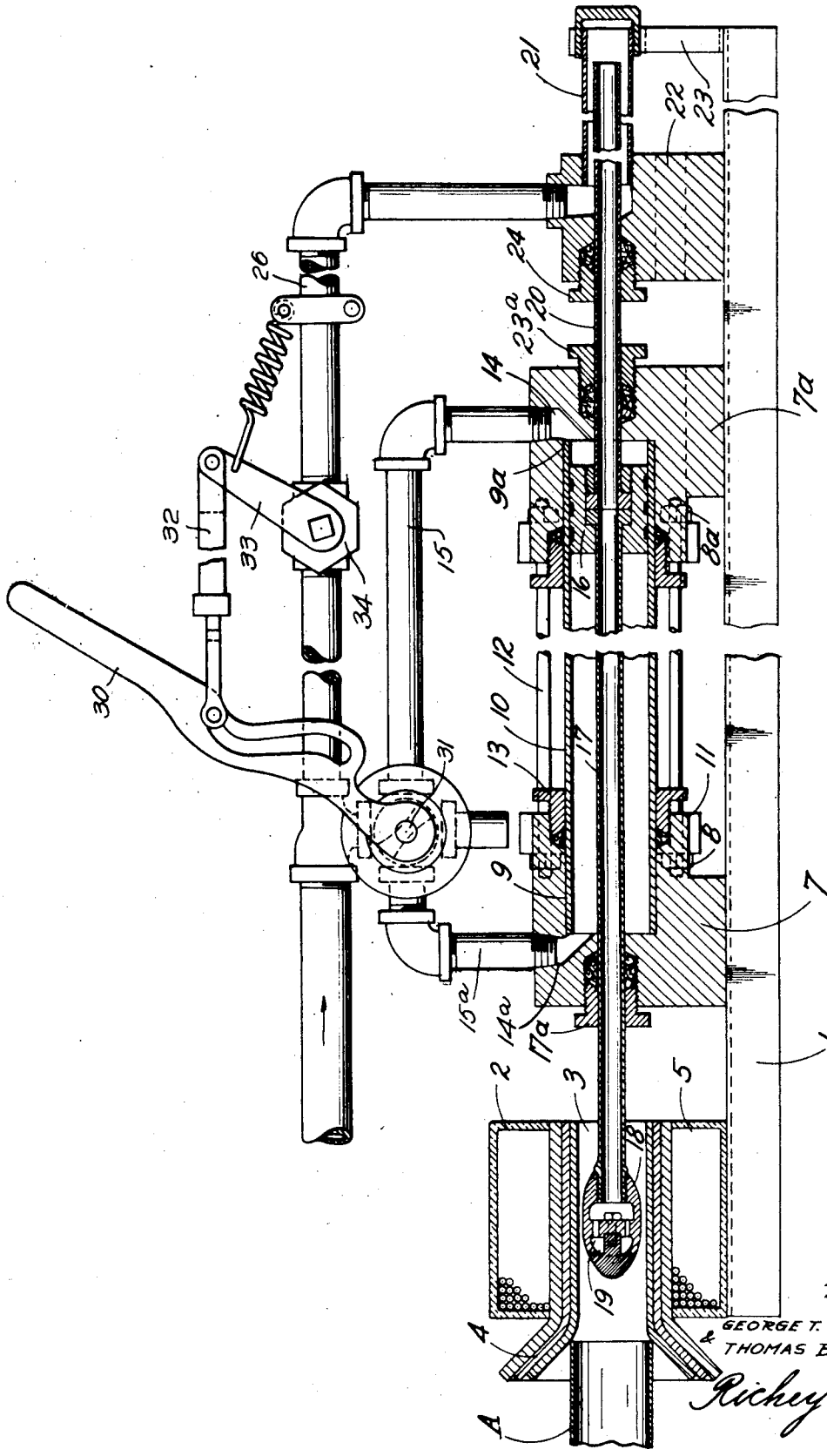
Nov. 27, 1934. G. T. CHURCH ET AL 1,982,590

PIPE AND TUBE BLOWER

Filed Dec. 17, 1932



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Patented Nov. 27, 1934

1,982,590

UNITED STATES PATENT OFFICE

1,982,590

PIPE AND TUBE BLOWER

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Application December 17, 1932, Serial No. 647,758

9 Claims. (Cl. 91—44)

This invention relates to apparatus for treating the interior surface of tubular articles.

In prior practices it was customary in blowing out the surplus coating from the inside of a tubular article by steam, to apply a nozzle to one end of the article and allow the steam to blow through. However, when this method was followed unless the steam supply line was of equal diameter to the pipe being treated the expansion of the steam would have decreased its power to the extent that the surplus coating on the inside would not be uniformly blown out, and the inside surface would not be clean and smooth. In other methods, in addition to the air or fluid under pressure, it was necessary to swab out or wipe the interior of the tube to effect a uniform coating.

The illustrated embodiment of the invention comprises a guide member which is adapted to receive one end of a tube to be treated as it is rolled down a conveyor. Surrounding the tube guide is an electromagnet which when energized maintains and positions the end of the tube within the guide during the period that it is being treated. A hollow piston rod having a nozzle member disposed on the end thereof is reciprocated through the tube. Intermediate the extremities of the piston rod is a piston suitably contained within a cylinder. The end of the piston rod opposed to the nozzle member is slidably retained within a stationary tube or steam box. When steam is admitted to the cylinder to move the nozzle into the tube, steam also enters the stationary tube from which it is conveyed to the nozzle member through the hollow piston rod. Similarly when steam is admitted to the opposed side of the piston to withdraw the nozzle from the tube the valve controlling the admission of steam to the stationary tube is closed.

Various advantageous features of the invention will become apparent as the detailed description thereof continues in conjunction with the accompanying drawing wherein similar characters of reference designate corresponding parts and wherein:

The figure is a fragmentary side elevational view, partly in section illustrating the preferred embodiment of the invention.

With reference to the drawing the machine illustrated is supported on a base 1. Adjacent the forward end of the base 1 and disposed thereon is a box 2 having a longitudinal axial aperture 3 therethrough within which there is positioned a plurality of telescoping guide funnels 4 which receive one end of a pipe A to be treated. Encircling the shank portion of the funnel guides is a magnetic coil 5 which when energized magnetizes the funnels and attracts the tube end, thus holding the same within the funnel portion of the guide during the operation of the device. As is illustrated a plurality of guide members are telescopingly arranged; in the event that pipes of various diameters are to be treated additional guide members could be added to adapt the device to pipes of smaller diameters, or one or more guides could be removed to accommodate pipe of increased diameter.

Mounted on the base 1 intermediate the extremities thereof are disposed a pair of spaced pillow blocks 7 and 7*a* having opposed cylindrical extensions 8 and 8*a* respectively formed thereon. These cylindrical extensions 8 and 8*a* are axially bored as at 9 and 9*a*, respectively, to receive the ends of a cylinder 10. Integrally formed on the extensions 8 and 8*a* are collars 11 having a plurality of longitudinal bores which receive tie-rods 12 to maintain the respective ends of the cylinder within the bores 9 and 9*a*. A ring 13 is threaded into the collar 11 and which cooperates with suitable packing to effect a seal between the bore and the exterior wall of the cylinder 10. Passages 14 and 14*a* are provided in the respective pillow blocks 7*a* and 7 and are adapted to connect the ends of the cylinder chamber 10 with a conduit 15 and 15*a* respectively whereby steam may be conveyed thereto.

Mounted for reciprocation within the chamber of the cylinder 10 is a piston 16 having an axial bore therein through which extends a hollow piston rod 17. The forward end of the rod 17 projects through the pillow block 7 and into the guide member 4. A suitable stuffing box 17*a* provides an effective seal between the hollow piston rod 17 and the bore of the block 7 through which it passes. A nozzle 18 is carried on the outer end of the piston rod 17 and is propelled through the tube to be treated by the piston 16. The nozzle is formed with an annular restricted outlet 19 which is adapted to apply a ring of steam or other suitable fluid against the interior wall of the tube as the same is advanced therethrough.

The piston rod 17 is provided with an extension 20 which extends rearwardly of the piston 16 through the block 7 and into a tubular member or casing 21. This casing has one end thereof embedded in a block 22 and the opposing end is carried by a bracket 23. Both the block 22 and bracket 23 are mounted on the base 5. Suitable stuffing boxes 23*a* and 24 are provided to effect a seal between the blocks 7*a* and 22 respectively and the piston rod extension 20. Steam is caused

to be conveyed to the interior of the casing 21 through the conduit 26.

In operation, the tube to be treated, having been brought to the proper position within the funnel portion of the guide member and being maintained in position by the magnet 5, the operating handle 30 of the two-way valve 31 is moved forward. Through link 32 the operating lever 33 of valve 34 is likewise moved forward. Fluid under pressure is conveyed through conduit 15 and passage 14 to the rear face of the piston 16, causing the same to move forward. Simultaneously with the admission of fluid to the rear face of the piston 16 steam is admitted to the interior of the casing 21 through conduit 26, and thence to the nozzle 18 through the hollow piston rod 17. As the nozzle 18 is advanced through the tube a disc-like stream of steam is directed against the interior wall of the tube under treatment. When the nozzle has moved the full extent of the stroke of the piston 16 and the interior surface of the tube has been treated, the lever arm 30 is moved rearwardly and the valve admitting steam to the casing 21 is closed and fluid is admitted to the forward part of the cylinder chamber through passage 14*a*. The piston is moved rearwardly and the piston rod and nozzle withdrawn from the tube. The electromagnet is de-energized and the tube A is released from the guide 4, and the apparatus is then in position to receive another tube to be treated.

Although the foregoing description is necessarily of a detailed character to completely set forth the invention, it will be apparent that modifications can be made within the spirit and scope of the invention and such modifications are to be covered by the appended claims.

We claim:

1. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for maintaining said tube end in operative relation within said guide, a nozzle member adapted to be propelled through said tube, and means for conveying steam to said nozzle means, said nozzle means formed with an annular restricted outlet adapted to project steam under pressure during the advance of said nozzle.

2. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for maintaining said tube end within said guide, a nozzle member, means for propelling said nozzle member through said tube, and means for conveying steam to said nozzle.

3. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for maintaining said tube end within said guide, a nozzle member, means for propelling said nozzle member through said tube comprising a cylinder, a piston reciprocatively mounted within said cylinder, a hollow piston rod operatively connecting said piston and said nozzle.

4. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for mainfaining said tube end within said guide, a nozzle member, means for propelling said nozzle member through said tube comprising a cylinder, a piston reciprocatively mounted within said cylinder, a hollow piston rod operatively connecting said piston and said nozzle, and means for conveying steam to said nozzle.

5. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for maintaining said tube end within said guide, a nozzle member, means for propelling said nozzle member through the tube comprising a cylinder, a piston mounted for reciprocation within said cylinder, a hollow piston rod adapted to carry said nozzle member and means for simultaneously admitting steam to said cylinder and to said hollow piston rod whereby the nozzle member is caused to move through the tube and steam is conveyed thereto.

6. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, magnetic means for maintaining said tube end within said guide, a nozzle member, means for propelling the nozzle member through the pipe being treated and means for simultaneously admitting steam to said nozzle propelling means and to said nozzle member.

7. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, means for positively maintaining said tube end and said guide member in abutting relationship, a nozzle member, means for propelling said nozzle member within said tube and means for simultaneously admitting steam to said nozzle propelling means and to said nozzle member.

8. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a pipe, magnetic means for maintaining said tube end within said guide, means including a nozzle member for projecting fluid against the interior of said tube, and means for propelling said nozzle means through said tube comprising a cylinder having a piston mounted for reciprocation therein.

9. In a machine for treating the interior surface of pipes or tubes, a guide member adapted to receive one end of a tube to be treated, means for positively maintaining the end of said tube and said guide member in abutting relationship, a nozzle member, means for propelling said nozzle member through the tube comprising a cylinder, a piston mounted for reciprocation within said cylinder, a hollow piston rod adapted to carry said nozzle member, and means for simultaneously admitting steam to said cylinder and to said hollow piston rod whereby the nozzle member is propelled through the tube being treated and steam is conveyed to the nozzle member.

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