

July 2, 1957

F. G. WILDE ET AL

2,797,793

SAFETY DEVICE FOR MACHINES FOR MAKING PRINTS

Filed July 22, 1954

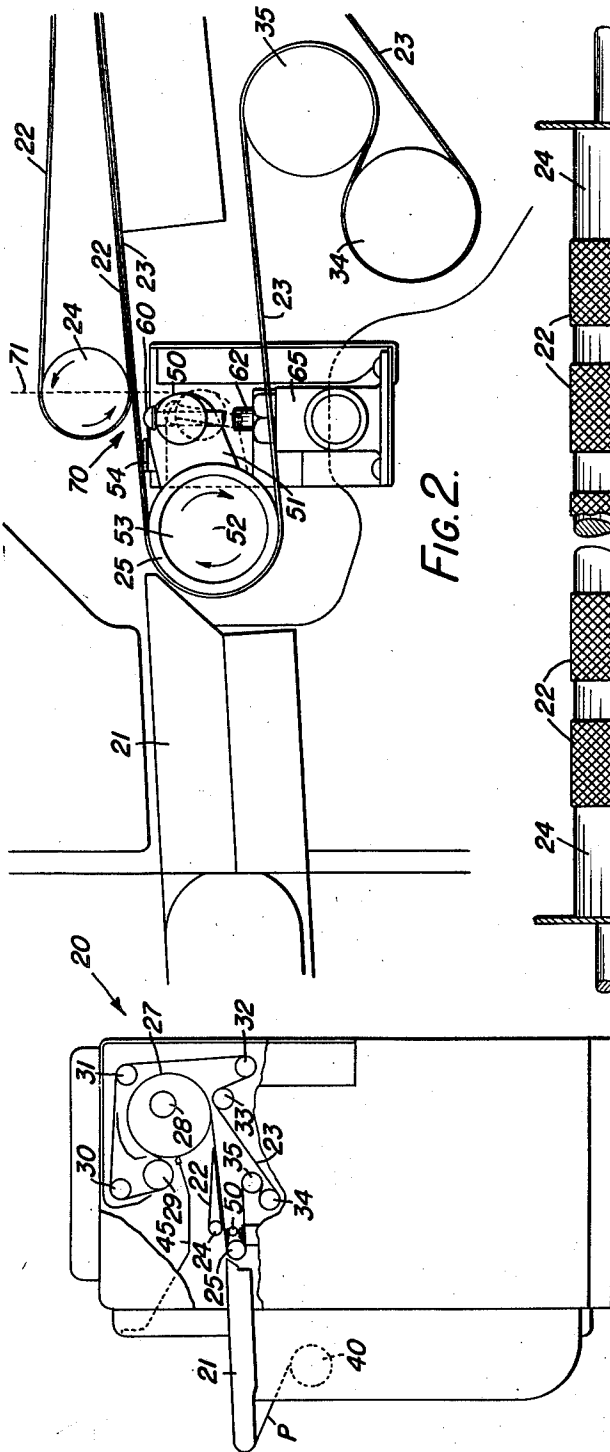


FIG. 1.

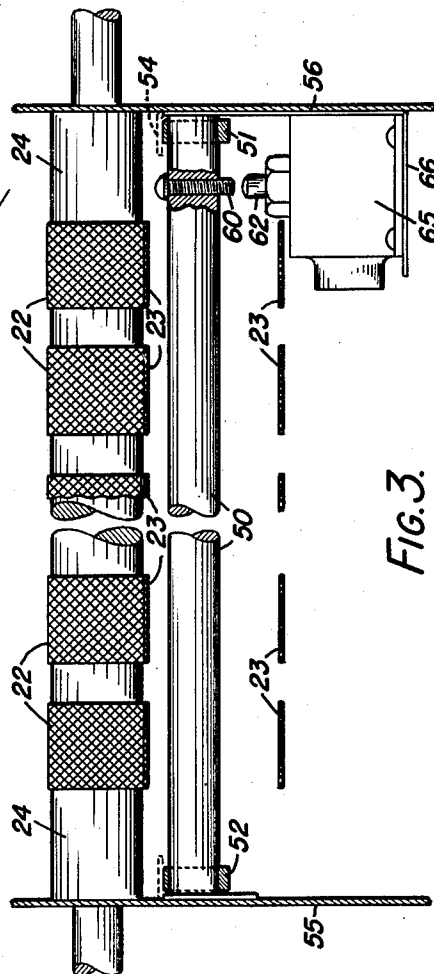


FIG. 2.

FIG. 3.

INVENTORS
FREDERICK G. WILDE
AND HOLLAND F. JOHNSON

BY *B. Schlegel*
ATTORNEY

1

2,797,793

SAFETY DEVICE FOR MACHINES FOR MAKING PRINTS

Frederick G. Wilde and Holland F. Johnson, Rochester, N. Y., assignors to Paragon-Revolute Corporation, Rochester, N. Y., a corporation of New York

Application July 22, 1954, Serial No. 445,130

4 Claims. (Cl. 198—110)

The present invention relates to machines for making reproductions, and especially to machines for making blueprints, white prints, and the like. More particularly, the invention relates to a safety attachment for such a machine for protecting the operator in case the operator accidentally puts his hand into the feed mechanism of the machine.

In certain types of machines for making blueprints and the like, a tracing, or other matter to be reproduced, is placed upon sensitized paper; and the tracing and the paper are fed into the machine between upper and lower endless belts. The tracing and paper are conveyed past a glass enclosed lamp which makes the exposure. The endless belts are driven by rollers. One of the rollers, over which the upper belt or upper series of belts passes, is positioned adjacent the feed inlet of the machine but rearwardly of the forward end of the lower belt or lower series of belts.

In order to obtain a satisfactory reproduction, the tracing or other material to be reproduced must be started straight in the machine. If the tracing is not started straight, the operator must quickly reach into the machine, and withdraw the tracing so that he can start it anew properly. Occasionally in reaching for the tracing it occurs that the operator gets a hand caught between the upper roller and the lower belt, and his hand is drawn into the machine and may be crushed.

To protect the operator against such an occurrence and to enable the operator to withdraw a tracing from the machine quickly in case it is not started straight it is customary to provide a tension release mechanism on the machine for the lower belt or series of belts so that the operator can release the belt drive. However, this device is not a complete protection, because if the operator gets his hand caught in the drive mechanism, it is not until after he gets it caught that he actuates the belt tension release.

Various other types of safety devices, that are used to protect operators on other types of machines, are not satisfactory for machines for making blueprints and the like. A manual, or a foot-treadle operated, stop button or stop switch, like a belt tension release mechanism, has certain deficiencies, and is no complete safeguard against injury. A guard member in front of the feed belts would interfere with proper feed of the tracings, or other matter to be reproduced, into the machine.

A primary object of the present invention is to provide a safety device for a machine for making blueprints and the like, which will automatically protect an operator from getting his or her hand injured by getting it caught between the feed belts of the machine.

Another object of this invention is to provide a safety device for a machine of the character described, which will operate before, not after, an injury occurs.

Another object of this invention is to provide an automatic safety device for a machine of the type described, which will be actuated without conscious effort on the part of the machine operator.

2

Another object of the invention is to provide a safety device of the character described which will operate automatically not only to prevent an operator's hand from being drawn into the machine, should be accidentally insert it therebetween, but will also actually operate to withdraw the operator's hand from between the belts.

A further object of the invention is to provide a safety device of the character described which can be manufactured easily and inexpensively.

Other objects of this invention will be apparent herein-after from the specification and from the recital of the appended claims.

In the drawing:

Fig. 1 is a side view of a machine for making blueprints and the like, which is provided with a safety device constructed according to one embodiment of this invention, a portion of the side of the machine being broken away to show the feed mechanism of the machine and the safety device;

Fig. 2 is an enlarged, fragmentary side view of the feed mechanism and safety device; and

Fig. 3 is a section taken generally on the line 3—3 of Fig. 2 and looking in the direction of the arrows.

In the drawing 20 denotes generally the printing machine. This machine, except for the safety device, may generally be of conventional construction. It has a feeding leaf 21, a series of parallel, narrow, upper endless feed belts 22 (Fig. 3), and a series of parallel, narrow, lower endless feed or contact belts 23.

The upper belts 22 travel over horizontal parallel rollers. The forward roller is denoted at 24.

The lower belts 23 travel over a roller 25, around a glass contact cylinder 27, which houses the quartz lamp 28, and over the rollers 29, 30, 31, 32, 33, 34, and 35 back to roller 25. The upper series of belts 22 is driven in the same direction as the lower series of belts 23, the drive being from a motor, not shown, mounted in the base of the machine.

The print paper P may be fed into the machine over feeding leaf 21 from a roll 40, that is suitably journaled in the base of the machine.

In operating the machine, the operator places the tracing on the paper P. The print paper and tracing are carried between the upper belts 22 and the lower belts 23 and around the glass contact cylinder 27. As the sensitized paper and tracing move over cylinder 27, the tracing is reproduced on the paper, after which the tracing is deposited in a tracing tray 45. The printed paper then moves on to be deposited at the back of the machine.

It not infrequently happens that a tracing is wrinkled, has tattered edges, or bent corners, and it has to be straightened out before it reaches the glass cylinder 27; otherwise a poor print will be obtained. Accidents occur when the operator, concentrating on straightening out the tracing, or other item which is to be reproduced, gets his hand caught between the rollers 24, or the portions of the belts 22 passing over rollers 24, and the endless belts 23.

Heretofore, it has been customary to provide, as a safety device, a foot-operated tension release pedal for the contact belts 23 so as to enable the operator by quickly stepping on the pedal to release the tension on the belts 23, thus preventing the operator's hand from being drawn in further between rollers 24, or belts 22, and belts 23. It takes an instant or so, however, for the mind to react and to telegraph to the foot an order to step on the pedal. In this instant the operator may suffer a serious or, at least, painful injury.

To avoid this, the safety device, of the present invention has been devised. With this device, should an operator's hand get caught between the roller 24, or belts 22, and the belts 23, the belts 22 and 23 will be reversed

3

automatically, and the hand will be fed automatically out from between the belts instead of being drawn therebetween.

This device comprises a horizontal trip-bar 50 which extends substantially across the full width of the belts. It is positioned between the upper and lower reaches of the belts 23 slightly forward of the vertical center line 71 of the roller 24. It is mounted at its ends on the rear ends of two parallel arms 51 which are pivotally supported for rocking movement about the axis 52 of the shaft 53 on which the roller 25 is journaled. Compression springs (not shown) are provided which tend constantly to rock the arms 51 and trip bar 50 upwardly. This upward rocking is limited by stops 54 which are angle irons and which are secured to opposite sides 55 and 56 of the machine. The stops hold the trip-bar 50 spaced about one-quarter inch below the adjacent upper reaches of the belts 23.

Bar 50 has a pin 60 threaded through it adjacent one end. The lower end of this pin 60 is normally slightly spaced from the plunger 62 of a micro-switch 65. The micro-switch is wired in the circuit to the motor which drives the belts 22 and 23, so that, when it is tripped, it reverses this motor and drives the belts oppositely to the feed direction. Thereby the operator's hand is carried out of the machine, that is, out from between the belts 22 and 23. Switch 65 is mounted on an angle bracket 66 which is secured to the inside of side 56 of the machine.

The belts 22 and 23 are mounted in such relation that the mouth or entry opening 70 between them will receive tracings and print paper; and the belts are taut enough to effect the feed of the tracings and print paper. Nevertheless the belts will yield to some extent.

The operation of the safety device is as follows: If an operator gets his hand caught under roller 24 and between endless belts 22 and 23, the belts 23 will yield sufficiently under the pressure, and because of the thickness of the operator's hand, for the trip-bar 50 to be rocked about its pivotal axis 52, against the resistance of the compression springs referred to previously. In this rocking movement, the lower end of pin 60 strikes the plunger 62 of the micro-switch 65, tripping the switch. This reverses the drive motor of the machine, reversing the belts and withdrawing the operator's hand from between the belts. As the hand is expelled and freed, trip-bar 50 rises to its original position as shown in Fig. 3. When the contact between pin 60 and plunger 62 is broken, the motor again reverses restarting the belts in their respective feeding directions.

However, instead of restarting the motor automatically, the switch 65 may be incorporated in or connected to a timer relay, so that the timer relay will control the ensuing operation. If the switch is tripped, then, it reverses the drive motor of the machine, as described, reversing the belts, but after a predetermined time, determined by the setting of the timer, the motor stops. This will insure complete withdrawal of the operator's hand from the machine. In this case, the start button of the machine must be positively actuated to restart the feed movement of the belts.

The trip-bar 50 is spaced, as stated, a quarter of an inch or so below the upper reaches of belts 23. This is enough to prevent tripping of limit switch 65 if a tracing, or other matter to be reproduced, of slightly more than usual thickness is fed into the machine. It is close enough to the upper reaches of belts 23, however, to trip the limit switch if the upper reach of any of the belts 23 is depressed by interposition between that upper reach and the adjacent lower reach of a belt 22 of an object of extraordinary thickness such as the human hand.

The trip-bar 50 is positioned slightly forward of the vertical center line 71 of the roller 24 so that it will

4

be rocked and the limit switch will be tripped as soon as the tips of the fingers of the operator enter the mouth 70 between the belts, thus reducing to a minimum the possibility of injury to the operator.

The safety device of the present invention operates, before an injury occurs, by reversing the machine feed to expel the operator's hand from the machine. Its location inside the machine and between the upper and lower reaches of the lower set of belts permits free operation of the machine without obstruction.

While the invention has been described in connection with a specific embodiment thereof, it is to be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

Having thus described our invention, what we claim is

1. In a machine of the character described having an inlet through which material may be fed into the machine, an upper endless feed belt and a lower endless feed belt, means for driving said belts simultaneously in the same direction comprising in each case a roller over which the forward end of the respective belt travels, the lower reach of said upper belt being positioned in operative relation to the upper reach of the lower belt to receive said material between them and to feed that material onward into the machine, the roller over which the forward end of the upper belt travels being spaced rearwardly a greater distance from said inlet than the roller over which the forward end of the lower belt travels, whereby to expose a portion of the lower belt onto which the material may be placed through said inlet, and a control member for said driving means mounted between the upper and lower reaches of the lower belt to be actuated when engaged by the upper reach of said lower belt, said control member being disposed rearwardly of the forward end of the upper belt, said control member being spaced below the upper reach of said lower belt so that a lost-motion downward movement of said upper reach of said lower belt must take place before said control member is actuated, said control member being operatively connected to said driving means to reverse said driving means when said control member is actuated.

2. In a machine of the character described, an upper endless feed belt and a lower endless feed belt, means for driving said belts simultaneously in the same direction, the lower reach of said upper belt being positioned in operative relation to the upper reach of the lower belt to receive material between them and to feed that material into the machine, control means for said driving means including a switch for reversing said driving means, and movable actuating means for tripping said switch comprising a bar disposed between the upper and lower reaches of said lower belt, said bar extending across the full width of said lower belt and being pivotally mounted in said machine for rocking movement about a horizontal axis, and a member carried by said bar for engaging and tripping said switch when said bar is rocked downwardly about its pivotal axis, said bar being spaced below the upper reach of said lower belt whereby a predetermined downward movement of said upper reach is required before said upper reach engages said bar to rock said bar downwardly, and said member being adjustable in said bar to predetermine the amount of downward movement of said bar required before said member trips said switch.

3. A machine of the character described having an inlet through which material may be fed into the ma-

5

chine, an upper endless belt and a lower endless belt positioned adjacent and in operative relation to said inlet to receive said material between their respective lower and upper reaches, means for driving said belts simultaneously in the same direction, said means including in each case a roller over which the forward end of the respective belt passes, the roller over which the forward end of the upper belt travels being spaced rearwardly a greater distance from said inlet than the roller over which the forward end of the lower belt travels, whereby to expose a portion of the lower belt onto which the material may be placed through said inlet, and a safety device for stopping travel of said belts in the normal feed direction comprising a movable member disposed between the upper and lower reaches of said lower belt, said member being normally positioned a distance below the upper reach of said lower belt and slightly forward of the vertical center of the roller over which the forward end of the upper belt travels, and said member being actuable by downward movement thereof.

4. A machine of the character described having an inlet through which material may be fed into the machine, an upper endless feed belt and a lower endless feed belt positioned adjacent and in operative relation to said inlet to receive said material between their respective lower and upper reaches, means for driving said belts simultaneously in the same direction, said means including a first roller over which the forward end of

6

said upper belt passes and a second roller over which the forward end of said lower belt passes, said first roller being spaced rearwardly a distance from said inlet and said second roller being positioned forwardly of said first roller, and a safety device comprising a switch for reversing said driving means, a movable bar disposed between the upper and lower reaches of said lower belt and extending across the full width thereof, said bar being normally positioned a distance below the upper reach of said lower belt and slightly forward of the vertical center of said roller, and means for pivotally supporting said bar rearwardly of said second roller for downward rocking movement about a horizontal axis coaxial with said second roller, and a member carried by said bar for engaging and tripping said switch when said bar is rocked downwardly about its pivotal axis, whereby a predetermined downward movement of the upper reach of said lower belt is required before said upper reach engages said bar to rock said bar downwardly.

References Cited in the file of this patent

UNITED STATES PATENTS

1,537,864	Morin	May 12, 1925
2,029,936	Morin	Feb. 4, 1936
2,271,750	Vandercook et al.	Feb. 3, 1942
2,535,770	Wilde	Dec. 26, 1950
2,553,719	Palmer	May 22, 1951