

(No Model.)

J. P. SERVE.  
MECHANISM FOR POLISHING TUBES.

No. 438,026.

Patented Oct. 7, 1890.

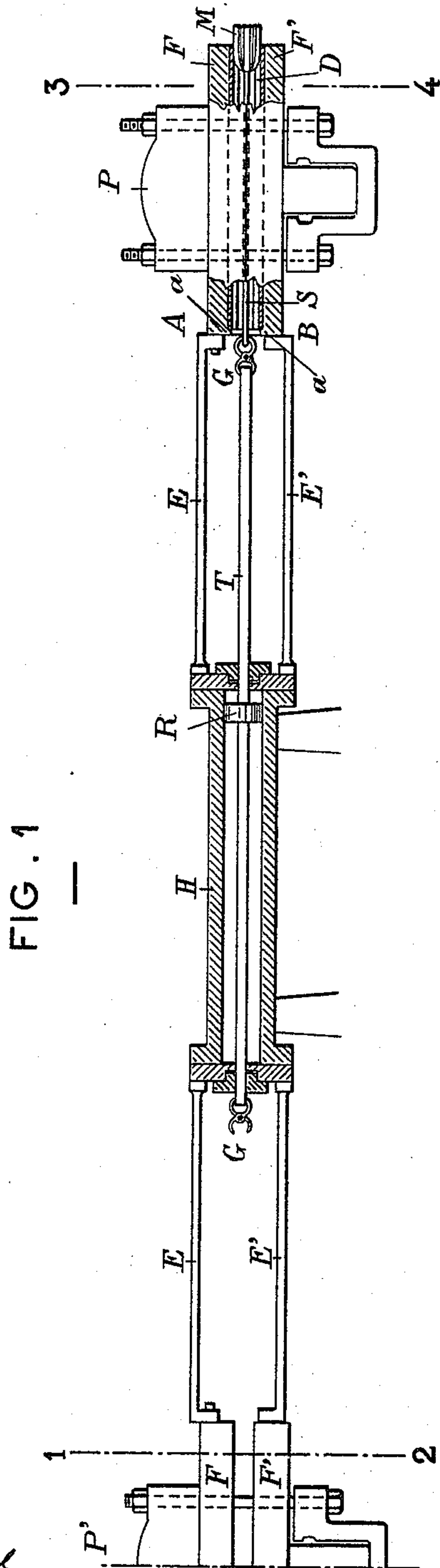
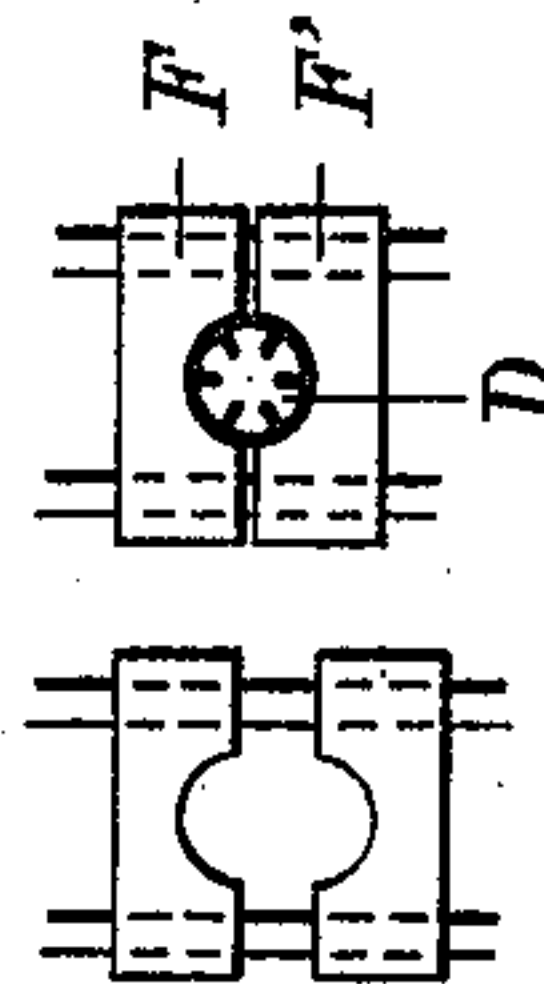


FIG. 1

FIG. 2



Witnesses

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# UNITED STATES PATENT OFFICE.

JEAN PIERRE SERVE, OF GIVORS, FRANCE.

## MECHANISM FOR POLISHING TUBES.

SPECIFICATION forming part of Letters Patent No. 438,026, dated October 7, 1890.

Original application filed August 7, 1889, Serial No. 320,043. Divided and this application filed November 8, 1889. Serial No. 329,635. (No model.) Patented in France February 15, 1889, No. 196,106, and in Italy July 1, 1889, No. 25,745.

*To all whom it may concern:*

Be it known that I, JEAN PIERRE SERVE, manufacturer, a citizen of the Republic of France, and a resident of Rue des Servettes, Givors, (Rhône,) France, have invented new and useful Improvements relating to the Polishing of Metal Tubes and to Apparatus Therefor, (for which I have obtained patents in the following countries: in France, No. 196,106, dated February 15, 1889, and in Italy, No. 25,745, dated July 1, 1889,) of which the following is a specification, reference being had to the accompanying drawings.

This application is a division of an application filed by me in the United States Patent Office August 7, 1889, Serial No. 320,043.

The improved method and apparatus for polishing the interior of metal tubes of any kind which form the subject of this invention substantially consists in causing a mandrel to pass through the interior of the tube which has been previously pickled and is firmly held throughout its length, the said mandrel presenting the interior shape of the tube, and being of such a thickness that it will exert a sufficiently strong pressure for rapidly polishing the internal surface of the tube by friction. Under these circumstances it is important that the tube shall be very powerfully compressed over the whole of its exterior surface, so as to preclude the tube giving way under the pressure exerted by the mandrel which is passed through it.

In the accompanying drawings, Figure 1 represents the apparatus employed for carrying the aforesaid method into effect. Fig. 2 shows two sections taken, respectively, on the lines 1 2 and 3 4 of Fig. 1.

The pickled tube D to be polished is placed in a very rigid and very strong mold or support, which is formed of two semi-cylindrical parts F F', having their interior surfaces accurately shaped, so that when the mold or support is closed its internal diameter shall be a little less than that of the tube D to be placed therein. One of the parts F of the mold or support is fixed and by preference placed horizontally, while the other part F' is movable, and is applied against the under

side of the part F by means of one or more hydraulic presses P, with which it is combined. As the external diameter of the tube placed in the mold or support is slightly greater than the interior diameter of the mold or support, the pressure produced by the presses P will be exerted upon the entire external surface of the tube, which will thus be firmly held and very powerfully compressed throughout its length. This compression will have the effect, in the first place, of perfectly straightening the tube in case it should present a slight curvature after its manufacture, and, in the second place, of absolutely preventing it from giving way on opening accidentally under the internal pressure of the mandrel.

In order to insure the operation of the apparatus, the two parts F and F' of the mold or support are provided with guide pieces or projections and recesses carefully arranged, so as to keep them invariably together during the operation, and the interior extremities of the mold or support present a slightly-projecting annular shoulder *a a*, which will serve as an abutment for the tube when the latter is put in its place without interfering with the movement and passage of the mandrel. This mandrel M, which is generally made of polished and hardened steel, presents a form corresponding exactly to the interior shape of the tube, the internal dimensions of which it exceeds a little, as above stated. This mandrel is fixed to one extremity of a strong metal rod S, which is of a greater length than the length of the tube, and which is drawn by the rod T of the piston R of a hydraulic cylinder H or by any other suitable traction device.

E E' are connecting-pieces, one of which E is fixed at A to the part F of the mold or support, the other E' being so arranged that the part F' of the mold or support can slide upon it.

It will be readily understood that under the above-named conditions the metal of the tube D being strongly compressed between the circumference of the mandrel and the interior of the said mold or support cannot undergo any deterioration. The unevenness



of its interior surface will, however, disappear by reason of the friction of the mandrel, and the pores of the metal will be slightly compressed, but the length of the tube will only be increased to a small extent. After this polishing operation the mold or support is opened by the backward movement of the pistons or rams of the hydraulic press, so that the tube can be easily removed therefrom and is ready for the market.

The described arrangement can be repeated, if desired, on the left-hand side of the hydraulic cylinder H, as indicated in Fig. 1, so that useful work will be performed during the movement of the piston R in one and the other direction.

The forms, arrangements, and details of construction of the apparatus above described can be variously modified. For example, the two parts of the mold or support can be held together by any mechanical means suitable for this purpose—such as ferrules, wedges, keys, pressing-screws, and the like—and the movable part of the mold or support can be secured upon the fixed part through the medium of hinges, or it can be made independent of the fixed part, if preferred.

Instead of using a stationary mold or support which is secured to the floor or ground, the mold or support may be rendered movable by placing it upon a truck or carriage or upon slides and arranging it to butt simply against stops provided for the purpose in order to resist the traction exerted on it longitudinally by the mandrel. In this case the mandrel may be fixed by securing the extremity of its rod to suitable rigid parts and then applying the traction directly to the mold or support containing the tube, which is thus traversed the whole of its length by the mandrel, the effect produced being the same as in the case above described. This method of polishing tubes of any kind is also applicable with advantage in cases where use is made of ordinary pickling processes, and where the tube shall or shall not be pickled or polished on its exterior surface, if desired, the essential feature of the invention consisting in supporting the tube externally throughout its length in order to obviate any accidental deformation of the same and of polish-

ing the interior surface by producing great friction through the medium of a mandrel.

What I claim is—

1. The method herein described of polishing the interior of pickled tubes, which consists in compressing the entire external surfaces of the tubes and passing a polishing medium through the tubes while they are externally compressed, substantially as set forth.

2. In an apparatus for polishing the interior of tubes, the combination of a tube-compressing mold comprising sections, and the internal diameter of which is slightly less than the external diameter of the tube to be polished, means for pressing the mold-sections upon the tube, and a mandrel for moving through the tube while compressed by the mold, substantially as described.

3. In an apparatus for polishing the interior of tubes, the combination of a sectional tube-compressing mold, means for pressing the mold-sections upon the tube, a polishing-mandrel, and means for moving the mandrel through the tube while the latter is compressed by the mold, substantially as described.

4. In an apparatus for polishing the interior of tubes, the combination of a sectional tube-compressing mold, a press for forcing the mold-sections upon the tube, a polishing-mandrel for moving through the tube, and a cylinder having a piston connected with the mandrel for moving the latter through the tube, substantially as described.

5. In an apparatus for polishing the interior of tubes, the combination of a sectional tube-compressing mold, a press for forcing the mold-sections upon the tube, a polishing-mandrel for moving through the tube, a cylinder having a piston connected with the mandrel, and connecting-pieces between the cylinder and the mold-sections, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JEAN PIERRE SERVE.

Witnesses:

GEORGES FREYDIER DUBREUL,  
XAVIER JANICOT.