(No Model.)

C. H. ROBINSON.

VERTICAL STEAM PUMP.

No. 454,498. Patented June 23, 1891.

FIG. 1.

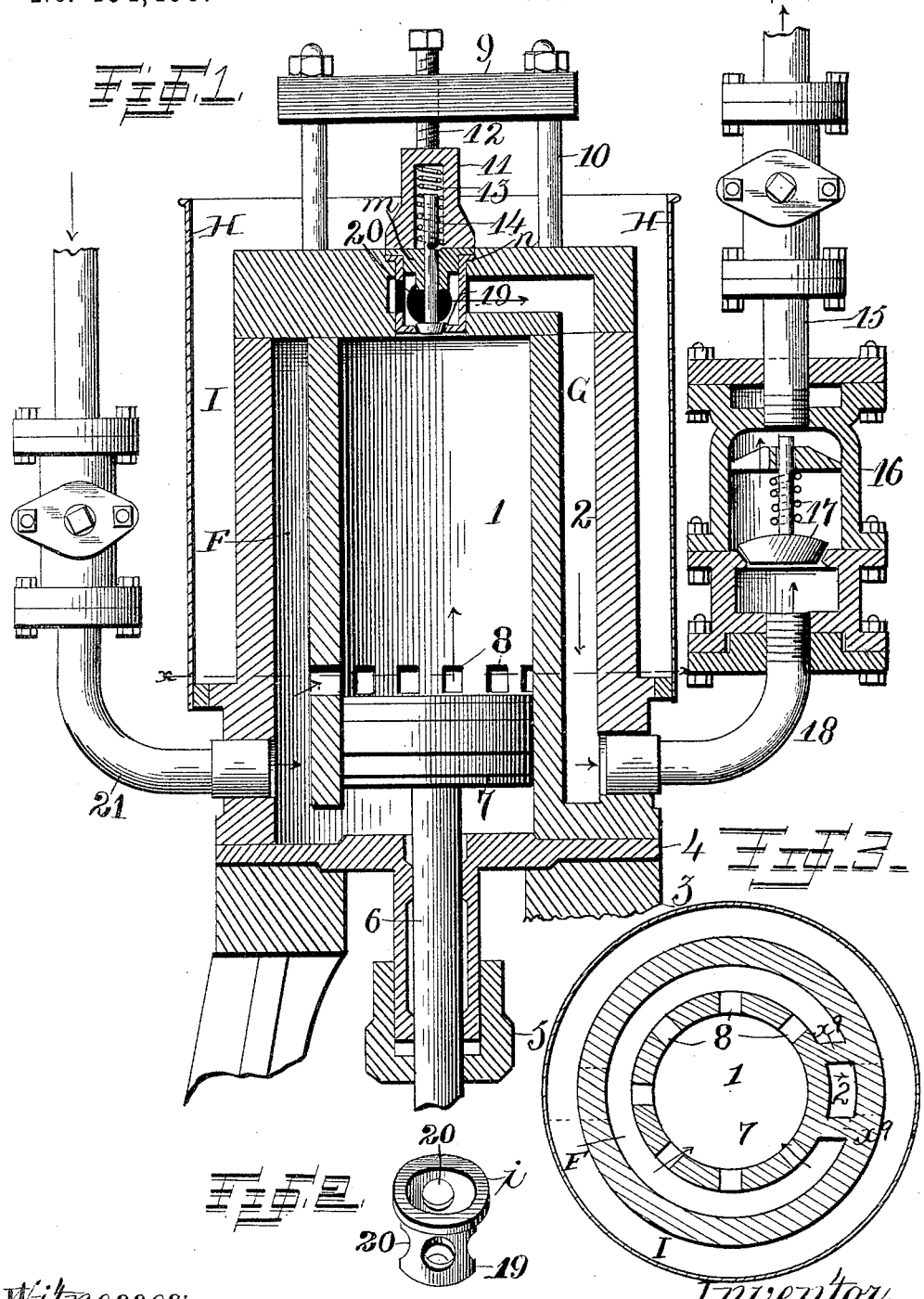

FIG. 3.

FIG. 2.

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CHARLES H. ROBINSON, OF HUNTSVILLE, TEXAS.

VERTICAL STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 454,498, dated June 23, 1891.

Application filed April 19, 1890. Serial No. 348,680. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ROBINSON, of Huntsville, Walker county, State of Texas, have invented certain new and useful Improvements in Steam-Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to steam-pumps which are adapted to compress a liquefiable gas—such as that of ammonia—to a state of partial liquefaction, the pressure being subsequently removed and the liquefied refrigerating agent expanding through tubes and chambers, and the cooling effect produced by the volatile liquid again assuming its gaseous state is utilized for the absorption of heat.

The invention consists in the novel construction, combination, and arrangement of parts, hereinafter set forth, and pointed out in the annexed claim.

In the drawings, Figure 1 is a vertical sectional elevation with parts broken away of a pump embodying my invention, and Fig. 2 is a detail view in perspective of a removable spider or valve-cage made use of. Fig. 3 is a horizontal section on line $x\ x$ of Fig. 1.

The pump-cylinder I has the induction-passage F and the eduction-passage G formed in the walls thereof, the former passage being of the shape of a crescent, the latter being square and separated from the former by the vertical walls x^9, and it will thus be seen that the portion of the cylinder marked 2 will act as a jacket thereof. I also provide a tank or jacket H, encircling said jacket 2, with its upper end open, and water-circulating space 1, located between said third and outer jacket and said jacket 2, which latter may be termed the "intermediate jacket."

3 is supports leading to the motor or steam cylinder, and upon which supports the cylinder I is mounted. Between the cylinder and the supports 3 is located a diaphragm 4, which forms the lower head of said cylinder, its upper side being plain and its opposite side being provided with a dependent stuffing-box, upon which a cap 5 is screwed.

The piston-rod 6 has upon its upper end the piston 7, the body of which is solid or imperforate, being entirely devoid of valves and valve-seats, and the edge of which is provided with the usual packing-rings.

Through the walls of the cylinder I is formed an annular series of elongated openings or ports 8, which are uncovered at each downward stroke of the piston, permitting the fluid to rush into the vacuum formed above the same.

10 represents two or more vertical stay-rods secured to the top of cylinder, to which rods is screwed a horizontal support 9, held in place by nuts.

12 is a clamping-bolt threaded through the support 9 and bearing against a cap 11 for holding same in a secure position upon top of cylinder. Within the cap 11 is placed a coiled spring 13, which bears upon and operates a valve 14.

19 represents a removable spider or valve-cage provided with a valve-seat at its lower end and having side openings 20 and a flange i. This spider is clamped removably between the cylinder and the disk m, which latter is also removable and acts as a guide to the stem of the valve 14, a seat or recess n being formed in the upper cylinder-head for reception of said spider and said disk.

Attached to the discharge-pipe 18, leading from the cylinder, is a check-valve casing 16, and within this casing is a spring-pressed valve 17, which will prevent loss of fluid if the cylinder should be broken by accident or any of its parts, which is not liable to occur, as no valve is used in the piston. 15 is a pipe leading from the check-valve 16 to wherever the fluid is desired to be utilized. It will thus be observed that the cylinder is provided with a series of ports opening into induction-passage F, and that said passage is encircled or inclosed by the walls of the central jacket 2, and this in turn is inclosed by an open-ended passage 1, and, lastly, that this passage is inclosed by the walls of the exterior jacket H, and that the piston is imperforate and entirely devoid of valves and valve-seats, leaving no room for such valves to become disconnected and fall down between the piston and lower head of cylinder and cause a break down of the entire pump. The fluid first enters passage F through induction-pipe 21, and thence to the cylinder by way of the series of

ports 8 and out past valve 14 into passage G and to the check-valve. By this construction of cylinder, ports, and jackets, and induction and eduction passages, and using a solid piston I am enabled to dispense with the use of any sort of valve whatever in the piston.

What I claim is—

In a pump, the cylinder having the outer and the inner walls 1 and 2, with the water-chamber between, as F, extending from end to end and communicating with an induction-pipe at its bottom, and ports, as 8, communicating with the central bore, and with the eduction-passage, as G, also between said walls and separated from the chamber F by partitions, as x^9, communicating with an eduction-pipe near its bottom and having the cap or head removably secured to such cylinder and having a radial passage communicating with the central bore of the cylinder and the upper end of eduction-passage G and having a valve at the inner end of said radial passage and piston within said central bore, all constructed and arranged substantially as and for the purposes set forth and described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. ROBINSON.

Witnesses:
G. A. WYNNE,
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