Nov. 24, 1931. S. McMULLAN 1,833,654

SIGNALING SYSTEM FOR MATERIAL HANDLING APPARATUS

Filed March 31, 1925

Fig. 1.

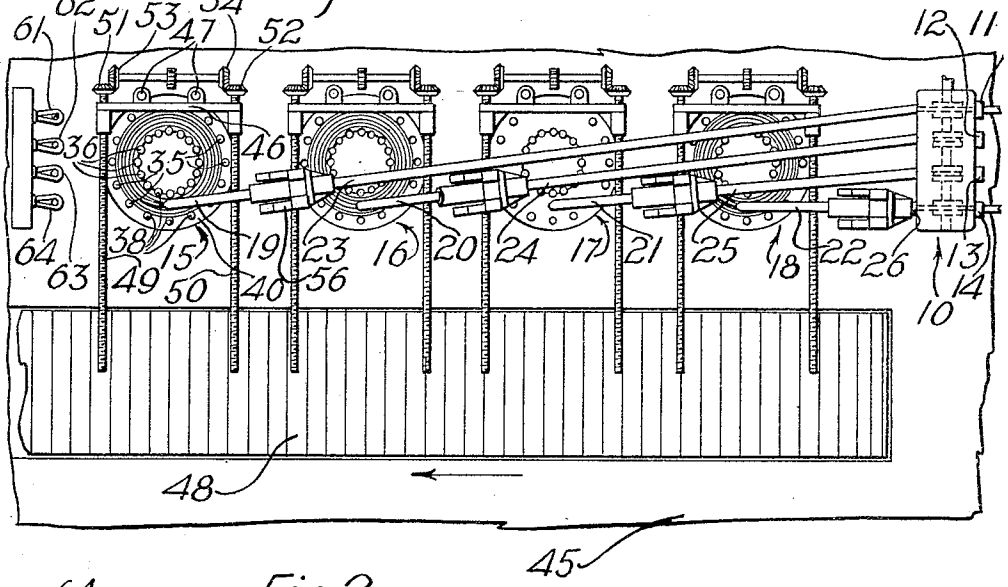



Fig. 2.

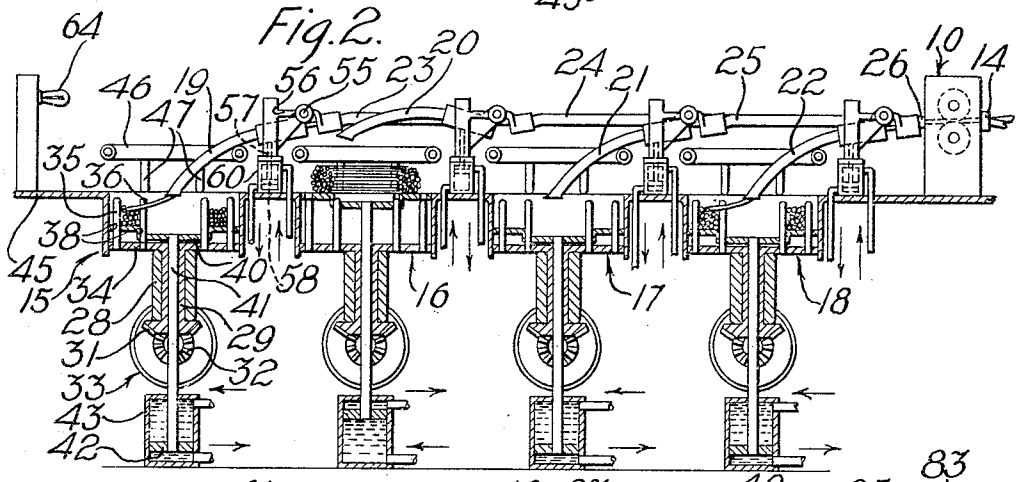
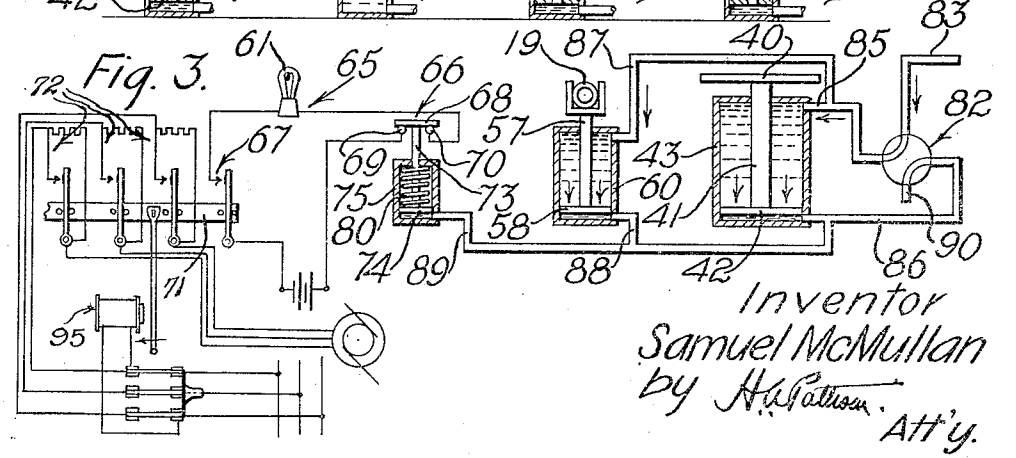



Fig. 3.




Inventor
Samuel McMullan
by H. A. Pattison.
Att'y.

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# UNITED STATES PATENT OFFICE

SAMUEL McMULLAN, OF RIVERSIDE, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

## SIGNALING SYSTEM FOR MATERIAL HANDLING APPARATUS

Application filed March 31, 1925. Serial No. 19,699.

This invention relates to signaling systems for material handling apparatus, and more particularly to a signaling apparatus adapted for use in connection with the coiling mechanism of a rolling mill.

The object of the present invention is to provide in a material handling apparatus an improved signaling device for automatically and positively indicating when the apparatus is in condition to properly handle material.

One form of the invention is embodied in a rod coiling apparatus wherein the rod, after leaving the finishing pass of the rolling mill, is coiled and transferred to a conveyor leading to a quenching bath. The rod is guided to one of a plurality of coilers by means of delivery tubes individual to the coilers, each tube terminating in pivotally mounted portion. The operation of a common pneumatic valve causes the stripping of the coil from the coiling means and simultaneously causes the associated guide tube to be moved to permit the transfer of the coil to the conveyor. Simultaneously therewith and controlled by the same valve a switch operates which controls an electric circuit including a signaling lamp. When the tube is in its inoperative position the switch is open and the circuit is maintained open at that point until the tube returns to its operative position. The circuit includes a second switch which automatically closes the circuit at another point when the coiler has attained a predetermined speed, at which time it is ready to receive a rod which condition is indicated by the lighted lamp.

Other features of the invention will become apparent from the following detailed description, reference being had to the accompanying drawings wherein

Fig. 1 is a plan view of a plurality of coiling apparatus employed in a rod rolling mill embodying the features of the invention, the major part of the mechanism being shown schematically to more clearly illustrate the invention;

Fig. 2 is a fragmentary vertical section thereof, and

Fig. 3 shows a diagram of the electric circuit and air control mechanism.

Referring to Figs. 1 and 2 of the drawings in detail, 10 indicates, schematically, a finishing stand of any suitable type in a rolling mill for producing rod, and comprises a plurality of finishing passes or rolls 11, 12, 13 and 14 which lead to a plurality of coilers indicated generally at 15, 16, 17 and 18, respectively, which coilers are adapted to receive and coil the finished rod. The rod is guided to the coilers 15, 16, 17 and 18 by means of pivotally mounted tubes 19, 20, 21 and 22, respectively, which are connected with the passages 11, 12, 13 and 14 by guide pipes 23, 24, 25 and 26, respectively.

Since the coilers 15, 16, 17 and 18 are similar in construction and in operation, it is thought that a description of the construction and operation of coiler 15 will suffice. Rotatably journaled in a bearing 28 is a sleeve 29 to which is secured a bevel gear 31 meshing with a pinion 32 which is driven from any suitable source of power such as an electric motor 33. Rigidly secured near the top of the sleeve 29 is a disk 34 and projecting upwardly from the disk are a plurality of pins 35 and 36 arranged in concentric circles and which are adapted, when the coiler is in operation, to coil rod guided into the space between the circles by the tube 19. The pins project through apertures 38 formed in a stripping plate 40 which is secured to a rod 41 slidably journaled in the sleeve 29 and connected to a piston 42 disposed in a pneumatic cylinder 43. The cylinder 43 is connected to any suitable source (not shown) of air or other gaseous medium under pressure whereby the rod 41 and stripping plate 40 may be moved upwardly to strip the coiled rod from the pins and raise it to the level of a floor 45.

Depending from a carriage 46 are posts 47 which are adapted to push the coiled rod across the floor 45 onto a conveyor 48 which is driven by any suitable means (not shown) and is adapted to deposit the coiled rod in a quenching bath or the like (not shown). The carriage 46 is reciprocably mounted on a pair of threaded rods 49 and 50 which

are rotatably journaled in suitable bearings (not shown) and are driven by any suitable means through bevel gears 51 and 52 meshing with bevel gears 53 and 54, respectively. The tubular member 19 is pivoted at 55 in a bracket 56 and is adapted to be oscillated in a vertical plane by a piston rod 57 (Fig. 3) which is connected to a piston 58 in a pneumatic cylinder 60. The cylinder 60 is connected to the supply (not shown) of air under pressure whereby the air may be admitted into the cylinder in such manner that the tube 19 may be moved into and out of its operative position with respect to the coiler 15, thus permitting the tube 19 to be withdrawn from the path of the carriage 46 when the coiled rod is to be transferred to the conveyor 48.

The above described coiling and transferring mechanism is fully disclosed and described in Patent No. 1,598,835 to Ralph C. Walter, dated September 7, 1926. It is therefore thought that a further detailed description thereof is unnecessary herein.

Associated with the coilers 15, 16, 17 and 18 are signal lamps 61, 62, 63 and 64, respectively, which lamps serve to indicate to the operator which coilers are ready to receive a rod. In order for a coiler to be ready to receive a rod it must be revolving at or above a predetermined speed and the pivotal guide member which guides the rod between the circles of coiler pins, must be in its lowered position. Each of the signal lamps is connected in an electric circuit 65 (Fig. 3) which circuit is controlled by switches 66 and 67, the switch 66 being operated simultaneously with the movement of the pivotal guide member 19, as will hereinafter be described, and the switch 67 being controlled by the speed of the coiler motor. Any well-known mechanism may be provided for automatically closing the switch 67 to close the circuit 65 when the coiler motor has attained a predetermined speed. In the present embodiment of the invention the switch 67 is controlled by the reciprocable contact support bar 71 which closes and opens the switch 67 simultaneously with the closing and opening of the final contacts 72 of the motor control circuit as indicated in Fig. 3. The bar 71 may be actuated in the usual manner by a slow operating relay 95 connected in the motor circuit of the coiler, the relay being timed so as to operate to close motor contacts 72 and switch 67 upon the coiler motor attaining a predetermined speed.

The switch 66 comprises a contact member 68 (Fig. 3) which is adapted to engage a pair of contacts 69 and 70 to close the circuit 65 when the guide tube 19 is in its operative position with respect to the coiler 15. The contact member 68 is secured near the top of a piston rod 73 which is connected to a piston 74 disposed in a pneumatic cylinder 75. The cylinder 75 is connected to the supply (not shown) of air under pressure in such manner that the air may be admitted to move the piston 74 and piston rod 73 upwardly, thereby causing the contact member 68 to be disengaged from the contacts 69 and 70. A compression spring 80 (Fig. 3) encircling the piston rod 73 and interposed between the piston 74 and the top of the cylinder 75 serves to return the contact member 68 to the position wherein it engages the contacts 69 and 70 after the guide tube 19 has returned to its operative position.

Referring to Fig. 3, the means for controlling the admission of air under pressure into the cylinders 43, 60 and 75 comprises a manually operable two-way valve 82 which is connected by a pipe 83 to the source (not shown) of air under pressure. The valve 82 is connected to the cylinder 43 by pipes 85 and 86 and is similarly connected to the cylinder 60 by pipes 87 and 88. A pipe 89 connected to the pipe 88 provides a passage for compressed air from the valve 82 into the cylinder 75. An exhaust pipe 90 connected to the valve 82 provides a means for the escape of the compressed fluid from the cylinders 43, 60 and 75.

Since as mentioned above the coilers 15, 16, 17 and 18 function similarly the operation of the coiler 15 and its associated signaling mechanism is alone described. The coiler is rotated by starting the driving motor 33, the valve 82 being manipulated to admit air under pressure through the pipe 83, valve 82, and pipes 85 and 87 into the cylinders 43 and 60, respectively, above the pistons 42 and 58, respectively. When the valve 82 is in this position, the cylinders 43, 60 and 75 communicate with the exhaust pipe 90 through the pipes 86, 88 and 89, respectively, which are connected to the cylinders below the pistons 42, 58 and 74. It is, therefore, apparent that the compressed air moves the pistons 42 and 58 downwardly and, at the same time, the compression spring 80 forces the piston 74 downwardly causing the contact member 68 to engage the contacts 69 and 70 thus closing one opening in the circuit. Upon the coiler attaining a predetermined speed, the switch 67 automatically closes the circuit 65 thereby lighting the lamp 61 and indicating to the operator positioned at the finishing pass that the coiler 15 is ready to receive a rod. In response to this signal the operator inserts the rod into the pass associated with such coiler. Likewise the lamps 62, 63 and 64 when lighted indicate to the operator that the coilers 16, 17 and 18, respectively, are each ready to receive a rod.

After a rod has been coiled by the coiler 15, the motor 33 is brought to a stop in any usual manner and the valve 82 is manipulated so that air under pressure will enter

the cylinders 43, 60 and 75 through the pipes 86, 88 and 89, respectively, while the cylinders 43 and 60 communicate with the exhaust pipe 90 through the pipes 85 and 87, respectively. The stopping of the motor 33 automatically opens the switch 67, thereby opening the circuit 65 and extinguishing the lamp 61. The compressed air moves the pistons 42, 58 and 74 upwardly carrying with them the stripping plate 40, the guide tube 19 and the contact member 68, respectively. The upward movement of the piston 74 causes the contact member 68 to become disengaged from the contacts 69 and 70, thereby opening the circuit 65 at a second point.

The stripping plate 40, in moving upwardly, strips the coiled rod from the pins 35 and 36 and raises it to the level of the floor 45. Simultaneously therewith the upward movement of the piston 58 causes the guide tube 19 to move upwardly and out of the path of the carriage 46 which moves forwardly to push the coiled rod onto the conveyor 48. The guide tube 19 is maintained in this position until after the carriage 46 has returned to its normal position after which the motor 33 is again started and the valve 82 is again manipulated to return the tube 19 to its operative position with respect to the coiler 15. The same operation is repeated for each of the coilers 15, 16, 17 and 18 while their associated lamps 61, 62, 63 and 64, respectively, indicate to the operator when they are ready to receive rods.

Although the invention is herein illustrated and described in connection with a coiling apparatus employing four coilers positioned in a certain arrangement, it should be understood that the improved signaling system is applicable to any number of coilers arranged in any manner without departing from the spirit of the invention which should be limited only by the scope of the appended claims.

What is claimed is:

1. In an apparatus for handling strand material, a plurality of rotatable coilers each adapted upon attaining a predetermined rotative speed to receive and coil a moving strand, delivery pipes individual to the coilers, movable to a plurality of positions with respect thereto and operative in one of said positions for guiding strands to the associated coilers, a strand distributing member common to all of the coilers and having a plurality of strand distributing passages, guide tubes individually connecting the delivery pipes with the distributing passages, and means individual to the coilers, distinguishable from the distributing member, and effective when the associated coiler has attained the predetermined speed and the associated delivery pipe is in operative position with respect thereto for indicating when the respective coilers are ready to receive a strand.

2. In a rod mill, a plurality of individually driven rotatable coilers each adapted upon attaining a predetermined rotative speed to receive and coil a drawn rod, delivery pipes individual to the coilers, movable to a plurality of positions with respect thereto and operative in one of said positions for guiding rods to the associated coilers, a finishing stand common to all of the coilers and having a plurality of passes individually connected with the delivery pipes, and means individual to the coilers, distinguishable from the finishing stand and effective upon the respective coilers attaining the predetermined speed and when the associated delivery pipes are in operative position with respect thereto for indicating that the respective coilers are ready to receive a rod.

3. In a rod mill, a plurality of individually driven rotatable coilers each adapted upon attaining a predetermined speed to receive and coil a drawn rod, delivery pipes individual to the coilers, movable to a plurality of positions with respect thereto and operative in one of said positions for guiding rods to the associated coilers, a finishing stand removed from and common to all of the coilers and having a plurality of passes, guide tubes individually connecting said passes with the delivery pipes, and an electrical signal circuit associated with each of the coilers, each signal circuit including a circuit closer responsive to the speed of the coiler, a circuit closer actuated by the delivery pipe, and a lamp visible to an operator at the finishing stand and effective when the associated coiler has attained the predetermined speed and the associated delivery pipe is in its operative position, for indicating that the said coiler is ready to receive a rod.

In witness whereof, I hereunto subscribe my name this 17th day of March, A. D., 1925.

SAMUEL McMULLAN.