

No. 679,042.

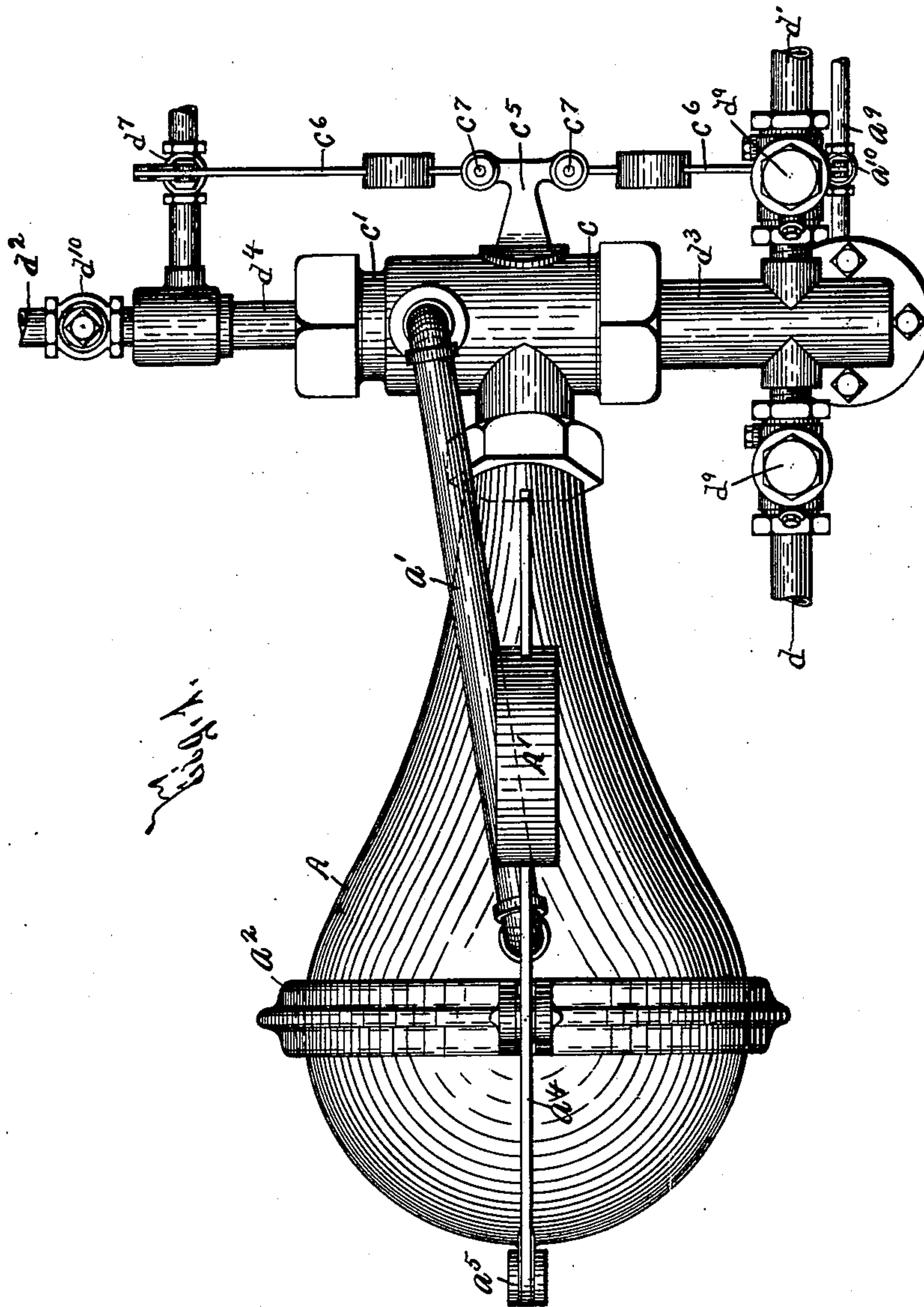
Patented July 23, 1901.

**E. P. WAGGONER.**  
**DISCHARGING APPARATUS.**

(Application filed Apr. 13, 1900.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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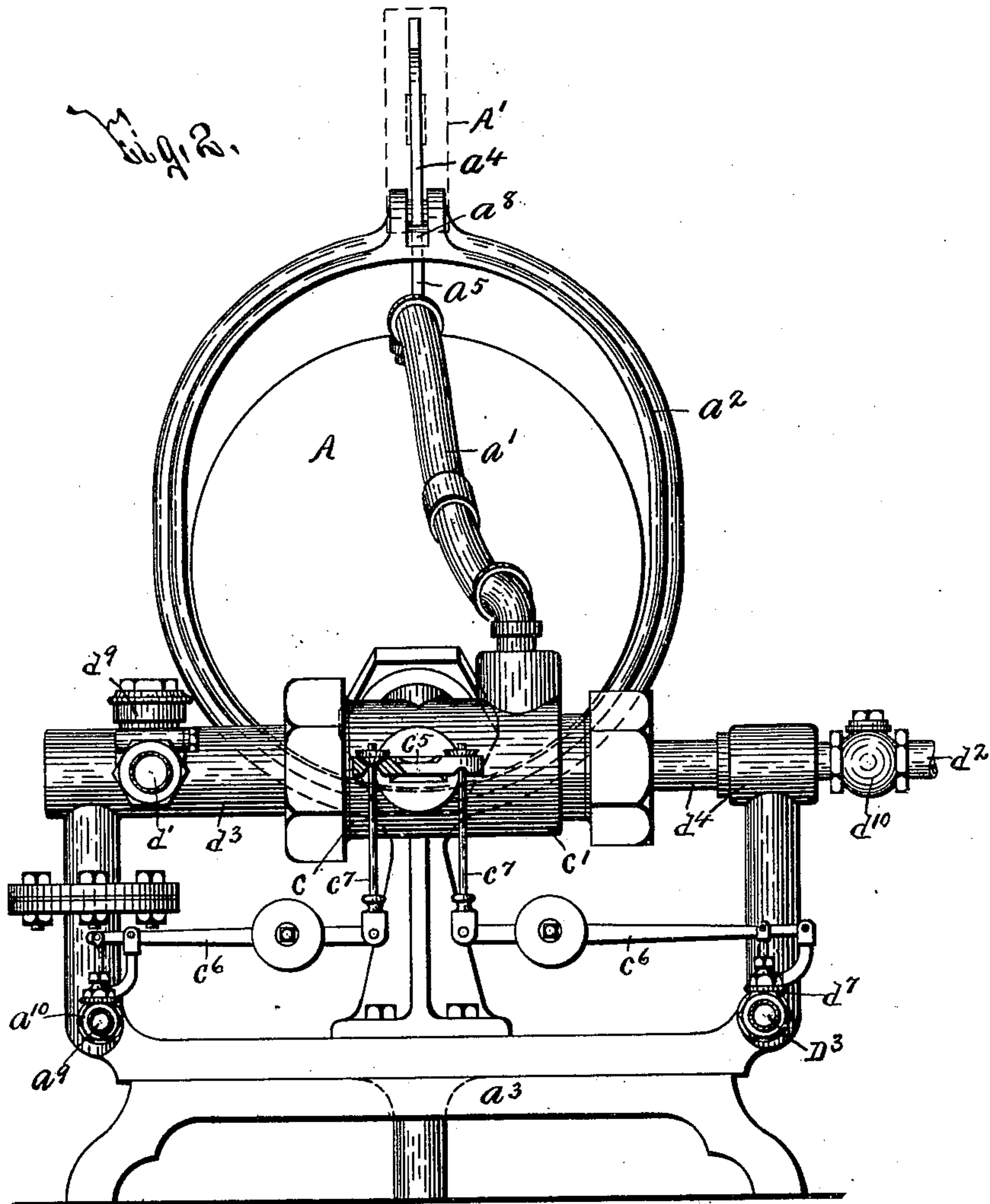
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4 Sheets—Sheet 2.



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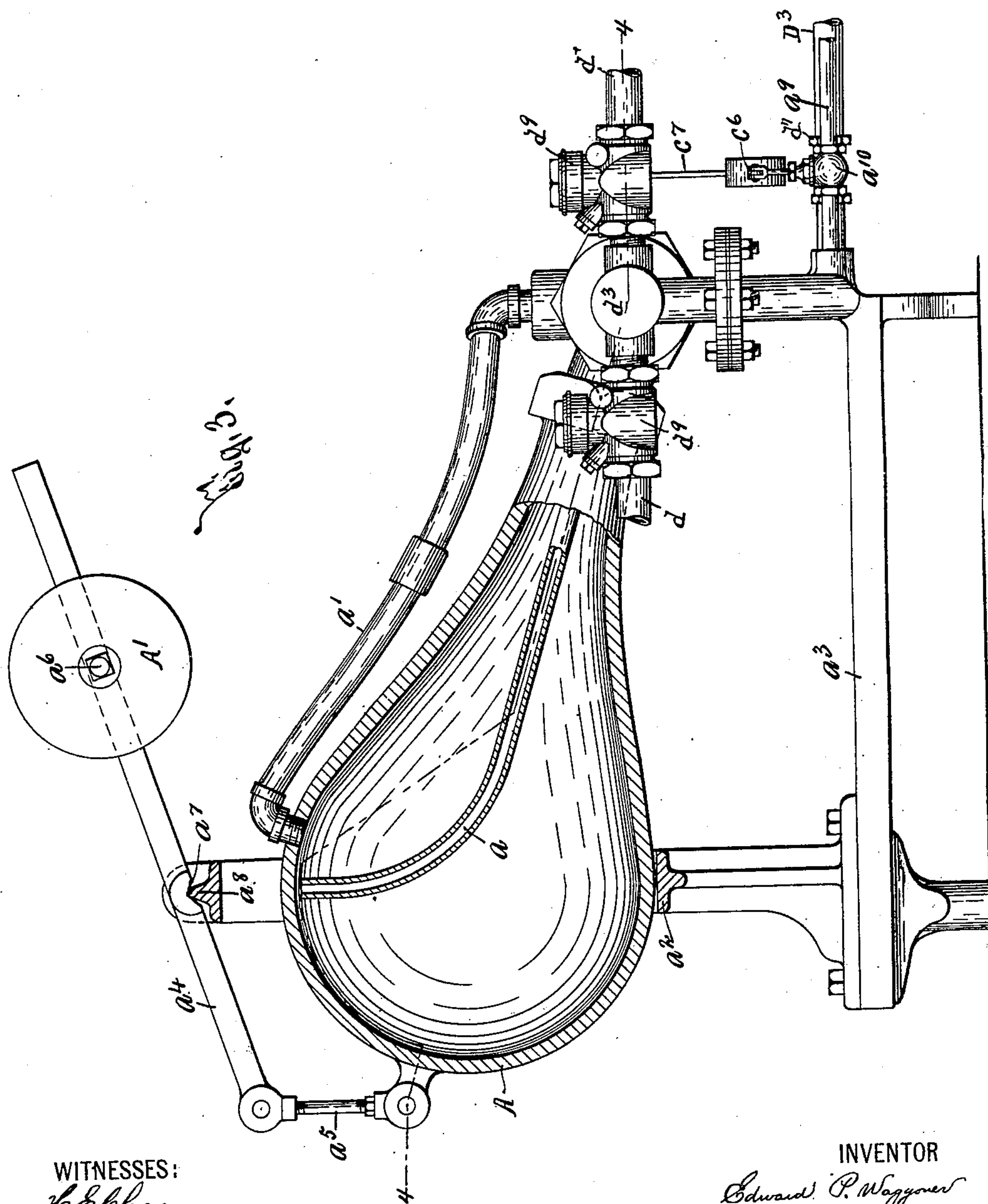
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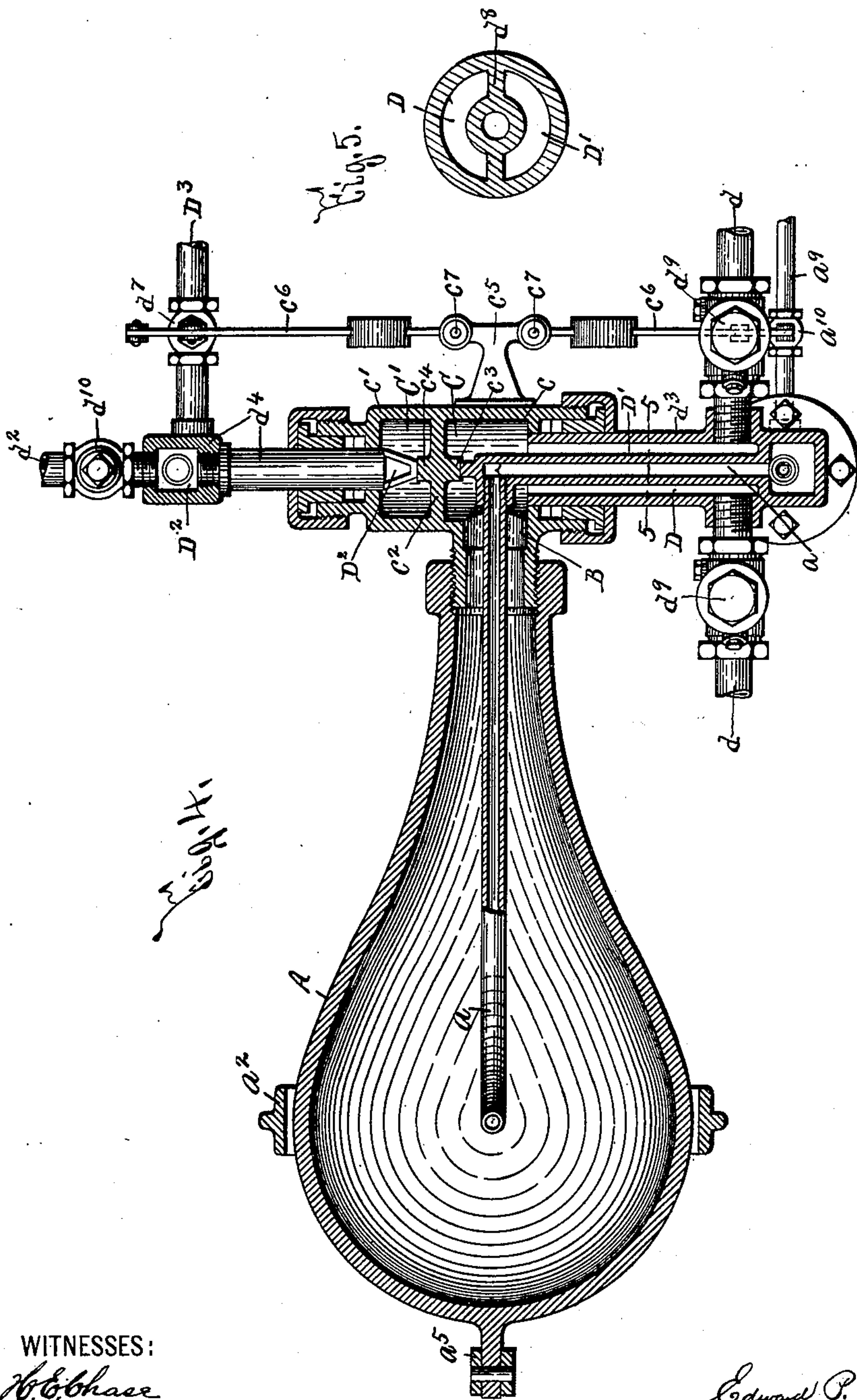
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(No Model.)

4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

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## DISCHARGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 679,042, dated July 23, 1901.

Application filed April 13, 1900. Serial No. 12,678. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. WAGGONER, of Syracuse, in the county of Onondaga, in the State of New York, have invented certain  
5 new and useful Improvements in Discharging Apparatus, of which the following is a specification.

My invention relates to automatic discharging apparatus especially applicable for freeing  
10 steam-pipes from the water of condensation and returning such water to a steam-boiler; and it consists in certain novel combinations of parts and in novel features of construction, as hereinafter set forth.

15 In the accompanying drawings, Figures 1 and 2 are respectively top plan and front elevation, partly in section, of my discharging apparatus, the weight being indicated by dotted lines in Fig. 2. Fig. 3 is a side elevation,  
20 partly in section, of said apparatus. Fig. 4 is a horizontal sectional view taken on line 4 4, Fig. 3. Fig. 5 is a detail sectional view taken on line 5 5, Fig. 4.

My automatic discharging apparatus preferably comprises a movable reservoir A, a pair  
25 of conduits  $a$   $a'$ , respectively communicating directly with the reservoir A for respectively exhausting air from the reservoir and admitting steam thereto, and means for conducting  
30 water to and from the reservoir and for supplying steam to one of said conduits and thereby discharging water from the reservoir independently of the other conduit.

As usually constructed the reservoir A is  
35 formed with an enlarged rear end which is connected to a weight  $A'$  and rocks vertically in a yoke  $a^2$ , rising from a suitable base  $a^3$ . The connections between the rear end of the reservoir A and the weight  $A'$  generally consist of a lever  $a^4$  and a link  $a^5$ . Said lever  $a^4$   
40 is arranged above the reservoir A in a plane substantially parallel therewith and is suitably secured at its front end to said weight  $A'$  by any desirable fastening means  $a^6$ . The intermediate portion of the lever  $a^4$  is formed  
45 with a cut-out  $a^7$ , which receives an upwardly-extending pivotal projection  $a^8$ , provided upon the upper end of the yoke  $a^2$ . Said link  $a^5$  is pivoted at its opposite ends to a lug projecting rearwardly from the reservoir A and  
50 to the rear end of the lever  $a^4$ .

The means just described for supporting the lever  $a^4$  and connecting the same to the reservoir A forms no part of my present invention, and it will be understood that any  
55 suitable means may be used for this purpose.

The conduit  $a$  is stationary, extends longitudinally through the support  $d^3$  and the trunnion  $c$ , presently described, and laterally  
60 through a water-passage B, also presently described, into the reservoir A, and is formed with an open inner end terminating near the top of the rear end of the reservoir when said rear end is depressed, as seen in Fig. 3. Said  
65 conduit  $a$  serves to exhaust the air from the reservoir A when being filled with the water of condensation and is suitably connected to a branch conduit  $a^9$ , which is provided with a valve  $a^{10}$  for controlling the flow through  
70 the conduit  $a$ . The conduit  $a'$  is arranged outside of the reservoir A, is movable with said reservoir, and is formed with downturned ends connected, respectively, to the reservoir A and the inner chamber  $C'$  of the trunnion  
75  $c'$ , presently described.

The means for conducting the water of condensation to and from the reservoir A preferably consists of the conduit  $a'$ , the water-passage B, chambers C C', passages D D' D<sup>2</sup>, and conduits  $d$   $d'$   $d^2$ . Said water-passage  
80 B is of considerably greater diameter than the conduit  $a$ , passed therethrough, as previously described, and communicates with the smaller or front end of the reservoir A. The chambers C C' are arranged in front of the  
85 reservoir A within trunnions  $cc'$ , forming pivotal means for the reservoir A. Said chambers C C' are respectively connected to the passages D D' and to the passage D<sup>2</sup> and the conduit  $a$  and are separated by a partition  
90  $c^2$ , provided with thrust-bearing faces  $c^3$   $c^4$  on opposite sides thereof within said chambers. The trunnions  $c$   $c'$  extend in opposite directions in a plane at substantially right angles  
95 with the lengthwise plane of the reservoir A and are formed with openings in their outer ends, which receive the adjacent ends of suitable stationary supports  $d^3$   $d^4$ , having their adjacent end faces engaged with the thrust-bearing faces  $c^3$   $c^4$ . The adjacent ends of  
100 said trunnions are provided with a forwardly-extending arm  $c^5$ , suitably connected to the



valve  $a^{10}$ , and to a second valve  $d^7$ , presently described. As here illustrated, the connections between said arm and valves consist of pivoted levers  $c^6$ , arranged substantially parallel with the trunnions  $c c'$  and having their outer ends connected to the valve-pieces or movable members of the valves  $a^{10} d^7$  and their inner ends weighted and connected by links  $c^7$  to the arm  $c^5$ . When the arm  $c^5$  is rocked upwardly, the weighted ends of the levers  $c^6$  are elevated and the opposite ends of said levers are depressed for closing the valve  $a^{10}$  and opening the valve  $d^7$ , and when the arm  $c^5$  is reversely moved the weighted ends of the levers  $c^6$  descend, thus opening the valve  $a^{10}$  and simultaneously closing the valve  $d^7$ .

The passages  $D D'$  extend longitudinally through the support  $d^3$  and are usually separated by a partition  $d^8$ , Fig. 5, although they may be connected together at their adjacent sides and consist of opposite portions of the same passage or opening. Said passages are connected, respectively, to the conduits  $d d'$ , which form water inlets and outlets for conducting the water of condensation to and from said passages and are provided with check-valves  $d^9$  for preventing reverse movement of the water therethrough. The passage  $D^2$  extends longitudinally through the support  $d^4$  and communicates with the chamber  $C'$  and with the conduit  $d^2$ , which forms a water-inlet for conducting the water of condensation to said passage and is provided with a suitable check-valve  $d^{10}$  for preventing return movement of the water. In the construction of my discharging apparatus just described the water of condensation is conducted to said apparatus by both of the pipes  $d d^2$ ; but it will be obvious to those skilled in the art that either of said pipes may be omitted or provided with a valve for shutting off the flow of water therethrough during the passage of water through the other of said pipes.

The means for supplying steam to the conduit  $a'$  usually consists of the chamber  $C'$ , the passage  $D^2$ , and a steam-inlet pipe  $D^3$ , provided with the valve  $d^7$ , previously mentioned.

In the operation of my invention the water of condensation flows into the reservoir  $A$  from the pipes  $d d^2$  through the supports  $d^3 d^4$  to the chambers  $C C'$  and thence to the water-passage  $B$  and the conduit  $a'$ . During the entrance of the water within the reservoir  $A$  the air escapes through the conduit  $a$  and the branch conduit  $a^9$ , the valve  $a^{10}$  being open. When the reservoir is filled, the weight of the water therein overbalances the weight  $A'$  and the free end of said reservoir descends, thus closing the valve  $a^{10}$  and opening the valve  $d^7$ . Steam then passes from the inlet-pipe  $D^3$  through the passage  $D^2$ , the chamber  $C'$ , and the conduit  $a'$  to the interior of the reservoir  $A$  and forces the water from said reservoir  $A$  through the passage  $B$ , chamber  $C$ , passage  $D'$ , and pipe  $d'$ .

The construction and operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be particularly noted that more or less change may be made in the arrangement and construction of the component parts thereof without departing from the spirit of my invention.

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

1. An automatic discharging apparatus comprising a movable reservoir, a pair of conduits respectively communicating directly with the reservoir for respectively exhausting air from the reservoir and admitting steam thereto, means for conducting water to and from the reservoir and for supplying steam to one of said conduits independently of the other conduit and thereby discharging water from the reservoir, and valves actuated by the reservoir for controlling the flow through said conduits, substantially as and for the purpose described.

2. An automatic discharging apparatus comprising a rocking reservoir, inner and outer conduits respectively communicating directly with the reservoir for respectively exhausting air from the reservoir and admitting steam thereto, means for conducting water to and from the reservoir, and for supplying steam to one of said conduits independently of the other conduit and thereby discharging water from the reservoir, and valves actuated by the reservoir for controlling the flow through said conduits, substantially as and for the purpose specified.

3. An automatic discharging apparatus comprising a rocking reservoir, a pair of conduits extending lengthwise of the reservoir and respectively communicating directly therewith for respectively exhausting air from the reservoir and admitting steam thereto, means for conducting water to and from the reservoir and for supplying steam to one of said conduits independently of the other conduit and thereby discharging water from the reservoir, and valves actuated by the reservoir for controlling the flow through said conduits, substantially as and for the purpose set forth.

4. An automatic discharging apparatus comprising a movable reservoir, a stationary conduit communicating directly with a reservoir for exhausting air therefrom, and means for conducting water to and from the reservoir and for supplying steam to said reservoir independently of the stationary conduit and thereby discharging water from the reservoir, substantially as and for the purpose described.

5. An automatic discharging apparatus comprising a rocking reservoir, a stationary conduit projecting into the reservoir, and means for conducting water to and from the reservoir and for supplying steam to said reservoir independently of the stationary con-



duit and thereby discharging water from the reservoir, substantially as and for the purpose specified.

6. An automatic discharging apparatus comprising a rocking reservoir, a stationary conduit communicating directly with the reservoir for exhausting air therefrom, a second conduit movable with the reservoir for conducting water thereto, and means for supplying steam to one of said conduits independently of the other conduit and thereby discharging water from the reservoir, substantially as and for the purpose set forth.

7. An automatic discharging apparatus comprising a rocking reservoir, inner and outer conduits extending lengthwise of the reservoir and communicating therewith, the inner conduit being stationary and the outer conduit being movable with the reservoir, and means for conducting water to and from the reservoir and for supplying steam to the outer conduit and thereby discharging water from the reservoir, substantially as and for the purpose set forth.

8. An automatic discharging apparatus comprising a rocking reservoir, a stationary conduit communicating directly with the reservoir, means for conducting water to and from the reservoir and for supplying steam to said reservoir independently of the stationary conduit, and a valve actuated by the reservoir for controlling the flow through said conduit, substantially as and for the purpose specified.

9. An automatic discharging apparatus comprising a rocking reservoir, inner and outer conduits communicating directly with the reservoir, the inner conduit being stationary and the outer conduit being movable with the reservoir, means for conducting water to and from the reservoir and for supplying steam to one of said conduits independently of the other conduit, and valves actuated by the reservoir for controlling the flow through the conduits, substantially as and for the purpose described.

10. An automatic discharging apparatus comprising a rocking reservoir, a water-passage communicating with the reservoir, a conduit extending through said passage and communicating with the reservoir for withdrawing air therefrom, and means for conducting water to the water-passage and for discharging water from the reservoir independently of said conduit, substantially as and for the purpose specified.

11. An automatic discharging apparatus comprising a rocking reservoir, a water-passage communicating with the reservoir, a stationary conduit extending through said passage into the reservoir, and means for conducting water to the water-passage and for discharging water from the reservoir independently of said conduit, substantially as and for the purpose set forth.

12. An automatic discharging apparatus comprising a rocking reservoir, a water-pas-

sage communicating with the reservoir, a stationary conduit extending through said passage and communicating with the reservoir, means for conducting water to the water-passage and for discharging water from the reservoir independently of said conduit, and a valve actuated by the reservoir for controlling the flow through the conduit, substantially as and for the purpose described.

13. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber communicating with the reservoir, a support for the trunnion having a plurality of passages therein for the entrance and discharge of water and the withdrawal of air, and means for discharging water from the reservoir independently of the passage for the withdrawal of air, substantially as and for the purpose specified.

14. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber, a water-passage connecting the reservoir to the inner chamber of the trunnion, a support for the trunnion having fluid-conducting means for the entrance and discharge of water, a stationary conduit extending through said support, trunnion and water-passage and communicating with the reservoir, and means for discharging water from the reservoir independently of the conduit, substantially as and for the purpose set forth.

15. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber, a water-passage connecting the reservoir to the inner chamber of the trunnion, a support for the trunnion having fluid-conducting means for the entrance and discharge of water, a stationary conduit extending through said support, trunnion and water-passage and communicating with the reservoir, means for discharging water from the reservoir independently of the conduit, and a valve actuated by the reservoir for controlling the flow through the stationary conduit, substantially as and for the purpose described.

16. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber communicating with the reservoir and formed with a closed end, a support projecting into the trunnion and provided with fluid-conducting means communicating with the inner chamber of the trunnion, said support being also provided with a water-inlet and a water-outlet, a conduit extending through the support and trunnion and communicating with the reservoir, and means for discharging water from the reservoir independently of the conduit, substantially as and for the purpose specified.

17. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for



supporting the reservoir, said trunnion having an inner chamber communicating with the reservoir and formed with a closed end provided with a bearing-face for resisting end strain, a support projecting into the trunnion and provided with fluid-conducting means communicating with the inner chamber of the trunnion, said support being also provided with a water-inlet and a water-outlet and being engaged with said bearing-face, a conduit extending through the support and trunnion and communicating with the reservoir, and means for discharging water from the reservoir independently of the conduit, substantially as and for the purpose set forth.

18. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber communicating with the reservoir and formed with a closed end provided with an external bearing-face for resisting end strain, a support projecting into the trunnion and provided with fluid-conducting means communicating with the inner chamber of the trunnion, said support being also provided with a water-inlet and a water-outlet, means engaged with said bearing-face, a conduit extending through the support and trunnion and communicating with the reservoir, means for discharging water from the reservoir independently of the conduit, and a valve actuated by the reservoir for controlling the flow through the conduit, substantially as and for the purpose described.

19. An automatic discharging apparatus comprising a rocking reservoir, a chamber movable with the reservoir and separated therefrom, an outer conduit connecting the reservoir and the chamber, a stationary conduit communicating directly with the reservoir, and fluid-conducting means communicating with the reservoir and the chamber, substantially as and for the purpose set forth.

20. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber separated from the reservoir, an outer conduit connecting the reservoir and the chamber of the trunnion, a support for the trunnion having fluid-conducting means communicating with the inner chamber of the trunnion, and fluid-conducting means communicating with the reservoir, substantially as and for the purpose described.

21. An automatic discharging apparatus comprising a rocking reservoir, a trunnion for supporting the reservoir, said trunnion having an inner chamber separated from the reservoir and provided with an internal bearing-face for resisting end strain, an outer conduit connecting the reservoir and the chamber of the trunnion, a support for the trunnion having fluid-conducting means communicating with the inner chamber of the trunnion, said support having its inner end engaged with the internal bearing-face, and fluid-conducting means communicating with the reservoir, substantially as and for the purpose specified.

22. An automatic discharging apparatus comprising a rocking reservoir, a water-passage communicating with the reservoir, a pair of hollow trunnions for supporting the reservoir, the inner chamber of one trunnion communicating with the water-passage and having a closed end provided with internal and external bearing-faces for resisting end strain, and the inner chamber of the other trunnion being separated from the inner chamber of the first trunnion, a conduit connecting the reservoir to said separated inner chamber, and supports projecting into the trunnions and provided with fluid-conducting means communicating with the inner chambers of the trunnions, said supports being engaged with the bearing-faces for resisting end strain, substantially as and for the purpose set forth.

23. An automatic discharging apparatus comprising a movable reservoir having an arm, fluid-conducting means communicating with the reservoir, valves for controlling the flow through said fluid-conducting means, levers connected, respectively, to the valves and movable automatically in the same direction for closing one valve and opening the other valve, and connections between said arm and levers for moving the levers in the opposite direction, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 8th day of January, 1900.

EDWARD P. WAGGONER.

Witnesses:

K. H. THEOBALD,  
S. DAVIS.