

(No Model.)

2 Sheets—Sheet 1.

S. S. FLEMING.

FEED WATER MECHANISM FOR STEAM BOILERS.

No. 468,014.

Patented Feb. 2, 1892.

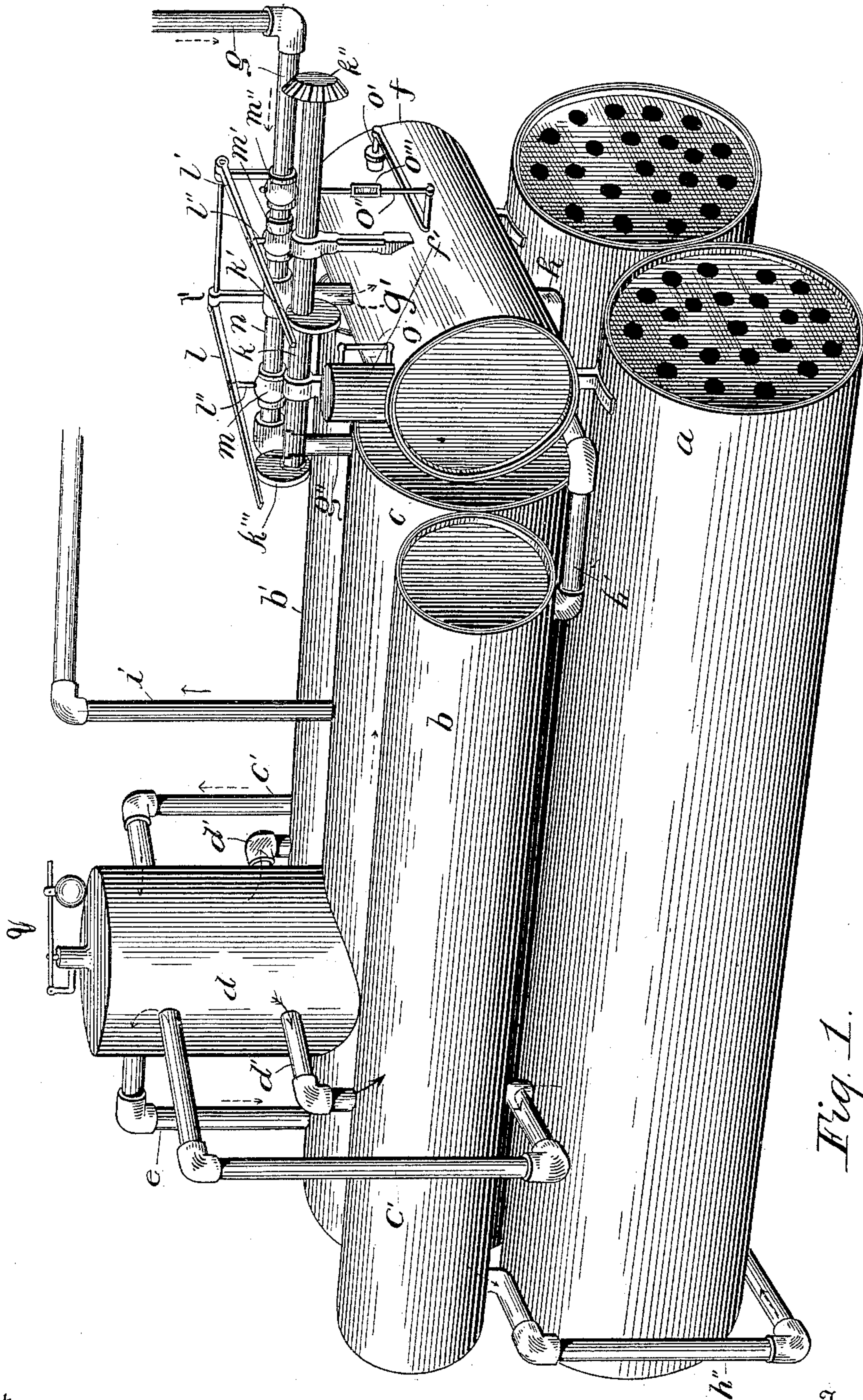


Fig. 1.

Witnesses

C. C. Burdine  
Geo. H. Wheelock

Inventor

Samuel S. Fleming  
per R. H. Boyce  
his Attorney

(No Model.)

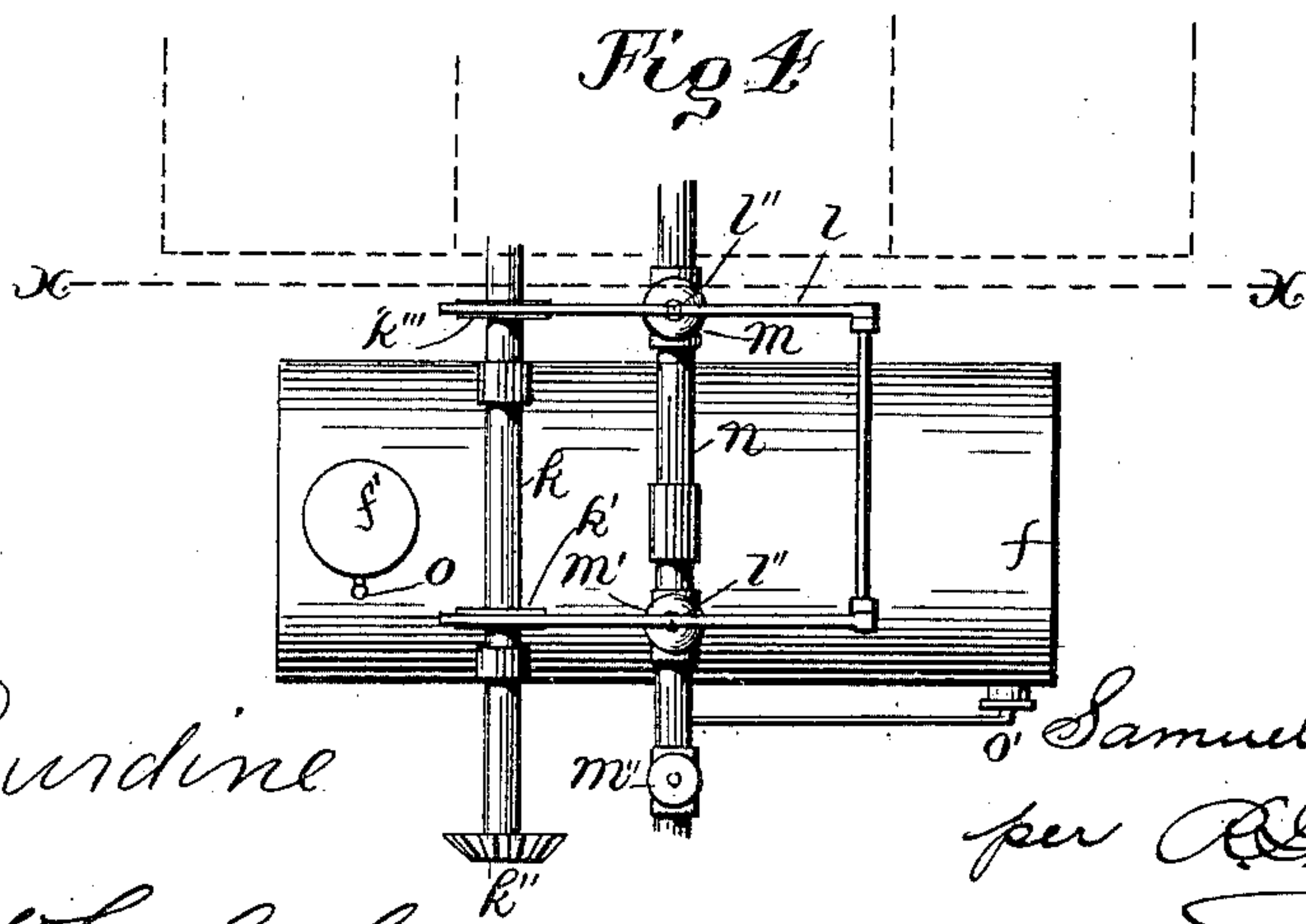
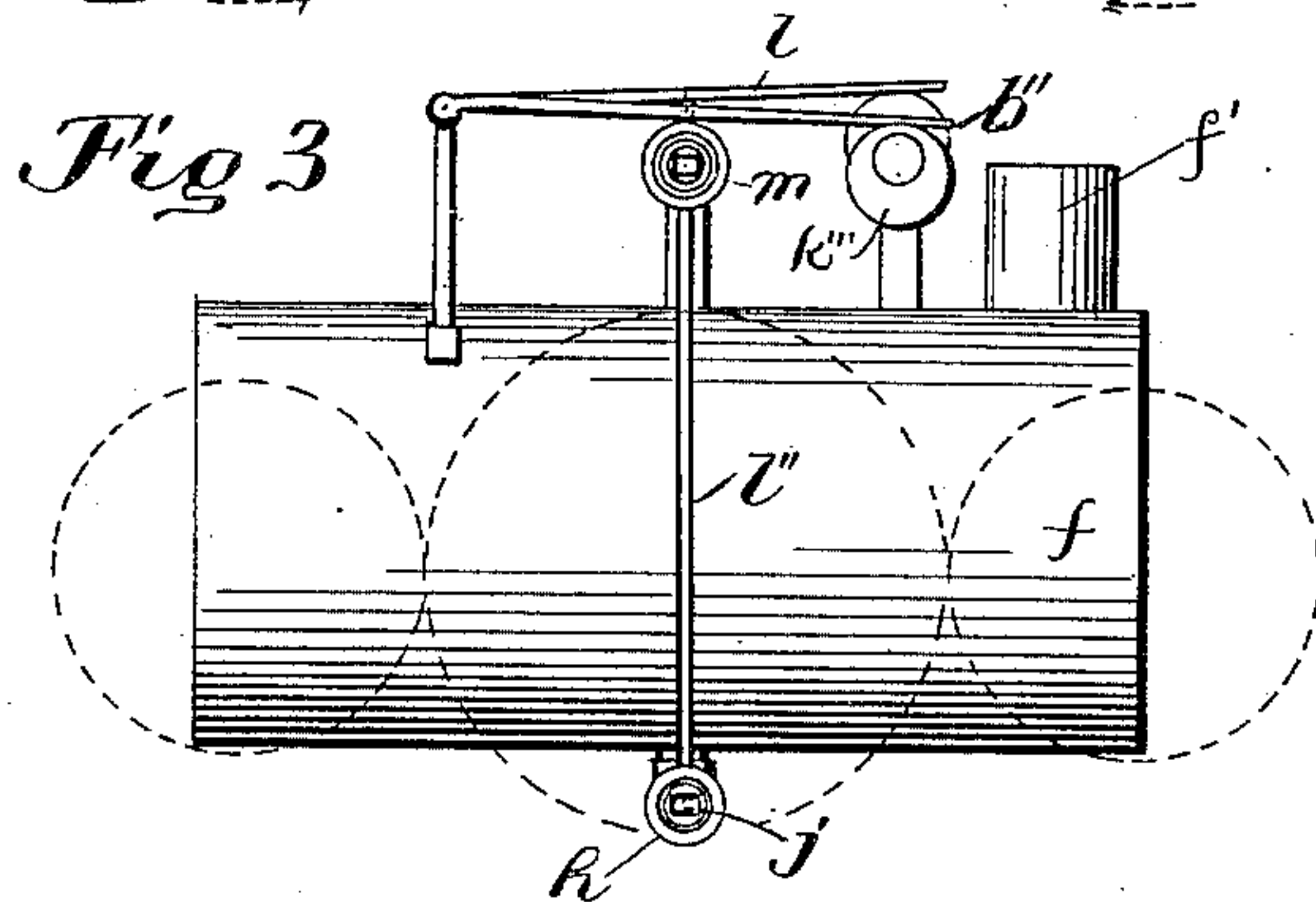
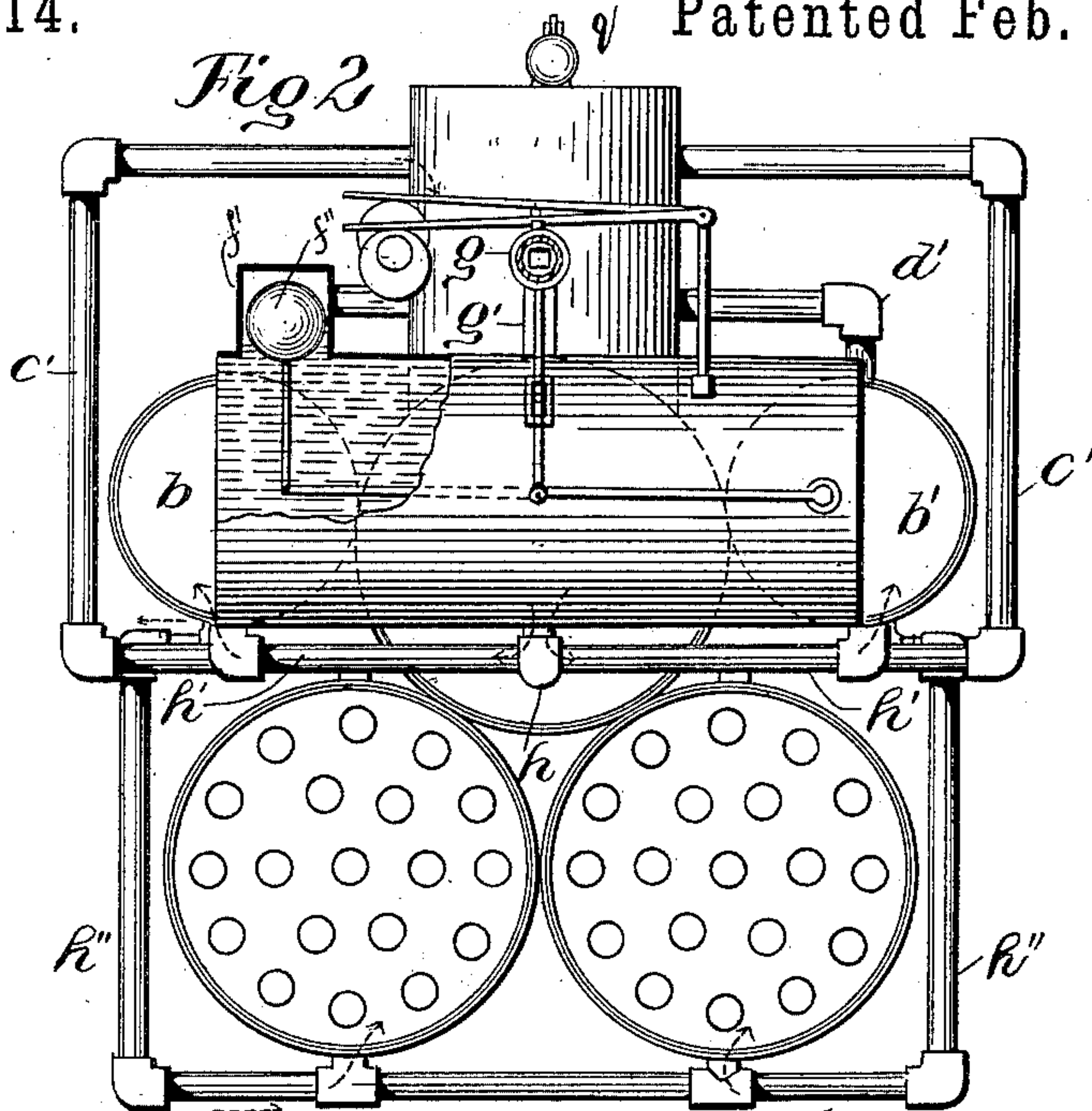
2 Sheets—Sheet 2.

S. S. FLEMING.

FEED WATER MECHANISM FOR STEAM BOILERS.

No. 468,014.

Patented Feb. 2, 1892.



Witnesses  
C. C. Burdine  
Geo. L. Wheelock

Inventor  
S. S. Fleming  
per R. D. Foig.  
his Attorney.



# UNITED STATES PATENT OFFICE.

SAMUEL S. FLEMING, OF SARVERSVILLE, PENNSYLVANIA.

## FEED-WATER MECHANISM FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 468,014, dated February 2, 1892.

Application filed May 22, 1891. Serial No. 393,747. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL S. FLEMING, a citizen of the United States, residing at Sarversville, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Mechanism for Steam-Boilers; 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.

My invention is intended as an improvement on my prior patent, No. 445,760, dated February 3, 1891, the object of my present invention being to provide a more perfect and an automatic arrangement for feeding the water to the boilers.

With this end in view my invention consists in the peculiar features and combinations of parts more fully described hereinafter, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a perspective view of my complete invention; Fig. 2, a rear end view; Figs. 3 and 4, views of details.

Referring to the drawings, the reference-letter *a* denotes a pair of twin boilers provided with flues and adapted to be placed upon any suitable setting. A pair of twin water-tanks *b b'*, cylindrical in shape and extending longitudinally with the boilers, are placed over the latter and a dry-steam drum *c* is interposed between these tanks with its lower circumference resting upon the boilers, as more clearly seen in Fig. 2. This dry-steam drum is thus placed, in order that the steam may be better reheated as it passes out to the engine, and also to give compactness to the whole structure. A vertical steam-receiving dome *d* is mounted upon the top of the forward portion of the dry-steam drum *c* and receives the steam directly from the boilers through pipes *c' c'*. Any condensed steam will be carried off through lateral pipes *d'*, leading down to the tanks *b b'*, while the live steam passes on down through pipe *e*, leading into the front end of dry-steam drum *c*. The water-tanks *b b'* and dry-steam drum *c* are shortened at the rear ends to accommodate an auxiliary water cylinder or tank *f*, placed transversely over the rear ends of the boilers. The supply of water enters the top of this

tank *f* through valved pipe *h* and branch pipes *h'* to the water-tanks *b b'*, thence through these tanks into the boilers through branch pipes *h''*. It is then generated into steam, which rises into dome *d*, thence passes down through pipe *e* and out through dry-steam chamber *c* and up through pipe *i* to the engine.

The general structure just described, being shown and fully set forth in my prior patent before mentioned, will not require further description.

I will now proceed to describe the automatic feed-water mechanism used in connection therewith and which forms the principle subject-matter of the present specification. This mechanism consists of a horizontal driven shaft *k*, provided with alternating eccentric cams *k' k''*, driven by a beveled gear *k'''*. These eccentric cams reciprocate a pair of second-class levers *l*, fulcrumed on standards *l'* and connected with vertical rods *l''*, which rods are in turn attached to valves *m m'* in horizontal water-supply pipe *g* and also the valve *j* in pipe *h*, Fig. 3. The auxiliary water-tank *f* is provided with a dome *f'*, which contains a float *f''*, and it is also provided with a water-gage *o* to indicate the height of the water within. The float actuates a governor-valve *m''* through the medium of a bell-crank lever *o'*, fulcrumed in the side of the tank, and a vertical rod *o''*. The latter is provided with a turn-buckle *o'''* for adjusting its length, and hence regulating the amount of cut-off to the valve and the supply of water to the tank. The dry-steam cylinder is connected with the pipe *g* and tank *f* through short vertical pipe *g''*. The flow of water from the auxiliary tank *f* through pipes *h'* is regulated by a valve *j* in short pipe *h*, Fig. 3, which valve is operated by the rod *l''*, connected to lever *l*, whereby both the valves *m* and *j* are opened simultaneously, the latter to draw off the water and the former to admit steam into the tank to overcome or balance the back-pressure from the boiler.

The preferred construction of my machine having thus been set forth, I will now proceed to describe its operation. Water is supplied to auxiliary tank *f* through pipes *g* and *g'*. When the tank becomes full, the float rises, lifts the bell-crank lever, and cuts off



or lessens the supply by closing the governor-valve  $m''$ . The cam-shaft  $k$  is made to continuously revolve through the medium of bevel-gear  $k''$ , and in so doing intermittently  
 5 opens and closes the valves  $m$   $m'$   $j$ . If governor-valve  $m''$  is closed, no water will be admitted to the tank by such intermittent opening and closing; but when it is open the water enters the pipe  $g$  between valves  $m$  and  $m'$   
 10 and is emptied from the pipe as soon as the eccentric cam  $k'''$  lifts the lever  $l$  and opens valves  $m$  and  $j$ , Figs. 1 and 3. At each admission of water to the tank  $f$  the eccentric cam  $k'$  allows the lever  $l'$  to descend and close  
 15 valve  $m'$ , so that the dry steam from chamber  $c$  forces the water down into the tank  $f$ . Simultaneous with the admission of water to the upper part of the tank it is drawn off below and passes on to the tanks  $b b'$ , from which  
 20 it passes to the boiler and pursues the course hereinbefore outlined. Any excess of steam escapes at the safety-valve  $q$ .

It is evident that my invention could be varied in many slight ways that might suggest themselves to a skilled mechanic. Therefore I do not limit myself to the exact construction herein shown, but consider myself entitled to all such variations as come within the spirit and scope of my device.

30 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic feed-water device for steam-boilers, the combination of an auxiliary tank provided with a float, a water-supply  
 35 pipe provided with a valve actuated by said float, a driven shaft carrying alternating eccentric cams, a pair of levers operated by said cams, valves located in said water-supply  
 40 pipe and actuated by said levers, and a valved outlet-pipe leading from the bottom of the auxiliary tank, all arranged and adapted to operate in the manner and for the purpose substantially as described.

2. In an automatic feed-water device for  
 45 steam-boilers, the combination of a pair of boilers, a pair of tanks, a steam-drum, dome, and connecting-pipes, substantially as described, an auxiliary tank, a water-supply pipe  
 50 communicating with the top of said drum and tank, an outlet-pipe leading from the auxiliary tank to said pair of tanks, a float located within the auxiliary tank, a governor-valve actuated by said float, and a pair of  
 55 alternating levers connected to operate valves commanding the pipes leading to and from said auxiliary tank, in the manner and for the purpose substantially as described.

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

SAMUEL S. FLEMING.

Witnesses:

R. G. DUBOIS,

W. H. CLENDENIN.