June 4, 1957 H. R. CRANE 2,794,197

PIPE CLEANING TOOL

Filed March 15, 1955

Fig. 1

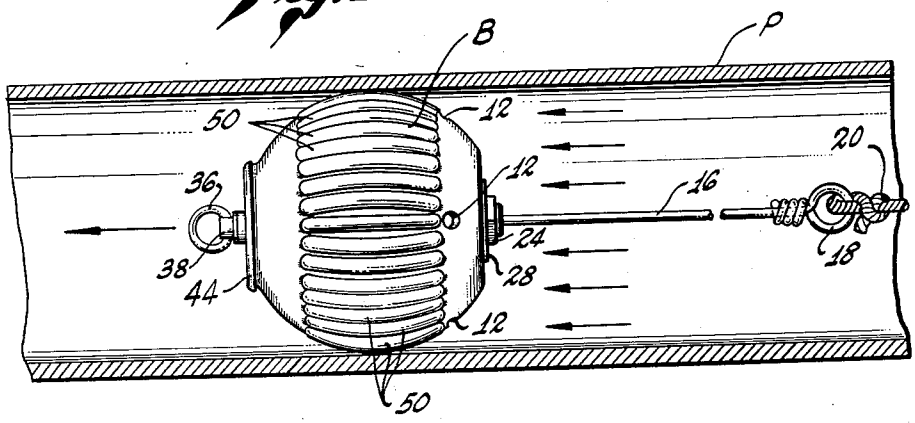


Fig. 2

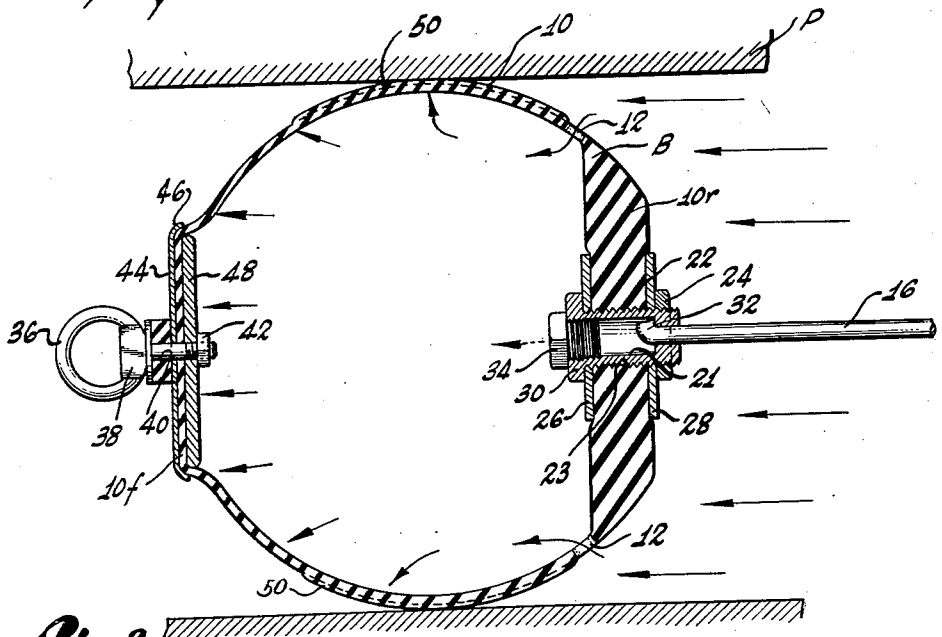
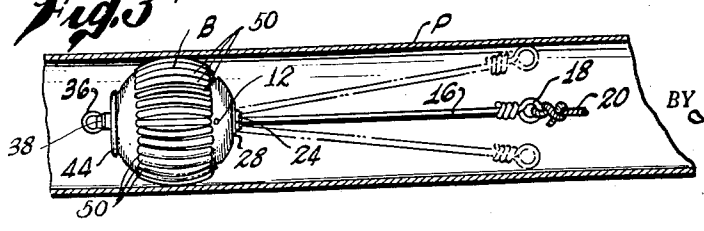


Fig. 3



INVENTOR.
HUBERT R. CRANE
BY Fulwider Mattingly & Hunter
Attorneys

United States Patent Office 2,794,197 Patented June 4, 1957

2,794,197

PIPE CLEANING TOOL

Hubert R. Crane, Los Angeles, Calif., assignor to Flexible Manufacturing Corporation, Los Angeles, Calif., a corporation of California

Application March 15, 1955, Serial No. 494,457

3 Claims. (Cl. 15—104.06)

The present invention relates to pipe cleaning tools.

It is a major object of the present invention to provide a novel pipe cleaning tool which is moved through the bore of a sewer pipe or the like so as to clean the interior thereof.

Another object of the invention is to provide a pipe cleaning tool that is very effective in its cleaning operation and yet is extremely simple of design and construction.

A further object of the invention is to provide a pipe cleaning tool which is of a generally spheroidal configuration having deformable walls permitting it to partially collapse or distort should it encounter an obstacle within the pipe.

It is another object to provide a pipe cleaning tool which may be manufactured at a comparatively low cost.

An additional object is to provide a pipe cleaning tool which is foolproof in operation.

A further object is to provide a pipe cleaning tool especially adapted to be forced through a pipe to be cleaned under the influence of hydraulic pressure.

An important object of the present invention is to provide a pipe cleaning tool of a generally spheroidal configuration having deformable walls that are apertured whereby the interior thereof is filled with liquid during a cleaning operation.

These and other objects and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment thereof, when taken in conjunction with the appended drawings, wherein:

Figure 1 is a side view of a preferred form of pipe cleaning tool embodying the present invention disposed in a pipe to be cleaned;

Figure 2 is an enlarged central vertical sectional view of said pipe cleaning tool; and

Figure 3 is a reduced side elevational view illustrating different attitudes which may be assumed by said pipe cleaning tool during a pipe cleaning operation.

Referring to the drawings, the preferred form of pipe cleaning tool embodying the present invention comprises a hollow, generally spheroidally-shaped body B defined by walls **10** formed of a natural or synthetic rubber, or a plastic material, having the ability to return to its original configuration after being deformed. The outside diameter of the body B substantially corresponds to that of the pipe to be cleaned P. It is important to notice that the walls **10** are formed with at least two apertures designated **12**. In the embodiment shown in the drawings, four of such apertures **12** are utilized.

A metal connector rod **16** is rotatably affixed to the rear wall **10***r* of the body B. The rear end of this connector rod **16** is formed with an eye **18** for receiving a control line **20** of rope or cable. As shown in Figure 2, the front end of the connector rod **16** is disposed within a cavity **21** formed in an externally threaded bushing **22**, the latter being disposed in a coaxial bore **23** formed in the rear wall **10***r*. A nut **24** is threadably secured upon

the rear portion of the bushing **22**. A first washer **26** is shown interposed between the head **30** of the bushing **22** and the front surface of the rear wall **10***r*, and a second washer **28** is shown interposed between the front of the nut **24** and the rear surface of the wall **10***r*. The front end of the connector rod **16** is bent over within the cavity **21**, as indicated at **32**. It is secured against forward movement out of the cavity by a bolt **34** which is threadably disposed within the front portion thereof.

Conveniently, a second eye **36** may be affixed to the front end of the body B. This eye **36** is held in place by a stud member **38**. The latter is disposed in a coaxial bore **40** formed in the front wall **10***f* of the body. The stud member **38** in turn is held in place by a nut **42**. Preferably, the stud member **38** will extend through an outer reinforcing plate **44** of circular configuration having its radially outer ends dished rearwardly, as indicated at **46**. The stud member also extends through a flat washer element **48** which is disposed with its front end abutting the rear surface of the front wall **10***f*.

Preferably, the external surface of the sides of the walls **10** will be formed with a plurality of axially-extending reinforcement ribs **50**.

In operation, the above-described pipe cleaning tool is inserted into a length of pipe P through a manhole or the like and a head of water or other liquid will be built up in the pipe behind the tool. It should be particularly observed that such liquid may enter the interior of the body B through the apertures **12**, the air initially contained within the body being displaced through these same apertures. In this manner the pressure within and without the body B will be equalized. As the workman lets out the control line **20**, the body B will move downstream through the interior of the pipe to be cleaned P, the pressure of the liquid within the body B causing the radially outer portion of the walls **10** to scrape along the walls of the pipe P . Such scraping causes the walls **10** to shear off encrustations or projections, such as those resulting from grease, roots, rough joints and other deposits from the inside of the pipe. It should be particularly noted that the scraping force obtainable with the pipe cleaning tool of the present invention is appreciably greater than that afforded by the similar heretofore-proposed tools employing an air-filled body. In addition to this shearing action, a certain amount of liquid will flow forwardly around the outer surface of the walls **10** with a comparatively high velocity. This flow will scour sediment and organic deposits from the surface of the pipe. Additionally, this high velocity liquid flow will create a considerable amount of turbulence in the liquid downstream from the tool. Such turbulence will assist in transporting downstream foreign matter disposed in the pipe ahead of the tool.

It should be noted that the elastic walls **10** of the tool permit it to deform should the body encounter a restriction in the pipe P. When the walls are so deformed an orifice will be formed through which the liquid under pressure will jet. This jet will tend to wash the material away ahead of the body thereby tending to dissipate the restriction. The front eye **36** may be utilized for retrieving the pipe cleaning tool through a drop-manhole or the like.

Referring now to Figure 3, it should be particularly noted that the length of the connector rod **16** should be sufficient that the body B cannot be tilted to such an extent that one or more of the apertures **12** could be closed by abutment with the pipe wall. Such closing of the apertures could interfere with the proper operation of the device. The rotatable attachment of the connector rod **16** eliminates kinking or fouling of the control line **20**.

While there has been shown and described hereinbe-

fore what is presently considered to be the preferred embodiment of the present invention, it will be apparent that various modifications and changes may be made thereto without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A tool for cleaning the inside of a pipe, comprising: a hollow, generally spheroidally-shaped body having deformable walls of a diameter substantially corresponding to that of said pipe, with at least two apertures formed in the rear wall of said body; a coaxial connector rod rotatably secured to the rear wall of said body; and an eye formed on the front wall of said body.

2. A tool for cleaning the inside of a pipe which includes: a hollow, generally spheroidally-shaped body having deformable walls of a diameter substantially corresponding to that of said pipe, said body having at least two apertures in the rear wall thereof, said apertures being on opposite sides of said body; and a connector rod attached to the rear of said body and held substantially coaxial therewith, said rod extending rearwardly of said body and acting to prevent tipping thereof by an amount sufficient to cause one of said apertures to be closed by engagement with the wall of said pipe.

3. A tool for cleaning the inside of a pipe which includes: a hollow, generally spheroidally-shaped body having deformable walls of a diameter substantially corresponding to that of said pipe, said body having a longitudinally extending axis with at least two apertures formed in the rear wall of said body on opposite sides of said axis; and a connector rod attached to the rear wall of said body and held substantially coaxial with said axis at all times, said rod being rotatable with respect to said body about their common axis, said rod extending rearwardly of said body and acting to engage the interior of said pipe as said body is tipped, thereby limiting the tipping of said body within said pipe and preventing the closure of one of said apertures by its engagement with the wall of said pipe.

References Cited in the file of this patent

UNITED STATES PATENTS

423,134	Cope	Mar. 11, 1890
876,566	Lehnert	Jan. 14, 1908
2,668,307	Preen	Feb. 9, 1954

FOREIGN PATENTS

121,170	France	Nov. 15, 1877