Feb. 3, 1942. E. O. VANDERCOOK ET AL 2,271,750

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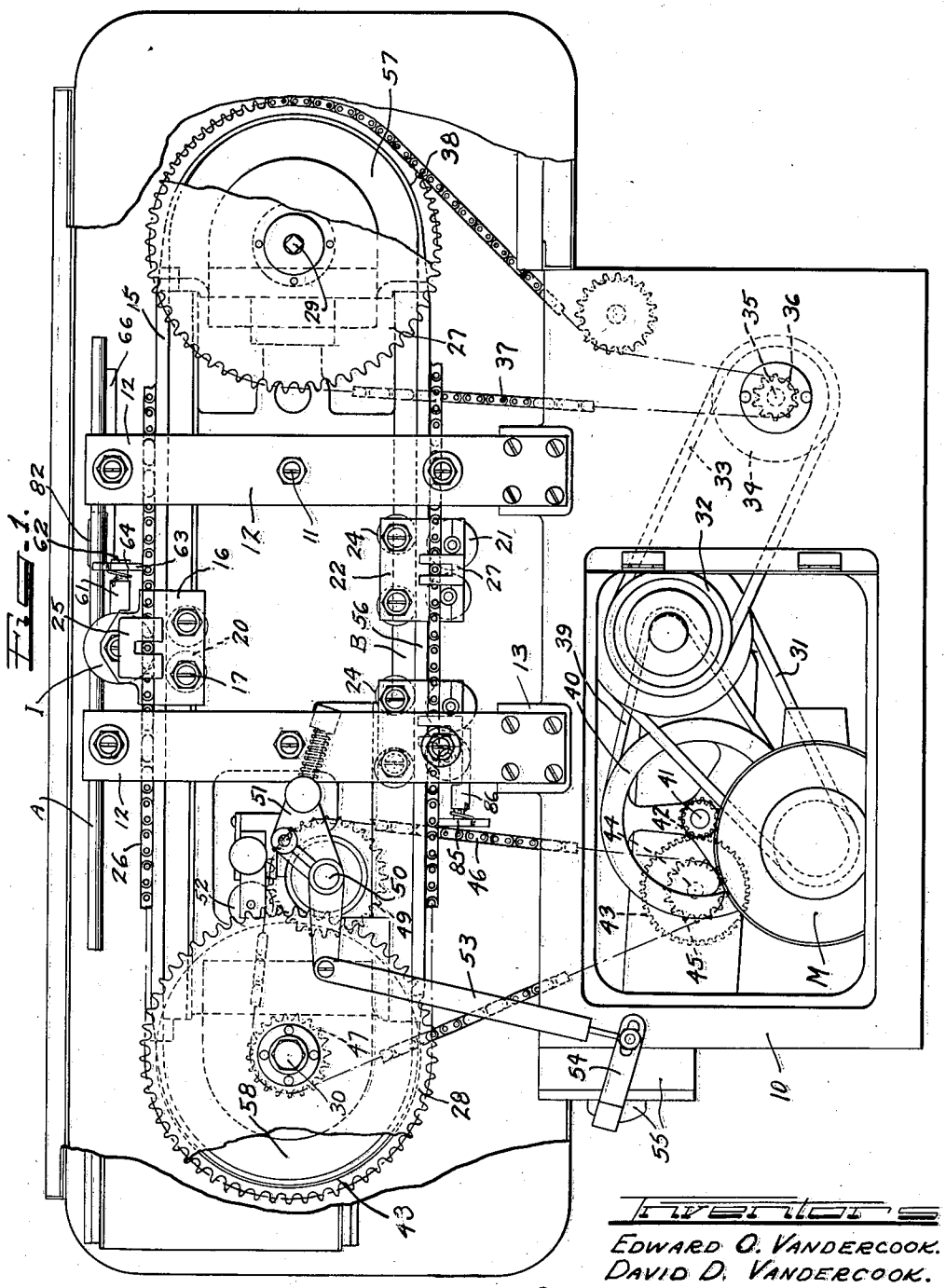


Fig. 1.

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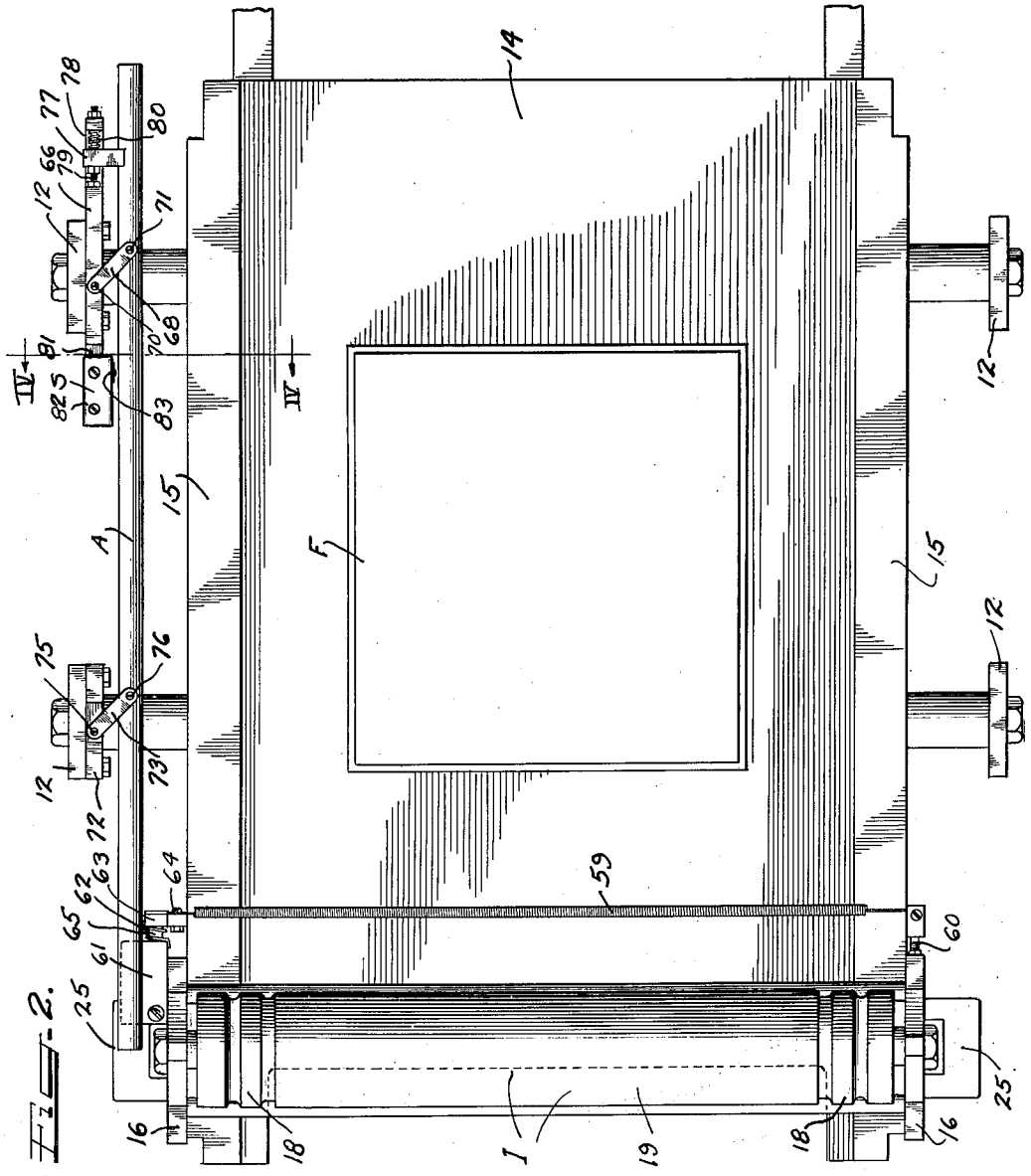


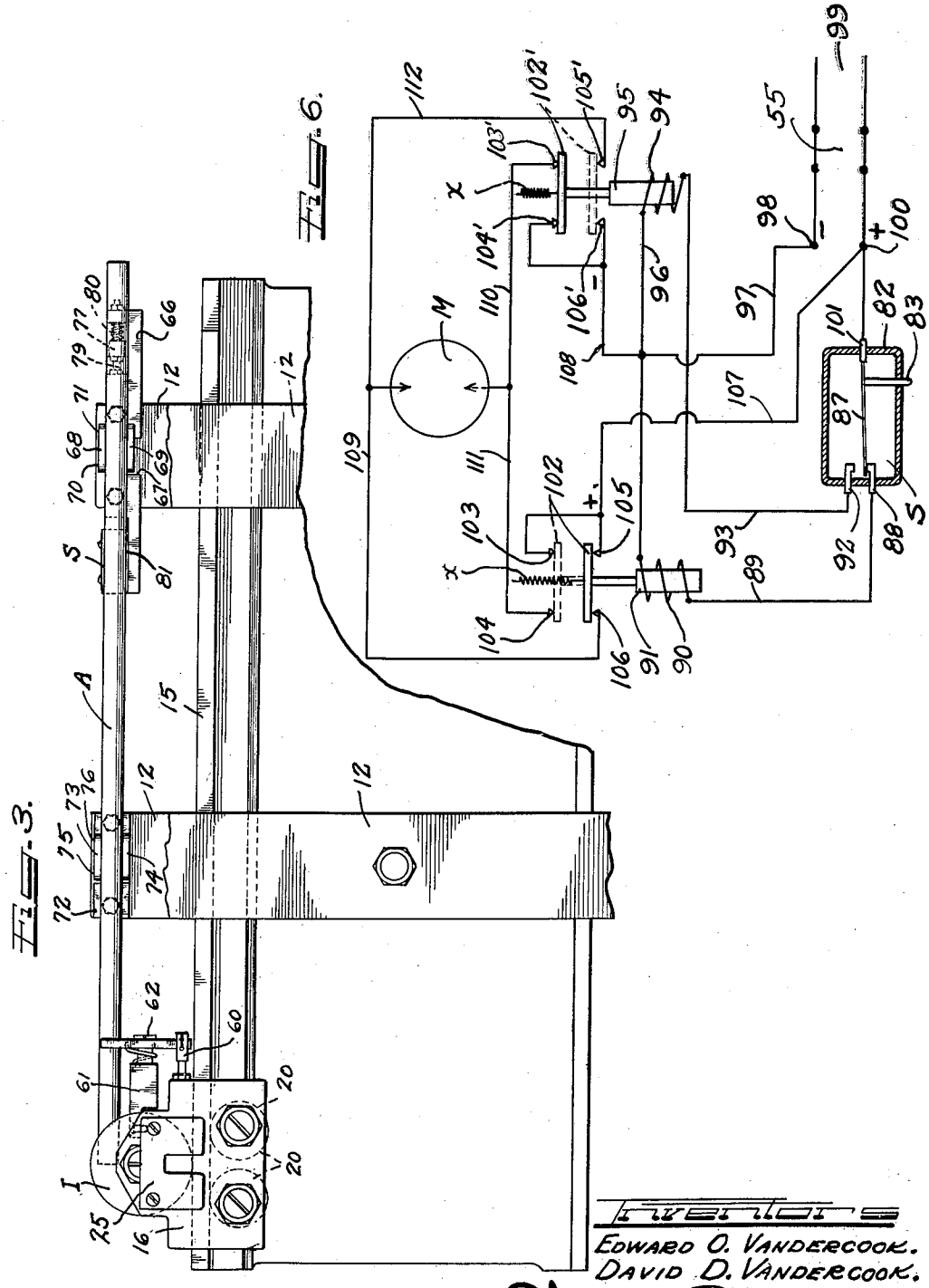
Fig. 2.

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Fig. 5.

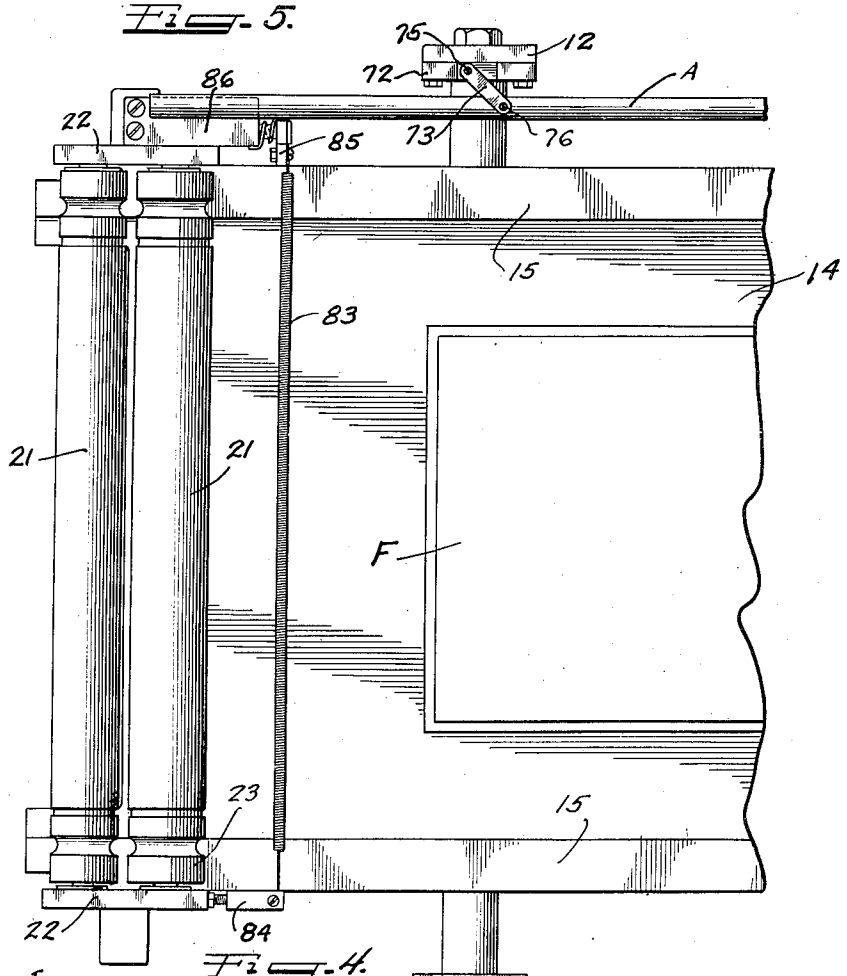
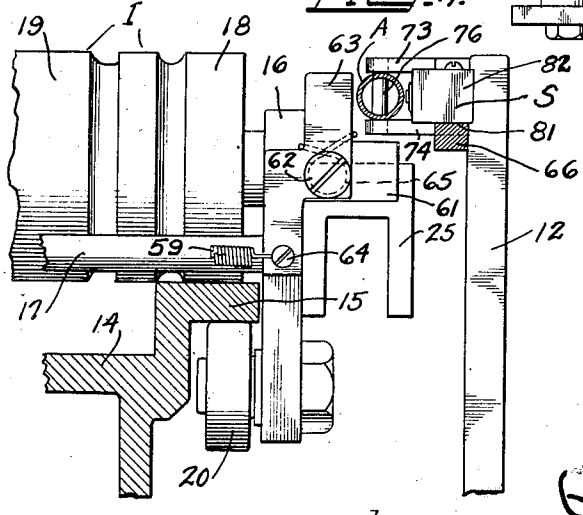


Fig. 4.



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UNITED STATES PATENT OFFICE

2,271,750

PROOF PRESS

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Application December 13, 1940, Serial No. 369,916

6 Claims. (Cl. 101—270)

This invention relates to printing or proof presses and particularly to improved safety means therefor for preventing injury to the operator.

Our invention is particularly useful in connection with presses of the type disclosed in Vandercook et al. Patent No. 1,843,255, dated February 2, 1932, in which type of presses an impression cylinder and an inking roll assembly are caused to travel through an orbit for successive passage over the press bed for cooperation with a printing form on the bed to ink the form and take an impression therefrom. Such presses are usually motor driven and sometimes at considerable speed so that forty or more proofs a minute may be taken off the press. In the operation of these presses the operator must place and align a sheet on the inked form before the approach of the impression cylinder, and then after the impression is taken, the operator must strip the printed sheet from the form before the approach of the inking rollers. Where the presses are driven at considerable speed, the operator must operate with corresponding rapidity in order that the hands may be withdrawn from the path of the impression cylinder or inking roll assembly so as to avoid impact of the cylinder or rollers, or catching of the fingers or part of the hand between the impression cylinder or rollers and the end of the form, all of which may result in injury to the operator.

The main object of our invention is to provide simple and effective means readily attachable to presses for eliminating liability of injury to the operator. We preferably provide a guard or impact element on the impression cylinder carriage, and a similar element on the carriage for the form rollers, which guard elements will engage with the operator's hand, if not sufficiently rapidly withdrawn, or with other obstructions, and with these guard elements cooperable with control means for the press driving source to stop the operation of the press. Where the press is driven by an electric motor, the guard elements are cooperable with actuating means or switch mechanism in the motor supply circuit to effect not only stoppage of forward drive but to reverse the motor for reverse drive of the press so that upon impact of the guard members with the hand or other obstruction the press will be almost instantly stopped and reversely driven until the hand or obstruction is released from the guard elements.

The various features involved in our invention are incorporated in the structure shown on the drawings, in which drawings:

Figure 1 is a side elevation of a proof press showing our safety means applied;

Figure 2 is a plan view of the press bed portion and showing the cooperation of the guard member on the cylinder carriage with the motor circuit switch controlling assembly;

Figure 3 is a front side elevation of the part of the assembly shown on Figure 2;

Figure 4 is an enlarged section on plane IV—IV of Figure 2;

Figure 5 is a plan view of one end of the press bed structure and the switch control structure, showing the cooperation of the guard element on the form roller assembly with the switch control mechanism; and

Figure 6 is a diagram of the motor controlling circuits.

The press to which our invention is shown applied is substantially the press disclosed in Vandercook et al. Patent No. 1,843,255. Briefly describing the press and referring particularly to Figure 1, the press base 10 supports the press bed structure B by means of cross bolts 11 extending through the bed structure and through vertical bars 12 at opposite sides of the bed and extending upwardly from brackets 13 on the base. The bed structure B provides the bed plate 14 and the rail flanges 15 for the supporting wheels of the impression cylinder and the printing rolls.

The impression cylinder carriage comprises end structures 16 connected by cross bars 17 and journaling the impression cylinder I which comprises metallic end portions 18 for engagement with the rail flanges 15, and the impression roll 19 of rubber or other suitable material. The cylinder supporting end structures 16 journal guide rollers 20 for engaging the under side of the rail flanges 15 to hold the impression cylinder carriage structure to the rail flanges.

The inking rolls 21 are journaled in end frames 22, the end portions 23 of the inking rolls engaging the rail flanges 15, and the rollers 24 on the end frame 22 engaging the under side of the rail flanges 15.

The end structures 16 for the impression cylinder have secured against their outer sides inverted U-shaped brackets 25 for receiving chain belts 26 to which the brackets may be connected in any suitable manner, and the end structures 22 of the form roller carriage have similar brackets 27 for receiving the chain belts. The two belts are at opposite sides of the bed structure B and are mounted on sprocket wheels 27 and 28 at the opposite ends of the bed structure. The sprocket wheels 27 are secured to a shaft 29, and

the sprocket wheels 28 rotate on a shaft 30.

Within the base 10 of the press is a driving source such as an electric motor M which is connected by a belt 31 to a cone pulley 32 from which a driving belt 33 extends to a pulley 34 on the shaft 35. This shaft supports a sprocket pinion 36 connected by a chain belt 37 with the sprocket wheel 38 on the shaft 29 on which the sprocket wheels 27 for the chain belts 26 are mounted.

A belt 39 extends from the pulley 32 to a pulley 40 on a shaft 41, a gear pinion 42 on this shaft meshing with a gear wheel 43 on a shaft 44 on which is a sprocket pinion 45 engaged by a chain belt 46. This belt engages a sprocket wheel 47 on the ink drum 48 secured on the shaft 30 on which the sprocket wheels 28 for the chain belts 26 are rotatably mounted.

The chain belt 46 also passes around a sprocket wheel 49 on a shaft 50 for driving the ink supply rolls, and a rocking frame 51 on the shaft mounts the ink supply and spreading roll 52 for the ink drum 48. The rocking structure 51 is connected by a link 53 with a switch lever 54 for the main switch 55 for the circuit for the motor M. When the press is idle, the switch will be open and the rocking frame 51 will hold the ink supply roll 52 away from the ink drum. When the machine is to be started, the switch lever 54 is swung down to close the switch and the link 53 is then moved to swing the frame 51 for application of the ink supply roll 52 to the ink drum.

When the press is in operation, the chain belts 26 will move the impression cylinder carriage and the form roller carriage through an orbit, the travel being in clockwise direction. The impression cylinder carriage and the form roller carriage are preferably secured to the chain belts 180° apart so that when one of the carriages is traveling along the top of the orbit on the rail flanges 15, the other carriage will be traveling in the opposite direction along the bottom of the orbit where the bed structure B provides the rails 56 for the rollers 20 and 24 of the impression cylinder carriage and the form roller carriage respectively. At the ends of the bed structure B semicircular guide channels 57 and 58 are provided for the rollers 20 and 24.

When the press is in operation, the inking rolls travel around the ink drum to receive a supply of ink and then ink the form F on the press bed and then the operator applies to the form a sheet to be printed after which the impression cylinder rolls over the form whereafter the operator strips the printed sheet from the form, and this cycle is repeated.

Describing now our improved safety means, a guard element 59 extends across the impression cylinder carriage in front of and parallel with the impression cylinder I. This guard element is preferably a flexible and elastic band such as a helical spring. On the front end structure 16 of the impression cylinder carriage is provided a stud or post 60 extending laterally, which post forms an anchorage for one end of the spring 59. On the chain receiving bracket 25 on the rear end structure 16 of the impression cylinder carriage is secured a block 61 to extend laterally and this block supports a fulcrum stud 62 for the lever 63. To the lower end of this lever the rear end of the spring 59 is secured as by a bolt 64.

A spring 65 is coiled on the stud 62 with one end thereof engaging against the rear side of the lever 63 and its other end engaging against the front end of the block 61. The spring forming the guard element 59 is close wound with its coils normally in engagement, and the spring 65 tends to swing the lever 63 to hold the guard member 59 taut and straight. Upon lateral pressure against the guard member 59, it will expand and exert tension on the lever 63 to swing it with its upper end rearwardly.

Secured against the front side of the right-hand rear bar 12 is a support 66 in the form of a bar. In its lower end this bar has a rectangular notch 67 from which extends a lower link 69, an upper link 68 extending from the top of the bar, the inner ends of the links receiving a pivot pin 70 extending through the bar, and the links at their outer ends receiving between them a tubular actuating rod A to which the links are pivoted by a pin 71.

On the front side of the left-hand rear bar 12 is secured a support in the form of a bar 72 from which extend upper and lower links 73 and 74 from a pivot pin 75, the links at their outer ends receiving between them the actuating rod A to which they are secured by a pivot pin 76. The links 73 and 74 are parallel with the links 68 and 69. On the right end of the actuating rod A an abutment arm 77 extends rearwardly into the elongated notch 78 in the upper side of the supporting bar 66. At the left end of this slot is an adjustable abutment stud 79 against which the arm 77 is normally held by a compression spring 80 interposed between the arm and the bar at the right end of the slot 78. In this normal position of the actuating rod, the supporting links therefor extend diagonally forwardly and toward the right as clearly shown on Figure 2.

At its left end the supporting bar 66 is cut out at the top to leave a supporting shelf 81 for the housing 82 of a switch S from which housing extends an actuating pin 83 in the path of the actuating rod A. As best shown on Figure 4, when actuating rod A is held in its normal position by the spring 80, the rear side of the bar will be displaced a distance from the end of the switch actuating pin 83. However, when lateral pressure is exerted against the guard element 59 and this element is flexed, the lever 63 will be swung against the rod A to cause bodily rearward movement of the rod and exertion thereby of pressure against the switch pin 83 for setting of the switch. As will be described more fully later, such setting of the switch results in control of the motor circuit for reverse operation of the motor and thereby quick stopping of the press. On Figure 2, the impression cylinder carriage is approaching the form F on which the operator must apply and align a sheet before the form is reached by the impression cylinder. Where a press is run at considerable speed, the operator must be accurate and quick in order to get the sheet aligned on the form before approach of the impression cylinder. If he should not withdraw his hands sufficiently rapidly, they may be struck by the impression cylinder carriage or the cylinder, or his fingers may be caught between the carriage and the end of the form, and the operator may thus be injured. However, with our improved safety means installed, if the operator does not quickly enough withdraw his hand, it will be engaged by the guard element 59 which will then be flexed to effect control of the motor circuit as has been referred to. So long as the guard element 59 remains deflected and tense, the motor will reverse the travel of the press until the guard

element 59 is withdrawn from the operator's hand whereupon the released actuating rod A will be restored to its normal position away from the switch S so that the motor may again be connected in circuit for forward operation of the press.

The guard element 83 may be arranged on the form roller carriage in the same manner as the guard element 59 is arranged on the impression cylinder carriage. The guard element 83 is anchored between a post 84 on the front wall 22 of the form roller carriage, and a lever 85 fulcrumed on the block 86 on the rear end of the carriage, the actuating rod A being in the path of the upper end of the lever so that, when the guard element 83 is deflected and tensed, the lever will shift the actuating rod rearwardly for setting of the switch S for reversal of the motor drive. Thus, if the operator during stripping of the printed sheet from the form does not get his hand quickly enough out of the way of the form roller carriage, the guard element 83 will engage the hand and be flexed to cause setting of the switch for motor reversal, but as soon as the guard member 83 is released from the hand, the switch S will be reset for forward operation of the motor.

On Figure 6 we have diagrammatically shown a circuit arrangement for control of the motor where the motor is of the direct current type. The switch S functions to selectively supply current to solenoid operated switches for controlling the motor circuit for forward or reverse drive of the press. The switch blade 87 within the housing of the switch S normally engages a contact 88 connected by a conductor 89 with one terminal of the coil 90 for the solenoid armature 91. When the pin 83 of the switch is engaged by the actuating rod A and shifted inwardly, the switch blade 87 engages the contact 92 which is connected by conductor 93 with one terminal of the coil 94 for the solenoid armature 95, the other terminals of the solenoid coils being connected by a conductor 96 which conductor is connected by a conductor 97 with the negative terminal 98 of the current supply circuit 99. The positive terminal 100 of the supply circuit connects with the switch contact 101 from which the switch blade 87 extends. The current supply circuit 99 includes the main switch 55, which is mounted on the press base 10 as shown on Figure 1.

The solenoid armature 91 bears a contact bar 102 which, when the solenoid 90 is deenergized, engages with upper contacts 103—104 as shown by dotted lines on Figure 6, a spring X tending to hold the armature in its upper position. Upon energization of coil 90, the armature 91 will be shifted downwardly for engagement of the bar 102 with the lower contacts 105 and 106.

The bar 102' on the armature 95 is engageable with upper contacts 103' and 104' and with lower contacts 105' and 106'.

The contacts 103 and 105 are connected by conductor 107 with the positive terminal of the supply circuit and a conductor 108 extending from the contacts 104' and 106' is connected with the negative pole of the supply circuit by the conductor 97.

Normally the switch pin 83 is out and the switch blade 87 engages the contact 88 for current flow through the solenoid coil 90, this flow being from the positive side of the supply circuit, through the switch blade 87, the conductors 89, 96 and 97. The bar 102 will therefore be in engagement with the contacts 105—106 so that the current flow through the motor M will be from the plus side of the supply circuit, through the conductor 107, solenoid switch bar 102, conductor 109, the motor M, the conductor 110, the bar 102' and contacts 103' and 104', and conductor 108 to the negative side of the supply circuit, the current flow through the motor being in direction of the full line arrow, the motor thus driving in forward direction for operation of the press.

Upon inward shift of the switch pin 83 by the actuating rod A, the switch blade will be disconnected from the contact 88 and engaged with the contact 92. The solenoid coil 90 is now deenergized and the solenoid coil 94 receives current flow from the positive side of the supply line through the switch S, conductor 93, and conductors 96 and 97 to the negative side of the supply line and the armature 95 will be drawn down. Current flow through the motor will now be from the positive side of the supply line through conductor 107, contact 103, switch bar 102, contact 104, conductor 111, the motor M, conductor 112, contact 105', switch bar 102', contact 106', and conductor 108 to the negative side of the supply line, the current now flowing through the motor in reverse direction as indicated by the dotted arrow, and the motor driving direction will be reversed. When the actuating rod A is released from the switch pin 83, the released switch spring 87 will be sprung back to its normal position in engagement with the contact 88 for forward operation of the motor.

The actuating rod A extends substantially full length of the printing bed so that, when it is engaged at any point by the lever 63 or 85 on the respective carriages, the bar, by virtue of its link suspension, will be moved bodily rearwardly for engagement with the switch pin 83 for adjustment of the motor controlling circuits. Our improved safety means can be readily applied as an accessory to proof presses which may then be run at high speed without any danger of injury to the operator while feeding sheets to the form or stripping the printed sheets therefrom. Should any other conditions arise which would make it desirable to quickly stop the press, such stoppage can be accomplished by merely pressing against the guard element 59 or the guard element 83, or by directly pushing the actuating rod A into engagement with the switch S.

We have shown a practical and efficient embodiment of our invention but we do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications may be made without departing from the spirit of the invention.

We claim as our invention:

1. In a printing press, the combination of the press bed, a carriage movable over said bed and supporting a roll for cooperation with a form on said bed when said carriage moves in forward direction, an electric driving motor and driving means between the motor and said carriage, electrical circuits for said motor, electrical controlling means for said motor circuits, a control switch for said electrical control means located adjacent to said bed, said control switch being normally set for operation of said motor for forward drive of said carriage, actuating means for said control switch, guard means movable with said carriage and located in advance of the carriage roll, and means effective upon movement of said guard means from its normal position during forward travel of said carriage for causing

said actuating means to set said control switch for control of the motor circuit for reverse operation of the motor and reverse movement of said carriage.

2. In a printing press, the combination of the press bed, a carriage movable on said bed supporting a roll member for cooperation with a form on said bed, a driving motor for said carriage, electrical control circuits for said motor, a control switch for said control circuits mounted adjacent to said bed, actuating means for said control switch located adjacent to said bed, said control switch being normally set for forward drive of said carriage by said motor, guard means movable with said carriage relative to said switch actuating means, and means on said carriage actuated by the movement of said guard means from its normal position during forward movement of the carriage for moving said actuating means for setting of said control switch for control of the motor circuits for reverse operation of said motor and reverse travel of said carriage.

3. In a printing press, the combination of the press bed, a carriage movable on said bed and supporting a member for cooperating with a form on said bed, an electric driving motor for said carriage, control circuits for said motor, a control switch for said control circuits mounted adjacent to said bed, an actuating rod for said control switch mounted adjacent to and parallel with said bed, said control switch being normally set for forward drive of said carriage by said motor, a guard element extending across said carriage at the front side thereof, an actuating member on said carriage connected with said guard element and movable alongside of said actuating rod as said carriage moves in forward direction, said actuating element upon movement of said guard element from its normal position during forward travel of said carriage being engaged with said actuating rod to effect movement thereof for setting of said control switch for control of said circuits to cause reverse driving of said motor.

4. In a printing press, the combination of the press bed, an impression cylinder carriage, an inking roll carriage, an electric driving motor and driving means controlled thereby for causing said carriages to travel successively over said bed for application of ink to a form on the bed and for printing from the inked form, control circuits for said motor, a control switch for said control circuits mounted adjacent to one side of said bed and normally set for forward driving of said motor, an actuating bar for said switch located adjacent to and parallel with the said bed, a guard member for each carriage extending across the forward side thereof, actuating means on each carriage connected with the respective guard element and movable alongside of said switch actuating bar as said carriages travel over said bed, and means effective upon movement of either guard element from its normal position during travel of the carriage toward a form on said bed for causing the respective actuating means to engage with and move said actuating bar for setting of said control switch for control of said circuits to cause reversal of said motor and reverse travel of said carriages.

5. In a printing press, the combination of the press bed, an impression cylinder carriage, an inking roll carriage, an electric driving motor and driving means controlled thereby for causing said carriages to travel successively over said bed for application of ink to form on the bed and for printing from the inked form, control circuits for said motor, a control switch for said control circuits mounted adjacent to one side of said bed and normally set for forward driving of said motor, an actuating bar for said switch located adjacent to and parallel with the said bed, a guard member for each carriage extending across the forward side thereof, actuating means on each carriage connected with the respective guard element and movable alongside of said switch actuating bar as said carriages travel over said bed, and means effective upon movement of either guard element from its normal position during travel of the carriage toward a form on said bed for causing the respective actuating means to engage with and move said actuating bar for setting of said control switch for control of said circuits to stop forward drive of said motor.

6. In a printing press, the combination of the press bed, a carriage movable on said bed and supporting a member for cooperation with a form on said bed, an electric driving motor for said carriage, electrical control circuits for said motor, a control switch for said control circuits mounted adjacent to said bed and normally set for forward drive by said motor, an actuating member for said switch located adjacent to said bed, a flexible guard element in the form of a closed helical spring extending across said carriage at the forward side thereof, an actuating member on said carriage connected with said guard rail and movable alongside of said switch actuating member as said carriage moves on said bed, said actuating member upon transverse flexure of said guard rail during forward travel of said carriage being moved to engage with and move said switch actuating member for setting of said switch for control of said circuits for reverse drive of said motor.

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