July 5, 1932. E. L. MUELLER 1,865,479

SAFETY DEVICE FOR PRINTING PRESSES AND THE LIKE

Filed Aug. 5, 1930

Fig. 1.

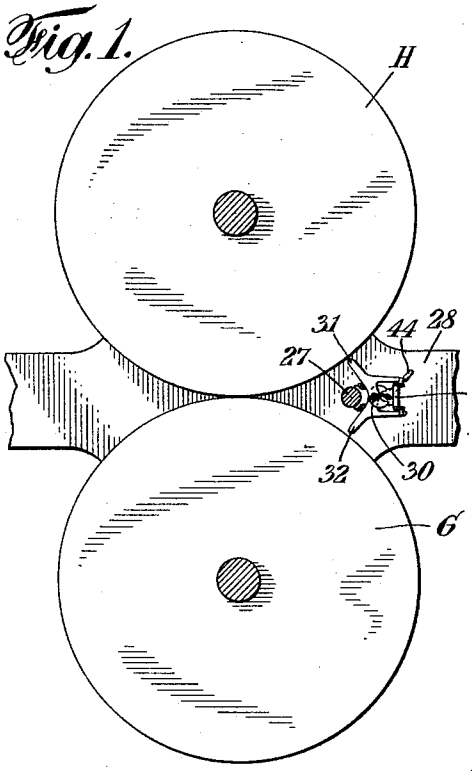


Fig. 2.

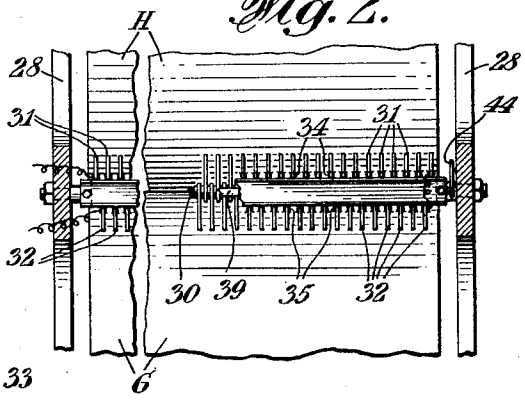


Fig. 3.

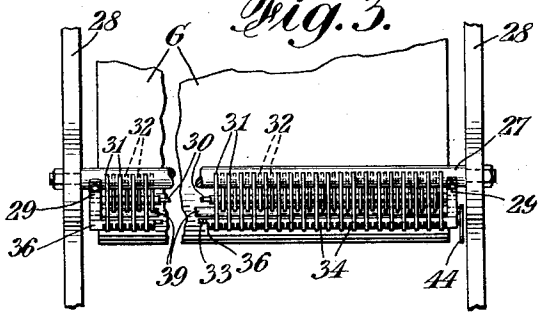


Fig. 4.

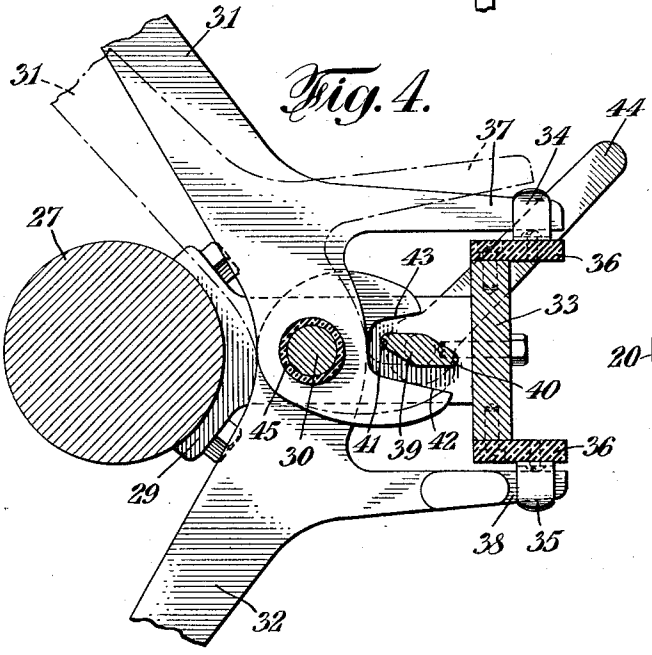
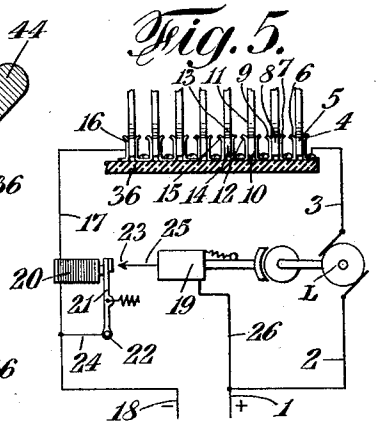


Fig. 5.



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UNITED STATES PATENT OFFICE

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SAFETY DEVICE FOR PRINTING PRESSES AND THE LIKE

Application filed August 5, 1930. Serial No. 473,140.

This invention relates to a safety device for printing presses and the like and an object of the invention is to provide a simple, practical and efficient device acting to prevent injury to printing rollers, on the accidental passage of bulky articles between them, and also to prevent likelihood of injury to the person of a workman.

A more detailed object is to provide a safety device which may be arranged adjacent a pair of printing rollers or the like and which will stand as a guard to be engaged by any articles, such as a rag, rumpled paper, or an operator's finger, etc., and which will be effective to stop the movement of the rollers in consequence of such engagement.

A further object is to so construct the device that it may be manufactured and marketed as a separate article of commerce to be attached onto a printing press or the like.

A further and more specific object is to provide a safety device which will include a number of electric contacts all connected together in series and related with a brake mechanism in a manner to effect stoppage of the machine when circuit is broken at any one of said contacts, and to provide suitably sensitive means whereby the circuit will be broken at one or more of said contacts whenever a foreign object comes into engagement with the safety device.

A further detailed object is to provide simple and efficient means for manually restoring the parts of the safety device to their original operative position.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawing which is to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:—

Fig. 1 is a transverse sectional view through a device constructed in accordance with this invention and showing the same in association with a pair of printing rollers or the like.

Fig. 2 is a front elevational view of a portion of the structure shown in Fig. 1.

Fig. 3 is a top plan view of the structure illustrated in Figs. 1 and 2.

Fig. 4 is an enlarged transverse sectional view through the device as seen in Fig. 1, and

Fig. 5 is a diagrammatic view illustrating the electric wiring employed.

Referring to the drawing for describing in detail the structure shown therein, reference is first made to the wiring diagram as illustrated in Fig. 5 wherein the reference character L indicates a suitable electric motor which it will be understood is mechanically connected for driving a printing press or the like including for instance the two rollers as the impression roll G and the printing roll or cylinder H shown in Fig. 1.

The circuit for this motor extends from main 1 along wire 2 to the motor, thence along wire 3 to a spring contact 4. From this contact it traverses a blade 5 to a contact 6. The contact 6 is electrically connected with a contact 7. A second blade 8 fits between the contact 7 and a co-operative contact 9. The contact 9 is electrically connected with a contact 10, and a blade 11 fits between the contact 10 and a co-operative contact 12. The contact 12 is electrically connected with a contact 13, and a blade 14 fits between the contact 13 and a co-operative contact 15. These blades and contacts may be repeated in any number so that the current will travel through them in series, the last contact as 16 in the series being connected with a conductor as 17 which extends to the opposite main 18.

The blades 5, 8, 11, 13 etc. are engaged by friction between their co-operative spring contacts. They are easily removable, and the removal of any one or more of them will break the motor circuit.

In some instances the stopping of the motor may not be sufficient to insure stoppage of the rollers, as G and H, in as short a period of time as may be necessary to prevent damage or injury. In other cases a suitable elec-

trically operable brake mechanism, diagrammatically indicated at 19 in Fig. 5, may be provided for braking rotation of the rollers. This brake mechanism may be of any approved construction well known in this art. For the purpose of illustration it is shown here connected with the motor circuit as follows: The motor circuit may traverse a suitable electro-magnet as 20. A contact arm as 21, pivotally mounted as at 22, may be normally held by the magnet 20 out of engagement with a stationary contact 23 which is arranged for controlling a shunt circuit including the brake 19, the contact 21 being connected with main 18, as by wire 24, the contact 23 being connected with the brake mechanism as by wire 25 and the brake mechanism in turn being connected with the main 1 as by wire 26.

So long as the motor circuit is closed through all of the contacts and blades 4—16 the contacts 21 and 23 will be held separated so that the brake 19 is inoperative, but if an emergency should move one of the blades as 5, for breaking the motor circuit then the magnet 20 will release contact 21 and the brake device 19 will become instantly effective to stop rotation of the rollers G and H, the driving power of the motor having of course been removed by the breaking of the motor circuit.

Referring now more particularly to the illustrations Figs. 1 to 4, the reference character 27 indicates a stationary rod which extends across the printing or like machine as a part thereof, being usually in the form of a tie rod for connecting together the opposite side frame members as 28—28 of the machine.

Upon this rod is fixed a pair of brackets as 29—29, at the opposite sides of the machine. Extending between these two brackets is a pivot rod 30, and upon this rod is mounted a double row of arms as 31 and 32, each arm being pivotally mounted to swing freely upon the shaft as a pivot. The row of arms 31 project upwardly from the shaft 30 so that the outer ends of said arms 31 lie in close proximity to the nearest peripheral surface of the roller H, while the row of arms 32 projects downwardly from the shaft 30 and have their outer ends in close proximity to the nearest peripheral surface of the roller G.

The arms 31 preferably alternate with the arms 32 along the shaft 30. They may be as close together or as far apart as may be desired, and there may be any desired number of them. They preferably however are spaced equi-distant apart throughout the length of the rollers G and H.

Carried also by the brackets 29—29 is a cross bar 33 upon which is supported two rows of spring contacts, as indicated at 34 and 35, corresponding with those indicated 4, 6, 7, 9, 10, 12, 13, 15 etc. in Fig. 5. These contacts are preferably mounted upon insulating strips as 36—36 attached to the cross bar so that the contacts are suitably insulated from each other.

The arms 31—32 carry blades as 37 and 38, corresponding with blades 5, 8, 11, 14 etc. in Fig. 5, said blades being rigid one with each of the arms 31—32 and being movable into and out of contact forming position by swinging movement of said arms, as indicated by the dotted line position of one of the arms 31 in Fig. 4.

The blades are all held in contact making position by their frictional engagement between their co-operative spring contacts and said blades and arms are so weighted as to tend always to swing by gravity out of contact making position.

Any suitable means may be provided for restoring the arms 31—32 to contact making position but for this purpose the drawing herewith suggests the use of a rock shaft as 39 extending parallel with the shaft 30 and pivotally mounted in the brackets 29—29 said shaft having transversely extending portions as 40 and 41 at opposite sides of its axis of rotation, the portion 40 being adapted to engage shoulders as 42 provided upon the arms 31 and the portion 41 being adapted to engage shoulders as 43 provided upon the arms 32. An operating handle as 44 may be provided upon the rock shaft for rotating it at the will of the operator. The normal position of the rock shaft is approximately as indicated in Fig. 4 so that the arms 31—32 are free to swing out of contact making position, but when any one or more of the arms are out of contact making position all of them may be instantly returned to their normal positions by the simple act of swinging down the handle 44, the portions 40 and 41 engaging against the shoulders 42 and 43 of the displaced arms and forcing said arms back to contact making position.

It will be understood that the upper row as 34 of spring contacts is electrically connected in series with the bottom row 35, that is to say that all of the spring contacts, and their blades, are in series connection as indicated diagrammatically in Fig. 5, so that the motor circuit will be broken by movement of any blade, either of the upper arms 31 or the lower arms 32, out of contact making position.

All of the blades are of course insulated from each other. Any suitable means may be employed to this end, but for illustrative purposes the drawing herewith shows the use of an insulating sleeve as 45 surrounding the shaft 30 and serving as the immediate support for the arms 31—32 which are formed as parts of the blades, each arm and its blade being thereby insulated from each of the other arms and blades.

The arms 31—32 stand in such relation to the rollers G and H that any article, such as

an operator's hand or finger, or a rag, or even an extra thickness or sheet of paper, attempting to pass into the jaws between the two rollers will cause one or more of said arms to be swung to circuit breaking position, thereby instantly stopping the movement of the rollers as above described.

The present device may if desired be built into any appropriate machine requiring protection of the kind which this device affords, but it is preferably made up as a separate article of commerce adapted for easy attachment to and detachament from the machine. To this end it will be noted that the cross bar 33 is rigidly connected with the end bracket 29—29 between which the several other parts are mounted so that all may be handled as an entity. The end brackets may be given any desired form best calculated to facilitate their easy attachment to and disconnection from different machines. While said end brackets are herein illustrated as being shaped for attachment to the cross tie or rod 27 said end brackets may be otherwise shaped as will be understood for attachment to other convenient existing portions of different machines requiring protection. Or, of course the device may be connected with the machine in any other manner as preferred.

As many changes could be made in this construction without departing from the scope of the invented as defined in the following claims, it is intended that all matter contained in the above description, or shown in the accompanying drawing, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a pair of rotatable rollers and an electrically operable device to drive said rollers, of a guard device for said rollers comprising a plurality of electric contacts arranged in a row extending along one side of said rollers, and means including a plurality of contact blades co-operative with said contacts to complete a circuit for said electrically operable device extending in series through the row of blades, said blades having parts extending to points adjacent said rollers and being independently movable into and out of circuit closing position.

2. The combination with a pair of rotatable rollers, means to drive said rollers, and a brake to stop rotation of said rollers, of a guard device for said rollers comprising a guard member standing adjacent said rollers, means by which said guard member is movably mounted, and means by which movement of said guard member will control the operation of said brake.

3. The combination with a pair of rotatable rollers, means to drive said rollers, and an electrically operable brake to stop rotation of said rollers, of a guard device for said rollers comprising a plurality of electric contacts arranged in a row extending along one side of said rollers, and means including a plurality of contact blades co-operative with said contacts to complete a circuit extending in series through the row of blades for controlling the operation of said brake, said blades having parts extending to adjacent said rollers and being independently movable into and out of circuit closing position.

4. The combination with a pair of rotatable rollers, an electrically operable device to drive said rollers, and an electrically operable brake to stop rotation of said rollers, of a guard device for said rollers comprising a plurality of electric contacts arranged in a row extending along one side of said rollers, and means including a plurality of contact blades co-operative with said contacts to complete a circuit extending in series through the row of blades for controlling the operation of said electrically operable device and of said brake, said blades having parts extending to adjacent said rollers and being independently movable into and out of circuit closing position.

5. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are independently movable into and out of position connecting said stationary contacts in series for controlling an electric circuit, and said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact.

6. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are independently movable into and out of position connecting said stationary contacts in series for controlling an electric circuit, said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact, and manually operable means for moving said movable contacts to circuit closing position.

7. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are independently movable into and out of position connecting said stationary contacts in series for controlling an electric circuit, said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact, and a manually operable resetting device extending common to all of said movable contacts operable to return to con-

tact making position any of the movable contacts which have been moved out of contact making position.

8. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are mounted for independent pivotal movement into and out of position connecting said stationary contacts in series for controlling an electric circuit, and said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact.

9. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are mounted for independent pivotal movement into and out of position connecting said stationary contacts in series for controlling an electric circuit, said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact, and a manually operable re-setting device extending common to all of said movable contacts operable to return to contact making position any of the movable contacts which have been moved out of contact making position.

10. A guard device for rollers, said guard device comprising two rows of stationary contacts, two rows of movable contacts, a single pivot rod upon which all of the movable contacts are pivotally mounted to swing into and out of position connecting said stationary contacts in series for controlling an electric circuit, the movable contacts of one row each having a part extending to adjacent one roller adapted to be engaged for moving the respective movable contact, each movable contact of the other row having a part extending to adjacent another roller adapted to be engaged for moving the respective movable contact, and a manually operable re-setting device extending common to all of said movable contacts operable to return to contact making position any of the movable contacts which have been moved out of contact making position.

11. As an article of manufacture, a safety device comprising a cross bar having end brackets thereon, a shaft extending between said end brackets parallel with said cross bar, a row of electric contacts carried by said cross bar spaced apart in insulated relation along the length thereof, a row of contact members carried by said shaft spaced apart in insulated relation along the length of said shaft movable into and out of position controlling a circuit in series through the first contacts, and each movable contact having an arm projecting therefrom adapted for actuating said movable contact.

12 As an article of manufacture, a safety device comprising a cross bar having end brackets thereon, a shaft extending between said end brackets parallel with said cross bar, a row of electric contacts carried by said cross bar spaced apart in insulated relation along the length thereof, a row of contact members carried by said shaft spaced apart in insulated relation along the length of said shaft movable into and out of position controlling a circuit in series through the first contacts, each movable contact having an arm projecting therefrom adapted for actuating said movable contact, and a manually operable re-setting device mounted upon said end brackets and extending common to all of said movable contacts manually operable to return to contact making position any of the movable contacts which have been moved out of contact making position.

13. As an article of manufacture, a safety device comprising a cross bar having end brackets thereon, a shaft extending between said end brackets parallel with said cross bar, two rows of electric contacts carried by said cross bar, the contacts of each row being spaced apart in insulated relation along the length of said cross bar, two rows of contact members carried by said shaft spaced apart in insulated relation along the length of said shaft movable into and out of position controlling a circuit in series through the first contacts, said movable contacts being pivotally mounted upon said shaft and being alternately associated with the respective rows of first contacts, each movable contact having an arm projecting therefrom adapted for actuating said movable contact the arms of the movable contacts associated with one row of the first mentioned contacts projecting in one direction from the shaft and the arms of the movable contacts associated with the other row of the first mentioned contacts projecting in a different direction from the shaft, and manually operable means to move all of the movable contacts to contact making position at the will of the operator.

14. A guard device for rollers, said guard device comprising a row of pivotally mounted contacts, a single pivot rod upon which all of the pivotally mounted contacts are carried side by side along the length of said rod adapted to swing into and out of contact position for controlling an electric circuit, means by which the rod may be mounted in a position extending lengthwise parallel with the roller to be protected, and each contact in said row having an arm projecting laterally from the rod into close proximity with one of the rollers so that any element attempting to pass between the surface of the roller and the ends of the arms will swing the adjacent arm for controlling the electric circuit.

15. A guard device for rollers, said guard device comprising a row of pivotally mounted contacts, a single pivot rod upon which

all of the pivotally mounted contacts are carried side by side along the length of said rod adapted to swing into and out of contact position for controlling an electric circuit, means by which the rod may be mounted in a position extending lengthwise parallel with the roller to be protected, and each contact in said row having an arm projecting laterally from the rod into close proximity with one of the rollers so that any element attempting to pass between the surface of the roller and the ends of the arms will swing the adjacent arm for controlling the electric circuit, together with a manually operable re-setting device extending common to all of said contacts operable to simultaneously return any of said contacts which may have been swung.

16. A guard device for rollers, said guard device comprising a row of stationary contacts, a row of movable contacts, means by which the movable contacts are independently movable into and out of position controlling an electric circuit, said movable contacts each having a part extending to adjacent at least one of said rollers adapted to be engaged for moving the respective movable contact, and a manually operable re-setting device extending common to all of said movable contacts operable to re-set any of the movable contacts which may have been moved.

In testimony whereof I affix my signature.

EMIL L. MUELLER.