

(No Model.)

J. H. BLESSING.
AUTOMATIC STEAM TRAP.

No. 578,311.

Patented Mar. 9, 1897.

Fig. 1.

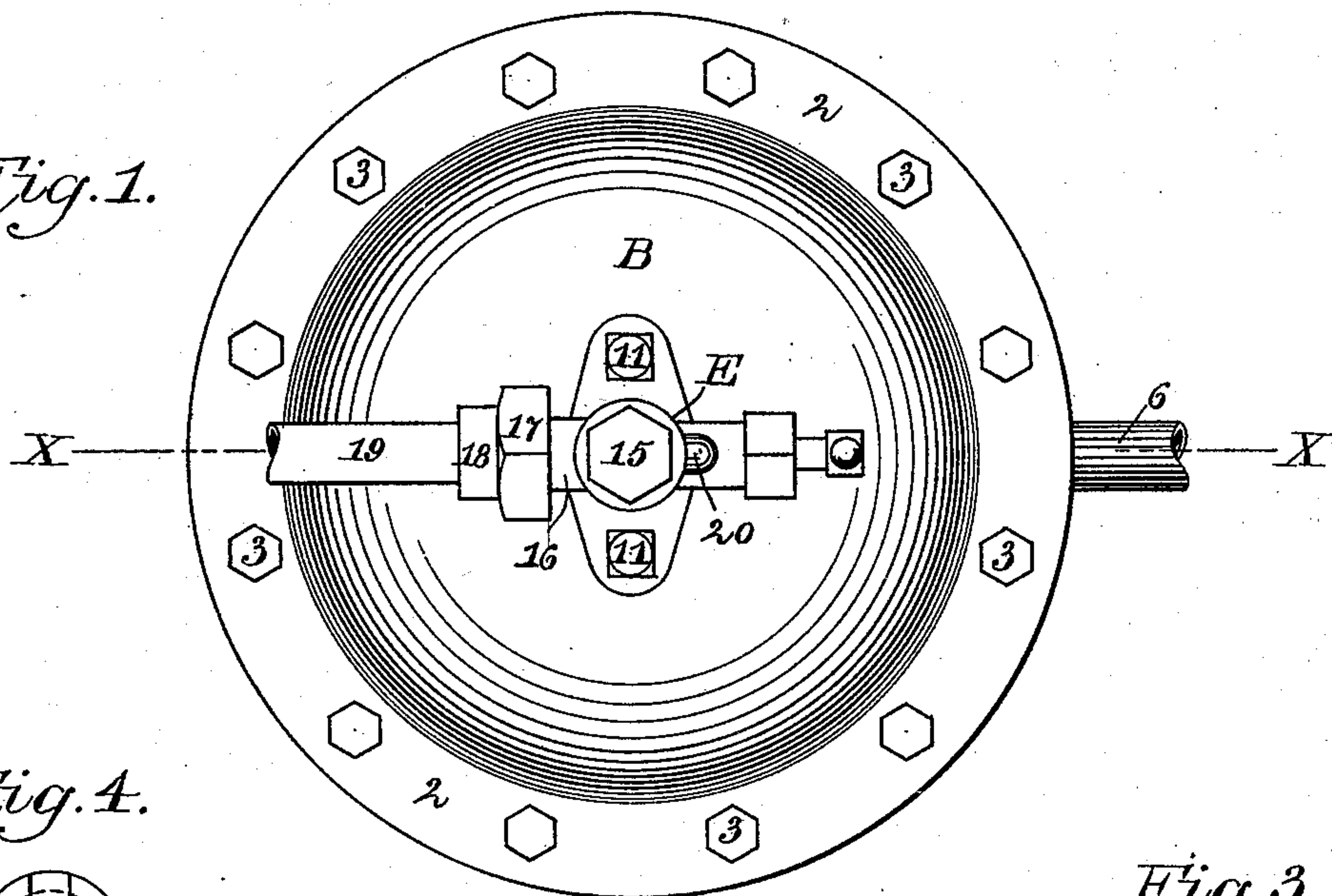


Fig. 4.

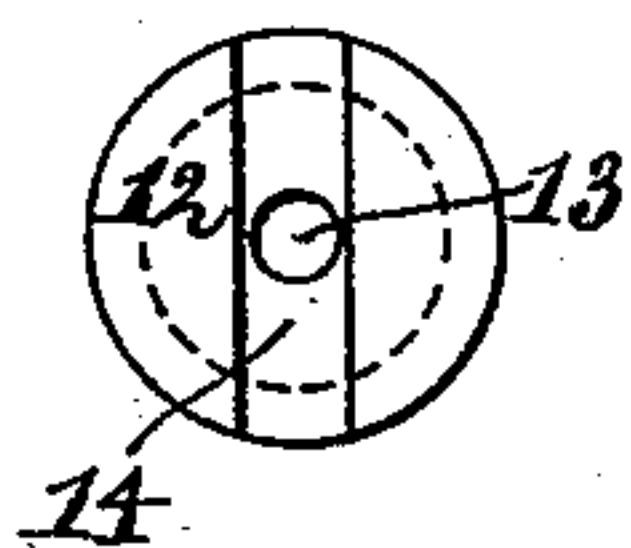


Fig. 3.

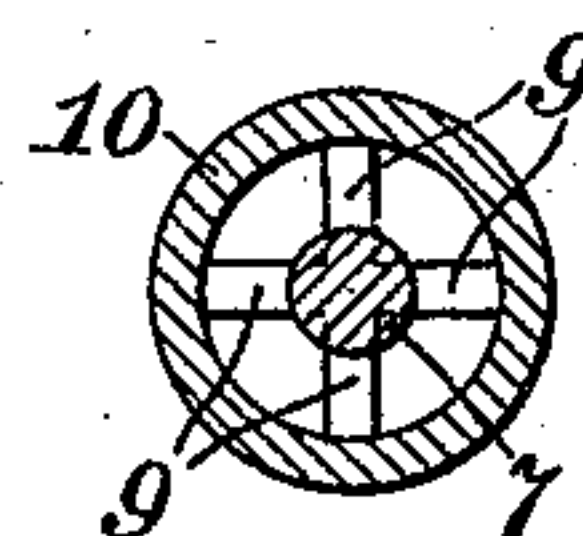
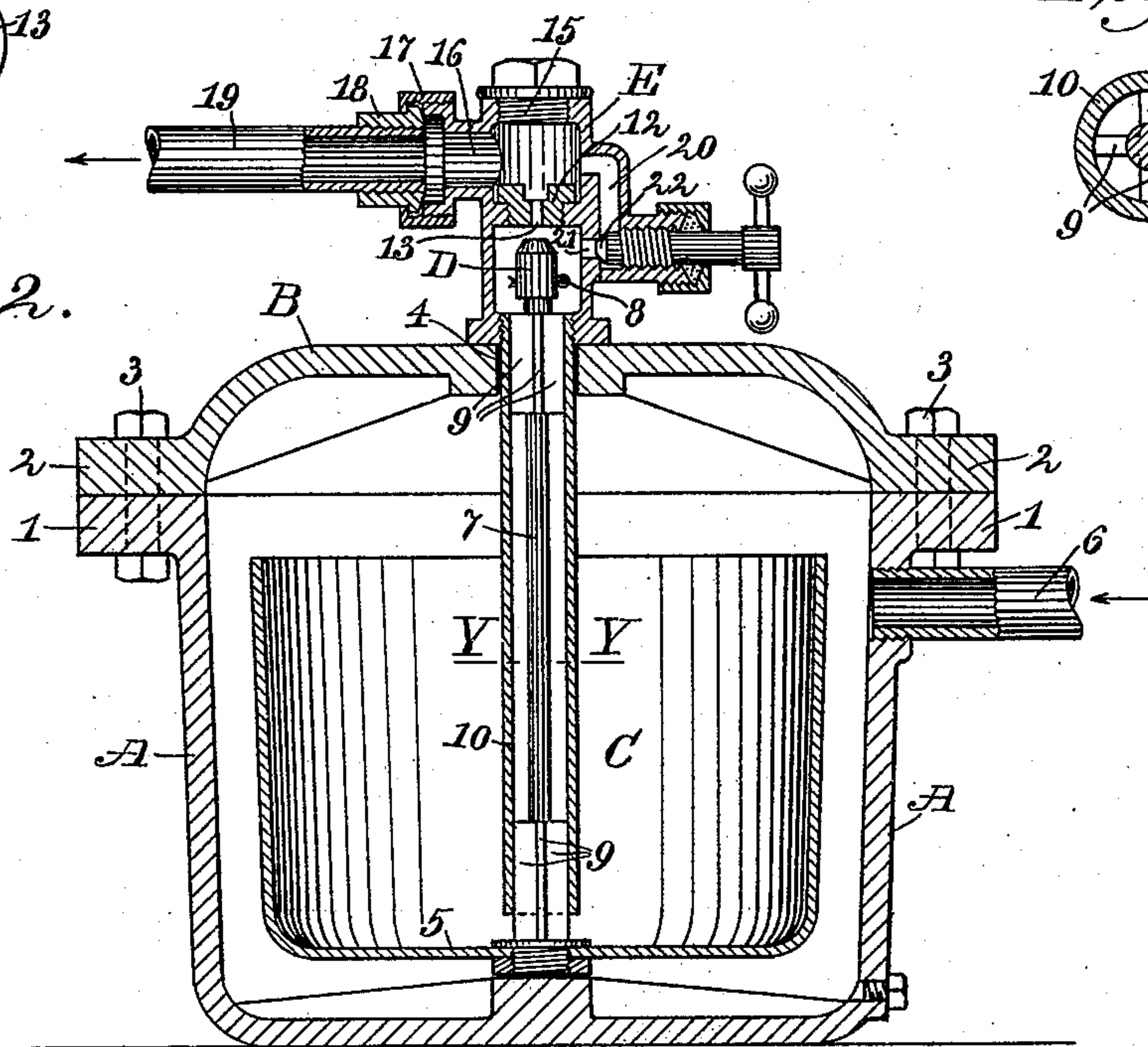


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES H. BLESSING, OF ALBANY, NEW YORK.

AUTOMATIC STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 578,311, dated March 9, 1897.

Application filed June 3, 1896. Serial No. 594,095. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BLESSING, of Albany, in the county of Albany and State of New York, have invented new and useful
5 Improvements in Automatic Steam-Traps, of which the following is a specification.

This invention relates to improvements in automatic steam-traps that are adapted to discharge the water of condensation received
10 from a system of steam heating-pipes directly into the atmosphere, or into a drain or sewer, or into a tank or other receptacle, but said trap is not adapted to return said water to a gen-
erator from which it has been recently drawn
15 in a vaporized condition, this class of steam-traps being technically known as "drain-traps" to distinguish them from the class known as "return-traps," which return the
water of condensation to a steam-boiler in
20 which the steam has been generated.

The object of my present invention is to provide a simple, cheap, effective, and enduring steam-trap constructed and arranged to operate in the manner herein described.

25 In many kinds of "drain-traps" as usually constructed the water of condensation is permitted to enter the floating bucket directly, that is to say, without first entering the water-chamber of the casing, wherein it should ac-
30 cumulate until it flows over the upper edge of said bucket, and a failure to construct the trap in such manner that this accumulation of the water must occur before it can enter the bucket produces an action of the trap that
35 is irregular, uncertain, and erratic. The object of my invention is to remedy the defects of this class of steam-traps.

In the accompanying drawings, which are herein referred to and form part of this speci-
40 fication, Figure 1 is a plan view of my invention; Fig. 2, a vertical section of the same at the line X X; Fig. 3, an enlarged horizontal section at the line Y Y of the valve and guide-sleeve, and Fig. 4 an enlarged plan view of
45 the renewable valve-seat of my trap.

As represented in the accompanying draw-ings, A designates the casing of my steam-trap, made of metal cast in a practically cy-
lindrical form, the top of said casing being
50 open and surrounded by an annular flange 1, that projects outwardly, and the bottom of said casing is closed.

B is a bonnet which forms a closure for the open top of the casing A. Said bonnet is pref-
erably recessed at its lower side and is pro- 55
vided with an annular flange 2, which con-
forms to the flange of the casing A. Said bon-
net is secured to the casing A by joint-bolts
3, which pass through the flanges 1 and 2. At
the center of said bonnet an opening 4 is 60
formed for a purpose hereinafter explained.

C is a metallic bucket that is arranged to rise and fall in the casing A. The form of
said bucket approximates to that of the cas- 65
ing A, but it is not as deep or as large in di-
ameter as said casing, the difference in depth
being made for the purpose of allowing suf-
ficient space to permit the bucket to rise and
fall in said casing, and the difference in di-
70 ameter being allowed to form an annular
space between the outer side of the bucket
and the inner side of the casing. Said bucket
has a closed bottom 5, having a central open-
ing formed therein. The bucket C should be
75 deep enough to extend above a water-inlet
pipe 6, which is fixed in the side of the casing
A, so that the water which enters the casing
through said pipe must strike against the side
of the bucket C, below the upper edge of the
80 latter, and be deflected downward into the cas-
ing A without entering into the bucket.

D is a valve removably attached to the up-
per end of the stem 7, which is secured in the
central opening in the bottom 5 of the bucket
C, so as to stand erect in the latter. Said 85
valve is attached to the stem 7 by a cotter 8,
which can be readily removed when occasion
requires a removal of the valve, the removal
of said valve being readily effected without
removing the bonnet B from the casing A. 90
The stem 7 is provided with wings 9, which
fit loosely in a guide-sleeve 10, so as to guide
the bucket C in its movements. The spaces
left between the wings 9 and between the
stem 7 and guide-sleeve 10 afford a suitable 95
passage for an outflow of water through said
guide-sleeve.

E is a valve-casing which is removably se-
cured on the top of the bonnet B, and the re-
moval of said valve-seat can be effected with- 100
out removing said bonnet from the casing A.
The valve-casing E is secured to the bonnet
B by means of bolts 11 or other suitable fas-
tenings. To the lower side of said valve-cas-

ing a guide-sleeve 10, which is hereinbefore referred to, is secured to extend downward through the central opening of the bonnet B nearly to the bottom of the bucket C. The valve-casing E is provided with a removable valve-seat 12, against which the valve D will bear when the bucket C has attained its raised position, whereby the valve D will be moved into contact with the valve-seat 12 and effect a closing of the opening through the latter. Said valve-seat is provided with a small discharge-opening 13, which will be closed by the valve D when the bucket C reaches its higher position. By providing the valve-seat 12 with a discharge-opening considerably smaller than the area of the guide-sleeve 10 a retardation of the outflow of the water from the trap will be effected that will prevent a sudden discharge of the water from the trap, which sudden discharge will produce an emptying of the trap and permit a current of steam to flow through and out of the trap without producing any beneficial effect. By making the valve-seat 12 removable provision is made for substituting valve-seats having different calibers of the discharge-opening to adapt the trap to different pressures and conditions, and it also provides for a renewal of the valve-seat when one has become cut, grooved, or otherwise injured by the action of the water. The valve-seat 12 is usually made to screw into the valve-casing E, and said valve-seat should be provided with a groove 14 in its upper face, so that an implement can be inserted in said groove to screw said valve-seat into and out of the valve-casing E. The upper end of said valve-casing is provided with a removable closure 15, by removing which access can be obtained to the valve-seat 12. The valve casing E has a branch pipe 16, formed to extend sidewise therefrom above the valve-seat 12, said branch pipe being fitted to receive a coupling-nut 17, which takes against the shoulder of a coupling 18, that is secured to a discharge-pipe 19, through which water from the trap is conveyed to a place of final delivery. The valve-casing E is also provided with a by-pass 20, through which air that is held in the trap and which will prevent a proper operation of the trap can be discharged in order to put the trap in a proper condition to operate automatically. Said by-pass is provided with an opening 21, which leads from the lower chamber of the valve-casing into said by-pass, and a valve 22 is arranged to close said opening when occasion requires.

It should be understood that the valve D is operated directly by the bucket C without the intervention of levers or other mechanism to enhance the effect of the weight of said bucket and of the water contained therein, and for that reason only a limited movement can be imparted to said bucket. Consequently the number of movements of the bucket must be proportionately increased to effect the discharge of the required quantity of water.

The water-inlet pipe 6 being connected to

the casing A and to a system of steam heating-pipes, (not shown in the drawings,) the operation of my trap is as follows: The water of condensation enters the casing A through the water-inlet pipe 6, and, striking against the side of the bucket C a sufficient distance below the upper edge of the latter to prevent the water from entering directly into the bucket, it is thereby deflected through the annular space formed by the outer side of the bucket C and the inner side of the casing A toward the bottom of the casing wherein the bucket C is at the lowest point of its movement. The inflow causes the water to rise in said casing until the flotation of the water, acting upon the outer surface of the bucket, causes the latter to rise until the valve D is seated upon the valve-seat 12 to close the opening 13 of said valve-seat. The bucket C is now held in a stationary position while the water rises in the casing A to a level where it will pour into said bucket over the upper edge of the latter. When the water has accumulated in the bucket C so that its weight will overcome the flotation, the bucket will sink in the water contained in the casing A, and its sinking will be accelerated by the sudden influx of water in said bucket until the latter attains the lowest phase of its downward movement. When the lower end of the guide-sleeve 10 is uncovered, the superincumbent pressure, acting on the surface of the water in the bucket C, will force the water from said bucket and cause it to pass through the guide-sleeve 10 and discharge-opening 13, thence into the discharge-pipe 19, from whence it will be delivered into a drain, sewer, tank, or other place or receptacle for receiving the discharged water. When the water has been sufficiently expelled from the bucket C so that the flotation of the water contained in the casing A will cause said bucket to rise, the upward movement of said bucket will carry the valve D into position to close the discharge-opening 13, and thereby the trap will be restored to a condition for a repetition of the operation just described.

By locating the valve-casing E on top of the bonnet B and securing it in place by the bolts 11 it can be readily removed from its place after removing said bolts and disconnecting the coupling-nut 17, and such removal can be effected without taking the bonnet B from the casing A. When such removal is accomplished, access to the valve D can be had, and said valve can be removed from the stem 7 and a new valve substituted for it, if desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

In an automatic steam-trap, the combination, with a casing, A, a bonnet, B, secured to and forming a closure for the top of said casing, a valve-casing, E, secured to the upper side of said bonnet, a pendent guide-sleeve, 10, secured to the lower side of the valve-casing and arranged to extend into the

interior of the trap; said valve-casing and guide-sleeve being combinedly removable from the bonnet B without removing the latter from the casing A, a valve-seat, 12, removably secured in said valve-casing and having a discharge-opening, 13, of smaller caliber than the bore of the guide-sleeve, and a discharge-pipe, 19, leading from the valve-casing E, of a bucket, C, arranged to automatically rise and fall in the casing A, a stem, 7, erected centrally on the bottom of the bucket C and having guide-wings, 9, fitted to slide

loosely in the guide-sleeve 10, a valve, D, attached to the stem 7 and detachable from the latter without removing the bonnet B from the casing; said valve being arranged to close the discharge-opening 13, and a water-inlet pipe, 6, secured to the casing A, as herein specified.

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Witnesses:

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