No. 670,813.

Patented Mar. 26, 1901.

J. N. RICE.

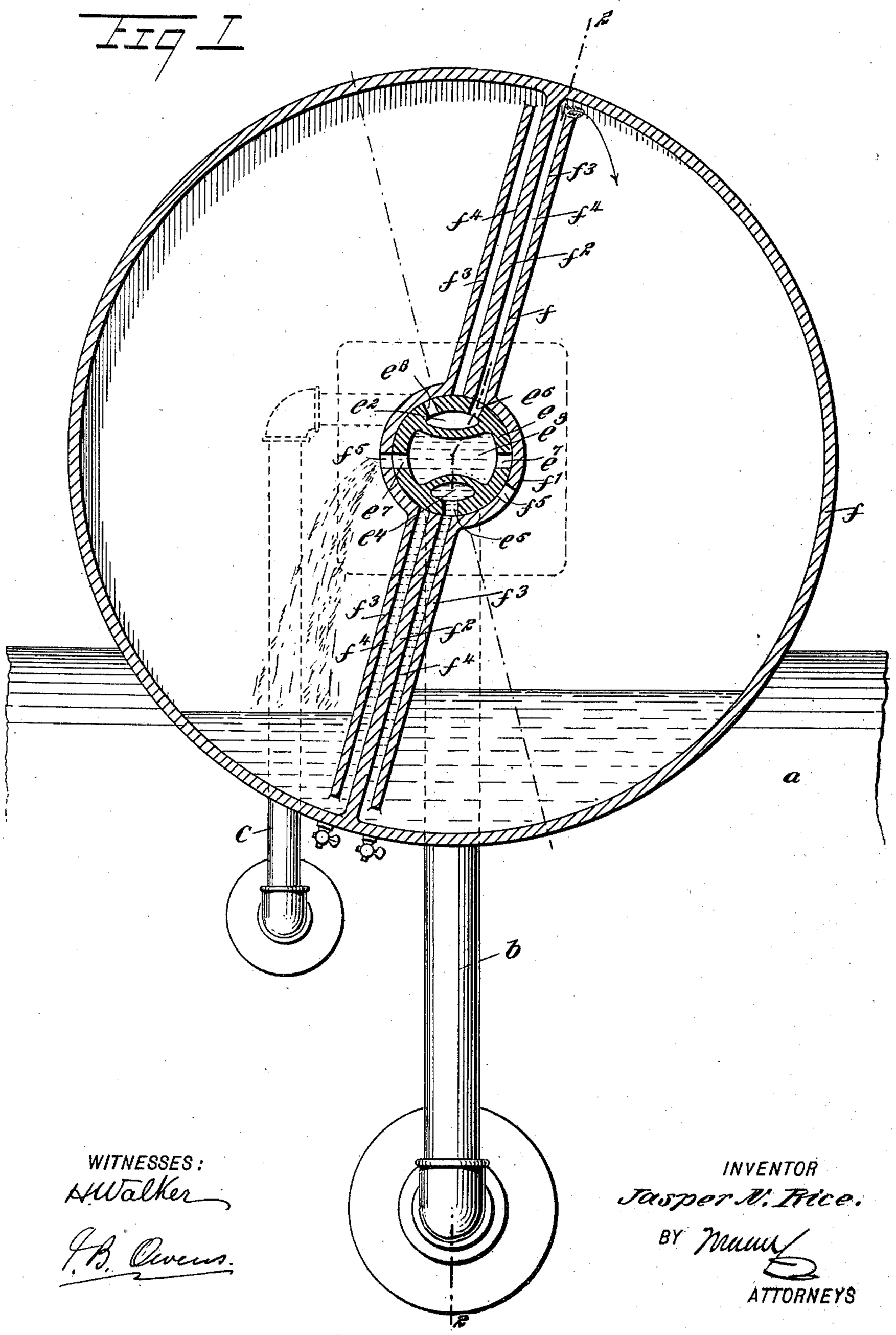
BOILER FEEDER.

(Application filed Sept. 19, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig 1



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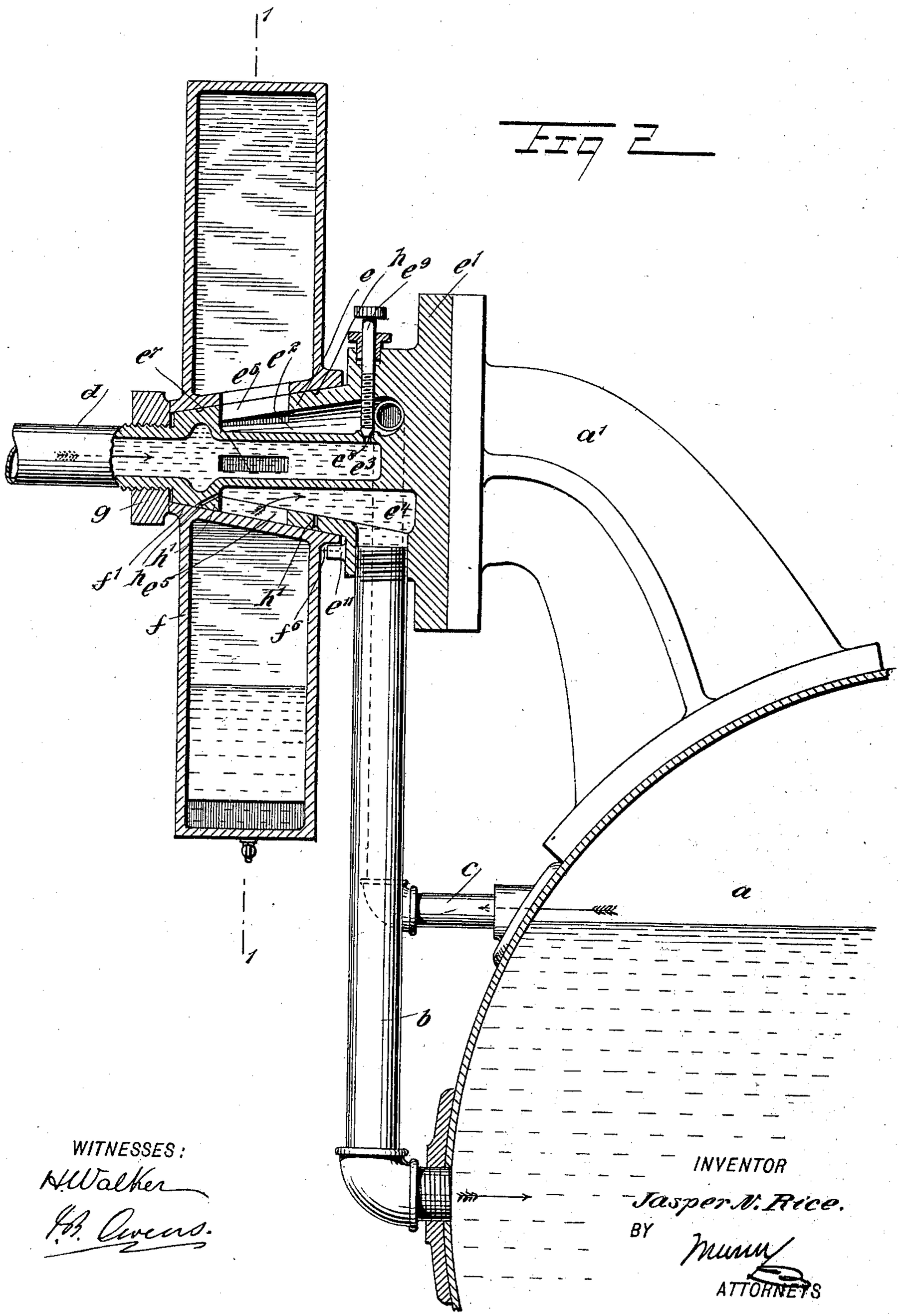
2 Sheets—Sheet 2.

Fig 2



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UNITED STATES PATENT OFFICE.

JASPER N. RICE, OF BETHANY, MISSOURI.

BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 670,813, dated March 26, 1901.

Application filed September 19, 1900. Serial No. 30,493. (No model.)

To all whom it may concern:

Be it known that I, JASPER N. RICE, a citizen of the United States, and a resident of Bethany, in the county of Harrison and State of Missouri, have invented a new and Improved Boiler-Feeder, of which the following is a full, clear, and exact description.

This invention relates to a boiler-feeding apparatus which will automatically maintain the water in the boiler at a certain level, this end being attained by employing the steam-pressure of the boiler as a means of forcing the water into the boiler.

This specification is the disclosure of one form of the invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a sectional view of the invention on the line 1 1 of Fig. 2, and Fig. 2 is a sectional view on the line 2 2 of Fig. 1.

a represents the boiler; *b*, a pipe leading the water thereinto; *c*, a pipe located at the water-level for conducting steam to the feeder, and *d* the pipe which passes from the source of water-supply. The pipe *d* communicates with a conical shell *e*, which has a flanged end *e'*, fastened to an arm *a'*, mounted on the boiler. The shell *e* is formed into three compartments, respectively designated e^2, e^3, and e^4. The compartment e^3 is in the middle and is in direct communication with the pipe *d*. The compartments e^2 and e^4 are not in direct communication with the compartment e^3. The compartment e^4 is formed with a port e^5 in the outer wall thereof, and the compartment e^2 is formed with two ports e^6 in its outer wall. The middle compartment e^3 has oppositely-disposed ports e^7 in its outer walls. The pipe *b* leads from the compartment e^4, and the pipe *c* leads to the compartment e^2. A vent-orifice e^8 is formed in the wall between the compartments e^2 and e^3 and is commanded by a needle-valve e^9, as shown in Fig. 2. When this valve is open, fluids may pass freely from the compartment e^2 to the compartment e^3, or vice versa.

Mounted to turn on the conical shell *e* is the hub *f'* of a circular drum *f*. This drum is divided into two equal compartments by partitions f^2, which pass radially from the hub *f'* to the periphery of the drum. False partitions f^3 are placed in the drum on each side of the partitions f^2 and are spaced therefrom to form passages f^4 on each side of the partitions f^2, such passages being open at their outer ends into the drum and having their inner ends opening into the hub *f'* thereof. It will be seen that by this construction the drum is divided into two separate compartments and that each compartment communicates by two passages f^4 with the interior of the hub of the drum. This hub turns freely on the shell *e* and is formed with two ports f^5 therein, such ports being adapted, respectively, to register with the ports e^7 of the shell *e*. The drum *f* is held on the shell *e* by a nut *g*, the drum being adapted to turn on its bearings, and this turning movement being limited by a stud e^{11} on the shell *e*, which projects into a recess f^6, formed in the hub of the drum *f*. (See Fig. 2.)

After the operation of the device has been started the water enters the chambers of the drum *f*, when the ports e^7 and f^5 register with each other, as is shown at the left of Fig. 1, and the steam enters the compartments of the drum from the boiler by way of the compartment e^2 and passes through the upper passages f^4, when one of the ports e^6 registers with the corresponding passage f^4 at the upper part of the drum, as is shown at the right-hand side of Fig. 1. When, therefore, the steam enters the compartment, the pressure of the steam forces the water out of the same and causes it to move up one of the passages f^4 into the compartment e^4 of the shell *e*, when the said bottom passage f^4 is in registry with the port e^5, and from this compartment e^4 the water passes by the pipe *b* into the boiler. When this operation has been started, the flow of water is assisted by gravity, as will be apparent. The various ports of the drum and shell are arranged to move into and out of registry, as explained, such movement being brought about by the regular rocking of the drum, which in turn is due to the alternate preponderance of the water in the two compartments thereof. The compartment e^3 of the shell *e* communicates with the water-supply, and as the water is sprayed into the compartments of the drum it con-

denses the steam therein, thereby causing a partial vacuum and insuring the passage of the water into the compartment. After the operation starts it continues automatically until the rising water in the boiler closes the pipe *c*, whereupon steam does not pass to the feeder and its operation is arrested.

To start the operation of the feeder, the valve e^9 should be opened, so that the steam may pass freely from the compartment e^2 of the shell *e* into both compartments of the drum *f* and also into the compartment e^3, forcing out of these compartments all of the air and water which is therein. Then when the steam condenses a partial vacuum is formed in the various compartments of the feeder, and the water rushes into these compartments, filling the same, after which the operation of the feeder may be started by rocking the drum around the shell.

In order to prevent air from being drawn into the apparatus through the hub f' of the drum *f* and the shell *e*, I form in the shell two annular grooves *h*, which communicate with the compartment e^4 of the shell by passages h'. By this arrangement the grooves *h* are kept filled with water from the compartment e^4, and the apparatus is thus water-sealed. Should the joint between the parts *e* and *f* not be tight, water rather than air will be drawn from the grooves into the apparatus.

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

1. A boiler-feeder, having a shell having a journal and divided into compartments one of which communicates with a source of steam-supply another of which with a means for conducting the water to the boiler, and the third with a source of water-supply, and a drum mounted to turn on the shell and having two compartments therein formed by a diametrical partition or partitions, the shell and drum having ports permitting the water to flow into the compartments of the drum and permitting also the entry of the steam to force the water out of the drum.

2. A boiler-feeder, having a shell with three compartments therein, the compartments respectively communicating with a source of water-feed, a means of conducting the water from the shell to the boiler, a means of conducting steam from the boiler to the shell, and a circular drum mounted at its center to turn on the shell and having two compartments therein formed by a diametrical partition or partitions, the drum and shell having coacting ports permitting the passage of the water from the water-compartment of the shell to the two compartments of the drum, and also permitting the passage of the steam from the steam-compartment of the shell to the two compartments of the drum, and the passage of the water from the drum to the third compartment of the shell.

3. A boiler-feeder, having a shell with a number of compartments therein, the shell being formed with ports in its outer walls communicating with the compartments, a drum arranged to turn on the shell and having a partition therein forming two compartments and also having false partitions adjacent to the first-named partitions, the false partitions forming passages from the outer part of the drum to the hub, and means for conveying the water and steam to and from the boiler-feeder in the manner specified.

4. A boiler-feeder having a rolling drum with partitions therein forming two compartments, and with false partitions forming radial passages alongside the partitions proper, and the drum also having ports communicating directly with the compartments and with the passages, and a shell whereon the drum is mounted, the shell having steam and water compartments and ports communicating therewith and working with the ports in the drum.

5. In a boiler-feeder, the combination with a boiler, of a feed-water pipe passing thereinto, a steam-pipe passing therefrom, a shell having three compartments therein, two of which are respectively in communication with the water and steam pipes of the boiler and the third of which is in communication with a source of water-supply, and a comparted drum arranged to turn on the shell, the drum and shell having ports therein permitting the circulation of the steam and water.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JASPER N. RICE.

Witnesses:
EUGENE B. NEAL,
JAMES H. RUSK.