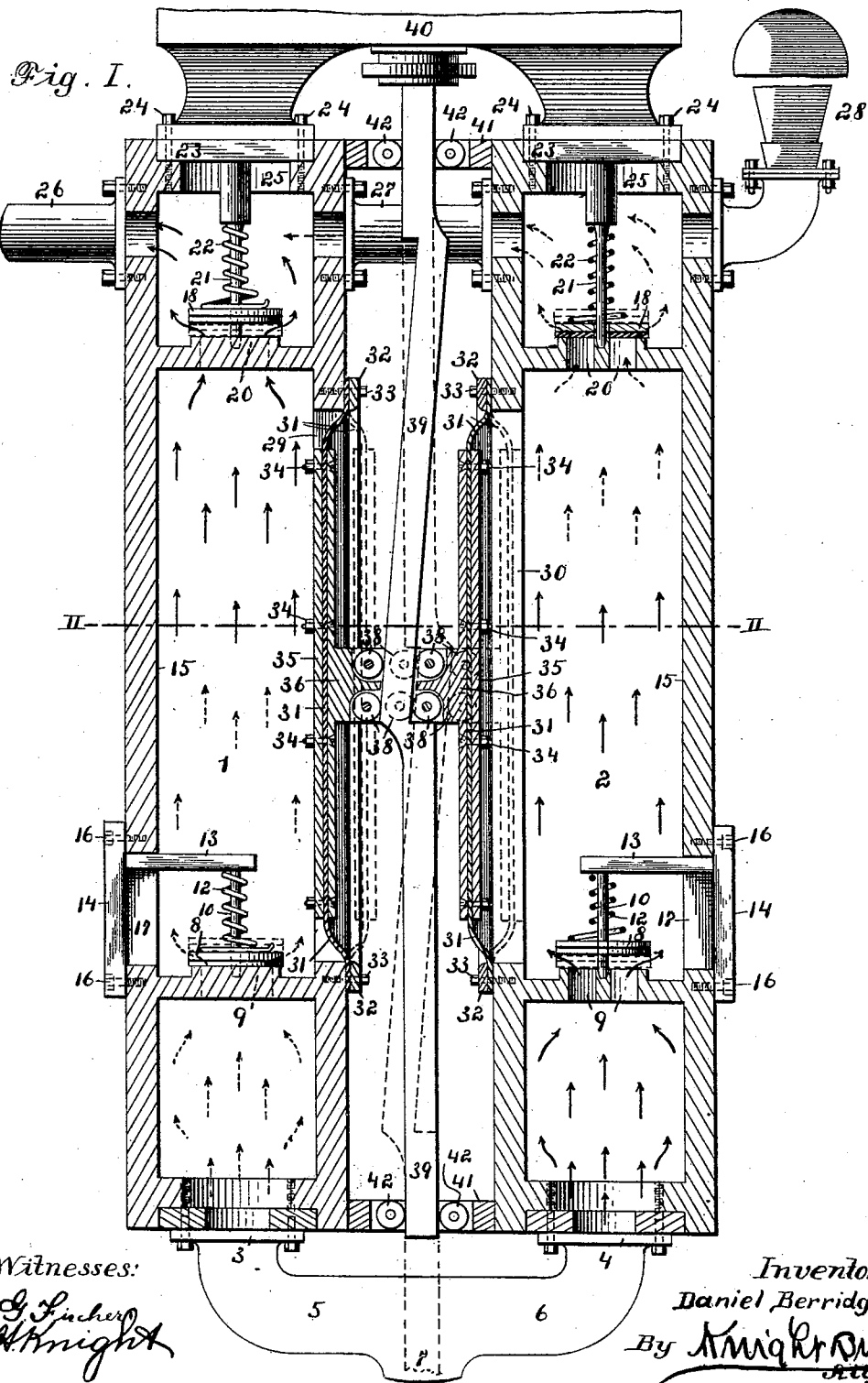


D. BERRIDGE.
PUMP.

No. 453,925.

Patented June 9, 1891.



(No Model.)

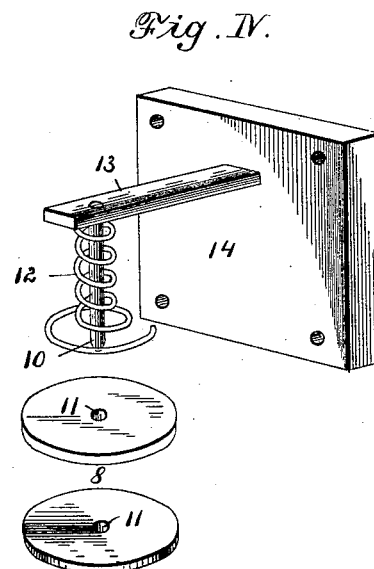
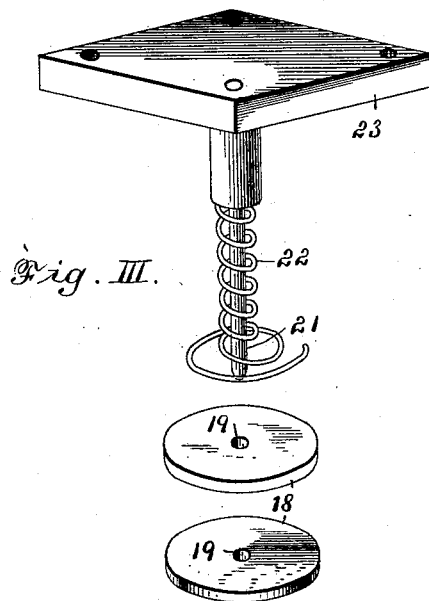
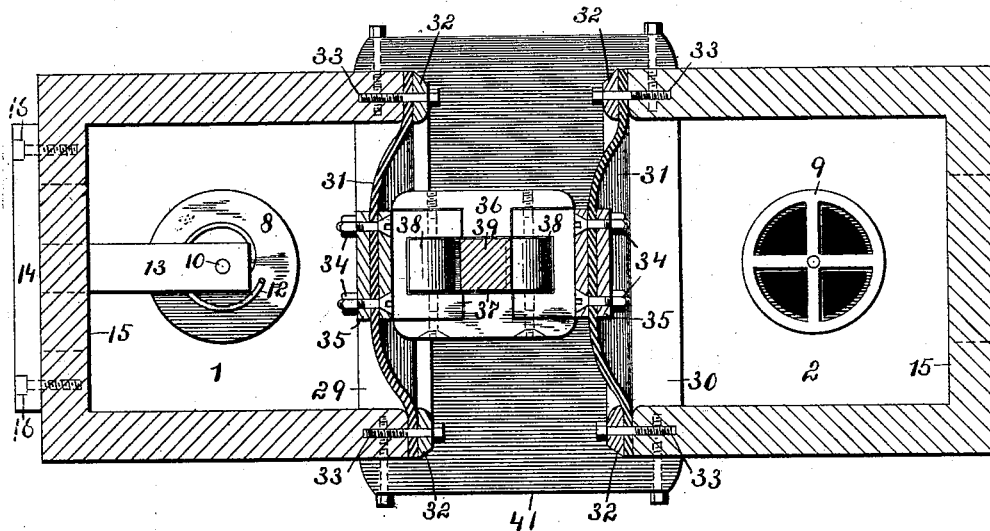
2 Sheets—Sheet 2.

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Fig. II.



Witnesses:

J. G. Fischer
S. H. Knight

Inventor:
Daniel Berridge

By *Knickerbocker*
Attys.

UNITED STATES PATENT OFFICE.

DANIEL BERRIDGE, OF LEADVILLE, COLORADO.

PUMP.

SPECIFICATION forming part of Letters Patent No. 453,925, dated June 9, 1891.

Application filed October 31, 1890. Serial No. 369,896. (No model.)

To all whom it may concern:

Be it known that I, DANIEL BERRIDGE, of Leadville, in the county of Lake and State of Colorado, have invented certain new and useful Improvements in Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in the construction and operation of pumps; and my invention consists in certain features of novelty hereinafter described, and pointed out in the claims.

Figure I represents a longitudinal section of my improved pump. Fig II is a transverse section taken on line II II, Fig. I. Fig. III is an enlarged perspective view of one of the discharge-valves. Fig. IV is an enlarged perspective view of one of the supply-valves.

Referring to the drawings, 1 2 represent two chambers through which the water is forced, each of said chambers being connected at 3 4 with the two branches 5 6 of a supply-pipe 7. 8 represents valves formed of two disks of suitable material, said valves having seats 9 situated near the supply ends of the chambers 1 2.

10 represents pins or valve-stems which pass through openings 11 in the center of the valves, said openings in the valves being large enough to allow the valves to move to and fro on the pins.

12 represents spiral springs on the pins or stems 10, said springs serving to hold the valves against their seats when they are in their normal or closed position. The stems 10 are secured at their outer ends to plates 14, which may be attached to the outer walls 15 of the chambers 1 2 by means of screws 16. Thus by removing the screws the valves may be withdrawn for repair, &c., there being openings 17 in the walls of the chambers to admit of their free passage. Near the discharge ends of the cylinders are valves 18, having openings 19, valve-seats 20, valve-stems 21, and spiral springs 22 on the stems, all constructed and arranged in the same manner as the like parts just described and which are located at the opposite ends of the chambers. The stems 21 are secured to plates 23, said

plates being secured to the walls of the chambers by screws 24. By removing the plates the valves 18 may be withdrawn for repair, &c., there being openings 25 in the walls of the chambers to admit of their passage.

26 represents the discharge-pipe, and 27 a pipe connecting the chambers 1 2 at their discharge ends.

28 represents the air-chamber commonly used in steam-pumps.

29 30 represent oblong openings in the inner walls of the cylinders 1 2, said openings being inclosed by flexible strips or diaphragms 31, which may be constructed of rubber, leather, or other suitable material. The outer edges of the strips 31 are secured to the walls of the chamber surrounding the openings 30 by some suitable means. I have shown the same secured by rigid strips 32 and screws 33, but do not confine myself to this particular form of securing said strips or diaphragms 31.

To the central portion of the flexible strips 31 I secure, by means of bolts 34 or other suitable means, rigid oblong strips 35, which may be made of wood or other suitable material.

Connecting the strips 35 at their center and formed integral therewith is a cross-head 36, having an opening 37 in its center, on each side of which are journaled a pair of anti-friction rollers 38, thus leaving an opening between said rollers.

39 represents a zigzag or Z-shaped piston-rod, one end of which may work in a steam-cylinder, as shown at 40, in order to operate the pump. The Z-shaped portion of the piston-rod operates between the rollers 38 in the cross-head 36, thus giving to the flexible strips 31 a reciprocating motion. (See dotted lines, Fig. I.) The rollers 38 are set in an oblique line on both sides of the piston-rod, so as to conform to the angle of its oblique portion.

41 represents cross-pieces between the opposite ends of the cylinders, in which are journaled guide-rollers 42, which assist in guiding the piston-rod 39 and prevent too much lateral play in the same.

The operation is as follows: When the parts are in the position shown in Figs. I and II, the water is being forced or discharged from the chamber 1 out through the valve 18 and discharge-pipe 26, as shown by arrows. While

the water is being forced out of chamber 1 the water is drawn into chamber 2 through valve 8, the water filling the space left by the outward movement of the diaphragms 31. Then
5 as the Z-shaped piston-rod travels in the opposite direction the diaphragms 31 are forced into the position shown in dotted lines, Fig. I, thus forcing the water out of chamber 2 and drawing in a fresh charge into chamber 1, and
10 so on, one of the chambers discharging at each stroke of the piston-rod, thus keeping up a continuous discharge. The water from chamber 2 passes out through valve 18 through connecting-pipe 27 and out through discharge-
15 pipe 26, as shown by arrows.

By the use of my device I avoid the use of packing in my pump and am enabled to readily remove my valves to repair the same or put in new ones, as the case may require.

20 I claim as my invention—

1. In a pump, the combination, with the chambers 1 2 and the diaphragms 31, of the cross-head connecting said diaphragms together, a piston-rod having an oblique portion, and anti-friction rollers journaled in said
25 cross-head and arranged in an oblique line on

both sides of said oblique portion of the piston-rod, substantially as set forth.

2. In a pump, the combination, with the two chambers 1 2 and the diaphragms 31, of the
30 cross-head connecting said diaphragms together, the cross-pieces 41, and a piston-rod guided by said cross-pieces and having a single oblique portion working in the cross-head, the ends of the rod adjoining said oblique
35 portion being axially arranged, substantially as set forth.

3. In a pump, the combination of the two chambers having diametrically-opposite openings and suitable ingress and egress valves,
40 the diaphragms closing said openings, a cross-head connecting said diaphragms together, a zigzag piston-rod passing through said cross-head, and a pipe 27, connecting the egress ends of the chambers together and passing to
45 one side of the said piston-rod, substantially as set forth.

DANIEL BERRIDGE.

Witnesses:

WILLIAM H. NASH,
R. C. DUSTAN.