Dec. 6, 1955 H. D. LOCHNER 2,726,025

CUSHION FILLING MACHINE

Filed Feb. 24, 1950 2 Sheets-Sheet 1

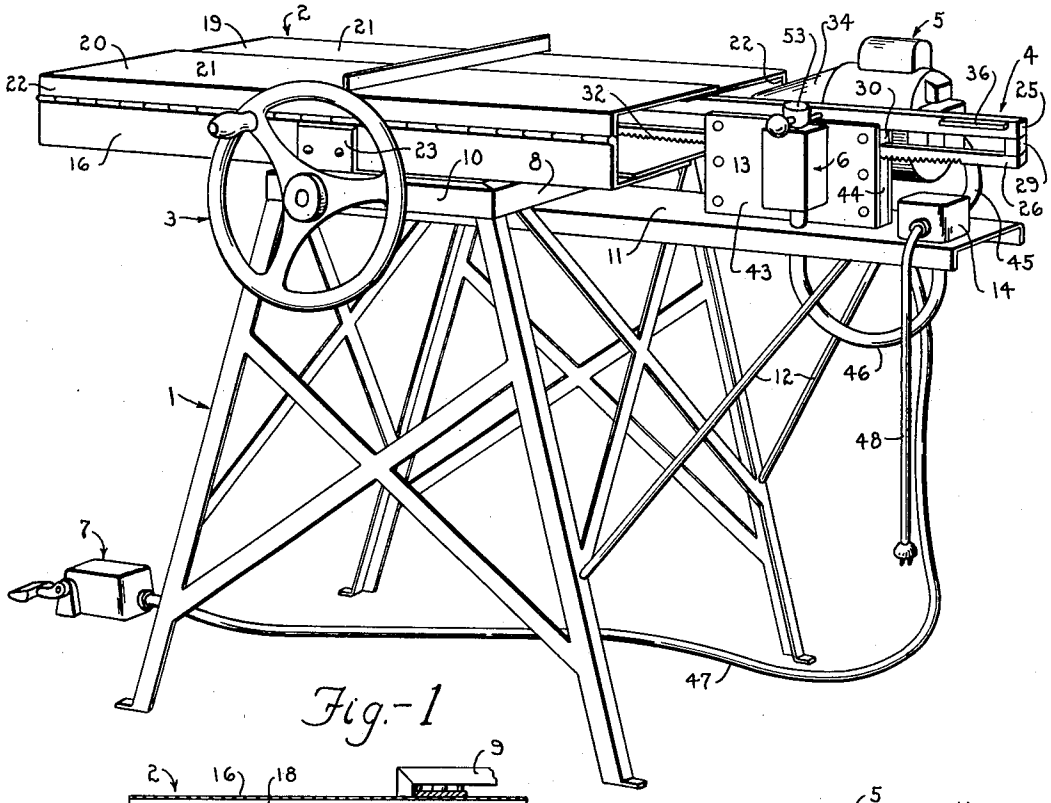


Fig.-1

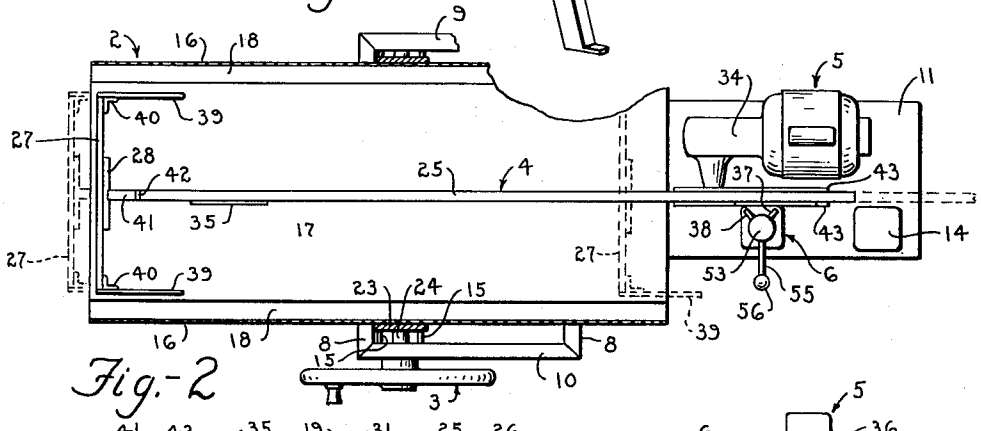


Fig.-2

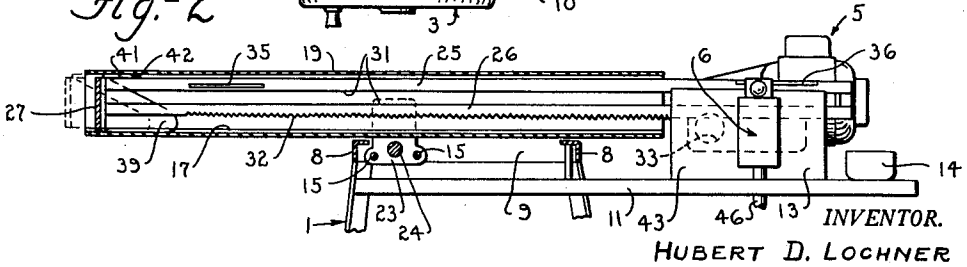


Fig.-3

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Dec. 6, 1955 H. D. LOCHNER 2,726,025

CUSHION FILLING MACHINE

Filed Feb. 24, 1950 2 Sheets-Sheet 2

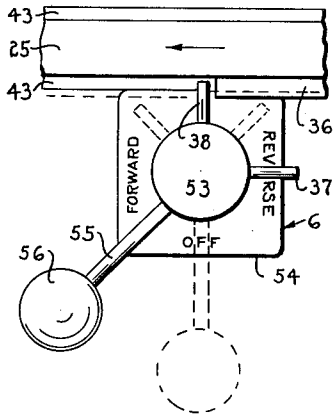


Fig.-4

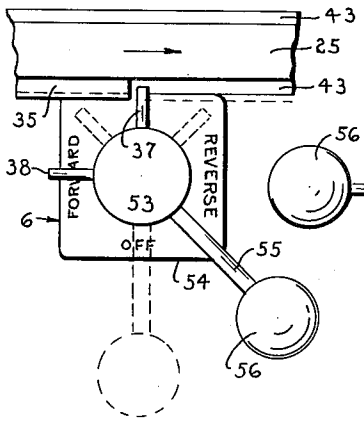


Fig.-5

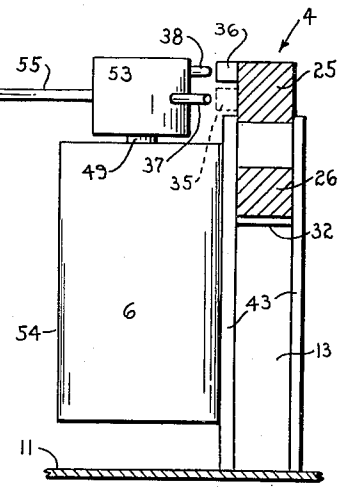


Fig.-6

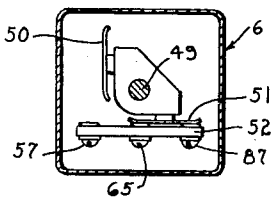


Fig.-7

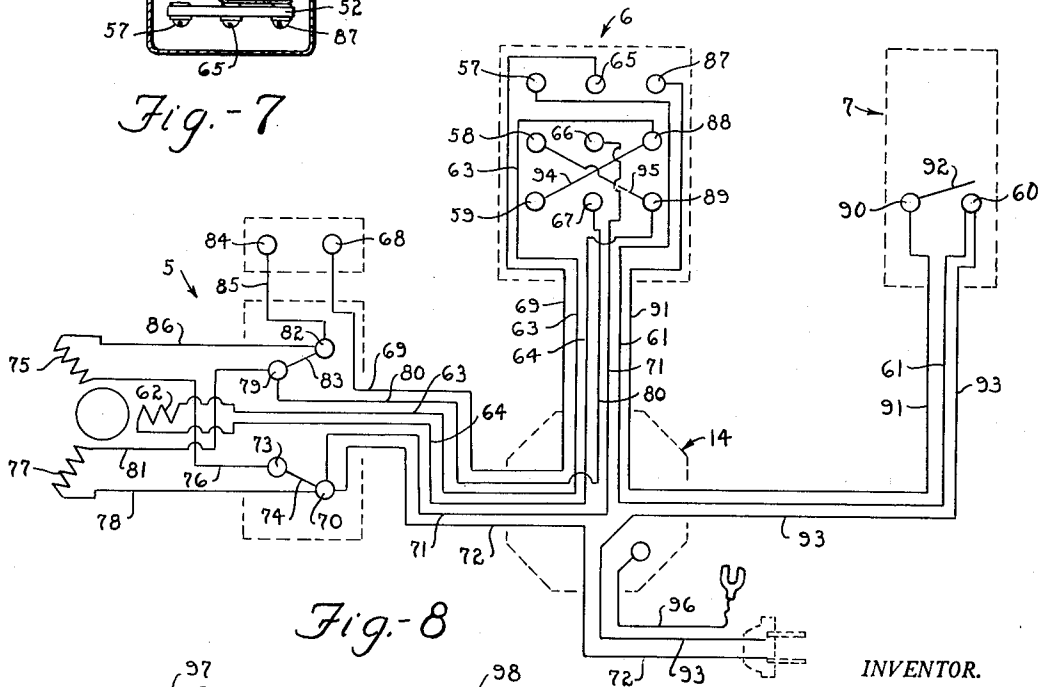


Fig.-8

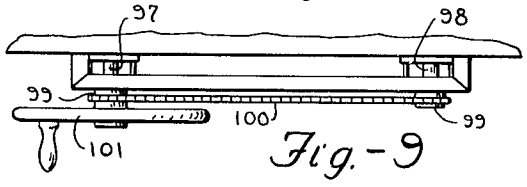


Fig.-9

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United States Patent Office 2,726,025 Patented Dec. 6, 1955

2,726,025

CUSHION FILLING MACHINE

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Application February 24, 1950, Serial No. 145,986

18 Claims. (Cl. 226—46)

This invention relates generally to filling machines and more particularly is directed to electric power driven apparatus for introducing filler material into the cover or casing of a cushion.

The majority of various types of power driven cushion filling machines now in commercial use have not proven entirely satisfactory or efficient under all operating conditions. Some of these power machines are cumbersome and heavy, and thereby take up considerable valuable floor space, which space is not always available in upholstery shops of medium or average size. Also, some machines are so fragile, light in weight, and unstable in construction that they fail in operation when subjected to normal or hard continuous use. Many of the larger machines are complicated and include a multitude of shafts, belts, pulleys, belt shifting devices and linkages, while others include numerous gear trains, cam arrangements and intricate clutch mechanisms. Most all of these machines require frequent adjustments and considerable expense to maintain them in proper working order. In fact, some machines are so designed and constructed that they are dangerous to operate and difficult to control, making it necessary to put operators through an advance course of comprehensive training or instruction.

It is recognized that some conventional cushion filling machines on the market are actuated by an electric motor generally of the single phase type and include a pair of limit switches for controlling the travel of the ram or plunger employed in forcing the filler material into a cover. Machines employing this type of motor are not efficient because such motors do not propertly respond to a reversing switch while in full motion and as a consequence the motor shaft will continue to rotate in its original direction after the switch has been thrown to reverse the rotation direction of the shaft. This overrunning of the motor shaft cannot be satisfactorily controlled unless, for example, a magnetic brake is operatively associated with a motor of the character just described. Magnetic brakes are very expensive and when the cost of other accessories and components necessary to the operation of the brake and machine are included, the initial price of the machine is generally so high that the proprietor of a shop of medium or average size cannot afford one.

One of the principal objects of the subject invention is to provide a machine embodying improved principles of design and construction which overcomes all of the disadvantages inherent in the various machines alluded to above.

Another object of the invention is to provide an electric power driven machine having a wide range of adaptability and which is primarily adapted for installation and use in shops of medium or average size.

An object of the invention is to provide a substantial machine in which the various operating components thereof are so arranged with respect to each other that they are well balanced and supported for efficient operation.

A significant object of the invention is to provide a unique and efficient system or setup for controlling the operation of the electric motor or power unit for reciprocating the ram or plunger relative to a cushion box, the latter of which may constitute a component of the machine. In this respect, it is deemed desirable to emphasize that the invention contemplates the utilization of a primary control preferably in the form of a single master switch and a secondary control such as a footswitch, which switches are electrically connected with the motor and a source of electrical power in such a manner that an operator can readily manipulate the footswitch to stop the forward movement of the ram at any point desired or cause it to travel its full distance until it is finally automatically terminated or stopped by the master switch. As will be pointed out more in detail subsequently, the master switch may be normally actuated to initiate backward travel of the ram and automatically determine the extreme forward and backward stopping positions of the ram regardless of the condition existing in the footswitch. This arrangement, among other things, has the advantage of permitting an operator to use both hands to adjust and hold a cover in proper relationship to the cushion box while the filler material is being fed and packed into the cover by the ram, as required; it also enables the operator to begin opening and re-loading the cushion box during the time required for the ram to return to its rear stopping position.

Another object of the invention is to design and construct a machine which is foolproof as to operation and control and a setup whereby the master control or switch is provided with fingers arranged at different levels or elevations and the ram is provided with abutments which are adapted to respectively independently engage the fingers for automatically operating the switch to determine the forward and backward stopping limits of the ram.

An additional object of the invention is to provide the machine with a bearing block which, among other things, serves to support the ram and the primary control unit, and also an arrangement whereby the ram supports the cover or covers of the cushion box assembly.

Another object of the invention is to provide an improved ram construction which carries a toothed bar or element, the latter constituting a rack which is driven by a pinion on a shaft of the motor and wherein the rack finds support on the bearing block above referred to.

Also, an object of the invention is to provide the ram with unique meansw hereby to prevent the operating end of the ram from accidentally catching on the bottom wall of the cushion box or platform of the machine or on the hinged cover or cover sections of the box.

A further object of the invention is to provide a machine embodying a pair of operatively connected screws for adjusting the movable side walls of a comparatively long cushion box relative to one another to vary the width of the box if desired, and a means carried by one of the screws for simultaneously manipulating both screws so as to maintain the walls in proper parallel and operative relationship.

A still further object of the invention is to provide a machine which is efficient, positive in action, and comprised of components which can be economically manufactured and readily assembled on a production basis to such an extent that the machine can be sold at a reasonable price.

Many other objects and advantages of the invention will become apparent after the description hereinafter set forth is considered in conjunction with the drawings annexed hereto.

In the drawings wherein like parts or elements through-

out the various figures are designated by the same numerals:

Figure 1 is a perspective view of a cushion filling machine embodying the improved principles of design and construction of the invention;

Figure 2 is a top view of the machine illustrated in Figure 1, with portions of the structure in section for the purpose of exemplifying certain details of construction;

Figure 3 is a vertical section taken through appropriate parts of the machine to depict other details;

Figure 4 is a top view of the primary control or master switch constituting a component of the assembly and shows the manner in which one of the abutments on the ram or plunger is adapted to engage one of the fingers on the master switch for automatically turning the switch from an "on" forward position to an "off" position whereby the forward travel of the ram may be positively stopped;

Figure 5 is a top view of the primary control, similar to Figure 4, and depicts the manner in which another abutment on the ram is adapted to engage another finger on the switch for automatically turning the switch from an "on" reverse position to an "off" position to positively stop the backward travel of the ram;

Figure 6 is a view showing in elevation the relationship of the fingers and abutments including the cross sectional character of the ram assembly;

Figure 7 is a transverse section taken through an appropriate part of the master switch showing the operative relationship between bridge members and various contacts thereof;

Figure 8 is a diagrammatic view exemplifying the electrical hookup between the electric motor for operating the machine, the primary control and secondary control; and

Figure 9 is a partial view of a modified construction of a cushion box assembly in which a pair of screws for adjusting the sides of the cushion box are driven by a handwheel carried by one of the screws.

The machine exemplified in the drawings includes, among other things, a substantial stand **1**, an elongated rectangular open ended cushion or stuffing box **2**, means including a hand wheel **3** whereby the width or size of the box may be adjusted to accommodate cushion covers of various sizes, a ram or plunger assembly **4**, an electric motor **5** for reciprocating the ram assembly with respect to the box, a primary control or master switch **6** for determining, among other things, the forward and backward stopping limits of the ram assembly, and a secondary control or footswitch **7** whereby the forward movement or travel of the ram assembly may be controlled as desired, all of which will be described more in detail subsequently.

The stand **1** may be designed and constructed as desired, but as herein illustrated, preferably includes four legs made from angle iron which are trussed together in a manner to impart strength and stability to the structure. The upper ends of the legs are joined by a pair of end rails **8** and a pair of side rails **9** and **10** to form a generally rectangular frame at the top of the stand. One end of an elongated horizontal table **11** is secured to and under the end rails **8** on a level below this frame and its other end is extended and supported by a pair of braces **12** connected to the rear legs of the stand. This extended end of the table carries the electric motor **5** and a relatively heavy upstanding bearing block assembly **13**, the latter in turn supporting the ram assembly **4** and the primary control switch **6**. A junction box **14** is also preferably mounted on the extended end of the table and its relationship to the motor, primary control and secondary control will be described in due course.

The novel cushion or stuffing box **2** and the unique manner of mounting it on the stand **1** will now be described. The box may be mounted in various ways but as herein depicted it is preferably mounted so that its forward free extremity projects a sufficient distance in advance of the stand to enable an operator to conveniently operate the machine and otherwise have the full use of both hands to do whatever is required with respect to properly filling a cover. More particularly, the movable side components of the box are mounted on a pair of parallel round guide rods **15**. The ends of the rods are anchored in the side rails **9** and **10** of the stand.

The box proper includes vertical side walls **16** and a center planar bottom wall **17** which is supported on the end rails **8** in a fixed horizontal position slightly thereabove by means not shown. The side walls **16** are provided with integral inturned horizontal planar walls **18** which complement the center wall **17** to provide a sectional bottom or platform for the filler material. The inturned walls **18** are arranged to slidably engage the underside of the center wall throughout its entire length and support its forwardly extending extremity in advance of the stand. A pair of covers **19** and **20** are hingedly connected to the side walls **16**. Each cover includes a relatively large rectangular flat portion **21** and an angular portion **22**. The angular portions **22** of the covers constitute continuations of the side walls **16**. It will be noted that the flat portion of cover **19** overlaps the cover **20** when the box is closed as illustrated in Figure 1 of the drawings. More particularly in this regard the combined widths of the covers is greater than the full open width of the box so that under normal operating conditions the covers will always be maintained in an overlapping relationship. Thus, it will be evident that a side wall **16** and its inturned wall **17** and an attached cover constitute a separate unit or side assembly of the box.

A bracket **23** is fixedly secured to the inturned wall **18** of each side assembly or unit. Each bracket is provided with two pairs of bearing blocks which slidably receive the guide rods **15**. A nut is also floated in each of the brackets for receiving a threaded shaft **24**. The ends of the shaft are journalled in the side rails **9** and **10** between the rods **15**. Although not shown, the extremities of the shaft are respectively provided with right and left hand threads which cooperate with corresponding threads in the brackets in such a manner that by manipulating the hand wheel **3** carried by the shaft, the side units or assemblies of the box can be simultaneously moved to and from the fixed or stationary center bottom wall **17** so that the width of the box may be varied as desired to accommodate cushion covers of different sizes.

The ram assembly **4** is of a unique character and includes a pair of longitudinal parallel bars **25** and **26**, the forward ends of which are secured to a transverse rectangular pressure plate **27** by a member **28** and screws which project through the plate and member into the ends of the bars. The rear ends of the bars are joined by a member **29**. The bar **25** is disposed above bar **26** and these bars in combination with the members **28** and **29** define an elongated relatively narrow rectangular slot of a predetermined width for embracing a rail **30** secured to the upper extremity of the bearing block assembly **13**. The opposed longitudinal edges **31** of the bars constitute a track which slidably engage the upper and lower surfaces of the rail **30**. The longitudinal lower edge of bar **26** is provided with teeth **32** which are adapted to mesh with a pinion **33** carried by a shaft extending from a gear speed reducing unit **34** of the motor **5**.

The ram assembly is provided with a pair of elongated abutments or dogs **35** and **36** which are preferably detachably connected to the extremities of the top bar **25** at selected positions and at different levels or elevations. More specifically in this regard the forward abutment is arranged at a level below the rear abutment **36**. These abutments are adapted to respectively automatically engage fingers **37** and **38** provided on the primary control switch **6** to actuate this switch in a manner which will be described subsequently.

A runner or shoe 39 is attached to each end of the pressure plate 27 by angle pieces 40. These runners extend rearwardly from the plate in parallel relationship and are arranged so that their lower marginal edges ride on the center bottom wall 17 of the cushion box when the ram assembly is reciprocated. If the ram assembly is projected forwardly beyond its intended stopping limit in advance of the box, as illustrated by the dotted lines in Figure 2, the runners 39 will continue to rest upon the platform of the box and thereby prevent the pressure plate from dropping therebelow. This feature is important because the pressure plate is prevented from catching or hooking onto the front edges of the platform when the ram assembly is moved rearwardly. These runners also serve to take some of the load off the bearing block assembly 13. In some instances the box may be adjusted so that its width is considerably greater than the length of pressure plate 27. When this becomes necessary to accommodate a large cover, a plate longer than plate 27 may be associated with plate 27 to compensate for the difference.

It is to be noted that the length of the runners 39 and the distance between them are such that the runners cannot engage the motor 5 or primary control 6 when the ram assembly is retracted as shown in Figure 2.

Means are also provided for preventing the upper portion of the pressure plate from hooking or catching on the front edges of the covers 19 and 20 when the pressure plate 27 moves rearwardly from the overextended forward dotted line position shown in Figures 2 and 3. The means employed for this purpose is an elongated rest member 41 which is attached to the upper edge of the bar 25 at its forward end. This rest member slidably engages the under side of cover 19 when the ram assembly is reciprocated. It not only supports cover 19 and the overlapping cover 20, but reduces friction to a minimum between the ram assembly and associated covers. The inner end of the rest member is preferably rounded or bevelled as indicated at 42 so that the front edge of the cover 19 will be caused to cam or ride up on to the upper surface of the rest from the bar 25 in the event the pressure plate is moved rearwardly from a point quite some distance in advance of that exemplified by the dotted lines. When the side units or sections of the box have been moved outwardly from the center bottom wall 17 so that the width of the box is increased to a substantially maximum open position the upper inclined edges of the runners will serve to engage the front edges of the covers and prevent the pressure plate from catching on these edges if the plate is moved rearwardly from the dotted line position in advance of the box. The runners and rest have proven very advantageous in practice and serve to prevent damage to the machine.

The bearing block assembly 13 is firmly anchored to the table 11 and includes a pair of side plates 43 which support the rail 30, above referred to, and spacer means 44 below the rail to provide an opening in the assembly through which the lower bar 26, constituting a rack, reciprocates. The thickness of the rail 30 and spacer means 44 are the same so that the distance between the opposed inner planar faces of the plates is predetermined and the sides of the bars 25 and 26 will be caused to slidably engage such faces. The frictional engagement or contact area between the bars, rail and side plates is sufficient to substantially support, guide and stabilize the ram assembly for proper reciprocatory movement. The bearing block assembly is provided with a suitable clearance opening for the shaft carrying the pinion 33 and the spacer means 44 is provided with a clearance recess for the pinion as illustrated by the dotted lines in Figure 3. In other words, the shaft extending from the reducing unit 34 and the pinion 33 carried by the shaft are preferably not supported by the bearing block. The arrangement is such that the pinion is continuously in mesh with a number of the teeth 32 on the rack bar 26.

As stated above, much of the difficulty encountered with power driven cushion filling machines originates in the gearing and clutch mechanisms. The motor 5 and unit 34 have been designed and constructed to provide a complete assembly which functions efficiently under all normal operating conditions. It contains precision-cut gears mounted on ball and roller bearings. The worm gear thereof is heat treated alloy steel and the worm wheel is bronze. A fluidtight housing and an oil reservoir protect and lubricate the gears, shafts, and bearings. The pinion 33 and the rack bar 26 are cut from steel. In practice the assembly has proven superior to other types of power units employed in connection with filling machines because all of the gearing, internal and external, is in constant mesh and therefore is not frequently subjected to engagement and disengagement as in prior conventional power units.

The motor 5 is electrically connected to the junction box 14 by means of conductors encased in a conduit 45 and the primary control or master switch 6 is electrically connected to the box 14 by conductors in a conduit 46 which projects through holes provided therefor in the table 11. The secondary control or footswitch 7 is connected to the junction box 14 by conductor wires in a cable 47. This cable is of a length sufficient to permit the footswitch to be located in a desirable position on a floor in advance of the stand for convenient manipulation. Another cable 48 is attached to the box and is of a length to be plugged into a 110 or 220 volt line. These conductors and cables are preferably so arranged with respect to the switches and junction box that minimum lengths are required and so that they do not in any way interfere with the movement of the ram assembly or any other movable components of the machine.

The primary control or master switch 6 which functions as a directional selector and as a limit switch for stopping the motor and travel of the ram assembly in either direction is preferably made in the form of a capstan and is secured in a vertical position to one of the side plates 43 of the bearing block 13. As herein illustrated, it includes, among other things, a rotatable spindle 49 provided with rows of bridge members 50 and 51, which are adapted to respectively engage various stationary contacts carried by one or more insulators such as 52. A cylindrical fitting 53 is fixed to the upper end of the spindle exteriorly of a switch casing 54. This fitting 53 carries the radial fingers or pins 37 and 38 and also a radially extending lever 55 having a knob 56 at its free end. The switch casing 54 may be provided with suitable indicia to indicate the "forward," "reverse" and "off" positions of the switch. More particularly in this respect, the radial fingers 37 and 38 are preferably arranged at substantially right angles with respect to one another with the finger 37 disposed on a lower level for engagement with the lower abutment 35 and the finger 38 for engagement with the abutment 36 on the bar 25 of the ram assembly. As will be explained more in detail later, when the lever 55 is manually moved in a clockwise direction from the "off" dotted line position to the forward position illustrated in Figure 4, a circuit will be established whereby forward movement of the ram assembly is subject to the control of the footswitch. When the ram assembly approaches its limit of travel in the forward direction the abutment 35 will engage the finger 37 and trip the switch back to its "off" position to automatically terminate or stop the ram assembly. When the switch lever 55 is manually moved from the "off" position to the "reverse" position as shown in Figure 5, another circuit will be established to cause the ram assembly to move backwardly and as it approaches its limit of travel in this direction, the rear end of the abutment 36 will engage the finger 38 and trip the switch lever back to its "off" position to automatically terminate or stop the ram assembly.

The circuit arrangements diagrammatically exemplified

in Figure 8 of the drawing in combination with the primary control switch and secondary footswitch and motor will now be described.

The primary switch 6, among other things, is provided with a first row of stationary contacts 57, 58 and 59; a second center row of contacts 65, 66 and 67; and a third row of contacts 87, 88 and 89. The contacts 58 and 59 of the first row are respectively connected to the contacts 89 and 88 of the third row by jumpers 95 and 94. When the primary switch lever 55 is in an "off" position none of the contacts just referred to are bridged. When the lever is moved to the "forward" position, separate bridge members, corresponding to bridge member 51, will bridge the contacts 65 and 87, 66 and 88, and 67 and 89 of the center and third rows and when moved to the "reverse" position, separate bridge members, corresponding to bridge member 50, will bridge the contacts 57 and 65, 58 and 66, and 59 and 67 of the first and center rows. The arrangement is preferably such that when the switch lever is in the "forward" position, the footswitch will be operated to control the forward movement of the ram assembly as desired and when the lever is in the "reverse" position, the footswitch is rendered inoperative.

Describing more in detail the manner in which the various contacts of the primary switch and footswitch and terminals on the motor are operatively connected, the contact 57 in the first row of contacts of the primary switch is connected to the stationary contact 60 of the footswitch by conductor 61. The contact 87 of the third row is connected to a stationary contact 90 of the footswitch by conductor 91. A bridge 92, adapted for actuation by a lever on the footswitch, is arranged to bridge the contacts 60 and 90. The contact 60 of the footswitch is adapted for connection with a power source through a conductor 93 constituting a component of the extension cord 48. The contact 88 of the third row is connected to a winding 62 of the motor by a conductor 63.

With respect to the center row of contacts of the primary switch, contact 65 is connected to a terminal 68 of a conventional thermotector by a conductor 69 and contact 66 is connected to a terminal 70 on the motor by a conductor 71; terminal 70 to a terminal 73 by a conductor 74; and terminal 73 to a winding 75 of the motor by a conductor 76. Terminal 70 is also connected to a complementary winding 77 of the motor by a conductor 78. Terminal 70 is further connected to a conductor line 72 of the cord for connection with a power source. The contact 67 of the primary switch is connected to a terminal 79 on the motor by a conductor 80 and the terminal 79 is connected to the winding 77 by conductor 81 and to a terminal 82 by a conductor 83. The terminal 82 is connected to a terminal 84 of the thermotector by a conductor 85 and to the winding 75 by a conductor 86. The extension cord 48 containing the conductor wires 72 and 93 may be connected either to a 110 or 220 volt power source. The machine may be grounded by a wire 96. Obviously, the thermotector may be omitted as it is merely one of several safety devices that may be employed to protect the motor from overload.

In view of the foregoing, and assuming that the cord 48 is operatively connected with a power source, the machine is ready for operation. When the operator desires to direct the ram assembly forwardly for the purpose of filling a cushion cover, it is merely necessary for the operator to move the primary switch lever 55 to the "forward" position illustrated in Figure 4 so that separate bridge members, corresponding to 51, will bridge the contacts 65 and 87, 66 and 88, and 67 and 89 of the center and third rows. Then, when the footswitch 7 is operated to cause the bridge 92 to bridge contacts 60 and 90, current will flow from the power source through conductor wire 93, contact 60, bridge 92, contact 90, conductor 91, contacts 87 and 65, conductor 69 to terminal 68 of the thermotector and to terminal 84 thereof through a conventional connection and from terminal 84 to a terminal 82 through conductor 85. Current also flows from terminal 82 through conductor 86 to the winding 75, through and from winding 75 to terminal 73, terminal 73 to terminal 70 through a conductor 74, and from terminal 70 back to the source through conductor wire 72. Current also flows from terminal 82 to terminal 79 through conductor 83, terminal 79 to winding 77 through conductor 81, through and from winding 77 to terminal 70 through conductor 78, and back to the power source through conductor wire 72. Moreover, current will also flow between terminal 79 of the motor and contact 67 of the primary switch through conductor 80, between contacts 67 and 89 of the primary switch, through a suitable bridge member, contact 89 to winding 62 by a conductor 64, through and from winding 62 to contact 88 through conductor 63, contact 88 to contact 66 through a suitable bridge member, contact 66 to terminal 70 through conductor 71, and from terminal 70 back through conductor wire 72 to the source. Thus, by manipulating the footswitch an operator may cause the ram assembly to move forwardly in one continuous stroke or the forward movement may be interrupted as required. When the ram assembly approaches its extreme forward position, the forward end of the upper abutment or dog 36, carried by the bar 25 of the ram assembly, will engage the finger 38 of the primary switch and cause the arm 55 thereof to swing to the dotted line "off" position, illustrated in Figure 4, to automatically stop the motor and forward movement of the ram assembly to position the pressure plate 27 substantially flush with the front marginal edge of the cushion box or slightly to the rear of such edges.

To reverse the movement of the ram assembly it is merely necessary for the operator to swing the switch lever 55 to the "reverse" position whereupon the ram assembly will travel rearwardly and as it approaches the termination of its stroke, the rear end of the lower abutment or dog 35 on the bar 25 will engage the lower finger or pin 37 of the switch and cause the lever 55 to swing back to its "off" or neutral position, whereby to automatically stop the motor and rearward movement of the ram assembly to position the pressure plate of such assembly adjacent to the rear end of the cushion box.

Attention is directed to the fact that the footswitch is preferably located a sufficient and convenient distance in advance of the machine so that while it is being manipulated, it is practically impossible for an operator to reach over and actuate the primary switch. This arrangement has the advantage of placing the forward working stroke of the ram assembly directly under the control of the footswitch and, at the same time, prevents an operator from inadvertently selecting an improper position of the primary switch. Moreover, the various electric circuits are so operatively connected that when the ram assembly is traveling rearwardly, manipulation of the footswitch will not in any way affect such travel.

More particularly in these respects, when the switch lever 55 is moved by an operator to the "reverse" position, separate bridge members, corresponding to the bridge member 50, will respectively bridge the contacts 57 and 65, 58 and 66, and 59 and 67, of the first and center rows of the switch, whereupon current will flow from the source through conductor 93 to contact 60 of the footswitch, contact 60, conductor 61, contact 57 of the primary switch, contact 57 to contact 65, through a suitable bridge member, contact 65, conductor 69, terminal 68 to terminal 84 of the thermotector through a suitable connection, terminal 84, conductor 85, and to terminal 82. Current will also flow from terminal 82 through conductor 86 to winding 75, through and from winding 75 to terminal 73 through conductor 76, terminal 73, conductor 74, terminal 70, and from terminal 70 back to the source through conductor 72. Current will also flow from terminal 82 through conductor 83 to terminal 79,

conductor 81 to winding 77, conductor 78 to terminal 70 back to source through conductor 72. Moreover, current will flow from terminal 79 through conductor 80 to contact 67 of the primary switch, contact 67 to contact 59 through a suitable bridge member, jumper 94 to contact 88, conductor 63, winding 62, conductor 64 to contact 89, through jumper 95 to contact 58, contact 58 to contact 66 through a suitable bridge, contact 66 through conductor 71 to terminal 70, and from terminal 70 back to the source through conductor 72.

The inclusion of the footswitch as a secondary control prevents the operator from "fooling" the limit control on the machine. With the footswitch placed on, or fastened to, the floor at a convenient location for operation, and the operator in a position to cause forward travel of the ram by depressing the pedal of the footswitch, the operator is not within reach of the primary control, and cannot operate the switch lever to "reverse." He, therefore, cannot "kill" to forward limit control. When the operator moves over to one side of the machine to operate the lever 55 to a "reverse" position, and having moved the lever to "reverse," makes the error of moving it quickly to "forward" the motor will stop because the operator is not within reach of the normally open footswitch. The motor may then be restarted in either direction by the correct procedure, and the limit control will stop it at the end of the travel chosen. It is important to note that the motor may be stopped at any point along the travel in one direction and started again in either direction with positive limit control available in either direction selected.

In the subject machine, there is some overtravel of the ram assembly in each direction of its movement. This overtravel is controlled, within practicable limits, by automatically operating the primary switch to interrupt the flow of current to the motor at predetermined intervals, so that if, for example, the overtravel of the forward work stroke of the ram assembly is found to be one inch after the flow of current is interrupted, then the primary switch is made to operate so that the pressure plate 27 will come to rest in a position flush with or slightly beyond the forward end of the cushion box. It should never stop short of the end of the box because some of the filler material would remain in the box instead of being rammed into the cushion cover. More particularly in this respect, the upper abutment or dog 36 on the bar 25 of the ram assembly is adjusted to trip the upper finger 38 of the primary switch the moment that the pressure plate is substantially one inch in advance of its desired stop position flush with the forward end of the cushion box. It is recognized that the pressure plate may occasionally run beyond the forward end of the cushion box and as pointed out above, this will not affect the efficiency of the machine in any way because the runners or shoes 39 on the plate serve to prevent the plate from catching on the lower edges of the cushion box. Although not illustrated, the upper bar 25 of the ram assembly is provided with two rows of holes so that fastening means can be secured in any hole or holes to locate the abutments where desired.

No serious problem is encountered with respect to overtravel of the ram assembly on its return or reverse stroke, as it can be readily controlled within practicable limits by merely adjusting the lower abutment or dog 35 on the bar 25 of the ram assembly so that the lower finger 37 of the primary switch will be tripped a predetermined distance in advance of the desired stop position of the plunger assembly.

Attention is further directed to the fact that the abutments 35 and 36 on the ram assembly are of a predetermined length and that the relationship between these abutments and the fingers on the primary switch are such that when the forward stroke of the ram assembly is terminated the primary switch can be manually moved only from the "off" position to the "reverse" position, because the abutment 35 provides a stop for the finger 37 and since the finger 37 and abutment 35 are on a level different from the finger 38 and abutment 36, clearance is provided for actuating the switch to said "reverse" position. When the rearward stroke of the ram assembly is terminated, the primary switch can be manually moved only from the "off" position to the "forward" position for reasons corresponding to those just referred to.

In the modification of the invention illustrated in Figure 9 of the drawing provision is made for adjusting and maintaining the side sections of a relatively long cushion box in parallel relationship. When a long box is employed, considerable pressure is exerted by the ram assembly against the filler material adjacent the forward extended portion of the box and as a result the sides of the box tend to spread apart at the forward portion of the box. In order to prevent spreading or scissoring of the side sections of the cushion box the machine is provided with a pair of rotatable shafts 97 and 98 which are operatively connected to the side sections of the box in substantially the same manner that the shaft 24 is connected to the side sections described above. The ends of the shafts 97 and 98 on one side of the machine are provided with sprockets 99 which are operatively connected by an endless chain 100. When the handwheel 101 connected to the shaft 97 is manipulated, the shafts 97 and 98 will simultaneously rotate to move the side sections of the box relative to one another. Thus the width of the box may be varied as desired and the side sections are at all times maintained substantially in parallel relationship.

While the foregoing description has been given in detail, it is not the intention to thereby restrict the scope of the invention beyond that defined by the appended claims since the inventive principles thereof are capable of assuming other physical embodiments than those hereinbefore described.

I claim:

1. A cushion filling machine comprising a frame, an elongated cushion box having its inner end attached to the frame and its outer end extending forwardly and free of the frame, an elongated platform having an inner end attached to the frame and its outer end extending rearwardly beyond the inner end of the box, a bearing block mounted on the platform, an elongated reciprocable ram assembly supported on the bearing block for movement in the box, an electric motor drivingly connected to the ram assembly, a switch operatively connected to the motor and adapted for connection with a source of electricity, a pair of abutments provided on the switch and arranged at different levels, and a pair of abutments provided on the ram assembly arranged to respectively engage the abutments on the switch as the ram assembly approaches the ends of its strokes to actuate the switch to stop the motor and ram assembly for determining the travel of the latter.

2. In a cushion filling machine, a cushion box, a platform, a bearing block mounted on the platform, a ram assembly supported on the bearing block, a motor mounted on the platform for driving the ram assembly forwardly and backwardly with respect to the cushion box, a primary switch carried by the bearing block and operatively connected to the motor, and abutments provided on the ram assembly and said primary switch having fingers adapted to engage the abutments to actuate the switch to stop the motor as the ram assembly approaches the end of its forward and backward strokes.

3. A cushion filling machine comprising a cushion box having a bottom wall, a ram assembly having a longitudinally extending bar, a motor for reciprocating the ram assembly in the box, a primary switch and a footswitch operatively connected to the motor and with a source of electricity for controlling movement of the ram assembly in one direction, said primary switch also being operable to cause movement of the ram assembly

in an opposite direction, and means on the primary switch and means on the bar of the ram assembly directly engageable with one another at a location above the bottom wall of the box to render the primary switch inoperative to stop the motor and movement of the ram assembly as the ram assembly approaches the end of its movement in each direction for determining the travel of the ram assembly.

4. A cushion filling machine comprising a cushion box, a ram assembly, a motor for reciprocating the ram assembly with respect to the cushion box, a primary switch operatively connected to the motor, and a footswitch operatively connected to the primary switch and motor, and means for operatively connecting the switches and motor with a source of electricity in a manner whereby said primary switch and footswitch can be jointly operated to control movement of the ram assembly in one direction and said primary switch can also be operated to simultaneously render the footswitch inoperative and control movement of the ram assembly in an opposite direction.

5. A cushion filling machine comprising a frame, a cushion box and a platform carried by the frame, a bearing block and a motor mounted on the platform, a ram assembly supported on the bearing block and operatively connected to the motor for reciprocation in the box, a three position primary switch carried by the bearing block and operatively connected to the motor, a secondary switch operatively connected to the primary switch, spaced abutments provided on the ram assembly, and fingers provided on the primary switch cooperable with the spaced abutments, the arrangement being such that after the primary switch has been manually moved to one position the secondary switch can be operated to cause forward movement of the ram assembly until one of the abutments engages one of the fingers to move the switch to a second and inoperative position to automatically stop the motor, after which the primary switch may be manually moved to a third position to simultaneously render the secondary switch inoperative and cause rearward movement of the ram assembly until the other abutment engages the other finger on the primary switch to actuate the switch back to its second inoperative position.

6. In a cushion filling machine, a frame, a cushion box carried by the frame, a platform, a bearing block mounted on the platform, an elongated ram assembly supported on the bearing block, said ram assembly including a pressure member at one end and a rack extending substantially the full length of the assembly, a motor on the platform having a pinion drivingly connected with the rack, a plural position primary switch carried by the bearing block and having a pair of fingers projecting therefrom, a pair of spaced abutments provided on the ram assembly adapted to be respectively engaged by the fingers, a secondary switch operatively connected with the primary switch in a manner whereby when the primary switch is manually moved to one position and the secondary switch is then actuated the motor will drive the ram assembly in one direction relative to the box until one of the abutments engages one of fingers to move the primary switch to a second position to automatically stop the motor and movement of the ram assembly, and means whereby when the primary switch is moved to a third position the motor will drive the ram assembly in an opposite direction relative to the box until the other abutment engages the other finger to move the primary switch to said second position to automatically stop the motor and movement of the ram assembly in said opposite direction.

7. A cushion filling machine comprising a frame, an elongated cushion box having its inner end attached to the frame and its outer end extending forwardly and free of the frame, an elongated platform having an inner end attached to the frame and its outer end extending rearwardly beyond the inner end of the box, a bearing block mounted on the platform, an elongated reciprocable ram assembly supported on the bearing block for movement in the box, an electric motor drivingly connected to the ram assembly, a switch operatively connected to the motor and adapted for connection with a source of electricity, a pair of fingers provided on the switch and arranged at different levels, a first elongated abutment provided on one extremity of the ram assembly and arranged to engage one of the fingers to actuate the switch to stop the motor and forward movement of the ram assembly, and a second elongated abutment provided on the other extremity of the ram assembly for engaging the other finger to actuate the switch to stop the motor and rearward movement of the ram assembly, the relationship of the said other finger and second abutment being such that after the switch has been actuated to stop the rearward movement of the ram assembly the second abutment acts as a stop for said other finger so as to prevent a repeated actuation of the switch to initiate further rearward movement until the ram assembly has first travelled forwardly a predetermined distance.

8. In a cushion filling machine, a cushion box, a platform, a ram assembly supported for reciprocatory movement in the cushion box, a motor for driving the ram assembly, a primary switch supported above the platform and operatively connected to the motor, abutments provided on the switch, and abutments provided on the ram assembly adapted to engage the abutments on the switch to actuate the switch to stop the motor as the ram assembly approaches the end of its forward and backward strokes.

9. In a cushion filling machine, a cushion box, a platform, a support mounted on the platform, a ram assembly movably mounted on the support and including a longitudinal bar, a motor for driving the ram assembly forwardly and backwardly with respect to the cushion box, a primary switch operatively connected to the motor, and means provided on the bar of the ram assembly and means on the primary switch engageable with the means on the bar for actuating the switch to stop the motor as the ram assembly approaches the end of its forward stroke.

10. In a cushion filling machine, a cushion box, a platform, a support mounted on the platform, a ram assembly movably mounted on the support, a motor adapted for connection with a circuit for driving the ram assembly forwardly and backwardly with respect to the cushion box, a primary switch operatively connected to the motor, means provided on the primary switch and means provided on the ram assembly operatively related to the means on the primary switch, a secondary switch operatively connected to the primary switch and motor through the circuit in such a manner that when the primary switch is in one position and the secondary switch is actuated, the motor will drive the ram assembly in one direction until the means on the ram assembly cooperates with the means on the primary switch to stop the motor as the ram assembly approaches the end of its forward stroke.

11. The structure defined in claim 10, in which the switches are substantially spaced apart so that they cannot be manipulated simultaneously.

12. In a cushion filling machine, a cushion box, a platform, a ram supported for reciprocating movement in the cushion box, a motor for driving the ram, a primary switch supported with respect to the ram and electrically connected to the motor, means providing on the primary switch and means provided on the ram assembly cooperable with the means on the primary switch for stopping the motor as the ram approaches the end of its forward stroke, and a secondary switch electrically connected to the primary switch and motor for starting the motor when the primary switch is set to a predetermined position.

13. In a cushion filling machine, a cushion box, a platform, a ram supported for reciprocating movement in the cushion box and including a longitudinal bar, a pressure plate connected to the forward end of the ram, means carried by and extending rearwardly from the pressure plate, a motor for driving the ram, a primary switch operatively connected to the motor, and means on the switch and means on the bar cooperable with the means on the switch to actuate the switch to stop the motor as the ram approaches the end of its forward stroke, the arrangement being such that the extending means will prevent the pressure plate when projected forwardly out of the box from catching on the box when the ram is retracted.

14. A cushion filling machine comprising a frame, a cushion box and a platform carried by the frame, a support mounted on the platform, a motor, a ram mounted on the support and operatively connected to the motor for reciprocation in the box, said ram having a longitudinal bar, a three position primary switch operatively related to the ram and operatively connected to the motor, a secondary switch operatively connected to the primary switch, spaced means provided on the bar and spaced means provided on the primary switch cooperable with the spaced means on the bar, the arrangement being such that after the primary switch has been manually moved to one position the secondary switch can be operated to cause forward movement of the ram until one of the means on the bar will engage one of the means on the primary switch to move the primary switch to a second and inoperative position to automatically stop the motor, after which the primary switch may be manually moved to a third position to simultaneously render the secondary switch inoperative and cause rearward movement of the ram until the other means on the bar will engage the other means on the primary switch to return the primary switch back to its second inoperative position.

15. In a cushion filling machine, a frame, a cushion box carried by the frame, a platform, a support on the platform, an elongated ram mounted on the support, said ram including a rack and a pressure member at one end thereof, a motor having a pinion drivingly connected with the rack, a plural position primary switch having a pair fo fingers projecting therefrom, a pair of spaced abutments provided on the ram adapted to be respectively engaged by the fingers, a secondary switch operatively connected with the primary switch in a manner whereby when the primary switch is manually moved to one position and the secondary switch is then actuated the motor will drive the ram in one direction relative to the box until one of the abutments engages one of the fingers to move the primary switch to a second position to automatically stop the motor and movement of the ram, and means whereby when the primary switch is moved to a third position the motor will drive the ram in an opposite direction relative to the box until the other abutment engages the other finger to move the primary switch to said second position to automatically stop the motor and movement of the ram in said opposite direction.

16. A cushion filling machine comprising a frame, an elongated cushion box having its inner end attached to the frame and its outer end extending forwardly and free of the frame, an elongated platform having an inner end attached to the frame and its outer end extending rearwardly beyond the inner end of the box, a support on the platform, an elongated reciprocable ram mounted on the support for movement in the box, an electric motor drivingly connected to the ram, a switch operatively connected to the motor and adapted for connection with a source of electricity, a pair of fingers provided on the switch and arranged at different levels, a first elongated abutment provided on one extremity of the ram and arranged to engage one of the fingers to actuate the switch to stop the motor and forward movement of the ram, and a second elongated abutment provided on the other extremity of the ram for engaging the other finger to actuate the switch to stop the motor and rearward movement of the ram, the relationship of the said other finger and second abutment being such that after the switch has been actuated to stop the rearward movement of the ram the second abutment acts as a stop for said other finger so as to prevent a repeated actuation of the switch to initiate further rearward movement until the ram has first travelled forwardly a predetermined distance.

17. In a cushion filling machine, a cushion box, a platform, a bearing block mounted on the platform, a ram assembly supported on the bearing block and having a pressure member at its fore end for normal movement within the confines of the box, said ram assembly having a bar, a motor mounted for driving the ram assembly forwardly and backwardly with respect to the cushion box, a primary switch operatively connected to the motor, means on the switch and means on the bar adapted to engage the means on the switch to actuate the switch to stop the motor as the ram assembly approaches the end of its forward stroke, and means carried by the ram assembly for preventing the pressure member when projected out of the box from catching on the box when moved backwardly into the box.

18. A cushion filling machine comprising a frame, an elongated cushion box having its inner end attached to the frame and its outer end extending forwardly and free of the frame, an elongated platform having an inner end attached to the frame and its outer end extending rearwardly beyond the inner end of the box, a bearing block mounted on the platform, an elongated reciprocable ram assembly supported on the bearing block for movement in the box, an electric motor drivingly connected to the ram assembly, a switch operatively connected to the motor and adapted for connections with a source of electricity, a pair of abutments provided on the switch and arranged at different levels, a pair of abutments provided on the ram assembly arranged to respectively engage the abutments on the switch as the ram assembly approaches the ends of its strokes to actuate the switch to stop the motor and ram assembly for determining the travel of the latter, a second switch operatively connected to the first mentioned switch and the motor for starting the motor, and means for preventing rearward movement of the ram assembly until the latter has first travelled forwardly a predetermined distance.

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