Dec. 31, 1957 G. E. MARTELL 2,818,149

SAFETY DEVICE

Filed March 29, 1954

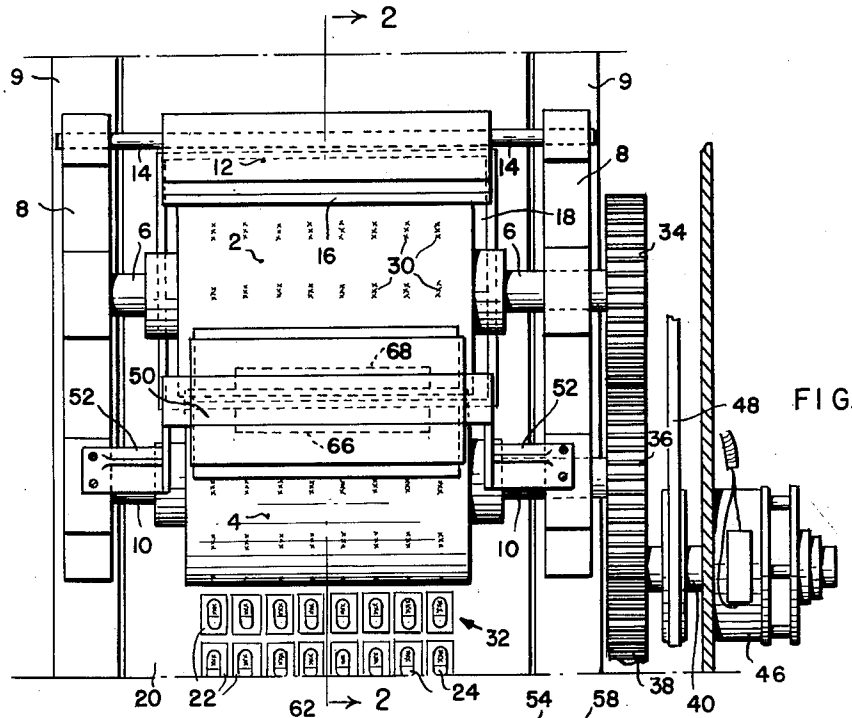


FIG. 1.

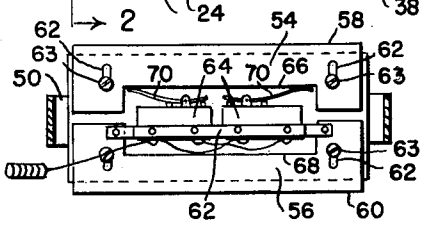


FIG. 3.

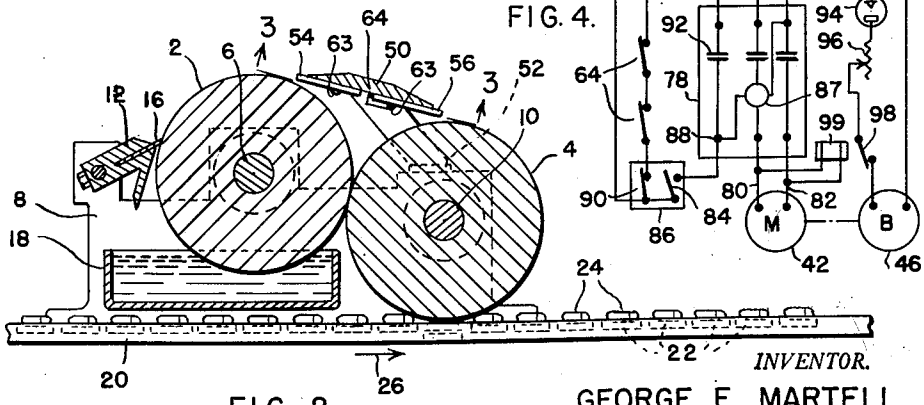


FIG. 2

FIG. 4.

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United States Patent Office 2,818,149 Patented Dec. 31, 1957

2,818,149

SAFETY DEVICE

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Application March 29, 1954, Serial No. 419,182

1 Claim. (Cl. 192—130)

This invention relates to a safety device and, more particularly, to a device for preventing foreign objects and operator's fingers from being engaged by a pair of adjacently positioned rollers.

In certain types of printing operations, an engraved print roller is adapted to operate adjacent to a transfer roller. The two rollers are in engagement with each other and the transfer roller carries ink from the engraved portions of the print roller and transfers the ink to objects to be printed. These rollers generally rotate in such directions that the engaging portions of the rollers move away from the operator of the machine. It is necessary at intervals for the operator to wipe off the transfer roller in order to insure continued clean printing. With the engaging rollers rotating in the direction described, there is a highly hazardous condition existing and the likelihood of harm to the operator or damage to the machine as a result of foreign objects, including the operator's fingers, becoming engaged between the rollers is great.

It is the object of this invention to provide a safety device which may be positioned adjacent to the rotating rollers or to any similar rotating elements to prevent foreign objects from becoming engaged between the rollers and, at the same time, to provide only a minimum of obstruction or coverage over the surfaces of the rollers to provide a maximum exposed area of the rollers to facilitate the operator's observation of the rollers and cleaning of the rollers.

The foregoing and other objects of the invention will become apparent from the following description when read in conjunction with the accompanying drawing in which:

Figure 1 is a plan view of apparatus embodying the invention;

Figure 2 is an elevation taken on the trace 2—2 shown in Figure 1;

Figure 3 is a fragmentary showing of the apparatus taken on the trace 3—3 of Figure 2; and

Figure 4 is a diagram showing the electrical circuit involved.

Referring to the drawing, an engraved printing roller 2 is mounted on a shaft 6 which is supported at each end by blocks 8 which are affixed to frame members 9. A transfer roller 4 is mounted on a shaft 10, the ends of which are supported by the block 8. The two rollers 2 and 4 are positioned so as to be in engagement with each other. A member 12 extending transversely of the roller 2 is mounted on a shaft 14 which is supported by the block 8. The member 12 carries a blade 16 which rests upon the roller 2 with a force provided by the weight of the member 12. An ink reservoir 18 is supported below the roller 2 in such a position that the roller rotating in a clockwise direction, as viewed in Figure 2, carries ink from the reservoir 18 toward the blade 16. A conveyor 20 passing between the frame member 9 and below the rollers 2 and 4 includes a plurality of rows of yieldably mounted article carrying blocks 22. Articles 24 are carried on the blocks and pass under the roller 4 and come into engagement therewith as the conveyor 20 moves in the direction of the arrow 26 in Figure 2.

The roller 2 is engraved with a plurality of annular successions of indicia 30. As the roller 2 rotates, it carries ink upwardly from the reservoir 18 and the ink penetrates into the engravings on the roller. The scraper blade 16 moves the excess ink from the roller and the surface of the roller passing beyond the scraper blade 16 contains ink only in the engraved portions thereof. The roller 4, which is preferably made of hard rubber or other suitably yielding material, is pressed into engagement with the roller 2 and, as the ink filled engravings of the roller 2 come into contact with the roller 4, ink is picked up from the engravings by the roller 4 and carried by the roller 4 which rotates in a counterclockwise direction downwardly toward the conveyor 20. The locations of the engravings on the roller 2 and the speed of rotation of the rollers is selected so that a transferred ink indicia carried by the roller 4 comes into engagement with and is applied to each of the successive articles carried by the article carrying blocks 22 passing under the roller 4, as indicated at 32 in Figure 1.

The roller 2 is driven by means of a gear 34 mounted on the shaft 6. The roller 4 is driven by means of a gear 36 mounted on the shaft 10. The gears 34 and 36 are in mesh with each other and are driven through the gear train 38 from a shaft 40. A motor, shown at 42 in the wiring diagram of Figure 4 and not shown in Figure 1, drives the shaft 40 through a belt 48 in a conventional fashion. A magnetic brake 46 is mounted on the shaft 40 and is adapted to arrest rotation of the shaft in the conventional manner in response to operation of an electrical circuit shown in Figure 4 and which will hereinafter be described.

A fixed plate 50 extends longitudinally above the rollers 2 and 4 and is supported by brackets 52 affixed to the blocks 8. A pair of longitudinally extending movable plates 54 are positioned under the fixed plate 50 and have oppositely positioned longitudinally extending edges 58 and 60, respectively, extending outwardly from under the fixed plate 50. The movable plates 54 and 56 are each provided with a pair of slots 62 through which there extends pins 63 supporting the movable plates from the fixed plate from movement toward and away from each other.

A pair of conventional limit switches 64 is mounted on a bar 62 attached to the movable plate 56. The plates 54 and 56 are provided with cut-away portions 66 and 68, respectively, to provide space for the limit switches 64. Each of the limit switches 64 is provided with the conventional limit switch operating lever 70. The movable ends of the operating levers 70 are adapted to engage the edge of the recess 66 in the movable plate 54. It will be evident that the arrangement described will provide for movement of either or both of the limit switch operating levers 70 in response to movement of either or both of the movable plates 54 and 56. Thus, in the operation of the apparatus, an operator while cleaning the rollers 2 or 4 may accidentally engage either of the movable plates 54 or 56 by a foreign object such as a cleaning rag or his fingers whereupon the engaged movable plate will be displaced causing actuation of one or both of the limit switches 64.

Referring to the wiring diagram of Figure 4, the apparatus is connected to a suitable source of power by means of a conventional disconnect switch 72. A pilot light 73 is connected across the load side of the disconnect switch to indicate closure of the switch. Two conductors 74 and 76 connect the disconnect switch with two terminals on the supply side of a conventional three

pole motor starter 78. The motor 42 is connected to the corresponding load side terminals of the motor starter 78 through conductors 80 and 82. A start contact 84 of a conventional start-stop switch 86 is connected in series between the conductor 74 and the third load side terminal 88 of the motor starter. This connection serves to energize the motor starter holding coil 87 when the start switch 84 is closed, the coil 87 being connected between the terminal 88 and the conductor 76. Connected in parallel with the start switch 84 is the stop switch 90, the normally closed contacts of the two limit switches 64 and the third contact 92 of the motor starter 78. This contact 92 serves to hold the coil 87 of the motor starter after the coil has been energized through the start switch 84, and the motor starter closed.

The brake 46 is connected across the conductors 74 and 76 in series with a rectifier 94, a current limiting resistance 96 and a contact 98. The contact 98 is positioned to be opened when a solenoid coil 99 is energized. The solenoid coil 99 is connected between the conductors 80 and 82 supplying the motor 42.

In operation of the apparatus, upon closure of the disconnect switch 72, the brake 46 is energized and rotation of the apparatus is prevented. Upon closure of the start switch contact 84, the motor starter coil 87 is energized, closing the motor starter and supplying power to the motor 42. The potential applied across the conductors 80 and 82 serves to energize the solenoid coil 99 opening the contact 98, releasing the brake 46. After the motor starter has closed, the start contact 84 may be opened and the motor starter coil 87 is sealed in through the motor starter contact 92, the limit switch contacts 64 and the stop switch contact 90. Thereafter, the motor will continue to operate until one of the limit switches 64 of the safety device or the stop switch 90 is opened. Opening of one of these switches will cause the motor starter to drop out, the contact 98 to close and thus the brake 46 will be applied substantially immediately, serving to arrest rotation of the machine and, particularly, of the rollers 4 and 6 whenever any foreign object engages either of the movable plates 56 or when the stop switch contact 90 is actuated.

While the invention has been described in conjunction with a printing apparatus employing a pair of adjacent rollers, it will be evident that the safety device may be

adapted for use with any power driven apparatus having a pair of adjacently positioned generally parallelly extending rotatable members. Thus the invention is not limited to association with a printing apparatus. It will be evident that these and other modifications may be made in the embodiment of the invention disclosed herein without departing from the scope of the invention as set forth in the following claim.

What is claimed is:

A safety device adapted for use with a pair of adjacently positioned power driven rotatable rollers having generally parallel adjacent surfaces, the device comprising a fixed plate extending generally parallel to said rollers and positioned with its underside facing said rollers and with each longitudinal edge thereof adjacent to one of the rollers, a pair of plates, means movably mounting said plates on the underside of said fixed plate for movement generally parallel with the underside of said fixed plate and transversely thereof, one of said movable plates having one edge extending out from under one longitudinal edge of said fixed plate between said fixed plate and an adjacent roller, the other of said movable plates having one edge extending out from under the other longitudinal edge of said fixed plate between said fixed plate and the other adjacent roller, said movable plates each being positioned substantially tangentially to its adjacent roller, and electrical control means responsive to movement of either of the plates and adapted to act in response to movement of either of the plates to arrest operation of the power driven rollers, the fixed and movable plates substantially completely closing off the space between the rollers below the fixed plate.

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