Nov. 2, 1943. A. FINNIE 2,333,238

SHAFTING DIE

Filed May 28, 1942

Fig. 1.

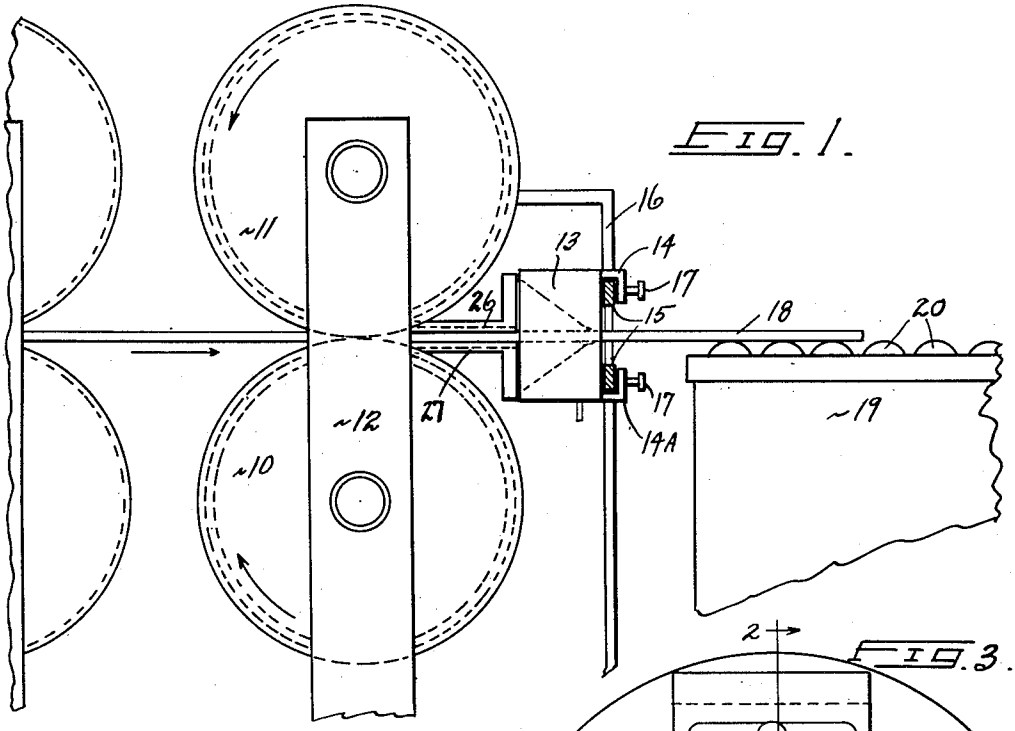


Fig. 2.

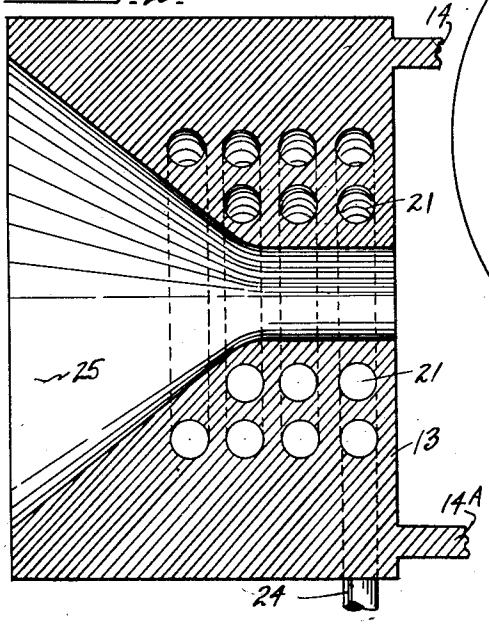
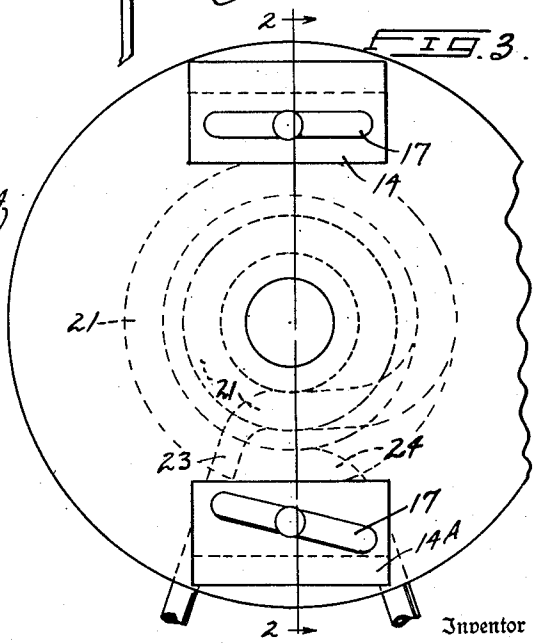


Fig. 3.



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SHAFTING DIE

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1 Claim. (Cl. 80—4)

This invention relates to a die and more particularly to a die adapted to be placed in usable position immediately adjacent the last stands of a shafting mill, bar rolling mill or the like.

The principal object of the invention is the provision of a die adapted to be used in combination with a shafting or bar rolling mill, which die will finish the shaft or bar being rolled so as to form the finished product into a perfect round or any other desired shape.

A further object of the invention is the provision of a die adapted to be positioned adjacent to the last stands of a rolling mill and so designed as to be capable of lateral adjustment with respect thereto.

A further object of the invention is the provision of a die adapted to be used in connection with the last stands of a rolling mill, the said die adapted to be liquid cooled so as to prevent the deterioration of the material thereof.

A still further object of the invention is the provision of a die adapted to be used in connection with a shafting or bar rolling mill to facilitate the formation of a shaft or bar of relatively strong structural quality due to the tendency of the die toward compressing or more closely packing the material structures being shaped thereby.

A still further object of the invention is the provision of a die adapted to be used in combination with the last stands of a rolling mill, the said die being adapted to control the shape of objects primarily shaped by the said rolling mill.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a side elevation of the last stands of a rolling mill and shows the die, the subject of this invention, in workable position adjacent thereto.

Figure 2 is an enlarged cross-sectional side elevation of the die, the subject of this invention.

Figure 3 is an end elevation, on a scale similar to that of Figure 2, illustrating the die, the subject of this invention.

By referring to the drawing and Figure 1 in particular, it will be seen that the last two stands of a rolling mill are represented in side elevation and that the last stand of a rolling mill comprises rolls 10 and 11 positioned in the usual manner in the rolling mill stand indicated by the numeral 12. In a position adjacent the rolls 10 and 11 and in a location wherein bars or shafts traveling from left to right of the device illustrated in Figure 1, will enter it, there is a die generally indicated by the numeral 13 which die is formed of material adapted to withstand the wear and heat it is subjected to in shaping bar or shaft emerging from between the rolls 10 and 11. It will be seen that the die 13 enables the formation of a perfect bar or shaft as irregularities in the shape of the bar or shaft as rolled, are forcefully smoothed out by the die 13.

Still referring to Figure 1 of the drawing, it will be observed that the die 13 is positioned adjacent the rolls 10 and 11 in a manner making it possible to move it sideways in order to facilitate its use with multiple cavity rolls which are ordinarily common in the art and wherein different sizes of bars or shafts may be rolled by simply utilizing adjacent positioned cavities. The means provided for the sideway or lateral adjustment of the die 13, may obviously be varied as to design and construction. In Figure 1 however, such means is illustrated as comprising a pair of brackets 14 and 14A, the bracket 14 formed with a downturned end, and the bracket 14A formed with an upturned end. These brackets 14 and 14A are adapted to slidably engage a pair of horizontally positioned guiding and supporting bars 15 which are in turn carried by structural members 16 spaced well apart from the central location of the die 13, and which structural members 16 may obviously be attached to and form a part of the rolling mill stand structure heretofore referred to and indicated by the numeral 12.

In order that the die 13 may be locked in position in alignment with the particular cavities being utilized in rolling shafting or bar, manually operated bolts 17 are threadably positioned through each of the brackets 14 and 14A and are adapted to engage the horizontal guiding and supporting bars 15 so as to effectively lock the die against unwanted sideward movement during actual operating periods.

Still referring to Figure 1, it will be observed that bar or shaft emerging from the die 13 is

indicated by the numeral 18 and is shown being delivered to a conveyor table 19, the conveyor rolls of which are indicated by the numerals 20. It is believed that the various conveyor rolls 20 of the conveyor table 19 should be powered in order to impart movement to the bar or shaft 12 and thus tend to keep it in motion after the rearmost end has left the rolls 10 and 11. The distance between the shaping surfaces of the die 13 and the engaging positions of the rolls 10 and 11 is not great but provision has been made to provide for imparting movement to the bar or shaft 18 during this phase of its travel to insure the rear-most end successfully passing through the shaping die 13. In the event the motion imparted by the conveyor rolls 20 is not sufficient for the purpose, it will be observed that it is well within the scope of the art to attach momentarily, a device capable of pulling the bar or shaft 18 through the die 13.

By referring now to Figures 2 and 3 of the drawing, it will be observed that the shaping areas of the die 13 have been efficiently surrounded by cooling chambers 21, which chambers are tubular in shape and as shown in Figure 3, arranged so that water or other suitable cooling agent introduced thereinto through a passageway 23 which communicates with the exterior of the die 13, will be forced to travel through the chambers 21 around the shaping surfaces of the die and will then be discharged through a secondary passageway 24 communicating with the chambers 21 and the exterior of the die. Hose connections are established between the outer-most ends of passageways 23 and 24, one of which is placed in communication with a fluid supply source, the other of which forms a drain.

It will be seen that the die 13 may be formed in any practical shape of any practical material and that if desired, the actual shaping surface of the die may be made in the form of inserts positioned in a body member adapted to hold the same and provide for the cooling thereof. It will also be seen that the die is provided with a trumpet shaped opening 25 which insures the direction of the bar or shaft being shaped to the shaping surfaces of the die.

It will be seen that the die as illustrated and described herein when used in connection with bar and shafting rolling mills, makes it possible to produce perfect shaped products whether they be round, square or any other shape desired. The die therefore, eliminates the waste now common in the art of making shafting and bars in that there are no out-of-round or other undesirable irregularities produced which must be cut from the finished product as waste. It will also be seen that the condition of the rod or shaft being used will not affect the quality of the product produced as scale or other surface imperfections are readily removed by the die.

By again referring to Figure 1 of the drawing, it will be seen that a pair of secondary guide members 26 and 27 have been positioned between the die 13 and the point between the rolls 10 and 11 where the shaft or bar emerges therefrom. These guides are preferably carried by the structural members 16 heretofore described, and serve to prevent buckling of the bar or shaft being directed through the die 13. It will be observed that these guide members may be supported or otherwise held in desirable position by any means known in the art so that they will remain in operative position at such times that there are no bars or shaft therebetween. The guides extend into the cavities of the rolls and are shaped to fit therein so that they guide the shaft or bar over the complete distance between the rolls and the die.

Having thus described my invention, what I claim is:

The combination of a bar rolling mill and a die positioned immediately after the last stands of the said rolling mill, the said die comprising a body member of suitable material having an opening formed therethrough and a directional trumpet formed therein, cooling chambers positioned about the shaping surfaces of the said die and means for circulating a cooling agent therethrough, the said die adapted to be positioned in alignment with the delivery section of a bar or shaft rolling mill so that bar or shaft emerging from the rolling mill is directed through the said die and suitably shaped thereby.

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