April 8, 1941. S. FINDLATER 2,237,983

PIPE OR TUBE ROLLING

Original Filed Jan. 21, 1937 2 Sheets-Sheet 1

FIG. 1.

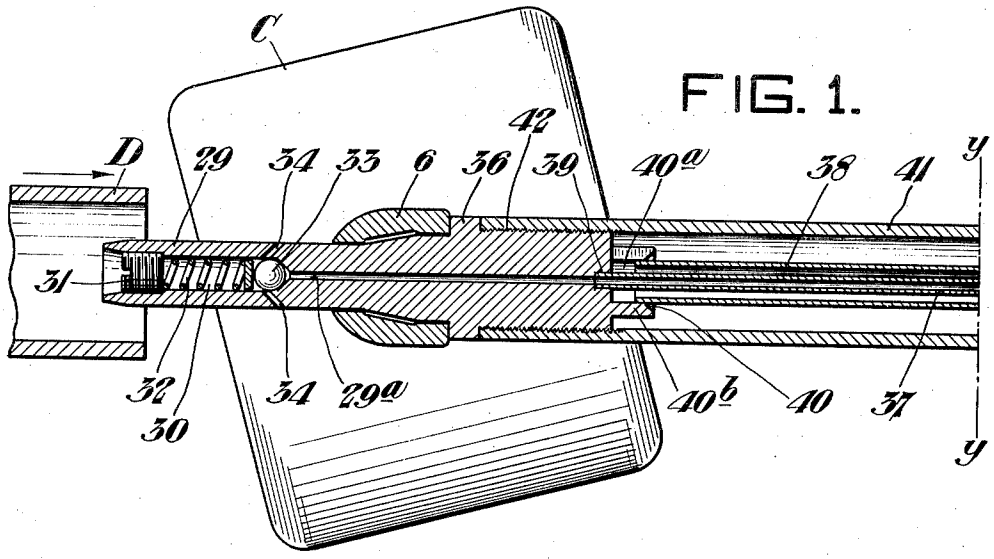
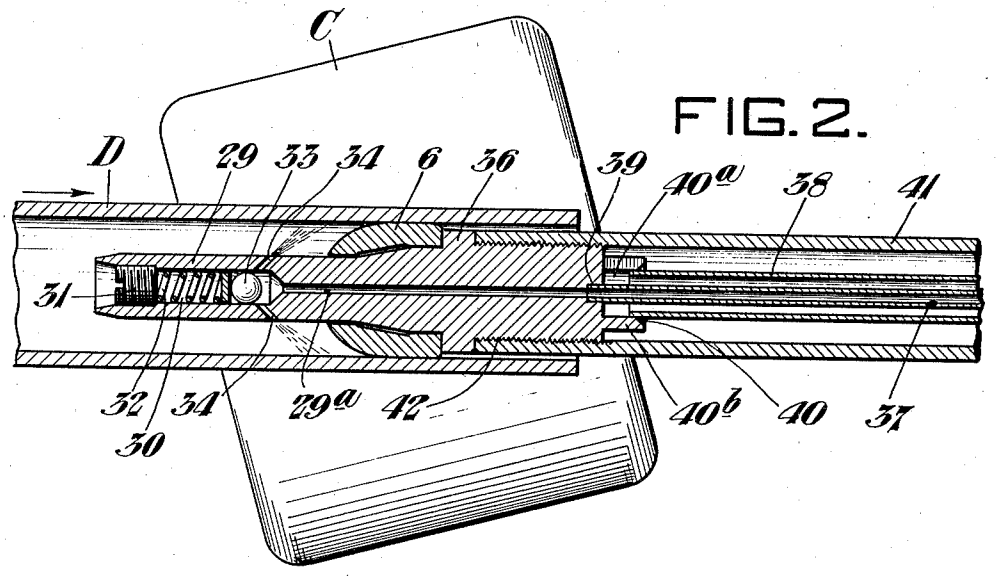


FIG. 2.



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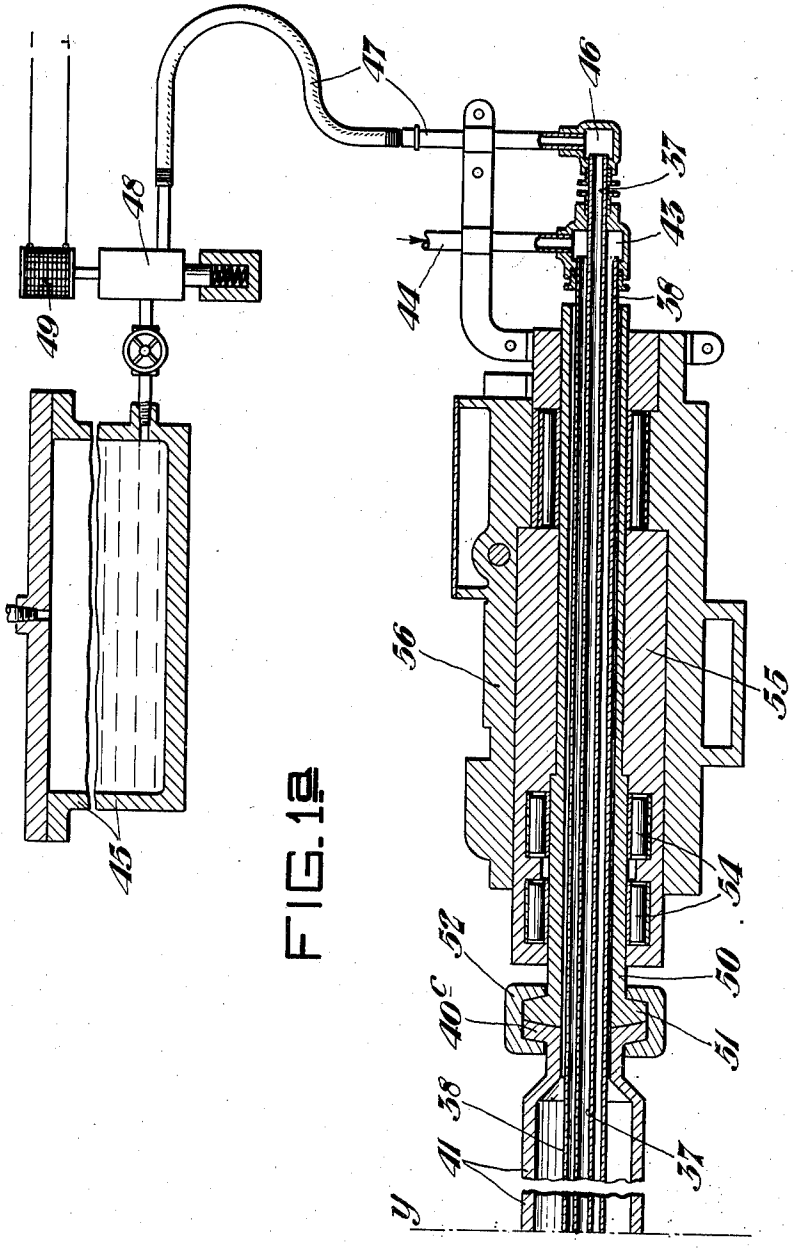


FIG. 1a

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UNITED STATES PATENT OFFICE

2,237,983

PIPE OR TUBE ROLLING

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Original application January 21, 1937, Serial No. 121,660. Divided and this application January 13, 1939, Serial No. 250,807

1 Claim. (Cl. 80—13)

This invention relates to the rolling of tubes and, more particularly, to a novel method and apparatus for internally lubricating tubes while being rolled.

In the art of rolling pipes or tubes it has hitherto been the practice to roll the pierced or tubular blank over a plug. This has resulted in severe wear on the plug and scratches on the interior surface of the tubular blank. Various attempts have been made to overcome these difficulties. The most common expedient is to station a man at the inlet side of the mill whose duty it is to place a small quantity of coal dust or salt in the tubular blank just prior to the insertion of the plug. Due to the heat of the tubular blank, combustion immediately takes place, and consequently very little lubricating effect is obtained, and that only for a short distance from the end thereof.

It is accordingly an object of my invention to provide a novel method and apparatus for efficiently lubricating the interior of tubular blanks during the rolling thereof.

It is a further object of my invention to provide a novel apparatus for continuously and automatically lubricating tubular blanks while being rolled.

This is a divisional application of my application Serial No. 121,660, filed January 21, 1937, and entitled "Pipe or tube rolling." In said application, Serial No. 121,660, there is disclosed a device having the same objects of the device of the present invention but related to usage in a "plug mill" wherein the axes of the rolls occupy a common vertical plane and are grooved to conform to the periphery of the blank. In the present case, the device is intended for usage in a helical type mill wherein the work-piece is advanced helically as distinguished from the mere longitudinal movement imparted by a "plug mill."

The foregoing and other objects will be apparent after referring to the drawings, in which:

Figures 1 and 1ª are longitudinal sectional elevations of the apparatus of the invention;

Figure 2 is a fragmentary sectional elevation similar to that of Figure 1, but showing some of the elements of the apparatus in a different working position.

Rotary plugs are commonly employed when tubular blanks are rolled over a plug in helical type mills wherein it is spun on its axis by helically-acting rolls while being drawn longitudinally therethrough. In Figures 1, 1ª and 2, I have shown the apparatus of my invention as applied to a helical type mill and rotary plug. The helically-acting rolls are designated by the letter C and the tubular blank to be processed by the letter D. The numeral 29 designates a bar member having a bore 29ª therein, which is enlarged at its outer end to form a valve chamber 30. Secured within the valve chamber 30 by a screw-plug 31 is a valve-spring 32 and a ball check-valve 33. A plurality of spaced apertures 34 are provided in the bar 29 opening into the chamber 30. These apertures 34 are directed rearwardly at a point adjacent a plug member 6 mounted on the bar 29 and abutting against a shoulder 36 formed thereon. An inner pipe 37 for conveying lubricating fluid is disposed in alignment with the bore 29ª in the bar member 29 and is attached to the latter, as shown at 39. A pipe 38 for conveying a cooling fluid is telescoped over the pipe 37 and attached to the bar 29 at 40. The pipe 38 communicates with the interior of the mandrel bar 41 by means of apertures 40ª in the rear portion 40ᵇ of the bar 29. The mandrel bar 41 telescopes over the pipes 37 and 38 and is attached to the bar 29 by screw threads 42 or other suitable means.

The outer pipe 38 is connected to a suitable source of cooling fluid by a rotary joint coupling 43 and pipe 44. The inner pipe 37 is connected to container 45 which holds a suitable lubricant under pressure by a rotary joint coupling 46, pipe 47 and valve 48 which is operated by a solenoid 49 automatically controlled by the motor control for the rolls C.

The outer end of the mandrel bar 41 has a shoulder 40ᶜ formed thereon and is connected to a sleeve 50 which has a shoulder 51 by means of a collar 52. The sleeve 50 is rotatively mounted on bearings 54 and is concentrically disposed within a sleeve 55. A thrust block carriage 56 is concentrically disposed on the sleeves 50 and 55. Thus, it will be seen that the mandrel bar 41 having the plug 6 mounted thereon is freely rotatable.

When the blank D is forced into contact with rolls C, the control for the rolls C is actuated, thereby causing the solenoid 49 to open the valve 48 and allow the lubricating fluid under pressure to be delivered to force back the ball check-valve 33, compress the spring 32, and be delivered into the interior surface of the blank D just prior to its contact with the plug 6.

Thus, I am enabled to thoroughly lubricate the inner surface of the work-piece D and plug 6, thereby minimizing the friction between the tubular blank and the plug generated by the pressure of the rolls C. This not only reduces the

amount of power required but also results in a better finish on the interior of the tubular blank and less wear on the plug 6.

I have found that heated tar, due to its heavy body, is a very satisfactory lubricating fluid for this purpose but numerous lubricating oils will produce excellent results.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of my invention, as defined by the following claim.

I claim:

In an apparatus for integrally supporting and lubricating tubular blanks while being rolled, a mandrel bar, a plug bar carried on the forward end of said mandrel bar, a flange on the exterior of said plug bar, a hollow mandrel plug mounted on said plug bar with its rearward end in contact with said flange, and means in advance of said mandrel plug for spraying a lubricant into the interior of a tubular blank progressing thereover, said means comprising a tubular extension on the forward end of said plug bar and extending through and projecting from said hollow mandrel plug, said tubular extension having a valve chamber at a point in advance of the forward end of said mandrel plug, the wall of said tubular extension having at least one aperture communicating with said valve chamber and directed rearwardly towards said hollow mandrel plug, a pressure responsive valve in said valve chamber between said aperture and said hollow mandrel plug, and means for delivering the lubricant under pressure to said valve chamber.

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