

(No Model.)

J. F. McELROY.
STEAM TRAP.

No. 404,925.

Patented June 11, 1889.

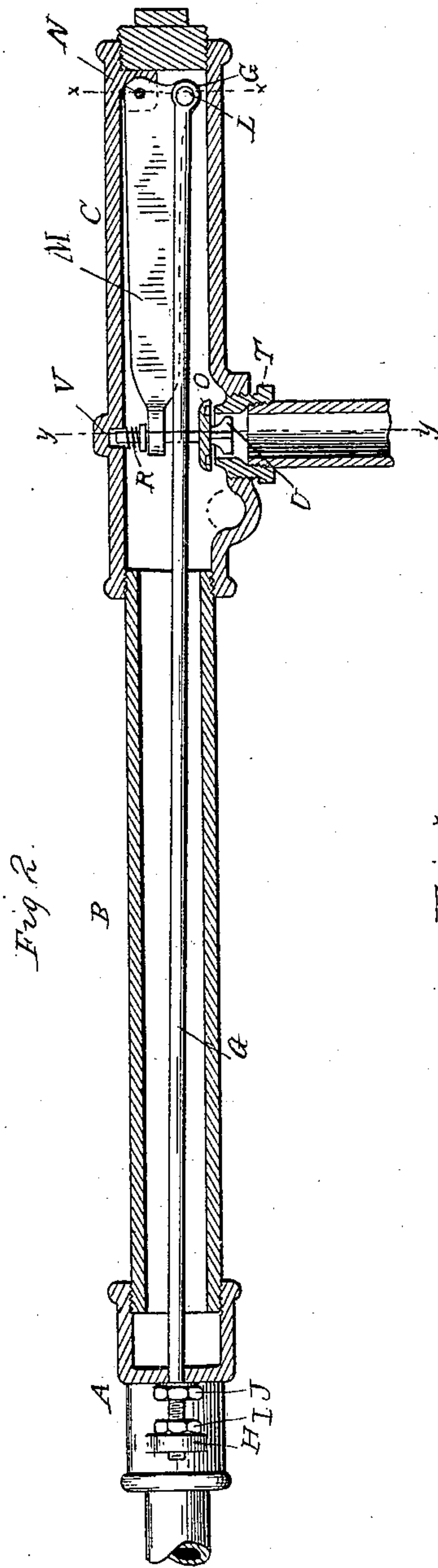


Fig. 2.

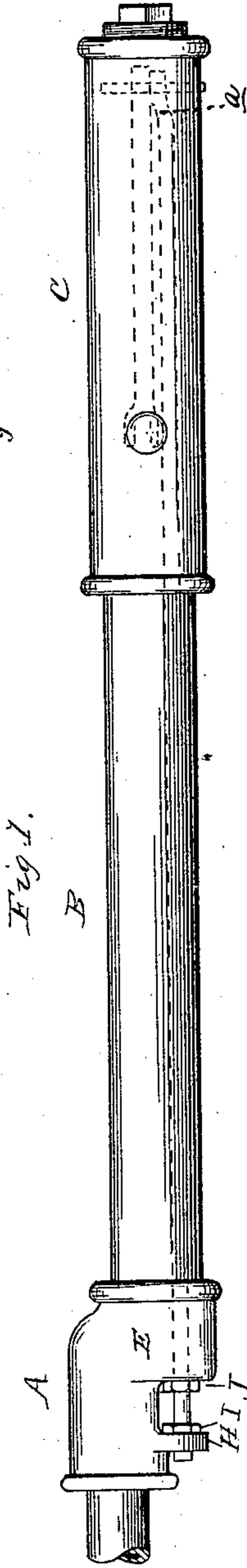


Fig. 1.

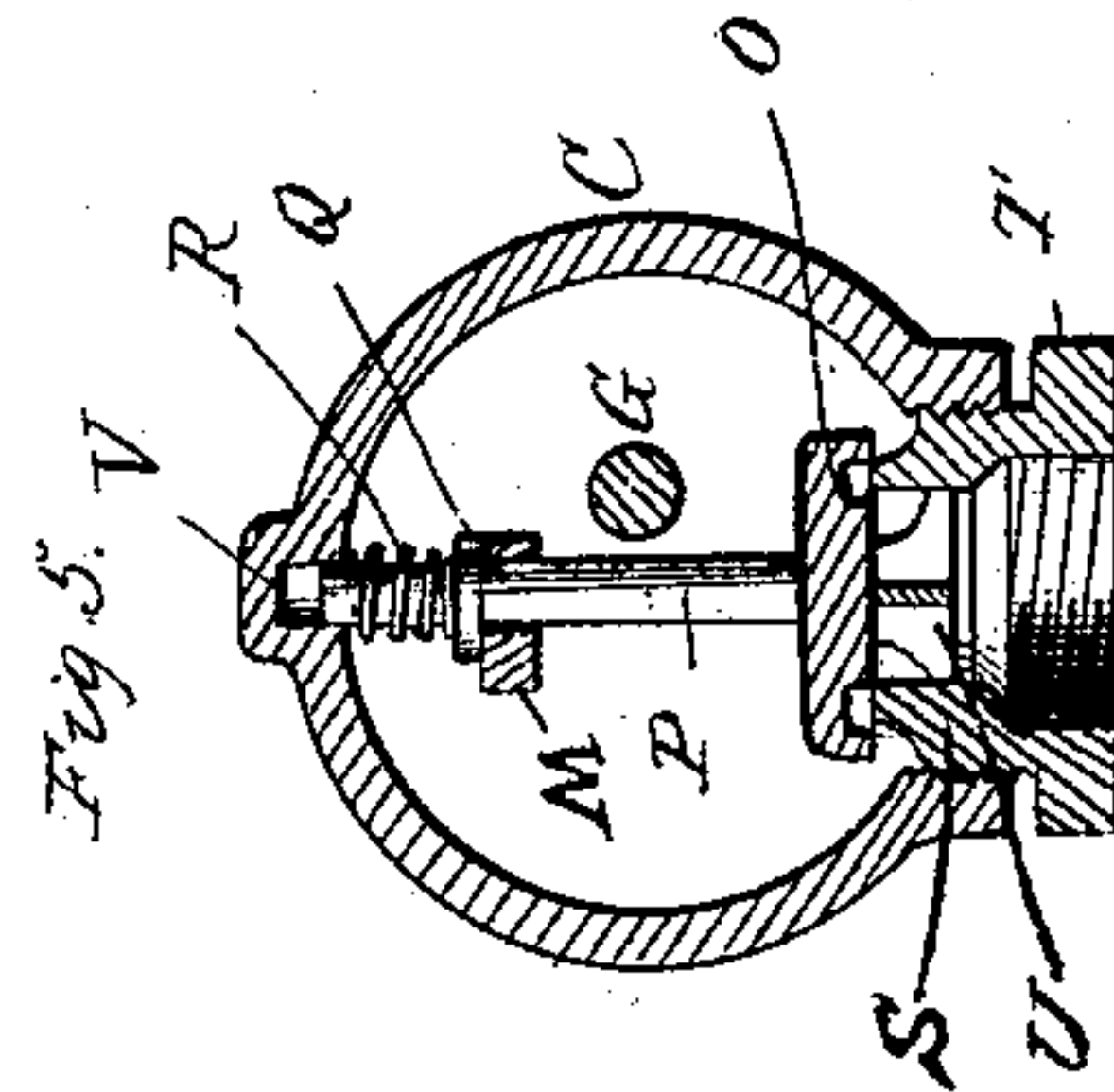


Fig. 5. V.

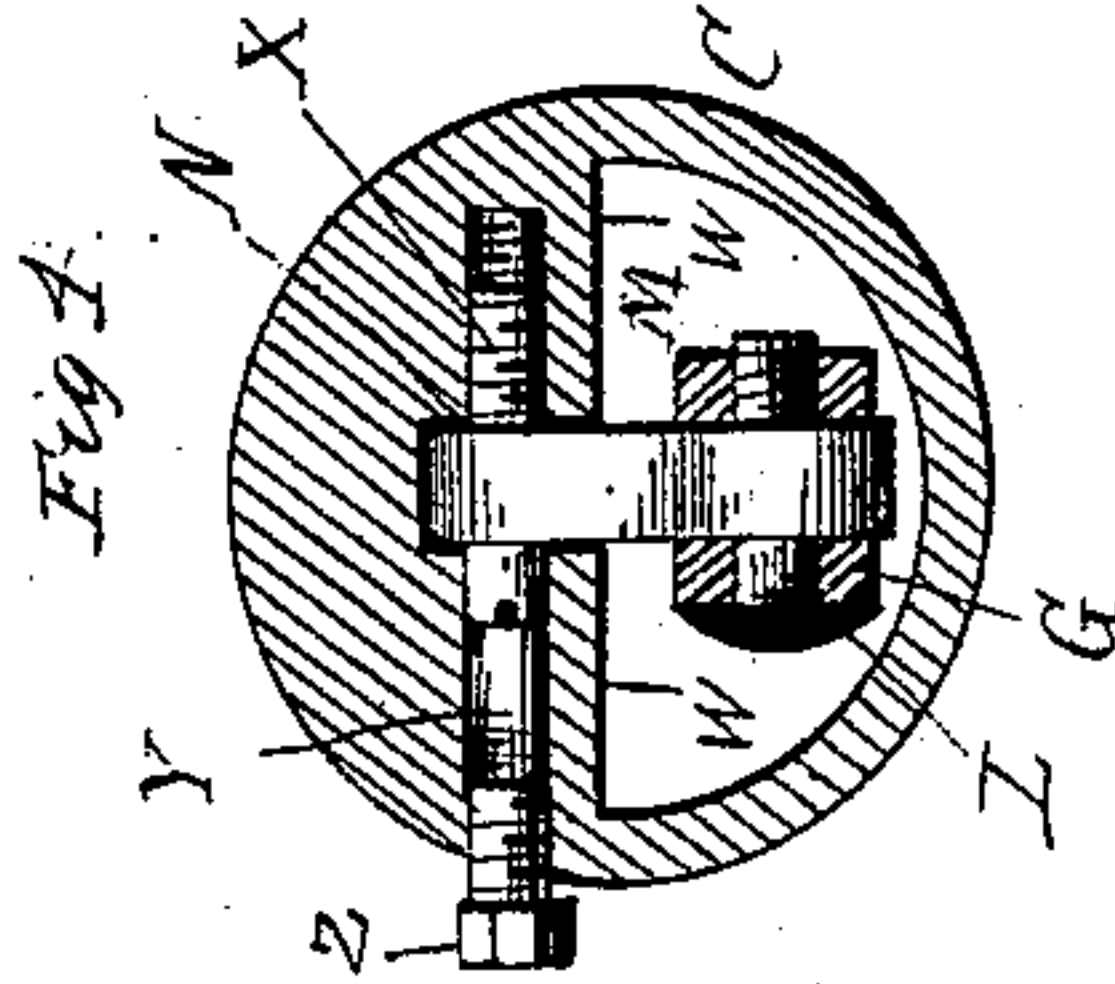


Fig. 4.

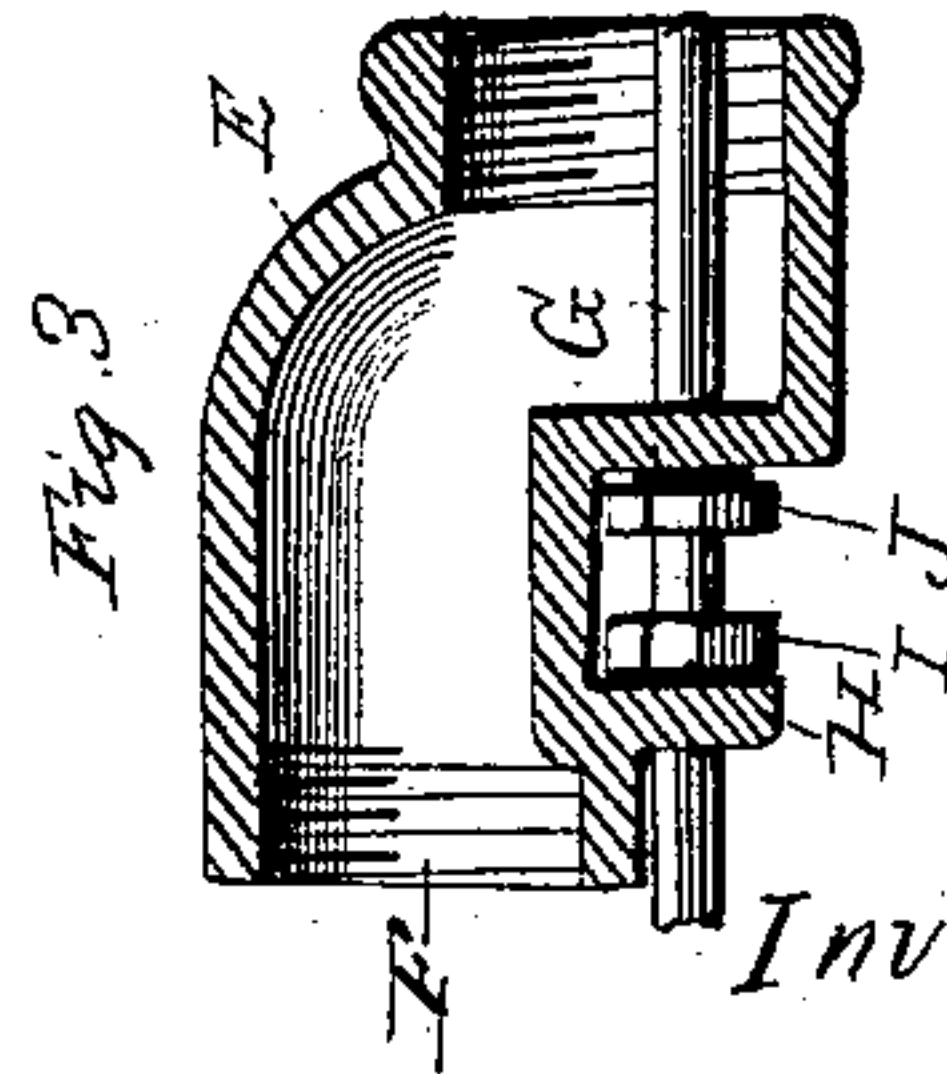


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF LANSING, ASSIGNOR TO THE McELROY CAR HEATING COMPANY, OF DETROIT, MICHIGAN.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 404,925, dated June 11, 1889.

Application filed July 30, 1888. Serial No. 281,415. (No model.)

To all whom it may concern:

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

10 This invention relates to new and useful improvements in automatic steam-traps of that description wherein the movement of the valve is automatically obtained by the expansion or contraction of metal at varying
15 degrees of temperature.

The object of my invention is to construct a trap of this description wherein a larger degree of movement of the valve is obtained than in the ordinary construction.

20 To this end my invention consists in the construction, arrangement, and combination of different parts, whereby an increased motion of the valve is obtained by the use of a multiplying-lever, all as more fully herein-
25 after described, and shown in the drawings, wherein—

Figure 1 is a plan of my improved trap. Fig. 2 is a vertical central section thereof. Fig. 3 is a horizontal section of the part A. 30 Fig. 4 is a cross-section on line *x x* in Fig. 2, and Fig. 5 is a cross-section on line *y y* in Fig. 2.

A, B, and C represent the outer casing or shell of the trap, constructed in three parts
35 for the sake of convenience and economy. The part B connects the parts A and C together, and is preferably an ordinary piece of iron pipe screw-threaded into the parts A and C, or otherwise connected thereto. The part
40 C is also preferably of tubular form, and is closed at its free end by a suitable screw-plug or otherwise. The part A is also preferably of tubular form, and is provided with an offset or bend E, to which the pipe B is
45 secured and which is in actual line therewith and with the part C.

F is a suitable aperture in the part A, by means of which the trap is connected to a heating system or other device for which the
50 trap may be employed.

G is a metal rod, preferably of brass, inclosed within the casing of the trap and ex-

tending the whole length thereof, or nearly so. One end of this rod passes through the wall of the offset E, and through a guide-lug 55 H, formed on the part A. This end of the rod G is screw-threaded and provided with two lock-nuts I and J, one of which is seated against the lug H and the other against the wall of the offset E, a suitable washer being 60 interposed between the latter and the offset for the purpose of making a tight joint. By means of this construction the expansion-rod is readily adjustable, securely held in alignment, and at the same time the outside end 65 is well protected against all kinds of damage incidental to its use in railroad-cars where it is liable to be stepped on or hit by the feet, and no stuffing-box is required. The opposite end of the metal rod G is pivotally se- 70 cured at L to the multiplying-lever M. This lever is fulcrumed at M and has a long arm and a short arm, the latter of which pivotally connects L at the lever at right angles, or nearly so, with the rod G, and the long arm 75 of the lever extends parallel with the rod G, or nearly so, and carries at its free end the valve of the trap. This valve is provided with a suitable disk O and a valve-stem P, which is engaged by the forked end of the 80 multiplying-lever M.

Q is a fixed collar on the valve-stem, by means of which the valve is carried in one direction by the free end of the multiplying-lever, and R is a spring sleeved upon the up- 85 per end of the valve-stem.

S is a suitable valve-seat located below the valve O in the wall of the casing, and preferably formed on the end of the screw-nipple T.

The valve is guided in its movement by 90 means of a suitable spider U on the valve, which engages into the screw-nipple, and by a suitable guide-bearing V, formed in the casing for the upper end of the valve-stem.

The fulcrum of the multiplying-lever M is 95 preferably formed, as shown in Fig. 4, wherein W W are suitable ears formed interiorly on the part C, and X a pivot-screw secured from the outside of the casing by means of an aperture Y, and Z is a screw closing the aper- 100 ture Y on the outside of the casing. By this means the pivot of the multiplying-lever is secured from the outside, while at the same time a reliable steam-joint is obtained, which

prevents any leakage. In practice, the parts being constructed and arranged as described, it is obvious that the expansion of the brass rod G produces a movement of the valve O from its seat, and although the variation in the length of rod G may be very small, it is considerably amplified by the multiplying-lever to produce a decided movement of the valve O at the slightest degree of variation in its length.

By means of the lock-nuts I and J the operative portion of the rod G within the casing of the trap may be lengthened or shortened, and thus the critical point of the opening of the valve at any desired temperature of steam or water may be regulated with the greatest accuracy, and as soon as the valve begins to lift off its seat a slight fall of temperature is only required to give a large discharge-opening. Thus, for instance, if the trap is adjusted to retain hot water until its temperature has dropped to seventy-five degrees, the valve will be kept closed as long as the temperature of the water in the trap is above that temperature, as the movement of the multiplying-lever M does not affect the valve until the free end of the lever M impinges against the collar Q; but as soon as the water in the trap reduces its temperature by radiation of the casing and further contraction of the rod G, there will now be produced a decided movement of the valve from its seat. The spring R takes up all lost motion and prevents the valve from sticking. The discharge from the trap is carried off through a suitable drip-pipe secured in the nipple T.

I am aware that it is not new to amplify the contraction and expansion of metal by means of a multiplying lever or levers in devices of this kind; but my construction presents some advantages, which I claim as new.

The principal advantage is the ease and accuracy by means of which I can adjust the valve, as the adjusting devices are on the outside and in a very accessible position.

A further advantage of my construction lies in its compactness, as with my trap I can obtain a motion in the valve-disk equal to that given by a differential trap of iron and brass of considerably greater length, and as such traps have to be often concealed or placed in restricted places the advantage I obtain thereby is obvious.

A further advantage in my construction is that the heating apparatus which the trap is designed to retain surrounds the metal rod G, so that its temperature is solely affected by the temperature of the agent and is not subjected to outside temperature, which in other constructions of traps often disturbs the proper action of the trap.

I also consider the means by which I pre-

vent any leakage of steam or hot water from the trap a valuable point of its construction.

It will be seen from the dotted lines in Fig. 1 that the expansion-rod and multiplying-lever and the stem of the valve are particularly disposed in relation to each other within the casing for the purpose of providing the necessary room for the valve to operate within the casing itself, as shown, instead of requiring a lateral extension or enlargement of the casing. To this end I place the expansion-rod outside of the plane of the motion of the multiplying-lever, preferably by placing it near the wall of the casing, and providing it with a bend *a* near its free end, as shown in dotted lines in Fig. 1. This arrangement is of great advantage in steam-heating for railroad-cars, in which the whole system of pipes have to be placed close to the floor of the car to pass underneath the seats, and as the trap has to form the lowest part of the system it is evident that only such a trap can be used within a car which permits of its being put directly upon the floor or very close to it. Another advantage in the construction of my trap is the relative location of the inlet and outlet openings and in the means of adjusting the expansion-rod, which are such that the valve may be conveniently located in the confined space below a car-seat and accessible for all the purposes desired.

What I claim as my invention is—

1. The combination of the casing provided with a bend or offset E at one end, an expansion-rod inclosed within that casing and passing with its free end through the bent portion or offset of said casing to the outside, the lug H, into which the expansion-rod engages, and the lock-nuts I and J, substantially as described.

2. The combination of the casing consisting of the parts A, B, and C, the offset E of the part A, the expansion-rod G, within the casing and projecting through the offset E to the outside, the lug H, into which the expansion-rod engages, the adjusting-nuts I and J, the multiplying-lever M, fulcrumed at and pivotally secured with the short arm to the expansion-rod, the valve O, carried by the long arm of the lever and having the valve-stem P, the collar Q upon said valve-stem, the spring R, and the nipple T, secured in the walls of the casing, the parts being arranged and constructed to operate substantially as and for the purpose described.

In testimony whereof I affix my signature, in presence of two witnesses, this 17th day of July, 1888.

JAMES F. McELROY.

Witnesses:

JAMES WHITTEMORE,
P. M. HULBERT.