United States Patent

[11] 3,589,711

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[45] Patented **June 29, 1971**
[73] Assignee **Hollymatic Corporation**

[54] **SEPARATOR SHEET FEEDER**
17 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **271/10,** 271/44, 53/122, 17/32
[51] **Int. Cl.** **B65h 5/00**
[50] **Field of Search** 271/10, 44; 53/122, 159; 17/32

[56] **References Cited**

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3,388,529	6/1968	Holly	53/122
3,417,425	12/1968	Holly	17/32

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ABSTRACT: An apparatus for applying a separator sheet to each of a series of molded articles ejected in a path from a molding device comprising a retainer beside the path for retaining a supply of the sheets with an end sheet of the supply exposed, sheet projecting means for projecting a forward edge portion of the successive end sheets toward this path, a conveyor engaging each end sheet successively and movable into the path to withdraw the sheets from the supply and move the sheets into the path to be contacted by an ejected article and pressure means for pressing the forward edge portion of each end sheet against the conveyor means in a pinching action to aid in withdrawing the end sheet from the supply by the movement of the conveyor means.

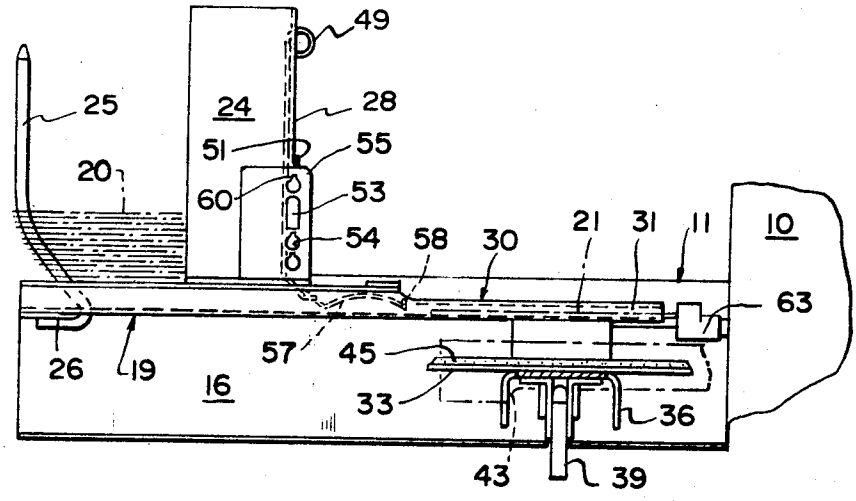


FIG. 1

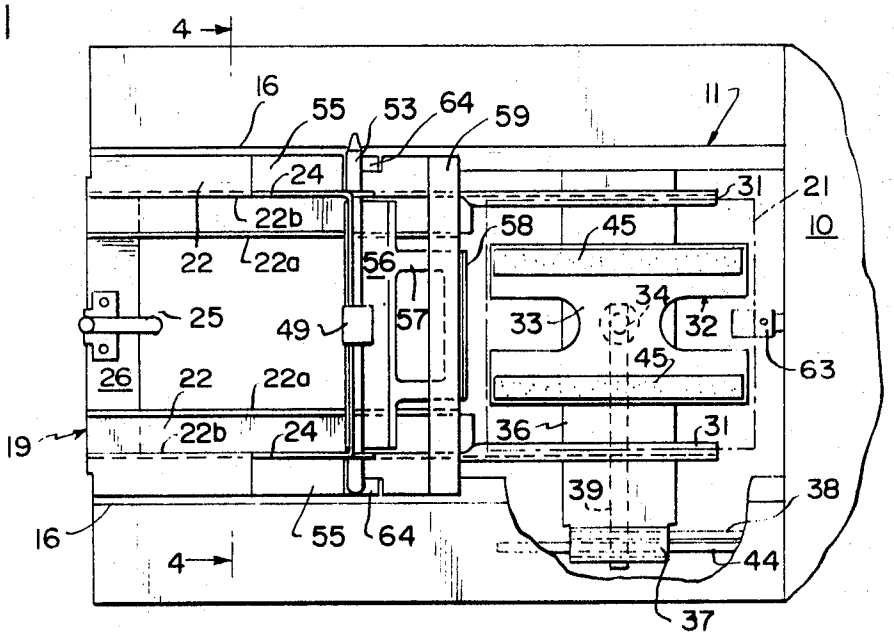
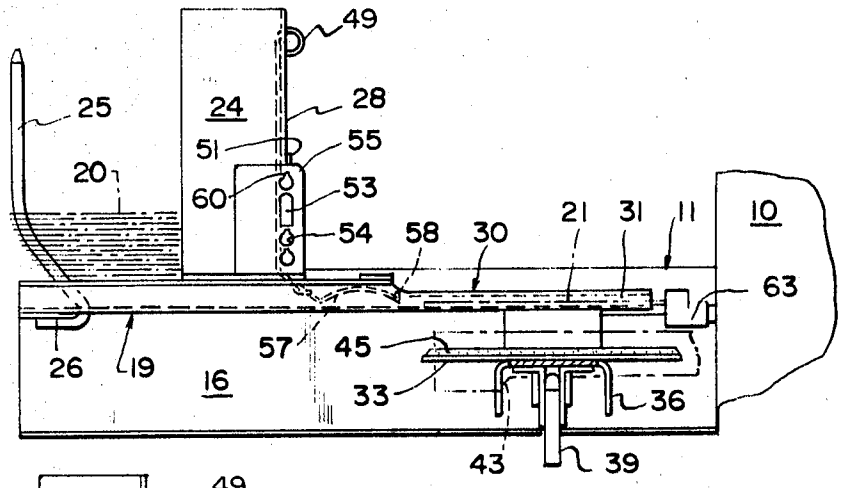


FIG. 2



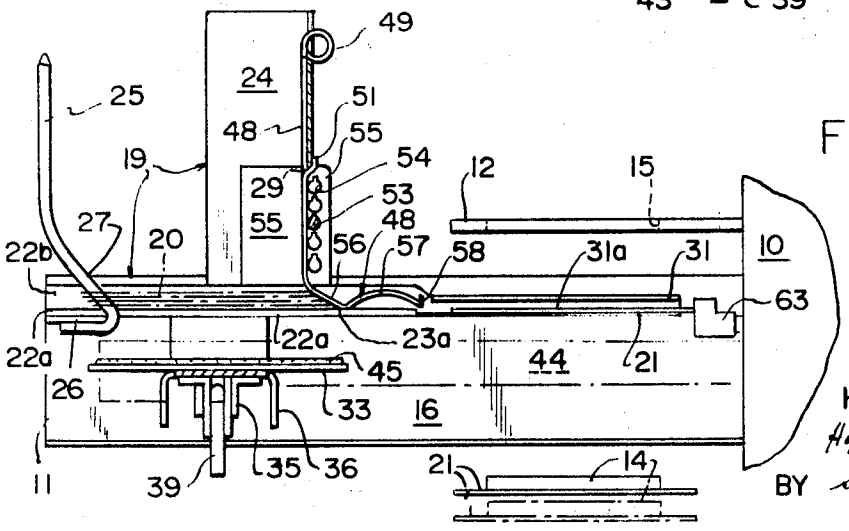


FIG. 3

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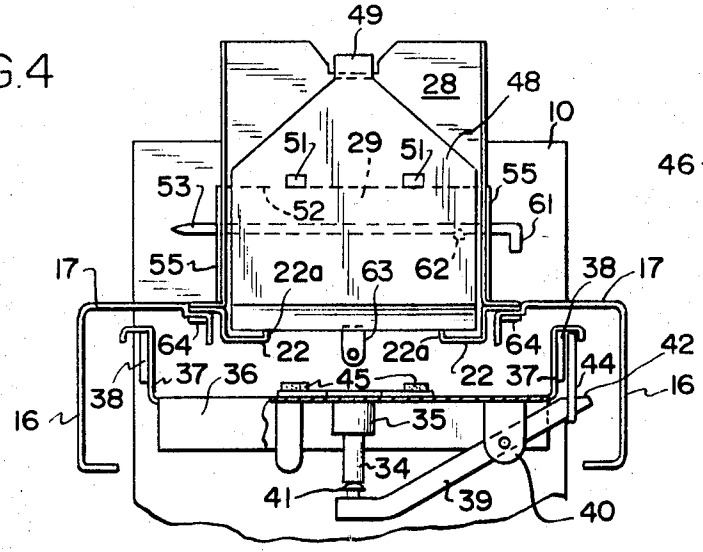
FIG.4



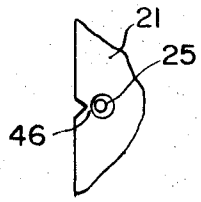


FIG.10

FIG.5

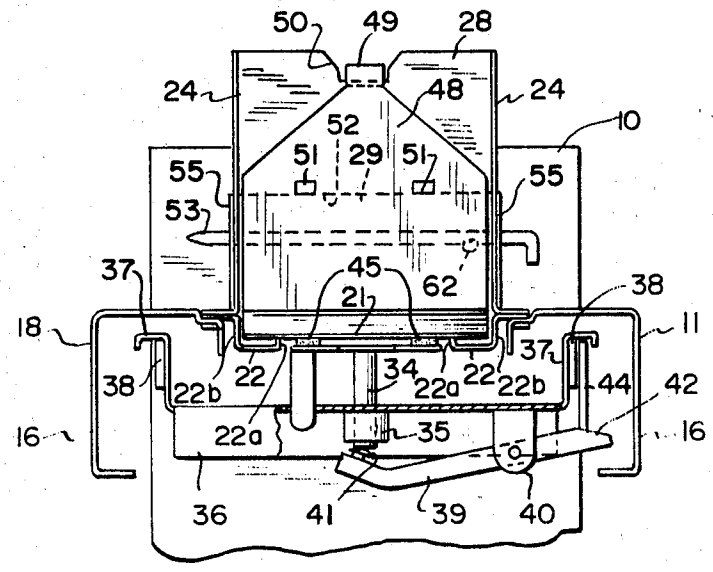


FIG.6

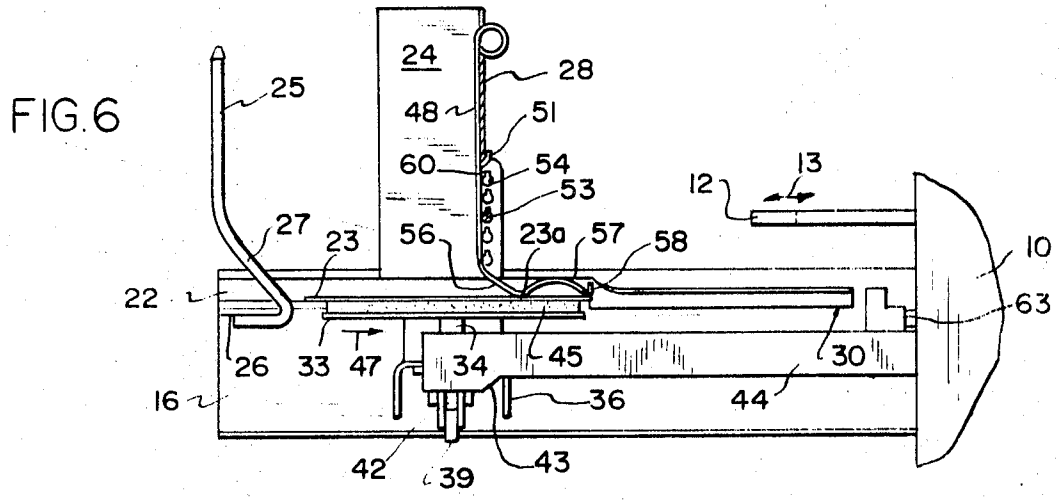


FIG.8

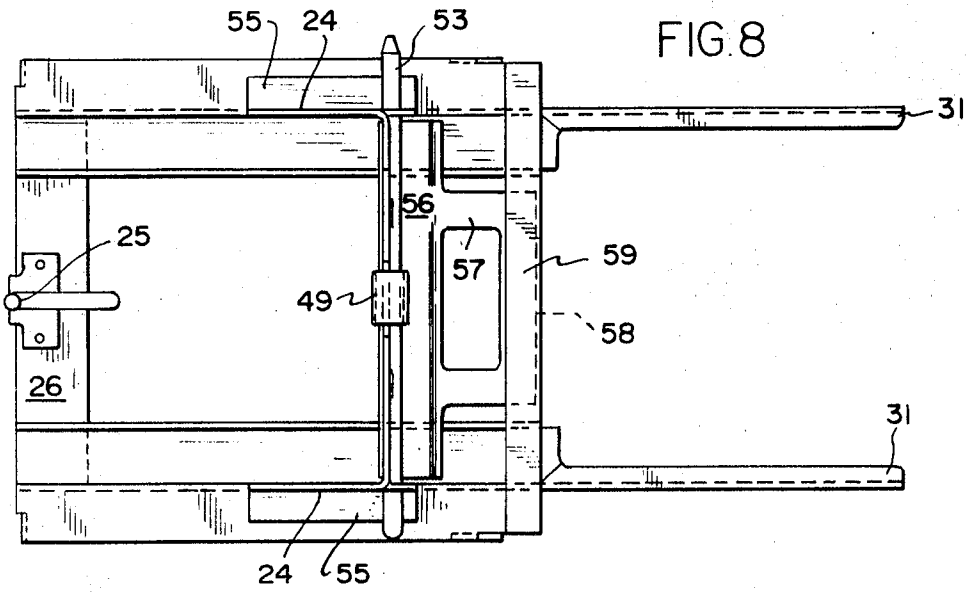


FIG.7

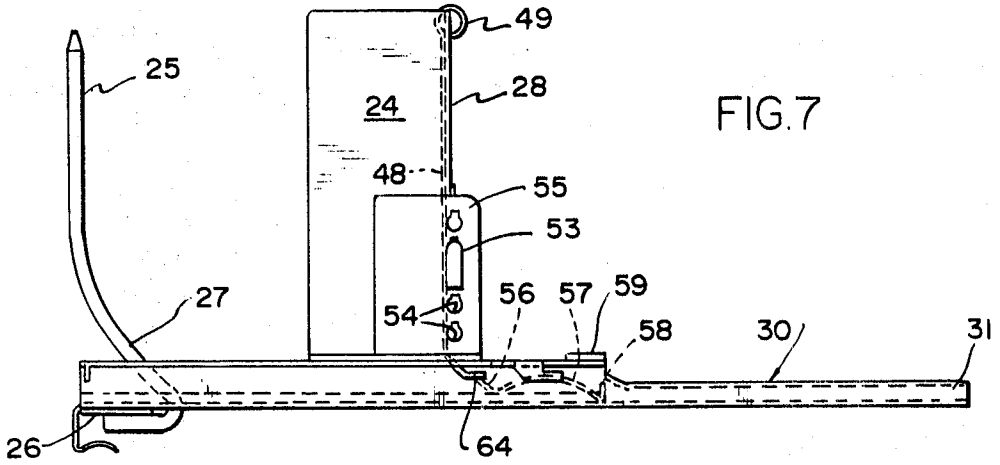
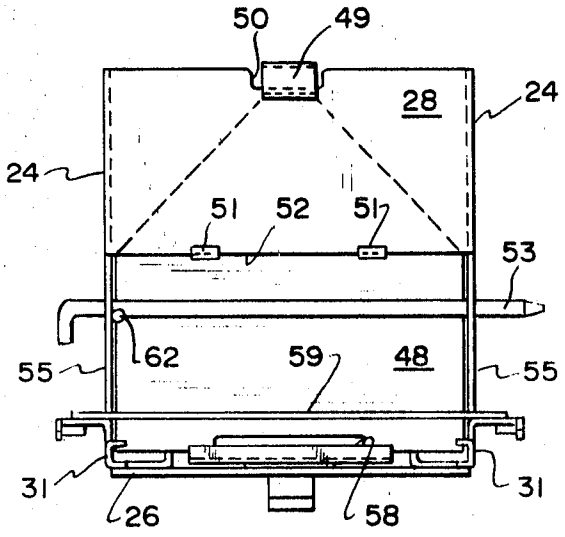


FIG.9



SEPARATOR SHEET FEEDER

The sheet applying apparatus of this invention is particularly adapted for supplying sheets to individual shaped or molded articles particularly adhesive articles such as food products of the nature of portions of ground or chopped meat, fish and the like so that the separator sheets will keep adjacent portions from adhering together. In the apparatus of this invention the separator sheets are arranged in a stack to be applied in series to the successive shaped articles. Sheet-feeding devices of this general type are disclosed in prior U.S. Pat. No. 3,126,683 issued Mar. 31, 1964, No. 3,388,529 issued June 18, 1968 No. 3,417,425 issued Dec. 24, 1968 and 3,526 issued Sept. 8, 1970. All of these are assigned to the same assignee as the present application.

In all of these sheet devices the end sheets of a supply of sheets are removed in series. In one embodiment the sheets are in a stack and are removed from the bottom of the stack. A conveyor is provided engaging this bottommost sheet and withdrawing it from the bottom of the stack and then transporting the sheet to a sheet-retaining frame where it is in position to be engaged by a molded article from the mold. In this invention there is provided a spring pressure device for pressing a forward edge portion of an end or bottom sheet onto the conveyor so that the conveyor can exert a firm grip on the bottom of the stack. This is accomplished in a manner described in more detail hereinafter.

In addition, the structure of this invention provides simple means for varying the magnitude of the spring pressure which in the disclosed embodiment comprises a movable fulcrum for a spring plate that results in greater pressure the closer the fulcrum is moved to the path of travel of the conveyor.

The invention will be described as related to the illustrated embodiment disclosed in the accompanying drawings. Of the drawings:

FIG. 1 is a plan view partially broken away of one end of a patty molding apparatus showing an embodiment of the separator sheet applying apparatus.

FIG. 2 is a side elevational view partially in section through the apparatus of FIG. 1.

FIG. 3 is a side elevational view with portions of the apparatus in section and other portions omitted for clarity of illustration.

FIG. 4 is a sectional view partially broken away taken along line 4–4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4 but showing the sheet engaging member or platform in raised position beneath the stack and engaging a bottom sheet on the stack.

FIG. 6 is a side view taken from the right-hand side of FIG. 5 and partially broken away and partially in section for clarity of illustration.

FIG. 7 is a side elevational view of the removable sheet stack holder of the apparatus.

FIG. 8 is a plan view of the holder.

FIG. 9 is a front elevational view of the holder.

FIG. 10 is a fragmentary plan view of a separator sheet of the type used in the apparatus of this invention.

In the separator sheet feeder there is provided a support structure 11 extending forwardly from the end part 10 of the machine to an area considerably beyond the extended portion of the mold plate 12 as shown in FIG. 3. In the molding device the mold plate 12 is reciprocated back and forth, as indicated by the arrow 13 in FIG. 6 to a position within the patty molding apparatus and then to a fully extended position as shown in FIG. 3 where the patty 14 is removed from the mold opening 15 by a knockout means not illustrated herein but shown clearly in the above-mentioned U.S. Pat. No. 3,417,425.

The support structure 11 comprises a pair of spaced parallel support strips 16 each of sheet metal shaped to a channel structure so as to have coplanar top surfaces 17 and sides 18. At the extreme forward end of the support structure 11 there is located a stack means or retainer 19 for retaining a supply, here shown as a stack 20, of separator sheets one of which is illustrated in the partial plan view of FIG. 10. These sheets 21 are positioned on spaced side sheet supports 22 (of channel shape as shown in FIGS. 4 and 5) that form a part of the stack means so that the stack is held on the inner turned up edges 22*a* FIGS. 4 and 5) and between the channel sides 22*b* (FIG. 5) where the bottom surface of the bottom end sheet 23 (FIG. 6) is exposed. This stack of sheets is retained against substantial lateral movement by the channel sides 22*b* and side parallel guide plates 24 aligned therewith (FIGS. 1 to 5). The stack 20 of sheets is also retained in position by an upward extending pin 25 that is attached to an end crossbar 26 extending between the sheet supports 22. This pin 25 has a top portion that is generally vertical and a bottom forward projecting part 27 that is angled downwardly and rearwardly toward the molding apparatus 10. The stack means retainer 19 also includes a crossmember or plate 28 extending between the tops of the side guide plates 24 to leave an opening 29 beneath this cross plate 28.

The sheet applying apparatus includes a sheet-retaining means 30 comprising a pair of parallel side frame members or channels 31 integral with the stack support channels 22 for retaining a sheet 21 from the stack 20 in position to engage an article such as the patty 14 from the mold opening 15 in the mold plate 12. These channels 31 have open sides 31*a* (FIG. 3) facing each other to receive the side edges of a separator sheet 21 and hold it in position to be picked up by the patty 14 when it falls from the mold opening 15 as illustrated in FIG. 3. The sheet 21 in the side support channels 31 spans the opening between these channels 31 and the patty 14 (when ejected from the mold opening 15) falls between these side channels 31.

In order to transfer a bottom sheet from the bottom of the stack 20 to the sheet-retaining means channels 31 there is provided a sheet conveyor 32 having a movable carrier in the form of a vertically reciprocable platform 33 which is positioned at the top of a vertical pin 34 that is movable in a bushing 35 mounted on the bottom of a cross strip 36. The opposite ends 37 of this cross strip 36 are attached to a pair of side horizontal bars 38 that are parts of the operating mechanism for reciprocating the mold plate 12. In the molding apparatus itself these parallel bars 38 (FIG. 1) comprise gear racks which are reciprocated in unison with the mold plate 12 as indicated by the arrow 13 of FIG. 6.

The vertical pin 34 on the bottom of the platform 33 is movable in the bushing 35 by a lever 39 fulcrumed at an intermediate point of the lever on a bracket 40 that extends downwardly from the bottom of the cross strip 36. This lever has a rounded button 41 bearing against the bottom exposed end of the movable pin 34. The other end of the lever 39 is shaped as indicated at 42 to be engaged by a sloped cam surface 43 on the forward end of a horizontal cam plate 44. Again, this cam plate 44 like the previously mentioned parallel side bars 38 are parts of the patty molding apparatus 10 all of which is described in more detail in the above U.S. Pat. No. 3,417,425.

The platform 33 used in transferring the sheets from the bottom of the stack 20 carries at its sheet engaging surface a pair of spaced parallel friction surface members in the form of strips 45 of high friction rubber or similar material.

The portion of the apparatus 10 that moves the mold plate 12 and the apparatus that forces material such as ground meat into the mold opening 15 includes the side bars 38 and elongated cam plate 44 as previously described. When the mold plate 12 is in its furthest extended position as shown in FIG. 3 the nearer side bar 38 is hidden behind the cam plate 44 (FIG. 4). Then the bars 38 are also extended so that the sheet transfer platform 33 is beneath the stack 20 (FIG. 3). Movement of the cam plate 44 to the right or from the position shown in FIG. 3 to the position shown in FIG. 6 causes the cam surface 43 to raise the platform and engage the bottommost sheet 23 on the stack 20. This "pinches" the forward end portion 23*a* of the bottom sheet between the bottom of angled spring plate part 56 and the platform 33 and distorts the bot-

tom of the spring plate 48 upwardly to apply a strong spring force to each successive sheet 23 (FIG. 6). (The stack is omitted from FIGS. 1 and 4—6 for clarity of illustration.)

Movement of the platform 33 to the right carries the "-pinched" sheet 23 with it and breaks the sheet away from the spindle 25 at the small tear portion 46 of the sheet (FIG. 10). In the position of FIG. 6 the platform 33 has begun its rearward movement and thus is in the act of moving the bottommost sheet 23 toward the sheet-retaining means 30 as indicated in this FIG. by the arrow 47.

When the platform has been moved to its furtherest rearward position, which is to the right of that shown in FIG. 6 and to the position of FIG. 1, the sheet 21 is positioned between the retainer channels 31 as illustrated in FIG. 3 and by broken lines in FIG. 1. The forward motion of the sheet is stopped by an adjustable stop member 63 engaged by the forward edge portions of the successive sheets. The cam plate 44 is again moved to the left by the operating apparatus within the mold device 10 so that the cam surface 43 no longer engages the lever 39 with the result that the platform 33 is lowered to the position shown in FIG. 2 which is directly beneath the sheet retainer 30.

The previously mentioned angled spring plate bottom part 56 is an integral part of a spring plate 48 mounted on the crossmember plate 28 that extends across the tops of the guide plates 24. This spring plate 48 is attached to the cross plate 28 by means of a top catch member portion 49 that is retained in a central top groove 50 at the top of the cross plate and a pair of spaced tongues 51 that are struck from the spring plate 48 and that engage the bottom edge of the cross plate 28.

The bottom of this spring plate 48 is exposed in the area beneath the bottom edge 52 of the cross plate 28 and bears forwardly against an adjustable fulcrum pin 53 which is releasably held in a pair of a plurality of horizontally aligned pairs of openings or holes 54 in side brackets 55. These side brackets 55 are mounted on the outer surfaces of the side guide plates 24 as shown in FIG. 2.

The bottom part 56 of the spring plate 48 is angled forwardly at approximately the same angle to the horizontal as the bottom portion 27 of the sheet retaining pin 25. This combination of bottom spring part and angled part serves to "-feather" the forward edges of the bottom sheets as illustrated in broken lines in FIG. 3. Thus the forward edge of each bottom sheet 23*a* as it is contacted by the friction sheet conveyor 32 is "pinched" at the forward edge portion between the conveyor and the angled spring part 56. This provides a firm grip on the bottom sheet to pull it from the pin 25 or from the bottom of the stack and hold it on the platform while it is moved into position as described in the sheet retainer 30.

The angled parts 56 and 27 of the spring and pin also prevent vertical lifting of the stack of sheets by the rising platform. Thus, they press the entire bottom portion of the stack of sheets firmly against the platform so that the sheets can be withdrawn one at a time.

The resistance to upward bending of the spring plate 48 and thus the spring force applied to the sheet pressing it against the platform is regulated by changing the position of the fulcrum pin 53 to the desired horizontal pair of aligned retaining holes 54. Thus, for heavier and more tear resistant sheets, the pin 53 will be moved downwardly to apply greater pressure. For more flimsy sheets it will be moved upwardly to reduce the pressure.

As the sheet conveyor 32 is moved rearwardly as described the sheet is retained thereon by an extension means 57 which is actually an extension of a bottom part 56 of the spring plate. The rearward motion of the sheet carried by the conveyor 32 is stopped by the stop member 63 and when so stopped the sheet is in proper position to be contacted and carried with the ejected patty 14 as illustrated in FIG. 3.

The forward end of the spring extension 57 is provided with a generally vertical flange 58. This flange operates as a stop portion adjacent the rear edge of the sheet when the sheet is in proper position in the side frame members 31 and prevents the sheet from bouncing back excessively away from the stop member 63. This is important because preferably the forward travel of the sheet conveyor 32 would take it slightly beyond the stop member 63 in order that every successive sheet will be placed in proper position for the successive descending patties. In general the distance between the flange 58 and the stop member 63 is slightly greater than the length of the separator sheet.

Extending across the rear of the sheet support channel 22 and attached to the top surface thereof is a cross strengthening bar 59 (FIG. 1).

As stated earlier, the cross fulcrum pin 53 may be aligned in the desired pair of horizontal openings or holes 54 which will move the pin closer to or further away from the spring plate part 56 which applies the spring force to the paper sheets as they are withdrawn by the platform from the bottom of the stack 20 as described. In order to retain the cross fulcrum pin 53 in the pair of holes to which it has been moved each hole 54 is provided with an upward extension 60. Then, the corresponding portion of the cross pin 53 is provided with a radial extension 62 as illustrated in FIG. 4. This means that when the right-angled end 61 of the fulcrum pin 53 is turned upwardly or opposite to the position of FIG. 4 the extension 62 passes freely through the upward extension in the nearest hole 54. However, when the handle 61 is turned downwardly the pin cannot be withdrawn.

The operation of the device has been explained in comments regarding the individual parts. However, to summarize, the operation is as follows. When a stack 20 of sheets is placed in the retainer with the pin 25 engaging the openings in the sheets at the tear portions 46 as shown in FIG. 10 the angled bottom portion 27 of the pin and the angled bottom part 56 of the spring plate 48 which are substantially the same angle "-feathers" the forward edge parts of the bottom sheets beneath the angled spring part 56. This means that the forward edge part of the bottommost sheet in each instance is beneath the spring part 56 so that it is pinched between this spring part and the rising sheet conveyor 32. The degree of pinch can be increased by lowering the cross fulcrum pin 53 for thicker and more tear resistant sheets and can be lessened for thinner sheets by raising the pin.

Then, when the sheet conveyor 32 is moved rearwardly, it carries the sheet with it because the upward motion of the conveyor has bent the angled spring plate 56 upwardly so that the pressure of the distorted spring holds the sheet on the conveyor. As the sheet is drawn rearwardly by the conveyor the spring extension 57 retains the sheet on the conveyor. Just short of the rearwardmost travel of the conveyor 32 the rear edge of the sheet on the conveyor contacts the stop member 63 while the conveyor travels a very short distance beyond. This properly positions the sheet in the side channels 31 to be picked up by the next descending patty 14. Because the action of the conveyor 32 is quite rapid there would be a tendency for the sheet to strike the stop member 63 and bounce back. This, however, is prevented by the flange 58 which is spaced from the stop member 63 a distance slightly greater than the length of the sheet. The size of the patty 14 is of course determined by the size of the mold plate opening 15 and the thickness of the mold plate. Therefore, whenever the patty size is changed it is necessary to change the mold plate 12 and this is customary practice. When this is done it is also necessary to change the size of the separator sheets 21 and therefore necessary to change the sheet retainer 19. This can be done very easily by merely substituting another proper size retainer which is shown in its entirety in FIGS. 7—9. In actual practice the changing of the retainer is very rapid as it is held on the machine by spring side clips 64.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified.

I claim:

1. Apparatus for applying a separator sheet to each of a series of molded articles ejected in a path from a molding device, comprising: a retainer beside said path for retaining a supply of said sheets with an end sheet of said supply exposed; sheet projecting means for projecting an edge portion of said end sheet toward said path; a conveyor for engaging said end sheet and movable into said path to withdraw said sheet from said supply and move the sheet into the path; and yieldable pressure means engageable with the other side of said sheet that is opposite said conveyor for pressing said edge portion of said end sheet against said conveyor to aid in withdrawing said end sheet from said supply by said movement of said conveyor, said sheet projecting means comprising a projecting part of said pressure means and a projecting part of said retainer.

2. The apparatus of claim 1, wherein there are provided means for moving said conveyor upwardly from beneath said supply into engagement with one side of said end sheet, and said yieldable pressure means is positioned to bear against the other side of said end sheet.

3. The apparatus of claim 2, wherein said pressure means bears against said supply adjacent to said edge portion of the end sheet to resist upward movement of said supply including said end sheet by the force exerted by said upward moving of the conveyor.

4. The apparatus of claim 1, wherein said projecting parts of said pressure means and said retainer are spaced from each other with said supply of sheets therebetween.

5. The apparatus of claim 1, wherein said sheets are arranged in a stack, said end sheet is a bottom sheet and said pressure means comprises a spring plate having a bottom part angled to provide said projecting part against which the edge portions of the bottom sheets in said stack bear.

6. The apparatus of claim 5, wherein said retainer comprises a pin engaging tear openings in the edges of said sheets that are opposite said edge portions, said projecting parts of said pin and spring plate being substantially parallel and between which said stack is positioned.

7. The apparatus of claim 5, wherein said retainer comprises side guide plates for preventing lateral displacement of said edge portions, and there are provided a crossmember between said plates above said bottom sheets and beneath which said edge portions of said sheets project, and means mounting said spring plate on said crossmember with said spring plate bottom part therebeneath.

8. The apparatus of claim 7, wherein said mounting means comprises a catch member fixing the end of said spring plate that is opposite said angled bottom part and a fulcrum member mounted on said retainer and engaging said spring plate in an area intermediate said end and said angled bottom part.

9. The apparatus of claim 8, wherein said fulcrum member comprises a cross fulcrum pin releasably held in a selected pair of a plurality of pairs of pin openings in side brackets on said retainer, the position of said pin thereby providing a corresponding resistance to distortion of said spring plate by said movement of the conveyor.

10. The apparatus of claim 1, wherein there are provided side frame members on opposite sides of said path for holding a sheet that has been moved into said path by said conveyor, an extension means on the side of said pressure means adjacent said frame members for aid in retaining said sheet on said conveyor and a stop member contacted by said sheet edge portion for limiting the extent of movement of said sheet into said path, said sheet thereby being contacted by a said ejected article.

11. The apparatus of claim 10, wherein said extension means is provided with a stop portion aligned with and adjacent the edge of a said sheet in said frame members.

12. The apparatus of claim 5, wherein said retainer comprises a pin engaging tear openings in the edges of said sheets that are opposite said edge portions, said projecting parts of said pin and spring plate being substantially parallel and between which said stack is positioned, and there are provided side guide plates for preventing lateral displacement of said edge portions, a crossmember between said plates above said bottom sheets and beneath which said edge portions of said sheets project, and means mounting said spring plate on said crossmember with said spring plate bottom part therebeneath.

13. The apparatus of claim 12, wherein there are provided side frame members on opposite sides of said path for holding a sheet that has been moved into said path by said conveyor, a stop member contacted by said sheet edge portion for limiting the extent of movement of said sheet, said sheet thereby being contacted by a said ejected article, an extension means on the side of said pressure means adjacent said frame members for aid in retaining said sheet on said conveyor, and a stop portion on said extension means adjacent the edge of a said sheet when in said frame members.

14. Apparatus for applying a separator sheet to each of a series of molded articles ejected in a path from a molding device, comprising: a retainer beside said path for retaining a supply of said sheets with an end sheet of said supply exposed; sheet projecting means for projecting an edge portion of said end sheet toward said path; a conveyor for engaging said end sheet and movable into said path to withdraw said sheet from said supply and move the sheet into the path; sheet-supporting frame members at the sides of said path for supporting said sheet in the path; and yieldable spring pressure means for pressing said edge portion of said end sheet against said conveyor to aid in withdrawing said end sheet from said supply by said movement of the conveyor and in retaining said end sheet on the conveyor during the entire extent of said movement.

15. The apparatus of claim 14, wherein said spring pressure means extends from said retainer and the supply of sheets therein to just short of said sheet-supporting frame members.

16. The apparatus of claim 14, wherein there is provided a stop portion on said pressure means opposite and aligned with the adjacent edge of a said sheet held by said frame members.

17. The apparatus of claim 16, wherein said spring pressure means extends from said retainer and the supply of sheets therein to just short of said sheet-supporting frame members.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,589,711 Dated June 29, 1971

Inventor(s) Harry H. Holly

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 13, "3,526" should read -- 3,526,924 --.

Signed and sealed this 2nd day of May 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334