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C. J. V. HENTSCHELL ET AL

AUTOMATIC BREAK WEB SWITCH

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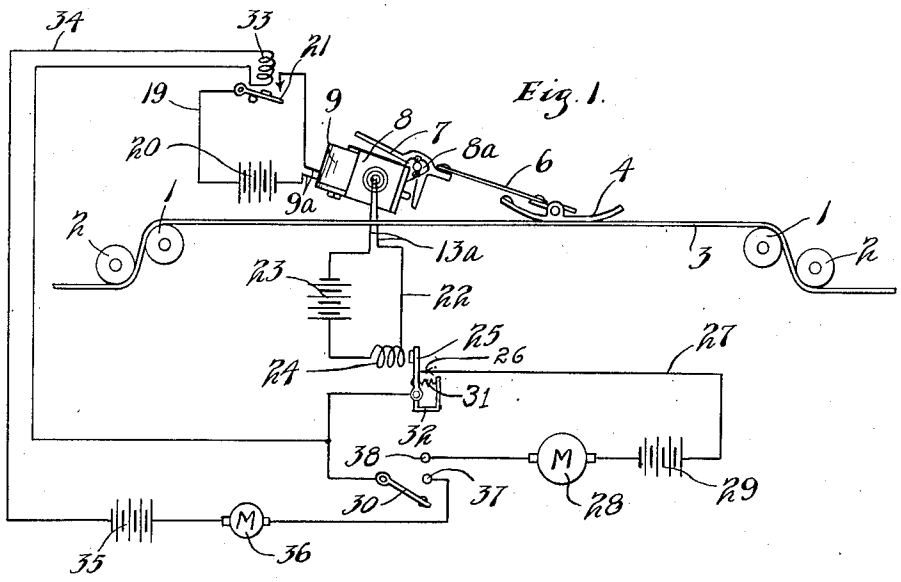


Fig. 1.

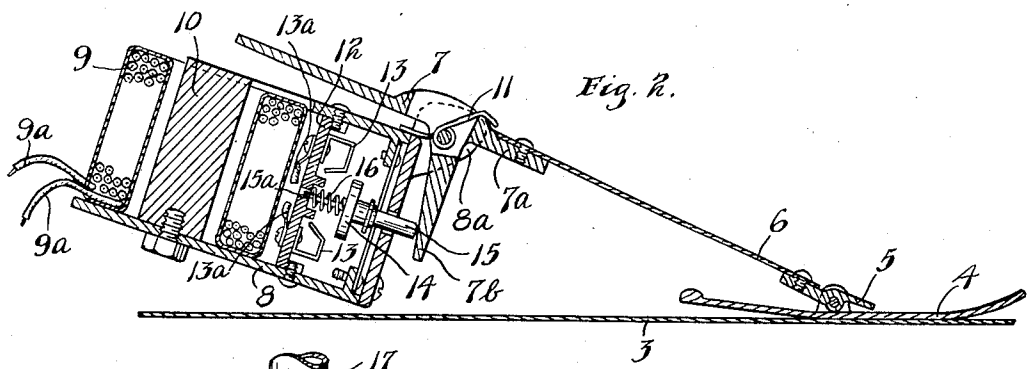


Fig. 2.

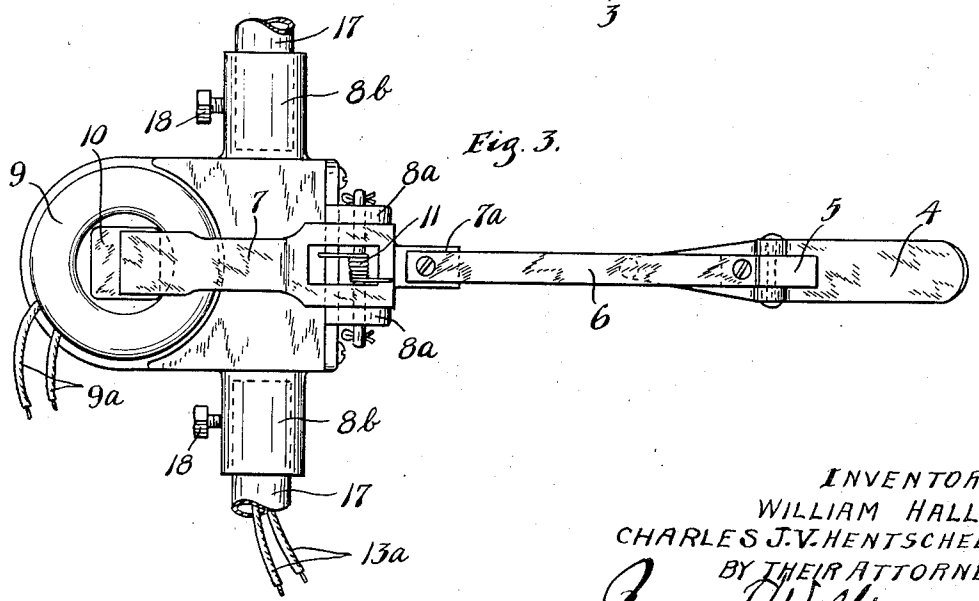


Fig. 3.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC BREAK-WEB SWITCH.

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To all whom it may concern:

Be it known that we, CHARLES J. V. HENTSCHELL and WILLIAM HALL, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in an Automatic Break-Web Switch; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a controlling device for a machine embodying or operating upon a travelling web of sheet material such as a modern printing press in which the sheet of paper printed travels through the machine. With such printing presses and other machines involving a travelling web it is desirable to stop the machine if the web breaks and a shoe is used for this purpose which rests upon the web and is adapted to drop by gravity if the web breaks. It is also desirable to have this shoe raised from the web or the plane of the web while the web is being placed or threaded in the machine.

It is an object of this invention, therefore, to provide such a machine, as described, with a shoe engaging with a web together with means actuated by the movement of the shoe to stop the machine when the web breaks so that the shoe is unsupported.

It is also an object of this invention to provide magnetic means for lifting the shoe from the plane of the web, which means preferably is automatically operated.

It is more specifically an object of the invention to provide such a shoe, as above mentioned, which is carried by a lever, one portion of which is adapted to be actuated by a magnet to lift the shoe and another portion of which is adapted to operate a switch controlling a circuit breaker for opening the main motor circuit of the machine when the shoe falls.

It is a further object of the invention to provide means whereby when the main motor circuit is closed the shoe will be placed in engagement with the web.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to the same parts throughout the different views and in which,

Fig. 1 is a diagrammatic view mainly in elevation, illustrating the apparatus;

Fig. 2 is a central vertical section through the controlling shoe and its actuating mechanism; and

Fig. 3 is a plan view of the parts shown in Fig. 2, Figs. 2 and 3 being shown on an enlarged scale.

Referring to the drawings, a portion of a machine having a web of sheet material travelling therethrough is illustrated which portion comprises the rollers 1 and 2, the web, which is designated as 3, travelling under the roller 2 at one end of the machine and over the roller 1 at said end, then in a substantially horizontal plane 2 and over the roller 1 at the other end of the machine and under the roller 2 at said latter end. Resting upon the top of the web 3 between the rollers 1 is a shoe 4 having a longitudinally convex lower surface. This shoe is pivoted to a member 5 in the form of a lever having a forward arm projecting over and adjacent the shoe 4 and a rearward arm to which is secured one end of a spring arm 6. The other or upper end of the spring arm 6 is secured to a forwardly projecting arm 7^a of a lever 7 pivoted in lugs 8^a projecting from a casing 8. The casing 8, as shown, is disposed above the web 3 and carries at its rearward portion a solenoid coil 9 having therein the core 10, the upper and rear part of lever 7 extending over the upper end of the core 10. The lever 7 normally is urged to swing its arm 7^a downwardly by a light spring 11 bearing against the top of arm 7^a coiled about the pivot of lever 7 and also contacting the top front portion of casing 8. In the lower forward portion of casing 8 is a plate 12 preferably of insulating material carrying spaced contacts 13. These contacts are adapted to be connected by a collar or plate 14 carried on a plunger 15 which plate and plunger normally are held in an outward position by a spring 16 surrounding a projection 15^a of said plunger which projection is guided in an opening in member 12. The members 13 and plate 14 thus form a switch. The outer end of plunger 15 is disposed closely adjacent to or substantially in contact with the rear side of an arm 7^b projecting downwardly from lever 7. The spring 16 is disposed between the plate 12 and the collar or plate 14. The casing 8

has laterally projecting hubs 8^b adapted to receive the ends of pipes 17 secured therein by the set screws 18 which pipes support said casing from some suitable part of the machine. The ends of the solenoid coil 9 are shown as 9^a and are included in an electrical circuit 19, as shown in Fig. 1, having therein a battery or other suitable source of power 20, which circuit is adapted to be opened or closed by a switch 21. The switch 21 is adapted automatically to be operated. In operating the modern printing press using a web of paper, it is the practice to have a large or main motor driving the machine during its normal operation. When the web of paper is broken or discontinued for some reason and it is necessary to thread a new sheet of paper in the machine, it is the practice to have the press driven by a small motor which runs the press at slow speed, so that the same conveniently and safely can be worked upon. When the smaller motor is started to drive the machine at slow speed it is desirable to have the shoe 4 raised from the plane of the web so that it will not interfere with the threading of the new web into the machine. A magnet coil 33 is provided, therefore, adapted, when energized, to actuate switch 21 to close the same. The said switch 21 is formed as an armature of the coil 33 and, while the switch might be moved to open position by any suitable means, as illustrated, the same is shown as arranged to drop to open position when the magnet is de-energized. The coil 33 is included in a circuit 34 having therein a suitable source of power 35 and also shown as including the small motor 36. Circuit 34 is closed when the switch arm 30 is moved to contact 37. When the arm is moved to said contact the small motor is started and the coil 33 is energized. The arm 30 is also adapted to co-operate with a contact 38 to close the main motor circuit 27 having therein a suitable source of power 29 and the large or main motor 28. The circuit 27 is adapted to be opened by the switch 25 which forms the armature of a magnet coil 24 included in a circuit indicated as 22. The circuit 22 has a suitable source of power 23 therefor and includes the contacts 13^a which are connected, respectively, to the contacts 13. The conductors 13^a conveniently can be carried to the contacts 13 through the tubes 17. A torsion spring 31 is secured to armature switch 25 and to a fixed support 32 and is adapted to return switch 25 to closed position when magnet coil 24 is de-energized. The switch member 30 is illustrated as in neutral position, out of engagement with both contacts 37 and 38 so that both the circuits 27 and 34 are open.

In the normal operation of the machine the web 3 travels therethrough for the desired purpose and the shoe 4 will rest on the web and ride thereon. There is always some wave motion or vibration of the web and the shoe will rise and fall somewhat, owing to the spring arm 6, excessive motion of the shoe about its pivot being prevented by the forwardly projecting portion of lever 5. In such normal operation the member 14 is separated from contacts 13 and the rear portion of lever 7 is separated from core 10, the parts occupying substantially the position shown in the drawings, circuit 27, however, being closed by switch 30. Should the web 3 break so that the shoe will be unsupported, said shoe will fall by gravity and arm 7^b will push plunger 15 inwardly so that member 14 will bridge and connect the contacts 13. Spring 11 acts to give an initial downward impulse to shoe 4 and lever 7. This will close the circuit 22 and coil 24 will be energized. Armature 25 of the circuit breaker will thus be attracted away from contact 26 and the motor circuit will be opened. This will stop the motor 28, and hence the machine. The switch 30 can now be moved to neutral position permanently to open the motor circuit. The switch arm 30 will now be moved to the contact 37 to start the small motor 36 so that a new web can be threaded into the machine. The coil 33 will thus be energized and armature switch 21 will be closed. This energizes magnet coil 9 so that its core 10 attracts lever 7 and the shoe is raised above its normal position and above the plane of the web. Spring 16 now forces plate 14 outwardly so that circuit 22 is again open at the contacts 13 and magnet coil 24 de-energized. Spring 31 then moves armature switch 25 to its normal position again closing the main motor circuit at contact 26. The shoe 4 is now held above the plane of the web as the new web is threaded into the machine. When the machine is again ready for operation, the lever arm 30 will be thrown into engagement with contact 38 to start the main motor. As said arm moves out of engagement with contact 37, circuit 34 will be open so that coil 33 will be de-energized. Armature switch 21 will now drop to open position so that coil 9 will be de-energized and the shoe 4 will drop to operative position on the web 3 and the machine will then continue in its normal operation. In the modern printing press or other similar machine, the various switches and connections controlling the motor and other circuits usually are located on the switch panel and the motion is communicated thereto through primary circuits operated by push buttons in the vicinity of the machine. It is unnecessary and superfluous to show all of the primary circuits and connections as well as the electrical apparatus used in such a controlled system,

and in the drawings, only sufficient circuits and switches are indicated to accomplish the desired functions and illustrate the control of the machine in its relation to shoe 4 and the other parts shown.

From the above description it is seen that applicant has provided a simple, efficient and very convenient means for controlling the shoe 4 and the operation of the machine. As soon as the web 3 breaks so that the shoe 4 moves to its lower position, the main motor circuit will be opened so that the machine stops. The operator then merely presses the necessary button to operate the switch arm 30 to start the small or auxiliary motor 36. As this is done, the re-set circuit 19 is closed and the shoe 4 lifted from the plane of the web so that the same will not be in the way. The shoe remains in its elevated position until the operator is again ready to start the machine. In practice, this is done by pressing a button which actuates the necessary mechanism to swing switch lever 30 into engagement with contact 38 to close the main motor circuit. The machine is thus again started and the shoe 4 drops onto the web 3. The whole operation of the shoe 4 is thus automatic and is taken care of when the starting switches are operated. Heretofore, it has been necessary for the operator to climb up on the machine and to raise the shoe 4 and lever 7 manually and mechanically lock the same in raised position, as well as also to climb up on the machine to release said shoe and lever again to place the shoe in contact with the web. It will also be apparent that it is not necessary to have two motors as it would be possible to run the machine with the main motor operating at very low speed.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of the applicants' invention which, generally stated, consists in a device capable of carrying out the objects above stated, such as shown and described and set forth in the appended claims.

What is claimed is:

1. In combination with a machine having a web of sheet material travelling therein and a motor driving said machine, a movable member contacting said web adapted to shift its position when the web breaks, a circuit breaker in the motor circuit, a circuit for operating said circuit breaker and a switch operated by said movable member in shifting its position when said web is broken, whereby the last mentioned circuit is closed and the motor circuit opened by said circuit breaker so that the machine is stopped, and electrically operated means for moving and holding said shoe out of the plane of the web after it has shifted its position.

2. The structure set forth in claim 1, and means for rendering said last mentioned means inoperative so that the shoe is again placed in contact with the web when the motor circuit again is closed to start the machine.

3. In combination with a machine having a web of sheet material travelling therein, a movable member resting upon said web adapted to drop by gravity when the web is broken, an electromagnet adapted to lift said member and means for actuating said electromagnet.

4. The combination of a machine having a web of sheet material travelling therein, and a motor for driving said machine, of a shoe resting on said web, an arm carrying said shoe, a lever to which said arm is secured, an electromagnet for swinging said lever to lift said shoe above the web, a switch adapted to actuate a circuit breaker to open the circuit of said motor, an arm on said lever adapted to close said switch when said shoe drops by gravity, and resilient means normally urging said shoe and arm carrying the same downwardly.

5. The combination with a machine having a web of sheet material travelling therein, of a swinging member resting upon said web and adapted to drop by gravity, a lever carrying said member, an electromagnet positioned to act on a portion of said lever to lift said member above the web, and means for actuating said electromagnet.

6. The combination of a machine having a web of sheet material travelling therein, and a motor for driving said machine, of a shoe resting on said web, an arm carrying said shoe, a lever to which said arm is secured, an electromagnet for swinging said lever to lift said shoe above the web, a switch adapted to actuate a circuit breaker to open the circuit of said motor, and an arm on said lever adapted to close said switch when said shoe drops by gravity.

7. The structure set forth in claim 6, and means for opening said switch when said shoe is again lifted.

8. In a machine having a web of sheet material travelling therein and a motor for driving said machine, a shoe adapted to rest on said web, an arm carrying said shoe to which is pivoted a lever to which said arm is secured, a casing supported above said web to which said lever is pivoted, a solenoid in said casing adapted to actuate said lever to lift said arm and shoe, means for energizing said solenoid, a switch in said casing, a circuit breaker controlled by said switch and adapted to open the actuating circuit of said motor, means on said lever for closing said switch to actuate said circuit breaker when said shoe falls by gravity upon breaking of the web.

9. The combination with a machine hav-

ing a web of sheet material travelling therein, a movable member resting upon said web to shift its position when the web is broken, an electro-magnet adapted to move said member out of the plane of the web, and means for actuating said electro-magnet.

10. In combination with a machine having a web of sheet material travelling therein and a motor driving said machine, a movable member contacting said web adapted to shift its position when the web breaks, a main motor for driving said machine, a circuit therefor, an auxiliary motor for driving said machine at slow speed, means actuated by the movement of said shoe in shifting its position when the web breaks to open the main motor circuit and thus stop the machine, means for moving said shoe out of the plane of the web when the auxiliary motor is started, and means for placing said shoe in operative position in contact with the web when the main motor circuit is closed again to start the machine.

11. In combination with a machine having a web of sheet material travelling therein and a motor driving said machine, a movable member contacting said web adapted to shift its position when the web breaks, means for stopping said motor, means operated by said movable member in shifting its position when said web is broken to actuate said first mentioned means, and means for moving and holding said shoe out of the plane of said web after it has shifted its position.

In testimony whereof we affix our signatures.

WILLIAM HALL.
CHARLES J. V. HENTSCHELL.