

No. 677,474.

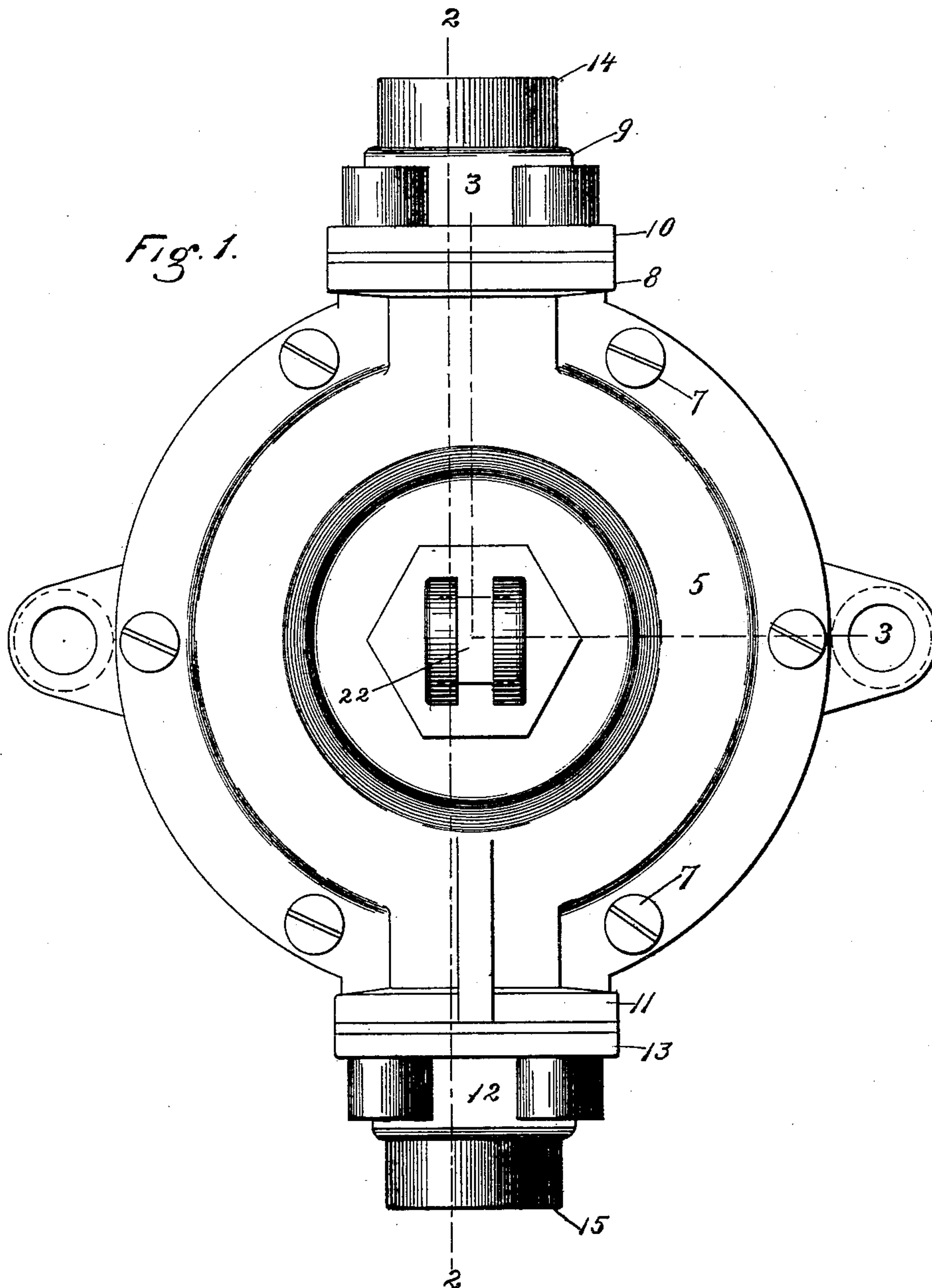
B. RUSSELL.
PUMP.

Patented July 2, 1901.

(Application filed Nov. 16, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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No. 677,474.

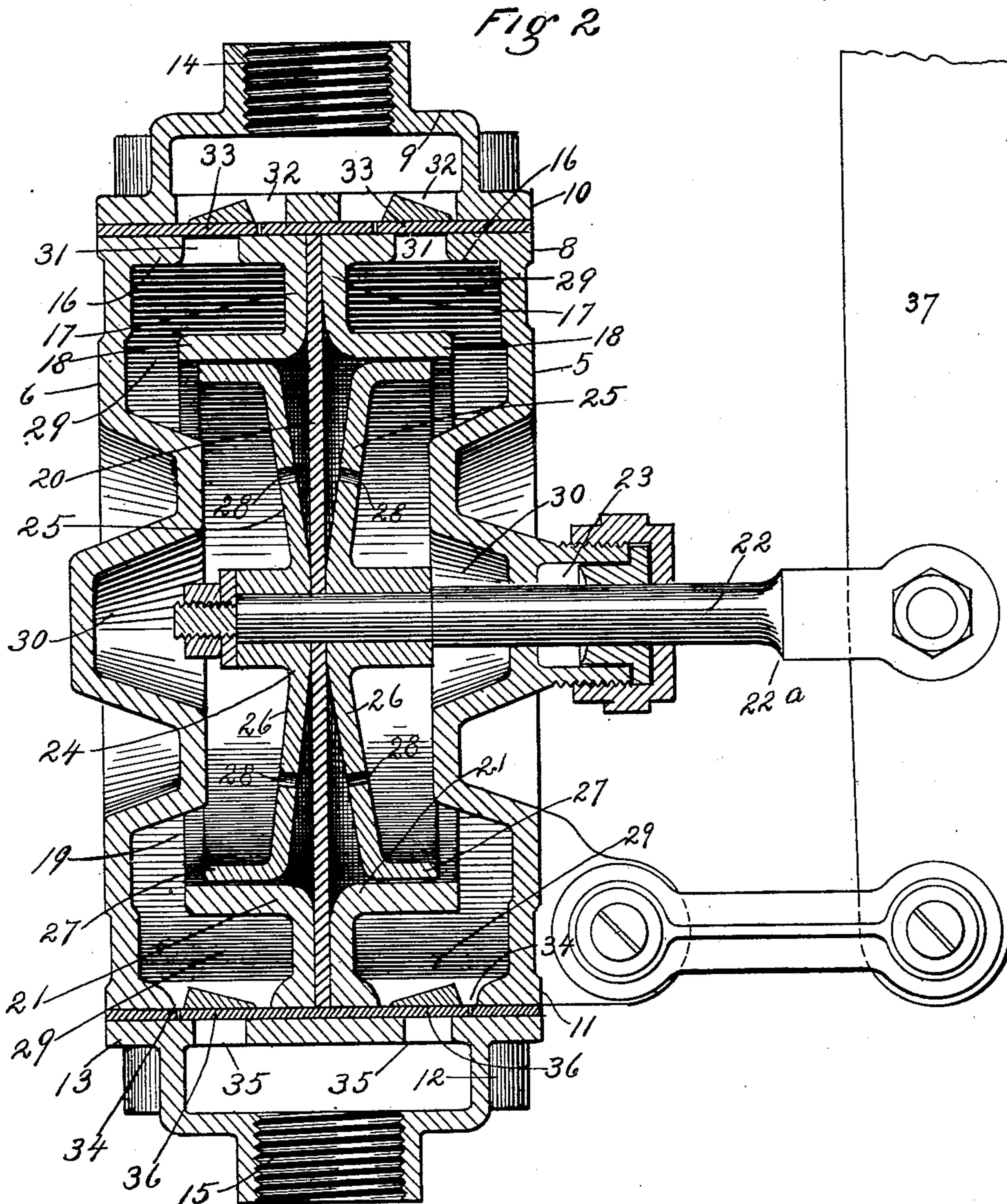
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3 Sheets—Sheet 2.



WITNESSES:

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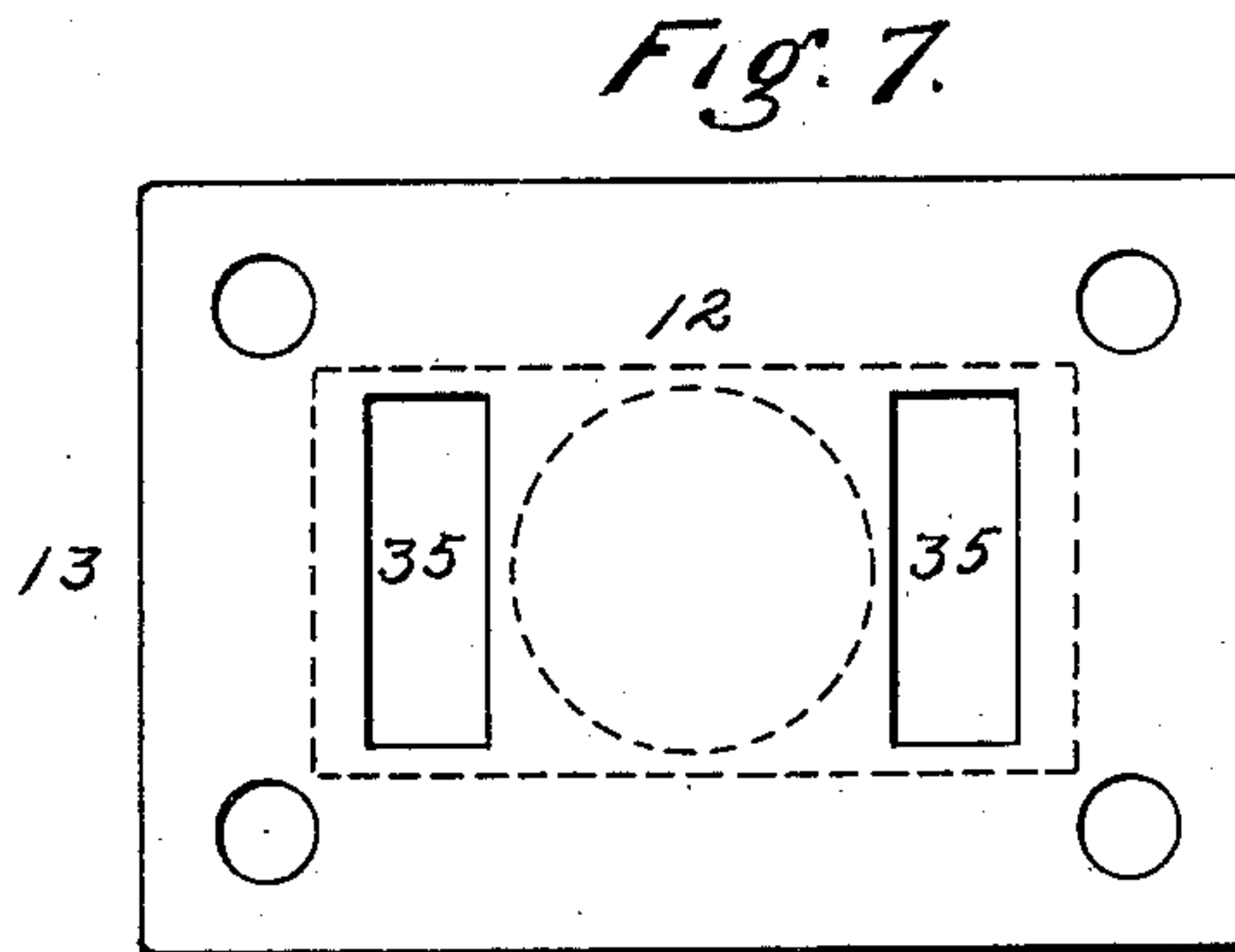
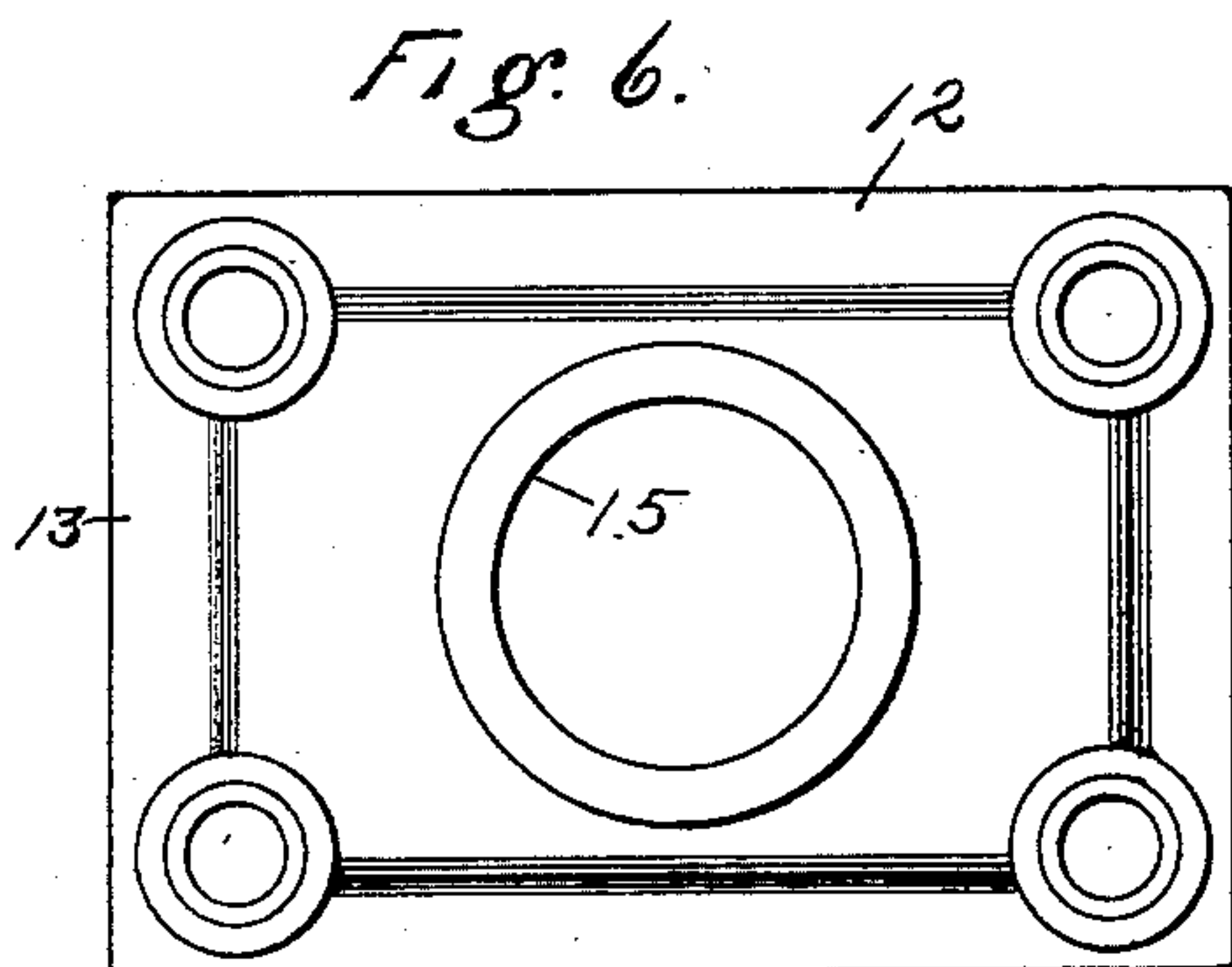
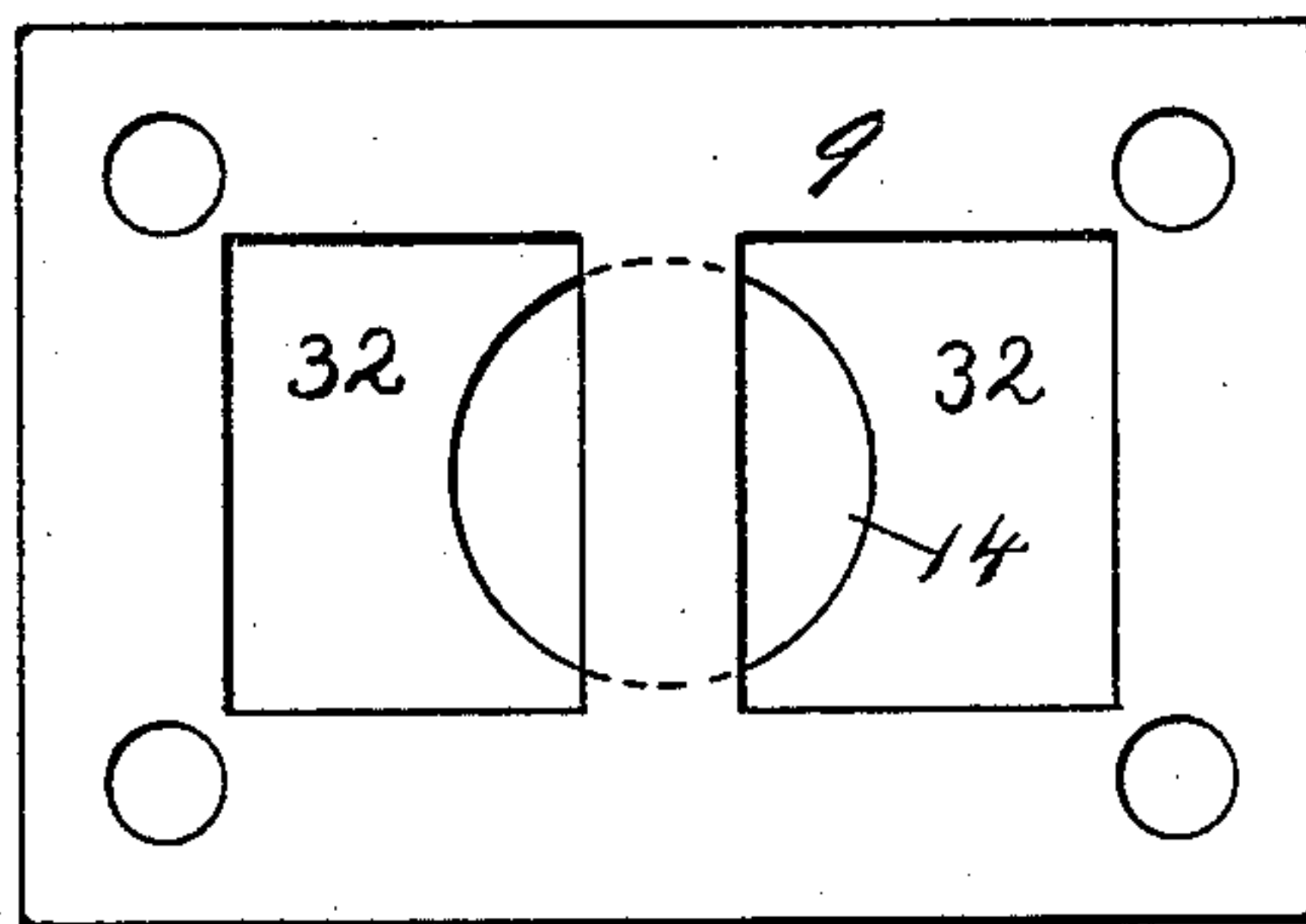
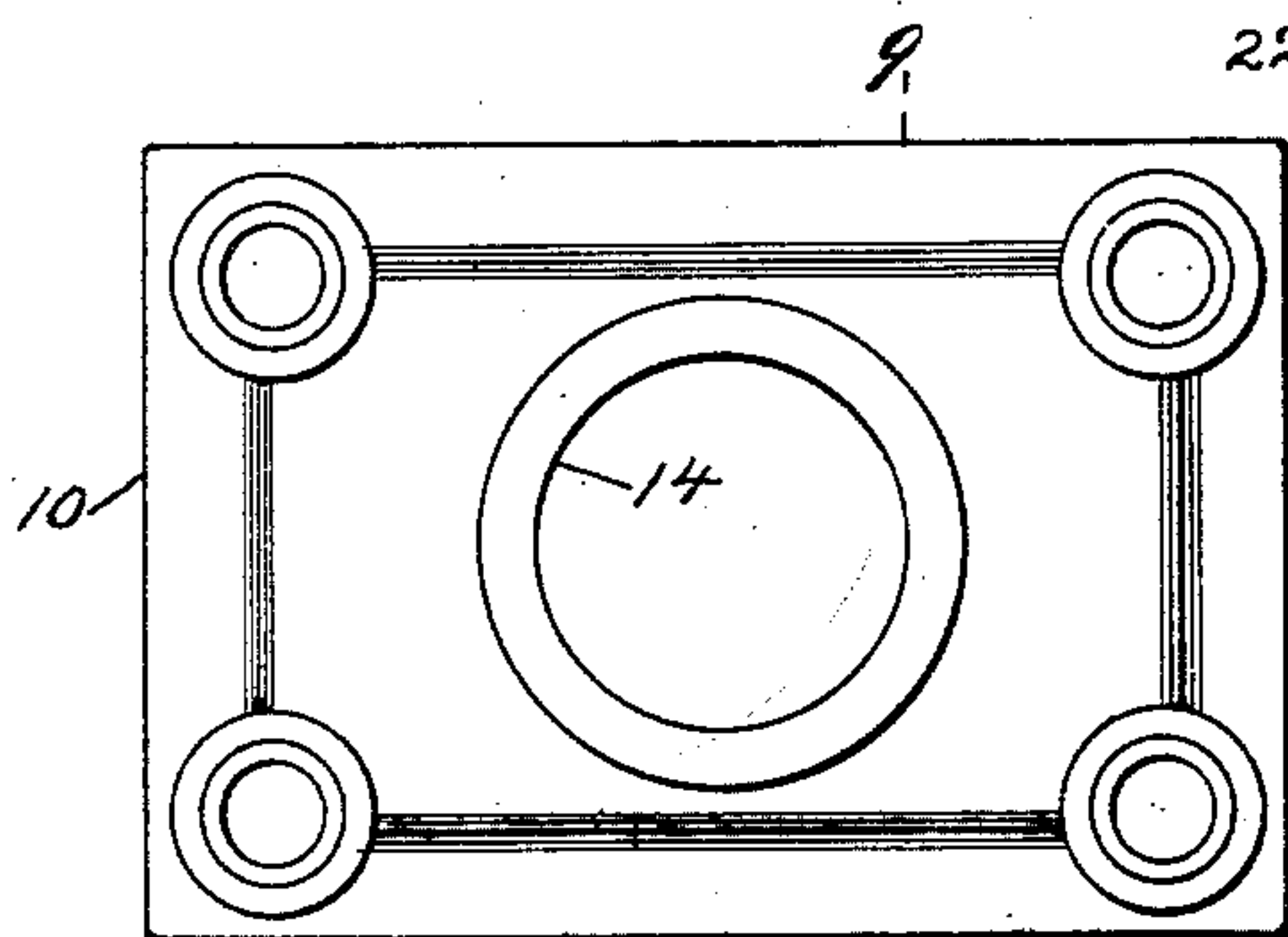
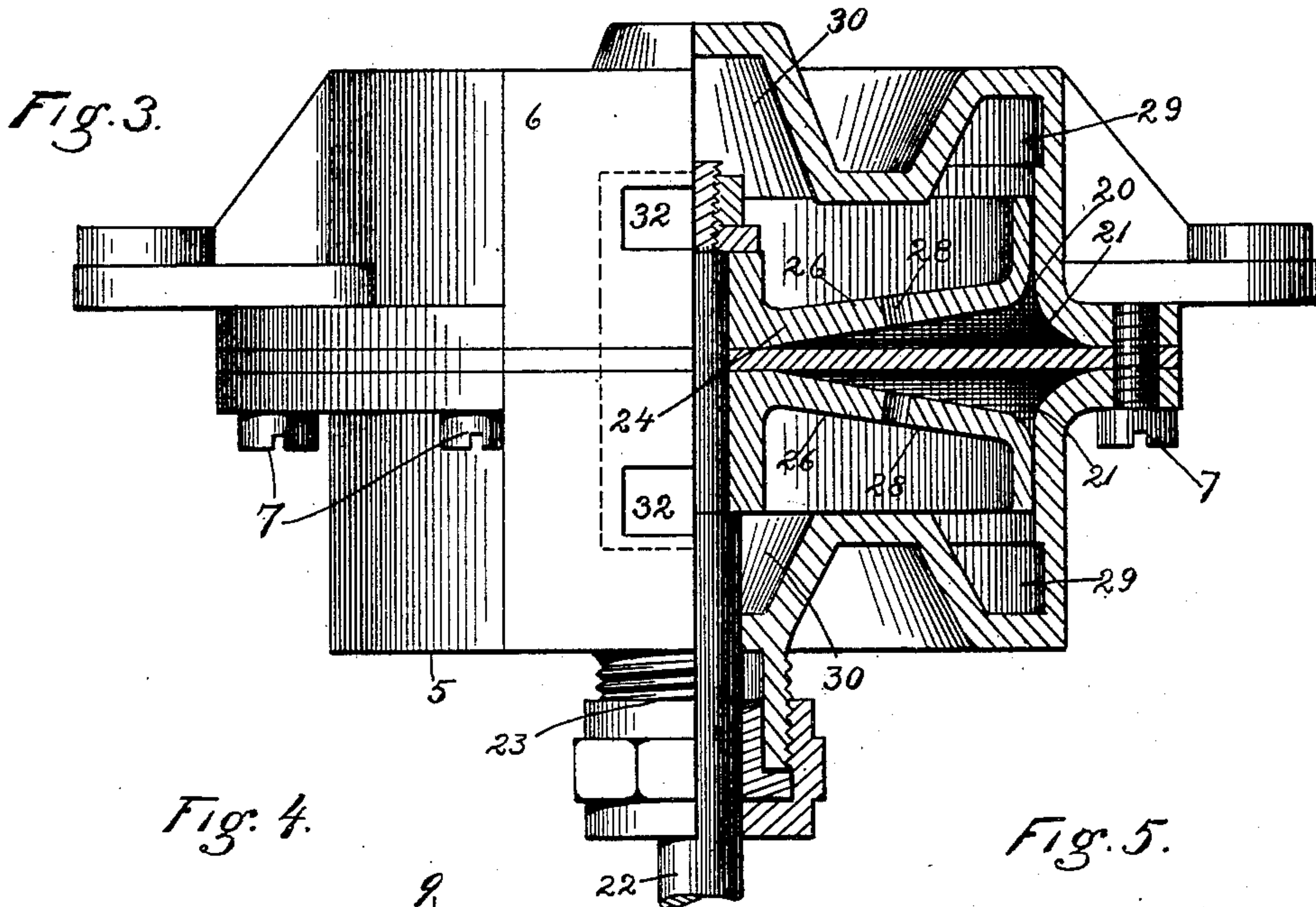
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B. RUSSELL.
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(Application filed Nov. 18, 1900.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

BRIDGMAN RUSSELL, OF LONDON, ENGLAND.

PUMP.

SPECIFICATION forming part of Letters Patent No. 677,474, dated July 2, 1901.

Application filed November 16, 1900. Serial No. 36,667. (No model.)

To all whom it may concern:

Be it known that I, BRIDGMAN RUSSELL, a subject of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in Pumps, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

10 This invention relates to pumps, and the object thereof is to provide an improved double-acting pump for lifting, forcing, compressing, or exhausting air or liquids, a further object being to provide a pump of the class described
15 which is adapted for use either as a single or multiple piston pump and which may be operated by hand or power; and with these and other objects in view the invention consists in a pump constructed as hereinafter described
20 and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

25 Figure 1 is a front view; Fig. 2, a central vertical section on the line 2 2 of Fig. 1; Fig. 3, an angular section on the line 3 3 of Fig. 1; Figs. 4 and 5, top and bottom plan views, respectively, of an outlet or delivery box which forms a part of my improved pump;
30 and Figs. 6 and 7 are top and bottom plan views, respectively, of an inlet or suction box which forms a part of the pump.

In the drawings forming part of this specification the separate parts of my improvement are designated by the same reference character in each of the views, and in the practice of my invention I provide a pump-casing, comprising front and back members 5 and 6, which may be regarded or denominated the "opposite" sides of the pump-casing, and these parts 5 and 6 of the pump-casing are bolted together, as shown at 7 in Fig. 1.

At the top of the pump-casing formed by the side members 5 and 6 is a flange 8, to
45 which is bolted or otherwise secured the outlet or delivery box 9, which is provided with a flange 10, which corresponds with the flange 8, and at the bottom of the main casing formed by the side members 5 and 6 is a
50 flange 11, to which is bolted or otherwise secured the inlet or suction box 12, having a

flange 13 similar to the flange 11, and the outlet or delivery box 9 is provided with an interiorly-threaded tubular extension 14, while the inlet or suction box 12 is provided with a
55 similar interiorly-threaded tubular extension 15. The opposite side members 5 and 6 of the main casing of the pump are provided at their perimeter with inwardly-directed drum-shaped portions 16, which at their inner edges are bent inwardly at right angles,
60 as shown at 17, and then outwardly to form rims 18, which rims together form a cylindrical barrel or guide 19 open at both ends, and between the separate members 18 of the cylindrical barrel or guide 19 is secured a transverse and flexible diaphragm 20, composed of leather or any other suitable flexible material, and which divides the barrel or guide 19
65 into two separate parts, and the separate members 18 of the barrel or guide 19 are beveled at their inner edges, as shown at 21, so that they will not cut or injure the diaphragm 20 in the operation of the pump.
70

An operating rod or shaft 22 passes through
75 one side of the pump-casing, the front side thereof, as shown at 23, and secured thereon is a diaphragm-guard 24, consisting of two separate similar members 25, each of which is shaped like the half of a drum divided
80 transversely of its axis and comprising a circular convex or beveled head 26 and a rim 27, and the diaphragm 20 is secured between the separate members of the guard 24, as clearly shown in Fig. 2, and the convex or beveled
85 heads of the separate members of the guard 24 are provided with ports or passages 28.

In each side of the pump-casing is an annular chamber 29, and centrally of each side is a recess 30, these recesses being designed to
90 receive on one side the end of the operating rod or shaft 22 and on the other side the hub of one member of the guard 24. The annular chambers 29 are in communication with the outlet or delivery box 9 by means of ports or
95 passages 31, formed in the drum of the opposite sides of the casing, and corresponding ports or passages 32, formed in the base of the outlet or delivery box, and these ports or passages are controlled by weighted valves
100 33, which open upwardly and outwardly, and the said annular chambers 29 are also in com-

munication with the inlet or suction box 12 by means of ports or passages 34, formed in the drums of the separate sides of the pump-casing, and corresponding ports or passages 5 35, formed in the base of the said inlet or suction box, and these ports or passages are controlled by weighted flexible valves 36, which open inwardly.

The operating rod or shaft 22 may be operated by a hand-lever 37 or in any desired manner, and the operation of the pump will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following statement thereof.

It will be observed that the heads of the separate members of the diaphragm-guard are convex, as hereinbefore stated, on their inner sides, and that the diaphragm 20 is compressed between the hubs of the separate members of the said guard, and the diaphragm is thus free to swing laterally during the operation of the guard.

It will be observed that the diaphragm-guard or the separate parts thereof do not fit tightly in the barrel or guide 19, a thin space being left around said guard or the separate parts thereof. The stroke of the guard is also comparatively short, the inward movement thereof being limited in any desired manner, preferably by an annular shoulder 22^a at the outer end of the piston-shaft, and the outer movement thereof being limited by one of the hubs of the diaphragm-guard, and by reason of the fact that the guard does not fit tightly in the guide or barrel 19 the liquid or other substance is free to circulate around the separate members of the guard and through the heads thereof, said heads being provided with ports or passages 28 for this purpose.

As the diaphragm-guard moves forwardly or to the right the liquid or other substance passes in through the inlet or suction box and into the left-hand annular chamber 29, from which it is forced into and through the outlet or delivery box 9, and at the next movement of the guard, or when said guard moves to the left, the liquid or other substance passes into the right-hand annular chamber 29, from which it is forced into and through the outlet or delivery box 9 at the next forward or outward movement of the guard.

The object of the ports or passages 28 in the circular heads of the separate parts of the diaphragm-guard is to provide means whereby any liquid which succeeds in entering the space between the separate parts of the guard will pass therefrom, thus preventing the bursting or breaking of the diaphragm.

It will be observed that the diaphragm 20 securely packs the guard 24 and the liquid or other substance cannot pass from one side of the pump-casing to the other under any conditions, and by means of my improved construction the necessity for employing piston-rings and other packings is obviated and the

friction in the operation of the pump is reduced to a minimum.

My improved pump is simple in construction and operation and perfectly adapted to accomplish the result for which it is intended, and it will be apparent that changes in and modifications of the construction described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pump comprising a casing having an interior concentric barrel or guide open at both ends and divided vertically between said barrel or guide and the walls of the casing, so as to form separate side compartments, said side compartments having top and bottom inlet and outlet openings, a flexible diaphragm secured vertically and transversely of said barrel or guide, and dividing the same into separate parts, an operating-rod passing through one side of the casing and through said barrel or guide and through said diaphragm, and a diaphragm-guard consisting of two parts secured to said operating-rod on the opposite sides of said diaphragm, substantially as shown and described.

2. A pump comprising a casing having an interior concentric barrel or guide open at both ends and divided vertically between said barrel or guide and the walls of the casing, so as to form separate side compartments, said separate side compartments having top and bottom inlet and outlet openings, a flexible diaphragm secured vertically and transversely of said barrel or guide, and dividing the same into separate parts, an operating-rod passing through one side of the casing and through said barrel or guide and through said diaphragm, and a diaphragm-guard consisting of two parts secured to said operating-rod on the opposite sides of said diaphragm, said parts of said guard being cylindrical in cross-section and comprising a circular head and a flange or rim, and the adjacent sides of said heads being beveled or convex, substantially as shown and described.

3. A pump comprising a casing having an interior concentric barrel or guide open at both ends and divided vertically between said barrel or guide and the walls of the casing, so as to form separate side compartments, said side compartments having top and bottom inlet and outlet openings, a flexible diaphragm secured vertically and transversely of said barrel or guide, and dividing the same into separate parts, an operating-rod passing through one side of the casing and through said barrel or guide and through said diaphragm, and a diaphragm-guard consisting of two parts secured to said operating-rod on the opposite sides of said diaphragm, said parts of said guard being cylindrical in cross-section and comprising a circular head and a flange or rim, and the adjacent sides of said

heads being beveled or convex, and being also perforated, substantially as shown and described.

4. A pump comprising a casing having an interior concentric barrel or guide open at both ends and divided vertically between said barrel or guide and the walls of the casing, so as to form separate side compartments, said side compartments having top and bottom inlet and outlet openings, a flexible diaphragm secured vertically and transversely of said barrel or guide, and dividing the same into separate parts, an operating-rod passing through one side of the casing and through said barrel or guide and through said diaphragm, and a diaphragm-guard consisting of two parts secured to said operating-rod on the opposite sides of said diaphragm, said parts of said guard being cylindrical in cross-section and comprising a circular head and a flange or rim, and the adjacent sides of said heads being beveled or convex, and being also perforated, and said guard being also of slightly-less diameter than the barrel or guide, substantially as shown and described.

5. A pump comprising a cylindrical casing having an interior concentric barrel or guide open at both ends, a diaphragm arranged centrally in said barrel or guide and dividing

the same into separate parts, and an operating-rod passing through one side of the casing and through said diaphragm, and provided with a guard composed of two parts, one on each side of said diaphragm said guard being adapted to move in said barrel or guide, and said casing being provided with inlet and outlet openings, substantially as shown and described.

6. A pump, comprising a cylindrical casing, having an interior barrel or guide open at both ends and divided by a transverse flexible diaphragm, an operating-rod passing through one side of said casing and through said diaphragm and provided with a diaphragm-guard, consisting of two parts secured thereto on the opposite sides of the diaphragm and freely movable in said barrel or guide, said casing being provided at the opposite sides with inlet and outlet openings respectively, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 5th day of November, 1900.

BRIDGMAN RUSSELL.

Witnesses:

WILLIAM SMEATON,
A. V. DICKSON BULGIN.