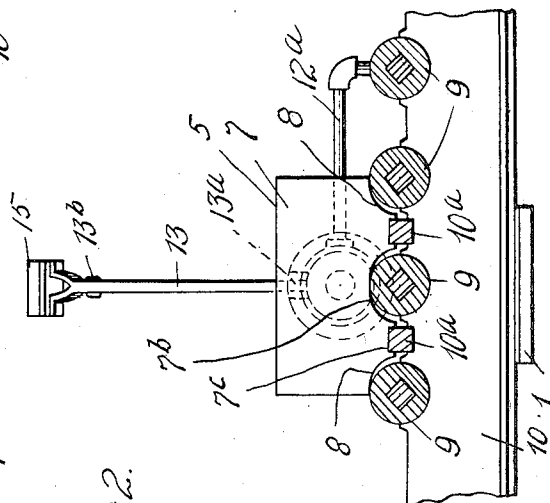
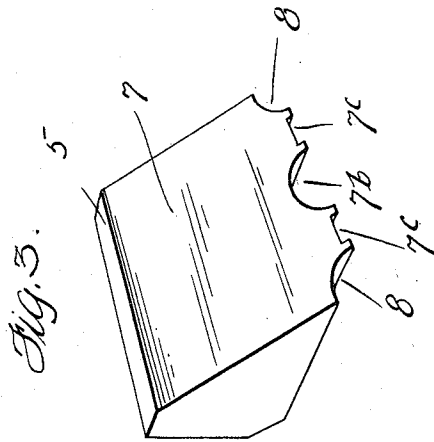


944,318.

Fig. 1.

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Fig. 2.

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UNITED STATES PATENT OFFICE.

FRANCIS B. CARRAHER, OF PITTSBURG, PENNSYLVANIA.

INGOT-TURNING DEVICE.

944,318.

Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed July 16, 1909. Serial No. 508,077.

To all whom it may concern:

Be it known that I, FRANCIS B. CARRAHER, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Ingot-Turning Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an ingot manipulating mechanism for rolling mills and the object thereof is to provide a mechanism in a manner as hereinafter set forth for turning over and otherwise manipulating ingots, blooms, billets, slabs, and like bodies of metal when desired during the rolling of the body. Hereinafter the term "ingot" means any body of metal as heretofore set forth.

As is well known, in rolling mills of the class for rolling bodies of metal, live rollers are employed on either side of the forming rolls of the mill or the rolls provided with the passes and which carry the ingot to and from the forming rolls. The ingot is moved transversely to the several passes in the forming rolls by means of hydraulic rams or other suitably arranged sliding rods or mechanism, so as to position the ingot in alinement with a pass. It necessitates at times when the ingot has been delivered from one pass to turn or manipulate it so as to be properly positioned for further rolling, in some instances the ingot is to be turned on edge, or upon one face, or completely turned over and to provide for such manipulation of the ingot is the primary object of a mechanism to be hereinafter referred to, such ingot manipulating mechanism being comparatively simple in its construction and arrangement, strong durable, efficient in its use, readily set up in coöperative relation with the mill, completely operated and comparatively inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come

within the scope of the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings wherein like reference characters denote corresponding parts throughout the several views, and in which,

Figure 1 is a side elevation of an ingot manipulating device in accordance with this invention and showing the adaptation thereof in connection with what is termed the live rolls of the mill. Fig. 2 is a sectional view illustrating an end elevation of one of the elements of the manipulating device, and Fig. 3 is a detail of one of the shifting heads for the ingot.

Referring to the drawings in detail, 1 denotes a bed plate upon which are mounted a pair of supports 1^a, 1^b respectively. Upon the latter is mounted a cylinder 3 for the reception of a motive fluid and upon the former is mounted a cylinder 2 for the reception of a motive fluid. The cylinder 2 extends toward the cylinder 3 and operating in the cylinder 2 is a motive fluid actuated piston head (not shown), to which is attached a piston rod 4, the latter projecting from the cylinder 2, and arranged in the cylinder 3 is a motive fluid actuated piston head (not shown) to which is attached a piston rod 4^a which projects from the cylinder 3. The cylinders 2 and 3 are fixedly secured to the supports 1^a and 1^b.

Mounted upon the bed plate 1 and interposed between the supports 1^a, 1^b and extending at right angles with respect to the supports 1^a and 1^b are bearings 10, in which are journaled the live rolls 9 of the rolling mill the said live rolls 9 constituting a table. The cylinder 2 as well as the cylinder 3 is positioned at points removed from the bearings 10 and at right angles thereto as clearly shown in Fig. 1. Arranged between certain of the rolls 9 and mounted upon and connected to the bearings 10 are brace bars 10^a, which also constitute fillers between the spaces formed by the rolls 9 and further constituting guide bars for ingot shifting heads to be presently referred to as well as supports for said head.

Fixed to the outer end of the piston rod 4 is an ingot shifting head 5 and fixed to the outer end of the piston rod 4^a is an ingot

shifting head 6. As the construction of one shifting head is the same as the other but one will be described. Each of the shifting heads consists of a rectangular body 5 having a portion of its inner face inclined upwardly and outwardly as at 7 and the remaining portion perpendicular as at 7^a. The lower face of each of the shifting heads is cut away as at 7^b so as to straddle a roll 9, cut away as at 7^c so as to straddle the bars 10^a and further cut away at each end of its lower face as at 8 so as to partly extend over a pair of the live rolls 9. The cut away portions 7^b and 8 in the lower faces of the shifting heads provide clearances for the ends of the live rolls 9 when the heads are moved to travel toward the transverse center of the live rolls or away from said center. The cut away portion 7^c provides guide 20 grooves for the bars 10^a, the grooves and bars associating when the heads are shifted as will be evident so that the movement of the heads will be guided and furthermore so that the heads will not rock during their 25 shifting movement. The bars 10^a as before stated constitute supports for the heads when the heads are in their normal or inoperative position, as shown in Fig. 1.

A conventional means for driving the live 30 rolls is shown as a gearing and indicated by the reference character 11; the ingot is indicated by the reference character 12 and the motive fluid supply means is indicated by the reference character 12^a.

35 The cylinder 2 as well as the cylinder 3 or both of the said cylinders can be provided with an ingot abutment member as shown, the cylinder 3 is shown provided with such a member. The member consists of an arm 40 which is indicated by the reference character 13 and is hinged to the cylinder 3 at its lower ends as at 13^a. To the upper portion of the arm 13 is hinged as at 13^b a depending handle 14 and upon the upper terminus 45 of the arm 13 is fixed an angle plate 15. When the arm 13 is dormant it assumes a position shown in Fig. 1 and is supported by the flanges of the cylinder 3, or the cylinder 2 if the member is attached to said cylinder. 50 The length of the handle 14 is such as to project away from the cylinder 3 so that the arm 13 can be conveniently manipulated or shifted or positioned when occasion so requires.

55 Operation: It will be assumed that the ingot 12 is in the position as shown in full lines in Fig. 1, lying flat upon the live rolls 9, motive fluid is supplied to the cylinders 2, 3 which impacting with the piston heads 60 will force the piston rods 4 and 4^a toward each other carrying the heads 5, 6 therewith, the heads 5, 6 will be moved to engagement with the ingot 12 and the ingot 12 will be caused to ride upwardly in an in-

clined position upon the beveled face of the 65 head 6, as indicated by dotted lines in Fig. 1. The ingot being in the position as shown in dotted lines and the heads also being in the position in dotted lines, the arm 13 is lowered whereby the plate 15 will engage the 70 upper edge of the ingot, said arm and plate constituting an abutment for the ingot for the reason that the plate 15 not only engages the upper edge of the ingot 12, but also one face thereof. With the top of the ingot 75 held by the arm 13, the head 6 will be slightly withdrawn, and the head 5 will be further projected thereby causing the ingot to assume a vertical position against the head 5 and arm 13 and can then be lowered 80 into position by allowing the head 6 or both heads to recede consequently the ingot will then stand on edge as is evident. If it is desired to completely turn the ingot, the head 6 will further recede and the head 5 85 accordingly further projected thereby causing the ingot to fall and rest upon the inclined face of the head 5; when in this latter position both heads are then withdrawn permitting the ingot to assume the desired 90 position upon the live rolls as shown in full lines in Fig. 1 of the drawings.

The arm 13 and the plate 15 are termed an ingot abutment member and when a single member is employed it is interchangeable 95 owing to the providing of the element 13^b on the cylinder 2 through which the said member can be hinged.

What I claim is:

1. An ingot manipulating mechanism 100 comprising a table, a pair of oppositely disposed ingot shifting heads above the table, each having its inner face inclined upwardly and outwardly, an arm pivoted to a support, said arm having its free end in co- 105 operative relationship with said head, said free end being located above the table and so arranged that it can aid the heads in turning the ingot when the same is on the table. 110

2. An ingot manipulating mechanism 110 comprising a table, a pair of oppositely disposed ingot shifting heads above the table, an arm pivoted to a support, said arm having its free end provided with an angle plate 115 in coöperative relationship with said heads, said angle plate being located above the table and so arranged that it can aid the heads in turning the ingot when the same is on the table. 120

3. An ingot manipulating mechanism 120 comprising a table, a pair of oppositely disposed ingot shifting heads above the table, each having its inner face inclined upwardly and outwardly, an arm pivoted at one end 125 to a support, said arm having its free end provided with an angle plate in coöperative relationship with said heads, said angle plate

being located above the table and so arranged that it can aid the heads in turning the ingot when the same is on the table.

5 4. An ingot manipulating mechanism comprising a table, a pair of oppositely disposed ingot shifting heads above the table, an arm pivoted to a support, said arm having its free end in coöperative relationship with said heads, said free end being located

above the table and so arranged that it can 10 aid the heads in turning the ingot when the same is on the table.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANCIS B. CARRAHER.

Witnesses:

MAX H. SROLOVITZ,

H. C. EVERT.