

G. KEISLING.

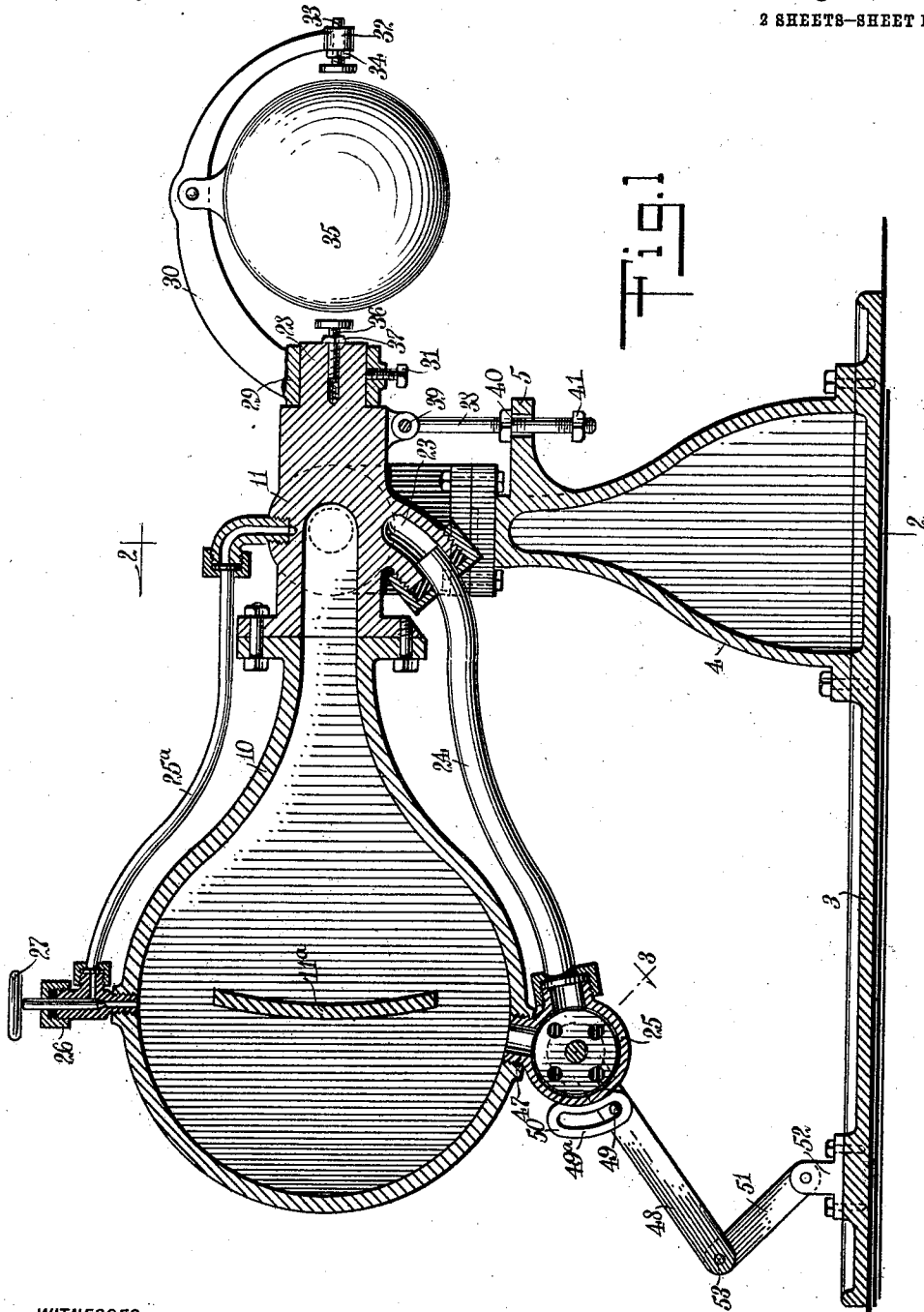
STEAM TRAP.

APPLICATION FILED OCT. 29, 1910.

1,000,920.

Patented Aug. 15, 1911.

2 SHEETS—SHEET 1.



WITNESSES
John Bergthand
Walton Harrison

INVENTOR
George Keisling
BY *Munn & Co.*

ATTORNEYS

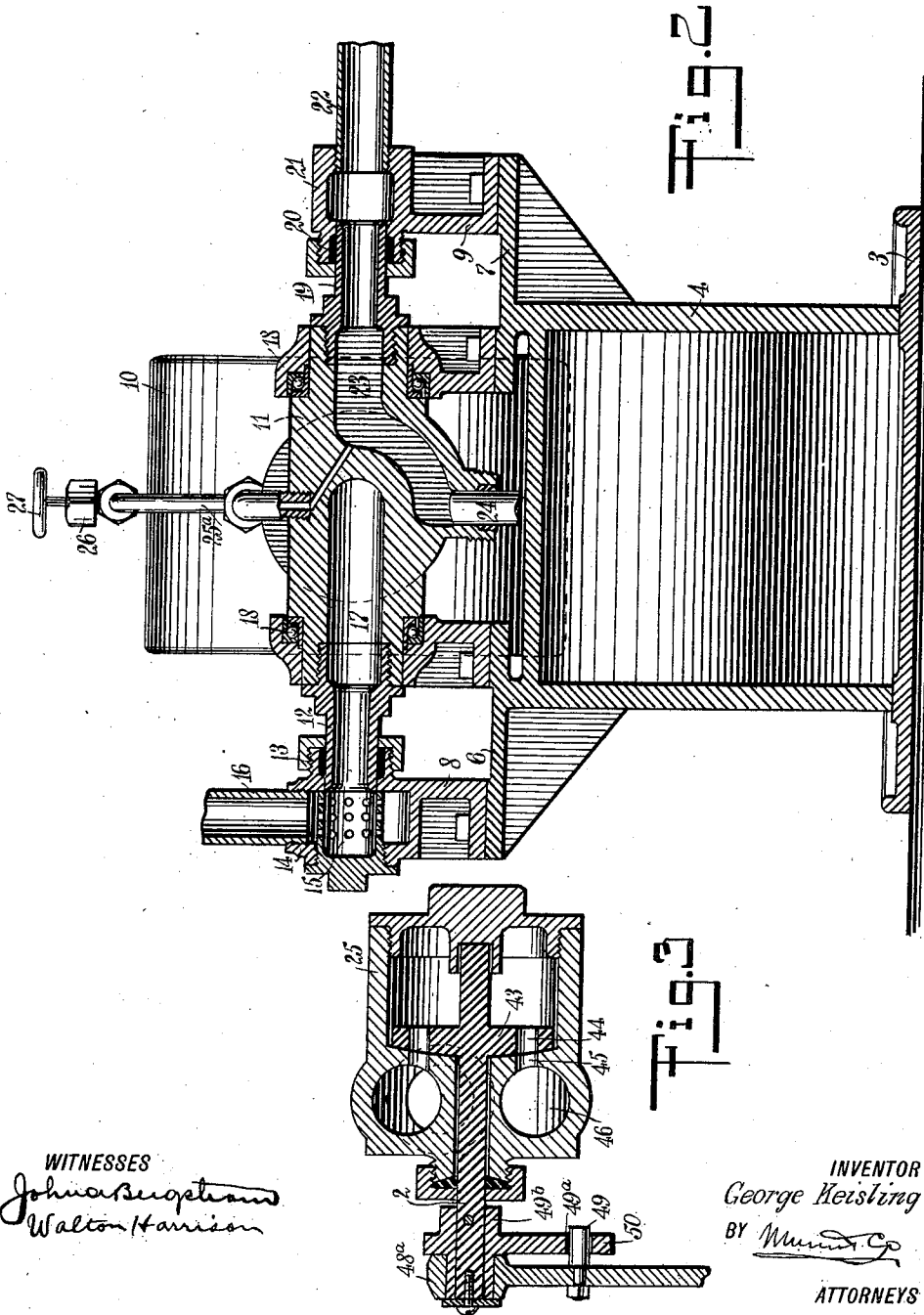
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WITNESSES
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UNITED STATES PATENT OFFICE.

GEORGE KEISLING, OF SCRANTON, PENNSYLVANIA.

STEAM-TRAP.

1,000,920.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed October 29, 1910. Serial No. 589,810.

To all whom it may concern:

Be it known that I, GEORGE KEISLING, a citizen of the United States, and a resident of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and Improved Steam-Trap, of which the following is a full, clear, and exact description.

My invention relates to steam traps of the kind which automatically discharge the water of condensation at intervals depending upon the rapidity with which the water accumulates within the trap.

My invention comprehends more particularly a trap of this type having a shifting weight of improved construction arranged in connection with a reservoir for the purpose of facilitating the step of tilting the reservoir and of preventing its return to normal position until all of the water of condensation is discharged, the return of the reservoir then being effected by the restoration of the weight, under control of gravity, to its own normal position.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a substantially central longitudinal section through my apparatus complete; Fig. 2 is a cross section on the line 2—2 of Fig. 1, looking in the direction of the arrow; and Fig. 3 is a detail, being a section on the line 3—3 of Fig. 1, looking in the direction of the arrow, and showing a part of the valve mechanism for discharging the water.

Resting upon a base plate 3 is a pedestal 4, this pedestal having a shelf 5 integral with it and serving the purpose of an eye, as will be understood from Fig. 1. The pedestal 4 is further provided with shelves 6, 7 (see Fig. 2) disposed upon its opposite sides and integral with it. Resting upon the shelves 6, 7 are stationary bearings 8, 9. At 10 is a reservoir 7, having generally the form of a flask and mounted within the flask is a baffle plate 11^a; the flask is further provided with a neck 11. Extending laterally from this neck (see Fig. 2) is a sleeve 12 serving as an inlet pipe for admitting steam into the flask.

Fitting around the sleeve 12 is a stuffing box 13 forming part of a casing 14, and fitted into this casing is a perforated plug 15

which serves as a screen. Connected with the casing 14 is a steam pipe 16 through which the exhaust steam flows into the flask. The neck 11 is provided with a passage 17 cored therein and registering with the sleeve 12, as will be understood from Fig. 2. The neck 11 is mounted upon ball bearings 18 and is adapted to rock within proper limits. The neck 11 is provided with a sleeve 19 extending oppositely to the sleeve 12, and fitting around the sleeve 19 is a stuffing box 20 mounted upon a casing 21 forming practically a part of the bearing 19.

At 22 is a water pipe which is connected with the casing 21. When the flask, supported, as above described, by the ball bearings, is rocked, the sleeves 12, 19 turn slightly within the stuffing boxes 13, 20 and the bearings 8, 9. The neck 12 is provided with a cored passage 23, and registering with the latter is a pipe 24 which is rendered steamtight and watertight relative to other parts. The pipe 24 is also connected with a casing 25 disposed upon the under side of the flask 10, as will be understood from Fig. 1.

At 26 is a needle valve provided with a hand wheel 27 whereby it is controllable. A tube 25^a is connected with this needle valve and is also in communication with the neck 11. By manipulating the hand wheel 27 any air arriving along with the steam and passing into the flask along with the steam may be, at the will of the operator, discharged from the flask without the loss of any steam. The neck 11 is provided with a boss 28 having generally a cylindrical form. A ring 9 is adapted to fit upon this boss, this ring being provided with an arm 30 integral with it. A set screw 31 extends radially through a portion of the ring 29 and may be tightened against the adjacent surface of the boss 28. By aid of the screw 31 the ring 29 may be adjusted slightly, if desired, in relation to the boss 28, the ring 29 being thus moved toward or from the center upon which the flask rocks.

The arm 30 at its outer or free end carries an eye 32 which is threaded internally. Fitting into this eye is a screw 33 and encircling this screw is a nut 34 which may be jammed against the eye 32, thus serving as a lock for the screw 33. The arm 30 has generally an arcuate form and suspended from its middle is a weight 35.

At 36 is a screw which is centered relatively to the boss 28 and is encircled by a nut 37. By manipulating this nut the screw 36 may be loosened or tightened at the will of the operator and may be adjusted relatively to the boss 28 and weight 35. By a proper adjustment of the screws 33 and 36 the play of the weight 35 between the adjacent ends of these screws, may be regulated at will; and, moreover, the general positions of the screws relatively to that of the weight may be changed within reasonable limits controllable by the respective lengths of the screws.

The parts are so arranged that whenever the flask 10 tilts downwardly—that is to say, when the flask turns slightly in a counterclockwise direction, according to Fig. 1—the center of gravity of the weight 35 is shifted slightly toward the left; that is, nearer to the center of rocking movement of the flask as a whole. During the time this occurs, if any water is present within the flask 10, this water, by flowing to the left according to Fig. 1—that is, flowing in the direction in which it tends to flow by gravity whenever there is any initial tilting of the flask—virtually shifts the center of gravity of the flask and its contents slightly away from the center of rocking motion of the flask. These two movements taken together—that is, the shifting of the center of gravity of the weight 35 and the shifting of the center of gravity of the volume of water in the flask 10—mutually contribute to the continuance of any rocking movement once started relative to the flask 10.

A rod 38 is, by aid of a pivot pin 39, mounted upon the under side of the neck 11. This rod extends through the eye 5 and is partially threaded and is fitted with nuts 40, 41. The nut 40 is above the eye 5 and the rod 41 is below the latter, so that the nuts 40, 41, taken in connection with the rod 38, and the eye 5, serve to limit the travel of the flask 10. The weight 35 is so proportioned relatively to the other parts and the screws 33, 36 are so adjusted that when the flask 10 is emptied the nut 40 rests upon the upper side of the eye 5; whereas, if the flask 10 be tilted into its contrary position, the nut 41 rises and engages the under side of the eye 5.

The casing 25 has generally the construction indicated in Fig. 3. A valve stem 42 extends axially into the casing and is provided with a valve 43 having holes 44 through it. The casing is further provided with a partition having holes 45, so that the rocking movements of the valve stem 42 may turn the holes 44 of the valve 43 into or out of registry with the holes 45. The casing 25 is further provided with passages 46 with which the holes 45 communicate, the passages 46 being permanently in communication with the pipe 24. The casing

25 is provided also with a neck 47 by aid whereof it is held in its position upon the under side of the flask 10, the neck serving also as a means of communication between the casing and the inside of the flask.

A link 48 carries a pin 49 which fits neatly within an arcuate slot 49^a with which a valve lever 50 is provided. This valve lever is provided with a hub 49^b which is secured rigidly upon the valve stem 42, as will be understood from Fig. 3. The link 48 at its upper end is provided with a bearing 48^a (see Fig. 3) which encircles the hub 49^b and is not connected rigidly with either this hub or the stem 42. The lower end of the link 48 is connected with a shorter link 51 by aid of a pivot pin 52. The link 51 is pivotally mounted upon a bracket 53, the latter being secured to the base plate 3. Whenever the flask 10 is tilted in a counterclockwise direction according to Fig. 1, the casing 25, of course, descends and the link 48 is moved relatively to the link 51 so that the pin 49 rises within the arcuate slot 49^a. No change whatever is made in the position of the valve stem 42 relatively to the casing until the pin 49 reaches the upper end of the slot 49^a and engages the upper portion of the lever 50. When this takes place, the further movement of the flask 10, in the same direction in which it started, causes the lever 50 to be abruptly moved in a clockwise direction according to Fig. 1, so that the valve stem 42 is rotated quickly for a little distance; that is, until the holes 44 come into registry with the holes 45, as will be understood from Fig. 3.

When the flask 10 is tilted back in a clockwise direction according to Fig. 1 until it reaches the limit of its travel, the pin 49 first descends until it reaches the bottom of the slot 49^a, and up to the time when it reaches the bottom the stem 42 is not turned. When, however, the pin 49 reaches the bottom of the slot, the lever 50 is turned abruptly a slight distance so that the valve 43 is restored to its normal position, the holes 44 being thus moved out of registry with the holes 45.

The operation of my device is as follows: The parts being assembled, arranged and adjusted as above described, I will first assume that the flask 10 is empty. Exhaust steam (or any other steam to be used in connection with the trap) is admitted through the pipe 16, screen 15 and sleeve 12 to the cored passage 17, and thence into the flask 10. Here, if it have any considerable elasticity, it strikes against the baffle plate 11^a. The steam being condensed, water of condensation of course accumulates in the flask 10. The weight 35, however, maintains the flask 10 in its normal position, as above described until a predetermined quantity of water accumulates. When this occurs, the flask rocks

as above described, the weight 35 shifting toward the rocking center and the water in the flask shifting away from said center, so that the weight of the water exerts a progressively increasing leverage, the action of the weight 35 being to exert a progressively diminishing leverage. The rocking movement of the flask 10 is therefore tolerably abrupt and energetic. In performing this movement, the flask descends until the pin 49, after a free movement in the slot 49^a, causes the valve lever 50 to rock abruptly, and this turns the valve 43 so that the holes 44 come into registry with the holes 45, as above described. This allows the water to discharge through the casing 25, and if there be any material steam pressure upon the water the discharge is facilitated, the water being driven obliquely upward through the pipe 25 and out through the ports 23 and outlet pipe 22.

The water being completely discharged, the flask 10, because of its newly acquired lightness, is no longer able to balance the weight 35, and consequently the flask, under impulse of the weight last mentioned, returns to its normal position, as indicated in Fig. 1. In doing this, the valve 43 is turned slightly as above described, so that the holes 44 are cut off from communication with the holes 45.

I do not limit myself to the precise construction herein shown and described, as various changes may be made without departing from the spirit of my invention.

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

1. A device of the character described, comprising a flask having a neck, an air pipe connecting the body portion of said

flask with said neck, valve mechanism for controlling said air pipe, means for discharging air and water from said flask, and mechanism including a weight and controllable partly by said weight and partly by the weight of water within said flask for tilting said flask in order to discharge water therefrom.

2. A device of the character described, comprising a flask provided with a neck and journaled to tilt, said neck having a boss, a collar encircling said boss, means controllable at will for adjusting said collar relatively to said boss, an arm carried by said collar and extending away from said neck, and a weight carried by said arm and movable toward and from said neck for the purpose of enabling said weight to shift toward the center of movement of said flask when said flask is tilted in a predetermined direction.

3. In a steam trap, the combination of a flask, means controllable by weight of water of condensation for tilting said flask, a valve casing carried by said flask and provided with holes, a valve having generally the form of a disk and revolubly mounted within said casing, said valve being provided with holes adapted to register with said holes in said casing when said valve is turned, and means controllable by the tilting of said flask for turning said valve within said casing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE KEISLING.

Witnesses:

DAVID LEWIS,
FRED BEADLE.