

No. 671,323.

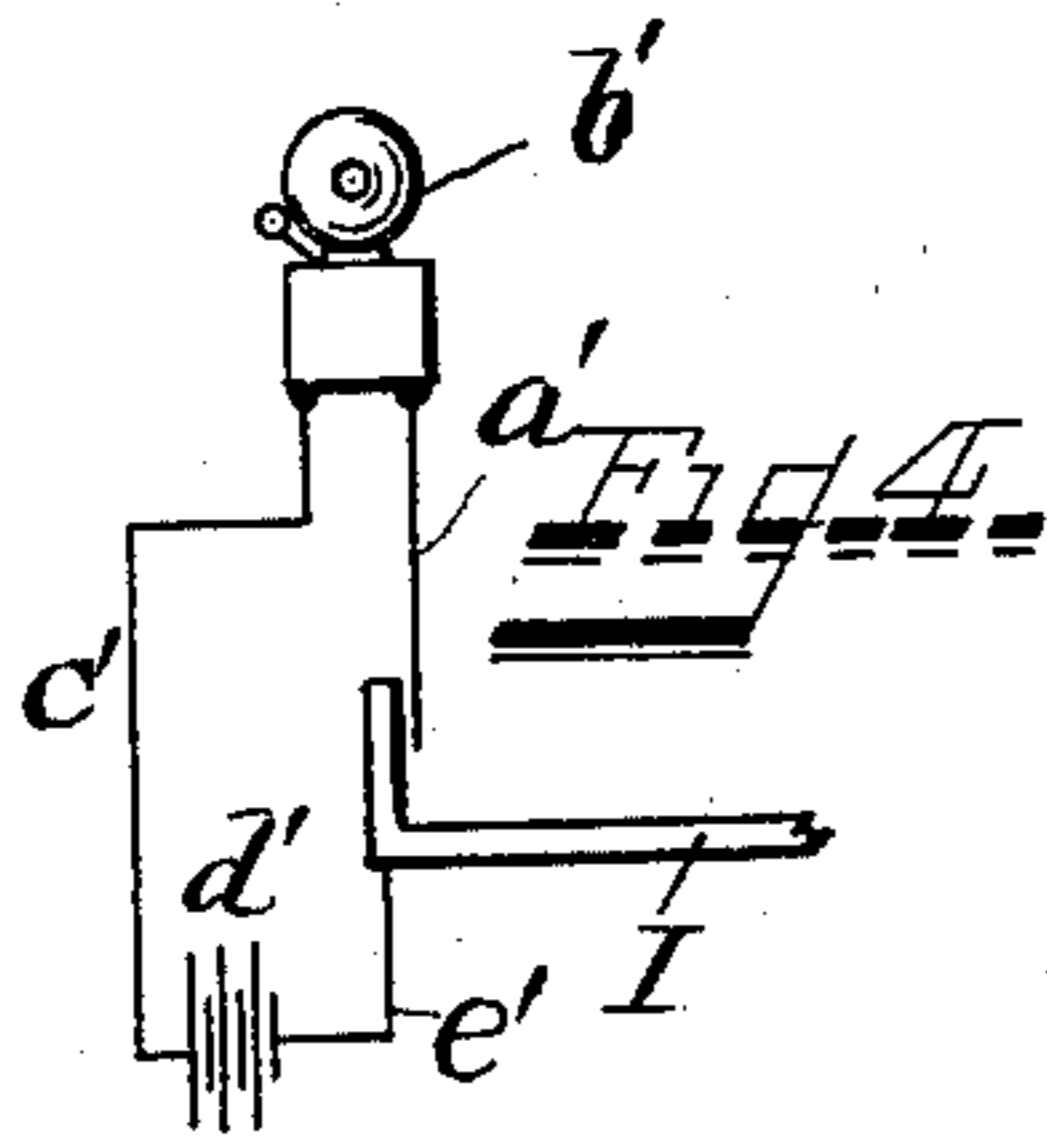
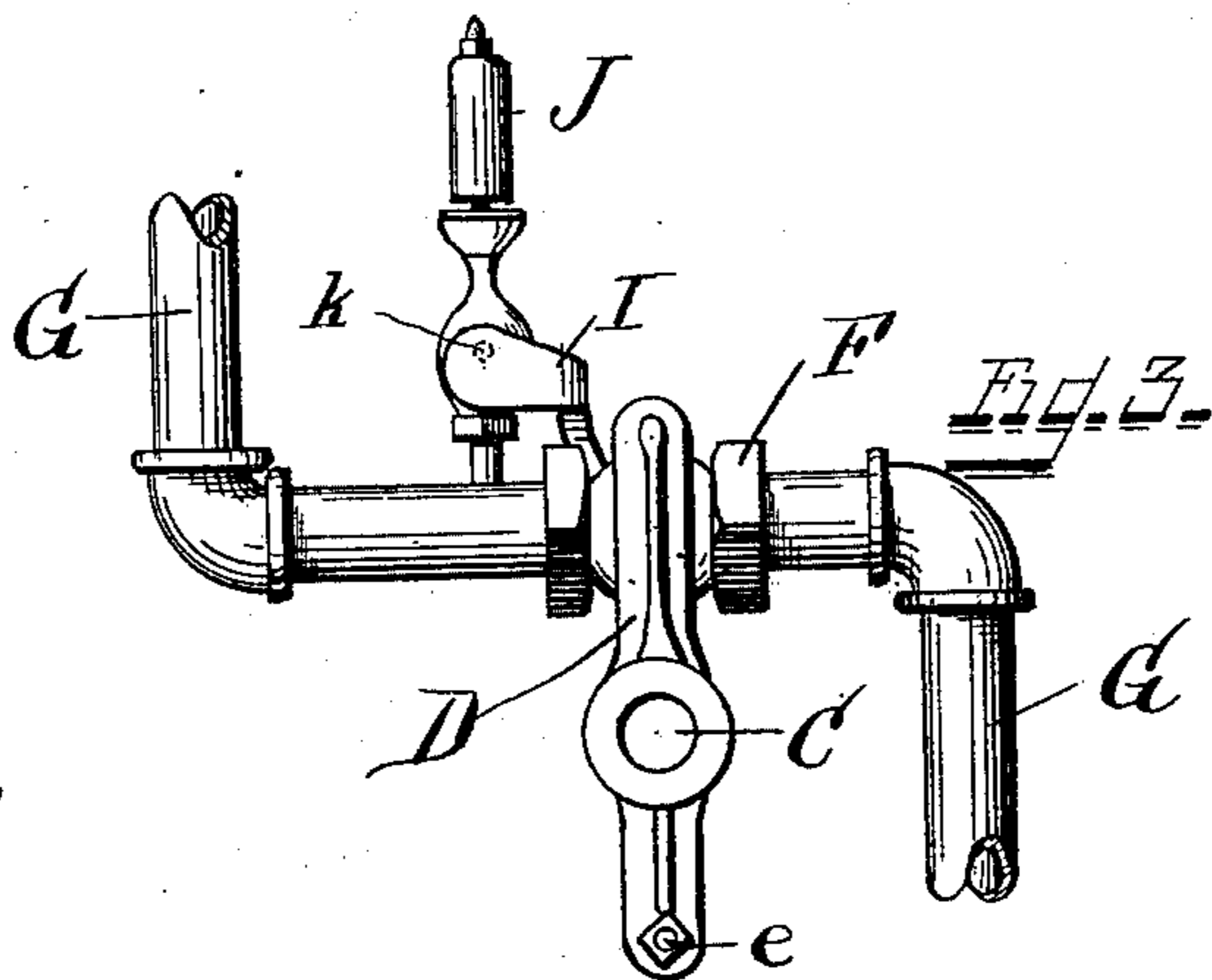
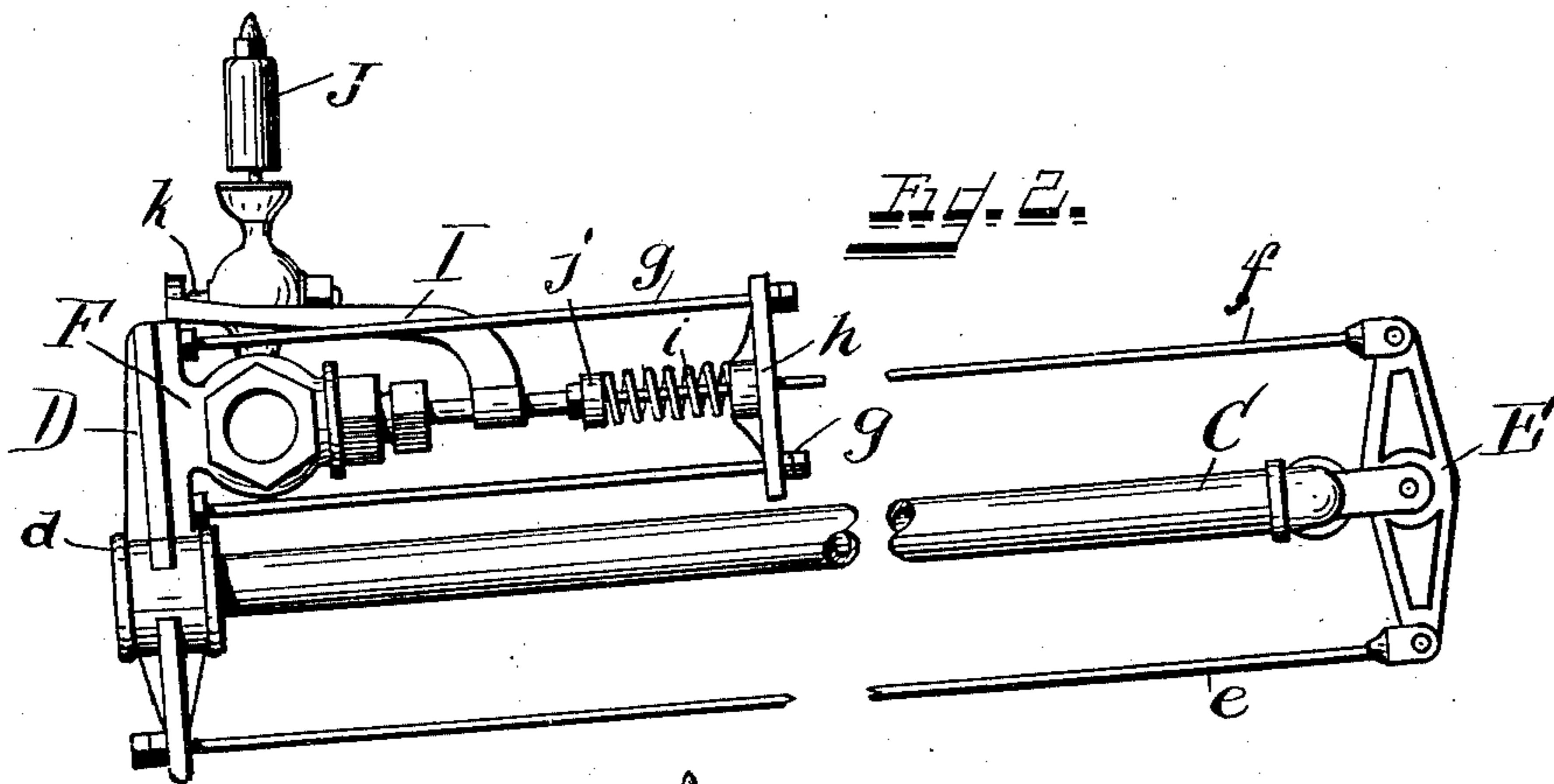
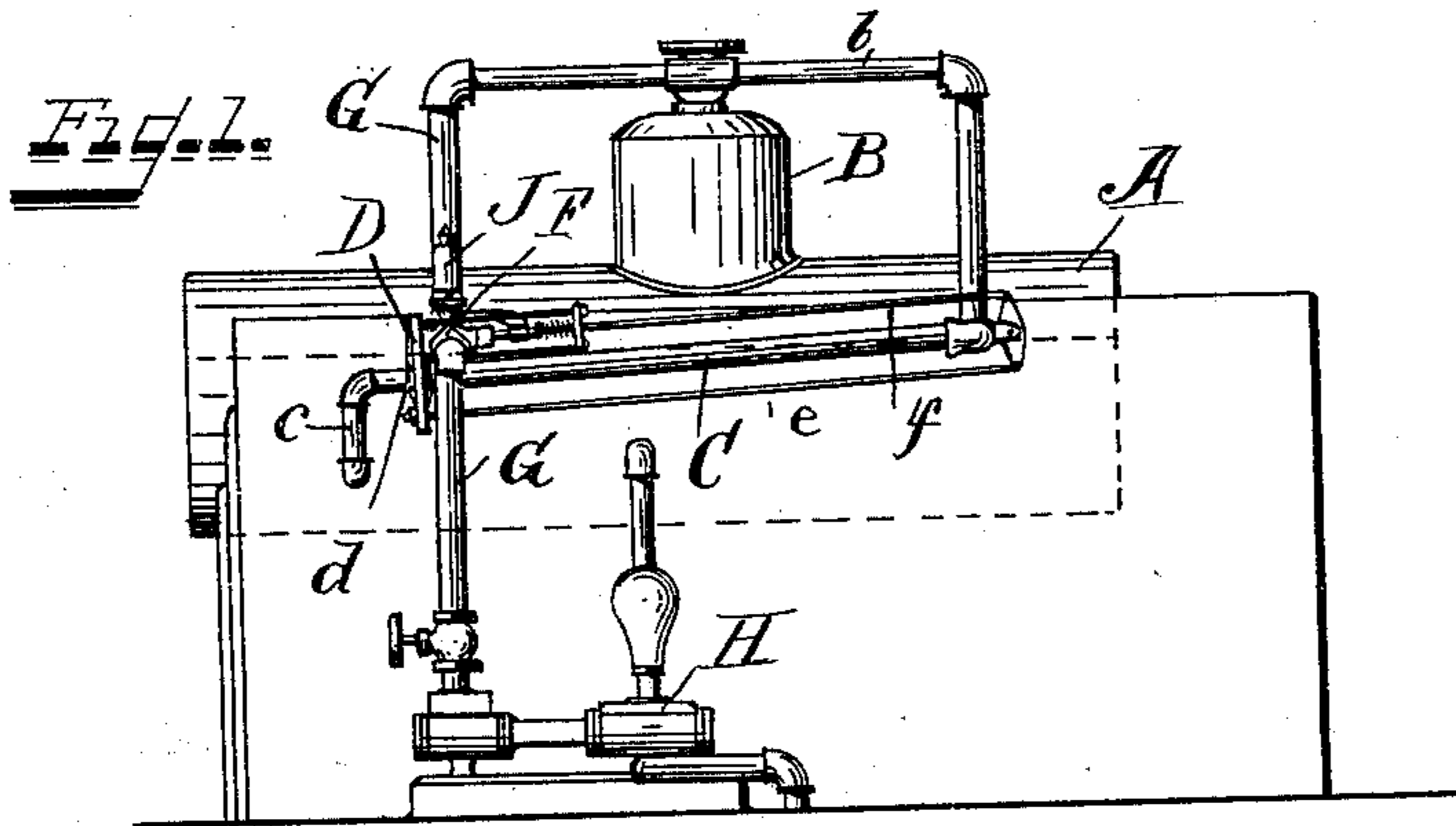
Patented Apr. 2, 1901.

C. L. MILD.

FEED WATER REGULATOR AND LOW WATER ALARM.

(Application filed May 24, 1900.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES L. MILD, OF HAMILTON, OHIO.

FEED-WATER REGULATOR AND LOW-WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 671,323, dated April 2, 1901.

Application filed May 24, 1900. Serial No. 17,878. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. MILD, a citizen of the United States, residing at Hamilton, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Feed-Water Regulators and Low-Water Alarms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of feed-water regulators and low-water alarms for boilers in which an exterior thermostat arranged at or about the normal water-line upon the exterior of the side of the boiler and at a slight angle to the said water-line by its expansion and contraction controlled by the height of the water in the boiler operates a valve, admitting steam to the feed-water pump of the boiler and at the same time, should the water become dangerously low by reason of the failure of the pump to work from any cause, operates an alarm, such as a whistle or bell, to give notice to the attendant of the failure of the pump to do its duty; and it has for its object the provision of simple and efficient means for accomplishing these results.

The novelty of my invention will be hereinafter more fully set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of a boiler and a feed-pump, showing the application of my invention thereto. Fig. 2 is an enlarged side elevation, partly broken, of the thermostat and alarm embodying my invention. Fig. 3 is an end elevation, partly broken, looking to the right of Fig. 2. Fig. 4 is a detail view of a modification of the alarm mechanism.

The same letters of reference are used to indicate identical parts in all the figures.

The thermostat mechanism is substantially that of prior patent, No. 495,302, issued April 11, 1893, to Emory M. Carr, and in describing it it is only necessary to say A represents a boiler of the usual or any suitable construction, having the usual steam-dome B, from which a pipe *b* leads to one end of a copper or other suitable pipe C, placed on a slight angle on the outside of the boiler-casing and at about the normal water-line, as shown in Fig. 1, and is made so as to be capable of ex-

pansion when subjected to heat or of contraction when the heat is reduced. The opposite end of this pipe C has a pipe connection *c* with the boiler near its bottom, while the forward end of the pipe C, at *d*, has a cross-head D, Fig. 2, rigidly attached thereto and to which is attached, below the pipe C, a rod *e*, which extends rearwardly and parallel with the pipe C and is pivoted at its rear end to a lever E, fulcrumed at its middle to the rear end of the pipe C or to a headpiece thereon. The opposite or upper end of the lever E is pivoted to a similar rod *f*, which extends forward and parallel to the first-mentioned rod *e* and which is connected on its forward end to the operating-stem of a valve in a casing F, Fig. 2, which valve is located in a steam-pipe G, which extends from the steam-dome of the boiler to the feed-water pump H, Fig. 1, which may be of the usual or any suitable construction. The casing F of this valve is fastened on the cross-head D by a pair of rearwardly-extending rods *g g*, one above and the other below the rod *f* and connected together at their rear ends by a second cross-head *h*. A coiled spring *i* surrounds the rod *f* and has its rear end bearing against the forward side of the cross-head *h* and its forward end bearing against the rearward end of a collar *j*, fast on the rod *f*.

It will be seen from the foregoing description that any expansion in the pipe C in a lineal direction produces twice the amount of movement in the rod *f* and also that the spring *i* is constantly tending to close the valve in the casing F.

Fast on the rod *f*, between the cross-head *h* and the valve F, is an arm I, bent upwardly and forwardly and having its forward end bent toward the boiler. Secured on the pipe G, between the boiler and the valve in the casing F, Fig. 3, is a whistle J, having its valve-stem *k* in line with the movement of the arm I, so that when the arm I has traveled a given distance its bent end comes in contact with the valve-stem of the whistle, thereby opening the valve of the same and causing the whistle to sound.

The operation of my device is as follows: When the water in the boiler begins to lower beneath its normal level, it at the same time begins to drain the pipe C, which admits live

steam thereto at its rear end, thereby heating the pipe C and causing it to expand in a lineal direction, which produces movement in the lever E, which has its lower end held
 5 from lineal movement by the rod e, and which consequently moves the rod f twice the distance of the expansion in the pipe C, thereby opening the valve in the casing F and causing more steam to be admitted to the feed-
 10 pump H. If, however, the feed-pump refuses to perform its duty by becoming clogged or from any other cause and the water in the boiler continues to descend, the pipe C will continue to expand as more steam is admitted
 15 to it until the arm I comes in contact with the whistle-valve stem, when the whistle will be sounded, thereby announcing to the attendant that the water in the boiler has reached the danger-line.

20 While I prefer the use of a whistle sounded from the boiler as the simplest and surest means of producing the alarm, yet it is evident that other audible alarms may be employed, and in Fig. 4 I have illustrated one where the
 25 arm I is brought into contact with a closed-circuit-battery wire a', in which is placed an electric bell b', having a wire c' extending to the battery d' on one side, and from which a wire e' on the opposite side extends to the
 30 arm I, so that when the arm I is brought in contact with the wire a', the circuit will be established and the bell will be rung to attract the attention of the attendant.

Having thus fully described my invention,
 35 I claim—

1. A feed-water regulator and low-water alarm comprising an expansion and contraction pipe arranged alongside a boiler in an inclined position and at or about the normal
 40 water-line thereof, the lower end of said pipe

being connected with the water-space of the boiler and the upper end with the steam-space thereof, a lever pivoted between its ends on the upper free end of the said pipe and having one end connected to a fixed point and its
 45 opposite end pivoted to a rod connected to the stem of a valve in a pipe leading from the steam-space of the boiler to a feed-pump therefor, a spring normally tending to close said valve, an audible alarm to be set in action by
 50 a contact located near said last-named pipe, and an arm carried by the valve-stem to effect such contact when the water in the boiler reaches a dangerously low level and the pump fails to do its duty, substantially as described. 55

2. A feed-water regulator and low-water alarm comprising an expansion and contraction pipe arranged alongside a boiler in an inclined position and at or about the normal water-line thereof, the lower end of said pipe
 60 being connected with the water-space of the boiler and the upper end with the steam-space thereof, a lever pivoted between its ends on the upper free end of said pipe and having one end connected to a fixed point and its op-
 65 posite end pivoted to a rod connected to the stem of a valve in a pipe leading from the steam-space of the boiler to a feed-pump therefor, a spring normally tending to close said valve, a steam-whistle to be set in action by a
 70 valve-stem located near said last-named pipe, and an arm carried by the valve-stem to operate the whistle-valve stem when the water in the boiler reaches a dangerously low level and the pump fails to do its duty, substan-
 75 tially as described.

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Witnesses:

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