

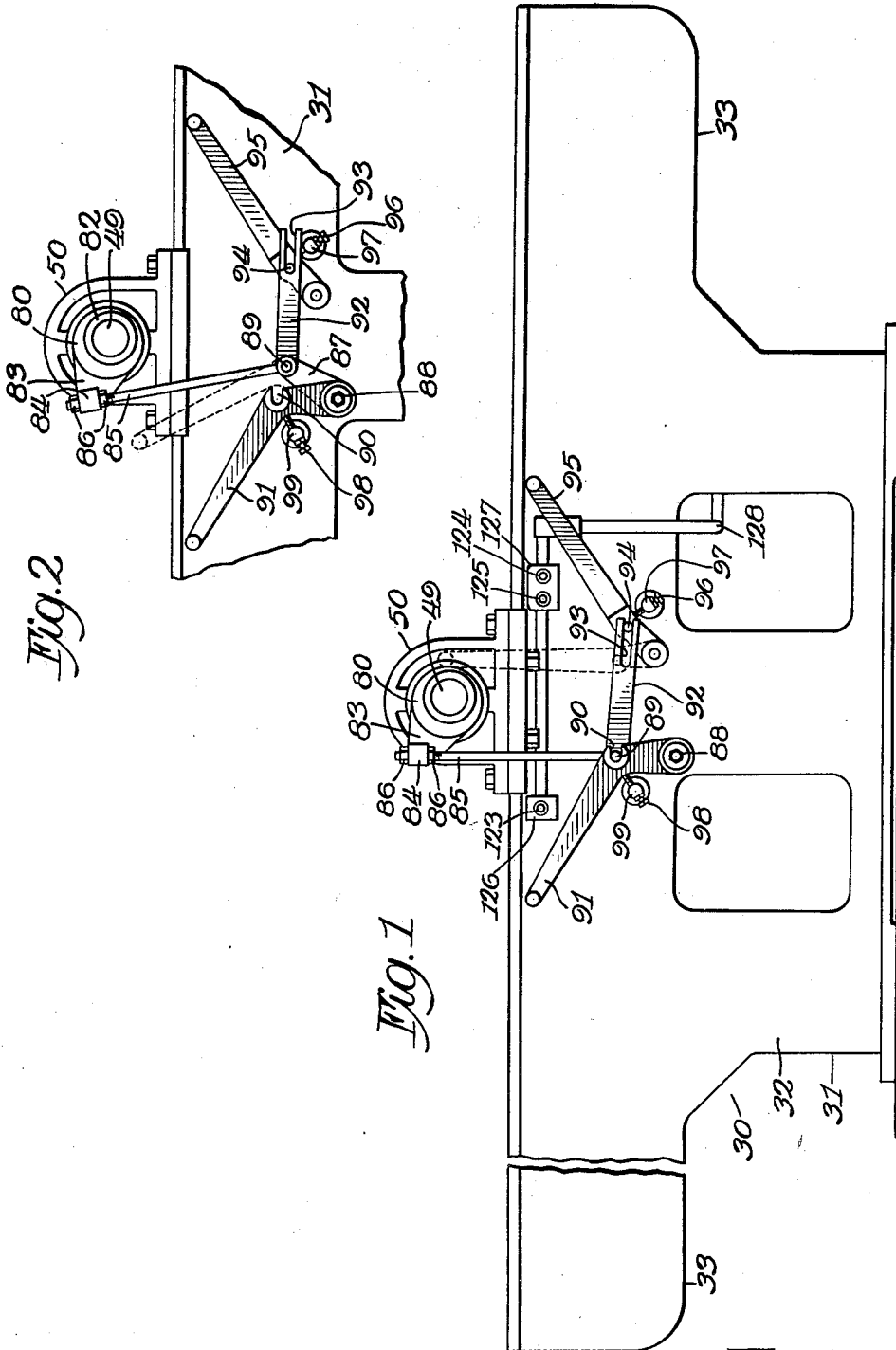
March 27, 1934.

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1,952,173

RECIPROCATING CARRIAGE MECHANISM

Original Filed Dec. 20, 1924 8 Sheets-Sheet 1



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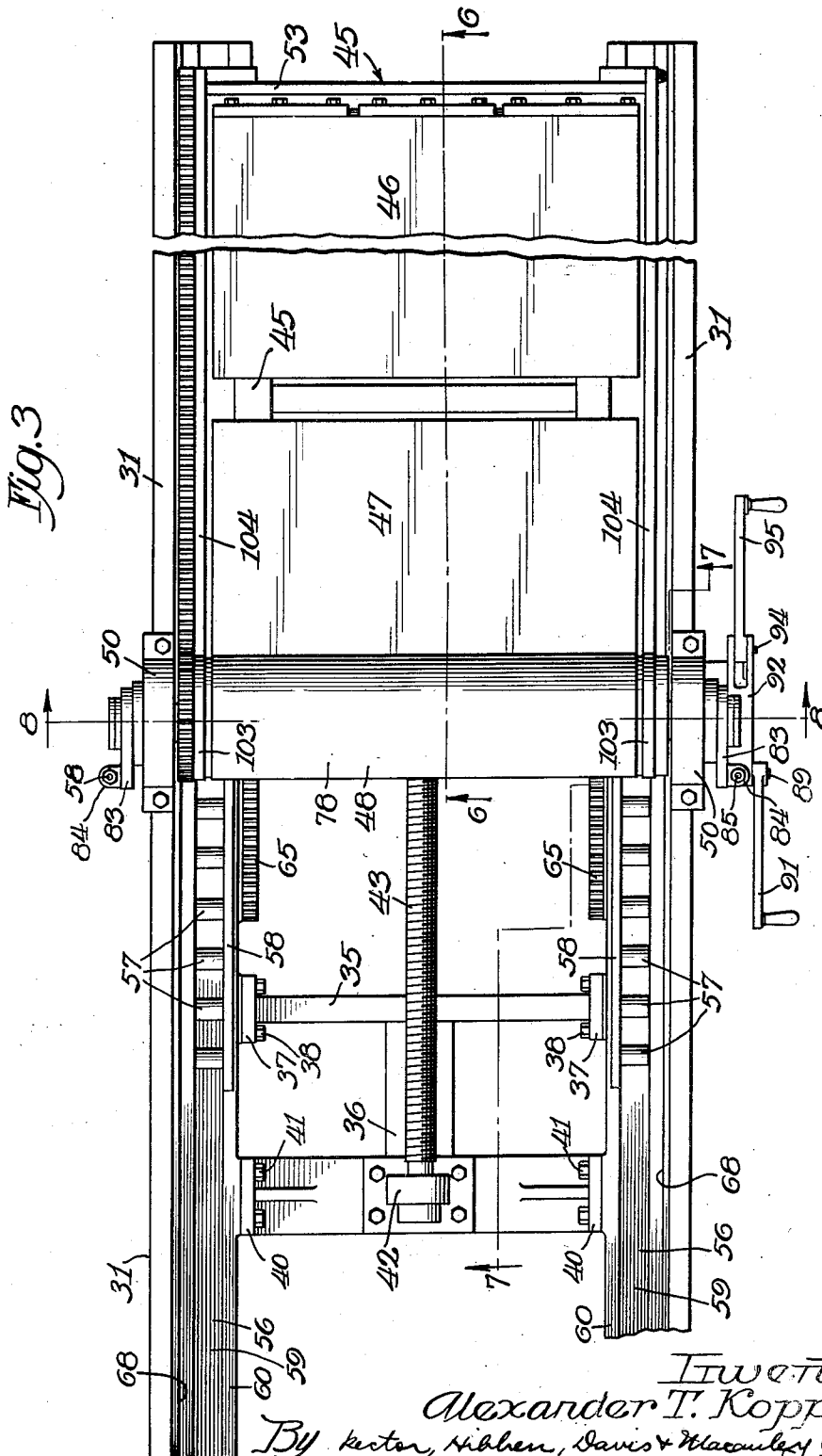
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RECIPROCATING CARRIAGE MECHANISM

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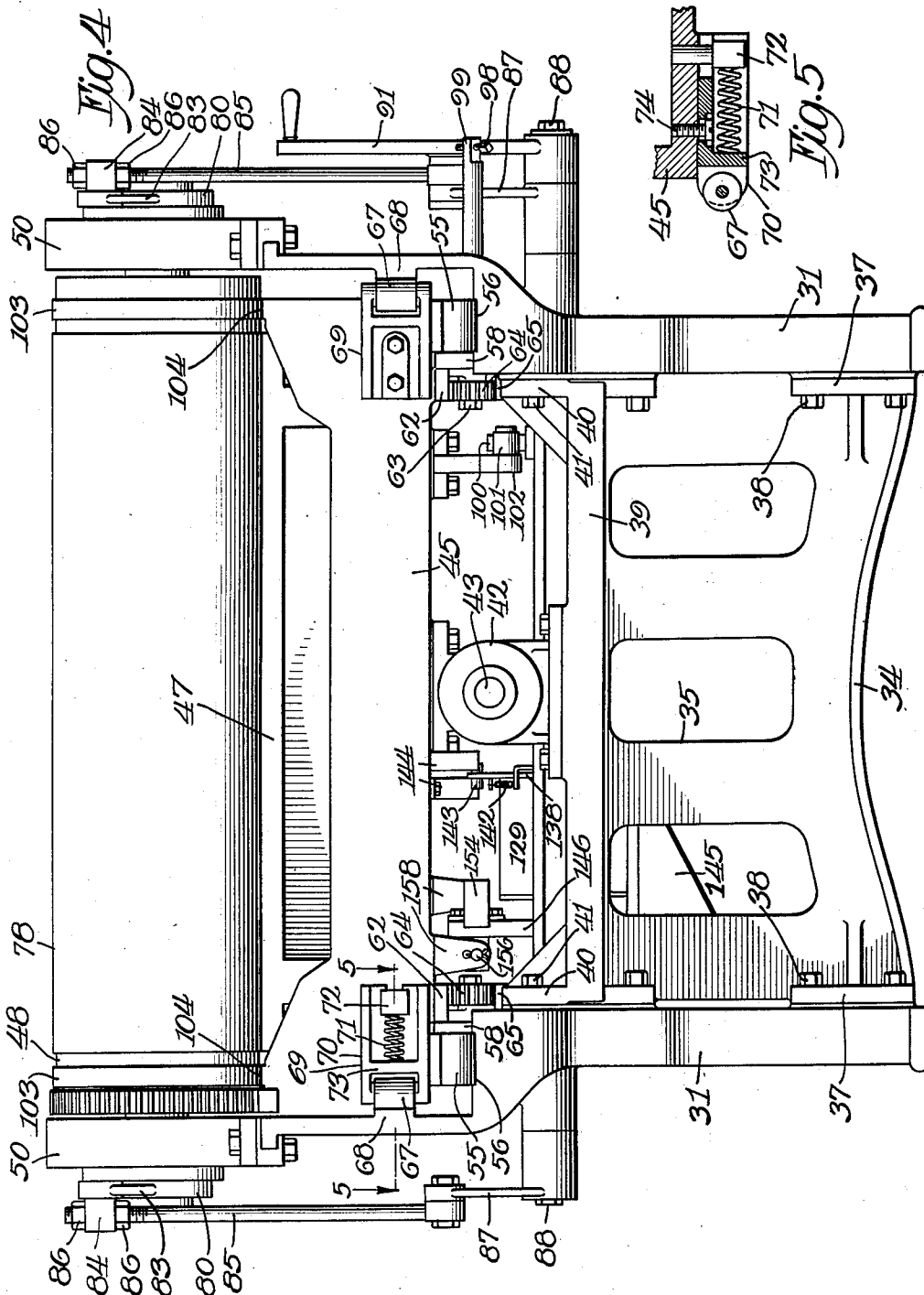
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RECIPROCATING CARRIAGE MECHANISM

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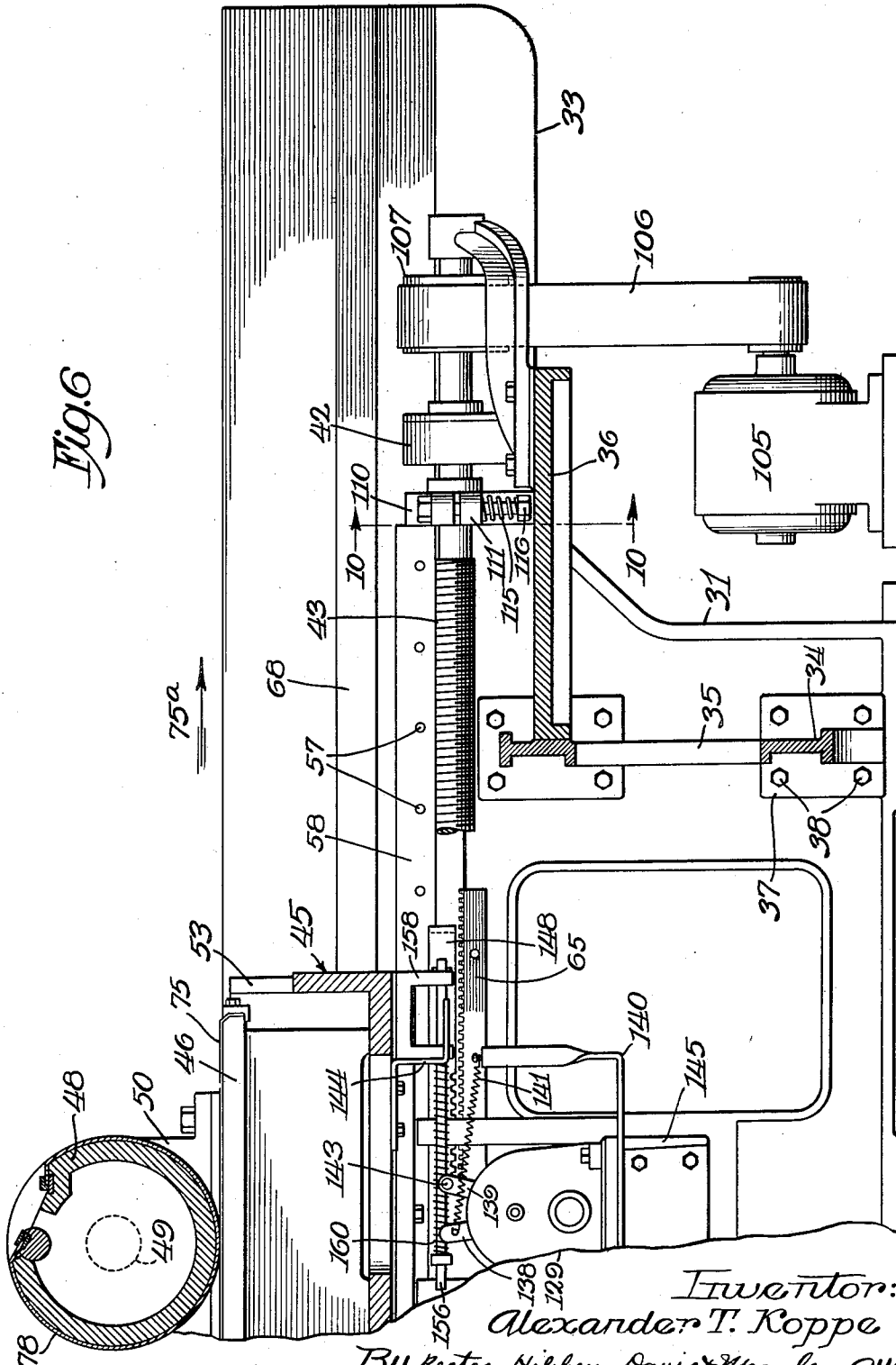
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RECIPROCATING CARRIAGE MECHANISM

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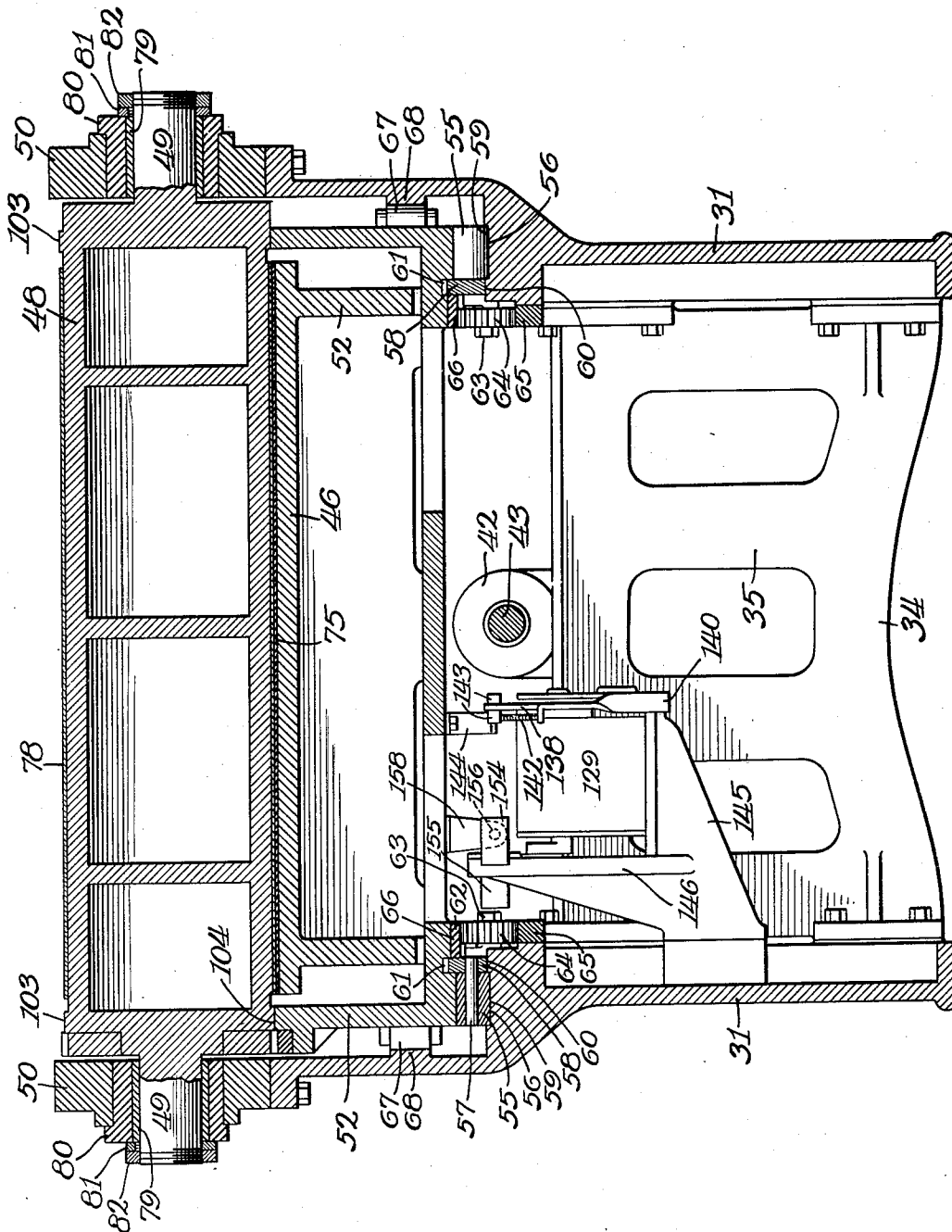


Fig. 8

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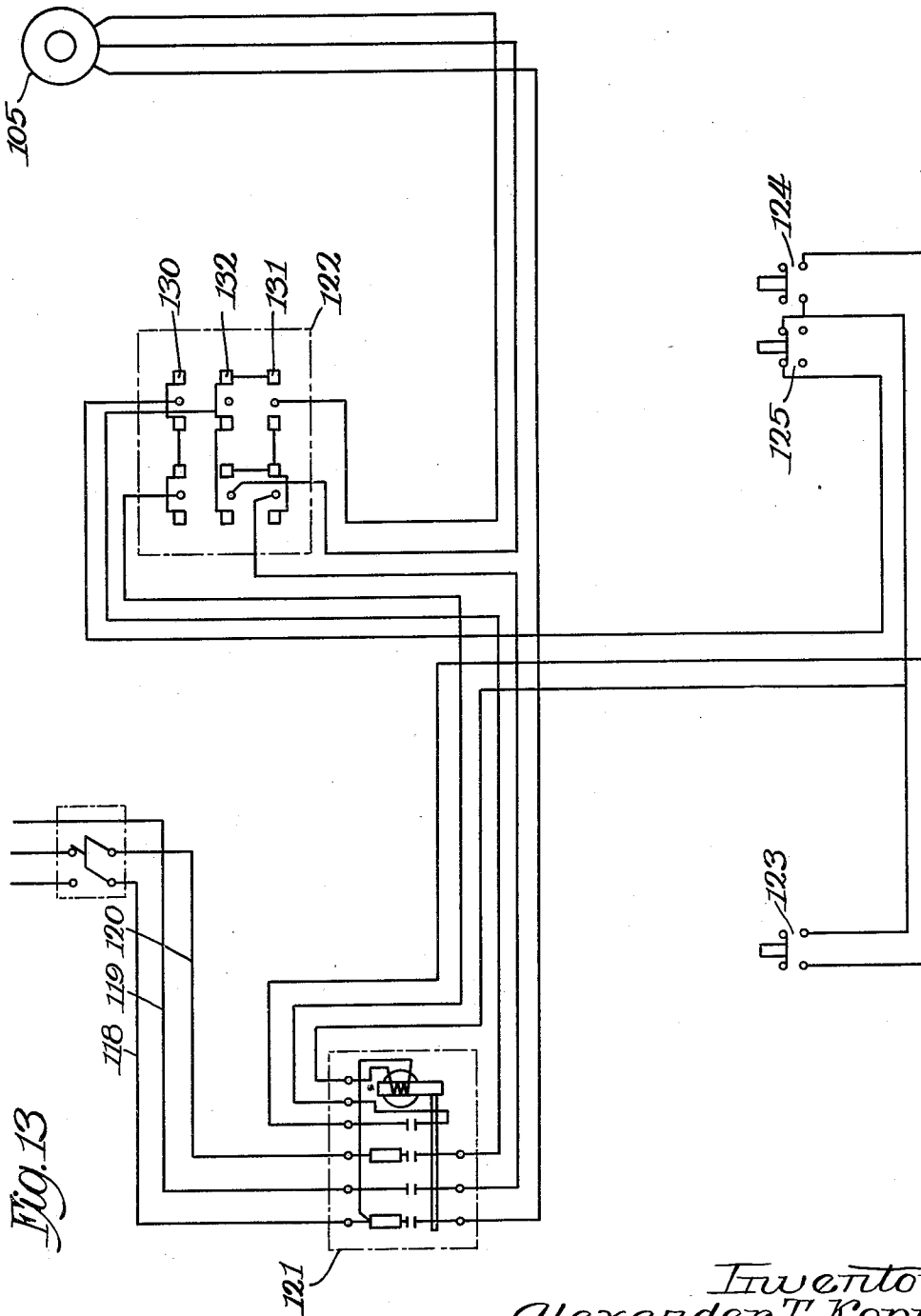


Fig. 13

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UNITED STATES PATENT OFFICE

1,952,173

RECIPROCATING CARRIAGE MECHANISM

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Original application December 20, 1924, Serial No. 757,104. Divided and this application May 23, 1929. Serial No. 365,273

9 Claims. (Cl. 192—141)

My invention relates to reciprocating carriage mechanism and is concerned more particularly with an arrangement of this character which is used in connection with proof presses adapted for proving lithographic work from zinc or aluminum plates, or other sensitized sheets, employed in offset printing and for similar purposes. The present application is a division of my co-pending application for proof presses, Serial No. 757,104, filed December 20, 1924, the subject of the former being illustrated and described in the pending case.

One of the objects of my invention is to provide a mechanism for actuating a carriage having a reciprocating movement which may be intermittently controlled or automatically stopped at either end of its movement. A further object is the provision of means including a motor driven mechanism which is arranged to stop the carriage and to reverse the motor connections when the carriage has reached the end of its travel in either direction. A further object is the provision of a brake mechanism which is arranged to promptly bring the driving shaft of the carriage to rest when the motor has stopped. A further object is to provide in a proof press, or similar mechanism, means for automatically elevating the transfer roll at the end of travel of the bedplate which is supported on the carriage. Other objects will become more apparent from the following specification, reference being had to the accompanying drawings, and the novel means by which said objects are effectuated will be definitely pointed out in the claims.

In the drawings,

Figure 1 shows a side elevation of a proof press embodying my improved mechanism, the transfer roll being shown in lowered position;

Fig. 2 shows a partial side elevation of the machine, illustrating the positions of the parts of the actuating mechanism of the transfer roll when the roll has been raised;

Fig. 3 shows a top plan view of the mechanism;

Fig. 4 shows an end elevation of the machine, looking toward the right as viewed in Fig. 1;

Fig. 5 is a detail section taken on the line 5—5 of Fig. 4;

Fig. 6 shows a longitudinal section taken on the line 6—6 of Fig. 3;

Fig. 7 shows a longitudinal section taken on the line 7—7 of Fig. 3, the views of Figs. 6 and 7 showing a complete longitudinal section through the machine, with the carriage displaced on the opposite side of the transfer roll from that shown in Fig. 3;

Fig. 8 shows a transverse section taken on the line 8—8 of Fig. 3;

Fig. 9 shows a top plan view of the motor control by which the direction of rotation of the motor is automatically reversed at the ends of travel of the bedplate;

Fig. 10 is a vertical section taken on the line 10—10 of Fig. 6 through the friction brake for controlling the rotation of the screw shaft;

Fig. 11 shows a side elevation of the controller mechanism illustrated in Fig. 9;

Fig. 12 shows a side elevation of the controller mechanism, looking toward the opposite side from that illustrated in Fig. 11; and

Fig. 13 is a diagrammatic view showing the electrical connections of the reversing controller and other devices for controlling the operation of the driving motor.

For purposes of description, my improved mechanism is illustrated in an operating environment embodying a proof press construction in which the numeral 30 designates a supporting frame, comprising a pair of side frames or standards 31, each having a part 32 extending upwardly from a floor or other support, and provided with longitudinal extensions 33 extending in opposite directions thereon. The side frames 31 are united by a pair of transverse frame members 34 having the form illustrated particularly in Figs. 4 and 6, where each transverse frame is shown as comprising an upwardly extending part 35 and a horizontally projecting shelf portion 36, these transverse frames being provided at their ends with laterally projecting flanges 37 which are secured to the side frames 31 by means of bolts 38. The parts 36 are formed integrally with or connected to two other transverse frame members 39 having flanges 40 on their ends which are connected to the side frames by bolts 41, these transverse frame members 34 supporting the bearings 42 of a longitudinal power driven screw shaft 43 by which the carriage is moved longitudinally of the machine. The threaded portion of the screw shaft 43 threadedly engages an internally threaded sleeve or nut 44 which is secured to the underside of a carriage 45, as shown in Fig. 7, so that the rotation of the shaft moves the carriage with respect to the frame 30. The carriage 45 supports the bedplates 46 and 47 which are adapted to carry the lithograph plates and the paper sheets, respectively, and to travel beneath the transfer roll 48 which is provided with trunnions 49 journaled in bearings carried by the bearing bracket 50 secured to the side frame member 31. In the operation of the ma-

chine, a plate bearing a lithograph design is placed on the bedplate 46 and as the carriage 45 moves longitudinally of the machine, the design to be reproduced is transferred to the roll 48 by which it is in turn transferred to the paper sheet mounted on the bedplate 47 as the longitudinal movement of the carriage 45 continues.

The carriage 45 is in the form of a rectangular frame of box like form having a central transverse member 51, side members 52, and transverse end members 53 and 54. The side members 52 of the carriage 45 travel on two series of cylindrical rollers 55 which roll on trackways 56 formed integrally with the side frame members 31, as shown particularly in Fig. 8. Rollers 55 are mounted on spindles 57 which extend outwardly from roller bars 58. The trackways 56 are grooved slightly as shown at 59 to receive the rollers 55 and the roller bars 58 adapted to travel above the shoulders 60 which are formed at the inner side of the groove. The rollers 55 are preferably so designed that the roller bars 58 travel longitudinally of the frame 30 with a speed substantially half of the longitudinal speed of the carriage 45, this arrangement substantially eliminating friction between the rollers and the contacting surfaces of the frame and carriage. The roller bars 58 are adapted to slide in guideways 61 which are formed in the underside of the side members 52 of the carriage and the bars are retained in these guideways by the detachable bars 62 which are secured to the underside of the carriage by cap screws or the like. In order to retain the bars 58 and their rollers in the same relative position at all times with respect to the carriage 45, in any given position of the carriage 45 each bar 58 is provided with an inwardly projecting spindle 63 having mounted thereon a pinion 64 adapted to mesh with a rack bar 65 secured to the side frame member 31 and with another rack bar 66 secured to the bars 62 carried by the carriage 45. As the carriage 45 moves longitudinally of the frame 30, the weight of the carriage is supported by the rollers 55 and the pinions 64 cooperating with the rack bars 65 and 66 at the sides of the machine serve merely to maintain the roller bars 58 in the proper relative position with respect to the carriage. The sides of the carriage are spaced inwardly somewhat from the side walls of the frame 30, as shown in Fig. 4, and the carriage is maintained in position laterally of the frame by means of rollers 67 which are adapted to contact with the vertical surfaces of trackways 68 formed on the side walls of the frame. At one side of the machine the rollers 67 are mounted on pivots carried by brackets 69 which are secured in fixed position on the ends of the carriage 45, as shown in Fig. 4, but at the other side of the machine, the rollers 67 are mounted on pivots carried by brackets 70 which are slidably mounted on the ends of the carriage 45, these brackets 70 being forced normally in an outward direction by means of coil springs 71 which are mounted between the lugs 72 on the carriage and the flanges 73 of the brackets, so that the adjacent rollers are maintained in contact with the adjacent trackways 68 and lateral movement of the carriage is at all times prevented. As shown in Fig. 5, the brackets 70 are slidably mounted in guides 74 fixed on the carriage 45.

A bedplate 46 is supported on the carriage 45 in any approved manner and preferably according to the arrangement illustrated and described in the above noted application, said plate being

intended to carry a zinc plate 75 secured thereto in any approved manner. In the operation of the machine, the carriage 45 and the bedplate 46 travel toward the right as viewed in Fig. 6, indicated by the arrow 75^a when the zinc plate is engaged by the transfer roll. Similarly, a bedplate 47, on which the paper sheet is mounted, is supported in any approved manner on the carriage 45 and preferably according to the means shown in the above noted application, said plates being intended to carry a paper sheet 76 which is secured in position on the bedplate 47 in any approved manner. Special mechanism may be employed to properly adjust the position of the bedplates 46 and 47 relative to the transfer roll, and also to accurately position the zinc plate 75 and the paper sheet 76 thereon, means for achieving this result being illustrated and described in the above noted application, but forming no part of the present invention.

The transfer cylinder 48 is utilized for the purpose of transferring the design or impression to be reproduced from the lithograph plate 75 to the paper sheet 77. Said cylinder is provided with a flexible card or blanket 78, of rubber or the like, which is secured in position thereon according to the special means shown and described in the above noted application.

The trunnions 49 which carry the transfer roll 48 are mounted to rotate in bushings 79 located in eccentric sleeves 80 which in turn are journaled in the bearing bracket 50, previously referred to. The ends of the trunnions 49 are engaged by washers 81 and nuts 82 and the eccentrics 80 are provided with integral crank arms 83 pivotally connected at their outer ends to blocks 84 which are threadably engaged by operating rods 85 secured in adjusted position in the blocks 84 by means of lock nuts 86. The rods 85 are pivotally connected at their lower ends to crank arms 87 which are fixed on a transverse shaft 88 journaled in the side frames 31. At the front side of the machine, as viewed in Fig. 1, the crank arm 87 is connected to the rod 85 by means of a pivot pin 89 which projects outwardly to be engaged by slots 90 in an operating lever 91 rotatably mounted on the end of the shaft 88. When the lever 91 is moved toward the right as viewed in Fig. 1, to the position shown by dotted lines in Fig. 2, the crank arms operate the rods 85 to rotate the eccentrics 80 and thereby permit the cylinder 48 to be elevated free of engagement with either the lithograph plate on the bedplate 46 or the paper sheet on the bedplate 47. The reverse motion of the eccentrics with a resulting lowering of the transfer roll 48, so that the rubber sheet thereof engages with the upper surfaces of the lithographic plate 75 or the paper sheet 76, may be effected manually through the operation of a link 92 which is connected to the pivot pin 89 and arranged to extend longitudinally therefrom. This link has a slot 93 in the end thereof which is engaged by a pin 94 on an operating lever 95 and this operating lever may be moved toward the left, as viewed in Figs 1 and 2, to effect the lowering of a cylinder toward the bedplates. The movement of the lever 95 toward the right, as viewed in Figs. 1 and 2, is limited by means of a stop screw 96 threadably engaging a lug 97 extending outwardly from the adjacent side frames 31 and this stop screw limits also the extent of movement of the link 92 and the crank arms 87 when actuated by the lever 91, so that it determines the extent to which the roll 48 is elevated

away from the path of movement of the bed-plates. In a similar manner, the lever 91 is limited in its counterclockwise movement by a stop screw 98 which threadably engages a lug 99 extending outwardly from the side frames 31, so that the lowering of the roll 48 is limited by the engagement of the pin 89 with the slot 90 and the engagement of the lever 91 with the stop screw 98. By adjusting the stop screws 96 and 98, any desired range of movement of the transfer roll 48 may be obtained. Further adjustment may be secured by regulating the lock nut 86 in order to vary the position of the rods 85 in the block 84, thereby varying the normal position of the eccentrics 80 in their bearings. When the carriage 45 reaches the end of the path of travel toward the right, as viewed in Fig. 7, the cylinder 48 is elevated automatically by the action of an arm 100 fixed on the shaft 88 in the path of movement of a stop member 101 carried by a bracket 102 secured to the end of the carriage 45.

The roll 48 is provided at opposite ends with bearers in the form of bearing disks or wheels 103 and when the roll 48 is lowered by the operation of the eccentric mechanism heretofore described these bearing members 103 rest on the horizontal bearing surfaces 104 which are formed on the side members 52 of the carriage 45. When the carriage 45 is moved longitudinally by the rotation of the screw shaft 43, the contact between the surfaces 104 and the peripheral surfaces of the drum 103 serves to rotate the transfer roll 48 so that the impression on the lithograph plate 75 is first transferred to the rubber sheet 78 and then transferred to the paper sheet 77 mounted on the bedplate 47. Special mechanism, illustrated and described in the above noted application, is employed for the purpose of insuring an exact registration of the transfer roll 48 with the lithograph plate and the paper sheet when the design being transferred involves the reproduction of a plurality of different colors.

The screw shaft 43 by which the longitudinal movement of the carriage 45 is effected is driven by an electric motor 105 which is connected by a belt 106 with a pulley 107 mounted on the end of the shaft 43, as shown in Fig. 6. In order that the screw shaft 43 may come to rest promptly when the motor 105 is stopped, thereby preventing over-running of the carriage 45, the shaft 43 is provided with a friction wheel 108 surrounded by a friction shaft or housing 109 formed in two parts 110 and 111, the latter of which is secured to the frame member 36. The part 110 is provided with lateral projections 112 adapted to overlie similar projections 113 on the part 111 and bolts extend downwardly from the part 112 through apertures 114 in the part 113, some of these bolts having coil springs 115 mounted thereon between the lugs 113 and the nuts 116, so that the springs serve to maintain in contact with the surface of the friction wheel 108, the friction plates 117 of leather or the like which are secured on the inside of the part 110 of the housing. By adjusting the nut 116 the degree of frictional contact may be regulated in order to arrest the movement of the screw shaft 43 in the manner desired after the motor 105 has been stopped.

The motor 105 may be either a direct current motor or an alternating current motor, but for example, there is illustrated in the drawings an alternating current, three-phase system which is automatically controlled so that the motor may be conveniently started and stopped by the oper-

ator and its direction of rotation automatically reversed by control of mechanism which is operated when the carriage 45 reaches either limit of its travel. As shown in Fig. 13, a three-phase, alternating current motor is supplied with electric current from a suitable source through three line wires 118, 119 and 120. The supply of current from these line wires to the motor 105 is controlled by an electro-magnetic switch 121, a reversing controller 122, two starting switches 123 and 124, and a stopping switch 125. The starting switch 123 is located in a casing 126 on the side frames 31 adjacent the lever 91, as shown in Fig. 1, and the other starting switch 124 is located with the stopping switch 125 in a casing 127 located adjacent the other operating lever 95, the switch casing being connected by a conduit 128 in which the electric conductor is located. One of the line conductors 118 leads through the electro-magnetic switch 121 directly to the motor, as shown in Fig. 13, and the other two line conductors 119 and 120, after passing through the electro-magnetic switch 121, are carried to the controller 122 having contacts which are adapted to be operated, as hereinafter described, by reversing the connections of these conductors at the ends of the path of travel of the carriage 45, so that the direction of rotation of the motor is automatically reversed when the carriage reaches the end of its travel in either direction. The starting switches 123 and 124 are normally open and the instantaneous closing of either of them by the fingers of the operator serves to operate the electro-magnetic switch 121 so that the contacts will close and start the motor in operation. When it is desired to stop the operation of the motor, the electro-magnetic switch 121 is operated to open the circuit by the manual operation of the stopping switch 125.

The controller 122 comprises a casing 129 having mounted therein two series of stationary electrical contacts 130 and 131 adapted to be engaged by the movable contacts 132, all of these contacts being connected in the electrical circuit as shown in Fig. 13. The movable contacts 132 are actuated by the shaft 133 which projects through the end wall of the casing 129 and has fixed thereon a disk 134 provided with a pair of notches 135 and 136, as shown in Fig. 11, adapted to be engaged by rollers 137 mounted on the two locking levers 138 and 139. A U-shaped bracket 140 is secured to the base of the controller casing, and the upwardly extending arms of this bracket are connected by coil springs 141 and 142 to the locking levers 138 and 139, respectively. The springs 141 and 142 hold rollers 137 in contact with the peripheral surface of the disk 134 so that when the disk is turned to proper position, the rollers 137 will engage one or the other of the notches 135 and 136. Each of the locking levers 138 and 139 has a roller 143 pivotally mounted on the upper end thereof to be engaged by a tripping member 144 of angular form, one of which is mounted at each end of the carriage 45, as shown in Figs. 6 and 7. The controller 122 is mounted on a bracket 145 secured to the side frames 31, as shown in Fig. 8 and this bracket is provided with a pair of upwardly extending arms 146 having guideways 147 formed in the upper part thereof to receive a slidably mounted bar 148 having formed therein a plurality of rack teeth 149 arranged to mesh with the teeth of a segmental gear 150 secured by cap screws 151 on an arm 152 which is fixed to the end of the controller

shaft 133, at the end of the controller opposite the disk 134.

When the bar 148 is moved longitudinally of the machine in its guideway 147, the resulting angular movement of the segmental gear 150 moves the controller shaft 133 to throw the movable contacts 132 of the controller to one extreme position or the other, so that they engage stationary contacts 130, or the stationary contacts 131, thereby controlling the direction of rotation of the motor 105. The extent of movement of the segmental gear 150 is determined by the engagement of the arm 152 with the stop members 153 which are secured to the end wall of the controller casing 129, as shown in Fig. 12. The bar 148, by which the controller 122 is operated, is provided at opposite ends with oppositely directed flanges 154 and 155, which are adapted to be engaged at either end of the path of travel of the carriage by one or the other of two actuating rods 156, which are slidably mounted in the depending arms 157 of brackets 158 secured to the underside of the carriage 45 at each end thereof, as shown in Figs. 6 and 7. The movement of each actuating rod 156 away from the central part of the carriage 45 is limited by a cotter pin 159 passing through the rod, and the rod is normally moved toward the end of the carriage by a coil spring 160 which is mounted thereon, as shown particularly in Fig. 9, between one of the bracket arms 157 and a collar 161 fixed on the rod. As the carriage 45 approaches either end of the path of travel, one of the rollers 143 on the locking lever 138 or 139 which carries the roller 137 then in engagement with one of the notches 135 or 136, is engaged by one of the depending tripping members 144 carried by the carriage, with the result that the roller 137, mounted on the locking levers 138 or 139 in question, is moved out of engagement with the notch on the disk 134, so that the controller shaft 133 is then free to turn. Just after the disk 134 is released, one of the flanges 154 or 155 of the operating bar 148 is engaged by one or the other of the actuating rods 156, depending upon the direction of movement of the carriage 45. When this occurs, the engaged rod 156 moves longitudinally in the supporting bracket 158 and the spring 160 mounted on the rod is compressed until the pressure acting on the bar 148 is sufficient to actuate the segmental gear 150 and thereby throw the controller to its other extreme position through the rotation of the shaft 133. When the movable contacts 132 of the controller reach that position which effects the reversal of the direction of rotation of the motor 105, as determined by the engagement of the arm 152 with one or the other of the stops 153 mounted on the end wall of the controller, the roller 137 on the other one of the two operating locking levers 138 or 139, which was in its outer position during the preceding longitudinal movement of the carriage 45, is moved inwardly by its connected spring 141 or 142, thereby causing the roller 137 thereon to engage one of the notches 135 or 136 to hold the controller in the reversed position. The momentary interruption of the circuits during the movement of the movable contact of the controller from one position to the other serves to stop the motor 105 simultaneously with the reversal of the electrical connections to the motor, so that the motor can subsequently be started in operation to effect further movement of the carriage 45 in the reverse direction only by depressing one or the other of the starting switches 123 or 124.

After the circuit of the motor has been interrupted by the initial movement of the controller mechanism, the continued movement of the rack bar 148 to complete the reversal of the electrical connections to the motor 105 is affected by one of the actuating rods 156, the energy stored up in the connected spring 160 being sufficient to continue the movement of the rack bar 148 until the segmental gear 150 reaches the limit of its movement.

Two of the starting switches 123 and 124 are provided at convenient points on one side frame 31, so that the machine can be started conveniently from either of the positions adjacent the operating lever by which the transfer roll is raised and lowered. One of the starting switches 124 is located adjacent the stopping switch 125 so that these switches may be alternately depressed in succession by the operator for the purpose of effecting an intermittent longitudinal movement of the carriage 45 for positioning purposes. By means of this construction and arrangement of the actuating mechanism for the carriage 45, it will be apparent that at the end of its path of travel, the carriage 45 is automatically stopped and the connections of the motor are reversed so that the next movement of the carriage is in the reverse direction. At one end of the machine, the stopping of the motor and the reversal of its connection by the operation of the controller takes place simultaneously with the automatic elevation of the transfer roll 48 out of contact with the paper sheet on the bedplate 47.

In the operation of the machine, with the carriage 45 at the right hand end of the machine, as viewed in Fig. 1, the operator places the zinc plate 75 on the bedplate 46 and secures it in position. One of the starting switches 123 or 124 is then depressed with the result that the carriage 45 is moved by the motor to the other end of the machine, this movement taking place with the transfer roll in its elevated position. The zinc plate on the bedplate 46 is preferably inked before the carriage is moved to the left hand end of the machine, as viewed in Fig. 1, and when the carriage reaches the last mentioned position, the paper sheet 77 is placed in position on the bedplate 47, with the edges of said sheet properly secured in position. The roll 48 is then lowered by the operation of the lever 95 and the motor having been automatically stopped by the controller when the carriage reaches the left hand end of the machine, the operator then starts the motor by again depressing one of the starting switches, with the result that the carriage moves to the right hand end of the machine, as viewed in Fig. 1, and the impression on the zinc plate is transferred to the roll 48 and by that roll impressed on the paper sheet 77. When the carriage 45 reaches the right hand end of the machine again, the roll 48 is automatically elevated and the motor 105 is automatically stopped simultaneously with the reversal of the said connection. In addition to the means for automatically elevating the transfer roll 48, the lever 91 is provided, as heretofore explained, for effecting a manual elevation of the transfer roll 48 at any desired point in the operation of the machine. The motor 105 may, of course, be stopped at any point in the movement of the carriage by manipulating the switch 125 and, when the circuit of the motor is broken either by the operation of the stopping switch or by the operation of the con-

troller, the friction brake on the screw shaft 43 promptly brings the carriage 45 to rest.

While I have shown one set of elements and combinations thereof for effectuating my improved reciprocating carriage mechanism, it will be understood that the same is intended for purpose of illustration only and in nowise to restrict my arrangement to the exact forms and structures shown, for many changes may be made therein without departing from the spirit of my invention.

I claim:

1. The combination of a frame, a carriage mounted for movement in said frame, means comprising an electric motor for effecting movement of said carriage, an electric circuit for said motor, a controller connected in said electric circuit to reverse the direction of rotation of said motor, a gear connected to operate said controller, a rack bar meshing with said gear, and means carried by said carriage for actuating said rack bar at a predetermined point in the path of travel of said carriage.

2. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller for actuating said circuit to effect reversal of said motor, locking means for securing said controller in adjusted position, means actuated by said carriage for releasing said locking means at a predetermined point in the path of travel of said carriage, and means actuated by said carriage thereafter for operating said controller to reverse said motor.

3. The combination of a frame, a carriage mounted for movement in said frame, means comprising an electric motor for effecting movement of said carriage, an electric circuit for said motor, a controller connected to said electric circuit to reverse the direction of rotation of said motor, a gear connected to operate said controller, a rack bar meshing with said gear, and yieldable means carried by said carriage for actuating said rack bar at a predetermined point in the path of travel of said carriage.

4. The combination of a frame, a carriage mounted for movement in said frame, means comprising an electric motor for effecting movement of said carriage, an electric circuit for said motor, a controller connected in said electric circuit to reverse the direction of rotation of said motor, a gear connected to operate said controller, a rack bar meshing with said gear, means carried by said carriage for actuating said rack bar at a predetermined point in the path of travel of said carriage, and means for locking said controller in the shifted position.

5. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller for actuating said circuit to effect reversal of said motor, locking means for securing said controller in adjusted position, means actuated by said carriage for releasing said locking means at a predetermined point in the path of travel of said carriage, means actuated by said carriage thereafter for operating said con-

troller to reverse said motor, and means for locking said controller in the shifted position.

6. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller comprising a shaft for actuating said circuit to effect reversal of said motor, locking means comprising a notched disk on said shaft and a lever engageable with one of said notches for securing said controller in adjusted position, an arm on said carriage releasably engageable with said lever at a predetermined point in the path of travel of said carriage, means actuated by said carriage thereafter for operating said controller to reverse said motor, and a second lever on said controller for locking the same in the shifted position.

7. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller connected in said circuit to reverse the direction of rotation of said motor, a gear connected to operate said controller, a rack bar meshing with said gear, locking means for securing said controller in adjusted position, means actuated by said carriage for releasing said locking means at a predetermined point in the path of travel of said carriage, means carried by said carriage for thereafter actuating said rack bar at a predetermined point in the path of travel of said carriage to reverse said motor, and means for locking said controller in the shifted position.

8. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller comprising a shaft for actuating said circuit to effect reversal of said motor, locking means comprising a notched disk on said shaft and a lever engageable with one of said notches for securing said controller in adjusted position, an arm on said carriage releasably engageable with said lever at a predetermined point in the path of travel of said carriage, a gear mounted on said shaft, a rack bar meshing with said gear, and means carried by said carriage for actuating said rack bar at a predetermined point in the path of travel of said carriage subsequent to the release of said lever.

9. The combination of a frame, a carriage movable in said frame, means including a motor for effecting movement of said carriage, a circuit for said motor, a controller comprising a shaft for actuating said circuit to effect reversal of said motor, locking means comprising a notched disk on said shaft and a lever engageable with one of said notches for securing said controller in adjusted position, an arm on said carriage releasably engageable with said lever at a predetermined point in the path of travel of said carriage, a gear mounted on said shaft, a rack bar meshing with said gear, means carried by said carriage for actuating said rack bar subsequent to the release of said lever for operating said controller to reverse said motor, and a second lever engageable with one of said notches for locking said controller in adjusted position.

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