loaded delivery valves arranged one in the casting at the lower end of the delivery
 35 valve chest and the other in the top cover at a position adjacent to the upper end of the delivery valve chest, the space provided in the top cover for accommodating the latter delivery valve being adapted to serve also as an air cushion chamber, and an operating lever connected to the outer end of the piston rod and to the upper end of the suction valve chest.

45 The accompanying drawing is a sectional elevation of a vertical pump constructed in accordance with the invention.

In carrying the invention into effect as shown, we employ a casting which forms
 50 an open-ended vertical cylinder *a* having combined with it a suction valve chest *b* and a delivery valve chest *c*, the valve chests being open at each end and being situated at opposite sides of and parallel with the cylinder. This casting comprises one member of the pump, and is such that the cylinder *a* and locations at the appropriate ends of the valve chests
 55 *b*, *c* for a pair of suction valve seatings *e* and one of a pair of delivery valve seatings *f* can be bored in one setting.

60 The suction valve seatings *e* are in the form of bushes which are mounted in the locations at the upper and lower ends of the suction chest *b*, and in combination

with the outer end of each of these seatings is provided a poppet valve *g* which is held on its seating by a spring *h* supported by the adjacent end cover *i*. The liquid to be pumped is admitted to the interior of the suction valve chest *b* through an inlet *j* provided in an extension of this valve chest, which extension forms at its upper part a suction air chamber.

70 The delivery valve seatings *f* also comprise bushes one of which is mounted in a location formed in the lower end of the delivery chest *c*, and the other of which is mounted in a location formed in the upper end cover *i*. In combination with the upper end of each of these seatings *f* is provided a poppet valve *k* which is held on its seating by a spring *m*. The space provided in the upper end cover *i* for accommodating the corresponding delivery valve *k* is also adapted to serve as an air cushion chamber, and this chamber may be extended by a member *p* as shown. A delivery outlet *n* is provided on one or each side of the delivery valve chest *c* at a position between the valves *k*.

80 The upper and lower ends of the cylinder and valve chest casting above described are closed by the end covers *i*, the lower end cover serving as the base or foot of the pump structure. Also each of these covers has its inner surface so shaped as to form with the adjacent end of the casting the required passages between the corresponding ends of the cylinder and valve chests.

85 The piston *s* in the cylinder *a* is secured to a rod *t* which passes through a gland *u* in one of the end covers *i*, and the outer end of the rod *t* is pivotally attached to a manually-operable actuating lever *v*. This latter is pivotally attached by a link *w* to the upper end of the above mentioned extension of the suction valve chest
 90 *b*. Moreover the lever *v* may be adapted for actuation at two ends as shown, each of these ends being provided with a handle *x*.

95 If desired the cylinder *a* may be provided with a liner *y* as shown.

By this invention we are able greatly to simplify the design or construction and facilitate the manufacture of hand operated reciprocatory pumps such as are used in mine workings or for fire extinguishing and other like purposes.

100 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

105 1. A reciprocatory pump comprising the combination of a casting forming a vertical cylinder and suction and delivery
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valve chests, the latter being situated at opposite sides of the cylinder and being provided respectively with an inlet and an outlet, a base or foot forming with the lower end of the casting passages extending between the lower ends of the cylinder and valve chests, a top cover forming with the upper end of the casting passages extending between the upper ends of the cylinder and valve chests, a piston slidable in the cylinder and having a rod which passes through a gland in the top cover, a pair of spring-loaded suction valves arranged in the casting at the upper and lower ends respectively of the suction valve chest, a pair of spring-loaded delivery valves arranged one in the casting at the lower end of the delivery valve chest and the other in the top cover at a position adjacent to the upper end of the delivery valve chest, the space provided in the top cover for accommodating the latter delivery valve being adapted to serve also as an air cushion chamber, and an operating lever connected to the outer end of the piston rod and to the upper end of the suction valve chest. 25

2. A reciprocatory pump as claimed in Claim 1 and comprising the combination and arrangement of parts substantially as described and as illustrated in the accompanying drawings. 30

Dated this 21st day of February, 1939.
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[This Drawing is a reproduction of the Original on a reduced scale.]

