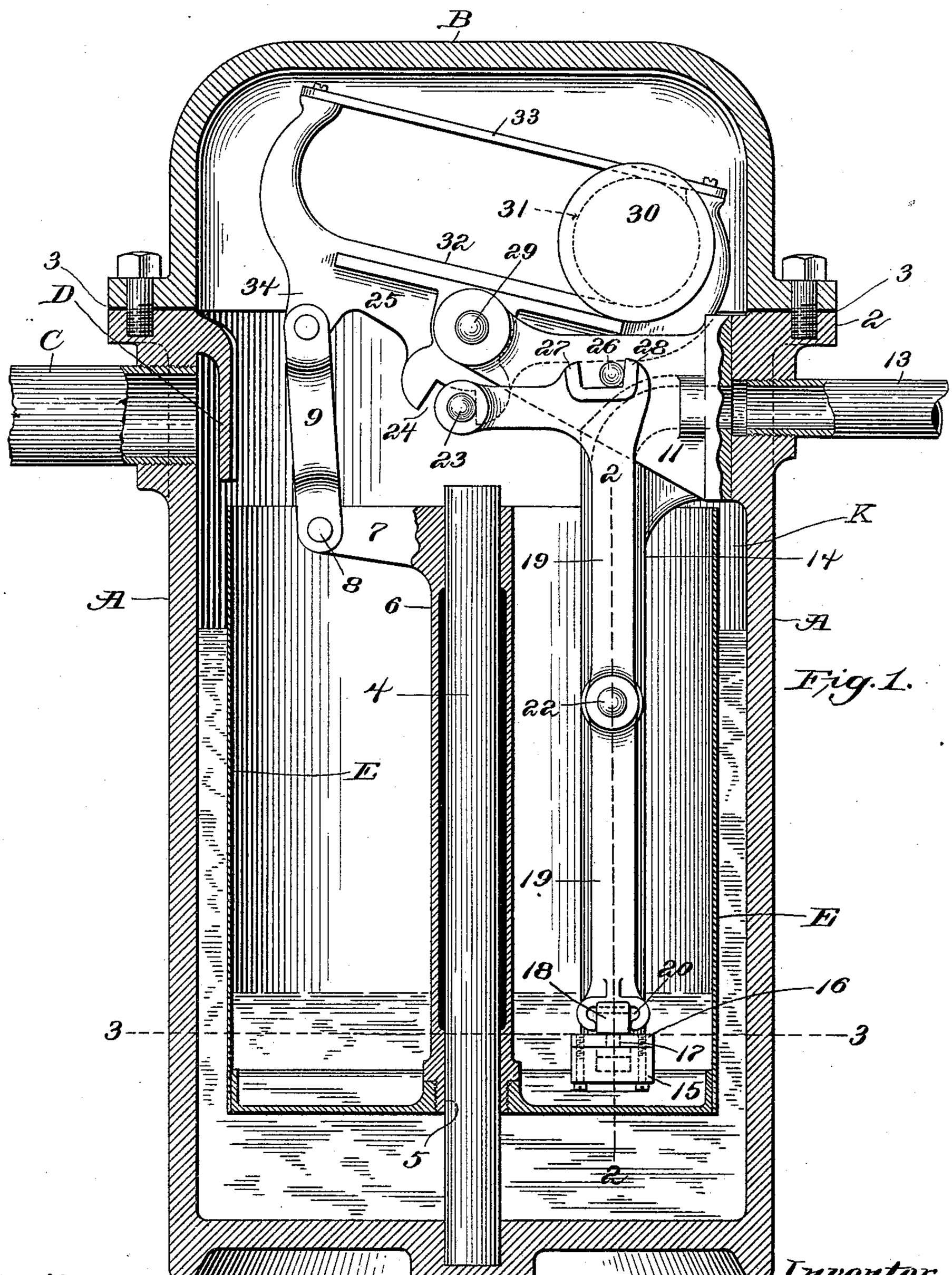
(No Model.)

3 Sheets—Sheet 1.

# W. B. MASON.

## STEAM TRAP.

No. 583,064. Patented May 25, 1897.




Witnesses.
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Robert Wallace.

Inventor.
William B. Mason,
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(No Model.)

3 Sheets—Sheet 2.

# W. B MASON.

## STEAM TRAP.

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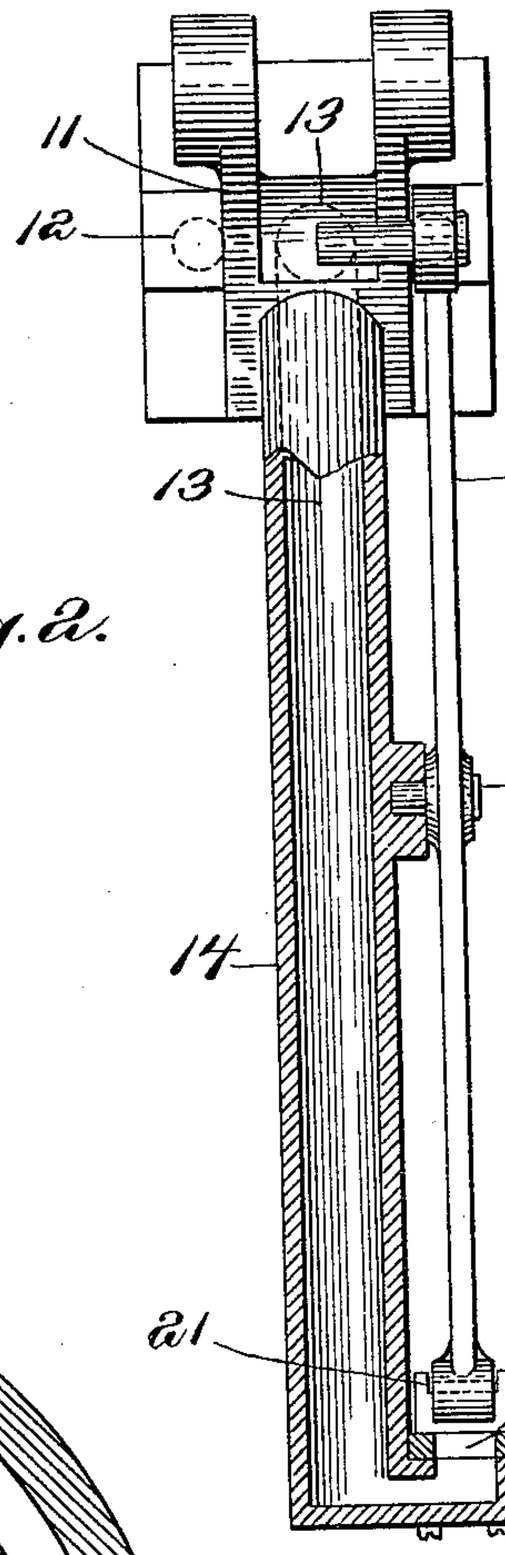


Fig. 2.

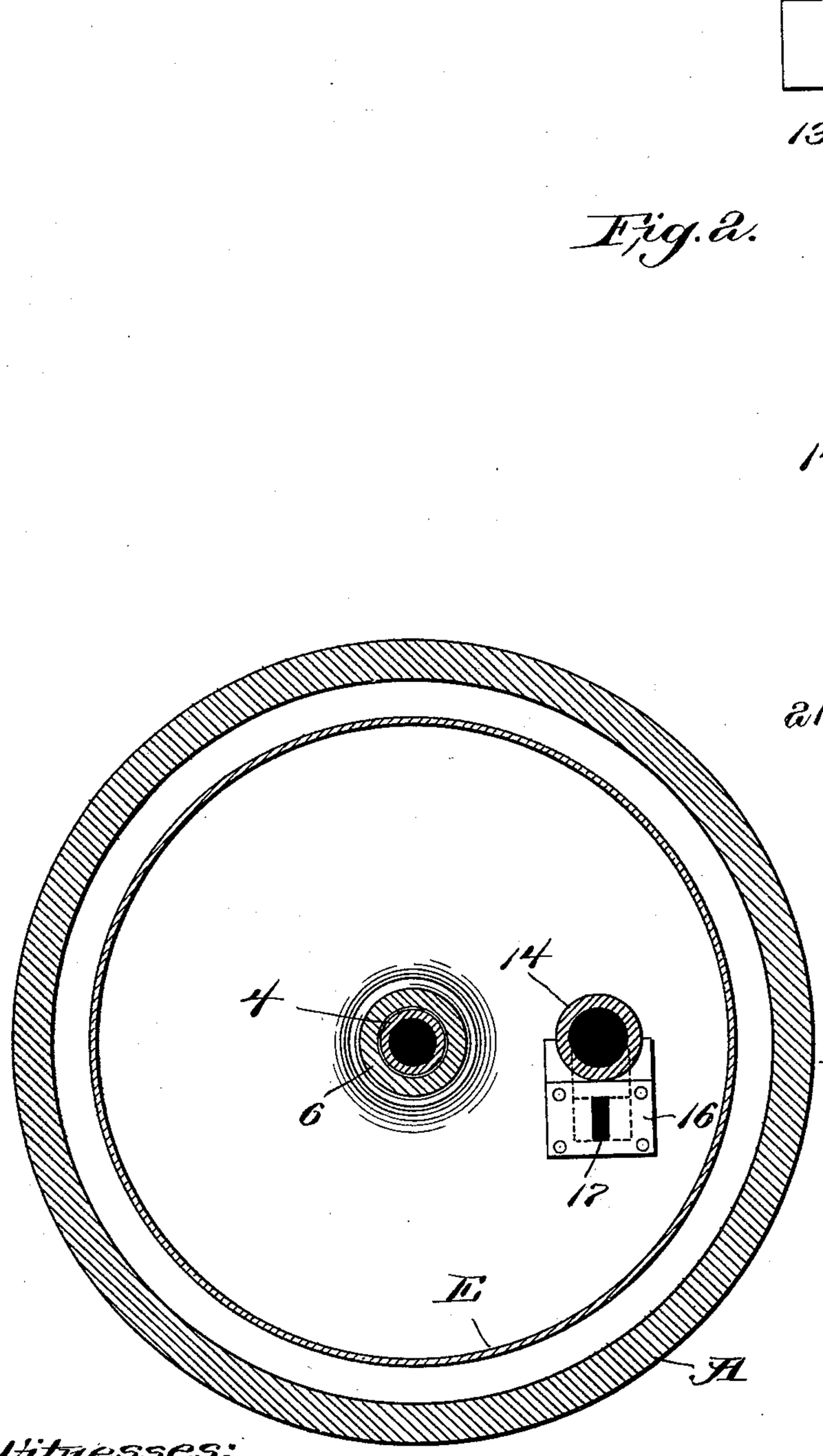


Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

# W. B. MASON.

## STEAM TRAP.

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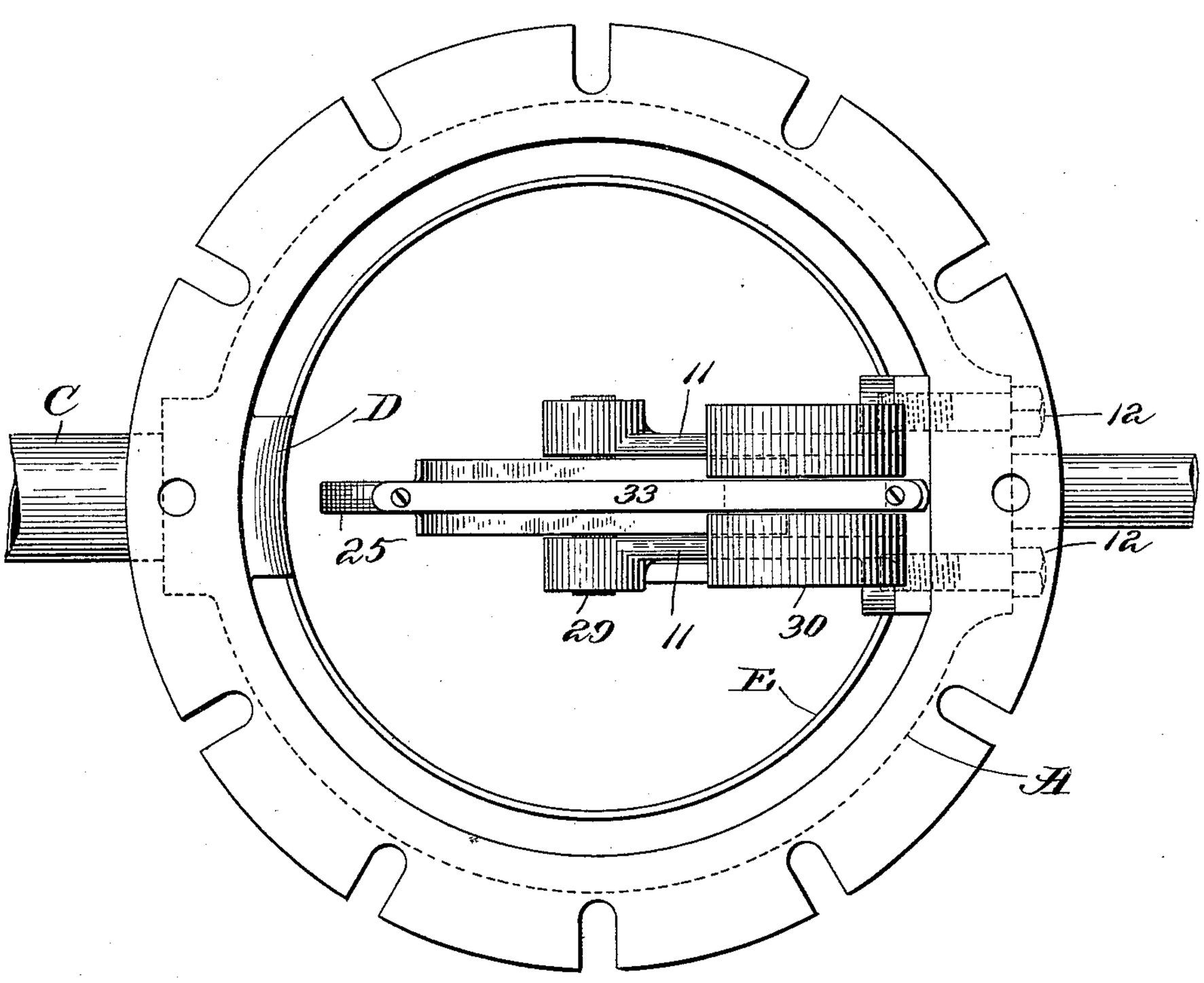


Fig. 4.

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# UNITED STATES PATENT OFFICE.

WILLIAM B. MASON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE MASON REGULATOR COMPANY, OF SAME PLACE.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 583,064, dated May 25, 1897.

Application filed March 16, 1896. Serial No. 583,308. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM B. MASON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, 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.

My invention has for its object to provide an improved steam-trap which shall be efficient in operation and inexpensive in construction; and it consists in a trap constructed as hereinafter set forth.

The novel features of my invention are particularly pointed out and clearly defined in the claims at the end of this specification.

In the accompanying drawings, to which reference is made in the following description, I have shown my invention in the best form now known to me.

In said drawings, Figure 1 is a central vertical section showing the internal parts in elevation. Fig. 2 is a section on line 2 2, Fig. 1. Fig. 3 is a section on line 3 3, Fig. 1. Fig. 4 is a plan view with the cover or dome removed.

My invention relates to that class of steam-traps which are known as "float-traps," in which the valve is operated in one direction by the buoyancy of a part and in the other direction by the weight of said part. Such traps as usually constructed in practice, so far as known to me, are objectionable in that the valve of the escape or outlet passage is liable to become what is termed "gagged"—that is, is held off its seat—so that it does not close completely, thus permitting the escape of steam and rendering the trap useless. These traps are also objectionable because of their small capacity relatively to their size, which is due to the manner in which the valve is controlled by the float. Many of them are also large and cumbersome, requiring a large amount of space when connected up and in position for use. By means of my invention herein set forth I have been enabled to overcome these objections or reduce them to a minimum.

Referring to the drawings, A is the body of the trap, which is of metal, preferably cast-iron and preferably cylindrical in shape, as shown.

B is the dome-shaped cover thereof, which is bolted to a flange 2 on the top of the body A, a gasket of rubber 3 or equivalent packing being employed to make a steam-tight joint.

C is the inlet-pipe, leading from the system of pipes to which the trap is applied and which it is desired to drain.

D is a deflector which projects downwardly inside the body A in front of the inlet-opening and serves to turn the course of the water entering the trap from the inlet C and cause it to pass downwardly along the inside of the trap-body A and between said body and the wall of the float or bucket E. It is not to be understood as essential that all the water from the inlet should pass into the space between the body A and the float E, but it is desirable that the greater portion of the water from the inlet should do so in order to give the float a chance to rise when the water in it has been discharged. At 4 is shown an upright, which is fast at its lower end to the bottom of the trap-body A and is preferably placed in the center of the latter. The upright 4 passes through an opening 5 in the bottom of the float or bucket, and a guide-sleeve 6, fitted to slide on the upright 4, is secured at its lower end to the bottom of the float E. The sleeve 6 and upright 4 serve as a guide to prevent lateral movement of the float relatively to the trap-body A, while freely permitting the float to move vertically within the said body. Near the top of the sleeve 6 I secure an arm 7, to the outer end of which a link 9 is pivoted at 8. A bracket-arm 11 is secured by bolts 12 or other suitable means inside the body A near the top thereof and preferably opposite the inlet or wherever it is desired that the outlet shall be, since the outlet-passage 13 is preferably formed through a portion of said arm 11. Projecting downwardly from the arm 11 and preferably cast integral therewith is a part 14, which is long enough to reach almost to the bottom of the float or bucket E when the latter is in its highest position. At the lower end of said part 14 is an offset portion 15, upon the upper

surface of which is secured by screws or other suitable means a plate 16, which forms the valve-seat. The valve-port 17 is formed through said seat or plate 16 and opens directly into the outlet-passage 13, which is formed, as shown in Fig. 2, through the offset portion 15 and downwardly-projecting portion 14. It will be clear that if the valve-port 17 be open any water under pressure in the float or bucket E will be caused to pass out of the trap through the outlet 13.

For closing the valve-port 17 I provide a valve 18, which is adapted to slide on the flat plate or seat 16 to close the port therein. The valve 18 and seat 16 are formed preferably from brass or similar material, which will not corrode in water. For sliding the valve 18 on its seat I employ a lever 19, which is forked at its lower end, a recess 20 being formed therein to receive the valve 18, which is placed loosely within said recess. The recess 18 is cut away or recessed, as shown at 21, to receive said forked end. By this means the valve is prevented from getting out of engagement with the lever. As will be clear, when the lever 19 is moved the valve 18 will be caused to slide on its seat 16, opening or closing the valve-port. This sliding movement of the valve is of very great importance, since it renders the valve self-clearing and operates to remove any foreign matter which may get onto the valve-seat and which if the valve had a vertical movement relatively to the seat would prevent the valve from closing.

The valve-operating lever 19 is pivoted at 22 on a boss or projection formed on the downwardly projection 14, and the upper end of said lever is bent, as shown, Fig. 1, the free end thereof being provided with a pin 23, which projects into a recess 24, formed on the under side of the boss of the rocking lever or walking-beam 25. The ends of the recess 24 engage the pin 23 to move the valve-operating lever 19, and the said recess is formed of such a size that during the greater portion of the movement of the rocking lever 25 the lever 19 will be at rest. In this way, as only a slight movement of the lever 19 is required to open or close the valve, the latter is opened and closed quickly and with a maximum of power, as will be more clear from what is hereinafter set forth. A pin 26 is set in the bracket-arm 11 and engages the stops 27 28 on the lever 19, thus limiting the throw of the lever and preventing the valve 18 from being slid off its seat. The rocking lever 25 is of the flattened V shape shown, and is pivoted at 29, at mid-length thereof, in the bracket 11, the latter being of the forked or V shape shown, Fig. 4. A cylindrical weight 30, which is provided with an annular groove 31, is mounted on the said lever 25, the latter being provided with a projecting rail 32, which fits the annular groove in the weight and serves to prevent the weight falling off the lever. To more securely hold the weight on the lever, a rod 33 is secured at each end to an arm of the V, the said rod also lying in the annular groove in the weight, so that the weight may roll from end to end of the lever 25, between said lever and the rod 33, without danger of becoming displaced. On the lever 25 is a short projection 34, to which the upper end of the link 9, previously described, is pivoted. The float or bucket E when immersed in water is slightly heavier than the weight 30, so that when the bucket is full or nearly so it will slightly overbalance the weight and gradually raise it until that end of the rocking lever at which the weight is located is higher than the opposite end, when the weight 30 will shift on the lever and the combined weight of the bucket and weight 30 will be applied to the lever 19 and through said lever to the valve 18 to open the latter.

The operation of the device is as follows: The trap being empty, as shown in Fig. 1, the water of condensation enters through the inlet C and fills the space inside the trap-body and between the latter and the bucket or float E, said bucket being in its highest position. When the trap is in use, the said space between the trap-body A and the bucket E will remain filled with water, or substantially filled, there being, when the bucket rises after the trap discharges, a relatively small space between the top of the bucket and the body of the trap, which is empty. The said empty space referred to is shown at K, Fig. 1, and the size of said empty space relatively to the other dimensions of the trap is shown with substantial accuracy in said figure. It is only therefore when the trap is first connected up that the whole interior space between the bucket and the trap-body requires to be filled with water before the trap will operate. When the water reaches the top of the bucket, it flows over into the same, finally filling it. As soon as the bucket is nearly full it sinks, gradually tilting the lever 25 until the weight 30 rolls to the opposite end thereof. The descent of the bucket is accomplished after its buoyancy has been overcome against the resistance of the weight 30 until the said weight shifts past the fulcrum of the lever 25. The weight serves, therefore, to prevent the bucket from descending to its lowest position until it is full, and not only is this the case, but when the bucket finally sinks to its lowest position there is, in a trap proportioned substantially as that shown, Fig. 1, about two inches of water within the trap above the top of the bucket, which is discharged, and the trap is therefore of maximum capacity, since not only is the water in the bucket discharged down to nearly the level of the valve, but a considerable quantity of water above the bucket is also discharged. When a lever 25 has been sufficiently tilted to cause the weight to shift thereon, the end of the recess 24 is preferably nearly but not quite in engagement with the pin 23. The engagement of the end of the recess 24 with the pin 23 takes place, preferably, after the weight 30 has moved past the

fulcrum of the lever 25, and for the best results I prefer to have the said engagement of the end of the recess with the pin 23 occur when the weight 30 has nearly or quite reached the opposite end of the lever, so that the momentum of the descending weight is utilized in shifting the valve. The weight of the bucket E and weight 30 is now exerted under a leverage which in a device having the proportions shown, Fig. 1, multiplies the efficiency of the combined weight of these parts in the ratio of about two to one to open the valve 18. As will be clear, by changing the point at which the pivot 22 is located, as also the length of the boss or projection which engages the pin 23, the power obtained to move the valve may be increased or diminished. The latter is thus quickly opened to its full extent, which is much more desirable than would be a gradual or slow opening of the valve, for obvious reasons. Under the pressure of the steam in the trap the larger part of the water in the bucket E is then quickly forced out, leaving only a sufficient quantity in the bucket to seal the outlet-valve and prevent the escape of the steam. As the bucket is emptied its buoyancy begins to assert itself and the bucket gradually rises, carrying up that end of the lever 25 at which the weight 30 is located. The ascent of the bucket is accomplished against the resistance of the weight 30 until the weight has shifted, and this is an important and valuable feature, because it permits of as complete a discharge of the water in the bucket as is possible without unsealing the valve and thus adds materially to the capacity of the trap. As soon as that end of the lever which is being raised is higher than the opposite end the weight 30 rolls to the opposite end, the pin 23 engages the opposite end of the recess 24, and the combined power of weight 30 and the buoyancy of the empty float act to slide the valve 18 on its seat, closing the valve-port before the water has been forced out of the bucket E down to the level of the outlet-valve. The operation is repeated each time the bucket E is filled and emptied. In the operation of closing the valve it will be seen an abundance of power is supplied, which operates to completely open and close the valve quickly, which I consider a very desirable feature.

It will be noted when the trap is of large capacity, as is the one hereinabove described, the parts of the trap will require to move very much less frequently than would be the case in a trap of small capacity. They are thus subjected to very much less wear and the durability of the trap is largely increased. It is also true that when the capacity of the trap is increased the valve requires to be opened and closed less frequently, and in consequence the danger of it becoming impaired in its operation is correspondingly diminished.

What I claim is—

1. The combination with a valve for the outlet of means for operating said valve comprising a bucket within which said valve is located and which is free to rise and fall, a tilting lever joined to said bucket and having a movable weight thereon which will shift from one side of the fulcrum of said lever to the other as the said lever is moved by the said bucket in the ascent and descent of the latter, and a lever engaging said valve to operate the same and operated with provisions for lost motion by said weighted tilting lever, whereby said valve for said outlet-passage is operated to open or close the same by the combined power of said weighted tilting lever and said bucket, substantially as set forth.

2. The combination with a suitable casing, of the vertically-movable bucket E, the lever 25 joined to the said bucket and operated therefrom, and the shifting weight connected with the said lever, of a valve-operating lever operated by the said lever 25 with provisions for lost motion between the two levers, the outlet located within the said bucket, and a slide-valve for said outlet operated by the said valve-operating lever, substantially as described.

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

WILLIAM B. MASON.

Witnesses:

CHAS. F. RANDALL,

ALICE H. MORRISON.