April 7, 1964 H. D. GIFFEN 3,127,706

PIPE CLEANING APPARATUS

Filed Jan. 16, 1961 2 Sheets-Sheet 1

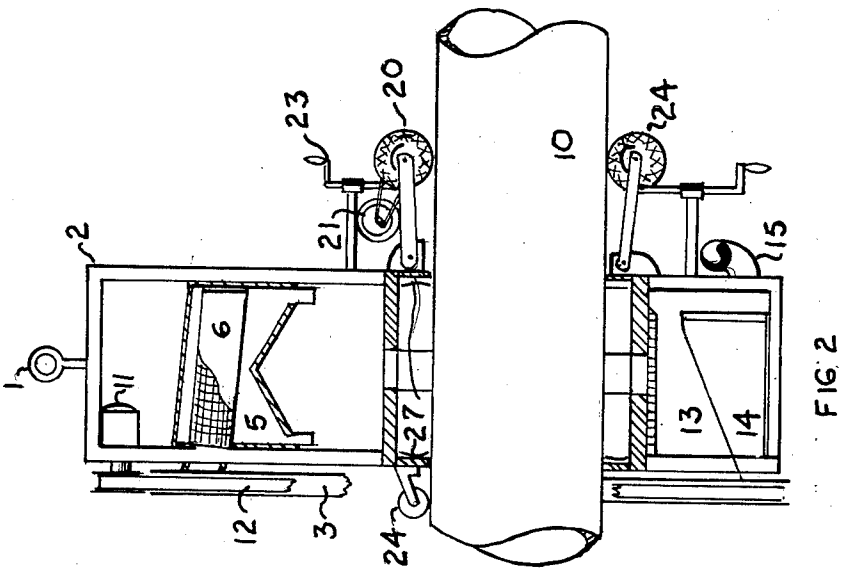



FIG. 2

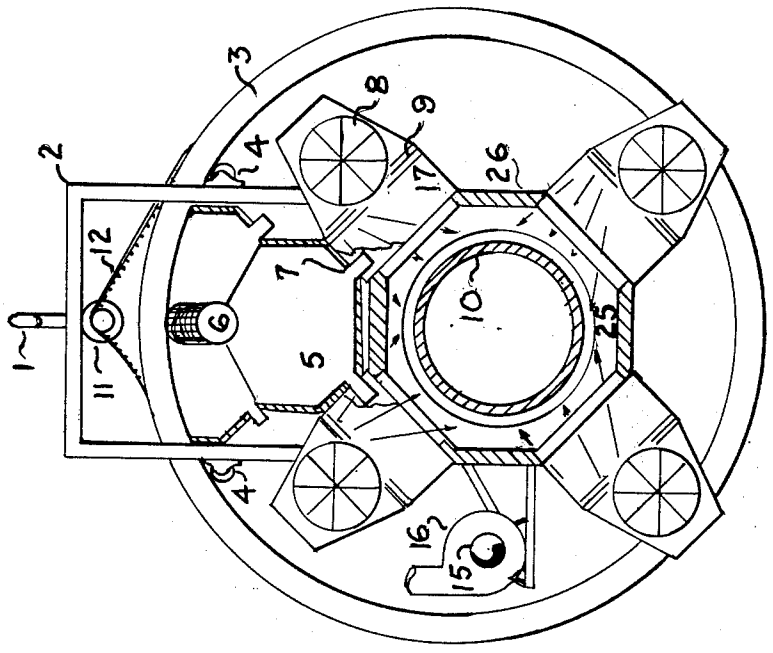



FIG. 1

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Filed Jan. 16, 1961 2 Sheets-Sheet 2

FIG. 3

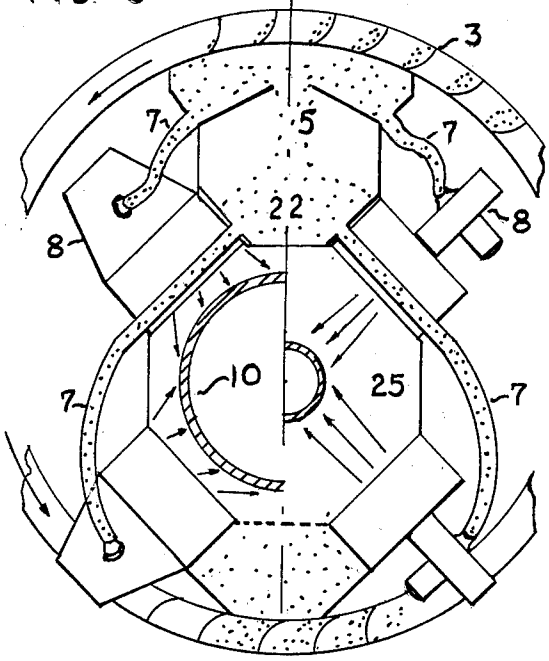
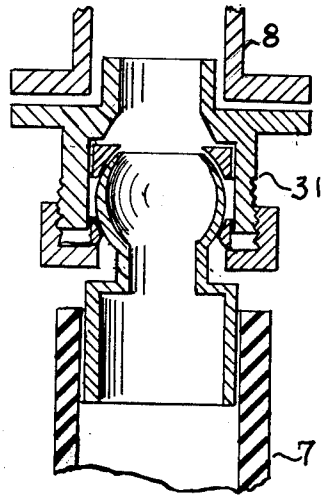



FIG 7



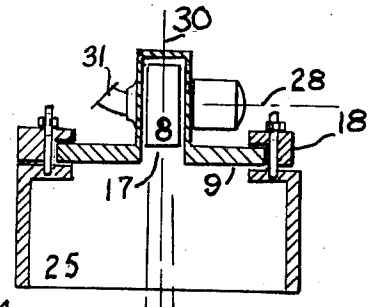
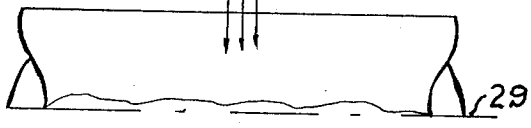
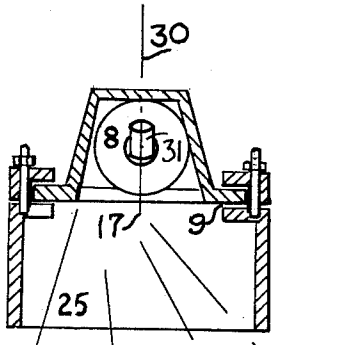




FIG. 4



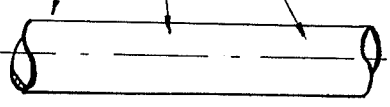




FIG 6

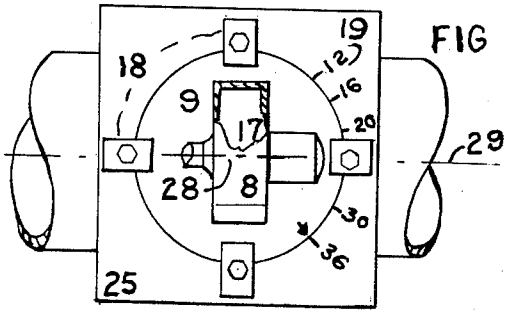



FIG 5

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United States Patent Office

3,127,706

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# PIPE CLEANING APPARATUS

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Filed Jan. 16, 1961, Ser. No. 83,093
9 Claims. (Cl. 51—9)

This invention relates to an apparatus for cleaning the exterior surface of pipe.

An object of the present invention is to provide a new and improved method of cleaning large diameter pipe lines with hurled abrasives.

Another object of the present invention is to provide means of cleaning all the exterior surface of a pipe without rotating the pipe.

Another object is to provide means of feeding abrasive materials to the centrifugal elements which hurl the abrasive upon the surface of the pipe.

Another object is to provide means of collecting and cleaning the spent abrasive materials and elevating the material to the feeding system.

Another object is to provide means of adjusting the hurled abrasive pattern to secure maximum impingement on the surface of different sized pipe.

Other objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawings wherein:

FIGS. 1 and 2 are sectional views embodying the preferred form of the invention.

FIG. 3 is a composite view showing the relation of the feed conduits and the throwing wheels. At the left of the center line the throwing wheels are shown set for the large size pipe and at the right of the center line the throwing wheels are shown in the position for small pipe. Preferably, the conduits **7** would be of a type available on the market and known as fully convoluted ducts fabricated of rubber-impregnated fiber glass cloth. These ducts are extremely flexible and can be compressed and elongated.

FIGURES 4, 5 and 6 are detail views illustrating the means of adjusting the abrasive pattern in relation to the size of the pipe to be cleaned. FIGURES 4 and 5 show the throwing wheel set at a position for large pipe and FIGURE 6 shows the throwing wheel set at a position for small pipe.

FIGURE 7 ilustrates one method of forming a connection between the feed part of the throwing wheel and the flexible conduits.

While the invention is susceptible of embodiment in many different forms, we have shown in the drawings and shall herein describe in detail a preferred form, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the forms shown.

In the form selected for purposes of disclosure in FIGS. 1, 2, and 3, the invention comprises as essential elements a supporting frame **2**, centrifugal elements to hurl the abrasive **8**, abrasive conveying elements **3**, **4**, **5**, **6**, **7**, **11** and **12**, abrasive cleaning system **13**, **14**, **15** and **16**, and in FIGURES 4, 5 and 6, means of adjusting the abrasive pattern in relation to the axis of the pipe **9**, **17**, **18** and **19**.

The relationship of the different axes as recited in the claims is illustrated in FIGURES 4, 5 and 6, wherein line **29** is the axis of the pipe, line **30** the axis of rotation of plate **9** and **28** is the axis of the throwing wheel.

Conveyor ring **3**, rotating on rollers **4**, and driven by belt **12** and motor **11**, elevates the abrasive **22** to the top of the apparatus. The abrasive falls from the conveyor through trash screen **6** into hopper **5** and through conduits **7**, to the centrifugal elements **8**. A number of centrifugal elements **8** are arranged in a manner to hurl the abrasive against the entire circumference of the pipe. The centrifugal elements **8** are mounted on rotating plates **9**, containing apertures **17** which can be locked on cleaning chamber **25**, in various positions by means of clamps **18**. The plate **9** is rotated to a point indicated on the index **19**, which will correspond to the diameter of the pipe being cleaned, thus substantially all of the shot being hurled through the aperture **17**, would strike the surface of the pipe **10**. This is an important feature of this invention since hurled abrasive not striking the pipe surface will strike some point on the interior of the cleaning chamber **25**, which, in a few days of operation, could seriously damage the apparatus, by erosion.



The cleaning chamber **25** confines the abrasive action by means of side walls **26** and end walls **27**. Rubber curtains would be attached to the end walls to fit each size of pipe being cleaned. Spent abrasive will fall through the bottom of the cleaning chamber **25**, onto screen **13** and will flow to conveyor **3**. Unwanted dust and fines will fall through screen **13**. The heavy refuse drops into chamber **14** and the fine light particles are drawn through conduit **15** by blower **16** and are discharged to atmosphere.

A number of wheels and rollers **24** are provided to center the pipe in the apparatus. Position of these elements can be changed to fit various size pipes by jacks **23** or other means. One or more drive wheels **20**, energized by variable speed motor **21**, are provided to move the apparatus along the pipe. In field operation the weight of the apparatus would be supported by I-bolt **1**, from a mobile crane or by other means.

It is contemplated that standard type of centrifugal blast units would be incorporated in this apparatus and the size and shape of the aperture **17**, would be made to correspond with the abrasive pattern of the unit used.

I claim:

1. A cleaning apparatus for non-rotatable pipe comprising, in combination, power driven centrifugal blast wheels, means of rotating the axes of said blast wheels between parallel and right angle positions with respect to the axis of the pipe, means of locking the blast wheels axes in any position of said rotation, means for advancing the apparatus along the pipe.

2. A cleaning apparatus for the outer surface of non-rotatable pipe comprising, in combination, power driven abrasive hurling centrifugal elements adjustably mounted so that the hurled abrasive pattern can be rotated about an axis at right angles to the axis of the pipe, means of moving the apparatus along the pipe at adjustable speeds.

3. A cleaning apparatus for the outer surface of non-rotatable pipe comprising, in combination, power driven abrasive hurling centrifugal elements adjustably mounted so that the hurled abrasive pattern can be rotated about an axis at right angles to the axis of the pipe, means of moving the apparatus along the pipe at adjustable speeds, means of feeding the abrasive to the centrifugal elements, means of collecting the spent abrasive material and means of cleaning the abrasive material.

4. A cleaning apparatus for the outer surface of non-rotatable pipe comprising, in combination, power driven abrasive hurling centrifugal elements adjustably mounted so that the hurled abrasive pattern can be rotated about an axis at right angles to the axis of the pipe, means of moving the apparatus along the pipe, at adjustable speeds, means of feeding the abrasive to the centrifugal elements, means of collecting the spent abrasive material and means of cleaning the abrasive material, and an elevator to convey the abrasive material to the top of the apparatus.

5. A cleaning apparatus for the outer surface of non-rotatable pipe comprising, in combination, power driven abrasive hurling centrifugal elements adjustably mounted so that the hurled abrasive pattern can be rotated about an

axis at right angles to the axis of the pipe, means of moving the apparatus along the pipe at adjustable speeds, means of feeding the abrasive to the centrifugal elements, means of collecting the spent abrasive material and means of cleaning the abrasive material, and an elevator to convey the abrasive material to the top of the apparatus, all combined in one portable unit.

6. In a pipe cleaning apparatus using power driven abrasive hurling centrifugal elements, in combination, means of rotating the abrasive patterns about axes at right angles to the axis of the pipe to cause substantially all of the hurled abrasive to strike the surface of different sizes of pipe and means of securing the rotated elements.

7. In a pipe cleaning apparatus using power driven abrasive hurling centrifugal elements, in combination, means of rotating the abrasive patterns about axes at right angles to the axis of the pipe to cause substantially all of the hurled abrasive to strike the surface of different sizes of pipe and means of securing the rotated elements, means of moving the apparatus along the pipe, means of feeding abrasive to the said centrifugal elements and means of collecting spent abrasive.

8. In a pipe cleaning apparatus using power driven abrasive hurling centrifugal elements, in combination, means of rotating the abrasive patterns about axes at right angles to the axis of the pipe to cause substantially all of the hurled abrasive to strike the surface of different sizes of pipe and means of securing the rotated elements, means of moving the apparatus along the pipe, means of feeding abrasive to the said centrifugal elements and means of collecting spent abrasive, means of cleaning spent abrasive and means of confining the cleaning action within a chamber.



9. In a pipe cleaning apparatus having centrifugal blast units carried by a non-rotating housing surrounding the pipe, means of mounting each blast unit on a rotating plate on said housing, said plate to rotate about an axis at right angles to both the face of the plate and the axis of the pipe, said plate having an aperture adapted to pass the grit discharge from the blast wheel, means of locking said plate at any point of its rotation and means of indexing said plate in reference to the size of pipe to be clean.

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