

T. H. JOSEPH, L. LARSEN & F. W. SMITH.  
EMBROIDERY MACHINE.

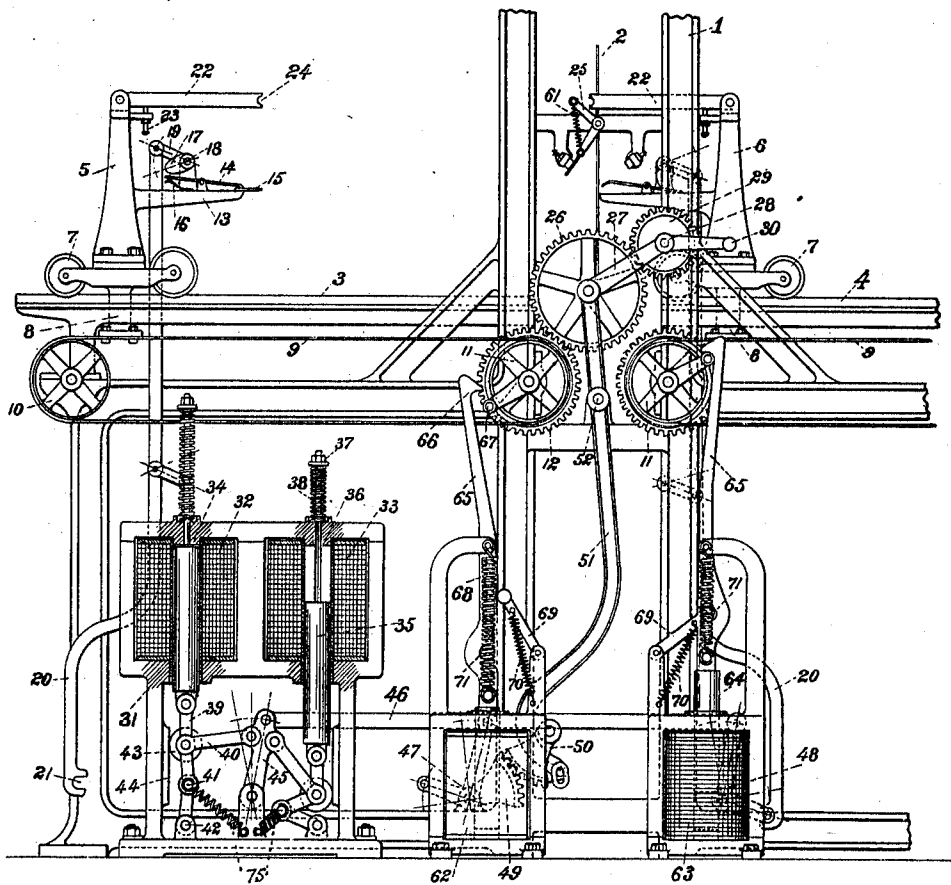
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990,198.

Patented Apr. 18, 1911.

2 SHEETS—SHEET 1.

FIG. 1.



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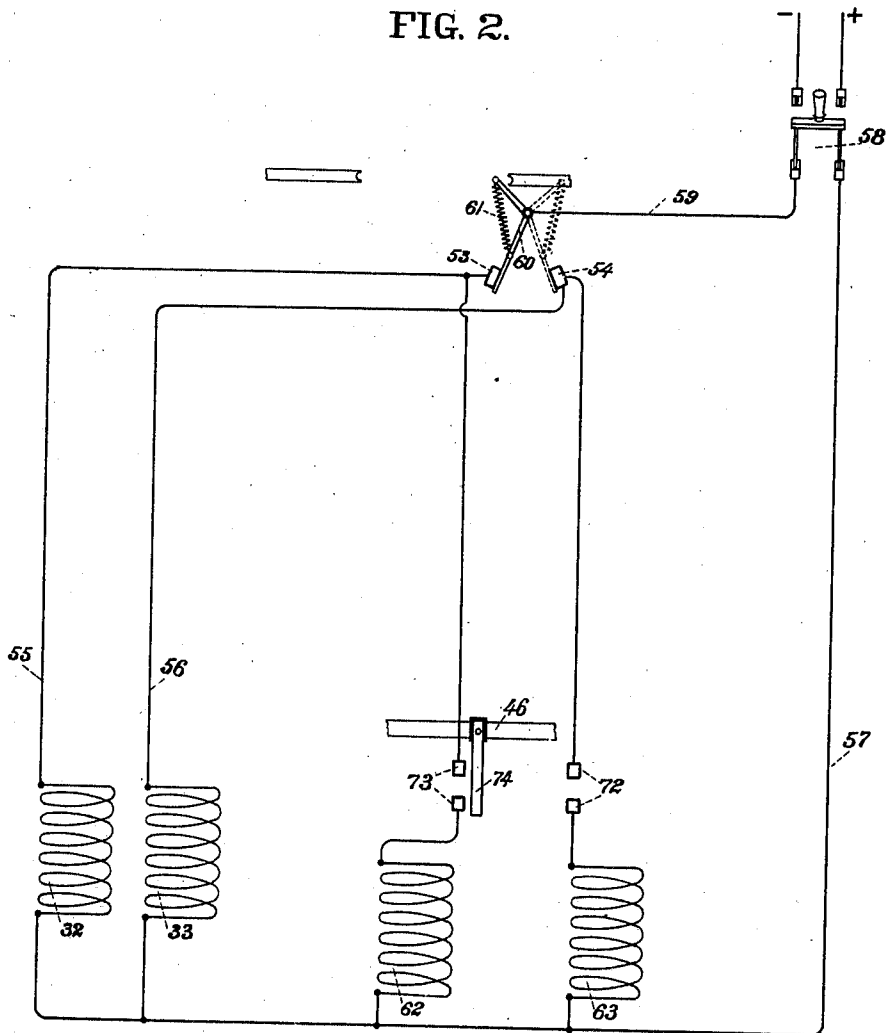
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2 SHEETS—SHEET 2.

FIG. 2.



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# UNITED STATES PATENT OFFICE.

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## EMBROIDERY-MACHINE.

990,198.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed October 31, 1908. Serial No. 460,387.

*To all whom it may concern:*

Be it known that we, THEODORE H. JOSEPH and LOUIS LARSEN, residing at New York, in the county of New York and State of New York, and FRANK W. SMITH, residing at Westfield, county of Union, and State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Embroidery-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to embroidery machines and more particularly to machines in which the fabric is supported by a frame actuated by a pantograph movement.

One of the objects of the invention is to provide means for automatically shifting the operative devices.

Another object is to provide means for automatically overcoming the inertia of the moving parts at the commencement of their operation.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, wherein is shown one of the various possible embodiments of our invention, Figure 1 is an end elevation of a portion of an embroidery machine having our improved automatically operating devices associated therewith. Fig. 2 is a diagrammatic view of the wiring and connections.

Referring to the drawings, 1 represents a suitable frame upon which the fabric 2 is supported in the usual manner, said frame being provided with the laterally extending guides or rails 3, 4, upon which the traveling carriages 5 and 6 are adapted to be moved back and forth. As these carriages and their associated parts are similar in all

respects, one only will be described, similar reference numbers being applied to the like parts of each. The carriage is preferably supplied with suitable rollers 7 engaging the rails and with a portion 8 which is secured in any suitable manner to the endless member 9, which may be a belt or chain, as desired. This endless member is mounted upon the pulleys 10 and 11, preferably secured to the frame of the machine, the pulley 11 being provided with teeth 12, which may be formed integral therewith or may be formed upon a separate gear mounted upon the pulley shaft. A needle bar 13 is mounted upon the carriage in the usual manner and has pivotally mounted thereon a suitable gripping member 14, the inner edge of which is normally held in operative position with said needle bar to hold the needles 15, being retained in said position by any suitable means, such as the spring 16. A cam 17 is rotatably mounted upon the rod 18 supported by the needle bar and is operatively connected to the link 19 which, in turn, is connected to the depending arm 20 which is provided at its lower end with a recess 21, for a purpose hereinafter described. A laterally extending arm 22 is carried by the carriage, being preferably pivoted thereto, and resting upon an adjustable stop 23, by means of which it may be held in the proper position for its inner end 24 to engage the pivotally mounted member 25. The gear wheel 26 is rotatably mounted upon one end of the arm 27, upon the other end of which is mounted gear 29 permanently meshed with gear 26. The gear wheel 29 which is concentrically mounted with respect to the pivot 28 meshes with the gear 26 and is supplied with a suitable handle 30 by means of which it may be rotated, thus driving the gear 26 and the pulley 11 with the teeth 12 of which said gear is in mesh. The rotation of the pulley will cause the traveling carriage associated therewith to move back and forth, depending, of course, upon the direction of rotation of the gear wheel 29.

Assuming the parts to be in the position shown, the usual and well known operation

of a machine of this character is as follows:—The handle 30 is grasped by the operator in charge and rotated in a direction which will cause the carriage 5 to move toward the fabric 2 until it assumes its innermost position, the needles carried thereby passing through the fabric and between the needle bar and gripping member of the carriage 6, which is at rest in its innermost position, as shown. The needles are then released from the holding means on carriage 5 and gripped by the holding means on carriage 6, the gear 26 is at the same time shifted out of engagement with the left hand pulley 11 and into engagement with the right hand pulley 11, after which the handle 30 is rotated to cause the carriage 6 to move to its outermost position, thus causing the threads attached to the needle to be drawn through the fabric. The operation is then reversed, the carriage 6 being moved back to its innermost position, the needles being transferred therefrom to the carriage 5 which is then caused to travel to its outermost position.

The means by which the needles are automatically gripped and released and the means for automatically shifting the position of the gear 26 will now be described. Mounted upon a suitable support 31, which may, if desired, be secured to the frame 1, are solenoids 32 and 33, provided with cores 34 and 35, respectively, which are preferably provided with upwardly extending rods 36, having suitable headed portions 37, between which and the support 31 extend coiled springs 38, which assist in raising the cores to their uppermost positions. To the lower end of each core is pivoted a link 39 which in turn is in pivotal connection with one end of a link 40 and with one member of a toggle joint 41, the other member of which is pivoted to the support as at 42. Suitable means, such as spring 75, may be employed if necessary to aid in movement of the toggle. Roller 43 is also pivotally secured to the lower ends of the links 39 and engages the surfaces 44 formed upon the support 31. The other ends of the links 40 are pivoted to the rocking member 45, one end of which is pivotally supported upon the frame 31 and to the free end of which one end of a laterally extending bar 46 is pivoted. Rotatably supported upon the frame 1 are the bell crank levers 47 and 48, one arm of each being pivotally secured to the bar 46 and the other arms thereof being free for engagement with the recesses 21 formed in the depending arms 20 supported by the carriages 5 and 6. Mounted to rotate with one of the bell crank levers 47 is a toothed segment 49 engaging another toothed segment 50 mounted upon the frame 1 and connected in any suitable manner to the lower end of the

lever 51 pivoted to the frame at 52 and the upper end of which operatively engages the gear 26, whereby, upon movement of said lever, the gear 26 may be shifted to engage with teeth 12 of either one of pulleys 11. In practice, lever 51 and arm 27 are preferably made in one piece. Mounted upon the frame and insulated therefrom, are the contacts 53 and 54 from which conductors 55 and 56 lead to one terminal of solenoids 32 and 33 respectively, the other terminals of said solenoids being connected with the conductor 57 leading to one side of the main switch 58, the other side of said switch being connected by a conductor 59 to the swinging contact member 60, adapted to be moved by any suitable means as the pivoted member 25 and the spring 61. The operation of these parts will be understood from the above description:—As the carriage 5 is moved to its innermost position, the arm 22 will force the member 25 to assume the position indicated in dotted lines in Fig. 2, thereby causing the swinging contact to move out of engagement with contact 53 and into engagement with contact 54, thus de-energizing the solenoid 32 and energizing the solenoid 33, and causing the core 35 to rise and the core 34 to fall. This movement of the cores will cause the rod 46 to move to the left, swinging the bell crank levers about their pivots. As the free end of the bell crank lever 48 rises, it will raise the arm 20 and rotate its associated cam 17 so as to disengage the gripping member 14 whereby it may be forced to engage the needles which have been passed through the fabric in the manner above described. As the free end of the bell crank lever 47 is lowered, it will draw down the arm 20, with the recess 21 of which said lever is in engagement when the carriage 5 is in its innermost position, thus rotating its associated cam 17 to engage the gripping member 14 and cause its inner end to raise and release the needles. Simultaneously with the movements of the bell crank levers, the toothed segment 49 will be rotated, thereby rotating the segment 50 and causing the lever 51 to oscillate about its pivot, thereby shifting the gear 26 to engage the teeth 12 of the right hand pulley 11, whereby, upon rotating the gear 29, the carriage 6 may be caused to travel. When the carriage 6 returns to its innermost position, it will cause the swinging contact to move into engagement with the contact 53, causing the parts to operate in a manner the reverse of that described.

The means for overcoming the inertia of the moving parts at the initial stage of their movement will now be described:—Located adjacent to the pulleys 11 and preferably secured to the frame 1 are the solenoids 62 and 63, and as said solenoids and their associated

parts are alike in all respects, but one only will be described, the same reference numerals being used to indicate like parts in each. Each solenoid is provided with a core 64 to one end of which an arm 65 is pivotally secured, having a hook 66 at its free end adapted to engage a lug or projection 67 secured to the pulley 11. The core is normally kept in its raised position by a suitable spring 68. A dog 69 is held in engagement with the arm 65 in any suitable manner, as by a spring 70, and is adapted to lie within a recess 71 when the arm is in its raised or normal position with its hooked end engaging the lug 67 on its associated pulley. One terminal of each of the solenoids 62 and 63 is connected to the conductor 57 and their other terminals are connected to one member of a pair of contacts 72 and 73, the other members of which are connected to the contacts 54 and 53 respectively. These contacts are adapted to be bridged by a circuit closer 74 carried by and insulated from the bar 46. This circuit closer is preferably so positioned that the circuits of solenoids 62 and 63 will be closed practically at the instant of completion of stroke of solenoids 32—33. The operation of these parts will now be understood from the above description. The gear 26, having been shifted to engage the teeth upon the right hand pulley in the manner above set forth, the solenoid 63 will be energized, thus causing its core to move downward and by means of the arm 65, the hooked end of which engages the lug 67 on the pulley 11, said pulley will be rotated, thus causing the carriage to move and thereby materially assisting the operator at the initial movement of said carriage. As said arm is drawn further downward, the dog 69 will ride out of the recess 71, thereby pressing the arm back out of engagement with the lug 67, as indicated at the left in Fig. 1. As the solenoid 62 is de-energized, its core will be raised to its uppermost position, whereby the hook will be thrown into engagement with the lug upon its associated pulley 11, in readiness to rotate said pulley when the carriage 6 returns to its innermost position, thus causing the bar 46 to shift, in the manner above described, to open the circuit of solenoid 63 and close the circuit of solenoid 62.

It will be seen from the above that we have devised a machine provided with means whereby the operative gear is automatically and positively moved to occupy its different positions and in which the inertia of the parts is automatically overcome at the beginning of their movements.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from

the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, and automatically operating electromagnetically operated means for shifting said member.

2. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, electromagnetically operated means for shifting said member, actuating means operatively associated with said moving means, and means adapted to be actuated by said last mentioned means for controlling the operation of said electromagnetically operated means.

3. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, electromagnetically operated means for shifting said member, and means actuated by the carriages adapted to control the operation of said electromagnetically operated means.

4. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, a plurality of electromagnetically operated devices for shifting said member, a switch adapted to control the operation of said electromagnetically operated devices, and means carried by said traveling carriages for actuating said switch.

5. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, means for moving the same, needle holding means carried by said carriage and comprising a movable member, and automatically operating elec-

tromagnetically operated means for operating said movable member to release or grip said needles.

6. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, means for moving said carriage, a needle bar carried by said carriage, means to hold needles upon said bar comprising a movable member, electromagnetically operated means for actuating said member, switching means for controlling the operation of said electromagnetically operated means, and means operatively associated with said first mentioned means for controlling the operation of said switching means.

7. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, needle holding means carried by said carriage and comprising a movable member, electromagnetically operated means for operating said member, and means actuated by said carriage for controlling the operation of said electromagnetically operated means.

8. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said means, needle holding means supported upon said carriages, and automatically operating electromagnetically operated means for shifting said member and simultaneously releasing the needles from one of said needle-holding means.

9. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages to move the same, an operative member adapted to be shifted to engage either of said moving means, needle holding means supported by said carriages, means adapted to release the needles from said holding means, electromagnetically operated means for simultaneously shifting said member and actuating said releasing means, switching means for governing the operation of said electromagnetically operated means, and means operatively associated with said moving means for controlling the operation of said switching means.

10. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages to move the same, an operative member adapted to

be shifted to engage either of said moving means, needle holding means supported by said carriages, means adapted to shift said member, means adapted to release the needles from said holding means, electromagnetically operated means adapted simultaneously to actuate said shifting means and said releasing means, and means controlled by said carriage for governing the operation of said electromagnetically operated means.

11. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, manually operated means adapted to move said carriage, and automatically operated electromagnetically operated means for assisting in the initial movement of said manually operated means.

12. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, manually operated means adapted to move said carriage, electromagnetically operated means for assisting in the initial movement of said manually operated means, switching means for governing the operation of said electromagnetically operated means, and means operatively associated with said manually operated means for controlling the operation of said switching means.

13. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, manually operating means for moving said carriage, and electromagnetically operated means for assisting in the initial movement of said operating means, said electromagnetically operated means being controlled by said carriage.

14. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, manually operated means adapted to move said carriage, means to engage said operating means and move the same to assist in overcoming the inertia of the carriage, an electromagnetically operated device to actuate said last mentioned means, and means governing the operation of said electromagnetically operated device and controlled by said carriage.

15. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, automatically operating electromagnetically operated means for shifting

said member, and electromagnetically operated means for assisting in the initial movement of said first mentioned means.

16. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, means for moving the same, needle holding means carried by said carriage and comprising a movable member, automatically operating electromagnetically operated means for operating said movable member to release or grip said needles, and electromagnetically operated means for assisting in the initial movement of said first mentioned means.

17. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, needle holding means carried by each of said carriages and comprising a movable member, automatically operating electromagnetically operated means for shifting said member and for operating said movable member to release or grip the needles, and automatically operating electromagnetically operated means for assisting in the initial movement of said first mentioned means.

18. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, electromagnetically operated means adapted upon being energized to move said member in one direction, electromagnetically operated means adapted upon being energized to move said member in the opposite direction, switching means for governing the operation of said electromagnetically operated means, and means operatively associated with said first mentioned means for controlling the operation of said switching means.

19. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, a solenoid provided with a core, said core being operatively associated with said member whereby said member will be moved in one direction when said solenoid is energized, a second solenoid provided with a core, said core being operatively associated with said member whereby said member will

be moved in the opposite direction when said second solenoid is energized, circuits for each of said solenoids, switching means associated with said circuits and means operatively associated with said first mentioned means for actuating said switching means to alternately open and close said circuits.

20. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, means for moving said carriage, needle holding means supported upon said carriage, said means comprising a needle bar and a movable member normally held in operative relation thereto, means adapted to engage said member and move it into inoperative relation with respect to said bar, a solenoid adapted to actuate said engaging means, a circuit in which said solenoid is located, a switch associated with said circuit and switch controlling means operatively associated with said moving means.

21. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, a traveling carriage mounted upon said frame, manually operated means adapted to move said carriage, means to engage said manually operated means and move the same to assist in overcoming the inertia of the carriage, a solenoid for actuating said last mentioned means, a circuit in which said solenoid is located, a switch associated with said circuit and switch controlling means operatively associated with said first mentioned means.

22. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, electromagnetically operated means for shifting said member, switching means for governing the operation of said electromagnetically operated means, electromagnetically operated means for assisting in the initial movement of said first means, means operatively associated with said first means for controlling the operation of said switching means, and means actuated by said first electromagnetically operated means for controlling the operation of said second electromagnetically operated means.

23. In an embroidery machine, in combination, a frame upon which the fabric is adapted to be supported, traveling carriages mounted upon said frame, means operatively connected to each of said carriages for moving the same, an operative member adapted to be shifted to engage either of said moving means, solenoids adapted to actuate said member, solenoids adapted to assist in the

initial movement of said first mentioned means, circuits in which said solenoids are located, circuit controlling means governed by the movement of said first mentioned  
5 means for controlling the operation of said first solenoids, and circuit controlling means governed by said first solenoids for controlling the operation of said second solenoids.

In testimony whereof we affix our signatures in the presence of two witnesses.

THEODORE H. JOSEPH.  
LOUIS LARSEN.  
FRANK W. SMITH.

Witnesses:

GILBERT R. SACKMAN,  
GEORGE L. PLATZER.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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