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J. SILVERMAN ET AL

3,276,776

WORKPIECE STACKING APPARATUS

Filed Aug. 20, 1964

2 Sheets-Sheet 1

FIG. 1

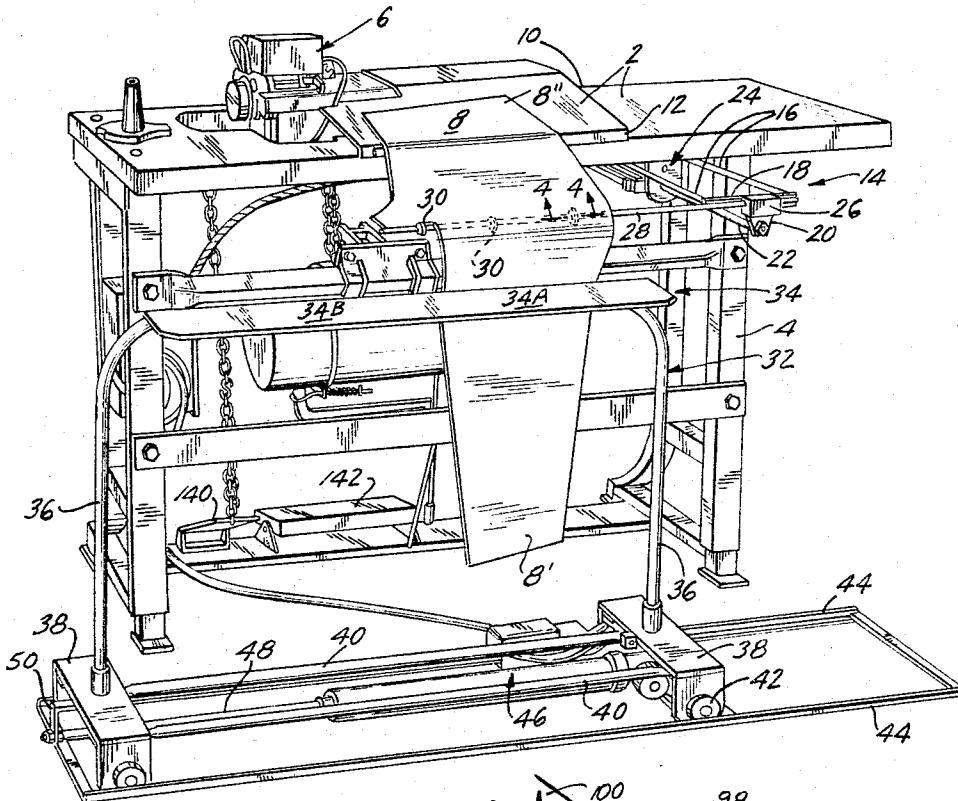
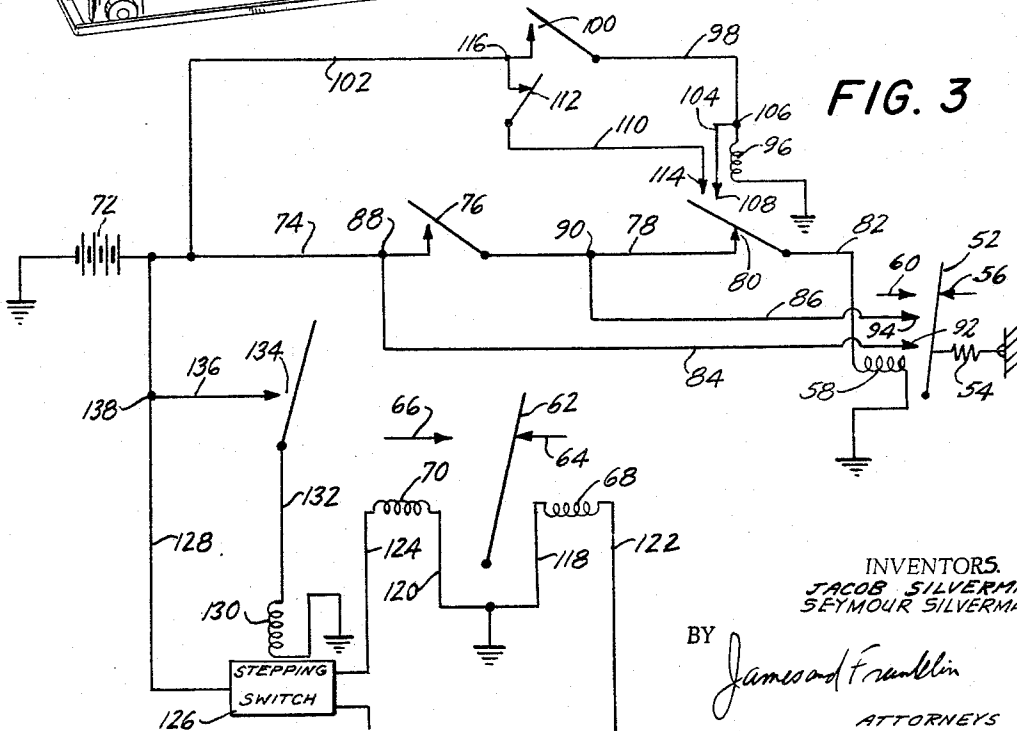


FIG. 3



INVENTORS.
JACOB SILVERMAN
SEYMOUR SILVERMAN

BY *James and Franklin*
ATTORNEYS

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2 Sheets-Sheet 2

FIG. 2

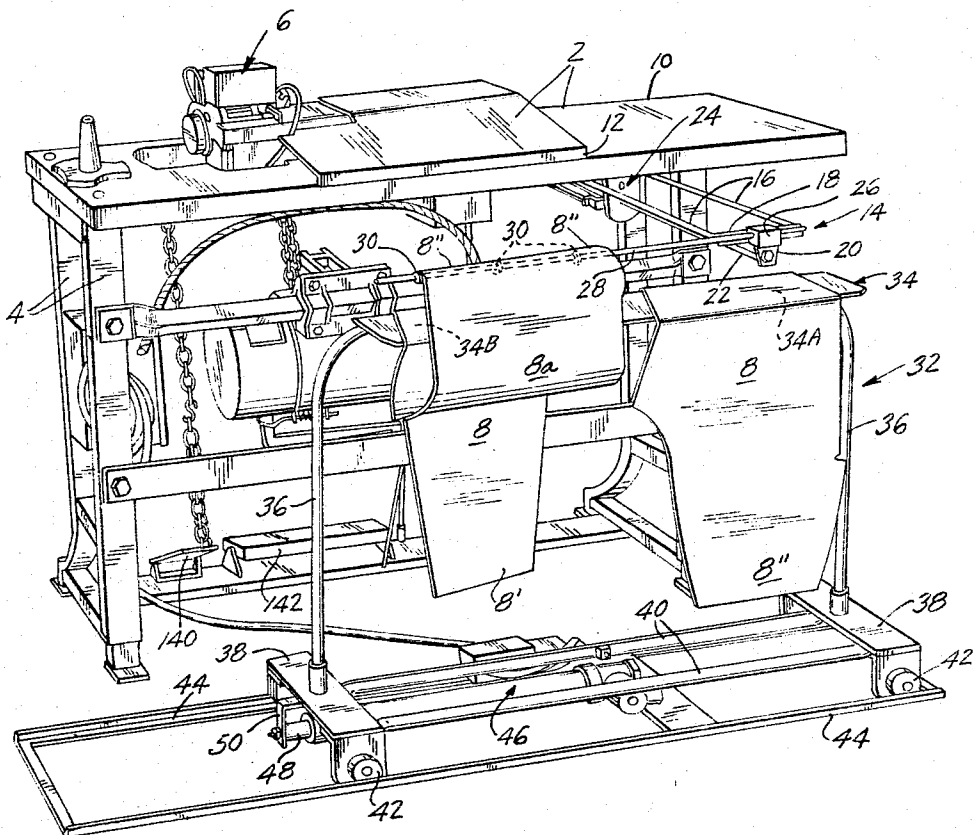


FIG. 4

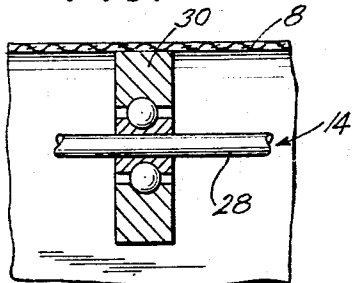
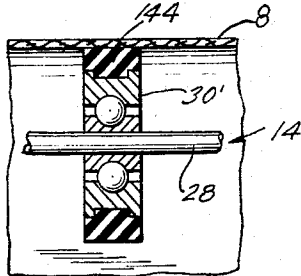


FIG. 5



INVENTORS.
JACOB SILVERMAN
SEYMOUR SILVERMAN

BY

James and Franklin

ATTORNEYS

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3,276,776

WORKPIECE STACKING APPARATUS

Jacob Silverman, 2102 Ave. R, Brooklyn, N.Y., and Seymour Silverman, 320 E. 42nd St., New York, N.Y.

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14 Claims. (Cl. 271-86)

The present invention relates to a device for automatically withdrawing flexible workpieces from a work table and stacking them in a manner facilitating their transportation to a subsequent work station.

The invention has a prime field of applicability in connection with the performing of sewing operations upon a plurality of fabric sheets (or a single sheet adapted to be cut into individual pieces), and it is here specifically illustrated in that connection. In the manufacture of garments or other objects adapted to be formed from a plurality of sheets of fabric, certain operations, such as cutting, shaping, folding, hemming, seaming, attachment of trim, and the like, are successively performed upon a plurality of workpieces. After the operation in question has been performed upon a given workpiece it must then be removed from the working area so that the same operation can be performed upon the next succeeding piece. The group of pieces, after a given operation has been performed upon each of them, must be arranged in a regular manner so that they can be presented in an orderly fashion to the worker who is to perform the next operation thereon.

The usual procedure is to cause the workpieces to fall one after the other from the work table into a bin. Thus it is incumbent upon the operator to see to it that after the operation has been completed on each piece it is pushed from the work table into bin. This usually involves manual action on the part of the operator, and detracts from the efficient performance of the operator's more constructive duties. At appropriate intervals a person removes the workpieces from the bin and then arranges them in stacked fashion, prior to transporting them to the place where the next operation is to be performed. This is time consuming and therefore expensive, particularly when it is realized that it is a matter of some difficulty to smooth out individual fabric sheets so that they can be stacked upon one another.

A further problem involved in the manual stacking operations which have been employed heretofore derives from the fact that in many operations there are differences of shading and pattern in the material being worked upon which must be taken into account in making the final garment. Where these factors obtain it is essential that the pieces presented to an operator be in proper order. Where the workpieces fall into a bin and are then arranged manually, the arrangement of the individual pieces in proper order is not only extremely time consuming but is also subject to human error.

It is the prime object of the present invention to provide for the effective stacking of workpieces after a given operation has been performed upon them and as they leave the work table, and to accomplish that stacking in an automatic and highly effective manner. It is a further object of the present invention to provide means for accomplishing the stacking operation and at the same time ensuring the removal of a completed workpiece from the work table without requiring any special manual action on the part of the operator, who can thus devote her full attention to the proper performance of the functional operation which is entrusted to her.

It is a further prime object of the present invention to provide a stacking device which will automatically form a plurality of stacks of workpieces, with the workpieces arranged on those stacks in a predetermined fashion relative to the sequence in which work is performed on them.

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To these ends a workpiece-engaging member is associated with a work table, that member being movable, when actuated, to engage a workpiece as that piece extends over the rear edge of the work table, to draw that workpiece from the work table, and to fold or drape the workpiece over an appropriately positioned rack element. The workpiece-engaging member is then returned to its initial position, ready to repeat this operation with subsequent workpieces, each piece draping itself over preceding pieces previously deposited on the rack element. The rack element itself is movable between a plurality of operative positions exposing different portions of itself to the workpieces as they are withdrawn from the work table, thereby to form on the rack element a plurality of stacks of draped workpieces. As a result, when a group of workpieces are to be transported to a new working station all that an operator need do is remove the piles or stacks of workpieces from the rack element. These stacks will already be smoothly and regularly formed, with the individual pieces in proper sequence, and may be transported to the new operating station in precisely the same condition as they are in when they are removed from the stacking means.

More specifically, the work table is mounted in an elevated position and the workpiece-engaging member is mounted below the rear table edge. It normally assumes a first operative position beneath the table and inside the rear table edge, therefore being behind that portion of the completed workpiece which hangs down from said edge. When the member is actuated it moves in a generally outward direction so as to engage the depending portion of the workpiece, pull the workpiece from the work table, and move it so that the depending portion of the workpiece is engaged by the rack element. The member moves further from the work table to a position beyond the rack element, and in so doing the workpiece is pulled completely from the work table, becomes disengaged from the member, and is draped over the rack element. The member then returns to its first operative position. The rack element is then moved to a new position such that when the member is again actuated to engage and pull a workpiece from the work table, that workpiece will be draped over a second portion of the rack element, thereby to form a plurality of stacks of workpieces on the rack element as the work operations proceed. The actions of the workpiece-engaging member and the rack element can take place while the next workpiece is being operated upon, and the sequence of operations can be continued for as long as desired. The workpiece-engaging member is so constructed as to engage the workpiece with a predetermined but minimal degree of friction sufficient to permit the member to draw the workpiece from the work table and drape it over the rack element but insufficient to cause the workpiece to permanently drape over the engaging member itself. To this end it may be provided with rollers which engage the workpiece. For workpieces made of most natural fibres metal-faced rollers are satisfactory, but for workpieces formed of certain synthetic fibres or formed of silk friction facings are provided on the rollers in order to provide the desired minimal degree of frictional engagement with the workpieces.

The operation of the device is fully automatic and the parts thereof may be manufactured and assembled very inexpensively.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the construction of a workpiece stacking apparatus as defined in the appended claims and as described in this specification, taken together with the following drawings, in which:

FIG. 1 is a three-quarter perspective view of a sewing machine work table with which is associated the stacking

means of the present invention, the rack element of that stacking means being shown in one of its operative positions and the workpiece-engaging member being shown in an intermediate position in which it has engaged a workpiece and is drawing that workpiece from the worktable and causing it to engage the rack element;

FIG. 2 is a view similar to FIG. 1 but showing the rack element in a second operative position with a workpiece already draped over it in one location and with a second workpiece partially draped over it in a second position, the workpiece-engaging member being shown in an intermediate position more remote from the work table than shown in FIG. 1, the workpiece engaged thereby having been completely withdrawn from the work table and almost completely draped over the rack element;

FIG. 3 is a schematic circuit diagram illustrating one type of electrical interlock circuit which could be employed for coordinating the movements of the work-engaging member and the rack element;

FIG. 4 is a fragmentary cross sectional view on an enlarged scale taken along the line 4-4 of FIG. 1; and

FIG. 5 is a view similar to FIG. 4 but showing a specifically different embodiment in which the roller is provided with a frictional facing.

The present invention is here specifically disclosed in conjunction with the stacking of individual flexible fabric pieces upon which a sewing operation is adapted to be performed, although it will be appreciated that it is capable of use in numerous other instances. A work table 2 is mounted in an elevated position on legs generally designated 4. Mounted on the table 2 is a work device such as a sewing machine generally designated 6, which is adapted to sequentially perform a sewing operation on a plurality of workpieces, generally designated 8, as those pieces are moved over the table 2 from the front edge 10 thereof to the rear edge 12 thereof. If desired, the location of the rear table edge 12 could be made adjustable to compensate for workpieces 8 of different lengths, by means of any appropriate adjustably positionable mechanical structure.

The workpiece-engaging member, generally designated 14, comprises a pair of rods 16 slidably mounted in any appropriate manner beneath the table 2 so as to be received completely under the table 2 or projected out beyond the rear table edge 12. The rods 16 are connected at their outer ends by bracket 18 having depending ear 20. A rod 22 is secured to the ear 20 and constitutes an extension of the piston rod of a pressure cylinder 24 which is mounted beneath the table 2, that pressure cylinder being provided with an internal piston (not shown) and with appropriate valving for applying pressure to one side or the other of that piston, thereby to cause the piston to move in one direction or the other, the piston rod 22 moving therewith. Mounted on the bracket 18 is a block 26 through which rod 28 extends and in which the rod 28 is longitudinally adjustably fixed by any appropriate clamping means. The rod 28 is oriented in the same general direction as at table edge 12, extends to a position in line with that portion of the table 2 over which the workpieces 8 are adapted to pass as they are worked upon, and is there provided with a plurality of spaced rollers 30 which are adapted to relatively freely rotate about the axis of the rod 28 and to extend out beyond the periphery of the rod 28, the rollers 30 constituting the parts which primarily engage the workpieces 8 during the operation of the apparatus.

The rack element, generally designated 32, comprises a plate 34 over which the workpieces 8 are adapted to be draped, the plate 34 being supported in a raised position by means of legs 36 mounted on brackets 38 which are held together by rods 40. The brackets 38 are provided with wheels 42 adapted to ride on tracks 44. A pressure cylinder 46 is located between the tracks 44 and has a piston rod 48 extending out therefrom, the end of that rod being connected to arm 50 fastened to the left hand

bracket 38. The pressure cylinder 46 is provided with an internal piston (not shown) connected to the piston rod 48, and with appropriate means for applying pressure to one side or the other of that piston, thereby causing the piston to move within the cylinder 46 and cause corresponding movement of the piston rod 48.

The details of the pressure cylinders 24 and 46 and the valves which control the application of fluid under pressure to one side or the other of the pistons therein, together with associated equipment such as pressure regulator valves, fluid cleaners or the like, are conventional and form no part of the present invention. They therefore will not be described in any further detail.

FIG. 3 represents a schematic circuit diagram of an electrical system for controlling the operation of the pressure cylinders 24 and 46, and hence the workpiece-engaging member 14 and the rack element 32 respectively. The pressure cylinder 24 is provided with a valve (not shown) which controls the application of pressure to cause the piston thereof to move either to an advanced or retracted position. This valve is controlled by armature 52, which is biased by spring 54 to its right hand position against part 56 and is movable by solenoid coil 58 to its left hand position against part 60. Engagement of the armature 52 with the part 56 causes the piston to pressure cylinder 24 to retract and engagement of the armature 52 with the part 60 causes the piston of the pressure cylinder 24 to advance. The valve (not shown) for the pressure cylinder 46 will similarly control the application of pressure to cause the piston (not shown) of that cylinder to advance or retract, that valve being controlled by armature 62 movable against parts 64 or 66, engagement of the armature 62 with the part 64 causing the piston of pressure cylinder 46 to advance and engagement of the armature 62 with the part 66 causing the piston to retract. The armature 62 is movable from one operative position to the other by energization of one or the other of solenoid coils 68 and 70, the armature 62 remaining in a given operative position until it is moved to the other operative position by energization of the appropriate coil 68 or 70. A battery 72 or other source of electrical power has one end connected to ground. Its other end is connected by lead 74, normally open switch 76, lead 78, relay contacts 80 and lead 82 to one end of the solenoid coil 58, the other end of that coil being connected to ground. Leads 84 and 86 extend from points 88 and 90 respectively to contacts 92 and 94 respectively, the points 88 and 90 being on opposite sides of the switch 76 and the contacts 92 and 94 being conductively bridged by the armature 52 when that armature is in its left hand operative position against the part 60. The relay contacts 80 are normally closed but are adapted to be opened when relay winding 96 is energized, one end of that winding being connected to ground and the other end thereof being connected by lead 98, normally open limit switch 100 and lead 102 to the battery 72. Lead 104 extends between point 106 on lead 98 and contact 108. Lead 110 and normally closed limit switch 112 connect contact 114 with point 116 on lead 102. The limit switches 100 and 112 are operatively connected to the workpiece engaging member 14, the limit switch 100 being closed when the piston of pressure cylinder 24 has moved to its fully advanced position, moving the workpiece-engaging member 14 to its projected position, the limit switch 112 being opened when the piston of the pressure cylinder 24 is in its retracted position, with the workpiece-engaging member 14 therefore in its retracted position. One end of the solenoid coils 68 and 70 are connected by leads 118 and 120 respectively to ground, and their other ends are connected by leads 122 and 124 to a stepping switch 126, one terminal of which is connected by lead 128 to the battery 72. The stepping switch 126 will sequentially energize the windings 68 and 70, that stepping switch being actuated by winding 130 one end of which is connected to ground and the other end of which is connected

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by lead 132, limit switch 134 and lead 136 to point 138 on lead 128. The limit switch 134 is normally open, and is closed when the workpiece-engaging member 14 is in its fully advanced position.

The workpiece-engaging member 14 is movable by the piston of the pressure cylinder 24 between a retracted position in which the rod 28 is located below the rear table edge 12 and behind that edge beneath the table 2 and a projected or advanced position in which it extends out well beyond the table edge 12. FIG. 1 shows the workpiece-engaging member 14 in a partially projected position, and FIG. 2 shows it in a still further projected position, but still short of its final projected position.

The rack element 32 is adapted to be moved laterally between the two operative positions shown in FIGS. 1 and 2 respectively through the action of the pressure cylinder 46. When the piston of that pressure cylinder is in its advanced position the rack element 32 is moved to its left hand operative position shown in FIG. 1, in which the right hand portion 34A of the plate 32 is disposed opposite the workpieces 8 as they are worked upon on the table 2. When the piston in the pressure cylinder 46 is retracted the rack element 32 is moved to its right hand operative position shown in FIG. 2, in which position the left hand portion 34B of the plate 34 is disposed opposite the workpieces 8. The fully projected position of the workpiece-engaging member 14 is such that the rod 28 is projected well to the opposite side of the plate 34 of the rack element 32 from the table 2.

The operator may control the functioning of the sewing machine 6 in any appropriate manner, as by means of the treadles 140 and 142. The latter may control the sewing machine motor and the former may control the presser foot of the sewing machine. The switch 76 is also under the control of the operator, by any appropriate means, so as to be actuated either independently of or along with one of the treadles 140 and 142, as desired. As the operator performs sewing operations upon the workpiece 8 it is moved across the table 2 from the front edge 10 of the rear edge 12, and the leading portion 8' of the workpiece 8 extends out beyond the rear table edge 12, folds thereover and depends therefrom to a position below the level of the plate 34 and the rack element 32 and also below the level of the rod 28 of the workpiece-engaging member 14. After the work has been completed on the workpiece 8 the operator closes switch 76. This energizes winding 58, causes the armature 52 to move to its left hand position engaging part 60, the valve of the pressure cylinder 24 is shifted to cause the piston thereof to advance, and the rod 28 moves out from beneath the table 2, the rollers 30 thereon engaging the depending portion of the workpiece 8 and moving it out from the table 2. When the armature 52 is moved to its left hand position it closes a holding circuit between contacts 92 and 94, bypassing the switch 76, so that the outward movement of the workpiece-engaging member 14 will continue even though the switch 76 is released and returns automatically to its normal circuit-opening position.

As the rod 28 moves out it will pull the workpiece 8 from the table 2 and will bring its depending portion into engagement with the edge of the rack element plate 32 (see FIG. 1). As the rod 28 continues its movement it will pull the trailing portion 8' of the workpiece completely off from the table 2 and, in moving beyond the rack element plate 34 (see FIG. 2) will drape the workpiece 8 over the plate 34. As the rod 28 reaches the end of its projected movement the weight of that portion 8a of the workpiece 8 which hangs between the plate 34 and the rod 28 will cause the trailing portion 8' of the workpiece to slide from the rod 28 and to hang down from the rack element plate 34. In order to facilitate this separation of the workpiece 8 from the rod 28, the workpiece 8 must frictionally engage the rack plate 34 with a greater force than exists between workpiece 8 and the

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rod 28. This can be accomplished by making the rod 28 thinner than the rack element plate 34, as disclosed, or by providing the rod 28 with a coating having a low coefficient of friction, or by providing the plate 34 with a coating or surface having a high coefficient of friction, or by providing the rod 28 with freely rotatable rollers 30, as shown, or by a combination of any of these arrangements or equivalents thereof.

When the workpiece-engaging member 14 reaches its fully projected position, at which time the workpiece 8 will have fallen therefrom and be draped over the rack element plate 34, the limit switch 100 is closed, thus energizing winding 96 and opening relay contacts 80. This opens the circuit to coil 58, armature 52 returns to its right hand position, the valve for pressure cylinder 24 is reversed, the piston of that pressure cylinder retracts, and the workpiece-engaging member 14 is withdrawn to its initial retracted position. When the relay contacts 80 are opened a holding circuit through the relay coil 96 is closed through contacts 108 and 114, thus bypassing the limit switch 100, which opens as soon as the workpiece-engaging member 14 starts to retract. This holding circuit passes through limit switch 112, which is normally closed, but which is opened when the workpiece-engaging member 14 has moved to its fully retracted position. When the limit switch 112 opens the holding circuit for relay winding 96 is broken, the relay contacts 80 close, and the circuit is re-set for subsequent actuation.

When the workpiece-engaging member 14 reaches its fully advanced position the normally open limit switch 134 is closed. This energizes winding 130 and causes stepping switch 126 to advance one step. If, before that advance, coil 68 was energized and the armature 62 was against part 64, as shown in FIG. 3, thereby causing the piston in the pressure cylinder 46 to advance and position the rack element 32 in its left hand position, as shown in FIG. 1, the actuation of the stepping switch 126 will de-energize winding 68 and energize winding 70, thereby causing the armature 62 to shift to part 66, thus causing the piston in pressure cylinder 46 to retract, the rack element 32 then moving to its right hand position as shown in FIG. 2.

The rod 28 of the workpiece-engaging means 14 engages the workpiece 8 with sufficient frictional force so as to pull it from the table 2 when the rod 28 is moved from its retracted to advanced position. In some instances, as where the workpieces 8 are made of particularly sleazy material, there may not be sufficient frictional engagement between the rod 28 and the workpiece 8 to accomplish this result. Under those circumstances, as shown in FIG. 5, the rod 28 may be provided with rollers 30' the outer surfaces of which are defined by facing rings 144 of rubber or other high friction material.

The stacking operation, it will be noted, is initiated by the momentary closing of the switch 76 and thereafter continues automatically through an entire cycle of operation without requiring any attention on the part of the operator. The operator may thus, while the stacking operation is being carried out, perform desired work on the next succeeding workpiece, so that production is uninterrupted.

It will be appreciated that the stacking device in question not only ensures that the individual workpieces are smoothly stacked one upon the other, and in proper sequence, and in a plurality of stacks if desired, but also that the element which withdraws the workpiece from the table need carry only a single workpiece at any one time. Thus it may be made light and small and may be readily moved between its operative positions without requiring any appreciable exertion or force. The rack element, on the other hand, may be made as sturdy as need to be support large stacks of workpieces, and since the rack element may be supported on the floor and moves rectilinearly on wheels, it too may be moved

between its operative positions, when that is desired, efficiently and effectively through the application of normal amounts of force. The operator of the sewing machine 6 or other comparable device does not have her attention distracted from her main job. The necessity for manually taking loose workpieces and stacking and arranging them is completely eliminated, and sequential arrangement of the workpieces is positively ensured, without any possibility of intervening human error.

The structure of the apparatus of the present invention is simple, and is easily assembled from standard components which do not require any high degree of precision or dimensional tolerances. Operation is reliable and substantially foolproof.

While but a single embodiment of the present invention has been here disclosed, it will be apparent that many variations may be made therein, all within the scope of the instant invention as defined in the following claims.

We claim:

1. Stacking apparatus comprising a support where work is adapted to be performed on a flexible workpiece, a member mounted on said support, means for moving said member between said first and second operative positions respectively close to and remote from said support, said member being adapted to engage said workpiece intermediate the ends of said workpiece while said workpiece is at least partially on said support and while said member is in its first operative position, and a rack element positioned at a distance from said support between said first and second operative positions of said member and at a height below that of said member, whereby movement of said member from its first to its second operative position will remove said workpiece from said support and drape it over said rack element, and means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element.

2. In the stacking apparatus of claim 1, interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after a predetermined number of cycles of movement of said member.

3. In the stacking apparatus of claim 1, interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after each cycle of movement of said member.

4. Stacking apparatus comprising a support including a table where work is adapted to be performed on a flexible workpiece, said table having an edge over which an end of said workpiece is adapted to fold and depend when said workpiece extends beyond said edge, an elongated member mounted on said support below said table edge, means for moving said member between first and second operative positions respectively beneath said table and inside said edge and remote from said table and beyond said edge, said member being adapted to engage that portion of said workpiece folded over and depending from said table edge while another portion of said workpiece is on said table and to draw said workpiece from said table as said member moves toward its second operative position, and a rack element positioned at a distance from said support between said first and second operative positions of said member and at a height below that of said member and in the path of said depending portion of said workpiece, whereby movement of said member from its first to its second operative position will remove said workpiece from said support and drape it

over said rack element, and in which said member is provided, along its length, with rollers adapted to engage said workpiece.

5. In the stacking apparatus of claim 4, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element.

6. In the stacking apparatus of claim 5, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element, and interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after a predetermined number of cycles of movement of said member.

7. In the stacking apparatus of claim 5, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element, and interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after each cycle of movement of said member.

8. Stacking apparatus comprising a support including a table where work is adapted to be performed on a flexible workpiece, said table having an edge over which an end of said workpiece is adapted to fold and depend when said workpiece extends beyond said edge, an elongated member mounted on said support below said table edge, means for moving said member between first and second operative positions respectively beneath said table and inside said edge and remote from said table and beyond said edge, said member being adapted to engage that portion of said workpiece folded over and depending from said table edge while another portion of said workpiece is on said table and to draw said workpiece from said table as said member moves toward its second operative position, and a rack element positioned at a distance from said support between said first and second operative positions of said member and at a height below that of said member and in the path of said depending portion of said workpiece, whereby movement of said member from its first to its second operative position will remove said workpiece from said support and drape it over said rack element, and in which said member is provided, along its length, with rollers adapted to engage said workpiece, said rollers being provided with a frictional workpiece-engaging surface.

9. In the stacking apparatus of claim 8, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element.

10. In the stacking apparatus of claim 8, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are

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brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element, and interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after a predetermined number of cycles of movement of said member.

11. In the stacking apparatus of claim 8, means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element, and interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after each cycle of movement of said member.

12. Stacking apparatus comprising a support including a table where work is adapted to be performed on a flexible workpiece, said table having an edge over which an end of said workpiece is adapted to fold and depend when said workpiece extends beyond said edge, an elongated member mounted on said support below said table edge, means for moving said member between first and second operative positions respectively beneath said table and inside said edge and remote from said table and beyond said edge, said member being adapted to engage that portion of said workpiece folded over and depending from said table edge while another portion of said workpiece is on said table and to draw said workpiece from said table as said member moves toward its second operative position, and a rack element positioned at a

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distance from said support between said first and second operative positions of said member and at a height below that of said member and in the path of said depending portion of said workpiece, whereby movement of said member from its first to its second operative position will remove said workpiece from said support and drape it over said rack element, and means for moving said rack element in a direction substantially at right angles to the direction of movement of said member between first and second operative positions in which different portions of the length of said rack member are brought into registration with said workpieces as they are removed from said support, thereby to form two stacks of workpieces on said rack element.

13. In the stacking apparatus of claim 12, interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after a predetermined number of cycles of movement of said member.

14. In the stacking apparatus of claim 12, interlock means operatively connected between said member moving means and said rack element moving means for causing said rack element to move from one of its operative positions to the other after each cycle of movement of said member.

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