

(No Model.)

J. ROBERTSON

APPARATUS FOR THE MANUFACTURE OF METAL TUBES, RODS, &c.

No. 524,506.

Patented Aug. 14, 1894.

FIG. 1.

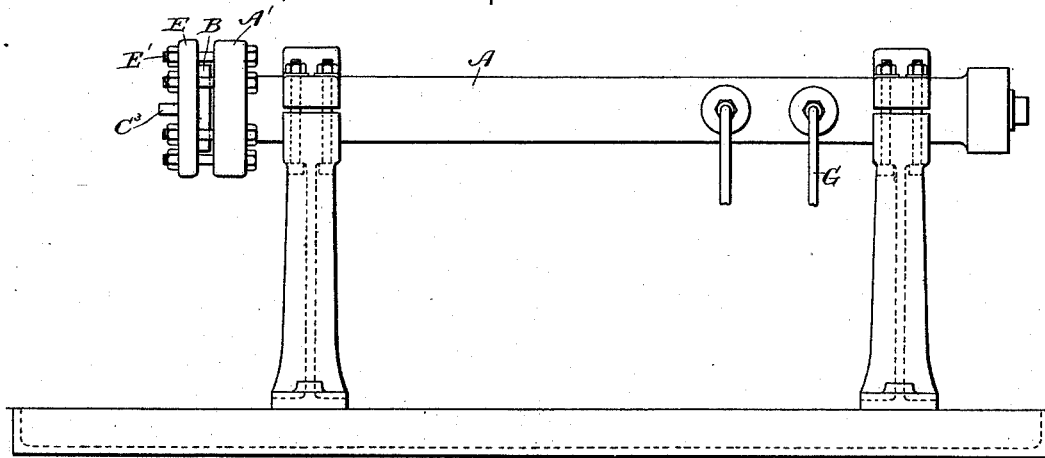


FIG. 2.

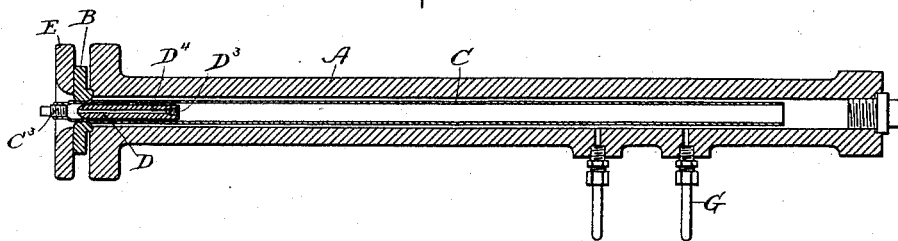


FIG. 2^a.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JAMES ROBERTSON, OF MANCHESTER, ENGLAND.

APPARATUS FOR THE MANUFACTURE OF METAL TUBES, RODS, &c.

SPECIFICATION forming part of Letters Patent No. 524,506, dated August 14, 1894.

Original application filed September 30, 1893, Serial No. 486,869. Divided and this application filed February 19, 1894. Serial No. 500,726. (No model.) Patented in England October 14, 1893, No. 19,356.

To all whom it may concern:

Be it known that I, JAMES ROBERTSON, of Manchester, England, have invented certain new and useful Improvements in Apparatus for the Manufacture of Metal Tubes, Tubular and Hollow Articles, Rods, Bars, Wires, and Plates, (for which I have obtained British Letters Patent No. 19,356, dated October 14, 1893,) of which the following is a specification.

10 This invention is a division of my application for Letters Patent of the United States filed September 30, 1893, Serial No. 486,869. Said application describes certain improvements in the manufacture of metal rods, bars, 15 tubes, tubular articles, plates, and wires, by a drawing operation, a new method being involved, namely, compressing and forming a metal article by confining a blank or partially formed mass of metal at the entrance to a 20 drawing die and forcing a liquid against said metal under sufficient pressure to push it through the die and thus impart to the cross-section of the metal the form of the die, the liquid pressure acting to force the metal forward without involving any injury to the completed article or to any part thereof by the force used in driving the metal through the die.

The present invention has for its object to provide an organized apparatus for making 30 tubular articles by the use of a mandrel located wholly within the container, and having no external support, said mandrel enabling the forward end of the blank to be closed by a plug or head which receives the full pressure of the impelling liquid.

35 Of the accompanying drawings forming a part of this specification, Figure 1 represents a side elevation of an apparatus provided with my improvement. Fig. 2 represents a longitudinal section of the same. Fig. 2^a is a detail end view, somewhat enlarged, of the mandrel and valve D³ shown in Fig. 2.

The same letters of reference indicate the same parts in all the figures.

45 In the drawings, A represents a container or receptacle, of strong construction, adapted to sustain the high pressure of a liquid introduced into it, as hereinafter described. Said liquid is introduced through one or more 50 pipes G, two such pipes being illustrated.

The container is of elongated form, and its interior cavity or chamber is formed to correspond to the general shape of the blank or mass of metal to be drawn. The container has at one end a discharge opening, through 55 which the metal passes. At said opening is located a drawing die B, which is or may be a plate of suitable metal, such as hardened steel, having an orifice, the walls of which are shaped to give the desired form to a mass of 60 metal forced through the die, as usual in the operation of drawing-dies. The die constitutes, in effect, the outlet of the container, it being secured to the container in such manner that when liquid pressure is maintained 65 within the container, the only outlet will be through the die.

In the simplest form of apparatus embodying my invention, the die is or may be secured to the container by means of a head or plate 70 E, which is secured by bolts E' to a flange A' formed on one end of the container. The plate E is thus removably attached, so that the die may at any time be removed and another one substituted for it, the die being 75 placed loosely between the flange A' and plate E. A water-tight joint may be maintained between the die and the container, by means of a packing-ring or washer of leather or other suitable material. 80

In drawing tubular articles in accordance with my invention, I employ a tubular blank C, which is placed in the container and projects into the die B. In the construction referred to in Fig. 2, the mandrel D is loosely 85 placed in the container and is made larger, excepting at its tapered forward end, than the opening through the die, so that the liquid pressure holds the mandrel in place against the interior of the blank. The mandrel is wholly within the tube blank, and does not project through the front end of the same, so that there is nothing to prevent the closing of the front end of the tube blank by a plug C³, which may be affixed to the tube 95 blank by means of screw threads formed upon it and upon the interior of the tube blank or in any other suitable way, said plug constituting a head which receives the pressure of the impelling fluid in the container. Access 100

of said fluid to the plug or head C³ may be permitted by means of an opening or openings through the mandrel.

In Fig. 2 I show a mandrel having a single longitudinal opening or passage D⁴, the entrance to which may be enlarged or contracted by means of a valve D³, which is preferably made in form of a screw fitted into a tapped socket in the rear end of the mandrel and provided with grooves D⁵, (see Fig. 2^a) which are enlarged when the screw is turned outwardly and contracted when the screw is turned inwardly.

It will be seen that the loose mandrel shown in Fig. 2 is self-adjusted and finds its proper place in the die, and serves to co-operate with the die in gripping and drawing the walls of a tubular blank, without being held in position by any means except the blank and the liquid pressure which is exerted upon the rear end of the mandrel.

I claim—

1. The combination of a container having a

liquid inlet and an outlet formed as a drawing die, combined with a loose mandrel having a short stem located wholly within the container, said mandrel being of greater cross sectional area than the die and adapted to be held in its operative position by the blank and by the liquid pressure.

2. The combination of a container having a liquid inlet and an outlet formed as a drawing die, combined with a mandrel arranged to co-operate with said die in shaping a tubular article and located within the container and provided with means for the passage of liquid through it.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 27th day of December, A. D. 1893.

JAMES ROBERTSON.

Witnesses:

ARTHUR C. HALL,
JOHN W. THOMAS.