April 5, 1927. 1,623,537

W. W. HILL

APPARATUS FOR TREATING STEEL

Filed Feb. 6, 1926 2 Sheets-Sheet 1

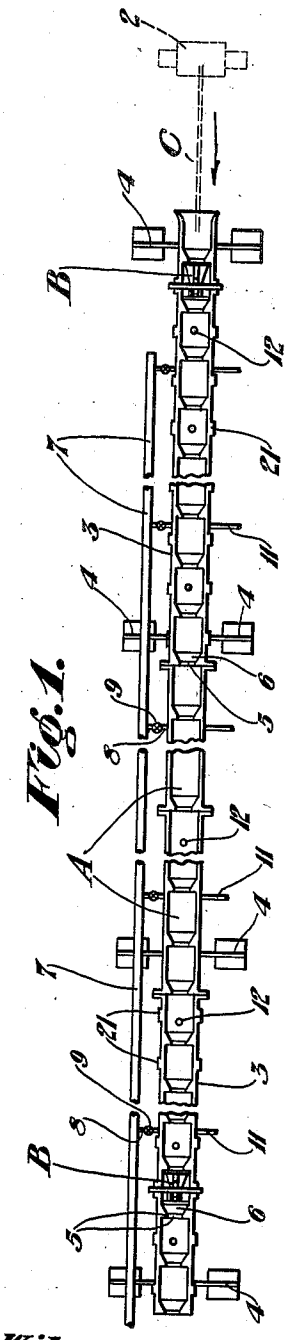


Fig. 1.

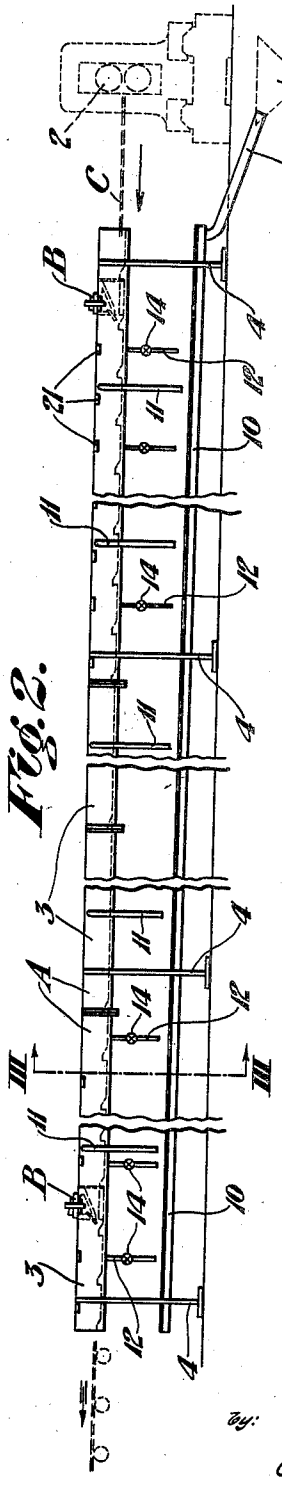


Fig. 2.

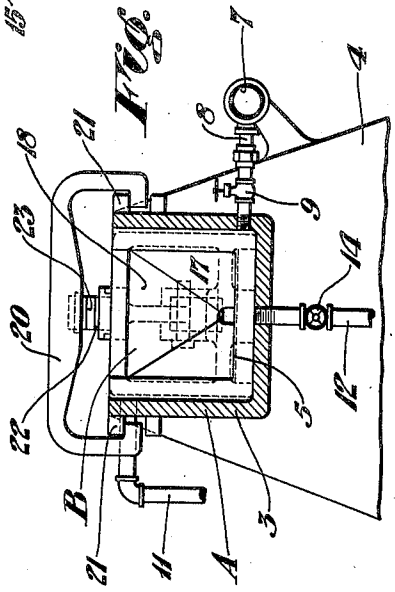


Fig. 6.

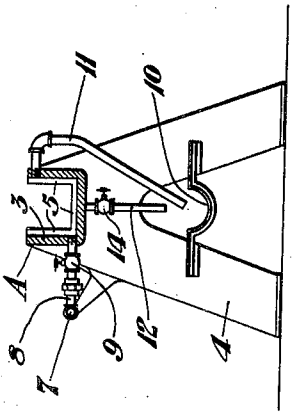


Fig. 7.

Witnesses:
Edwin Trueb

Inventor:
WILLIAM W. HILL,
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APPARATUS FOR TREATING STEEL

Filed Feb. 6, 1926 2 Sheets-Sheet 2

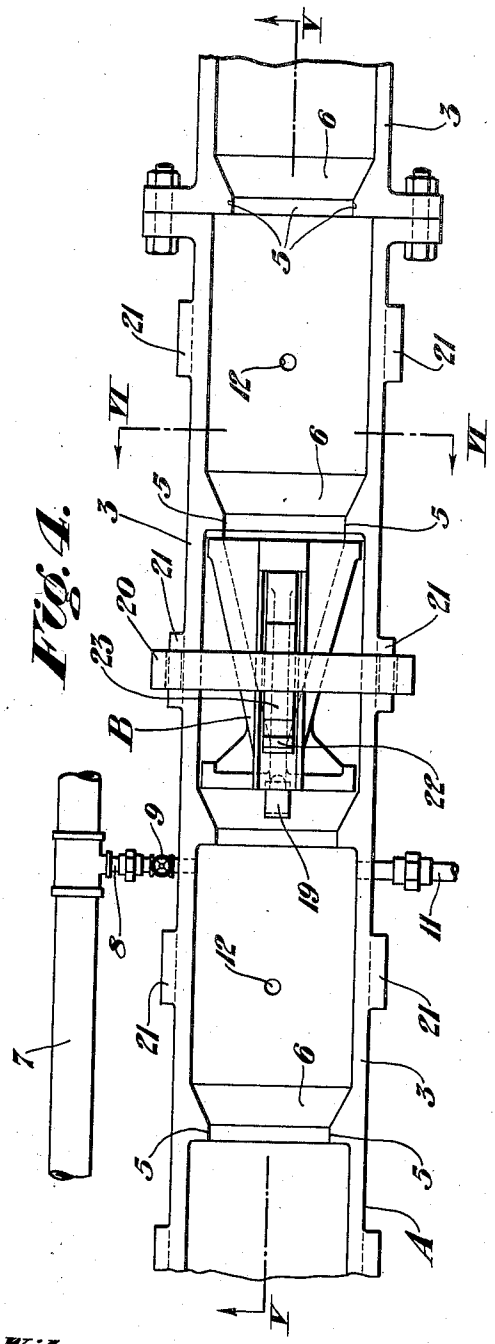


Fig. 4.

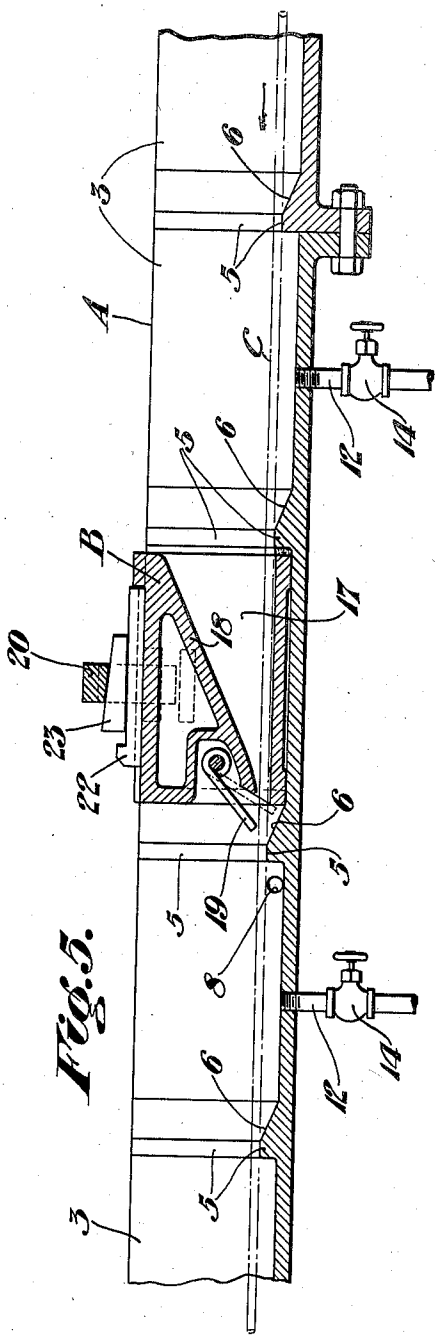


Fig. 5.

Witnesses:
Edwin Trueb

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Patented Apr. 5, 1927. 1,623,537

UNITED STATES PATENT OFFICE.

WILLIAM W. HILL, OF DUQUESNE, PENNSYLVANIA.

APPARATUS FOR TREATING STEEL.

Application filed February 6, 1926. Serial No. 86,582.

This invention relates to apparatus for treating metal and more particularly for heat treating rolled steel without the necessity of reheating, and has for its object the provision of apparatus in which rolled metal may be quenched to increase the tensile strength and elastic limit of the metal immediately after leaving the rolls and without reheating.

Another object is to provide apparatus having the novel construction, design and combination of parts hereinafter described and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a plan view of the apparatus embodying my invention.

Figure 2 is a side elevation thereof.

Figure 3 is a sectional view taken on the line III—III of Figure 2.

Figure 4 is an enlarged fragmentary detail plan of a portion of the trough.

Figures 5 and 6 are sectional views on the lines V—V and VI—VI, respectively, of Figure 4.

Referring more particularly to the drawings, the numeral 2 designates the finishing stand of rolls of a rolling mill. A trough A, composed of sections 3 bolted together and supported on stands 4, extends from the rolls 2 toward the cooling bed. Each of the sections of trough is provided with a plurality of spaced internal shoulders or ribs 5 which are beveled rearwardly or toward the rolls as at 6, so as not to impede the passage of metal through the trough.

A water supply main 7 extends parallel with the trough and is provided with branch conduits 8 connecting with each of the trough sections. Each of the conduits 8 is provided with a valve 9 for controlling the feed of water to the trough.

A drain trough or conduit 10 is mounted under the trough A and supported on the stands 4. An overflow pipe 11 extends from a point adjacent the upper edge of each of the trough sections downwardly into the drain trough 10 to prevent the overflowing of the trough, and a plurality of drain conduits 12 extend from the bottom of the trough sections downwardly into the drain trough 10. The drain conduits 12 are provided with valves 14 to control the flow of water therethrough.

The drain trough 10 is inclined rearwardly toward the rolls and has an extension 15 which extends into the scale pit 16 of the rolls, which pit is provided with the usual drain (not shown) connecting with a sewer or other point of disposal.

A pair of combined dam and guide members B are adapted to be mounted in the trough A. The members B are castings adapted to fit between any two of the ribs 5 of the trough and provided with a guide opening 17 therethrough, the top wall 18 of the casting being inclined downwardly so as to guide or force the metal being treated downwardly along the bottom of the trough. The forward or exit end of the opening 17 is adapted to be normally closed by a self closing hinged dam or closure 19.

The members B are adapted to be secured in position by clamping yokes 20 having their ends secured in bosses 21 on the sides of the trough and having a cooperating key 22 and wedge 23 mounted between the clamping yoke and member B.

One of the combined guide and dam members B is adapted to be located at the entering end of the trough, and the other member B is adapted to be located at any desired point along the length of the trough which will provide a sufficient body of water between the members to quench the metal.

In operation, the metal, designated by the letter C, after leaving the finishing stand of rolls 2, passes through the guide B at the rear or entering end of the trough, and enters the body of water in the portion of trough between this guide and the second or forward guide B. While passing through the body of water the metal is quenched and it then passes out through the forward guide B and onto a cooling bed or other place of disposal (not shown). The distance between the combined dam and guide members, or the length of the body of water in the trough, can be adjusted at will to suit the quenching time required to give the bar the necessary heat treatment by changing the position of the dam and guide members B.

In order to maintain the body of water between the two dam and guide members B at the proper level, all the valves 9 of the water inlet or branch pipes between the two members are opened, while the valves 9 on the remaining inlet pipes are closed, and the valves 14 in the drain pipes 12 between the two members B are closed. The valves 14 in

the remaining drain pipes 12 beyond the members B, are opened to provide for the escape of the water flowing out of the guide openings 17 as the metal passes through the members B.

The apparatus above described, provides for the heat treating or quenching of metal after rolling without reheating or rehandling and also provides an apparatus capable of adjustment for treating a wide range of sizes of metal rods or bars.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the scope of my invention as defined in the appended claims.

I claim:

1. In an apparatus for treating metal, an elongated receptacle adapted to retain a quantity of water, a plurality of combined dam and guide members removably and adjustably mounted in said receptacle, openings in said dam and guide members adapted to permit the passage of the metal therethrough, and means for normally closing said openings.

2. In an apparatus for treating metal, an elongated trough, combined dam and guide members removably and adjustably mounted in said trough, openings in said dam and guide members adapted to permit the passage of the metal therethrough, means for normally closing said openings, and water inlet and drain conduits communicating with said trough.

3. In an apparatus for treating metal, an elongated trough, combined dam and guide members removably and adjustably mounted in said trough, openings in said dam and guide members adapted to permit the passage of the metal therethrough, means for normally closing said openings, water inlet and drain conduits communicating with said trough, and means for controlling the inlet and drain of water from said trough.

4. In an apparatus for treating metal, an elongated trough, combined dam and guide members removably and adjustably mounted in said trough, openings in said dam and guide members adapted to permit the passage of the metal therethrough, means for normally closing said openings, water inlet and drain conduits communicating with said trough, overflow pipes for limiting the amount of water in said trough, and means for controlling the inlet and drain of water from said trough.

5. In an apparatus for treating metal, a trough, a pair of combined dam and guide members removably and adjustably mounted in said trough, means for securing said dam and guide members in position in said trough, said combined dam and guide members having openings therein adapted to permit the passage of metal therethrough, and means for normally closing said openings to maintain a body of water between said members.

6. In an apparatus for treating metal, a trough, a pair of combined dam and guide members removably and adjustably mounted in said trough, means for securing said dam and guide members in position in said trough, said combined dam and guide members having openings therein adapted to permit the passage of metal therethrough, means for normally closing said openings to maintain a body of water between said members, and inlet and drain conduits communicating with said trough.

7. In an apparatus for treating metal, a trough, a pair of combined dam and guide members removably and adjustably mounted in said trough, clamping means for securing said dam and guide members in position in said trough, said combined dam and guide members having openings therein adapted to permit the passage of metal therethrough, and means for normally closing said openings to maintain a body of water between said members.

8. In an apparatus for treating metal, a sectional trough, each of said sections being provided with a plurality of spaced internal ribs, a pair of combined dam and guide members, adapted to be mounted between any two of said ribs, said combined dam and guide members having openings therein to permit the passage of the metal therethrough, means for normally closing said openings, and means for removably securing said combined dam and guide members in position.

9. In an apparatus for treating metal, a sectional trough, each of said sections being provided with a plurality of spaced internal ribs, a pair of combined dam and guide members, adapted to be mounted between any two of said ribs, said combined dam and guide members having openings therein to permit the passage of the metal therethrough, means for normally closing said openings, and clamping means engaging said trough and said combined dam and guide members for securing said members in position.

10. In an apparatus for treating metal, a sectional trough, each of said sections being provided with a plurality of spaced internal ribs, a pair of combined dam and guide members, adapted to be mounted between any two of said ribs, said combined dam and guide members having openings therein to permit the passage of the metal therethrough, means for normally closing said openings, means for removably securing said combined dam and guide members in position, water inlet and drain conduits com-

municating with said trough, and overflow pipes for limiting the amount of water in said trough.

11. In an apparatus for treating metal, a sectional trough, each of said sections being provided with a plurality of spaced internal ribs, a pair of combined dam and guide members, adapted to be mounted between any two of said ribs, said combined dam and guide members having openings therein to permit the passage of the metal therethrough, means for normally closing said openings, means for removably securing said combined dam and guide members in position, water inlet and drain conduits communicating with said trough, overflow pipes for limiting the amount of water in said trough, and means for controlling the inlet and drain of water from said trough.

In testimony whereof, I have hereunto set my hand.

WILLIAM W. HILL.