

Aug. 10, 1948.

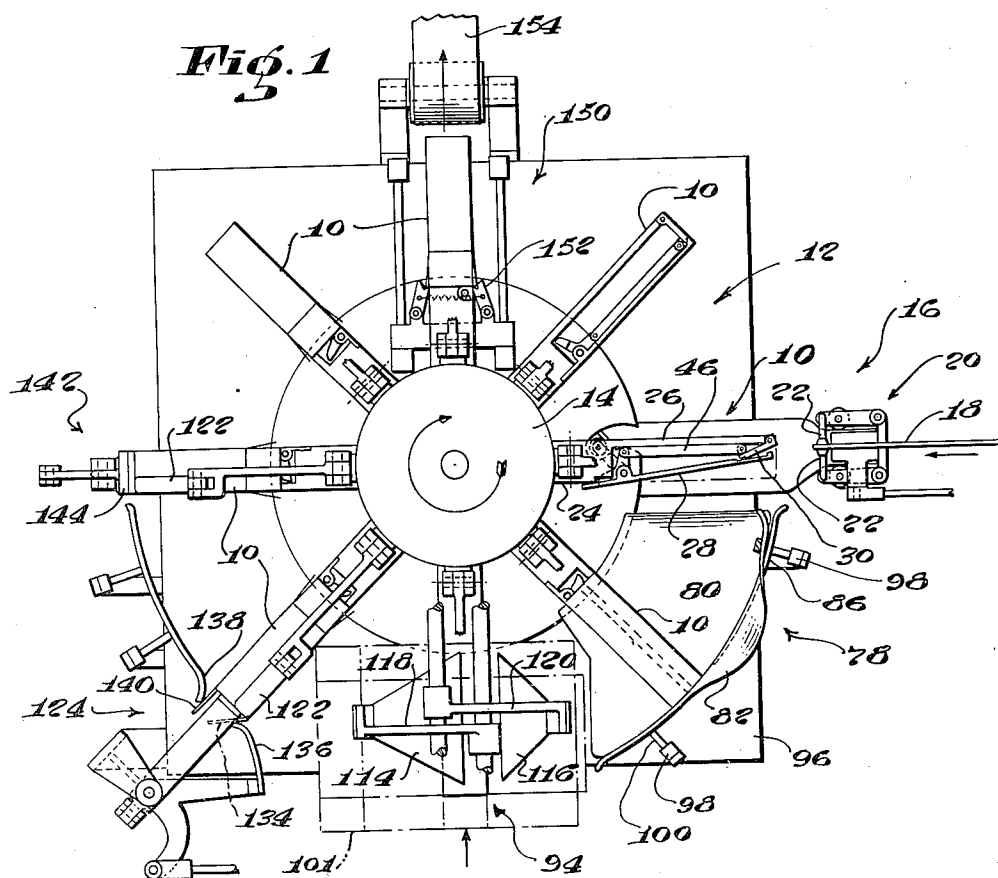
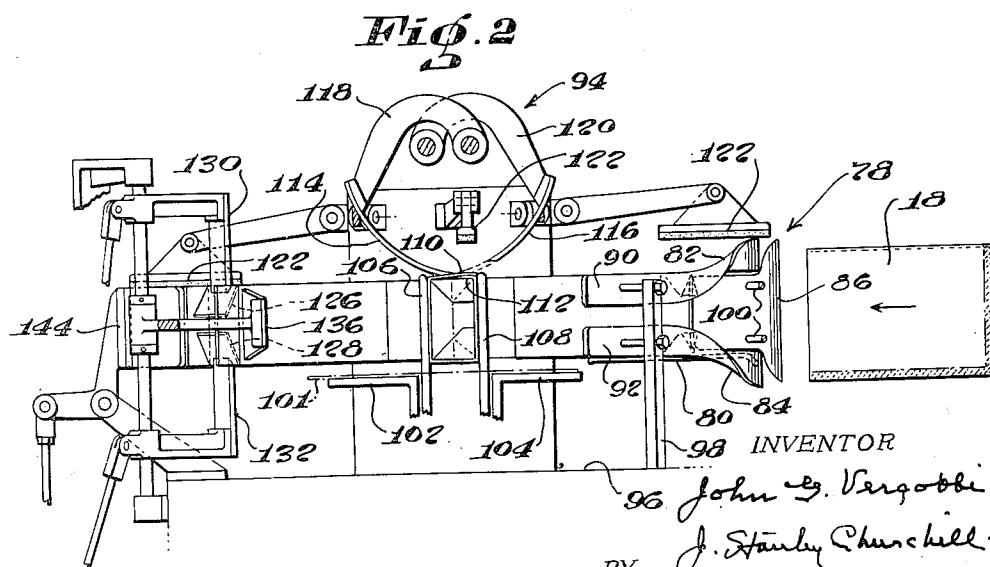
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2,446,798

CONTAINER FORMING MACHINE

Filed Sept. 30, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3

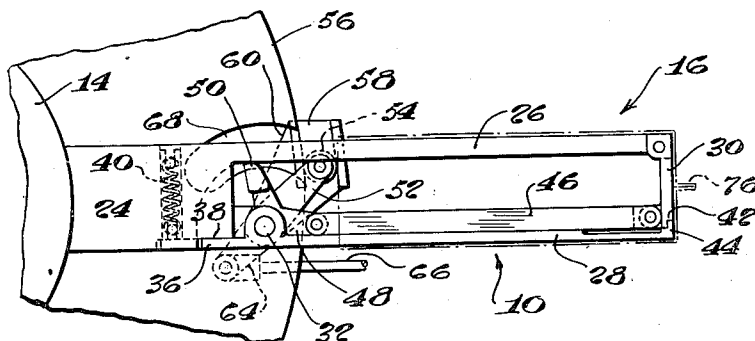


FIG. 4

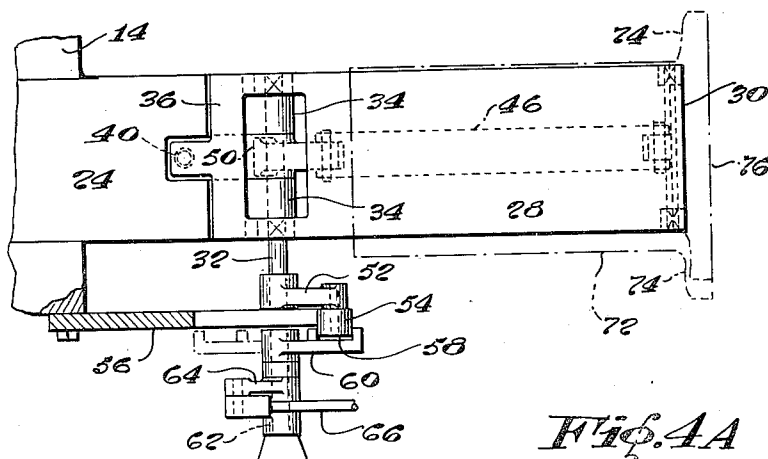


FIG. 5

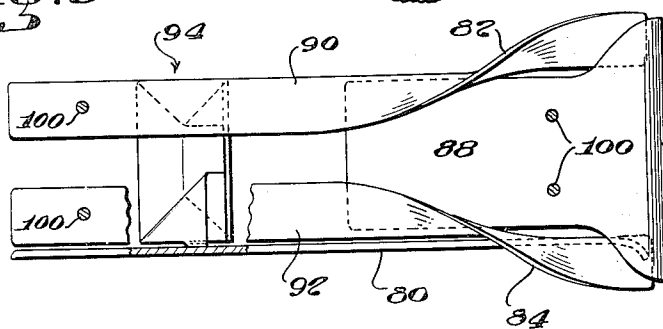


FIG. 4A

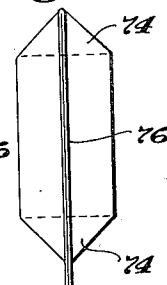


FIG. 6

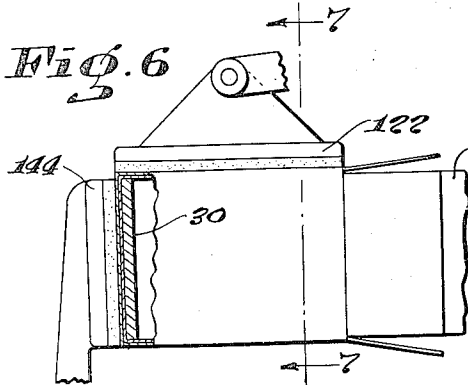
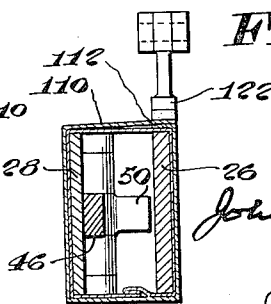


FIG. 7



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CONTAINER FORMING MACHINE

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5 Claims. (Cl. 93—59)

1

This invention relates to a container forming machine.

The invention has for one of its objects to provide a novel and improved container forming machine having provision for shaping a flat bag into rectangular form to provide a bag suitable for use as an individual container or which may be used with advantage as the inner bag or liner for a carton.

A further object of the invention is to provide a novel and improved container forming machine provided with an expansible mandrel or forming block upon which a flat bag may be shaped into rectangular form and in which provision is made for thereafter forming a carton about the bag while supported on the mandrel to form a lined carton.

With these general objects in view and such others as may hereinafter appear, the invention consists in the container forming machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a plan view of a container forming machine embodying the present invention; Fig. 2 is a side elevation of the machine shown in Fig. 1; Fig. 3 is an enlarged plan view detail of an expansible mandrel or forming block shown in its expanded condition; Fig. 4 is a side elevation of the mandrel shown in Fig. 3; Fig. 4A is an end view of a container as it appears upon expansion of the mandrel; Fig. 5 is an enlarged detail view of stationary folding rails through which the bag passes to be folded against the mandrel; Fig. 6 is a detail view in side elevation and partly in cross section showing presser members in engagement with the bottom flaps and side seam of a carton formed about the liner supported upon the mandrel; and Fig. 7 is a cross sectional view taken on the line 7—7 of Fig. 6.

In general, the present invention contemplates a novel and improved container forming machine of general utility but which is particularly adapted for use in the production of a container which may be efficiently sealed to provide an air and moisture proof container suitable for use in the packaging of dehydrated foods. The present machine is particularly designed to handle flat bags preferably made from a moisture resisting material and which have been provided with face to face seams along the side and bottom thereof to form a flat open mouth bag entirely free of

2

overlapping seams so as to enable the bag to be efficiently sealed. Provision is made for shaping the flat bag into rectangular form to provide a bag suitable for use as an individual container or which may be used to advantage as the inner bag or liner for a carton. To this end the present machine is provided with a novel expansible mandrel upon which a flat bag may be drawn while the mandrel is in its collapsed condition and which may thereafter be expanded to extend the flat bag into rectangular shape whereupon a carton blank may be wrapped about the liner on the mandrel to form a lined carton.

The present invention is herein shown as embodied in a container forming machine of the type having an intermittently movable horizontally disposed forming block or mandrel about which the blanks of the container forming material are wrapped to produce the container and except as to such details as are hereinafter pointed out, the illustrated container forming machine may comprise any of the usual forms of such apparatus now upon the market. Reference is made to the United States Patent to Hesser, No. 1,020,821, dated March 19, 1912, for the details of construction and the mode of operation of such prior art container forming machine.

In the operation of such prior container forming machines, a blank of the material is wrapped about a forming block at one station of operation and adhesively or otherwise sealed along a longitudinal overlapping side seam to produce a tubular container having one end extending beyond the end of the block. Thereupon, the forming block is moved to another station of operation where the extended portions are folded over in overlapping relation and adhesively secured to form the bottom of the container. Thereafter, a carton is formed about the container, and the end is closed in a similar manner before the removal of the lined carton from the block. Thus, in the commercial form of such prior container forming machines the inner bag or liner is provided with overlapping seams and this type of seal and end closure has been difficult to seal to produce a substantially air-tight or hermetically sealed container.

Referring now to the drawings which illustrate the preferred embodiment of the invention, only a sufficient portion of the container forming machine has been herein illustrated and will be hereinafter described as will enable the present invention to be understood. As herein shown, the numeral 10 represents generally the expansible mandrels which are herein illustrated as

embodied in a container forming machine 12 having an intermittently rotatable spider 14 from which the mandrels 10 extend radially for presentation to successive stations for forming the container upon the mandrel.

As illustrated in Fig. 1, a mandrel 10 is shown in its collapsed condition at the bag receiving station 16 in readiness to receive a flat bag 18 which may be drawn over the end of the mandrel either manually or by any usual or preferred bag opening and transferring mechanism which as herein shown may comprise a reciprocable unit indicated generally at 20. The reciprocal bag applying unit 20 includes a pair of opposed suction nozzles 22 arranged to engage the sides of the bag and arranged to be spread apart to open the mouth of the bag sufficiently to be applied to the mandrel. The unit 20 is then carried forward to draw the bag over the mandrel whereupon the suction nozzles release their hold upon the sides of the bag and the unit is returned to its initial position. The mandrel is then expanded into rectangular form, as illustrated in Fig. 3 to extend the flat bag into rectangular form.

As best shown in Figs. 3 and 4, each mandrel 10 comprises an elongated generally rectangular and horizontally extended block having a solid base or inner end portion 24 for attachment to the rotary disc 14 and having its forward or extended end open on two sides. The extended portion of the block comprises a relatively fixed side plate 26 which may and preferably will be formed integrally with the base portion and collapsible portions, including an opposing side plate 28 and an end plate 30. As herein shown, the side plate 28 is pivotally mounted on a shaft 32 journaled in bearing members 34 extending from the base 24 and the side plate is provided with an extended portion 36 arranged to bear against a depressed or undercut surface 38 of the base, a spring 40 extending within the base portion being arranged to urge the extension 36 against the surface 38 in order to hold the side plate 28 in parallel alignment with the opposing side plate 26 when the block is in its expanded condition.

The end plate 30, as herein illustrated, is pivotally mounted at the outer end of the fixed side plate 26 and is provided at its free end with a grooved portion 42 arranged to receive a tongue 44 projecting from the free end of the side plate 28 when the block is in its expanded condition, as shown in Fig. 3, whereby to join the free ends of the collapsible plates at right angles. Provision is made for rocking the collapsible plates 28 and 30 inwardly at the bag receiving station to permit a flat bag to be drawn thereon, and, as shown in Figs. 3 and 4, the end plate 30 is connected to a toggle linkage comprising a link 46 and one arm 48 of a bell crank, the latter being fast upon the shaft 32. With the toggle extended as shown in Fig. 3 the end plate 30 is firmly held in its expanded condition so as to enable a relatively great pressure to be applied against the end of the block in the formation of the carton. However, when the shaft 32 is rotated counterclockwise, as viewed in Fig. 3, the end plate is rocked inwardly, as shown in Fig. 1. At the same time, a second arm 50 of the bell crank is arranged to engage the extended portion 36 of the side plate 28 to effect pivotal movement of the plate inwardly, as shown in Fig. 1, against the action of the spring 40.

As herein shown, in order to rock the shaft 32 to effect rocking of the collapsible members 28, 75

30 at the bag receiving station 16, the lower end of the shaft 32 is provided with an arm 52 fast thereon which carries a roller 54 engageable with a stationary cam disc 56 for maintaining the toggle in its extended position during the movement of the block through the various stations. However, when the block arrives at the bag receiving station the roller 54 is guided into an arcuate cam portion 58 provided on the end of an arm 60 fast on a vertical shaft 62 supported immediately below and in vertical alignment with the block shaft 32. As shown in Fig. 3, the arcuate cam portion 58 is maintained concentric with the cam disc 56 in one position of operation and is arranged to be rocked counterclockwise to effect rocking of the shaft 32 through connections including an arm 54 connected by a link 66 to a cam, not shown. The cam disc 56 is provided with an arcuate cut-out portion 68 to provide clearance for the roller 54 in its counterclockwise movement, as illustrated.

From the description thus far it will be observed that in the operation of the machine, when the mandrel is brought into bag receiving position, the mandrel is automatically collapsed and a bag is applied over the mandrel by the bag opening and transferring unit, as above described. Thereafter, the mandrel is expanded to extend the bag into rectangular form, the extended bag as shown in Figs. 3, 4 and 4A having a projecting side seam 72, extended triangular tabs 74, and a projecting bottom seam 76. In order to fold the projecting and extending portions of the bag down flat against the mandrel a stationary rail unit is preferably provided, as indicated generally at 78, and which comprises a bottom rail 80 for folding down the projecting side seam 72, upper and lower curved rails 82, 84 and a co-operating side rail 86 arranged to fold down the projecting bottom seam 76 and the extended triangular tabs. In the operation of the machine the upper and lower triangular tabs 74 are received between the rails 82, 84 and side rail 86 and as the mandrel is moved past the same the curved portions of the rails 82, 84 operate to fold the tabs down over the edges of the narrower portion 88 of the side rail 86 to be thereafter pressed flat against the end plate of the mandrel by the vertical portions 90, 92 of the rails 82, 84 so as to present the end of the bag folded on the mandrel as shown in Fig. 5 at the carton forming station 94. As shown in Fig. 1, the folding rails may be supported from the platen 96 of the machine by standards 98 in which pins 100 extending from the rails are adjustably supported.

The mechanism for wrapping the carton blank 101 about the bag supported upon the mandrel may comprise any of the well-known mechanisms embodied in the container forming machines now upon the market, and, as best shown in Fig. 2, may include a folding table upon which the carton blank is placed. The blank is supported upon stationary members 102, 104 and over side folding members 106, 108. Upon upward movement of the side folding members 106, 108 the blank is wrapped about the sides of the mandrel and then the extended portions 110, 112 may be folded down upon the top of the mandrel by any of the well-known instrumentalities for this purpose such as the curved folding plates 114, 116 mounted upon rocker arms 118, 120 respectively. A presser foot 122 is then lowered upon the overlapping portions of the tubular carton thus formed, the presser thus applied operating to set the adhesive, previously applied to the overlapping portions, whereby

5

to produce a firm seal. It will be observed that in the present mandrel, see Fig. 7, the overlapping portions of the carton occur at the upper edge of the fixed side plate 26 which is formed integrally with the block so that substantial pressure may be applied against the block to set the longitudinal side seam of the carton.

After the above described operations have been performed, the side folding members 106, 108 are returned to their initial position whereupon the mandrel is moved to the next station of operation, indicated generally at 124, at which station the extended bottom flaps of the carton, which have previously been supplied with adhesive, are folded down against the bottom of the block. As diagrammatically illustrated in Figs. 1 and 2, the end flaps 126, 128 are first folded in by vertically reciprocating folders 130, 132 and then one of the side flaps 134 is folded in by a curved folding plate 136, it being understood that these folders may be actuated by any usual or preferred operating means forming a part of a known commercial container forming machine.

Thereupon, the mandrel is moved into engagement with a stationary rail 138 which operates to fold down the remaining side flap 140 of the carton as it passes thereby. The mandrel is then brought to rest at an end presser station 142 which, as herein shown, comprises a presser member 144 arranged to be pressed into and out of engagement with the end of the mandrel to firmly set the adhesively sealed end flaps of the carton, as shown in detail in Fig. 6.

It will be observed that the construction of the present expansible mandrel is such that a rigid end wall is presented to the presser station whereby substantial pressure may be applied, one end of the plate 30 being supported by the fixed side plate 26 and the free end of the plate 30 being held in its expanded position by the toggle mechanism above described, the adjacent end of the block comprising the end of the movable side plate 28 firmly held in position by the tongued and grooved portions, as illustrated.

The intermittently movable mandrel is then moved to a discharge station 150 where the lined carton is withdrawn from the mandrel by reciprocating stripper mechanism indicated diagrammatically at 152 which operates to transfer the lined carton to a discharge belt 154 to be delivered from the machine.

To recapitulate in the operation of the present machine, provision is made for collapsing the mandrel at a bag receiving station to receive a flat open mouth bag preferably provided with face to face seams as above described and for thereafter expanding the mandrel to extend the bag into rectangular form. The intermittently movable mandrel is then moved past stationary rails which operate to fold down the projecting and extended portions of the bag against the mandrel, whereupon the latter is brought to rest at a carton forming station at which a carton blank is wrapped about the bag supported on the mandrel. At this station a side seam presser is brought to bear against the longitudinal seam of the carton which has been previously provided with adhesive. The following station of operation effects folding of the extended carton flaps which have also been previously provided with adhesive to form the bottom of the carton. At the next station of operation an end presser is brought to bear against the folded bottom flaps with substantial pressure whereby to set the adhesive to form an efficiently sealed bottom closure. There-

6

after, the lined carton is stripped from the mandrel and discharged onto a conveyor and set in an upright position for delivery to a filling machine. The filler carton with its extended liner may then pass through top closing mechanism including means for providing an elongated face to face seal for the mouth of the liner whereby to provide a completely sealed inner bag or liner entirely free of overlapping seams and which may provide an efficient hermetically sealed container adapted for use in packaging dehydrated foods. Thereafter, the extended portions of the liner may be folded down and the top flaps of the carton folded and sealed in the usual manner to complete the container.

Thus it will be observed that the present container forming machine embodies an expansible mandrel capable of being collapsed to receive a flat bag and thereafter expanded to form a relatively rigid block or mandrel upon which the projecting portions of the bag may be folded and which is sufficiently rigid to be capable of withstanding a high pressure for setting the adhesively closed seams of the carton which has been wrapped about the bag and the mandrel.

From the above description it will also be observed that the present container forming machine is adapted to form a flat bag into rectangular shape in a simple and efficient manner and that the novel expansible mandrel embodied therein is adapted to be automatically collapsed and expanded and is also arranged as above set forth to present a substantially rigid surface against which substantial pressure may be applied in the production of a container in the machine.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a container forming machine, an expansible mandrel comprising a substantially rectangular block having a fixed side plate, an opposing pivotally mounted side plate, and a pivotally mounted end plate, said end plate forming a continuous end surface of the block, and means for rocking said pivotally mounted plates to collapse and expand said block including a toggle connected to said end plate, and means for yieldingly urging said pivotally mounted side plate into its expanded position parallel to said fixed side plate, and means associated with said toggle for rocking said pivotally mounted side plate inwardly when the toggle is contracted to collapse the block said toggle serving to lock the plates in their expanded position against substantial sealing pressure.

2. In a container forming machine, in combination, an intermittently movable mandrel adapted to be moved through successive operating stations, said mandrel being provided with one fixed side plate and with an opposed movable side plate and a movable end plate, said plates cooperating when in an expanded condition to form a rectangular shaped mandrel having a continuous end surface, operating means including an element movable relative to said mandrel for effecting movement of the end and movable side plates into an angular position with respect to the fixed side plate and each other when the mandrel is collapsed, and means for actuating said mandrel operating means to effect collapsing of the mandrel when the latter is moved into one station of

operation and for again expanding said mandrel prior to the movement of the mandrel to a second station of operation and means at said second station engaging said movable element of said operating means to prevent movement thereof to mandrel collapsing position.

3. In a container forming machine, in combination, an intermittently movable mandrel adapted to be moved into successive stations of operation, said mandrel comprising a rectangular block having a fixed side plate an opposed spaced and pivotally mounted side plate and a pivotally mounted end plate, said end plate cooperating with said side plates in the expanded position of said mandrel to provide a continuous end surface for the block, means for rocking said pivotally mounted end and side plates to collapse and expand said mandrel, said rocking means including a toggle locking the plates in expanded position and serving to transmit pressure from the end plate to the base, and means operating in timed relation to the intermittent movements of the mandrel for actuating the rocking means to effect the collapsing and subsequent expansion of the mandrel during the period that the mandrel remains at one operating station.

4. In a container forming machine, an expansible mandrel comprising a base portion, a fixed side plate integral with and projecting from the base portion, a movable side plate normally parallel to and spaced from the fixed side plate, means for movably mounting the movable side plate upon the base portion, an end plate pivoted to the free end of the fixed side plate and movable from a position substantially normal to said side plate to a collapsed position at an angle thereto, means for moving said end plate to either of said positions, said means including pressure transmitting means for transmitting pressure from the free end of said end plate directly to said base, said end plate when in said normal position, defining a continuous surface between said side plates.

5. In a container forming machine, an expansible mandrel comprising a base portion, a fixed side plate integral with and projecting from the base portion, a movable side plate normally parallel to and spaced from the fixed side plate, means for movably mounting the movable side plate upon the base portion, an end plate movably mounted on the fixed plate and having a movable end to engage said movable side plate when the mandrel is expanded to form a continuous end of the mandrel, and collapsible means connected to the base and to the end plate, said end plate, fixed side plate and collapsible means cooperating to transmit sealing pressures exerted against the end plate to the base portion, said end plate being mounted to be movable inwardly into angular position with respect to the fixed side plate when it is desired to collapse the mandrel, and operating means mounted between said side plates for effecting simultaneous movement of both the end and movable side plates into collapsed and expanded positions.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
131,841	Bibby et al.	Oct. 1, 1872
830,259	Stanley	Sept. 4, 1906
1,702,704	Phillips	Feb. 19, 1929
1,762,329	Ludington	June 10, 1930
2,162,263	Lindholm et al.	June 13, 1939
2,297,946	Doering	Oct. 6, 1942

FOREIGN PATENTS

Number	Country	Date
299,554	Germany	Aug. 4, 1917