Feb. 11, 1930. A. R. McARTHUR 1,746,488

HOT MILL CATCHER

Filed Dec. 28, 1927. 3 Sheets-Sheet 1

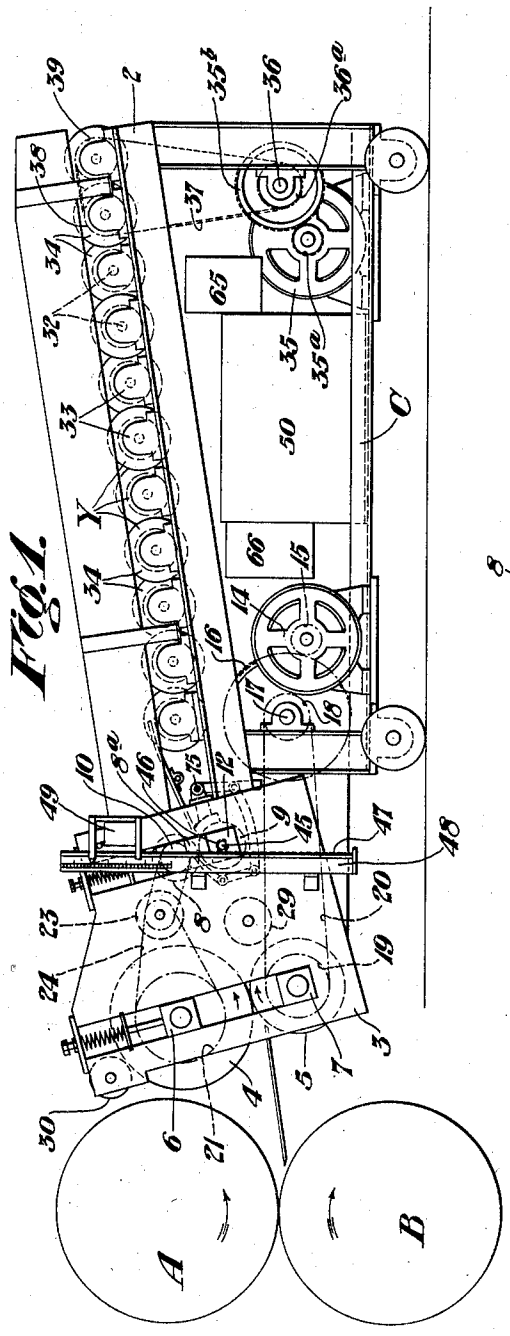


Fig. 1.

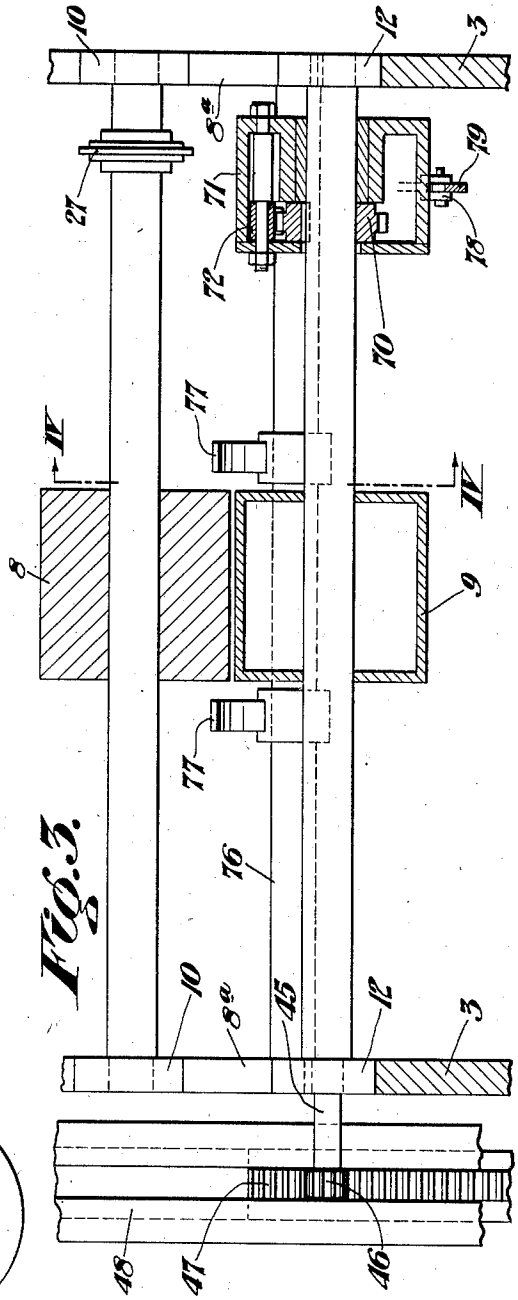


Fig. 3.

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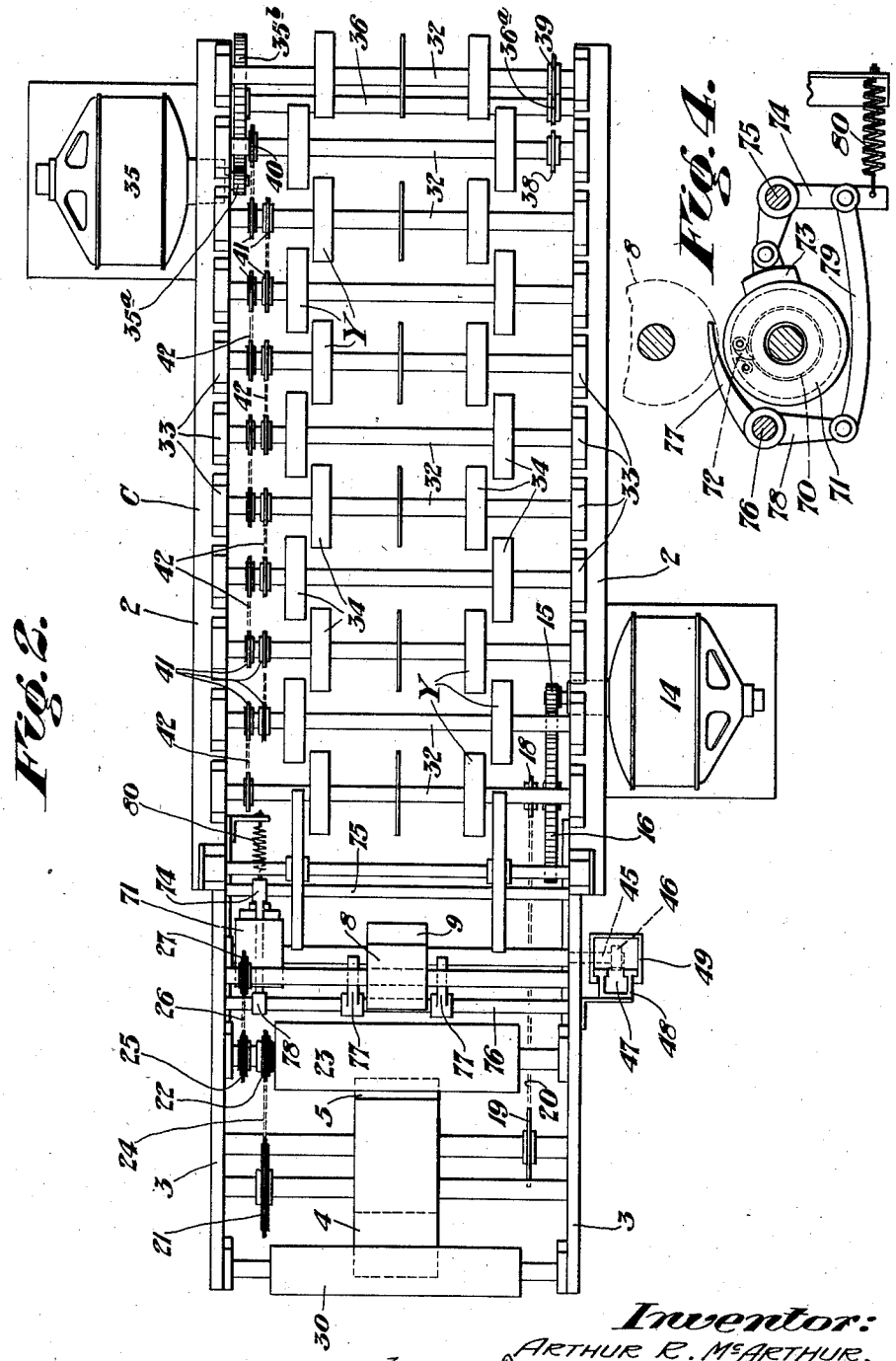


Fig. 2.

Fig. 4.

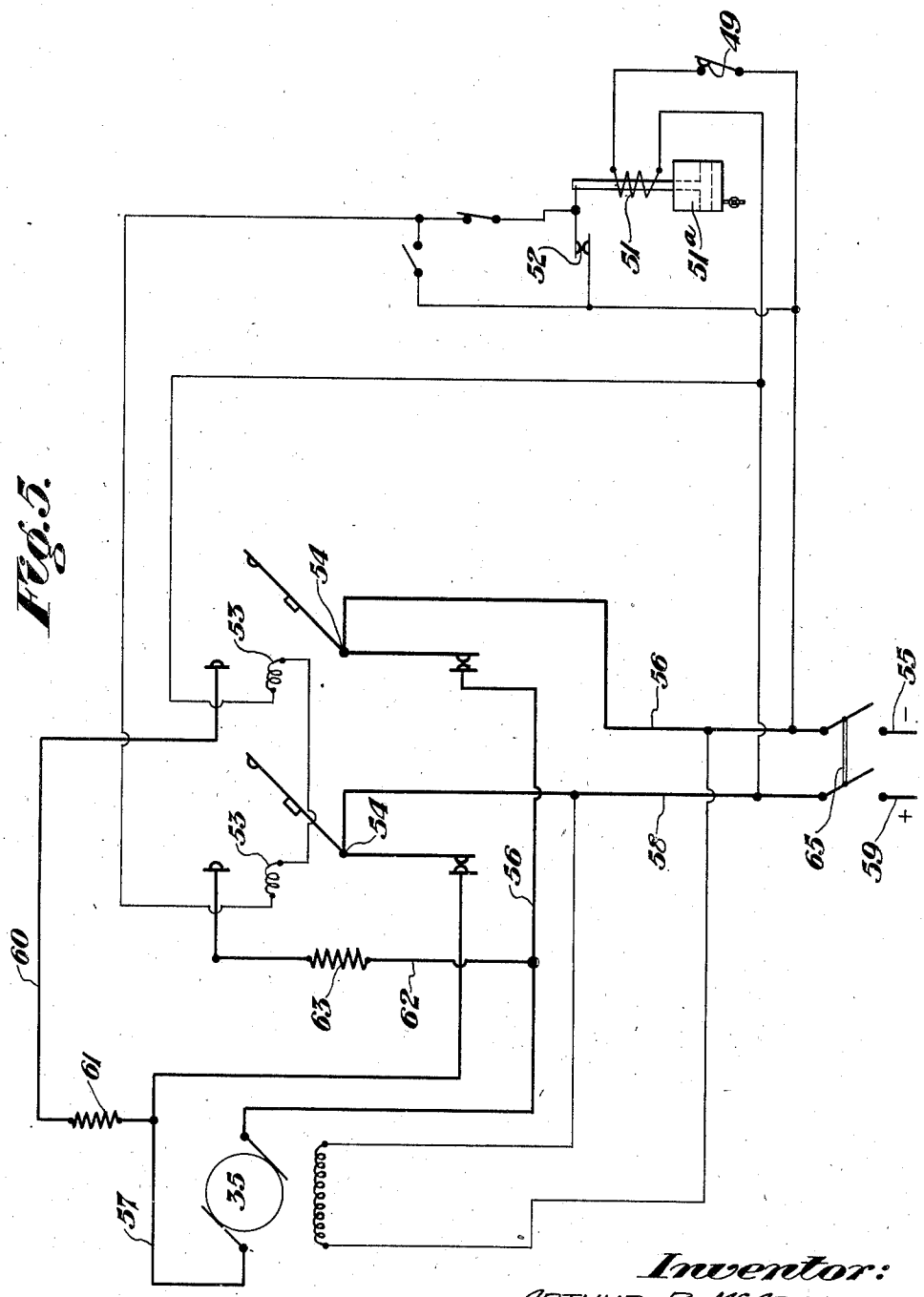
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HOT MILL CATCHER

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Fig. 5.



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UNITED STATES PATENT OFFICE

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HOT-MILL CATCHER

Application filed December 28, 1927. Serial No. 243,029.

This invention relates to hot mill catchers and more particularly to hot mill catchers for tin mills and the like, and has for one of its objects the provision of a catcher that will be automatic and speedy in operation.

Another object is to provide a catcher composed of few parts and with a simple control so as to reduce the cost of construction and maintenance to a minimum.

A further object is to provide a catcher having the novel construction, design and arrangement of parts hereinafter described and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of a catcher constructed in accordance with this invention.

Figure 2 is a plan thereof.

Figure 3 is an enlarged sectional detail through the rear pair of pinch rolls which feed the sheets onto the catcher table, showing the brake mechanism.

Figure 4 is a transverse sectional detail taken on the line IV—IV of Figure 3.

Figure 5 is a wiring diagram showing the motor control circuits.

Referring more particularly to the drawings, the letters A and B designate the upper and lower rolls of a hot mill.

The catcher of this invention comprises a wheeled frame C having inclined channel shaped upper side members 2 and extension side-plates 3 at its forward or mill end.

A pair of pinch rollers 4 and 5 are journaled in suitable bearings 6 and 7, respectively, in the side-plates 3 and are adapted to receive the plates as they pass from between the mill rolls A and B. A second set of pinch rollers 8 and 9 are journaled in bearings 10 and 12, respectively, in the side-plates 3. The upper bearings 6 and 10 for the upper rollers of said pairs of pinch rollers, are spring pressed so as to permit the plates to pass therebetween. The uper roller 8 of said second pair of pinch rollers is limited in its movement toward the lower roller 9 by a block 8^a, so as to maintain said rollers in spaced relation.

A compound motor 14 is mounted on the frame C and is provided with a pinion 15 which meshes with a gear 16 on a drive-shaft 17. A sprocket 18 is mounted on the shaft 17, and is connected with a sprocket 19 on the lower pinch roller 5 by a chain 20 so as to normally drive the roller 5 in a clockwise direction. The upper pinch roller 4 is in frictional engagement with the roller 5 so that the roller 4 will be driven in a counter-clockwise direction. The roller 4 is provided with a drive-sprocket 21 which is connected to a sprocket 22 on a plate return roller 23 by a chain 24. The roller 23 is journaled in fixed bearings in the side-plates 3 and is adapted to aid in conveying the plates over the rolls when they are returned by the catcher.

The roller 23 is provided with a second sprocket 25 which is connected by a chain 26 with a sprocket 27 on the upper pinch roller 8.

From the above it will be readily seen that the single motor 14 serves to drive the pair of pinch rollers 4 and 5, the conveying or plate return roller 23, and the upper roller 8 of the pair of pinch rollers 8 and 9.

A plate supporting idler roller 29 is journaled in the side plates 3 between the pairs of pinch rollers and serves to support the hot plate as it passes from one pair of pinch rollers to the other.

A second plate supporting idler roller 30 is journaled above and forward of the upper pinch roller 4 to support the plate as it passes over the upper mill roll A.

A plurality of conveyer rollers Y are arranged in spaced relation along the inclined side members 2 of the frame C and are composed of shafts 32 journaled in bearings 33 on the side members 2 and having disks 34 secured thereon.

A reversing motor 35 is mounted on the frame C and is provided with a pinion 35^a which meshes with a gear 35^b on a shaft 36 which shaft is provided with a sprocket 36^a which is connected by a drive chain 37 with sprockets 38 and 39 on the shafts 32 of the two rearmost conveying rollers Y. The next-to-the-rearmost conveyer roller shaft 32 is provided with a sprocket 40 and each of the other conveyer shafts 32 are provided with

pairs of sprockets 41 which sprockets are connected by chains 42 so as to cause all of said conveyer rollers Y to be rotated in the same direction by said single motor 35.

The motor 35 is adapted to normally drive or rotate the rollers Y toward the mill or in a counter-clockwise direction so as to return the plates over the rolls A and B.

In order to automatically gage the length of the plates and to run the full length or finished plates away from the mill, means are provided for automatically reversing the motor 35.

The automatic reversing means comprises a shaft extension 45 on the lower or idler pinch roller 9 on which is mounted a pinion 46 which is in mesh with a rack 47 slidably mounted for vertical movement in a guideway 48. The rack 47 is adapted to engage and trip a vertically adjustable switch 49 when the rack is elevated a sufficient distance by the pinion 46 as the idler roller 9 is rotated when a plate passes between the rollers 8 and 9.

The tripping of the switch 49 is adapted to energize an electric reversing control mechanism designated generally by the numeral 50. The control 50 is standard design and is shown in detail in the wiring diagram of Figure 5.

When the switch 49 is tripped it will energize the solenoid 51 which will operate the switch 52 and complete a circuit through the coils 53 of magnetically operated switches 54 which will operate to reverse the armature circuit of the motor 35.

The normal or forward circuit to the armature of motor 35 is from the supply line 55 through line 56, through one of the switches 54, line 56, then through the armature of the motor 35, through the line 57 and the other switch 54 to line 58, and back to the other supply line 59.

When the solenoid 51 has been energized by the tripping of the switch 49 and the switches 54 have been moved into reverse position a circuit will be completed from supply line 55, through the line 56, switch 54, line 60 and resistance 61, to line 57, then through the armature to line 56 and line 62 and resistance 63, to the second switch 54 and back through line 58 to the other supply line 59.

A standard manually operated switch 65 is provided for completing the circuit from the supply lines 55 and 59, and a second standard switch shown only as a rectangular box 66 is shown secured to the machine frame and is provided for closing the circuit to the motor 14.

The solenoid 51 is provided with a dash-pot 51ª which serves to time the operation of the switch 52 so said switch will remain closed until the plates have been conveyed off of the catcher.

In order to prevent the lower or idler pinch roller 9 from overunning after the plate has passed from between the pinch rollers 8 and 9 and thereby causing the switch 49 to be actuated to reverse the motor 35 before the plate is rolled to gage or length, I have provided a brake on the roller-shaft.

The brake on the shaft of roller 9 comprises a ratchet-wheel 70 secured to the shaft of the roller 9 and a brake-drum 71 journaled on the shaft and having a dog 72 adapted to engage the ratchet-wheel 70. A brake-shoe 73 is pivotally connected to one arm of a crank-lever 74 pivotally mounted on a shaft 75. A shaft 76 is jou naled immediately forward of the pinch rollers 8 and 9 and has a pair of operating triggers 77 keyed thereon and adapted to be depressed by the plates as they enter between the rollers 8 and 9, so as to rock the shaft 76. A lever 78 is keyed on the shaft 76 and connected by a link 79 to the crank-lever 74. A spring 80 normally tends to force the brake-shoe 73 against the brake-drum 71.

When the plates approach the pinch rollers 8 and 9 they will engage and depress the levers or triggers 77 so as to rock the shaft 76 and thereby move the brake-shoe away from the drum 71, thus permitting the lower pinch roller 9 to rotate since the dog 72 may rotate the drum 71.

As soon as the plate passes through the pinch rollers 8 and 9 the trigges 77 will be released and the spring 80 will snap the brake-shoe 73 against the drum 71, thereby stopping the rotation of the roller 9 in the forward or clockwise direction.

The roller 9 will be free to move in the reverse directon after the brake-shoe is applied since the dog 72 can ride over the ratchet 70. This free reverse movement will permit the rack 47 to fall to its lower or normal position by gravity in readiness to gage the same plate or the next plate.

It will also be noted that the brake mechanism will prevent any rebound of the rack 47 as it falls by gravity.

The foremost roller Y, that is the roller Y nearest the mill end of the catcher, is elevated slightly above the other rollers Y so as to elevate the end of the plates being returned over the mill.

In operation, the plates will pass from between the mill rolls A and B into the bite of the pinch rollers 4 and 5, and then into the bite of the pinch rollers 8 and 9. The pinch rollers 8 and 9 will feed the plates onto the conveyer rollers Y which are, if the plates are not rolled to finished length, being rotated in a counter-clockwise direction or toward the mill, and will consequently reverse the direction of movement of the plates and move them toward the mill.

The foremost roller Y is elevated above the other rollers Y so that the mill end of

the plates being returned toward the mill will be elevated or tilted upwardly so as to engage the upper surface of the rollers 8, 23 and 4, all of which are rotating in a counter-clockwise direction and will, therefore, serve to boost the plates over the top mill roll A which is also rotating in a counter-clockwise direction.

Prior to the rolling of the plates the switch 49 will be adjusted vertically so that the rack 47 will not trip the switch unless the plates are of sufficient length to rotate the idler pinch roller 9 a sufficient number of revolutions to cause the pinion 46 to elevate the rack a predetermined amount.

When the plates are rolled out to finished length the friction of the plate passing between the pinch rollers 8 and 9 will rotate the idler roller 9 a sufficient number of revolutions to cause the rack 47 to trip the switch 49, thus energizing the automatic reversing mechanism 50 and reversing the motor 35 so as to reverse the direction of rotation of the rollers Y, causing them to rotate in a clockwise direction and carry the plate rearwardly off of the catcher.

When the plate has passed from between the pinch rollers 8 and 9, the rack 47 will fall by gravity and permit the switch 49 to reset for the next operation. However, once the switch 49 has been tripped, the motor 35 will remain reversed, for a predetermined time, due to the dash-pot control on the switch 52 which will hold the switch 52 closed a sufficient length of time for the plate to be conveyed rearwardly off of the catcher.

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. The combination with a hot mill of a catcher, said catcher comprising at least one set of pinch rollers for receiving the plates as they pass from said mill, a table, a plurality of conveying rollers journaled on said table, means for operating said pinch rollers, other means for operating said conveying rollers, said last named means normally rotating said rollers toward the mill, and means operable by and dependent on the length of the plates for reversing said last named means so as to reverse said conveying rollers.

2. The combination with a hot mill of a catcher, said catcher comprising at least one set of pinch rollers for receiving the plates as they pass from said mill, a rigid table inclined toward said mill, a plurality of conveying rollers journaled on said table, means for operating said pinch rollers, other means for operating said conveying rollers, said last named means normally rotating said rollers toward the mill, and means operable by and dependent on the length of the plates for reversing said last named means so as to reverse said conveying rollers.

3. The combination with a hot mill of a catcher, said catcher comprising at least two sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, means for driving said pinch rollers, other means for driving said conveying rollers, said last named means normally driving said conveying rollers toward the mill, and means operable by said idler pinch roller for reversing said last named means so as to reverse said conveying rollers.

4. The combination with a hot mill of a catcher, said catcher comprising at least two sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, an electric motor for driving said pinch rollers, a second electric motor for driving said conveying rollers, said second named motor normally driving said conveying rollers toward said mill, electrically operated means for reversing the direction of rotation of said second named motor, a switch for controlling said electrically operated means, and means operable by said idler roller of said pinch rollers for operating said switch.

5. The combination with a hot mill of a catcher, said catcher comprising at least two sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, an electric motor for driving said pinch rollers, a second electric motor for driving said conveying rollers, said second named motor normally driving said conveying rollers toward said mill, electrically operated means for reversing the direction of rotation of said second named motor, a switch for controlling said electrically operated means, and a rack and pinion operating mechanism operable by said idler pinch roller for operating said switch.

6. The combination with a hot mill of a catcher, said catcher comprising at least two

sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, an electric motor for driving said pinch rollers, a second electric motor for driving said conveying rollers, said second named motor normally driving said conveying rollers toward said mill, electrically operated means for reversing the direction of rotation of said second named motor, a switch for controlling said electrically operated means, a pinion operable by said idler pinch roller, and a rack operable by said pinion and adapted to trip said switch.

7. The combination with a hot mill of a catcher, said catcher comprising at least two sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, an electric motor for driving said pinch rollers, a second electric motor for driving said conveying rollers, said second named motor normally driving said conveying rollers toward said mill, electrically operated means for reversing the direction of rotation of said second named motor, a switch for controlling said electrically operated means, a pinion operable by said idler pinch roller, a rack operable by said pinion and adapted to trip said switch, and means for preventing the overrun of said idler pinch roller.

8. The combination with a hot mill of a catcher, said catcher comprising at least two sets of pinch rollers for receiving the plates as they pass from said mill, one roller of one of said sets of pinch rollers being an idler roller and being spaced from the other roller of said set a distance sufficient to clear said other roller and adapted to be driven by the plate as it passes between said rollers, a table, a plurality of conveying rollers journaled on said table, an electric motor for driving said pinch rollers, a second electric motor for driving said conveying rollers, said second named motor normally driving said conveying rollers toward said mill, electrically operated means for reversing the direction of rotation of said second named motor, a switch for controlling said electrically operated means, a pinion operable by said idler pinch roller, a rack operable by said pinion and adapted to trip said switch, brake means for preventing the overrun of said idler pinch roller, and means operable by the plates as they pass between said set of pinch rollers including the idler roller for releasing said brake means.

In testimony whereof, I have hereunto set my hand.

ARTHUR R. McARTHUR.