

Nov. 15, 1932.

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1,887,571

BRUSHING DEVICE FOR CAR CUSHION CLEANING MACHINES

Filed Sept. 3, 1926

3 Sheets-Sheet 1

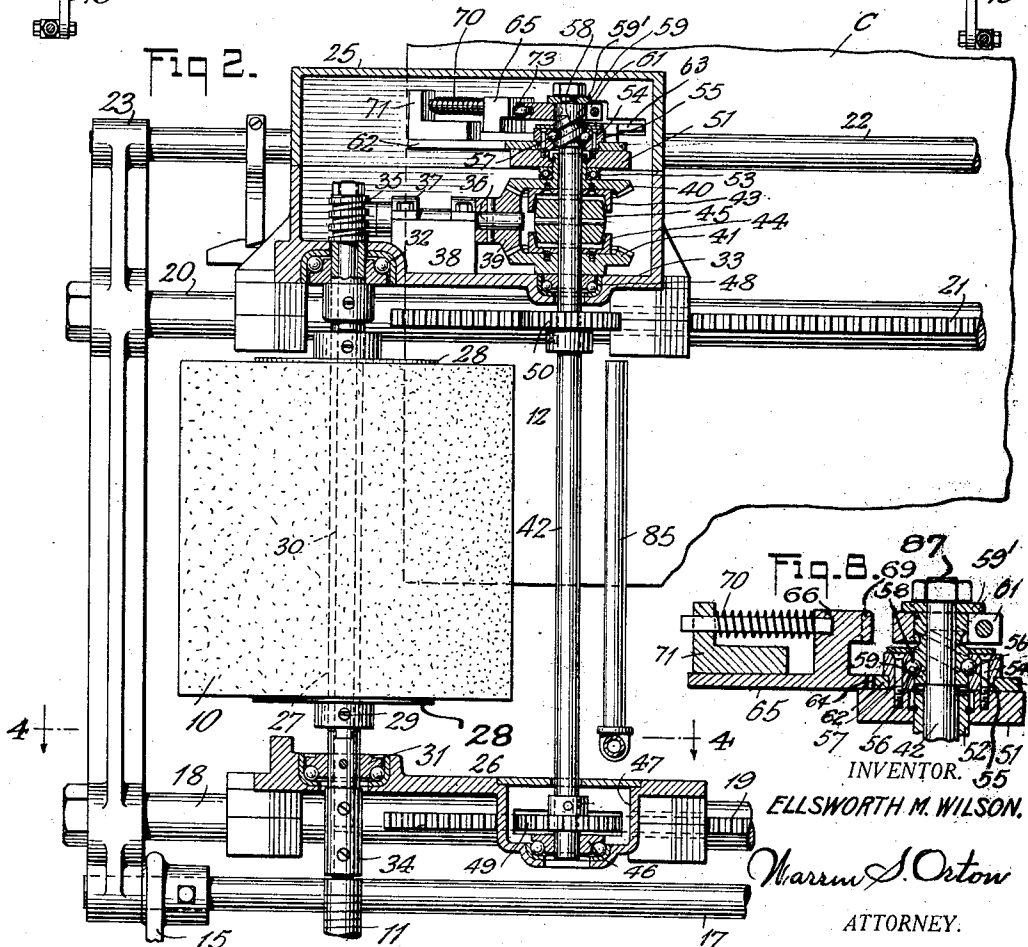
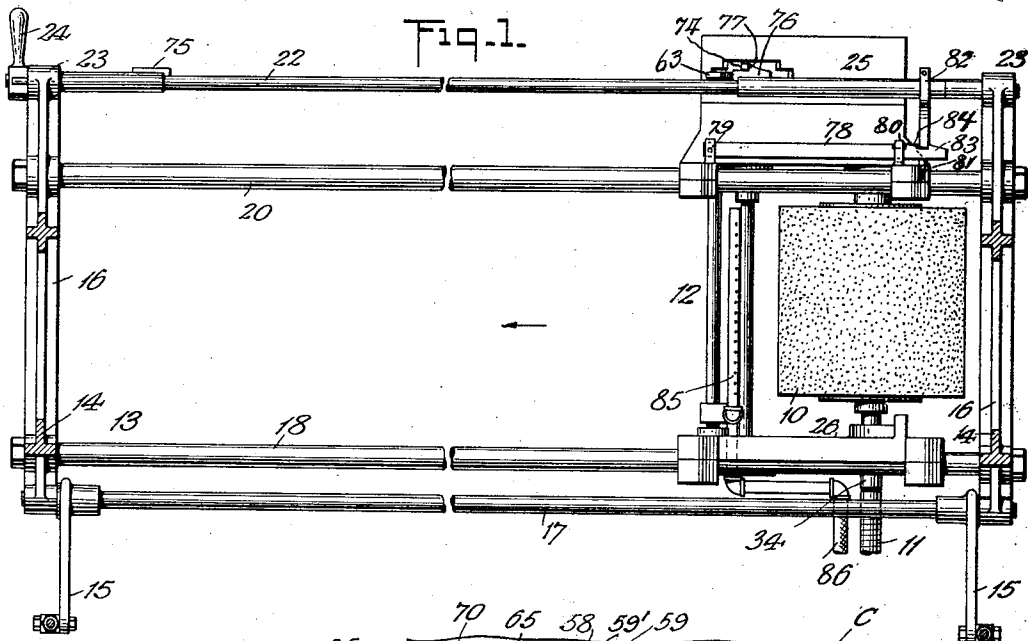


Fig. 8

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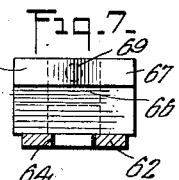
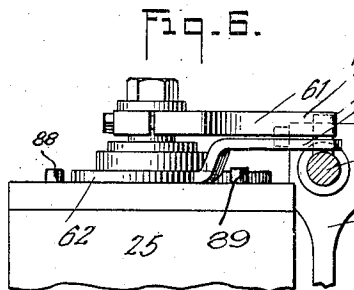
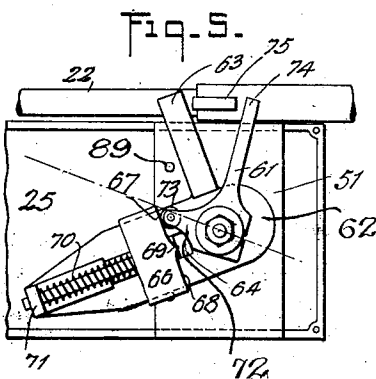
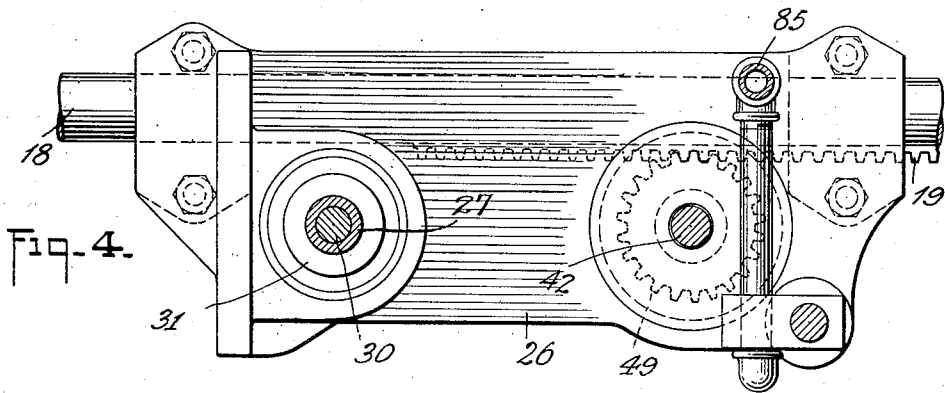
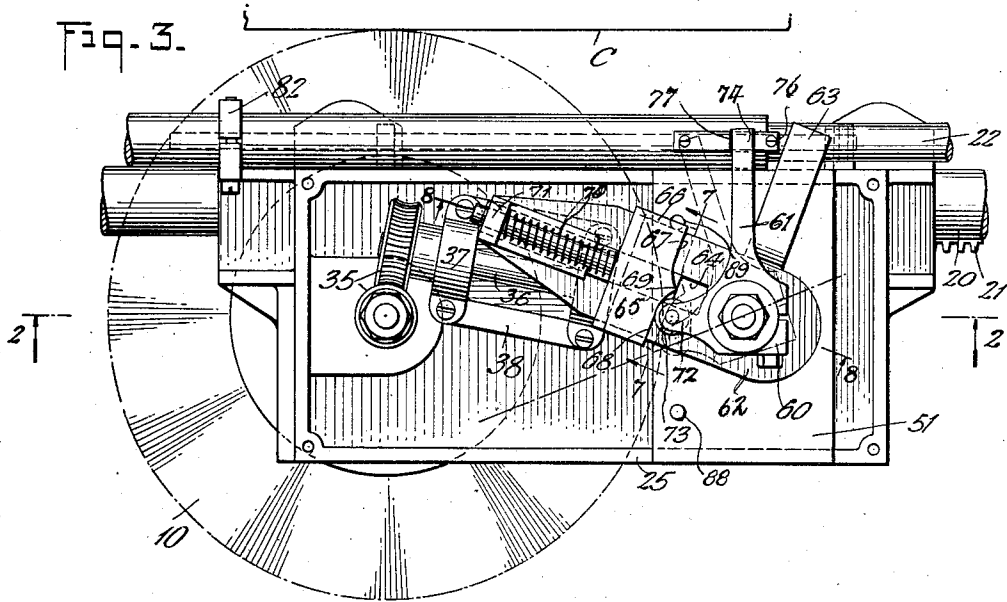
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3 Sheets-Sheet 2



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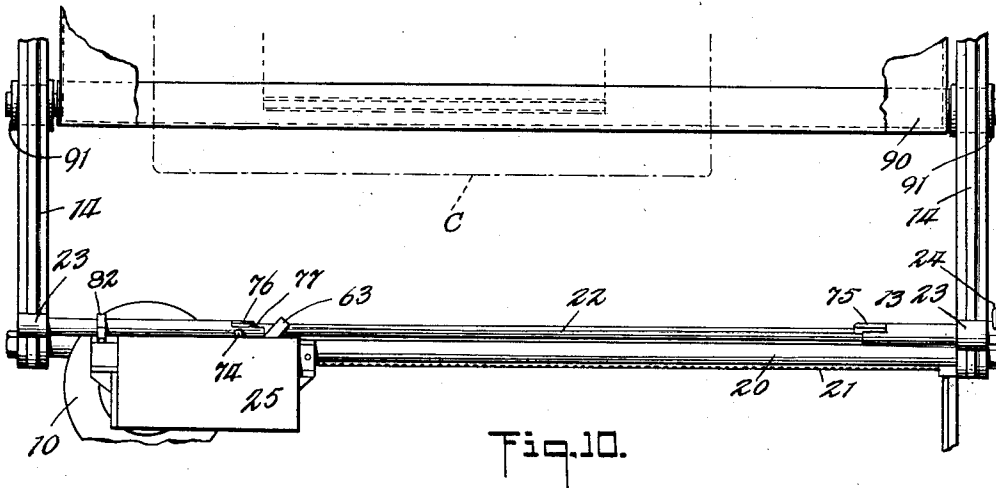
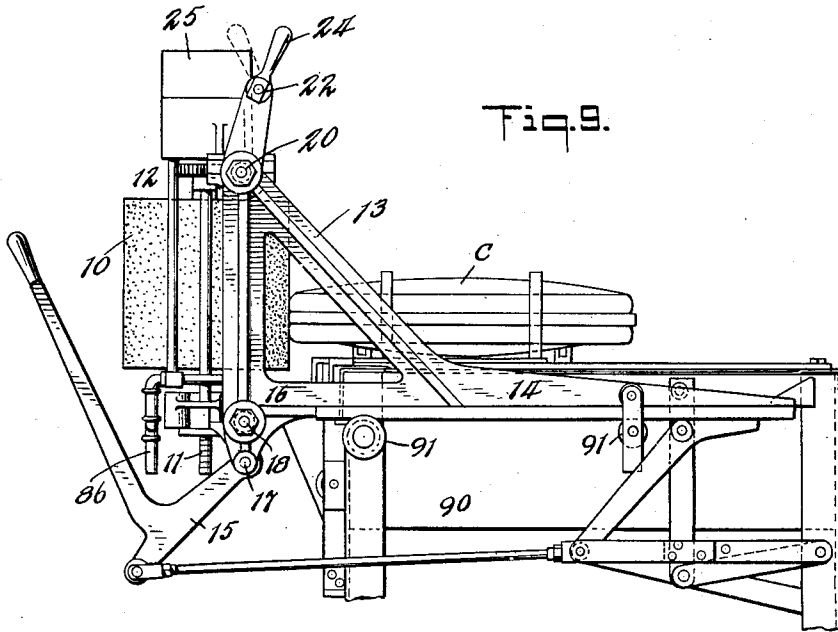
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BRUSHING DEVICE FOR CAR CUSHION CLEANING MACHINES

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3 Sheets-Sheet 3



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BRUSHING DEVICE FOR CAR CUSHION CLEANING MACHINES

Application filed September 3, 1926. Serial No. 133,309.

The invention relates in general to a machine for use in the brushing of car seats, backs, cushions and other similar articles hereinafter collectively referred to as car cushions and the present disclosure constitutes a companion case with my copending application entitled "Car cushion cleaning machine", Serial No. 133,308 filed under even date now Patent Number 1,767,420, June 24, 1930.

As is more particularly described in the above identified copending application, it is intended that the machine of which the present disclosure is a part be utilized to subject the car cushion, preferably while wet, to a vigorous brushing treatment and in the companion application there was disclosed a machine for successively presenting to the brush the several surfaces of the cushion to be treated.

More specifically defined the invention herein disclosed relates to that part of the complete machine which has to do with the brushing device which comprises a rotating brush, mechanism for reciprocating the same back and forth across the car cushion or other surface to be brushed and control devices therefor.

The primary object of the present invention is to provide a simplified form of brush and brush control which while featuring a structure by means of which the intensity of engagement between the brush and the surface under treatment may be under the sensitive manual control of the operator, as is more particularly outlined in the companion application, there is provided at the same time a brush capable of having a powerful rotative movement at high speed and which can be actuated mechanically to have bodily reciprocatory movement back and forth across the surface under treatment and without attention on the part of the operator who is thus left free to attend to those functions of the machine which require personal supervision.

Another object of the invention is to provide a simple form of automatically actuated mechanism for causing a rotating brush to travel in one direction across the surface under treatment, to reverse its direction of

travel when it reaches its limit of movement in both directions, to repeat its reciprocatory movement until interrupted by the operator and to provide for such reversal in travel positively, easily, without detrimental shock or strain on the reciprocating parts and in a way tending to minimize consumption of the mechanical energy driving the reciprocating and rotating brush.

Another object of the invention is to provide an easily manipulated form of manual control for inaugurating and intercepting the bodily reciprocatory movement of the brush so that the engagement of the brush with the cushion may at all times be under the control of the operator and convenient to him as he is manipulating the cushion positioning means; while he is controlling the engagement of the brush with the cushion and otherwise occupied with the other manually manipulated parts of the complete machine.

Still another object of the invention is to provide a simplified form of mechanism for insuring the positive locking of the brush in an inoperative position spaced from the cushion whenever it is desired to intercept the bodily travel of the brush and incidentally the invention features the disposition of the brush while rotating and not travelling out of brushing engagement with the cushion and at the same time to dispose the brush in an out of the way position permitting the brush to maintain its high speed rotative motion during the period while the cushion is being shifted from one into another of its operative positions.

Another object of the invention is to provide a form of construction in which the several structural units are formed of the least number of separate parts and arranged convenient for ready replacement and repair.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of device embodying my invention, and the invention also consists in certain new and novel features of construction and combi-

nation of parts hereinafter set forth and claimed.

In the accompanying drawings:

Figure 1 is a view in rear elevation of the brush support, constituting a preferred embodiment of my invention and looking at the same from the side nearest the cushion under brushing treatment on the main part of the complete machine;

Fig. 2 is an enlarged view of the structure shown in Figure 1 looking at the same from the opposite or front side; showing the brush carriage in vertical sectional view and taken on the line 2—2 of Fig. 3;

Fig. 3 is a plan view looking down upon the parts shown in Fig. 2 and with the cover of the transmission casing removed to show the contained reversing mechanism in plan and in position to disconnect the clutch control;

Fig. 4 is a horizontal sectional view of the lower portion of the brush carriage taken on the plane indicated by the line 4—4 of Fig. 2 looking downwardly as indicated by the arrows;

Fig. 5 is a detail view of the reversing mechanism displaced from the position thereof shown in Fig. 3 and in one of its clutch closing positions;

Fig. 6 is an end view of part of the reversing mechanism above the transmission casing looking at the same from the left side of Fig. 2;

Figs. 7 and 8 are detail views in vertical section of the reversing mechanism taken respectively on the lines 7—7 and 8—8 of Fig. 3 looking in the directions indicated by the arrows;

Fig. 9 is a view in side elevation of the complete machine showing the mechanism for manually shifting the brush carriage and with other parts omitted; and

Fig. 10 is a plan view looking down on the front portion of the machine shown in Fig. 9 and showing the parts in the normal operative position of the brush travel.

In the following description and in the claims, parts will be identified by specific names for convenience of expression but they are intended to be as generic in their application to similar parts as the art will permit.

In the drawings and referring particularly to Figs. 1 and 2 it is to be understood that the cylindrical brush 10 is mounted for rotary movement about its own axis and is designed to move with its axis vertically disposed back and forth along a vertical plane under the action of a source of power indicated symbolically by the one-way main driving shaft 11. The shaft is shown to be a flexible device so as to provide sufficient slack to move with the brush in its reciprocatory movement and is connected to be driven from an electric motor or other source of power (not shown). The brush is mounted for its perambulating

movement in a brush carriage 12 which in turn is mounted for reciprocatory movement in a vertically extending skeleton support 13. This skeleton support is slidably mounted as a whole on the part of the machine 90 which carries the cushion C to be brushed and is identified in the copending application by the term "brush carriage". The support includes a pair of sliding bars 14 shown in cross section in Fig. 1 in plan in Fig. 10 and one of which is shown in side elevation in Fig. 9 and which provides the supporting engagement between the part herein illustrated and the main portion of the machine. The support 13 is moved bodily so as to bring the brush in varying engagement with the cushion to be brushed by means of a pair of carriage shifting arms 15 controlled by a single manually actuated control lever shown in Fig. 9. In this figure the lower fulcrum end of the rocking arm 15 is fixed in place so that the swinging of the lever will act to shift support 13 on rollers 91 carried by the machine part 90. Levers 15 have their upper ends pivoted to the support 13 and act to slide the brush support relative to the article to be brushed, as is more fully described in my above identified patent. From the present disclosure it is to be understood that the support 13 has bodily movement as a whole relative to the cushion mounted on the main part of the machine in addition to the rotary and reciprocatory movement herein featured.

The support 13 includes a pair of end frames 16 connected by a plurality of parallel rods one of which 17 is journaled in the lower ends of the end frames and connects the arms 15. Another of these rods 18 is provided on its front side with a rack 19 and will be identified hereinafter as the lower rack rod. Still another of these rods 20 spaced above the rod 18 is similarly provided with a rack 21 and constitutes the upper rack rod. The uppermost rod 22 which is rotatably mounted in bearings 23 outlining the upper ends of the end frames will be referred to hereinafter as a control rod. The control rod is provided at its right end and adjacent the station of the operator with a control handle 24 by means of which the rod is rocked about its axis to stop and start the reciprocatory travel of the brush carriage.

The brush carriage is formed in effect of two separate parts, an upper hollow box-like structure 25 referred to hereinafter as the transmission casing, and a lower plate structure 26 referred to as a lower casing. The casings 25 and 26 are spaced apart vertically a distance sufficient to accommodate the brush 10 therebetween and it is understood in general that the structure is designed so as to contain the mechanism within a compact space and disposed so as to enclose movable parts in lubricant containing casings where-

ever possible and to leave exposed the other structural parts.

The brush 10 constitutes part of a replaceable unit which includes a sleeve 27 and at opposite ends of the brush are brush end plates 28 secured by screws 29 to the sleeve 27. The brush unit is demountably positioned on a vertically extending brush shaft 30 mounted in anti-friction bearings including a lower bearing 31 formed in the lower casing 26 and an upper bearing 32 formed in the bottom 33 of the transmission casing 25 all as is particularly shown in Fig. 2. The lower end of the brush shaft is connected by means of a coupling 34 with the drive shaft 11. From this construction it is seen that the brush is connected directly to the main shaft and it is the intent to rotate this main shaft at high speed preferably by connecting the same to a high speed electric motor. The upper end of the brush shaft is intruded into the transmission casing 25 and is provided at its upper end with a worm-drive connection 35 turning a horizontally disposed intermediate drive shaft 36 rotatably mounted in bearings 37 formed on top of a bearing block 38 contained in the casing 25. To the opposite or right hand end of the shaft 36 is secured an intermediate bevelled gear 39 disposed between and at all times in driving relation with a pair of superposed end bevelled gears 40 and 41 coacting therewith to constitute a reversing drive motion particularly shown in Fig. 2. The end gears 40 and 41 are loose on a vertically disposed rack and pinion shaft 42 and are designed to be clutched thereto as shown in Fig. 2.

A double-cone three positioned clutch is disposed between the end gears and in position to drive the shaft 42 in both directions. The clutch includes end clutch elements 43 and 44 secured respectively to the end gears 40 and 41 and facing each other concentrically of the shaft 42. Positioned between the end clutch elements is an intermediate axially shiftable cone clutch element 45 designed when elevated with the rack shaft as hereinafter described to provide a driving connection from the shaft 36 to rotate the rack shaft clockwise and when depressed by the lowering of the rack shaft to rotate the same anti-clockwise. The third position of the intermediate element 45 as shown in Fig. 2 spaces the same from its driving relation with both of the end clutch elements and disposes the clutch in an inoperative, non-rotating position to intercept the driving connection between the main or brush shaft and the rack shaft.

The lower end of the shaft 42 is journalled for rotary movement in a lower anti-friction bearing 46 contained in a lubricant casing 47 constituting part of the lower casing 26. The shaft 42 is also journalled intermediate its length in an antifriction bearing 48

formed within the casing 25 and on top of the bottom 33 thereof and exposed to receive lubricant contained in the transmission casing 25. The shaft is otherwise journalled as hereinafter described and every effort is made to insure the mounting of the shaft so as to have a freedom of rotary movement.

The rack shaft 42 is provided adjacent its lower end and within the casing 47 with a lower pinion 49 designed when in engagement with the lower rack 19 to mesh with the same as shown in Fig. 2 and assist in advancing the carriage as a whole along the length of the carriage support. Similarly the rack shaft is provided just below the transmission casing 25 with an upper pinion 50 designed to mesh with the upper rack 21 as previously described for the lower pinion and rack connection.

For the purpose of elevating or depressing the rack shaft and thus move the clutch element 45 to and from its three positions above referred to the shaft is mounted to have a freedom of vertical or axial movement necessary to effect the clutching and declutching engagement of the differential device therewith but as this movement is slight, in an actual embodiment of the invention being a matter of about one-sixteenth of an inch, it is understood that the rack pinions while thus shifted axially are at all times in mesh with the relatively wide racks.

The rack shaft is moved from its position providing a driven engagement with the reversing drive motion automatically as the carriage approaches the limit of movement in each reciprocatory direction across the surface of the cushion being brushed. For this purpose there is provided a snap acting shaft rocking, shifting and locking mechanism. Referring to the showing in Fig. 2 it is noted that a bed plate 51 extends transversely across the transmission casing and provides a bearing for the hub 52 of the upper differential drive gear 40. An anti-friction bearing 53 is disposed between this clutch element and the bed plate. Demountably secured to the upper face of the bed plate by means of screws 54 is a fixed nut 55. The nut is provided at its inner periphery with an annular semi-spherical groove 56 in which groove are positioned spherical rollers 57. The rollers are contained partially in the annular groove 56 and partially in a spiral groove 58 formed on a sleeve 59 loosely mounted on the reduced upper end of shaft 42 and held in place thereon by a nut 87.

From this construction it is apparent that a rotation or rocking movement of the sleeve 59 will cause the rollers to react on the spiral groove to shift the shaft 42 axially for the limited distance necessary to effect a clutching and declutching of the clutch. To the extreme upper end of the sleeve 59 is clamped the split link 60 of a bell crank lever 61 here-

inafter referred to as a tripping or shaft rocking lever.

Rotatably mounted upon the fixed nut 55 and projecting laterally therefrom is a snap acting locking plate 62 provided on one side with a plate tripping finger 63 adapted to be engaged by a stop on the control rod 22 hereinafter described. The locking plate 62 is limited in its swinging movement by stops 88 and 89 carried by the bed plate 51. The plate is provided with a longitudinally extending slot 64 in which is slidably mounted a cam plate 65 and which plate includes a camming head 66 provided on its advance side with a double cam face formed of flat bearing faces 67 and 68 separated by a projecting point 69. A spring 70 positioned between the head 66 and a projection 71 on the plate 62 maintains the shaft 42 locked against accidental movement axially. The lever 61 which is mounted in advance of and opposite to the point 69 of the spring pressed camming head 66, is provided with two unequal length arms extending at right angles to each other. The shorter arm 72 is provided with a roller 73 engaged by either of the bearing faces 67 or 68 depending on the position of the lever 61 in relation to the plate 62 as shown in Figs. 3 and 5. The longer arm 74 hereafter referred to as a clutch tripping finger extends in the same general direction as the finger 63 normally at a slight angle to each other and both project towards and above the control rod 22 and extend out of the transmission casing.

The control rod 22 is provided adjacent opposite ends thereof with a pair of reversing stops 75 and 76. These reversing stops are disposed in the path of movement of the tripping finger 63 and the parts are so organized that the engagement of this finger with either of the reversing stops causes the lever 63 to swing the plate 62 as a whole and with it the camming head 66 to advance the point 69 past the roller 73 thus compressing the spring 70. As soon as the roller clears the point 69 the spring reacts to snap the lever 61 into its fully shifted position with the roller engaging the face 67 or 68 on the side of the point 69 opposite to the side previously engaged by the roller.

From this construction it is seen that in the normal reciprocatory action of the device the fingers 63 and 74 are normally at an angle and are snapped past each other from the position shown in Fig. 3 into the position shown in Fig. 5. In both positions the clutch element 45 is locked by the tension of the spring 70 and is retained thereby until the tripping finger 63 is shifted in the opposite direction by its engagement with the other reversing stop. This rotation of the rocking lever 61 causes the same to rotate the sleeve 59 over an arc sufficient to cause the spiral groove to turn relative to the roll-

ers 57 and thus elevate or depress the rock shaft and with it the clutch member 45 to effect a reversal in driving connection through the reversible clutch.

Normally the finger 74 passes over the stops 75 and 76 without engaging the same. Should it be desired to stop the transverse bodily movement of the brush carriage the handle 24 is rotated into the position shown in Fig. 1 with the reversing stop 76 rotated slightly to bring it into the path of the finger 74. For this purpose the stop 76 at the left end of the machine is provided with an upstanding shoulder 77 which is disposed in the path of movement of the clutch tripping finger 74 as particularly noted in Figs. 1 and 6.

The stop 77 is so related to the clutch tripping finger 74 that when the carriage next approaches the limit of its movement to the left of the machine as shown in Fig. 1, the rocking lever 61 is shifted with the plate 62 and this of course shifts the point of the camming head so as to maintain the roller on the side on which it was when the movement started. Differently expressed, the locking plate 62 rotates with the rocking lever 61 and the snap action of the camming head is avoided. The effect of simultaneously moving both these members is to shift the clutch element 45 into the intermediate non-clutching position shown in Fig. 2.

In order to insure the positive locking of the carriage against accidental movement after the driving connection has been broken at the clutch, an automatically acting locking device is provided as shown in Fig. 1. This locking device includes a locking arm 78 pivotally mounted at one end to a bracket 79 forming part of the transmission casing 25 and the free end of which arm is contained within a combined guideway and stop 80. A spring 81 acting on the free end tends normally to maintain the same in the raised operative position shown in Fig. 1. The control rod 22 is provided adjacent the left end thereof with a locking arm 82 which, when the control rod is rotated into position to stop the travel of the carriage is moved simultaneously into a depending position and into position to be engaged by the beveled end 83 defining the upper side of the locking arm 78. At the inner end of the bevel the locking arm is provided with a locking notch 84 into which the locking arm 82 is received and maintained in position by tension of the spring 81. The stop mechanism above described is so disposed relative to all possible positions of the cushion that when the carriage is locked against its reciprocatory movement as shown in Fig. 2 the brush is offset to one side of and out of contact with the cushion and in this way any tendency of the rapidly revolving brush to burn the cushion is avoided.

It is desired in some forms of machines of the type outlined to spray either the brush or the cushion under treatment, or both, with water or with a cleansing solution and for this purpose there is provided a perforated spray pipe 83 supplied by means of a flexible connection 83 with some suitable source of fluid supply. The spray pipe is carried by and movable with the carriage and is disposed to direct the sprayed material as desired either onto the cushion C under treatment or on to the brush 10.

In operation the machine is started usually by starting the motor driving the main shaft and this in turn sets the brush rotating and this rotary movement of the brush is maintained as long as the machine is in use. It is required in some brushing operations that the brush be rotated at high speed and as these brushes are of some material weight it is advisable to maintain the brush active during the short period of time while the operator is reversing the position of the cushion to prevent successive parts to the brushing operation as is more fully disclosed in the companion application.

The reciprocating action of the brush is inaugurated by the operator lowering the control handle from the position shown in Fig. 1 into a partially depressed position. This has the effect of removing the locking arm 82 from engagement with the notched lever 78. Removing the stop 77 from the finger 74 permits the tension of the spring 70 reacting on the tripping finger to rerotate the rocking lever into position to bring the clutch into proper driving relation to cause the carriage to move from left to right of the machine in the direction indicated by the reverse showing in Fig. 1 and the carriage will be moved by the rack and gear connection illustrated until the carriage reaches the right of the machine and until the tripping finger 63 is moved into engagement with the adjacent side of the reversing stop 75. The rocking device is thus shifted from the full line position into the line indicated by dot and dash in Fig. 3. This will have the effect of rotating the spiral groove sleeve and shift the shaft 42 axially to effect a reversal in driving connection through the double acting clutch controlling the differential drive. The carriage will then start in its reverse travel from right to left of the machine and the engagement of the tripping finger 63 with the stop 76 at the left of the machine will act simultaneously to reverse the direction of drive and the carriage will then move again in its left to right movement. This reversing of the carriage in its reciprocatory movement across the machine will continue as long as the control rod is in its position to effect the reversal of the clutch.

With the control handle elevated as shown in Fig. 1 simultaneous action on both the trip-

ping fingers will cause only a partial shifting of the clutch into the unclutched position previously described.

By means of a device of the character described it is possible for the operator to set the brush in motion and then simply by the manipulation of a single control can set the machine into operation with the brush reciprocating back and forth across the surface being brushed and without necessity of attention on the part of the operator to control any part of the brush travel. This leaves the operator free to adjust the cushion and to control the intensity of engagement between the rotating and perambulating brush and the cushion surface with which it is in brushing engagement.

While I have shown and described, and have pointed out in the annexed claims, certain novel features of my invention, it will be understood that various omissions, substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. In a machine for brushing car cushions and the like, the combination of a fixed support, of a vertically disposed long skeleton frame, mounted on the fixed support for movement in a direction perpendicular to its plane, said frame including a plurality of parallel horizontally extending rods, a brush carriage slidably mounted on the rods for movement in the plane of the frame and including an upper transmission casing and a lower casing, a brush positioned between the casings, a vertically extending brush shaft for the brush journaled on opposite sides of the brush in said casings and a flexible shaft operatively connected to the lower end of the brush shaft to rotate the same in all shifted positions of the carriage.

2. In a device of the class described the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage, said means including the shiftable element of a reversible clutch drive, a sleeve mounted for both rotary and axial movement for controlling said element by its axial movement, means for translating the rotary movement of said sleeve into an axial movement, and a tripping finger secured to the sleeve to rotate the same.

3. In a device of the class described the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the car-

riage, said means including the shiftable element of a reversible clutch drive, a sleeve mounted for both rotary and axial movement for controlling said element by its axial movement, means for translating the rotary movement of said sleeve into an axial movement, a tripping finger secured to the sleeve to rotate the same, and spring pressed means for snapping the tripping finger into a position to fully shift said element.

4. In a device of the class described, the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage, said means including the shiftable element of a reversible clutch drive, a sleeve mounted for both rotary and axial movement for controlling said element by its axial movement, means for translating the rotary movement of said sleeve into an axial movement, a tripping finger secured to the sleeve to rotate the same, and spring pressed means for snapping the tripping finger into a position to fully shift said element and for locking the element in said fully shifted position.

5. In a device of the class described, the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage, said means including the shiftable element of a reversible clutch drive, a sleeve mounted for both rotary and axial movement for controlling said element by its axial movement, means for translating the rotary movement of said sleeve into an axial movement, a tripping finger secured to the sleeve to rotate the same, spring pressed means for snapping the tripping finger into a position to fully shift said element, and tripping means for shifting said spring pressed snapping means into an inoperative position thereby to intercept the completion of the movement of the clutch element into its fully shifted position.

6. In a device of the class described, the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage forward and backward, said means including a clutch for controlling the direction of travel of the carriage, said clutch including a shiftable element having two operative positions disposed in one position to cause the carriage to move in one direction and in the other position to cause the carriage to move in the opposite direction, a clutch controlling mechanism including a sleeve mounted for combined axial and rotary movement

and operatively connected to said shiftable clutch element to shift the same by the axial movement of said sleeve and thus reverse the direction of movement of the carriage, a tripping lever secured thereto with one arm provided with a roller and the other arm constituting a tripping finger, a snap acting locking plate mounted for rotary movement about the axis of said sleeve and provided with a tripping finger, a spring controlled camming head slidably mounted on the plate and provided with a pair of bearing faces with a projecting point separating the faces, and means to shift the last mentioned tripping finger to force the projecting point on the camming head past the roller to bring, alternately, the bearing faces in contact with the roller to reverse the clutch tripping lever.

7. In a device of the class described, the combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage forward and backward, said means including a clutch for controlling the direction of travel of the carriage, said clutch including a shiftable element having two operative positions disposed in one position to cause the carriage to move in one direction and in the other position to cause the carriage to move in the opposite direction, a clutch controlling mechanism including a sleeve mounted for combined axial and rotary movement and operatively connected to said shiftable clutch element to shift the same by the axial movement of said sleeve and thus reverse the direction of movement of the carriage, a tripping lever secured to the sleeve with one arm provided with a roller and the other arm constituting a clutch tripping finger, a snap acting locking plate mounted for rotary movement about the axis of said sleeve and provided with a plate tripping finger, a spring controlled camming head slidably mounted on the plate and provided with a pair of bearing faces, with a projecting point separating the faces, and with one of the faces in selective bearing engagement with the roller to secure the rocking lever in one of two positions depending on which face is in engagement with the roller, and means for selectively shifting either the locking plate alone thereby to shift said point past the roller and thus cause the camming head to snap the locking plate from one to another clutch controlling position or for shifting both the lever and plate together and in the same direction thereby to maintain the roller on the face with which it was already in engagement and thus cause the clutch controlling mechanism to assume a neutral position.

8. In a device of the class described, com-

combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage, said means including a clutch for controlling the direction of travel of the carriage, a clutch controlling mechanism including a member mounted for combined rotary and axial movement the axial movement of said sleeve shifting said clutch, a rocking lever connected to said member and operatively associated with stops to cause a rotary movement of said member in one direction and thus cause the clutch to be moved into one operative position and in the reverse direction to cause the clutch to be moved into another operative position, and camming means for moving said lever into its fully shifted positions.

9. In a device of the class described, combination of a supporting frame, a brush carriage slidably mounted on the frame, a brush mounted for rotary movement in the carriage, means for driving the brush, means driven from the brush for shifting the carriage, said means including a clutch for controlling the direction of travel of the carriage, a clutch controlling mechanism including a member mounted for combined rotary and axial movement the axial movement of said sleeve shifting said clutch, a rocking lever connected to said member and operatively associated with fixed stops to cause a rotary movement of said member in one direction to cause the clutch to be moved into one operative position and in the reverse direction to cause the clutch to be moved into another operative position, camming means for moving said lever into its fully shifted positions, and means controlled by the shifting of the carriage on the frame for shifting said last named means with the rocking lever to cause a shifting of said clutch controlling mechanism.

10. In a device of the class described, the combination of a supporting frame provided with a rack, a brush supporting carriage carried by the frame, a carriage moving pinion carried by the carriage and in mesh with the rack, a brush mounted for rotary movement in the carriage, and travelling with the carriage, a reversible driving connection for rotating the pinion in both rotary directions, a control for said connection including a snap locking mechanism operatively connected to the driving connection to move and lock the driving connection selectively in either of its driving relations to the pinion, and means for shifting said mechanism to reverse the direction of rotation of the pinion and thus reverse the direction of movement of the carriage and cause the mechanism to be locked in its shifted position.

11. In a device of the class described, the

combination of a supporting frame provided with a rack, a brush supporting carriage carried by the frame, a carriage moving pinion carried by the carriage and in mesh with the rack, a brush mounted for rotary movement in the carriage, and rotatably mounted in the carriage, a reversible driving connection for rotating the pinion in both rotary directions, a control for said connection including a snap locking mechanism operatively connected to the driving connection to move and lock the driving connection selectively in either of its driving relations to the pinion, means for shifting said mechanism to reverse the direction of rotation of the pinion, and a manually actuated control for causing said last named means to become inoperative and without effect on the locking mechanism.

12. In a device of the class described, the combination of a supporting frame provided with a rack, a brush supporting carriage carried by the frame, a carriage moving pinion carried by the carriage and in mesh with the rack, a brush mounted for rotary movement in the carriage, and journaled in the carriage, a reversible driving connection for rotating the pinion in both rotary directions, a control for said connection including a snap locking mechanism operatively connected to the driving connection to move and lock the driving connection selectively in either of its driving relations to the pinions, means for shifting said mechanism to reverse the direction of rotation of the pinion, and means for moving said reversible driving connection into an inoperative position thereby to disconnect said pinion from its source of power.

13. In a machine for brushing cushions and the like, the combination of a cushion support, a brush support, a brush carriage mounted for reciprocatory movement on said brush support, a brush mounted for rotary movement on said carriage and movable bodily therewith, manually actuated means for shifting the brush support to and from the cushion support thereby to cause the rotating and reciprocating brush also to move relative to the cushion support and a source of power operatively connected to rotate the brush and reciprocate the carriage back and forth across said brush support.

14. In a machine for brushing cushions and the like, the combination of a brush supporting carriage, a brush mounted in the carriage for rotary movement in one direction about its axis of rotation, means for reciprocating the brush back and forth across the cushion surface being brushed and along a line at right angles to its axis of rotation, a single power means operatively connected to rotate the brush about its axis and to move the brush with said reciprocatory linear movement, means controlled by the movement of the brush carriage towards one end of its path of reciprocatory movement for intercepting said

movement while permitting the brush to continue its rotary movement under the action of said power means, and means controlled by the position of the brush carriage for locking the same from continuing said linear movement.

15. In a machine for brushing cushions and the like, the combination of a rotating brush, means for causing said brush to have a bodily linear movement across the surface being brushed in addition to its rotary movement, control means for causing said brush to reverse its direction of linear travel and manually actuated means operatively connected to said control means for causing said linear movement of the brush to be intercepted automatically as the brush reaches a limit of its path of linear movement.

16. In a machine for brushing cushions and the like, the combination of a shiftable brush carriage, a cylindrical brush mounted in said carriage for rotary movement about its own axis, means for guiding the brush in a bodily movement across the surface to be brushed, mechanism for reciprocating said brush along said guiding means, said mechanism including a clutch having two clutching positions, one position causing the brush to travel in one direction in its bodily movement, and the other position causing the brush to travel in the reverse direction and means controlled by the approach of the brush towards its limiting position in said directions and operatively connected to shift said clutch automatically from one to the other of its said two positions thereby to cause the brush to reciprocate back and forth across the cushion surface being brushed.

17. In a machine for brushing cushions and the like, the combination of a shiftable brush carriage, a cylindrical brush mounted in said carriage for rotary movement about its own axis, means for guiding the brush in a bodily movement across the surface to be brushed, mechanism for reciprocating said brush along said guiding means, said mechanism including a three position clutch, one position being neutral and intercepting the driving connection through the mechanism, another position causing the brush to travel in one direction in its bodily movement, and the third position causing the brush to travel in the reverse direction and means controlled by the approach of the brush towards its limiting position in said directions and operatively connected to shift said clutch automatically from one to the other of its said two last named positions thereby to cause the brush to reciprocate back and forth across the cushion surface being brushed and means for shifting said clutch into its neutral position thereby to intercept the reciprocatory movement of the brush.

18. In a machine for brushing car cushions and the like, the combination of a support,

a frame slidably mounted thereon, a brush shaft journaled therein, a rotating and travelling brush actuated thereby, a transmission casing into which the shaft intrudes, a rack carried by the support, a rack shaft geared to the rack to propel the casing and brush along said support, said rack shaft intruding into the transmission casing, reversible driving mechanism in said casing operatively connecting the intruding portions of said shafts and means operatively connected to said reversible driving mechanism to cause the casing and brush to reciprocate back and forth across said support while the brush is rotating.

19. In a machine for brushing car cushions and the like, the combination of a brush carriage including a transmission casing, mechanism contained therein for propelling the carriage, said mechanism including a reversible transmission, means for shifting the transmission, and a controlling device including a tripping finger controlled automatically by the movement of the casing into a limiting position for actuating said shifting means.

20. In a machine for brushing car cushions and the like, the combination of a brush carriage including a transmission casing, mechanism contained therein for propelling the carriage, said mechanism including a reversible transmission, means for shifting the transmission and a controlling device for said means including a fixed nut, a shiftable sleeve provided with a spiral groove passed through the bore of said nut, rollers carried by the nut and working in said groove to shift the sleeve axially when the sleeve is rotated, and means for rotating the sleeve.

21. In a device of the class described, the combination of a support, a brush carriage, slidable on said support for reciprocatory movement, a brush carried by the carriage, mechanism for reciprocating the carriage including a double acting clutch having a movable element, means for shifting the movable element of the clutch into two positions, one to move the carriage in one direction and the other to move the carriage in the reverse direction, means disposed in the path of movement and actuated by the movement of the carriage towards the limits of its path of movement for reversing its direction of movement and means for moving said carriage reversing means into an inoperative position for locking the carriage from movement at one end of its path of movement.

22. In a machine for brushing car cushions and the like, the combination of a support provided with carriage guiding means, a brush carriage slidably mounted on said guiding means for reciprocatory movement, a brush carried by said carriage and movable therewith, mechanism for moving the carriage along said support including a reversible driving connection for moving the car-

riage alternately in both directions, control means for said connection including a snap locking device operatively connected to said connection to secure the reversible driving mechanism in position selectively to move the carriage in its reciprocatory movement along the guiding means, said locking device including a tripping finger for shifting the locking device and the reversible driving connection with a snap movement from one to the other of their operative positions, and a stop on the support disposed in the path of movement of said tripping finger as it is moved with the carriage and adapted to react on the same thereby to cause the carriage to reverse its direction of travel.

23. In a device of the class described, the combination of a support, a carriage slidably mounted on said support, a brush mounted for rotary movement in the carriage, mechanism for driving the carriage along said support and for rotating the brush, said mechanism including a reversible driving connection operatively connected to cause the carriage to reverse its directions of movement, means for controlling said connection, said means including a fixed nut provided with an annular groove open to its bore, a shiftable element slidably mounted for axial movement in the bore operatively connected to said connection, and provided with a spiral groove, rollers disposed on both the spiral and annular groove and means for rotating the shiftable element thereby to cause the same to move axially and in turn effect a reversing of said connection with a resulting reversing of the direction of movement of the carriage.

24. In a machine for brushing car cushions and the like, the combination of a cylindrical brush with its axis of rotation vertically disposed, mechanically actuated means for rotating the brush about its own axis and for causing the brush to move in a horizontal line, mechanism for actuating said means and manually actuated means for shifting said brush laterally to cause it while rotating to move horizontally in a plurality of parallel planes whereby the relation of the brush to the cushion surface being brushed may be varied under the control of the operator while the rotary and travelling movement of the brush is mechanically actuated.

25. In a machine for brushing car cushions and the like, the combination of a cylindrical brush with its axis of rotation vertically disposed, mechanically actuated means for rotating the brush about its own axis and for causing the brush to move in a horizontal line, mechanism for actuating said means, manually actuated means for shifting said brush laterally to cause it while rotating to move horizontally in a plurality of parallel planes whereby the relation of the brush to the cushion surface being brushed may be varied

under the control of the operator while the rotary and travelling movement of the brush is mechanically actuated, and automatically actuated means controlled by the approach of the brush towards the limits of its horizontal movement for reversing the direction of bodily movement of the brush whereby the brush will be reciprocated mechanically back and forth across the cushion surface being brushed.

26. In a machine for brushing car cushions and the like, the combination of a cylindrical brush with its axis of rotation vertically disposed, mechanically actuated means for rotating the brush about its own axis and for causing the brush to move in a horizontal line, manually actuated means for shifting said brush laterally to cause it while rotating to move horizontally in a plurality of parallel planes whereby the relation of the brush to the cushion surface being brushed may be varied under the control of the operator while the rotary and travelling movement of the brush is mechanically actuated, automatically actuated means controlled by the approach of the brush towards the limits of its horizontal movement for reversing the direction of bodily movement of the brush, and manually actuated means controlling said mechanically actuated means.

27. In a machine for brushing cushions and the like, the combination of a cushion support, a brush, a carriage therefor, a supporting frame for the carriage, means for shifting the frame to move the carriage and with it the brush to and from the cushion support, said frame including a pair of end frames, rollers journaled on the supporting frame and on which rollers the end frames slide in the movement of the carriage and brush to and from the cushion support, a plurality of rods connecting the end frames, certain of said rods providing a support for the carriage and means for shifting the carriage and with it the brush along said rods.

28. In a machine for brushing cushions and the like, the combination of a cushion support, a brush, a carriage therefor, a supporting frame for the carriage, means for guiding said supporting frame horizontally in its movement to and from the cushion support, means including a long manually actuated lever for shifting the frame to move the carriage and with it the brush to and from the cushion support, said frame including a pair of end frames, a plurality of rods connecting the end frames, certain of said rods providing a support for the carriage, and certain other of said rods providing means for controlling the carriage and means for shifting the carriage and with it the brush along said rods.

29. In a machine for brushing cushions and the like, the combination of a support, a carriage mounted for reciprocatory move-

ment on said support, said carriage including a transmission casing, a power shaft intruding into said casing and driven in one direction, a brush carried by said shaft, means for reciprocating said carriage including a rack shaft intruding into said casing and having a slight freedom of axial movement, a reversible clutch drive with the end gears loose on the rack shaft and with the intermediate gear operatively connected to be driven from the power shaft, a double acting clutch with one end clutch element secured to one of the end gears and another clutch end element secured to the other end gear, a coacting intermediate clutch element secured to the rack shaft to turn therewith and shiftable axially therewith into selective clutching engagement with either of the end clutch elements thereby to vary the direction of rotation of the rack shaft relative to the unidirectional driving power shaft and control means for shifting said intermediate clutch element.

30. In a machine for brushing cushions and the like, the combination of a support, a carriage mounted for reciprocatory movement on said support, said carriage including a transmission casing, a power shaft intruded into said casing and driven in one direction, a brush carried by said shaft, means for reciprocating said carriage including a rack shaft intruded into said casing and having a slight freedom of axial movement, a reversible clutch drive with the end gears loose on the rack shaft and with the intermediate gear operatively connected to be driven from the power shaft, a double acting clutch with one end clutch element secured to one of the end gears and another clutch end element secured to the other end gear, a coacting intermediate clutch element secured to the rack shaft to turn therewith and shiftable axially therewith into selective clutching engagement with either of the end clutch elements thereby to vary the direction of rotation of the rack shaft relative to the unidirectional driving power shaft, and shaft shifting means operatively connected to the rack shaft to shift said intermediate clutch element to and from its clutching positions engaging the coacting end clutch elements thereby to control the driving connection between the power shaft and said carriage reciprocating means.

Signed at New York, in the county of New York and State of New York, this 30 day of Aug., A. D. 1926.

ELLSWORTH M. WILSON.