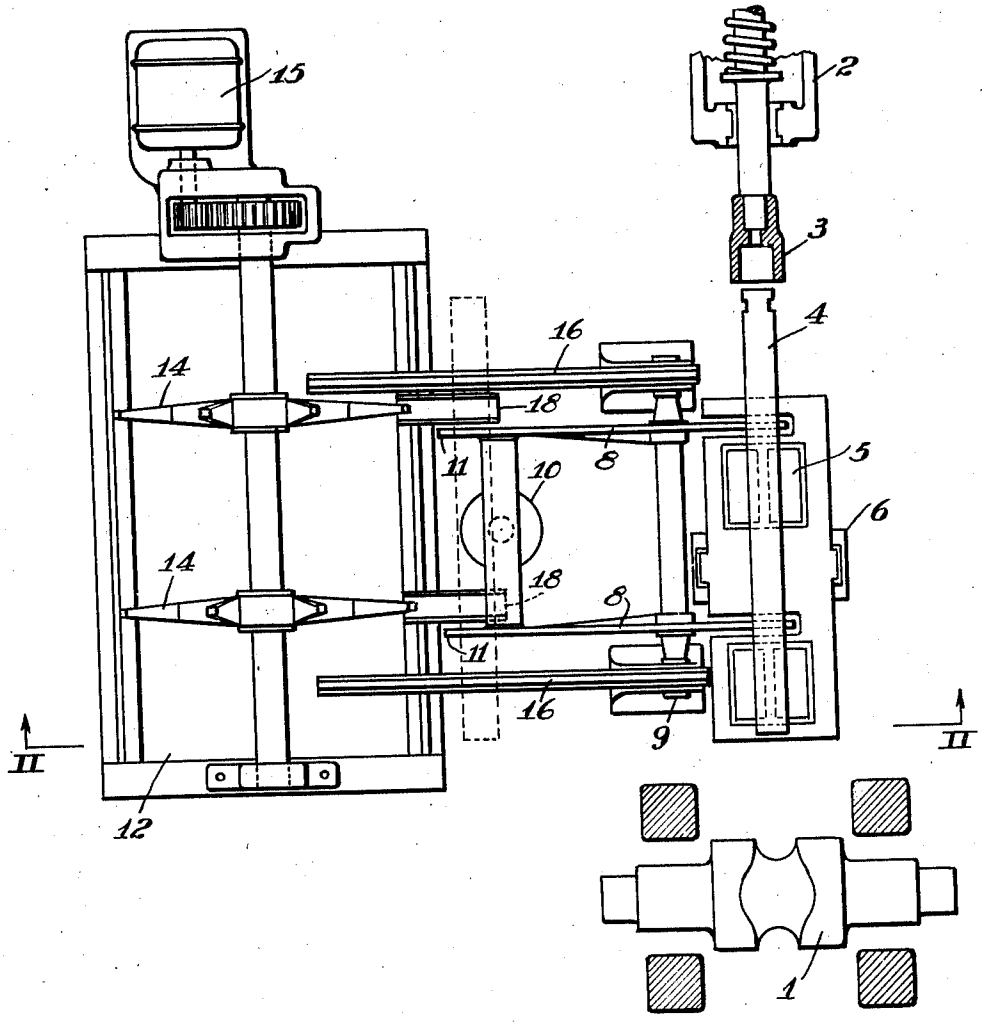
June 17, 1930. L. LÖWY 1,764,736

MANDREL MOVING AND COOLING APPARATUS

Filed March 12, 1928 2 Sheets-Sheet 1

Fig. 1.



WITNESS
C. B. Wallace.

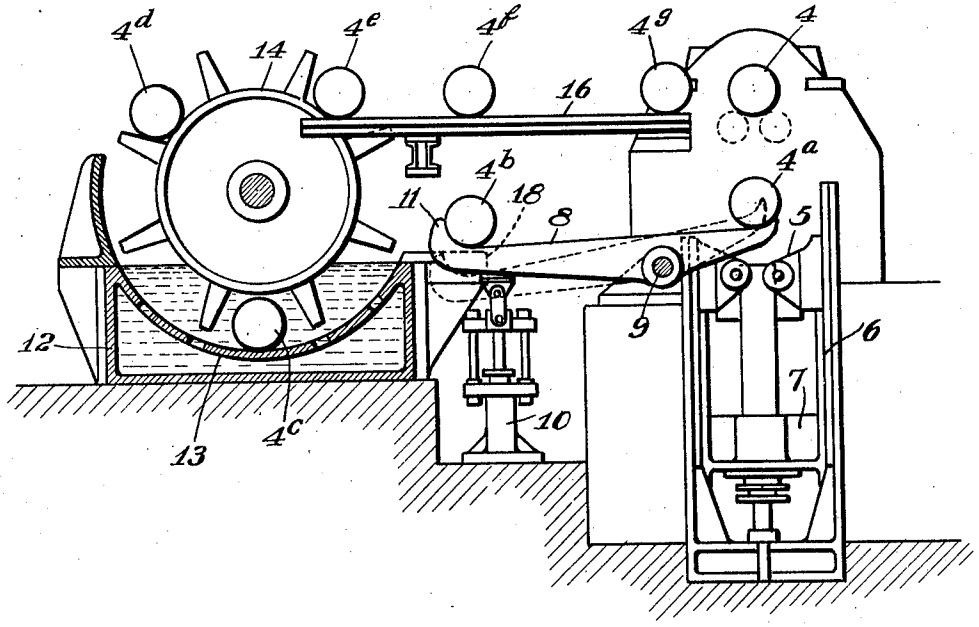
INVENTOR
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Fig. 2.



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Patented June 17, 1930 1,764,736

UNITED STATES PATENT OFFICE

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MANDREL MOVING AND COOLING APPARATUS

Application filed March 12, 1928, Serial No. 261,173, and in Germany March 21, 1927.

In pilger or swaging mills of known construction used in the manufacture of tubes from hollow billets or blooms, the mandrel upon which a tube is swaged becomes very hot in a relatively short time, and requires removal for the purpose of being cooled and replaced by a cool mandrel. This exchange of mandrels requires a comparatively long time during which the whole swaging mill remains idle. Special cranes have been provided with a view of reducing this loss of time, and facilitating the changing of mandrels, but these cranes, which extend considerably above the floor, interfere with the proper working of the overhead traveling crane which serves the mill, and they prevent a clear view of the mill from the operating platform.

The object of this invention is to provide simple and effective apparatus for handling and cooling mandrels, so constructed that it does not interfere with the working of an overhead traveling crane, and that it permits a clear view of the mill from the operating platform.

The invention is illustrated in the accompanying drawings, of which Fig. 1 is a plan view of mandrel transferring and cooling apparatus associated with a swaging mill, the mill being illustrated somewhat diagrammatically; and Fig. 2 a combined elevation and vertical section taken on the line II—II, Fig. 1.

The apparatus provided according to this invention comprises a mandrel-cooler arranged at the side of a swaging mill, which mill may be any of the various forms of tube rolling mills in which a tubular or pierced billet or bloom remains upon a mandrel while it is progressively reduced and elongated to form a tube. Below the level of the mandrel attaching head of such a mill, there is provided a vertically movable support for receiving a hot mandrel from the head and lowering it to a position for transferring it to the mandrel cooler, and also for receiving a cooled mandrel and positioning it in line with the head for attachment to it. Means, preferably in the form of a pivotally supported table, is provided for receiving a hot mandrel from a lowered position of the vertically movable support and for transferring it to the cooler. Arranged in the cooler, mechanism, preferably in the form of a vaned wheel, is provided for moving mandrels through the cooler and elevating them when cooled to a position for their reception by the vertically movable mandrel support.

Having reference to the illustrative embodiment of the invention, a swaging mill is shown as comprising a pair of pilger swaging rolls 1 and a feed mechanism 2, the forward end of the latter being provided with a head 3 for the attachment of a mandrel 4. Below the level of the head 3, and in a position to receive a mandrel 4 when it is withdrawn from rolls 1, there is a mandrel support 5 mounted in suitable guides 6 for vertical movements which may be effected by a fluid pressure cylinder 7. For receiving mandrels from support 5 when it is lowered, there is provided a table, preferably of skeleton form, comprising arms 8 pivotally supported at 9 and adapted to be rocked by a fluid pressure mechanism 10. The outer ends of arms 8 are provided with stops 11 for holding the mandrel on the table until it has cooled below its critical temperatures.

At the outer end of table 8 there is a mandrel cooler preferably in the form of an oil or water containing tank 12 having a cylindrical perforated mandrel support 13. Extending into cooler 12 there is a vaned wheel 14 adapted to be rotated by a motor 15 through the driving connections indicated in Fig. 1. In a position to receive cooled mandrels from the upper portions of wheel 14 there is a platform 16 extending from the wheel to vertically movable support 5.

In operation, when it is desired to remove a hot mandrel 4 from the swaging mill, support 5 is moved upwardly until the mandrel rests upon it. After the mandrel has been detached from head 3, the support is lowered below the inner end of table 8, the arms of which receive the mandrel while the support is being lowered. When the table thus re-

ceives a mandrel it is in the position indicated in full lines in Fig. 2. The table being then somewhat downwardly inclined, the mandrel rolls to its outer end where it is engaged by stops 11. After the mandrel has cooled below its critical temperature, or to such temperature as is desired, table-actuating mechanism 10 is operated to lower the outer end of the table and permit the mandrel to rest upon downwardly inclined supports 18 at the edge of the cooler, on which the mandrel rolls into the coller where it lies between adjacent vanes of wheel 14. Here the mandrel is permitted to remain until sufficiently cooled, when motor 15 is operated to further move the mandrel through and elevate it above the cooler. When thus raised out of the cooler, the mandrel is engaged by platform rails 16 where it remains until again attached to the mandrel head of the feed mechanism for the swaging mill. For doing this, support 5 is moved upwardly to receive a mandrel from platform 16, and then further raised to position it in line with head 3 for attachment to it. In Fig. 2 a mandrel 4 is indicated in its operative position attached to and in line with head 3. In its other positions while being transferred to and through cooler 12, and while resting on the platform 16, it is indicated by the numerals 4^a, 4^b, 4^c, 4^d, 4^e, 4^f, and 4^g.

According to the provisions of the patent statutes, I have explained the principle and operation of my invention, and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced by other forms of construction than specifically illustrated and described.

I claim as my invention:

1. A mandrel cooling apparatus, comprising a reservoir, a vertically movable mandrel support at a side of said reservoir, means for receiving a mandrel from said support when the support is lowered and for transferring the mandrel laterally to said reservoir, and means for moving a mandrel through and above said reservoir to position it for lateral movement back to said support when elevated.

2. A mandrel cooling apparatus, comprising a reservoir, a vertically movable mandrel support at a side of said reservoir, a horizontally pivoted skeleton table for receiving a mandrel from said support when the support is lowered and for transferring the mandrel laterally to said reservoir, and means for moving a mandrel through and above said reservoir to position it for lateral movement back to said support when elevated.

3. A mandrel cooling apparatus, comprising a reservoir, a vertically movable mandrel support at a side of said reservoir, a horizontally pivoted skeleton table for receiving a mandrel from said support when the support is lowered and for transferring the mandrel laterally to said reservoir, a vaned wheel for moving a mandrel through and elevating it above said reservoir, and a skeleton table for receiving mandrels from the upper portion of said wheel and for transferring them back to said support when elevated.

In testimony whereof, I hereunto sign my name.

LUDWIG LÖWY.