

911,268.

J. E. PURSER.  
STEAM TRAP.

APPLICATION FILED APR. 6, 1908.

Patented Feb. 2, 1909.  
3 SHEETS—SHEET 1.

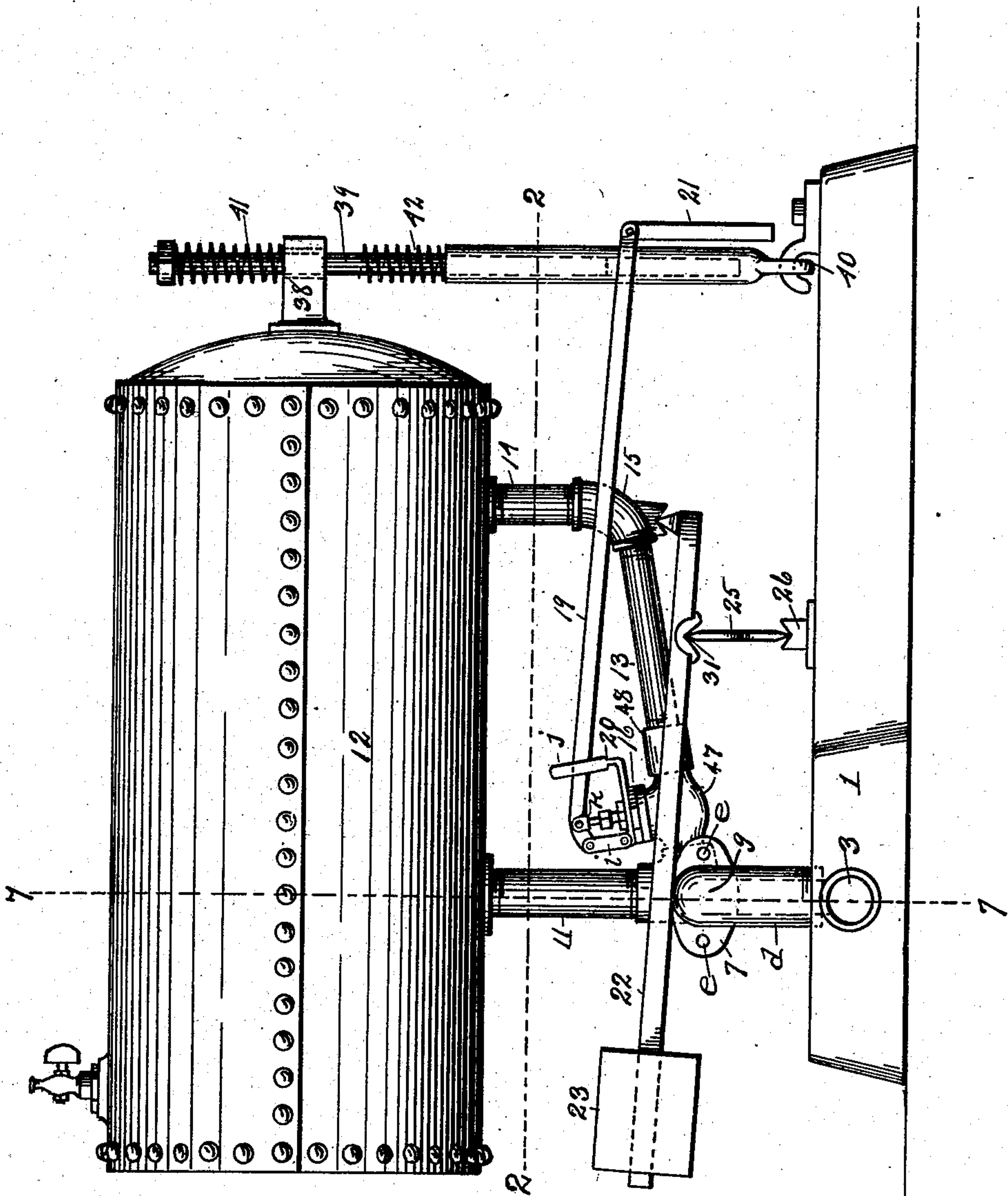


Fig. 1.

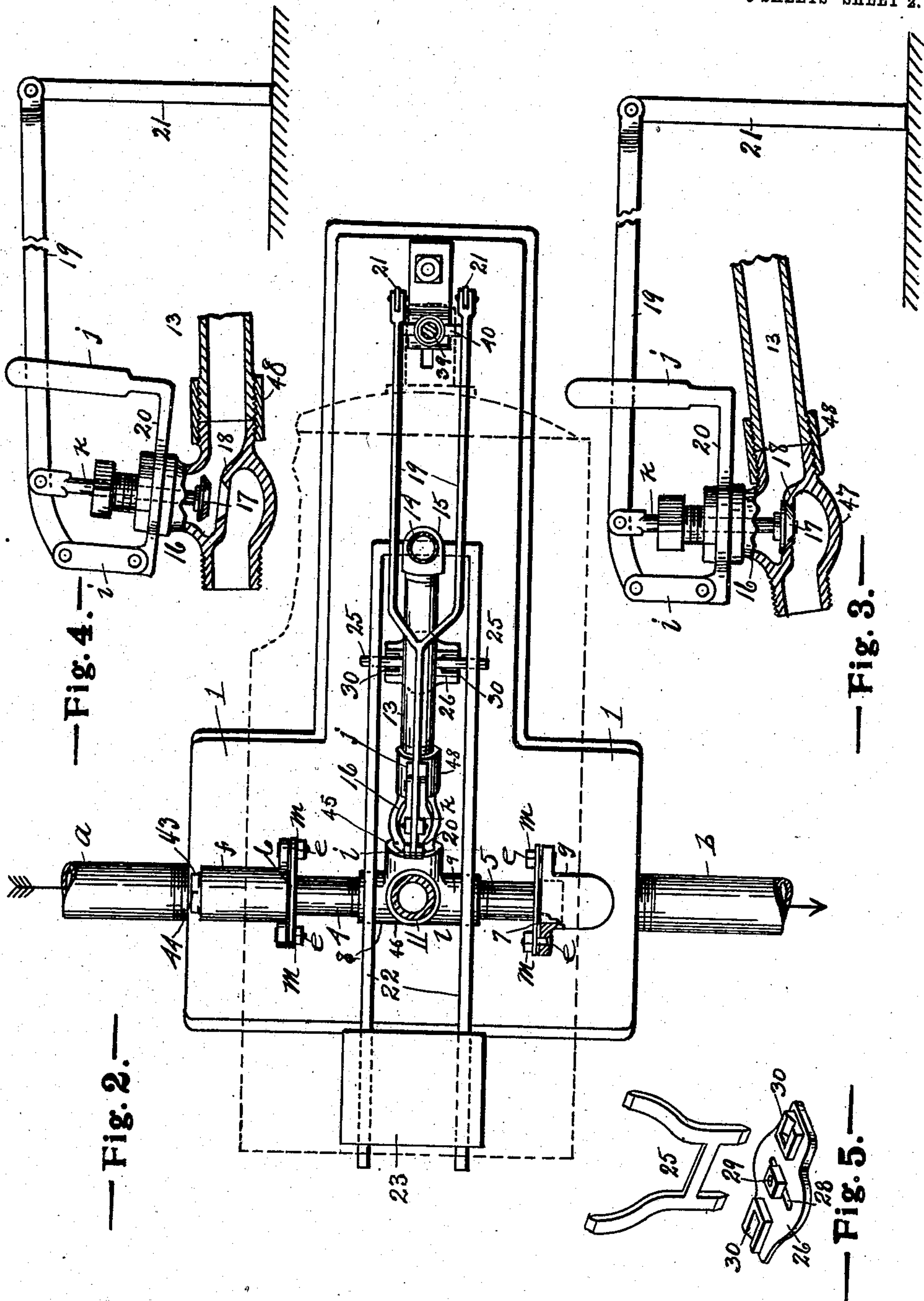
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3 SHEETS—SHEET 2.



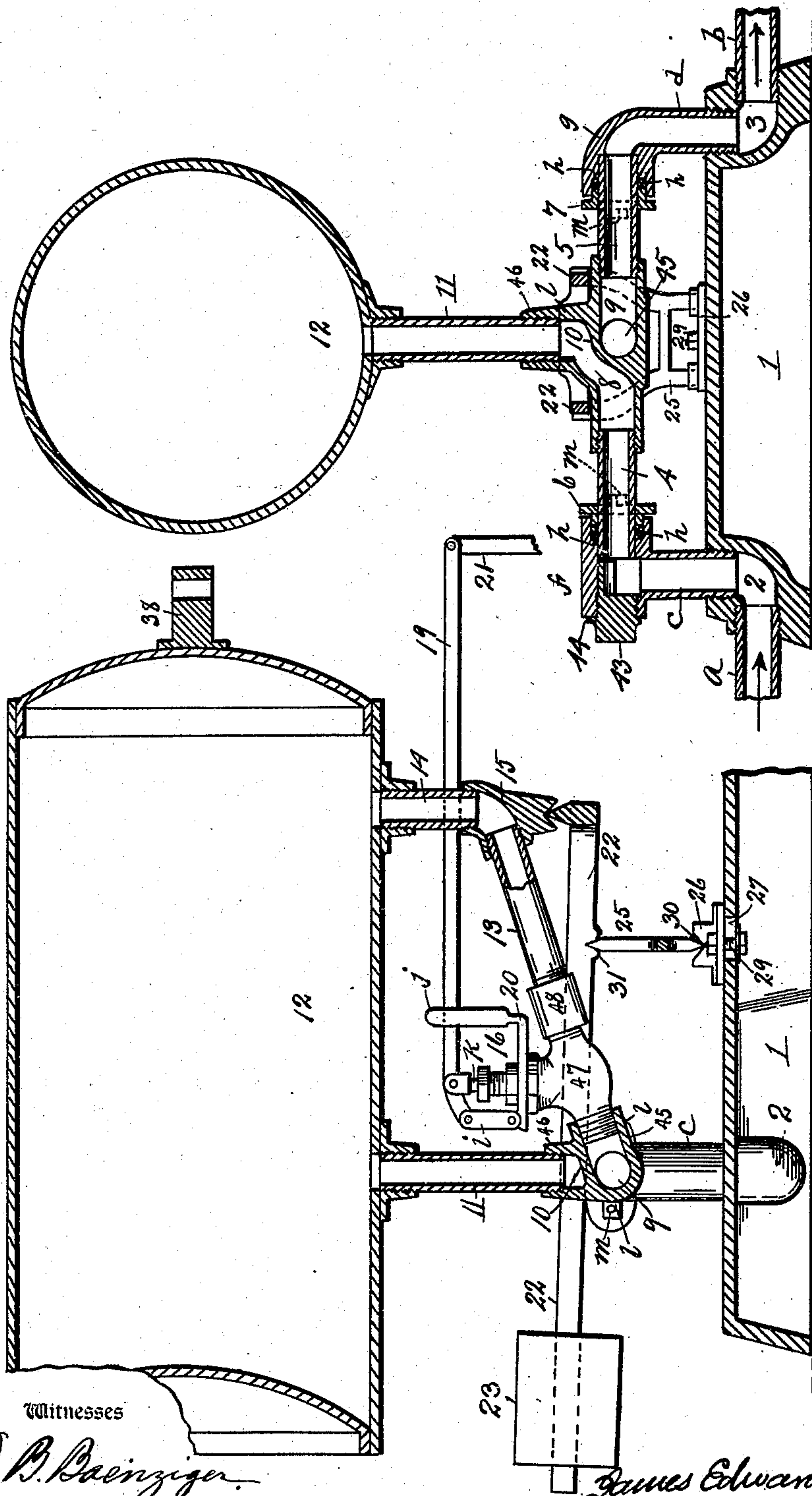
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8 SHEETS—SHEET 3.



— Fig. 7. —

— Fig. 6. —

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# UNITED STATES PATENT OFFICE.

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## STEAM-TRAP.

No. 911,268.

Specification of Letters Patent. Patented Feb. 2, 1909.

Application filed April 6, 1908. Serial No. 425,546.

*To all whom it may concern:*

Be it known that I, JAMES EDWARD PURSER, a subject of the King of Great Britain, residing at Windsor, in the county of Essex and Province of Ontario, Canada, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification.

My invention has reference to certain new and useful improvements in a steam trap, the same being designed as a gravity separator to separate water of condensation from steam.

My invention consists in the construction, combination, and arrangements of devices and appliances hereinafter described and claimed, and illustrated in the accompanying drawings, in which,

Figure 1 is a view in side elevation. Fig. 2 is a view in horizontal section on the line 2—2 Fig. 1. Fig. 3 is a detail view showing the valve mechanism in the discharge pipe, parts being in vertical section and parts in side elevation, the parts being in normal or closed position. Fig. 4 is a view similar to Fig. 3 but showing the valve in open position. Fig. 5 shows in detail a suitable plate and yoke upon which the weighted lever is fulcrumed. Fig. 6 is a view in vertical longitudinal section showing parts in side elevation. Fig. 7 is a vertical transverse section on the line 7—7 Fig. 1.

The purpose of my invention is to provide a steam trap of simple and economical construction.

My invention is intended to provide a tilting tank or receiving chamber, the device being provided with valve mechanism to hold the contents of the tank in check, or from being discharged, until the weight of water in the tank overbalances a weight employed to hold the tank in normal position, the valve being opened when the tank tilts to permit the contents of the tank to discharge.

My invention also includes certain other features hereinafter set forth.

I carry out my invention as follows: In the drawings the numeral 1 denotes any suitable base provided upon opposite sides thereof with inlet and discharge chambers indicated at 2 and 3. An inlet pipe *a* communicates with the chamber 2, and a discharge pipe *b* communicates with the chamber 3. The chambers 2 and 3, as shown, are provided with communicating pipes or

channels, respectively, indicated at *c* and *d*, the upper ends of which are provided with chambered elbows *f* and *g* preferably made integral therewith. Upon the said elbows or sleeves are supported hollow trunnion arms 4 and 5, glands 6 and 7 being employed, engaged with the inner ends of the respective elbows in any suitable manner, as by bolts *e* to hold a suitable packing *h* in place.

It will be evident that the trunnion arms communicate through their respective elbows and corresponding channels *c*, *d*, with the chambers of the base with which are connected the corresponding inlet and discharge pipes *a*, and *b*. The trunnion arms 4 and 5 are connected with a channeled casting 7 formed with an inlet channel 8 and a discharge channel 9, said channels being on opposite sides of a separating diaphragm 10 within the casting. Said casting is further formed with a laterally extended channeled arm 45 and with an upright channeled arm 46, supporting an upright pipe 11, the pipe 11 supporting a tilting receiving tank or separator 12. The trunnion arms have a rocking movement in the corresponding elbows permitting the tank to tilt. It will be understood that the tank is supported upon the pipe 11 at one side of its center of gravity. The supporting pipe 11 communicates with the channel 8. A discharge pipe 13 communicates with one end of the tilting tank as through a vertical pipe 14, the pipes 13 and 14 being connected by an elbow 15. The pipes 13 and 14, and elbow 15, practically form a single discharge pipe. The discharge pipe communicates with the channel 9 and trunnion arm 5. Controlling the discharge channel is a valve mechanism 16 of any suitable construction, that shown herewith, comprising a valve case 47 threaded into the channeled arm 45 at one end thereof, and connected at its opposite end with the discharge pipe 13 as by a suitable pipe coupling 48. A valve 17 seats upon the valve seat 18 within the case. The stem 19 of said valve is shown jointedly connected at its upper end with a normally horizontally extended lever 19, said lever at one end thereof having a link connection *i* with a yoke 20 provided with a guide arm *j* to guide the movement of the valve lever. The opposite end of the valve lever is shown provided with a vertically depending stop 21, to contact with the base when the tank



tilts thereby holding the valve 17, and permitting the valve seat to drop away therefrom upon the farther tilting of the tank whereby the valve mechanism is opened. I would have it understood that this valve mechanism, however, may be located in the discharge pipe anywhere between the casting 7 and the entrance of the discharge pipe into the tank. The valve while seated, or closed, will hold the contents of the tank in check from passing through the discharge pipe while the tank is filling, until the weight of water in the tank causes the tank to tilt.

To hold the tank in normal position while filling, I provide a weighted lever 22 preferably bifurcated, as shown in Figs. 2 and 7, said lever being provided with a weight 23 which may be adjusted thereupon. The end of the weighted lever opposite the weight, is arranged to support the corresponding end of the tank and hold the tank in normal position until the weight of water therein overbalances the weight upon said lever. To this end the weighted lever is shown engaged with a pipe fitting 15 in the pipe 13. The weighted lever is fulcrumed upon a yoke 25 carried upon a plate 26, said plate being made longitudinally adjustable upon the base in any suitable manner. As shown the base is constructed with a longitudinally elongated slot 27, through which the plate may be bolted upon the base. The plate may also be laterally adjusted upon the base by providing the plate with a laterally elongated slot 28 through which the bolt 29 is passed. Said plate is shown provided with recesses 30 upon the upper side thereof in which the corresponding lower extremities of the yoke 25 rest. The upper ends of said yokes are shown engaged in corresponding recesses 31 in the bifurcated arms of the weighted lever.

The rear end of the tank is preferably provided with a shoulder 28 through which is passed a rocking bar 39 having a jointed engagement at its lower end upon the base as shown at 40. Above and below said shoulder, said bar is provided with buffer springs 41 and 42 to take the shock in the movement of the tank.

The operation of the device will readily be understood. When the tank is in a horizontal position the valve is closed, holding the steam and water on the upper side of the valve in check, until the tank fills sufficiently to overbalance the weight. The tank then tilts and opens the valve, the tank lying in tilted position until the weight restores the tank to normal position.

In order to secure the ready adjustment or engagement of the trunnion arms in position, I prefer to provide the elbow *f* with a plug 43 having a threaded engagement therein, the plug being chambered at its in-

ner end to afford communication between the corresponding trunnion and the corresponding upright pipe *c*. By removing the plug it will readily be seen that the corresponding trunnion arm may be inserted in place and moved outward in the corresponding elbow sufficiently to enable the outer end of the other trunnion arm to be inserted in place, after which the trunnion arm may be shifted laterally so that the plug may be reengaged in place to hold the trunnion arm in proper position. The bolts whereby the stuffing boxes are held in place are preferably arranged in the corresponding casting, as indicated in section, for example, in the casting *g*, in Fig. 2. The stuffing boxes may thus be simply slipped over the ends of the bolts, nuts *m* being provided to hold the stuffing boxes in place.

To make sure that the plug 43 when in place has its inner chamber in communication with the pipe *c*, I prefer to provide the upper surface of the plug with a line as indicated, for example, at 44, Fig. 2, to indicate when the plug is properly entered.

What I claim as my invention is:

1. A steam trap comprising a tilting tank, hollow trunnions communicating with the tank upon which said tank tilts, chambered fittings to receive the outer extremities of said trunnions, a removable plug in one of said fittings to bear against the adjacent end of the corresponding trunnion through which the trunnion communicates with the corresponding fitting, a weighted lever to hold the tank in normal position, a discharge pipe communicating with the tank and with one of said trunnions, and a valve located in the discharge pipe.

2. A steam trap comprising a base chambered on opposite sides thereof, upright channeled arms communicating with the chambers of the base, hollow trunnions rocking in said channeled arms, a tilting tank supported upon said trunnions and communicating with one of said trunnions, a discharge pipe communicating with the other of said trunnions and with said tank, valve mechanism in the discharge pipe to hold the tank in normal position until the weight of water in the tank causes the tank to tilt, and a weight to hold the tank in normal position, said valve mechanism provided with a vertically seating valve, a normally horizontally extended lever connected with the stem of the valve, and a vertically depending stop jointly connected with the rear end of the lever to hold the lever and the valve when the tank tilts, permitting the valve seat to drop away from the valve upon the tilting of the tank.

3. A steam trap comprising a base chambered on opposite sides thereof, upright channels communicating with the chambers



of the base, chambered fittings upon the upper ends of said channels, hollow trunnions engaged in said fittings, stuffing boxes about said trunnions engaged with the corresponding fittings, a discharge pipe communicating with the tank and with the other of said trunnions, a valve seated in the discharge pipe to hold the tank in normal position until the weight of water in the tank causes

the tank to tilt, and a weight to hold the tank in normal position.

In testimony whereof I have signed this specification in presence of two witnesses.

JAMES EDWARD PURSER.

Witnesses:

N. S. WRIGHT,

G. E. McGRANN.