July 30, 1935. C. B. COTTRELL, 3D 2,009,687

BED AND CYLINDER PRINTING PRESS

Filed May 11, 1933 2 Sheets-Sheet 1

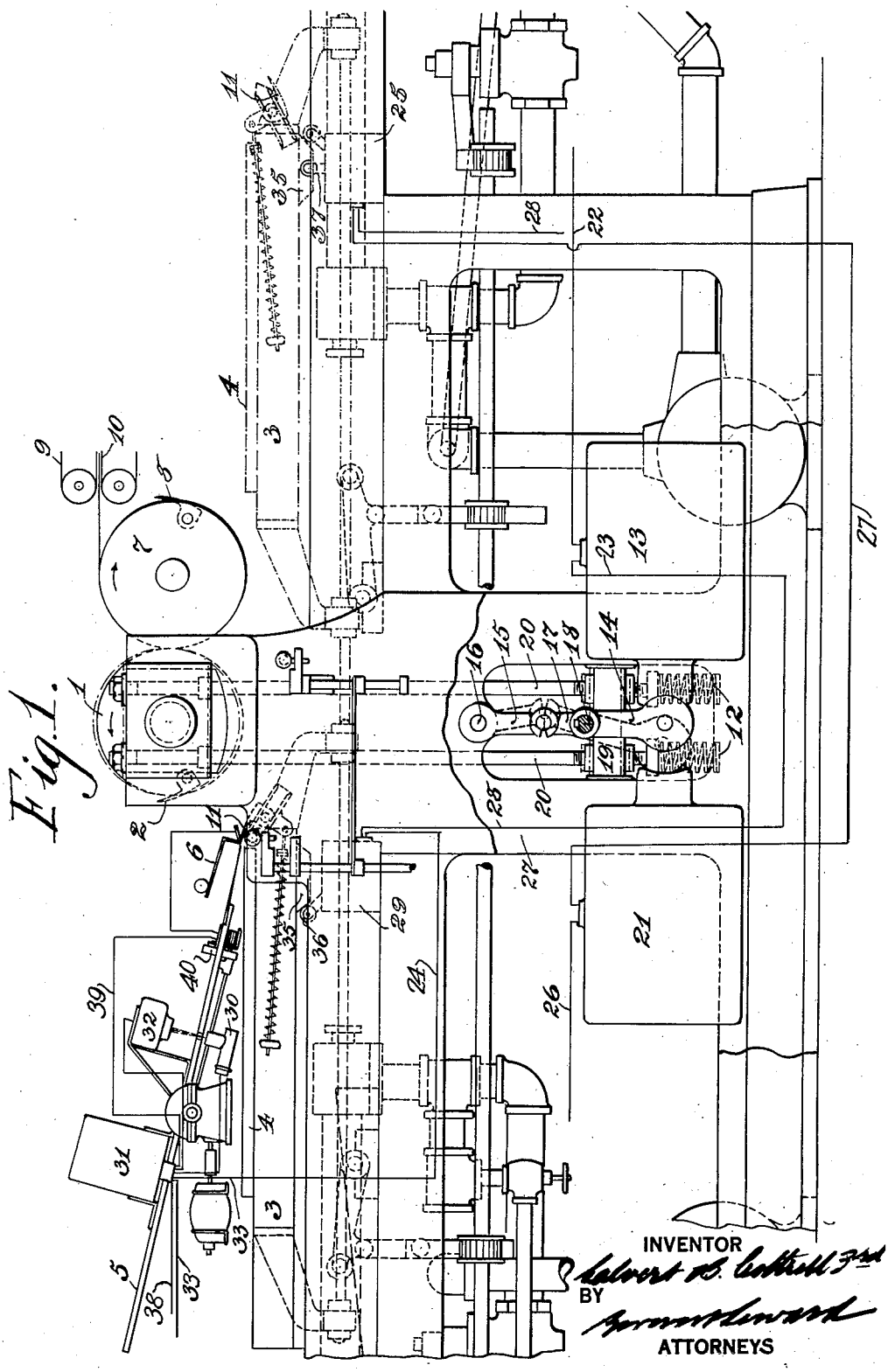


Fig. 1.

INVENTOR
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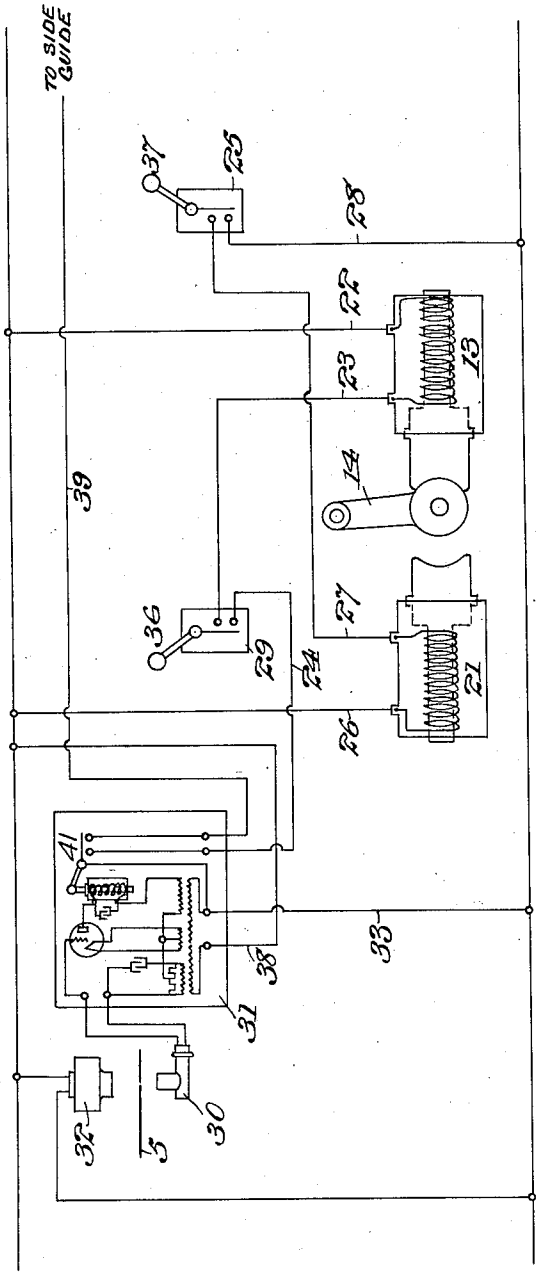


Fig. 2.

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Patented July 30, 1935 2,009,687

UNITED STATES PATENT OFFICE

2,009,687

BED AND CYLINDER PRINTING PRESS

Calvert B. Cottrell, 3d, Westerly, R. I., assignor to C. B. Cottrell & Sons Company, Westerly, R. I., a corporation of Delaware

Application May 11, 1933, Serial No. 670,408

16 Claims. (Cl. 101—284)

My invention is directed, broadly, to a novel electrically controlled means for respectively bringing the bed and cylinder into and out of printing coaction for the printing and non-printing strokes of the bed.

My invention is also directed to means for preventing the bringing of the bed and cylinder into printing coaction should a sheet fail to be fed.

My invention, more particularly, comprises a lever, as a toggle lever, for controlling the operation of the impression cylinder, said lever being provided with an armature which is moved in one direction by the energization of one electromagnet, to bring the cylinder down into printing coaction with the bed for the printing stroke of the bed, and which is moved in the opposite direction by the deenergization of said electromagnet and the energization of another electromagnet, to cause the lever to permit the impression cylinder to be raised out of its printing coaction with the bed for the non-printing stroke of the bed; said first named electromagnet being under the control of the relay of a photoelectric unit whereby the electromagnet will be deenergized upon the failure of a sheet to be fed, thus preventing the bringing of the impression cylinder down into printing coaction with the bed.

I have chosen to illustrate my invention in connection with the bed and cylinder printing press which forms the subject matter of my copending application filed February 2, 1933, Serial No. 654,855, and also in connection with the sheet registering device which forms the subject matter of my copending application filed December 17, 1932, Serial No. 647,714 now Letters Patent 1,951,901, dated March 20, 1934.

A practical embodiment of my invention is represented in the accompanying drawings, in which Figure 1 represents my improved bed and cylinder printing press in side elevation, the parts being shown in full lines in the positions they assume as a sheet is about to be taken from the feeder by the form bed grippers on the printing stroke of the bed, and in dotted lines in the positions they assume as the bed reaches the end of its printing stroke, or upon the failure of a sheet to be fed, and Figure 2 is a complete wiring diagram of the embodiment herein represented in Figure 1.

The oscillating impression cylinder is denoted by 1 and its set of grippers by 2. The reciprocating bed is denoted by 3 and its form by 4. The sheet feeder, denoted by 5, is provided with the usual sheet stop 6, said feeder being located at one side of the impression cylinder 1. The delivery which is located at the other side of the impression cylinder includes, in the present instance, a rotary sheet carrier 7 provided with a set of grippers 8 arranged to take the printed sheets from the grippers 2 of the impression cylinder and to deliver the sheets at the top of the rotary carrier to the coacting endless tape carriers 9, 10.

The reciprocating form bed 3 is provided with a set of tumbler actuated grippers 11 which operate on the printing stroke of the bed, to take the sheets from the feeder 5 after they have been registered and to transfer the sheets to the impression cylinder grippers 2 at the bottom of the cylinder as shown, described and claimed in my said copending application filed February 2, 1933, Serial No. 654,855.

The several grippers may be operated in any well known or approved manner at the proper times and their operating means are not shown and will not be specifically described herein.

Means are provided for normally lifting the impression cylinder away from its printing coaction with the form bed, said means in the present instance comprising expansion springs 12.

Electrically controlled means are provided for bringing the impression cylinder 1 down into its printing coaction with the form bed 3 on the printing stroke of the bed, providing a sheet has been fed from the feeder to the bed grippers 11. The said means in the present instance comprises an electromagnet 13 arranged, when energized, to move the armature 14 in a direction to close a toggle lever, one arm 15 of which is pivoted at 16 to the press frame and the other arm 17 of which is pivoted at 18 to the cross head 19 of the cylinder lifting bars 20. An oppositely disposed electromagnet 21 is arranged, when energized, (if the electromagnet 13 be deenergized) to move the armature 14 in a direction to open the toggle lever and thus permit the springs 12 to raise the impression cylinder 1.

The electromagnet 13 is connected by a wire 22 to a source of electric current supply, not shown herein. The electromagnet is also connected through the wires 23 and 24, through a circuit maker and breaker 29 which, in the present instance, is a normally open switch arranged in position to be closed to energize the electromagnet 13 as the form bed reaches the end of its non-printing stroke.

The electromagnet 21 is connected through a wire 26 to a source of electric current supply, not shown herein, and it is also connected by the wires 27, 28, through a circuit maker and breaker

25, in the present instance a normally open switch which is closed as the form bed reaches the end of its printing stroke, to energize the said electromagnet 21.

The electromagnet 13 is also under the control of a light responsive device, as a photoelectric unit, which is in turn controlled by the registry of the sheet on the feeder, as is clearly shown in my said Letters Patent 1,951,901. This photoelectric unit is connected, through the circuit line 39, to the side guide 40 of the sheet registering device, the operation of which is fully explained in my said Letters Patent 1,951,901. This photoelectric unit comprises, generally, the following elements: The photoelectric tube 30 is electrically connected to the photoelectric relay 31 of any well known or approved form. This photoelectric tube 30 is positioned beneath the feed table 5 in the path of a beam of light projected from the lamp 32. This relay 31 is electrically connected to the electromagnet 13 through the circuit wire 24, switch 29 and wire 23 and also to a source of electric current supply, not shown herein, by wire 33.

This relay 31 is also electrically connected through the circuit wire 38 to a source of electric current supply, not shown herein.

In operation: When a sheet has been side registered by cutting off the beam of light from the lamp 32 of the photoelectric unit, the closing of the contactor switch 41 completes the circuit through the circuit wire 24, switch 29 and circuit wire 23 to cause the energization of the magnet 13, the deenergization of the electromagnet 21 having been accomplished by the disengagement of the lug 35 with the switch arm 37 of the circuit maker and breaker 25. The energization of the electromagnet 13 and the deenergization of the electromagnet 21 will cause the electromagnet 13 to move the armature 14 in a direction to close the toggle lever and thus bring the impression cylinder 1 down into position to coact with the form bed 3 on the printing stroke of the bed. If, however, no sheet is fed, the relay 31 will remain open and the electromagnet 13 will remain deenergized, thus permitting the springs 12 to hold the impression cylinder 1 out of its printing coaction with the form bed.

After the sheet has been printed and the bed has reached the end of its printing stroke the lug 35 will engage the arm 37 of the circuit maker and breaker 25, thus closing the circuit through the electromagnet 21 and energizing the same. In the meantime, the lug 35 on the printing stroke of the bed has permitted the arm 36 to swing back into position to open the circuit maker and breaker 29. Therefore, as the electromagnet 13 is deenergized the energized electromagnet 21 will swing the armature 14 in a direction to open the toggle lever and thus permit the springs 12 to lift the impression cylinder 1 out of its printing coaction with the bed on the non-printing stroke of the bed.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not wish to be limited to the particular embodiment herein shown and described, but

What I claim is:

1. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, and electric means controlled by the bed for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed.

2. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, electric means controlled by the bed for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed, and a sheet controlled light responsive device for preventing the bringing of the bed and cylinder into printing coaction upon the failure of a sheet to be fed.

3. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, and electric means controlled by the bed for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed, said electric means including a toggle lever bearing an armature and oppositely disposed electromagnets for opening and closing the toggle lever.

4. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, electric means controlled by the bed for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed, said electric means including a toggle bearing an armature and oppositely disposed electromagnets for opening and closing the toggle lever, and a sheet controlled light responsive device for preventing the energization of the toggle lever opening electromagnet upon the failure of a sheet to be fed.

5. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, a toggle lever controlling the relative movements of the bed and cylinder, an armature carried by the toggle lever, and bed controlled electromagnets disposed upon opposite sides of the armature for moving the armature to open and close the toggle lever for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed.

6. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, a toggle lever controlling the relative movements of the bed and cylinder, an armature carried by the toggle lever, bed controlled electromagnets disposed upon opposite sides of the armature for moving the armature to open and close the toggle lever for causing the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed, and a sheet controlled light responsive device in circuit with the toggle lever closing electromagnet for preventing the energization of the electromagnet upon the failure of a sheet to be fed.

7. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, a toggle lever controlling the relative movements of the bed and cylinder, an armature carried by the toggle lever, electromagnets disposed upon opposite sides of the armature, and circuit makers and breakers for the electromagnets, operated by the bed at the ends of its strokes, for causing the electromagnets to move the armature to open and close the toggle lever to cause

the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed.

8. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally separating the bed and cylinder, a toggle lever controlling the relative movements of the bed and cylinder, an armature carried by the toggle lever, electromagnets disposed upon opposite sides of the armature, circuit makers and breakers for the electromagnets, operated by the bed at the ends of its strokes, for causing the electromagnets to move the armature to open and close the toggle lever to cause the bed and cylinder to be brought into and out of printing coaction on the printing and non-printing strokes respectively of the bed, and a sheet controlled light responsive device in circuit with the toggle lever closing electromagnet for preventing the energization of the electromagnet upon the failure of a sheet to be fed.

9. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, and electric means controlled by the bed for causing the cylinder to be moved into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed.

10. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, electric means controlled by the bed for causing the cylinder to be moved into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed, and a sheet controlled light responsive device for preventing the bringing of the cylinder down into its printing coaction with the bed upon the failure of a sheet to be fed.

11. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, and electric means controlled by the bed for causing the cylinder to be moved into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed, said electric means including a toggle lever bearing an armature and oppositely disposed electromagnets for opening and closing the toggle lever

12. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, electric means controlled by the bed for causing the cylinder to be moved into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed, said electric means including a toggle lever bearing an armature and oppositely disposed electromagnets for opening and closing the toggle lever, and a sheet controlled light responsive device for preventing the energization of the toggle lever opening electromagnet upon the failure of a sheet to be fed.

13. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, a toggle lever controlling the movement of the cylinder toward and away from the bed, an armature carried by the toggle lever, and bed controlled electromagnets disposed upon opposite sides of the armature for moving the armature to open and close the toggle lever for causing the cylinder to be brought into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed.

14. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, a toggle lever controlling the movement of the cylinder toward and away from the bed, an armature carried by the toggle lever, bed controlled electromagnets disposed upon opposite sides of the armature for moving the armature to open and close the toggle lever for causing the cylinder to be brought into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed, and a sheet controlled light responsive device in circuit with the toggle lever closing electromagnet for preventing the energization of the electromagnet upon the failure of a sheet to be fed.

15. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, a toggle lever controlling the movement of the cylinder toward and away from the bed, an armature carried by the toggle lever, electromagnets disposed upon opposite sides of the armature, and circuit makers and breakers for the electromagnets, operated by the bed at the ends of its movements for causing the electromagnets to move the armature to open and close the toggle lever to cause the cylinder to be brought into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed.

16. In a bed and cylinder printing press, an impression cylinder, a reciprocating form bed, means normally lifting the cylinder from the bed, a toggle lever controlling the movement of the cylinder toward and away from the bed, an armature carried by the toggle lever, electromagnets disposed upon opposite sides of the armature, circuit makers and breakers for the electromagnets operated by the bed at the ends of its movements for causing the electromagnets to move the armature to open and close the toggle lever to cause the cylinder to be brought into and out of printing coaction with the bed on the printing and non-printing strokes respectively of the bed and a sheet controlled light responsive device in circuit with the toggle lever opening electromagnet for preventing the energization of the electromagnet upon the failure of a sheet to be fed.

CALVERT B. COTTRELL, 3RD.