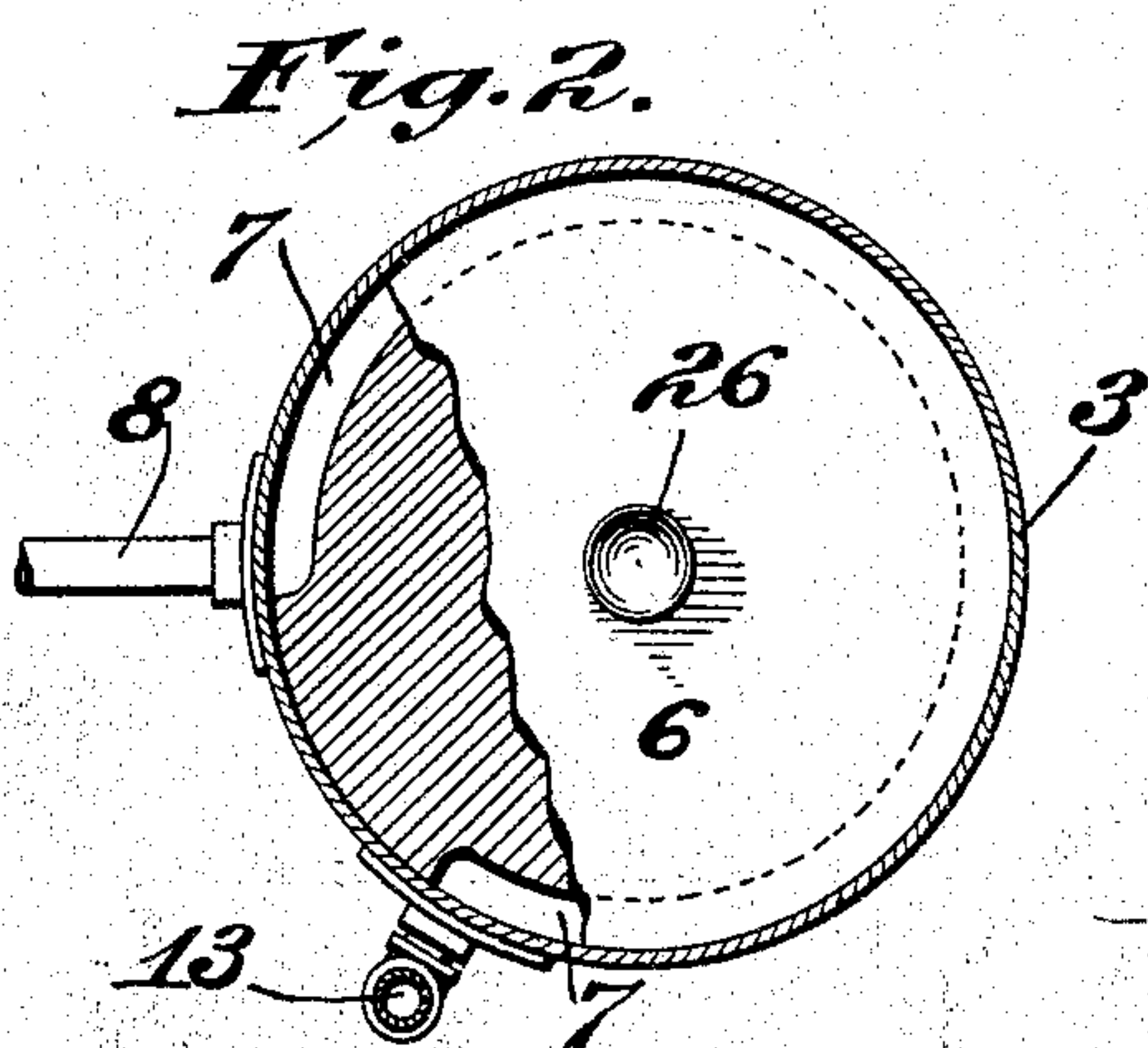
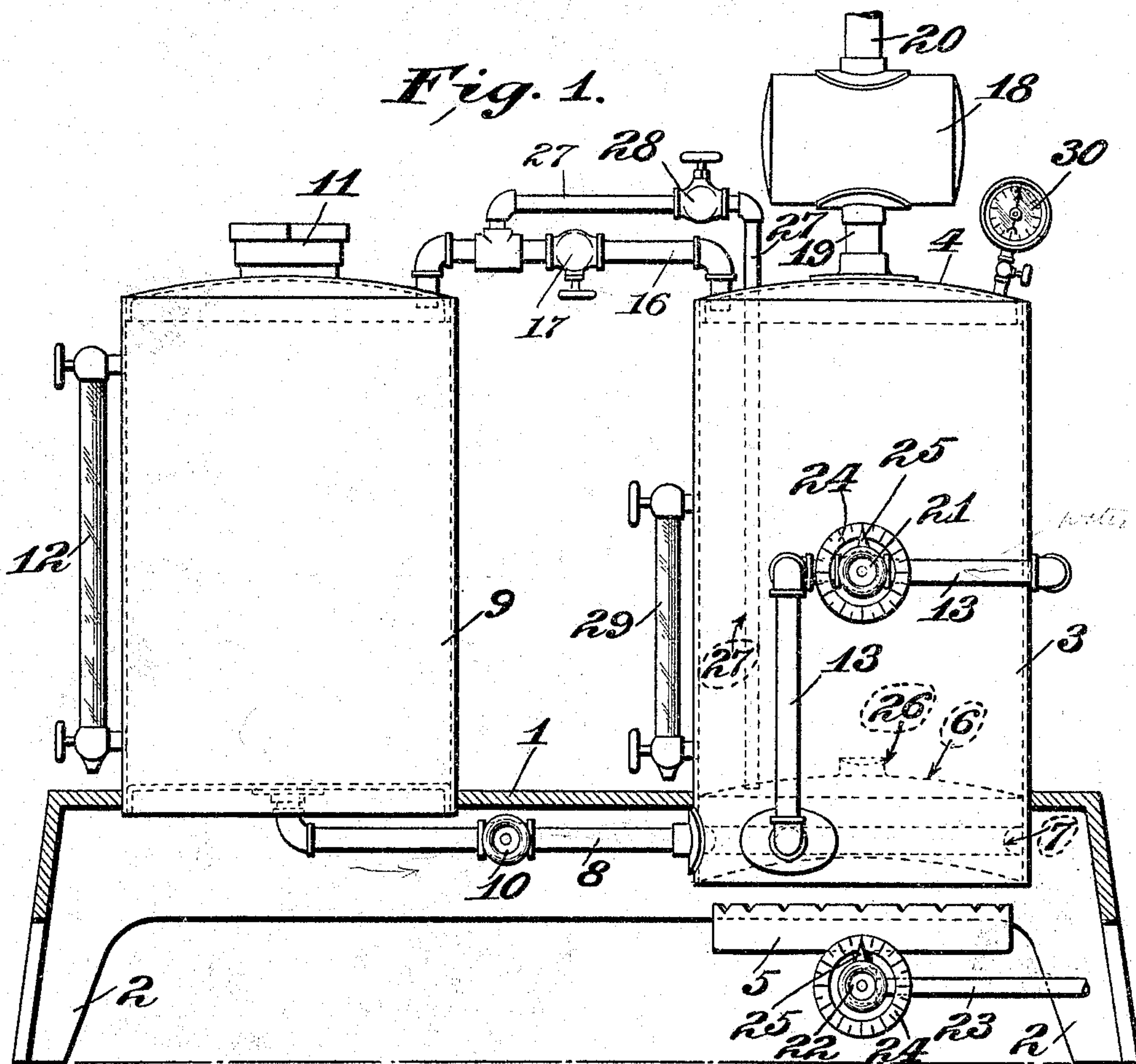
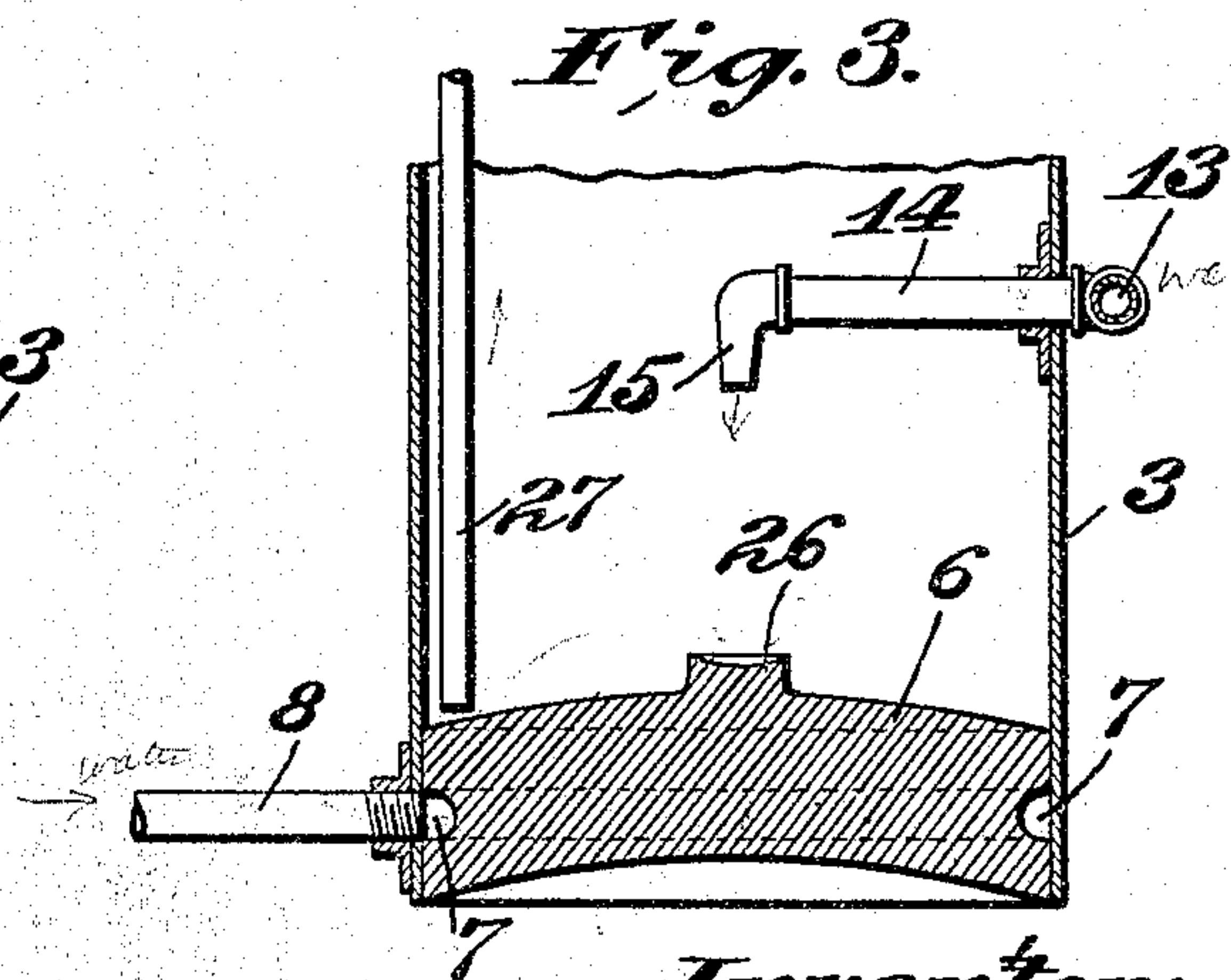


930,817.

Patented Aug. 10, 1909.



*Witnesses:*  
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Edgar T. Farmer



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By *Paul C. [unclear]* Attys.



# UNITED STATES PATENT OFFICE.

ABRAHAM WALLERSTEIN, OF ST. LOUIS, MISSOURI.

## STEAM-GENERATOR.

No. 930,817.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed September 23, 1908. Serial No. 454,336.

*To all whom it may concern:*

Be it known that I, ABRAHAM WALLERSTEIN, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Steam-Generators, of which the following is a specification.

My invention relates to steam generators and has for its principal objects to produce a simple, compact and economical apparatus for generating steam, to provide for the continuous and automatic operation of the apparatus, to provide for the easy regulation of the same, and to attain certain advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawing forming part of this specification and wherein like symbols refer to like parts wherever they occur, Figure 1 is a side elevation of an apparatus embodying my invention; Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1; and Fig. 3 is a fragmentary vertical section of the steam generator taken on or about the line 3—3 of Fig. 2.

The apparatus is preferably mounted upon a base or stand 1 of any suitable construction. Preferably, it is a table-like casting mounted on legs or feet 2.

The generator comprises a tank 3 which is closed at its top by a head 4. The bottom of the tank extends below the top of the stand 1 in proximity to a fuel burner 5. The bottom head of the tank 3 comprises a thick metal plate 6 preferably of copper or other suitable tenacious heat conducting metal. Preferably this plate 6 is concavo-convex, or at least convex in its inner face, as shown. It may be shrunk and bolted or otherwise secured in place. A groove 7 is provided in the peripheral face of this bottom plate. This groove extends almost entirely around the plate as more clearly shown in Fig. 2 of the drawing. When the plate is secured in position, the grooved portion constitutes a passageway which is closed by the shell of the tank 3.

A pipe 8 communicates at one end with one end of the passageway or coil formed by the groove 7 in the plate 6. The opposite end of the pipe 8 is connected to a water supply tank 9 and said pipe is provided with a valve 10 for controlling the passage of water there-through. The water supply tank 9 is provided with a suitable filling opening which is

closed by a cap or plug 11 and it is also provided with a suitable gage 12 for indicating the level of the water therein.

Communicating with the passageway or coil 7 at the end opposite its connection with the pipe 8 is a pipe 13. This pipe 13 extends upwardly and horizontally part way around the tank 3 and is connected to a horizontal pipe section 14 which extends into the tank 3 at a point some distance above the bottom plate 6. The inner end of this pipe section 14 terminates at a point above the middle of the plate 6 and is downturned or provided with a downturned nozzle 15, as more clearly shown in Fig. 3 of the drawing.

Communicating with the two tanks 3 and 9 at the tops thereof is a cross connecting pipe 16 which is provided with a suitable cutoff valve 17. This pipe connection is provided to admit steam pressure from the generator tank or boiler 3 to a point in the water supply tank above the column of water therein so as to force the circulation of the feed water into the generator.

Mounted above the generator tank or boiler 3 is a steam dome or chamber 18. This chamber communicates with the generator through a short pipe or tube 19, and it also has a pipe 20 connected thereto and leading to any desired point where the steam is to be utilized.

In the operation of so much of the apparatus as has herein been set forth, the valves 10 and 17 of their respective pipes 8 and 16 are set to open communication between the water supply tank 9 and the generator tank 3. The water in passing through the coil or passageway 7 in the thick bottom head or plate 6 which is heated from the fuel burner 5, will become heated before it passes into the pipe 13. When it is desired to make dry steam instantaneously and to maintain the same under a low, even pressure, a valve 21 is set to admit the water through the pipe 13 in a very small stream so as to merely trickle or fall in drops from the nozzle or downturned end of pipe 14 upon the center or crown portion of the convexed inner face of said bottom plate and will spatter about the surface thereof. The bottom plate being of copper or other suitable tenacious metal of high conductivity, the water will become instantly converted into steam. By adjusting the valve 21 in the pipe 13 and also the valve 22 which controls the fuel supply to the burner 5 through the pipe 23, the apparatus



may be regulated so that an even pressure can be maintained in the generator, and also by adjusting said valves 21 and 22 relatively, the pressure can be raised and lowered at will. To facilitate the proper adjustment of the valves, graduated dials 24 may be arranged to cooperate with pointers 25 carried by the valve knobs or stems, as shown.

In order to provide for the uniform separation of the water into drops and to cause the same to spread over a greater area of the surface of the bottom plate or head 6 a boss or projection 26 is provided at the center of the plate. Preferably, the upper face of this boss 26 is slightly hollowed out or concaved so that the water will be deflected slightly upwardly as it leaves said central projection. This boss or projection may be cast or formed integral with the bottom plate 6, or it may be made separate and secured thereon in any desired manner. Should any condensation occur in the chamber 18 the water will be returned into the generator tank 3 through the pipe or passageway 19, and falling upon the bottom plate, will be again converted into steam.

In order to prevent an accumulation of water at the bottom of the generator tank 3 a very small pipe or tube 27 is extended into the tank from the top. Its lower end terminates close to the upper face of the bottom plate 6 at a point near the margin thereof, and at a point below crown of the plate. The outer end of this tube or pipe 27 is tapped into the pipe 16 at a point between the valve 17 and the water supply tank 9, and it is provided with a cutoff valve 28. By this arrangement, any water that collects on the bottom of the tank will not rise to a level above the bottom of the tube 27 as the pressure of the steam will force the water up through the tube and into pipe 16 whence it will be forced into the water supply tank 9. Thus, the greater central portion of the bottom plate may be kept free of water so as not to interfere with the instantaneous conversion of the incoming water from the nozzle 15 into steam. In some cases, it is desirable to boil water in the bottom of the generator tank to make steam. In such a case, the valve 28 in the pipe 27 will be closed and the water may be kept at the proper level in the tank 3. A suitable water gage 29 is provided to indicate the level of the water in said tank, and a suitable steam gage 30 is also provided to indicate the pressure.

Obviously, the apparatus may be modified without departing from my invention, and, therefore, I do not wish to be limited to the exact construction and arrangement shown.

What I claim as my invention and desire to secure by Letters Patent is:

1. A steam generator comprising a cylindrical tank having a thick bottom head of tenacious metal of high conductivity, said bot-

tom head having a circumferential water passageway therein, a water supply pipe communicating with said passageway at one end and a pipe communicating with its opposite end and extending into said tank above said bottom head and arranged to discharge thereon, and means for heating said bottom head.

2. A steam generator comprising a cylindrical tank having a thick bottom head of tenacious metal of high conductivity, said bottom head being grooved peripherally and fitted tightly into said tank, whereby said groove constitutes a passageway, a water supply pipe communicating with said passageway and extending into said tank above said bottom head and arranged to discharge thereon, and means for heating said bottom head.

3. A steam generator comprising a tank having a thick bottom head of tenacious metal of high conductivity, said bottom head having a water passageway therein, a water supply pipe communicating with said passageway, a second pipe communicating with said passageway and extending into said tank above said bottom head and arranged to discharge thereon, a heating element for said bottom head, and means for relatively controlling said heating element and the admission of water into said tank.

4. A steam generator comprising a cylindrical tank having a thick bottom head of tenacious metal of high conductivity, said bottom head having a circumferential water passageway therein and a convexed inner face, a water supply pipe connected with one end of said circumferential water passageway, a second pipe connected with the opposite end of said circumferential water passageway, said last mentioned pipe being extended into said tank above said bottom head and being also arranged to discharge upon the crown of said bottom head, and means for heating said bottom head.

5. A steam generator comprising a cylindrical tank having a thick bottom head of tenacious metal of high conductivity, said bottom head having a circumferential water passageway therein and a convexed inner face having a small projection on the crown thereof, a water supply pipe communicating with one end of said circumferential water passage, a second pipe connected with the opposite end of said circumferential water passageway, said last mentioned pipe being extended into said tank and adapted to discharge water in a trickling stream upon the projection on said bottom head from a point thereabove, means for controlling the passage of water through said last mentioned pipe, and a heating element for said bottom head.

6. A steam generator comprising a tank having a thick bottom head of tenacious



metal of high conductivity, said bottom head having a water passage therein, a convexed upper face and a central projection on said upper face, said central projection having a concaved upper face, a pipe communicating with said water passage, extending into said tank and having a nozzle arranged to discharge water in a small stream upon said concaved face of said projection from a point thereabove, and means for heating said bottom head.

7. A steam generator comprising a generator tank having a thick bottom head of tenacious metal of high conductivity, said bottom head having a convexed inner face, a water supply tank, a water pipe communicating with said supply tank and extending into said generator tank and arranged to dis-

charge upon the crown of said bottom head from a point thereabove, means for controlling the passage of water through said pipe, a small pipe extending into said generator tank and terminating close to the upper face of said bottom head near the margin thereof at a lower level than the middle portion of said convexed inner face and communicating with said supply tank, and means for heating said bottom head.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 19th day of September, 1908, at St. Louis, Missouri.

ABRAHAM WALLERSTEIN.

Witnesses:

G. A. PENNINGTON,  
J. B. MEGOWN.