F. M. SCHORN.

PUMP.

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1,096,463. Patented May 12, 1914.

Fig. 1.

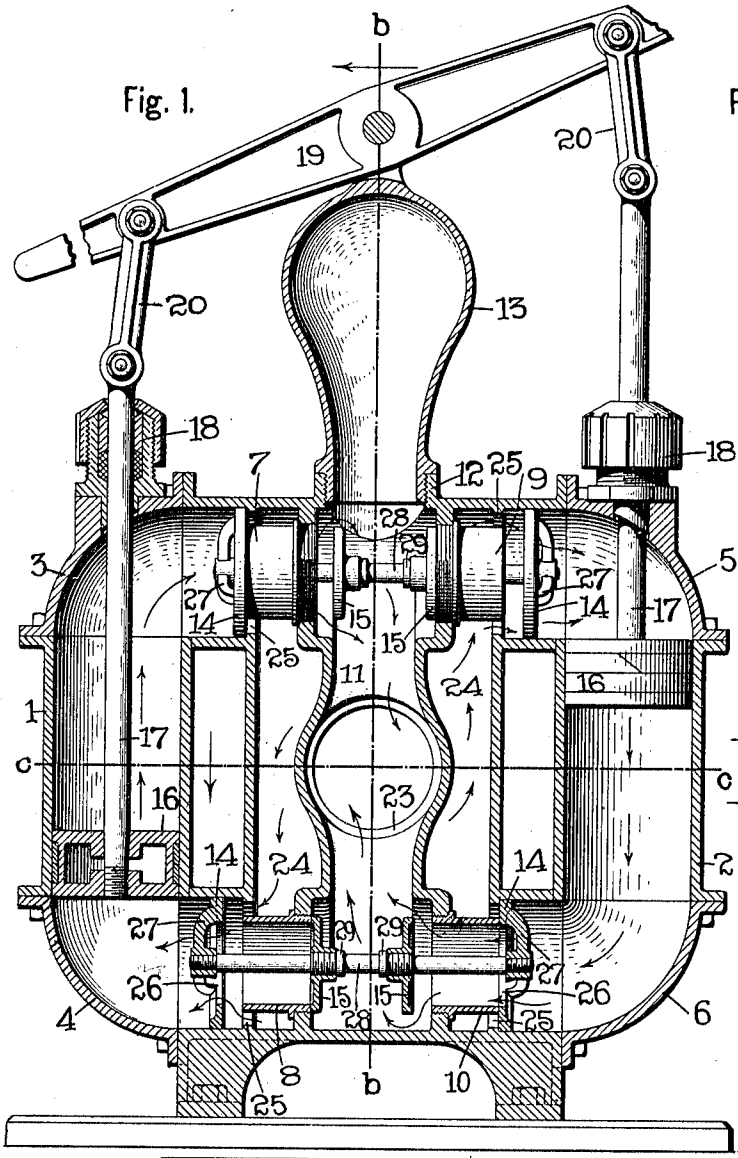


Fig. 2.

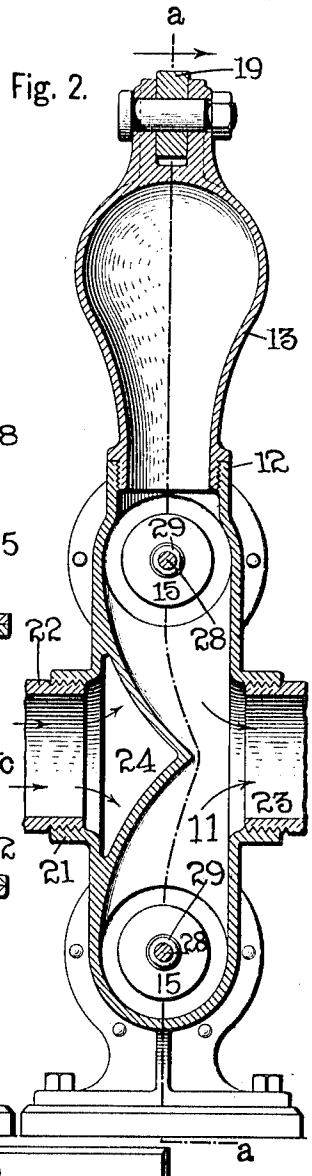
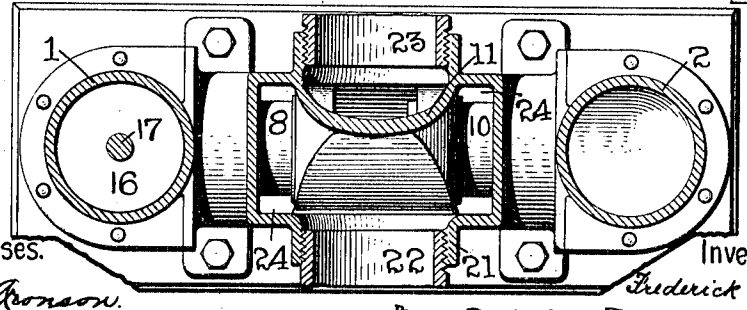


Fig. 3.



Witnesses.

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PUMP.

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Application filed February 9, 1911, Serial No. 607,573. Renewed October 17, 1913. Serial No. 795,788.

To all whom it may concern:

Be it known that I, FREDERICK M. SCHORN, a subject of the King of Great Britain, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to improvements in reciprocating pumps, and primarily to that class of pumps which are of a double-acting character, and by which a practically continuous stream is produced.

One of the features of the invention resides in the tubular loop-like frame of the pump body.

Another feature has reference to the arrangement of valves in pairs and between the pump cylinders at equal distances from said cylinders so that the piston pressures are balanced.

The principal object of the invention is to provide a comparatively simple, durable and compact pump, capable of producing a practically continuous stream, and having a comparatively large pumping capacity in proportion to its size.

The invention also relates to certain details of construction of the pump and its parts, which will be hereinafter described in the specification and claims, reference being had to the accompanying drawings in which a preferred adaptation of the pump is illustrated.

Figure 1 is a transverse central vertical section through an adaptation of the improved pump on line *a a*, Fig. 2. Fig. 2 is a longitudinal central vertical section through an adaptation of the improved pump on line *b b*, Fig. 1. Fig. 3 is a central horizontal section through an adaptation of the improved pump on line *c c*, Fig. 1.

In referring to the drawings in detail illustrating one of the adaptations of the improved pump, like numerals designate like parts.

The pump casing is illustrated in the accompanying drawings practically in the form of a tubular loop of a substantially square shape, the vertical sides of said loop constituting the pump cylinders, and the upper and lower horizontal members being constructed and arranged to operatively support the valves.

Referring to Fig. 1, the pump casing consists of two vertical pump cylinders 1 and 2, which are arranged side by side, four tubular corner members 3, 4, 5 and 6 located at the respective corners of the casing, four valve cylinders 7, 8, 9 and 10 arranged in horizontally alined pairs, and a central vertical hollow member 11 which extends between the pump cylinders. The hollow member 11 is provided on one side with a tubular extension which constitutes the outlet of the pump, and has its respective upper and lower ends extending between the pairs of valve cylinders, as shown in Fig. 1, the cylinders of each pair being screwed into openings in the side walls of the hollow member 11. The upper end of the hollow member 11 is opened and a short interiorly screw-threaded tubular extension 12 projects slightly above the top surface of the casing. A hollow expansion dome 13 has its lower end screwed into the tubular extension 12, as shown in Figs. 1 and 2. The valves are arranged in opposed pairs with the members of each pair located, respectively, at the opposite ends of one of the valve cylinders. As there are four valve cylinders, necessarily four pairs of opposed valves are required, and as the cylinders are arranged in horizontally alined pairs, it is possible to mount the valves for each pair of cylinders on a single stem, as shown in Fig. 1. As all of the pairs of valves are of similar construction, the larger valve member of each pair will be indicated by the numeral 14, and the smaller member of each pair by the numeral 15. A piston 16 is arranged in each pump cylinder so as to reciprocate vertically therein, and has a piston rod 17 which passes through a stuffing box 18 mounted on the top corner of the pump casing vertically above the cylinder.

A walking beam 19 is pivoted at or near its center between a bifurcated vertical extension on the top of the dome 13 by a pivoted pintle. The walking beam is rocked on its pivot by hand or power, as desired, and the upper ends of the piston rods are respectively connected to near the opposite ends of the walking beam by pivotal links 20, as shown in Fig. 1.

The pump inlet is located on the side of the casing opposite the pump outlet, a short tubular extension 21 being provided which is interiorly screw-threaded for the attachment of a pipe, a fragment of a pipe 22 being shown in Fig. 2. Likewise, a small fragment of a pipe 23 leading from the outlet is shown in Fig. 2. The liquid or other ma-

terial in entering the pump passes into the inlet, as indicated by arrows in Fig. 2, and then moves upwardly and downwardly through the hollow spaces 24 located on opposite sides of the hollow member 11.

By referring to Fig. 1 it will be noted that annular spaces or openings 25 are provided between the outer ends of the valve cylinders, and that these spaces are adapted to be closed by the larger valve members. The liquid or other material passes from the spaces or openings 24 through the annular spaces or openings 25, entering the corner members and being drawn into the pump cylinder by the reciprocation of the piston in one direction. When the piston reaches the end of its movement in one direction, it stops momentarily and then starts on its return movement in the opposite direction, thereby forcing the liquid or other material out of the pump cylinder and at the same time closing the larger valve of the pair of valves in proximity to said cylinder. The larger valves of each pair are provided with central openings 26, as shown in section in the lower portion of Fig. 1, so that the liquid or other material passes through the valve cylinder into and through the hollow central member 11, and out through the outlet of the pump. The larger valve 14 of each pair, is of an annular form, and serves to close the annular space around the valve cylinder, and is attached to or supported from the valve stem by means of a skeleton frame or spider 27. Each of the valve stems 28 is sufficiently long to pass horizontally centrally through one of the pairs of the horizontally alined valve cylinders, as shown in Fig. 1. The inner, or smaller valve member of each pair of valves is of a circular disk-like form, and is adapted to contact with the inner edge of the valve cylinder, thus closing said valve cylinder against the passage of liquid or other material.

Shoulders 29 are provided on the valve stems against which the inner or smaller valves fit, as shown in Fig. 1. It will be noted that the inner valve member of one pair and the outer valve member of the other pair located on the same horizontal plane, are opened at the same time, and that all of the valve members mounted on the same stem are opened and closed by a simultaneous movement. Also, when the outer valve member of the lower left-hand pair is open, the outer valve member of the upper right hand pair is also open, so that the liquid or other material is passing in at the upper end of the right-hand pump cylinder and simultaneously at the lower end of the left-hand pump cylinder.

The operation of this improved pump will be quickly understood by referring to the accompanying drawings in tracing the passage of the liquid or other material through the pump by the indicating arrows shown thereon.

I claim:—

1. A pump of the class described having a tubular loop-like casing consisting of two pump cylinders, and valve cylinders extending between the ends of the pump cylinders, pistons in the pump cylinders, valve stems in the valve cylinders and valves arranged in opposed pairs and mounted on the valve stems in the valve cylinders; each pair of valves consisting of an annular valve and a disk valve.

2. A pump of the class described having a tubular loop-like casing consisting of two pump cylinders, and valve cylinders extending between the ends of the pump cylinders, tubular corner members connecting the pump cylinders and the valve cylinders, pistons in the pump cylinders, valve stems in the valve cylinders and valves arranged in opposed pairs and mounted on the valve stems in the valve cylinders; each pair of valves consisting of an annular valve and a disk valve.

3. A pump of the class described having two vertical pump cylinders pistons in the pump cylinders, four valve cylinders in horizontally alined pairs, one pair of valve cylinders being arranged between the upper ends of the pump cylinders and the other pair of valve cylinders being arranged between the lower ends of the pump cylinders, two valve stems each extending through one of the pairs of valve cylinders, eight valves arranged in opposed pairs with the valves of each pair located at opposite ends of one of the valve cylinders, two pairs of the opposed valves being mounted on each valve stem, and said pairs of valves each consisting of an annular valve and a disk valve.

4. A pump of the class described having two vertical pump cylinders, four valve cylinders in horizontally alined pairs, one pair of valve cylinders being arranged between the upper ends of the pump cylinders and the other pair of valve cylinders being arranged between the lower ends of the pump cylinders, valve stems in said valve cylinders eight valves arranged in opposed pairs with the valves of each pair located at opposite ends of one of the valve cylinders, and mounted on the valve stem within said valve cylinder, one of the valves of each pair of valves being of an annular-like form, and the other valve being of a disk-like form, and pistons in the pump cylinders.

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Witnesses:
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