

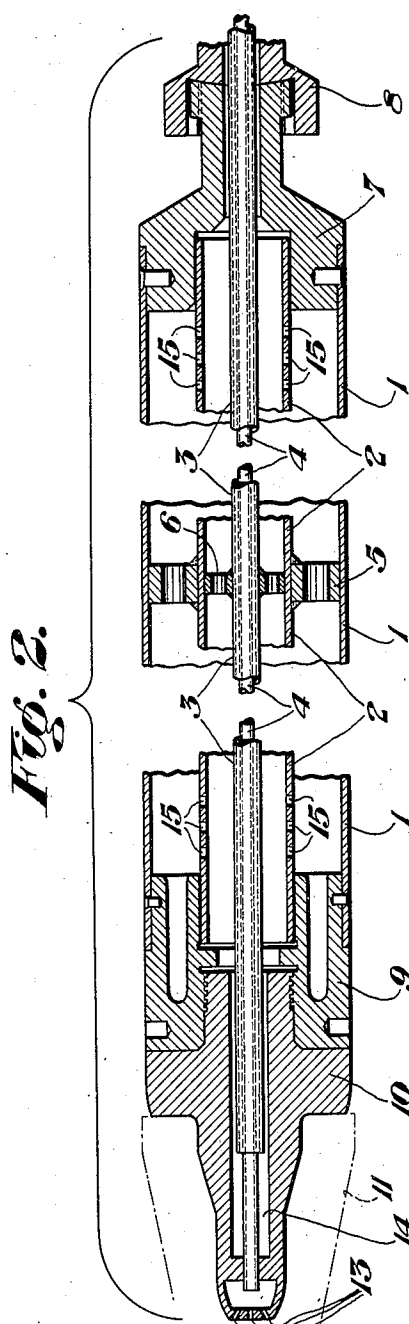
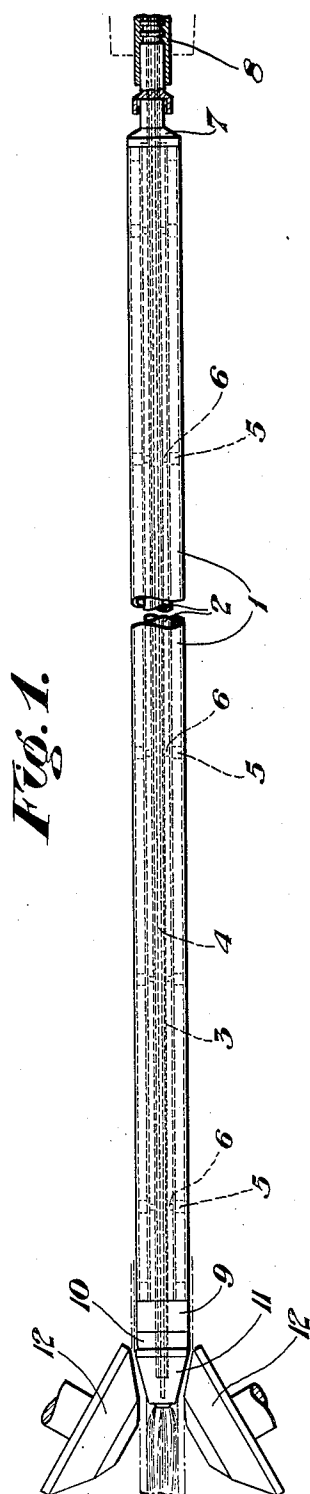
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MILL MANDREL BAR

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MILL MANDREL BAR

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2 Claims. (Cl. 80—13)

This invention broadly relates to the manufacture of tubes and specifically to the mandrel bars of tube mills and machinery. At present, these are constructed with a loose inside water cooling pipe which thrashes violently about as a tube is being rolled, and frequently fractures itself. The present bar is intended to obviate this objectionable feature and, in addition, to provide an improvement in stiffness and general resistance to thrust. The invention also covers an improved tube rolling method which will be disclosed after describing the new bar.

The accompanying drawing illustrates a specific example of the mandrel bar and also the new rolling method,

Figure 1 being a side elevation, and
Figure 2 a longitudinal cross-section.

These various figures show a tube 1 containing a second and smaller tube 2. Inside of this second tube is a water cooling pipe 3 which contains a compressed air pipe 4. A number of apertured annular bracing members 5 are spaced throughout this assembly between the tubes 1 and 2. Preferably, these are welded to the inside tube 2 because this facilitates the bar's assembly during its construction. These members 5 serve to distribute bending stresses between the tubes 1 and 2 so that the bar's tendency to whip is greatly decreased. Similar but smaller bracing members 6 are spaced along between the pipe 3 and the tube 2. These are also preferably welded to the innermost member, the pipe 3, and are spaced so that when the bar is assembled they will be in line with the member 5 and will hold the pipe 3 at the bar's axis.

The right-hand end of the bar is carried by a mounting 7 which works against a thrust block 8. Its left-hand end is fixed to a head 9 which carries a pin 10 on which a mandrel 11 may be mounted. The working rolls 12 are only diagrammatically illustrated as they are conventional.

The primary difference between the head end of this bar and others is that the pin 10 is bored so that the compressed air pipe 4 can extend through to its tip. This tip is constructed with orifices 13 whose function will be explained shortly. The bore in the pin 10 has an enlarged portion 14 which receives the cooling water ejected from the pipe 3. This water can, of course, flow back from this portion 14 and circulate through the entire bar as the spacing members 5 and 6 are all apertured for this purpose. Apertures 15 at either end of the tube 2 provide inlets and outlets so that circulation is established within this tube also.

It is apparent that the bar will be extremely stiff and non-whipping. Bending stresses will be

distributed equally throughout the various parts, the bar being in effect a structural column. It is impossible for the water cooling tube 3 to thrash or shake about as it is supported at short-spaced points. The play between this pipe and its contained air supply pipe 4 is too small to permit excessive whipping. In any event, the air pipe will be firmly held by the hydrostatic pressure about it.

Much difficulty has been experienced with excessive scale forming on the inside of tubes being rolled, especially in the larger sizes, the usual efforts to blow the scale from end to end of the tube just prior to rolling having proven more or less ineffectual. However, when using this new mandrel bar it is possible to eject compressed air directly against the inside surface of the tube just about to pass over the mandrel 11. Naturally, the effect of this direct fluid impingement method is much greater than that obtained by merely blowing air through the pipe from one end. Of course, this rolling method may be performed with any mandrel bar which is altered by the addition of an air pipe communicating with the nose of its mandrel and is not necessarily limited to the use of air, as steam or other fluid under pressure may be used. The orifices in the pin are constructed so that this fluid strikes the pipe at high velocity.

Although a specific form of the new mandrel bar has been shown and described in accordance with the patent statutes, it is not intended to limit the scope of the invention exactly thereto except as defined by the following.

We claim:

1. A mandrel bar including a plurality of superimposed tubes, a plurality of spaced annular and apertured bracing members arranged in circumferential alignment between said tubes, a mandrel supporting pin carried at one end of said tubes, a water pipe within the innermost one of said tubes, means for supporting said pipe at said tubes' axes, a compressed fluid pipe in said water pipe and communicating with the extreme end of said pin and apertures in the walls of all the inner ones of said tubes.

2. A mandrel bar for tube mills, including a tubular body, a second tubular body within the first named tubular body and opening thereinto, a conduit within said second tubular body, the first named body being provided with a means for mounting a mandrel having a longitudinally extending conduit communicating with the first named conduit, and a series of spaced braces between said tubular bodies throughout their lengths.

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