Dec. 16, 1952 J. G. CRISPIN 2,621,668

HYDRAULIC IMPACT DEVICE FOR CLEANING PIPES

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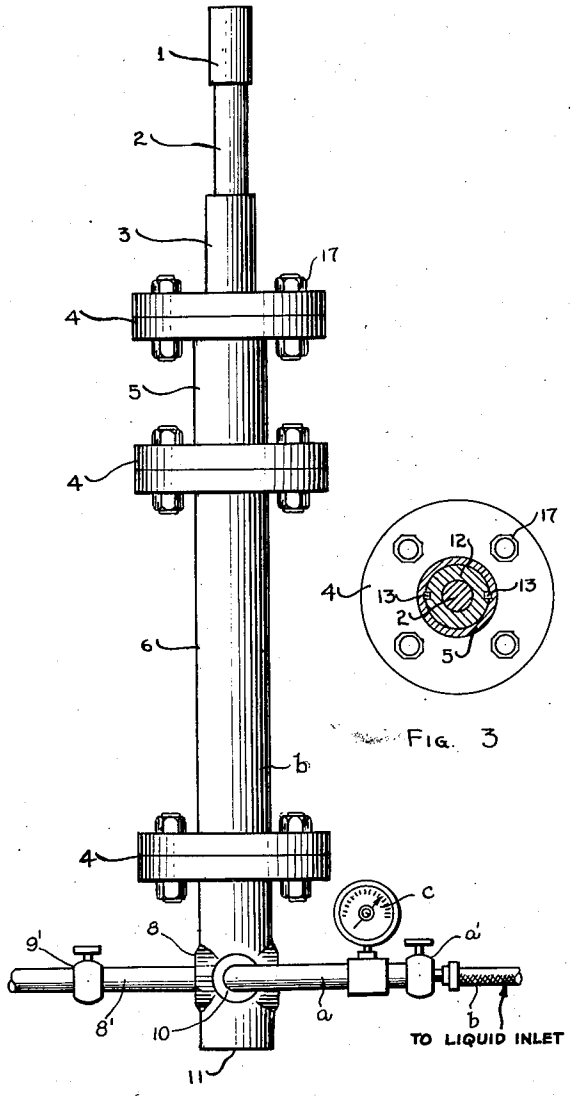


FIG. 1

FIG. 3

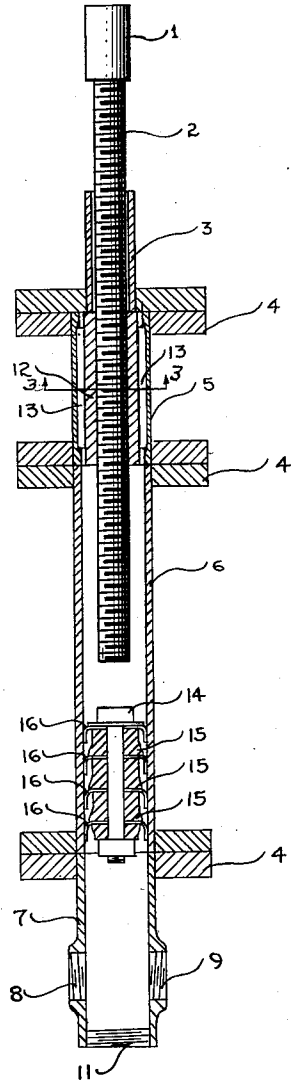


FIG. 2

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HYDRAULIC IMPACT DEVICE FOR CLEANING PIPES

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4 Claims. (Cl. 134—169)

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This invention relates to a device known as a liquid power and expulsion machine for dislodging accumulations in pipes and cleaning water pipes, and an object of the invention is to provide means adapted to be connected to water pipes and to a gauge of known construction whereby the pressure developed for dislodging deposits in pipes may be determined, the device having one branch or opening connectable to the pipe to be cleaned so that pressure developed in the device will dislodge the accumulated dirt and wash it from the pipe to thoroughly clean the pipe.

An object of this invention furthermore is to provide a casing or cylinder having outlets to a pipe to be cleaned and to a gauge, said casing having a plunger or head fitting the interior of the casing with a leakproof joint between them, so that when the plunger is forced inwardly, it moves the liquid contents of the casing, which contents are driven into the water pipe to act on the deposit therein and dislodge the same.

A further object of the invention is to provide a casing of the character indicated having guiding means for a piston rod, which piston rod is slidable in the casing and impinges the piston or plunger so that when the outer end of the piston rod is struck by a driving instrument, such as a maul, the liquid contents of the casing in the cylinder are moved.

It is a still further object of the invention to provide a device of the character indicated comprising comparatively few, inexpensive parts that are strong and durable, efficient and satisfactory in use, and comparatively inexpensive to manufacture and maintain.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompaning drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which:

Figure 1 illustrates a view in elevation of one side of the device;

Figure 2 illustrates a vertical sectional view thereof; and

Figure 3 illustrates a sectional view of the device on the line 3—3 of Fig. 2.

As shown in Figure 2, the device includes a driving head 1 provided on a sectional drive shaft 2, the drive shaft being slidable in a guide or

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bearing 3. The lower end of the bearing 3 is seated or operatively connected to a union or joint 4.

A drive sleeve housing 5 is conveniently attached at its upper end to the union 4, and the lower end of the housing 5 is in contact with the upper end of a plunger tube or casing 6, the sleeve and casing being held in proper position by means of a union or joint 4a similar to the union 4. The lower end of the casing 6 is in facial contact with the upper end of an adaptor 7 and a union 4b seals the joint between the casing 6 and the adaptor.

The adaptor 7 is provided with a plurality of threaded openings 8, 9 and 10 and the lower end is formed with a threaded opening 11.

The openings 8, 9, 10 an 11 are of the same internal diameter and the casing 6 is in communication with a liquid inlet line, such as a pipe a having a valve a', and with reference to Figure 1, it will be seen that the pipe a is connected to the opening 10 of the adaptor. A pressure gauge c is also interposed in the pipe a to enable the pressure within the system to be determined.

A pipe to be cleaned, indicated 8', may be coupled with either of the openings 8, 9 or 11, although the drawing shows the pipe 8' connected to the opening 8. It will be appreciated that the other openings 9 and 11 may be closed by suitable plugs (not shown). A hand operated valve 9' is located in the pipe 8'.

The drive shaft 2 is externally threaded to a slidable sleeve 12, the sleeve 12 being provided with diametrically opposed longitudinally extending grooves which receive ribs 13 provided on the interior of the housing 5. Consequently, the sleeve 12 may have sliding movement respecting the housing but cannot rotate relative to the housing.

The lower or free end of the drive shaft 2 functions to impinge or contact a plunger assembly located within the plunger tube or casing 6. The plunger assembly comprises a nut and bolt unit 14 supporting a plurality of alternately superimposed spacer bushings 15 and cup leathers 16, the units being located between the bolt head and the securing nut. Obviously, when the head 1 is struck by a tool such as a maul, the plunger will be forced downwardly in the tube 6 and adaptor 7, thus moving the volume of liquid in the tube and adaptor, the liquid, of course, being forced into the clogged pipe for dislodging the deposit therein.

To operate the cleaning device, the valve 9' on the pipe 8' is opened and the valve a' is also

opened. All air is purged from the device and the device is in condition for operation. When pressure is delivered to the casing **6**, the piston assembly will be forced upwardly therein and the drive shaft **2** is adjusted so that the lower end thereof is in contact with the upper end of the plunger assembly, the lower end of the plunger assembly being in contact with the liquid. Before operation, the valve *a'* is closed and when the drive head **1** is struck with either a manually or mechanically operated hammer, the drive shaft causes the plunger assembly to exert a force or pressure on the liquid at the bottom of the casing **6**, and after each stroke, the rebound of the shaft **2** is arrested with a sudden stop when the shaft and sleeve **12** return to the end of the housing **5**. This operation is continued and by maintaining the end of the shaft **2** in contact with the plunger assembly to compensate for any loss of liquid, a pulsating motion results by virtue of the free plunger assembly of the free floating shaft **2** and freely moving sleeve **12**. Manifestly, the bearing **3** will maintain the drive shaft **2** in proper alinement.

After the device has been in operation for a time, as above described, the valve *a'* may be opened to purge all residue or whatever matter is loosened or freed during the above described operation, after which the valve *a'* is closed and the operation continued in a sequence in a similar fashion until the pipe is cleaned completely by the pulsating action of the liquid.

In the event there is a complete stoppage, the drive shaft **2** is kept against the plunger assembly so that there is a pressure of 10 pounds or more indicated on the gauge, the pressure being augmented as the drive head is struck.

I claim:

1. In a device for cleaning water pipes, an adaptor having a plurality of openings therein, a clogged pipe line connected to one of the openings, a liquid inlet line having a bleeder valve and a pressure gauge therein connected to another of said openings, an alined plunger tube, drive sleeve housing and drive shaft guide having successive abutting ends, means coupling the alined plunger tube to another of the openings in the adaptor to provide a leakproof joint, and further means coupling the drive sleeve housing, plunger tube and drive shaft guide together to provide leakproof joints therebetween, a plunger freely movable longitudinally within the said plunger tube, a sleeve slidably but non-rotatably disposed within said drive sleeve housing, a drive shaft carried by said sleeve for longitudinal movement in said shaft guide and drive sleeve housing, cooperating means on said sleeve and drive shaft for axially adjusting the drive shaft relative to the plunger so that the end of the drive shaft engages the plunger prior to operation of the drive shaft, and a drive head on said drive shaft adapted to be mauled for driving the plunger inwardly in the plunger tube and adaptor to force liquid into contact with the deposit in the clogged pipe and for dislodging the deposit.

2. A device according to claim 1 in which the leakproof joint between the adaptor and plunger tube, the leakproof joint between the plunger tube and the drive sleeve housing and the leakproof joint between the drive sleeve housing and the drive shaft guide are maintained by flange unions.

3. A device according to claim 1 in which the cooperating means on the sleeve and shaft comprises interengaging threads on the sleeve and drive shaft whereby when the plunger is under pressure of water in the system, the drive shaft may be screwed to place its end in contact with the plunger for imparting the impact of the mauling instrumentality to the said plunger.

4. A water pipe cleaner, an adaptor having threaded openings for connection to a liquid inlet line and to a clogged pipe respectively, a freely movable plunger movable in said adaptor, means associated with the adaptor forming a guide for a drive shaft, a sleeve slidably but non-rotatably supported within said guide, a drive shaft carried by the sleeve, cooperating means on said sleeve and drive shaft for adjusting the drive shaft longitudinally in the sleeve with relation to the plunger whereby the end of the drive shaft is positioned in contact with the plunger, and a head on the drive shaft adapted to be mauled for driving the shaft against the plunger and exerting force on fluid within the system for dislodging accumulation in the clogged pipe.

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