Nov. 15, 1938. J. F. BLAKE 2,137,128

THIEF TUBE

Filed Nov. 4, 1936 2 Sheets-Sheet 1

Fig. 1.

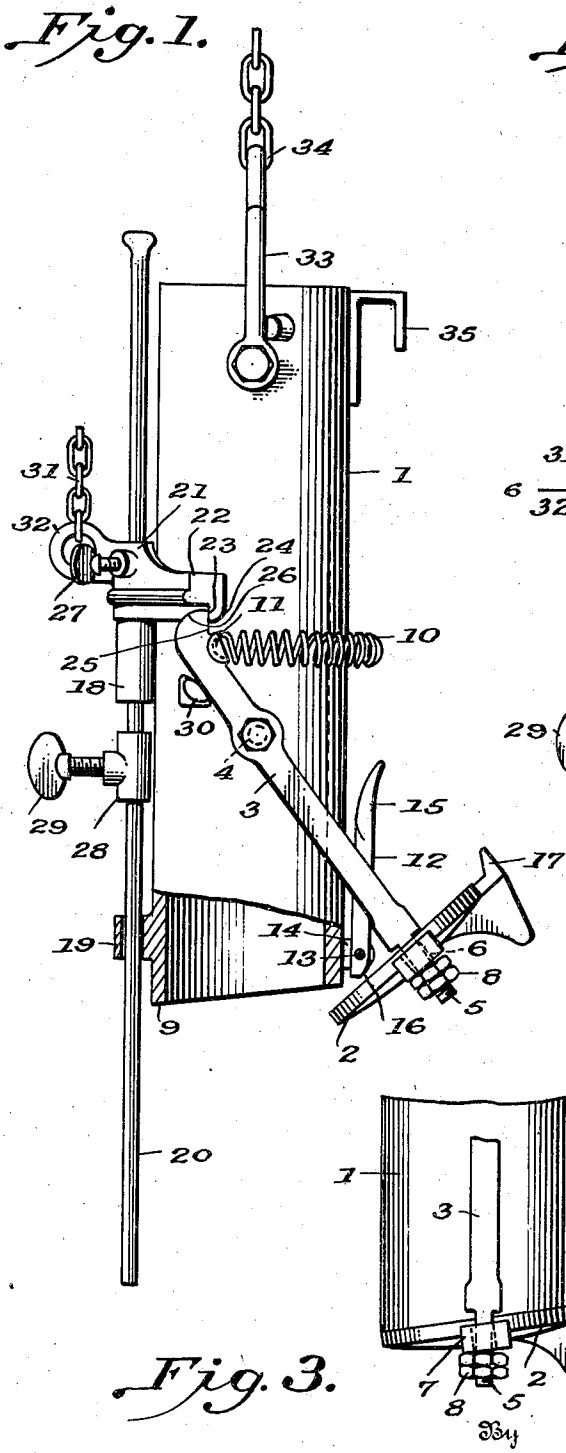


Fig. 2.

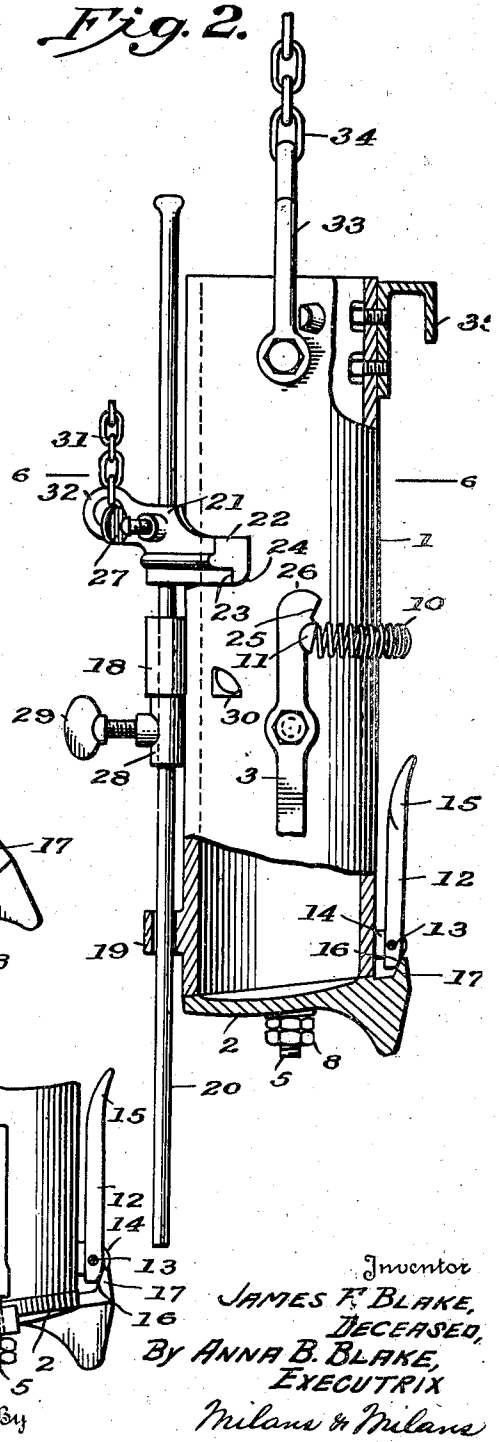


Fig. 3.

Inventor
JAMES F. BLAKE,
DECEASED,
By ANNA B. BLAKE,
EXECUTRIX
Milans & Milans
Attorneys

Nov. 15, 1938. J. F. BLAKE 2,137,128

THIEF TUBE

Filed Nov. 4, 1936 2 Sheets-Sheet 2

Fig. 4.

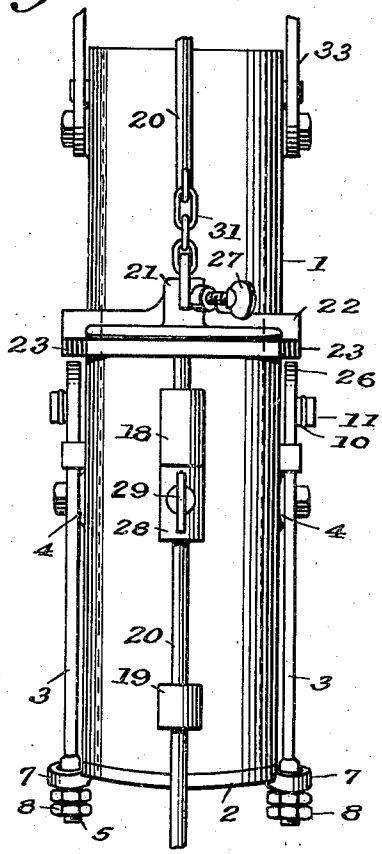


Fig. 5.

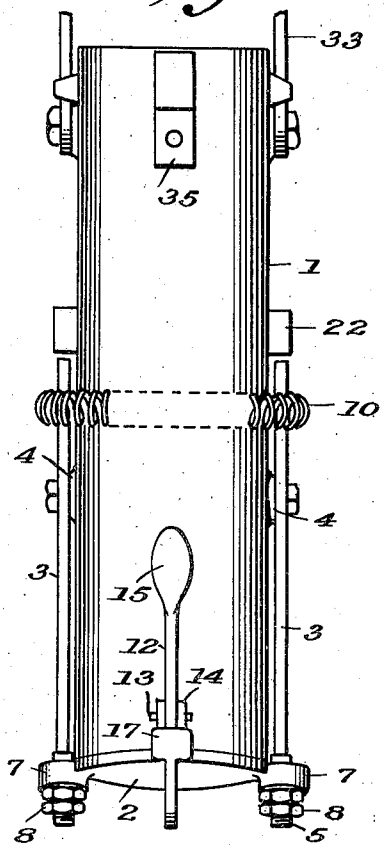


Fig. 6.

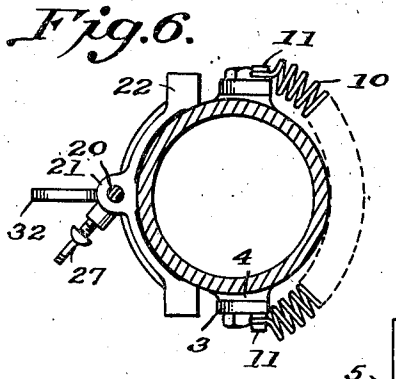


Fig. 7.

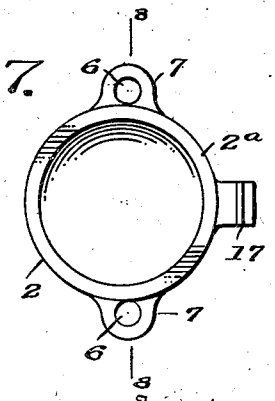
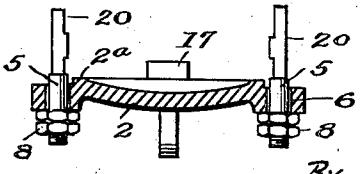


Fig. 8.



Inventor
JAMES F. BLAKE,
DECEASED,
By ANNA B. BLAKE,
EXECUTRIX

By Milans & Milans,
Attorneys

Patented Nov. 15, 1938 2,137,128

UNITED STATES PATENT OFFICE

2,137,128

THIEF TUBE

James F. Blake, deceased, by Anna B. Blake, Tulsa, Okla., executrix; Anna B. Blake, assignee by decree of court

Application November 4, 1936, Serial No. 109,160

3 Claims. (Cl. 137—18)

This invention relates to improvements in thief tubes of the type comprising a tube or receptacle with a movable bottom closure, and employed for taking samples of liquids from storage tanks and other containers at different depths within the liquid.

Objects of the invention are to provide an improved thief tube of the general type referred to; to provide an improved construction of bottom closure and supporting means therefor that will provide for the automatic adjustment of the closure to the end seat or face of the tube or receptacle and insure a tight fit between the parts and a liquid tight closure of the bottom of the tube or receptacle; to provide improved latch mechanism for holding the closure locked in open position, and improved means for automatically forcing the closure to closed position when the latch mechanism is tripped, whereby a simple, efficient, compact, satisfactory device is afforded.

The invention, with other objects and advantages thereof and the particular construction, combinations and arrangements of parts comprising the same, will be understood from the hereinafter contained detailed description when considered in connection with the accompanying drawings forming part hereof and illustrating one embodiment of the invention.

In the drawings:

Figure 1 is a side elevation of a thief tube constructed in accordance with the present invention, the lower portion of the tube or receptacle being shown in section and the bottom closure being shown locked in open position.

Fig. 2 is a side elevation and part section, the bottom closure being shown in closed position.

Fig. 3 is a side elevation of the lower part of the device with the bottom closure in closed position.

Fig. 4 is a front elevation.

Fig. 5 is a rear elevation.

Fig. 6 is a transverse section on the line 6—6 of Figure 2.

Fig. 7 is a top plan view of the closure.

Fig. 8 is a transverse section on the line 8—8 of Figure 7, the lower end portions of the supporting arms for the closure being shown in side elevation.

While a specific embodiment of the invention is illustrated in the drawings, it will be understood that minor changes and modifications may be made in the particular construction shown, and the invention may be embodied in other forms as will appeal to those skilled in the art and falling within the scope of the appended claims, without departing from the spirit of the invention.

Referring to a detailed description of the particular embodiment of the invention illustrated in the drawings, 1 designates a tube or receptacle open at each end, and 2 is the closure for the bottom of the tube or receptacle, the latter being shown as cylindrical and the closure being correspondingly circular in shape.

The closure 2 is supported for swinging movement substantially edgewise transversely of the bottom of the tube or receptacle by a pair of arms or levers 3 pivotally connected intermediate their ends to the tube or receptacle at opposite sides thereof. The arms or levers 3 are mounted on trunnions 4, which as shown, may conveniently take the form of short screws engaging threaded openings in the walls of the tube or receptacle. The closure is mounted on the lower end portions of the arms or levers for limited play or rocking movement relatively thereto. The lower end portions 5 of the arms or levers, which are reduced in size and rounded in cross section, extend through openings 6 in lugs 7 projecting laterally from opposite side marginal portions of the closure, said openings being slightly larger in diameter than the reduced end portions 5 of the arms or levers. The reduced end portions 5 are threaded for a portion of their length to receive jam nuts 8 upon which the lugs 7 of the closure rest. The tube or receptacle is provided with a smooth, plain bottom face or seat 9 extending at a slight upward inclination from front to rear thereof, as shown, the closure 2 having a smoothly ground flat angular face or seat 2^a, and the trunnions 4 for the arms or levers 3 are located substantially midway opposite sides of the tube or receptacle. The upper ends of the arms or levers 3 are attached to opposite ends of a coiled extension spring 10 stretched circumferentially around the rear side of the tube or receptacle, the spring having eyes at its ends engaging laterally projecting lugs 11 on the arms or levers and being under constant tension to draw the upper ends of the arms or levers toward the rear side of the tube or receptacle and move the closure to closed position.

As will be understood, the nuts 8 are adjusted so that the closure has sufficient play or rocking movement relatively to the arms or levers 3 to enable it to automatically adjust itself to closely fit against the bottom face 9 of the tube or receptacle when the arms or levers are swung to move the closure to closed position, and the tension of the spring 10 transmitted through the arms or

levers forces the closure to become tightly wedged between the inclined bottom face or seat 9 of the tube or receptacle and the jam nuts 8, and thus a secure liquid tight closure for the tube or receptacle is provided.

A lever 12 is provided for prying the closure loose from the bottom face or seat 9, said lever being fulcrumed near one end on a pin 13 supported in lugs 14 projecting from the rear side of the tube or receptacle near the base thereof. By applying pressure, conveniently by the thumb of the operator, against the face 15 of the lever, the heel 16 of the same will be forced against a lip 17 on the closure and the closure will be moved rearwardly.

Supported for longitudinal sliding movement in bearings 18 and 19 on the front side of the tube or receptacle is a rod 20 and fixed on this rod is a latch member adapted to engage the arms or levers 3 and hold the bottom closure locked in open position as illustrated in Figure 1 of the drawings. The latch member, which is of general arcuate shape, has a central sleeve part 21 to engage the rod 20, and enlarged end portions 22 that have shoulders 23 and curved front surfaces 24 to cooperate with shoulders 25 and curved surfaces 26 on the upper ends of the arms or levers 3.

The inner faces of the central sleeve part 21 and the enlarged end portions 22 of the latch member are formed, as shown, to slidably engage the wall of the tube or receptacle. The latch member, which is adjustably secured on the rod 20 by a set screw 27 on the sleeve part 21, is adapted to abut against the upper end of the bearing 18 and limit the extent of downward travel of the rod. A stop collar 28 adjustably secured on the rod 20 between the bearings 18 and 19 by a set screw 29, is adapted to engage the lower end of the bearing 18 and limit the upward travel of the rod. To lock the closure in open position, the same, after being pried loose from the seat 9 on the tube or receptacle, is drawn backwardly and upwardly until the curved surfaces 26 on the upper ends of the arms or levers 3 come in contact with the curved surfaces 24 on the end portions of the latch member, and by cam action force the latch member upwardly and then allow it to fall back so that the shoulders 23 on the latch member engage the shoulders 25 on the upper ends of the arms or levers. Stop lugs 30 on the walls of the tube or receptacle, may be, and preferably are provided to limit the movement of the arms or levers in setting the closure in open position.

As will be understood the tension in the spring 10 maintains the shoulders 23 of the latch member in engagement with the shoulders 25 on the arms or levers, and the closure is thus held in open position until the latch member is raised.

The rod is adapted to be adjusted as illustrated in Figure 1 of the drawings to extend beyond the lower end of the tube or receptacle to automatically trip the latch by engaging the bottom of a tank or the like. The latch member may also be tripped manually through the medium of a chain or cable 31 connected to a ring 32 thereon.

Pivotally connected to the upper end of the receptacle is a bail 33 to which is attached a chain or cable 34 by which the device is lowered into and withdrawn from the liquid. On the upper part of the tube or receptacle is also a hook 35 to provide for hanging the device to some object when it is inconvenient to use the bail 33 for that purpose.

In the use of the device, the trip rod 20 is adjusted to the latch member and stop collar 28 so that the lower end of the trip rod is at the predetermined distance below the lower end of the tube or receptacle when the stop collar 28 abuts against the bearing 18 and the latch member is just high enough to release the arms or levers. The bottom closure 2 is then set to open position as hereinbefore described. The device is then lowered into the tank or cask of liquid by means of the chain or cable 34 attached to the bail 33. As the thief tube sinks, a perfect core of the liquid passes relatively upward through the unrestricted opening at the lower end of the tube or receptacle and thence on through the tube or receptacle, this core within the tube or receptacle is therefore a true section of the stratum of the liquid at the depth of the thief tube.

When the lower end of the trip rod 20 engages the bottom of the tank, cask or other container, the tube or receptacle continues to sink, thereby causing the trip rod to push the latch member upwardly clear of the arms or levers 3 and allowing the spring 10 to quickly draw the upper ends of the arms or levers backwardly to swing and wedge the closure to a tightly closed position as illustrated in Figure 2 of the drawings.

Samples of liquid can also be taken at various depths by pulling upwardly on the chain or cable 31 attached to the latch member and tripping the same at the desired depth. The latch member having been tripped, either automatically by the trip rod 20 or manually by means of the chain or cable 31, the thief tube with its sample is drawn up by means of the chain or cable 34 attached to the bail 33.

It will be noted that by the particular construction and arrangement of parts hereinbefore set forth, a very simple, practical construction of thief tube is afforded. The construction provides for securely wedging the closure in tight fitting engagement with the bottom of the tube or receptacle to insure a liquid tight closure of the same. The special closure supporting and actuating means, and the particular latch mechanism are of a simple efficient nature and also of a character that permits of a close association of the same with the tube or receptacle to provide a compact structure.

What is claimed is:

1. A device of the class described, including a tube or receptacle open at top and bottom, a pair of arms pivotally connected to the tube or receptacle at opposite sides thereof, a closure for the lower end of the tube or receptacle carried by said arms for swinging movement transversely of the bottom of tube or receptacle, means to force the closure to closed position, a latch adapted to engage one of said arms for holding the closure in open position, a pair of bearings on the tube or receptacle arranged in spaced relation in longitudinal alignment, a rod supported in said bearings to slide longitudinally and adapted to project beyond the lower end of the tube or receptacle, said rod being adapted to automatically trip the latch to release the closure when the lower end of the rod engages the bottom of a tank or the like, and a part on said rod between said pair of bearings adapted to cooperate with one of the same to limit the downward movement of the tube or receptacle relatively to the rod.

2. A device of the class described, including a tube or receptacle open at top and bottom, a pair of arms pivotally connected to the tube or recep-

tacle at opposite sides thereof, a closure for the lower end of the tube or receptacle carried by said arms for swinging movement transversely of the bottom of the tube or receptacle, a coiled spring extending circumferentially of the tube or receptacle with its ends engaging said arms, the spring being adapted to force the closure to closed position, a rod mounted on the tube or receptacle to slide longitudinally and adapted to project beyond the lower end of the tube or receptacle, and a latch on said rod adapted to engage the arms for holding the closure in open position, said rod being adapted to automatically trip the latch to release the closure when the lower end of said rod engages the bottom of a tank or the like.

3. A device of the class described, including a tube or receptacle open at top and bottom, and having its lower end extending at an inclination to the plane of the transverse axis thereof to provide a correspondingly inclined seat for a closure, a closure for the lower end of the tube or receptacle adapted to engage said seat, means pivoted at approximately the longitudinal axis of the receptacle and at the side thereof supporting the closure for swinging movement transversely of the bottom of the tube or receptacle around the higher portion of the inclined closure seat and towards and from the lower portion thereof, the closure being connected to said supporting means for limited rocking movement relatively thereto, means to force the closure to closed position, the lower inclined end of the receptacle acting to cause the closure to be wedged tightly thereagainst when the same is swung to closed position, and a latch for holding the closure in open position adapted to be tripped to release the closure.

ANNA B. BLAKE,
Executrix of the Estate of James F. Blake, Deceased.