

(No Model.)

J. DEAN.  
STEAM BOILER FEEDER.

No. 504,151.

Patented Aug. 29, 1893.

Fig. 1.

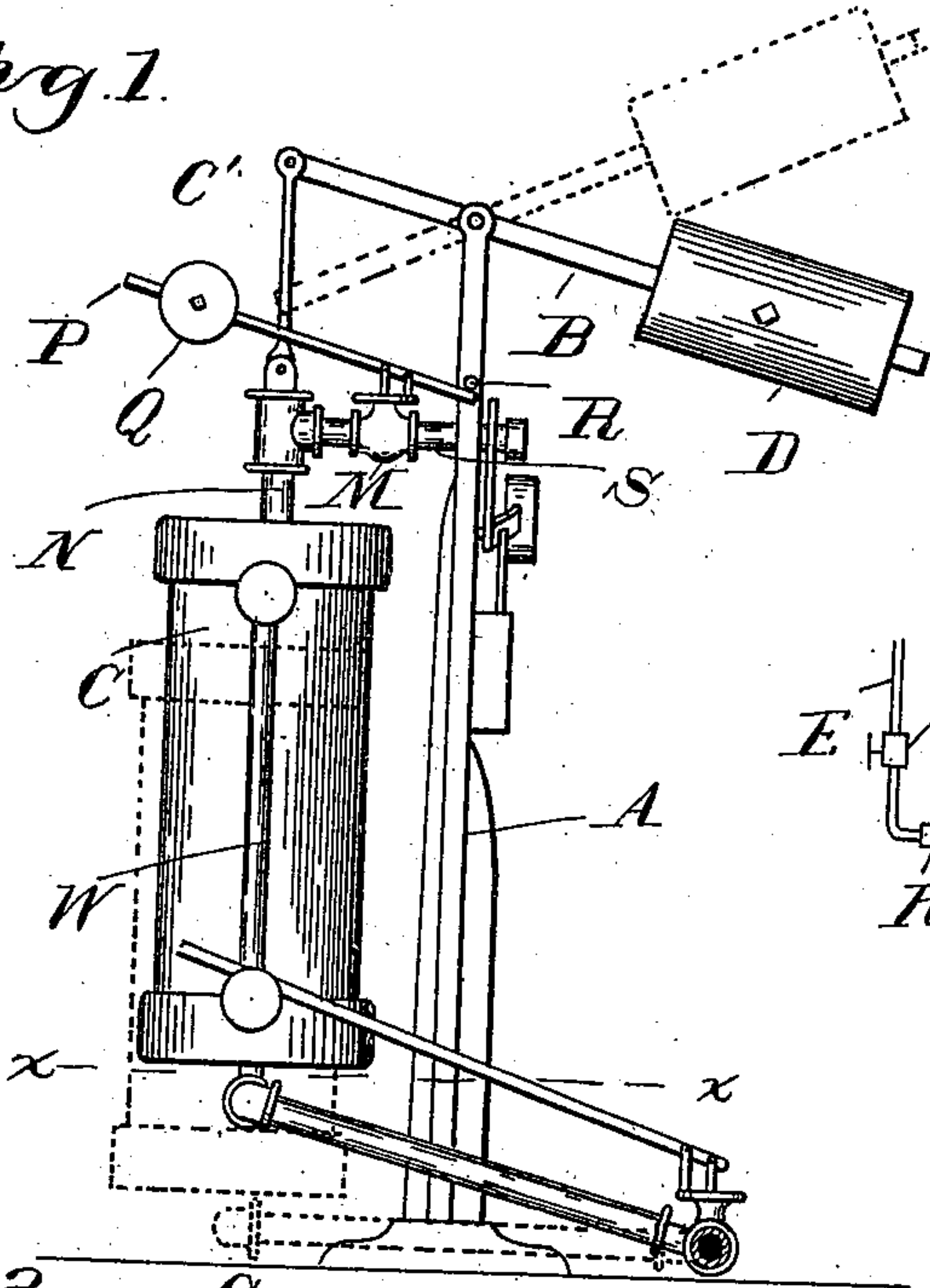


Fig. 5.

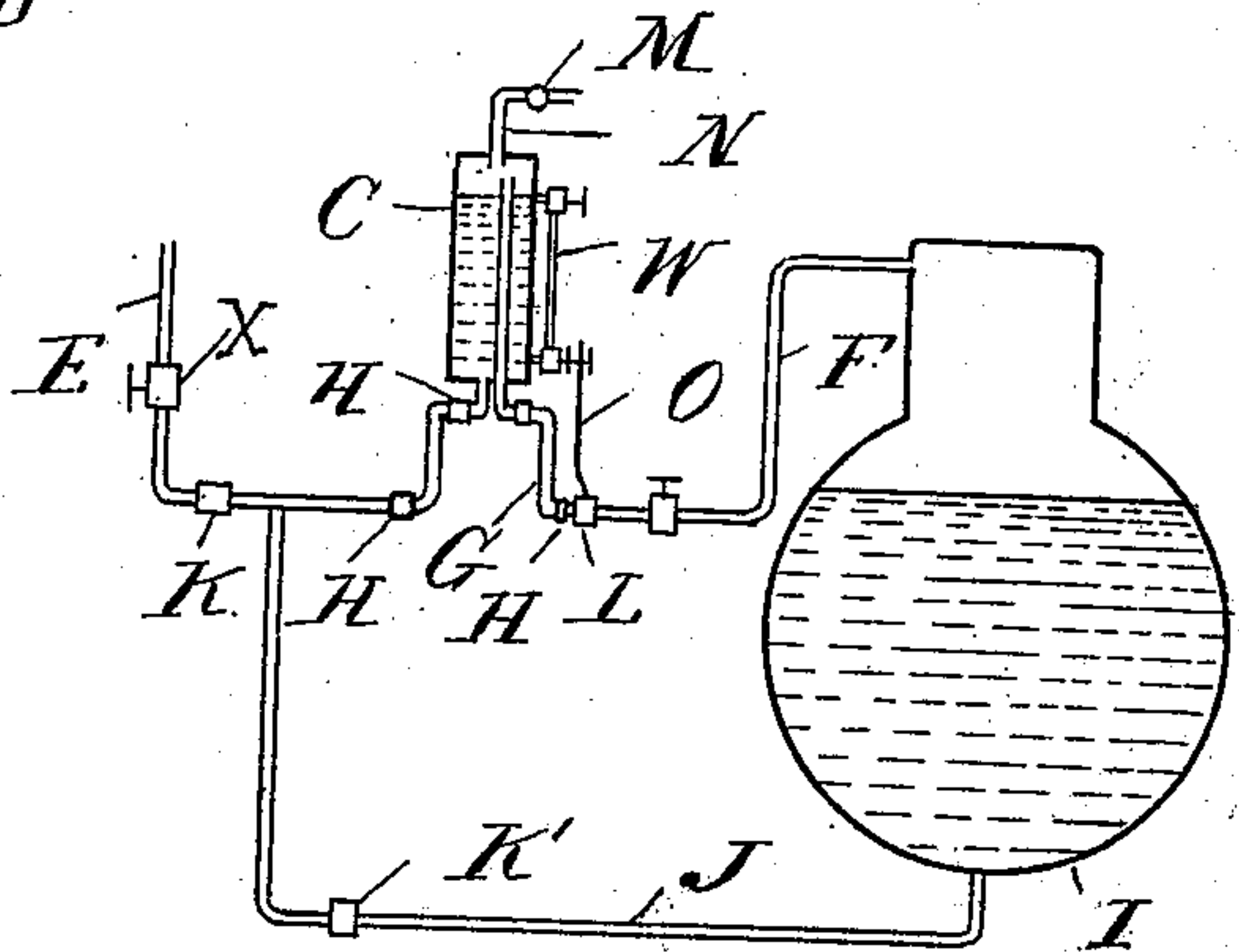


Fig. 2.

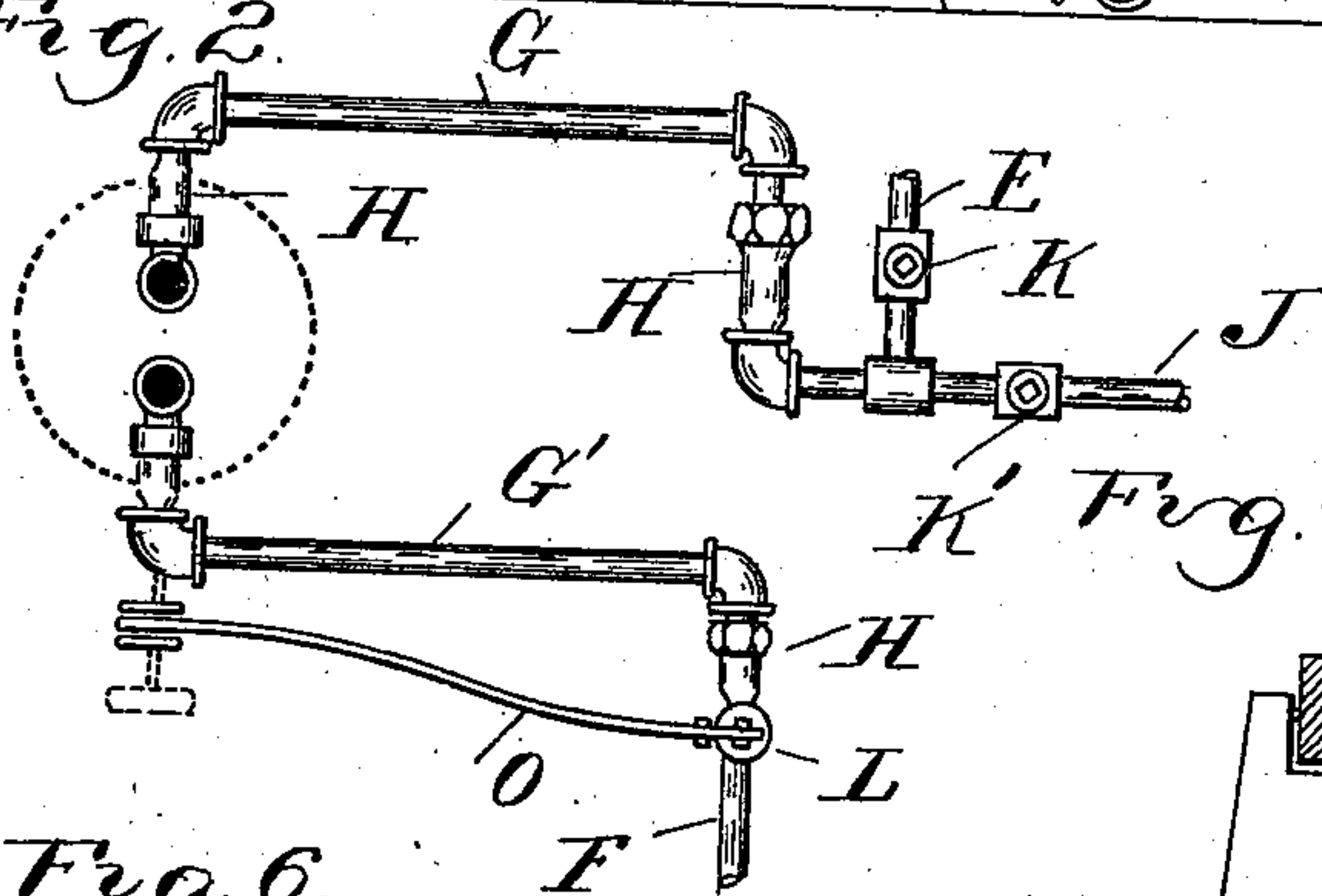


Fig. 3.

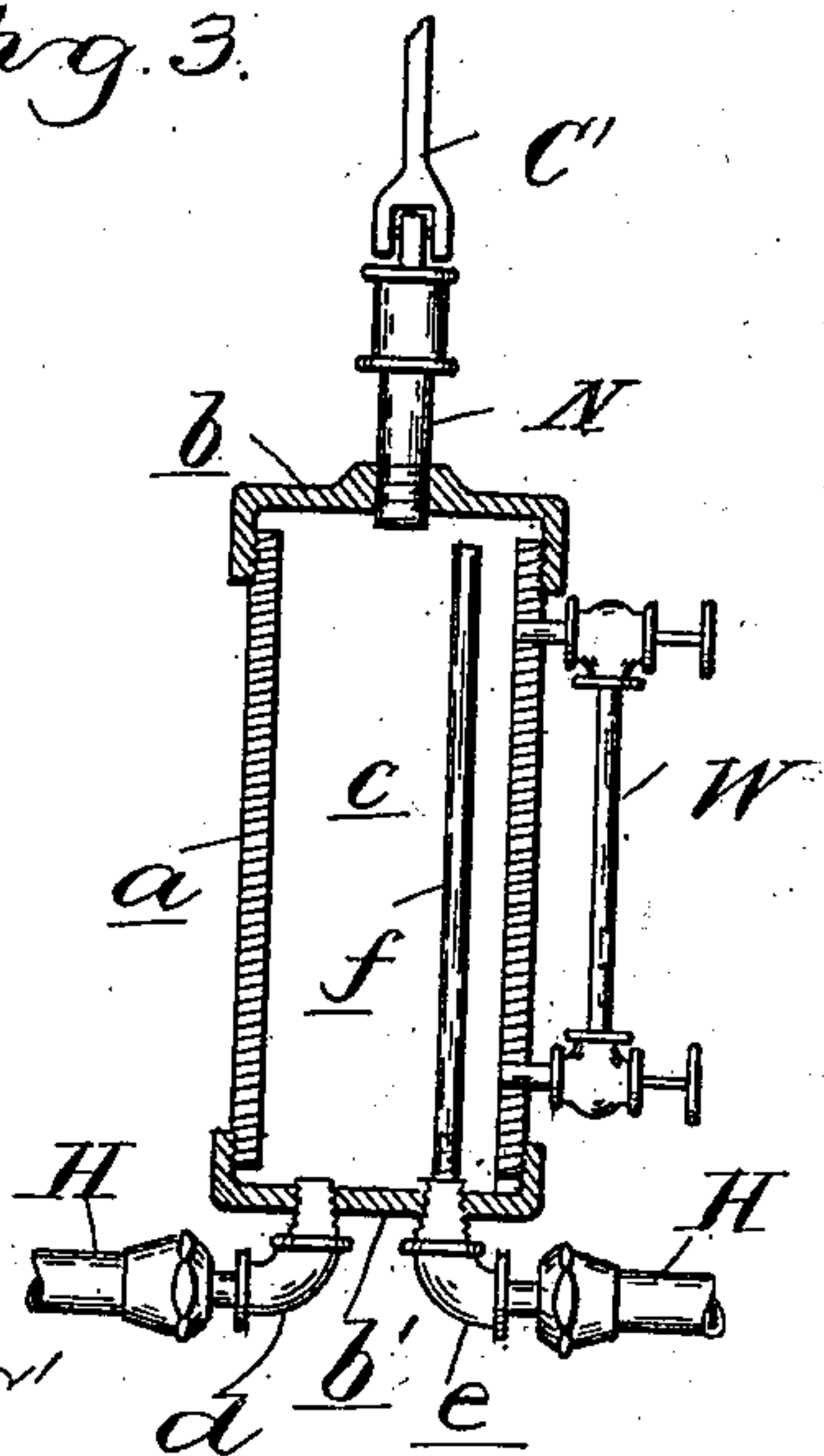


Fig. 4.

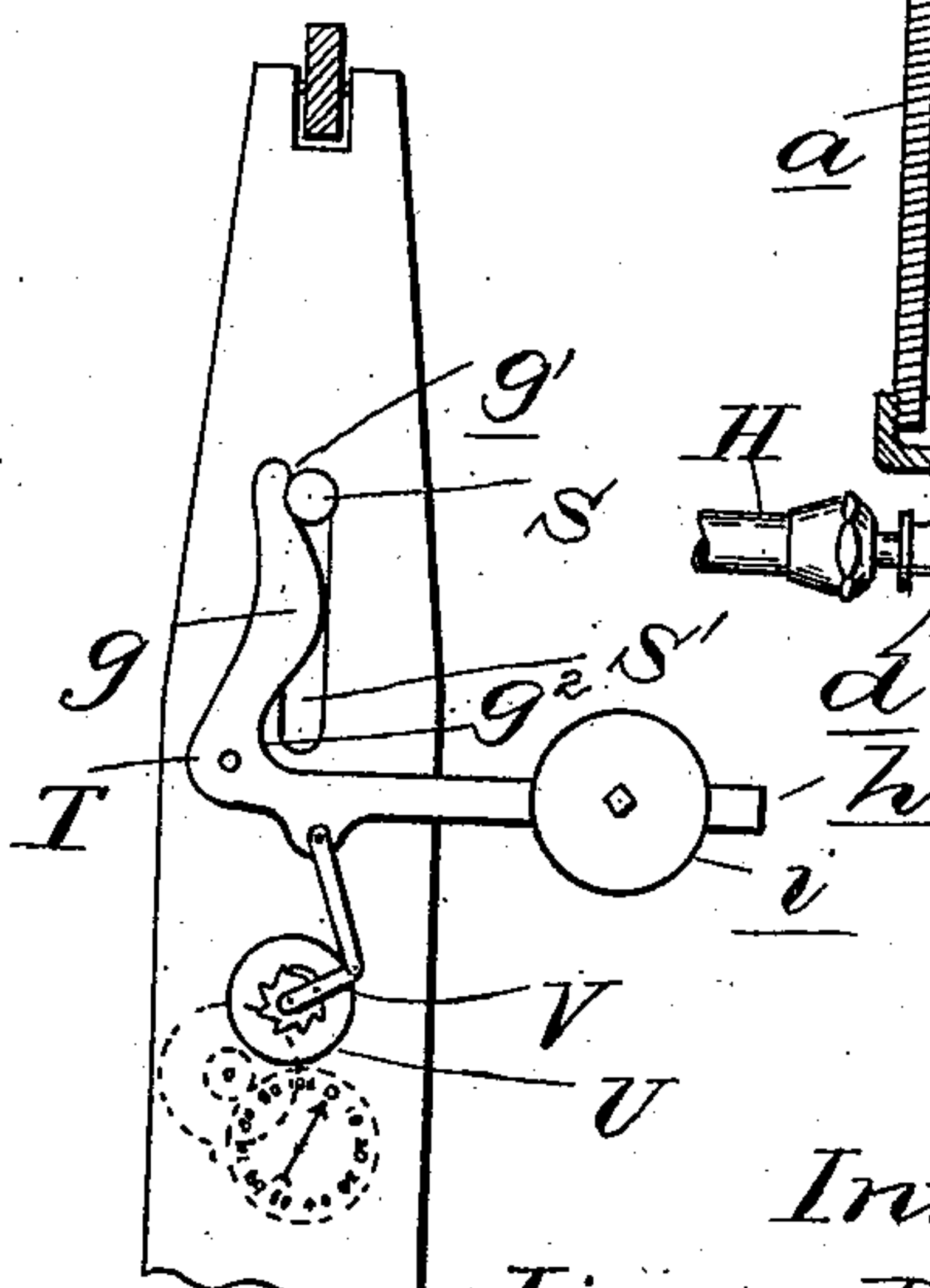
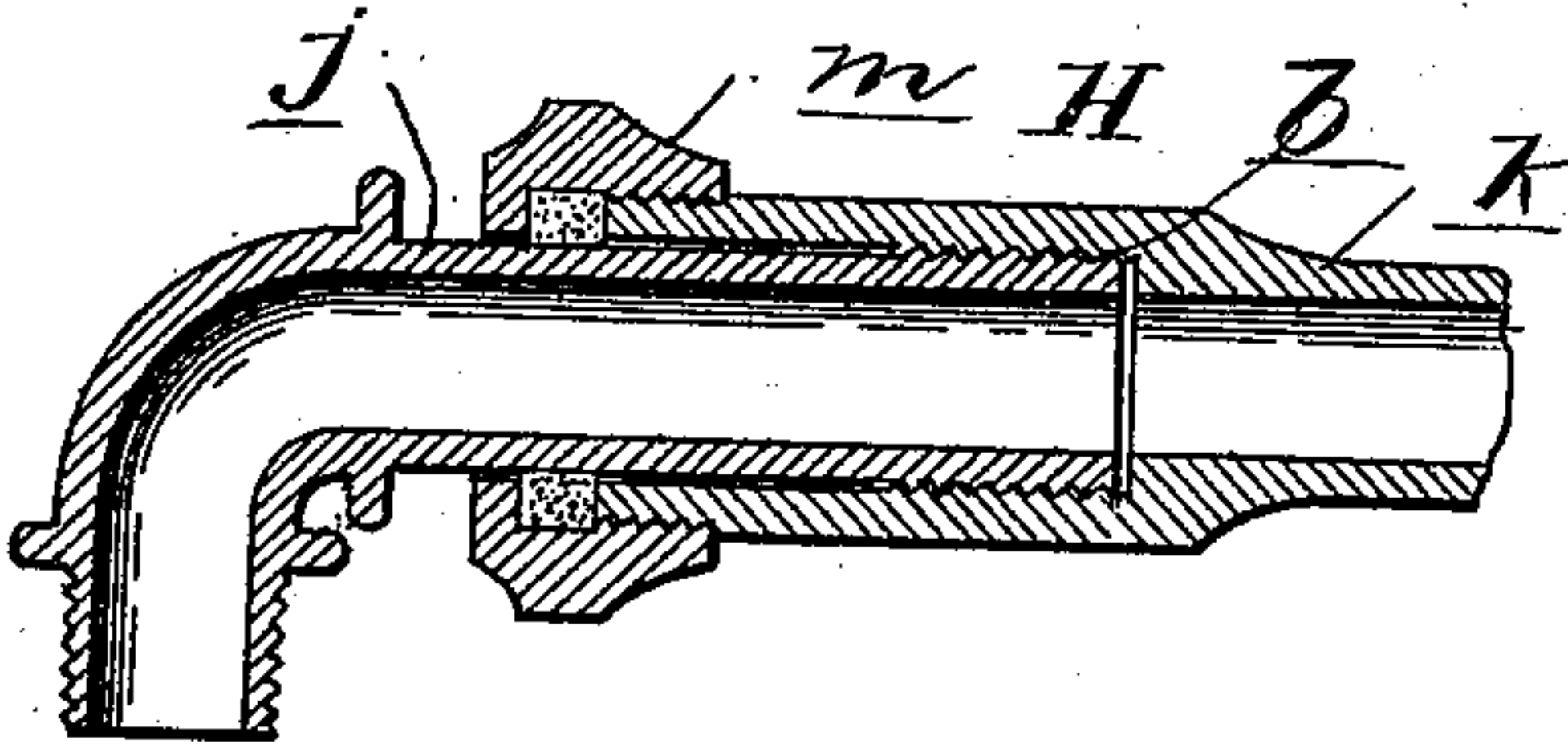


Fig. 6.



Witnesses  
A. C. Kabbier  
N. L. Lindop

Inventor  
James Dean  
By *Thos. K. Spagnoli*  
Atty's



# UNITED STATES PATENT OFFICE.

JAMES DEAN, OF DETROIT, MICHIGAN.

## STEAM-BOILER FEEDER.

SPECIFICATION forming part of Letters Patent No. 504,151, dated August 29, 1893.

Application filed November 5, 1892, Serial No. 451,089. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES DEAN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Steam-Boiler Feeders, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates more specifically to a device for feeding water into boilers; and the invention consists in the peculiar construction, arrangement, and combination of parts whereby the quantity of water fed is accurately measured and registered as more fully  
15 hereinafter described and specifically set forth in the claims.

In the drawings, Figure 1 is a side elevation of my water balance. Fig. 2 is a horizontal section on the line  $x-x$ . Fig. 3 is a vertical cross section through the water receptacle. Fig. 4 is a detail of the gravity latch. Fig. 5 is a diagram showing my device in connection with a boiler. Fig. 6 is a  
25 detail view of one of the swivel unions.

A is a standard upon the upper end of which is fulcrumed a lever B.

C is a water receptacle suspended from one arm of the lever B by a connecting link C' and  
30 Disa counter-weight, adjustably secured upon the other arm of said lever.

The water receptacle C preferably consists of a cylindrical casing  $a$  provided at its upper and lower ends with caps  $b$   $b'$ , forming  
35 the water chamber  $c$ .

$d$   $e$  are pipes entering the chamber  $c$  through the cap  $b'$ , the pipe  $e$  having an extension  $f$  rising to near the top of said chamber.

E is a water supply pipe, and F a steam pipe flexibly connected to the pipes  $e$  and  $f$  respectively, preferably by means of connecting pipes G and G' and swivel unions H.

I is a boiler or other steam generator to which the pipe F is connected and J is the  
45 feed water pipe which communicates with the chamber  $c$  of the water receptacle, either through a separate flexible connection or preferably through pipe G.

K and K' are check valves in the pipes E  
50 and J respectively.

L is a valve in the steam pipe F.

M is a valve in the exhaust pipe N, communicating to the top of the chamber  $c$ .

O and P are actuating levers for the valves L and M the former engaging with the receptacle C and the latter provided with the adjustable counter-weight Q upon one arm, and passing with the other arm under the pin R on the standard A.

S is a lateral arm (preferably an extension of the pipe N) which passes through the vertical guide slot S' in the standard A.

T is a gravity latch, having a locking arm  $g$  provided with notches  $g'$  and  $g^2$  adapted to engage with the arm S and weighted arm  $h$  upon which is adjustably secured the counter weight  $i$ .

U is a register of any desired construction and V is a pawl for actuating the same which may be attached to the gravity latch T or directly to the receptacle C.

W is a water gage on the receptacle C which in the drawings I have shown as an ordinary water glass, having a graduated scale indicating the contents of the receptacle.

In practice the device is placed in position above the level of the water in the boiler and operates as follows: The pipe F is connected with the steam space of the boiler; the pipe E to the water supply pipe or to the return for the water of condensation and the feed pipe J to the boiler. The initial position of parts is with the receptacle C in a raised position.

In this position the arm S is in engagement with the notch  $g'$ , of the gravity latch T, and the lever P engaging under the pin R holds the valve M in its open position.

The operator now opens the valve X in the water supply pipe, allowing the water to pass by the check valve K and through the pipe G into the chamber  $c$  of the receptacle. The valve M being opened the air in the chamber  $c$  is allowed to escape therefrom. After the water has reached a certain height in the chamber, its weight becomes sufficient to balance the counter-weight D and overcome the resistance of the gravity latch T.

The receptacle will then fall to its lower position, the swivel unions H admitting of such movement, and the arm S will engage with the notch  $g^2$  of the gravity latch. Upon the descent of the receptacle the lever P is released from its en-

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gagement with the pin R and the weight Q upon the opposite end of said lever then operates to close the valve M. At the same time the valve L in the steam pipe F has been  
 5 opened by the depression of the lever O and steam enters through the pipe e into the top of the chamber. The pressure above the water in the chamber now equals the pressure of steam in the boiler, and as the receptacle is above  
 10 the level of the water in the boiler the water contained therein will naturally flow down through the pipes G and J, opening the check valve K' and into the boiler. As the pressure in the boiler is greater than the pressure  
 15 of water in the supply pipe, the check valve K will be closed and will serve to prevent the water from being forced back into the pipe E. As soon as the chamber c is again emptied the counter-weight D will overcome the re-  
 20 sistance of the gravity latch T, and raise the receptacle again to its upper position. In so doing the valve L is again closed and the valve M open. The operation may be repeated in this manner until a sufficient quan-  
 25 tity of water is forced into the boiler.

To enable me to accurately measure the amount of water fed I have provided the receptacle C with a water gage W. By the aid of this the operator may adjust the counter-  
 30 weight D upon the lever B, so as to balance the water at any desired height in the chamber c, the scale on said gage indicating the exact capacity of the chamber at that level. As every time the chamber is emptied the  
 35 register U is turned by a pawl V, to determine the amount of water fed by the device it is only necessary to notice the height of water in the gage and multiply that by the number recorded by the register.

40 Although I have shown and described my device as adapted to feed water into a boiler it is obvious that it may be used for many other purposes, and where it is not necessary to feed under pressure the steam and exhaust  
 45 connections may be omitted.

The gravity latch T is for the purpose of delaying the movement of the receptacle, until it has sufficiently overbalanced the counter-weight so as to move quickly, and thereby to  
 50 operate the valves L and M without delay.

By providing this latch with an adjustable weight I am enabled to offer more or less resistance to the movement of the receptacle and thus more easily and accurately set the device to move at the desired water level. 55

What I claim as my invention is—

1. In a steam boiler feeder, the combination with a standard, of a lever fulcrumed to the top of the standard having an adjustable counter weight on one end, a water recepta- 60 cle secured to the opposite end of the lever, means for alternately emptying and filling said receptacle controlled by the movement of said receptacle and a register secured to the standard adapted to be actuated by the move- 65 ment of the water receptacle, substantially as described.

2. In a steam boiler feeder the combination with a water receptacle, means for alternately filling and emptying the receptacle, controlled 70 by its upward and downward movement, a water gage for said receptacle, an adjustable counter weight, and the gravity latch adapted to delay said receptacle at the limits of its movement and having an adjustable weight 75 secured thereon, substantially as described.

3. In a steam boiler feeder, the combination with a vertically reciprocating water receptacle, means for alternately filling and empty- 80 ing said receptacle, an adjustable balance secured to said receptacle, a register and a lever for actuating the register adapted to be actuated by the movement of said water receptacle, substantially as described.

4. In a steam boiler feeder, the combination 85 with a support, of a reciprocating water receptacle mounted thereon, an adjustable weight for the receptacle, means for alternately filling and emptying the receptacle controlled by the movement thereof, a register, a lever for 90 actuating the same and a projection on the receptacle for tripping the lever, substantially as described.

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

JAMES DEAN.

Witnesses:

M. B. O'DOHERTY,

N. L. LINDOP.