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BAR STEADIER FOR SEAMLESS TUBING MILLS

Filed July 16, 1953

2 Sheets-Sheet 1

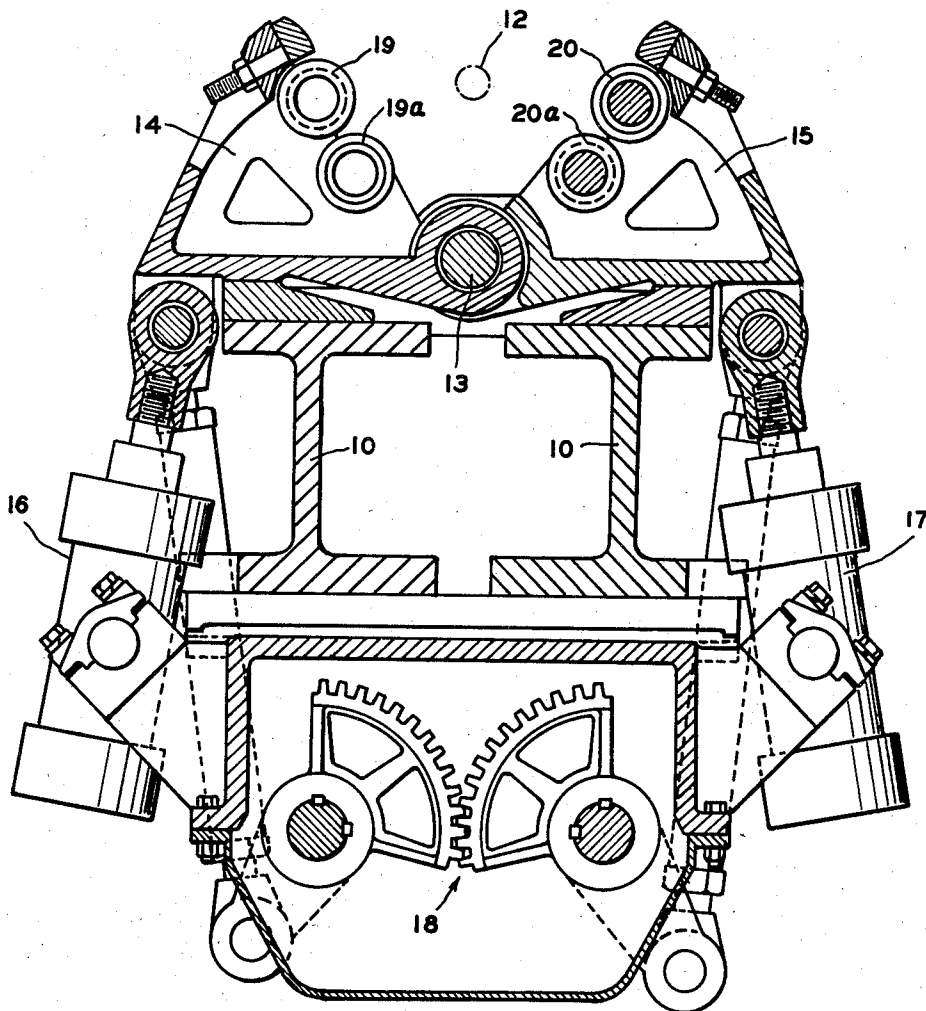


FIG. 1

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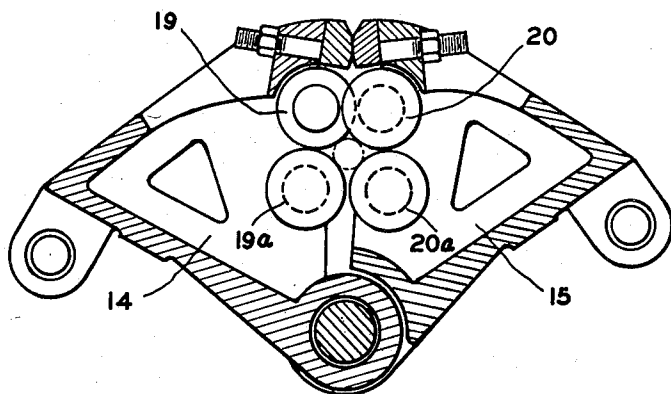


FIG. 2

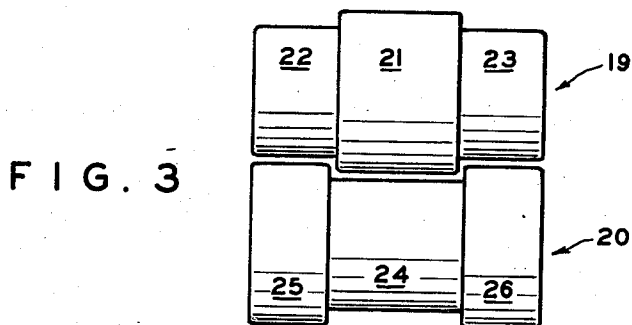


FIG. 3

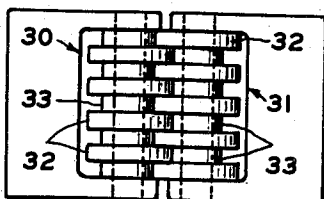


FIG 4

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BAR STEADIER FOR SEAMLESS TUBING MILLS

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1 Claim. (Cl. 80-13)

This invention relates to an improved bar steadier for seamless tubing mills and the like.

Seamless tubing mills, such as piercing or rotary expanding mills, conventionally include a mandrel which is supported in the roll pass at the free end of a rotatable elongated bar. The mandrel is used to work the inside surface of the tubing shell; consequently the bar must be of a length somewhat greater than the maximum shell length. To prevent vibration and sagging of the bar it is customary to support it with steadyers located intermediate its length. Each steadier includes a cluster of rolls which normally engage the bar, but which retract to allow the shell to pass. For a more complete disclosure of such steadyers and their relation to a mill reference can be made to Olson Patent No. 1,950,929, dated March 13, 1934, or Mohan Patent No. 2,306,827, dated December 29, 1942.

In some instances it is preferred to employ four-roll steadyers since they furnish a more positive grip on a bar than a three-roll steadier. However, previous four-roll steadyers with which I am familiar have not been suitable for bars of smaller sizes since the rolls cannot move sufficiently close together to grip the bar. The minimum diameter bar they can grip is about 2½ inches.

An object of the present invention is to provide four-roll steadyers which have improved rolls capable of gripping bars of a wider size range, that is, capable of gripping bars of small diameter without impairing their ability to grip larger bars.

A more specific object is to provide four-roll steadyers whose rolls have mating lands and grooves that enable the rolls to overlap for gripping small diameter bars.

In accomplishing these and other objects of the invention, I have provided improved details of structure, a preferred form of which is shown in the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a steadier which has rolls constructed in accordance with my invention, the rolls being retracted from the bar;

Figure 2 is a fragmentary vertical sectional view showing the rolls engaging a small diameter bar;

Figure 3 is a top plan view on a larger scale of a pair of mating rolls constructed in accordance with my invention; and

Figure 4 is a top plan view of a pair of rolls constructed in accordance with a modification of my invention.

Figure 1 shows a pair of supporting beams 10 and a small diameter bar 12 of a seamless tubing mill. The mill is not otherwise shown since it can be of any standard or desired construction, for example, as shown in the aforementioned Olson or Mohan patents. The beams 10 carry a bar steadier, which is illustrated as comprising a shaft 13 fixed to the top of the beams, a pair of opposed triangularly shaped arms 14 and 15 pivotally mounted on said shaft, and double-acting operating cylinders 16 and 17 for opening and closing said arms scissors fashion. The two arms are connected by an equalizer 18. The arm 14 carries upper and lower rolls 19 and 19a, and the arm 15 carries upper and lower rolls 20 and 20a, all con-

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structed in accordance with my invention and herein-after fully described. The operating mechanism illustrated is merely typical of those used in this type of steadier, and hence is not described in detail and is not to be construed as limiting the invention.

In accordance with the embodiment of my invention shown in Figure 3, the periphery of the upper roll 19 on the arm 14 has a central land 21 and a pair of grooves 22 and 23 at each end of said land. The periphery of the upper roll 20 on the arm 15 has a central groove 24 and a pair of lands 25 and 26 at each end of said groove. The land and grooves on the roll 19 are adapted to interfit with the groove and lands on the roll 20. Thus when the arms 14 and 15 are closed to grip the bar 12, as shown in Figure 2, the rolls overlap and can grip a bar of small diameter. The lower rolls 19a and 20a are shown as of uniform diameter, but it is apparent the lower rolls can have lands and grooves the same as the upper rolls if desired.

In the modification shown in Figure 4 the two upper rolls, designated 30 and 31, each have a somewhat number of interfitting lands 32 and corresponding grooves 33. The roll 30 is shown as having four lands 32 and five grooves 33, while the roll 31 has five lands and four grooves, but obviously the number can vary.

It is seen that with either embodiment of my invention the arms 14 and 15 can close considerably farther than is possible with the usual rolls of uniform outside diameter. I have found in actual practice that bar steadyers which are equipped with my improved rolls can successfully grip bars of an outside diameter of 1¾ inches or smaller. At the same time there is no loss in the effective maximum diameter of the rolls, and consequently they can be used just as successfully to grip larger bars. They furnish the same support to a larger bar as rolls of uniform diameter equal to that of the lands.

While two embodiments of my invention have been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claim.

I claim:

In a bar steadier which comprises a cluster of four opposed rolls and means journaling said rolls on parallel axes and supporting at least two of the rolls for relative movement toward and away from the other two, said four rolls when brought together defining a space for receiving a bar, which space is bounded by a portion of the circumference of each roll so that the four rolls cooperate to grip the bar, the improvement comprising high cylindrical sections and mating low sections formed on at least two of said rolls, which two rolls are relatively movable toward and away from each other, said high and low sections interfitting when the rolls are brought together enabling the circumferences of the high sections of two rolls and the circumferences of the other two rolls to contact a bar of diameter smaller than the distance across a space defined by four rolls of uniform diameter equivalent to that of said high sections, the circumferences of said high sections also being adapted to contact a bar of larger diameter without the sections interfitting.

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