

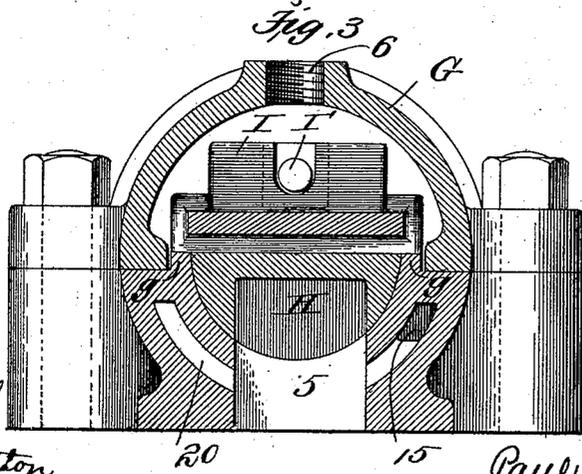
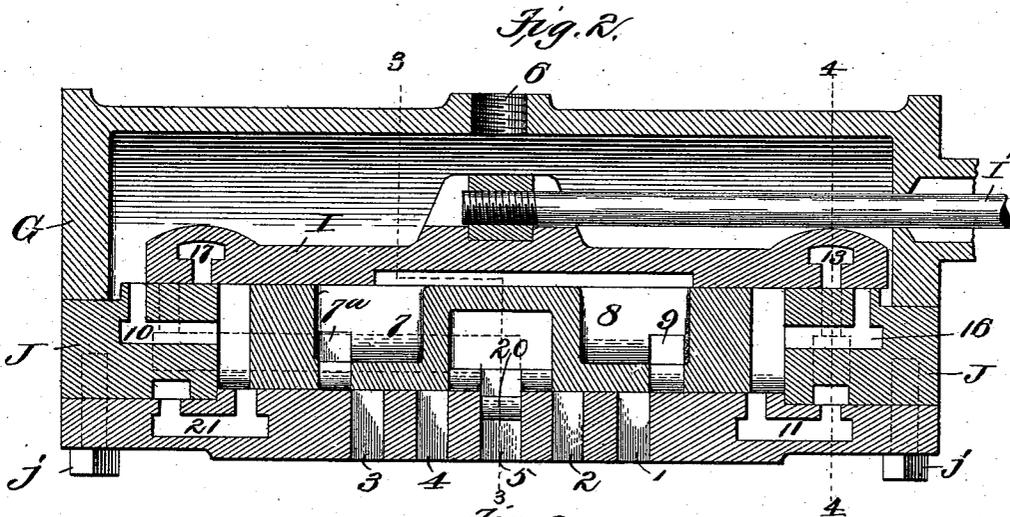
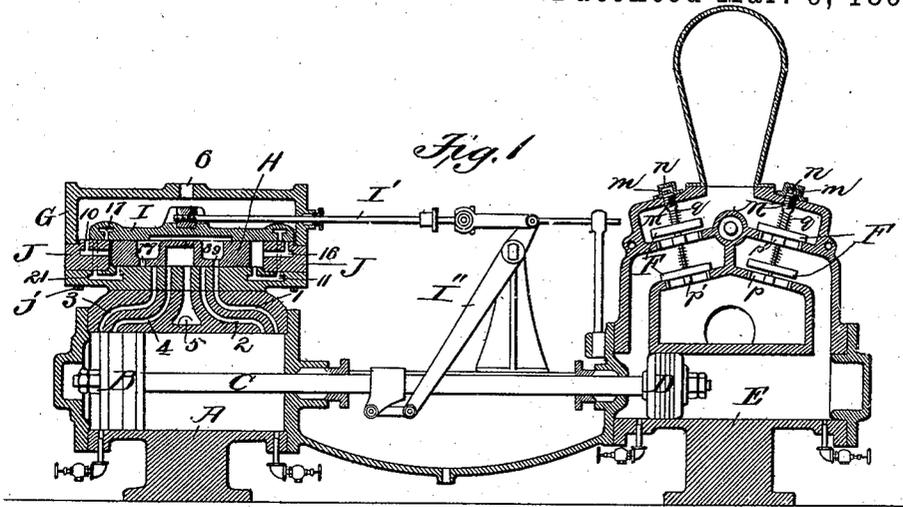
(No Model.)

3 Sheets—Sheet 1.

W. W. COREY, Jr.
STEAM PUMP.

No. 578,317.

Patented Mar. 9, 1897.



Witnesses:
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(No Model.)

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Fig. 4.

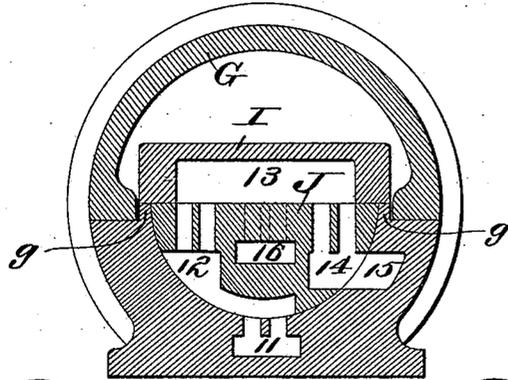


Fig. 5.

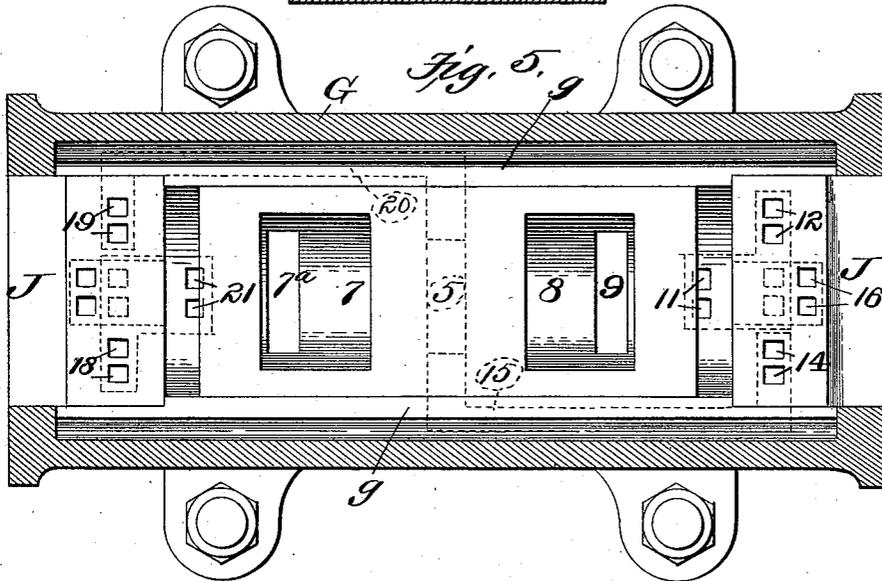
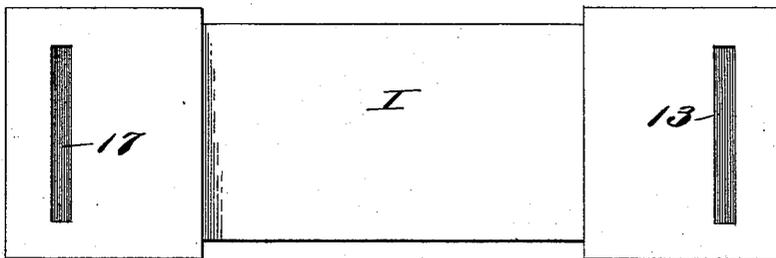


Fig. 6.



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Fig. 7

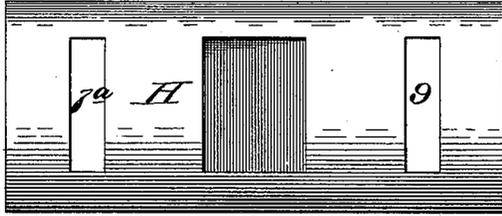


Fig. 8.

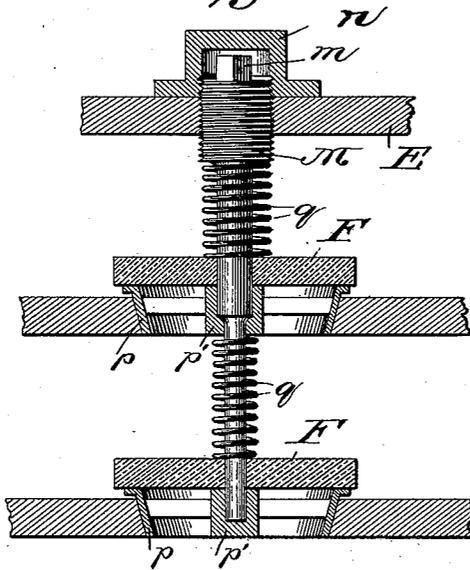
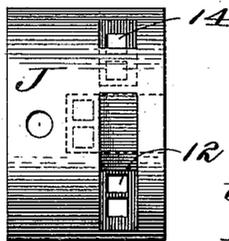


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM W. COREY, JR., OF ST. LOUIS, MISSOURI.

STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 578,317, dated March 9, 1897.

Application filed October 26, 1896. Serial No. 610,089. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. COREY, Jr., a citizen of the United States, residing at the city of St. Louis, State of Missouri, have
5 invented a certain new and useful Improvement in Steam-Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification,
10 wherein—

Figure 1 is a longitudinal sectional view of a steam-pump embodying my invention. Fig. 2 is a longitudinal sectional view of the steam-chest. Fig. 3 is a cross-sectional view through
15 the steam-chest on line 3 3, Fig. 2. Fig. 4 is a cross-sectional view through the steam-chest on line 4 4, Fig. 2. Fig. 5 is a horizontal sectional view through the steam-chest, the mechanically-operated slide-valve being
20 removed. Fig. 6 is a bottom plan view of the mechanically-operated slide-valve. Fig. 7 is a bottom plan view of the steam-thrown valve. Fig. 8 is an enlarged view showing the valves and valve-stem of the water side of the pump.
25 Fig. 9 is a bottom plan view of one of the plugs.

This invention relates to a new and useful improvement in steam-pumps; and it consists, generally stated, in the construction of the
30 steam-thrown valve, which is semicircular in cross-section; the construction of the mechanically-operated slide-valve; the combination of the steam-chest, steam-thrown valve, and mechanically-operated slide-valve, all of
35 which parts having cooperating ports, whereby the piston in the cylinder is caused to reciprocate by a preponderance of pressure being alternately admitted to the two ends thereof, while the mechanically-operated slide-valve controls the admission and exhaust of
40 the steam at the ends of the steam-thrown valve.

Other features of invention reside in the construction, arrangement, and combination of the several parts, all as will hereinafter be
45 described, and afterward pointed out in the claims.

In the drawings, A indicates a cylinder; B, the piston; C, the piston-rod, on the other end of which is arranged a plunger D, operating
50 in the pump-cylinder E.

F indicates valves in the water side of the pump, which are of the usual arrangement

to control the suction and discharge of the water.

The steam-cylinder A is shown in the drawings as having separate inlet and exhaust
55 ports at its ends, whereby the piston is cushioned. This, however, is unimportant, as it is obvious that a single port could be used for the inlet and exhaust.

G indicates a steam-chest which is bolted or otherwise secured to the cylinder A. This
60 steam-chest has port-openings in its bottom which register with the ports in the cylinder A, the port-openings in the steam-chest terminating at the semicircular valve-seat.

H indicates a steam-thrown valve which is semicircular in cross-section, its upper face
65 being flat and on a plane with a rib *g*, extending upwardly alongside of the valve-seat. The object of this rib is that should the valve become worn in its use, the upper half of
70 the steam-chest could be removed, the valve ground into its seat, so as to make a tight joint, and the rib and valve planed off together to the same plane. In this manner it is possible
75 to take up the wear of the valve at the expense of very little labor and time. These ribs could be dispensed with and the valve and casing planed off together without departing
80 from the spirit of my invention.

I indicates a mechanically-operated slide-valve which is arranged to operate upon the
85 upper faces of the ribs *g* and the valve H, the central portion of said slide-valve being reduced or formed as a bridge, whereby the steam, being admitted into the steam-chest above said valve, will have easy access on top
90 of the valve H.

J indicates two plugs inserted in the ends
95 of the steam-chest and secured in position by suitable bolts *j*. These plugs are preferably semicircular in cross-section and of larger diameter than the valve H, so that when said
100 valve is being ground in its seat its ends may extend beyond the shoulder, against which the plugs J abut, thereby enabling the valve H to grind an even seat the entire length of its stroke. These plugs J, at their inner ends, are on the same plane as the ribs *g* and the
upper face of the valve H and support, or help to support, the ends of the slide-valve I, which valve I always closes the space between the plugs and the ends of the valve H. When

the ribs *g* are being planed flush with the upper face of the valve H, these plugs are placed in position and planed with the ribs and valve, so as to make an even surface for the valve I.

5 Valve I is arranged on the end of a rod I', which is operated in any suitable manner from the piston-rod B, but preferably by means of a lever I'', so that when the piston B is at the inner end of its cylinder the valve
10 I will be thrown to the outer end of the steam-chest.

The port arrangements are as follows:

1 and 2 indicate inlet and exhaust ports, respectively, leading from the bottom of the
15 seat of valve H to the inner end of cylinder A, and 3 and 4 indicate inlet and exhaust ports, respectively, leading from the bottom of the seat of the valve H to the outer end of cylinder A.

20 5 indicates an exhaust-passage leading from the middle of the seat of valve H to any suitable point.

Steam is admitted into the upper part of the steam-chest through openings 6. Assuming that the parts are in the position shown in Fig. 1, the steam in the steam-chest will pass beneath the slide-valve I and into chambers 7 and 8 of the steam-thrown valve. From chamber 8 it passes through an opening which registers with the inlet-port 1 and passes down to the inner end of cylinder A.
30 In this view the slide-valve I has just been moved to the inner end of the chest, which opens a port 10, establishing communication between the steam-chest and the space at the left-hand side of the slide-valve, which tends to force said valve to the right.

The space at the right-hand side of the valve H is exhausted through a port 11, opening into the bottom of the valve-seat a little distance within the plug J, which port communicates with a port 12 in the bottom of plug J, which terminates at the upper face of said plug. The slide-valve being moved
40 to the right, as shown, will register a cross-port 13 in its end with the port 12 and with a port 14, also opening into the top of the plug, which port 14 is connected to a passage 15, extending along the side of the steam-chest and connected to the exhaust-port 5, as shown by dotted lines in Fig. 5. When the valve H is thrown from its position to the left, as shown in Fig. 1, to its position to the right, its opening 9 will pass beyond the inlet-port 1, and
55 an opening 7^a, leading from chamber 7, will register with inlet-port 3. The exhaust-port 4 will now be closed and the exhaust-port 2 will be opened and in communication with the exhaust 5. When the piston reaches the
60 inner end of the cylinder, the slide-valve will be moved from its position shown in Fig. 1 to the left, which will close port 10 and ports 12 and 14, opening port 16, which corresponds with port 10, the cross-port 17, corresponding
65 with cross-port 13, connecting ports 18 and 19, corresponding with ports 12 and 14, which permits the exhaust of the left-hand end of

the valve H through the medium of the passage 20, which corresponds to the passage 15. Port 21, connecting the end of the valve-chamber with the port 18, corresponds with
70 the port 11.

From the above description it will be seen that the construction is such that the valve will last a long time, being capable of re-
75 grinding constantly without detracting from its efficiency. The slide-valve controls the position of the fluid-thrown valve, which in turn controls the admission and exhaust of the motive fluid to and from the cylinder con-
80 taining the pump-driving piston.

In Fig. 8 I have shown an approved form of a removable valve-stem for the valves on the water side of the pump. Heretofore great
85 trouble has been experienced in the removal of this style of valve-stem in order to replace valves or valve-seats. I have devised a valve-stem which is threaded at its outer end, so as to engage the pump-casing, the inner end of the valve-stem extending down and engaging
90 the hub of the valve-seats, which are in line with each other. A square shank is arranged on the outer end of the valve-stem, by which it may be turned out, as is obvious. A cap
95 is introduced on the external threaded portion of the stem, which not only serves to make a water-tight joint, but also acts as a jamb-nut.

M indicates the valve-stem; *m*, the squared shank on its end; *n*, the cap; F, the valve;
100 *p*, the valve-seat; *p'*, the hub of the valve-seat, and *q* the springs for holding the valves to their seats.

I am aware that many minor changes in the construction, arrangement, and combi-
105 nation of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of the invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination with a steam-chest formed with a concaved valve-seat, of a semi-
115 circular fluid-thrown valve arranged therein, and a mechanically-operated slide-valve which engages the flat face of the fluid-thrown valve; substantially as described.

2. The combination with a steam-chest, of
120 a fluid-thrown valve which is semicircular in cross-section, plugs in the steam-chest for limiting the movement of said valve, and a slide-valve which is mounted upon the flat faces of the fluid-thrown valve and plugs;
125 substantially as described.

3. The combination with a steam-chest formed with a concaved valve-seat, of a fluid-thrown valve arranged in said seat, one face
130 of which is flat, and a slide-valve which is arranged upon said flat face of the fluid-thrown valve, whereby, should the fluid-thrown valve be worn, it can be ground into its seat, and the casing and valve planed off.

to be flush with each other; substantially as described.

4. The combination with a fluid-thrown valve having three chambers, two of which are constantly open to the live motive fluid, and the other to the exhaust, of a slide-valve for controlling the admission and exhaust of the motive fluid to and from the ends of said fluid - thrown valve; substantially as described.

5. The combination with a semicircular fluid-thrown valve which is formed with three chambers, two of which are constantly open to the live motive fluid, and the other to the exhaust, of a slide-valve operating above the fluid-thrown valve, the ends of said slide-valve resting upon the ends of the fluid-thrown valve and its casing, so as to form closed chambers at the ends of the fluid-thrown valve; substantially as described.

6. The combination with a fluid-thrown valve, of a steam-chest in which said valve is mounted, ports 11 and 21, in said steam-chest which lead from the ends of the fluid-thrown valve chamber, ports 15 and 20 which lead into the exhaust, plugs J, ports 12 and 14, and 18 and 19, in said plugs, ports 10 and 16 in the plugs for admitting live motive fluid to the ends of the fluid-thrown valve, and a slide-valve having ports 13 and 17 for cooperating with the ports 12 and 14, and 18 and 19 respectively, said slide-valve also cooperating

with the inlet-ports 10 and 16; substantially as described.

7. The combination with a steam-chest, of a semicircular fluid-thrown valve arranged therein, said valve being provided with three chambers, two of which are constantly open to the live motive fluid, and the other to the exhaust, of a slide-valve provided with cross-ports in its ends which cooperate with suitable ports to control the exhaust from the ends of the fluid-thrown-valve chamber, and inlet-ports which open into the steam-chest and to the ends of the fluid-thrown-valve chamber, which inlet-ports are also controlled by the slide-valve; substantially as described.

8. The combination with a steam-chest formed with a concaved valve-seat, of ribs extending along the side edges of said valve-seat, a fluid-thrown valve arranged in said seat, one face of which is flat and flush with said ribs, and a mechanically-operated valve cooperating with the flat face of said fluid-thrown valve, and with the upper faces of the ribs at the ends of the chest, substantially as described.

In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 23d day of October, 1896.

WILLIAM W. COREY, JR.

Witnesses:

F. R. CORNWALL,
HUGH K. WAGNER.