

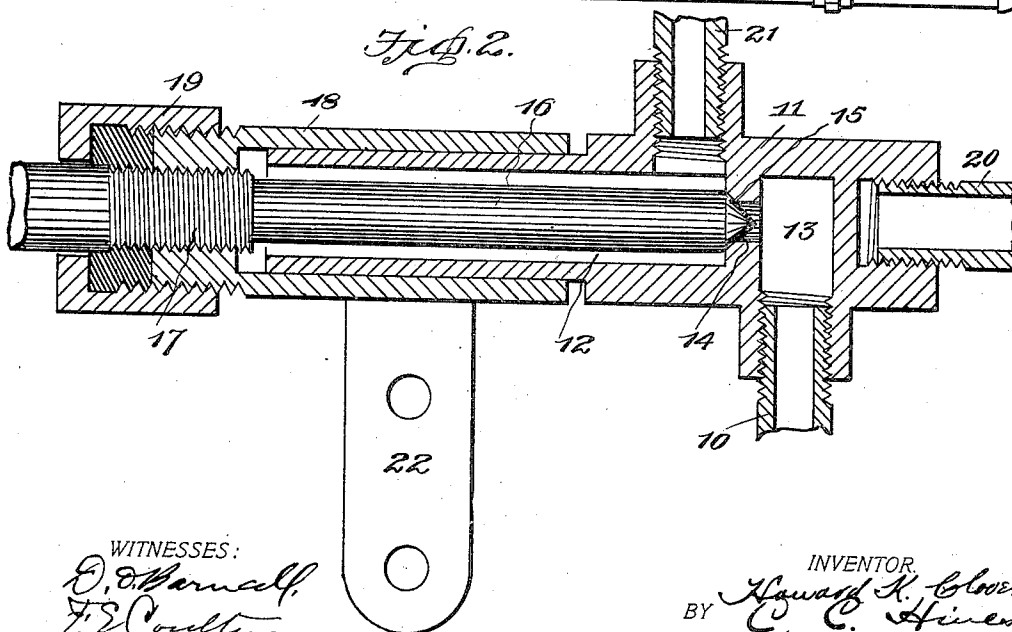
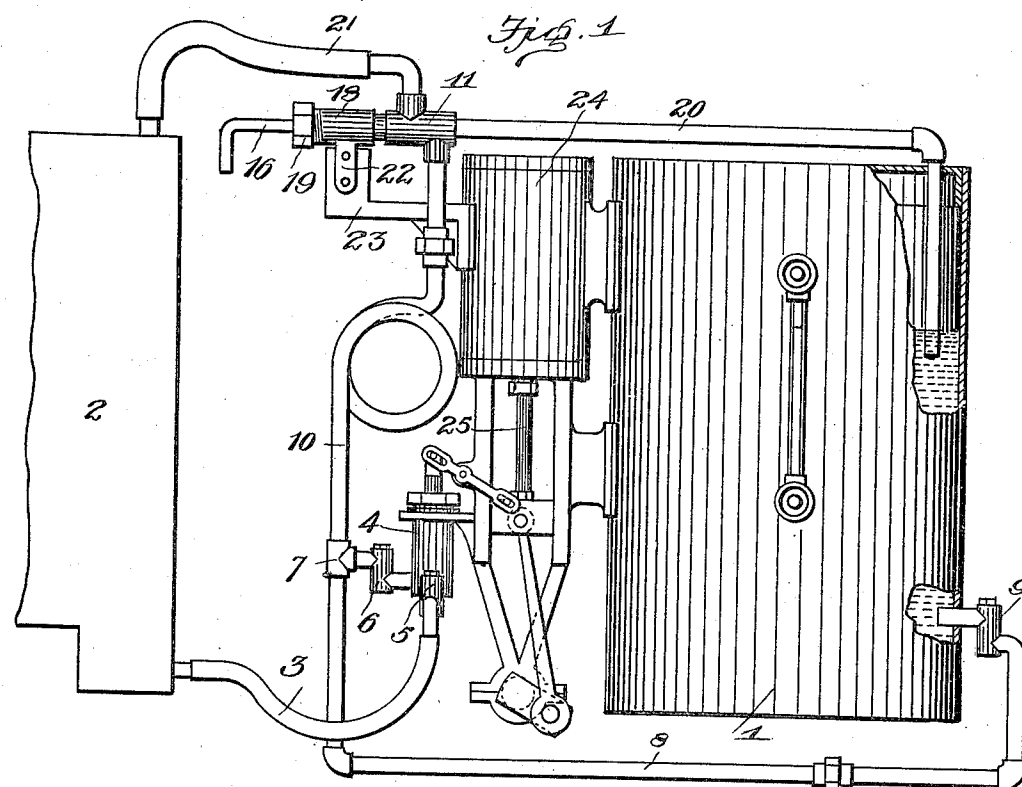
No. 679,252.

Patented July 23, 1901.

H. K. CLOVER.  
BOILER FEEDER.

(Application filed Sept. 25, 1900.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

HOWARD K. CLOVER, OF OMAHA, NEBRASKA.

## BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 679,252, dated July 23, 1901.

Application filed September 25, 1900. Serial No. 31,081. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD K. CLOVER, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Boiler-Feeders; and I do hereby declare the following to be a full, 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.

This invention relates to improvements in steam-boiler feeders.

One object of the present invention is to provide a feeder of the character described whereby a steam-boiler may be continuously fed with the requisite amount of water for making steam; and it is also an object of the present invention to provide a boiler-feeder which is entirely automatic in operation, so that the necessity of according the same attention is entirely obviated.

A further object of the invention is the provision, in a boiler-feeder, of simple and efficient means whereby when the water has reached the low-water line the feeder will commence to operate, and when the water has risen to a predetermined height the flow thereof will be automatically cut off and returned to the source of supply.

With these general objects in view, and others which will appear as the nature of the improvements is better understood, the invention consists, substantially, in the novel construction, combination, and arrangement of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation, partly in section, of a steam-boiler provided with a feeder constructed in accordance with the present invention. Fig. 2 is a longitudinal sectional view of the valve mechanism on an enlarged scale.

Referring to the drawings, the numeral 1 designates a steam-boiler, which may be of any approved construction, and 2 a tank which is utilized as the source of water-supply.

The numeral 3 designates a pipe leading from the water-tank 2, and arranged in said pipe is a pump 4, which may be operated through any suitable mechanism. Arranged at each side of the pump 4 are check-valves

5 and 6, said valves controlling the inflow and outflow of water to and from the pump 4. Connected to the water-pipe 3 by means of a T-coupling 7 is a feed-pipe 8, said pipe being provided with a check-valve 9, and said pipe 8 enters the boiler 1 at a point below the water-line in order to deliver the water from the pipe 3 to said boiler.

Connected to the upper end of the T-coupling 7 is the valve mechanism of the herein-described feeder, said mechanism being connected to said coupling by means of a branch pipe 10, and said mechanism comprises a casing 11, having at one of its ends a chamber 12 and provided with a vertically-disposed port 13, which communicates with the branch pipe 10. The port 13 communicates with the chamber 12 by a horizontally-disposed port 14, the end of which adjacent to the chamber 12 is flared to form a valve-seat 15. Coacting with the valve-seat 15 is a valve-stem 16, which stem is provided with a conical valve end adapted to fit upon the seat 15, said stem being screw-threaded, as at 17, for the reception of a screw-threaded sleeve 18, in which the contiguous end of the casing 11, in which the chamber 12 is formed, is slidably fitted. A cap 19 is threaded upon the sleeve 18, in which cap suitable packing may be placed in order to provide a tight joint between the valve-stem 17 and the sleeve 18.

Fitted in the end of the casing 11 which is opposite to the chamber 12 and in axial alignment with said chamber is a steam expansion-pipe 20, which leads from the boiler 1, and the lower end of said pipe terminates in said boiler at the low-water line of the latter. The upper end of the pipe 20, however, terminates adjacent to the vertically-disposed port 13 and by reason of this said port is in the direct path of the steam in the pipe 20, as will be hereinafter more fully pointed out. Communicating with the valve-chamber 12 at the top of the casing 11 is a by-pass 21, said by-pass also communicating with the water-tank 2, so that the water may be returned to the tank 2 when it is not desired to feed the same to the boiler.

Having fully stated the construction of the herein-described apparatus, the operation thereof is as follows: When the water in the boiler 1 falls below the low-water line, and

thereby opens the lower end of the pipe 20, steam will at once rush into said pipe and filling the same will expand said pipe and also expand the casing 11 at and adjacent to the port 14. Through such expansion the valve-casing is caused to slide outward in the sleeve 18, and the port 14 becomes closed by coaction with the valve-stem 16, and thus communication from the port 13 to the valve-chamber 12 is shut off. The pump 4 being at work, it is obvious that water will be forced from the tank 2 through the pipe 3, the coupling 7, and into the pipe 8. As the port 14 is closed the water cannot flow into the chamber 12, and therefore must be delivered to the boiler 1 under the full head of pressure of the pump 4. When, however, the water rises above the low-water level in the boiler 1, the flow of steam into the pipe 20 will be immediately cut off and the steam therein condensed, and as such condensation cools the pipe 20, together with the casing 11, said pipe and casing contract, and the latter moves inwardly or away from the valve, and thereby opens the port 14, so that communication between the port 13 and the chamber 12 is afforded. The water forced into the pipe 8 will therefore flow through the port 14 into the chamber 12 and out through the by-pass 21 back to the water-tank 2, and the greater the degree of contraction of the pipe 20 and casing 11 the greater the outflow of the water and the greater the decrease in the feed of the water to the boiler. The rising of the water in the pipe 20 also conduces to contraction thereof. Should the boiler be feeding too rapidly, the amount of feed can be reduced to the required extent by simply unscrewing the valve-stem 16, thereby affording a larger opening between the port 14 and the chamber 12, and, on the other hand, should the boiler be feeding too slowly under ordinary circumstances the amount of water fed thereto can be increased by simply screwing the valve-stem 16, so that the conical end thereof will advance toward the seat 15, so as to decrease the opening at this point.

In practice I may rigidly mount the sleeve 18 in any preferred manner to hold it and the valve-stem 16 against longitudinal displacement. A desirable construction to this end is to provide said sleeve with an arm 22 for connection with a bracket 23, extending from the engine-cylinder 24, which is suitably attached to the boiler. The pump 4 is operated through the medium of any suitable construction of mechanism connecting it with the piston-rod 25 of said cylinder. The upper end of the branch pipe 10 is adapted to yield to allow the valve-casing 11 to move, as is also the by-pass 21, which is preferably provided with a flexible portion in the form of a hose-pipe to allow the said valve-casing to slide freely outward on the sleeve 18 and toward the valve when the pipe 20 expands. Any

other suitable manner of mounting the parts to secure the same result may, however, be employed.

While the valve-stem 16 is shown as applied in a manner which is deemed preferable, the same may be used on the expanding pipe or tube, and it is also obvious that the invention is susceptible of various changes in the form, proportion, and minor details of construction, and the right is therefore reserved to modify or vary the invention as falls within the spirit and scope thereof and as experience and use may require.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a boiler-feeder, the combination with a boiler, and a water-supply, of a supply-pipe leading from said water-supply, a pump arranged in said pipe, a feed-pipe discharging into the boiler and connected to said supply-pipe, a steam expansion-pipe leading from the boiler, a valve-casing connected to the steam-pipe and in communication with said supply and feed pipes, a sleeve to which the valve-casing is movably connected, a by-pass leading from the valve-casing to the water-supply, and a valve carried by said sleeve and controlling the flow of water to said by-pass, said valve being seated and unseated by the movement of the valve-casing due to expansion and contraction, substantially as described.

2. In a boiler-feeder, a source of water-supply, a steam-pipe, a valve-casing connected to said water-supply and steam-pipe, a by-pass leading from the valve-casing, and a valve toward and from which the valve-casing is adapted to move, said valve being adjustably mounted, substantially as described.

3. In a boiler-feeder, a valve, a valve-casing having a port and movable toward and from the valve to open and close the port, water-supplying means, a steam-pipe connected to the valve-casing, and a by-pass leading from said valve-casing, substantially as described.

4. In a boiler-feeder, a source of water-supply, a steam-pipe, water-supplying means, a valve-casing connected at one end to said pipe and having at its opposite end a chamber, and also having ports communicating with each other and with said water-supplying means and chamber, a by-pass leading from said chamber, a sleeve in which the chambered end of the valve is slidably fitted, and a valve adjustably mounted in said sleeve and projecting into the valve-chamber, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD K. CLOVER.

Witnesses:

RUDOLPH RIX,  
F. E. COULTER.