

No. 714,097.

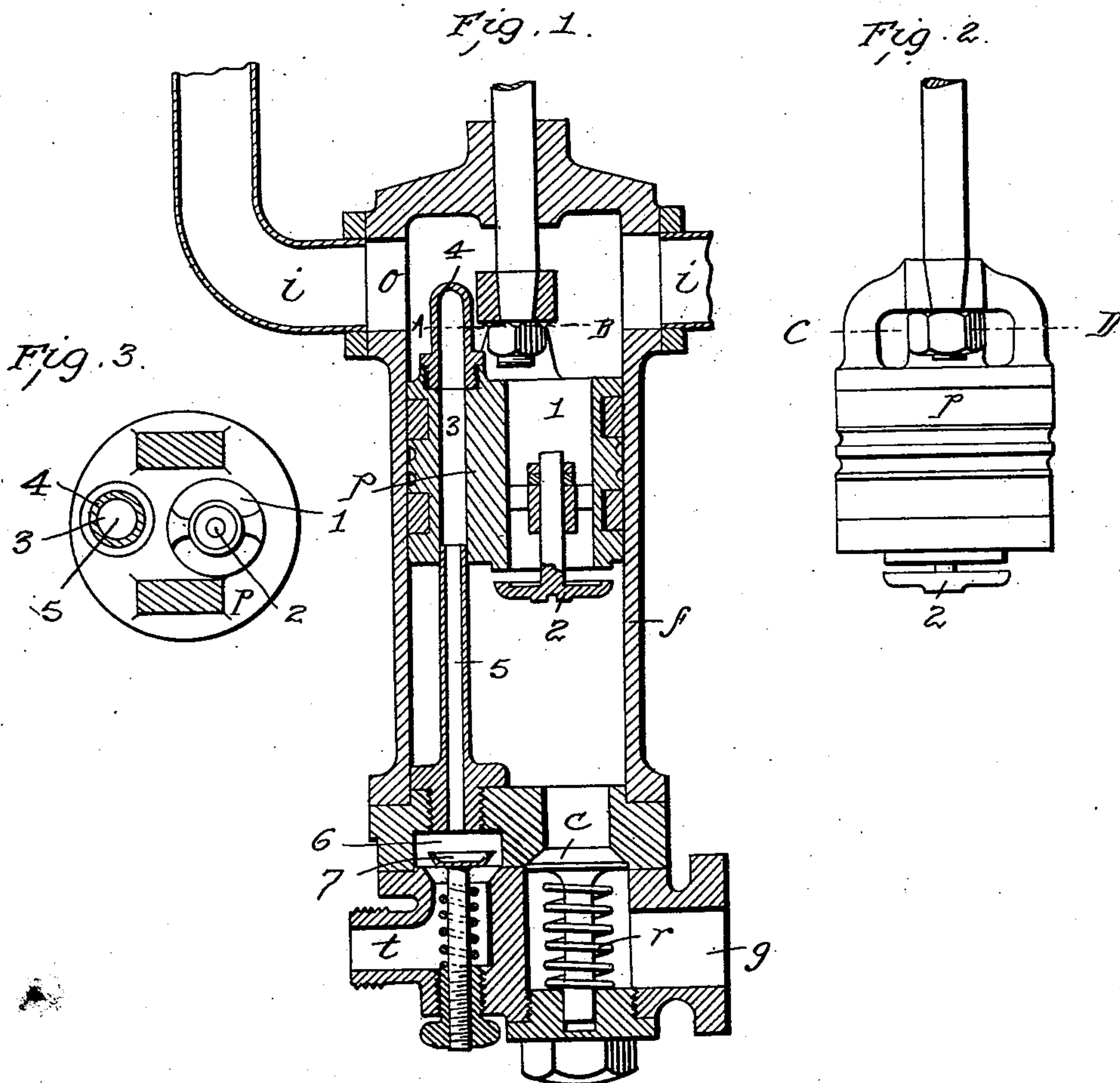
Patented Nov. 18, 1902.

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APPARATUS FOR FORCING LIQUIDS PARTICULARLY APPLICABLE FOR FEEDING
STEAM GENERATORS.

(Application filed Jan. 28, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

CHARLES CAILLE, OF BRY-SUR-MARNE, FRANCE.

APPARATUS FOR FORCING LIQUIDS PARTICULARLY APPLICABLE FOR FEEDING STEAM-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 714,097, dated November 18, 1902.

Original application filed September 6, 1901, Serial No. 74,506. Divided and this application filed January 28, 1902. Serial No. 91,616. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CAILLE, engineer, of 31 Rue de la Pépinière, Bry-sur-Marne, Seine, in the Republic of France, 5 (whose post-office address is the same,) have invented certain new and useful Apparatus for Forcing Liquids Particularly Applicable for the Feeding of Steam-Generators; and I do hereby declare the following to be a full, 10 clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention which is the subject of the present demand for a patent refers to an arrangement for forcing liquids particularly 15 applicable for the feeding of steam-generators.

The apparatus I have invented is suitable for the feeding of any receiver—such as a 20 boiler, for example, whatever be the pressure in this latter or the temperature of the feed liquid.

The invention is shown in detail on the accompanying drawings.

25 Figure 1 is a longitudinal section of the whole. Fig. 2 is an elevation of the details of the piston. Fig. 3 is a section on lines A B of Fig. 1 and C D of Fig. 2.

The apparatus consists of a cylinder of a 30 pump *f*, having at its lower end a passage *g* communicating with the receiver to be fed and in which is placed a valve *c*. A piston *p* moves in this pump-cylinder.

The filling of the cylinder of the pump is 35 done by simple descent of the liquid coming through one or more admission-pipes *i* from a reservoir under a head or pressure into the cylinder of the pumps and takes place immediately the piston commences its upward 40 stroke. For this purpose the piston contains a hollow passage 1, in which is guided a valve 2, which usually under the action of its own weight leaves this passage open in such a way that a communication is established be- 45 tween the orifices of admission of the liquid *o* and the pressure-chamber of the cylinder of the pump *f*. In order to allow the air and the vapors which have formed on the surface of the liquid during the filling to escape and 50 to insure a complete filling of the cylinder of the pump *f*, and thus avoid all back pressure

on the piston *p*, I have invented the following arrangement.

A second passage 3, taken through the piston *p*, is closed at its upper end—that is to 55 say, on the side of the admission of the liquid—by a cap 4. Opposite to this passage a tube 5 is erected of less diameter, open at both ends and fastened to the end of the cylinder of the pump. Beneath the lower open- 60 ing of this tube there is a chamber 6, which, according to the position occupied by a non-return valve 7, which is placed there, communicates by a pipe *t* with the atmosphere or is shut off from it. Suppose the piston *p* to 65 be at the end of its descending or working stroke—that is to say, resting against the lower end of the cylinder of the pump. The non-return valve *c* is closed. The valve 7 rises—that is to say, it opens—immediately 70 the piston commences its upward stroke. At the same time the valve 2 opens under the action of its own weight and the head of liquid above it. This liquid passing through the passage 1 and through the opening of the 75 valve 2 then enters the pressure-chamber of the cylinder of the pump, which it entirely fills. Meanwhile the air and vapor which may have formed above the liquid rises into the passage 3 and redescends through the tube 5 80 into the chamber 6, from whence it escapes into the atmosphere by means of the pipe *t* through the opening left by the valve 7.

Under compression the valves 2 and 7 are 85 closed by the pressure of the liquid in the compression-chamber. The non-return valve *c* is open, and the liquid which, whatever be its temperature, has filled the cylinder of the pump by simple descent is forced through the passage *g* into the receiver to be fed. 90

The apparatus described can be used to compress or distribute water or any other liquid at any temperature into a receiver at any pressure whatever—for example, for 95 feeding boilers or for circulating cooling-water in motors.

Referring again to the action of the valve 7, this valve 7 rises as soon as the piston commences its ascending course, owing to the action of the spring, which balances it and which 100 keeps it ordinarily open. This valve 7 closes at the descent of the piston under the action

of the compression which forms in the barrel of the pump. The air is not sucked through valve 7 when the piston rises, because the liquid which enters the barrel of the pump through valve 2 drives the air and the steam through this valve by means of tube 5.

This application is a division of that filed by me September 6, 1901, Serial No. 74,506.

I claim—

10 In combination, in an apparatus for forcing liquids, a cylinder having an inlet *i* for the water, and an outlet, a valve *c* controlling the outlet, an air or vapor escape valve 7, a piston having a passage 1 therethrough for the
15 passage of the water from the inlet to the

forcing side of the said piston, a valve 2 carried by the piston controlling the said passage, said piston having also a recess 3 therein closed at one end and a pipe 5 connected with the cylinder and in line with the recess 3 to enter the same, said pipe serving to conduct the air or vapor from the pressure side of the piston to the air or vapor valve, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

CHARLES CAILLE.

Witnesses:

ANDRE MORTIETER,

EDWARD P. MACLEAN.