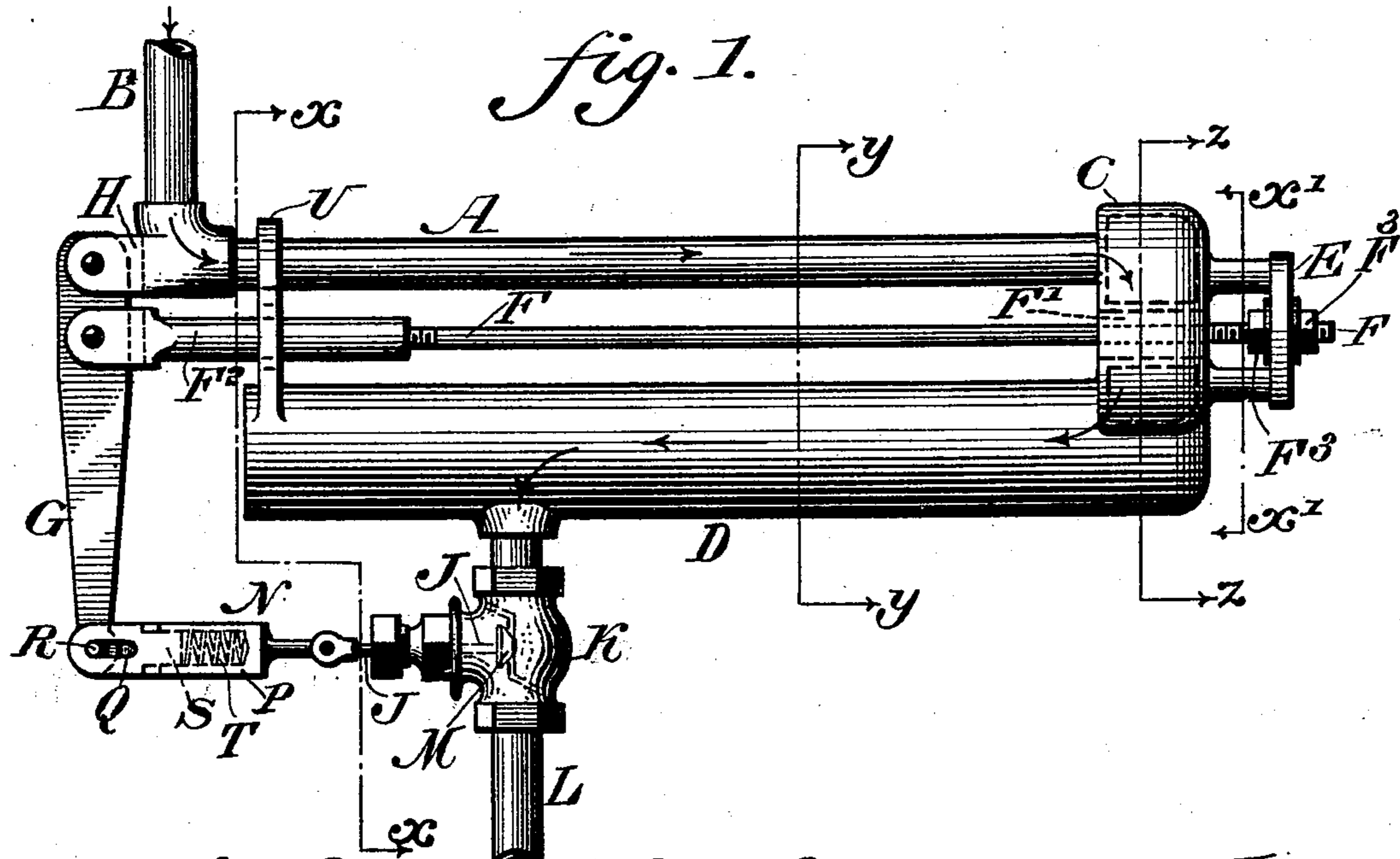


(No Model.)

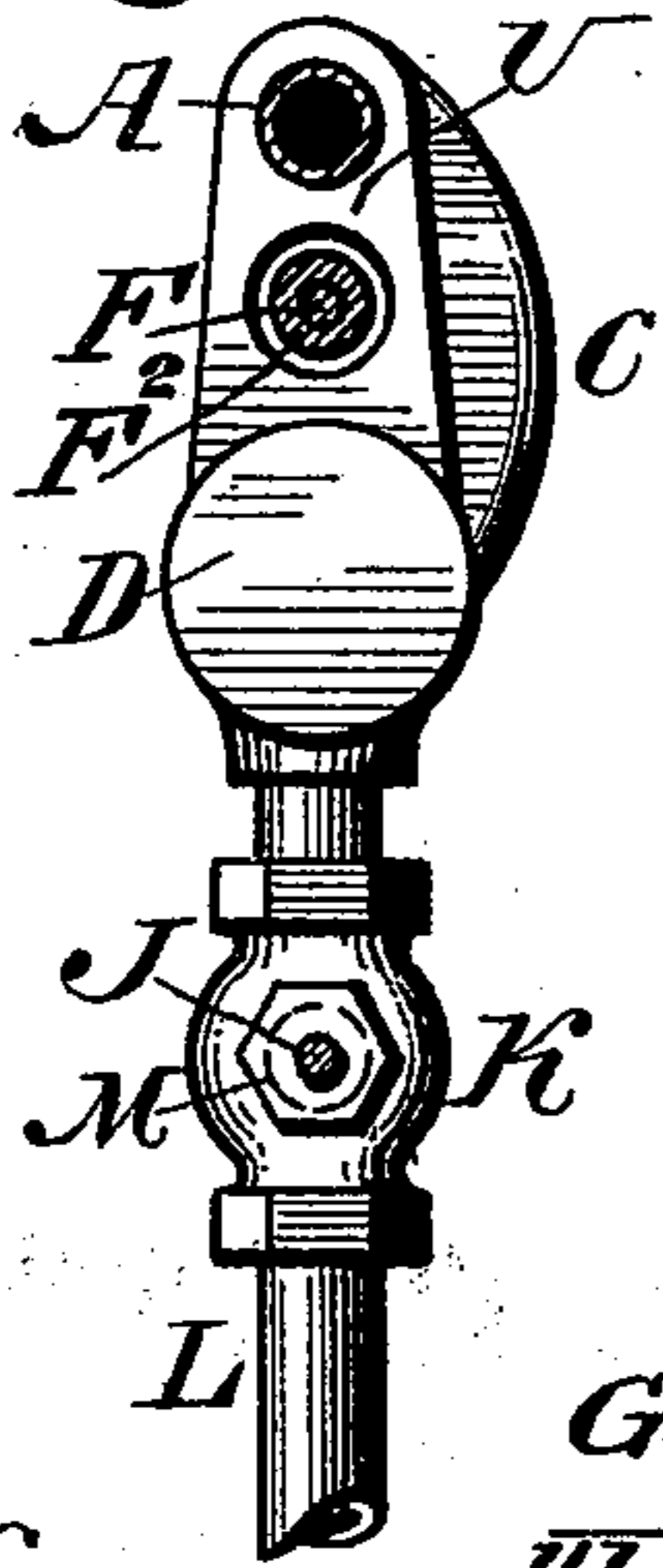
J. L. CHAPMAN.  
STEAM TRAP.

No. 518,053.

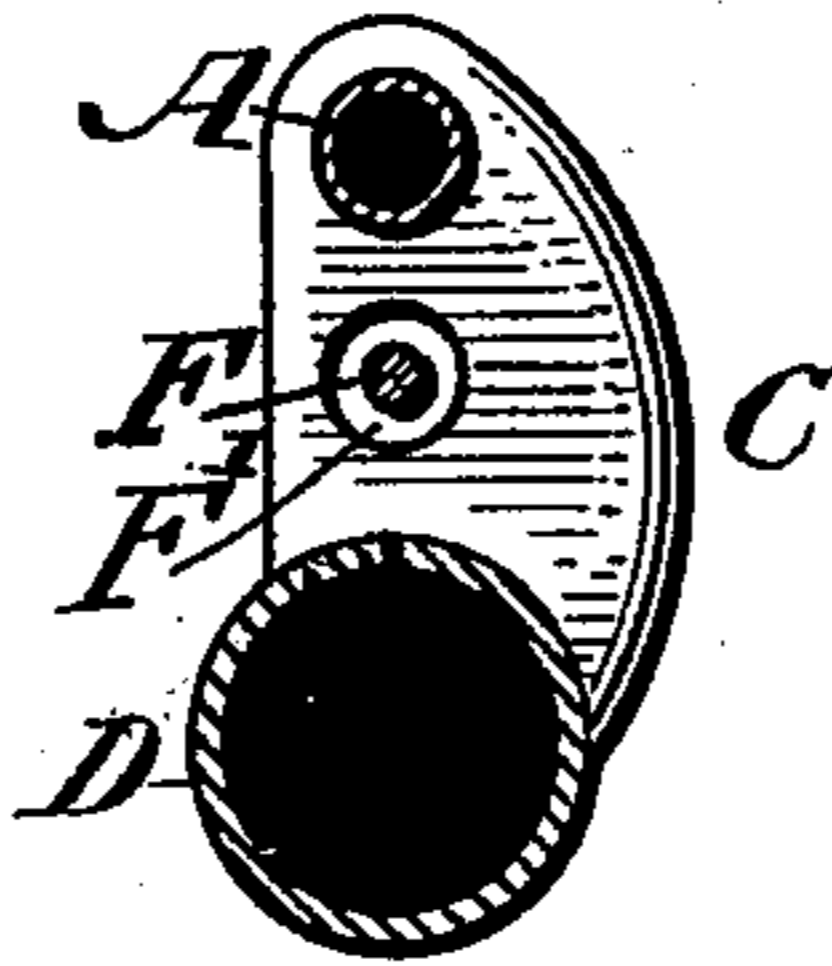
Patented Apr. 10, 1894.



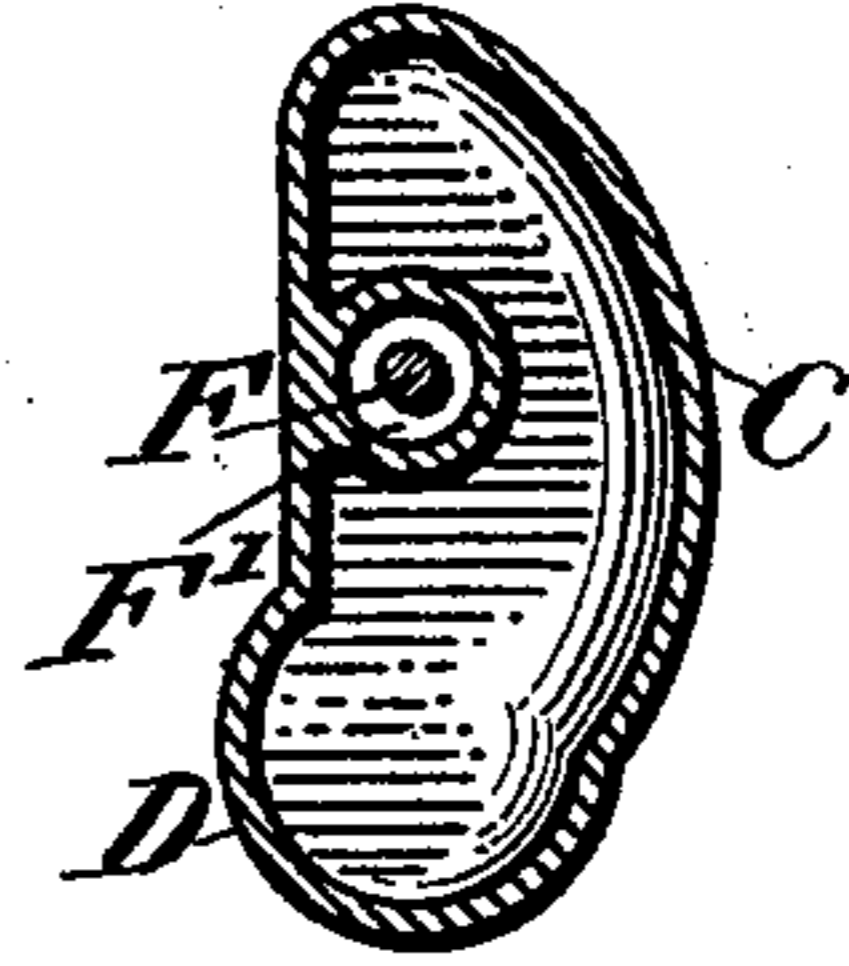
*fig. 2.*



*fig. 3.*



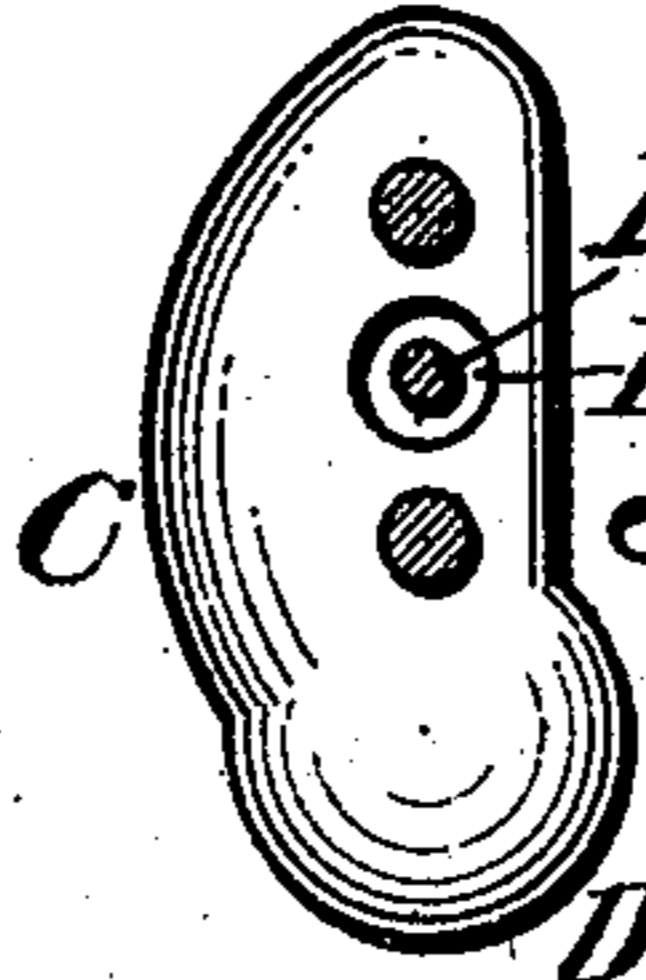
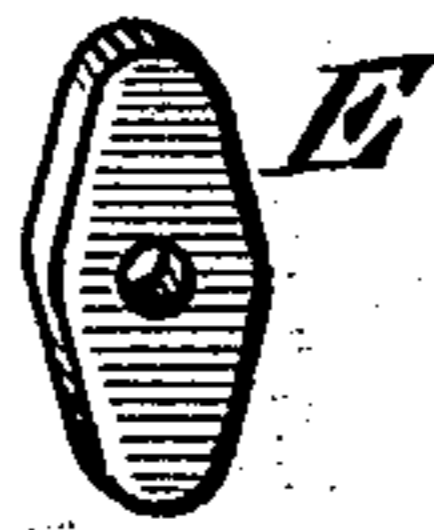
*fig. 4.*



*fig. 7.*



*fig. 6.*



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# UNITED STATES PATENT OFFICE.

JOSEPH L. CHAPMAN, OF HADDONFIELD, NEW JERSEY.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 518,053, dated April 10, 1894.

Application filed September 27, 1893. Serial No. 486,583. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH L. CHAPMAN, a citizen of the United States, residing at Haddonfield, in the county of Camden, State of New Jersey, have invented a new and useful Improvement in Steam-Traps, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a steam trap formed of a tube primarily receiving the steam, a tube in communication therewith for the water of condensation, a valve, and means for opening and closing said valve, due to the contraction and expansion of the steam-receiving tube, as will be hereinafter set forth.

It also consists of means for allowing the valve to leave its seat without disturbing and injuring the other parts of the trap in the event of foreign substances entering between said seat and the valve head.

Figure 1 represents a side elevation of a steam trap embodying my invention. Figs. 2, 3, 4, and 5 represent sections respectively on lines  $x, x, y, y, z, z$ , and  $x', x'$ , Fig. 1. Fig. 6 represents a side elevation of a detached portion. Fig. 7 represents a section of a detached portion on line  $z', z'$ , Fig. 8. Fig. 8 represents a section on line  $y', y'$ , Fig. 7.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings: A designates a tube which primarily receives steam from the pipe B, and is connected by the coupling C with the tube D, which coupling is provided with a cross head E to which is attached the rod F, which passes freely through a channel F' in the coupling C, and forms the fulcrum of an arm or lever G, which is mounted on the coupling H of the tube A and pipe B, opposite to the cross head E. The channel F' is open at its ends, but not in communication with the coupling C. To said lever G is secured the stem J of the valve K, which latter is connected with the tube D, and provided with a discharge pipe L.

The tube A is formed of brass or other material that suitably expands and contracts, it being evident that when steam enters the tube A, it is directed by the coupling C into the tube D. Now, as said tube A is in expanded condition, owing to the steam therein,

the connected end of the lever G is forced outwardly, whereby the valve K is closed, and the escape of the steam from the tube D is prevented.

When cold water from radiators, &c., enters the tube A or water of condensation backs-up through the coupling C into said tube A, the temperature of the latter is reduced, whereby said tube contracts, the effect of which is the operation of the lever G in such manner as to open the valve, the water then escaping. As steam again enters the tube A, the temperature of the latter is increased, and the valve is accordingly closed, the steam thus being retained in the tube D until the condensation thereof again causes the opening of the valve, as previously described.

As pieces of grit, &c., may pass through the trap and valve, and lodge between the head M of the valve and the seat thereof, and thus strain and injure said seat, the valve stem, the lever G and connected parts of the trap, I interpose between said stem and lever, a compensating device, which consists of a hollow link P which is connected at one end with the valve stem, and has at the other end the slots Q, through which is passed the pin R, which is attached to the lever G, so that the link has a sliding or yielding connection with said lever. Within the link is a head S and spring T, the latter bearing against said link and head, so as to force the head against the lever G, said link, spring and head acting as one piece under ordinary circumstances, to operate the valve stem, due to the motion of the lever G. Should however, the valve stem be pressed from its seat by any foreign substances, as hereinbefore stated, the link P yields or slides on the pin R without disturbing the lever and injuring the same and connected parts. When the valve is relieved, the spring T restores the link to its normal position, and causes the valve head to close properly on its seat.

The channel F' in the coupling C permits air to circulate therethrough, and prevents the heat from being transmitted to the fulcrum rod F and affecting the latter. Rising from the tube D is a standard U, which freely supports or sustains the tube A, and also the

connection  $F^2$  of the fulcrum rod F, whereby said tube A and rod are prevented from dropping, and they are held in a firm and reliable manner. The fulcrum rod F is adjustable by means of nuts  $F^3$  on opposite sides of the cross head E.

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

10 1. The tube A with an inlet pipe connected thereto by the coupling H, the tube D, the coupling C connecting said tubes A and D, and provided with the channel  $F'$  and the cross head E, the fulcrum rod F freely passing through said channel, a valve and discharge pipe for said tube D, a lever pivoted to said rod F, coupling H, and the stem of the said valve, said parts being combined substantially as described.

20 2. Two tubes with coupling, a fulcrum rod loosely inserted in a channel in said coupling, a lever pivotally secured to said fulcrum rod and at one end to one of said tubes, and a discharge valve for the other tube having

its stem connected with said lever, said parts being combined substantially as described.

3. A steam trap consisting of two tubes having a coupling with a cross head thereon and provided with a channel, a fulcrum rod adjustably connected with said cross head and freely passing through said channel, a discharge valve for one of said tubes, and a lever connected with the other tube, the fulcrum rod and the stem of the said discharge valve, said parts being combined substantially as described.

4. A tube with a discharge valve, a lever, a hollow link connected at one end with the valve stem and slotted at its other end, pins connected with said lever and in the slots of the said link, a head within said link, and a spring bearing against said head and link said parts being combined substantially as described.

JOSEPH L. CHAPMAN.

Witnesses:

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