

July 8, 1947.

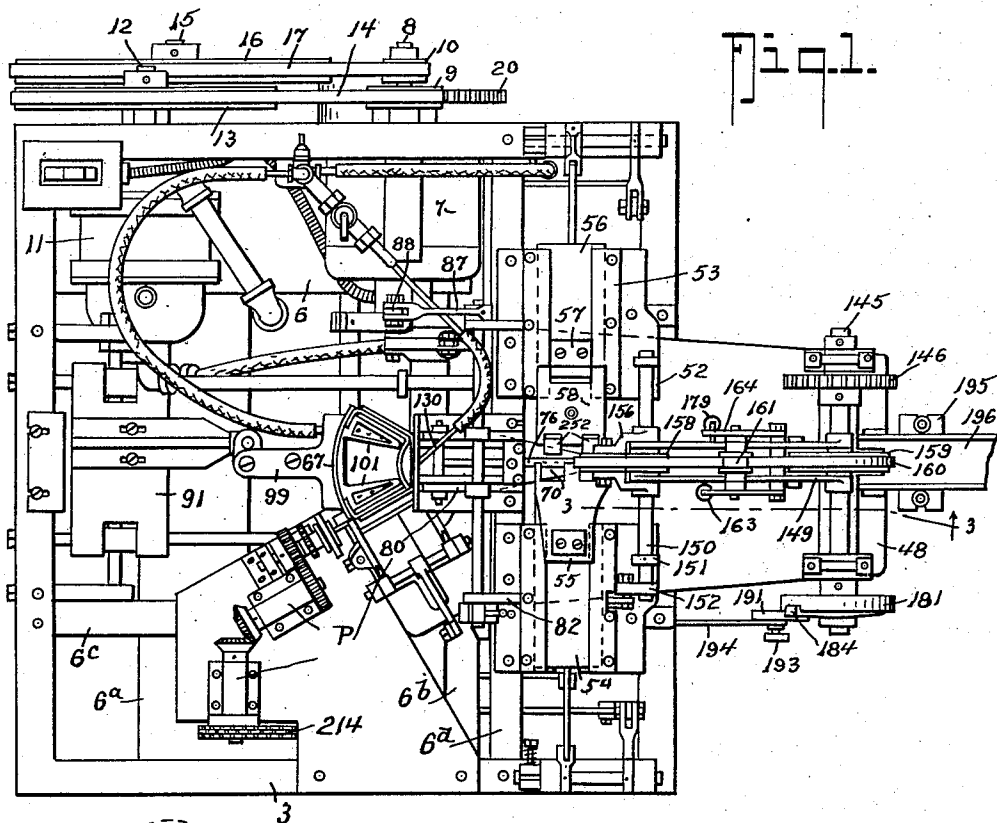
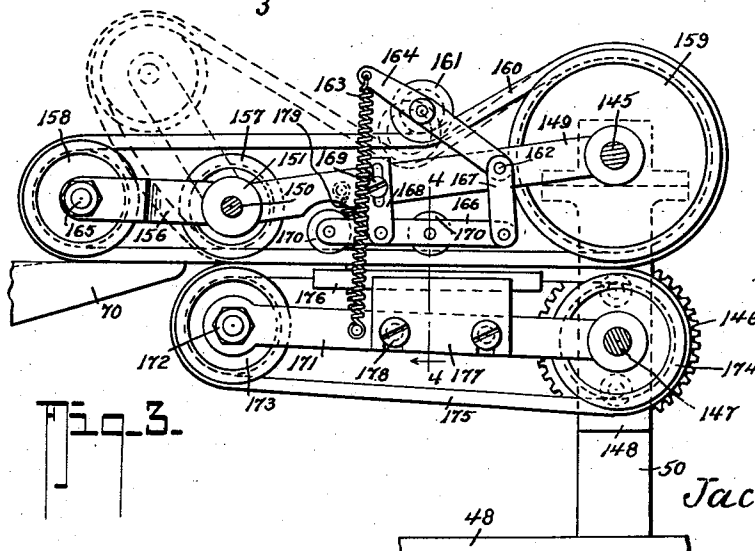
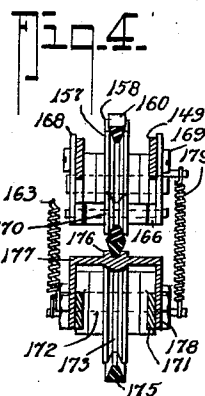
J. CUTLER

2,423,486

MECHANISM FOR EJECTING COMPLETED JACKETS FROM A MANDREL

Original Filed July 10, 1943

5 Sheets-Sheet 1



Inventor,
Jacob Cutler,

By Albert E. Dieterich,

Attorney.

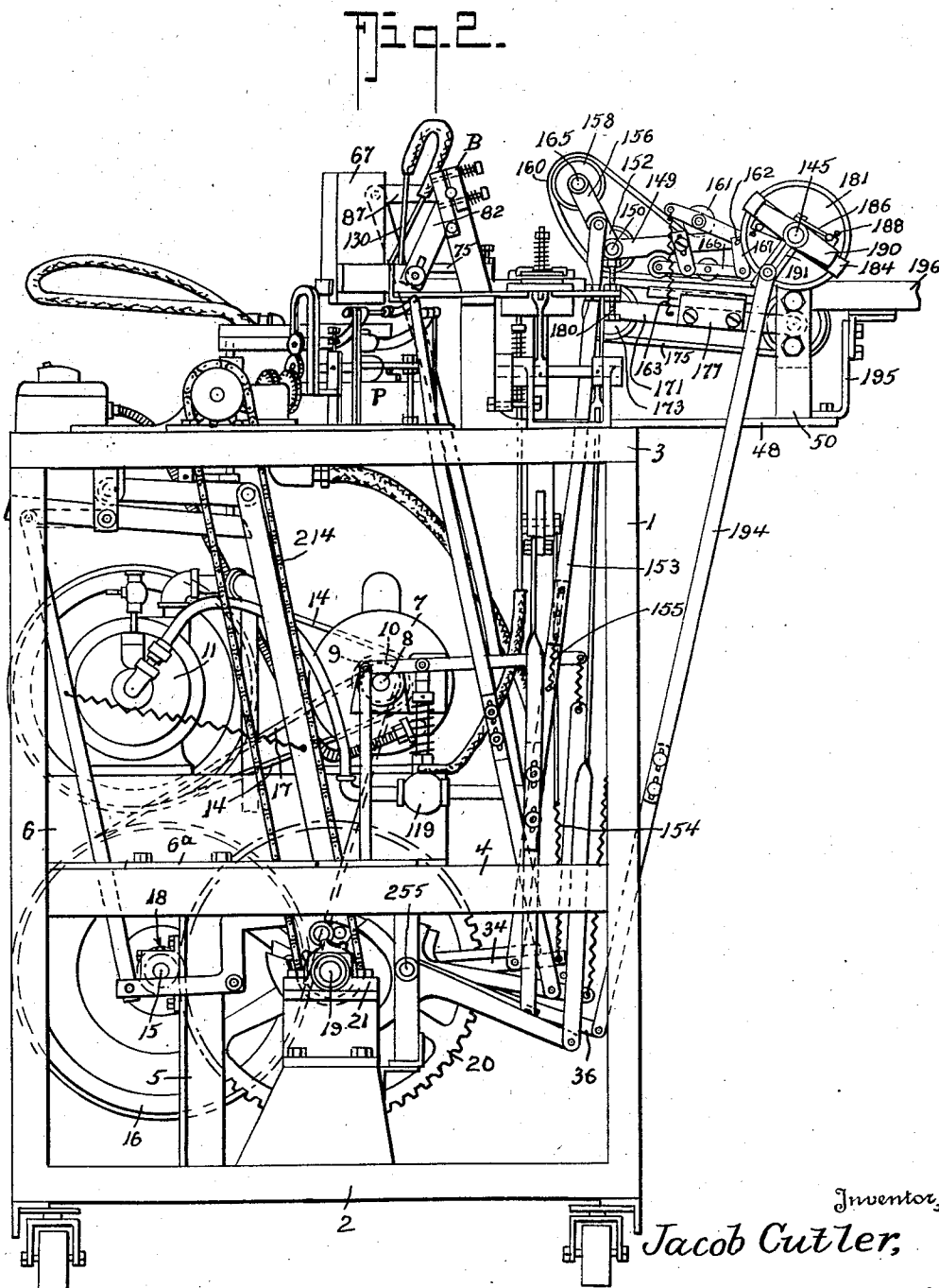
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Attorney -

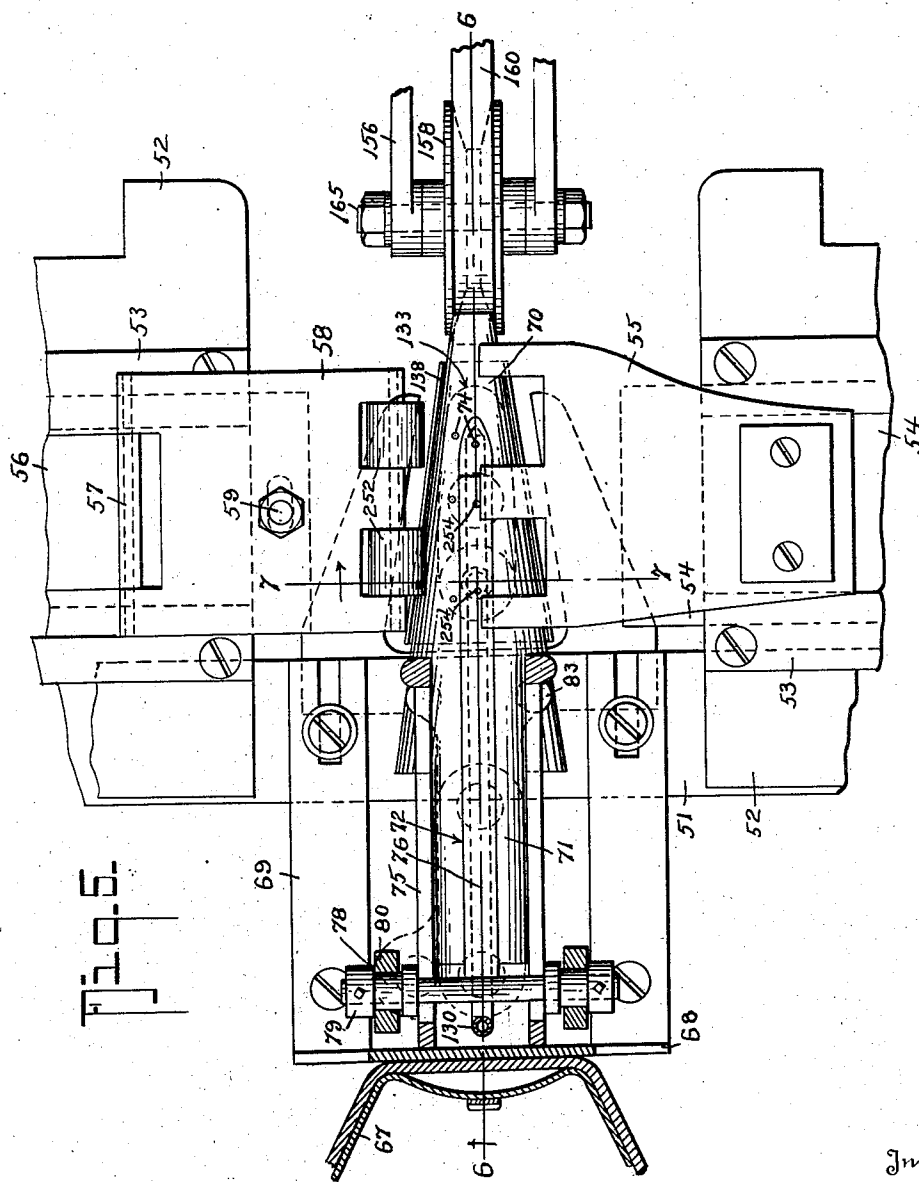
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Jacob Cutler,

By Albert E. Dieterich,

Attorney.

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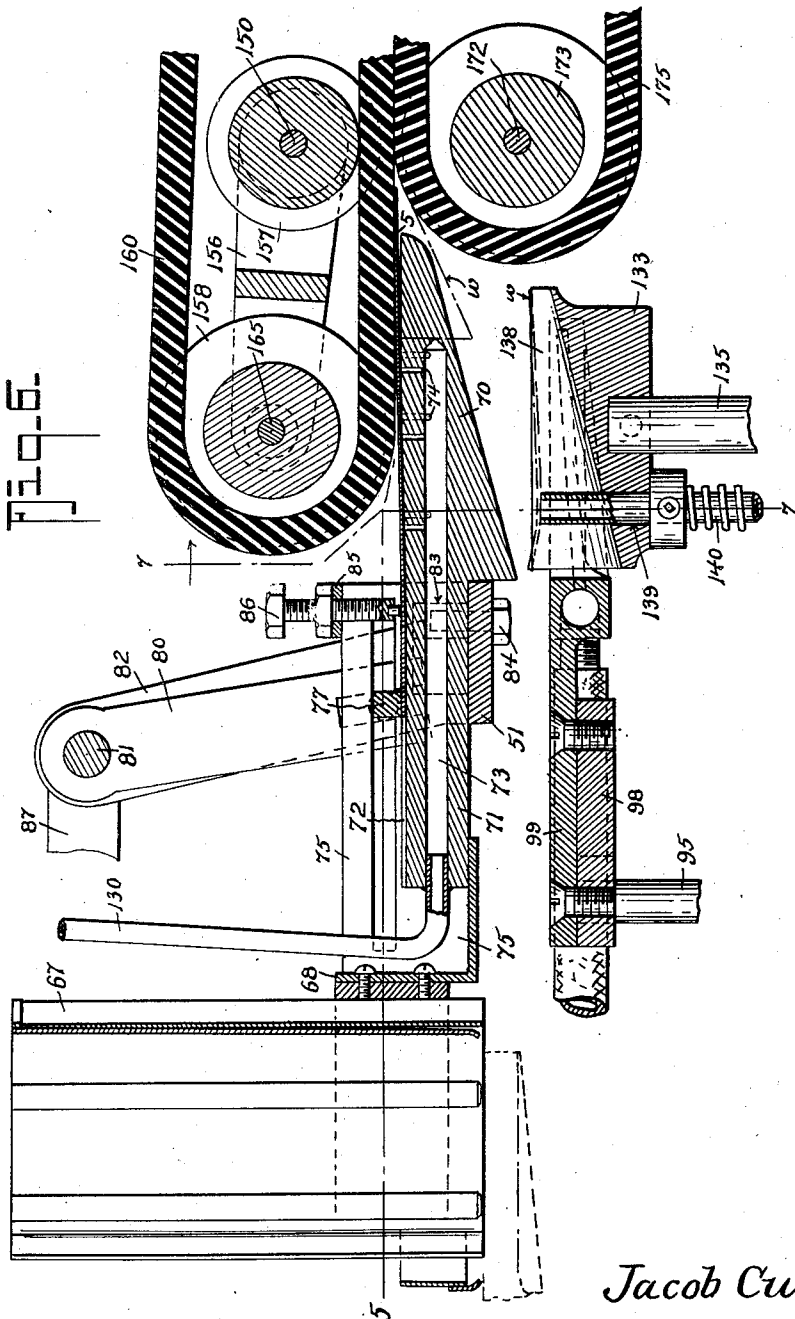
J. CUTLER

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5 Sheets-Sheet 4



Inventor,

Jacob Cutler,

By Albert E. Dieterich,

Attorney.

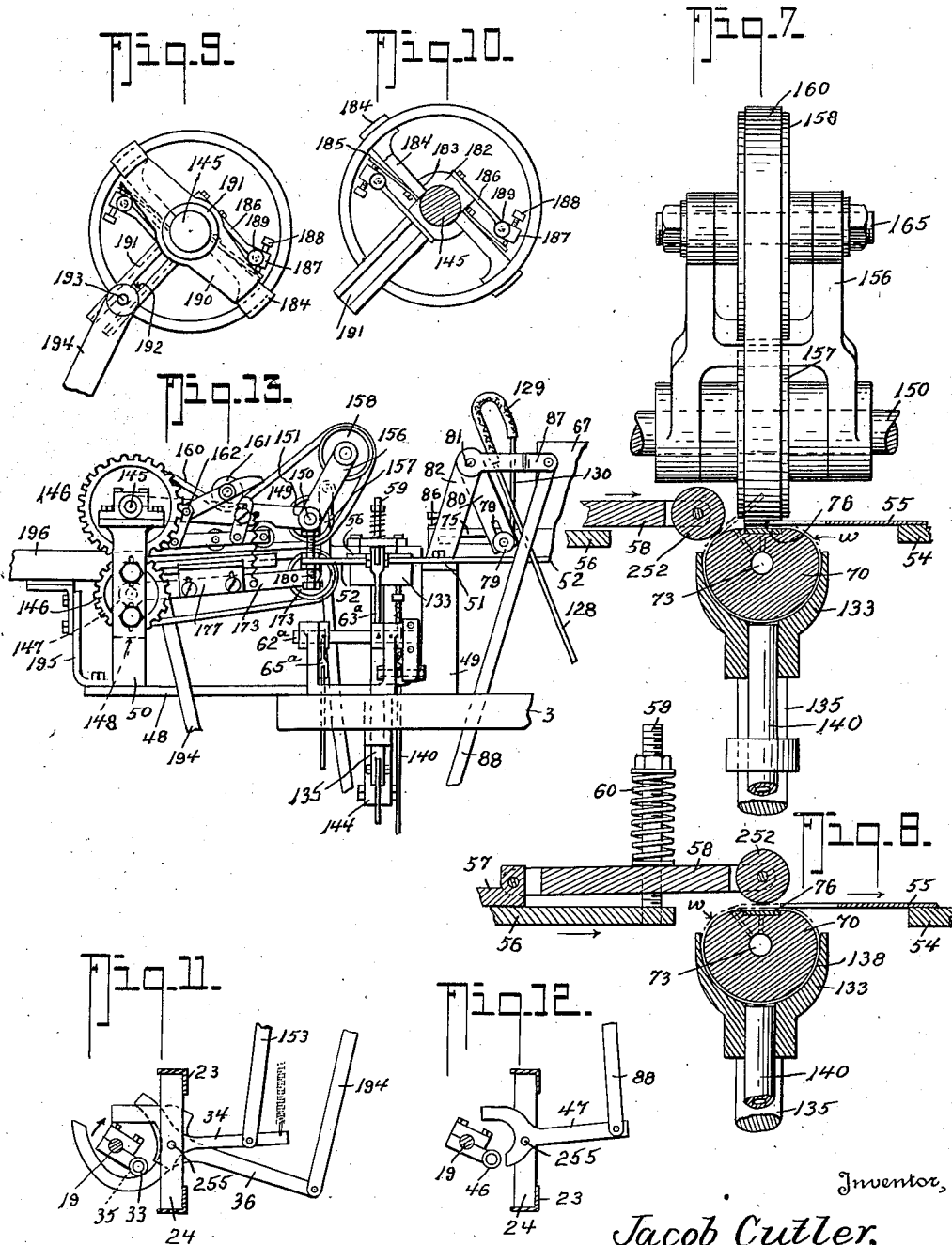
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J. CUTLER

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MECHANISM FOR EJECTING COMPLETED JACKETS FROM A MANDREL

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Inventor,

Jacob Cutler,

By Albert E. Dieterich,

Attorney.

UNITED STATES PATENT OFFICE

2,423,486

MECHANISM FOR EJECTING COMPLETED
JACKETS FROM MANDRELS

Jacob Cutler, Matapan, Mass., assignor to Maryland Baking Company, Inc., Baltimore, Md., a corporation of Maryland

Original application July 10, 1943, Serial No. 494,239. Divided and this application October 28, 1944, Serial No. 560,880

9 Claims. (Cl. 93—36)

1

My invention relates to machines for folding paper blanks into conical form, sealing the overlapped edges together and ejecting the finished cups or jackets from the mandrel on which they are formed.

The invention involved in the present application has to do with the ejection of the completed jackets from the mandrel and the present application is a division of my original application filed July 10, 1943, Serial No. 494,239.

Primarily the present invention has for an object to provide an ejecting mechanism which, while it may be found useful in other machines, is especially adapted for use in the complete machine for forming cone jackets which is fully disclosed in my original application aforesaid.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Fig. 1 is a top plan view of the machine shown in my aforesaid original application and which embodies the present invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a vertical cross section, on an enlarged scale, taken on the line 3—3 of Fig. 1.

Fig. 4 is a cross section on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged detail horizontal section of a portion of the machine taken on the line 5—5 of Fig. 6.

Fig. 6 is a vertical section on the line 6—6 of Fig. 5.

Fig. 7 is a detail cross section taken on the lines 7—7 of Figs. 5 and 6.

Fig. 8 is a detail cross section of a portion of the structure shown in Fig. 7 with the parts shown in another position.

Fig. 9 is an enlarged detail elevation of the one-way clutch for driving the ejecting mechanism.

Fig. 10 is a detail view, partly in section, with the leaf spring 190 removed and parts shown in section.

Figs. 11 and 12 are detail views of the cams and levers employed to effect the operation of the ejecting mechanism.

Fig. 13 is a detail elevation of a portion of the machine showing the parts illustrated in Fig. 3

2

but looking at the same from the opposite side of the machine.

In the drawings in which like parts in all the figures are indicated by the same reference numerals, the parts of the machine shown in the drawings have been given the same numbers of reference as the like parts in the machine of my original application Serial No. 494,239 aforesaid.

In general the machine, in which my present invention is embodied, includes a supporting frame, a drive motor, a vacuum pump, a magazine for jacket blanks, a glue-applying device for applying glue or paste to the blanks, a means to fold the blanks around the mandrel and cause the glue to stick the blank together, and the mechanism, which constitutes the subject matter of the present application, for stripping the jackets from the mandrel and discharging them from the machine.

The frame of the machine comprises vertical corner angle bars 1, bottom side and end angle bars 2, top angle bars 3, intermediate side angle bars 4, vertical supports 5 and horizontal supports 6, 6^a, 6^b, 6^c, 6^d.

Mounted on the support 6 is a driving electric motor 7 and a vacuum pump 11. The motor has a drive pulley 9 and a smaller drive pulley 10 secured to its shaft 8 (see Fig. 1), while the pump shaft 12 carries a large driven pulley 13. The pulleys 9 and 13 are connected by a belt 14, thereby constituting a reduction speed drive for the pump. The small pulley 10 is connected by a belt 17 to a large pulley 16 on a stub shaft 15. The pulley 16 is secured to the stub shaft 15 as is also a pinion 18 which meshes with a master gear 20 on a cam shaft 19. The cam shaft is journaled in suitable bearings 21.

Secured to the bars 4 is a transverse angle bar 23 (Figs. 11 and 12), there being another bar 23 mounted below the upper bar 23. Secured at suitable intervals to the bars 23 are vertical supports 24 for the pivots 255 of the several cam levers of the machine.

The machine includes operating cams for the various mechanisms. The operating cams which effect the operation of the ejecting mechanism that constitutes the subject matter of the present application are best shown in Figs. 11 and 12, in which 33 indicates the throw-off belt raising and lowering cam, 35 the throw-off belt operating cam (which is directly behind cam 33), 34 the belt raising and lowering cam lever, 36 the throw-off belt operating cam lever, 46 the blade operating cam, and 47 the blade operating cam lever. The cams for the other mechanisms, not being a

part of the present application need not be described herein but are fully disclosed in my original application aforesaid.

48 indicates a base plate on which is mounted spaced standards 49 and 50 which carry plates 52 having angle guides 51 between which the slides 54 and 56 of the blank folding mechanism are mounted. The guide 54 carries the forked folding blade 55 while the slide 56 carries the roller-carrying plate 58 that is hinged at 57 and is spring pressed as at 59, 60.

The magazine for the blanks *w* is designated by 67 and the mandrel about which the blanks are folded is indicated by 70.

The mandrel 70, from which the completed jackets are removed by the mechanism that comprises the subject matter of the present application, has a longitudinal blade-receiving groove 72 in which a blade 76 slidably fits. The mandrel has a bore 73 from which ports 74 lead to atmosphere. The blade 76 is secured at its rear end to a carrier 77. The ends of the carrier pass through the slots in the vertical guides 75 and carry rollers 78 and collars 79. The blade 76 has holes 254 which register with certain of the ports 74 when the blade is drawn back. Lever arms 80 have forked ends that engage the rollers 78 and are secured to a shaft 81 that is journaled in bearings 82 that are secured to the cross bar 51. An arm 87 forms, with the arms 80, a bell-crank lever. A connecting rod 88 connects the arm 87 with the cam lever 47, hereinbefore referred to.

The guides 75 are joined, at their forward ends, by a bridge 85 that carries an adjusting screw 86 for holding the blade 76 down in its groove 72. It will be noticed that the groove 72 does not extend to the apex or outer end of the mandrel 70, but tapers off about one-third the distance between the outer end of the mandrel and the bridge 85 (Figs. 5 and 6).

Therefore, when the blade 76 advances, it will ride up over the top of the tip end of the mandrel for a purpose soon made clear.

The blank transfer mechanism (which forms the subject matter of another divisional application) includes a transfer member 99 having converging arms 101 to receive a blank from the magazine 67 and convey it to the folding mechanism. The member 99 is carried on a bracket 98 attached to a sliding carriage 91 that is operated at proper times by suitable mechanism not involved in this particular application but fully shown and described in my original application. The arms 101 have suction apertures controlled by the valve 119 that also controls the suction in the bore 73. In brief when the blank transfer member is under the magazine 67 (see dotted lines Fig. 6) suction is turned on and a blank caused to adhere to the arms 101. The transfer member then carries the blank to a position beneath the mandrel, whereupon the suction in the arms 101 is turned off, suction is applied to the pipe 140 to hold the blank to the folding head 133 by which the blank is raised to and partially folded about the mandrel 70 (see Figs 6 and 7). As soon as the conforming groove 138 of the head 133 embraces the mandrel suction is broken in pipe 140 to release the blank therefrom. The head 133 is mounted on a vertically slidable rod 135 that is operated at the proper times by mechanism not a part of the subject matter of this application but which is fully disclosed in my original application aforesaid.

Mounted in suitable bearings on the standards

50 is a shaft 145 on which is secured a grooved belt pulley 159 and on which is pivoted a pair of arms 149 whose free ends carry a shaft 150. Connected arms 156 are pivoted to shaft 150 and in turn carry a shaft 165 on which is journaled a grooved pulley 158 (Figs. 3 and 13). A grooved pulley 157 is journaled to turn freely on shaft 150, which shaft is also free to be rocked in its bearings in arms 149. Arms 156, however, are secured to and turn with shaft 150.

An arm 152 (Fig. 2) is also secured to shaft 150. A connecting rod 153 (made in two parts, slidably, and spring loaded as at 155, connected together) joins arm 152 to cam lever 34. A return spring 154 (Fig. 2) serves constantly to return pulley 152 to the full-line position in Fig. 2 (dotted-line position, Fig. 3) when cam lever 34 is disengaged by cam roller 35. Cam roller 35 is behind roller 33 and not visible in Fig. 11. A V-type belt 130 takes around pulleys 158, 157 and 159.

A belt tightener is provided to keep belt 160 taut. It comprises a pair of arms pivoted respectively to the arms 149 at 162 and carrying between them a grooved roller 161 which rides on the belt 160 under pressure of the spring 163.

A pair of bars 166, adjustable and depending by links 167—168 form arms 149, carry spaced, grooved, belt-engaging rollers 170 for engaging and holding straight the lower flight of belt 160.

The links 167 are pivoted at 162, while the links 168 are slotted and secured by screws 169 to the arms 149.

Blocks 148 are adjustably secured to the up-rights 50 on the opposing faces thereof and carry a shaft 147 on which is secured a grooved pulley 174 and a gear wheel 146 which meshes with a similar gear wheel 146 secured to shaft 145 so that motion imparted to shaft 145 is transmitted to shaft 147.

Arms 171 are pivoted to shaft 147 and at their free ends carry a grooved pulley 173. An endless V-type belt 175 takes over pulleys 173, 174 and over a guide 176 whose bracket arms 177 are adjustably secured by screws 178 to the arms 171 (Figs. 3 and 4). The upper flight of belt 175 is held up against the lower flight of belt 160 by means of the spring 163 and a second spring 179 that connects an arm 149 with an arm 171. The pulley 173 lies below pulley 157, while arms 156 and pulley 158 overhang pulley 173.

Collars 151 on shaft 150 engage adjustable stop screws 180 secured to plates 52, for lining up the throw-off device with the mandrel.

The shaft 145 is turned at proper intervals by means of a one-way friction clutch device which will now be explained by reference, particularly, to Figs. 2, 9 and 10.

Secured to the shaft 145 is a clutch wheel 181 having a lateral flange over which is loosely fitted the slotted ends of arms 184. The arms 184 have their inner ends resting in recesses 183 in a collar 182 loose on shaft 145, the collar having an arm 191 that has a T-slot to receive the T-block 192 to which is pivoted, at 193, the connecting rod 194 that connects with the cam lever 36 (Fig. 11).

Each arm 184 carries a leaf spring 185. To the collar 182 is fastened rigid arms 186 having threaded slotted ends 187 to receive the adjusting screws 188. Clamp screws 189 are provided for the split ends 187. A leaf-spring 190, held on the shaft by a collar 191, keeps the arms 184 in place (Fig. 9).

A bracket 195 supports a trough 196 into which the finished jackets are delivered.

The adhesive applying mechanism of the ma-

5

chine forms the subject matter of another divisional application and in the present drawings is indicated generally by the letter P and is driven by a sprocket and chain drive directly from shaft 19. As this mechanism is no part of the present application a description and detailed illustration thereof has not been included herein. As soon as the jacket blank shall have been raised to and bent partly about the mandrel by the head, the blade 55 is advanced and as soon as the blade 55 has folded over the portion of the blank which it engages, the roller-carrying plate 56 moves the rollers 252 to the position of Fig. 8, the blade 55 being retracted as the rollers advance. The adhesive having been applied to the blank the rollers effect a primary sealing of the overlaps of the blank and thus complete the formation of the jacket. As soon as the rollers recede, belt 160 is brought down (Fig. 3) on the jacket; blade 70 is advanced to press the jacket seam against the belt and the belt is turned to strip the jacket from the mandrel, convey it to the place of discharge while holding the lapped parts together in co-operation with the belt 175 until adhesion has been completed; the belts throw off the jackets into the trough 196.

From the foregoing description taken with the accompanying drawings it is thought the complete construction, combination and arrangement of parts will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In a jacket forming machine wherein is provided a magazine for a stack of flat blanks, a distant mandrel on which the jackets are formed, and means for molding the blanks about the mandrel and overlapping the sides of the blanks and causing adhesion between the overlapped parts; a mandrel comprising a shank and a conical body, said body having a longitudinal groove in its face, a blade fitting said groove, means to advance and retract said blade along said groove, means to raise the advance end of the movable blade, and means cooperating with said blade to strip the jackets from the mandrel.

2. In a machine of the character described: a support; a mandrel secured to said support and extending beyond the same; said mandrel having a suction bore and a longitudinal groove having ports communicating with said bore; a blade in said groove, said blade having ports; a blade carrier to which said blade is secured; slotted guides in which said carrier is mounted; means to move said carrier forth and back in said guides to move the blade along said groove; a blade presser mounted on said guides to engage said blade; said mandrel having means to raise the advance end of said blade as it leaves the groove in its course of movement; and jacket throw-off means co-operative with said blade to remove the jackets from the mandrel.

3. The machine of claim 2 in which the jacket throw-off means comprises an upper and a lower endless belt, said belts having flights running in contact one with the other, one of said belts having an extension adapted to overlie the mandrel to co-operate with said blade; means to lift and lower the said extension from and to the mandrel; and means to drive the belts.

4. In a machine for forming tubular jackets on a mandrel; a mandrel having a longitudinal groove in its face, said groove terminating short of the end of the mandrel; a blade located in and longitudinally slidable along said groove; means to slide the blade forth and back along the groove

6

and over the ungrooved end of the mandrel; in combination with a jacket throw-off mechanism co-operative with the blade for removing jackets from the mandrel.

5. In a machine for forming tubular jackets on a mandrel; a mandrel having a longitudinal groove in its face, said groove terminating short of the end of the mandrel; a blade located in said groove and longitudinally slidable in the same; means to slide the blade forth and back along the groove and over the ungrooved end of the mandrel; combined with a jacket throw-off mechanism cooperative with the blade for removing jackets from the mandrel, said mechanism including an upper endless belt and pulleys around which said belt passes, said pulleys including a drive pulley and idler pulleys; a second endless belt located beneath the upper endless belt, said belts having their adjacent flights in close proximity, the lower belt extending away from the end of the mandrel, the upper belt having an extension that projects over the mandrel and blade, and means for lowering and raising said extended portion to and from the mandrel.

6. In a machine of the class described: a mandrel on which blanks are formed, combined with means to remove finished jackets from the mandrel while maintaining their lapped seams under pressure contact, said removing means comprising a support, a first driving shaft mounted in bearings on said support, means for turning said driving shaft, a driving pulley on said shaft, arms pivoted on said first driving shaft and carrying a second shaft, an idler on said second shaft, arms pivoted to said second shaft, an idler pulley journaled on said arms, an endless belt passing over said pulleys, a belt tightener pivoted to the first mentioned arms and having a pulley engaging said belt, a spring connected to said tightener to press its pulley against said belt to take up slack, a second driving shaft carried by said support and gear connected to said first driving shaft, arms pivoted to said second driving shaft, an idler pulley journaled on said last named arms, a second endless belt passing around the last named pulley and the pulley on said second driving shaft, said belts having contacting flights extending the length of the first and last mentioned arms, means to move the arms which are pivoted to the shaft that is carried by the first mentioned arms on said shaft as a pivot to raise and lower the third mentioned pulley from and to the mandrel, and means yieldably urging the second and fifth mentioned pulleys toward one another.

7. In a machine of the class described: a mandrel on which blanks are formed, combined with means to remove finished jackets from the mandrel while maintaining their lapped seams under pressure contact, said removing means comprising a support, a first driving shaft mounted in bearings on said support, means for turning said driving shaft, a driving pulley on said shaft, arms pivoted on said first driving shaft and carrying a second shaft, an idler on said second shaft, arms pivoted to said second shaft, an idler pulley journaled on said arms, an endless belt passing over said pulleys, a belt tightener pivoted to the first mentioned arms and having a pulley engaging said belt, a spring connected to said tightener to press its pulley against said belt to take up slack, a second driving shaft carried by said support and gear connected to said first driving shaft, arms pivoted to said second driving shaft, an idler pulley journaled on said

7

last named arms, a second endless belt passing around the last named pulley and the pulley on said second driving shaft, said belts having contacting flights extending the length of the first and last mentioned arms, means to move the arms which are pivoted to the shaft that is carried by the first mentioned arms on said shaft as a pivot to raise and lower the third mentioned pulley from and to the mandrel, and means yieldably urging the second and fifth mentioned pulleys toward one another, means carried by the arms which are pivoted to the second driving shaft for supporting that flight of the second belt which lies adjacent the first belt, means for supporting the flight of the first belt against that of the second belt, and means for supporting said second mentioned shaft so as to position the belts properly with respect to the mandrel.

8. In a machine of the character described wherein is provided a support, a mandrel secured to said support and means to form a jacket on said mandrel: the improvement which includes a blade in a groove in the face of the mandrel;

8

a jacket throw-off belt; means to bring said belt into cooperative position with respect to said mandrel; and means to move said blade into cooperative position with respect to said belt to press the jacket against the belt.

9. The improvement of claim 8 wherein a second belt is provided to cooperate with the first belt for conveying the jackets from the mandrel and for pressing the seam of the jacket together while pulling the jackets from the mandrel and discharging them from the machine.

JACOB CUTLER.

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