

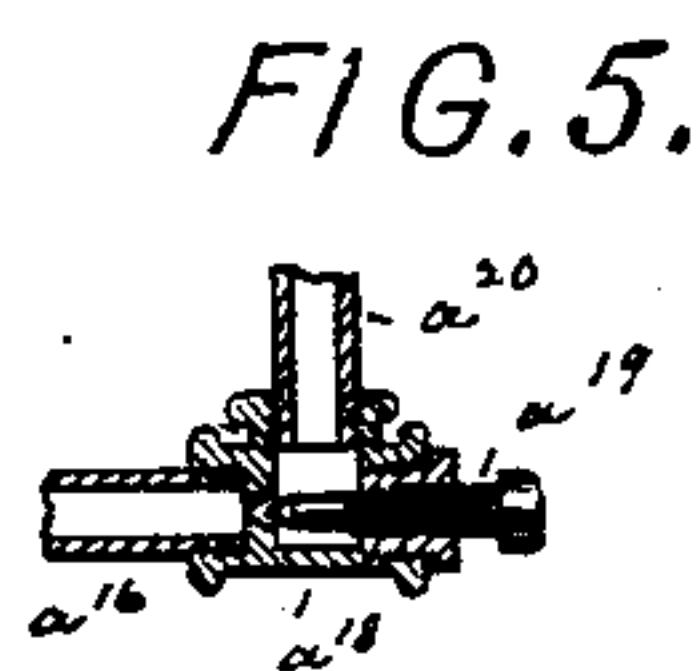
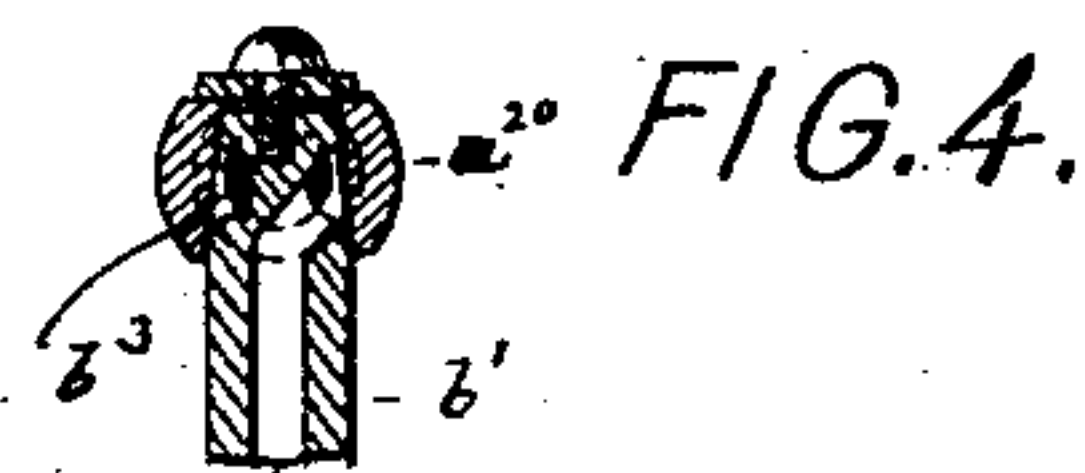
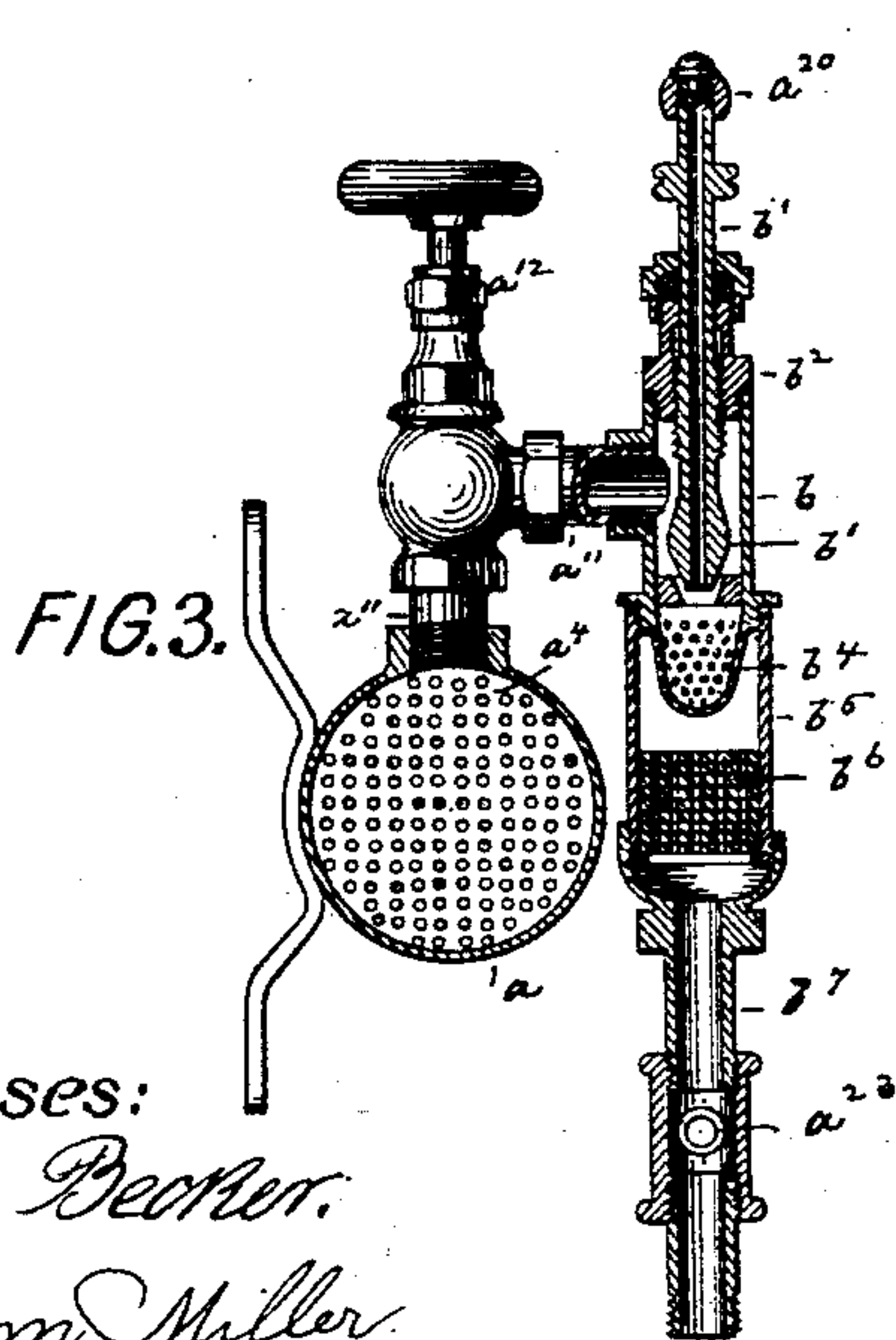
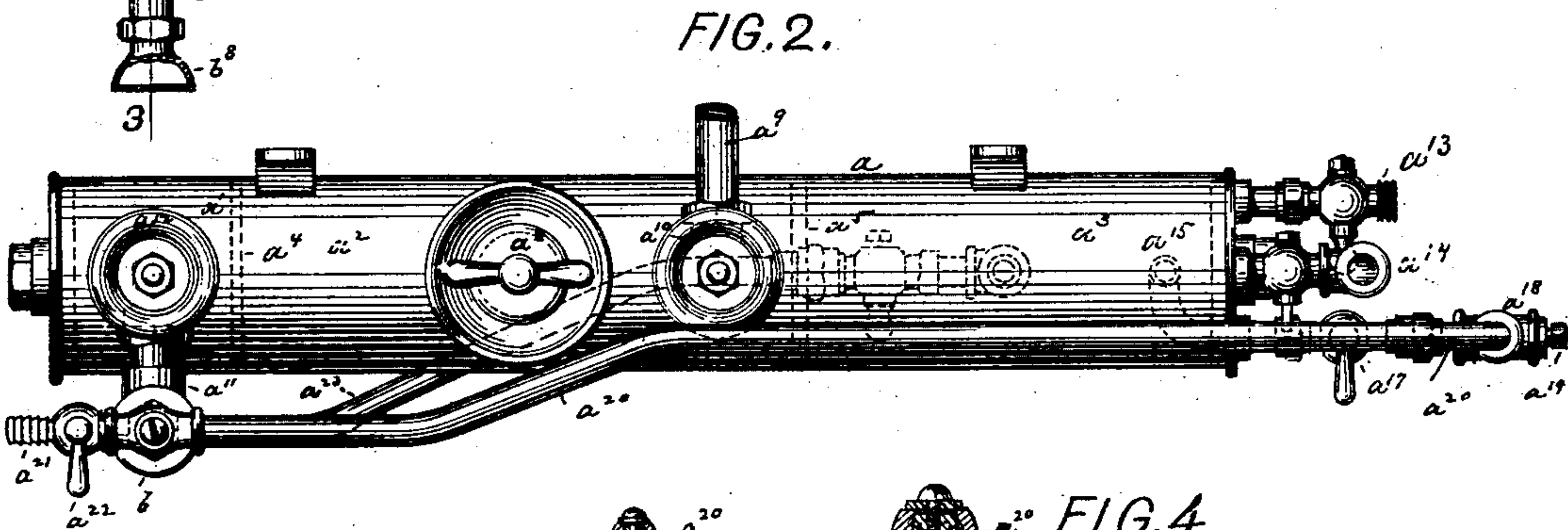
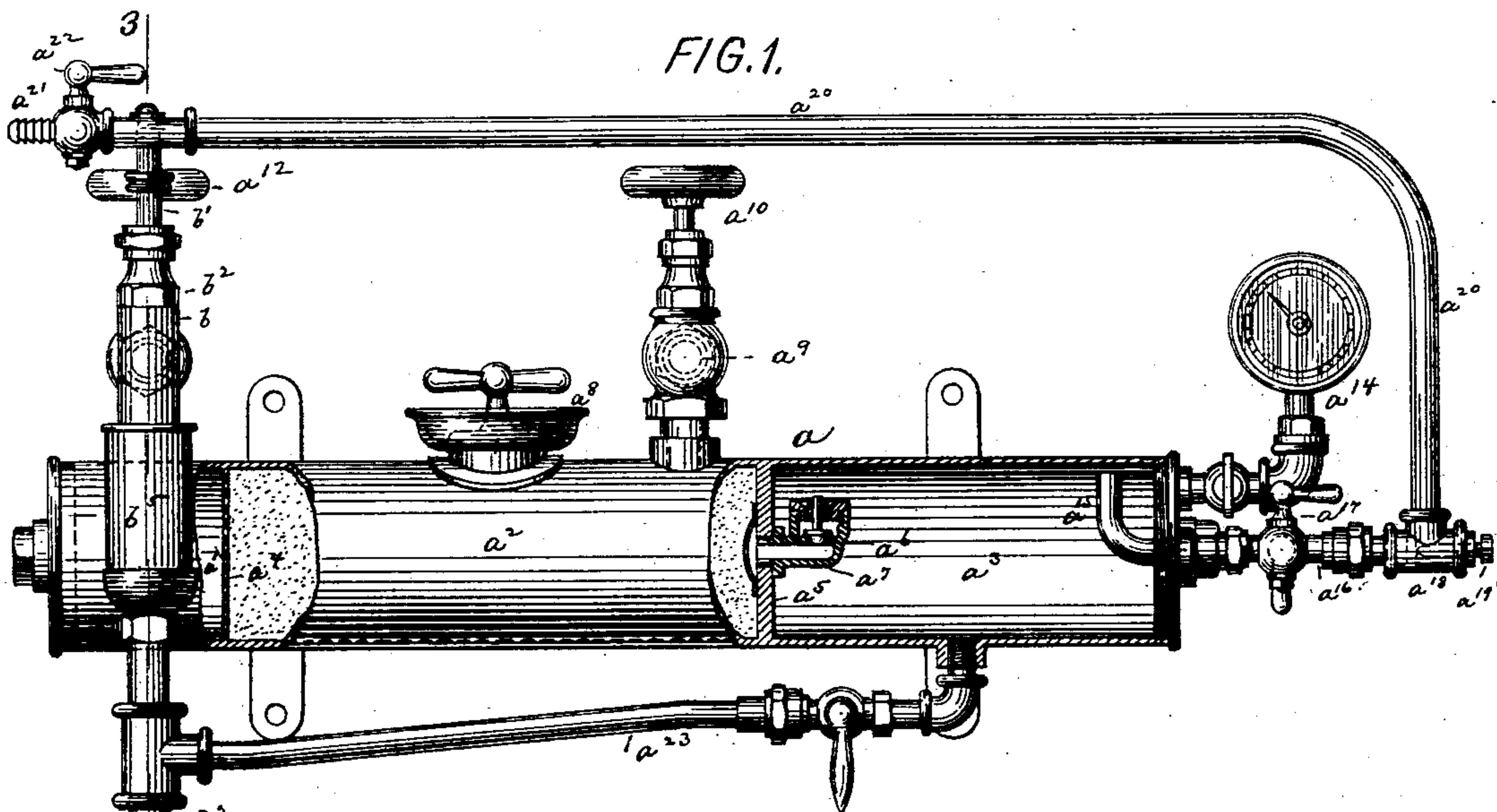
(No Model.)

R. G. FERGUSON.

APPARATUS FOR MIXING LIQUIDS WITH GASES.

No. 591,831.

Patented Oct. 19, 1897.



Witnesses:

John Becker.
William Miller.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MIXING LIQUIDS WITH GASES.

SPECIFICATION forming part of Letters Patent No. 591,831, dated October 19, 1897.

Application filed June 22, 1897. Serial No. 641,750. (No model.)

To all whom it may concern:

Be it known that I, ROBERT G. FERGUSON, a citizen of the United States, and a resident of Lakewood, in the county of Ocean and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Mixing Liquids with Gases, of which the following is a specification.

This invention relates to an apparatus for charging liquids with gases, and more particularly designed for producing effervescent or "Nauheim" baths, though the product of the apparatus may obviously be used for other purposes. I propose to employ a portable cylinder subdivided in a peculiar manner and adapted to be charged with the water, gas, and chemicals necessary to form the effervescent liquid. The charged cylinder is delivered to the consumer, who connects it to the water-main and uses it until empty, when it is exchanged for a charged cylinder. In this way the preparation of effervescent baths is greatly facilitated, and such baths are put within the reach of the occupants of hotels and dwelling-houses generally.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of my improved apparatus for mixing liquids with gases. Fig. 2 is a plan; Fig. 3, a vertical cross-section on line 3 3, Fig. 1; Fig. 4, a detail of the joint between the gas-pipe a^{20} and the injector-pipe b' , and Fig. 5 a detail of the gas-regulating valve a^{19} .

The letter a represents the body of a cylindrical vessel or fountain divided into three compartments a^1 a^2 a^3 by means of two transverse partitions a^4 a^5 . Of these the partition a^4 is foraminated to constitute a strainer, while the partition a^5 is perforated to permit communication between the compartments a^2 a^3 . This communication is, however, normally interrupted by a check-valve a^6 , closing by gravity upon a seat that is formed upon a short tube a^7 , which projects from the perforated partition a^5 into the compartment a^3 .

The compartment a^2 is, by a hand-hole a^8 , adapted to be charged with the salts or other chemicals necessary to form three, more or less, baths. It is also, by connection a^9 , controlled by valve a^{10} , adapted to be coupled to the water-main. The water charged with the

salt within the compartment a^3 passes through the strainer a^4 into the delivery-compartment a' , and from thence, by connections a^{11} , controlled by valve a^{12} , into the outer or fixed tube b of an injector, to be there mixed with the gas in manner hereinafter described.

The compartment a^3 is provided with a connection a^{13} , for charging it with gas, and with a pressure-gage a^{14} . It is also provided with a gas-outlet pipe a^{15} , which is bent so that its mouth is placed within a short distance from the roof of the compartment, while its lower end connects with an opening of the cylinder-head. Here the pipe a^{15} is, by connection a^{16} , having gas-cock a^{17} , connected to a T-coupling a^{18} , containing a gas-regulating needle-valve a^{19} , Fig. 5. The T-coupling a^{18} communicates with the gas-pipe a^{20} , that embraces and communicates with the inner longitudinally-adjustable tube b' of the injector, the nozzle of which discharges into the fixed tube b , Fig. 3.

The pipe a^{20} projects a short distance beyond tube b' , and is there provided with a hose-coupling a^{21} , having cock a^{22} , so that the gas may be delivered to the injector from an independent gas source, in lieu of being delivered thereto by the compartment a^3 . In order to permit the relative proportion between gas and liquid to be regulated, the tube b' is made longitudinally adjustable within tube b , so as to thereby adjust the size of the liquid-discharge passage formed within tube b , around the nozzle of tube b' . To effect this adjustment, I make the tube b' revolvable and suspend it within a nut b^2 , supported on tube b . At its upper end the duct of tube b' terminates in an annular groove b^3 , Fig. 4, that communicates permanently with the bore of tube a^{20} . By revolving the tube b' it will thus be raised or lowered to regulate the discharge, the slight adjustment required being permitted by the natural resiliency of pipe a^{20} .

The water charged with gas flows from tube b into a perforated thimble b^4 , and thence through pipe b^5 , containing a number of fixed perforated superposed plates b^6 , into the delivery-tube b^7 , that may be provided with a rose b^8 , and delivers its charge to a bath-tub or other receptacle, ready for use. If the gas

has been used up to such an extent that the gas-pressure within the compartment a^3 has fallen below the water-pressure in compartment a^2 , the valve a^6 will open and water will flow into the compartment a^3 to displace the gas and drive it out through the pipes a^{15} a^{20} . Owing to the elevated position of the mouth of tube a^{15} , this water will, however, be prevented from entering such tube, and in this way practically all the gas in compartment a^3 can be used up. After all the gas has thus been ejected the water may be drawn out of compartment a^3 by means of a drain-pipe a^{23} , that connects, preferably, with the discharge-pipe b^7 of the injector. The compartment a^3 , being thus relieved of its gas and freed from water, is ready to be freshly charged with gas, that may be supplied from a suitable source by connection a^{13} .

What I claim is—

1. In a mixing apparatus, a cylinder having a perforated partition that divides it into a gas and a water compartment, and a valve that controls the opening in said partition, means for connecting the cylinder to the water-main and controlling the flow of water into the cylinder, a mixing-chamber and valve-controlled passages leading from the water and gas compartments to the mixing-chamber, substantially as specified.

2. In a mixing apparatus, a cylinder having a strainer and a partition that divides the cylinder into a gas-compartment, and a water-compartment, means for connecting the cylinder to the water-main, a mixing-chamber and valve-controlled passages from the water and gas compartments to the mixing-chamber, substantially as specified.

3. In a mixing apparatus, a cylinder having a strainer, a perforated partition and a valve

that controls the opening in said partition, means for connecting the cylinder to the water-main and controlling the flow of water into the cylinder, a mixing-chamber and valve-controlled passages leading from the water and gas compartments to the mixing-chamber, substantially as specified.

4. In a mixing apparatus, a cylinder containing a delivery-chamber, a chamber to contain salt, and a gas-chamber, the said chambers being separated by a strainer, and a partition having an opening therethrough controlled by a valve, combined with means for connecting the salt-chamber to the water-main, means for regulating the flow from the delivery-chamber, and means for mingling the gas and the water.

5. In a mixing apparatus, a cylinder having a transverse strainer, and a valve-controlled transverse partition, and which is by the strainer and partition divided into three compartments, combined with an injector having a water and a gas tube, and with pipes that connect two of the cylinder-compartments with the injector-tubes, substantially as specified.

6. In a mixing apparatus, a cylinder provided with a transverse strainer, and a valve-controlled perforated partition to form three compartments, combined with an injector, pipes connecting two of said compartments with the injector, and with a drain entering one of said compartments, substantially as specified.

Signed at Lakewood, in the county of Ocean and State of New Jersey, this 14th day of June, A. D. 1897.

ROBERT G. FERGUSON.

Witnesses:

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