

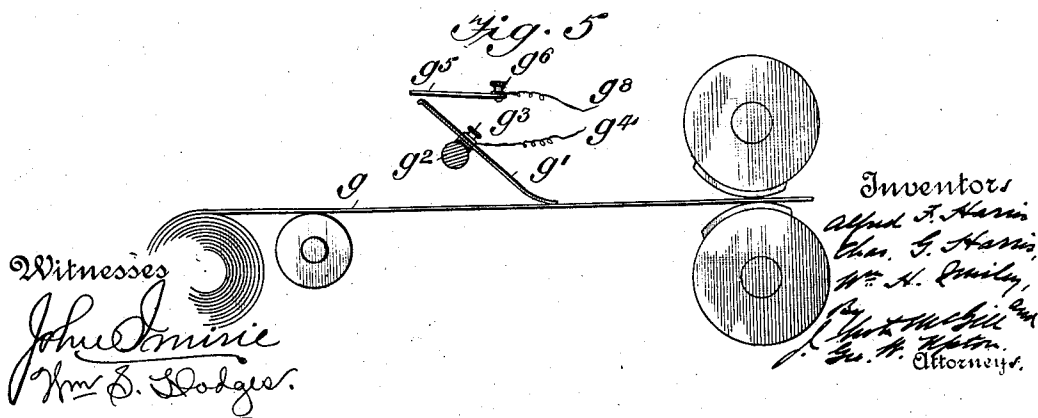
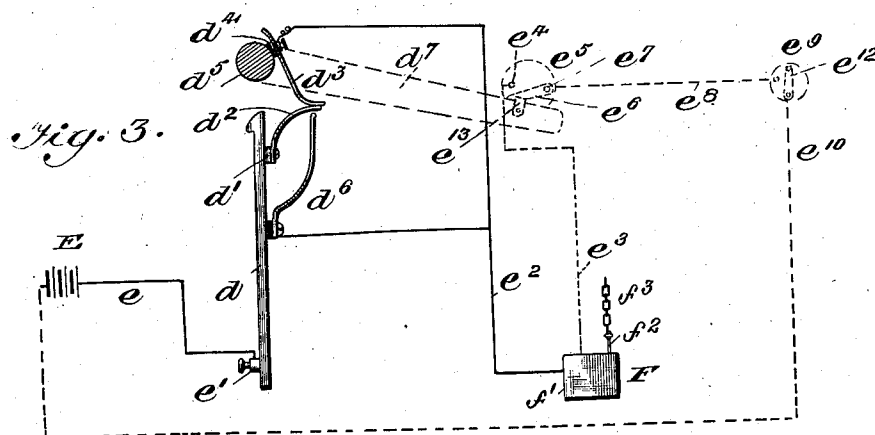
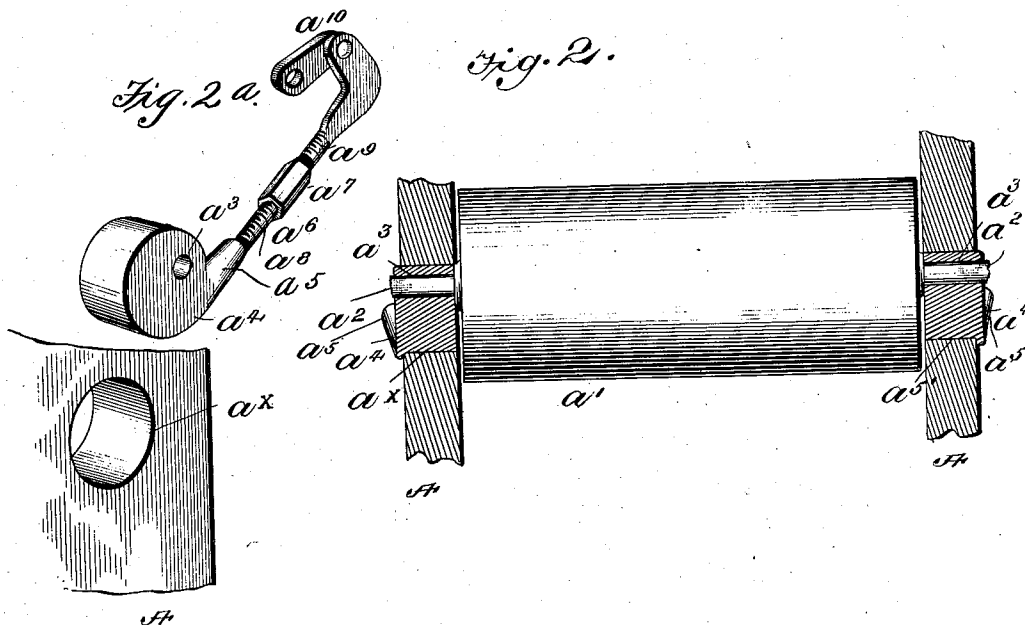
(No Model.)

3 Sheets—Sheet 2.

A. F. & C. G. HARRIS & W. H. SMILEY.
PRINTING MACHINE.

No. 586,898.

Patented July 20, 1897.



(No Model.)

3 Sheets—Sheet 3.

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PRINTING MACHINE.

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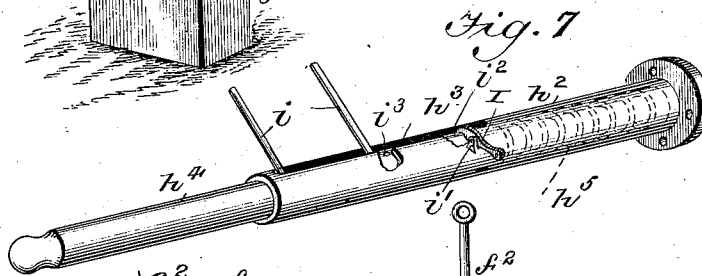
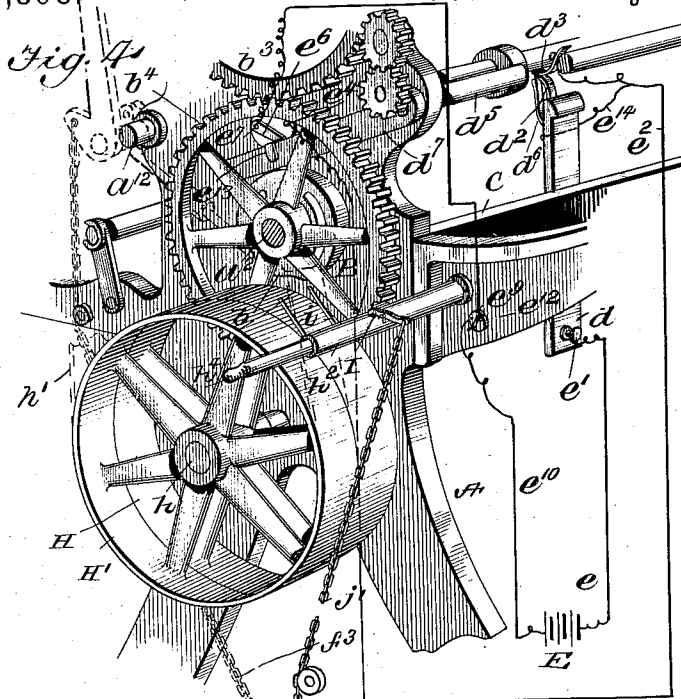
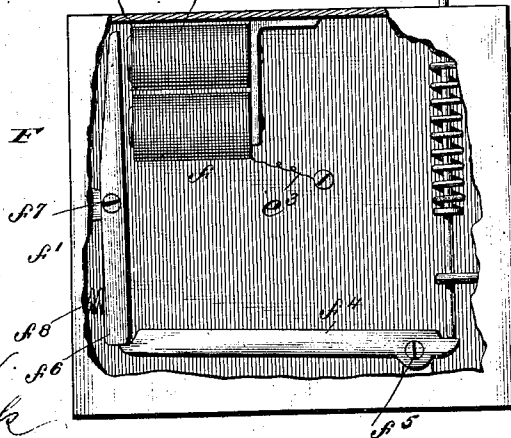


Fig. 6



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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 586,898, dated July 20, 1897.

Application filed April 27, 1895. Serial No. 547,365. (No model.)

To all whom it may concern.

Be it known that we, ALFRED F. HARRIS, CHARLES G. HARRIS, and WILLIAM H. SMILEY, of Niles, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Printing-Presses; 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 contemplates certain new and useful improvements in printing-presses.

The object of the invention is to provide improved means for automatically stopping the printing operation instantly any break or interruption occurs in the feed-supply. This end may be attained by effecting the lowering of the axis of the impression-cylinder sufficiently to avoid contact therewith of the type or impression plates of the plate-carrying cylinder or bed and also by automatically shifting the driving-belt from the fast to a loose pulley, thereby entirely stopping the operation of the press. The first mentioned is the result of "throw-off" mechanism and the last mentioned "stop" mechanism. The means by which these objects may be accomplished comprises an electric circuit which is broken when the proper feed-supply is maintained and closed instantly any break or interruption occurs in said supply, the closing of said circuit resulting in the lowering or shifting of the impression-cylinder and the shifting of the driving-belt, causing the printing to cease and bringing the press to a complete stop. The means also comprises two contact-points in the electric circuit and a trap or traps, the latter being connected to mechanism for shifting the impression-cylinder and releasing the belt-shifter. The circuit is broken as long as the supply of paper is regular and uniform, but instantly any break occurs therein, or a sheet of paper is not properly fed to the press, or too many sheets are fed, the circuit is closed through two contact-points and the trap is operated, effecting the lowering of the impression-cylinder and the shifting of the driving-belt. The paper as it is being fed to the press

breaks the circuit at the contact-points, but if at the time the circuit would otherwise be complete the paper should not be properly positioned, or, in the case of a continuous feed, there is any break in the web, the circuit is closed and the press ceases to operate, thus preventing any impression being made on the blanket-sheet of the impression-cylinder. The electric circuit embraces two circuit-closing devices, one lying in the path of the sheet to be fed and designed to be open during the uniform passage of the sheets, the other circuit-closing device being at another point in the circuit and designed to be intermittently opened and closed, the arrangement being such that if the proper feed is maintained one of the circuit-closers will be open when the other is closed.

The invention comprises the novel features of construction and the combination and arrangement of parts substantially as herein-after fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of a portion of a printing-press, showing the application of our invention. Fig. 2 is a view of the impression-cylinder, showing portions of the supporting-frame in section. Fig. 2^a represents a series of details. Fig. 3 is a diagrammatical view of the electrical appliance. Fig. 4 is an enlarged view in perspective of the belt-shifting mechanism. Fig. 5 shows the application of our invention to a continuous-web press, the electrical connections other than the contact-points, as well as parts of the machinery, being omitted. Fig. 6 is a view of the trap with parts broken away. Fig. 7 is a detail perspective view of the belt-shifter.

Referring to the drawings, A designates the framework of a job-press, portions only of which are shown.

a is the type-carrying cylinder, and a' is the impression-cylinder, whose journals a^2 are eccentrically mounted in cylindrical portions a^3 of cams a^4 , said cylindrical portions fitting in holes a^5 in the sides of frame A. The outer face of each cam has an arm a^6 and an adjustable extension a^7 , which is united thereto by a nut a^7 engaging threaded por-

tions a^8 and a^9 . At its upper curved end this extension of the cam is pivotally connected to a short arm a^{10} , fast on a rock-shaft a^{12} , supported by frame A. The above construction is the same at both sides of the machine, the illustration and description of the mechanism at one side being sufficient to enable the invention to be understood. On the outer end of each journal a^2 is a disk B, on the periphery of which is a shoulder b . On the end of shaft a^{12} is keyed a handle b' , having a short projection b^2 . When this handle is raised, as shown in full lines, Fig. 1, the cam a^4 is so positioned that the impression-cylinder is in proper alinement to receive the impression of the type; but when said handle is lowered, as seen in dotted lines, the cam is turned sufficiently far to lower the said impression-cylinder to prevent contact of the type therewith, said cylinder being lowered about one thirty-second of an inch, but not enough to cause the disengagement of the teeth of the gear-wheels b^3 b^4 on the journals of the two cylinders a and a' .

To a cross-piece C of frame A is connected an upright bar d , suitable insulation being placed between said cross-piece and bar. To this bar, near its upper end, is connected a block d' , from which extends a spring-tongue d^2 , the same being curved in the line of travel of the paper. With this tongue is designed to engage (when no paper is in the way) an upper tongue d^3 , which is attached by a brass block d^4 to a rock-shaft d^5 of the press, suitable insulation being placed between said block and the rock-shaft. This shaft is broken away near its center in Fig. 1 to clearly show these upper and lower tongues.

To bar d is connected a lower auxiliary tongue d^6 , with which the tongue d^2 is designed to contact in the event of too many sheets of paper being fed at one time, said tongue d^6 being of course insulated from said bar. The series of rollers and the feed mechanism by which the paper is fed to the press will not be described.

It is sufficient in the present case to say that the sheets of paper in being fed to the impression-cylinder pass between these two tongues d^2 d^3 and, as will hereinafter be seen, serve to break the circuit established between said tongues, and in the event of more than one sheet being fed at a time the tongue d^2 is forced into contact with the auxiliary tongue, as before stated. To one end of shaft d^5 is connected an arm d^7 , the free end of which rests upon the periphery of disk B. The rocking of this shaft is not sufficient to disengage the tongues d^2 d^3 , one of which, (preferably the lower tongue d^2 ,) being made of light spring metal, constantly remains in contact with the other tongue d^3 , save when separated by an interposed sheet of paper.

E is a battery from which leads a wire e , which is connected by a brass post e' to bar d , the charge of said bar extending to tongue

d^2 , which, if there be no paper in the way, is communicated to tongue d^3 and from the latter through a wire e^2 to a trap F through the magnets f therein, and thence through wire e^3 to a post e^4 of a switch e^5 , having a movable arm e^6 , connected to a second post e^7 , from which leads a wire e^8 to a second switch e^9 , from which leads a wire e^{10} to battery E. The switch e^9 has a movable arm e^{12} , which is moved to break the circuit when the press is not in operation, so as to save the battery. The movable arm e^6 , however, of switch e^5 is connected by a finger e^{13} to arm d^7 and is thereby caused to move with said latter arm, the completion of the circuit at this point being possible only when arm e^6 contacts with post e^4 . This occurs at the time when a sheet of paper is or should be between said tongues. The lower auxiliary tongue d^6 is connected to wire e^2 by a branch wire e^{14} .

The trap F may be of any preferred construction. We have shown a box f' , from which extends a spring-held rod f^2 , which is connected by a chain f^3 to the projection b^2 of handle b' . The rod f^2 is normally held extended by a lever f^4 , fulcrumed at f^5 , which in turn is held by a second lever f^6 , fulcrumed at f^7 . This latter lever is extended into close proximity to magnets f and acts as an armature. It is normally held away from the magnets by a spring f^8 . When the magnets are charged, the armature-lever is drawn thereto, freeing the trip-lever f^4 , which permits the lowering of rod f^2 under the action of its spring. This lowering of said latter rod draws on chain f^3 , which effects the partial rotation of shaft a^{12} , causing the slight movement of cam a^4 and allowing the impression-cylinder to be lowered. The conditions under which this may be brought about will now be described.

A sheet of paper passing between the two tongues d^2 and d^3 breaks the circuit at that point. These two tongues are in direct contact during the interim between sheets, but no circuit is made, because at that time the switch-arm e^6 is out of contact with post e^4 , the arm d^7 being lowered at its outer end; but at the proper time—that is to say, just after a sheet has or should have started between the two tongues—the shoulder of disk B raises the outer end of arm d^7 , causing switch-arm e^6 to contact with post e^4 . If the paper has been properly fed, the otherwise complete circuit is broken between tongues d^2 and d^3 , but should the paper be not in position or should rumple or twist then the two tongues being in contact the entire circuit is completed and the magnet f of trap F is charged and draws the armature-lever, allowing the spring-pressed rod to lower and hence draw on projection b^2 and effect the lowering of the impression-cylinder. When the feed is properly adjusted, the circuit in the meantime being broken by switch e^9 , the impression-cylinder is returned to its normal position by raising the handle b' , the spring-held

rod of the trap being again locked by the return of the levers of the trap to their normal positions. The same result is obtained in the event of too many sheets being fed forward at one time, causing the closing of the circuit by contact of tongue d^2 with auxiliary tongue d^6 .

The invention here involved is not confined to job or single-sheet presses, since it may be employed in connection with a web-press. In Fig. 5 we have outlined the cylinders of a web-press and the paper-roll, the paper being shown at g , extended to said cylinder. When so extended, it contacts with the lower end of an arm or tongue g' , secured on a loosely-mounted shaft g^2 by a brass screw g^3 , to which one wire g^4 of the circuit may be connected. This arm or tongue extends upwardly, so as to engage a second tongue g^5 , held by a screw g^6 , to which a second wire g^8 is connected. When the paper is being fed, the tension thereof holds the lower arm or tongue away from tongue g^5 ; but should any break occur in the web the two tongues will instantly contact, causing the closing of the circuit and the lowering of the impression-cylinder by the mechanism above described or other preferred means.

For the sake of perspicuity we have shown in Fig. 1 the trap and the handle b' on the same side of the press with the rest of the described mechanism, but when the press is also provided with the belt-shifter we prefer to use but one trap, and in that event the latter and the handle (see dotted lines, Fig. 4) are located at the same side of the press as the driving-belt and pulleys; but, however, two separate traps may be employed, and the belt-shifter will be described in connection with a second trap, it only being necessary in that event to employ branch wires. By the term "trap" we mean to include any suitable device or mechanism which will exert a decided pull or jerk on the part to which connected when operated by the complete closing of the electric circuit.

The belt-shifter is shown in Figs. 4 and 7. II designates a fast pulley, and H' a loose pulley, both mounted on a common shaft h , from which power is transmitted to the press. The driving-belt is indicated by h' . To that side of the press adjoining the pulleys II and H' is secured a tube or cylinder h^2 open at its outer end and having a longitudinal slot h^3 therein. Within this tube fits a rod h^4 and a coil-spring h^5 , the tension of the latter serving to force said rod outward. From this rod project two parallel arms i , designed to receive the driving-belt between them, said arms extending out through the slot h^3 . When the spring-pressed rod is held inward, the driving-belt is on the fast pulley. The said rod is so held by a locking-lever I, fulcrumed at i' on tube h^2 , and having its angular rounded end i^2 engaging a hole i^3 in said rod. When this locking-lever is disengaged, the rod is forced outward by its spring, causing the

arms to shift the driving-belt to the loose pulley H' . This operation of the locking-lever is effected by the operation of the trap instantly the electric circuit is closed under any of the conditions hereinbefore specified. The trap may be the same as that before described, but we have shown a counterpart J thereof, the spring-pressed rod j of which is connected by a chain j' to the locking-lever I. In shifting the driving-belt to the fast pulley the operator forces the rod inward, as against the action of its spring, and said rod is locked by the lever I and so held until the trap effects the disengagement thereof. This trap has the same electrical connection as that before described. When but one trap is used, the chain for effecting the shifting of the cylinder is connected to rod j at any suitable point, and the trap is located on the same side of the machine as the belt-shifter.

The advantages of our invention are apparent. It will be seen that by means thereof we successfully throw the machine out of operation in the event of any break or interruption in the feed-supply, and thus prevent any imprint being made on the impression-cylinder when the paper is not properly positioned thereon.

It will be understood that we do not restrict ourselves to the employment of the mechanism herein described and that changes may be made without departing from the scope of our invention. While it is preferable to conjunctively employ the means for shifting the cylinder and driving-belt, yet either may be used without the other.

By the term "feed-supply" we mean the paper fed or to be fed to the press-cylinders, either separate sheets from a stack thereof or a continuous sheet from a web or roll.

We claim as our invention—

1. In a printing-press having a cylinder provided with eccentric bearings, an electric circuit, a circuit-closing device lying in the path of the paper to be fed and designed to be held open by the passage of the paper, a second circuit-closing device designed to be intermittently opened and closed, the arrangement being such that if the paper is properly fed the first circuit-closer will be open when the second is closed, and connections between said circuit and said eccentric bearings of said cylinder, as and for the purpose set forth.

2. In a printing-press having a cylinder provided with eccentric bearings and a belt-shifter comprising a spring-impelled rod engaging the belt, an electric circuit, a circuit-closing device lying in the path of the paper to be fed and designed to be held open by the passage of the paper, a second circuit-closing device designed to be intermittently opened and closed, the arrangement being such that if the paper is properly fed the first circuit-closer will be open when the second is closed, and connections between said circuit and said eccentric bearings and said belt-shifter, substantially as set forth.

3. In a printing-press having a cylinder provided with eccentric bearings, an electric circuit, a circuit-closing device having one of its members lying in the path of the sheet to be fed and designed to be closed in the event of more than one sheet being fed at a time, a circuit-closing device at another point in the circuit designed to be intermittently opened and closed, the arrangement being such that if the paper is properly fed one circuit-closer will be open when the other is closed, and connections between said circuit and said eccentric bearings, substantially as set forth.

4. In a printing-press having a belt-shifter comprising a spring-impelled rod engaging the belt, an electric circuit, a circuit-closing device having one of its members lying in the path of the sheet to be fed and designed to be closed in the event of more than one sheet being fed at a time, a circuit-closing device at another point in the circuit designed to be intermittently opened and closed, the arrangement being such that if the paper is properly fed one circuit-closer will be open when the other is closed, and connections between said circuit and said belt-shifter, substantially as set forth.

5. In a printing-press having a cylinder provided with eccentric bearings, an electric circuit, a circuit-closing device in the path of the paper to be fed and designed to be open during the uniform passage of the paper, a circuit-closing device at another point in the circuit having a movable member, and a shaft operated by said cylinder and designed to effect the movement of said member, and connections between said circuit and said eccentric bearings, substantially as set forth.

6. In a printing-press having a shiftable impression-cylinder and a disk on the journal thereof, an electric circuit, a circuit-closing device at one point in the circuit in the path of the paper to be fed and designed to be held open during the uniform passage of the paper, a circuit-closing device at another point in the circuit designed to be intermittently opened and closed, said latter circuit-closing device having a movable member, a periodically-operated rock-shaft to which said movable member is connected, said shaft being operated by said disk, and means for shifting

said cylinder controlled by said circuit, substantially as set forth.

7. In a feeding apparatus for printing-machines, an electric circuit, a circuit-closing device at one point in the circuit lying in the path of the sheet to be fed and designed to be held open by the passage of the sheet, a circuit-closing device at another point in the circuit designed to be intermittently opened and closed, one of said circuit-closing devices having a movable member, a periodically-operated rock-shaft to which said movable member is connected, a shiftable impression-cylinder, a disk on the journal of said cylinder for operating said rock-shaft, and means for shifting said cylinder controlled by said circuit, as set forth.

8. A printing-press having a shiftable impression-cylinder, a disk carried by said cylinder having a shoulder, means for shifting said cylinder, an electric circuit connected to said means and having contact-points and a switch provided with a movable arm, and an arm engaging said disk and by which said switch-arm is carried, whereby said latter arm is caused to close said circuit simultaneous with the contact of said contact-points in the event of any break or interruption in the feed-supply, as set forth.

9. The combination with a printing-press having fast and loose pulleys, of a shifter comprising a tube or cylinder having a slot, a spring-pressed rod in said tube or cylinder having lateral arms extending through said slot, a locking-lever fulcrumed on said tube and designed to hold said rod retracted, a trap connected to said locking-lever, and an electric circuit connected to said trap, said circuit having two contact-points which close said circuit in the event of any break or interruption in the feed-supply, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

ALFRED F. HARRIS.
CHARLES G. HARRIS.
WILLIAM H. SMILEY.

Witnesses:

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