

March 13, 1934.

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1,950,585

PRINTING MACHINE

Filed May 20, 1929

2 Sheets-Sheet 1

Fig. 1.

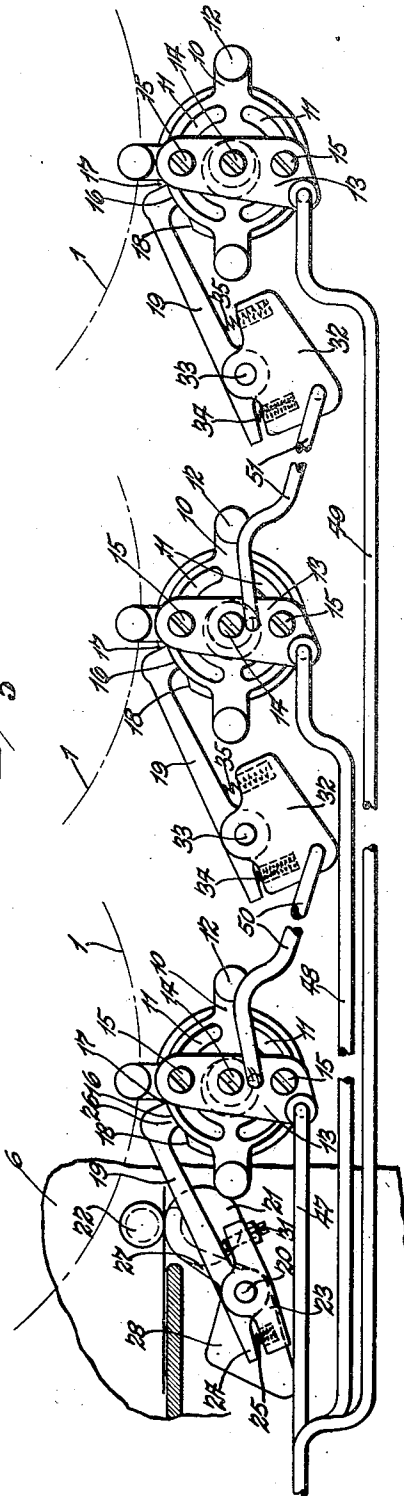
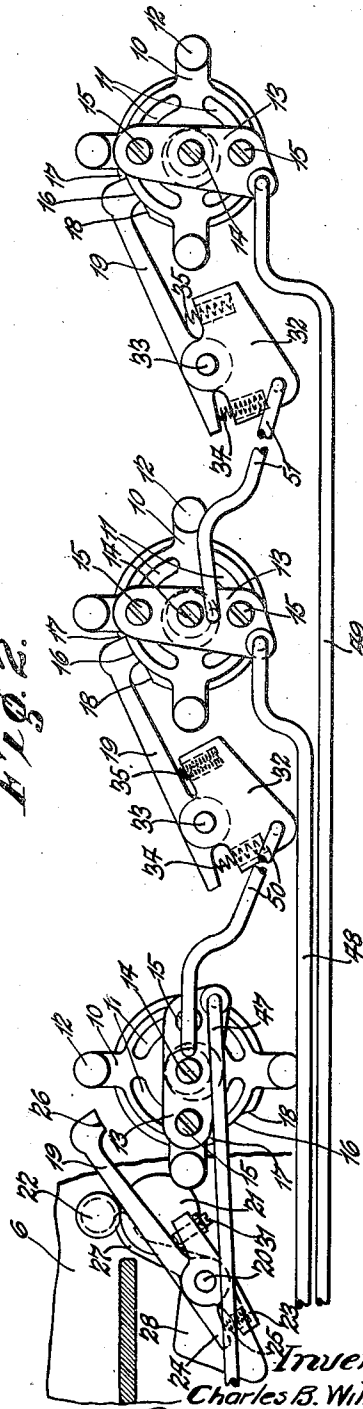


Fig. 2.



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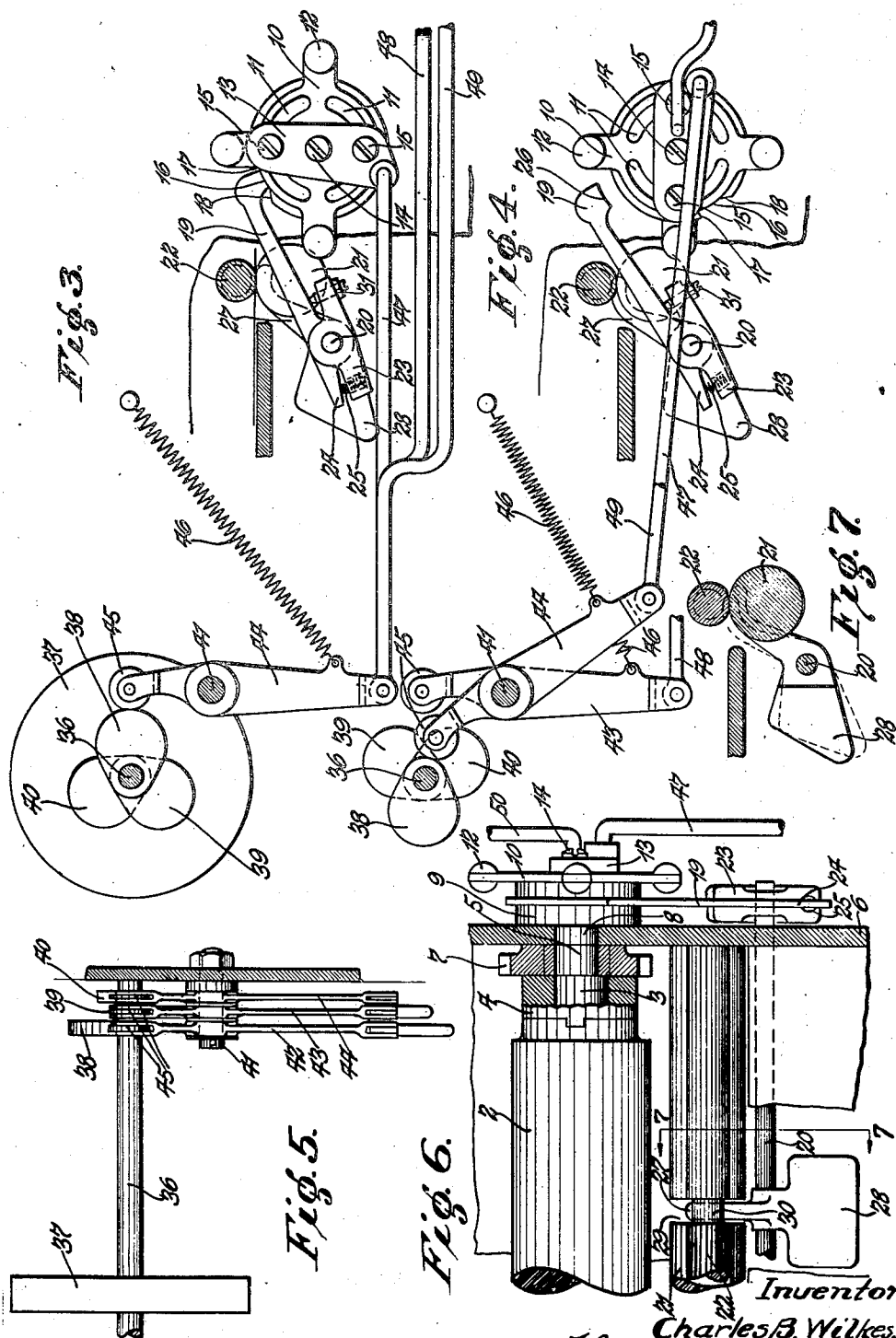
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PRINTING MACHINE

Charles B. Wilkes, Jr., St. Louis, Mo.

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9 Claims. (Cl. 101—247)

This invention relates to improvements in printing machines, and more particularly to printing machines comprising a plurality of printing couples each having a platen cooperating with a printing drum, in which the platens are jointly controlled for release and resetting by the feed of paper to the machine.

An object of the invention is to provide a printing machine of the type in which the printing is effected by a series of printing couples arranged in sequence, with means for controlling the shifting of the platen to printing and non-printing position dependent upon and controlled by the paper feed to the machine.

Another object of the invention is to simplify, in a machine of the class mentioned, the platen control whereby the same is positively actuated in coordination with the paper feeding mechanism to effect a non-printing adjustment when paper fails to feed to the machine and to effect a printing adjustment when paper feeds to the machine.

Additional advantages of the construction will be apparent from the following detailed description, taken in connection with the accompanying drawings in which—

Fig. 1 is a contracted partially diagrammatic view of the platen controlling mechanism in a set position for printing operation.

Fig. 2 is a view of the same parts illustrating the non-printing position.

Fig. 3 is a detailed view of one of the platen controls in association with the actuator for the plurality of controls in the printing position.

Fig. 4 is a view of the same parts in a non-printing position.

Fig. 5 is a cross section illustrating the association of the actuator for the platen control mechanism.

Fig. 6 is a view, partially in horizontal section, illustrating the platen mounting and the paper control device.

Fig. 7 is a cross section on the line 7—7 of Fig. 6.

As illustrated in the drawings, the machine comprises a plurality of printing drums 1 (Fig. 1) of the usual construction in which the drum rotates in a machine frame and has provision for supporting a type segment for direct printing or for printing through a fabric. The drums 1 extend transversely of the machine frame and are arranged on parallel axes longitudinally of the frame and driven from any suitable source in unison. Associated with each

drum and forming therewith a printing couple is a platen and, as the mounting of each platen and its construction is substantially the same, only one has been shown in the drawings (Fig. 6), to which reference is made for an understanding of the construction and mounting of each of the platens.

The platen, as shown in Fig. 6 of the drawings, comprises a platen roller 2 mounted on a shaft 3 with which it may be adjustably connected by an Oldham coupling 4. The shaft 3 has an extension 5 journaled in the side member 6 of the machine frame. The axes of the shaft 3 and the extension 5 are eccentric and, therefore, as the extension 5 is rotated, the adjustment of the platen in respect of the printing drum is changed or shifted from printing position to non-printing position, and from non-printing to printing position. The platen may be driven from a gear 7 connected with the drum so that the drum and platen rotate together. This construction of the platen, its mounting and association with the drum to form a printing couple, is of usual and known construction and its function and operation, as thus far described, will be readily recognized as common to the art.

The extension 5 extends through an opening 8 in the side frame 6, the opening constituting a journal for the shaft extension 5 which carries on its end a cylindrical collar 9. It will be understood that the shaft 3 and the extension 5 remain stationary during rotation of the platen, the platen rotating freely on the shaft 3. When the extension 5 is shifted the axis of the shaft 3 is raised or lowered away from or toward the periphery of the drum, thereby determining the space between the face of the platen and the drum. When in close adjustment with the drum the type imprints on paper fed across the platen, but when no paper is fed to the couple the platen lowers out of contact with the surface of the drum and, therefore, prevents offsetting onto the platen. It is this shifting of the platen in each of the couples, under the control of the paper fed to the first couple, which is broadly the novelty of the present invention, and the construction, association and arrangement of parts by which this is accomplished will now be described.

The shaft 3 is rocked to raise and lower the platen through mechanism cooperatively related to the paper feeding mechanism. It is held in latched adjustment when paper feeds to the first couple, and the latch is released to per-

mit the rocking of the shaft 3 when no paper advances to the first couple.

A plate 10 fits against the end face of the member 9, said plate having a pair of arcuate slots 11 and handles 12 by which it may be adjusted. An arm 13 fits over the plate 10 and the arm and plate are held in clamped relationship with the member 9 by a screw 14, that threads into the end of the shaft extension 5. The arm 13, the plate 10 and member 9 may be relatively adjusted and held in adjusted position by a screw 15 passing through the arm 13, the arcuate slots 11 in the plate 10, and into the face of the member 9. In the periphery of the member 9 of each of the platens there is a notch 16 having a vertical shoulder 17 and an inclined shoulder 18.

In the instance of the platen of the first couple the member 9 and, therefore, the shaft 3 and extension 5 are held against rocking movement, and released for rocking movement by a latch lever 19 pivoted on the end of a shaft 20 extending laterally of the frame of the machine forward of paper feed rollers 21 and 22. The latch lever 19 is mounted in a bracket 23 which bracket is rigid with and turns as the shaft 20 is rocked. The lever 19 has a short arm 24 between which and the face of the bracket 23 is interposed an expansion spring 25, the tendency of the spring 25 being to elevate the short arm of lever 19 and thereby depress a forward extremity 26 of said lever. The forward extremity 26 of the lever 19 is adapted to constitute the latch element in cooperation with the notch 16, the vertical forward edge of said extremity 26 seating against and being frictionally held in contact with the vertical shoulder 17 of the notch when the latch lever is down, which position it assumes and maintains when paper passes through the feed rollers 21 and 22.

The means for causing the rocking of the shaft 20, and thereby the movement of the bracket 23, comprises a finger 27 which forms the forward arm of a weighted lever, the opposite arm of which comprises a weight 28. The rollers 21 and 22 have aligned grooves 29 and 30 in the peripheries thereof in which the finger 27 operates.

By reference to Fig. 3 it will be noted that as the paper feeds between the rollers 21 and 22, the finger 27 is depressed and the bracket 23 is held in position so that the latch 26 is in the notch 16 and in engagement with the shoulder 17. A set screw 31 is provided for angular adjustment of the latch, so that it assumes its proper latching position when paper feeds to the machine. When no paper feeds between the rollers 21 and 22, the finger 27 raises to the position clearly shown in Fig. 4 of the drawings, causing the shaft 20 to tend to rock as a result of the weight 28 moving downwardly. This action rocks the bracket 23 to the position shown in Fig. 4, when the head 26 of the latch lever 19 moves out of the notch 16.

The action of the control for the couples, other than the first couple, is similar to the latch device described, except that instead of the bracket 23 there are provided modified forms of brackets for the subsequent couples, said brackets being designated by the reference numeral 32. The brackets 32 are pivoted on stud shafts 33 supported in the frame of the machine. Balanced springs 34 and 35 are provided on each side of the pivot for the lever 19.

All of the latch devices, as well as the means for rocking the arms 13, are controlled from a cam device mounted on a rotating member of the paper feeding mechanism in timed relationship with the printing mechanism, or from a constantly driven shaft.

It will be noted that the cam device is mounted on a shaft 36 which may be driven by a flexible connection to the pulley 37. On the shaft 36 is a plurality of cam plates 38, 39 and 40 having corresponding faces but positioned in respect of each other at 120 degrees to provide for the sequential action of the platen controlling mechanism. On a stud shaft 41 is a series of levers 42, 43 and 44, each having a roller 45 cooperating with the respective cams 38, 39 and 40. The lower or long arm of each of the levers 42, 43 and 44 is normally drawn forward by a retractile spring 46 connected with the respective levers. The forward end of the springs 46 are connected with a rod or some permanent part of the machine. A rod 47 connects the lower end of the lever 42 with the lower end of the arm 13 of the first couple, the extremity of said rod 47 having pivot connection at its opposite ends respectively with said arm 42 and the arm 13. Thus, as the shaft 36 rotates and the roller 45 rides on the high face of the cam 38, a pull is exerted on the rod 47 in opposition to the spring 46 and the arm 13 oscillates a slight degree clockwise, releasing the shoulder 17 from contact end 26 of the latch lever 19. When paper is passing through the machine the latch lever, however, cannot rise entirely out of the notch and will prevent the arm 13, the shaft 3 and the extension 5 from rocking, thereby maintaining the platen in close adjustment with the drum. However, when paper fails to pass between the rollers 21 and 22, the bracket 23 rocks, tending to raise the forward end thereof to the position shown in Fig. 4 of the drawings moving the latch lever out of contact with the notch 16, and the spring 46 exerts a push on the rod 47 rocking the arm 13, and thereby rocking the shaft 3 as its eccentric extension 5 rocks. This action carries the platen downwardly out of close contact with the drum and prevents offsetting from the drum to the platen periphery. It will be understood that this movement occurs as the roller 45 moves to the low face of the cam 38. When the cam 38 again contacts with the roller 45 and the roller moves to the high face of the cam a pull will be exerted on the rod 47 and will restore the arm 13 to the position shown in Fig. 3. The oscillation of the arm 13 and, as a consequence, the rocking of the shaft 3 will occur so long as no paper is fed to the machine, but as soon as the paper passes through the space between the rollers 21 and 22, the latch lever will be again depressed and will fall into the notch 16 preventing the further rocking of the shaft 3, thereby maintaining the platen in close contact with the drum of the couple.

The remaining platen controls of the series are similarly connected with the remaining cam plates. The arm 43 is connected with the arm 13 of the second platen control by a rod 48, and the arm 44 is connected with the arm 13 of the third platen control by a rod 49. Each of the rods 48 and 49 operates to control the oscillation of its respective arms 13 in the manner described in respect of the arm 13 of the first platen control. The control of the latches for the second and third platen control is by connection with

the arm 13 of the first platen control through rods 50 and 51, respectively. The operation of the latches of the second and third platen controls differ somewhat from the operation of the latch for the first platen control in that when the arm 13 of the first platen control is carried to release position, as illustrated in Figs. 2 and 4 of the drawings, the rod 50 is moved forward and rocks the bracket 32 of the second platen control to elevate the forward end thereof, placing a tension on the spring 35 which serves to move the long arm of the latch lever out of the notch 16 when a pull is exerted on the rod 48 to disengage the head 26 of the latch from the shoulder 17. The opposite movement of the rod 48 serves to oscillate the arm 13 of the second platen control in the same manner as described in respect of the oscillation of the arm 13 of the first platen control.

The sequence of the operation is controlled by the position of the cams on the shaft 36.

The third platen control is operated from the second platen control in the same manner as that described in connection with the operation of the second platen control from the first platen control.

From the foregoing description of the construction it will be understood that the operation of the device is, briefly, as follows:

Assuming first no paper is fed between the rollers 21 and 22, the finger 27 will be raised into the notch in the upper roller 22 above the periphery of the roller 21. This rocks the shaft 20, tending to raise the forward end of the bracket 23. The latch will remain in contact in the notch 16 as it is frictionally held by the shoulder 17 operating against the end of the latch. The arm 13 then oscillates so that the upper end thereof moves clockwise by a pull exerted on the rod 47 as the roller 45 rides on the high face of the cam 38, thus releasing the latch so that it may be forced upwardly by the weight 28 moving the forward end of the bracket 23, the pressure of the set screw 31 forcing the head 26 of latch lever 19 out of the notch. As the rod 48 moves in the opposite direction when the roller 45 rides the low face of the cam 38, the rod 47 moves forwardly by the spring 46 and forces the arm 13 to rock the extension 5, thereby rocking the shaft 3 downwardly. This movement, in turn, sets the brackets 32 of the second and third couple and they, in turn, are operated similarly to released position.

None of the latches will re-engage to hold the platen in close adjustment with the drums until paper is fed between the rollers 21 and 22. When paper is fed between the rollers 21 and 22 the finger 27 is depressed against the gravity pull of the weight 28, and the bracket 23 moves to a position so that the latch for the first couple is in position to be moved to its seat by the spring 25, and the arm 13 of the first couple is restored to vertical position and the latch holds the parts in printing position.

As a result of the assumption of printing position of the first couple, the brackets 32 of the second and third couple are carried to a position so that the respective latches will seat through the depression of the latch arms by the springs 34 in sequence, depending upon the action of the cams 39 and 40, respectively, with the rollers on the arms 43 and 44, respectively.

Therefore, it is apparent that by means of the paper fed to the first couple the couples in se-

quence are maintained in printing position. When no paper is fed to the machine the couples are released to non-printing position in sequence and will be restored, in sequence, to and maintained in printing position when paper again is fed to the machine. Thus failure of paper to feed the first couple places each couple in non-printing position and avoids the offsetting of the ink onto the platens, preventing damage to paper.

I am aware that the invention may be modified in certain particulars without departing from the nature and scope of the invention. I do not limit myself, therefore, to the exact invention shown and described, but what I desire to claim and secure by Letters Patent is:

1. In a printing machine, comprising a plurality of printing couples each including a printing platen, means for shifting the platen to printing and non-printing position, connections for operating said shifting means, a cam device operable in timed relationship with the paper feed for actuating said connections, and a latch device for each platen under the unitary control of paper feed to the first platen controlling the shifting movement of said platens.

2. In a printing machine comprising a plurality of printing couples, each including a printing platen, means for shifting the platen to printing and non-printing positions, and a latch for holding the platen in printing position, a sheet detector associated with the paper feed for effecting the release of each of said latches, and a cam adapted to cause the operation of said means sequentially.

3. In a printing machine comprising a plurality of printing couples, each including a printing platen, a connection for shifting the platen to printing and non-printing positions, a resilient member adapted to move said connection to shift the platen to non-printing position, a cam adapted to move the connection to shift the platen to printing position, and a latch to hold the platen in printing position, unitary means for moving the cams sequentially, means controlled by the paper feed to directly release the latch of the first platen, and means controlled by the position of the next preceding platen respectively to release the latch of each of the other platens.

4. In a printing machine comprising a plurality of printing couples, each including a printing platen, means to eccentrically rotate the platen to place it in printing and non-printing positions, and a latch for holding the platen in printing position, a sheet detector associated with the paper feed for effecting the release of each of said latches, and a cam adapted to cause the operation of said means sequentially.

5. In a printing machine comprising a plurality of printing couples, each including a printing platen, means for shifting the platen to printing and non-printing positions, and a latch for holding the platen in printing position, a sheet detector for directly effecting the release of the latch to the first platen, and means controlled by the position of the next preceding platen respectively to release the latch of each of the other platens, said means including for each succeeding latch a rotatable bracket having balanced springs engaging the latch and a connection between the bracket and the preceding platen for rotating the bracket.

6. In a printing machine comprising a plurality of printing couples, each including a print-

ing platen, a connection for shifting the platen to printing and non-printing positions, a resilient member adapted to move said connection to shift the platen to non-printing position, a
 5 cam adapted to move the connection to shift the platen to printing position, and a latch to hold the platen in printing position, a shaft operable in timed relationship with the paper feed for supporting and operating the cams, and
 10 means controlled by the paper feed for releasing the latches.

7. In a machine of the class described comprising a plurality of printing couples each including a platen, mechanism for shifting the
 15 platens to printing and non-printing position, means under the control of the feed of the paper to the first couple of said mechanism to maintain the platens in printing position when paper is fed to the machine and to release the platens
 20 to non-printing position when paper fails to feed, automatic means for actuating said mechanism to restore the platens to printing position after they have assumed non-printing position, and timing mechanism for controlling said
 25 restoring means.

8. In a machine of the class described comprising a plurality of printing couples each in-

cluding a platen, mechanism for shifting the platens to printing and non-printing position, means under the control of the feed of the paper to the first couple of said mechanism to maintain the platens in printing position when
 80 paper is fed to the machine and to release the platens in sequence to non-printing position when paper fails to feed, automatic means for actuating said mechanism to restore the platens to printing position after they have assumed
 85 non-printing position, and timing mechanism for controlling said restoring means.

9. In a machine of the class described comprising a plurality of printing couples each including a platen, mechanism for shifting the
 90 platens to printing and non-printing position, means under the control of the feed of the paper to the first couple of said mechanism to maintain the platens in printing position when paper is fed to the machine and to release the platens
 95 to non-printing position when paper fails to feed, automatic means for actuating said mechanism to restore the platens in sequence to printing position after they have assumed non-printing position, and timing mechanism for controlling said restoring means.
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