United States Patent [19]

Hubbell

[11] **3,882,566**

[45] **May 13, 1975**

[54] **DUCT CLEANING DEVICE**

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[73] Assignee: **Sauerman Bros., Inc.,** Bellwood, Ill.

[22] Filed: **Apr. 24, 1974**

[21] Appl. No.: **463,501**

[52] **U.S. Cl.** ..... **15/104.3 R**

[51] **Int. Cl.** **B08b 9/02**

[58] **Field of Search** ..... 15/104.3 R, 104.16; 37/103, 71, 135

[56] **References Cited**

UNITED STATES PATENTS

2,682,677	7/1954	Marshall	15/104.3 R
3,352,038	11/1967	Klave	37/135

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Attorney, Agent, or Firm—Wegner, Stellman, McCord, Wiles & Wood

[57] **ABSTRACT**

A device for cleaning out a duct, such as a culvert, sewer, or drain line, having an access opening. The cleanout device includes a plurality of portions preselected to be passed through the access opening and connecting structure adapted to secure the portions of the device together within the duct. The assembled device may have a transverse dimension substantially larger than the corresponding transverse dimension of the access opening which may be substantially smaller than that of the duct. The device is utilized to clean the duct by a movement along the bottom portion of the duct effected by dragging the device therealong by suitable dragline. A series of such cleaning operations may be effected by sequentially returning the device to an original cleaning position by means of a return dragline. Upon completion of the cleanout operation, the device may be disassembled and removed through the small access opening.

11 Claims, 5 Drawing Figures

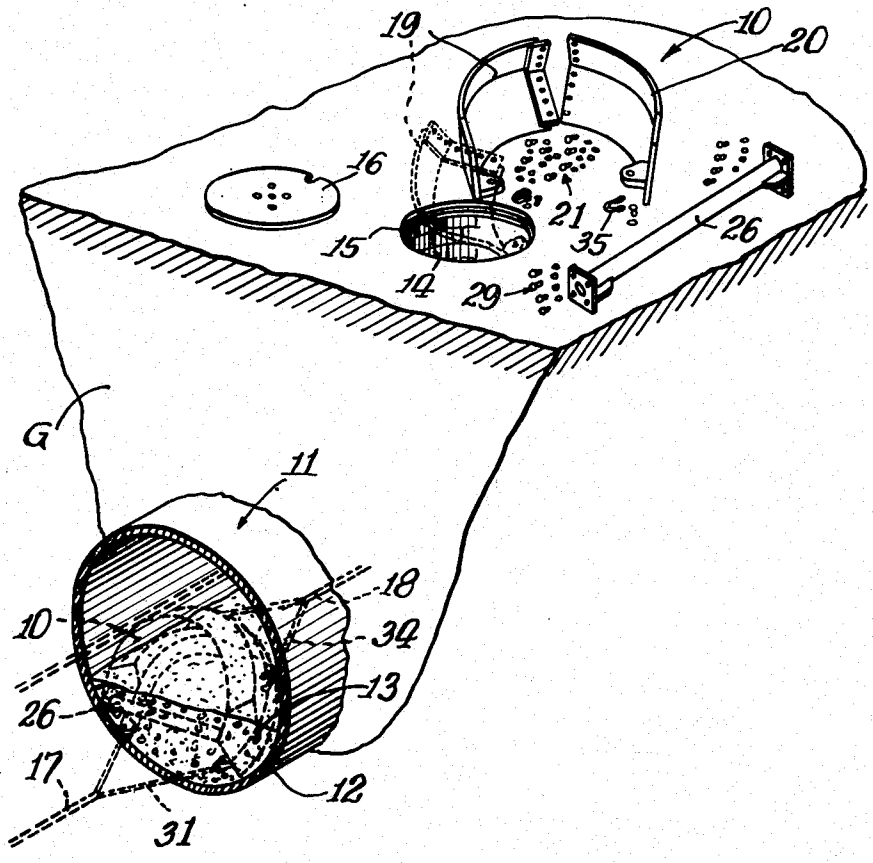


Fig. 1.

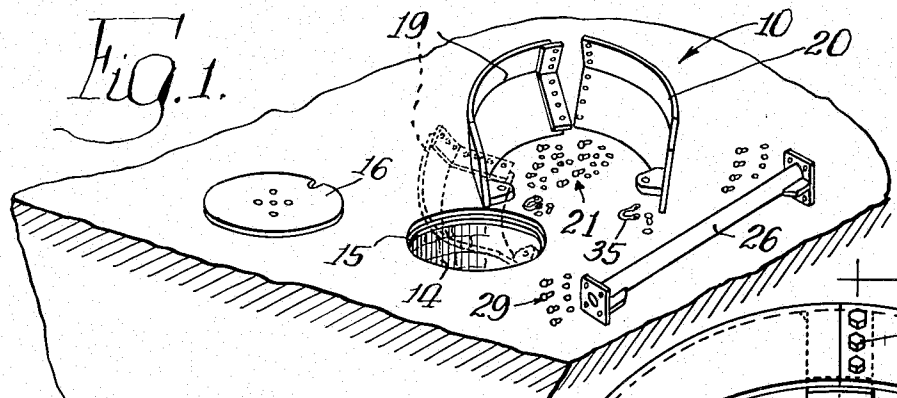
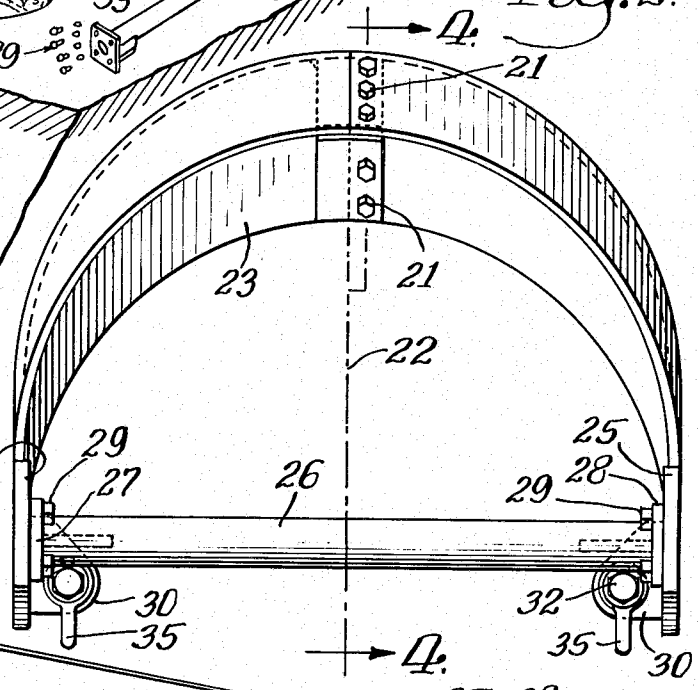


Fig. 2.



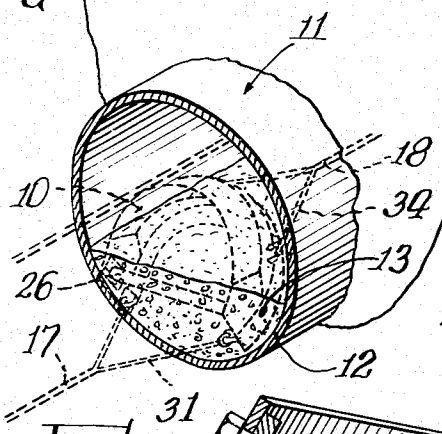


Fig. 4.

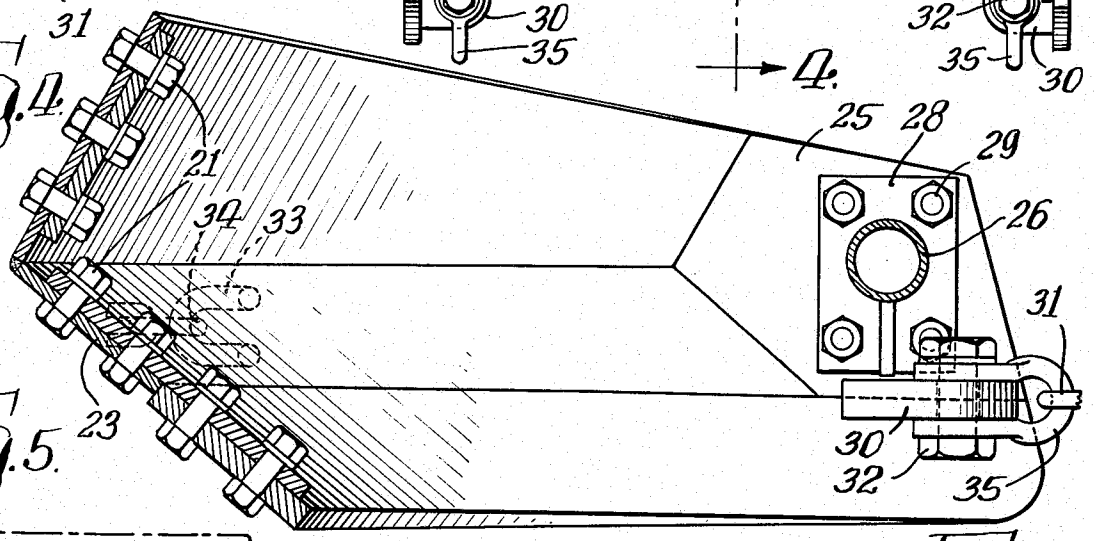


Fig. 5.

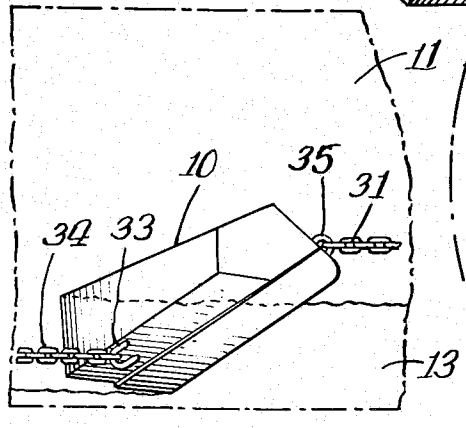
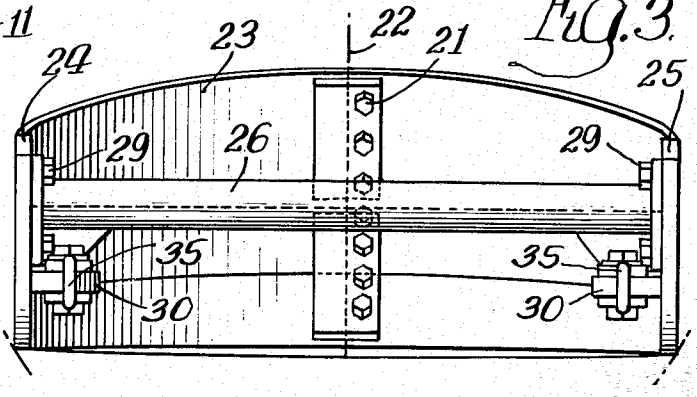


Fig. 3.



DUCT CLEANING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to material handling equipment and in particular to cleanout devices for use in cleaning ducts.

2. Description of the Prior Art

A serious problem arises in the clogging of ducts, such as a culvert, sewer, drain, etc. ducts, from material collecting in the lower portion thereof over a period of time. Such ducts are conventionally located underground and only limited access thereto is provided such as through conventional manholes having relatively small diameter access openings.

Illustratively, a conventional manhole opening may have a 24 inch diameter. While such an opening permits the movement of a man therethrough, it limits the size of equipment which may be brought into the manhole or duct.

One improved form of material handling device comprises a scraper marketed under the trademark CRESCENT by the assignee hereof. The scraper defines an arcuate wall element which is dragged along the surface of material to be scraped for moving the material to a desired delivery position.

As the duct may have a cross section substantially larger than that of the manhole access opening, cleaning of such ducts has been relatively slow and laborious because of the limited size of the cleaning equipment passable through the manhole into the duct.

Another form of known material handling device comprises a dragline bucket which differs from the above described scraper in being provided with a bottom wall so as to define a receptacle.

SUMMARY OF THE INVENTION

The present invention comprehends an improved duct cleanout device which may have a size substantially larger than that of the access opening so as to provide efficient rapid cleaning of the duct by a dragging or scraping operation.

The device includes means for connection thereof to a dragline for effecting the dragging or scraping operation. The device may further include means for connecting a second, rear dragline thereto for effecting retraction of the device so as to permit effecting a plurality of passes of the device in the cleanout operation.

The present invention comprehends the provision of such a cleanout device which may comprise a scraper having an arcuate configuration and may be provided with a front bail for rigidifying the forwardly extending side portions thereof.

The device includes means for securing separable portions thereof together in a material handling configuration. The device may comprise a plurality of wall means removably secured together to define a wall arrangement having a size substantially larger than that of the access opening to the duct for effecting rapid and efficient cleanout of the duct. The wall means may be secured together along the fore-and-aft centerline of the device. The bail element may be removably secured to the wall means, within the scope of the invention.

The device is adapted for use in cleaning ducts having diameters of approximately 48 inches, or larger, while yet being arranged to be brought into and from the duct through relatively small access means, such as a conventional 24 inch manhole.

The duct cleanout device of the present invention is extremely simple and economical of construction while yet providing the highly desirable features discussed above.

BRIEF DESCRIPTION OF THE DRAWING

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIG. 1 is a perspective view of a duct and manhole structure with a cleanout tool embodying the invention being illustrated in full lines preparatory to being passed through the manhole access opening into the duct for assembly therein and with the device being shown in broken lines as being used in the cleanout operation.

FIG. 2 is a top plan view of the cleanout device.

FIG. 3 is a front elevation thereof;

FIG. 4 is an enlarged vertical section taken substantially along the line 4—4 of FIG. 2; and

FIG. 5 is a side elevation of the device as utilized in the cleanout operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the exemplary embodiment of the invention as disclosed in the drawing, a cleanout device generally designated **10** is shown for use in cleaning out a duct generally designated **11** which may comprise a culvert, sewer, drain, etc. duct buried in the ground G so as to be relatively inaccessible. In the illustrated embodiment, duct **11** comprises a cylindrical duct defining a bottom portion **12** in which material, such as gravel and the like, **13** may collect over a period of time. The present invention is concerned with removing of the collected material in a cleanout operation effected by means of the device **10**.

As shown in FIG. **1**, access to duct **11** is provided through a manhole **14** defining an access opening **15** which is removably closed by a manhole cover **16**.

As further shown in dotted lines in FIG. **1**, device **10** defines an arcuate, or crescent-shaped, scraper adapted to scrape material to a desired collecting position as a result of being dragged along the surface of the collected material **13** by means of a suitable dragline **17**. A number of passes may be effected in the cleanout operation by suitably retracting, or returning, the scraper to a "start" position by means of a second, retraction dragline **18** extending rearwardly from the scraper.

The diameter of duct **11** is substantially larger than the diameter of the manhole opening **15** and it is desirable to utilize a scraper **10** which is substantially larger in transverse dimension than the diameter of the access opening so as to maximize efficiency in the cleanout operation. As illustrated in FIG. **1**, the present invention comprehends providing a material handling device **10** comprising a plurality of elements removably secured together within the manhole or duct after having been passed individually through the access opening **15**.

More specifically, as shown, the device **10** may comprise a scraper made up of a first wall portion **19**, a second wall portion **20**, and securing means **21** for securing the wall portions together along the longitudinal

centerline 22 of the device. As shown in FIG. 2, the device defines a rear arcuate wall portion 23 and opposed side portions 24 and 25 extending forwardly from rear wall portion 23 to define a wall arrangement having a generally concave arcuate shape. In the illustrated embodiment, the securing means 21 comprise a plurality of nuts and bolts defining removable threaded securing means.

The side portions 24 and 25 are rigidified by an interconnecting bail 26 having opposite ends 27 and 28 secured to the side portions 24 and 25 by removable securing means 29 which, in the illustrated embodiment, comprise threaded nut and bolt securing means.

Side portions 24 and 25 are further provided with connecting lugs 30. A connecting chain 31 may be secured between the lugs 30 by suitable securing means, such as clevices 32 and threaded elements 35 to provide means for removably connecting the dragline 17 to the cleanout device. Lugs 33 may be secured to the rear portion 23 of the device for similar removable connection of a second chain 34 therebetween for use in connecting the retracting dragline 18 to the device.

Each of the wall elements 19 and 20 has a size preselected to permit passage thereof through the manhole access opening 15 for movement to and from the duct 11. The bail may have a length substantially greater than the diameter of the access opening 15. However, the transverse cross section of the bail is substantially smaller than the diameter of the access opening to permit free passage of the bail lengthwise through the access opening to and from the duct. Thus, the cleanout device elements may be brought through the access opening into the duct for assembly of the device therein wherein the securing means 21 and 29 are utilized to secure the elements of the device together to form the relatively large size cleanout tool. Reversely, upon completion of the cleanout operation, the elements of the cleanout device may be readily disassembled for facilitated removal through the relatively small access opening 15.

As the cleanout device has a relatively large size, a substantial amount of collected material 13 is dragged from the duct to the desired cleanout position with each pass of the device along the upper surface thereof, as shown in FIG. 5. As the rear wall 23 is arcuate, it generally conforms to the natural arcuate configuration of the duct 11, thereby permitting cleaning out of material lying along the lowermost portion of the duct notwithstanding the relatively large transverse dimensions of the device. Thus, the device may quickly remove substantially all of the collected material from the duct in a simple and efficient manner.

The threaded securing means is adapted to provide facilitated assembly of the device within the confines of the manhole or duct. While the cleanout tool provides the improved cleanout operation discussed above, it is extremely simple and economical of construction and is substantially maintenance free.

The foregoing disclosure of specific embodiments is illustrative of the broad inventive concepts comprehended by the invention.

I claim:

1. A device for cleaning out a duct having means for providing access thereto defining an opening having a cross section smaller than that of the duct, said device being utilized to clean the duct by being dragged along the bottom of the duct by a drawn dragline so as to drag material collected in the duct to a removal position, said device comprising:

first wall means having a size preselected to permit passage thereof through said access opening into and from said duct;

second wall means having a size preselected to permit passage thereof through said access opening into and from said duct;

means for removably securing said first and second wall means together inwardly of said access opening to define an extended wall arrangement having a cross section larger than that of said recess opening and being preselected to be movable along the bottom portion of the duct for cleaning the duct; and

connecting means on said wall means for connecting a dragline thereto to effect such duct cleaning movement.

2. The duct cleaning device of claim 1 wherein said wall arrangement defines a crescent configuration.

3. The duct cleaning device of claim 1 wherein second connecting means are provided on a rear portion of said wall means for connecting a second dragline thereto to effect rearward, retraction movement of the device whereby the device may be caused to make a plurality of passes through the duct in effecting the cleaning operation.

4. The duct cleaning device of claim 1 wherein said wall configuration defines a fore-and-aft centerline and said securing means secures said wall means together along said centerline.

5. The duct cleaning device of claim 1 wherein said wall arrangement defines a forwardly opening, concave configuration.

6. The duct cleaning device of claim 1 wherein said wall arrangement defines a forwardly opening, concave configuration having forwardly extending side portions, said device further including a bail, and means for removably securing the opposite ends of the bail to said side portions inwardly of said access opening.

7. The duct cleaning device of claim 1 wherein said wall arrangement defines a forwardly opening, concave configuration having forwardly extending side portions, said device further including a bail having a length greater than the maximum cross section dimension of the access opening and a transverse cross section preselected to be smaller than the cross section of said access opening to permit passage of said bail lengthwise through said access opening into and from said duct, and means for removably securing the opposite ends of the bail to said side portions inwardly of said access opening.

8. The duct cleaning device of claim 1 wherein said wall arrangement defines a forwardly opening, concave configuration having forwardly extending side portions, said device further including a bail, and means for removably securing the opposite ends of the bail to said side portions inwardly of said access opening, said connecting means being carried by said side portions subjacent said bail ends.

9. The duct cleaning device of claim 1 wherein said securing means comprise threaded securing means.

10. The duct cleaning device of claim 1 wherein said wall arrangement is arcuate and is preselected to conform generally to an arcuate duct bottom portion.

11. The duct cleaning device of claim 1 wherein said wall arrangement defines a forwardly opening, concave configuration having forwardly extending side portions, said device further including a bail, and threaded means for removably securing the opposite ends of the bail to said side portions inwardly of said access opening.

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