July 21, 1959 J. B. RODMAN Re. 24,668

APPARATUS FOR CUTTING FLATTENED CONTAINERS

Original Filed Feb. 17, 1955 10 Sheets-Sheet 1

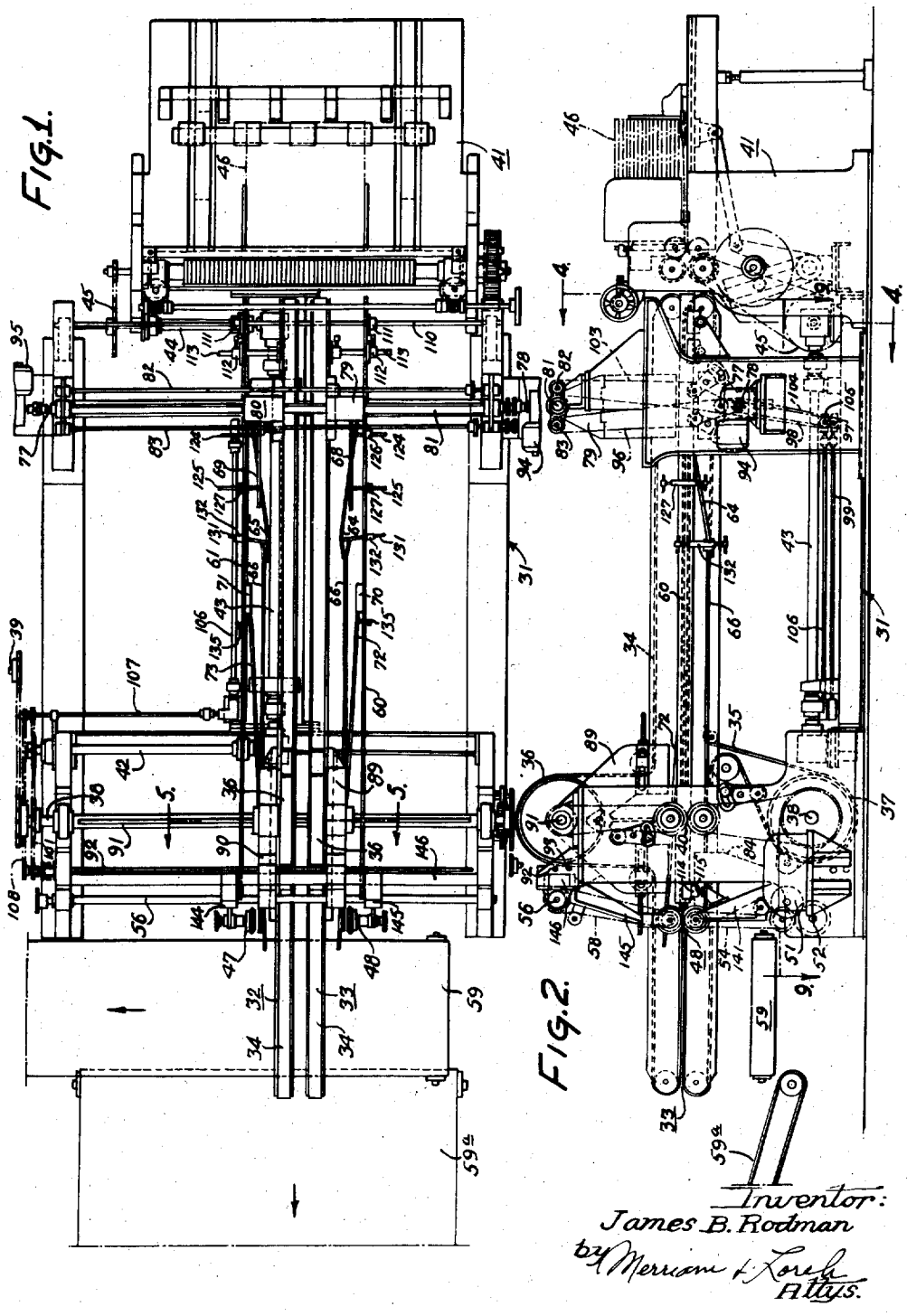


FIG. 1.

FIG. 2.

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FIG. 3.

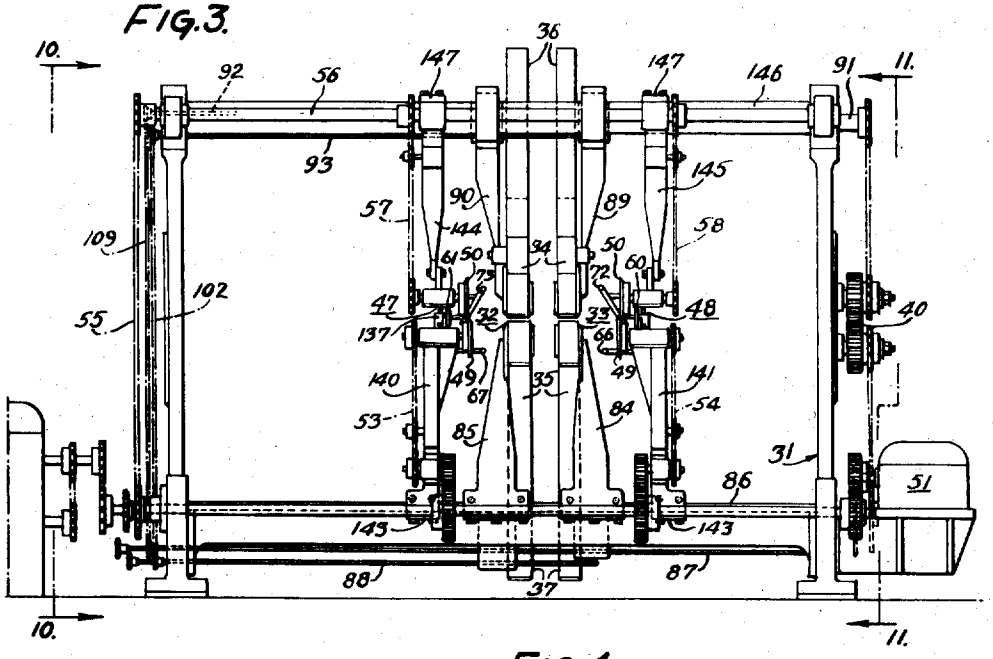
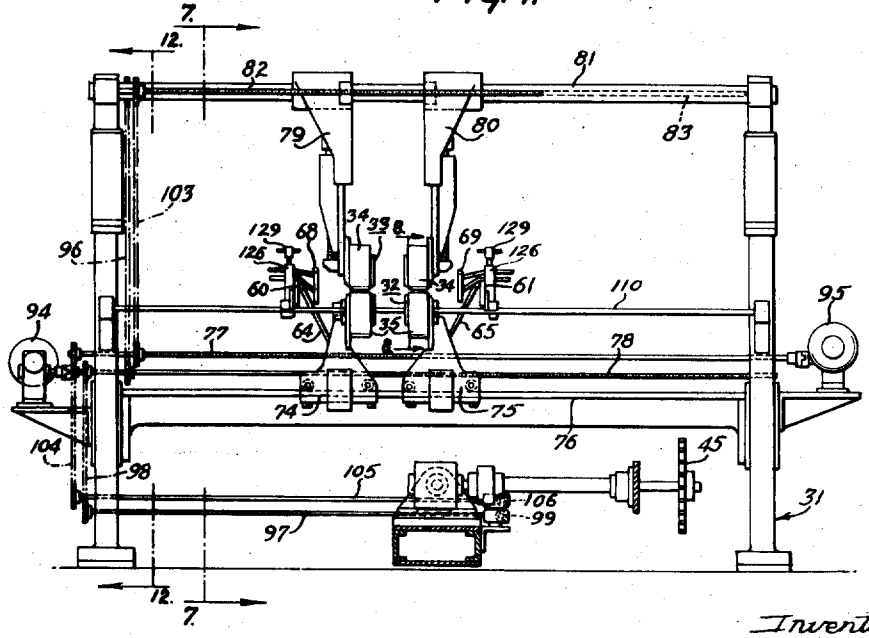


FIG. 4.



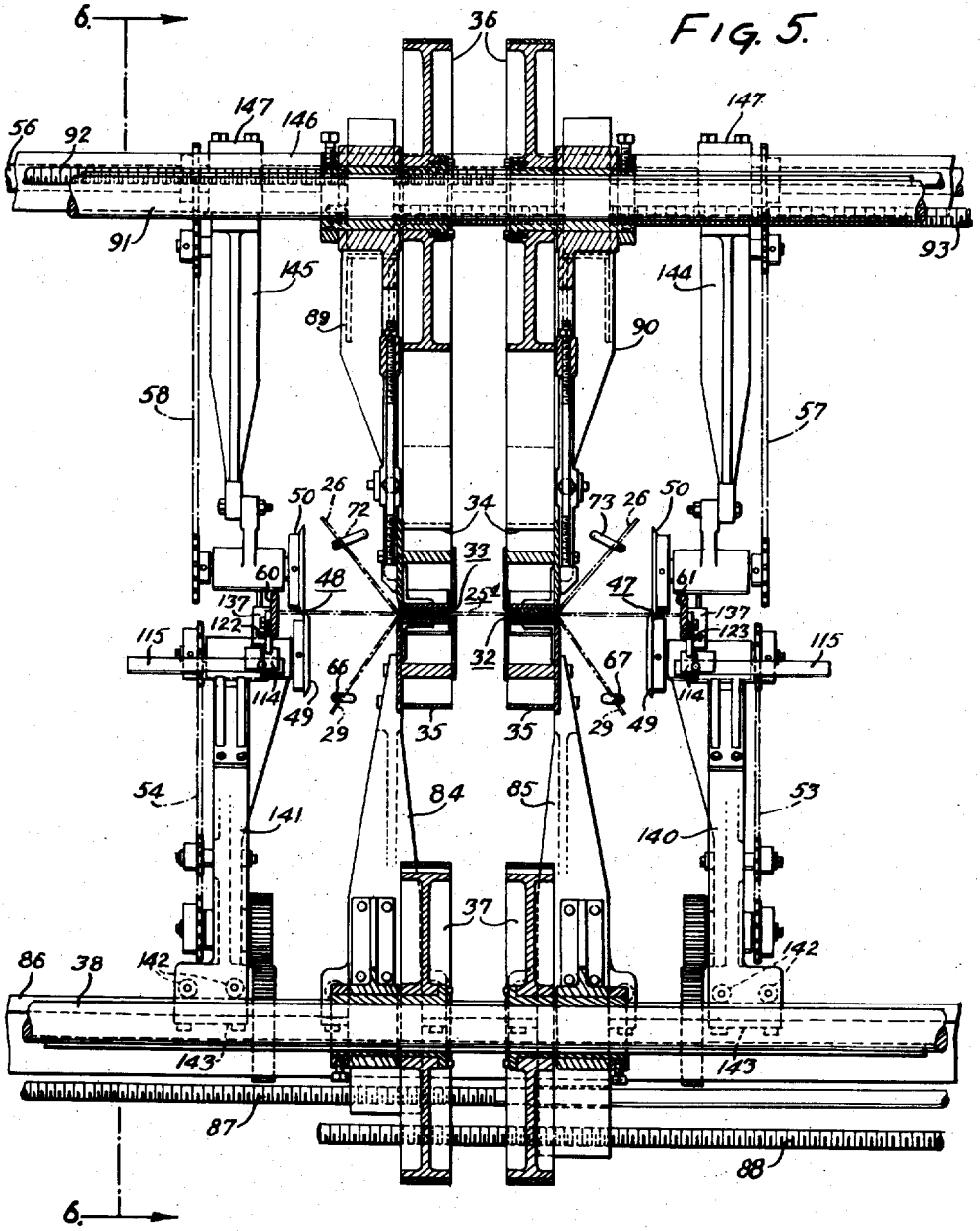
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APPARATUS FOR CUTTING FLATTENED CONTAINERS

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FIG. 5.



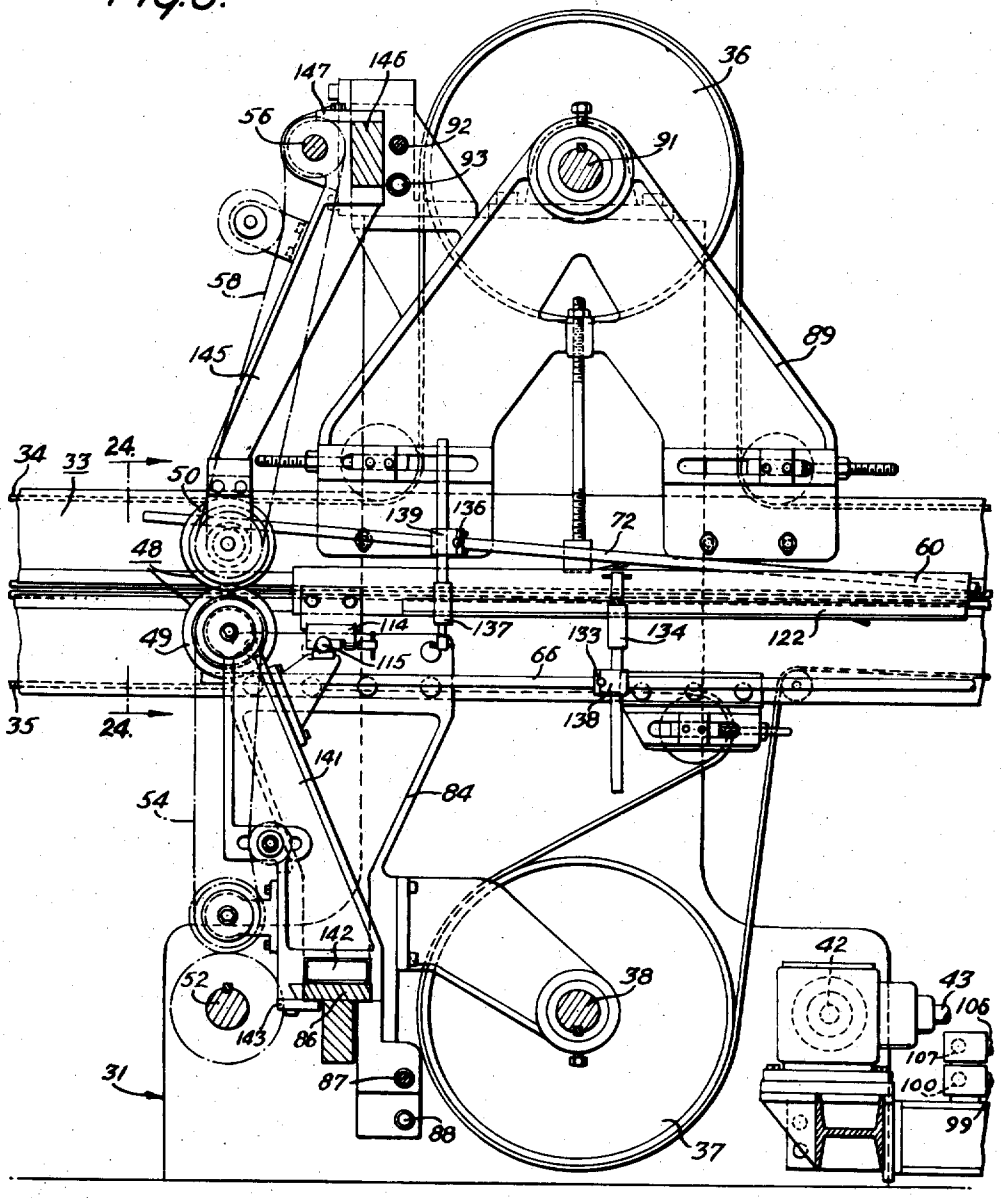
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FIG. 6.



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FIG. 8.

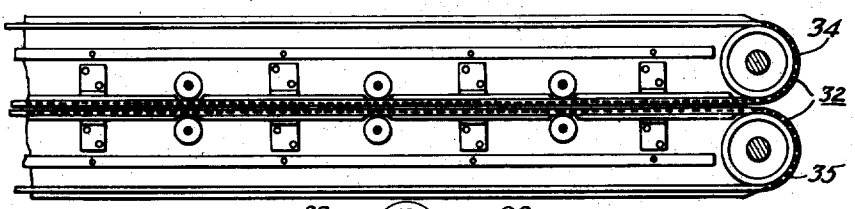
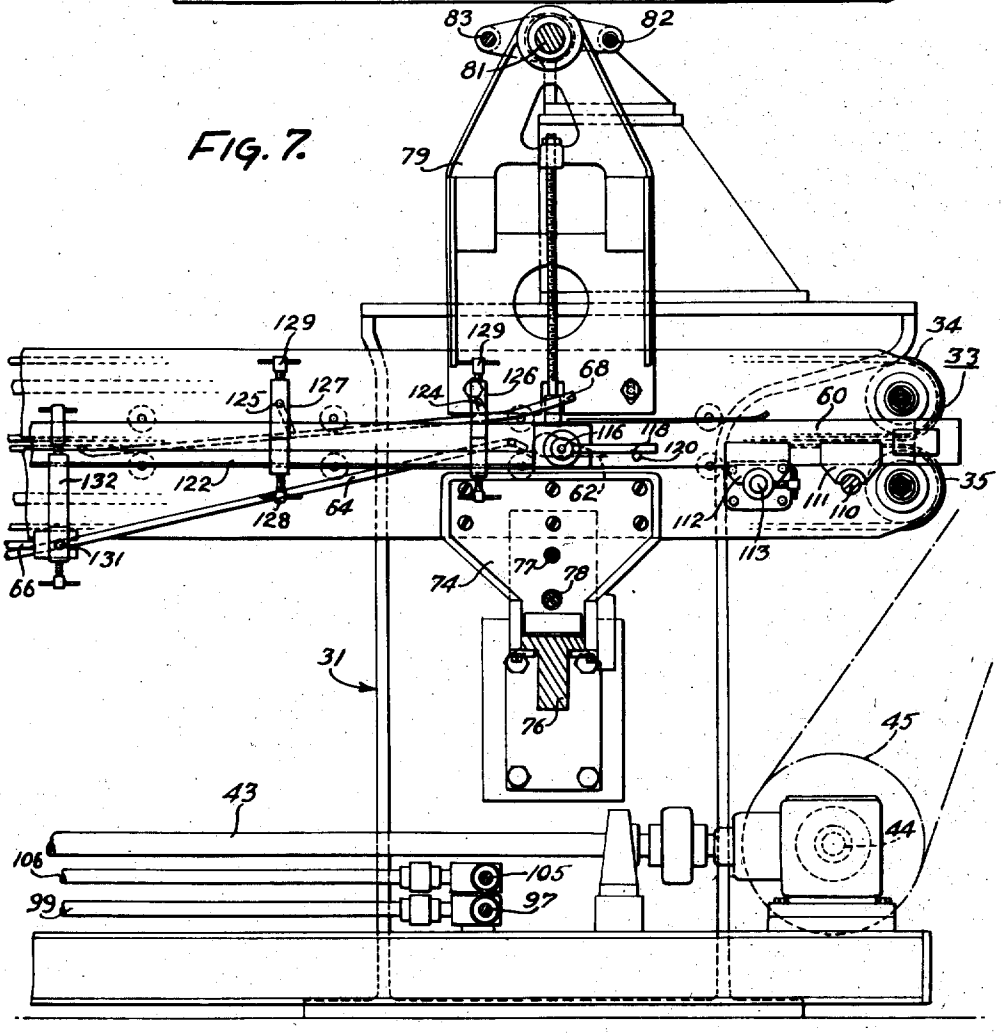


FIG. 7.



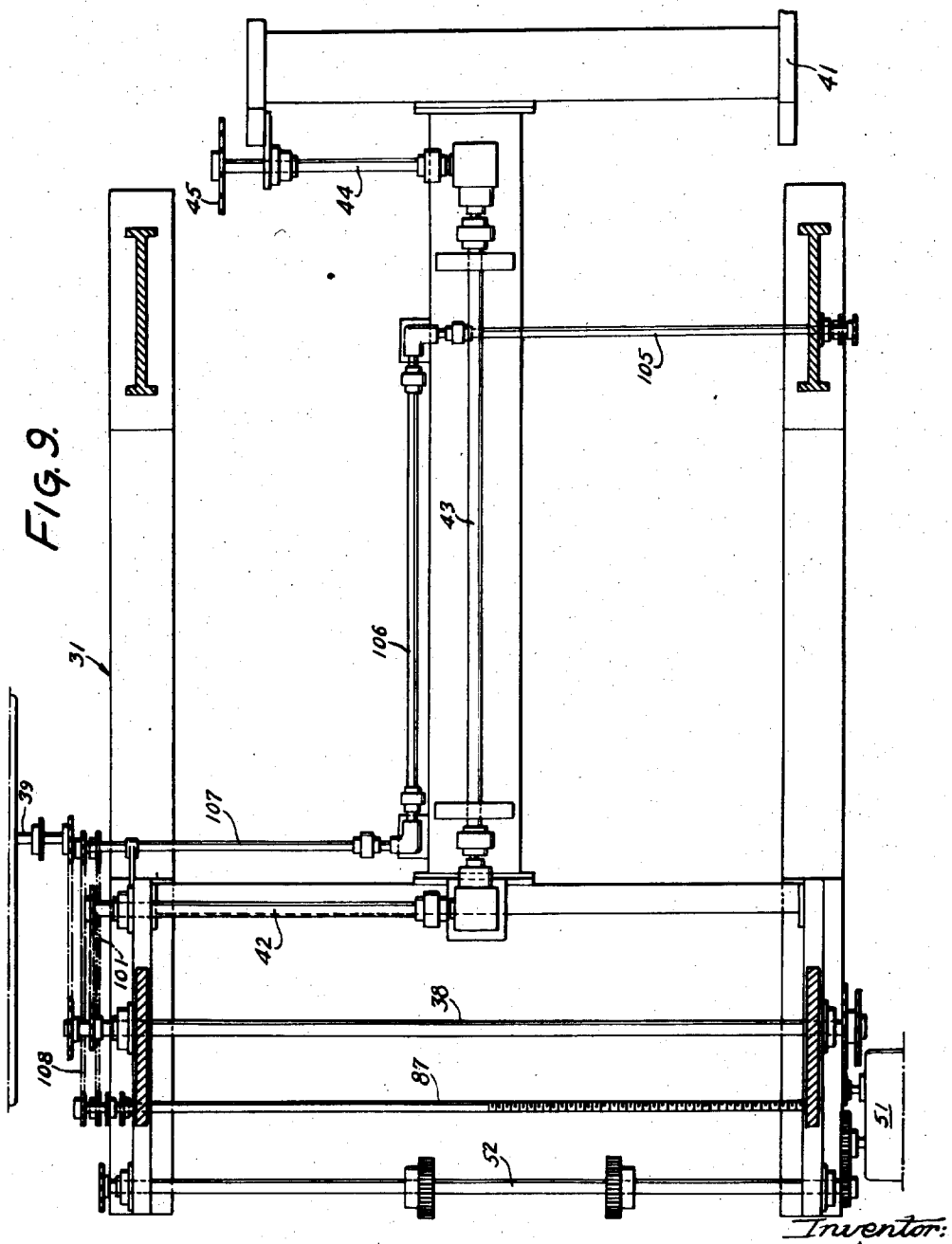
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FIG. 9.



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FIG. 10.

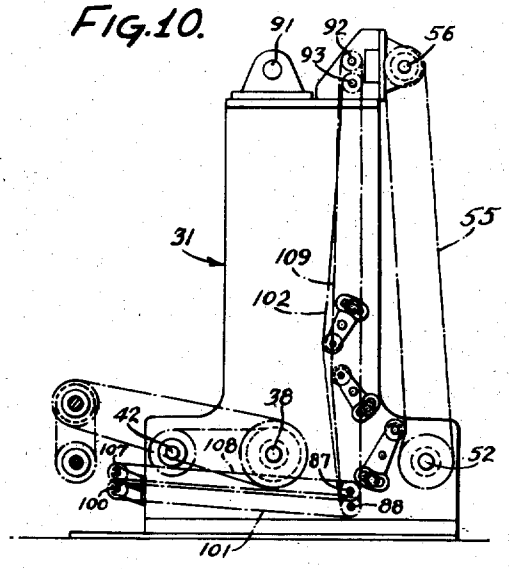


FIG. 11.

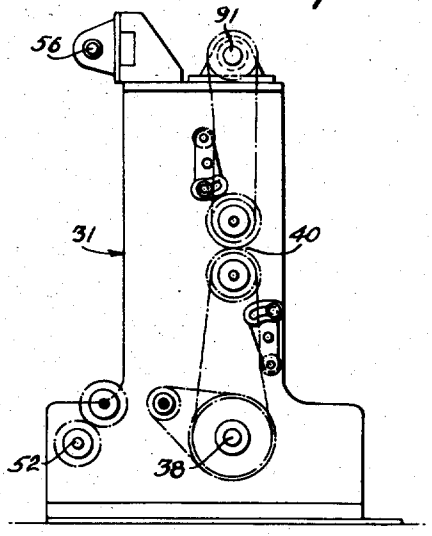


FIG. 19.

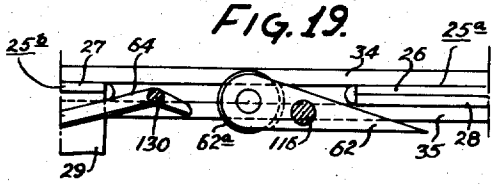


FIG. 12.

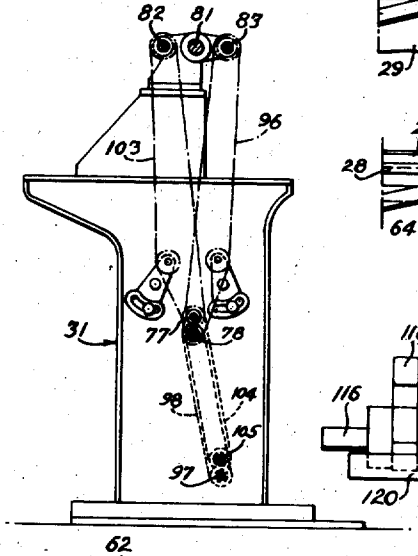


FIG. 20.

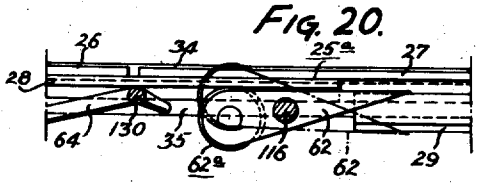
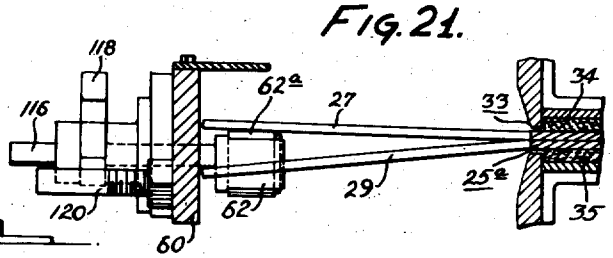


FIG. 21.



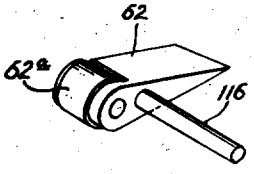


FIG. 22.

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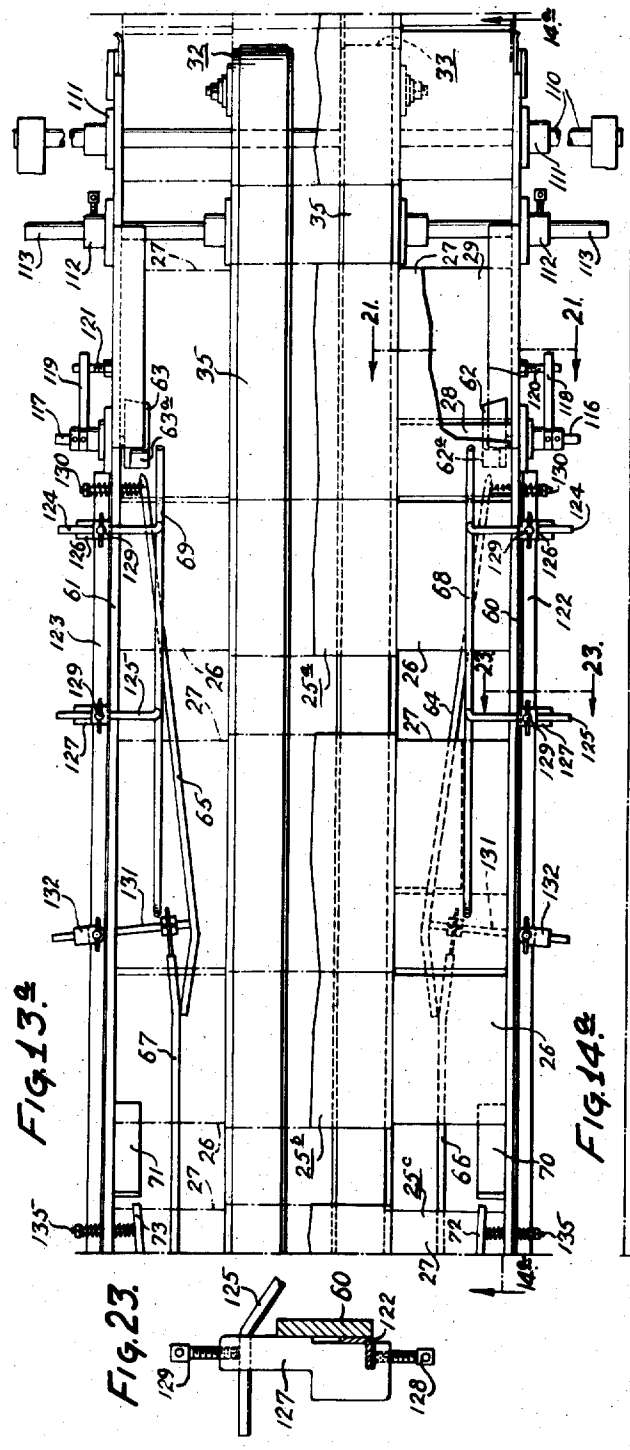


FIG. 13a.

FIG. 23.

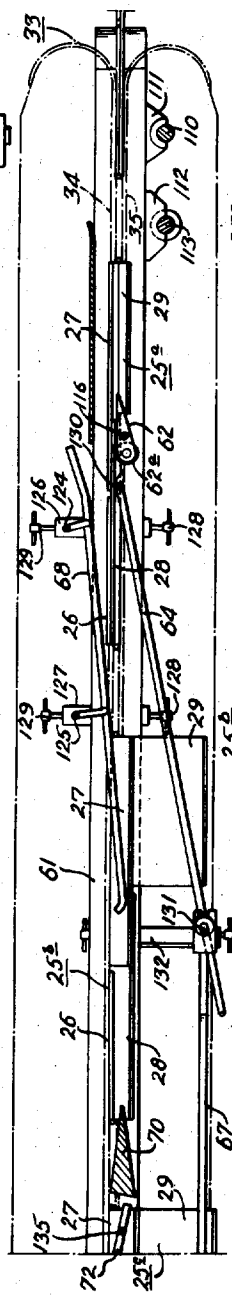


FIG. 14a.

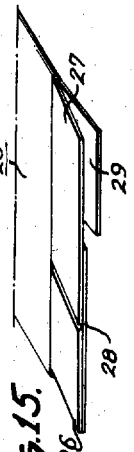


FIG. 15.

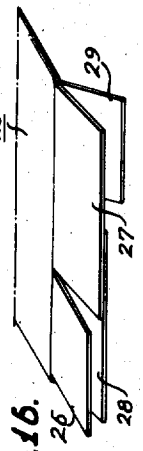


FIG. 16.

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APPARATUS FOR CUTTING FLATTENED CONTAINERS

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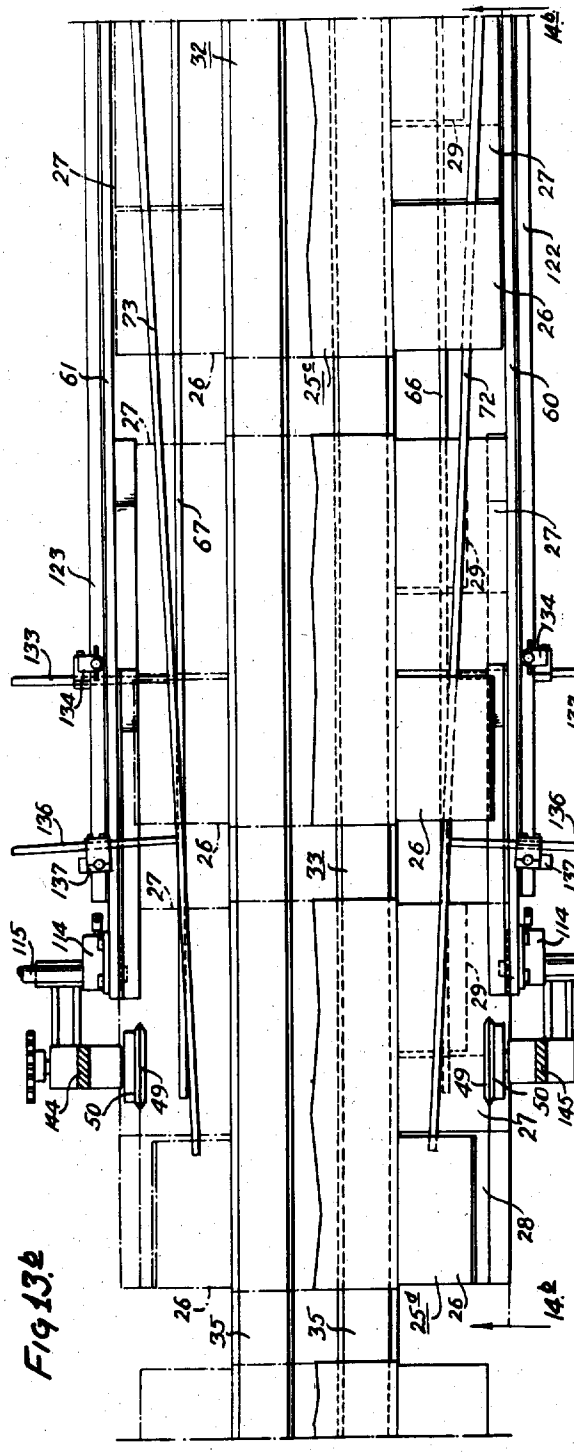


FIG. 13.2

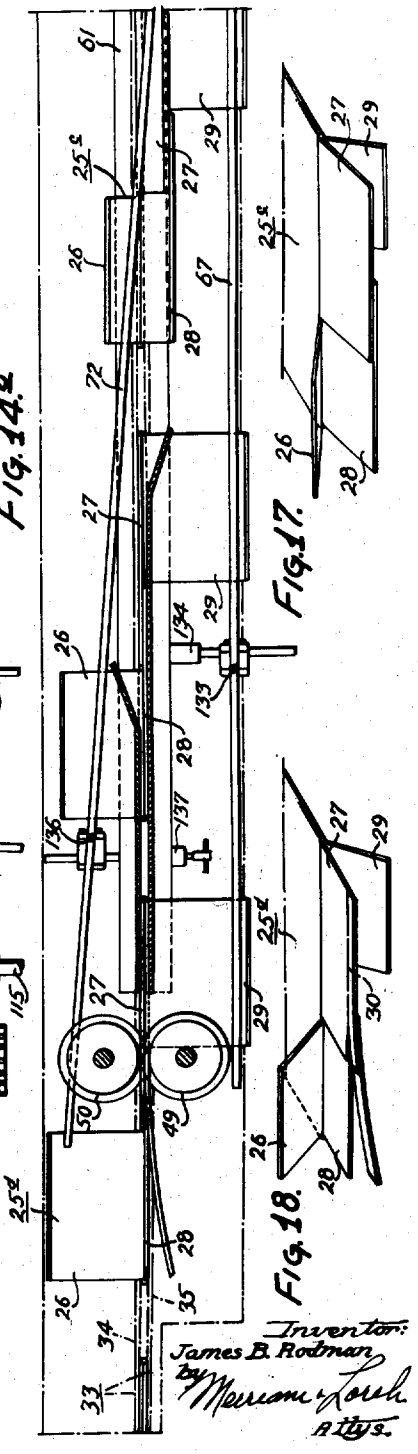


FIG. 14.2

FIG. 17.

FIG. 18.

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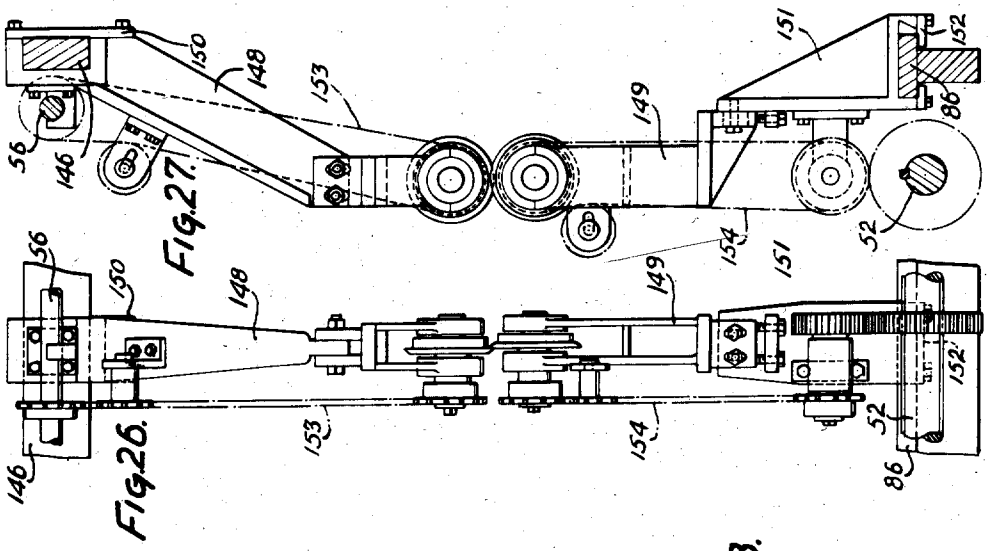


Fig. 27.

Fig. 26.

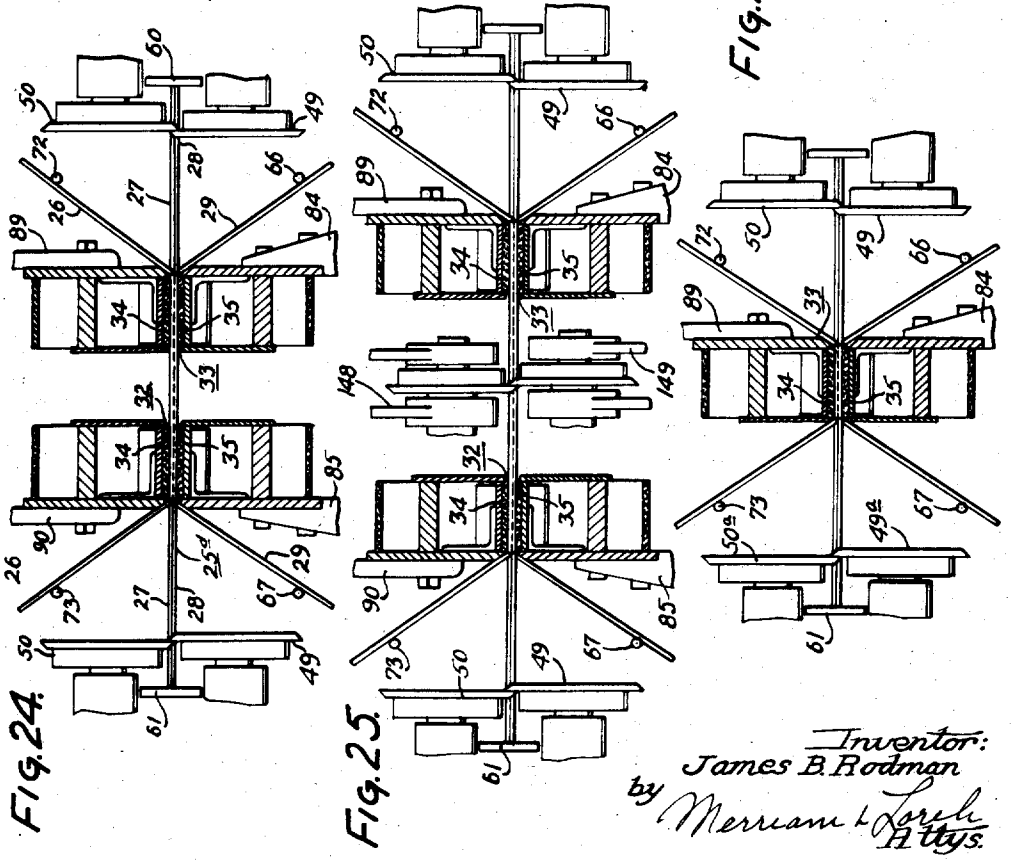


Fig. 28.

Fig. 24.

Fig. 25.

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United States Patent Office

Re. 24,668
Reissued July 21, 1959

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APPARATUS FOR CUTTING FLATTENED CONTAINERS

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Original No. 2,807,197, dated September 24, 1957, Serial No. 626,539, December 5, 1956, which is a continuation of Serial No. 488,926, February 17, 1955. Application for reissue February 19, 1959, Serial No. 794,485

38 Claims. (Cl. 93—58.4)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention is a continuation of my prior application Serial No. 488,926, filed February 17, 1955, entitled "Apparatus for Cutting Flattened Containers," and has to do with the manufacture of containers formed of cardboard or like material, such as solid fibre, or corrugated board. Such containers are generally of rectangular form comprising a body portion that forms the container walls and end portions or flaps hinged to the body portions. As customarily made, for example as by the machine of the character disclosed in the U.S. Patent No. 2,637,251, issued May 5, 1953, to Francis J. Spiess, the containers are in flattened or knocked-down condition. More particularly this invention relates to flap cutters for cutting flaps on flattened folded boxes in which the box is rectangular as distinguished from square and having flaps of unequal length, there being first a long flap and then a short flap, or vice versa. That is, in a collapsed folded box there are four flaps, two in each layer, i.e. one long and one short flap in each layer with the long flap in one layer overlapping the entire short flap in the other and also overlying part of the long flap. The words "overlapping" and "overlying" are here used regardless of which layer is physically above the other at any particular moment. These flaps are all of equal width as formed but in order to form the proper end closure for the box, i.e. with the ends of the flaps abutting, the width of the long flaps must be reduced. In the finished box the short flaps are half as wide as the long flaps are long and the long flaps are only half as wide as the short flaps are long. In other words, when folded, the long flaps between them span the short side and meet in the center, and the short flaps span the long side, and meet in the center of it.

This invention solves the problem of automatically cutting the long flaps to a width less than the short flaps while the folded boxes are being passed at rates of many thousand per hour through the machine. Previously, the means for flap cutting involved slow and tedious handling of the boxes, whereas the present mechanism does the entire job while the folded boxes are passing through the device at the above rates, and does not require that the boxes be handled in any way except to feed them into the machine. This is accomplished by using the long flap in one or both layers of the folded container as an effective part of the machine. Inasmuch as the flaps are part of the container there is thus no problem of inserting and removing a holding mechanism in the machine as would be the case if the long flaps themselves were not availed of for this purpose.

In the preferred form of the invention the containers are introduced to the mechanism with the long flap as the leading flap in the lower fold or layer of the flattened container. A member is provided which is engaged by this leading long flap which is moved upwardly. Inasmuch as the long flap in the lower layer is below both the short flap in the upper layer and part of the long flap in the upper layer, this upward movement moves all but the short flap in the lower layer out of the plane of the advancing container. When this flap is thus segregated it is engaged by another guide and spread, preferably so that it is at an angle of about 90 degrees to the body of the container.

The other flaps are then released and return to the plane of the container. Then, as the container advances, it engages a finger which presses upon the leading short flap in the upper layer and moves it and the underlying long flap down, say 30 degrees. This finger will then also contact the upper trailing long flap and as the container moves forward the short upper flap will ultimately pass out from under the finger. When this happens the natural resiliency of the paperboard will cause the short upper flap to spring back toward its original position while the upper long flap together with the underlying larger flap are still being held down by the finger. While so separated the upper short flap is engaged by a wedge or spreader and moved upwardly, preferably to an angle of about 90 degrees. It will be noted that the lower long flap does not also spring upwardly because the upper long flap acts as an extension of the holding wedge and holds down this flap, even after the wedge itself no longer overlies the lower long flap.

Some cardboard containers have upper and lower sections which interfit in telescopic relation and this invention provides for the central slitting of a flattened container where it is desired to form two such sections from a single formed container.

Other novel features of the invention will be apparent from the following detailed description with reference to the accompanying drawings, in which:

Fig. 1 is a plan view of an apparatus or machine embodying the present invention;

Fig. 2 is a side elevational view of the machine;

Fig. 3 is an end elevational view taken from the discharge end of the machine;

Fig. 4 is a sectional view taken on line **4—4** of Fig. 2;

Fig. 5 is a relatively large scale sectional view taken on line **5—5** of Fig. 1;

Fig. 6 is a sectional view taken on line **6—6** of Fig. 5;

Fig. 7 is a relatively large scale sectional view taken on line **7—7** of Fig. 4;

Fig. 8 is a partial longitudinal sectional view on line **8—8** of Fig. 4, showing the conveyor belts for moving the flattened containers;

Fig. 9 is a relatively large scale sectional view taken on line **9—9** of Fig. 2;

Fig. 10 is a sectional view taken on line **10—10** of Fig. 3;

Fig. 11 is a sectional view taken on line **11—11** of Fig. 3;

Fig. 12 is a sectional view taken on line **12—12** of Fig. 4;

Figs. 13a and 13b together comprise an enlarged plan view of that portion of the apparatus which performs the flap-deflecting and flap-cutting operations;

Fig. 14a is a view taken on line **14a—14a** of Fig. 13a;

Fig. 14b is a view taken on line **14b—14b** of Fig. 13b;

Figs. 15 to 18 are perspective views showing flattened containers at different stages of the flap-deflecting and flap-cutting operations;

Figs. 19 and 20 are views illustrating the manner in which the first flap-deflecting operation is performed;

Fig. 21 is a sectional view taken on line **21—21** of Fig. 13a;

Fig. 22 is a perspective view of one of the flap deflecting elements;

Fig. 23 is a sectional view taken on line 23—23 of of Fig. 13a;

Fig. 24 is a relatively large scale sectional view taken on line 24—24 of Fig. 6 showing more clearly how some of the flaps are deflected while others are cut;

Fig. 25 is a view similar to Fig. 24 showing the use of a central cutter or slitter to divide the flattened container into two sections when it is desired to produce a container of the telescopic type;

Fig. 26 is a front view of the central slitter;

Fig. 27 is a side view of the same; and

Fig. 28 is a view similar to Fig. 24 showing the use of a single conveyor unit when containers of shallow depth are to be formed.

The drawings illustrate in detail a complete machine which has been used successfully for the purposes of the present invention. Many of the mechanical details of the machine are of no particular interest, and it will suffice to describe the machine only to the extent necessary to afford a clear understanding of the invention.

It is thought that a clear understanding of the principal purpose and functioning of the machine may best be had by first referring to Figs. 15 to 18 which show flattened containers 25a to 25d at different stages of progression through the machine. In these figures, only a portion of the flattened container is shown which comprises the central body portion and flaps on overlying sides of one end thereof. In the illustrations, the flaps of one end only of the carton are shown, but it will be understood that there are similar flaps on the opposite end of the body portion. In passing through the machine, the flaps on each side of the flattened container are disposed as shown, there being a small upper leading flap 26, a large upper following flap 27, a large lower leading flap 28, and a small lower following flap 29. As each flattened container moves through the machine, the small flaps 26 and 29 are separated from the large flaps 27 and 28, and the large flaps are cut while the small flaps are held separated therefrom. The necessity for cutting the large flaps arises from the fact that these flaps will extend widthwise or across the shorter dimension of the rectangular container, and therefore, it is necessary to cut them in order that they will not overlap, assuming that it is desired to have the small flaps as well as the large flaps abut when the container is closed.

As each flattened container progresses through the machine, the flap 29 is first separated from the other flaps as shown in Fig. 15 and is deflected downwardly and held in a fully deflected position. The other flaps are then temporarily depressed and the flap 26 is first released to effect its separation by reason of its springing back to horizontal position as shown in Fig. 16. While it is thus separated, flap 26 is deflected upwardly and is held in fully deflected position as shown in Figs. 17 and 18. The manner in which the flap separating and deflecting operations are performed will be described in detail later. At the stage illustrated in Fig. 17, the two small flaps 26 and 29 have been separated and deflected, and the large flaps 27 and 28 have been permitted to return to horizontal position. These latter flaps are guided in that position as they undergo the cutting operation as shown in Fig. 18, the line of cut being represented by the broken line 30.

Referring now to the general structure of the machine as shown particularly in Figs. 1 to 8, the stationary framework of the machine is designated generally by reference numeral 31. The flattened containers are carried through the machine from right to left as viewed in Figs. 1 and 2, preferably by means of cooperating endless belt conveyors which frictionally engage the upper and lower surfaces of the central body portion of each flattened container, leaving the flaps on each side free for deflection. In the machine illustrated, there are two such conveyors 32 and 33, each comprising an upper belt 34 and a lower belt 35. These belts extend respectively about pulleys 36 and 37 through which they are driven. Adjustable tensioning devices which are not of particular interest are provided in association with each of the belts. Pulley 37 is driven through shaft 38 (see Fig. 9) from a power-operated drive shaft 39. Pulley 36 is driven from shaft 38 through the chain and gear drive designated generally by reference numeral 40.

The flattened containers are fed to the machine from a known form of feeding device designated generally by reference numeral 41, which device is driven from shaft 38 (see Fig. 9) through shafts 42, 43, and 44 which are interconnected by encased bevel gears. The power take-off for the feeding device is at the driven sprocket 45. As we are not here concerned with the feeding device, detailed description thereof is unnecessary and it suffices to note that this device feeds flattened containers successively to the machine from a stack shown at 46 in Fig. 2. Obviously, the flattened containers could be fed by hand.

The flap-cutting on the opposite ends of each flattened container is performed by the cutting devices designated generally by reference numerals 47 and 48 (see Fig. 3). Each of these devices comprises a lower cutting wheel 49 and an upper cutting wheel 50 which are power driven from a power source 51. The lower cutting wheels are driven from shaft 52 through gear and chain drives represented generally by reference numerals 53 and 54. The upper cutting wheels are driven from shaft 52 through chain drive 55, shaft 56, and chain drives 57 and 58. As may be seen in Figs. 1 and 2, a transverse conveyor 59 serves to catch the falling pieces which are cut from the flaps, while the flattened containers with cut flaps are fed to a conveyor 59a.

Considering now in greater detail the manner in which the flap-deflecting and flap-cutting operations are performed, reference is made particularly to Figs. 13a and 13b and 14a and 14b. In considering these figures, Figs. 13a and 14a should be placed to the right of Figs. 13b and 14b. The flattened containers move from right to left. As each flattened container is carried along by the belt-conveying means, it passes between guide bars 60 and 61 which extend substantially the full length of the machine. These guide bars are normally stationary but they are adjustable as to their transverse spacing to accommodate different sized flattened containers as hereinafter described. As each flattened container passes between the guide bars 60 and 61, the flap-deflecting operations are performed, preparatory to the flap-cutting operation, by the elements now to be described. At the opposite sides of the path traversed by each flattened container, and located near the beginning of said path, are wedges 62 and 63 which are preferably pivoted and normally gravitate to the position shown in Fig. 19 and shown in dotted outline in Fig. 20. The wedges have rollers 62a and 63a thereon (see Fig. 22). As the forward end of each flattened container encounters the wedges, the undersurfaces of the leading flaps 28, which underlie flaps 26 and 27, engage the wedges and the flaps 26, 27, and 28 (see Fig. 15) are slightly raised by the wedges. At the same time the wedges are caused to rotate about their pivots to the solid line position of Fig. 20. By the time the following or trailing small flap 29, which underlies flap 27, on each side of the flattened container reaches the wedge, the latter has its pointed end directed for entry between the flap 29 and the slightly-raised overlying large flap 27. The wedge effectively pries the flap 29 downwardly away from the flap 27, as shown in Figs. 20 and 21. Fig. 15 shows the condition on each side of the flattened container at this stage of its progression through the machine, the flap 29 being deflected somewhat downwardly from the general horizontal plane of the flattened container.

As the flattened container moves further toward the

cutting devices **47** and **48**, the trailing flap **29** on each side of the container is further deflected downwardly by deflecting rods **64** and **65**, and is then held in fully deflected position by rods **66** and **67**. Figs. 16 to 18 show the process of deflection of the flap **29**. In the meantime, the upper leading small flap **26** on each side of the flattened container is separated and deflected upwardly. After the initial deflection of flap **29**, as shown at the right side of Fig. 14a, the forward edges of the flaps on each side of the flattened container come into engagement with stationary deflecting rods **68** and **69**. Each of these rods depresses the other three flaps **26**, **28**, and **27** on each side of the flattened container from their normal horizontal plane. As the small upper flap **26** on each side of the flattened container passes from engagement with the associated deflecting rod it is released and springs back to the horizontal position by reason of the resiliency of the cardboard material of which the flattened container is formed. Fig. 16 shows the condition on each side of the flattened container at this time with flap **29** being substantially deflected downwardly, flaps **27** and **28** being deflected downwardly to a lesser extent because flap **27** is under rod **68** and overlies flap **28**, and flap **26** being disposed in the normal horizontal plane due to its resiliency and being separated from the underlying flap **28**.

While the flaps **27** and **28** are still held depressed, the small upper flaps **26** engage and are deflected upwardly by stationary wedges **70** and **71**. Fig. 14a shows how each of the upper flaps **26** comes into engagement with the stationary wedge for upward deflection thereby. The depressed large flaps **27** and **28** pass beneath the stationary wedges **70** and **71**, and after passing the stationary wedges, these large flaps are permitted to return to their normal horizontal position and they pass between guides as shown in Fig. 14b. In the meantime, the upper small flaps **26** on the opposite sides of the flattened container are further deflected upwardly by deflecting rods **72** and **73**, and are held in fully deflected position by these rods.

Figs. 17 and 18 show the condition on each side of the flattened container in the latter stages of its progression through the machine.

With the small flaps **26** and **29** deflected upwardly and downwardly respectively, and with the large flaps **27** and **28** in horizontal position, as shown in Fig. 18, the flattened container is fed to the flap-cutting devices **47** and **48**. These devices cut the large flaps **27** and **28** along a predetermined line as represented at **30** in Fig. 18, so as to reduce these flaps to the desired size.

From the foregoing description, it will be seen that the apparatus provided by this invention is novelly characterized in that it comprises a combination of elements for performing in sequence the operations above described. Such combination comprises means for separating and initially deflecting one of the small flaps in one direction out of the plane of the flattened container, means for temporarily deflecting the other flaps in the same direction and first releasing the other small flap to effect separation of the latter, means for deflecting said other small flap in the opposite direction out of said plane, and means for cutting the large flaps while the small flaps are in deflected positions.

In a machine of the character here involved, it is desirable to be able to make adjustments to accommodate different sized flattened containers and also to accommodate flattened containers having different relative sizes of the central body portion and the flap portions. Therefore, it is desirable that the belt conveyors, the side guide bars, the flap-deflecting elements, and the flap-cutting devices shall all be adjustable transversely of the machine.

As may be seen in Fig. 4, the belt-supporting members at the input end of the machine comprise lower brackets **74** and **75** which are movably supported for transverse movement on a supporting rail **76** and which are adapted to be actuated respectively by screw shafts **77** and **78**. Upper brackets **79** and **80** at the same end of the machine are slidably mounted on a transverse rod **81** and are adapted to be actuated by screw shafts **82** and **83**. As may be seen in Fig. 5, the belt-supporting members at the discharge end of the machine comprise lower brackets **84** and **85** which are slidably mounted for transverse movement on rail or track **86** and are adapted to be actuated respectively by screw shafts **87** and **88**. The upper brackets **89** and **90** at the same end of the machine are mounted for transverse movement on rod **91** and are adapted to be actuated respectively by screw shafts **92** and **93**.

Looking lengthwise of the machine from the input end, as in Fig. 4, the left-hand and right-hand brackets which support the belts are motor-operable through their respective screws from two motors **94** and **95**. Motor **94** drives screw shaft **78** to which screw shaft **83** is connected through chain drive **96**. The driven screw shaft **78** is also connected to a shaft **97** through chain drive **98**. Shaft **97** is geared to a longitudinal shaft **99**, which in turn is geared to a shaft **100** near the discharge end of the machine. The latter shaft is connected by chain drive **101** to screw shaft **88**, which in turn is connected through chain drive **102** to screw shaft **93**.

Motor **95** drives screw shaft **77** which is connected to screw shaft **82** through chain drive **103**. Screw shaft **77** is also connected through chain drive **104** to a transverse shaft **105** which is geared to a longitudinal shaft **106**. The latter in turn is geared to a transverse shaft **107** which is connected through chain drive **108** to screw shaft **87**. The latter is connected through chain drive **109** to screw shaft **92**.

Referring to the mounting of the guide bars **60** and **61**, at the input end of the machine, these bars are slidably supported by the transverse rod **110**. As may be seen in Fig. 7, each of the guide bars has a plate **111** secured thereto which is recessed to seat on the rod **110**. As also shown in Fig. 7, each of the guide bars has a clamp **112** secured thereto, and the clamp engages a stud **113** projecting from the side of the associated conveyor structure. At the discharge end of the machine, as shown in Figs. 5 and 6, each of the guide bars has a clamp **114** secured to it, and the clamp engages a rod **115** carried by the cutter assembly. Loosening of the clamp permits relative movement between the guide bar and the cutter assembly.

The flap-deflecting elements hereinbefore described are all carried by the guide bars **60** and **61**. The movable wedges **62** and **63** (Fig. 13a) are mounted on studs **116** and **117** which are rotationally supported by the guide bars. The studs carry arms **118** and **119** which help to gravitationally bias the wedges and are engageable with fixed stops **120** and **121**. The fixed wedges **70** and **71** are directly secured to the guide bars. As may be seen in Fig. 5, the guide bars have angle supports **122** and **123** secured along their length, thus providing a flange on each guide bar for supporting the deflecting rods. As shown in Fig. 13a, each of the deflecting rods **68** and **69** has arms **124** and **125** by which it is supported by posts **126** and **127** which are mounted on the supporting flange. As shown in Fig. 23, each post is secured to the supporting flange by a screw **128**, and each arm is secured to its post by a screw **129**. Each of the deflecting rods **64** and **65** has an arm **130** at its forward end which is spring mounted to the associated guide bar, and has an arm **131** at its other end supported by a post **132** mounted on the supporting flange. Each of the deflecting rods **66** and **67** has its forward end secured to arm **131** and has an arm **133** at its other end by which it is supported by post **134** mounted on the supporting flange. Each of the deflecting rods **72** and **73** has an arm **135** at its forward end which is spring mounted to the associated guide bar, and an arm **136** at its other end supported by post **137** which is mounted on the supporting flange. As may be seen in Fig. 6, the ends of the rods secured to the posts **134** and **137** are secured thereto by means of adjustable

clamps **138** and **139**. In this way, the rods are adjustable to permit adjustment of the degree of deflection of the small flaps.

As shown in Figs. 3 and 6, the cutting devices **47** and **48** are mounted for adjustment transversely of the machine. The lower supports **140** and **141** of these devices are supported on the transverse rail **86** and are provided with rollers **142** to facilitate movement along the rail. Each support is held in adjusted position by a clamping plate **143**, as may be seen in Fig. 6. The upper supports **144** and **145** for the cutting devices are supported on a transverse rail **146**. Each support is held in adjusted position by a clamping plate **147**. Transverse adjustment of the cutting devices is effected by loosening the clamping plates and moving the supports along the supporting rails.

As mentioned at the outset, where telescopic containers are being made, it is necessary to slit each flattened container centrally to divide it into two sections. This may be accomplished in the present machine by employing central slitting means as shown in Fig. 25. Such slitting means comprises cutter-carrying supports **148** and **149**. As shown in Figs. 26 and 27, the upper support **148** is mounted on transverse rail **146** and is held in position by a clamp **150**. The lower support **149** is mounted on rail **86** by means of bracket **151** having an associated clamping plate **152**. The two supports **148** and **149** are removably mountable on the rails **146** and **86**. The upper cutting element is driven from shaft **56** through chain drive **153**. The lower cutting element is driven from shaft **52** through chain drive **154**.

By means of the machine above described, it is possible to cut the large flaps on either end or on both ends of a flattened container with or without the center slitting. It is also possible to center slit the flattened contianer with or without the flap cutting. This is because the flap cutters are individually adjustable and therefore either or both may be moved to ineffective position, and the central slitting means may be inserted or removed.

In some instances one-piece containers are made which are of shallow depth when finished. Fig. 28 shows the use of only one of the belt conveyors to grip the narrow central portion of such a flattened container.

While a preferred embodiment of a machine embodying the invention has been illustrated and described, it will be apparent that various modifications of the machine are possible particularly with respect to design and construction of the various parts. It will be understood, therefore that the invention is not limited to the illustrated embodiment but contemplates such modifications as may occur to those skilled in the art.

I claim:

1. In an apparatus for cutting the large flaps of a flattened rectangular container having a central body portion and large and small flaps on at least one end thereof; means extending lengthwise of the apparatus and engageable with said flattened container to move the latter through the apparatus; means for deflecting the small flaps out of the plane of the flattened container as it is moved by said conveyor; and means for cutting the large flaps while the small flaps are in deflected positions.

2. The flap cutting apparatus claimed in claim 1 wherein said means for deflecting the small flaps includes a member for temporarily intercepting the path of travel of each large flap and thereby moving the other overlapped large flap from its normal path of travel by reason of the movement of the intercepted large flap.

3. The flap cutting apparatus claimed in claim 1 wherein the said means for deflecting the small flaps includes means for temporarily intercepting the path of travel of each large flap and thereby moving both the intercepted and the other overlapped large flap from the normal path of travel solely by reason of the movement of the intercepted large flap, the movement of the large flaps being to one side of the path of movement prior to deflecting one small flap and subsequently to the opposite side of the path of movement prior to deflecting the other small flap.

4. The flap cutting apparatus claimed in claim 1 wherein the small flap deflecting means sequentially deflect the small flaps to move one small flap to one side of the path of blank movement and the other small flap to the opposite side of the path of blank movement, and including also means for temporarily intercepting the path of travel of one large flap and for moving also the therewith partially overlapped large flap first to the opposite side of the normal path of travel prior to the deflecting movement of the first small flap from that to which the first small flap is moved, and also including means for temporarily intercepting the path of travel of said other large flap and moving it and its partially overlapped large flap to the opposite side of the path of travel in the time between deflection of the first and second short flaps.

5 [2]. In an apparatus for cutting the large flaps of a flattened rectangular container having a central body portion and large and small flaps on each end thereof; endless belts extending lengthwise of the apparatus and engageable with the upper and lower surfaces of said central body portion to move the flattened container through the apparatus; means for deflecting the small flaps out of the plane of the flattened container as it is moved by said belts; and means for cutting the large flaps while the small flaps are in deflected positions.

6 [3]. In an apparatus for handling rectaingular flattened paper board containers having sides of unequal length and having a flap on each side, the flaps lying in two adjacent layers, one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and part of a long flap which comprises; a conveyor for moving the flattened containers in a predetermined path with the flaps at one edge; means for moving the long leading flap toward the leading short flap whereby both leading flaps and the trailing long flap are diverted, leaving the trailing short flap separated therefrom; means for spreading the trailing short flap; means for moving the leading small flap and the trailing long flap against the leading long flap; means for first releasing the short flap whereby it separates itself from the trailing long flap because of its natural resilience; means for spreading the thus separated leading short flap; and means for holding both long flaps in a position away from the last mentioned spreading means.

7 [4]. In an apparatus for handling rectangular flattened paper board containers having sides of unequal length and having a flap on each side, the flaps lying in two adjacent layers one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and part of a long flap which comprises; a conveyor for moving the flattened containers in a predetermined path with the flaps at one edge; means for moving the long leading flap toward the leading short flap whereby both leading flaps and the trailing long flap are diverted, leaving the trailing short flap separated therefrom; means for spreading the trailing short flap; means for moving the leading small flap and the trailing long flap against the leading long flap; means for first releasing the short flap whereby it separates itself from the trailing long flap because of its natural resilience; means for spreading the thus separated leading short flap; means for holding both long flaps in a position away from the last mentioned spreading means; and means for cutting the long flaps while the short flaps are spread.

8 [5]. In an apparatus for handling rectangular flattened paper board containers having sides of unequal length and having a flap on each side, the flaps lying in two adjacent layers one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and part of a long flap which comprises; a conveyor for moving the flattened containers in a predetermined path with the flaps at one edge; means for

moving the long leading flap toward the leading short flap whereby both leading flaps and the trailing long flap are diverted, leaving the trailing short flap separated therefrom; means for spreading the trailing short flap; means for moving the leading small flap and the trailing long flap against the leading long flap; means for first releasing the short flap whereby it separates itself from the trailing long flap because of its natural resilience; means for spreading the thus separated leading short flap; means for holding both long flaps in a position away from the last mentioned spreading means; and means for cutting the container through the center of the body as it is moved through the apparatus.

9 [6]. In an apparatus for handling rectangular flattened paper board containers having sides of unequal length and having a flap on each end of each side, the flaps on each end lying in two adjacent layers, one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and a part of a long flap, which comprises a conveyor for moving the flattened containers in a predetermined path with the flaps at each edge; means for moving the long leading flaps toward the leading short flaps whereby the leading flap and the trailing long flap on each end of the body are diverted, leaving the trailing short flaps separated therefrom; means for spreading the trailing short flap on each end of the body; means for moving the leading small flap and the trailing long flap on each end against the leading long flap on each end; means for first releasing the short flap on each end whereby they separate themselves from and the trailing long flap on each end against the leading means for spreading the thus separated leading short flaps; and means for holding the long flap on each end in a position away from the last mentioned spreading means on each end.

10 [7]. In an apparatus for cutting the large flaps on at least one end of a flattened rectangular container having a body portion, two large flaps, and two small flaps on said end thereof; means engageable with the container for moving the flattened container substantially in a plane; means for deflecting one of the small flaps in one direction out of said plane; means for temporarily deflecting the other flaps in the same direction and first releasing the other small flap to effect a separation of the latter; means for deflecting said other small flap in the opposite direction out of said plane; and means for cutting the large flaps while the small flaps are in deflected positions.

11 [8]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion, two large flaps and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane; means for deflecting one of the small flaps of each end in one direction out of said plane; means for temporarily deflecting the other flaps of each end in the same direction and first releasing the other small flap of each end to effect separation of the latter; means for deflecting said other small flap of each end in the opposite direction out of said plane; and means for cutting the large flaps while the small flaps are in deflected positions.

12 [9]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion, two large flaps, and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane; means for initially deflecting one of the small flaps of each end in one direction out of said plane; means for further deflecting said small flaps in the same direction and for holding them in deflected position; means for temporarily deflecting the other flaps of each end in the same direction and first releasing the other small flaps to effect separation of the latter; means for deflecting said other small flaps in the opposite direction out of said plane; means for further deflecting said other small flaps in said opposite direction and for holding them in deflected positions; and means for cutting the large flaps while the small flaps are in deflected positions.

13 [10]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion, two large flaps, and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane, there being a small flap leading and a small flap following on each end of the moving flattened container; means for initially deflecting said following small flap of each end in one direction out of said plane; means for temporarily deflecting the other flaps of each end in the same direction and first releasing the leading small flaps to effect separation of the latter; means for deflecting said leading small flap of each end in the opposite direction out of said plane; and means for cutting the large flaps while the small flaps are in deflected positions.

14 [11]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion, two large flaps, and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane, there being a small flap leading and a small flap following on each end of the moving flattened container; means for initially deflecting the following small flap of each end in one direction out of said plane; means for further deflecting said following small flaps in the same direction and for holding them in deflected positions; means for temporarily deflecting the other flaps of each end in the same direction and first releasing said leading small flaps of each end to effect separation of the latter; means for deflecting said leading small flaps in the opposite direction out of said plane; means for further deflecting said leading small flaps in said opposite direction and for holding them in deflected positions; and means for cutting the large flaps while the small flaps are in deflected positions.

15 [12]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion, two large flaps, and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane, there being a small flap leading and a small flap following on each end of the moving flattened container; wedges engageable by the flaps, whereby upon entry of the wedge between said following small flaps and the adjacent large flap the former is deflected in one direction out of said plane; means for further deflecting said following small flaps in the same direction and for holding them in deflected positions; means for temporarily deflecting the other flaps of each end in the same direction and first releasing said leading small flaps of each end to effect separation of the latter; stationary wedges engageable by the separated leading small flaps to deflect them in the opposite direction out of said plane; means for further deflecting said leading small flaps in said opposite direction and for holding them in deflected positions; and means for cutting the large flaps while the small flaps are in deflected positions.

16 [13]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion and large and small flaps on each end thereof; means engageable with the central body portion for moving the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; means for initially deflecting and holding the small lower flaps downward; means for temporarily depressing the other flaps and first releasing the small upper flaps to effect separation of the latter; means for deflecting and holding said upper small flaps upward; and means for cutting the large flaps while the said small flaps are held in deflected positions.

17 [14]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion and large and small flaps on each end thereof; means engageable with the central body portion for moving the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; means for initially deflecting the small lower flap downward; means for further deflecting and holding said lower flap downward; means for temporarily depressing the other flaps and first releasing the small upper flaps to effect separation of the latter; means for deflecting and holding said upper flaps upward; and means for cutting the large flaps while the said small flaps are held in deflected positions.

18 [15]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion and large and small flaps on each end thereof; means engageable with the central body portion for moving the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; a pivoted wedge engageable by the flaps on each end and movable thereby to effect entry of the wedges between the small lower flap and the overlying large flap of each end to deflect the former downward; stationary means engageable by the deflected lower flaps to deflect them further to hold them in fully deflected positions; stationary means engageable by the upper flap surfaces to temporarily depress the other flaps and first release the small upper flaps of each end to effect separation of the latter from the large flaps; stationary means engageable by the separated upper flaps to deflect them upwardly and to hold them in fully deflected position; and means for cutting the large flaps while the small flaps are held in deflected positions.

19 [16]. In an apparatus for cutting the large flaps on each side of a flattened rectangular container having a central body portion and flaps on each end thereof; means engageable with the central body portion for moving the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; a pivoted wedge engageable by the flaps upon each end and movable thereby to effect entry of the wedges between the small lower flap and the overlying large flap on each end to deflect the former downward; stationary means engageable by the deflected lower flaps to deflect them further and to hold them in fully deflected positions; stationary means engageable by the upper flaps to temporarily depress the other flaps and first release the small upper flaps to effect separation of the latter from the large flaps; a stationary wedge engageable by the separated upper flaps of each end to deflect them upwardly, stationary means engageable by the deflected upper flaps to deflect them further and to hold them in fully deflected position; and means for cutting the large flaps while the small flaps are held in deflected positions.

20 [17]. In an apparatus for centrally slitting a flattened rectangular container and for cutting the large flaps on each end thereof; the flattened container having a central body portion; two large flaps, and two small flaps on each end thereof; means engageable with the central body portion for moving the flattened container substantially in a plane; means for initially deflecting one of the small flaps of each end in one direction out of said plane; means for temporarily deflecting the other flaps of each end in the same direction and first releasing the other small flap of each end to effect separation of the latter; means for deflecting said other small flaps in the opposite direction out of said plane; means for cutting the large flaps while the small flaps are in deflected positions; and means for simultaneously centrally slitting the flattened rectangular container.

21 [18]. In an apparatus for centrally slitting a flattened rectangular container and for cutting the large flaps on each end thereof; the flattened container having a central body portion and large and small flaps on each end thereof; means engageable with the central body portion for moving the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; means for initially deflecting the small lower flap of each end downward; means for further deflecting and holding said lower flap downward; means for temporarily depressing the other flaps of each end and first releasing the small upper flaps to effect separation of the latter; means for deflecting and holding said upper flaps upward; means for cutting the large flaps while the said small flaps are held in deflected positions; and means for centrally slitting the flattened rectangular container.

22 [19]. In an apparatus for cutting the large flaps on each end of a flattened rectangular container having a central body portion and large and small flaps on each end thereof; endless belts extending lengthwise of the apparatus and engageable with the upper and lower surfaces of said central body portion to move the flattened container horizontally with a small upper flap leading and a small lower flap following on each end of the flattened container; means for initially deflecting and holding the small lower flaps downward; means for temporarily depressing the other flaps of each end and first releasing the small upper flaps to effect separation of the latter; means for deflecting and holding said upper flaps upward; and means for cutting the large flaps while the said small flaps are held in deflected position.

23 [20]. In an apparatus for selectively cutting flaps of a flattened container having a central body portion and flaps on each end thereof; a pair of laterally adjustable side guides extending lengthwise of the apparatus; laterally adjustable endless belts extending lengthwise of the apparatus and engageable with the upper and lower surfaces of said body portion to move the flattened container between said guides; deflecting elements supported by said guides for deflecting flaps of the flattened container which are not to be cut; and laterally adjustable cutting devices for cutting the other flaps.

24 [21]. In an apparatus for centrally slitting a flattened rectangular container having spread flaps on each end of a central body; a pair of spaced lateral conveyor means extending lengthwise of the apparatus and engageable with the body portion for moving the flattened container through said apparatus, said lateral conveyor means being spaced and positioned to define the position of the container by engagement respectively with the bases of the spread flaps; and means for centrally slitting the flattened container as it is positioned and moved by said pair of conveyor means.

25 [22]. In an apparatus for centrally slitting a flattened container having a central body portion and spread flaps on each end thereof; laterally spaced endless belts extending lengthwise of the apparatus and engageable with the upper and lower surfaces of said central body portion on opposite sides of the longitudinal center of said portion, said belts being spaced and positioned to define the position of the container by engagement respectively with the bases of spread flaps; means for driving said belts to move the flattened container through the apparatus; and means for centrally slitting the flattened container as it is positioned and moved by said belts.

26 [23]. In an apparatus for handling rectangular flattened paper board containers having sides of unequal length and having a flap on each side, the flaps lying in two adjacent layers, one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and part of a long flap; which comprises a conveyor for moving the flattened container in a predetermined path with the flaps at one edge of the path; an inclined wedge for engaging and moving the long leading flap towards the leading short flap, whereby both leading flaps and the overlapping trailing long flap are diverted from said path leaving the trailing short flap

separated from the other flaps; inclined means for further moving the trailing short flap from said path; a second wedge for moving the leading small flap and the trailing long flap against the leading long flap, said wedge being of such size and positioned in the direction of said path to release the short flap while still engaging the long flap, whereby the short flap separates itself from the trailing long flap because of its natural resilience; means for further spreading the thus separated leading short flap from said path; and means for supporting both long flaps in said path.

27 [24]. In an apparatus for handling rectangular flattened paper board containers having sides of unequal length and having a flap on each side, the flaps lying in two adjacent layers, one superposed on the other, with a short flap overlying a long flap and a long flap overlapping a short flap and part of a long flap; which comprises a conveyor for moving the flattened container in a predetermined path with the flaps at one edge of the path; a pivoted inclined wedge for engaging and moving the long leading flap towards the leading short flap, whereby both leading flaps and the overlapping trailing long flap are diverted from said path leaving the trailing short flap separated from the other flaps; fixed inclined means for further moving the trailing short flap from said path; a second wedge for moving the leading small flap and the trailing long flap against the leading long flap, said wedge being of such size and positioned in the direction of said path to release the short flap while still engaging the long flap, whereby the short flap separates itself from the trailing long flap because of its natural resilience; means for further spreading the thus separated leading short flap from said path; and means for supporting both long flaps in said path.

28. In apparatus for cutting the long flaps of a flattened rectangular container having a central body comprising long and short panels and long and short flaps on at least one end thereof with the container body being folded and secured to form the container as a two-layer folded blank with the long flaps in partially overlapping relationship and with each short flap completely overlapped by the long flap of the opposite layer, means extending lengthwise of the apparatus and engageable with the over and under panel surfaces of the folded box-blank to move the latter longitudinally through the apparatus, means for deflecting one of the long flaps in one directions transverse to the path of blank travel and thereby also deflecting the short flap overlapped by said long flap, means for deflecting the previously undeflected short flap in the opposite transverse direction relative to the path of blank travel, means to maintain the said short-flap deflection, means for deflecting the second of the long flaps in the reverse direction transversely relative to the path of blank travel, means for deflecting the second short flap in a transverse direction relative to the path of blank travel opposite to that of the first short flap, means to maintain the second short-flap deflection, the said deflected long flaps then returning to substantially the initial travel path, and means to trim only the long flaps to a shortened length along the path of travel while the short flaps are maintained deflected.

29. Apparatus for cutting the long flaps of a flattened rectangular container having a central body comprising long and short panels and long and short flaps on at least one end thereof, the said flaps each being subject to deflection about a fold axis coinciding with the attaching edge on the central body and with the container body being folded and secured to form a folded two-layer blank with its long end-flaps in partially overlapping relationship and with each short flap being completely overlapped by the long flap of the opposite layer, comprising means extending lengthwise of the apparatus and engageable with the over and under panel surfaces of the box-blank to move the latter longitudinally through the apparatus, means for deflecting one of the long flaps in one direction about its fold axis to move it transverse to the path of blank travel and thereby also deflecting the short flap overlapped by said long flap about its fold axis in the same direction, means for deflecting the previously undeflected short flap about its fold axis to move it in the opposite direction transverse to the path of blank travel, means for maintaining the said short flap-position away from the path of blank travel, means for deflecting the second of the long flaps about its fold axis in the reverse long-flap deflection direction relative to the path of blank travel, means for deflecting the second short flap about its fold axis in a direction transverse to the path of blank travel and opposite to that of deflection of the first short flap, means for maintaining the last-named short flap deflection, the said deflected long flaps then returning to substantially the initial travel path, and means to trim only the long flaps to a shortened length in the direction of blank travel while the short flaps remain deflected.

30. Apparatus for cutting protruding end flaps on folded box-blanks wherein two pairs of long and short flaps are adjacently positioned and arranged with each pair formed from a long and a short adjacently positioned flap so located that the long flap of each pair overlies the short flap of the other pair and each long flap overlies a portion of the other long flap which comprises means for feeding the box-blank along a feed path common to all flaps and to the blank, means to apply a displacing force to one of the two long flaps thereby to move it and one short flap transverse to the feed path in one direction, means to deflect the undisplaced short flap away from the feed path in a direction opposite to that of the displaced long flap, means to maintain the said short flap in displaced position, means to apply a displacing force upon the other of the two long flaps for displacing said flaps from the feed path in a direction opposite to their first displacement, means for displacing the second short flap in a direction transverse to the feed path opposite that of the displacement of the first short flap, means for then maintaining the second short flap displaced from the feed path in the direction of its first-named displacement, the long flaps being permitted to return to substantially the feed path subsequent to the displacement of the second short flap, and a cutter means for trimming the ends of the long flaps to selected depths at substantially the plane of the initial feed path thereof.

31. Flap cutting apparatus comprising a central body and means for feeding a box-blank therethrough, the box-blank being constituted by folded and secured panel members formed in two layers each having long and short end-flaps projecting from at least one end with the full member comprising two layers of which the short flap member of each is completely overlapped by the long flap of the opposite layer and the long flaps of the opposite layers partially overlap each other, a pair of laterally adjustable side guide members extending lengthwise of the apparatus for maintaining an aligned position of the box-blanks as fed therethrough, means for displacing one of the longer flap members and with it the other longer flap member and the overlapped short flap member to the one side of the path of box-blank travel, means for then displacing the previously undisplaced short flap member to the other side of the path of box-blank travel, means for holding the said displaced short flap member away from the path of box-blank travel, means for then displacing the other long flap member and with it its overlapped long flap member in the same direction relative to the path of box-blank travel as that in which the short flap member was displaced, means for then displacing the other short flap member in a direction relative to the path of box-blank travel opposite that of the other displaced short flap member, the resiliency of the displaced long flap members returning the long flap members to approximately the plane of blank travel, and means for then trimming of the long flap members.

32. The method of cutting protruding end flaps on

folded box-blanks wherein two pairs of long and short flaps are adjacently positioned and arranged with each pair formed from a long and a short adjacently positioned flap so located that the long flap of each pair overlies the short flap of the other pair and each long flap overlies a portion of the other long flap which comprises feeding the box-blank along a feed path common to all flaps and to the blank, displacing two long flaps and one short flap relative to the feed path in one direction transverse to the feed path, moving the undisplaced short flap in the opposite direction from the feed path, maintaining the said flap in a position away from the feed path, then displacing the two long flaps away from the feed path in a direction opposite to that of the first displacement, displacing the second short flap from the feed path in a direction opposite that of the displacement of the first short flap, maintaining the second short flap so-displaced, the long flaps being permitted to return to substantially the feed path subsequent to the displacement of the second short flap, then trimming the ends of the long flaps at substantially the plane of the initial feed path thereof, and discharging the cut box-blank.

33. A method for trimming the flap members of box-blanks to selected length where the box-blank is in the form of a body member provided with two pairs of rectangular panels with a first pair of separate end flaps of different length positioned adjacent to each other extending from one pair of panels and arranged in position for overlying a second pair of separate end flaps, also each of different length, positioned adjacent to each other and extending from the other pair of panels so that the two pairs are each positioned with each shorter end-flap completely overlapped by the longer flap of the other pair and the longer flaps of each pair partially overlap each other and so that all flaps are adapted to be bent upon a folding axis corresponding to the line of attachment of the flap to the body, which comprises the steps of feeding the box-blank in a direction parallel to the flap-fold axes along a feed path between a pair of spaced drive and positioning elements spaced from each other by a distance substantially corresponding to the depth of the overlayed flaps, applying a force for rotatably and angularly displacing one of the longer flaps and with it the other longer flap and the overlapped short flap from the feed path about the flap-fold axes to separate the longer flap to which force is applied from its adjacent short flap, applying a force for rotatably and angularly displacing the separated short flap from the feed path in the opposite direction about its flap-fold axis, holding the short flap displaced from the feed path, applying a force to the second longer flap to displace it and the first long flap rotatably and angularly also about the flap-fold axes but in the opposite direction to that provided by the first force supplied to turn the long flaps to an extent to remove the outer edge from the feed path and the plane of the second short flap, rotatably and angularly displacing the second short flap about its flap-fold axis in the opposite angular direction from that of the first short flap and also away from the feed path of the blank, holding the last named short flaps in displaced position, the longer flaps then returning to substantially the initial feed path, trimming the edges of the long flaps, and then removing the blanks from the feed path.

34 [25]. The method of cutting the long flaps of a flattened paper board container which comprises continuously advancing in a substantially horizontal path; a flattened container having a central body portion and a marginal area with a long and short flap in each of two superposed layers, the long flap being the leading flap in one layer and the short flap the leading flap in the other layer; first separating the trailing short flap from the remaining flaps; then separating the leading short flap from the remaining flaps; and cutting the long flaps while the short flaps are thus separated and the container is advancing in said path.

35 [26]. The method of cutting the long flaps of a flattened paper board container which comprises continuously advancing in a substantially horizontal path; a flattened container having a central body portion and a marginal area with a long and short flap in each of two superposed layers, the long flap being the leading flap in one layer and the short flap the leading flap in the other layer; deflecting the short flaps in the superposed layers from said horizontal path; supporting the long flaps in said horizontal path; and trimming the long flaps while so supported and moving with the short flaps deflected.

36 [27]. The method of handling rectangular flattened paper board containers which comprises; advancing in a substantially horizontal path a flattened paper board container comprising a central body portion and a marginal area having a long and short flap in each of two superposed layers, the long flap being the leading flap in one layer, and the short flap leading in the other; applying vertical pressure to the leading long flap whereby that flap and both of the flaps in the other layer are moved away from the trailing short flap producing a separation thereof; spreading the separated short flap; applying vertical pressure in the opposite direction to the remaining flaps to move them a substantial distance; releasing the pressure on the so-moved short flap first, whereby because of its natural resilience it snaps backwardly; then spreading this separated short flap.

37 [28]. The method of handling rectangular flattened paper board containers which comprises; advancing in a substantially horizontal path a flattened paper board container comprising a central body portion and a marginal area having a long and short flap in each of two superposed layers, the long flap being the leading flap in one layer, and the short flap leading in the other; applying vertical pressure to the leading long flap whereby that flap and both of the flaps in the other layer are moved away from the trailing short flap, producing a separation thereof; spreading the separated short flap; applying vertical pressure in the opposite direction to the remaining flaps to move them a substantial distance; releasing the pressure on the so-moved short flap first, whereby because of its natural resilience, it snaps backwardly; then spreading this separated short flap; and cutting marginal portions of the larger flaps while the short flaps are so spread.

38 [29]. In an apparatus for cutting flaps of a flattened container having a central body portion and flaps on each side thereof, endless belts extending lengthwise of the apparatus and engageable with the upper and lower surfaces of said central body portion to move the flattened container through the apparatus, and means for cutting flaps on each side of said central body portion without cutting the flap which normally lies against it in folded condition as the flattened container is moved by said belts.

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