Dec. 17, 1946. O. R. SMITH 2,412,758

APPARATUS FOR CLEANING PIPE AND THE LIKE

Filed Aug. 29, 1944 2 Sheets-Sheet 1

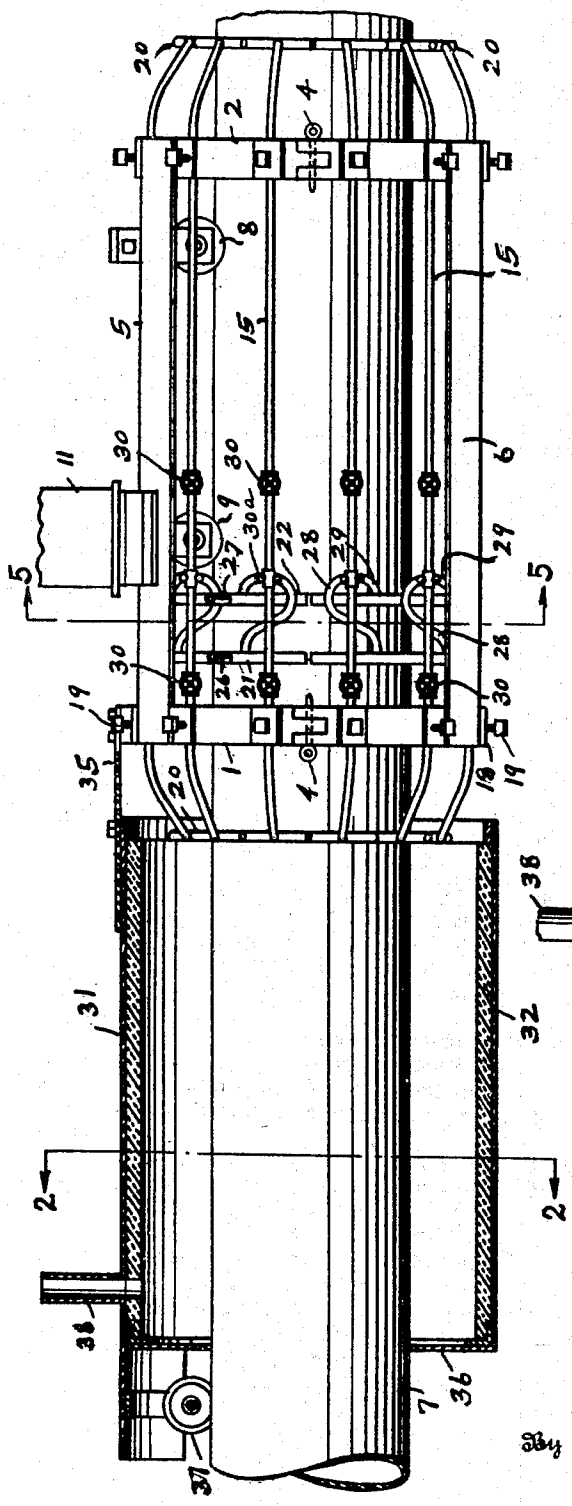


Fig. 1.

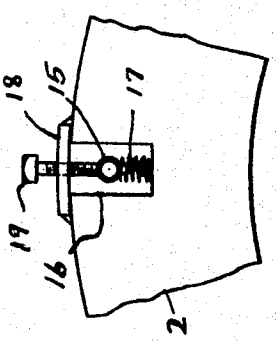


Fig. 3.

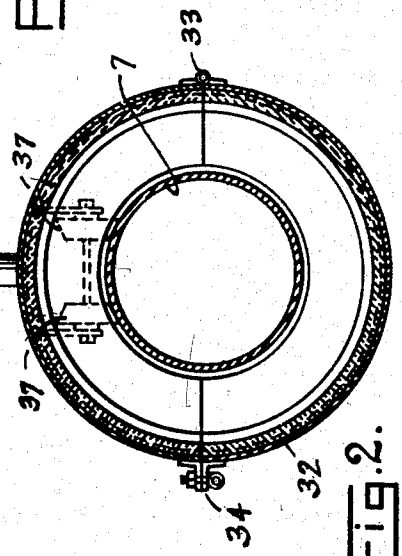


Fig. 2.

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APPARATUS FOR CLEANING PIPE AND THE LIKE

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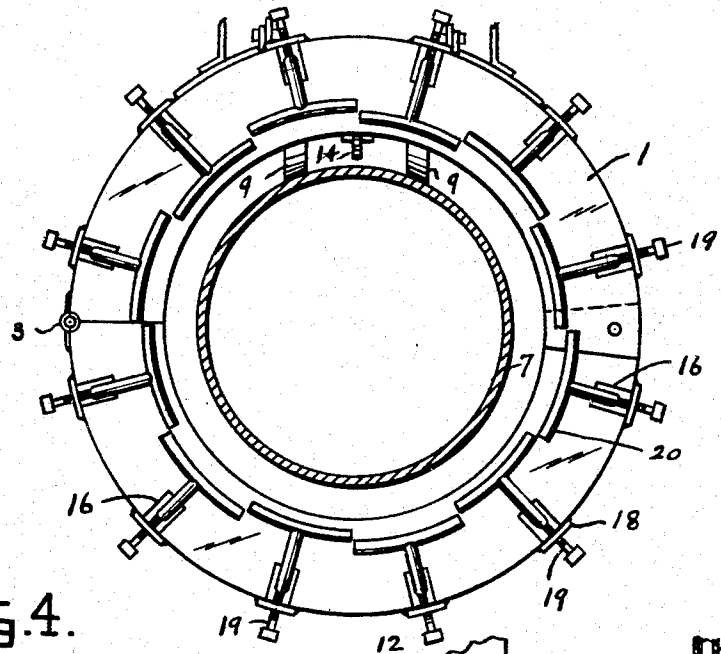


Fig. 4.

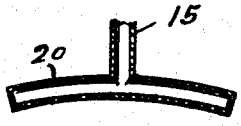


Fig. 6.

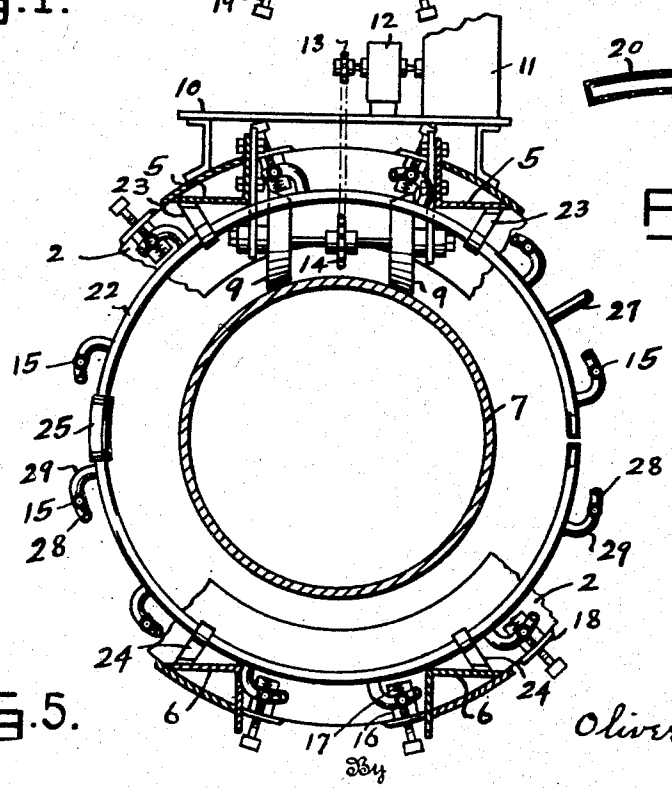


Fig. 5.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR CLEANING PIPE AND THE LIKE

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Application August 29, 1944, Serial No. 551,722

2 Claims. (Cl. 263—2)

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This invention relates to an apparatus and method for cleaning pipe and similar round objects.

The invention herein described is particularly useful in carrying out the method described in my co-pending application, Serial No. 613,123, filed in United States Patent Office on August 28, 1945, for a Method for cleaning pipe and similar round objects.

An object of the invention is to provide a device of the character described whereby heat may be applied to the outer surface of the pipe or other object to be cleaned so as to destroy all foreign matter and corrosive substances from the surface preparatory to applying a protecting coating to the cleansed surface.

The apparatus has been specially designed for use in cleaning and reconditioning pipe lines. As is well known pipe lines are periodically raised from beneath the earth surface and cleansed and coated and wrapped and then again buried. At the present time mechanical means are employed for cleaning the surface of the raised pipe preparatory to reconditioning the same but it is difficult to remove all of the foreign matter from the surface of the pipe by mechanical means, particularly where the pipe is pitted from corrosion. The present invention embodies means and a method for more efficiently cleaning the surface of the pipe for the reception of the coating material.

Another object of the invention is to provide a machine of the character described that is movable along the pipe during the cleaning process.

It is a further object of the invention to provide a cleaning machine of the character described which is so constructed that it will readily travel around bends in the pipe without interfering with the efficient operation of the machine.

A further object of the invention is to provide apparatus of the character described which will utilize any available type of fuel for creating the flame; or it may be adapted for using an electrical type of heat generator.

Another object of the invention is to provide a pipe cleaning apparatus of the character described which includes also a furnace arranged adjacent the burners and surrounding the pipe for more efficiently applying the heat to the surface of the pipe.

The invention also comprehends a novel method of cleaning pipe and similar objects.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts and to a novel method, an example of which is given in this specification and illustrated in the accompanying drawings wherein:

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Figure 1 shows a side elevation of the apparatus showing the furnace in section.

Figure 2 shows a cross, sectional view taken on the line 2—2 of Figure 1.

Figure 3 shows a fragmentary end elevation, partly in section.

Figure 4 shows an end view, shown partly broken away.

Figure 5 shows a cross, sectional view taken on the line 5—5 of Figure 1; and

Figure 6 shows a sectional view of one of the burner nozzles.

Referring now more particularly to the drawings wherein like numerals of reference designate the same parts in each of the figures, the numerals 1 and 2 designate the annular frame members forming the ends of the frame. These end members are each formed of two halfround sections which are connected together at one side by hinges as 3 and which may be secured together, at the other side, by the removable keys 4 which pass through interfitting parts of the corresponding sections, as shown in Figure 1.

The upper and lower sections of these end members are connected by the upper and lower longitudinal bars 5, 5 and 6, 6 which are preferably formed of angle irons, for strength, as shown in Figures 1 and 5. A cage like frame is thus formed whose sections are hinged on a horizontal axis so that the frame may be readily applied to or removed from the pipe 7 to be cleansed.

The frame is provided with the front and rear pairs of carrier wheels 8, 8 and 9, 9 which are shaped to conform to the contour of the pipe so as to move there along.

The machine may be moved along the pipe manually but as shown there is a platform 10 mounted on the frame which supports a motor 11. Associated with the motor, and driven thereby, is a conventional transmission 12, fixed onto whose shaft there is a sprocket wheel 13. This sprocket wheel is aligned with a corresponding wheel 14 which is fixed on the axle on which the carrier wheels 9 are also fixed and a suitable sprocket chain operates over these aligned sprocket wheels so as to transmit rotation from the motor to the carrier wheels 9.

Mounted on the frame are the longitudinal fuel conducting pipes 15 which are spaced apart the required distance around the frame. These pipes 15 extend through deep notches 16 in the annular frame members 1 and 2, as more clearly

illustrated in Figure 3 and as also shown in Figure 4. They are mounted on yieldable seats 17, preferably coil springs, which are supported on the bottom of said notches and welded to the peripheries of the end members 1 and 2 opposite said notches are the plates 18 through which the adjusting screws 17 are threaded. The inner ends of these adjusting screws bear against the outer sides of the fuel conducting pipes, as shown in Figure 3, all for a purpose to be hereinafter stated.

The ends of the fuel conducting pipes 15 converge inwardly toward the pipe 7 and terminate in arcuate nozzles 20 whose inner sides are perforated, as more accurately shown in Figure 6. These nozzles substantially surround the pipe to be cleaned and direct the flame against the surface of said pipe. They may be adjusted toward and from the pipe 7 as desired. By screwing the set screws 19 inwardly the nozzles may be adjusted closer the surface of the pipe 7 and when said set screws 19 are screwed outwardly the springs 17 will adjust the nozzles correspondingly outwardly. This is particularly desirable for the reason that when the machine is moving around a bend in the pipe the nozzles on one side might come too close to the pipe or might contact against it and extinguish the flames of the corresponding nozzles so contacting with the pipe 7.

The numerals 21, 22 designate circular manifolds which are arranged within the frame and which are anchored thereto by the upper and lower anchors 23, 23 and 24, 24, as more clearly shown in Figure 5. These manifolds are formed also in sections which are connected, at one side, by flexible connections 25 and they are closed at their other ends, as also shown in Figure 5. Fuel may be admitted from a suitable source into the manifold 21 through the connection 26 and oxygen or compressed air may be introduced into the manifold 22 through the connection 27. The fuel and the oxygen or air will be admitted under suitable pressures. The fuel from the manifold 21 is introduced into the pipes 15 through the conduits 28 and the oxygen or air is admitted from the manifold 22 through the conduits 29 so that a combustible mixture will be supplied to the fuel pipes 15.

Each fuel pipe 15 is equipped with suitable shut-off valves 30, 30, one on each side of the manifolds, so that the fuel may be directed to the set of nozzles at either end of the frame, and may also be equipped with conventional acetylene torch regulators 30*a*, 30*a*.

The machine may be moved along the pipe to be cleaned in either of the manners hereinabove specified and a circular flame projected against the surface of the pipe 7 all the way around, as the machine is moved along, at either one or both ends of the machine so that all foreign matter and corrosive substances on the surface of the pipe will be destroyed preparatory to applying a protecting coating to the cleansed surface.

If desired an oven may be associated with the machine. This oven is shown in Figures 1 and 2. It is drum-like in form. It is formed of upper and lower half-round sections 31, 32 which are composed of sheet metal suitably lined with asbestos or similar material. The sections are connected, at one side, by hinges as 33 and may be secured around the pipe, at the other side, by a

latch or latches as 34. It may be connected to one of the end members, as 1, by means of a connecting bar 35 which is bolted to said end member 1 and which may be adjustably connected to the adjacent end of the oven.

The end of the oven adjacent the machine is open and its other end is closed by an inwardly extended annular flange 36 which extends inwardly to the surface of the pipe 7, as shown in Figures 1 and 2. At its outer end it is supported on the pipe 7 by means of the carrier wheels 37 and it should be adjusted relative to the main frame of the cleaning apparatus so that the adjacent nozzles 20 will be located within the end of the oven. The opposite end of the oven has an outlet flue 38. The heat will thus be conserved and the flames from the nozzles 20, adjacent the oven, will be drawn inwardly through the oven around the pipe and will thus more efficiently destroy the foreign matter adhering to the surface of the pipe to be cleansed.

Various types of fuel may be used such as natural gas, butane, propane, kerosene, gasoline or acetylene when mingled with a suitable fluid to support combustion such as compressed air or oxygen.

It is, of course, obvious that electrical heaters might be substituted for the burners illustrated in the accompanying drawings.

When the foreign matter and corrosive substances on the surface of the pipe have been destroyed by the flame the products of combustion may be removed from the pipe in any selected manner.

After the pipe is coated it is then wrapped in the usual way and then buried.

It may be stated that when the machine is used for cleaning pipe not connected into a pipe line it may be mounted stationary and the pipe run through the machine rather than the machine being moved along the pipe.

The drawings and description are illustrative merely and it is contemplated that mechanical changes and adaptations may be made but the broad principle of the invention is defined by the appended claims.

What I claim is:

1. A cleaning machine comprising a frame shaped to surround a pipe, or the like, a carriage supporting the machine and movable along the pipe, longitudinal fuel pipes on the frame and spaced apart therearound and terminating at one end in nozzles which surround the pipe, means for adjusting the nozzles radially toward and from the pipe and means for supplying a combustible fuel to the pipes and nozzles.

2. A cleaning machine comprising a frame shaped to surround a pipe or similar object, a carriage supporting the frame on the object being cleaned, fuel conducting pipes supported on the frame and spaced apart around the frame, nozzles at one end of the pipes arranged to surround the object to be cleaned and means for supplying fuel to said pipes and to the nozzles, an oven surrounding and spaced from the pipe and connected to one end of the frame, the end of the oven adjacent the frame being open and the end of the oven remote from the frame being closed and provided with an outlet flue.

OLIVER R. SMITH.