July 12, 1966 C. J. PIERCE, JR 3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

Filed Jan. 20, 1964 11 Sheets-Sheet 1

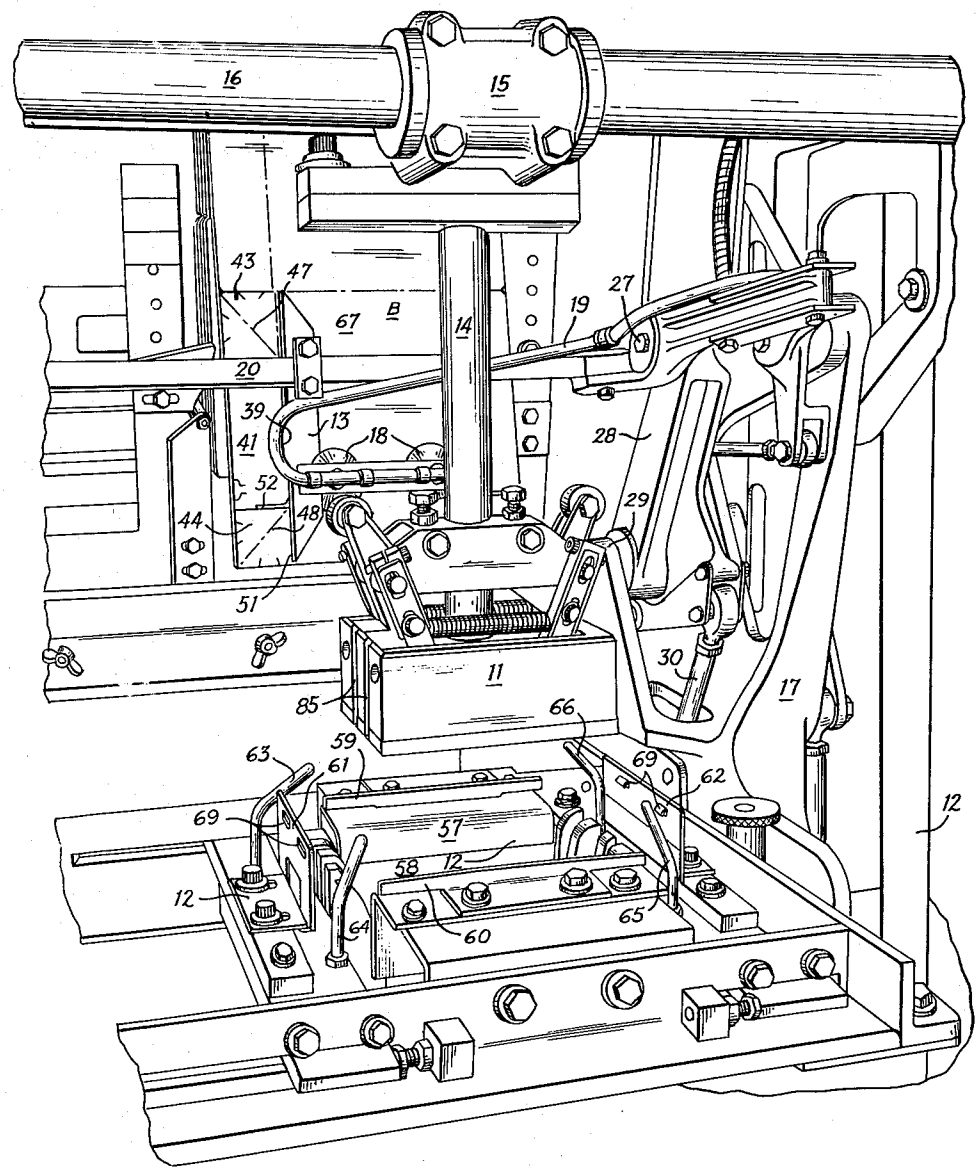


Fig. 1

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July 12, 1966 C. J. PIERCE, JR 3,260,174
METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS
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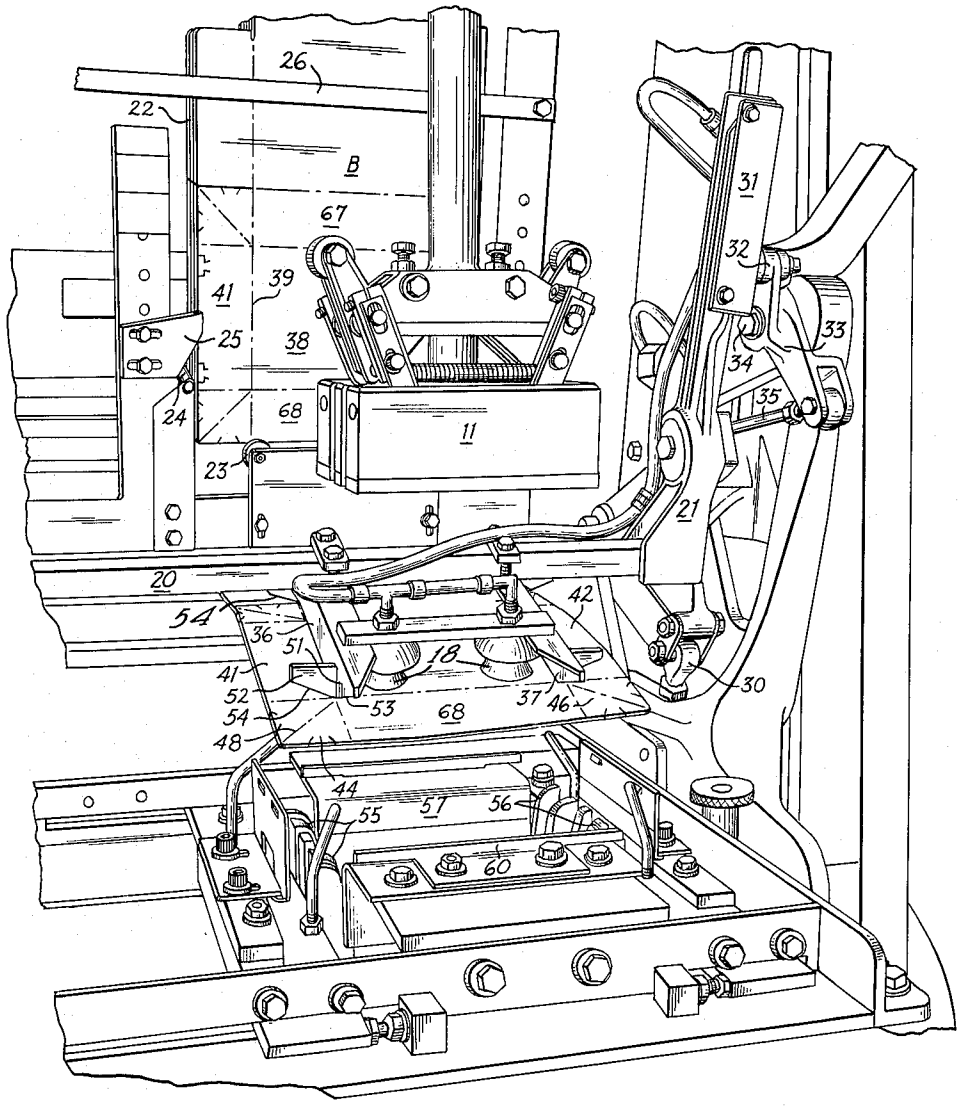


Fig. 2

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METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS
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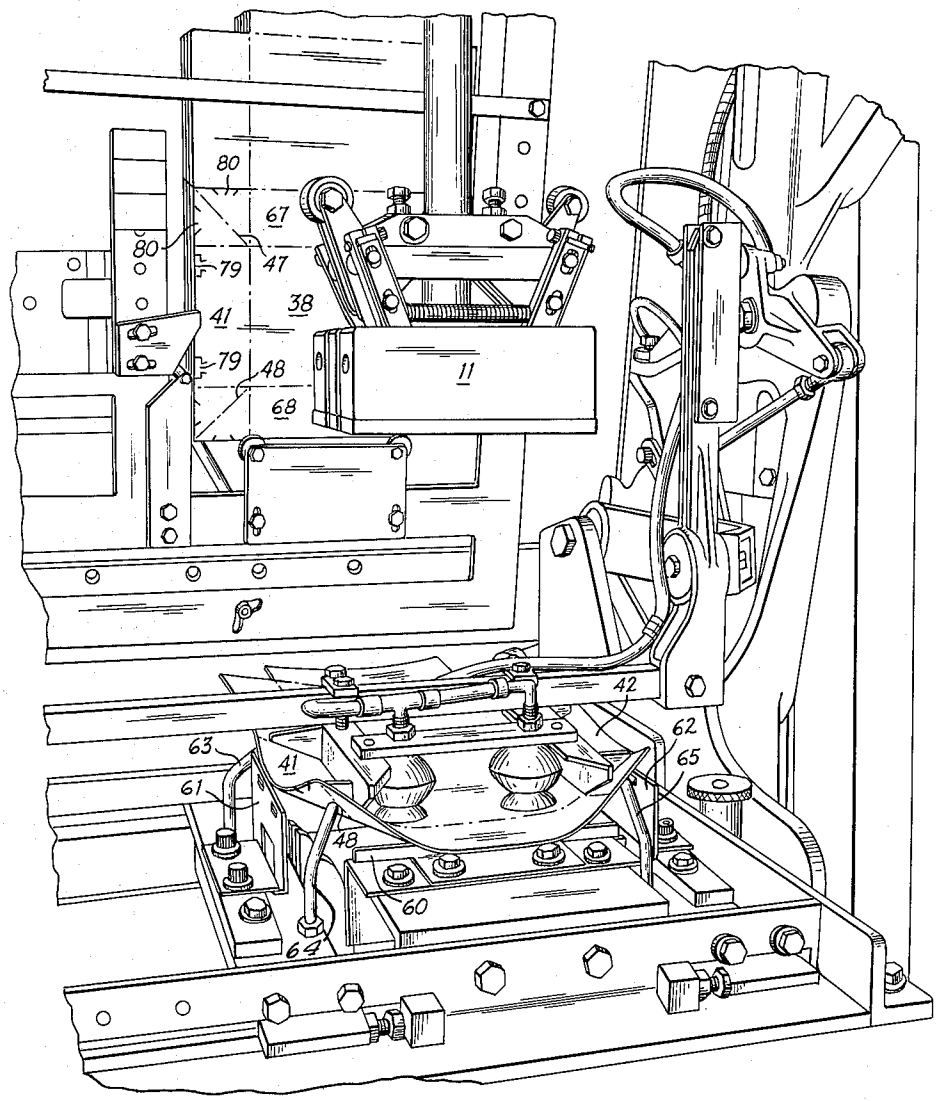


Fig. 3

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METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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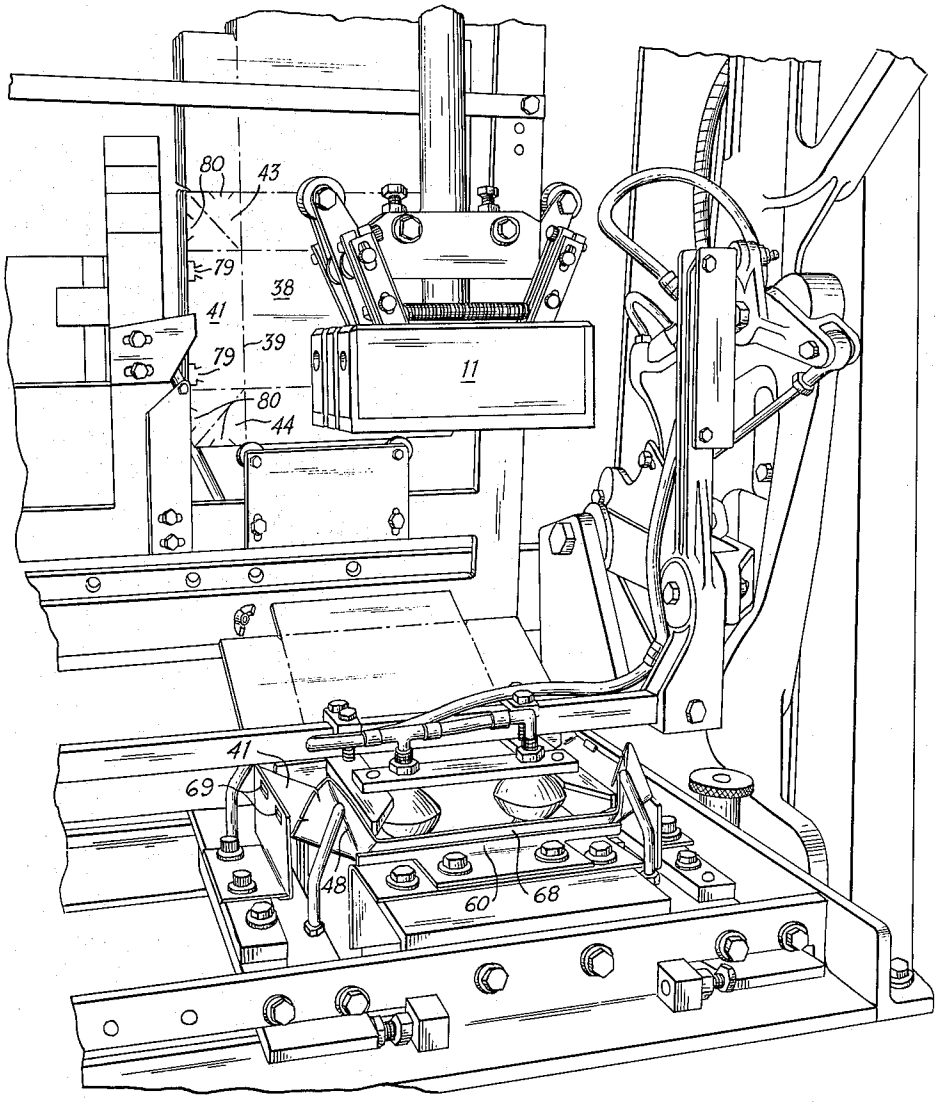


Fig. 4

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METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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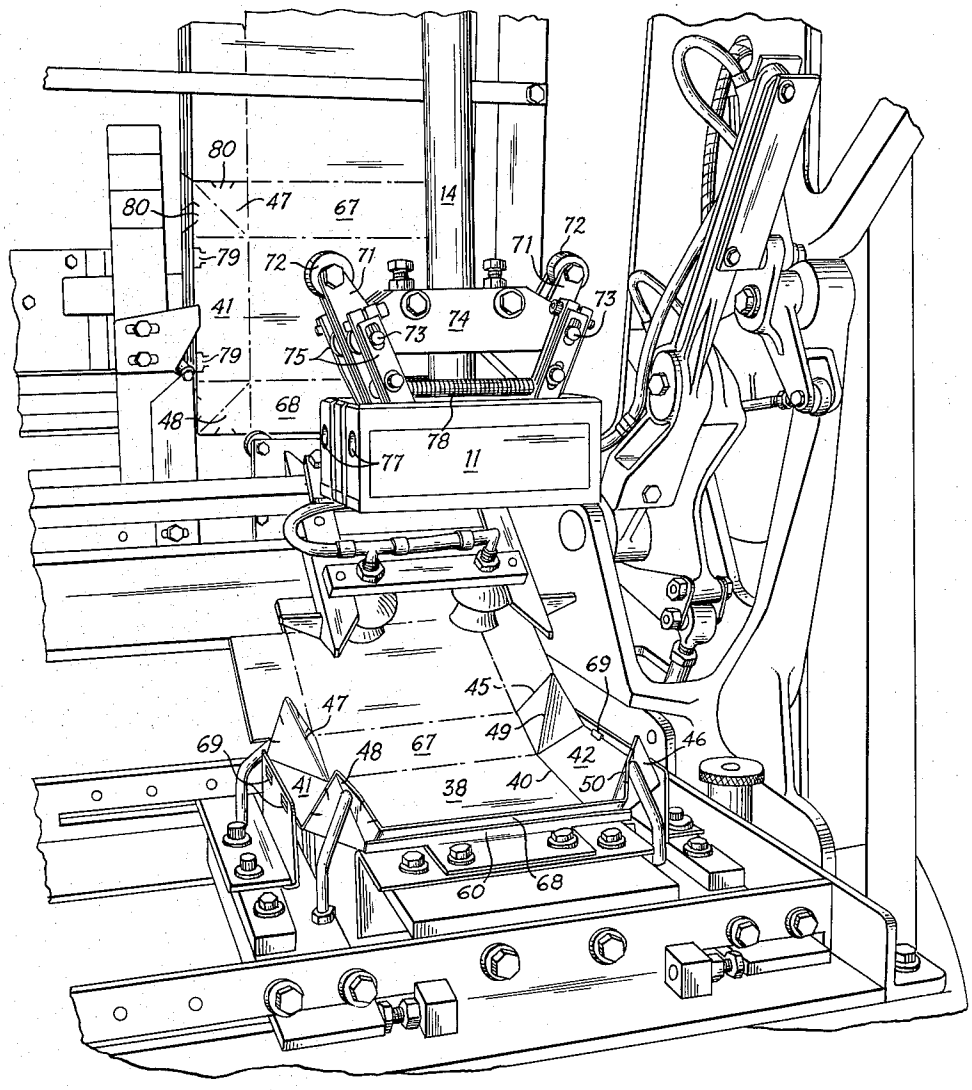


Fig. 5

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July 12, 1966 C. J. PIERCE, JR 3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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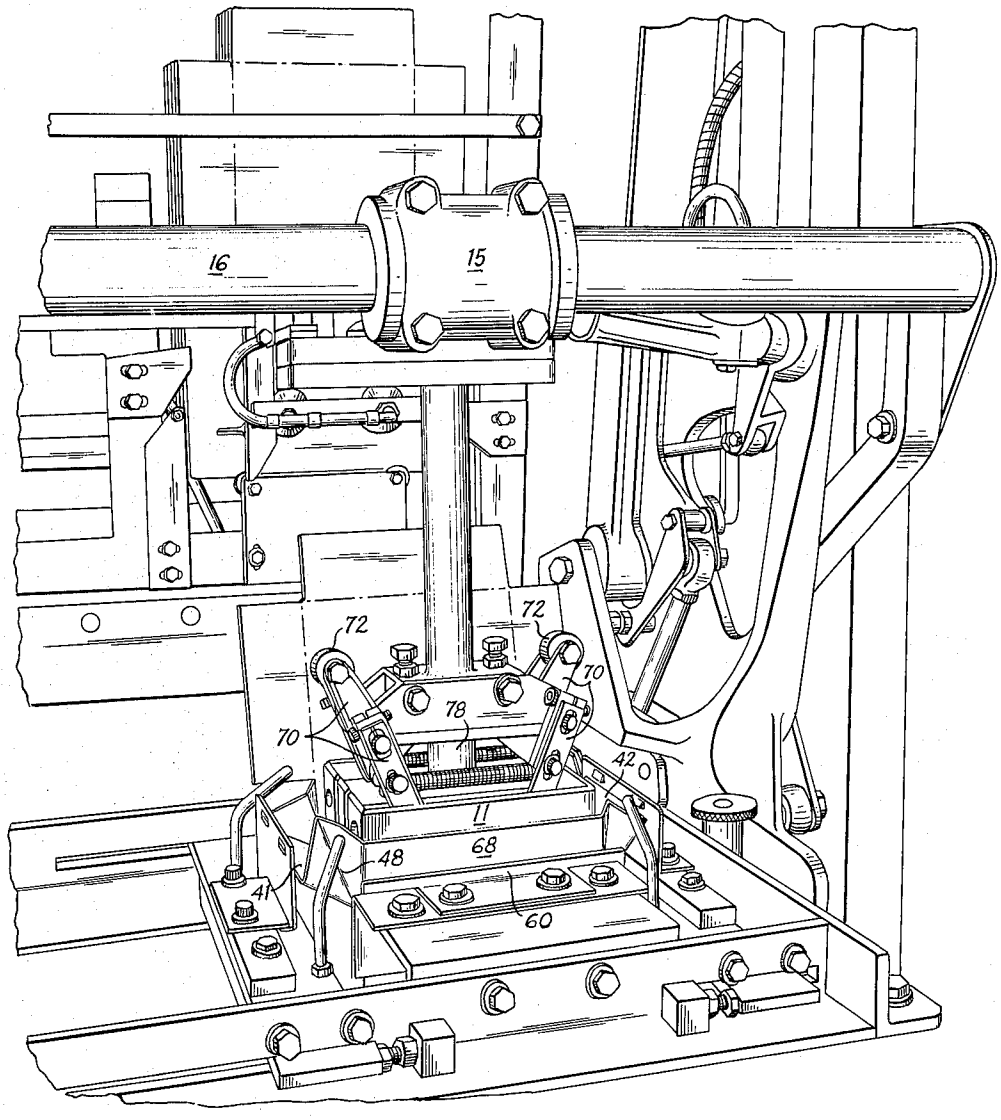


Fig. 6

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July 12, 1966 C. J. PIERCE, JR 3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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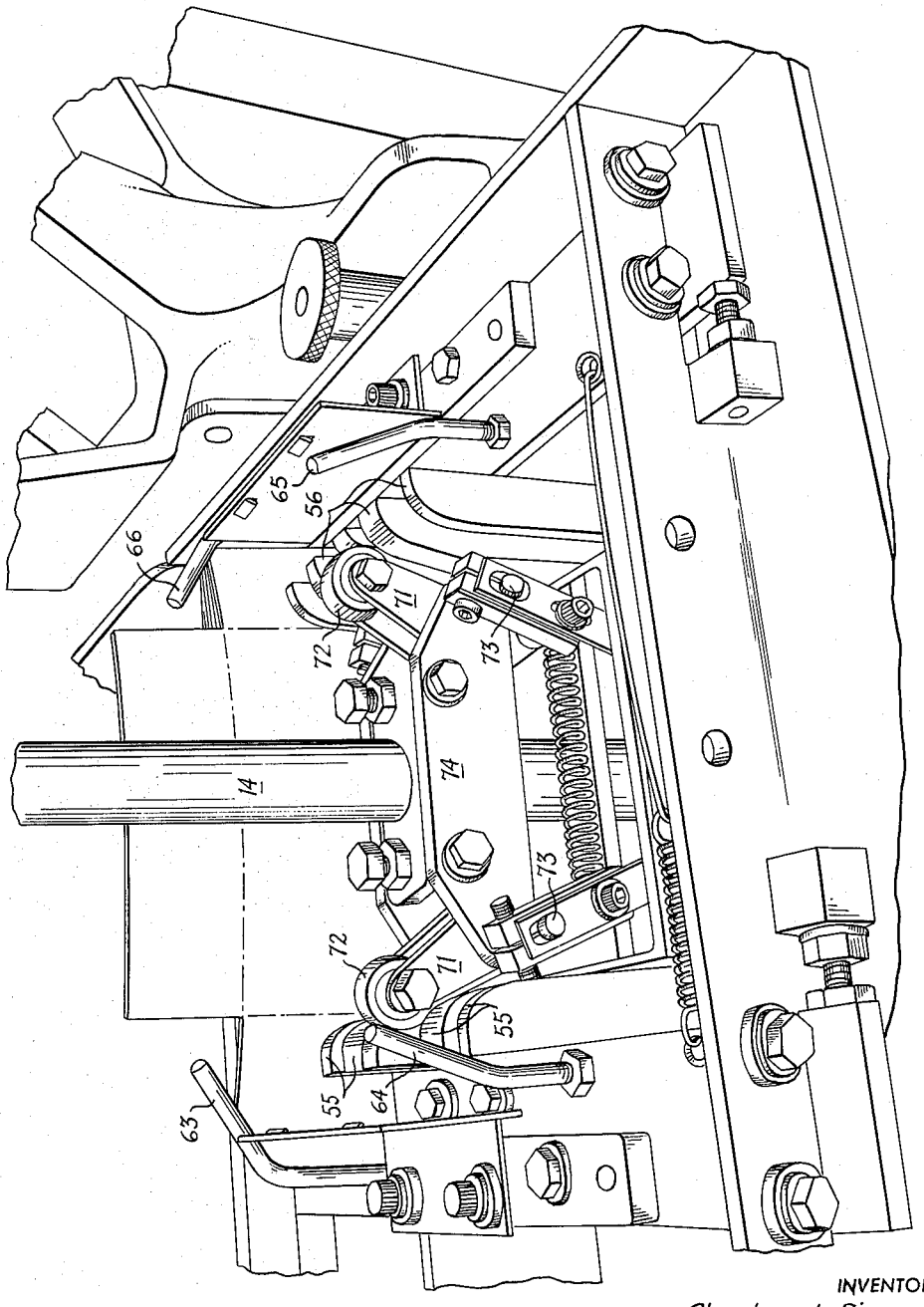


Fig. 7

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July 12, 1966 C. J. PIERCE, JR 3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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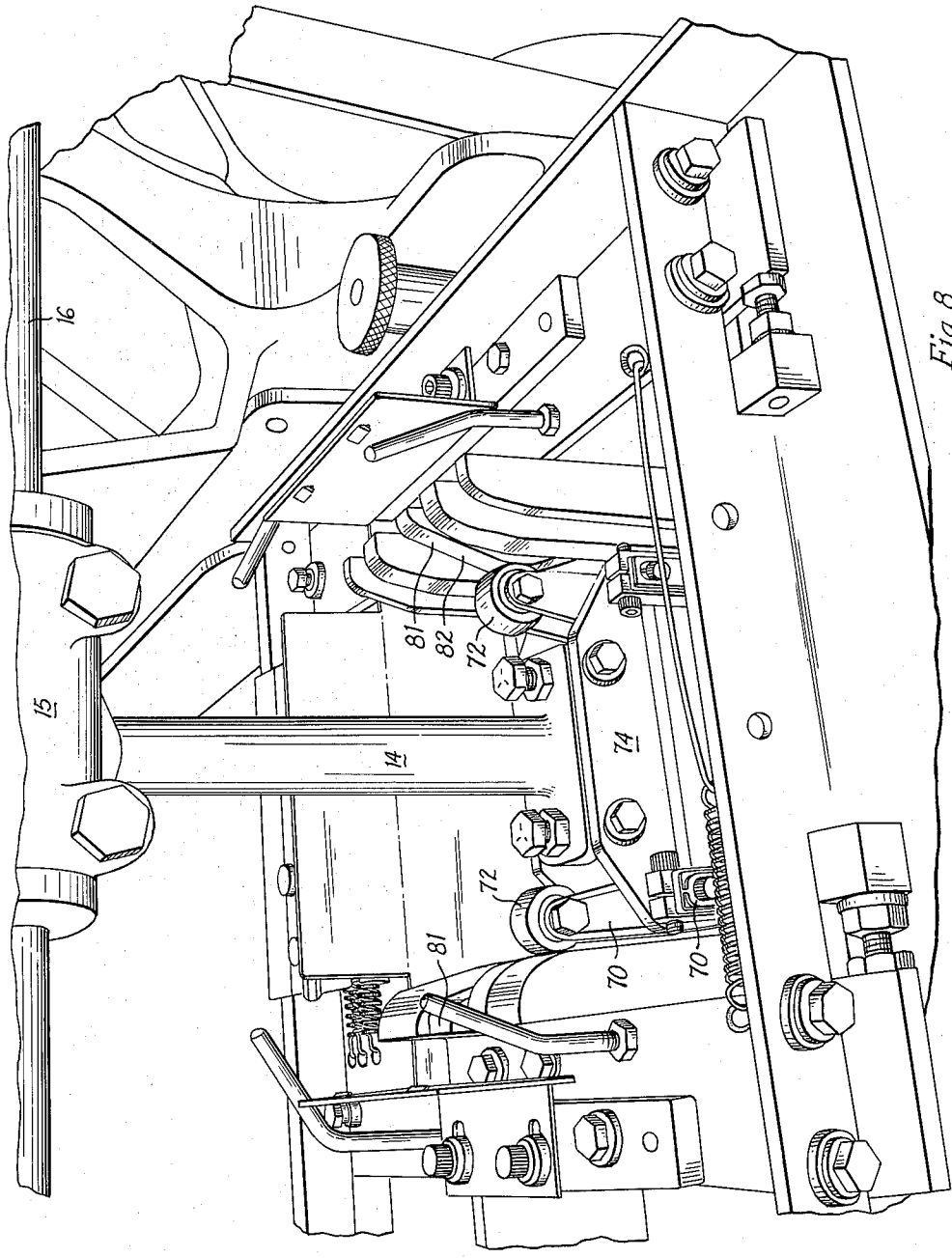


Fig. 8

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July 12, 1966 C. J. PIERCE, JR 3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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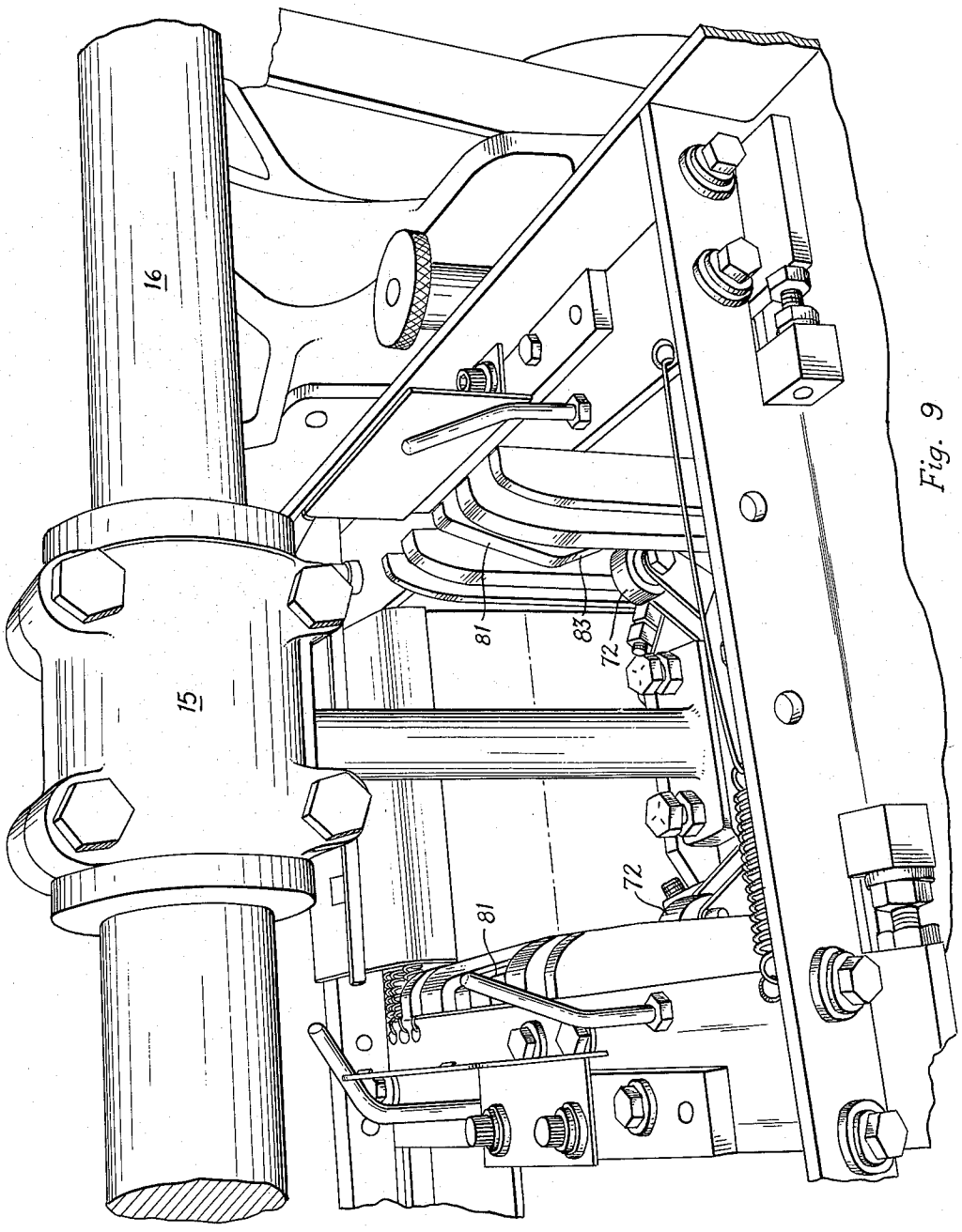


Fig. 9

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METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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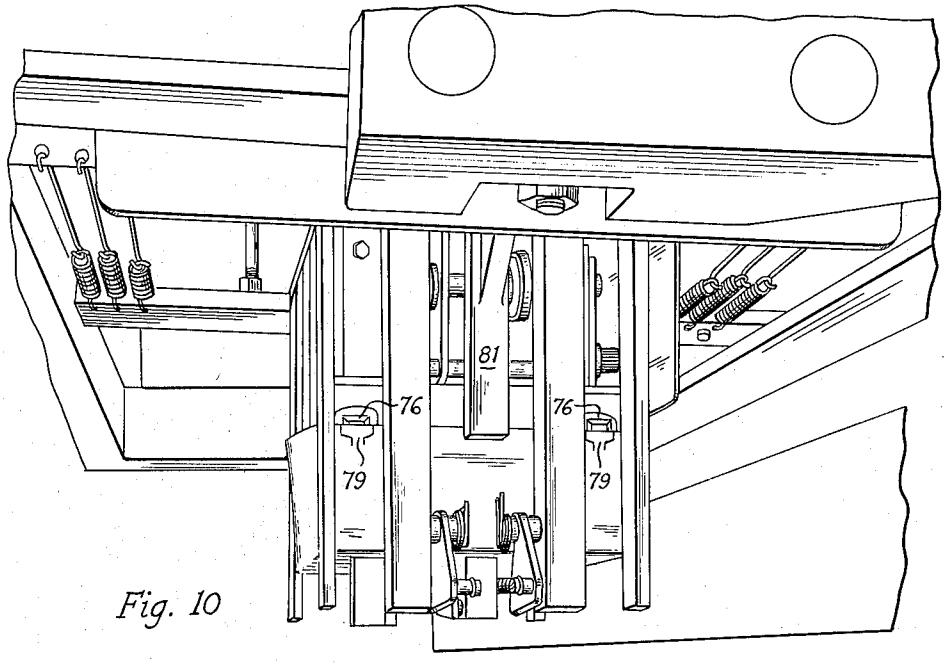


Fig. 10

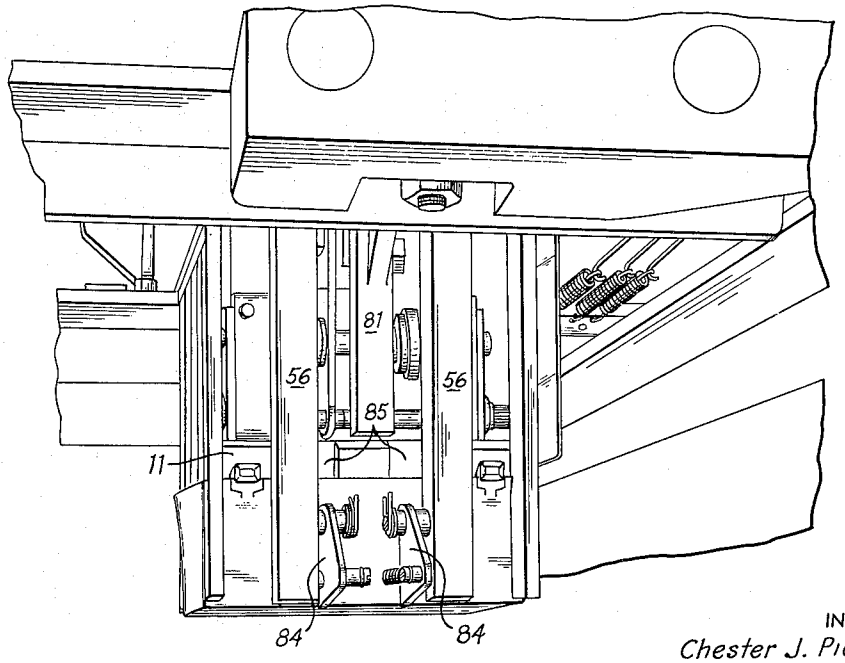


Fig. 11

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METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

Filed Jan. 20, 1964 11 Sheets-Sheet 11

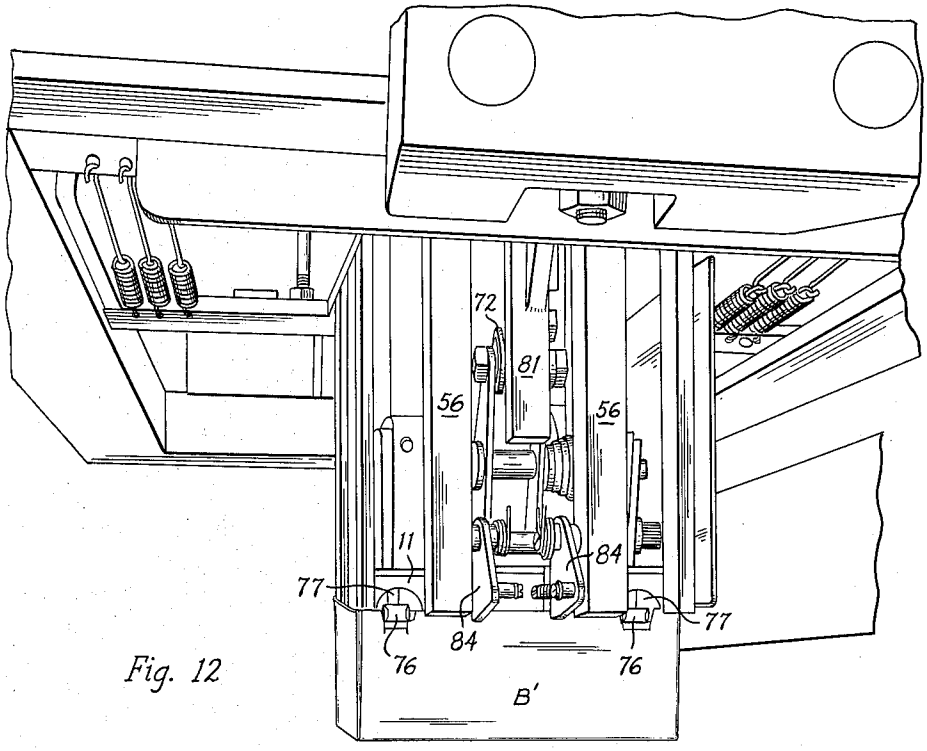


Fig. 12

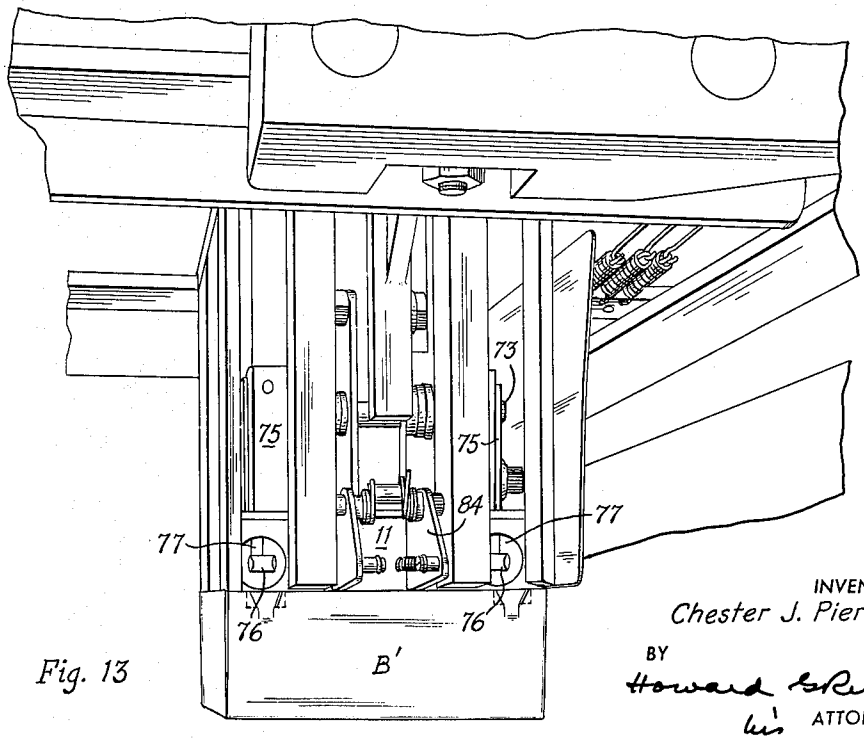


Fig. 13

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United States Patent Office 3,260,174 Patented July 12, 1966

3,260,174

METHOD OF AND DEVICE FOR SETTING UP GUSSET-CORNERED FOLDING BOXES FROM FLAT BLANKS

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Filed Jan. 20, 1964, Ser. No. 339,021
11 Claims. (Cl. 93—51)

This invention relates to the art of setting up gusset cornered folding boxes from flat box blanks and provides, particularly, a method of and a device for setting up folding boxes of the aforementioned type in which the gussets lie on the inside of the box, thus leaving all four box walls flat and free from protrusions.

The prior patent to Baker and Lefief 2,655,843, dated October 20, 1953, discloses a manner of setting up folding boxes in which a blank feeder which transports flat blanks to a main folding die is fitted with prefolding elements which cooperate with a prefolding die arranged in advance of a main folding die.

The feeder with its prefolding elements deposits the blank over the mouth or throat of the main die after moving past corresponding folding elements of the prefolding die which strike the previously flat blank and move portions of the blank into an angular prefolded position with respect to the remainder of the blank.

The feeder is then retracted and a main plunger engages the blank and drives it through the throat of the main die. During the latter operation the walls of the box are erected and certain locking elements which were prefolded by the prefolding mechanism are brought into box corner locking engagement.

The present invention employs the basic prefolding-by-the-blank-feeder idea disclosed in the aforesaid Baker and Lefief patent and develops the idea further for the specific purpose of setting up a folding box with interior corner gussets which are considerably more difficult to form than the more common exterior gussets, if automatic high speed mechanism is to be employed.

The various objects, features and advantages of the invention will appear more fully from the detailed description which follows accompanied by drawings showing, for the purpose of illustration, a preferred embodiment of the invention. The invention also resides in certain new and original features of construction, combination of elements, as well as steps and sequences of steps hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part of it in which:

FIG. 1 is a perspective view of a preferred form of device for carrying out the invention;

FIGS. 2 to 6 are perspective views of progressive phases of operation of the mechanism of FIG. 1;

FIGS. 7 to 9 are perspective views on an enlarged scale of a portion of the mechanism in three progressive phases of operation;

FIGS. 10 to 12 are perspective views from below of the mechanism shown in FIGS. 7 to 9, FIGS. 10 and 12 representing the phases of operation shown in FIGS. 8 and 9, respectively; and

FIG. 13 is a perspective view illustrating the final operation.

In the following description and in the claims various details will be identified by specific names for convenience. The names, however, are intend to be generic in their application. Corresponding reference characters refer

to corresponding parts in the several figures of the drawings.

The drawings accompanying, and forming part of, this specification disclose certain specific details of construction for the purpose of explanation of broader aspects of the invention, but it is understood that structural details may be modified in various respects without departure from the principles of the invention, and that the invention may be incorporated in other structural forms and that its method may be carried out by other devices than specifically shown.

Referring to FIG. 1, the box forming device is shown to comprise three major assemblies, a main box forming plunger **11**, a die assembly **12**, and a feeder assembly **13** which feeds individual blanks B into the path of the plunger **11** and performs certain prefolding operations later to be described.

The plunger **11** comprises a central stem **14**, the upper end of which is bolted to an L-shaped clamp **15** on a horizontal drive bar **16**. The drive bar **16** moves vertically up and down, thus causing the plunger **11** to enter the throat of the die **12** and to be retracted therefrom. The drive mechanism, including the drive bar **16**, is of conventional and known construction.

The die assembly **12** is stationary and is fixedly mounted on the machine frame **17**.

The blank feeder assembly comprises a pair of vacuum cups **18** from which a flexible line **19** leads to a control valve (not visible) and thence to a suitable source of vacuum such as a vacuum pump.

The vacuum cups are secured to a framework about to be described in greater detail, the latter being secured to a feeder bar **20** secured to the far ends of substantially identical double armed levers **21**, of which there is one on the right hand side of the machine and another on the left. These levers **21** are part of an otherwise known feeder drive mechanism which causes the vacuum cups to travel on a relatively complex path which can readily be traced by comparing the sequential FIGS. 1 to 6.

A blank magazine visible in back of the feeder (see also FIG. 2) supports a stack **22** of blanks B in nearly vertical position on edge on supporting rods **23**, of which there are two. Lateral aligning rods **24** maintain the blanks B lined up and lips **25**, as well as a retaining bar **26** keep the foremost blank from falling out of the magazine. These details of construction are conventional.

In order to remove the foremost blank from the magazine the vacuum cups **18** attach themselves to the blank, are then withdrawn first in a direction substantially parallel to themselves in order to withdraw the blank from the grip of the lips and are then swung downwardly in an arc to withdraw the upper portion of the blank from below the retaining bar.

The arcuate portion of the motion terminates above the die **12**, whereafter the blank is put down in a direction normal to its plane (FIGS. 3 and 4), as will also later be described in greater detail.

This complex feeder motion is produced by a lever mechanism of known construction and known motion geometry. It is described in detail in the patent to Lefief, No. 2,805,060, dated September 3, 1957. For the present description it will suffice to state that the double armed levers **21** are pivoted at **27** on bell crank levers **28** pivoted at **29** in the machine frame **17**. The bell crank levers **28** are rocked by a push rod **30**.

The near end of the double armed levers **21** is shaped as a track **31** having slidable as well as pivotal engagement with a control pivot **32** best seen in FIGS. 2 to 4. The control pivot **32** is a roller on a bell crank lever **33** pivoted at **34** and actuated by a further push rod **35**. Both push rods **30** and **35** are operated in timed sequence by the same power drive mechanism which moves the

plunger drive bar **16** up and down in the manner disclosed in the aforesaid patent, 2,805,060.

The feeder assembly **13** is constructed as a blank prefolding member in the shape of a four sided truncated pyramid and comprises at least two parallel speed folding rules **36, 37** (FIG. 2) which engage the bottom panel portion **38** of the blank adjacent the end fold lines **39, 40**, along which box end wall panels **41** and **42** are articulated to the bottom panel **38**.

The box blank B is of the corner gusset type and comprises four corner gusset areas **43, 44, 45** and **46**, each subdivided by a diagonal corner gusset fold line **47, 48, 49** and **50**.

The blank prefolding member further comprises corner folding rules, one for each corner, each corner folding rule assembly comprising two folding rules in the form of a V, the apex of the V lying at the corner of the bottom panel. As the four corner folding rule assemblies are identical it will suffice to describe the one nearest the observer. The corner folding rules **51** and **52** form a V in which the leg **51** is an extension of the end folding rule. The lower blank engaging edges **53, 54** of the corner folding rules are upwardly slanted, beginning at the apex of the V, as is best seen in FIG. 2. They thus slant away from the plane of a flat blank carried by the vacuum cups and drawn into engagement with the horizontal bottom edges of the end folding rules **36** and **37**.

This provides the aforementioned shape of an inverted truncated pyramid, the slanted engagement edges **53, 54** of the corner folding rules representing the sides of a pyramid which is truncated at the plane of the blank carried by the suction cups in FIG. 2.

The corner folding rules **51, 52** are in substantial alignment with the lines along which the gusset panels are articulated to the wall panels of the box blank. This is well visible in FIG. 2.

The main die is formed by main end wall folding elements **55, 56** in the form of vertically extending bars and main side wall forming elements in the form of plates of which only one is visible in the drawings at **57**. These main folding elements define a die throat **58** of rectangular outline, slightly larger than the body of the plunger **11** with allowance for the thickness of the paperboard which is being folded about the plunger **11**.

The main folding die is preceded by a prefolding die which comprises a pair of relatively low upright outer side folding elements **59, 60** spaced apart wider than the width of the main die throat, and a pair of taller upright outer end folding elements **61, 62** which are spaced apart a greater distance than the length of the main die.

Taller than both the outer side folding elements and the outer end folding elements are gusset folding elements, preferably in the form of pins **63, 64, 65, 66** fixed with respect to the main die and so placed that the ends of the pins strike the gusset panels of the blank centrally, i.e., at or near the diagonal fold line when the blank is being put down by the feeder (FIG. 3). This causes the blank to be flexed in such a manner that the four corners are turned up and the flexed blank portion assumes the shape of a shallow dish or hammock as shown in FIG. 3.

At the illustrated moment the bottom panel of the blank is substantially flat, as the special parallel folding members **36, 37** bear down on it while the pins **63** to **66** lift the blank corners. At this point the corner portions of the blank are not yet pressed against the slanted corner folding rules.

As the feeder and its prefolding member descends further (FIG. 4), the corner portions of the blank come to rest against the V-shaped corner folding rules, the pins force the gusset portions into the crotch of the V's with the result that the gusset panels crease at their diagonal fold lines **48**.

Substantially simultaneously the upper straight edge of the outer end folding elements **61** and **62** bear against the underside of the end wall panels **41** and **42** and debow or flatten them, which then causes the blank to fold or crease at the end fold lines **39** and **40**.

Shortly after engagement of the end wall panels **41, 42** by the outer end folding elements **61** and **62**, the outer side folding elements **59** and **60** engage the side walls **67, 68** of the blank, de-bow them with the result that the blank creases at the side fold lines and the side walls assume a slanted position as shown in FIG. 4.

At the moment illustrated in FIG. 4 the feeder and prefolder has about reached its lowest position in which the top edges of the end walls panels **41, 42** have moved slightly below barb-like protrusions or catches **69**, preferably formed by indenting the outer end folding elements from the outside. The catches retain the blank in the partially folded condition when the vacuum cups **18** release the blank and the feeder begins its return stroke (FIG. 5) while the plunger **11** descends in order to drive the partially folded blank into the throat of the main die.

The plunger is fitted with a box corner locking mechanism for the four box corners. This mechanism comprises a double armed lever assembly at each end of the plunger. Since the two lever assemblies **70** are identical, it suffices to describe one. A central upper arm **71** equipped with a roller **72** is fastened on a horizontal shaft **73** mounted in bushings of a yoke **74** on the plunger stem **14**. Clamped to the shaft **73** are two lower arms **75** movable inside the hollow body of the plunger and fitted with claws or fingers **76** at their lower ends. The claws or fingers may extend beyond the plunger ends through apertures **77** (FIGS. 10–13). The levers are normally maintained in a position in which the claws are retracted by a spring **78** (FIGS. 5–7).

The locking claws on fingers **78** serve to pull T-shaped locking tabs **79** in the end walls **41** and **42** through essentially V-shaped notches **80** in the top edges of the gusset panels when in the fully erected blank the T-tabs **79** lie in coincidence with the V notches **80** (FIGS. 10–12).

As the plunger **11** moves the prefolded blank into the main die (FIGS. 6 and 7) the roller **72** on the lever assemblies are initially extended by the force of the spring **78** until the rollers strike cam tracks **81** whose rising portions **82** cause the left lever assembly **70** to tilt in a clockwise direction and the right lever assembly to tilt in a counterclockwise direction to extend the claws **76** at their bottom ends through the respective apertures **77** in the plunger ends.

In doing so the T-shaped locking tabs **79** of the blank are first deflected outwardly (FIG. 10) until the claws snap beyond the top edges of the tabs (FIG. 11) at the moment the rollers **72** reach the peak portion of each cam track (FIG. 8). As the plunger descends further into the main die the rollers move into a re-entrant portion **83** of the cam track causing the claws or fingers **76** to retract and pull the T-tabs **79** through the narrower V cuts in the gusset panels, thereby locking the corner assemblies of the box together (FIG. 12).

Returning briefly to FIG. 6, it is seen that the prefolding of the blank (FIGS. 5 and 6) places the corner gussets in a position in which they normally fold flat against the ends of the descending plunger when the box end walls **41, 42** are folded into upright position by the plunger movement drawing the prefolded blank into the main folding die.

The orderly folding of the gussets is assisted by the folding sequence of the box walls in which the side walls **67, 68** are folded slightly earlier than the end walls **41, 42** as is clearly seen from FIG. 6. This is accomplished by an appropriate adjustment of the outer side folding elements **59, 60**.

After locking of the box corners (FIG. 12) the plunger travels a terminal distance to move the top edge of the formed box body beyond strip off catches **84** of otherwise conventional design. The catches **84** snap inwardly and

engage the top edge of the box body thus preventing the box B' from following the plunger **11** on its return stroke.

As the strip off catches normally extend into the path of the plunger, the plunger is provided with appropriate vertical relief channels **85** as is customary in the art (FIGS. 1 and 11). After withdrawal of the plunger **11** from within the formed box B', the box drops off and may be carried away by an appropriate chute or conveyor.

What is claimed is:

1. A device for setting up gusset cornered folding boxes from flat box blanks, the device comprising,

a prefolding member whose blank engaging bottom portion is of the general shape of an inverted truncated pyramid and comprises a central flat bottom portion corresponding to the bottom portion of the blank to be folded and defined by at least two spaced parallel folding rules and corner rules arranged in V-shape at corners of the bottom portion, the bottom edges of the corner rules being upwardly slanted from the apex of the V in a direction away from the said bottom portion;

a prefolding die comprising a pair of upright outer side folding elements spaced apart wider than the main side folding elements of the main die hereinafter recited, and a pair of upright outer end folding elements spaced apart wider than the main end folding elements of the main die hereinafter recited;

a gusset folding element taller than said outer side folding elements and said outer end folding elements, said gusset folding elements being stationary with respect to said prefolding die and located to engage the gusset portions of the blank within the areas of said V's before the remainder of the blank is engaged by said outer side folding elements and said outer end folding elements;

a main folding die comprising main side folding elements and main end folding elements substantially in line with the borders of the main panel of the blank;

a plunger movable into and out of the main die, said plunger comprising a blank engaging bottom portion corresponding to the bottom portion of the blank;

and means for moving said prefolding member into and out of the space between said gusset folding elements, and for moving said plunger into and out of said main die in timed sequence.

2. A device for setting up gusset cornered folding boxes from flat box blanks, the device comprising,

a prefolding member which comprises a central flat bottom portion corresponding to the bottom portion of the blank to be folded and defined by at least two spaced parallel folding rules, and corner rules arranged in V-shape at the corners of the bottom portion, the bottom edges of the corner rules being upwardly slanted from the apex of the V in a direction away from said bottom portion;

a suction element on said prefolding member in a position to grasp and hold a flat blank against said folding rules;

a prefolding die comprising a pair of parallel upright outer side folding elements spaced apart wider than the main side folding elements of the main die hereinafter recited, a pair of parallel upright outer end folding elements spaced apart wider than the main end folding elements of the main die hereinafter recited;

a gusset folding element for each of said V's, said gusset folding element being taller than said outer side folding elements and said outer end folding elements, said gusset folding elements being stationary with respect to said prefolding die and located to engage the gusset portions of the blank within the areas of said V's before the remainder of the blank is engaged by said outer side folding elements and said outer end folding elements;

a main folding die comprising main side folding elements and main end folding elements substantially in line with the borders of the main panel of the blank;

a plunger movable into and out of the main die, said plunger comprising a blank engaging bottom portion corresponding to the bottom portion of the blank;

and means for moving said prefolding member into and out of the space between said gusset folding elements, and for moving said plunger into and out of said main die in timed sequence.

3. A device as defined in claim **2** in which said gusset folding elements are pins.

4. A device for setting up gusset cornered folding boxes from flat box blanks, the device comprising,

a prefolding member whose blank engaging bottom portion is of the general shape of an inverted truncated pyramid and comprises a central flat bottom portion corresponding to the bottom portion of the blank to be folded and defined by at least two spaced parallel folding rules, and corner rules arranged in V-shape at corners of the bottom portion, the bottom edges of the corner rules being upwardly slanted from the apex of the V in a direction away from the said botom portion;

a prefolding die comprising a pair of upright outer side folding elements spaced apart wider than the main side folding elements of the main die hereinafter recited, and a pair of upright outer end folding elements spaced apart wider than the main end folding elements of the main die hereinafter recited, said outer end folding elements being taller than the outer side folding elements and comprising an upper straight engagement portion for engaging and de-bowing a blank engaged by the gusset folding elements hereinafter recited;

a gusset folding element for each of said V's, said gusset folding element being taller than said outer side folding elements and fixed with respect to said prefolding die and located to engage the gusset portions of the blank within the areas of said V's before the remainder of the blank is engaged by said outer side folding elements and said outer end folding elements;

a main folding die comprising main side folding elements and main end folding elements substantially in line with the borders of the main panel of the blank;

a plunger movable into and out of the main die, said plunger comprising a blank engaging bottom portion corresponding to the bottom portion of the blank;

and means for moving said prefolding member into and out of the space between said gusset folding elements, and for moving said plunger into and out of said main die in timed sequence.

5. In a device for setting up folding boxes from flat blanks in which a plunger moves the blank through a main folding die and in which a blank feeder comprising a blank grasping suction element is provided with a prefolding element which prefolds the blank when the blank feeder enters a prefolding die in advance of the main folding die, the improvement which comprises:

a prefolding element on the feeder comprising a pair of spaced parallel main folding rules for engaging a blank adjacent fold lines which define the blank bottom panel; and corner folding rules in the form of a V whose apex engages the blank adjacent the corners of the blank bottom panel, so as to comprise within the V a gusset forming portion of the blank, the bottom edges of the corner folding rules being upwardly slanted from the apex of the V;

and a prefolding die comprising a blank engaging corner element fixed with respect to the main die for engaging the blank carried by the feeder and folding the blank into the crotch of the V, thereby initiating the folding of a corner gusset;

a pair of parallel upright first prefolding elements fixed

with respect to the main die and spaced apart farther than the length of the bottom panel of the blank;

and a pair of parallel upright second prefolding elements fixed with respect to the main die and spaced apart wider than the width of the bottom panel of the blank, the two pairs of prefolding elements being arranged substantially in the form of a rectangle, one pair being taller than the other pair and both pairs being shorter than said corner elements.

6. In a device for setting up folding boxes from flat blanks in which a plunger moves the blank through a main folding die and in which a blank feeder comprising a blank grasping suction element is provided with a prefolding element which prefolds the blank when the blank feeder enters a prefolding die in advance of the main folding die, the improvement which comprises:

a prefolding element on the feeder comprising a pair of spaced parallel main folding rules for engaging a blank adjacent fold lines which define the blank bottom panel; and corner folding rules in the form of a V whose apex engages the blank adjacent the corners of the blank bottom panel, so as to comprise within the V a gusset forming portion of the blank, the bottom edges of the corner folding rules being upwardly slanted from the apex of the V;

and a prefolding die comprising a blank engaging corner pin fixed with respect to the main die for engaging a gusset corner portion of the blank carried by the feeder and folding the corner portion into the V, thereby initiating the folding of a corner gusset;

a pair of parallel first prefolding rules fixed with respect to the main die and spaced apart farther than the length of the bottom panel of the blank;

and a pair of parallel second prefolding rules fixed with respect to the main die and spaced farther than the width of the bottom panel, the two pairs of prefolding rules being arranged substantially in the form of a rectangle, one pair at a higher level than the other pair, the higher level being below the level defined by the blank engaging ends of said pins.

7. In a device for setting up folding boxes from flat blanks in which a plunger moves the blank through a main folding die and in which a blank feeder comprising a blank grasping suction element is provided with a prefolding element which prefolds the blank when the blank feeder enters a prefolding die in advance of the main folding die, the improvement which comprises:

a prefolding element on the feeder comprising a pair of spaced parallel main folding rules for engaging a blank adjacent fold lines which define the blank bottom panel; and corner folding rules in the form of a V whose apex engages the blank adjacent the corners of the blank bottom panel, so as to comprise within the V a gusset forming portion of the blank, the bottom edges of the corner folding rules being upwardly slanted from the apex of the V;

and a prefolding die comprising four blank engaging corner pins fixed with respect to the main die for engaging the corner portions of the blank carried by the feeder and folding the corner portions into the respective V's, thereby initiating the folding of the corner gussets;

and two spaced parallel prefolding rules fixed with respect to the main die for engaging opposite wall portions of the blank and de-bowing said opposite wall portions when the blank is being flexed by engagement with said corner pins.

8. In a device for setting up folding boxes from flat blanks in which a plunger moves the blank through a main folding die and in which a blank feeder comprising a blank grasping suction element is provided with a prefolding element which prefolds the blank when the blank feeder enters a prefolding die in advance of the main folding die, the improvement which comprises:

a prefolding element on the feeder comprising a pair of spaced parallel main folding rules for engaging a blank adjacent fold lines which define the blank bottom panel; and corner folding rules in the form of a V whose apex engages the blank adjacent the corners of the blank bottom panel, so as to comprise within the V a gusset forming portion of the blank, the bottom edges of the corner folding rules being upwardly slanted from the apex of the V;

and a prefolding die comprising four blank engaging corner pins fixed with respect to the main die for engaging the corner portions of the blank carried by the feeder and folding the corner portions into the respective V's, thereby initiating the folding of the corner gussets;

and two prefolding rules fixed with respect to the main die, said prefolding rules being substantially parallel to, and spaced wider apart than, said main folding rules, said prefolding rules being mounted in a position to engage the blank outside said main folding rules to de-bow the blank when it is being flexed by engagement with said corner pins.

9. The method of setting up into hollow box form a flat box blank comprising a bottom panel, end wall panels articulated to opposite ends of the bottom panel, side wall panels articulated to opposite sides of the bottom panel, and corner gusset panels between, and articulated to, an end wall panel and a side wall panel, respectively, the method comprising the steps of

depressing the bottom panel and simultaneously centrally lifting each of the gusset panels, thereby flexing the blank into the shape of a shallow dish or hammock;

then depressing all four wall panels by force applied adjacent the lines of articulation of the gusset panels, thereby creasing the gusset panels centrally in an upward direction;

next flattening and upwardly lifting two opposite flexed wall panels;

and finally upfolding the remaining two opposite wall panels.

10. The method of setting up into hollow box form a flat box blank comprising a bottom panel, end wall panels articulated to opposite ends of the bottom panel, side wall panels articulated to opposite sides of the bottom panel, and corner gusset panels between, and articulated to, an end wall panel and a side wall panel, respectively, the method comprising the steps of

depressing the bottom panel and simultaneously centrally lifting each of the gusset panels, thereby upwardly flexing the corners of the blank into an upwardly slanted position with respect to said bottom panel;

then supporting the corners of the blank against further upward flexing by force applied to the wall panels adjacent the lines of articulation of the gusset panels while continuing the central lifting of the gusset panels thereby creasing the gusset panels centrally in an upward direction;

next flattening and upwardly lifting two opposite flexed wall panels;

then flattening and upwardly lifting the remaining two opposite wall panels;

and finally upfolding into substantially vertical position with respect to the bottom panel both pairs of opposite wall panels.

11. The method of setting up into hollow box form a flat box blank comprising a bottom panel, end wall panels articulated to opposite ends of the bottom panel, side wall panels articulated to opposite sides of the bottom panel, and corner gusset panels between, and articulated to, an end wall panel and a side wall panel, respectively, the method comprising the steps of

depressing the bottom panel and simultaneously centrally lifting each of the gusset panels, thereby upwardly flexing the corners of the blank into an up-

wardly slanted position with respect to said bottom panel;

then supporting the corners of the blank against further upward flexing by force applied to the wall panels adjacent the lines of articulation of the gusset panels while continuing the central lifting of the gusset panels thereby creasing the gusset panels centrally in an upward direction;

next flattening and upwardly lifting two opposite flexed wall panels;

then flattening and upwardly lifting the remaining two opposite wall panels;

and finally driving the thus prefolded blank through a folding die by a plunger applied to the bottom panel to fold the four wall panels into upright position with respect to the bottom panel.

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