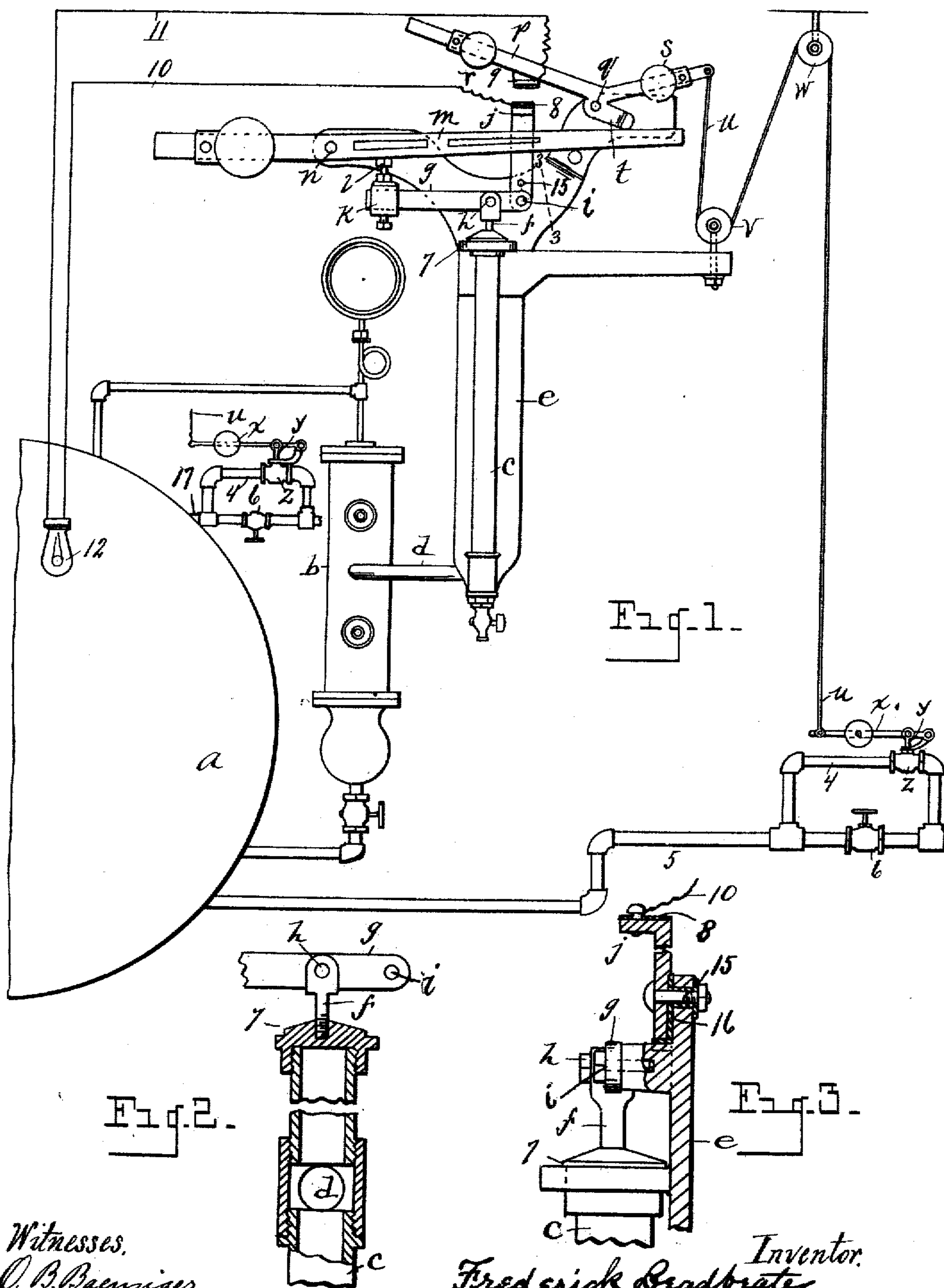


No. 814,305.


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F. LEADBEATER.
BOILER FEEDER.

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FREDERICK LEADBEATER, OF DETROIT, MICHIGAN.

BOILER-FEEDER.

No. 814,305.

Specification of Letters Patent.

Patented March 6, 1906.

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To all whom it may concern:

Be it known that I, FREDERICK LEADBEATER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Boiler - Feeders, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this specification.

My present invention is designed to provide certain new and useful improvements in an automatic boiler-feed of superior simplicity and utility.

I carry out my invention as herein described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation illustrating my invention. Fig. 2 is a view in vertical section through a portion of the expansion-tube. Fig. 3 is a view in section on the line 3 3, Fig. 1.

My invention is more particularly designed to provide means to control a feed-valve—as, for example, a valve controlling the passage of the steam from the boiler to the pump, where a single boiler is employed, or the passage of water through the main feed-pipe where a battery of boilers is employed.

I accomplish my object by means of an expansion-tube connected into the water-column of the boiler, together with intervening mechanism, and whereby an electric signal device will also be actuated in consequence of the expansion of said tube.

The desirability of an automatic boiler-feed by which the supply of water to the boiler will be effectually controlled and whereby the supply will be cut off when the water in the boiler is at a sufficient height is well understood.

In the accompanying drawings, *a* represents a boiler, and *b* a water-column connected therewith in the usual manner. An expansion-tube is indicated at *c*, communicating with the water-column through a connecting-pipe *d*. The connecting-pipe *d* is preferably connected with the second gage-cock of the water-column. A supporting frame or bracket *e* may be employed to support the expansion-tube and other features of the device. This frame or bracket may be itself supported in any desired manner. The upper end of the expansion-tube is provided with a supporting-standard *f*, upon which is pivotally supported a lever *g*, the pivot being shown at *h*. The adjacent end of the lever is

fulcrumed, as indicated at *i*, upon the bracket *e*. An arm constituting a stop *j* is also secured upon the said bracket and may be secured thereto by a bolt 15. The opposite end of the lever *g* is shown provided with a slide *k*, movable longitudinally of the lever, said slide being preferably provided with an adjustable screw *l*. Upon an arm of the bracket *e* is also fulcrumed an independent lever *m*, as indicated at *n*, the lever resting normally upon the head of the adjacent screw *l*. Upon an arm of the bracket *e* is also fulcrumed a bifurcated rocking lever *p*, as indicated at *q*. Upon the two arms of the bifurcated lever *p* are located adjustable weights, (indicated at *r* and *s*.) The lever is provided with an arm *t*, projecting beneath and preferably laterally from the fulcrum *q*, the lower extremity of the arm *t* being in contact with the lever *m* toward its outer end, as shown. The lever as constructed and arranged is in the nature of a counterbalance-lever and is designed to relieve the pressure on the lever *m*, the amount of pressure relieved being controlled by the adjustment of the weights, the adjustment being preferably such that the arms are quite or nearly balanced, although one of the weights is preferably so adjusted as to insure the valve controlled thereby dropping to its seat. Connected with one of the arms of the counterbalance-lever is a cord or chain, (indicated at *u*, which is preferably led about a pulley *v*, supported upon an arm of the bracket *e*, said cord or chain being preferably led about an additional pulley *w*, supported in any desired manner. The opposite end of the said cord or chain is connected with a lever *x*, arranged to actuate a valve-stem *y* of a valve *z*, said valve being preferably located in a by-pass, (indicated by the numeral 4,) which may be connected with the feed-pipe 5. Where the valve is in the water-feed pipe, said pipe may also be provided with a hand-operated valve 6, whereby the feed-pipe may be controlled independently of the automatic feeding mechanism, if desired. Where a single boiler is used, the valve *z* may be located in a by-pass of the steam-pipe 17. Where a battery of boilers is employed, the valve may be located in the water-supply pipe 5.

It will be obvious that by means of the counterbalance-lever the resistance will be relieved upon the top of the expansion-tube, the strain being taken off largely thereby from the lever *g*. It will readily be seen that if the cord *u* were connected with the outer

end of the lever *m* the strain upon the lever would be very great. By the interposition, however, of the counterbalance-lever and the connection of the cord *u* with one arm thereof as described the expansion of the tube *c* has practically only to lift the lever *m*. Inasmuch as at the instant when the lever touches the rocking center or end of the arm *t* the weight upon one arm of the counterbalance-lever will throw the lever down, thereby actuating the valve, the leverage can readily be altered by moving the slide *k* upon the lever *j*.

The expansible pipe *c* is provided with a cap 7, carrying the support *f*, by which the system of contact-levers hereinbefore described is actuated by the expansion of said pipe. The lever *g* is shown to contact with the lever *m* toward the end thereof adjacent to the fulcrum *n*. The contact-arm *t* of the counterbalance-lever *p* is arranged, as shown, to contact with the lever *n* toward the outer end thereof. The stop *j* is provided with an electrical contact, (indicated at 8,) and the arm *p* with an electrical contact 9. With said contacts are connected electrical conductors 10 and 11, forming an electrical circuit when the contacts are in closed position, in which is located a signal-light 12. It will readily be seen that when the counterbalance-lever *p* is actuated by the movement of the lever *m* the electric circuit will be closed and the signal-light displayed. The signal will of course only be displayed when the water is low in the boiler. It is obvious that instead of a signal-light a signal-bell might be located in the circuit.

The stop *j* is shown insulated from the bracket *e*, as indicated by the numeral 16.

What I claim as my invention is—

1. The combination with a boiler of a valve, an expansible tube communicating with the boiler, a lever actuated by the expansion of said tube, and a counterbalanced rocking device contacting with said lever and connected with said valve to relieve the pressure upon said lever.

2. The combination with a boiler provided with a water-column and with a feed-pipe, of a valve in the feed-pipe, an expansible tube communicating with the water-column, a primary lever actuated by the expansion of said tube, an additional lever actuated by the

movement of the first-named lever, a counterbalance device actuated by the movement of the said additional lever, and means to connect said device with said valve.

3. The combination with a boiler provided with a water-column and with a feed-pipe, of a valve to control the feed-pipe, an expansible tube communicating with the water-column, a support for said tube, contact-levers fulcrumed on said support actuated by the expansion of said tube, said levers comprising a counterbalance-lever, and means to connect said counterbalance-lever with said valve.

4. The combination with a boiler provided with a feed-pipe, a valve in the feed-pipe, an expansible tube communicating with the boiler, a system of levers actuated by the expansion of said tube, said system of levers comprising a counterbalance device connected with said valve, and an electrical circuit provided with a signal device, said circuit provided with contacts, whereby the circuit will be closed and opened by the operation of the counterbalance device.

5. The combination with a boiler provided with a water-column and with a feed-pipe, of a valve in the feed-pipe, an expansible tube communicating with the water-column, a primary lever actuated by the expansion of said tube, an additional lever actuated by the movement of the first-named lever, a counterbalance device actuated by the movement of the said additional lever, and means to connect said device with said valve, the primary lever provided with an adjustable contact-slide.

6. The combination with a boiler provided with a feed-pipe, of a valve in the feed-pipe, an expansible tube communicating with the boiler, and a system of levers actuated by the expansion of said tube, said system of levers comprising a counterbalance device consisting of a two-armed rocking lever provided with weights adjustable upon said arms and with a contact-point.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FREDERICK LEADBEATER.

Witnesses:

N. S. WRIGHT,
M. S. ALLEN.