

No. 654,784.

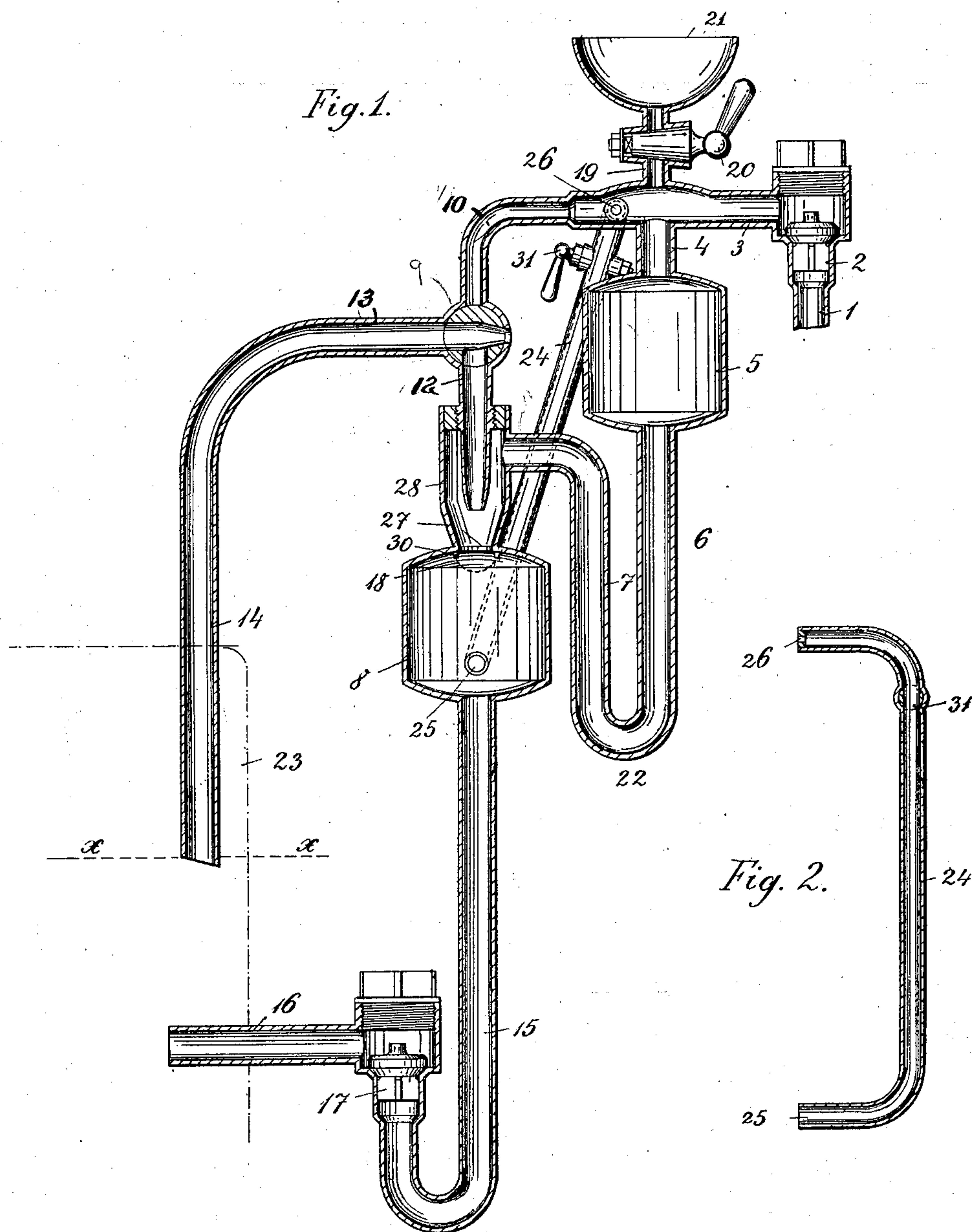
Patented July 31, 1900.

A. COUFALIK.

SELF ACTING FEED APPARATUS FOR BOILERS.

(Application filed Mar. 8, 1900.)

(No Model.)



WITNESSES:

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ANTONIN COUFALIK, OF KREPICE, AUSTRIA-HUNGARY.

SELF-ACTING FEED APPARATUS FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 654,784, dated July 31, 1900.

Application filed March 8, 1900. Serial No. 7,871. (No model.)

To all whom it may concern:

Be it known that I, ANTONIN COUFALIK, a subject of the Emperor of Austria-Hungary, residing in Krepice, Moravia, Austria-Hungary, have invented a new and useful Self-Acting Feed Apparatus for Boilers—the “Infusor with Injector”—of which the following is a specification.

My invention relates to self-acting feed apparatuses for steam-boilers which act by condensation; and the objects of my improvements are; first, to provide a continuous feeding of the boiler in maintaining the water in it practically on the same level and working at any steam-pressure, and, second, to assure the self-acting working of the feeder without any float, counterweights, or other auxiliary apparatuses by means of an injector, the which is interposed between the steam-cock and the condenser. I attain these objects by the mechanism illustrated in the accompanying diagrams.

Figure 1 shows the apparatus in an axial section. Fig. 2 is a tube which connects the condenser with the highest part of the water-tube, also in an axial section.

X X represent the water-level in the boiler 23. This boiler is fed by the pressure-tube 16, forcing-valve 17, and communicates with the condenser 8, which is situated higher than the highest water-level X X. A vertical steam-cone 12, inside the water-cone 28 of an injector, is placed upon the condenser 8. The steam-pipe 12 is connected with the water-pipe 10 3 and is provided with a steam-cock or valve 9, through which it can be also connected with the steam-pipe 13 14, which reaches into the boiler 23 to the level X X. In turning the steam-cock 9 its channel can connect either the steam with the injector and the condenser, closing at the same tube 10, or it may connect tube 10 with the tube 12 of the injector, closing the boiler. The former position, which is the one of working, is indicated in the drawings. Tube 3 leads to the tube 1 or to the water-supply. 2 is the check-valve. The water-pipe 10 3 is connected with the water-tank 5 by the vertical tube 4. The tank 5 is situated still higher than the condenser 8. It is connected with the water-cone 28 of the injector by the tube 6 22 7, its outlet being marked 11. On the top of the water-tube 10

3 there is an air-pipe 19, which is provided with an air-cock 20 and a goblet 21, this being continually filled with water. The air or gas which accumulates from the water escapes through this pipe 19, for which purpose the cock 20 has to be kept open as little and as much as needed. Pipe 24, which connects the bottom of the condenser 8 with the top of the tube 10 3, has a very small opening at 26, situated under the air-tube 19. The object of it is to allow an escape for steam or gas which may occur in the pipe 15. If the working stops, this connecting-tube 24 has to be shut in turning a cock 31, which is open during action. The steam-cone 12 is provided with small openings 29 in the highest place inside the water-cone 28. Any steam which otherwise would accumulate in this space will instantly be sucked in by the sharp steam which rushes through the cone 12 while the apparatus is working. A sieve 18 is placed under the outlet 27 of the water-cone 28 for the purpose of spreading and dividing the mixture of water and steam which rushes through this opening into the condenser 8.

Before working begins no steam has to be admitted through the channel of the cock 9 into the water. The cock 9 has therefore to be turned contrary to the position indicated in Fig. 1, so as to shut out the inlet from the steam-pipe 13 and to connect pipe 12 with 10. In this position all the space between the valves has to be filled with water. Cock 31 must be opened. Before the working begins cock 20 has to be opened very little, just so much as is needed to allow the escape of air from the water; but the goblet 21 is filled with water. If now there is steam in the boiler 23 and one opens the cock 9, as shown in the drawings, steam will rush through it and through the cone 12 into the cone 28. It carries the water with which it is condensed through the opening 27 and the sieve 18 into the condenser 8, where the condensation of all the steam is practically completed, and thus the hot water, of which the bulk is increased and which has acquired considerable velocity on its way through the tubes 15 16, could already by this fact alone rush into the boiler 23. Still more it is the case because of the column of water in 8, 15, and 16, which now is being exposed to equal pressure from

beneath and from above, and therefore falls into the boiler by its own weight already, whatever the pressure may be. Therefore vacuum is produced, by which reason water from the tank 5 must be sucked into the cone 28. Now the water column in the tank 5, as far as it overreaches the inlet 11, would by its own weight fall into the cone 28 because of the communication through pipe 24, wherewith the pressure is equalized above and beneath this column. This water will be replaced by new water from the supply or from pipe 1, as the case may be. If there is sucking through the opening 26 downward, the loss of energy by this fact is very small, the opening 26 being not more than, say, one-eighth of an inch, for instance, in diameter. For that this arrangement assures the precise working of the apparatus. The cock 20 has to be turned enough to give egress to the air and gas, which possibly might accumulate from the water and spoil the regular action of the feeding. The apparatus will now feed continually as long as there will be enough steam entering at 14 and enough water entering at 1 or at 3. If the dimensions of the feeder are proportionated, the level of the water will mount till it reaches the inlet of the steam-tube 14 at X X. If now the steam-tube will send water instead of steam, the effect of the injector will diminish and the level will fall, and so on. The water in the boiler must therefore remain practically on the same level. To stop working, one has only to turn cock 9 so as to shut the steam-inlet.

I am aware that prior to my present invention different self-acting feed-boilers have

been operating with injectors. I therefore do not claim such a combination broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination in a self-acting boiler, a condenser 8 located higher than the water-level in the boiler, an injector on the boiler, a water-tank connected thereto, said tank being situated higher than the condenser, the water-supply pipe, a pipe interposed between the same and the tank, the pipe 10 leading to the injector, the pipe 12 leading from the boiler to the pipe 10, a cock in said pipe controlling the communication between the pipes 10 and 13 and injector, a pipe connection between the bottom of the condenser and the boiler and a valve in the latter pipe, substantially as described.

2. The combination with the boiler, of a condenser, a pipe 15 leading from the same to the boiler, a supply-pipe, a pipe 3 leading from the latter, a pipe connection between the end thereof and the condenser, a pipe connection between the intermediate part of the pipe 3 and the condenser, a pipe connection from the upper part of the boiler to the condenser, a pipe 19 leading from the pipe 3 to the outer air and a pipe leading from the lower part of the condenser to said pipe 3, substantially as described.

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

ANTONIN COUFALIK.

Witnesses:

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