

July 7, 1959

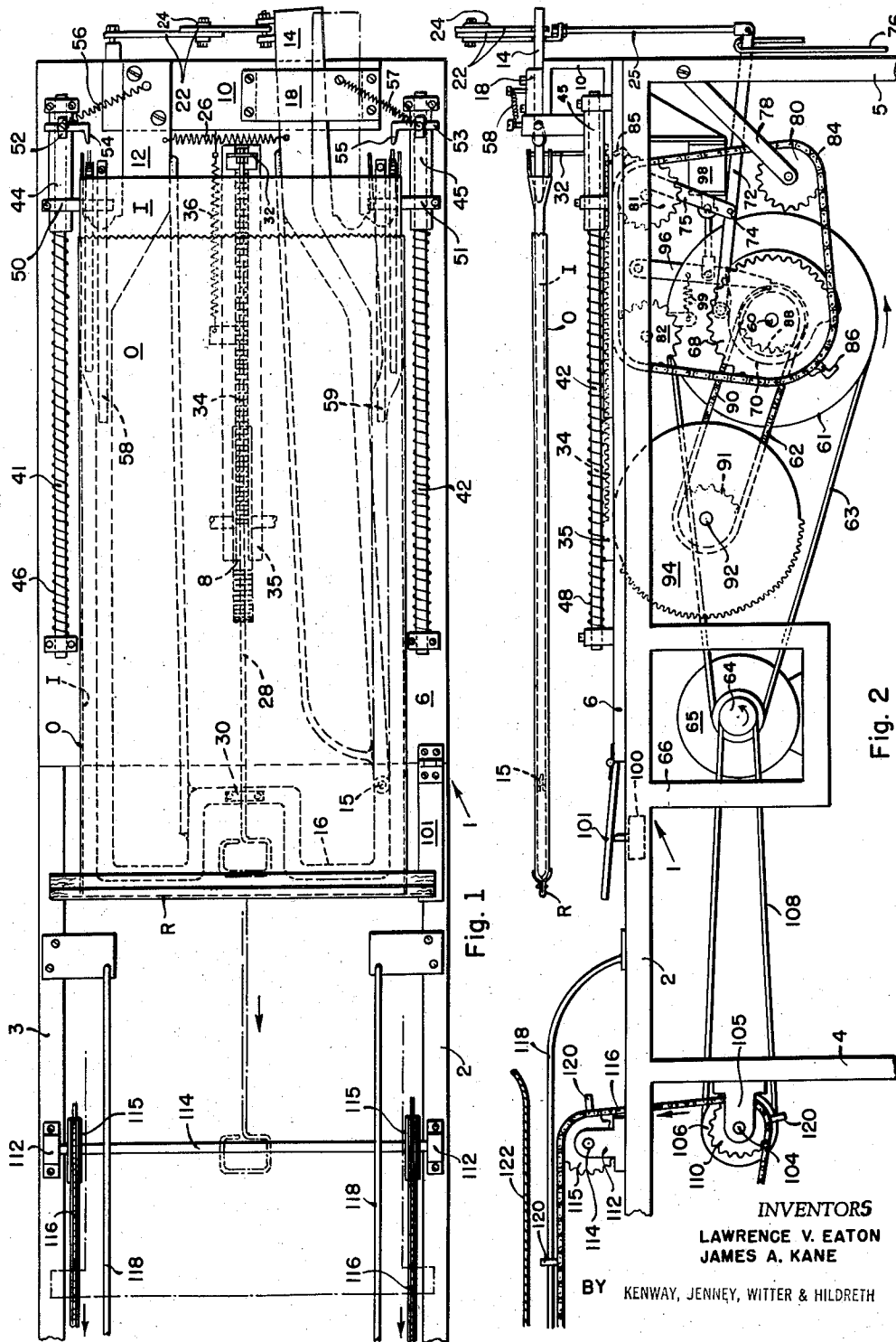
L. V. EATON ET AL

2,893,294

BAG LINING AND CUFFING MACHINE

Filed May 2, 1958

2 Sheets-Sheet 1



INVENTORS
 LAWRENCE V. EATON
 JAMES A. KANE

BY KENWAY, JENNEY, WITTER & HILDRETH

July 7, 1959

L. V. EATON ET AL
BAG LINING AND CUFFING MACHINE

2,893,294

Filed May 2, 1958

2 Sheets-Sheet 2

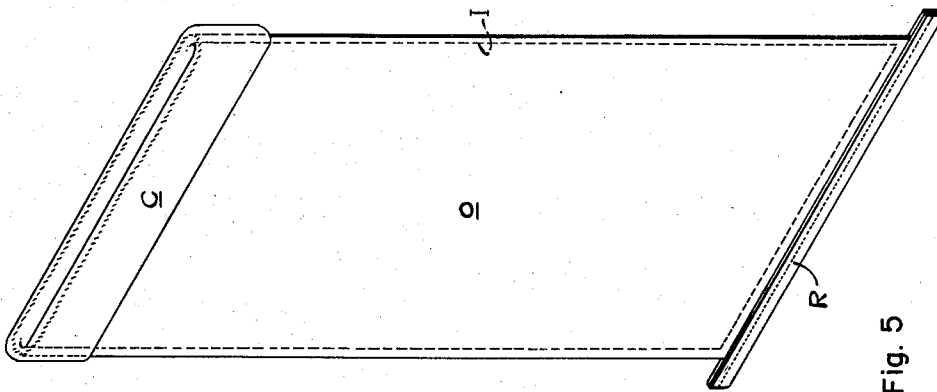


Fig. 5

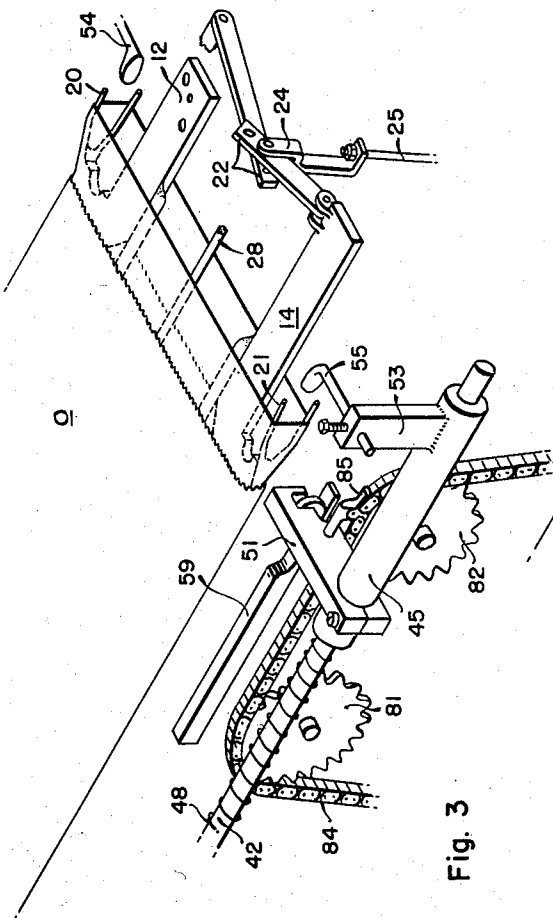


Fig. 3

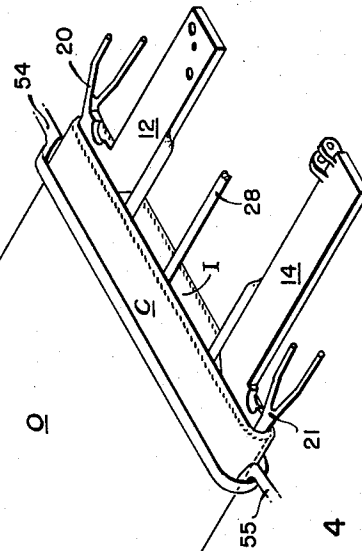


Fig. 4

INVENTORS
LAWRENCE V. EATON
JAMES A. KANE

BY KENWAY, JENNEY, WITTER & HILDRETH

1

2,893,294

BAG LINING AND CUFFING MACHINE

Lawrence V. Eaton, Waban, and James A. Kane, Arlington, Mass., assignors to Colony Foods Products, Inc., Medford, Mass., a corporation of Massachusetts

Application May 2, 1958, Serial No. 732,473

10 Claims. (Cl. 93—8)

In packaging various types of processed products to keep them from deterioration and protect them from injury during storage and transit it is the practice to line a shipping bag capable of withstanding severe handling with an impervious liner of a suitable plastic material, such as polyethylene, in the form of a bag which snugly fits within the outer or shipping bag. Vegetables, such as sliced peeled potatoes and the like, are illustrative of such products which are processed in one plant and subsequently shipped to hotels, restaurants or the like places. In order to prevent the liner or inner bag from crumpling or collapsing within the outer bag when being filled with the processed product it is made somewhat longer so that its marginal portion or its mouth or open end may be cuffed or folded over the mouth portion of the outer bag. This operation is usually performed by hand and is a time-consuming and tedious procedure usually requiring an experienced operator in order to avoid substantial wastage.

The principal objects of the present invention are to provide an efficient machine operative to produce a lined bag with the marginal portions of the mouth of the liner or inner bag cuffed or folded over that of the outer bag; to provide a machine for accomplishing this operation in the fraction of the time usually required by a skilled operator; and to provide a machine which permits a much lighter weight liner to be used than would otherwise be possible.

Further objects relate to various features of construction and will be apparent from a consideration of the following description and the accompanying drawings, wherein:

Fig. 1 is a top plan view of a machine constructed in accordance with the present invention;

Fig. 2 is a side elevation of a machine shown in Fig. 1;

Fig. 3 is a perspective view illustrating the manner in which the outer bag is fitted about the inner bag or liner preparatory to cuffing;

Fig. 4 shows a mouth portion of the inner bag cuffed over the mouth portion of the outer bag; and

Fig. 5 shows a completed bag.

In accordance with the present invention we provide a semi-automatic machine for lining an outer bag with an inner bag which is somewhat longer so that its projecting end may be cuffed or folded over the open end or mouth of the outer bag. The inner and outer bags, except for length, may be and preferably are substantially the same size, but the outer bag is preferably made of a heavy kraft, jute, burlap or other strong material, while the inner bag is made from a flexible, slightly stretchable sheet material, such as polyethylene or the like material, which is relatively impervious to fluids.

Our machine comprises a suitable base or stand on which is mounted spaced bag-stretching arms which are relatively movable toward and away from each other from a retracted position, wherein the inner bag and an outer bag may be slipped about them, to an extended position, wherein the nested inner and outer bags are

2

held in stretched fixed position with the open end or mouth portion of the inner bag projecting beyond that of the outer bag. Elongate guides are juxtaposed to the arms and mounted on these guides are laterally projecting cuffing fingers which are longitudinally movable and normally positioned to engage the inner end portions of the inner bag when they are moved inwardly. Preferably these cuffing fingers are rotatably supported so that they undergo a slight pivotal movement as they move longitudinally, which aids the cuffing operation.

Suitable driving means to effect sequentially the moving of the stretching arms to extended position, the longitudinal inward movement of the cuffing operation, and the release of the stretcher arms preparatory to removal of the cuffed outer bag which may be accomplished manually or automatically. Where automatic operation is desired, a longitudinally movable bag stripper may be mounted between the stretching arms so that it is enveloped by the nested bags with its inner ends engageable with the closed end of the inner bag and the drive means may act through suitable mechanism, such as a retractable rack, to move the stripper inwardly after the release of the stretching arms, thereby at least partly removing the cuffed bag from the arm. Thereafter grippers or the like conveyor means are brought into operation to remove the cuffed bag from the machine and drop it at a convenient place.

The mechanism herein shown for the purpose of illustration is designed to produce lined bags in which sliced peeled potatoes are stored and shipped to hotels, restaurants, etc. Such a container comprises an outer bag O which is made from a heavy creped kraft paper, the closed end of which is provided with a reinforcement R having its opposite ends projecting beyond the longitudinal edges of the outer bag. Within the outer bag is a liner or inner bag I which is of a light gauge polyethylene. Such bags are commercially available in a wide range of sizes.

The particular machine herein shown comprises a bench or stand 1 (Figs. 1 and 2) of conventional construction having longitudinal members 2 and 3 supported by legs 4 and 5. Secured to the longitudinal members 2 and 3 between the legs 4 and 5 is a platform 6 having a central longitudinally extending slot 8 (Fig. 1).

Mounted on the front of outer end of the platform 6 is a U-shaped, transversely extending bracket 10 (Figs. 1 and 2) and secured to one end of this bracket is the laterally offset end of a fixed arm 12 of a generally U-shaped frame member, shown by the broken lines of Fig. 1. The other arm 14 is pivoted at 15 to the closed end 16 of the frame member and its laterally offset outer end is held down on the bracket 10 by a yoke 18 which permits the arm to swing from retracted position, shown by the full lines of Fig. 1, to extended position, shown by the broken lines of Fig. 1 and the full lines of Figs. 3 and 4.

Outwardly of their offset portions the arms 12 and 14 carry forked members 20 and 21, the utility of which is hereinafter explained. The ends of the arms 12 and 14 are pivotally connected to toggle lines 22 which are connected by a clevis 24 to a pull rod 25. Inwardly of the bracket 10 a tension spring 26 (Fig. 1) connects the arms so as normally to hold them in retracted position. A downward pull on the rod 25 operates the toggle so as to swing the arm 14 to extended position and when the pull on the toggle is released the arm is returned to retracted position by the spring 26.

Between the arms 12 and 14 is a bag stripper 28 (Figs. 1, 3 and 4), the looped inner end of which is slidably supported by a bearing 30 (Fig. 1) fixed to the closed end 16 of the frame member. The outer or forward end of the stripper is slidably supported by a bushing

carried by an upstanding web 22 secured to one end of a rack 34 which is slidably mounted between ways or guides 35 on the platform 6, these guides being aligned with the slot 8. A retracting spring 36 (Fig. 1) connects a lug 38 (Fig. 1) carried by the rack with the bracket 10 so as to hold the rack and stripper in retracted position.

With the construction and arrangement thus far described an inner bag or liner I may be manually drawn about the arms and stripper and an outer bag O may likewise be drawn over the inner bag I, as shown in Figs. 1 to 3. Since the inner bag is somewhat longer than the outer bag its open end projects beyond that of the outer bag, as illustrated in Figs. 1 and 2, thus providing a "cuffing allowance." By pulling on the rod 25 the arm 14 is swung to extended position wherein it holds the nested bags in stretched, fixed position and when the pull on the rod 25 is released the arm 14 is returned to retracted position, wherein the grip on the nested bags is released so that the stripper 28 may be brought into operation.

Mounted on the platform 6 in spaced relation to the arms 12 and 14 (when the latter is extended) are guide rods 41 and 42 and at the forward ends of these rods are sleeves 44 and 45 which are both slidable and rotatable on the rods. Corresponding ends of compression springs 46 and 48 act on the inner support for the rods and the inner end of the sleeves to hold the latter in outermost position against the outer support, as shown in Figs. 1 and 2. The sleeves 44, 45 carry follower arms 50, 51 which project inwardly toward the stretcher arms and also upstanding lugs 52 and 53 to which are adjustably secured laterally extending cuffing fingers 54 and 55. Tension springs 56 and 57 (Fig. 1) connect the cuffing arms 52 and 53 with the arm 12 and yoke 18, respectively, and normally hold the cuffing arm in vertical position with the follow rolls on the dwell portions of cams 58 and 59 when the parts are retracted, as shown in Figs. 1 to 3.

The cams 58 and 59 are mounted on the platform 6 inwardly of the guide rods and their outer ends have dwell portions over which the rollers of follower arms 50, 51 ride. The construction and arrangement of parts are such that when the nested bags are held by the stretcher arms 12 and 14, as shown in Figs. 1 and 3, the cuffing fingers are spaced from but aligned with the edges of the inner bag between the prongs of the forks 20 and 21, and when the sleeves move inwardly the follower rolls contact the inclines of the cams at which point the cuffing fingers engage the inner bag and as the follower rolls ride up the inclines of the cams the sleeves and cuffing fingers are rotated outwardly through a slight angle, thereby drawing the material of the inner bag away from the forks to initiate the cuffing operation. Continued inward movement of the sleeves causes the cuffing fingers to roll or fold back the cuffing allowance C about the edge of the outer bag, thus completing the cuffing operation, at which point the fingers disengage the cuffed bag. Since these fingers are held tipped so long as the follower rolls ride on the throw or salient portions of the cams, they remain disengaged from the nested bags and hence do not interfere with the return movement of the sleeves under the influence of springs 46 and 48; and when the follower rolls ride down the cam inclines the springs 56 and 58 come into operation to restore the parts to their original position.

The sequential operations above described are effected by mechanisms best shown in Fig. 2, which comprise a main drive shaft 60 suitably journaled in bearings (not shown) carried by the stand 1. Rotatably mounted adjacent to one end of the shaft 60 is a sheave 61 connected through a conventional one-revolution clutch 62 to the shaft 60. The sheave 61 is connected by a V-belt 63 with one of the two sheaves 64 of a motor 65 which is mounted in a housing 66 secured to the stand 1. Keyed or otherwise secured to the shaft 60 are sprockets 68,

each positioned inwardly of a vertical plane tangent to the adjacent guide rod and between these sprockets and in approximate alignment with the pull rod is a plate cam 70. A follower lever 72 is pivotally supported at 74 to a depending arm 75 secured to the stand. The inner end of this arm carries a follower roll and its outer end is connected by a clevis to the lower end of the pull rod 25. Hence, counterclockwise rotation of the cam causes the follower rod to ride up on the salient portion of the cam, thereby pulling the rod downwardly to extend the arm 14. If desired, the outer end of lever 72 adjacent to its connection with the pull rod 25 may carry a treadle rod 76 which may be manually operated by a treadle (not shown) if circumstances require manual operation of the stretcher arms.

Mounted adjacent to the opposite sides of the stand are identical drives for the sleeves 44 and 45 and a description of one of the drives will therefore suffice. Each drive comprises a downwardly inclined arm 78 which supports an idler sprocket 80 aligned with the sprocket 68 and rotatably mounted on shafts carried by the stand are sprockets 81 and 82 likewise aligned with sprocket 68. A chain 84 extends about the sprockets 68, 80-82 passing along a slot (not shown) in the platform 6 and this chain carries two dogs 85 and 86 at the half and full way points. Each of the dogs is L-shaped and positioned so as to engage the outer face of the adjacent follower arm, as illustrated in Fig. 3, and carry the associated sleeve inwardly along the guide rod 42, thereby compressing the spring 48. As the dog 85 turns downwardly about the sprocket 82 it disengages the arm 51, thereby permitting the return of the sleeve under the influence of the spring 48.

A sprocket 88 is secured to the approximate center of the shaft 60 and this sprocket is connected by chain 90 to a sprocket 91 secured to shaft 92 (Figs. 1 and 2) which is journaled in bearings (not shown) carried by the stand. The sprockets 88 and 91 are the same size and hence one revolution of the former effects on revolution of the latter. A segment gear 94 is fixed to the shaft 92, the construction and arrangement of parts being such that the periphery of the segments projects through the slot 8 so that its teeth are engageable with the rack 34 to carry it from retracted position to bag stripping position. The design of the cam 70, segment gear 94 and associated parts is such that the segment gear does not come into operation until the roll of the follower arm 72 rides back on the dwell of cam 70 by which time the leading tooth of the segment gear makes contact with the rack and when the cam and sprocket have completed one revolution so also has the segment gear which comes to rest with its trailing tooth disengaged from the rack, as shown in Fig. 2.

The aforementioned sequence of operation is under the control of the clutch lock which comprises an arm 96 pivoted at its upper end to the stand and this arm is connected to the plunger of a solenoid 98 carried by a bracket secured to the stand. A tension spring 99 normally holds the arm 96 in locking position. This solenoid is under the control of a manually operated switch 100 which momentarily closes the circuit to the solenoid when the lever 101 is depressed. Normally the arm 96 is in locking position wherein it holds the shaft 60 against rotation, but when the operator depresses the lever 101, thereby momentarily energizing the solenoid which pulls the arm 96 from locking position, whereupon the shaft 60 and parts carried thereby make one complete revolution, after which the arm 96 locks the clutch and shaft against further rotation.

Since the stripper 28 is effective only partly to remove the cuffed bag from the stretcher arms, means are provided to effect complete removal from the machine and such means comprise a conveyor carried by the inner end of the machine, as shown in Figs. 1 and 2. This conveyor comprises a drive shaft 104, mounted in pillow blocks 105

5

which are secured to the vertical legs of the stand and between the ends of the shaft is a sheave 106 connected through V-belts 108 to the second of the two sheaves 64 of the motor 65. Adjacent to each end of the shaft 104 and in approximate alignment with the sprockets 68 are drive sprockets 110.

Mounted on the top of the stand are pillow blocks 112 which rotatably support a shaft 114 to which are fixed guide sprockets 115. Each set of sprockets 110 and 115 carry an endless chain 116 which extends horizontally from the sprocket 115 about a third sprocket (not shown) and back to the sprocket 110. Secured to the stand inwardly of each chain is a guard rail 118 with its horizontal run slightly above the adjacent chain so as to receive a cuffed bag when partly removed from the stretcher arms by the stripper 28. The chains 116 carry spaced lugs 120 which project vertically from the horizontal run of the chain so as to engage laterally projecting ends of the reinforcement R of the partly removed cuffed bag so as to carry it along the guard rails to the point at which it is dropped from the conveyor. In order to prevent displacement of the cuffed bag as it is presented to and travels along the rails, a horizontal deflector 122 (Fig. 2) is provided.

A summary of the operation of our machine is as follows:

Assuming that the operator has drawn the liner bag over the stretcher arms and an outer bag has been drawn over the liner bag, that the motor 65 is running, and that the parts are as shown in Figs. 1 and 2, the operator depresses the switch lever 101 which effects energization of the solenoid 98 and release of the clutch locking arm 96, whereupon the shaft 60 makes one complete revolution after which the tension spring 99 restores the arm 96 to locking position, thereby arresting rotation of the shaft 60. Rotation of the shaft 60 rotates cam 70 which causes the arm 72 to pull the rod 25 downwardly so that the toggle links 22 swing the arm 14 to extended position wherein the nested bags I and O are held in stretched fixed position, as shown in Fig. 3.

As the shaft 60 continues to rotate the sprockets 68 drive the chains 84 counterclockwise, causing the dogs 85 to engage the follower arms 51, thereby to move the sleeves 44 and 45 inwardly and cause the cuffing fingers 54 and 55 to move inwardly and upwardly. Continued inward movement, of the sleeves, as shown in Fig. 4, completes the cuffing operation, whereupon the dogs 85 disengage the follower arms, permitting the springs 47 and 48 to return the sleeves 44 and 45 back to original position and at the same time the springs 56 and 57 swing the cuffing fingers back to vertical position.

After the shaft 60 has rotated 180° or more, the follower arm 72 drops back into the dwell of the cam 70, thereby permitting the spring 26 to restore the arms 12 and 14 to retracted position and release their grip on the cuffed bag. By this time the sprocket 88 has rotated the segment gear 94 so that it engages the rack 34 to move it inwardly, thereby causing the looped end of the stripper 28 to push the cuffed bag part way off the stretcher arms, as indicated by the dot and dash lines of Fig. 1. As the shaft 60 completes its 360° revolution, the segment gear disengages the rack 34, thereby permitting the spring 36 to return it to retracted position.

In the meantime the conveyor continues to operate and when the stripper 28 has carried the closed end of the cuffed bag to a position above or beyond the shaft 114, then the lug 120 engages the projecting end of the reinforcement R to carry the bag along the guard rails and drop it at an appropriate place. All parts are now restored to original position and the operation is repeated.

An ordinary operator may produce as many as 3,000 bags per eight-hour day, as compared with less than half that amount by hand. Further advantages are that difficulties due to static are eliminated and liner bags of much lighter weight may be used. Moreover, breakage or spoilage is reduced to a minimum.

6

While we have shown one desirable embodiment of the invention, it is to be understood that this disclosure is for the purpose of illustration and that various changes and modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

We claim:

1. A bag lining and cuffing machine comprising spaced elongate bag-stretching arms relatively movable toward and away from each other from a normal retracted position, wherein inner and outer bags may be slipped about them, to an extended position, wherein said arms hold the nested bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, elongate guides juxtaposed to said arms, cuffing fingers longitudinally movable on said guides and engageable with the projecting inner end portions of the inner bag, and means for sequentially extending said arms, then moving said fingers inwardly to cuff said projecting ends about the end portion of the outer bag and moving said arms to retracted position to permit removal of the cuffed bag.

2. A bag lining and cuffing machine comprising spaced elongate bag-stretching arms relatively movable toward and away from each other from a normal retracted position, wherein the inner and outer bags may be slipped about them, to an extended position, wherein said arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, elongate bars juxtaposed to the cuffing arms, cuffing fingers laterally movable and longitudinally slidable on said bars and engageable with the projecting inner end portions of the inner bag, and means for sequentially extending said arms, then moving said fingers inwardly and laterally to cuff said projecting ends about the end portion of the outer bag and moving said arms to retracted position to permit removal of the cuffed bag.

3. A bag lining and cuffing machine comprising spaced elongate bag-stretching arms relatively movable toward and away from each other from a normal retracted position, wherein the inner and outer bags may be slipped about them, to an extended position, wherein said arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, a bag stripping member between said arms and movable inwardly to engage the closed end of the inner bag, elongate bars juxtaposed to the cuffing arms, cuffing fingers longitudinally slidable on said bars and engageable with the projecting inner end portions of the inner bag, means for sequentially extending said arms and then moving said fingers inwardly to cuff said projecting ends about the end portion of the outer bag, means for releasing said arm and moving them to retracted position, and means for moving said stripping member inwardly to disengage the cuffed bag from the outer portion of said arms.

4. A bag lining and cuffing machine comprising spaced elongate bag-stretching arms relatively movable toward and away from each other from a normal retracted position, wherein the inner and outer bags may be slipped about them, to an extended position, wherein said arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, a bag stripping member between said arms and movable inwardly to engage the closed end of the inner bag, elongate bars juxtaposed to the cuffing arms, cuffing fingers longitudinally slidable on said bars and engageable with the projecting inner end portions of the inner bag, means for sequentially extending said arms and then moving said fingers inwardly to cuff said projecting ends about the end portion of the outer bag, means for releasing said arm and moving them to retracted position, and means for moving said stripping member inwardly to disengage the cuffed bag from the outer portion of said arms.

5. A bag lining and cuffing machine comprising spaced

elongate bag-stretching arms relatively movable toward and away from each other from a normal retracted position, wherein the inner and outer bags may be slipped about them, to an extended position, wherein said arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, elongate bars juxtaposed to the cuffing arms, cuffing fingers longitudinally slidable and pivotally mounted to swing upwardly on said bars, said fingers being engageable with the projecting inner end portions of the inner bag, means for sequentially extending said arms and then substantially simultaneously moving said fingers inwardly and swinging them upwardly so as to cuff said projecting ends about the end portion of the outer bag, and means for sequentially releasing said arms and removing the cuffed bag.

6. A bag lining and cuffing machine comprising a stand, a generally U-shaped frame mounted above said stand with one arm fixed and its other arm pivoted to the closed end of the frame, resilient means normally holding the pivoted arm in retracted position, wherein an inner bag and an outer bag may be slipped about them, means for moving said pivoted arm to extended position, wherein the arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, guide rods secured to the stand and extending longitudinally in spaced parallel relation to the arms when in extended position, sleeves slidably mounted on the outer ends of said rods, cuffing fingers carried by said sleeves and projecting laterally inwardly so as to engage the projecting inner end portions of the inner bag, resilient means normally holding said sleeves in outermost position, means for sliding said sleeves inwardly so as to cuff said projecting ends about the end of the outer bag, and means operative after the completion of the cuffing operation to release said arms so that the cuffed bag may be removed.

7. A bag lining and cuffing machine comprising a stand, a generally U-shaped frame mounted above said stand with one arm fixed and its other arm pivoted to the closed end of the frame, resilient means normally holding the pivoted arm in retracted position, wherein an inner bag and an outer bag may be slipped about them, means for moving said pivoted arm to extended position, wherein the arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, guide rods secured to the stand and extending longitudinally in spaced parallel relation to the arms when in extended position, sleeves slidably and rotatably mounted on the outer ends of said rods, cuffing fingers carried by said sleeves and projecting laterally inwardly so as to engage the projecting inner end portions of the inner bag, resilient means normally holding said sleeves in outermost position, means for sliding said sleeves inwardly, and rotating them to swing said cuffing fingers upwardly, thereby to cuff said projecting ends about the end of the outer bag, and means operative after the completion of the cuffing operation to

release said arms so that the cuffed bag may be removed.

8. A bag lining and cuffing machine comprising a stand, a generally U-shaped frame mounted above said stand with one arm fixed and its other arm pivoted to the closed end of the frame, resilient means normally holding the pivoted arm in retracted position, wherein an inner bag and an outer bag may be slipped about them, means for moving said pivoted arm to extended position, wherein the arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, bag stripping means slidably mounted between said arms so as to engage the closed end of said inner bag, guide rods secured to the stand and extending longitudinally in spaced parallel relation to the arms when in extended position, sleeves slidably mounted on the outer ends of said rods, cuffing fingers carried by said sleeves and projecting laterally inwardly so as to engage the projecting inner end portions of the inner bag, resilient means normally holding said sleeves in outermost position, means for sliding said sleeves inwardly so as to cuff said projecting ends about the end of the outer bag, and means operative after the completion of the cuffing operation to release said arms and operate said bag stripping means so that the cuffed bag may be removed.

9. A bag lining and cuffing machine comprising a stand, a generally U-shaped frame mounted above said stand with one arm fixed and its other arm pivoted to the closed end of the frame, resilient means normally holding the pivoted arm in retracted position, wherein an inner bag and an outer bag may be slipped about them, means for moving said pivoted arm to extended position, wherein the arms hold the bags in stretched fixed position with the mouth portion of the inner bag projecting beyond that of the outer bag, bag stripping means slidably mounted between said arms so as to engage the closed end of said inner bag, guide rods secured to the stand and extending longitudinally in spaced parallel relation to the arms when in extended position, sleeves slidably and rotatably mounted on the outer ends of said rods, cuffing fingers carried by said sleeves and projecting laterally inwardly so as to engage the projecting inner end portions of the inner bag, resilient means normally holding said sleeves in outermost position, means for sliding said sleeves inwardly and rotating them to swing said cuffing fingers upwardly, thereby to cuff said projecting ends about the end of the outer bag, and means operative after the completion of the cuffing operation to release said arms and operate said bag stripping means so that the cuffed bag may be removed.

10. Apparatus as set forth in claim 1, wherein said bag-stretching arms carry forked members engageable with the inner surface of the open end portion of the inner bag and said cuffing fingers engaged with the inner bag between the prongs of said forked members.

No references cited.