

March 2, 1948.

J. A. KAY

2,437,198

PACKAGING MACHINERY

Filed July 8, 1944

3 Sheets-Sheet 1

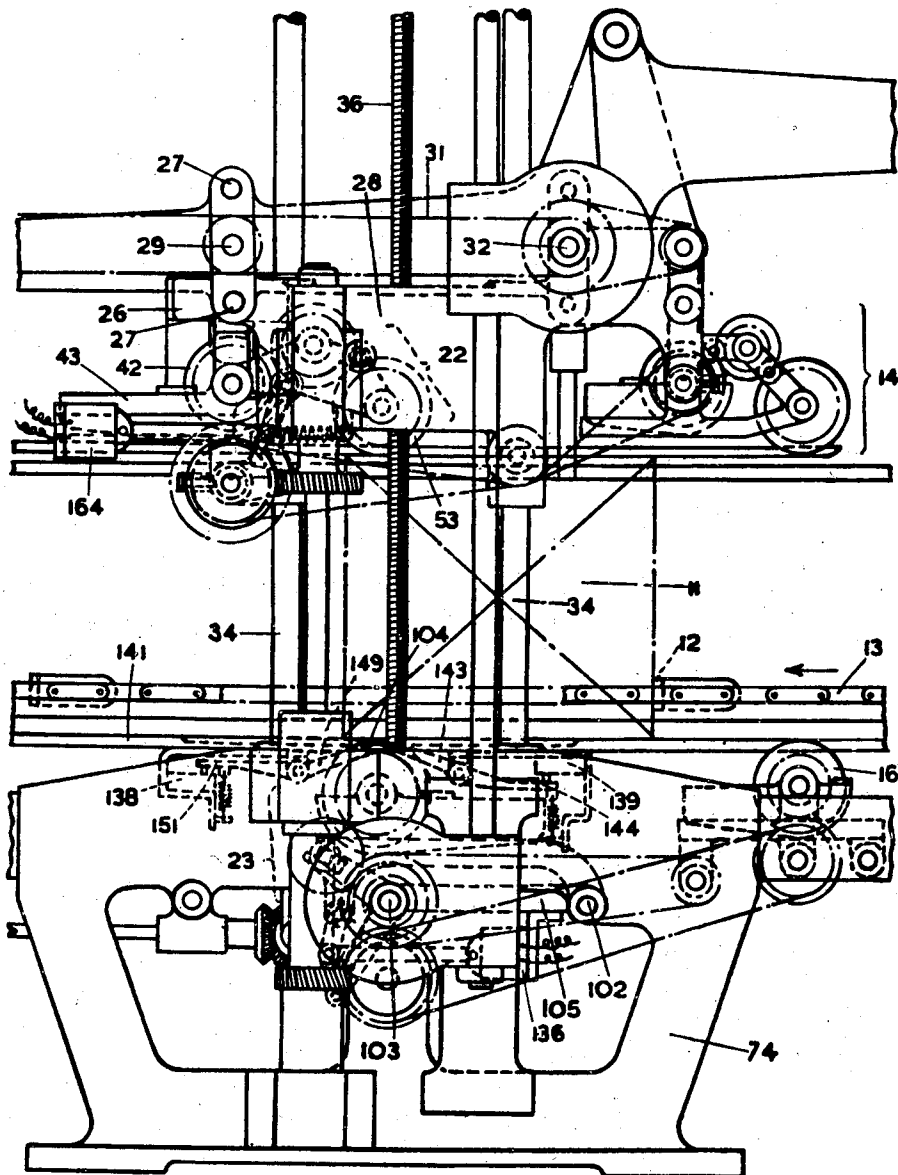


FIG. 1.

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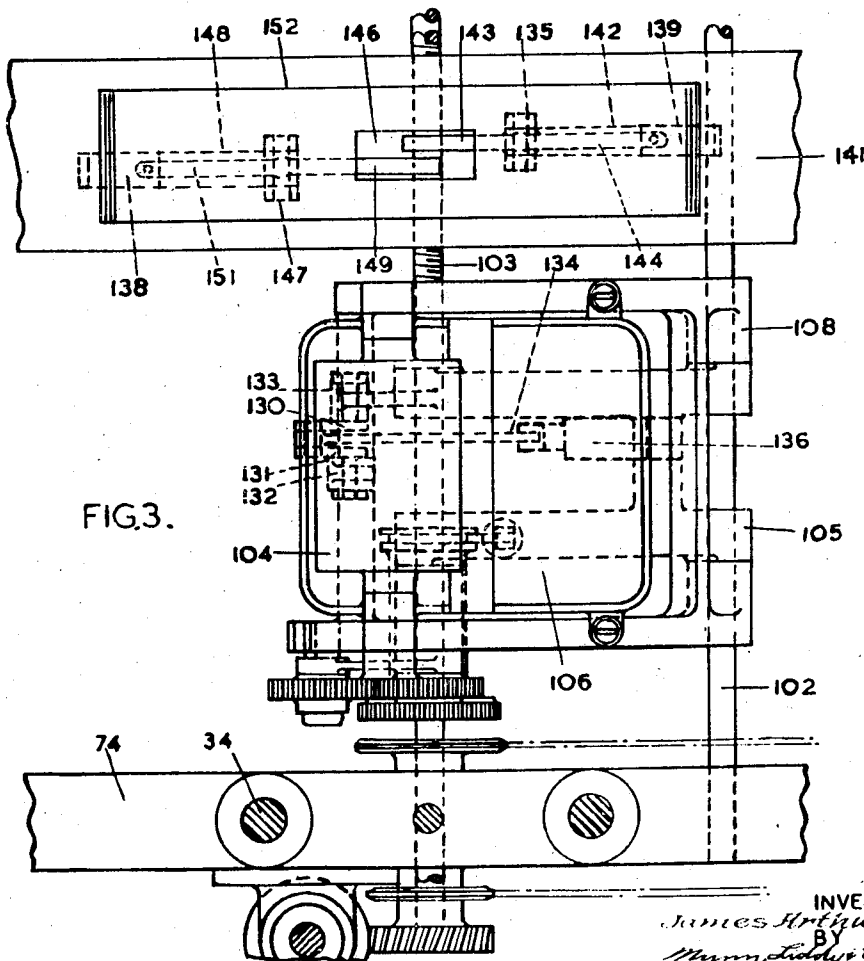
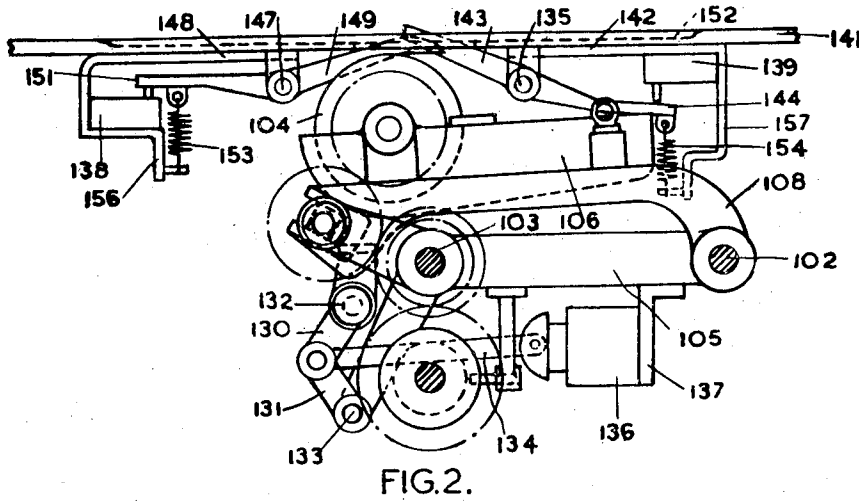
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

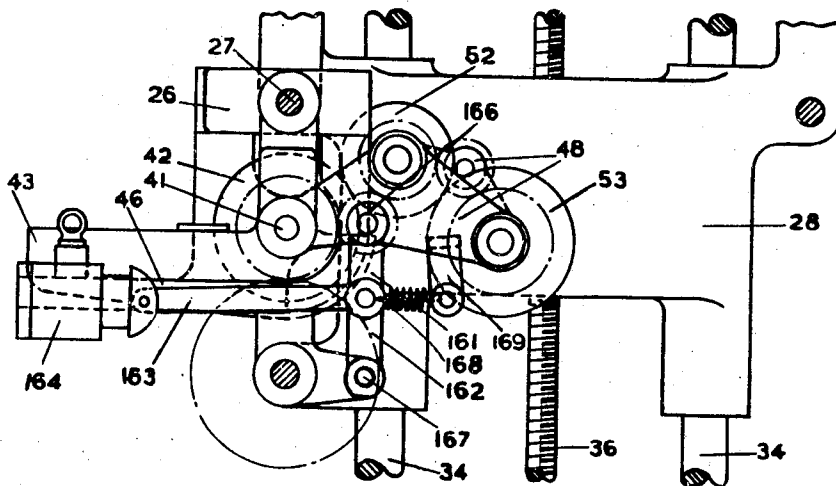


FIG. 4.

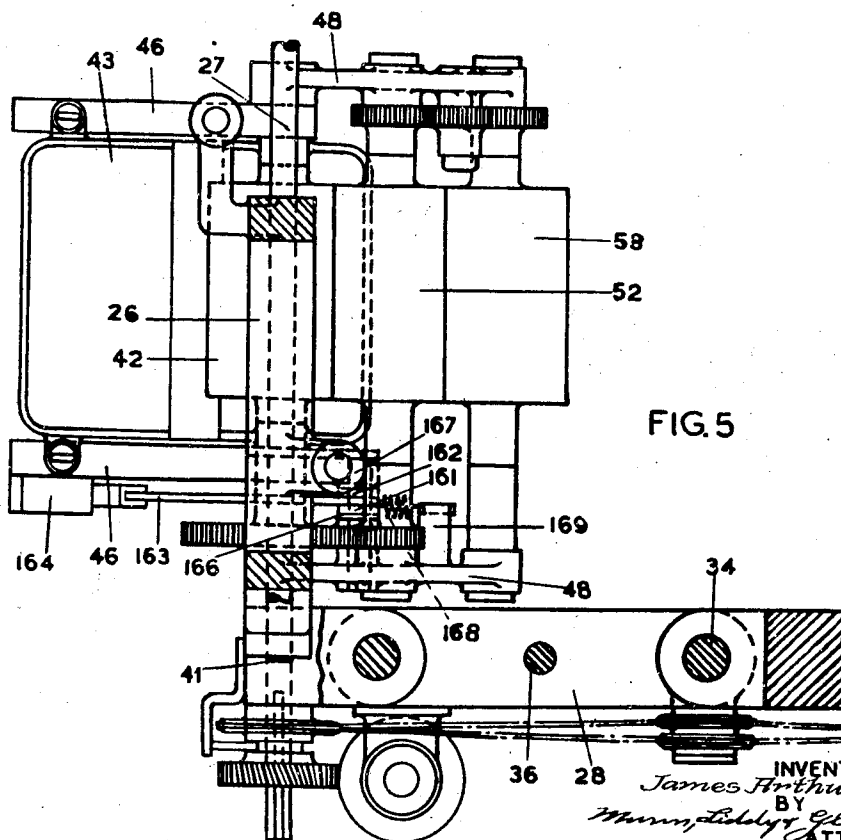


FIG. 5

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2,437,198

PACKAGING MACHINERY

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Application July 8, 1944, Serial No. 544,050
In Great Britain March 27, 1943

9 Claims. (Cl. 91—50)

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This invention relates to packaging apparatus and more particularly to apparatus for closing and sealing containers of fibreboard, cardboard, or like material, the apparatus being of the type described in United States Patent No. 2,370,583 (to which reference may be made for any details of the apparatus not apparent from this description) in which containers of the above kind are fed through a flap-gluing device in which provision is made for leaving the portions of the outside flaps which, in the finished container, extend over the gap between the inside flaps free of glue so as to prevent those portions from being stuck to the contents of the container.

An object of the invention is to provide an apparatus of this type in which the length of the glued and unglued portions of the outside flaps is determined automatically by the containers themselves during their passage through the apparatus.

According to the invention, therefore, there is provided an apparatus of the above type, wherein the glue-applying roller is adapted to be brought into gluing engagement with the outside flaps of the container through the action of a feeler member arranged to be moved into operative position by engagement with the inside flaps of the container during its passage through the apparatus and maintained in that position during continuance of such engagement. By these means, therefore, the length of the portions of the outside flaps on which glue is applied is determined by the length of the inside flaps, while the length of the portions on which no glue is applied is determined by the length of the gap between the inside flaps.

In this type of apparatus, it is usual to arrange the upper and lower gluing devices in pairs, one of each pair being disposed on each side of the apparatus, and it will be understood that the term "glue-applying roller" and other terms appertaining to the gluing devices, when used herein in the singular, are intended to include such an arrangement.

The feeler member may be in the form of a two-armed lever one arm of which constitutes a feeler and the other a contact arm arranged to operate a micro switch, the feeler member being pivoted and spring-urged in such a manner that the feeler projects into the path of the travelling containers so that upon engagement by the leading edge of the container the feeler member is caused to pivot so that the contact arm operates the micro switch and causes the glue-applying roller to be moved into such a position that it applies glue to the outside flaps which have been previously ploughed outwardly. The glue-applying roller is conveniently mounted in a pivoted glue bath which is arranged to be pivoted by a solenoid, suitably connected to the

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glue bath, which becomes energised or de-energised as the case may be, upon operation of the micro switch. It will be understood that, when the inside flaps at the top and bottom of the container are of equal length, the same feeler member and micro switch can operate both the upper and lower gluing devices by suitable connections between the two gluing devices and the micro switch, and that when the upper and lower inside flaps are of different length the upper and lower gluing devices will require their own feeler members and switches.

In the case of the lower flaps, it may be that in certain circumstances, for instance, when a container is filled with relatively small packages, the feeler may be prevented from springing into the gap between the inside flaps by reason of the contents of the container having sagged between the flaps on to the container-supporting plate with the result that the glue-applying roller would remain in gluing position. In order to avoid this difficulty, a detector member may be provided, according to a further feature of the invention, and this may also be pivoted, and provided with a contact arm arranged to engage a second micro switch. The detector member may be spring-urged in such a manner that its contact arm is normally in engagement with the second micro switch and its detector is just below the plane of movement of the inside flaps, a channel of substantial width, i. e. wide enough to allow any sagging contents to drop below the level of the container-supporting plate so as to engage the detector, being formed in the container-supporting plate.

By way of example, the invention will now be described in greater detail, with reference to the accompanying drawings in which:

Figure 1 is an elevation of part of a machine for closing and sealing containers of fibreboard or like material,

Figures 2 and 3 are an elevation and plan, respectively, of a portion of the apparatus shown in Figure 1, drawn to a somewhat larger scale, and

Figures 4 and 5 are an elevation and plan, respectively, of another portion of the apparatus shown in Figure 1, also drawn to a somewhat larger scale.

The machine is of the same general type as that described in Patent No. 2,370,583, mentioned above, although only the portion of the machine with which the present invention is concerned is shown, reference being made to the above-mentioned specification for further details of the construction and operation of the machine as a whole.

Referring to Figure 1, containers 11 are fed through the apparatus by means of pusher bars 12 carried by a pair of driven chains 13. Prior

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to reaching the position shown in Figure 1, the containers 11 have passed through folding devices for folding inwardly the inside flaps of the containers and for folding outwardly the outside flaps so that they lie in horizontal planes. After passing auxiliary gluing devices, generally indicated by reference numerals 14 and 16, the purpose of which is described below, the containers reach the main upper and lower gluing devices, generally indicated by reference numerals 22 and 23, which apply a film of glue to the inside surfaces of the outside flaps of the containers, and during their further passage through the machine their outside flaps are ploughed over into closed position.

The gluing devices 22 and 23 are arranged in pairs, one of each pair on each side of the machine, and the pairs are substantially identical in construction.

The upper gluing devices 22 are each carried by a bracket 26 slidably mounted on a pair of shafts 27 carried by a pair of brackets 28, and their lateral adjustment is brought about by means of a rotatable screwed shaft 29 mounted in the brackets 28 and engaging the bracket 26, the screwed shaft 29 being driven by chain and sprocket gearing 31 from a similar screwed shaft 32 which, in turn, is driven through suitable gearing from a driving motor (not shown). The brackets 28 are slidably mounted on a pair of pillars 34 and are vertically adjustable by means of screws 36 which are driven through suitable gearing from a driving motor (not shown).

The lower gluing devices 23 are arranged for lateral adjustment in a similar manner to the gluing devices 22, the gluing devices generally being slidably mounted on a guiding shaft 102 secured to the main framework 74 of the machine, the lateral movement being brought about by a screwed shaft 103 driven, like the screwed shafts 29 and 32, through suitable gearing from the same motor (not shown), the screwed shaft 103 engaging frames 105 of the gluing devices.

The gluing devices 22 and 23 are substantially identical in construction with the gluing devices described in Patent No. 2,370,583, except for the mechanism for moving them into and out of glue-applying positions, and it will not be necessary, therefore, to describe herein more than whatever salient features are necessary for a full understanding of the present invention.

In the case of the lower gluing devices 23 they are each carried on a frame 108 (see particularly Figures 2 and 3) which supports a glue bath 106 in which is mounted the glue-applying roller 104, the frame 108 being pivotally mounted on the guide shaft 102.

The movement of the glue-applying roller 104 into and out of glue-applying position is brought about by a toggle linkage consisting of a pair of articulated links 130 and 131, the link 130 being pivotally attached at 132 to the frame 108 and the link 131 being pivotally attached at 133 to the frame 105. The links 130 and 131 are connected by a pivoted link 134 to a solenoid 136 mounted on the frame 105 by means of a bracket 137. The operation of the solenoid 136 is controlled by micro switches 138 and 139 as described below.

The gluing device 23 is arranged so that the glue-applying roller 104, when in its inoperative position, lies just below the level of a container-supporting plate 141 along which the containers are fed through the machine. Pivotally mounted at 135 in a bracket 142 attached to the sup-

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porting plate 141 is a feeler member in the form of a two-armed lever one arm 143 of which constitutes a feeler and the other arm 144 a contact arm arranged to operate the micro switch 139, the latter being mounted on the bracket 142. The feeler 143 is arranged to protrude slightly through a slot 146 in the supporting plate 141 so that its tip lies in the path of the base of each container as it passes through the machine. Pivotally mounted at 147 in a further bracket 148 attached to the supporting plate 141 and carrying the micro switch 138 is a detector member in the form of a two-armed lever one arm 149 of which constitutes a detector and the other arm 151 a contact arm arranged to operate the micro switch 138. The detector 149 protrudes slightly through the slot 146 and is arranged so that its tip lies just below the level of the supporting plate 141 in a recess 152 formed in the supporting plate 141 for a purpose which will become apparent from later description. The detector member and the feeler member are spring-urged towards the base of the container by means of springs 153 and 154, respectively, attached to extensions 156 and 157 of the brackets 148 and 142 respectively.

In the case of the upper gluing devices 22, the glue bath 43 is supported on a pair of platforms 46 depending from the bracket 26 and houses a gluing roller 42 mounted on a rotatable shaft 41 having its bearings formed in extensions from the bracket 26. The glue-applying roller 53 is carried in a pair of frames 48 pivotally mounted on the shaft 41 and carrying a transfer roller 52 arranged to feed the glue-applying roller 53 from the glue roller 42.

As in the case of the lower gluing devices, movement of the glue-applying roller 53 into and out of glue-applying position is controlled by a toggle linkage consisting of a pair of links 161 and 162 and a pivoted link 163 connecting the links 161 and 162 with a solenoid 164 which is connected in the circuit of the micro switches 138 and 139. The link 161 is pivoted at 166 on one of the frames 48 while the link 162 is pivoted at 167 in a bearing depending from one of the platforms 46. A spring 168, attached at one end to the link 163 and at the other end to a bracket 169 depending from the adjacent frame 48, is arranged to return the glue-applying roller 53 to the inoperative position when the solenoid 164 is de-energised.

As mentioned above, the upper and lower gluing devices are arranged in pairs to accommodate the outside flaps on each side of the containers and at the top and bottom of the containers, and it will be understood that the feeler 143 and the detector 149 with their respective micro switches 139 and 138 control the four gluing devices in synchronism.

The auxiliary gluing devices 14 and 16, mentioned above, are for providing a ribbon of gum on the outside only of the outside flaps and only operate in the case of containers in which the outside flaps overlap. These auxiliary gluing devices are the subject of United States patent application Serial No. 544,049, filed July 8, 1944 and form no part of the present invention. It is not deemed necessary, therefore, to go into further details of these devices in this description.

In the operation of the apparatus according to the invention, the containers 11 are passed through the gluing devices 22 and 23, as explained above, and it will be seen that as the leading edge of a container reaches the feeler 143 the feeler

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is depressed about the pivot 135 and causes the contact arm 144 to operate the micro switch 138 which, in turn, energizes the solenoids 136 and 164 and causes the glue-applying rollers 104 and 53 to be moved into glue-applying position by the toggle linkages 130, 131, 134, and 161, 162, 163, respectively. It will be understood that the glue-applying rollers 104 and 53 are moved into glue-applying position substantially instantaneously upon depression of the feeler 143 by the container so that the rollers commence to apply glue to the outside flaps of the container almost as soon as the leading edge of the container depresses the feeler 143. It will be seen that the position on the flaps where the glue is first applied by the glue-applying rollers depends on the position of those rollers relative to that of the container (considered in the direction of travel of the container) when it strikes the feeler 143, and that such relative position can be adjusted to suit any particular requirements.

As the container is advanced along the supporting plate 141 the feeler 143 is maintained in its depressed position and the glue-applying rollers 104 and 53 in their glue-applying positions until the tip of the feeler 143 snaps off the trailing edge of the leading inside flap of the container, under the influence of the spring 154, into the gap between the front and rear inside flaps, whereupon the solenoids 136 and 164 are de-energized and the glue-applying rollers 104 and 53 returned to their inoperative positions. At this stage, no glue is being applied to the outside flaps which thus remain unglued for a distance equal to the gap between the inside flaps, and when the forward edge of the rear inside flap strikes the feeler 143, the sequence of operations described above is repeated and glue is once again applied to the outside flaps until the tip of the feeler 143 snaps off the end of the container.

The length of the glued portion of the outside flaps is thus determined automatically by the length of the inside flaps while the length of the unglued portion is determined automatically by the length of the gap between the inside flaps. The invention is thus particularly useful when containers having different inside flap lengths are passed through the apparatus successively. In the case of containers in which the inside flaps abut, and there is thus no gap into which the feeler 143 can move during the passage of the container over the feeler, it will be seen that the feeler is operative during the passage of the entire length of the container and thus causes the glue-applying rollers to apply glue over the whole length of the outside flaps.

In the description, it has been assumed that the contents of the containers are such that there is no sagging of the contents into the gap between the inside flaps. If the containers are filled with small packages, however, and there is thus a tendency for the contents to sag into the gap, it will be seen that any such contents will cause the feeler 143 to remain in its depressed position which would normally cause glue to be applied to the portions of the outside flaps corresponding to the gap between the inside flaps. Any contents sagging below the level of the supporting plate 141 into the recess 152, however, strike the detector 149, thus causing the contact arm 151 to pivot and disconnect the micro switch 138 which breaks the circuit and de-energizes the solenoids 136 and 164 and thus causes the glue-applying rollers to move into their inoperative

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positions, notwithstanding that the feeler 143 is still depressed by the sagging contents.

The above description has been confined to the case where the upper and lower flaps of the containers are identical in construction. In other cases, the upper and lower gluing devices may be operated independently by the provision of a further feeler similar to the feeler 143 arranged in the path of the upper surface of the containers and arranged to operate a further micro switch independently controlling the solenoids 164.

I claim:

1. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, operating means for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, and a feeler member movably mounted in the apparatus with its feeler projecting into the path followed by the folded inside flaps of the containers so as to be engaged thereby and moved into an operative position during the passage of the containers through the apparatus and maintained in that position during continuance of such engagement, and means inter-connecting the operating means and the feeler member and responsive to said movement of the feeler member for causing operation of said operating means.

2. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, electrically operated means including a micro switch for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, and a feeler member pivotally mounted in the apparatus with its feeler projecting into the path followed by the folded inside flaps of the containers so as to be engaged thereby and moved into an operative position during the passage of the containers through the apparatus and maintained in that position during continuance of such engagement, and a contact arm on said feeler member arranged to operate said micro switch upon pivotal movement of said feeler member so as to cause operation of said operating means.

3. Apparatus according to claim 2, wherein the electrically operated means includes a solenoid under the control of said micro switch.

4. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, operating means for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, a feeler member pivotally mounted in the apparatus with its feeler projecting into the path followed by the folded inside flaps of the containers so as to be engaged thereby and moved into an operative position during the passage of the containers through the apparatus and maintained in that position during continuance of such engagement, a contact arm

on said feeler member, a solenoid operatively connected to said operating means, and a micro switch controlling the movement of said solenoid, movement of said feeler into operative position causing said contact arm to operate said micro switch thus causing said solenoid to operate said operating means.

5. Apparatus according to claim 1, comprising a container-supporting plate along which the containers are fed through the apparatus, said plate being formed with an opening in its supporting surface arranged to receive any contents of the container that may sag from any gap between the inside flaps thereof, a detector member movably mounted in the apparatus with its detector arranged in said opening at or slightly below the level of the container-supporting plate so as to detect any such sagging contents and means responsive to the movement of said detector member upon such detection for rendering said operating means inoperative notwithstanding that said feeler member may still be in its operative position.

6. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, electrically operated means including a micro switch for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, a container-supporting plate formed with a recess in its supporting surface into which any contents sagging from the containers may pass, a feeler member pivotally mounted in the apparatus with its feeler projecting through said recess in said plate, into the path followed by the folded inside flaps of the containers so as to be engaged thereby and moved into an operative position during the passage of the containers through the apparatus and maintained in that position during continuance of such engagement, a contact arm formed on said feeler member and arranged to operate said micro switch upon pivotal movement of said feeler member into operative position, a detector member movably mounted on said plate with its detector projecting through said plate into said recess into a position just below the level of said supporting surface so as to detect and be moved into operative position by any contents sagging into said recess, and means responsive to such detecting movement of said detector member for rendering said operating means inoperative notwithstanding that said feeler member may still be in its operative position.

7. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, electrically operated means for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, a container-supporting plate formed with a recess in its supporting surface into which any contents sagging from the containers may pass, a pivoted feeler member projecting through said recess in said plate, into the path of movement of the containers so as to be moved into operative position by engagement with the inside flaps of each container during its

passage through the apparatus and maintained in that position during continuance of such engagement, a contact arm on said feeler member, a solenoid operatively connected to said operating means, a micro switch controlling the movement of said solenoid, movement of said feeler into operative position causing said contact arm to operate said micro switch thus causing said solenoid to operate said operating means, a detector member movably mounted on said plate with its detector projecting through said plate into said recess into a position just below the level of said supporting surface so as to detect and be moved into operative position by any contents sagging into said recess, and means responsive to the detecting movement of said detector member for rendering said operating means inoperative notwithstanding that said feeler member may still be in its operative position.

8. Packaging apparatus of the type described, comprising means for feeding a succession of containers through the apparatus with their inside flaps folded into closed position and their outside flaps folded outwardly preparatory to the application of glue thereto, a glue-applying roller, electrically operated means for moving the glue-applying roller into gluing engagement with the outside flaps of the containers during their passage through the apparatus, a container-supporting plate formed with a recess in its supporting surface into which any contents sagging from the containers may pass, a feeler member pivotally mounted in the apparatus with its feeler projecting through said recess in said plate, into the path followed by the folded inside flaps of the containers so as to be engaged thereby and moved into an operative position during the passage of the containers through the apparatus and maintained in that position during continuance of such engagement, a contact arm formed on said feeler member, a first micro switch controlling the operation of said operating means, pivotal movement of said feeler member into operative position causing said contact arm to operate said first micro switch, a detector member pivotally mounted on said plate with its detector projecting through said plate into said recess into a position just below the level of said supporting surface so as to detect any contents sagging into said recess, a second micro switch wired in the circuit of said first micro switch, and a contact arm formed on said detector member and arranged upon detecting movement of said detector member to operate said micro switch and by such operation break said circuit thus rendering inoperative said operating means notwithstanding that said feeler member may still be in its operative position.

9. Apparatus according to claim 8, comprising a solenoid operatively connected to said glue-applying roller, operation of said solenoid being controlled by said first and second micro switches.

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