July 17, 1962 H. W. THOMAS ET AL 3,044,572

RETRACTABLE SAFETY LANDING FOR AN ACCESS TUBE

Filed Sept. 25, 1959 3 Sheets-Sheet 1

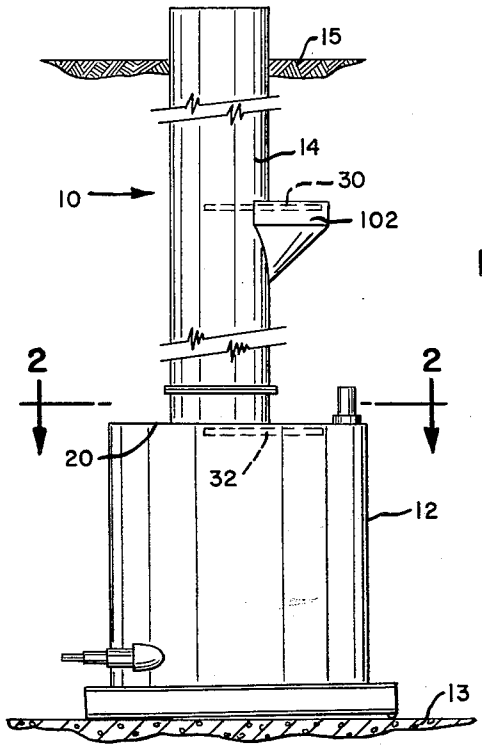


FIG. 1

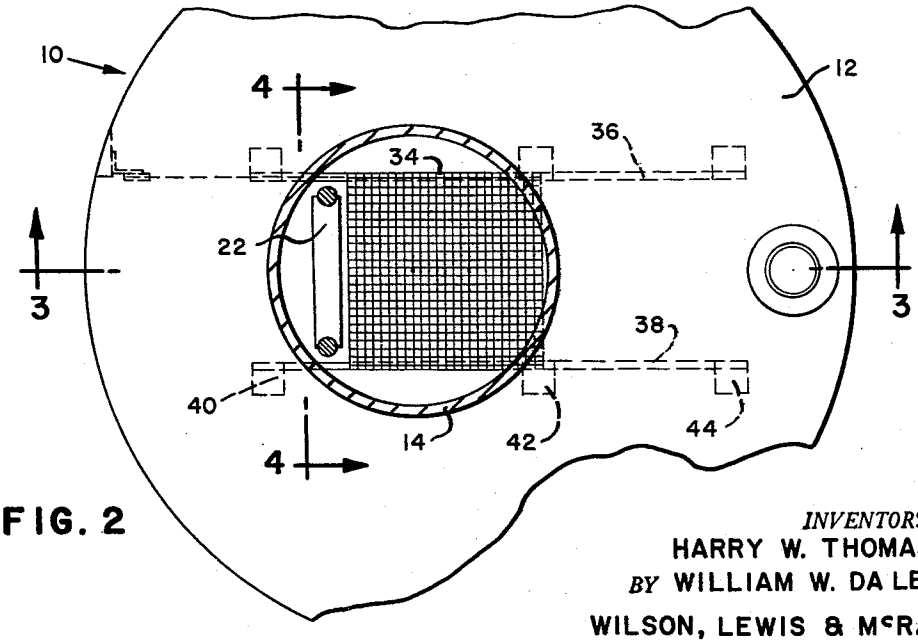


FIG. 2

INVENTORS
HARRY W. THOMAS
BY WILLIAM W. DA LEE
WILSON, LEWIS & McRAE
ATTORNEYS

July 17, 1962 H. W. THOMAS ET AL 3,044,572

RETRACTABLE SAFETY LANDING FOR AN ACCESS TUBE

Filed Sept. 25, 1959 3 Sheets-Sheet 2

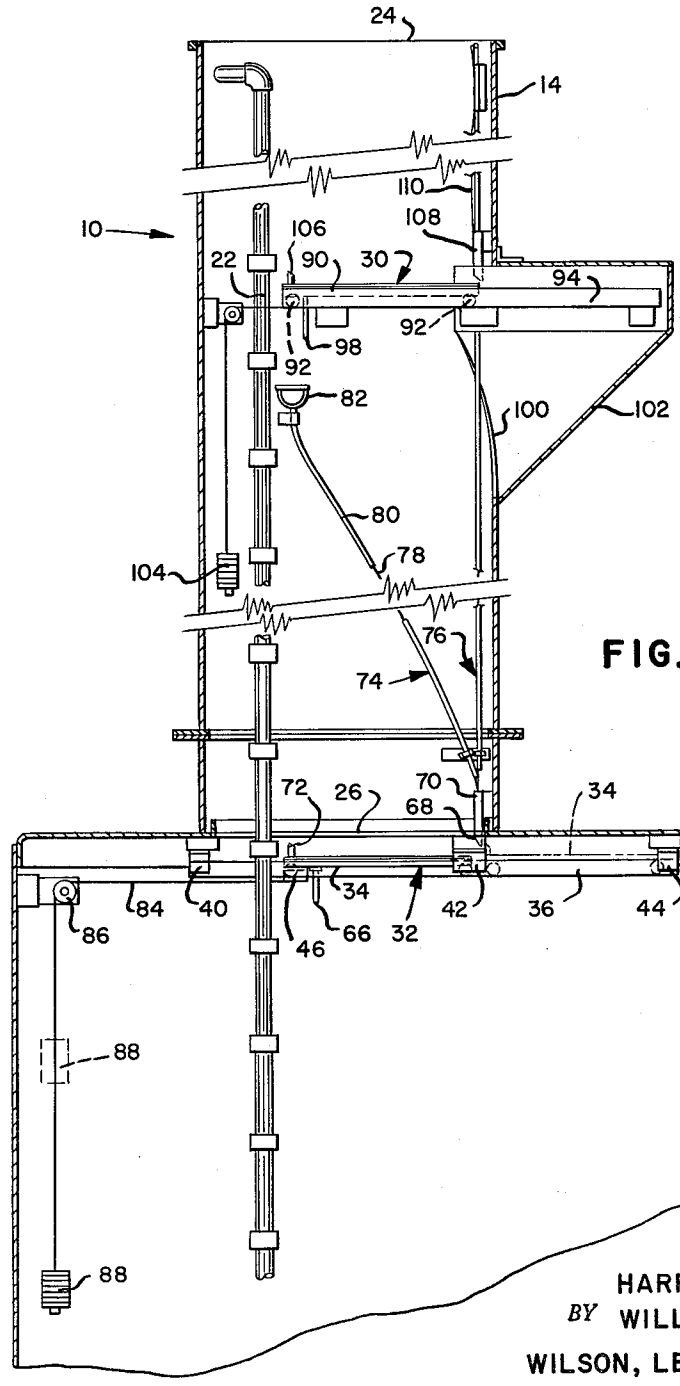


FIG. 3

INVENTORS
HARRY W. THOMAS
BY WILLIAM W. DA LEE
WILSON, LEWIS & McRAE
ATTORNEYS

July 17, 1962 H. W. THOMAS ET AL 3,044,572

RETRACTABLE SAFETY LANDING FOR AN ACCESS TUBE

Filed Sept. 25, 1959 3 Sheets-Sheet 3

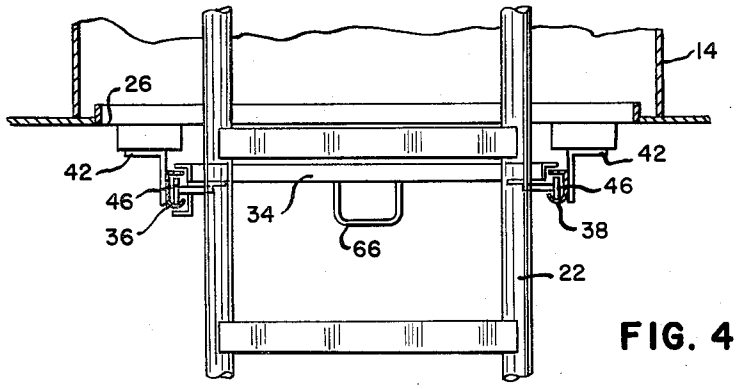


FIG. 4

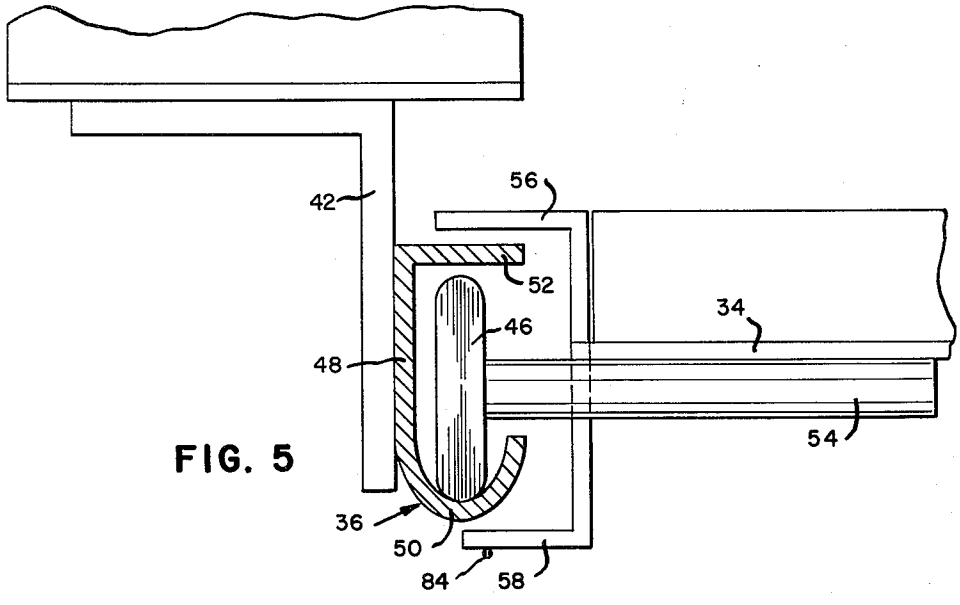


FIG. 5

INVENTORS
HARRY W. THOMAS
BY WILLIAM W. DA LEE
WILSON, LEWIS & McRAE
ATTORNEYS

United States Patent Office

3,044,572

Patented July 17, 1962

3,044,572

RETRACTABLE SAFETY LANDING FOR AN ACCESS TUBE

Harry W. Thomas, Orchard Lake, and William W. Da Lee, Birmingham, Mich., assignors to William A. Da Lee Incorporated, Detroit, Mich., a corporation of Michigan

Filed Sept. 25, 1959, Ser. No. 842,263
3 Claims. (Cl. 182—83)

This invention relates to a retractable safety landing and more particularly to a safety landing positioned in a downwardly extending access tube to prevent a person within such tube from slipping and falling the entire length of the tube.

As used in the description of the present invention, the term "access tube" refers to the entrance passage or shaft leading from the surface of the ground to an underground facility such as a mine, shelter, sewage lift station, a pumping, metering or junction station for water, natural gas or electricity and the like.

State and local health departments have become increasingly aware of the danger of serious injury involved in accidental falls within access tubes. Due to the human factors involved, falls cannot be entirely eliminated. However, the extent of the injuries resulting from such falls can be greatly reduced if proper preventive safety measures are employed.

One proposed method for reducing the seriousness of falling injuries is to provide platforms at spaced intervals in the tubes so that if a workman does fall, he can only fall a maximum predetermined distance. One proposed platform spacing specification calls for a platform at least every fifteen feet. A fall of fifteen feet is serious, but is not usually as damaging as a fall of twenty five or thirty feet.

The provision of permanent platforms in the tubes is one obvious expedient. However, in the use of permanent platforms, an opening large enough for a man to pass through must be provided in the platform diametrically opposite the descent ladder to permit passage by the platform. With this technique, if the man does fall off the ladder he will normally fall on the portion of the platform adjacent the ladder. There is, however, some danger that he will travel across the tube during his fall to the opposite side of the tube and through the opening of the platform or accidentally falling through the opening when he turns on the platform preparatory to descending to the next level. The use of such platforms requires that cross-sectional area of the tube be considerably enlarged to provide room for the platform plus opening. A tube having a small cross-sectioned area is desirable as it is safer in that it acts as a safety enclosure to prevent falls. For example, when a conventional thirty six inch diameter tube is used, the worker can release his hand hold on the ladder and lean back against the tube wall without falling. Additionally, the fear of falling is considerably reduced when such small tubes are used. This fear is believed to be a contributing cause for many falls.

According to the present invention, a retractable platform is provided which does not require enlargement of the access tube and which will completely eliminate the possibility of falling further than the platform.

It is, therefore, an object of the present invention to provide a retractable safety platform for an access tube.

Another object of the invention is to provide such a platform which is relatively inexpensive and is easily installed.

A further object of the invention is to provide a retractable platform which can be moved to a non-obstructing

position by use of the foot of one descending in the tube, and which is provided with means to automatically close the platform to an obstructing position after the workman has passed thereby.

Another object of the invention is to provide catch means to hold the retractable platform in a non-obstructing position and to provide dual release means whereby the catch may be released as soon as the workman passes by the platform or be released remotely at a point adjacent the entrance opening.

A further object of the invention is to modify the access tube by the provision of an opening in one side wall intermediate the upper and lower ends whereby a retractable landing may be provided in the middle of the tube.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIG. 1 is a side elevational view of a sewage lift station embodying tthe retractable landing of the present invention.

FIG. 2 is a top plan section view of the sewage lift station of FIG. 1 on an enlarged scale taken substantially along line 2—2 of FIG. 1 looking in the direction of the arrows.

FIG. 3 is a side elevational view in section of the lift station of FIG. 1 taken substantially along line 3—3 of FIG. 2 looking in the direction of the arrows.

FIG. 4 is a segmental view of the intermediate retractable landing as viewed from the left end of FIG. 3.

FIG. 5 is an enlarged view of the roller and track construction shown in FIG. 4.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

The use of the present invention will be described hereinafter in connection with a sewage lift station **10**. It will be readily appreciated however, that the invention is capable of application to a wide variety of such underground facilities.

Sewage lift stations are provided at predetermined intervals in sewage lines to pump sewage along its way to the terminal sewage disposal station. Such lift stations comprise a room **12** buried in the ground and supported on a concrete pad **13**. The room **12** may contain, for example, motors, pumps, control apparatus, internal piping, valves and fittings, sump pump, blower, de-humidifier, internal lighting, power wiring and the like. In addition to containing this equipment, such rooms are large enough to accommodate a serviceman to permit maintenance and repair functions. Entrance to the underground room **12** is gained by means of an access tube **14** which leads from the surface of the ground **15** to the ceiling **20** of the room. A ladder **22** is secured to one wall of the tube **14** and extends from the tube entrance opening **24**, through the tube exit opening **26** and terminates in the room **12**. As shown, a retractable safety landing **30** is provided intermediate the upper and lower ends of the tube **14** and a second landing **32** is provided at the lower end of the tube **14**.

The two landings **30**, **32** have substantially the same construction except for modifications incorporated due to the different locations. The number of such landings

may be as few as one or as many as needed to meet safety regulations. The exact number used depends upon the combined length of the tube 14 and the depth of room 12. If only one landing is used, it is preferably positioned at the lower end of the tube 14 because this positionment does not require modification of the tube 14.

The lowermost retractable safety landing 32 is positioned on the ceiling 20 of the room 12 and normally extends across the lower opening 26 of the tube 14 to obstruct passage therethrough. The landing 32 includes a trackway which extends across the opening 26 and thence for a distance along the ceiling. The trackway includes a pair of spaced rails 36, 38 which are secured to the ceiling 20 by means of brackets 40, 42, 44. The landing platform 34, which may be a metal grating, is provided with rollers 46 which ride in the rails 36, 38. If desired, other anti-friction means, such as slidable shoes, could be used in place of the rollers 46.

As may be seen in FIG. 5, the rails 36, 38 comprise a sidewall portion 48 which is secured to the brackets 40, 42, 44. A curved portion 50 is provided at the lower end of the portion 48 to carry the rollers 46. An outwardly extending flange 52 is provided at the upper end of the portion 48 to act as a guard. Each roller 46 is rotatably mounted on an axle 54 which is secured to the underside of the platform 34. The platform is provided with a flange 56 which overlaps the rails 36, 38 to carry the weight of the platform in case the axle or rollers break. The flange 56 also prevents snagging of a workman descending the ladder. Stop members (not shown) are provided in the rails 36, 38 to limit movement of the platform 34 therealong. A handle 66 is secured to the underside of the platform 34 to provide for manual opening of the landing.

Safety lock means comprising a spring-loaded plunger 68 mounted in a casing 70 are secured to the lower end of the tube 14 at a point just above the platform 34. A cooperating lug 72 projects upwardly from the platform 34. When the platform 34 is moved to a non-obstructing position along the rails 36, 38, as shown in phantom, the plunger 68 will engage the lug 72 and hold the platform in the non-obstructing position. Release means, comprising a pair of cables 74, 76, extend upwardly from the plunger 68 to permit disengagement of the lug 72 after climbing above the platform 34. Each cable 74, 76 includes a pull cable 78 enclosed in a length of tubing 80 and having a pull ring 82 at the upper end thereof. One of the release cables 74 leads to a point above the retractable landing 32 a sufficient distance to permit actuation thereof by a workman whose feet are at approximately the same level as the retractable landing. This permits one who has just climbed above the landing 32 to release the catch means. The second release cable 76 leads to a point adjacent to the access tube entrance opening 24 to permit remote release of the catch means. The second cable 76 is provided to permit closing of the landing 32 without descending the tube 14. Such use is desirable for the instance where a workman has forgotten to close the landing after leaving the tube or where a second workman wishes to enter the tube after the passage of a first workman.

Counterweight means are provided to constantly urge the platform 34 to the obstructing position. The counterweight means comprises a cable 84 which is secured to an arm 58 on the underside of the platform 34 and wound around a pulley 86. The cable 84 is weighted at its lower end by means of a weight 88. In operation, when the catch means is released, the counterweight 88 is operative to move the landing 32 to its obstructing position. As will be readily appreciated, other suitable closure means, such as a spring may be used in place of a counterweight. Additionally, the platform may be power operated to open and close by a motor or pneumatic or hydraulic power means.

The intermediate landing 30 also comprises a platform 90 having rollers 92 which ride in a pair of spaced rails 94. A handle 98 is provided on the underside of the platform 90 for opening the landing from beneath. The rails 94 extend from the ladder 22 across the tube 14 and through an opening 100 in the side wall of the tube to terminate at a point outside the tube. An enclosure 102 is provided on the outer surface of the tube 14. The enclosure 102 extends around the tube opening 100 and laterally outwardly therefrom to seal the tube opening 100 and cover the extending portion of the retractable landing. The landing 30 is also provided with a counterweight 104 to automatically move the platform 90 to an obstructing position upon release of the lug 106 from the catch 108 by means of the cable 110.

In operation, a workman descends the ladder until his foot touches the intermediate platform 90 whereupon he forces the platform into the enclosure 102 by use of his foot. The workman continues to descend the ladder until he is below the landing 30, whereupon the platform 90 may be moved back to its obstructing position. The workman then continues to descend the tube until he reaches the lowermost landing 32. He repeats the opening operation with his foot, whereupon the platform 34 is locked in the open position by the catch means. The workman may then enter the room 12 and perform his functions. If a second workman is to descend into the room 12, he should first release the landings 30, 32 by pulling the cables so that the platforms 34, 90 will be in obstructing position as he descends.

Having thus described our invention, we claim:

1. In combination, a downwardly extending access tube having an entrance opening at the upper end and an exit opening at the lower end for passage of a person therethrough; said access tube leading into a room at the lower end thereof; a ladder extending from the entrance opening into the room; and a retractable safety landing positioned on the ceiling of the room and normally extending across the lower end of the tube to obstruct passage thereby; said landing including a trackway which is secured to the ceiling of the room; said trackway extending across the tube and having a portion extending outside the periphery of the tube; a platform having anti-friction means which ride in said trackway; said platform being movable from the normal obstructing position to a non-obstructing position on the portion of the trackway outside the tube; latch means to hold the platform in said non-obstructing position; and closure means constantly urging the platform to its obstructing position.

2. A device as claimed in claim 1 and further characterized in that a second retractable landing is provided intermediate the upper and lower ends of the access tube; said second landing including a trackway which extends across the tube and has a portion extending outside the tube; a platform having anti-friction means which ride in said trackway; said platform being movable from a normal obstructing position on the portion of the trackway extending across the tube to a non-obstructing position on the portion of the trackway outside the tube.

3. In combination, a downwardly extending access tube having an entrance opening at the upper end for passage of a person therethrough; a ladder positioned in the tube; and a retractable safety landing extending across the tube to normally obstruct passage thereby; said landing including a trackway which extends across the tube and has a portion extending outside the tube; a platform having anti-friction means which ride in said trackway; said platform being movable to a non-obstructing position onto the portion of the trackway outside the tube; latch means to hold the platform in said non-obstructing position; a pair of release cables operatively connected to said catch means; one of said release cables leading to a point a distance above the retractable landing to permit actuation thereof by a person whose feet are at approximately the same level as the retractable landing; the other of said release cables leading to a point adjacent the access

tube entrance opening to permit remote release of said catch means; and closure means operatively connected to the retractable landing to move said landing to its obstructing position upon release of the catch means.

References Cited in the file of this patent

UNITED STATES PATENTS

292,092 Bleuler ---------- Jan. 15, 1884
696,693 Olsen ---------- Apr. 1, 1902
871,655 Winslow ---------- Nov. 19, 1907
951,192 Massey ---------- Mar. 8, 1910
2,535,544 McKinley ---------- Dec. 26, 1950
2,908,361 Reighart ---------- Oct. 13, 1959