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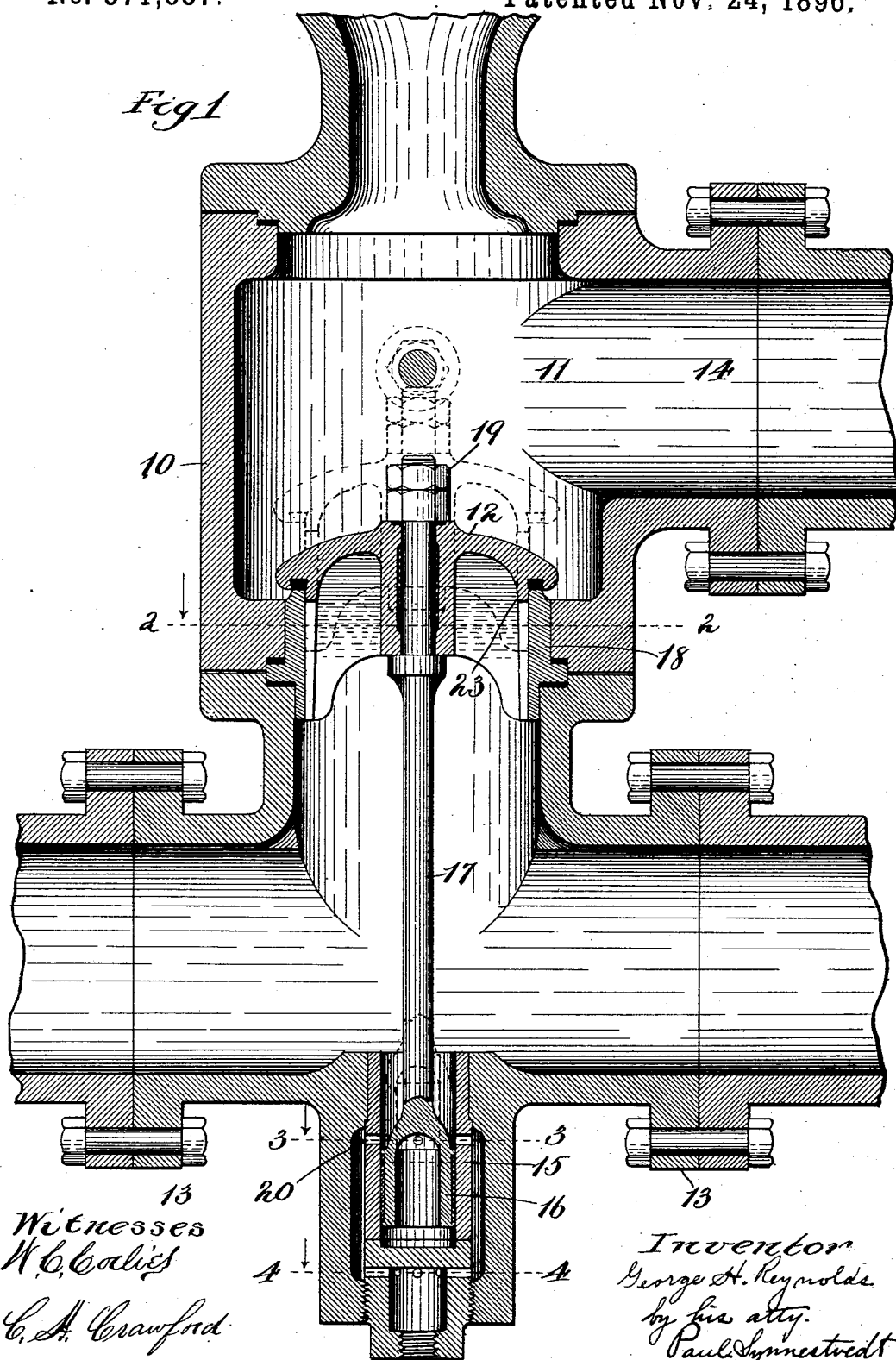
3 Sheets—Sheet 1.

G. H. REYNOLDS.
PUMP CHECK AND RELIEF VALVE.

No. 571,887.

Patented Nov. 24, 1896.

Fig 1



Witnesses
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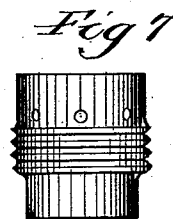
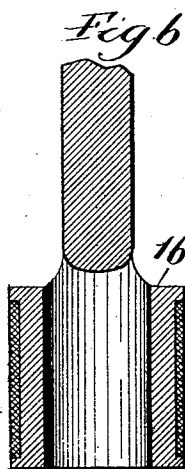
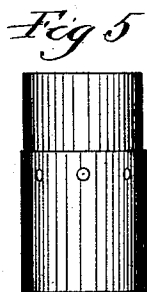
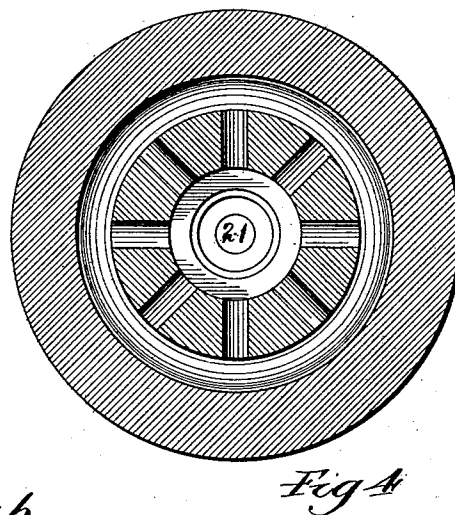
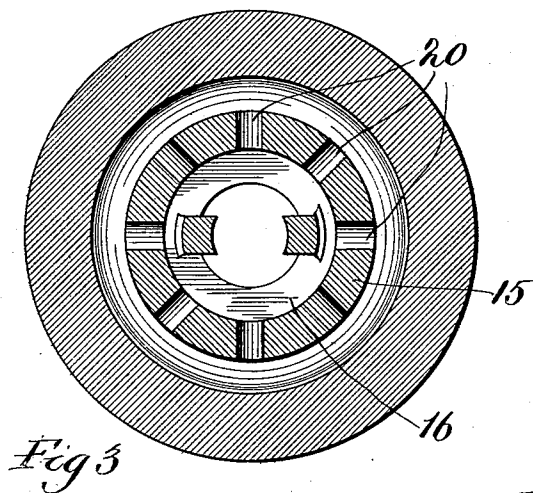
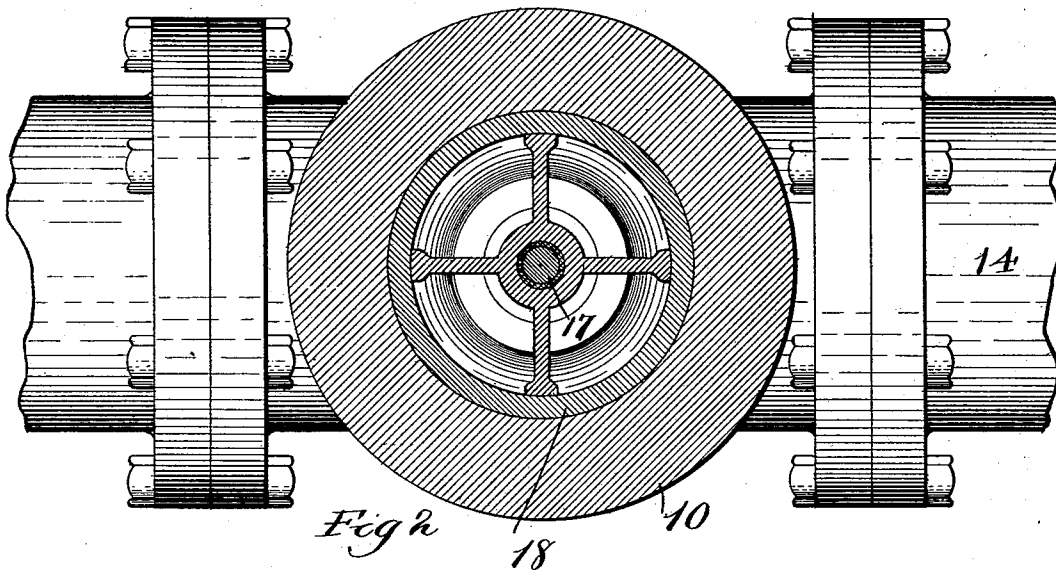
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3 Sheets—Sheet 2.

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No. 571,887.

Patented Nov. 24, 1896.



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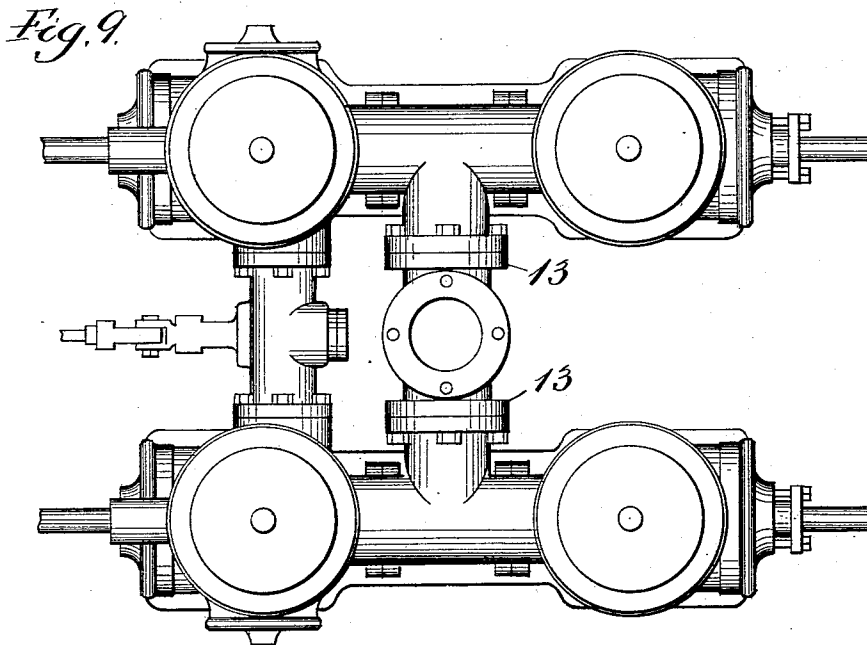
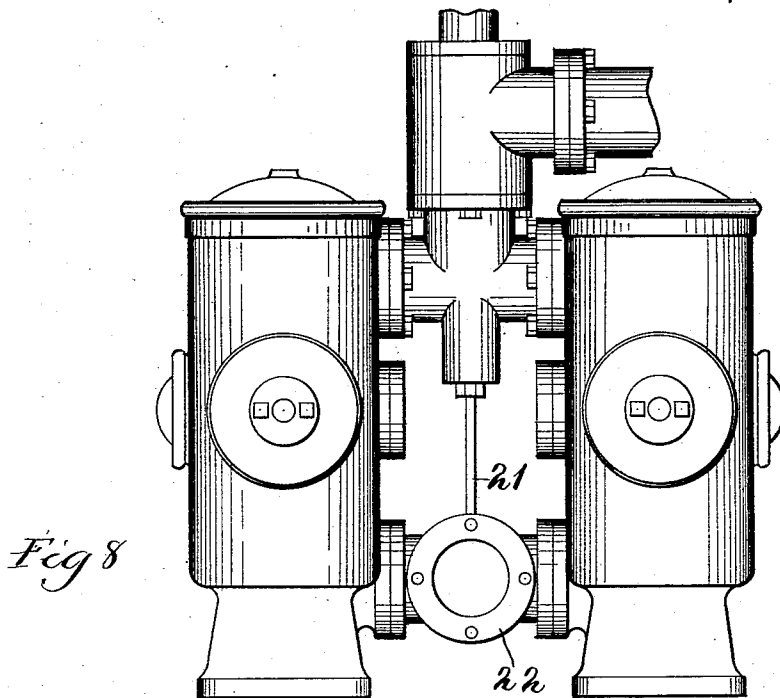
(No Model.)

3 Sheets—Sheet 3.

G. H. REYNOLDS.
PUMP CHECK AND RELIEF VALVE.

No. 571,887.

Patented Nov. 24, 1896.



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UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CRANE ELEVATOR COMPANY, OF SAME PLACE.

PUMP CHECK AND RELIEF VALVE.

SPECIFICATION forming part of Letters Patent No. 571,887, dated November 24, 1896.

Application filed July 24, 1896. Serial No. 600,455. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. REYNOLDS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pump Check and Relief Valves, of which the following, taken in connection with the accompanying drawings, is a specification.

In all classes of pumps, but particularly those operating against very heavy pressures, difficulty is encountered in getting the pump to start readily after it has been stopped. Unless the pressure of the motor fluid is very much in excess of the pressure against which the pump is operating the great resistance of the parts which is encountered in a state of inertia is liable to result in failure to start at all.

Broadly stated, the object of my invention is to overcome the above-mentioned difficulty.

More specifically, the object of my invention is to accomplish the end stated by mechanism simple in construction, positive in its action, and reliable at all times.

To the accomplishment of these and such other objects as may hereinafter appear my invention consists in the provision of a check-valve placed in the discharge-passage from the pump, and in the combination therewith of a relief-valve operated by said check-valve to allow the pressure from the pump-piston to escape when the pump stops and the check-valve seats.

My invention consists, further, in the provision of a check and relief valve of a form adapted to permit of a slow movement of the pump-piston in starting without any opening of the check-valve, and consequently without the necessity of overcoming the resistance of the pressure maintained in the storage-receptacle.

My invention consists, further, in certain details of construction of the before-mentioned check and relief valve, all as will be hereinafter particularly pointed out in the claims and now more specifically described in connection with the accompanying drawings, in which—

Figure 1 is a vertical section illustrating a discharge-passage from a pump provided with

my improved check and relief valve. Fig. 2 is a cross-section of the same on the line 2 2 of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a section on line 4 4 of Fig. 1. Figs. 5, 6, and 7 represent details of the relief-valve. Figs. 8 and 9 are partial views of a pump, showing my device in position.

Referring now more particularly to Fig. 1, it will be seen that I have provided a casing 10, containing a passage-way 11, in which is seated a check-valve 12. The lower half of the casing 10 is provided with flanges 13 as a means of attaching the same to the discharge-openings from a pump-cylinder. In the arrangement shown there are two such flanges, it being designed to be placed in service with a duplex pump. Leading out from above the check-valve is a passage 14, through which the fluid from the pump is discharged.

In the lower end of the casing which contains the check-valve I have provided a cylindrical chamber, formed in a bushing 15, in which operates a cylindrical valve 16, which I shall hereinafter designate as the "relief-valve." The ports 20 controlled by this valve are quite small relative to the opening or passage controlled by the check-valve and may be connected by a suitable pipe 21, so as to discharge directly to a waste or drain or to the suction-pipe 22, leading to the pump, the latter arrangement being preferable, as it avoids waste of water. A connection to the suction-pipe of the pump is illustrated in Figs. 8 and 9, in which the general arrangement of the device in reference to the pump-cylinders is clearly shown.

The check-valve 12 is connected with the relief-valve 16 by means of a stem 17. On the under face of the check-valve a cylindrical projection enters the bushing on which said valve seats for a distance approximately equal to the travel of the valve 16 necessary to the closing of the ports controlled by the latter. The object of this will be more apparent later.

The check-valve 12 is provided with wings to guide it within its bushing 18, and it is secured to the stem 17 by means of the lock-nuts 19; but it is to be understood that this specific construction is not essential to my invention.

The operation of my invention is as follows: When the pump is running, the check-valve and its connected relief-valve occupy the position shown in Fig. 1, in which position it will be noted the relief-valve has closed the ports 20 and shut off all escape of pressure through the pipe connected therewith, and as soon as the pump stops the check-valve settles down onto its seat and carries with it the relief-valve, the ports 20 just beginning to open as the cylindrical projection 23 on the under side of the check-valve enters the bushing on which the latter seats. This permits the pressure which has accumulated in the passage beneath the check-valve to escape, or be relieved, through the ports 20, the check-valve holding back the heavy pressure on its upper side.

When the pump is started, there is practically no accumulated pressure on the discharge side of the pump-pistons because of the ports 20 being open, and when the stroke of the pump becomes too rapid to allow the fluid to escape through the ports 20 the check-valve will begin to rise, the cylindrical projection on its under side passing out of the bushing just at the time the relief-valve 16 closes the ports 20. By this time the pump-piston has attained sufficient velocity to continue to operate against the high pressure above the check-valve.

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

1. The combination with a discharge-passage from a pump and a check-valve seated therein, of a relief-passage of small capacity relative to said discharge-passage and a relief-valve in said relief-passage operated by said check-valve, substantially as described.

2. The combination with a discharge-pas-

sage from a pump and a check-valve seated therein of a relief-passage of small capacity relative to said discharge-passage, and a relief-valve connected to said check-valve, substantially as described.

3. The combination with a discharge-passage from a pump and a check-valve seated therein; of a passage of small capacity relative to said discharge-passage for relieving pressure in said first-named passage, and a valve controlling the latter adapted to be operated by said check-valve, substantially as described.

4. The combination with a discharge-passage from a pump and a check-valve seated therein of a relief-passage from said discharge-passage; of small capacity relative to said discharge-passage, said relief-passage being controlled by a valve connected to said check-valve, substantially as described.

5. The combination with a discharge-passage from a pump of a check-valve seated therein having a cylindrical projection extending below its seat, ports for relieving excess of pressure from said discharge-passages and a relief-valve controlling said ports, operated by said check-valve, substantially as described.

6. The combination with a discharge-passage from a pump, and a check-valve 12 seated therein, of a relief-port 20 from said discharge-passage; said relief-port being of small capacity relative to said discharge-passage a relief-valve 16 for controlling said port and a stem 17 connecting said relief-valve to said check-valve, substantially as shown and for the purpose specified.

GEO. H. REYNOLDS.

Witnesses:

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