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POSITIONING MEANS FOR TUBE MILL MANDRELS

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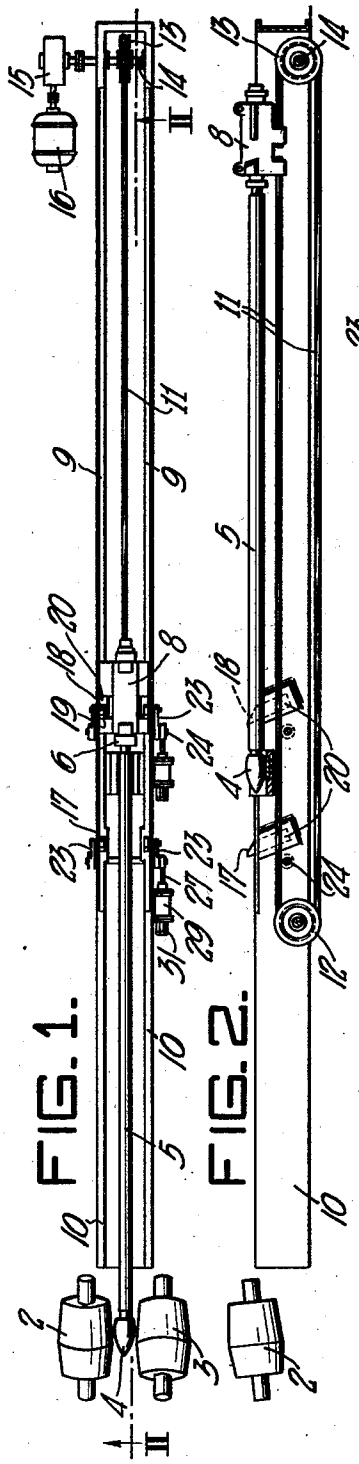


FIG. 1.

FIG. 2.

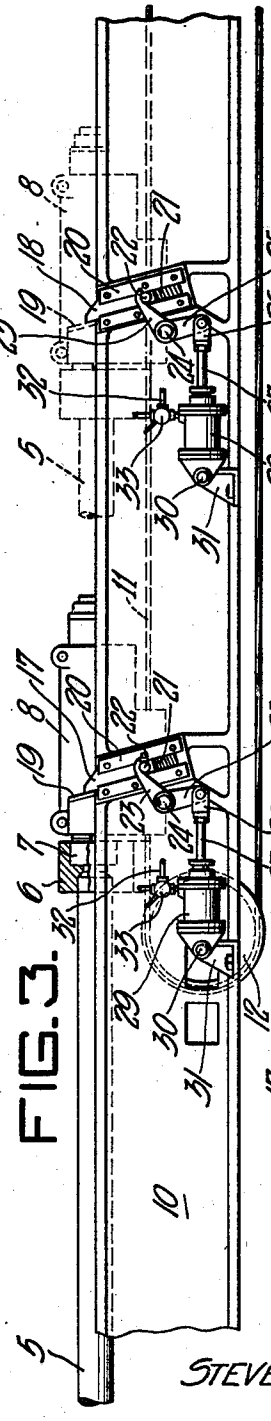


FIG. 3.

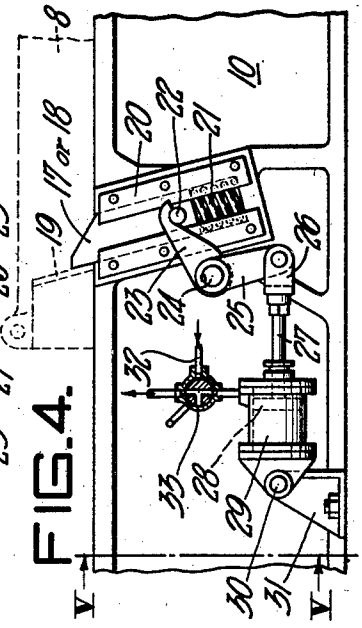


FIG. 4.

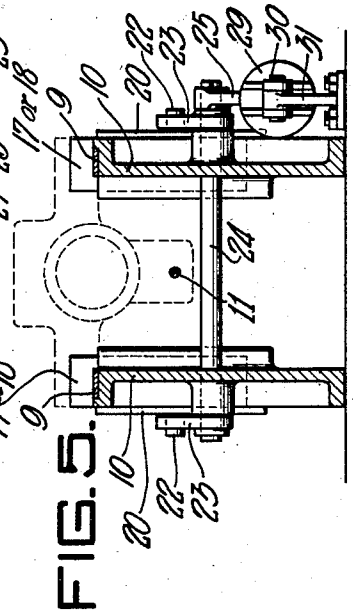


FIG. 5.

INVENTOR:
STEVENSON FINDLATER,
BY John E. Jamison
HIS ATTORNEY.

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POSITIONING MEANS FOR TUBE MILL MANDRELS

Stevenson Findlater, Pittsburgh, Pa., assignor to National Tube Company, a corporation of New Jersey

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2 Claims. (Cl. 80—13)

The present invention relates to specific features of design and arrangement for positioning the mandrel of a tube mill in such a way that either a long or short mandrel can be used. In conventional tube mills, the outlet trough and mandrel positioning and reciprocating devices are arranged to suit the longest tube rolled in the mill. Thus, in conventional prior art mills, whether a long or short tube is rolled, a long mandrel must be used. Due to the slenderness of a long mandrel and consequent lack of rigidity, it is necessary to use more mandrel steadiers than would be required for a short one. An economic advantage accrues in the use of a shorter mandrel, since due to its lighter weight and shorter travel, it can be reciprocated more frequently per unit of time and with less power consumption than a long mandrel.

The primary object of the present improvement is to provide means whereby either a long or short mandrel can be used at will in a given tube mill installation.

The above and other characteristic features of the invention will be fully apparent from a consideration of the following specification and appended claims when read in connection with the accompanying drawing.

In the drawing:

Figure 1 is a top plan illustrating enough of a seamless tube mill and outlet trough and related parts thereof to illustrate the present invention, a relatively short mandrel being shown in rolling position.

Figure 2 is a side elevation of Figure 1 but showing the short mandrel retracted.

Figure 3 is an enlarged side elevation of a portion of Figure 1, illustrating a plurality of stops effective to position either a long or short mandrel for coaction with the work rolls of the mill.

Figure 4 is an enlarged detail of one of the stop elements showing the fluid-actuating means and manual control therefor.

Figure 5 is a detail section on line V—V of Figure 4.

Referring in detail to the embodiment of the invention illustrated, numerals 2 and 3 designate a pair of conventional metal working rolls adapted to be supported in the usual bearings carried in a conventional form of housings, which have been omitted from the drawing in the interest of simplicity of illustration. Coacting with the working rolls is a piercing plug 4 of conventional form secured to the forward extremity of a mandrel 5 whose opposite extremity is detachably secured by means of a split coupling 6 engageable with a complementary portion 7 of a carriage 8 slidable on guides 9 formed on the side frames 10 of a conventional run-out trough of a tube mill.

The carriage 8 is propelled toward and from the work rolls of the mill by means of a flexible element such as a cable 11 or the like, which is trained over grooved pulleys 12 and 13, the pulley 13 being secured to a shaft 14 adapted to be driven through reduction gearing 15 from a motor 16 or other prime mover.

In accordance with the teachings of the present invention, instead of using a conventional overhead latch for holding the mandrel and its piercing plug 4 in rolling position, there is provided in the frame structure of the frame 10 a plurality of stop members indicated generally at 17 and 18, adapted to hold either a short or long mandrel bearing in either of two metal rolling positions, it being possible to readily change from a short mandrel to a long mandrel by disconnecting the split coupling 6.

Since the construction of both stops 17 and 18 is the same, a detailed description of one will suffice for both. Each stop is adapted to coact with an abutment 19 secured to or forming part of the carriage 8. Each stop is slidable in a substantially upright guide 20 and is urged upwardly by a spring 21 to the position of Figure 4, in which it will be seen that the stop is in the path of travel of the carriage abutment 19. Each stop carries a pin 22 which is adapted to coact with fingers 23 keyed or otherwise secured to the shaft 24 having an arm 25 connected by a clevis 26 to the extremity of a rod 27 secured to a piston 28 operating in a cylinder 29 pivotally mounted on a rod 30 carried by a bracket 31. As thus arranged, it is apparent that as fluid pressure is admitted to the cylinder on the right side of the piston 28, the shaft 24 will be rocked clockwise and cause each of the fingers to depress pin 22 against the action of a spring and thus retract the stop. The cylinder 29 may be regarded as either a hydraulic or compressed air receiver. It is adapted to be connected with a suitable source of motive fluid by a pipe 32 having a three-way valve 33 effective to manually control the admission of fluid to the cylinder and the escape of fluid therefrom. In the position shown in Figure 4, the cylinder is open to atmosphere through the three-way valve, and when the plug of the valve 33 is turned counter-clockwise 90° from the position of Figure 4, the vent to atmosphere will be closed and communication will be established between the supply pipe 32 and the cylinder, whereupon the

piston 28 will move to the left and thus retract the pair of stops against the action of the spring 21. In a similar manner, when the valve is again positioned as shown in Figure 4, the fluid pressure will escape from the right-hand end of the cylinder 28 and the springs 21 will elevate the stops into position for coaction with the abutment 19 on the carriage.

From the foregoing, it will be manifest that an operator can cause the forward pair of stops 17 to be elevated to working position when using a relatively short mandrel to thereby hold the piercing plug 4 in proper position for coaction with the working rolls. When a longer mandrel is to be used, the forward pair of stops 17 will be depressed by admitting pressure to the cylinder operating said stop 17. Thereafter the carriage will be retracted to the position indicated in dotted lines in Figure 3, and the pair of stops 18 will be elevated by manipulating the valve so as to permit escape of pressure from the operating cylinder 28 associated with said pair of stops 18. Thus it is apparent that the invention provides a plurality of stop members for holding either a respective short or long mandrel in working position so that the piercing plug is properly held for rolling coaction with the working rolls 2 and 3 when rolling either short or long pipe or tubing.

While I have described quite precisely the particular design and arrangement of the preferred embodiment of the invention herein illustrated, it is not to be construed that I am limited thereto, since various modifications may be made without departure from the invention as defined in the appended claims.

I claim:

1. In a tube mill including coacting working rolls and a mandrel plug secured to one extremity of a mandrel secured to a carriage movable toward and from said rolls, the improvement which comprises a plurality of spring-biased stop members in the path of carriage travel for holding long or short mandrels in rolling position, and power means for retracting selected stop members from the said path of carriage travel.

2. In a tube mill including coacting working rolls and a mandrel plug secured to one extremity of a mandrel whose opposite extremity is detachably coupled to a carriage movable toward and from said working rolls, the improvement which comprises respective front and rear stops, respective guides in which said stops are slidably mounted, respective means yieldingly holding said stops in the path of travel of said carriage, respective fluid pressure actuated devices and connections therewith for shifting said stops in said guides and manually actuated valve means for selectively controlling said fluid pressure devices.

STEVENSON FINDLATER.