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A. PERRAULT ET AL

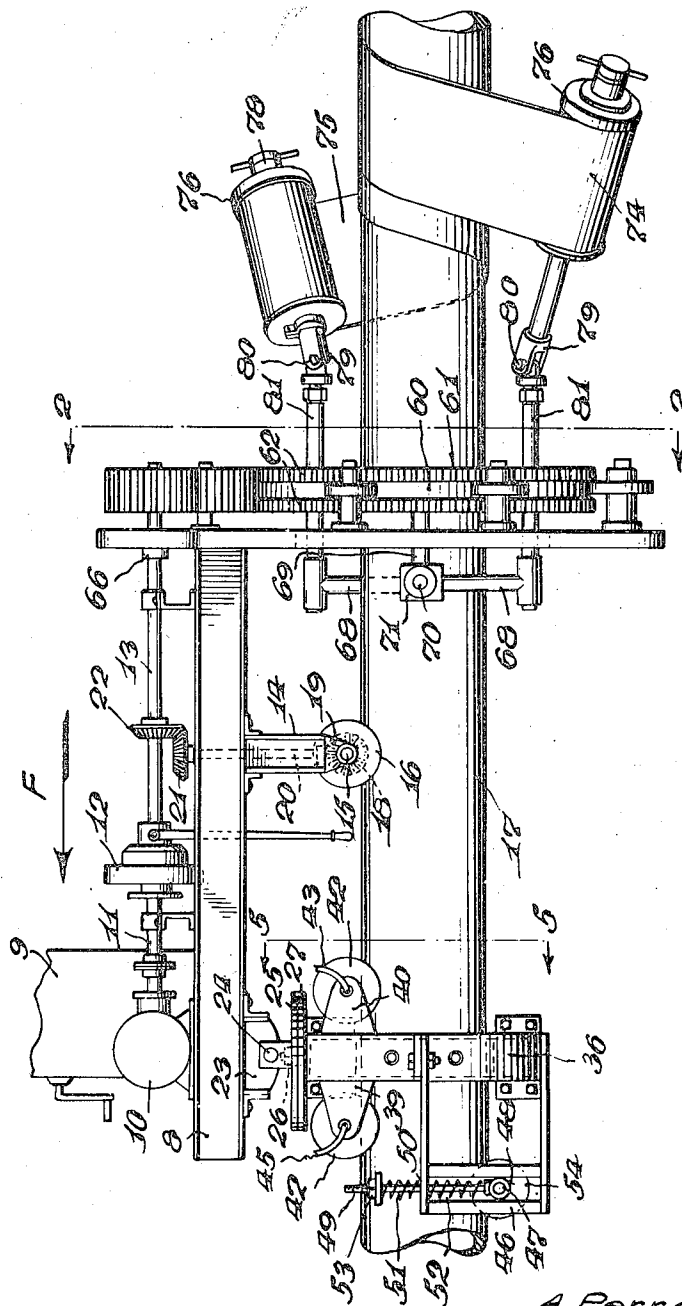
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APPARATUS FOR TREATING PIPES

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3 Sheets-Sheet 1

Fig. 1



Inventors

A. Perrault,
L. Perrault,

By

Barry & Cyn
Attorneys

May 31, 1949.

A. PERRAULT ET AL

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Fig. 2

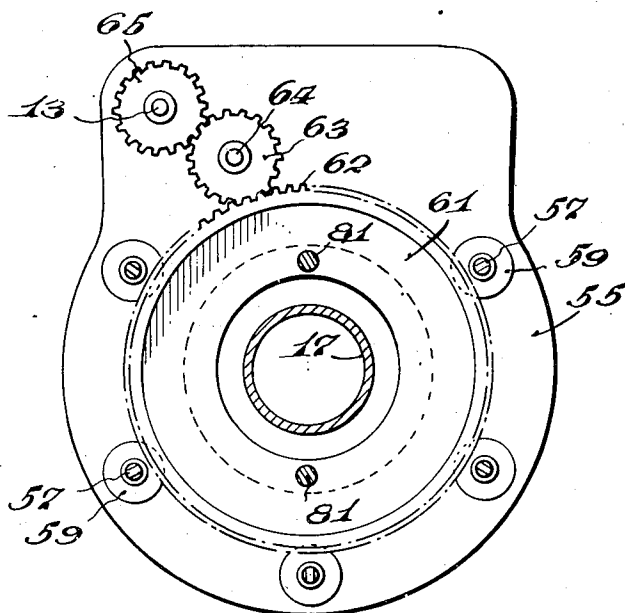


Fig. 3

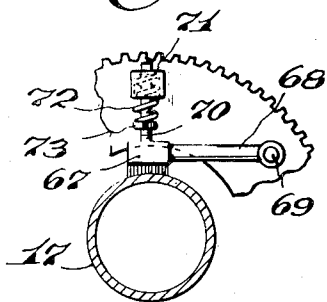
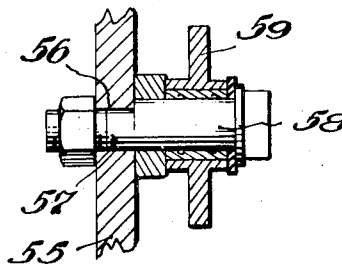


Fig. 4



Inventors

A. Perrault,
L. Perrault,

334

Barry & Coy
Attorneys

May 31, 1949.

A. PERRAULT ET AL
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Fig. 5

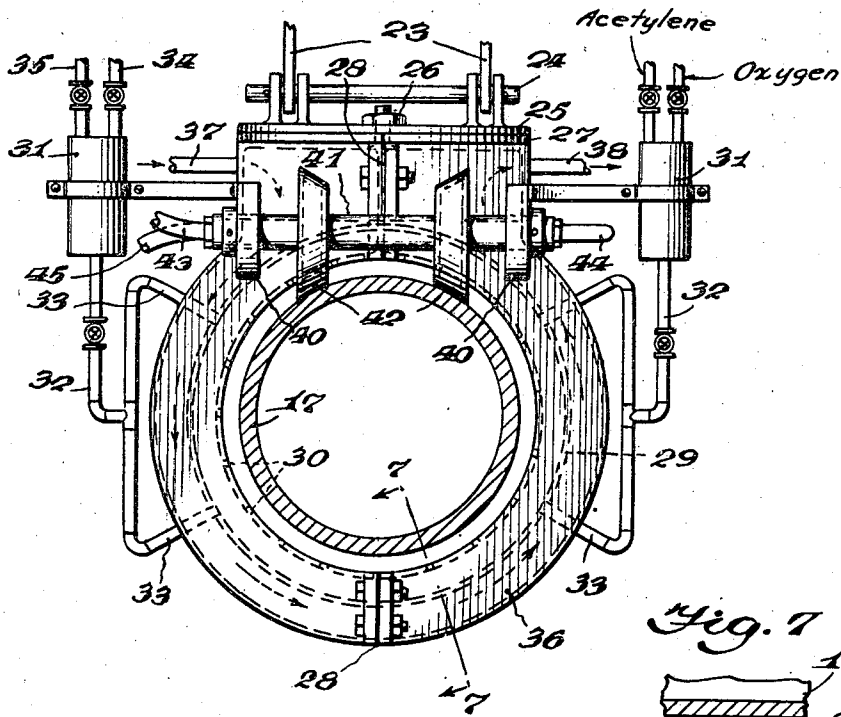


Fig. 6

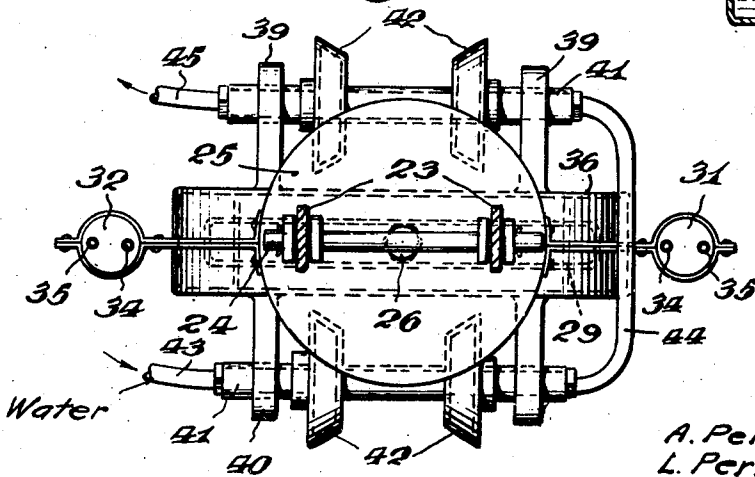
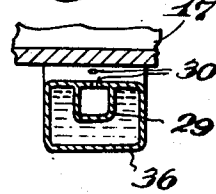


Fig. 7



Inventors
A. Perrault,
L. Perrault,

334

Barny & Byrne

Attorneys

UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING PIPE

Ainslie Perrault and Lewis Perrault, Tulsa, Okla.

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8 Claims. (Cl. 154—41)

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This invention relates to the treatment of pipes and more particularly to an apparatus for use in treating pipe lines such as are placed underground and used for the transportation of various fluids, including petroleum and petroleum products.

One of the objects of the invention is to provide means for cleaning the exterior of pipes and then applying a protective coating to the same.

Another object is to supply an apparatus which will progressively heat a pipe lengthwise thereof so as to loosen scale or the like; then remove the scale; and subsequently apply a coating or covering including a thermo-plastic which will be rendered tacky by heat radiating from the pipe.

A further object of the invention is to furnish a simple, practical apparatus, and one which will be exceedingly effective for the purpose for which it is designed.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings

Fig. 1 is a side elevation of our improved apparatus.

Fig. 2 is an end elevation, partly in vertical transverse section, the section being taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary elevation of a detail illustrating one of the pipe cleaning brushes and the yielding means for urging it toward the pipe.

Fig. 4 is a sectional view of a detail of one of the supporting rollers for the rotatable ring of the machine.

Fig. 5 is an enlarged elevation of the burners used in heating the pipe, and showing the fuel mixers and cooling means for the burners.

Fig. 6 is a top plan view of the burner unit and its water cooled supporting rollers.

Fig. 7 is a sectional view of the burner unit taken on the line 7—7 of Fig. 5.

Referring to the drawings, 8 designates a carriage frame supporting a prime mover 9, such as an internal combustion engine, which through a conventional gear reducer indicated at 10, operates a drive shaft 11, journaled on the frame. The shaft, through the medium of a manually controlled clutch 12, actuates a driven shaft 13; both shafts being preferably in alignment and extending lengthwise of the frame.

About midway the length of the frame, brack-

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ets 14, only one of which is illustrated, depend from the frame and are connected to a horizontal rotatable shaft 15, to which is fixed traction wheels or disks 16 adapted to travel along a pipe line indicated at 17. The traction wheels may be driven by any suitable means, for example, a beveled gear 18 rigid with the shaft, may mesh a similar gear 19, secured to the lower end of a vertical shaft 20. The latter is provided at its upper end with a beveled gear 21 meshing with a similar gear 22 fixed to the driven shaft 13.

The forward end of the frame of the machine is provided with a depending bracket 23 which supports, by means of a horizontal axle 24, a plate 25 adapted to rock about the axle 24 to accommodate inclined portions of the pipe line. The plate is swiveled as indicated at 26 to the central portion of a disk 27 adapted to turn about a vertical axis to allow the burner unit, now about to be described, to follow curvatures in the pipe line.

As best shown in Figs. 5 and 6, the disk 27 supports a bracket 28 which in turn supports a pair of semi-circular burners 29, having tips 30 adapted to direct the flame against the pipe 17. As the two burners form a ring, it is obvious that the flame will be directed against the pipe from all radii of the circle. Each burner is supplied with a gaseous mixture from a mixer 31 by means of a pipe 32 that is split into branches 33, connected respectively at spaced points to the burner 29 so as to evenly distribute the gaseous mixture. Each mixer 31 is provided with a valve controlled pipe 34 for the introduction of acetylene or the like, and another valve controlled pipe 35 for the introduction of oxygen. The acetylene and oxygen may be received from tanks, not shown, carried by a truck which will proceed along the pipe line as the apparatus progresses.

As the flame from the burners will create high temperatures, we prefer to provide the burners with a water jacket 36 through which water may be circulated from the inlet 37 to the outlet 38, for cooling purposes.

For supporting purposes, the water jacket is provided with oppositely extending arms 39 and 40, in which are journaled freely rotatable hollow shafts 41, each connected to a pair of beveled disks 42, adapted to travel along on top of the pipe line, as indicated in Fig. 5. As the disks have to travel over the heated portion of the pipe in the vicinity of the burners, they may, also, be of hollow construction (Figs. 5 and 6) so that water or the like may travel from an inlet pipe 43, through one of the hollow shafts and its disks, thence through a connection pipe 44, and finally

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through the other hollow shaft and its disks before discharging through pipe 45. The cooling water for this purpose may be circulated from a pump and radiator disposed on a sled or similar conveyance travelling adjacent to the pipe treating machine.

For balancing purposes, we may arrange brackets 46 (only one of which is shown) at the end of the apparatus where the burners are located, and such brackets may be secured to the water jacket. The brackets support a horizontal shaft 47 adapted to extend beneath the pipe line, as indicated in Fig. 1, the shaft being journaled in bearings 48 at the lower ends of the vertically disposed threaded rods 49, which extend through the brackets, as indicated at 50. Each of the threaded rods is surrounded by upper and lower springs 51, 52, the tension of which is adjusted by a nut 53 on the threaded rod. A pair of disks 54 are secured to the shaft 47 and are adapted to travel along the bottom of the pipe line.

The opposite end of the frame 8 is fixed to a substantially circular support plate 55 (Fig. 2) provided with a series of circumferentially arranged apertures 56, one of which is indicated in Fig. 4. Each aperture is adapted to receive a bolt 57 having an eccentric body 58 on which is journaled a disk or roller 59. Five of such rollers are illustrated, and it may be seen from Fig. 1 that they extend into a circumferential groove 60 of a gear wheel 61 and support the latter. By turning the bolts 57 about their axes, it is obvious that the wheel 61 may be shifted transversely or vertically, relatively to the axis of the pipe line.

The wheel is provided at opposite sides of the groove 60 with gear teeth 62 meshing with a gear 63 (Fig. 2) rotatable on a stud shaft 64 fixed to the ring 55. The gear is driven by a gear 65 fixed to the driven shaft 13 which extends through the ring and is journaled therein as indicated at 66 (Fig. 1).

A series of stiff brushes 67 (preferably wire) are used to clean scale or the like from the pipe after the pipe has been heated, and each of these brushes, as best shown in Fig. 3, is secured to one end of an arm 68, the opposite end being pivotally secured at 69 to the rotatable wheel 61. Each brush is provided with a threaded rod 70 extending through an abutment 71 fixed to the wheel. There is a spring 72 arranged on each rod between a nut 73 and the abutment, used in adjustably urging the brush toward the pipe line.

After a portion of the pipe line has been heated and then cleaned by the brushes, the heat impounded in the pipe is employed in applying a protecting covering or coating to the pipe. The heat can be used in rendering any suitable thermo-plastic material tacky and the thermo-plastic may be applied to the pipe separately or simultaneously with a wrapper of felt or the like. For example, as indicated in Fig. 1, rolls 74 of felt tape having a thermo-plastic layer 75 at one side thereof may be used for the purpose. If used, each roll may be arranged on a spool 76 rotatable about an axle 78, having a fork 79 projecting from one end thereof. The fork is adjustably secured by any suitable means, indicated at 80, to a rigid pin 81 fixed to the wheel 61. Obviously, when the wheel rotates and the carriage is traveling along the pipe line, the tape will be unwrapped from the spools and wrapped about the pipe and at such time, the heat in the pipe will render the thermo-plastic material tacky so that the felt or its equivalent will stick to the cleaned pipe. The heat of the pipe in addition to rendering any

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thermo-plastic material tacky, also in many instances eliminates the use of a coating primer necessary in the application of coating on a cold pipe.

From the foregoing, it is believed that the operation of the apparatus may be readily understood, but in brief, it will be observed that the engine 9 drives the apparatus along the pipe line in the direction of the arrow, indicated at F in Fig. 1, and at the same time causes the rotation of the wheel 61 and the parts which it carries. As the machine progresses along the pipe line, the flame issuing from the burners will heat the pipe and loosen any scale or the like, as well as remove moisture. Then the brushes will come into play and thoroughly clean the heated pipe before the thermo-plastic and wrapping material are applied, either singly or together.

It is manifest that a sand blast or the like could be substituted for the wire brushes, and other coating material such as bitumen or the like may be applied by means of a coating shoe prior to wrapping the pipe with felt, paper, etc.

While we have disclosed what we now consider to be a preferred embodiment of the apparatus, it will be apparent to those skilled in the art that changes may be made in the details of each without departing from the spirit of the invention, as expressed in the following claims.

What we claim and desire to secure by Letters Patent is:

1. A pipe treating apparatus comprising a carriage arranged to travel upon a pipe line, a heating unit movable with the carriage and providing heat to the pipe from substantially all radii thereof for removal of moisture and loosening of scale, a rotatable pipe cleaning unit movable with the carriage and arranged to remove scale from the hot pipe, and a wrapping unit movable with the carriage and rotatable about the pipe simultaneous with the cleaning unit, said wrapping unit including rolls of thermoplastic wrapping material, said heating unit and wrapping unit so constructed and arranged to utilize the heat impounded in the pipe to cause the wrapping material to adhere to the pipe.

2. A pipe treating apparatus comprising a carriage supported frame, a heating unit operatively connected to the frame and comprising substantially circular burner means adapted to surround the pipe and to direct flame against the pipe from substantially all radii thereof, a wrapping unit operatively connected to the frame and including spools of thermoplastic wrapping material, and means for moving the spools in a circular path around the pipe and arranged to utilize the heat impounded in the pipe for rendering the material tacky and causing adhesion thereto, and a cleaning unit operatively connected to the frame and arranged between the heating unit and the wrapping unit.

3. A pipe treating apparatus comprising a supporting means arranged to travel upon a pipe line, heating means carried by the supporting means and comprising a substantially circular burner arranged to substantially surround the pipe line, wrapping means supported by the supporting means and arranged to be rotated about the pipe, said wrapping means including rolls of thermoplastic wrapping material utilizing the heat impounded in the pipe by the burner means to render the material in such a condition to cause adhesion to the pipe, and means for cleaning the pipe prior to the wrapping thereof.

4. A pipe treating apparatus comprising a

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carriage arranged to be moved upon a line of pipe while the latter is held against endwise movement, a burner unit supported by the carriage and including means for directing the flame against the exterior of the pipe from substantially all radii thereof, wrapping means supported by the carriage arranged to be rotated about the pipe, said wrapping means also arranged posterior to the burner unit and including wrapping rolls of thermoplastic material for wrapping about the pipe while utilizing heat impounded in the pipe to render the thermoplastic material tacky to cause adhesion thereof to the pipe, brushes supported by the carriage and arranged between the burner unit and the wrapping means, and means for rotating the brushes about the pipe while they are in contact therewith.

5. A pipe treating apparatus comprising a carriage supported frame arranged to travel upon a pipe line, a heating unit carried by the frame and comprising substantially circular burner means adapted to substantially surround the pipe and direct flame thereagainst, a wrapping unit carried by the frame and including spools of thermoplastic wrapping material, said burner means and wrapping unit being so constructed and arranged to utilize the heat impounded in the pipe to cause adhesion of the wrapping material to the pipe, and a cleaning unit carried by the frame and arranged between the heating unit and the wrapping unit, said cleaning unit comprising brushes, means for moving the brushes in a substantially circular path, and means for urging said brushes toward the axis of the pipe.

6. A pipe treating apparatus comprising a carriage supported frame arranged to travel upon a pipe line, a heating unit carried by the frame and comprising substantially circular burner means arranged to substantially surround the pipe line and direct flame against the pipe from substantially all radii thereof, a wrapping means supported by the carriage and including rolls of thermoplastic material arranged to be rotated about the pipe, said wrapping means utilizing the heat impounded in the pipe by the burner means to render the material in such a condition to adhere to the pipe, and means for cleaning the pipe prior to the wrapping thereof.

7. A pipe treating apparatus comprising a supporting frame arranged to travel upon a pipe line, a heating unit carried by the frame and comprising substantially circular burner means arranged to substantially surround the pipe and direct flame against the pipe from substantially

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all radii thereof, a wrapping means supported by the carriage and rotating around the pipe, said wrapping means including rolls of thermoplastic wrapping material utilizing the heat impounded in the pipe for rendering the wrapping material in such a condition to cause adhesion thereof to the pipe.

8. A pipe treating apparatus comprising a carriage supported frame arranged to travel upon a pipe line, a heating unit carried by the frame and comprising substantially circular burner means arranged to substantially surround the pipe line and direct flame against the pipe from substantially all radii thereof, a wrapping means supported by the carriage and including rolls of thermoplastic material arranged to be rotated about the pipe, said wrapping means utilizing the heat impounded in the pipe by the burner means to render the material in such a condition to adhere to the pipe, means for cleaning the pipe prior to the wrapping thereof, and means to cause rotation of the wrapping means.

AINSLIE PERRAULT.
LEWIS PERRAULT.

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