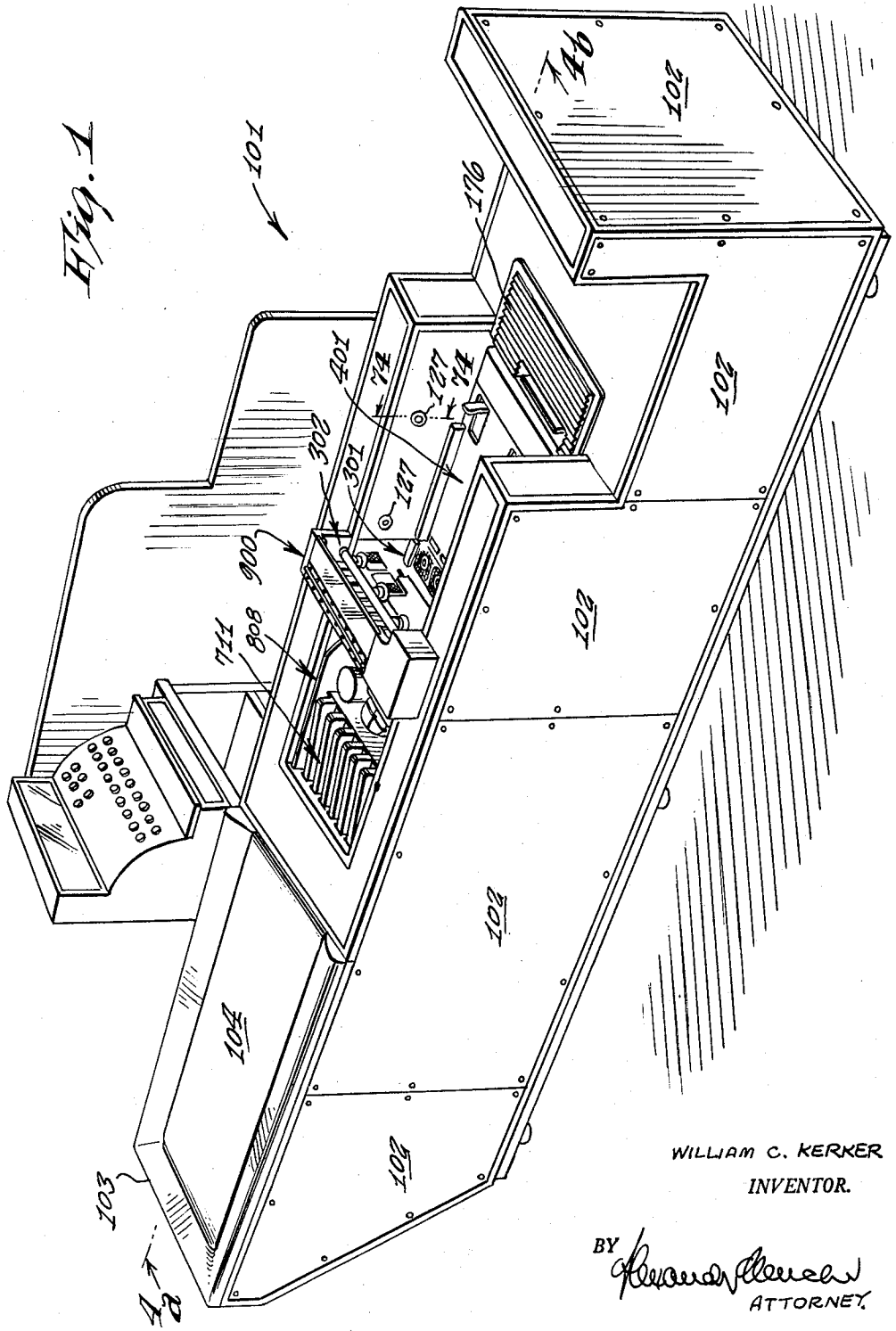
Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

Filed March 18, 1957 44 Sheets-Sheet 1

Fig. 1




WILLIAM C. KERKER
INVENTOR.

BY
ATTORNEY.

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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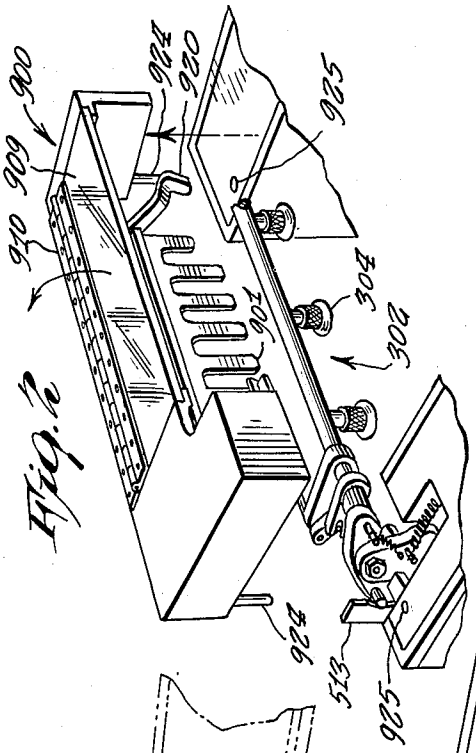



Fig. 2



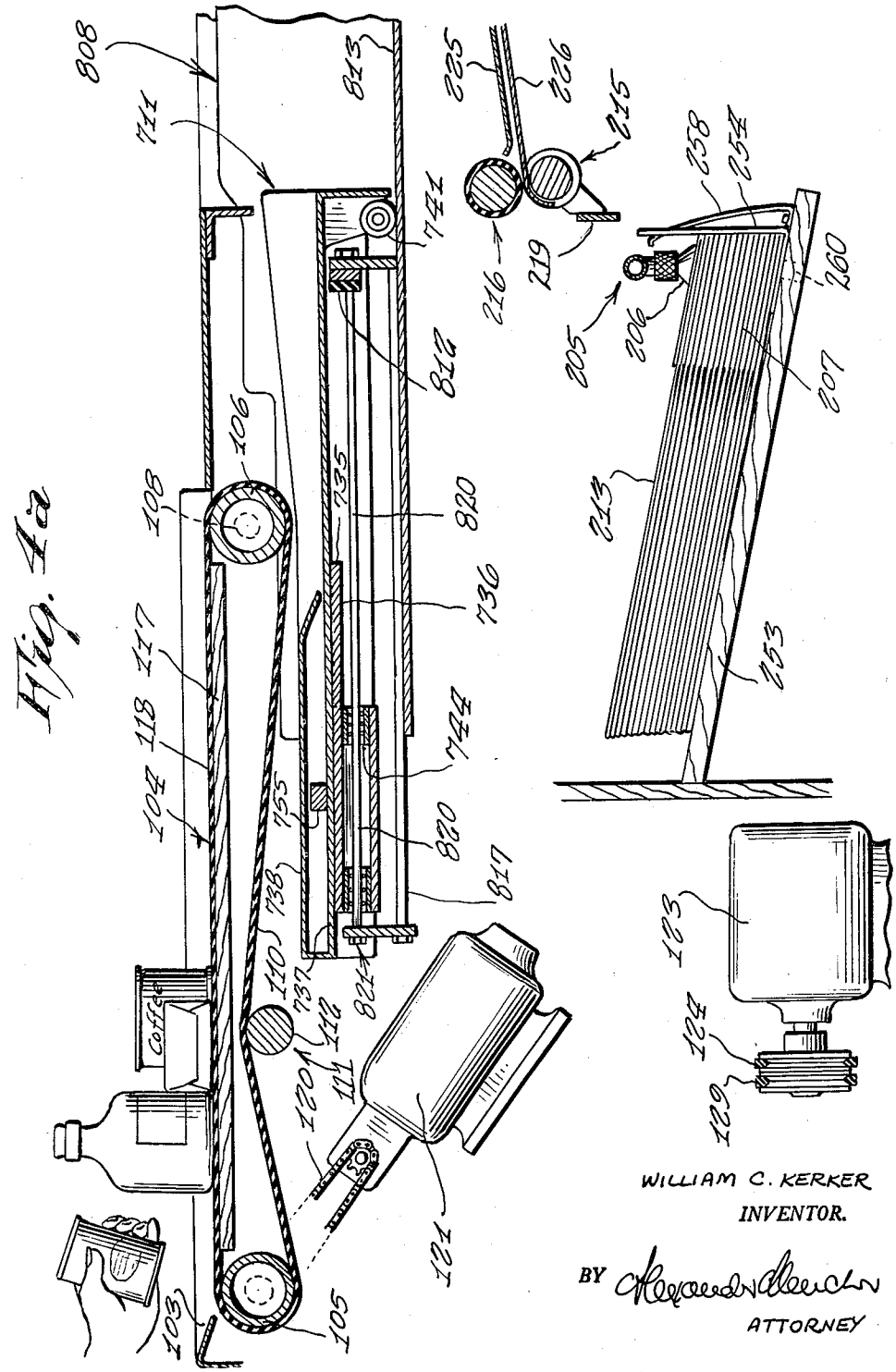

Fig. 3

INVENTOR.
WILLIAM C. KERKER
BY Kenneth Kerker
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

Filed March 18, 1957 44 Sheets-Sheet 3



Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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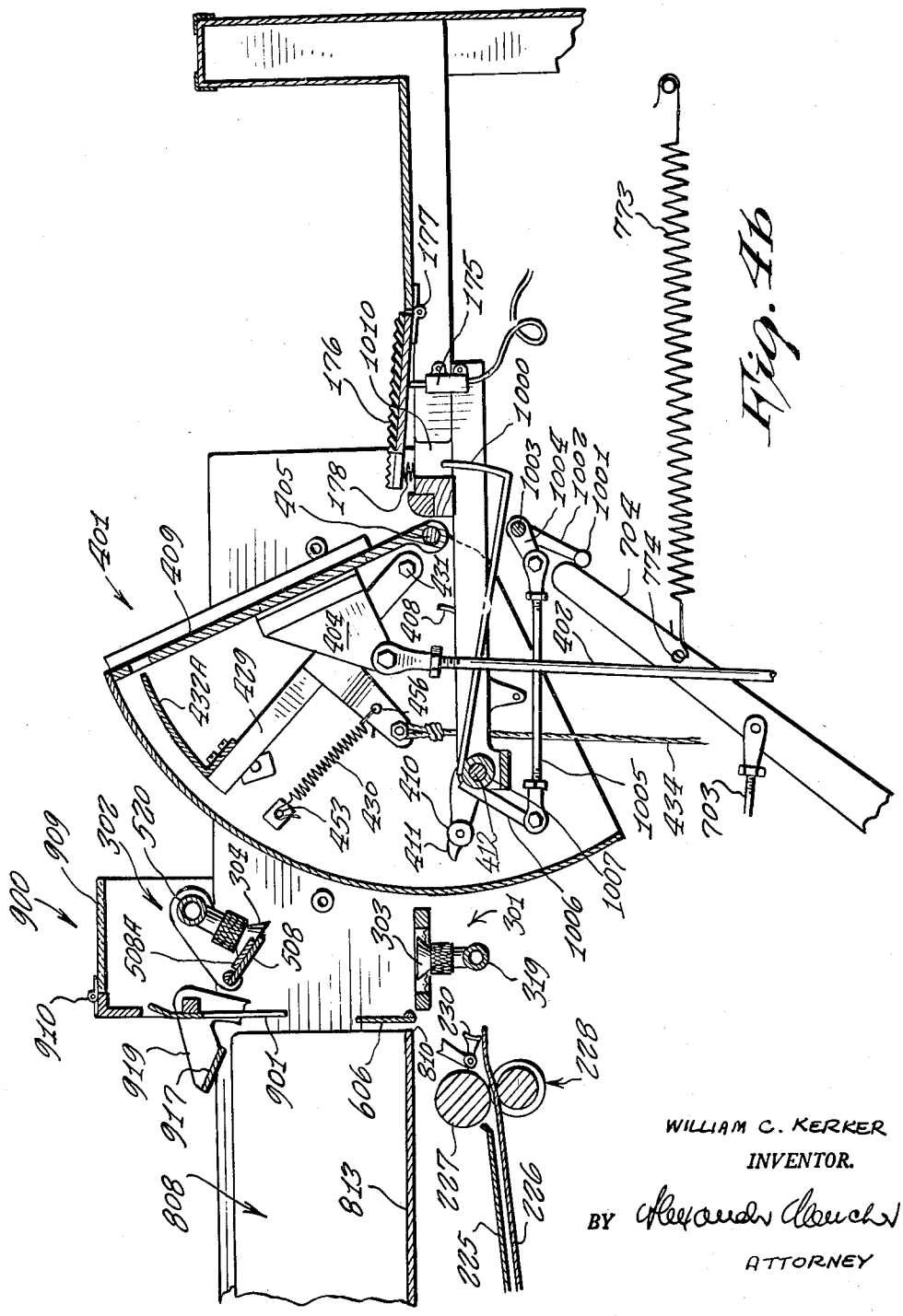


Fig. 46

WILLIAM C. KERKER
INVENTOR.

BY Alexander Mercier
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 5

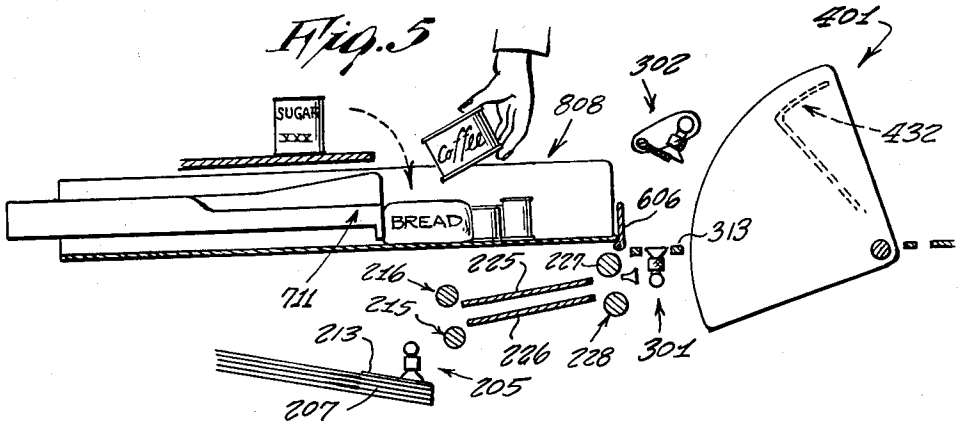



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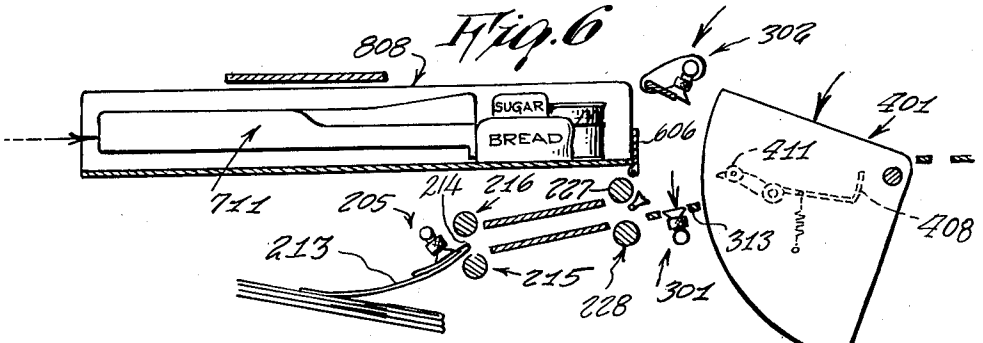



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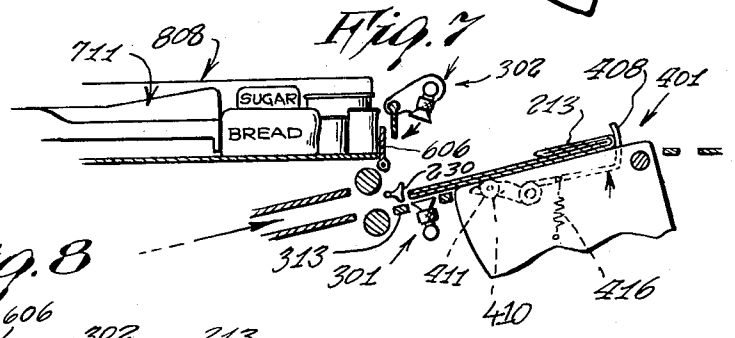



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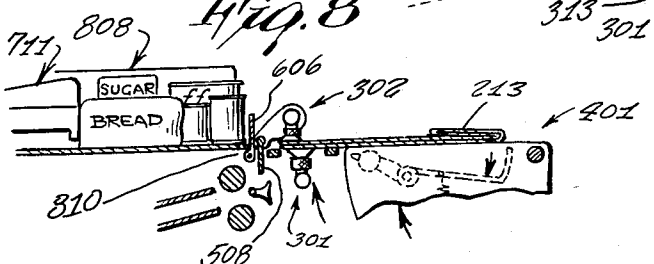
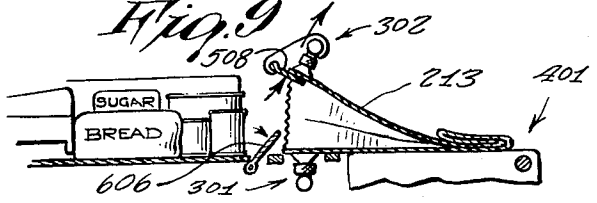



Fig. 9




WILLIAM C. KERKER
INVENTOR.

BY
ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 10

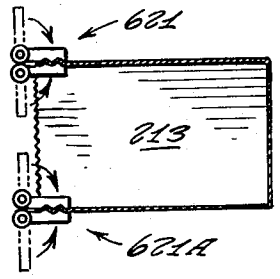



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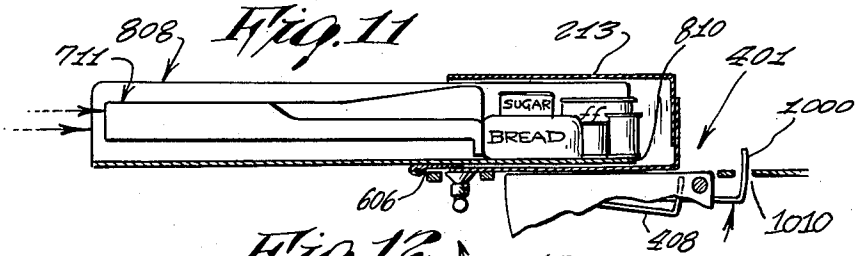



Fig. 12

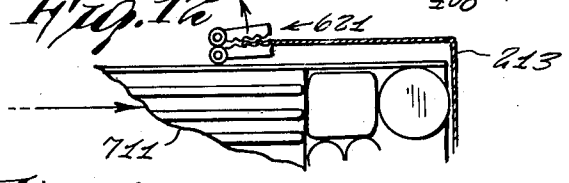



Fig. 13

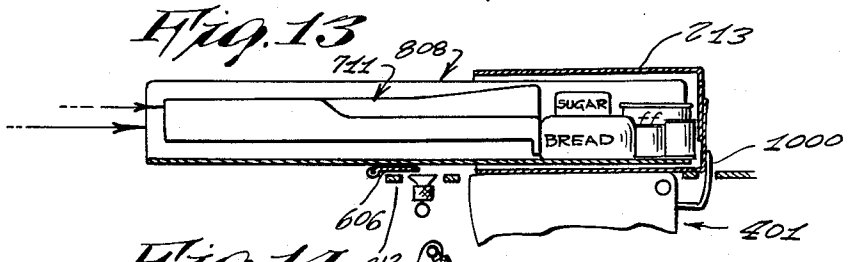
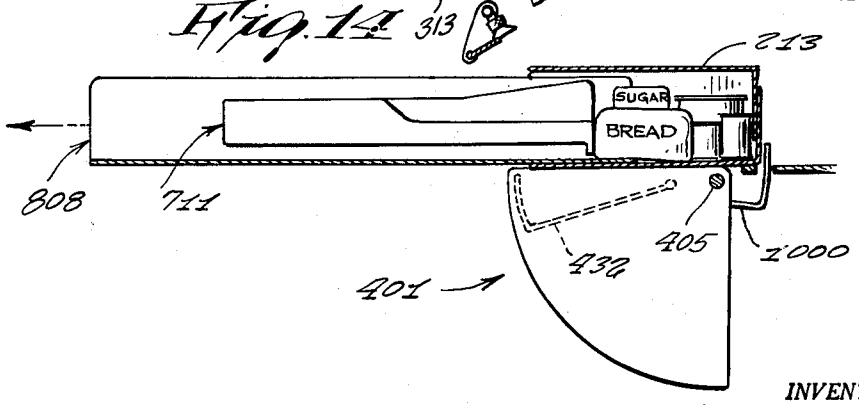



Fig. 14




INVENTOR.
WILLIAM C. KERKER

BY

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 15

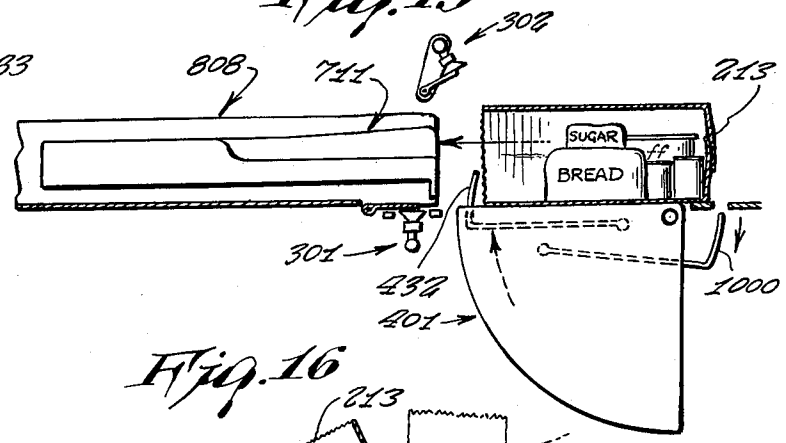



Fig. 16

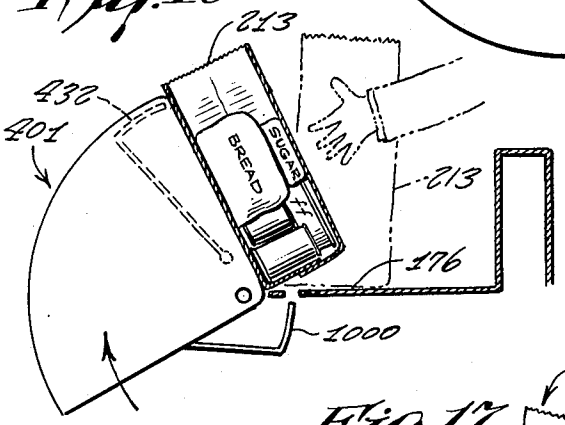



Fig. 17

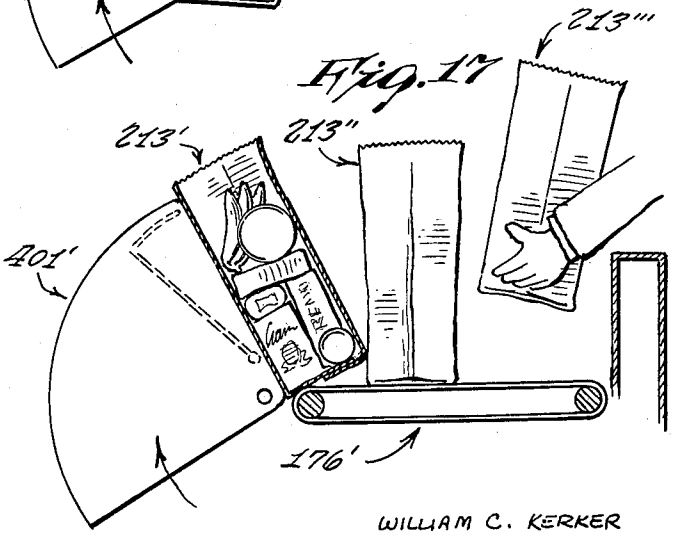
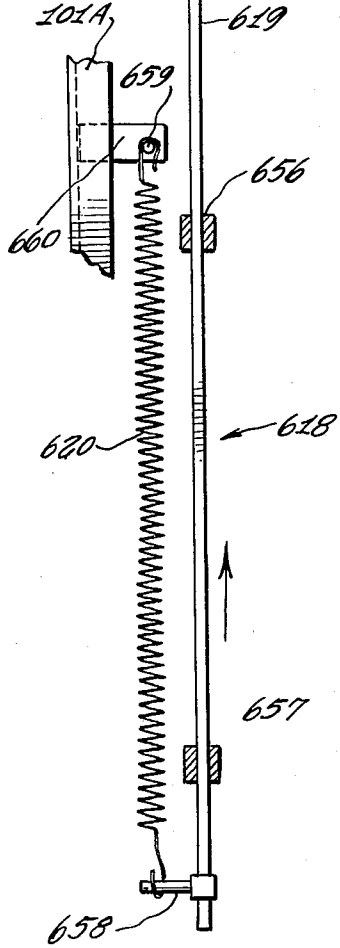



Fig. 46




WILLIAM C. KERKER
INVENTOR.

BY Kenyon & Kenyon
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 83

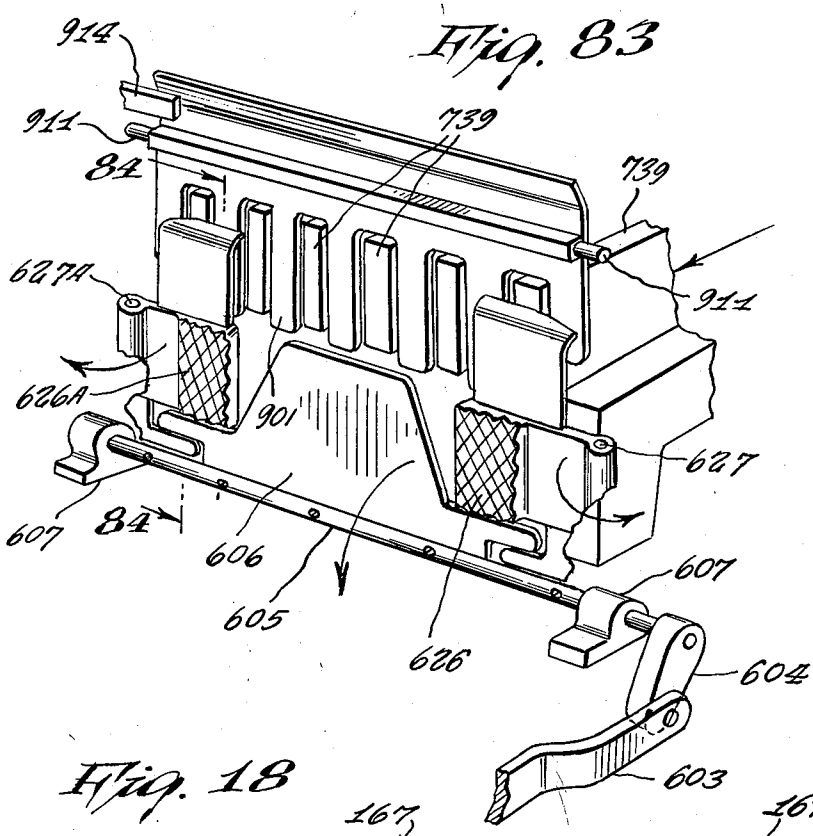
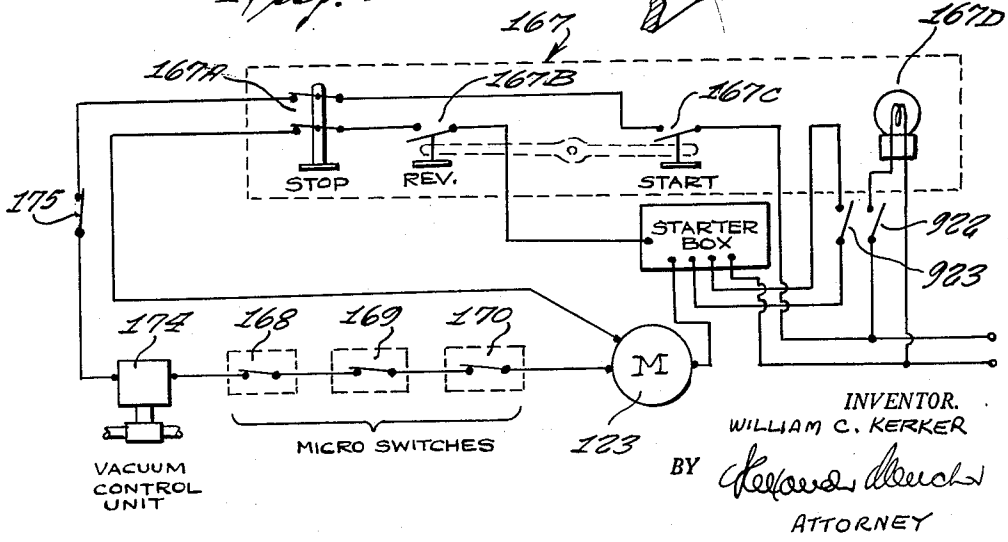



Fig. 18




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 76

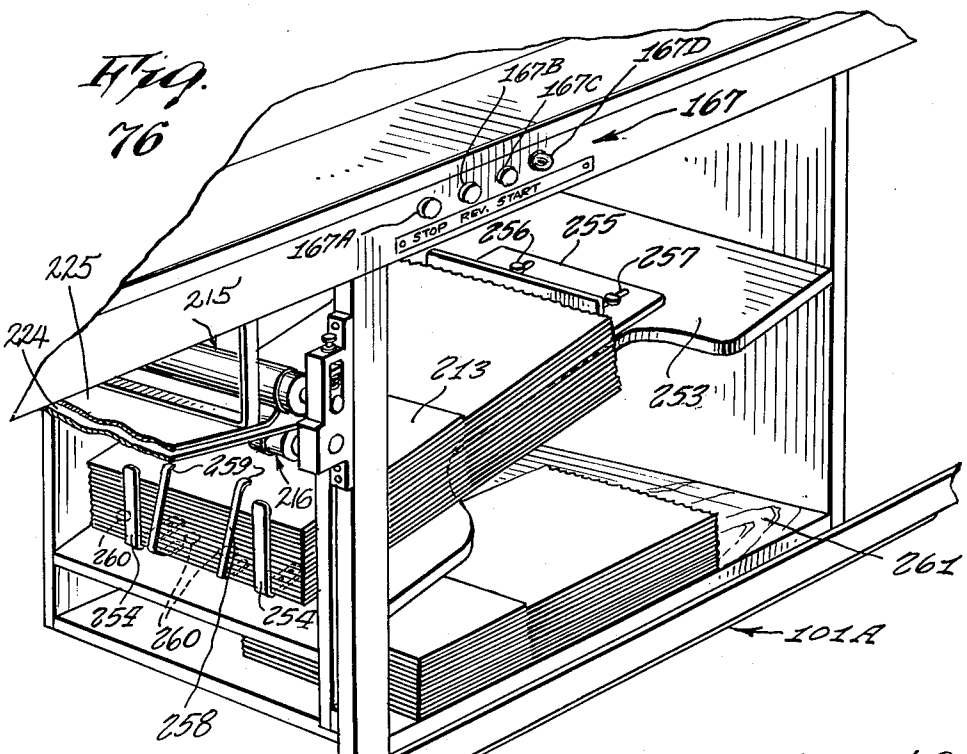
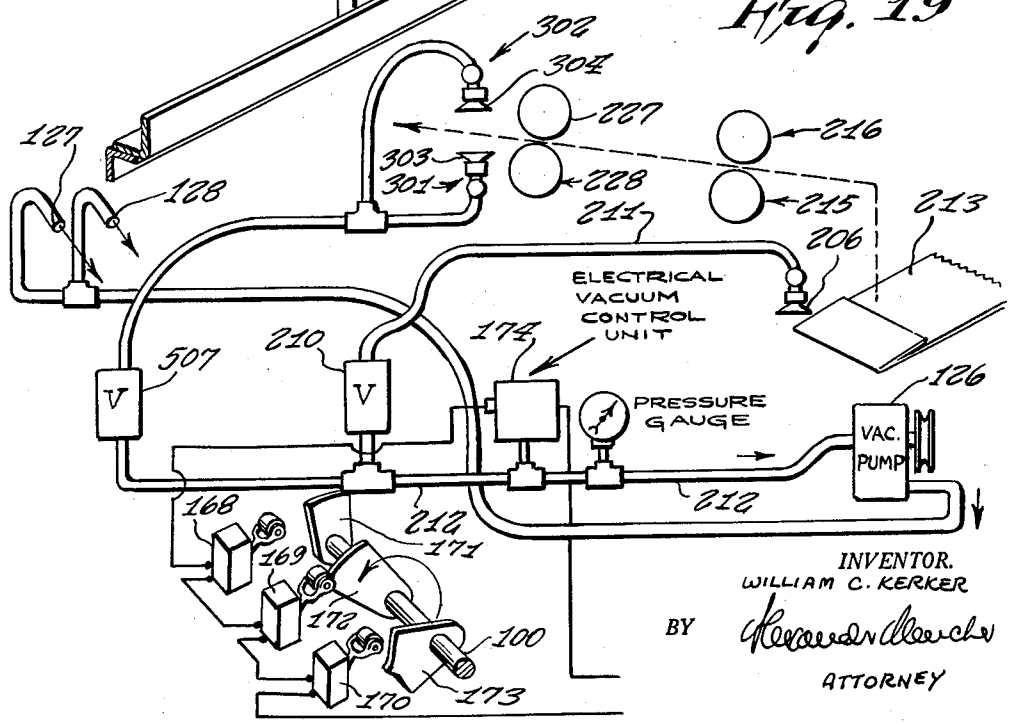



Fig. 19




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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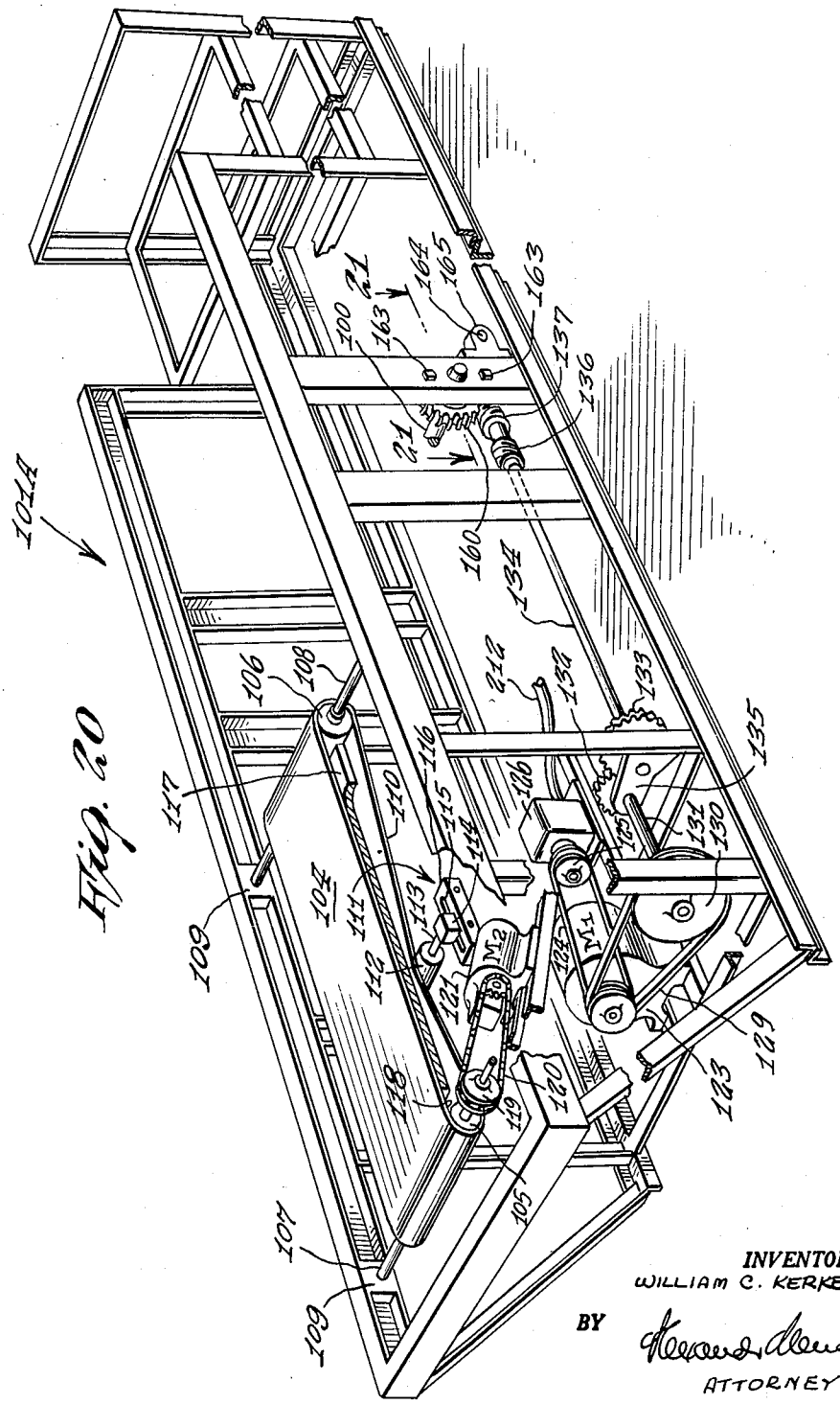



Fig. 20

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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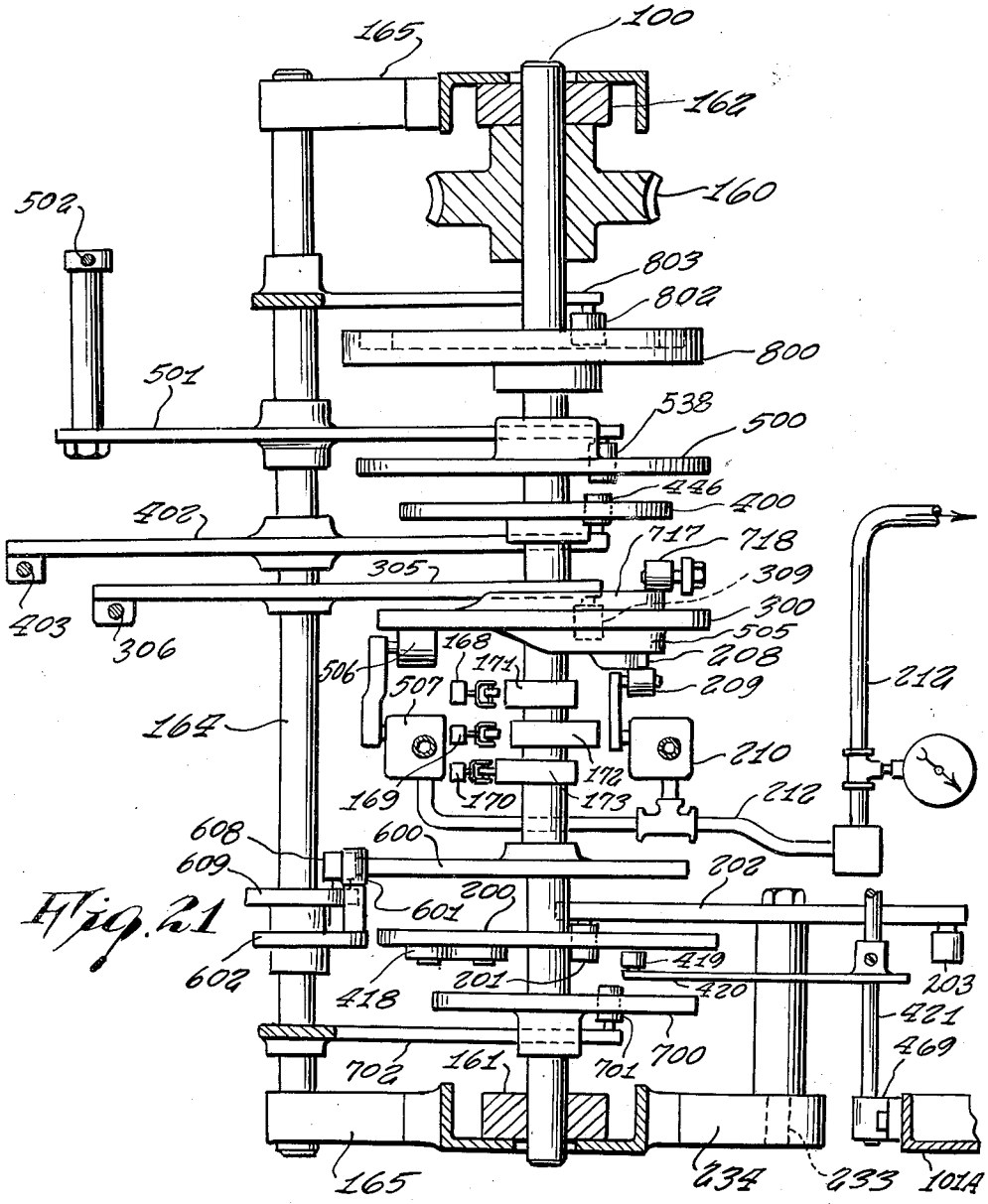



Fig. 21

WILLIAM C. KERKER
INVENTOR.

BY Alexander Sprung
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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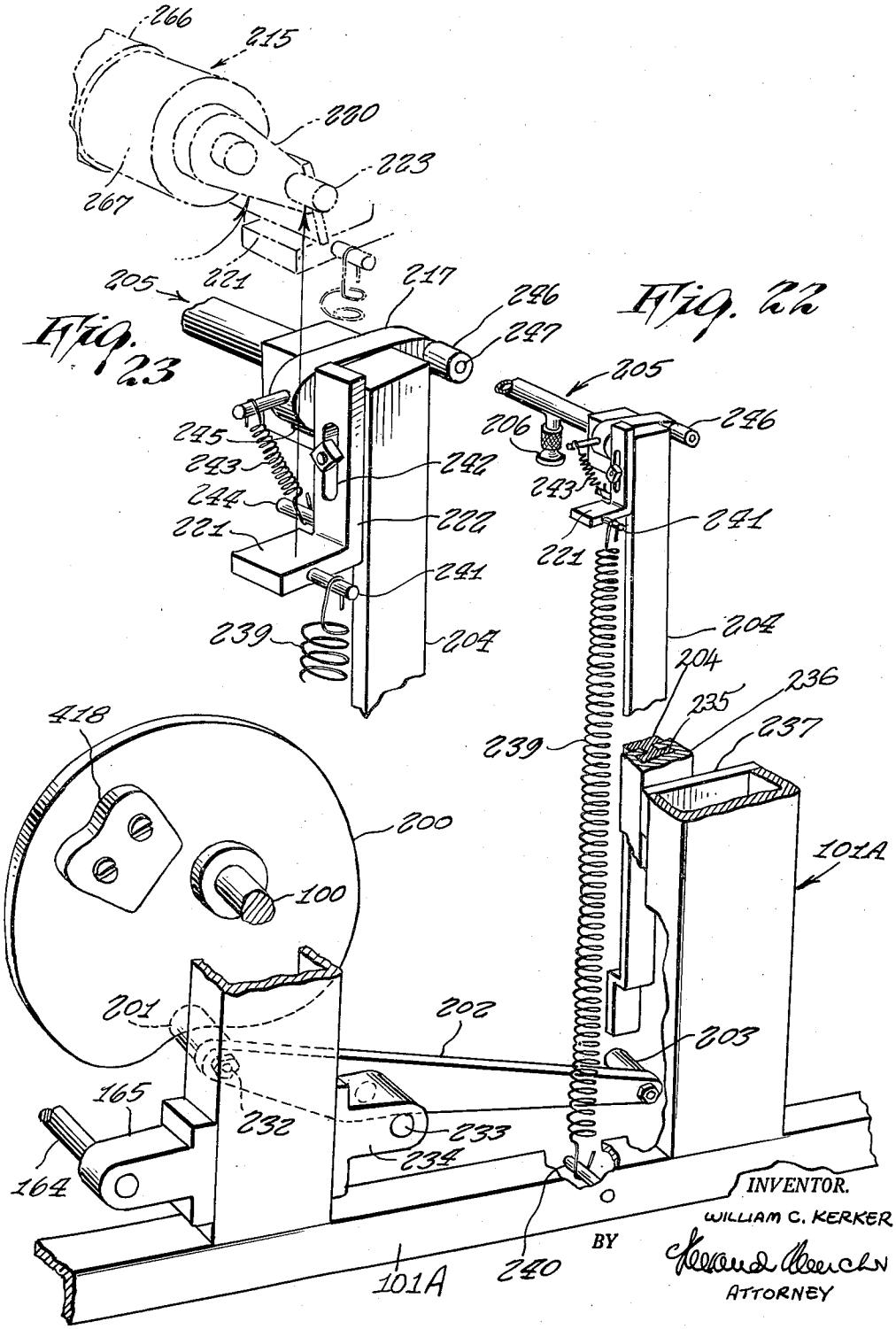



Fig. 23

Fig. 22

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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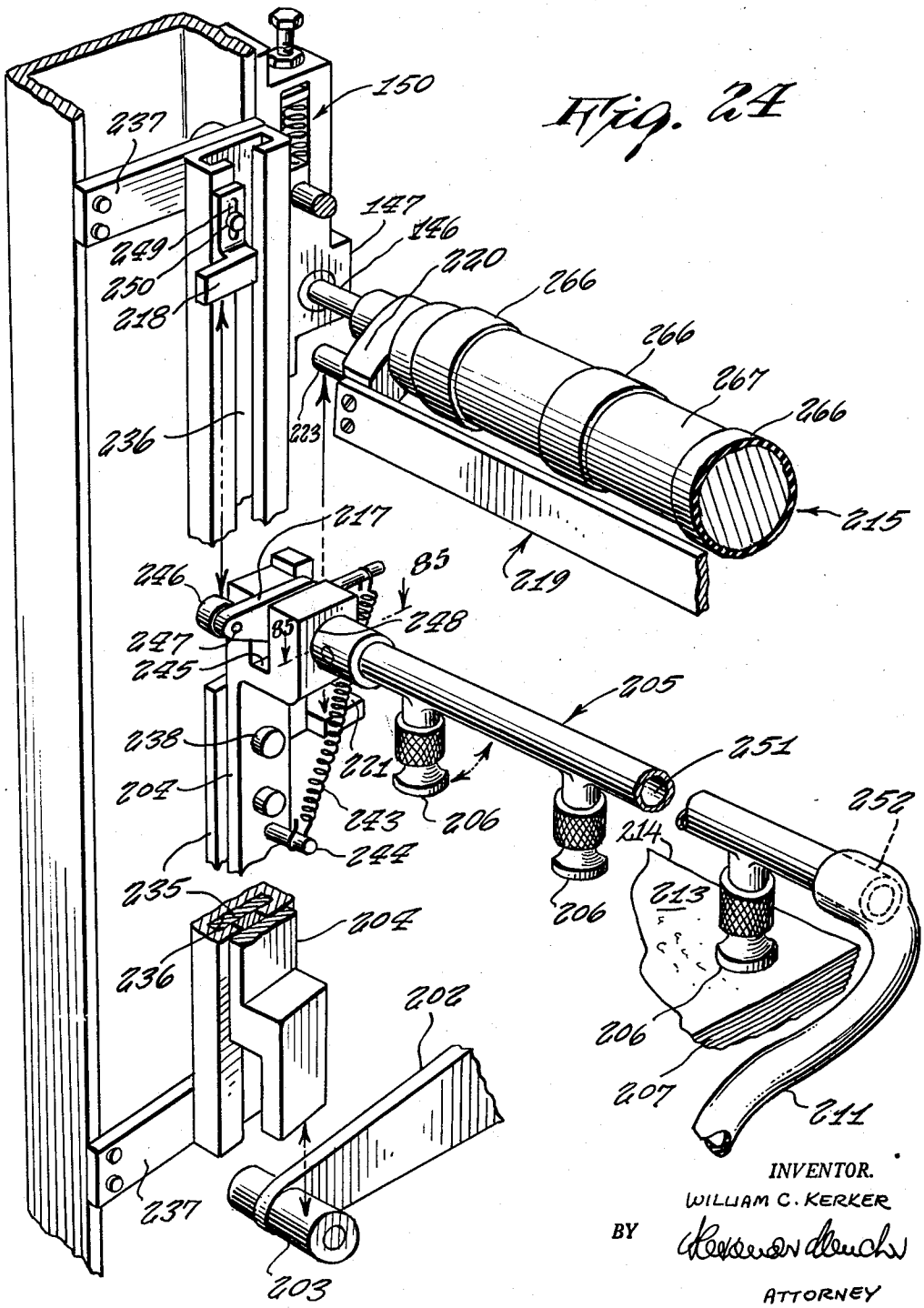



Fig. 24

INVENTOR.
WILLIAM C. KERKER
BY Kerkam & Merchant
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 24

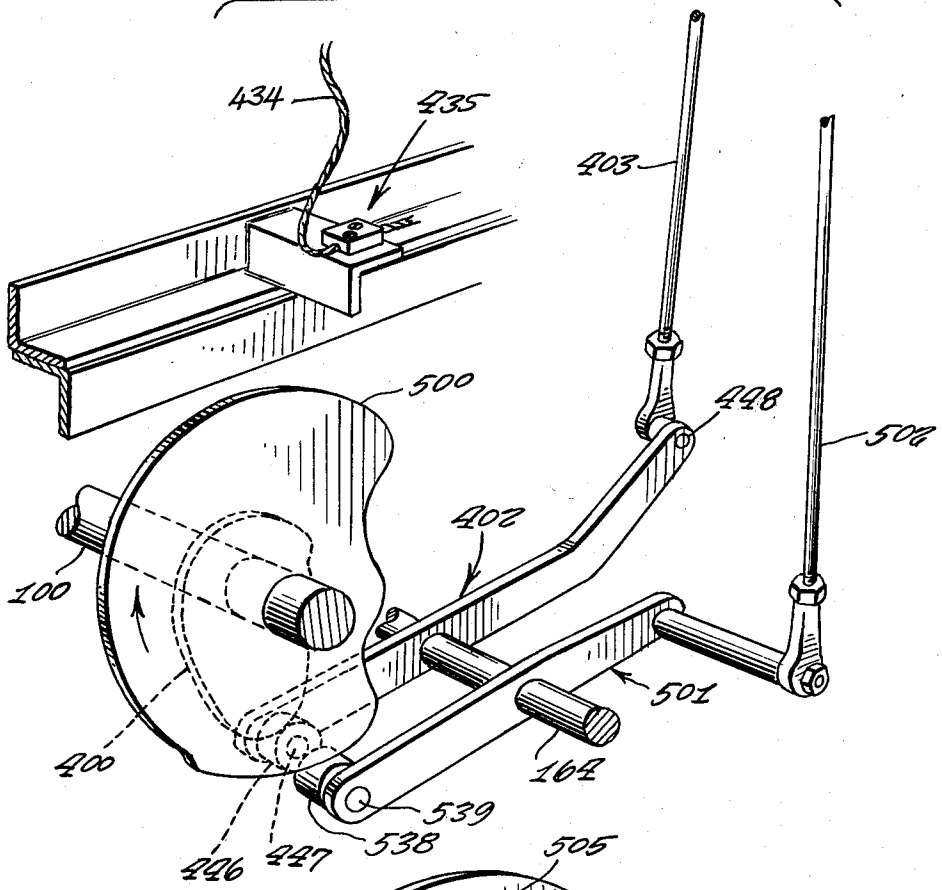
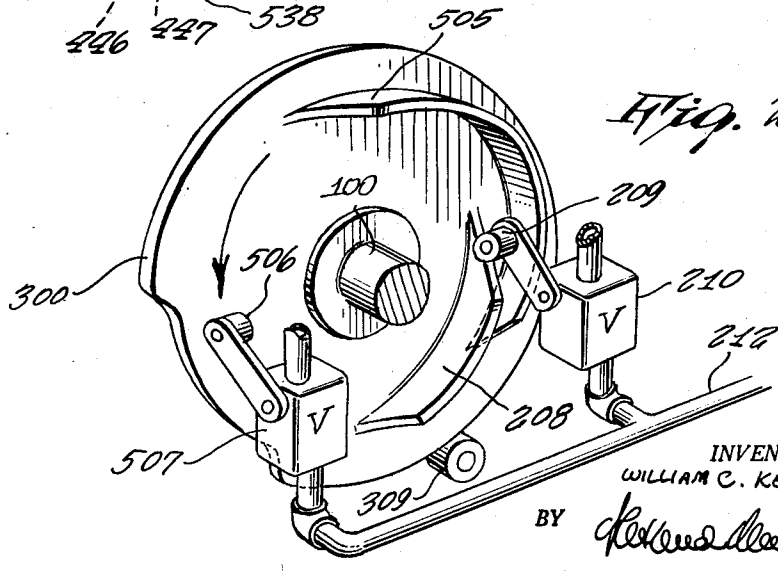



Fig. 25




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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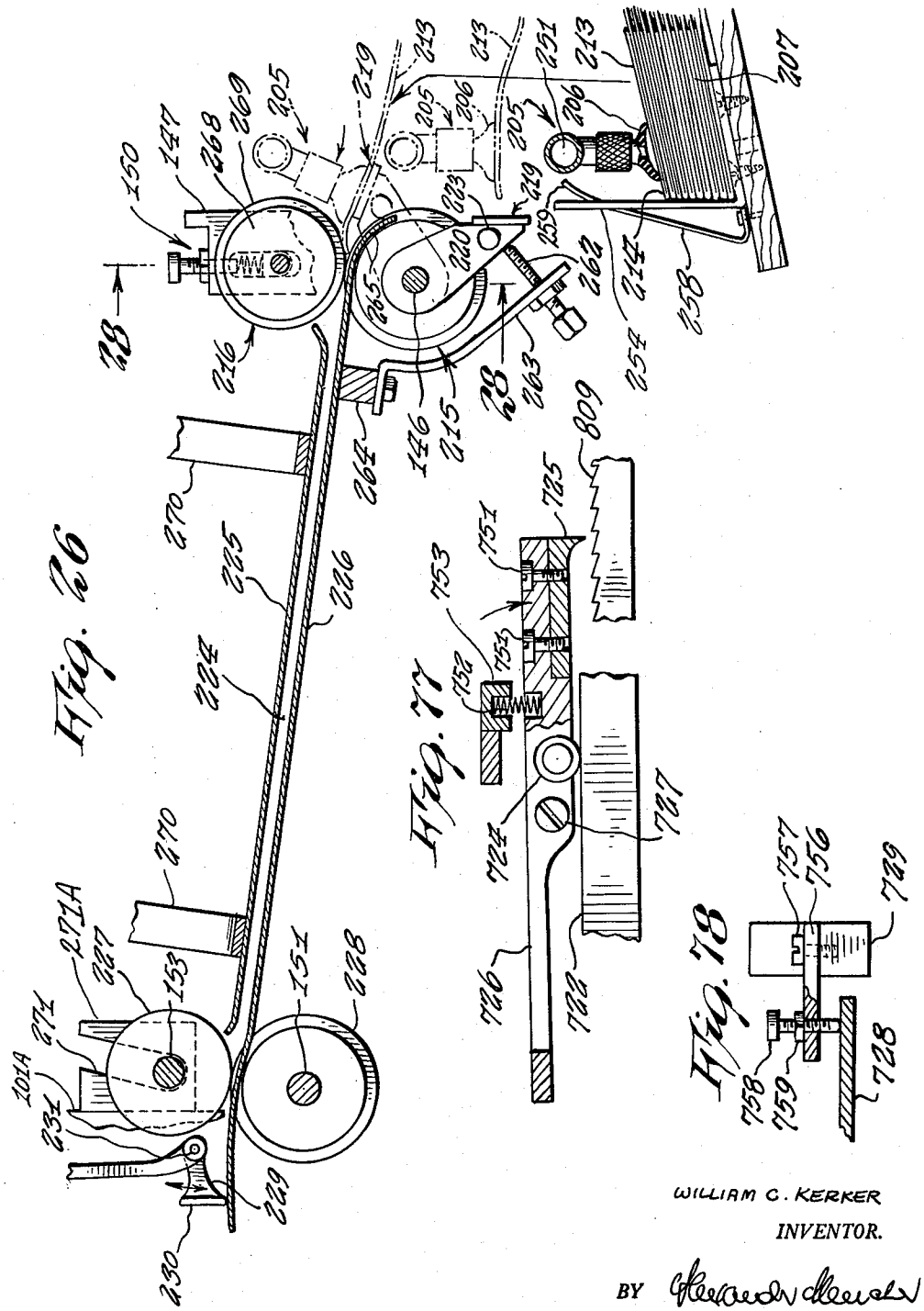


Fig. 16



Fig. 17



Fig. 18

WILLIAM C. KERKER
INVENTOR.

BY Alexander Mercer
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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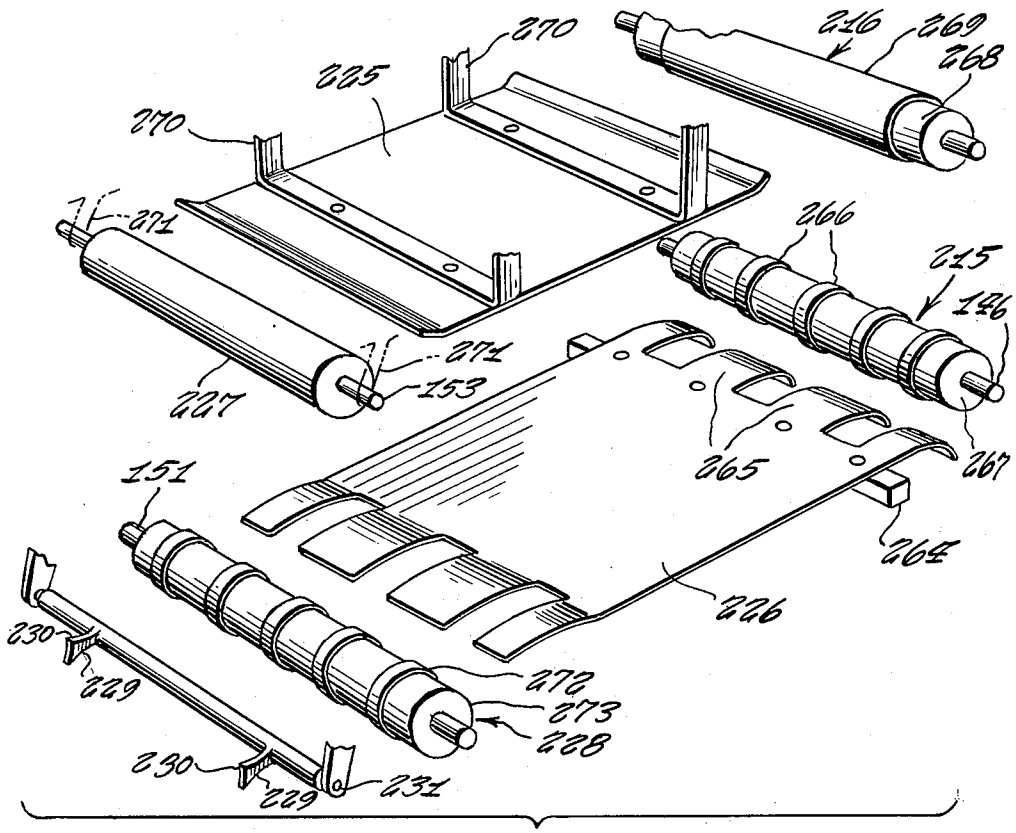
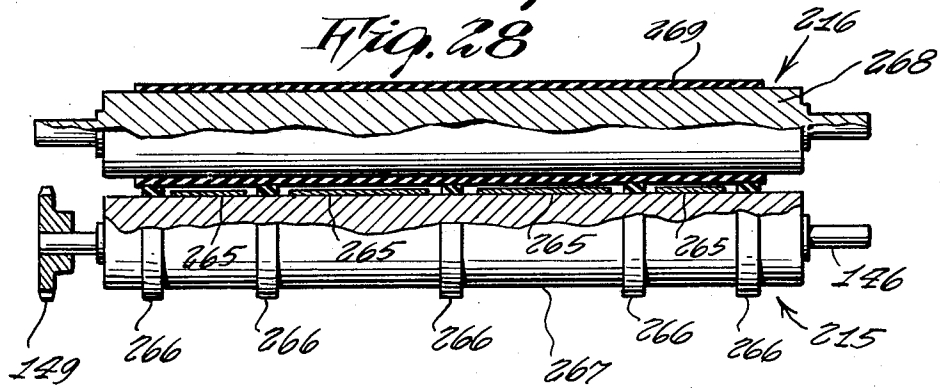



Fig. 27

Fig. 28



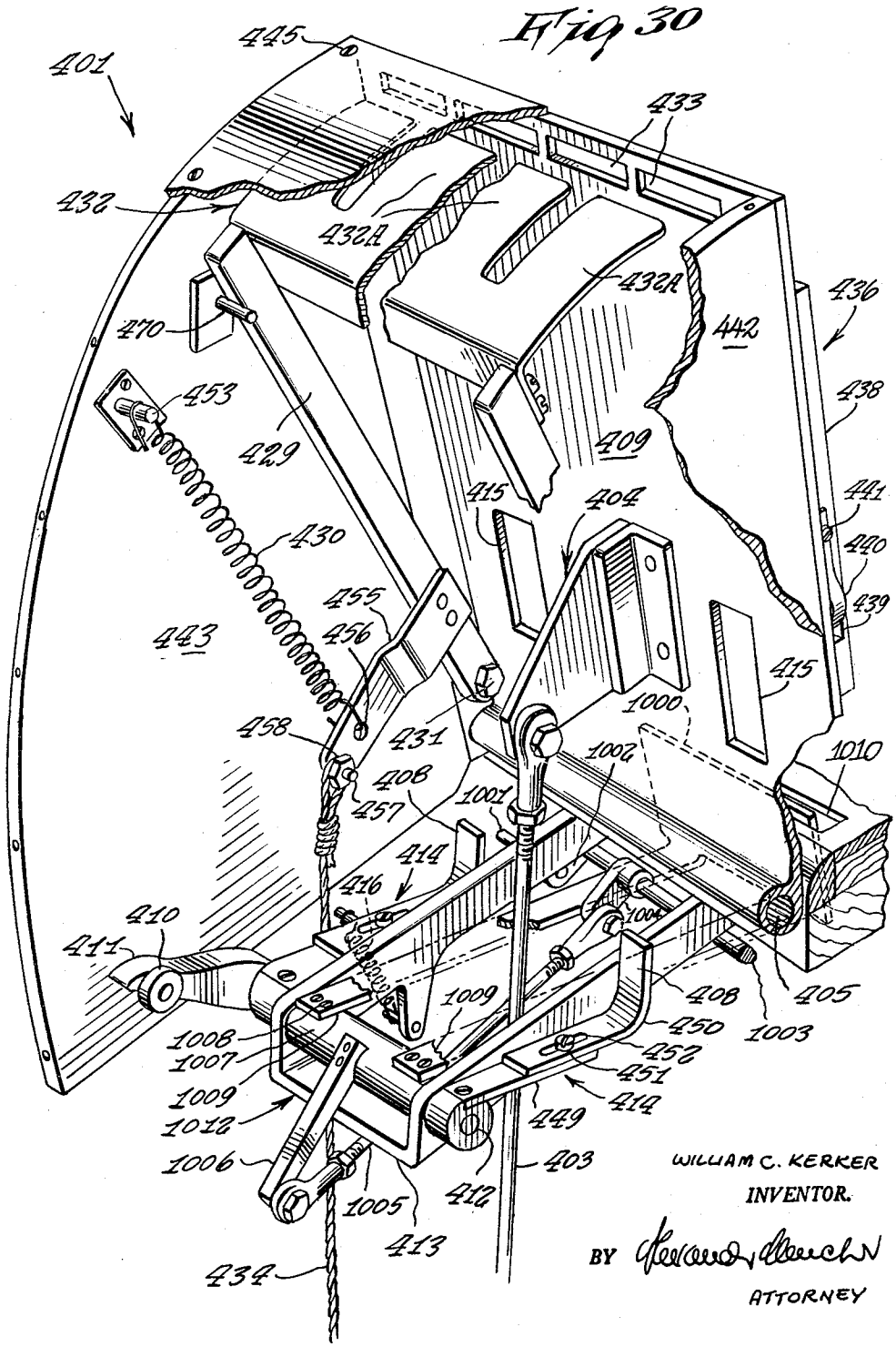

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig 30




WILLIAM C. KERKER
INVENTOR.

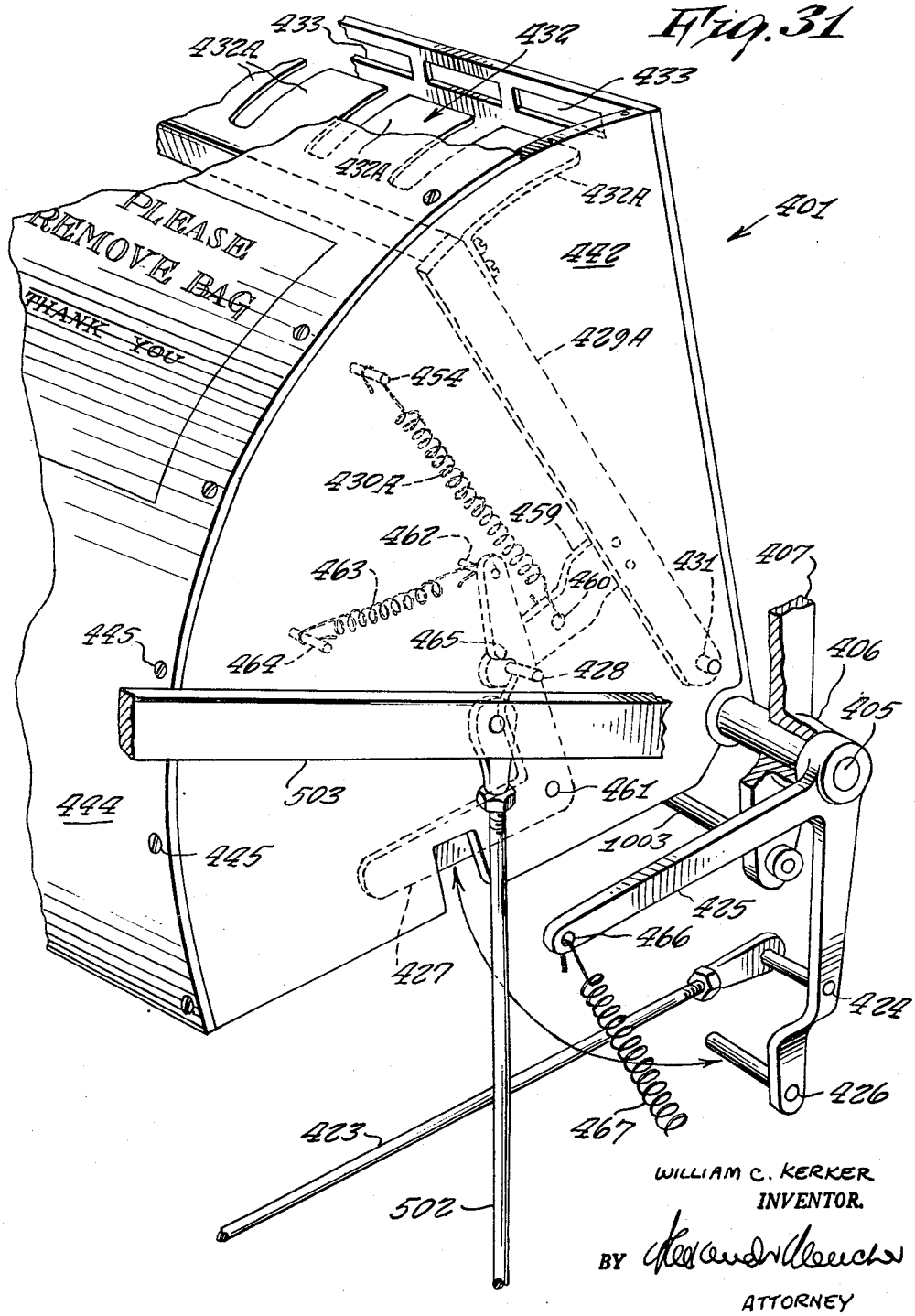
BY Howard Marcus
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 31




WILLIAM C. KERKER
INVENTOR.

BY

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 32

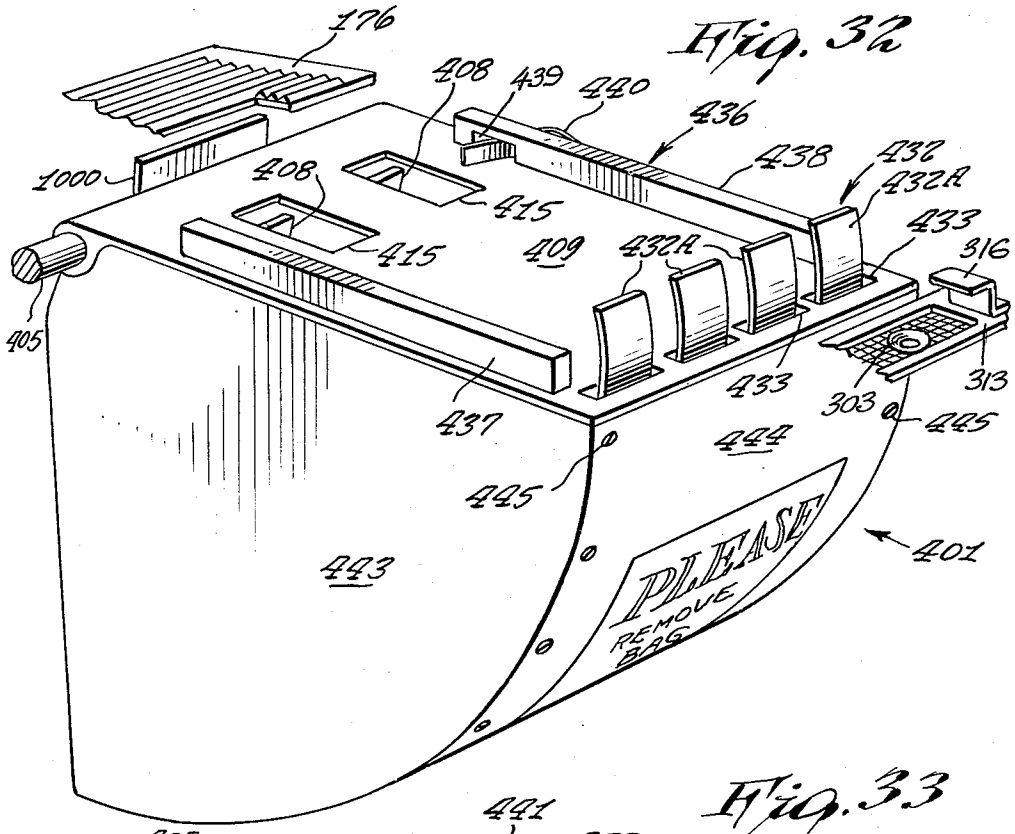
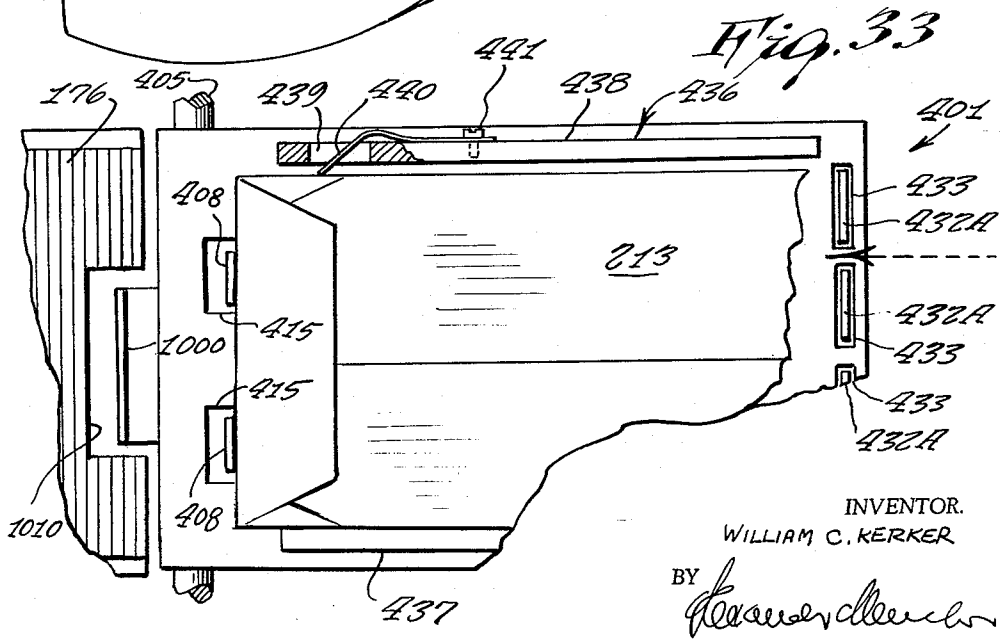



Fig. 33

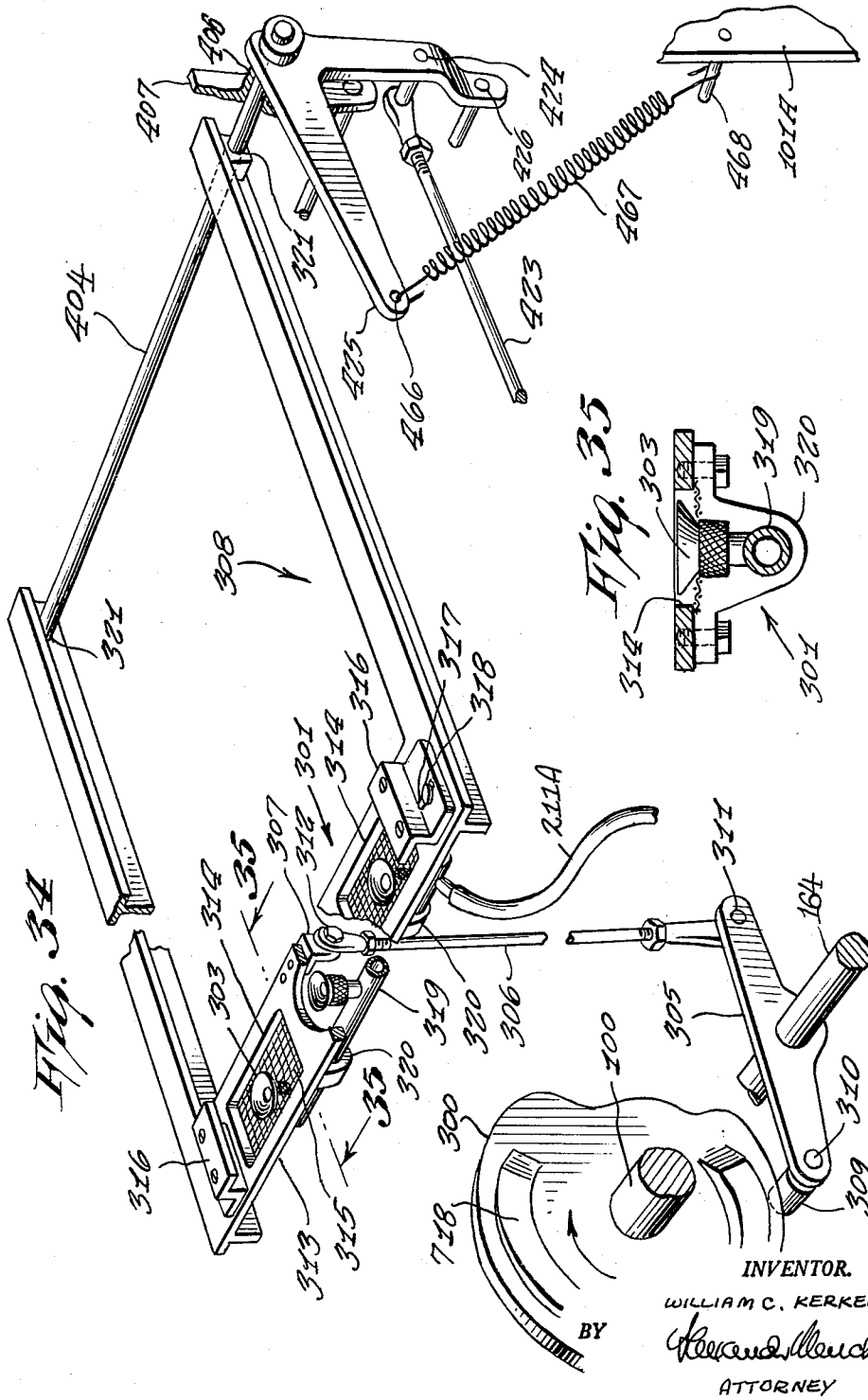



INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEYS

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

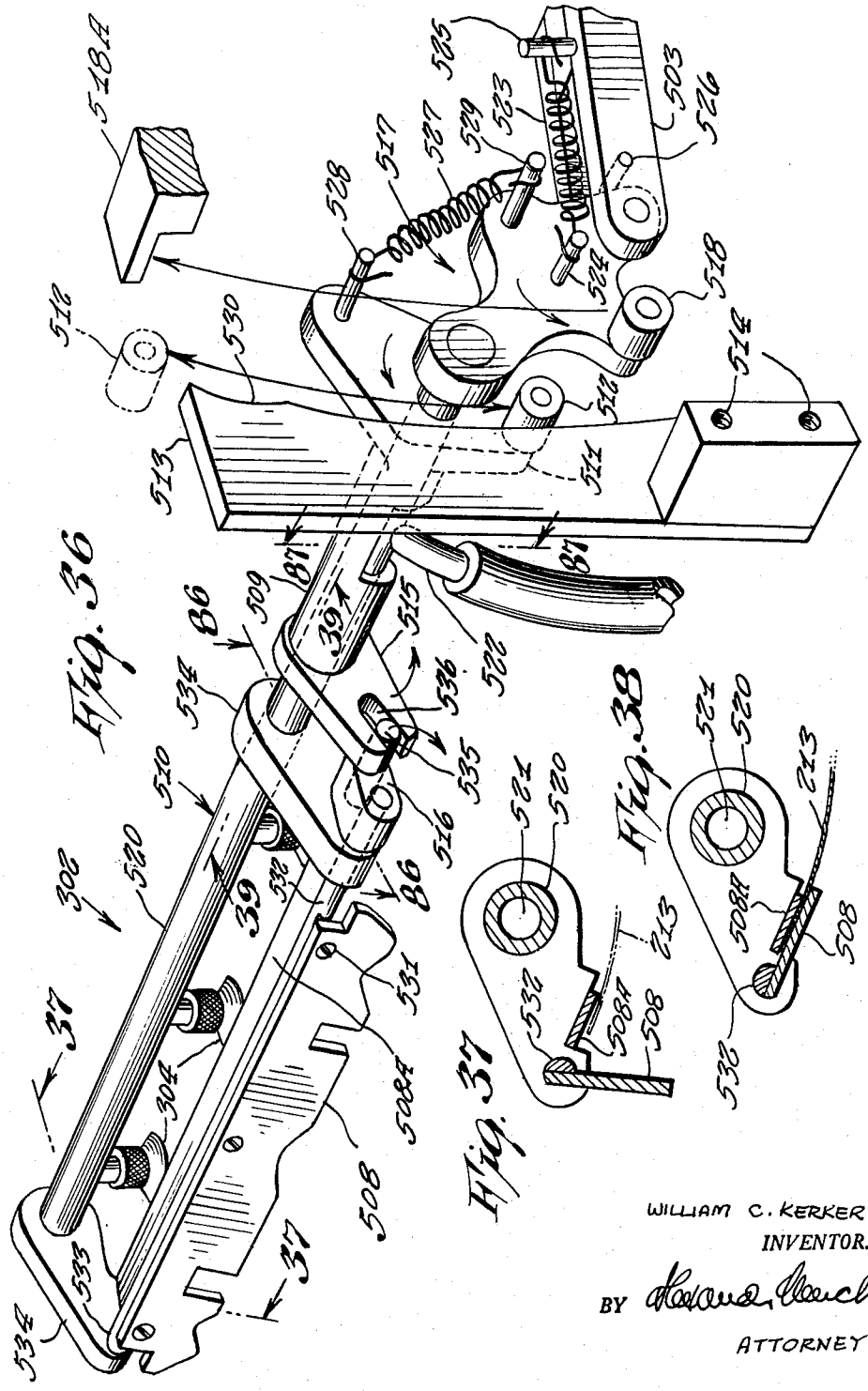
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Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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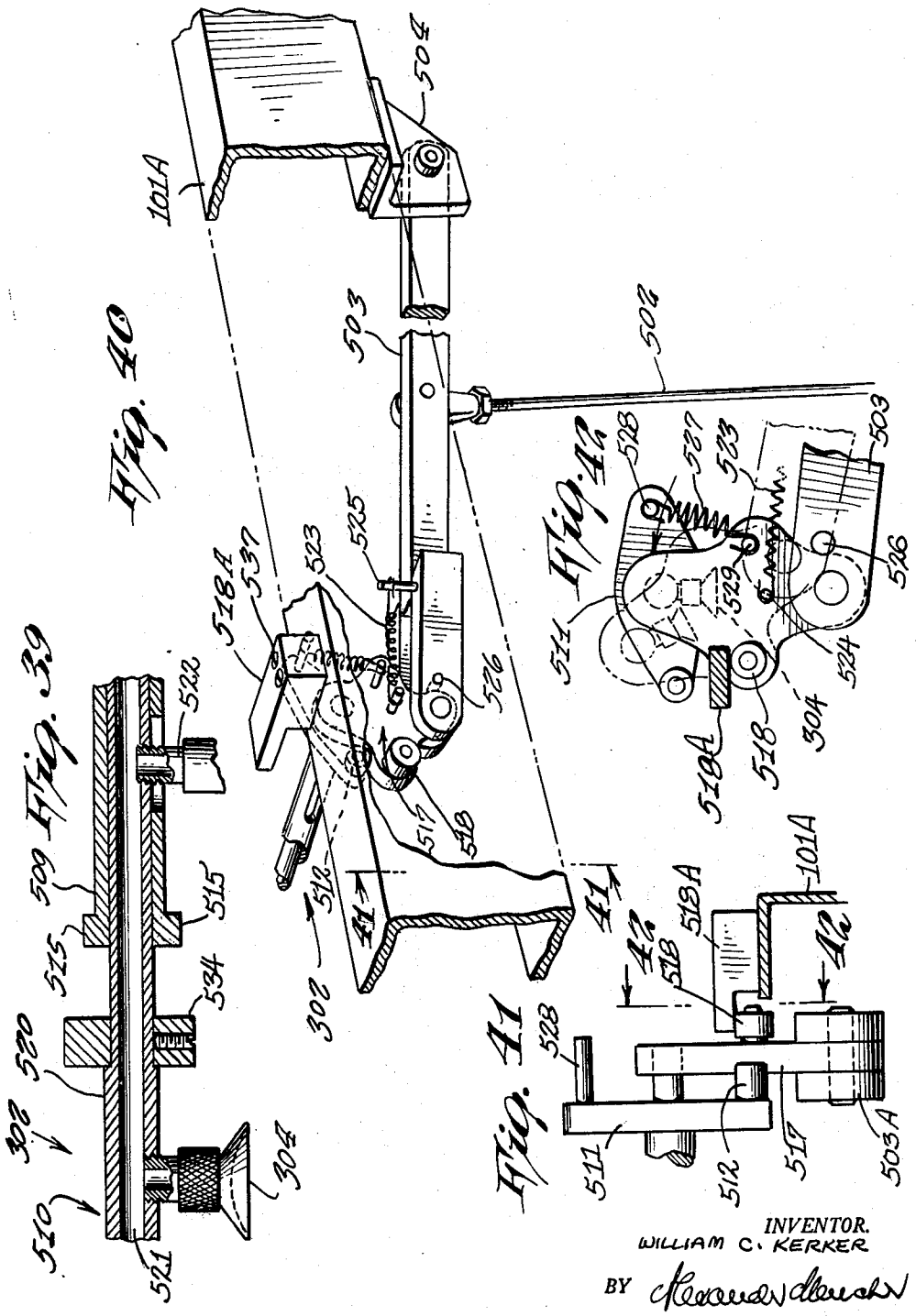

WILLIAM C. KERKER
INVENTOR.

BY Howard Barcher
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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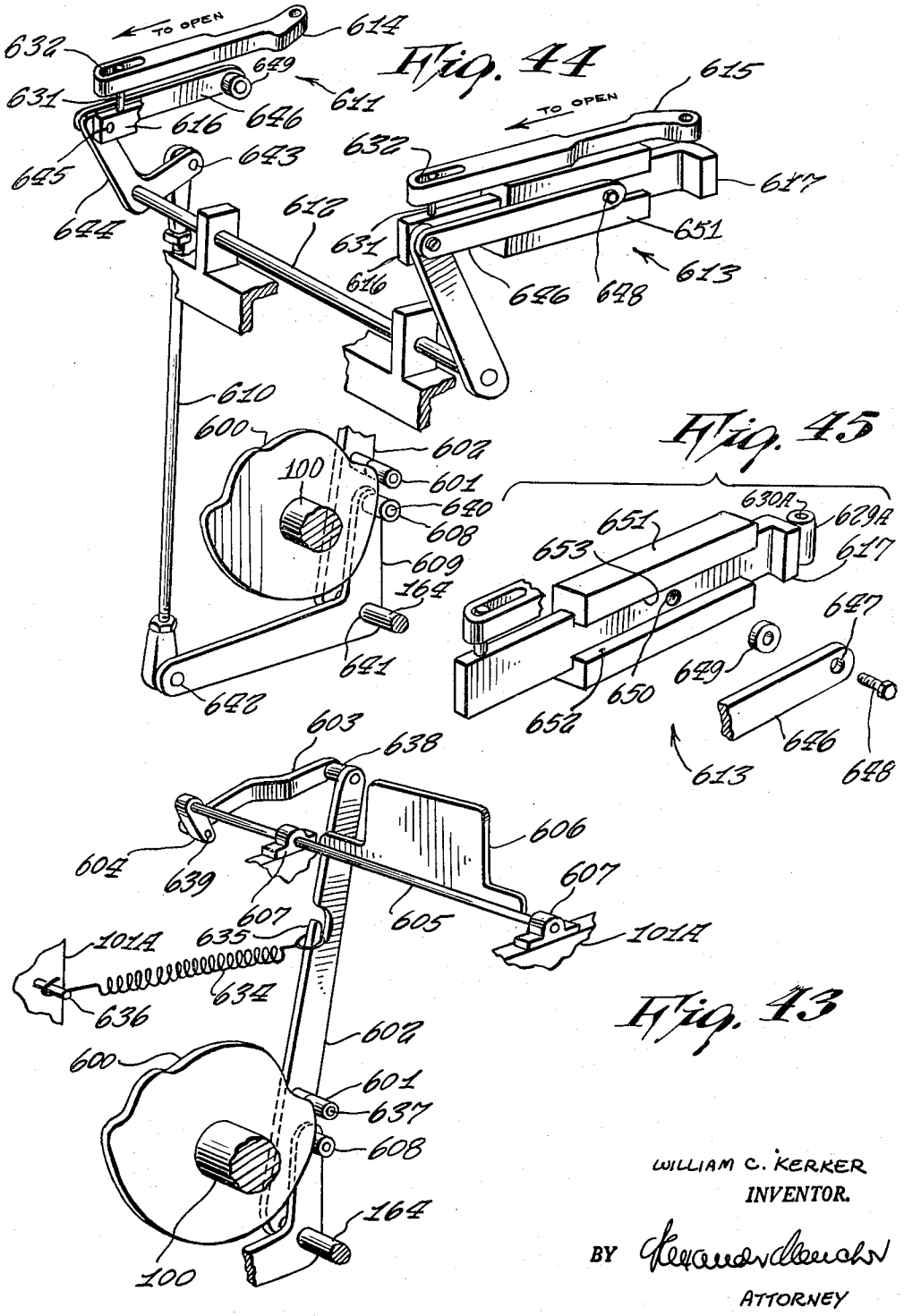



Fig. 44

Fig. 45

Fig. 43

WILLIAM C. KERKER
INVENTOR.

BY Kenyon & Kenyon

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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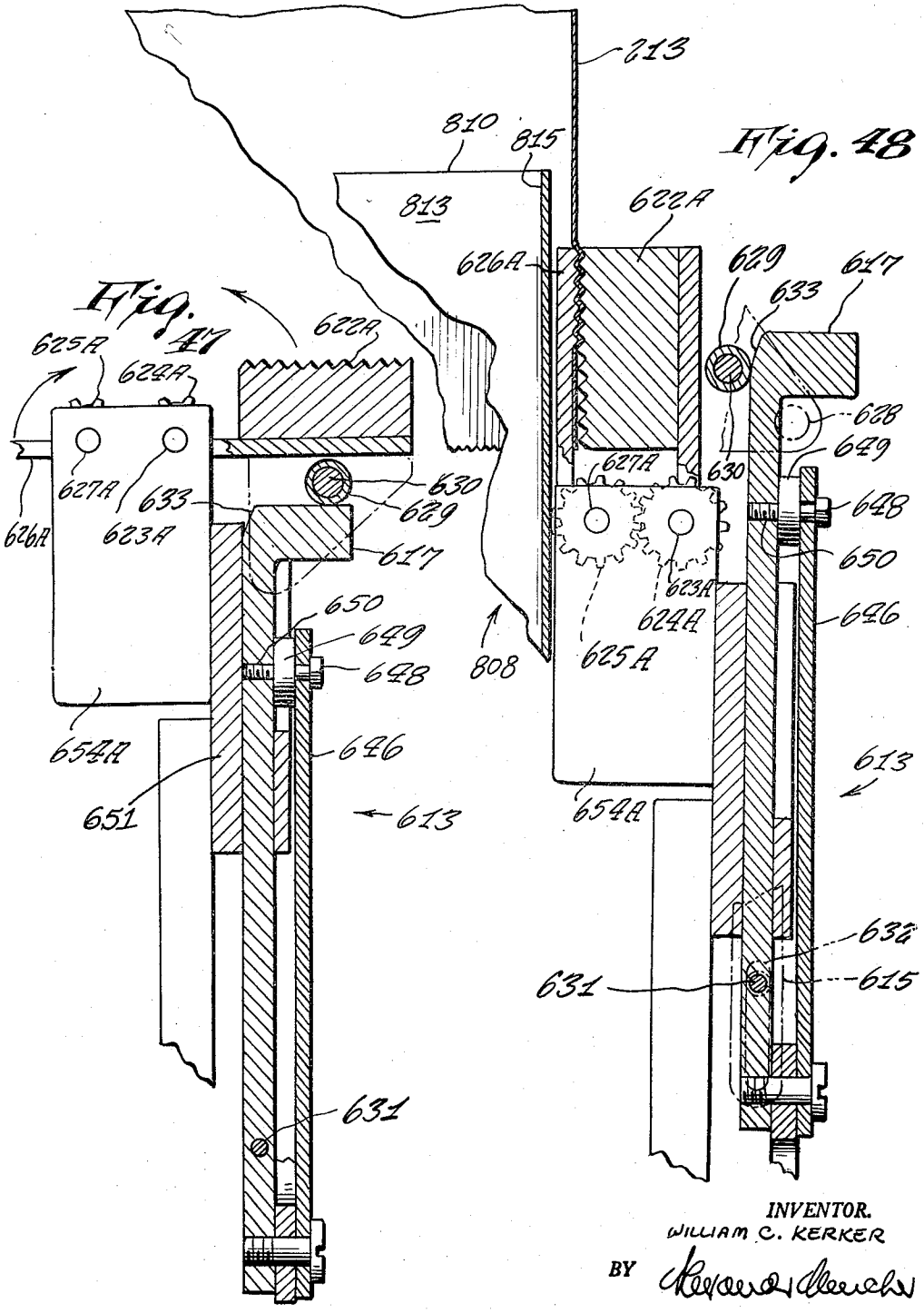



Fig. 48

Fig. 47

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

Filed March 18, 1957 44 Sheets-Sheet 25

Fig 48'

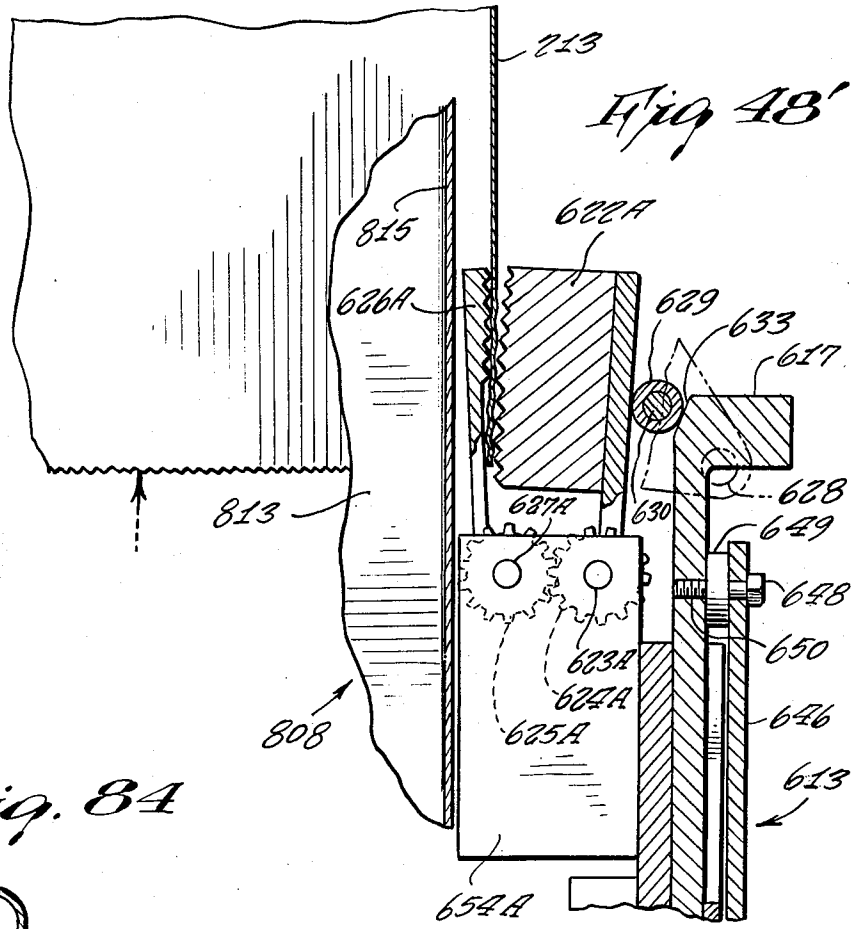



Fig. 84

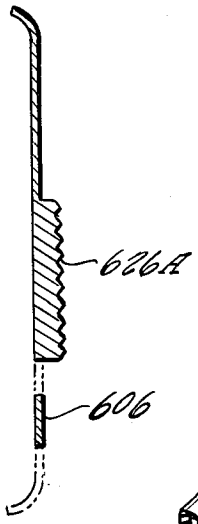



Fig. 87

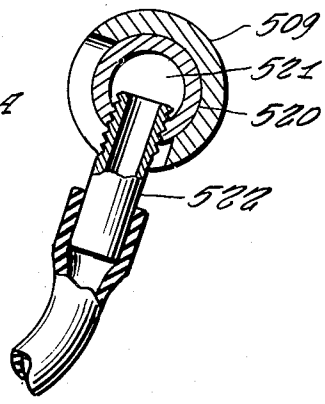
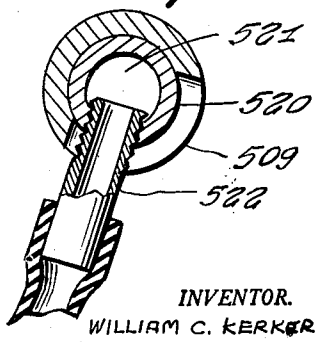



Fig. 88




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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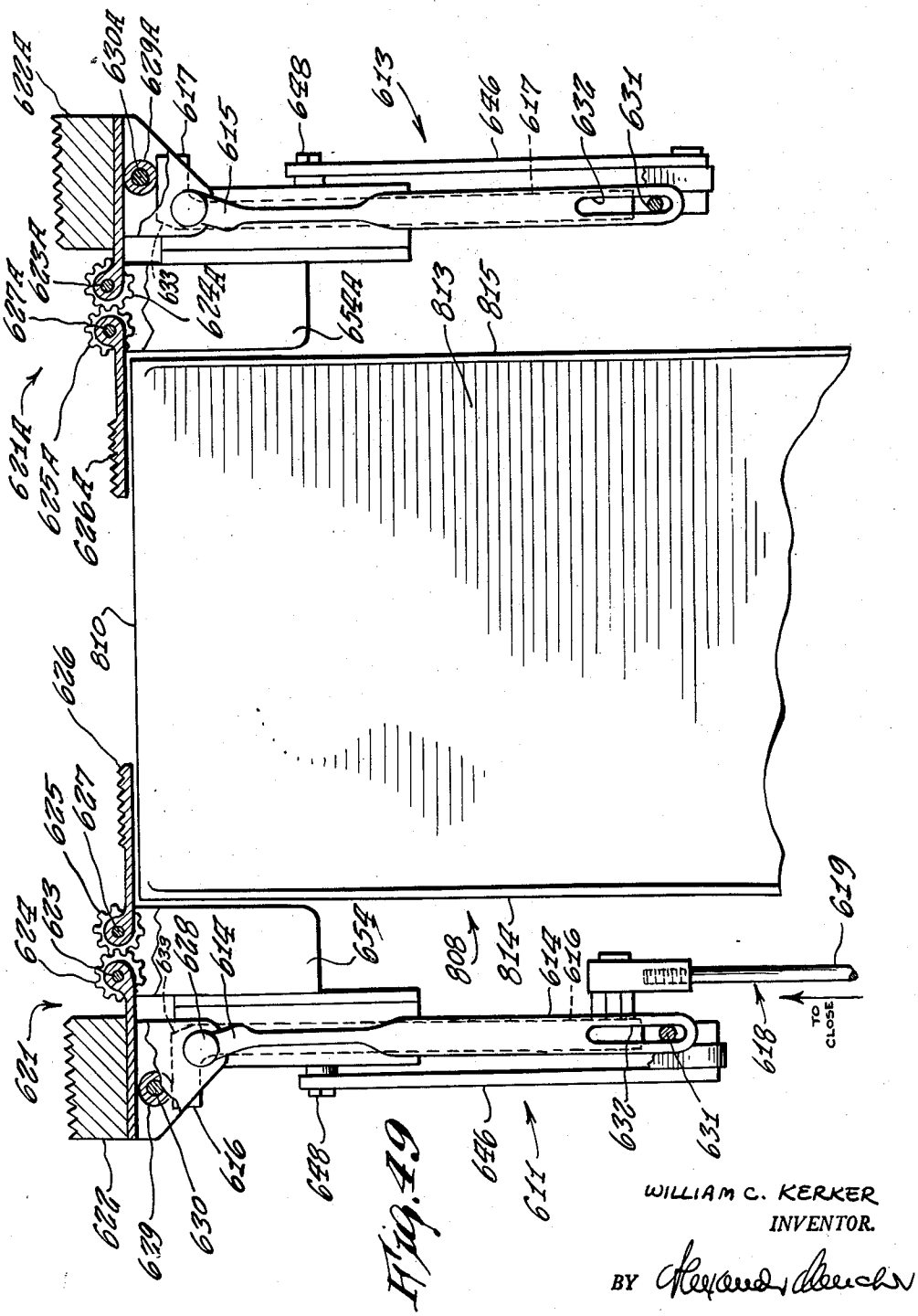



Fig. 44

WILLIAM C. KERKER
INVENTOR.

BY Howard Beach

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 50

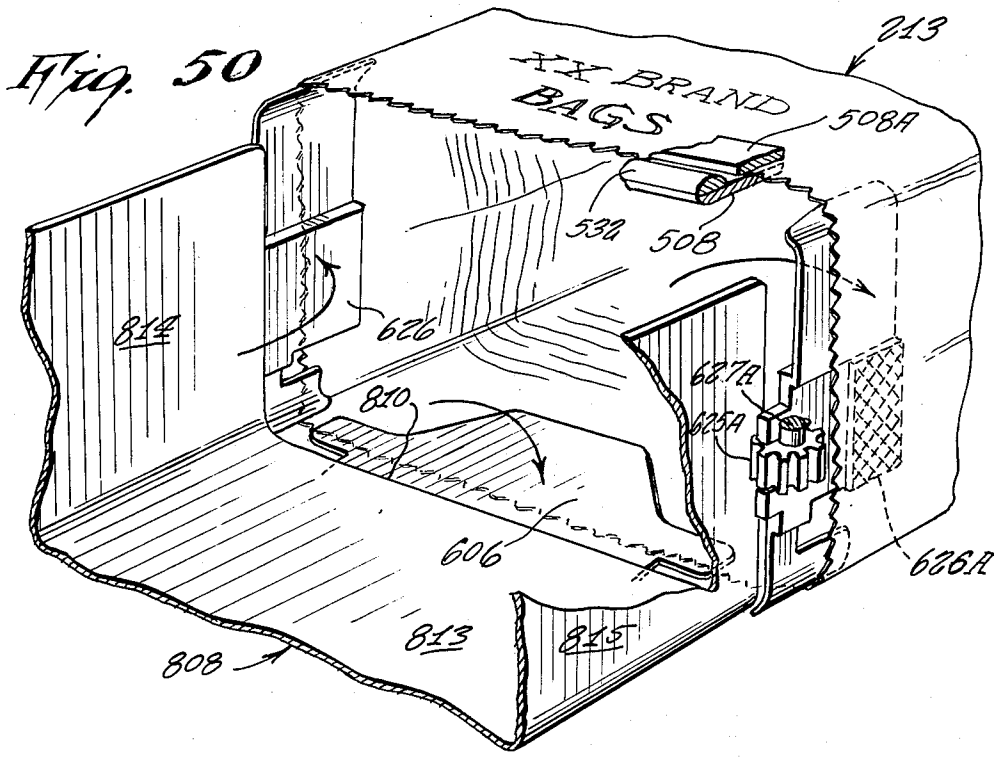
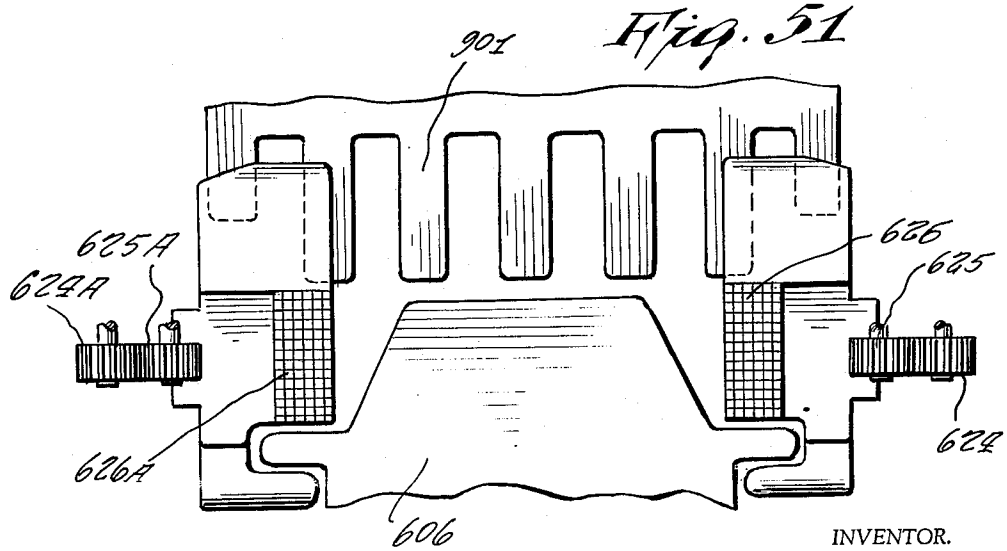



Fig. 51




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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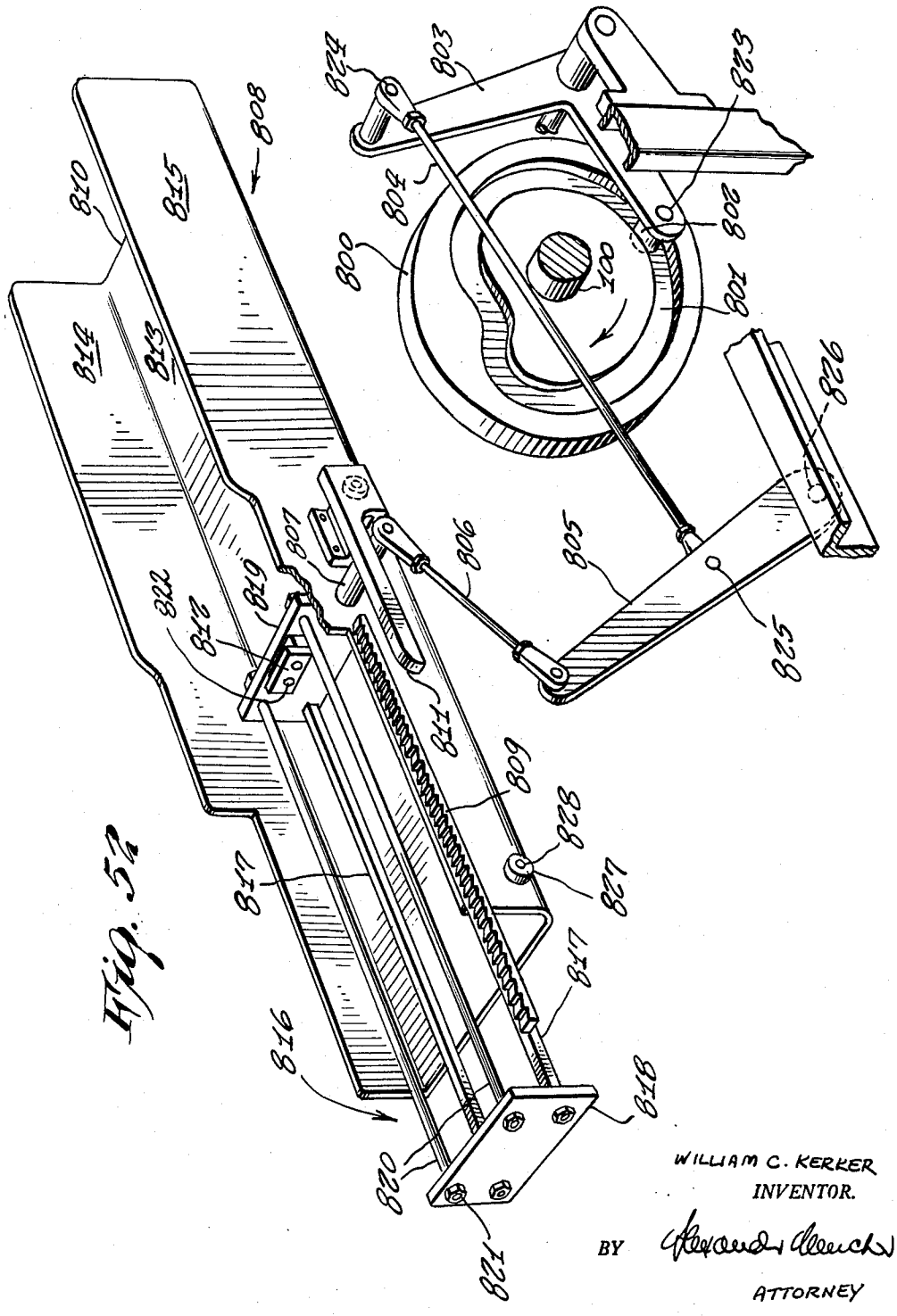



Fig. 52

WILLIAM C. KERKER
INVENTOR.

BY Alexander Mench
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

Filed March 18, 1957 44 Sheets-Sheet 29

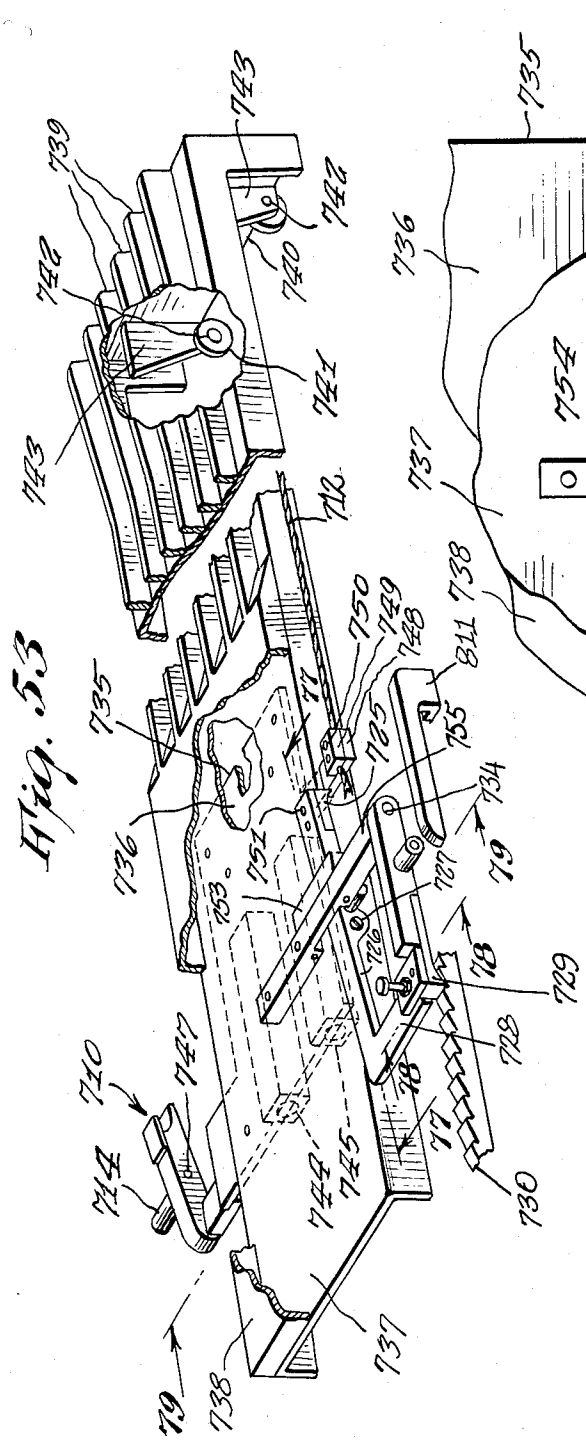


Fig. 53

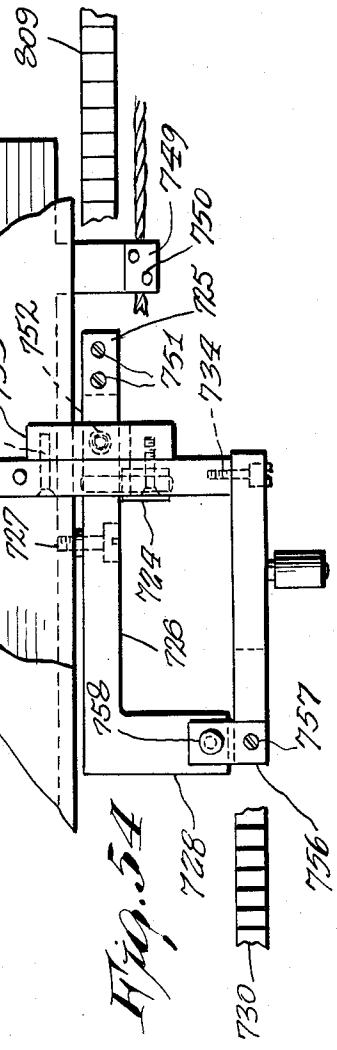


Fig. 54

WILLIAM C. KERKER
INVENTOR.

BY Reece & Mercer

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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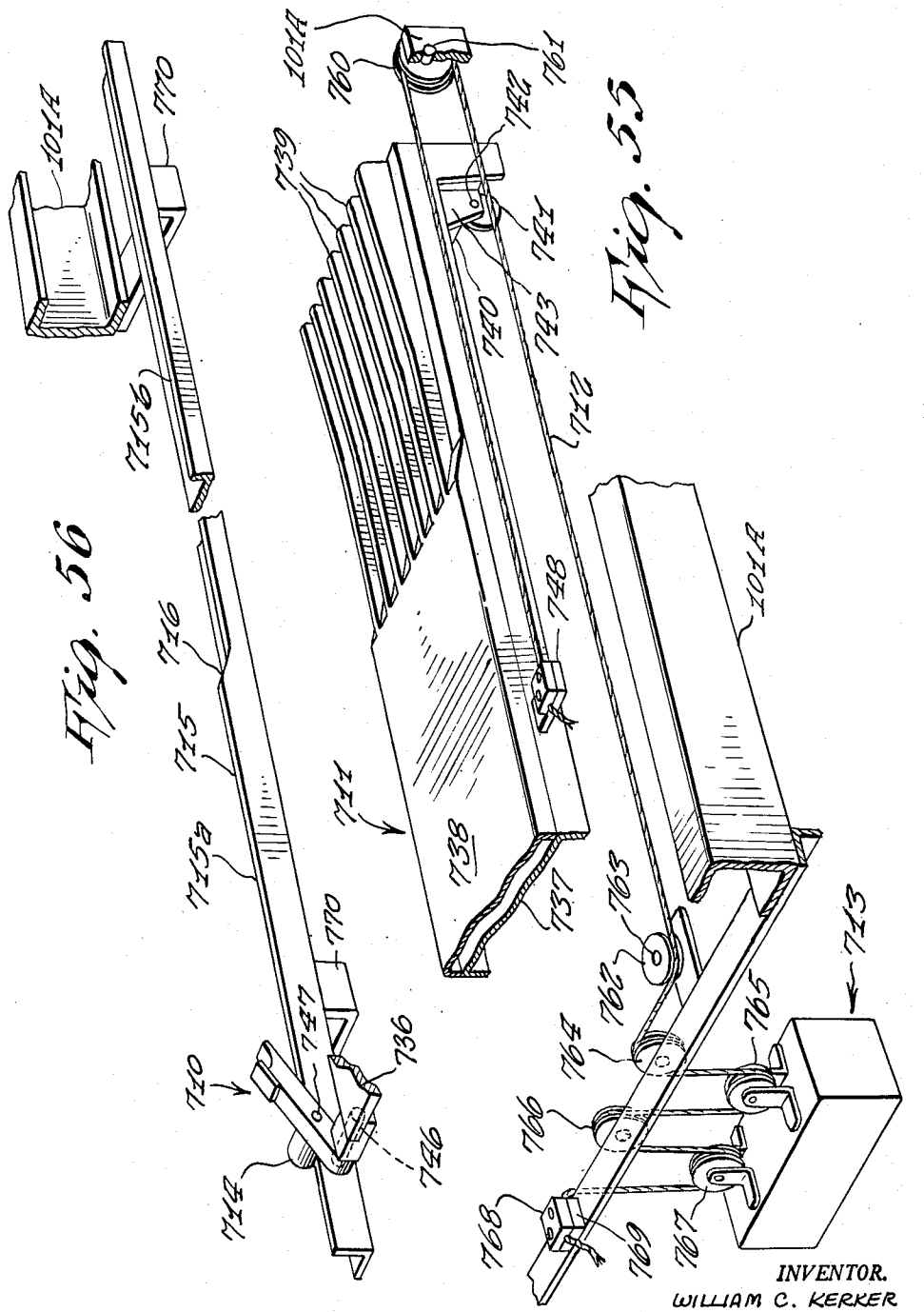



Fig. 55

Fig. 56

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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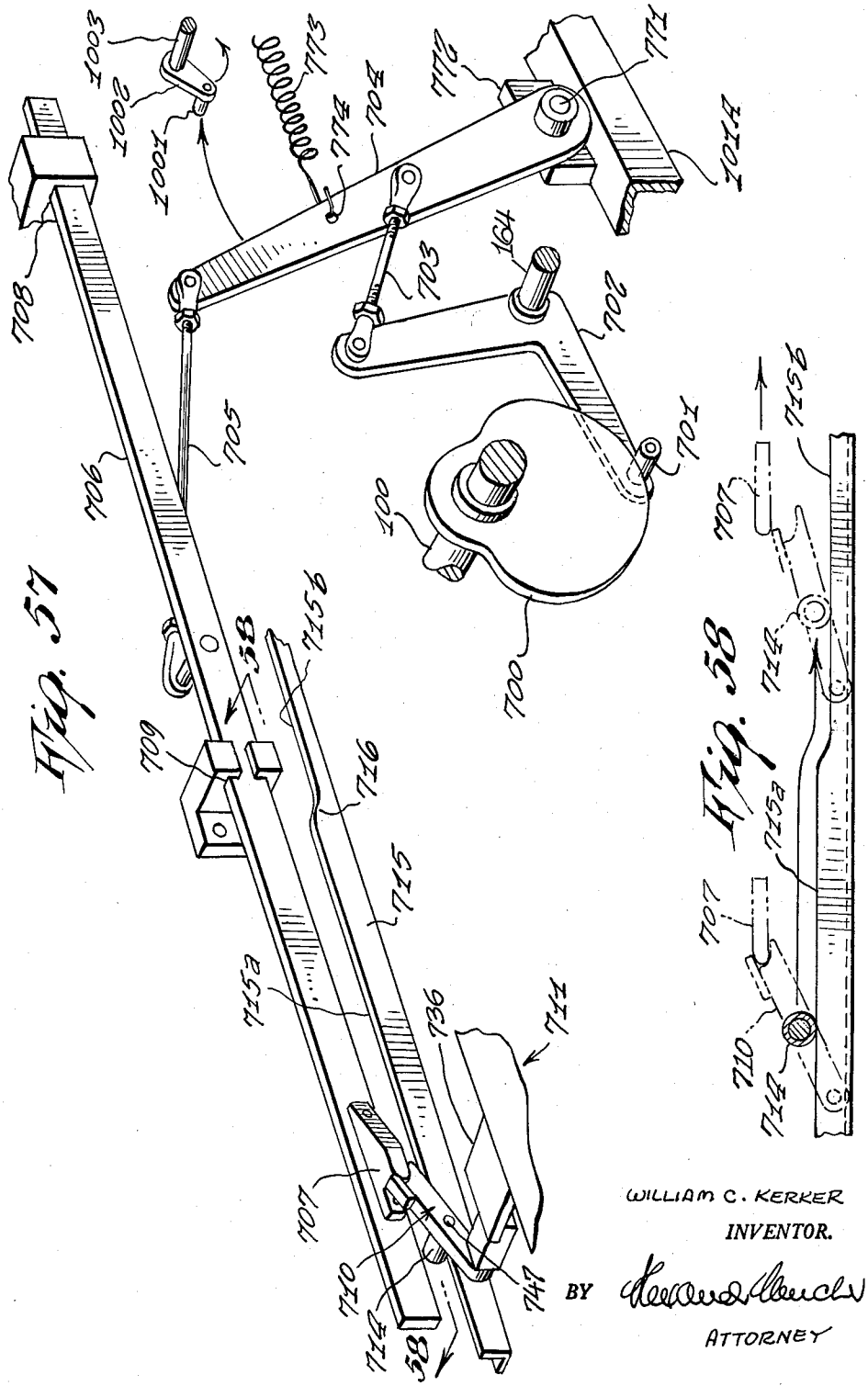



Fig. 57




Fig. 58

WILLIAM C. KERKER
INVENTOR.

BY

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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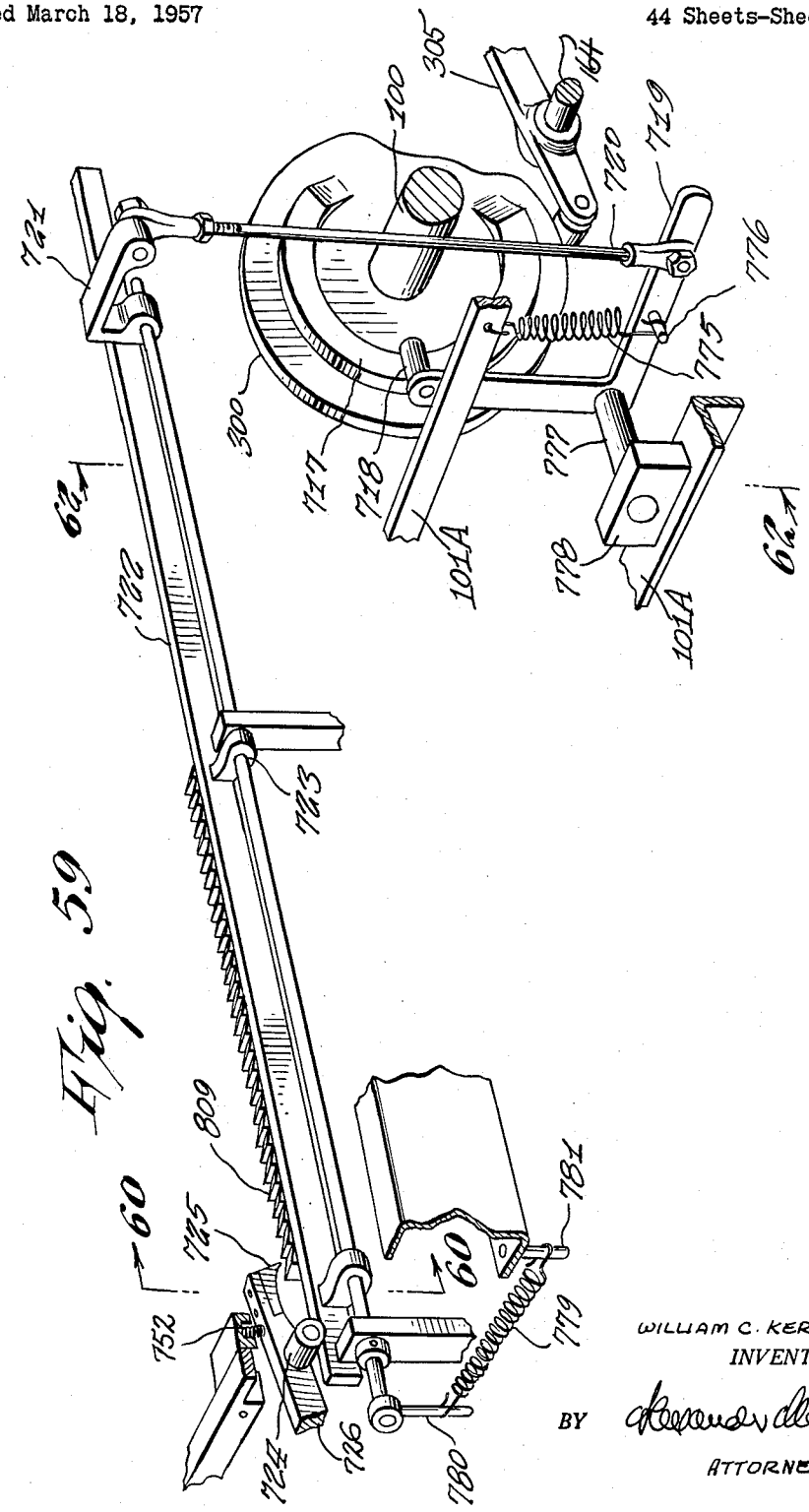



Fig. 59

WILLIAM C. KERKER
INVENTOR.

BY

ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 60

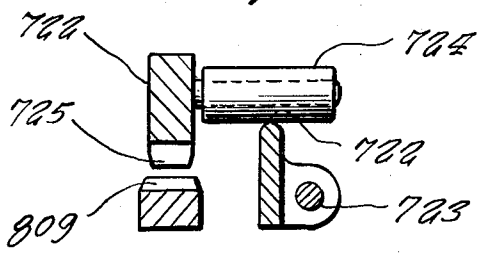
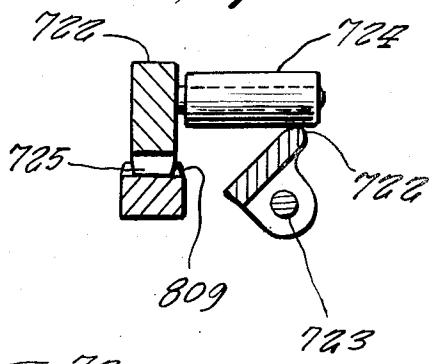



Fig. 61



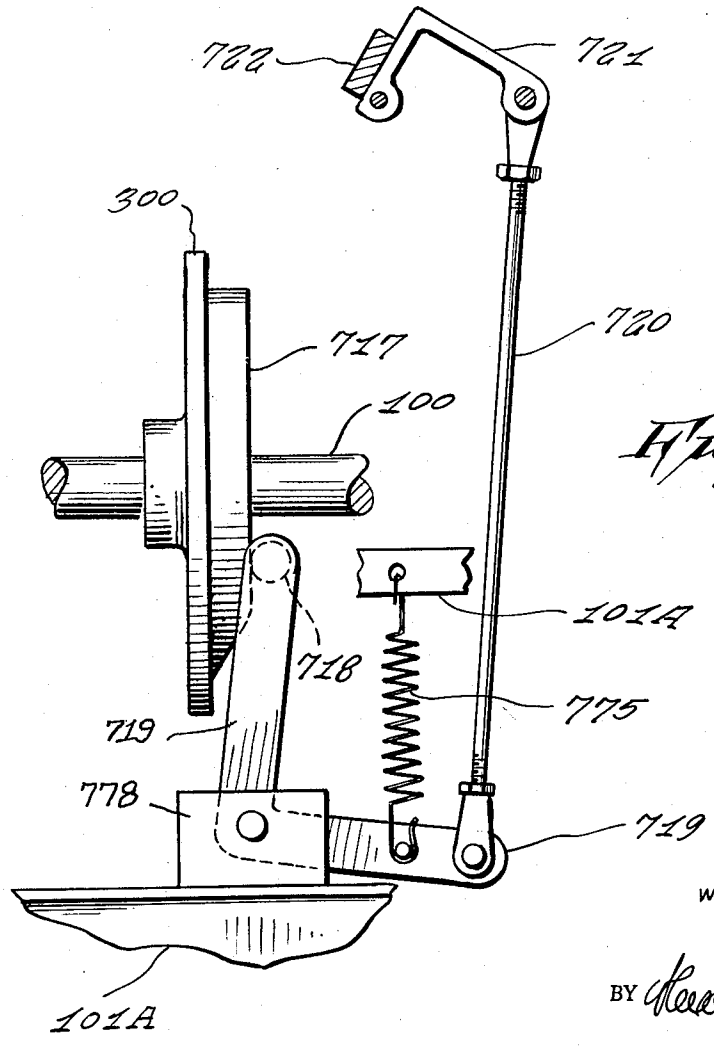




Fig. 62

WILLIAM C. KERKER
INVENTOR.

BY Howard Merchon
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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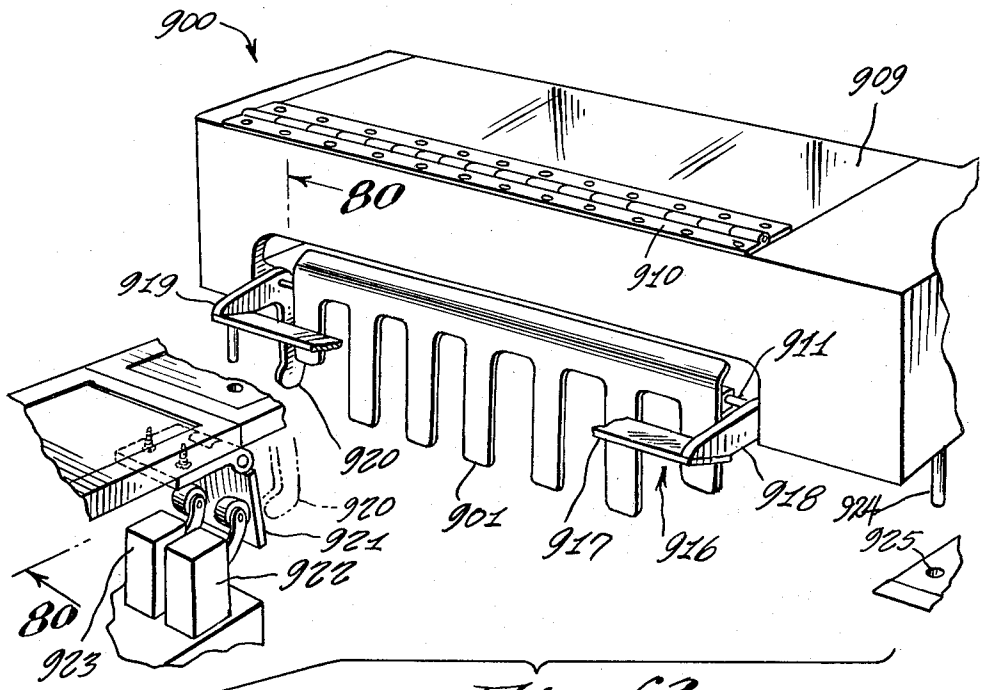



Fig. 63

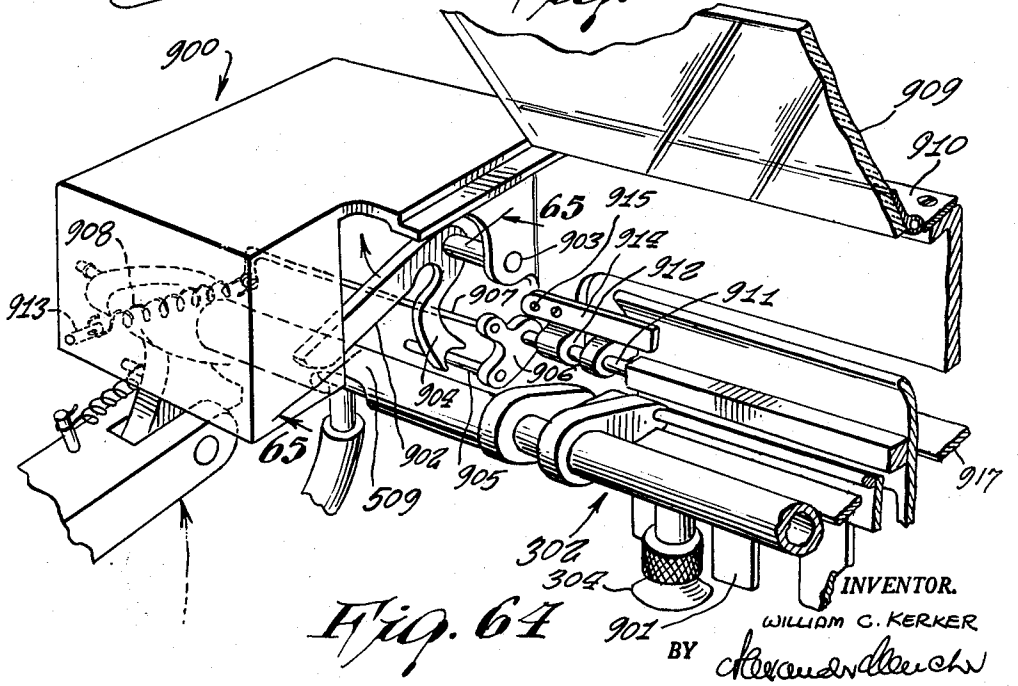


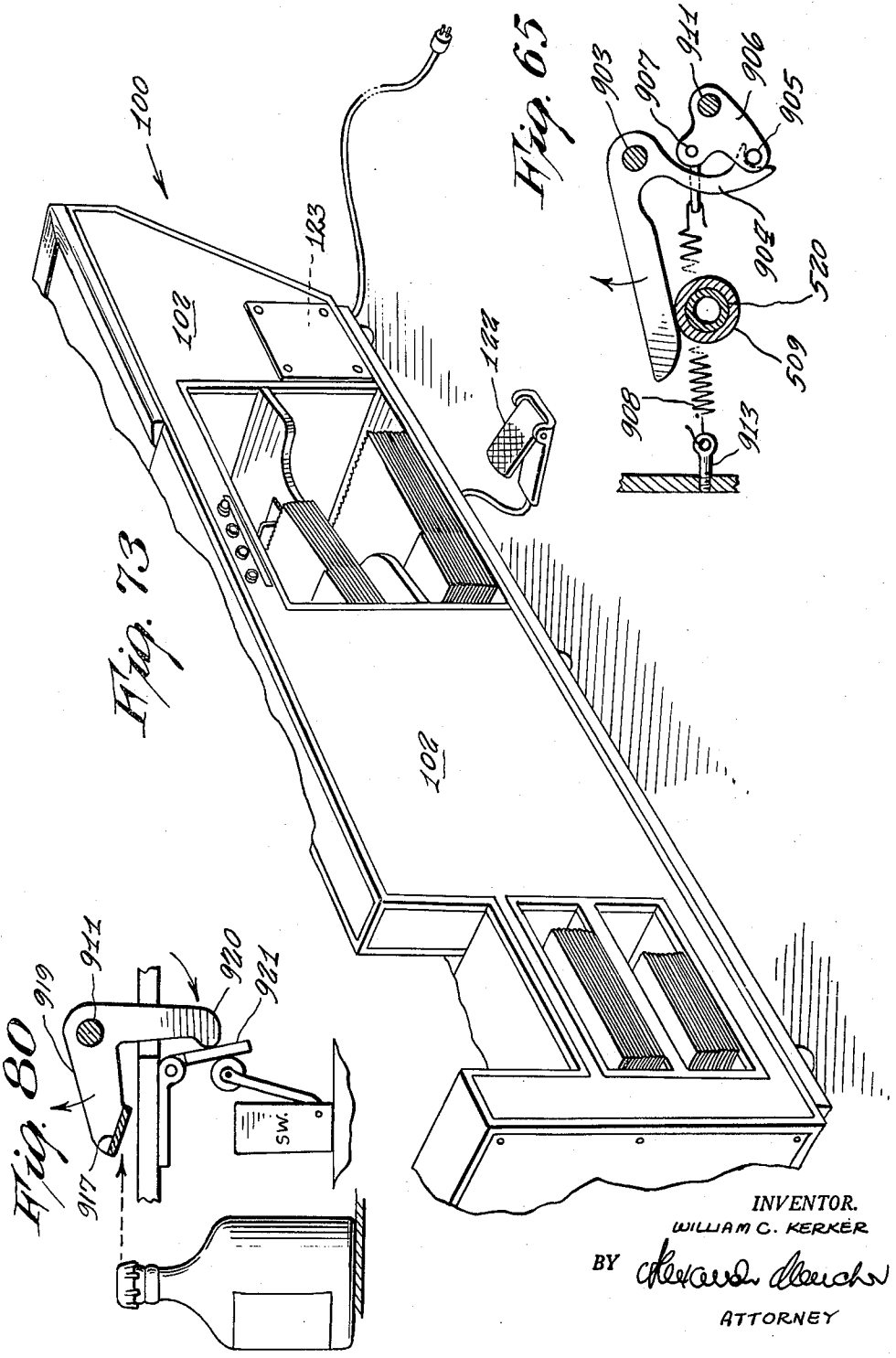

Fig. 64

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 66

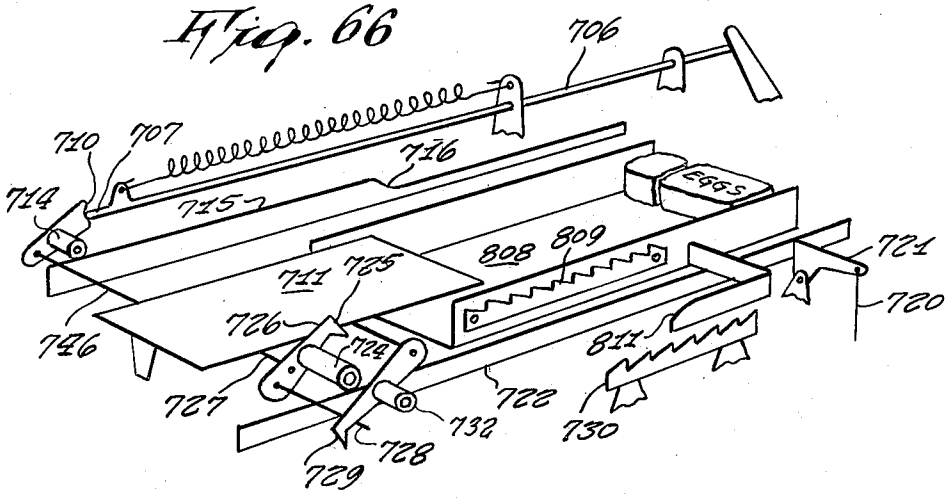
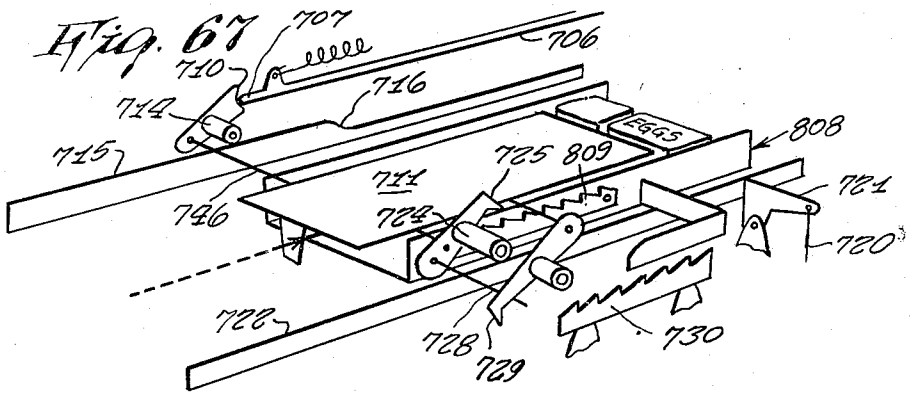



Fig. 67



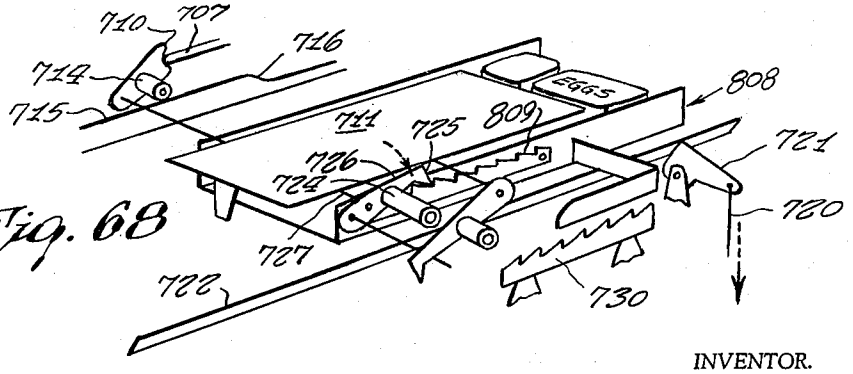




Fig. 68

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 69

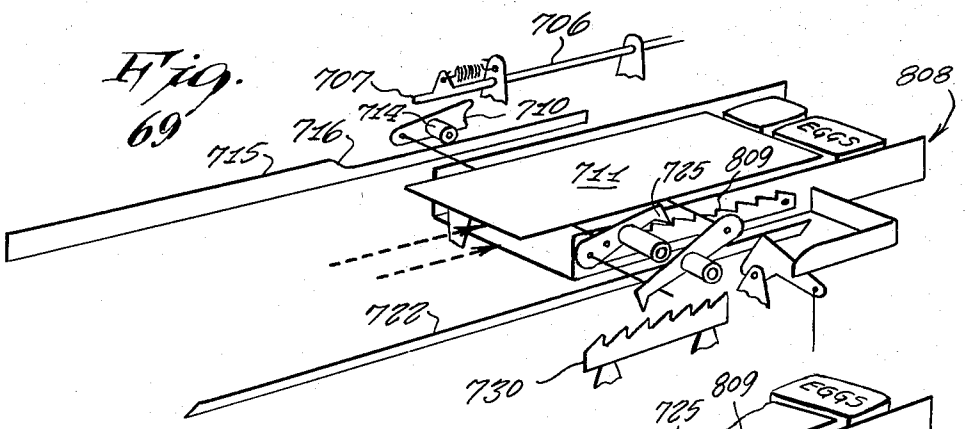



Fig. 70

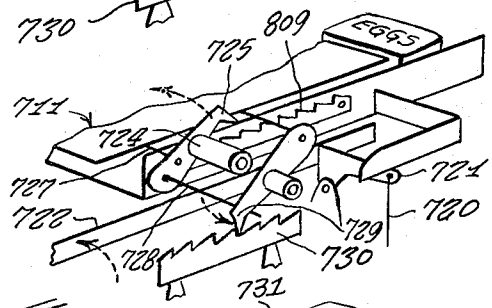



Fig. 71

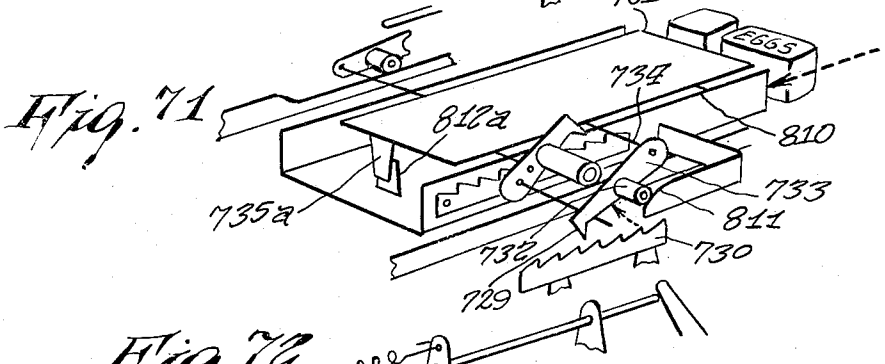
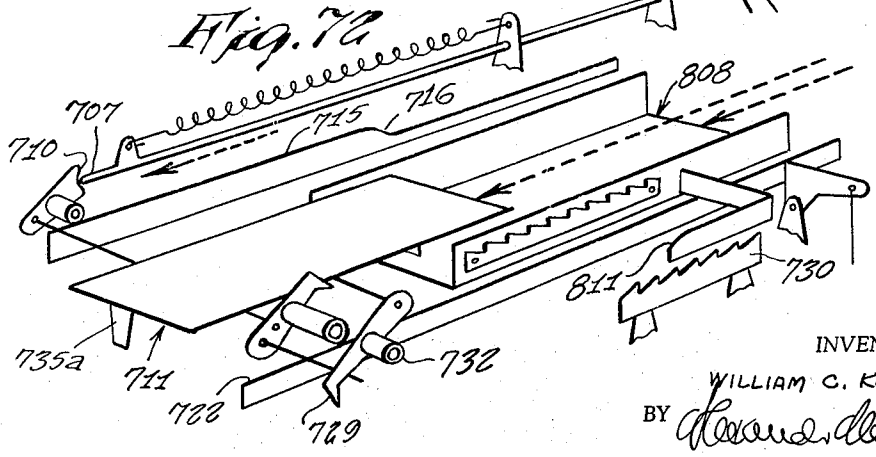



Fig. 72




INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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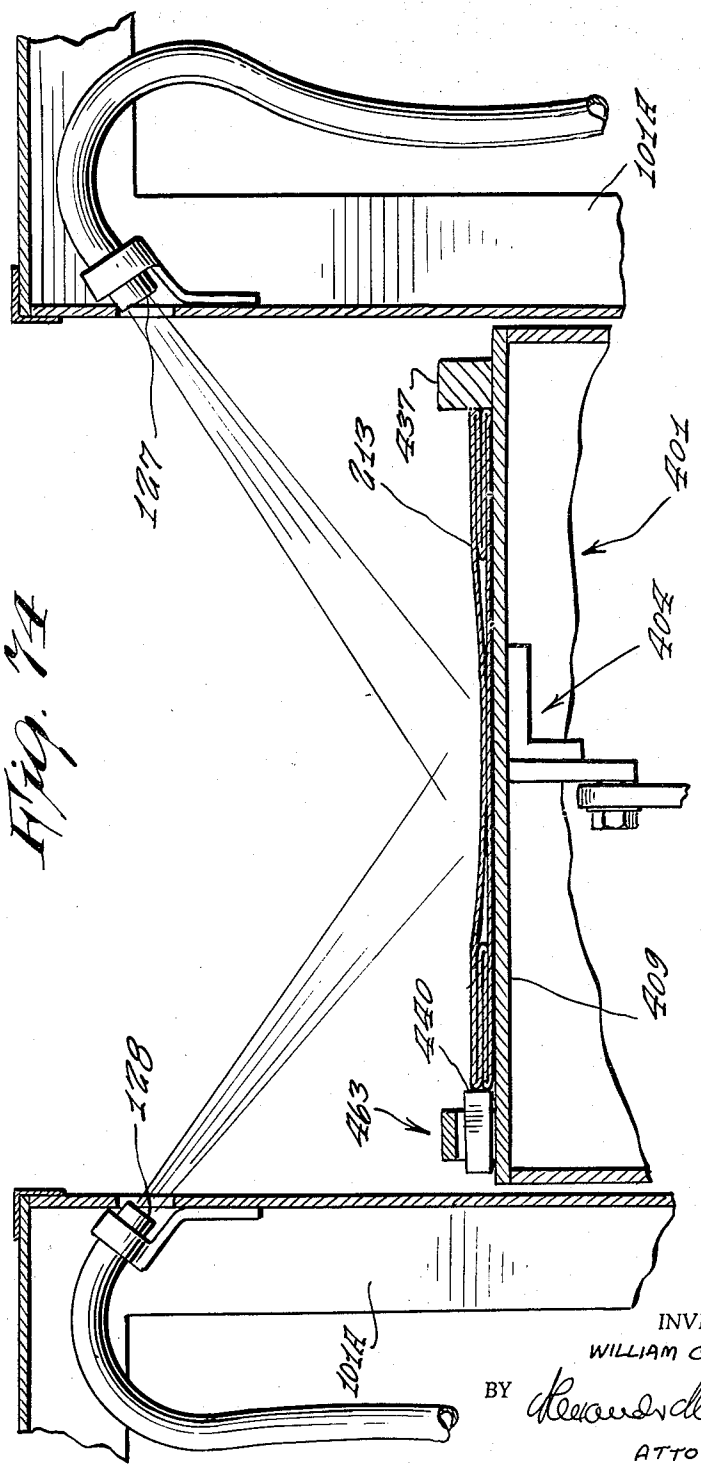



Fig. 14

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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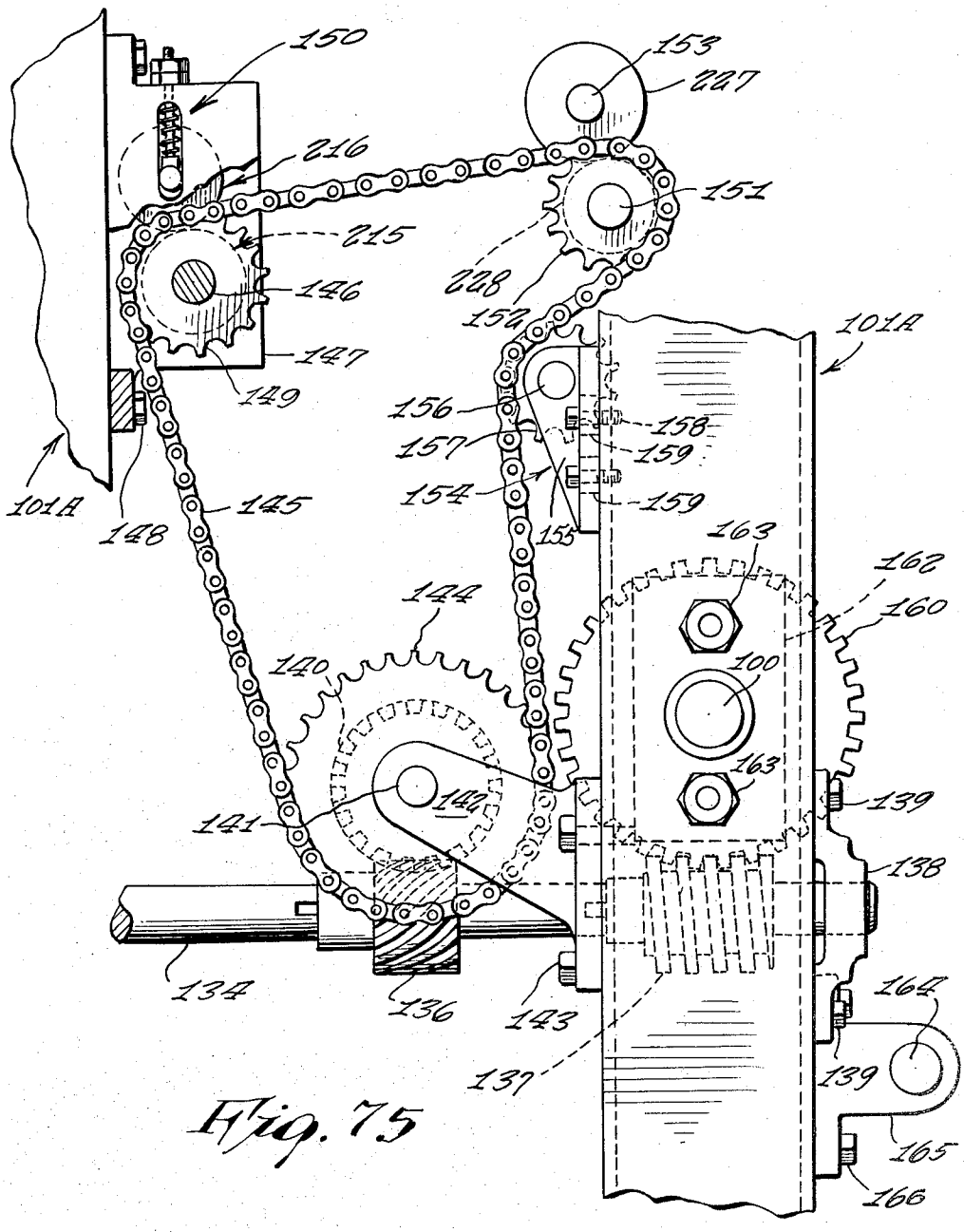



Fig. 75

INVENTOR.
WILLIAM C. KERKER
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Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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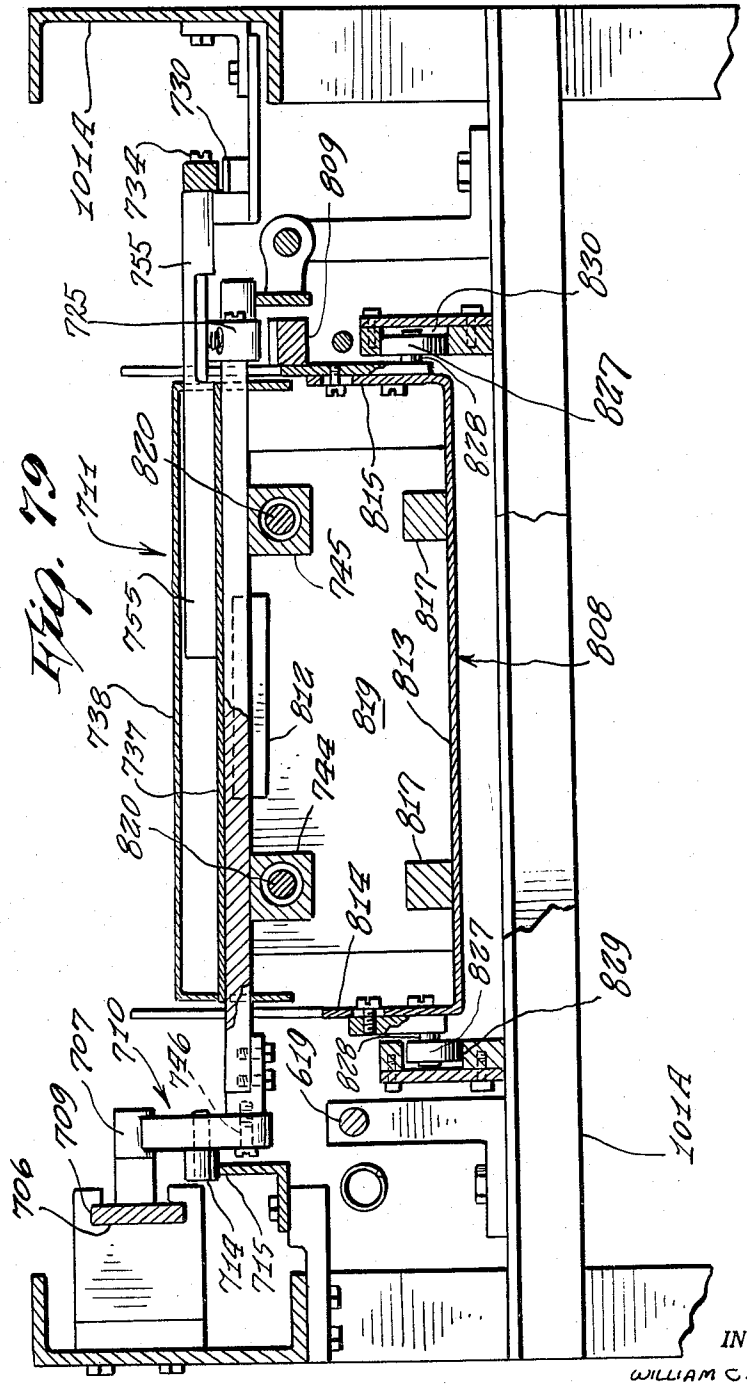



Fig. 19

INVENTOR.
WILLIAM C. KERKER
BY
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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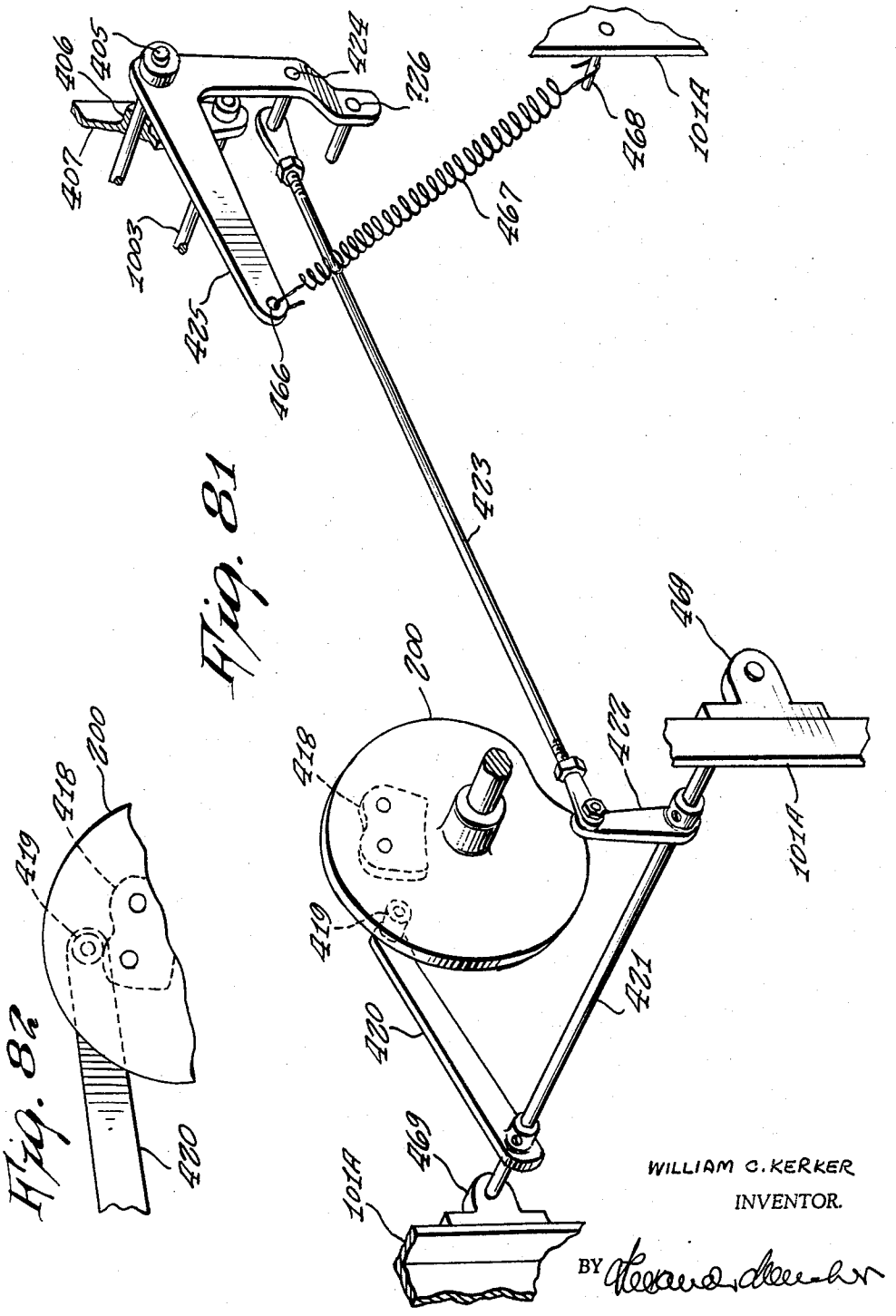



Fig. 81

Fig. 82

WILLIAM C. KERKER
INVENTOR.

BY

ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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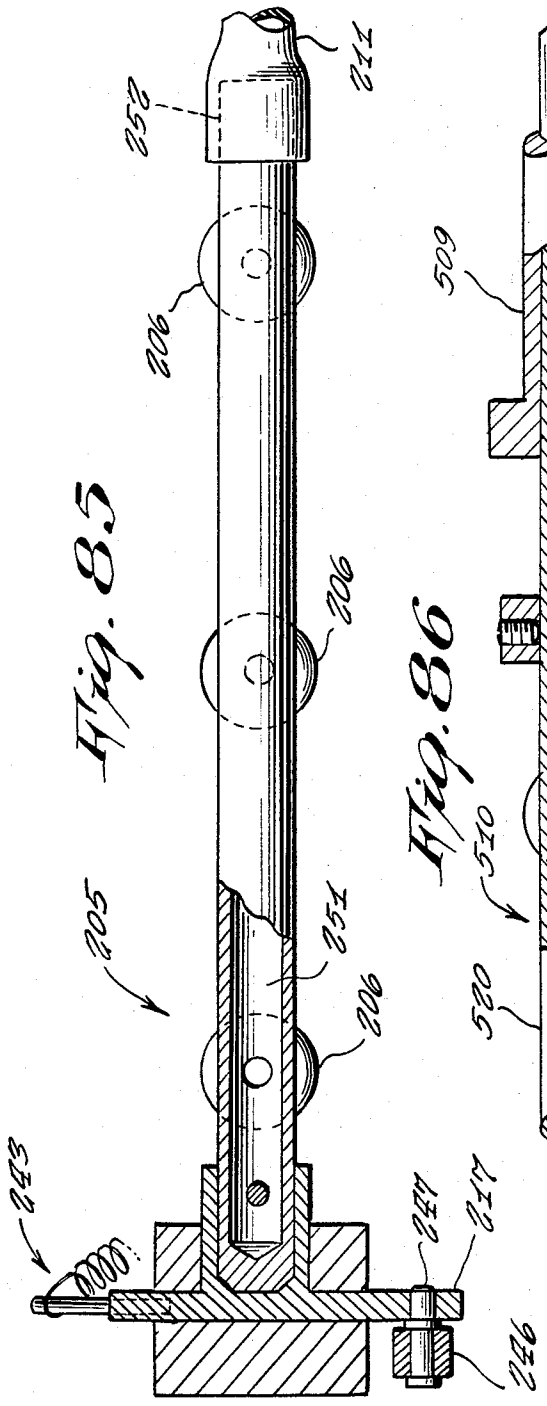



Fig. 85

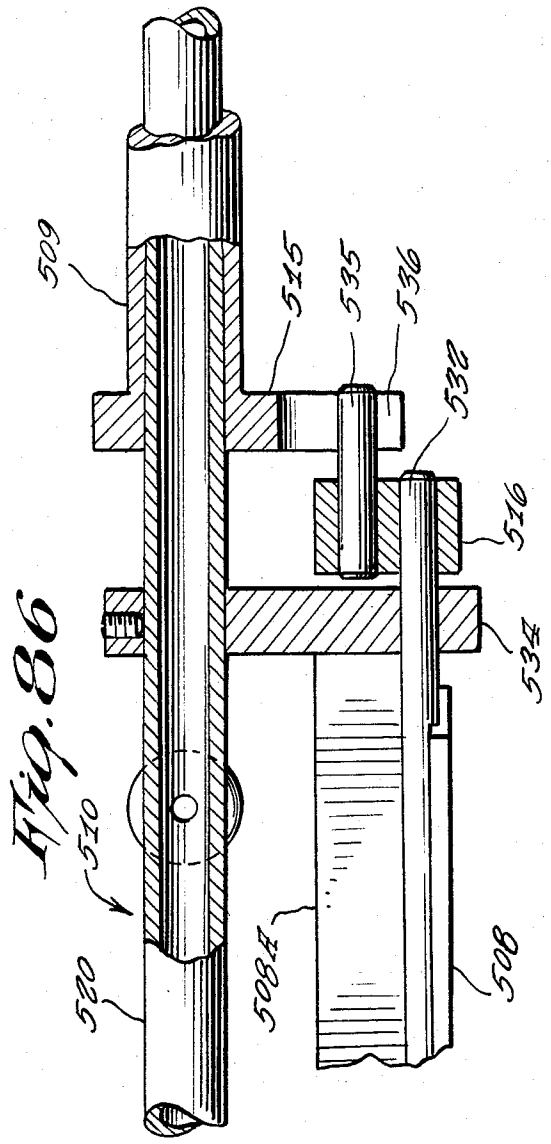



Fig. 86

WILLIAM C. KERKER
INVENTOR.

BY Meeker & Meeker
ATTORNEY

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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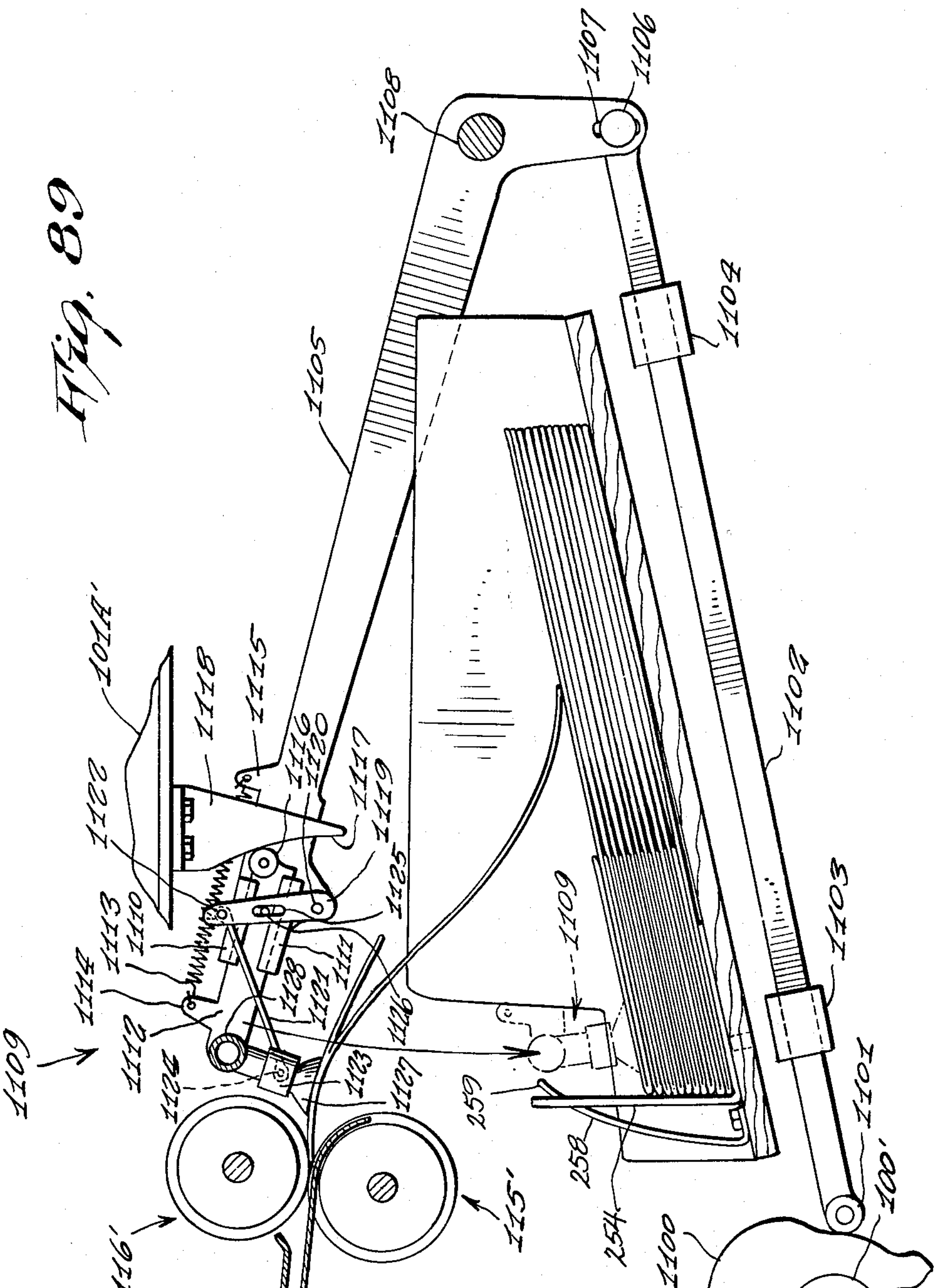


Fig. 89

INVENTOR.
WILLIAM C. KERKER
BY [signature]
ATTORNEY

Nov. 8, 1960 W. C. KERKER 2,958,990

AUTOMATIC BAG PACKAGING MACHINE AND METHOD

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Fig. 90

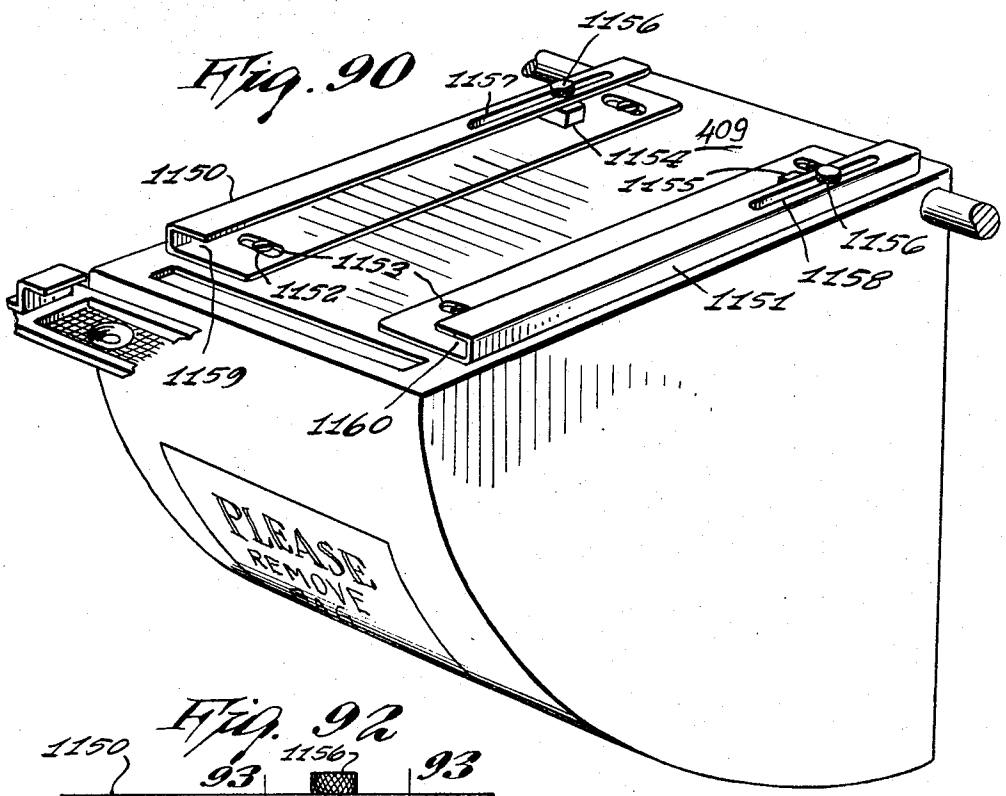



Fig. 92

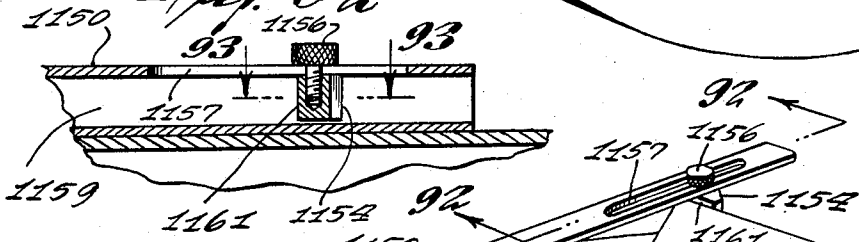
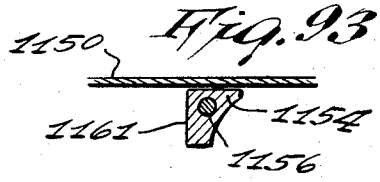



Fig. 91




Fig. 93




WILLIAM C. KERKER
INVENTOR.

BY

ATTORNEY

United States Patent Office

2,958,990

Patented Nov. 8, 1960



2,958,990

# AUTOMATIC BAG PACKAGING MACHINE AND METHOD

William C. Kerker, Lakeside Blvd., P.O. Box 613, Hopatcong, N.J., assignor of twenty-five percent to Frank Manfredonia and twenty-five percent to Mario Manfredonia

Filed Mar. 18, 1957, Ser. No. 646,701

45 Claims. (Cl. 53—24)

This invention relates generally to a method for automatically bag packaging and to automatic bag packaging machinery, but more specifically to a complete unitary structure mounted in a frame and adaptable for use in industrial and commercial packaging as well as for use in markets and chain stores. For purposes of illustration only, the structure and method are illustrated with adaptation for chain and public markets.

The purposes of the invention are to provide an automatic packaging machine and a method involving the elimination of hand packing, of hand withdrawal of bags, of reduction of operator fatigue, and the speeding up of operation. These advantages all result in economic saving of manpower and saving of operating areas.

The structure is compact with all mechanisms involved including the pneumatic power system deriving power from a single source by suitable operative connections in order that such mechanisms may be cyclically operated in proper synchronization for consecutive functions for successive and terminable cycles of operation.

For each cycle of operation, a single bag is withdrawn from a supply stack station; is fed and transferred to a receiving station where mechanism is provided for opening, reinforcing and gripping the bag mouth; is loaded through the open mouth at a loading station by a loading and stripping mechanism and said loaded bag is transferred for manual or other type of removal at a take-up station.

As a main object of the invention, means are provided to effectuate registrable and other operable movements in a unitary structure having operative connections from a single power source such as a main motor, said connections including a pneumatic pump, pneumatic connections as well as lost motion cam and linkage connections to accomplish the above functions in a minimum of time and wherein the termination of the cycle causes a cut-off of the power supply with all parts in initial position for a repetitive and successive cycle. The type of linkage provides for simultaneous, intermittent, sequential, differential movements and dwells of the parts including valve part operation for the pneumatic system. Movements include the bringing of mechanisms in and out of registry for cooperation and for return to initial or starting positions for repetitive and successive cycles.

A further object of the invention is to provide the means for effectuating the above operations including incorporation of automatic safety devices, and structures for easy stoppage and reversal of cyclic movements.

A further object of the invention is to provide a unitary structure wherein each cycle of operation is maintained uniform and wherein bags of various sizes are capable of use.

Before proceeding with the general description of the drawings illustrating preferred forms of the invention and the detailed description of the complete srtucture and mode of operation, it seems most expedient at this point to describe briefly the sequence of major operative acts of the machine for a single cycle from the moment of



loading the merchandise in a counter-equivalent to the time when said merchandise is ready to be removed fully loaded in a bag from a receiving platform.

As shown in the drawings, Figure 4*a* and Figures 5–16 by direction arrows show a complete loading and bagging operation automatically performed by the machine in a single cycle of operation. In this description, the word "forward" or equivalent words refers to the direction into which the bag and food or goods generally proceed and ultimately end. The word "rearward" or equivalent words refers to the opposite direction.

The customer, consumer, or industrial operator deposits the goods or purchases on the end of a counter such as a check-out counter. This counter may be in the form of a conveyor belt **104** (Fig. 4*a*). As is conventional in chain and public markets, the checker by customary means or by operating the conveyor belt **104** brings such goods within convenient reach. The cost is checked and the merchandise is placed in customary or conventional order into a well afforded by a trough member generally indicated by numeral **808** and designated herein as an outer horn. This well, according to the invention, is formed by said outer horn **808**, an inner horn **711** and a gate **606** (Fig. 5) and may be considered as a substitute or equivalent for the central part of a conventional check-out counter. After all the merchandise for the capacity of a bag has been registered on the cash register and deposited in the well aforementioned, the operator pushes a starting button to initiate machine operation in which a single cycle will sequentially effectuate a bag pick-up, a transfer thereof to a position opposite the well, a loading of the food items in the bag and a transfer of the loaded bag to a take-out position for the customer.

The inital step of machine operation resides in the automatic pick-up of an uppermost bag **213** of a single or multiple stack **207** by a series of suction cups **205** when in registration therewith, the stack **207** being located in a magazine under and within the machine. The bag is then carried by a feeding mechanism for registration with a set of propelling rollers **215**, **216** (Fig. 6) forming part of the transfer mechanism and between which bag **213** is deposited. The bag is then forced along plates **225** and **226** of the transfer mechanism toward another set of rollers **227**, **228** for deposit in a chosen angular position against a releasable stop **408** projecting above a pivotal member or bag receiving structure when the latter is in registration with said transfer mechanism, said bag receiving structure being shown in the form of a quadrant **401** (Fig. 7). At the same time, the inner horn **711** has moved within outer horn **808** to compress the merchandise (without breakage) in the outer horn well against the gate **606** and rake **901** as shown in Figures 6–7, 83.

Then quadrant **401** attains a registrable position with the horns **711** and **808** and with the bag mouth opening mechanism **301** and **302** for bag mouth opening, for introduction of open bag mouth retaining members **508** and **606** and for closing of bag open-mouth side clamping mechanisms **621** and **621A** as shown consecutively in Figures 8–10.

Now the horns **711** and **808** proceed forwardly and integrally into the open mouth of clamped or anchored bag **213** as shown in Figure 11, release of gate **606** and bag stop **408** permitting such ingress. When the leading edge **810** of horn **808** reaches a predetermined position clamp **621** and **621A** open partially to permit a bag pushing by the horns toward a forwardmost and introduced stop **1000** (Figures 11–13) at which time the merchandise is in compressed (without breakage) position between the horns and the bag bottom. Thereupon by suitable mechanism the outer horn **808** only is withdrawn for stripping of merchandise into bag **213** (Figure 14) until

receding leading edge **810** of horn **808** meets with the forward edge of inner horn **711**. At such time, the horns are integrated for receding motion (Figure 15) and food stop **432** is introduced and stop **1000** released. The horns recede integrally until a position is reached when outer horn and inner horn attain relative positions of Figure 5.

The transfer mechanism now comes into play by movement of quadrant **401** and simultaneous release of food stop **432** as shown in Figure 16 whereby the loaded bag is deposited on platform **176**.

The cycle is thus ended with all parts in initial position for similar successive cycles. All mechanical and pneumatic mechanisms are operatively connected to main motor **123** such as the pump **126**, main drive shaft **134** and main cam shaft **100** within the frame **101A** as shown in Figure 20.

To accomplish the above stated objects and other incidental ends and advantages of the invention and as will be pointed out in the appended claims, the invention will now be described in detail in conjunction with the preferred forms shown in the drawings wherein:

Figure 1 is a perspective view of the machine;

Figure 2 is a perspective view of a housing or cage for part of the bag-mouth opening mechanism and shown detached from the machine;

Figure 3 is a perspective view of the machine with a counter top replacing said housing;

Figures 4*a* and 4*b* are in combination a longitudinal cross-sectional view through the machine when in inoperative condition omitting driving connections;

Figures 5–16 inclusive are sequential and longitudinal sectional and diagrammatic views of machine parts showing essential movements of the machine for a single cycle of operation;

Figure 17 is a sectional view of a modified form of structure over Figure 16 wherein an endless belt platform is provided for holding several bags;

Figure 18 is an electrical circuit of the machine;

Figure 19 is a pneumatic circuit thereof;

Figure 20 is a perspective view with parts broken away showing the structural main frame of the machine;

Figure 21 is a cross-sectional view of the machine through the plane **21—21** of Figure 20 (said Figure 20 not showing the main cam shaft assembly) and shows the main cam shaft assembly;

Figures 22–24 are perspective views of the bag pick-up mechanism;

Figure 25 is a perspective view of the valve drive mechanism therefor;

Figure 26 is a longitudinal cross-sectional view of the bag pick-up mechanism;

Figure 27 is an exploded view in perspective of the roller assemblies of the bag transfer mechanism;

Figure 28 is a cross-sectional view through plane **28—28** of Figure 26;

Figure 29 is a perspective view of the quadrant drive mechanism;

Figures 30 and 31 in combination are perspective views partly in section of the bag receiving device or quadrant;

Figure 32 is a perspective view of the quadrant;

Figure 33 is a plan view thereof when bag **213** has been introduced thereon by the transfer mechanism as best shown in Figure 7;

Figure 34 is a perspective view of the lower division of the pneumatic mechanism for opening the bag mouth;

Figure 35 is a cross-sectional view through the plane **35—35** of Figure 34;

Figure 36 is a perspective view of the upper pneumatic mechanism for opening the bag mouth;

Figure 37 is a sectional view thereof through the plane **37—37** of Figure 36;

Figure 38 is a view similar to Figure 37 but shown in a subsequent position and wherein upper retaining plate **508** maintains the upper horizontal run of the open-mouthed bag in position;

Figure 39 is a cross-sectional view through the plane **39—39** of Figure 36;

Figure 40 is a perspective view of a portion of the mechanism operating the upper pneumatic unit;

Figure 41 is a view in the direction of plane **41—41** of Figure 40 and taken in elevation;

Figure 42 is a view in the direction of plane **42—42** of Figure 41 taken in elevation;

Figure 43 is a perspective view of the lower retainer plate drive assembly for maintaining the lower horizontal run of the open-mouthed bag;

Figure 44 is a perspective view of the jaw opening drive assembly;

Figure 45 is an exploded view in perspective of a portion thereof;

Figure 46 is a plan view of the jaw closing drive assembly;

Figure 47 is a plan view of one of the jaw mechanisms shown partly in cross-section;

Figure 48 is a similar view as in Figure 47 of the jaw mechanism in a subsequent and closed position about a side edge of bag **213**;

Figure 48′ is a fragmentary plan view partly in section showing the jaw portion of the mechanism in partly open position to release anchorage on bag **213** for forward movement thereof;

Figure 49 is a plan view partly in section showing the two jaw mechanisms adapted for application to the sides of the open-mouthed bag when operative therewith;

Figure 50 is a perspective view partly in section showing the retainer members and the jaws of the jaw mechanisms maintaining the bag in open-mouth position and being anchored by said jaws;

Figure 51 is a front view in elevation thereof showing the jaws and the lower retaining member before moving into retaining and anchorage positions;

Figure 52 is a perspective view of the outer horn assembly;

Figure 53 is a perspective view of the inner horn assembly shown partly in section;

Figure 54 is a fragmentary plan view of Figure 53;

Figure 55 is a perspective view of the inner horn and the drive assembly therefor;

Figure 56 is a perspective view of the inner horn dog roller cam track;

Figure 57 is a perspective view of the inner horn dog retainer mechanism;

Figure 58 is a fragmentary side view of Figure 57;

Figure 59 is a perspective view of one of the inner horn pawl operation mechanisms;

Figure 60 is a sectional view of Figure 59 taken along the plane **60—60** thereof;

Figure 61 is a similar view showing a subsequent position thereof;

Figure 62 is a sectional view in the direction of plane **62—62** of Figure 59;

Figures 63 and 64 are perspective views of the housing or cage assembly for adjacent mechanisms;

Figure 65 is a cross-sectional view through plane **65—65** of Figure 64;

Figures 66–72 inclusive are diagrammatical figures showing the sequence of operations for bag loading by means of the inner and outer horns;

Figure 73 is a perspective view of the operator's side of the machine;

Figure 74 is a sectional view through the plane **74—74** of Figure 1;

Figure 75 is a side view in elevation showing the drive mechanism for the roller assemblies of the bag transfer mechanism;

Figure 76 is a fragmentary view in perspective of the machine taken from the side of the operator;

Figures 77 and 78 are cross-sectional views through

the planes 77—77 and 78—78 respectively of Figure 53;

Figure 79 is a cross-sectional view through plane 79—79 of Figure 53;

Figure 80 is a cross-sectional view through plane 80—80 of Figure 63 showing a side view of the stop mechanism controlling the height of articles of merchandise introduceable into the open-mouthed bag;

Figure 81 is a perspective view of the drive mechanism for the baffle or stop introduceable into the mouth of the loaded bag;

Figure 82 is a fragmentary side view thereof shown in operative position;

Figure 83 is a perspective view of the lower retaining plate and the jaws in open position during the approaching movement of the inner horn;

Figure 84 is a cross-sectional view of Figure 83 across the plane 84—84 thereof;

Figure 85 is a cross-sectional view through the plane 85—85 of Figure 24;

Figure 86 is a cross-sectional view through the plane 86—86 of Figure 36;

Figure 87 is a cross-sectional view through the plane 87—87 of Figure 36;

Figure 88 is a similar view as shown in Figure 87 in a subsequent position;

Figure 89 is a view in elevation partly in section showing a modified form of bag pick-up and feeding mechanism taken from the side;

Figure 90 is a perspective view showing a modified form of bag stop and retaining mechanism in association with a quadrant;

Figure 91 is a view in perspective showing the device of Figure 90 in operative use;

Figure 92 is a cross-sectional view through the plane 92—92 of Figure 91;

Figure 93 is a cross-sectional view through the plane 93—93 of Figure 92.

In accordance with the invention and the preferred forms shown, the automatic bag packaging machine comprises the following assemblies:

(*a*) A main supporting frame.
(*b*) A bag magazine.
(*c*) A bag transfer mechanism.
(*d*) A bag pick-up and feeding mechanism.
(*e*) A bag receiver or quadrant.
(*f*) A loading and stripping mechanism for introduction into the bag when on said bag receiver.
(*g*) Bag mouth opening mechanism.
(*h*) Open-mouth retaining members and clamping mechanism.
(*i*) A take-off platform from the quadrant to receive the loaded bag.

All of the above mechanisms are operated by a motor energizable for each cycle of operation, there being operative means connected to the motor including a pneumatic power source, pneumatic and cam and lost motion linkage connections for synchronous operation and resulting in consecutive and cooperative functioning respectively of said bag pick-up and feeding mechanism, the said bag transfer mechanism, the said bag receiver or quadrant, the said bag mouth opening mechanism, mouth retaining member and mouth clamping mechanism, the said loading and stripping mechanism for article deposit in the open-mouthed bag on the bag receiver and the deposit by the bag receiver of the article containing bag on the take-off platform.

Thus various articles of food (or other merchandise for industrial packing) which the operator or clerk has placed into the well of outer horn 808 for purposes of being bagged are arranged into the forward part of the well as best seen in Figure 1 to the level of the horn side wall, the goods being confined as much as possible forwardly and against a locked gate 606 and rake 901 (Figs. 5, 63). Following this loading, the operator or check-out clerk pushes an electric starter which sets the machine into operation for one complete cycle of work at the end of which the machine is automatically shut off and the loaded bag placed in a position for removal.

*Bag pick-up and feeding mechanism*

The bag pick-up and feeding mechanism is operatively connected to a cam shaft 100 deriving power from motor 123 through transmission 134. A cam 200 is mounted on cam shaft 100, said cam being engaged by a cam follower 201 mounted on one end of a rocker arm 202, the opposite end of which has a roller 303 as best shown in Figures 21 and 22. When cam 200 has rotated to an operative position, roller 203 travels upwardly to meet the bottom edge of a vertical sliding bar 204 thereby causing the latter to be lifted vertically. Fastened to bar 204 is a pneumatic unit 205 deriving its power from a compressor 126 driven by motor 123. Unit 205 comprises a plurality of suction cups or heads 206 which prior to actuation of cam 200 are at rest due to gravity action on the top surface of one stack of collapsed bags 207 (see Figs. 22, 24, 26). There may be a multiple type of magazine to store various sizes of bags and a multiple number of pick-up suction cups for each size as will hereinafter be described. While said cups 206 rest on the uppermost bag, operative mechanism as well as pneumatic operation is in abeyance. As soon as cam 200 becomes operative, another cam 208 mounted on the side of cam 300 and also mounted on main cam shaft 100 becomes operative through a cam follower 309 causing a pneumatic valve 210 to open thereby permitting air to be drawn from the suction heads or cups 206 through the air lines 211 and 212 and into the inlet of the vacuum pump or compressor 126.

Suction cups 206 thus fasten themselves pneumatically to bag 213 as seen in Figure 19.

As the bar 204 incorporating unit 205 (see Fig. 24) is lifted upwardly by roller 203, bag 213 is lifted from the stack and carried vertically and then a short distance horizontally to allow the bottom edge 214 of the bag to be deposited between suitable pair of propelling rollers 215 and 216 (Fig. 26). The horizontal and forward motion is effected by pneumatic unit 205 when at the top end of its vertical journey by pivoting toward the said rollers 215 and 216. This pivoting operation involves suitable linkage. Thus pneumatic unit 205 is pivotally fastened to bar 204 (Fig. 24). An arm 217 is integrally fixed to unit 205 and extends transversely to the axis of the unit. Near the top of its upward journey, the outermost end of arm 217 abuts against a stop 218 fixed to the frame 101A of the machine while unit 205 continues a short distance in its upward travel. Arrest of travel of arm 217 causes the pneumatic unit 205 to rotate. Suction cups 206 depending from unit 205 transversely to the axis thereof are thus caused upon rotation of axis of unit 205 to describe a broad arc in a generally horizontal direction toward the rollers as best shown in Figure 26.

A bag support device 219 is adapted to move into the position indicated in phantom lines in Figure 26 for supporting the entire lower edge of the bag in a straight line for correct feeding between said rollers 215 and 216. Bag support 219 as seen in Figure 24 is laterally disposed to roller 215 and fastened pivotally free to the same shaft 146 by transverse brackets 220 (Fig. 24). Operation of bag support 219 is effected when a leg 221 of a bracket 222 (see Fig. 23) affixed to bar 204 abuts on its upward journey with pin 223 (Figs. 23, 24), the said pin being fixed to the free swinging end of bracket 220. Continued upward movement of leg 221 causes support 220 to rotate into operative position thereby bringing plate 219 under the edge of bag 213.

It is to be noted that the supporting plate 219 is actuated only after the bag has already passed by and the said plate then swings in an arc across the area which

the bag has passed the moment before, then taking up a position just below the bag (Fig. 26).

*Bag transfer mechanism*

By referring to Figures 5–8 it will be seen that bag **213** now passes between propelling rollers **215** and **216**, then through chute **224** between plates **225** and **226**, then between propelling rollers **227** and **228** until said bag strikes surface **229** of a stop **230**, thereby causing the latter to lift by rotation on a pin **231** (see Fig. 26). Bag **123** then passes under the stop **230** and is ejected therebeyond whereupon stop **230** immediately drops down again by force of gravity.

*Bag receiver or quadrant*

Bag **213** is now brought to an abrupt stop on quadrant **401** when it strikes against stops **408** actuated to project upwardly therefrom (see Figs. 4*b*, 7, 30, 31). Impact of sudden strike of bag **213** against stops **408** has a tendency to cause the bag to bounce backward, but stop **230** by gravity action has already closed rearward passage and the bag settles between stops **230** and **408** as seen in Figure 7, lying flat on the quadrant **401** when in pivoted and depressed position.

Quadrant **401** (Figs. 4*b* and 5–15) during the above action of bag pick-up and feed has also been in motion changing from the position shown in Figure 5 to that shown in Figure 7. The position of quadrant **401** in Figure 5 is the initial and final position of a cycle. The quadrant movements above described are brought about by a cam **400** which through suitable connections ultimately actuates quadrant **401**, the said cam being located on shaft **100** as shown in Figure 29. Thus, cam **400** actuates one end of a rocker arm **402**, the other end of said rocker arm actuating rod **403** which in turn is fastened to a bracket **404** (see Fig. 30) attached to quadrant top wall **409**.

Quadrant **401** is pivotally supported at its end by being freely attached to a fixed shaft **405**, the latter being supported in journals **406** disposed in brackets **407** integrated with the machine frame (see Fig. 31). Motion is transmitted through bracket **404** to the quadrant **401** causing it to rotate about shaft **405** into the various positions indicated by the cam **400** contour. Stops **408** which terminate the bag forward travel are suitably brought into operative position.

Thus, as quadrant **401** rotates downwardly from the position shown in Figure 5 to that shown in Figure 7, quadrant top plate **409** engages roller **410** on the outer end of arm **411** (Fig. 30) forcing the latter to rotate downwardly by reason of affixation therewith to rotatable shaft **412**. Shaft **412** is rotatable in bracket **413** fastened to the main frame **101A**.

Opposing arm **411** are bag stops **408** located at the outer ends of bars **414**, the latter being also affixed to shaft **412**. As arm **411** rotates downwardly, stops **408** rotate upwardly through openings **415** in quadrant top plate **409** to the position shown in Figure 7. Bars **414** are biased downwardly by a spring **416** against suitable stops (not shown) in brackets **413** (Figs. 6–7, 30).

By the time structural movements of the cycle of operation have progressed to the positions shown in Figure 7, the bag pick-up feeding and transfer mechanism heretofore described in detail have returned to initial position for commencement of a repetitive cycle. But quadrant **401** and associated parts have further functions to perform for the remainder of the cycle. Further functions of other mechanisms such as inner horn **711** which has already performed an article compressing function (Fig. 6), outer horn **808**, the bag mouth opening (already positionally activated), retaining and clamping means heretofore functionally inactive now become activated in a synchronized order for the remainder of the cycle.

*Bag mouth opening mechanism*

After bag **213** has been brought into the position of Figure 7, further cyclic operation involves the mouth opening of bag **213** and the retention thereof for receiving the merchandise stored in the well of outer horn **808** between inner horn **711**, gate **606** and rake **901** and already compressed (without breakage) therein by inner horn movement (Fig. 6).

For this purpose, quadrant **401** is pivotally moved upwardly by cam **400** until top plate **409** thereof carrying bag **213** (Fig. 7) is in horizontal or registrable position with the bag loading and stripping mechanism comprising outer horn **808** and inner horn or ram **711**. Meanwhile, stops **408** have already been retracted by mechanism operatively connected to shaft **412** (Fig. 30) already described. Thus, quadrant **401** moving upwardly releases the load on roller **410** causing spring **416** to retract stops **408**.

Bag **213** which hitherto has remained flat or collapsed is now opened by a bag mouth opening mechanism comprising a lower pneumatic unit indicated generally by numeral **301** which approaches the lips of the bag mouth from below, and an upper pneumatic unit **302** approaching the lips of the bag mouth from above. As may be seen in Figures 5–7, these units have already started their movements toward their respective operative positions during the bag pick-up, feeding and bag transfer operation.

The pneumatic units each have a plurality of suction elements or cups **303** and **304** which affix themselves to the upper and lower sides of the flat and collapsed bag mouth for purposes of opening. Suitable means are provided for synchronous operation. Thus, considering the lower unit **301** by reference to Figures 34 and 35, cam **300** mounted on shaft **100** imparts through rocker arm **305** a vertical motion to a rod **306** pivoted thereto at one end **311**, the upper end of rod **306** being pinned to a bracket **307** mounted on the free swinging end of a frame unit generally indicated by numeral **308**. The opposite end of frame unit **308** is freely pivoted on a fixed shaft **405**. Suction cups **303** facing upwardly are mounted on the free swinging end or transverse piece **313** of frame unit **308**. Following the contour of cam **300**, cups **303** are lifted toward and for contact with the underside of the bag mouth **213** as seen in Figures 5–15.

The upper pneumatic unit **302** shown best in Figures 29 and 36 is provided with cam **500** on shaft **100** to actuate a rocker arm **501** causing rod **502** to descend. The upper end of rod **502** is pinned toward the free-swinging end of a beam **503** (see Fig. 40), the other end of the beam being freely pivoted in a bracket **504** which is fastened to the machine frame **101A**. Vertical movement of rod **502** causes the free-swinging end of beam **503** to move in a vertical arc on its pivot at bracket **504** thereby causing suction cups **304** to contact the bag **213** by virtue of the fact that the shaft **510**, to which the suction cups are attached, also move in a vertical arc as hereinafter will be described.

Suction cups **303** and **304** when in such bag contacting position became pneumatically active by suitable mechanism. Thus, a cam **505** fixed to the side of cam **300** actuates cam folower **506** which in turn actuates valve **507** as seen in Figure 25. Valve **507** permits air to be drawn from the pneumatic suction cups **303** and **304** through an air hose **212** leading into the vacuum compressor or pump **126** as shown diagrammatically in Figure 19. Further rotation of cams **300** and **500** now cause pneumatic unit **302** to move upwardly carrying with it the upper lip of bag **213**, while unit **301** remains stationary pneumatically holding the lower lip of the bag (Figs. 25 and 29). The bag mouth is thus fully opened and the bag retaining mechanisms come into play.

*Open mouth retaining mechanism*

As pneumatic unit **302** moves upwardly (Figs. 36–42, 86), a retaining plate **508** suitably attached thereto moves under the edge of the lip of bag **213** and into the mouth thereby clamping the bag lip against a bar **508A** disposed intermediate suction cups **304** and retaining plate **508** as shown in Figures 9, 36–38. As best seen in Figure 36, a freely rotatable sleeve element **509** is fitted over one end of the pneumatic channel **520**. At one end of sleeve **509** is an arm **511** extending transversely to the axis thereof and carries a cam follower **512** attached at the arm end, the follower **512** being actuated by a cam plate **513** affixed to the framework **101A** of the machine at **514**.

As unit **302** rises, sleeve **509** through the action of cam **513** and follower **512** is caused to rotate. At an intermediate part of sleeve **509** is a similar transverse arm **515** which is forked as at **536** and into which a pin **535** of a crank or eccentric **516** is mounted. The end of the axial member or pivot member **532** to which retaining plate **508** is affixed is secured to the eccentric **516**. Arms **534** pivot on channel **520** and pivotally carry **532**. Thus, rotary motion of sleeve **509** relative to the pneumatic element **510** causes retainer plate **508** to fold back from the position shown in Figure 37 to that shown in Figure 38.

The entire pneumatic unit **302** is supported by a link **517** which in turn is pivotally attached to beam **503** (see Figs. 36 and 40). When pneumatic unit **302** arrives at its extreme upper position, a roller **518** fastened to link **517** strikes a stop **518A** causing the entire unit to tilt to the position indicated in phantom in Figure 42 for the purpose of allowing extra clearance for passage of the foods being loaded from a vertical position.

At this time a retainer plate **606** formerly serving as one well stop, as shown in Figures 43, 4*b*, 9 is brought down to hold the lower lip of the bag mouth. This plate is actuated by a cam **600** mounted on main shaft **100** and operates through a cam follower **601** by means of linkages **602**, **603** and **604**, the latter being fastened to the pivot shaft **605** to which retainer plate **606** is rigidly secured. Shaft **605** as shown in Figure 43 is held in bearings **607** fastened to the main frame **101A**.

*Open mouth clamping mechanism*

Next in sequence, the lip of the bag mouth is grasped at each side by a pair of locking jaws as shown diagrammatically in Figure 10 wherein the jaws are indicated generally by numerals **621** and **621A**. Suitable mechanism is provided for jaw operation. As shown in Figures 43–45, the cam **600** in addition to actuating lower bag lip retainer plate **606** also actuates a shaft **612** operative on jaw units **612** and **613** through cam follower **608**, lever **609**, rod **610**, and lever **644**. It is to be noted that the mechanism described can open the jaws **611** only by moving links **614**, **615** and the positive lock slides **616** and **617** in the direction indicated by the arrows in Figure 44.

For purposes of safe jaw operation, a spring mechanism generally indicated by numeral **618** (see Fig. 46) serves to effectively close the jaws without too much pressure. Thus, a rod **619** fixed to lock slide **617** is actuated by a spring **620** into the direction indicated by the arrow for closing both two sets of jaws. While spring **620** at all times urges the jaws **621** and **621A** generally toward closed position as shown in Figure 10, this force is controlled or arrested by operation of cam **600**.

The jaw structures disposed on opposite sides and mounted to frame **101A** are shown in detail in Figures 47–51. The jaw set **621** has a jaw member **622** (Fig. 49) pivoting in a horizontal plane about the axis of the shaft **623** which is rigidly mounted to the machine frame **101A**. A pinion **624** on the same shaft **623** is integrally and spacedly connected with the jaw **622** by a suitable plate, the said pinion engaging with a similar pinion **625** similarly integrally and spacedly connected with a cooperating jaw **626**, the latter being pivotally connected on shaft **627** which is also rigidly affixed to the machine frame **101A**.



Thus, movement imparted to one jaw member **622** (Fig. 49) is transmitted to the cooperative jaw member **626**. The jaws are actuated by horizontal sliding link **614** attached to jaw **622** by pin **628**. Longitudinal movement of link **614** causes rotary movement of jaws **622** and **626**. The positive lock slide **616** is provided to securely hold the jaws locked while in locking or anchorage position for open-mouthed bag **213**. Thus, when cam **600** is in an inoperative position for causing sliding link **614** and positive lock slide **616** (or **617** in jaw set **621A**) to move toward or remain in "open jaw" position, then spring **620** (Fig. 46) is free to influence a movement on said lock slide and sliding link toward the "closed jaw" position. The lock slide **616** or **617** thus moves longitudinally and forwardly from the position shown in Fig. 47 to that shown in Figure 48.

Jaw **622** is provided with a roller **629** mounted on a pin **630** (see Fig. 49). As this moves in a planetary arc about shaft **623** the roller moves from a position forwardly of the lock slide **616** or **617** to a position alongside of it as seen by comparing Figures 47 and 48. The lock slide **616** or **617** continues with a slight further forward movement thus firmly jamming the roller **629** in the new position preventing the jaws from rotating to open position.

By viewing Figure 49 it is to be observed that there are a pair of similar jaw members for set **621A** similarly operated and wherein corresponding parts are provided with similar reference numerals succeeded by letters A.

It is to be noted that the force to close the jaws of the jaw sets is directly linked to the positive lock slides **616** and **617**, and indirectly through the pins **631** thereof engaging the links **614** and **615** through the longitudinal slots **632** as best seen in Figure 44.

At this stage of the cycle, the opened mouth of the bag **213** is framed and anchored by retaining members **508**, **606** and closed jaw sets **621** and **621A** respectively.

*Loading and stripping mechanism*

The next stage of cyclic operation comprises the loading and stripping of the compressed food articles in the well of horn **808** into the open mouth of bag **213** now provided with retaining and clamping means. These operations are shown diagrammatically and in sequence in Figures 66–72 wherein articles proceed into **213** on a carriage.

As has heretofore been mentioned, at the start of the cycle and before the bag **213** is in registration therewith, inner horn **711** compresses the goods against stops **606**, **901** (without breakage) and remains stationary within outer horn **808** for a predetermined interval for successive cyclic operations to be discussed (Figs. 66–67). Then inner horn **711** becomes interlocked with outer horn **808** and proceeds together therewith, both entering the bag with the goods (see Figs. 9, 11–14). This mechanical operation is effected by suitable mechanism. Thus, to the inner horn assembly **711** there is attached a cable **712** (see Fig. 55) leading to a weight **713**, the latter normally urging forward movement of inner horn **711**. Such movement is normally arrested by stop **707** bearing against a dog **710** pivotally attached to the inner horn (see Fig. 57). When stop **707** by suitable mechanism is permitted to move forwardly as shown in Figure 67, inner horn **711** will automatically follow. Mechanism (Fig. 57) for inner horn movement comprises a cam **700** mounted on shaft **100**, the said cam serving to actuate in succession cam follower **701**, lever **702**, rod **703**, lever **704** and rod **705**. The latter rod urges a rail **706** to which stop **707** is affixed to slide forwardly in bearings

708 and 709. By further reference to Figure 57, it is seen that the dog roller 714 travels on surface 715*a* of cam track 715. When roller 714 meets the cam surface contour change at 716, dog 710 becomes free of stop 707 by taking a depressed position along cam surface 715*b* as shown in Figure 58.

However, before inner horn dog 710 has reached this contour change at 716, the inner horn will under all conditions of food loading and at the beginning of the cycle have first met the goods loaded in the well of outer horn 808 for compression thereof without breakage due to controllable weight 713. This meeting arrests the further inner horn travel. Meanwhile, a cam 717 located on the side of cam 300 (Fig. 59) continues in its cycle of rotation, the time thereof including the full time required for the inner horn to travel forward to the leading edge 810 of the outer horn in case no food has been loaded. After this time lapse, cam 17 through cam roller 718, lever 719, rod 720 and lever 721 causes another roller track 722 to tilt by rotating about its axis 723 (see Figs. 59 and 62). This causes a roller 724 also attached to the inner horn to lower and permit a pawl 725 to engage with a rack 809 affixed to the outer horn 808.

Thus, horns 711 and 808 now lock integrally. After a momentary pause during which interlocking has taken place, the horns proceed forwardly together. The lowering of the gate or stop 606 on the lower wall of the bag as well as the introduction of the other retainer plate 508 and inward movement of rake 901 and the closing of jaw sets 621 and 621A for the bag mouth opening occur before the integrated horn mechanism enter bag 213 (Figs. 9–10). Details of these actions have been already partly described under the headings Open-Mouth Retaining Members and Open-Mouth Clamping Mechanism. However, certain other parts comprising this gate 606 and rake 901 have however not as yet been considered in the description and are now to be dealt with as they become active.

*Incidental mechanisms—Housing 900*

Attached to a housing or cage mechanism 900 (see Fig. 63) is a depending rake-like assembly 901 pivoted at each of its ends in bearings fixed to the housing. This rake assembly 901 having been rigid during the stage when food was being loaded into the outer horn 808 so as to contribute with stop 606 the limiting wall, now must be instantly freed for a forward swing so as to permit the horn 808 with goods thereon to pass therethrough. This is accomplished by mechansim shown in Figure 64.

By referring to Figures 63–65, it is seen that after pneumatic unit 302 has opened the bag mouth and traveled upwardly as shown in Figure 9, it strikes at the terminus of its upward journey against lever 902 causing it to rotate about pin 903. This causes arm 904 of lever 902 to rotate thereby freeing pin 905 attached in lever 906. The latter lever 906 is rigidly fixed to the pivot shaft 907 of the rake 901. The unlatched mechanism now permits shaft 907, which is spring loaded by spring 908, to rotate thereby swinging the rake 901 out of the path of the oncoming horns 711 and 808 with food items thereon. Horns 711 and 808 now enter the opened bag 213, being powered by cam 800 on shaft 100 by operative connections 802—806 to the outer horn as best seen in Figure 52.

*Incidental mechanisms—Loaded bag stop 1000*

Meantime as shown in Figure 11 a forwardmost bag stop 1000 is brought into operative position by suitable means to serve as a limitation for the loaded and forward bag movement. Thus, a lever 704 (see Fig. 4*b*) strikes crank pin 1001 on lever 1002 thereby causing a shaft 1003 to which lever 1002 is affixed to rotate. This causes a lever 1004 also affixed to shaft 1003 to move thus imparting motion to rod 1005 and lever 1006, the latter being affixed to a sleeve 1007 on the pivot shaft 412 (Fig. 30). Fastened to sleeve 1007 by screws 1008 are a pair of forked tines 1009 which terminate at their other end in a flat stop plate 1000 which now emerges upwardly out of an opening 1010 in a platform 176 forwardly of quadrant 401 and into operative position to stop the bag as shown in Figures 11–13.

*Incidental mechanisms—Slight jaw releases*

As outer horn 808 at the leading edge 810 approaches a position proximate to the bottom of bag 213, jaw sets 621 and 621A open slightly releasing thereby the positive anchorage on the sides of the bag mouth as shown diagrammatically in Figure 12. The outer horn leading edge 810 continues now to push the bag bottom forward until it reaches stop 1000 (Figure 13). The lips of the bag mouth have thus been slipped out of the anchoring grip of the jaw sets 621 and 621A and also out of the hold of retainer plates 508 and 606 and are free thereof.

Suitable mechanism for the said slight jaw opening is provided. Thus, the positive return levers 614 and 615 and the positive lock slide levers 616 and 617 (Fig. 44) are actuated by cam 600 through the linkages already described and are now caused to move slightly rearwardly. The levers 616 and 617 are provided with receding faces 633 (see Fig. 49) which are thus brought alongside rollers 629, 629A thereby providing the space required to let each of the rollers relax from their former jammed positions shown in Figure 48 to the positions shown in Figure 48'. The jaws are thus made to become partly open allowing the bag lips to be withdrawn as already stated.

Thus the bag 213 having been freed of mechanical encumbrances at its mouth has now been pushed by the horns until the bag is stopped by stop 1000. At this moment, the forward travel of horns 711 and 808 is stopped by the contour of cam 800 (see Fig. 52).

*Incidental mechanisms—Inner and outer horn movements*

Stop 1000 having performed its service now recedes downwardly by suitable mechanism to provide clearance for bag deposit on platform 176. Thus, cam 700 forces lever 704 (Figs. 57, 46) rearwardly thus releasing the lever support of the mechanism of stop 1000 (see Fig. 4*b*) by gravity. In this way, stop 1000 descends through opening 1010 below the surface of the bag pick-up platform 176.

Now pawl 725 disengages with rack 809 by means of the bar 722 (shown in Figs. 59, 69–70) which tilts back into its original upright position. This is caused by further continued movement of cam 717. Roller 724 is lifted (Fig. 53) causing rocker arm 726 to pivot about pin 727 (Fig. 53) whereby pawl 725 at one end lifts from rack 809 (Fig. 59) and pawl support 728 at the other end (Fig. 53) is lowered thereby causing pawl 729 of inner horn 711 to engage with rack 730 fixed to the machine frame as shown diagrammatically in Figure 70.

Cam 800 now causes outer horn 808 to start moving rearwardly. However the inner horn 711 remains stationary because pawl 729 being locked in rack 730 withholds movement. This movement of the outer horn 808 only results in the various food items being stripped from the horn and left deposited in the bag 213.

At about the time the forward edge 810 of outer horn 808 arrives abreast of the forward edge 731 of inner horn 711, as best seen in Figure 70, a trip cam 811 affixed to outer horn 808 meets roller 732 and lifts the same thereby causing lever 733 to rotate upwardly about pin 734 causing pawl 729 to also lift and disengage with rack 730. Thereby the inner horn 711 becomes free.

A moment later stop 812*a* on the outer horn 808 strikes inner horn stop 735*a* of plate 736 (shown diagram-

matically in Fig. 71) and thus pushes the freed inner horn rearwardly therewith.

When the outer horn **808** reaches its most rearward position as determined by the cam contour **801** (Fig. 52), it stops, its work being ended. Thus the outer horn **808** is now at its original position for the start of a new cycle. The inner horn **711**, however, must be obliged to travel still farther rearwardly to attain its rearward position. This further rearward transport of inner horn **711** is now taken over by stop **707** spring urged against pawl **710** (Fig. 72). Thus, at the time of disengagement by the outer horn **808** with the inner horn on its rearward travel (Fig. 71), the progress of inner horn **711** has been such that the pawl **710** has already proceeded rearwardly beyond point **716** of track **715** and is now left in the path of stop **707**. This stop follows immediately thereafter in rearward travel and as directed by cam **717** (Fig. 59) now pushes inner horn **711** to its original starting position. Thus, the food stripping operation into bag **213** from horn **808** is ended.

*Loaded bag transfer system*

After the food depositing and stripping mechanism represented by horns **711** and **808** have completed their work a loaded bag transfer assembly commences operation. Thus, immediately after inner horn **711** has retracted rearwardly, a forked baffle generally indicated by numeral **432** and as seen in Figures 30 and 31 rises from within quadrant **401** to cover the loaded bag mouth so as to prevent any goods from falling therefrom (Fig. 15). Baffle **432** is actuated by mechanical motions originating at cam **418** mounted on the side face of cam **200** (Figures 81–82), then through cam follower **419**, pivoting arm **420**, shaft **421**, link **422**, rod **423** and then to pin **424** mounted on lever **425**. A short motion imparted to pin **426** as mounted on lever **425** causes it to strike lever **427** (Fig. 31) which at such time is located nearby. Lever **427** is thus caused to rotate a few degrees freeing the pin **428** and thereby causing baffle unit **432** urged by springs **430** and **430A** (see Figs. 30–31) to rotate on levers **429** and **429A** about pivot pins **431** thereby bringing tines **432A** of baffle **432** out of openings **433** in the quadrant plate **409** for purposes of covering the mouth of the loaded bag as generally shown in Figure 15.

Cam **400** on shaft **100** next imparts motion through linkages (Fig. 29) **402**, **403** and bracket **404** (Fig. 30) causing the quadrant **401** to rotate from the position shown in Figure 15 to the position shown in Figure 16 thereby pushing the loaded bag to be uprighted until standing on the bottom thereof with the bag mouth open on top. A short distance before the quadrant **401** ends its final and upward journey, baffle **432** is retracted into the body of the quadrant thus permitting the bag to arrive at its final destination unencumbered with any mechanism overhead or even nearby.

Retraction of baffle **432** is accomplished by means of a cable **434** attached at one end to the baffle structure and at the other end being rigidly anchored to the machine frame at **435** as seen in Figures 29 and 30. During the final journey of quadrant **401**, it is accompanied by the baffle **432** spring locked thereto (Fig. 30). However, the cable **434** not being sufficiently long to pay out the full distance of final upward travel of quadrant **401** eventually becomes taut, and arrests the further travel of the baffle. Quadrant **401**, nevertheless, completes the journey alone.

As shown in Figure 31, a sign stating "Please Remove Bag" painted on the rear of quadrant **401** thus is moved into full view after and at initiation of a single cycle where the customer can see it.

Thus, the full cycle of the operation of the machine is now completed, all the mechanisms having arrived at the positions where they were located at the start of the cycle. The power is adapted to be automatically shut off and the machine is no longer in operation although ready to repeat the same cycle of performance whenever the starting button is again depressed. The loaded bag is now left standing alone on the pick-up platform **176** where it may be conveniently lifted by the customer and removed (see Fig. 17).

*Safety mechanisms and aspects*

The machine is provided with mechanisms to insure safety both to industrial personnel, the operator, and in the public markets to the customers and the children.

Almost all moving parts are mounted and function within the body of the machine, the entire device being covered with protection plates **102** as best seen in Figure 3. Quadrant **401** and the housing cage mechanism **900** are the only portions exposed. The possible dangers from the quadrant are eliminated by affording a streamlined body for the quadrant free of openings where children and even grownups might probe. Removable housing or cage mechanism **900** provides a guard for the internal structure including pneumatic unit **302** (Fig. 2).

*Safety mechanisms and aspects—Inner horn 711*

Thus, inner horn **711** in moving through and compressing articles in outer horn well **808** against stop **606** and rake **901** is operated by a gravity weight **713** (Fig. 55) so that should one by intent or accident place his hand therein after the machine is set into operation, the forward motion of the inner horn becomes arrested easily by the harmless pressure of the weight against the hand with no possible injury resulting. This also accounts for no breakage of the articles during compression thereof in the well. It is only the rearward motion of the inner horn that cannot be retarded since such rearward motion is cam operated as heretofore stated and there is no danger in such motion for lack of access.

*Safety mechanisms and aspects—Jaw sets 621 and 621A*

The sets of jaws **621** and **621A** that retain the bag mouth although remotely placed are spring loaded and spring operated as heretofore stated in the closing movement thereof thereby affording a safety precaution should one's hand or anything else get within the bite of the jaws. Thus, the pressure of the jaw bite may be withstood without any harm resulting.

*Safety mechanisms and aspects—Hand-operated mechanisms*

Other than these built-in features to promote safety, there may be provided on the operator's control panel a stop button **167A** (Fig. 76) which upon being depressed will instantly stop all further motion of the machine. There is also a reverse button **167B** which upon being depressed reverses the movement of the machine should it be necessary to extricate any foreign object caught in the forward movement of the machine parts such as one's shirt sleeve, cuff or other object. Driving motor **123** is reversible.

*Safety mechanisms and aspects—Automatic shut-off mechanisms*

The machine is provided with several automatic shut-off devices for proper operation. As shown in Figures 19 and 21, there are three micro-switches **168**, **169** and **170** normally operated by cams **171**, **172** and **173** respectively on shaft **100**. Micro-switch **168** serves to automatically check the bag mouth opening operation. Switch **168** will automatically stop the machine if a bag **213** is improperly opened, torn or wrinkled by entry of outer horn **808**. Suitable mechanism is provided for this purpose such as utilization of suction heads **303** or **304**. They become free (Fig. 19) and permit intake of air at an improper time in the cycle of operation thereby causing a conventional electrical vacuum control unit **174** to accept an impulse from air line **212** to break the circuit. The torn or wrinkled bag can thereafter be manually removed,

the machine reversed until it is at the starting position. Then the machine is started again to repeat the cycle by a pick-up of a new bag **213**.

Micro-switch **169** is for the purpose of automatic shut-off of the machine when bag supply has been exhausted in the corresponding magazine. This micro-switch is operated by the bag pick-up suction heads **206** (Figs. 26, 76) upon engaging openings **260** in shelf **253** for admission of air at an improper time of cycle. Similarly to operation of micro-switch **168**, the machine comes to a stop.

Micro-switch **170** operable by cam **173** (Fig. 19) is for the purpose of stopping the machine at the normal time at the end of the cycle of operation.

As may be best seen in Figure 4*b*, a micro-switch **175** is fixed to the main frame **101A** under the bag pick-up platform **176**, said platform being pivotally movable at hinge **177**. When there is no load on said platform, it is in a raised position due to the bias of spring **178** forcing the platform upwardly and in disengaged position with the micro-switch. However, when a loaded bag rests on platform **176**, the latter is pivoted downwardly thereby actuating micro-switch **175** which stops the machine. The machine cannot commence a new cycle until the loaded bag is removed from platform **176**.

*Additional structural and functional details—Frame*

Reference will now be made to further details for identifying secondary parts and mechanisms not heretofore considered.

In Figure 1 an assembled unit **101** embodies the complete structure resembling a conventional check-out counter and serves as a substitution or replacement therefor. The basic framework **101A** (Fig. 20) is formed of channels and angle irons suitably welded together and upon which all the mechanisms are mounted. Suitable plates **102** cover the framework for appearance and protection. Toward the end of the structure designated **103** and on the upper surface, an endless belt **104** independently operated may be employed for purposes of moving the purchased items within the reach of the check-out clerk (Fig. 1). As shown in Figure 4*a*, belt **104** passes over rollers **105** and **106** which are freely mounted on shafts **107** and **108** respectively. Said shafts are suitably fixed at each end to blocks **109** (Fig. 20) mounted on each side of the main frame **101A**. By further reference to Figure 4*a*, there is provided a tension mechanism applicable to the return side **110** of belt **104** and disposed intermediate said rollers. The tension mechanism generally indicated by numeral **111** is comprised of a roller **112** mounted freely on a shaft **113** the ends of which are journalled in blocks **114** (see Fig. 20). Said blocks are slidably adjustable in slots **115** of mounting blocks **116** fixed on each side of the main frame **101A**. A flat board **117** (Fig. 4*a*) directly below the upper run **118** of belt **104** and supported on each side by the main frame **101A** is provided to support the belt against heavy loads placed thereupon. A pinion **119** (Fig. 20) fixed on shaft **107** and driven by chain **120** from electric motor **121** fastened on the main frame **101A** actuates the belt. The motor is operated by a foot switch **122** as shown in Figure 73.

*Additional structural and functional details—Pneumatic system*

Also fastened to the main frame **101A** is the main driving motor **123** operatively connected to the compressor or vacuum pump **126** by suitable means such as belt **124** and pulley **125** as seen generally in Figure 20. As shown in Figure 19, vacuum pump **126** while motor **123** is in operation pulls air from the suction cup inlets **206**, **303** and **304** through valves **210** and/or **507** and forces said air out at openings **127** and **128**. The latter may be located adjacent the empty bag transfer position on to quadrant **401** as best seen in Figure 74 for maintenance of bag position upon arrival (see Fig. 7).

The principal function of the pneumatic system is for bag pick-up and feed to the transfer mechanism and for bag mouth-opening as described. Also of significance is the fact that the pneumatic pump **126** also serves as a brake for the driving mechanism by reason of the pump drive **124** being taken off the same shaft of main motor **123** (Fig. 20).

*Additional structural and functional details—Main drive system*

As shown in Figures 20 and 75, a suitable drive for transmission shaft **134** is shown as comprised of a belt **129** driven by motor **123** and driving the pulley **130** fixed to one end of shaft **131**. At the other end of shaft **131** is affixed a gear **132** mating with gear **133** fixed to the transmission shaft **134**. Bracket **135** mounted on the main frame (Fig. 20) supports shaft **131** and **134** at adjacent ends. Also fixedly mounted on shaft **134** are worms **136** and **137** (Fig. 75). A bracket **138** fixed to the main frame **101A** by bolts **139** supports the other end of shaft **134**. A worm gear **140** mounted on shaft **141** mates with worm **136**, said shaft **141** being journalled in bracket **142** mounted as by bolts **143** to the main frame **101A**. A sprocket **144** also mounted on shaft **141** serves to transmit power through chain **145** to the bag transfer roller sets **215—216** and **227** and **228**.

Roller **215** is mounted on a shaft **146** supported in brackets **147** mounted as by bolts **148** to the main frame **101A** and is driven by chain **145** engaging sprocket **149** fixed to shaft **146**. A tension mechanism **150** serves to retain roller **216** against roller **215**.

Roller **228** is mounted on shaft **151** and similarly journalled and affixed in the main frame **101A** (not shown). Shaft **151** carries a sprocket **152** also powered by chain **145**. Roller **227** on shaft **153** is also journalled and affixed to the main frame (not shown) and bears against roller **228**. A suitable tension device **154** serves to keep the chain taut and is comprised of a bracket **155**, a pin **156** journalled therein and carrying sprocket **157**, the said bracket being suitably and adjustably mounted to main frame **101A** as by screws **158** passing through elongated bracket slots **159**.

The cam shaft **100** is driven by transmission shaft **134** in a suitable manner. Thus, worm **137** on transmission shaft **134** mates with worm gear **160** (Figs. 20, 75) fixed on cam shaft **100**. Bearing blocks **161** and **162** suitably fixed as by bolts **163** to the main frame **101A** serve as journals for cam shaft **100** as best seen in Figure 21. A cam follower shaft **164** is suitably journalled in brackets **165** fixed as by bolts **166** to main frame **101A** (Figs. 21, 75).

*Detailed mechanisms in order of operation*

(*a*): BAG PICK-UP, FEED AND TRANSFER

For aid in further understanding the structures and functions heretofore described for greater or for omitted detail, the systems in order of operations are now to be described.

The bag pick-up feed and transfer devices prior to initial positioning of bag **213** on quadrant **401** as best seen in Figures 19, 22–27, 76.

Mechanical power is derived from the cam **200**. Thus, cam follower roller **201** off cam **200** rotates freely on pin **232** mounted on rocker arm **202**, the latter pivoting on pin **233** which is mounted in bracket **234** attached to main frame **101A**. Vertical sliding bar **204** having shoe **235** is slidably locked in track **236** which is affixed to main frame **101A** by support bars **237** (Fig. 24). Shoe **235** is suitably integrated with said bar as by means of bolts **238** or otherwise.

Coil spring **239** (Fig. 22) normally urges bar **204** downwardly, and at its lower end is connected to pin

240 secured to the main frame. The upper end of spring 239 is secured to pin 241 in bracket 222 provided with an elongated slot 242 for adjustable affixation to bar 204 to permit adjustment of bracket leg 221 carrying pin 241 for proper influence on pin 223.

A coil spring 243 anchored to pin 244 on bar 204 urges one end of rocker arm 217 (Fig. 24) downwardly for support against the bottom of notch 245. The other end of rocker arm 217 carrying pneumatic unit 205 is provided with a roller 246 freely mounted on pin 247 fixed thereto. Pneumatic unit 205 being secured to rocker arm 217 pivots together therewith in bearing 248 afforded at the upper end of vertical sliding bar 204. An adjustably mounted stop 218 for roller 246 is provided having an elongated slot 249 for affixation to track 236 as by screw 250.

Pneumatic unit as generally designated by numeral 205 is provided with an air passage or tube 251 having outlets in the form of suction cups 206. A rubber hose 211 is suitably secured to the open end 252 of passage 251 for carrying air toward the pump 126 (Fig. 19).

Thus, vertical and horizontal movement of cups 206 are effected by action of elements 202, 203, 204, 246, 218, 217 (Fig. 24). Bag support 219 is brought into operative position by leg 221 engaging 223.

A bag magazine is shown in Figure 76 showing bags 213 stacked on inclined shelf 253. The lower edges are adapted to rest against uprights 254 fastened to the forward end of shelf. The weight of a metal keeper 255 bears gently against the flat mouth edges of the bags to maintain a neat pile for efficient operation. Keeper 255, is loosely held by screws 256 passing through adjustment slots 257. Flexible stripping rods 258 adjacent uprights 254 have outwardly offset leading edges 259 for separating or stripping the bags one at a time thereby assuring single bag feeding between propelling rollers 215 and 216. A series of openings or holes 260 heretofore mentioned are provided under the bag shelf near the lower edge for purpose of stopping or turning off the machine in the event of failure of bag supply by utilization of the electrical vacuum control unit 174 in the pneumatic and electrical circuits shown in Figures 18, 19. A lower shelf 261 serves as a storage compartment for an extra supply of bags to be readily available for replacing the depleted pile on shelf 253. As shown in Figure 76 and for convenience, the operator's control panel 167 is located adjacent the bag magazine.

As best seen in Figure 26, the underside bag support 219 for the bag edge 214 as it is brought by cups 206 to intermediate position between rollers 215 and 216 is attached to the roller assembly 215. It is normally supported when in non-active position (Fig. 26) by bracket 220 resting against adjustable stop 262 mounted in the lower end of a bracket 263 secured to the underside of plate 226 through a block 264. Said plate 226 is suitably secured to the main frame (not shown in the drawings) and constitutes the lower portion of the chute through which rollers 215 and 216 propel the bag.

Both ends of plate 226 are notched and curved as shown in Figure 27, the leading edges of forks 265 following the contour of roller 215.

Roller 215 comprises a metal body 267 (see Figs. 27, 28) with a plurality of sleeves 266 made of rubber fitted thereupon, the sleeves being of a thickness enabling them to extend radially beyond the outer surface of forks 265. This assures unobstructed feeding of bags 213 to the top of plate 226 without jamming in their transfer from the roller to the plate 226.

Roller 216 cooperating with roller 215 comprises a metal body 268 with a rubber sleeve 269 fitted to the full length thereof (Figs. 27, 28). Plate 225 in spaced relation to and disposed above plate 226 to form a bag chute therewith is supported by structure 270 secured to the main frame 101A (Fig. 26).

Roller 227 forming the second set of rollers 227—228 is metal-faced and is pivoted on shaft 153 supported in notches 271 provided in blocks 271A (Fig. 26) suitably secured to the main frame (not shown). It is held down by its own weight and bears against the rubber sleeves 272 of roller 228, said sleeves being similar to 266 of roller 215. Roller 228 is formed of a metal body 273. Thus, as bag 213 passes between the rollers 227, 228 roller 227 is free to rise upwardly in the notches 271 to accommodate for bag thickness, the said bag raising the free swinging stop 230 for passage therethrough as heretofore described under the heading of Bag Transfer Mechanism.

(b) BAG OPENING AND QUADRANT RELATIONSHIPS

Referring now to the lower pneumatic unit 301 of the bag opening mechanism, it is seen that mechanical power for unit 308 is derived from cam 300 as shown in Figure 34. Thus, cam 300 actuates cam follower 309 freely pivoting on pin 310 secured to one end of rocker arm 305. The lower end of rod 306 is pivoted to pin 311 secured to the other end of rocker arm 305 while the upper end of rod 306 is secured to bracket 307 of frame unit 308 as by screw 312.

Pneumatic unit 301 comprises an end frame piece 313 having openings 314 provided with a screen mesh 315 and in which suction heads 303 are disposed. Bag guides 316 are provided at each side of frame piece 313 and have slots 317 for adjustable affixation to 313 as by screws 318. An air tube 319 sealed at one end serves to transmit the air from the suction heads 303 to a hose 211A leading to vacuum pump 126. Brackets 320 support the tube 319 to the frame piece 313, which latter serves both as the support of the pneumatic unit 301 and as the end of the frame unit 308 all as shown in Figure 34. The whole frame unit assembly 308 is adapted to pivot on a shaft 404 at the opposite end of frame piece 313. It is to be observed that the frame unit 308 permits penetration of quadrant therethrough for cooperation therewith (Figs. 5–16).

(c) : QUADRANT AND SECONDARY MECHANISMS OR SUPPORTING PARTS

Before operative connection is made between lower pneumatic unit 301 with bag 213 for the opening operation, quadrant 401 has already during the cycle moved from position shown in Figure 5 to Figure 8. Quadrant 401 is adapted to receive bag 213 fed thereto by rollers 227, 228 when in registering position therewith as shown in Figure 7. Top wall 409 of quadrant 401 as seen in Figures 32–33 has a bag retaining device. Thus a bar 437 along one side cooperates with the device 436 on the other side consisting of a parallel bar 438 between which bars the bag is introduced. Bar 438 is provided with an opening 439 through which a flat spring retainer 440 passes. Spring 440 is anchored at one end to the outer side of bar 438 as by screw 441 while adjacent the other end is offset as at 440 to bear against the longitudinal edge of an arriving bag 213 for bag movement arrest.

Quadrant 401 is further provided with side quadrants or segments 442 and 443 to the curved edges of which is secured a conforming plate 444 as by screws 445 (Fig. 31). Thus quadrant 401 forms a chamber to enclose operative mechanisms therein for safety purposes.

As seen in Figure 29, the driving mechanism for quadrant 401 includes cam 400 and cam follower 446 on pin 447 mounted on one end of rocker arm 402. Pin 448 at the other end of rocker arm 402 serves as a pivot for the lower end of rod 403, the upper end of said rod being secured to the bracket shown in Figure 30.

Now considering some of the mechanisms mounted within the quadrant 401 and by reference to Figure 30, stops 408 are the first to be activated in the cycle of operation (Figs. 6–7). Each stop assembly is indicated by numeral 414 and consists of parts 449 and 450 adjustably engaged through an elongated slot 452 of part 450 by screw 451. Such adjustment is provided for accom-

modating bags of different lengths. Accordingly openings 415 in plate 409 through which stops 408 are adapted to penetrate are also elongated to accommodate the various possible conditions of stops 408.

In the drive mechanism which actuates baffle 432, the right angle lever 425 as see in Figures 31 and 81 at one end is provided with spring 467 mounted in an opening 466, the other end being anchored over post 468 fixed to the main frame 101A. In the same mechanism, shaft 421 is freely pivoted in bearings of brackets 469 attached to the main frame 101 is best shown in Figures 81 and 82. Shaft 421 is caused to rotate by engagement of roller 419 and cam 418 operatively connected thereto by roller arm 420. Movement of shaft 421 is transmitted to rod 423 connected to lever 425.

Baffle 432 includes the baffle tines 432A operating out of openings 433 in plate 409 of quadrant 401. Springs 430 and 430A (Figs. 30 and 31) are anchored at their upper ends on posts 453 and 454 which are fixed to the side walls 443 and 442 respectively of quadrant 401. Pin 470 fixed to wall 443 serves as a limiting downward stop for movement of the baffle being met by the baffle lever 429. Rigidly attached to baffle lever 429 is an arm 455 having the lower end of spring 430 attached thereto as through opening 456. An anchorage such as a screw 457 and nut 458 is attached at the outer end of arm 455 to serve as an anchor point for the cable 434.

Similarly attached to lever arm 429*a* as shown in Figure 31 is an arm 459 with an opening 460 to which the lower end of spring 430*a* is attached. Cooperating therewith is right angle lever 427 pivoting about pin 461 fixed to wall 442 of the quadrant 401, lever 427 having at its one end a post 462 to which a spring 463 is attached (see Fig. 31). Spring 463 is anchored to another post 464 at the other end mounted in side wall 442. Lever 427 in one arm is also provided with a notch 465 into which pin 428 of arm 459 is snap locked as heretofore described.

Now considering upper pneumatic unit 302 and by referring to Figures 36–38, pneumatic assembly 510 consists of a tube 520 having an air passage 521 and suction heads 304 in communication. Air passage 521 is sealed at one end and has at the other end a nipple 522 for connection with a hose carrying the air drawn through suction heads 304 to the vacuum pump 126.

As seen in Figures 36 and 40, a coil spring 523 attached over pins 524 and 525 normally urges the linkage 517 to bear against stop pin 526 fixed in the yoke 503A of beam 503. Spring 523 serves to return the linkage 517 to normal position after it has been in the position indicated by phantom lines in Figure 42.

Another coil spring 527 attached over posts 528 and 529 (Fig. 36) serves to urge the sleeve 509 to rotate as roller 512 moves along the changing contour 530 of cam plate 513. The retaining plate 508 which is adapted to serve as a rigid upper transverse frame for the inside wall of the upper bag edge is attached by screws 531 to the shaft 532 which is pivoted in bearings 533 on brackets 534, the latter being rigidly fixed to the tube 520 (Fig. 36). Eccentric 516 is fixedly mounted on shaft 532 and has a crank arm 535 which rides in the slot 536 of forked member 515 also mounted on tube 520 (Fig. 86). As shown in Figure 40 stop 518*a* is fixed by screws 537 to main frame 101A.

Thus and as shown in Figure 29, upper pneumatic unit 302 derives its movements through the action of cam 500 on cam follower 538 pivotally mounted on pin 539 fixed at the end of lever 501 all as best seen in Figure 29.

As shown in Figure 25, pneumatic power for pick-up and feed unit 205 is synchronously controlled by valve 210 actuated by cam 208 through follower 209; pneumatic power for opening units 301 and 302 is synchronously controlled by cam 505 operating on valve 507 through follower 506.

(*c'*) : BAG MOUTH RETAINER MEMBER 606 AND JAW SETS

In addition to prior description of structure and operation of member 606 and by reference to Figure 43, it is seen that lever 602 is normally urged by spring 634 fastened at one of its ends to a hook 607 thereon, the spring at the other end being secured to post 636 on the main frame 101*a*. Spring 634 urged cam follower roller 601 on shaft 637 to bear against cam 600. A pin 638 connects the levers 602 and 603 while pin 639 connects levers 603 and 604.

In connection with the operative connections for jaw sets 621 and 621A, it is further seen in Figure 44 how cam follower 608 is pivoted on pin 640 secured to the end of an arm of the right angle lever 609, the lever pivoting at 641 on shaft 164. A pin 642 secured at end of the other arm of lever 609 serves as a pivot for the lower end of rod 610, the upper end of the rod pivoting on pin 643 secured to one end of an angle lever 644. Lever 644 is secured to shaft 612. The other end of lever 644 is provided with a pin 645 to which the positive lock slide 616 and a link 646 are fastened. As best seen in Figures 44 and 45, links 646 are provided at their forward ends with an opening 647 through which a screw 648 passes, the latter going through a roller 649 and then into threaded engagement with opening 650 in the lock slide lever 617 (Fig. 45). Lock slide lever 617 is slidable in a block 651 suitably fastened to the main frame, the roller 649 sliding between the faces 652 and 653 of the slide block 651.

As to the jaw mechanisms of which full details have already been described under prior headings, it can be here added that the jaw pivot shafts 623 and 627 as best seen in Figures 48, 48′ and 49 are journalled in a journal block 654 which is suitably fixed to the main frame by suitable bolts. The structure is identical to shaft 623A and 627A journalled in block 654A also fixed to the main frame.

As shown in Figures 46 and 49 attached to lever 616 is a spring operated jaw closing mechanism 618 (as a safety factor) comprising a rod 619 fixed at its forward end by pin 655 to lever 616, the rod being supported in bearings 656 and 657 suitably secured to the main frame. At the rearward end of rod 619 is a cross pin 658 to which one end of a coil spring 620 is attached, the other end being attached to post 659 fixed in a plate 660 secured to the main frame 101A (Fig. 46).

(*d*) : INNER HORN STRUCTURE

For further details of inner horn structure 711, Figures 53 and 56 show the inner horn structure to be comprised of two inverted shallow channel-like frames 737 and 738 welded or otherwise attached, the upper frame 738 being shorter than the lower frame 737. The forward part of upper frame 738 may be formed as shown with a plurality of spaced upright ribs 739 which are adapted to pass between the teeth of rake 901 as best shown in Figure 83. A flat plate 740 is provided on the forward side of channel frame 738 and has wheels 741 pivoted on pins 742 secured to brackets 743 attached to the rear side of the forward wall plate 740 (Fig. 53). Wheels 741 are adapted to travel in the trough of the outer horn 808.

Toward the rear and at the underside of frame 737 is fastened a plate 736 having a forward edge 735 (Fig. 53) and carrying on the underside two bearing units 744 and 745 which are attached for sliding purposes on the rails 820 of the outer horn 808 as best seen in Figures 4*a*, 79. Attached to one side of plate 736 by a pin 746 (see Fig. 56) is a pivoting dog 710, the free end of which is concave in design to receive a stop 707 on moveable member 706 (Fig. 57).

Roller 714 of dog 710 rotates freely on the shaft 747. Along a longitudinal side of plate 736 is a tab extension 748 serving as an anchor for cable 712 which is locked between a plate 749 and the tab 748 as by screws 750

(Fig. 53). Adjacent this anchor is a double pawl mechanism now to be described.

The double pawl mechanism comprises an angle rocker arm **726** pivoted at its center as by screws **727** (Fig. 53) engaging the side of channel frame member **737**. Rocker arm **726** (Fig. 77) has a pawl **725** fastened at the forward end of a longitudinal arm as by screws **751**, said pawl being normally urged downwardly by a coil spring **752** disposed between the rocker arm **726** and a transverse bar **753** thereabove.

The angled arm of **726** has at the end thereof pawl support **728** as already described. Bar **753** is attached by screws **754** to bar **755**, the latter being fixed to the upper side of channel **737** (Figs. 53–54). A pivot pin or screw **734** for the pawl **729** is fastened to the projecting end of bar **755**. By further referring to Figures 53 and 54, the plate **756** is fastened by screws **757** to pawl **729** and a screw **758** is threaded through plate **756** serving as an adjustment for pawl support **728** (Fig. 78). A lock nut **759** may be provided to lock the setting.

Cable **712** fixed to the inner horn **711** leads forwardly over a pulley **760** (see Fig. 55) on shaft **761** in a bearing of main frame **101A**. The cable then proceeds rearwardly passing over pulley **762** on pin **763** secured to the main frame, the cable then being fed across upper pulley **764**, lower pulley **765** upwardly and through upper pulley **766** and then downwardly and through pulley **767**, the said pulleys **764** and **766** being disposed on a member of the main frame **101A** and pulleys **765** and **767** on counterweight **713**. The cable **712** terminates between clamp plates **768** and **769** screwed or attached to the member of the main frame **101A** as best seen in Figure 55.

By reference to Figure 56, cam track **715** is supported on brackets **770** adapted to be attached to main frame **101A** and is divided into a high track portion **715***a* and a low track portion **715***b*, the intermediate contour change taking place at **716**.

By referring to Figure 57, it is seen that lever **704** transmitting motion to dog stop **707** mounted on member **706** is pivoted on shaft **771** journalled in a block **772** welded on the main frame **101A**. A spring **773**, one end of which is attached to lever **704** as at opening **774** and the other end of which is attached to the main frame (not shown) normally urges dog stop **707** rearwardly but is resisted by the action of cam **700**.

In Figures 59–62 a tilting drive is shown for engagement and disengagement of pawl **725** with rack **809**. Thus pawl roller **724** when engaging track **722** is out of engagement with lower rack **809**. When track **722** is tilted, the rack is engaged. As shown spring **775** at one end is attached to one arm of a right angle lever **719** at pin **776**, the other end of the spring being attached to the main frame **101A**. Lever **719** pivots on shaft **777** attached to the block **778** affixed to the main frame. Another spring **779** is fixed over the post **780** immovably fastened to track **722** and at the other end is attached to a post **781** and fixed to the main frame **101A**.

(*e*) : OUTER HORN STRUCTURE

Referring in detail now to the outer horn generally indicated by numeral **808** (Figs. 52 and 79), there is shown a flat bottom **813** and side walls **814** and **815** on the two opposite longitudinal sides. A rail assembly **816** is provided at the rear part and consists of a pair of bars **817** fastened to the horn bottom and being secured at each end in plates **818** and **819** as by locking nuts **821**. A pair of rails **820** are also secured between the plates in similar manner and are adapted to be in slidable engagement with inner horn bearing units **744** and **745**, the latter travelling on said rails (Fig. 79). Inner horn wheels **741** are also adapted to travel on outer horn bottom **813**. A rubber bumper **812** fastened by screws **822** to plate **819** serves as a stop for inner horn maximum inner movement.

Cam **800** seen in Figure 52 is provided with a groove **801** thus controlling positively both the forward and the rearward motion of the outer horn. Thus, cam follower **802** rotates on pin **823** and rod **804** is pivoted at each of its ends by pins **824** and **825** attached respectively to levers **803** and **805**. Lever **805** is pivoted about pin **826** attached to the main frame **101A**. The outer horn is furthermore provided with wheels **827** mounted on pins **828** attached to the horn sides (Fig. 79), the said wheels travelling in the grooved tracks **829** and **830** fastened to the main frame **101A**.

(*f*) : HOUSING, RAKE RELEASE AND QUADRANT STOP 1000

By referring to Figures 63–64, the housing mechanism is shown to be a boxlike unit **900** which houses the rake tripping mechanism already described. Thus, a transparent window **909** is attached by a hinge **910** on the top to provide a view of the inner mechanism or access thereto. Rake **901** is pivoted on the shaft **911**, the latter being held in bearings **912** attached to the housing. Pin **913** attached inside housing **900** serves as the anchor post for spring **908**. A stop **914** fixed by screws **915** to the housing serves as a limiting stop for rearward movement of rake **901**.

The safety mechanism **916** is freely pivoted also on shaft **911** and provides control against over-tall items being delivered into the bag. Thus, a transverse horizontal bar **917** slightly inclined (Fig. 63) is held at one end by the bracket **918** and at the other end by the angle lever **919**, both pivoting on shaft **911**. The depending end **920** of angle lever **919** is positioned forwardly of a plate **921**, movement of the latter being adapted to actuate the micro-switches **922** and **923** directly behind plate **921** as best seen in Figure 80. Thus, if a tall object were carelessly loaded into the machine it will strike bar **917** causing the latter to rotate about the shaft **911** and depending lever **920** to rotate toward the hinge plate **921** to actuate the two micro-switches **922** and **923**. Switch **923** will open the electrical circuit and cause the machine to stop at once while switch **922** will close causing a red warning light **167D** on the control panel **167** to light up (see circuit diagram, Fig. 18). After the oversized item is removed, the starting button **167C** may be depressed and the machine will complete its cycle starting from the point where it had left off. Or the reversing button **167B** may be depressed, the machine then proceeding in reverse until the stop button **167A** is depressed for obstruction removal. Then start button may be depressed to resume the remainder of the cycle (Fig. 76).

Housing **900** is readily removable from the top of the machine being mounted thereon by two dowel pins **924** registering with holes **925** (Fig. 63). Housing **900** is removable for purposes of repair of the machine in event of breakdown. When removed a flat counter top **926** may be placed upon the machine thereby providing a conventional store counter until machine repair is completed (Figs. 2–3).

Referring now to the forwardmost stop **1000** disposed within the quadrant **401** and by reference to Figure 30, it is to be observed that said stop **1000** pivots on a sleeve **1007** about shaft **412**. Shaft **412** is supported on bearings in bracket **1012** which is suitably fastened at the forward end to the main frame **101A**.

*Modifications of the invention—Modified bag pick-up platform*

Certain modifications are provided in the heretofore described specification. Thus by reference to Figure 17 there is shown a modified pick-up platform **176'** wherein several loaded bags **213'**, **213''** and **213'''** may be stored on the bag pick-up platform **176** before being picked up, the bags being pushed forward on the conveyor belt **176'** by each succeeding bag.

*Modified bag pick-up and feeding structure*

Now referring to Figure 89, a modified bag pick-up and feeding mechanism is shown wherein a cam **1100**

located on the main cam shaft 100' actuates cam follower 1101 at the end of a link 1102, the latter being longitudinally slidable in bearings 1103 and 1104 suitably fixed to the main frame. The other end of link 1102 is connected to one end of an angled lever 1105 fastened by a pin 1106 going through lever slot 1107, the said lever 1105 pivoting on a shaft 1108. At the other end of angled lever 1105 is a suction head mechanism generally indicated by numeral 1109.

The suction head mechanism is comprised of a pair of guide blocks 1110 and 1111 between which is mounted a longitudinal sliding member 1112, the latter being restrained from outward movement by a spring 1113 fixed between sliding member ears 1114 and the ears 1115 on the lever 1105. A pivotally free roller 1116 is located at the rear of sliding member 1112 and is in striking engagement with cam surface 1117 of a bracket 1118 fixed to the main frame 101A' upon the upward movement of the suction head mechanism. This causes the slidable member 1112 to slide outwardly thereby delivering the bag to the transfer rollers 115' and 116'.

A lever 1119 is further suitably and pivotally fastened to member 1112. Thus secured to an extension of lever 1105 as by pin 1120, lever 1119 at the upper free end is pivotally secured to rod 1121 as by pin 1122. Rod 1121 leads to a collar 123 and is pivotally secured thereto as by pin 1124. Intermediate the length of lever 119 is a slot 1125 in which rides pin 1126 mounted in slidable member 1112. As member 1112 advances forwardly toward the transfer rollers 115', 116', lever 1119 is caused to rotate forwardly by virtue of the advancing pin 1126 acting thereon. This causes the suction cups 1127 to pivot about the bearing 1128 of the air tube, thus further advancing the bag until engaged between the rollers.

*Modified bag stop and hold-down structure on quadrant*

Another modified structure shown in Figures 90–93 is a bag hold-down and stop mechanism disposed on the quadrant. Thus, a pair of guide tracks 1150 and 1151 are adjustably fastened by screws 1152 through transverse slots 1153 into the quadrant face 409. Longitudinally adjustable stops 1154 and 1155 are mounted in longitudinal slots 1157 and 1158 in the guide tracks as by screws 1156. The edges of the bag pass through the grooves 1159 and 1160, and the forward movement of the bag is stopped when it strikes surfaces 1161 of the stops 1154.

Thus has been described an integrated mechanism and a system and method for each terminable cycle (of brief and controllable time) of operation to withdraw a single bag from a supply stack station, feeding and transferring the bag to a receiving station where mechanism is provided for opening, reinforcing and gripping the bag mouth, loading the bag through the open mouth at a loading station by a loading and stripping mechanism and transferring said loaded bag for manual or other type of removal at a take-up station.

Although the machine and method described has been illustrated for public stores and markets, it is feasible for use in other commercial and industrial establishments. All the assemblies and steps described both in combination, sub-combination and individually are encompassed within the invention.

Moreover, although the machine and method apply to a predetermined size of bag, the invention encompasses the use of any desirable bag size preselector mechanism, any desirable adjustability of described parts, mechanisms for making such adjustments and duplication of parts so that the bag magazine may contain a plurality of sizes and wherein any sized bag is capable of automatic pick-up and subject to consecutive operations as described.

I wish it understood that minor changes and variations in the combination, sub-combination and individual assemblies and parts of the invention, is the combination, sub-combination and individual steps of the method of the invention, in the integration of assemblies and parts, in the sequences of operation and consolidation of assemblies and parts, in synchronization and power sources and connections may all be resorted to without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. In a method for automatic bag packaging, the steps of depositing the articles to be packaged on a horizontally movable carriage, of simultaneously and independently movable parts, and the further successive steps of raising a single bag, releasably mounting said bag on a horizontally operative receiver, opening the mouth thereof while the bag is in horizontal position, releasably reinforcing and gripping said mouth, introducing the carriage into the bag, withdrawing same for article stripping therein and then transferring the loaded bag.

2. In a method for automatic bag packaging, the steps of depositing the articles to be packaged on a horizontally movable carriage of simultaneously and independently movable parts, raising a single bag, releasably mounting said bag on a horizontally operative receiver, opening the mouth thereof while the bag is in horizontal position, releasably reinforcing and gripping said mouth, introducing the carriage into the bag, and then withdrawing same for article stripping therein.

3. In a method for automatic bag packaging, the steps of depositing and compressing the articles to be packaged in an open chamber of a horizontally movable carriage of simultaneously and independently movable parts, introducing the carriage into a horizontally disposed open and mounted bag and then stripping the articles from the carriage into the bag by withdrawing said carriage.

4. In a method for automatic bag packaging, the steps of automatically raising a single empty bag, automatically transferring the bag to and releasably mounting the same on a horizontally operative receiver, opening the mouth of the bag and releasably reinforcing and gripping said open mouth.

5. In a method for automatic bag packaging, the steps of releasably mounting an empty bag on a horizontally operative receiver, opening the mouth of the bag, releasably reinforcing and gripping said open mouth, introducing and compressing articles into said bag while on said receiver and transferring said loaded bag from the receiver.

6. In a method for automatic bag packaging, the steps of automatically raising a single bag, releasably mounting said bag on a horizontally operative receiver, opening the mouth of the bag, releasably reinforcing and gripping said open mouth, introducing articles into said bag while on said receiver and automatically transferring said loaded bag from the receiver.

7. In a method for automatic bag packaging, the steps of pneumatically raising a single bag from a magazine, mechanically transferring said bag to a horizontally operative receiver, mechanically and releasably mounting said bag on the receiver, pneumatically opening the mouth of said bag mounted on the receiver, releasably reinforcing and gripping the opened mouth for article receipt, loading said bag while in horizontal position and mechanically transferring the loaded bag for pick-up.

8. In a method for automatic bag packaging, the steps of releasably mounting a bag on a horizontally operative receiver, pneumatically opening the mouth of the bag while on the receiver and releasably reinforcing and gripping the opened mouth on the receiver, introducing a horizontally movable article carrying carriage of simultaneously and independently movable parts into the bag and strippingly withdrawing said carrying carriage for article deposit therein.

9. In a method for automatic bag packaging, the steps of releasably mounting an open mouth bag on a horizontally disposed support, introducing a horizontally movable carriage having an open chamber for unoriented deposit of articles and having simultaneously and independ-

ently movable parts and being aligned therewith into the bag for compression of said articles therein and strippingly retracting said carriage for article deposit in the bag.

10. In a method for automatic bag packaging synchronized for single cyclic operations, the steps of raising a single bag from a magazine and feeding same to a horizontally operative receiver, opening the bag mouth and releasably reinforcing and gripping said open mouth, introducing a horizontally movable article receiving carriage having simultaneously and independently movable parts into the bag on the receiver and strippingly withdrawing said carriage from the bag for article deposit therein.

11. The method of claim 10 and transferring the loaded bag for pick-up.

12. In an integrated automatic bag packaging machine having a counter and a bag magazine for bag storage and adapted for each terminable cycle of operation to pick up an individual bag, load the bag with articles to be packaged, and transfer the loaded bag to a pick-up platform of said machine, the combination comprising a bag transfer mechanism, a cyclically movable and cyclically operative pneumatic bag pick-up and feeding mechanism engageable with an individual bag in said magazine when in registry therewith for bag pick-up and when in registry with said bag transfer mechanism for feeding the bag to said bag transfer mechanism, a cyclically movable and cyclically operative bag receiver mechanism to receive the bag from said bag transfer mechanism when in registrable position therewith, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag on said bag receiver mechanism when said bag receiver mechanism is in registrable position with said loading and stripping mechanism, cyclically movable and cyclically operative pneumatic bag mouth opening mechanisms including cyclically operative retaining and gripping mechanisms for the bag mouth when opened all operable on said bag during registry of said bag receiver mechanism with said loading and stripping mechanism and prior to introduction of said loading and stripping mechanism into said bag, a take-off platform to receive the bag with articles deposited therein when said bag receiver is in registrable position therewith, pneumatic mechanisms including pneumatic connections for said pneumatic bag pick-up and bag mouth opening mechanisms, a cyclically operative micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to said pneumatic mechanisms and all other of above said mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations from empty bag pick-up to transfer of the article-loaded bag to the take-off platform.

13. In an integrated automatic bag packaging machine as set forth in claim 12 having additional microswitch means and vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of bag pick-up.

14. In an integrated automatic bag packaging machine as set forth in claim 12 having additional microswitch means and a vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of proper bag mouth opening.

15. In an integrated automatic bag packaging machine as set forth in claim 12 having additional microswitch means and a vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of either bag pick-up or proper bag mouth opening.

16. In an automatic bag packaging machine adapted for each terminable cycle of operation to transfer articles of merchandise into a bag for packaging thereof, the combination of a bag receiver, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag, cyclically movable and cyclically operative mechanisms for opening, framing and gripping the bag mouth during introduction into and retraction from the bag, a cyclically operative micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to said operative mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations.

17. In an automatic bag packaging machine adapted for each terminable cycle of operation to transfer articles of merchandise into a bag for packaging thereof, the combination of a bag receiver, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag, cyclically movable and cyclically operative mechanisms for opening, framing and gripping the bag mouth during introduction into and retraction from the bag, including cyclically operative pneumatic means, pneumatic mechanisms including pneumatic connections for said cyclically operative pneumatic means, a cyclially operative micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to said pneumatic mechanisms and all other of above said mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations.

18. In an automatic bag packaging machine as set forth in claim 17 and having additional micro-switch means and a vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of proper bag mouth opening.

19. In an integrated automatic bag packaging machine adapted for each terminable cycle of operation to transfer articles of merchandise into a bag for packaging thereof, the combination of a cyclically movable and cyclically operative bag receiver mechanism, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag, cyclically movable and cyclically operative mechanisms for opening, framing and gripping the bag mouth during introduction into and retraction from the bag, a cyclically operative micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to all of above said mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations.

20. In an integrated automatic bag packaging machine as set forth in claim 19 wherein the operative mechanisms for opening, framing and gripping the bag mouth include cyclically operative pneumatic means, pneumatic mechanisms and pneumatic connections.

21. In an integrated automatic bag packaging machine as set forth in claim 19 wherein the operative mechanisms for opening, framing and gripping the bag mouth include cyclically operative pneumatic means, pneumatic mechanisms, pneumatic connections and a vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of proper bag mouth opening.

22. In an automatic bag packaging machine, a cyclically movable and cyclically operative bag receiver mechnism for bag receipt, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag on said bag receiver mechanism when said bag receiver mechanism is in registrable position with said loading and stripping mechanism, cyclically movable and cyclically operative pneumatic bag mouth opening mechanisms including cyclically operative retaining and gripping mechanisms for the bag mouth when opened all operable on said bag during registry of said bag receiver mechanism with said loading and stripping mechanism and prior to introduction of said loading and stripping mechanism into said bag, pneumatic mechanisms including pneumatic connections for said pneumatic bag mouth opening mechanisms, a cyclically operative micro-switch,

a motor in circuit therewith and deenergizable thereby and operative connections from said motor to said pneumatic mechanisms and all other of above said mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations.

23. In an automatic bag packaging machine as set forth in claim 22 having additional micro-switch means and a vacuum control mechanism in the motor circuit to stop operation of the cycle upon failure of proper bag mouth opening.

24. In an integrated automatic bag packaging machine having a counter and a bag magazine for bag storage adapted for each terminable cycle of operation to pick-up an individual bag, load the bag with articles to be packaged, and transfer the loaded bag to a pick-up platform, the combination comprising a bag transfer mechanism, a cyclically movable and cyclically operative bag pick-up and feeding mechanism engageable with an individual bag in said magazine when in registry therewith for bag pick-up and when in registry with said bag transfer mechanism for feeding the bag to said bag transfer mechanism, a cyclically movable and cyclically operative bag receiver mechanism to receive the bag from said bag transfer mechanism when in registrable position therewith, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag on said bag receiver mechanism when said bag receiver mechanism is in registrable position with said loading and stripping mechanism, cyclically movable and cyclically operative bag mouth opening mechanism including cyclically operative retaining and gripping mechanisms for the bag mouth when opened all operable on said bag during registry of said bag receiver mechanism with said loading and stripping mechanism and prior to introduction of said loading and stripping mechanism into said bag, a take-off platform to receive the bag with articles deposited therein when said bag receiver is in registrable position therewith, a cyclically operative micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to all of above said mechanisms including cam and lost motion linkage connections for a terminable cycle of synchronized operations from empty bag pick-up to transfer of the article-loaded bag to the take-off platform.

25. In an integrated automatic bag packaging machine having a counter and a bag magazine for storage and adapted for each terminable cycle of operation to pick up an individual bag, load the bag with articles to be packaged, and transfer the loaded bag to a pick-up platform, the combination comprising a bag pick-up and feeding mechanism, a bag receiver mechanism, a bag transfer mechanism operable between the feeding and bag receiver mechanisms, mechanisms for releasably opening, gripping and framing the bag mouth, an article-receiving loading and article-stripping mechanism introduceable into and retractable from the bag when on said receiver and when the gag mouth is opened, gripped and framed, means to transfer the bag with articles deposited therein, a micro-switch, a motor in circuit therewith and deenergizable thereby, and operative connections from said motor to all of above said mechanisms and to said means to transfer the bag including cam and lost motion linkage connections for a terminable cycle of synchronized operations from bag pick-up to transfer of the articles deposited therein.

26. An integrated automatic bag packaging machine as set forth in claim 25 and having pneumatic mechanisms including pneumatic connections and wherein at least either the bag pick-up and feeding mechanism includes pneumatic means or said mechanism for opening the bag mouth includes pneumatic means.

27. An integrated automatic bag packaging machine as set forth in claim 26 and wherein additional micro-switch means and a vacuum control mechanism in the motor circuit is provided to stop operation of the cycle upon at least failure of either bag pick-up and feeding or failure of bag mouth opening.

28. In an integrated automatic bag packaging machine adapted for each terminable cycle to load a bag mounted for article receipt, in combination with a releasable stop, a cyclically movable and cyclically operative article-receiving loading and article-stripping mechanism introduceable into and retractable from the mounted bag comprising a movable outer main member the forward edge normally being disposed adjacent said stop, a movable inner member forming an article receiving well therewith, and having biasing means for timed relative forward movement to compress contents of the well against said stop, mechanism for intermittent interlocking the main and inner members during entry into the bag for loading and during retraction for stripping and for releasing said stop during said intervals, a power source and operative conenctions from the power source for said article-receiving loading and article-stripping mechanism.

29. In an integrated automatic bag packaging machine for mounting a bag to receive a load of merchandise for each terminable cycle of operation, in combination a horizontally disposed bag support, releasable means to open the bag mouth, releasable means to reinforce opposite sides of the mouth, releasable means to grip opposite sides of the mouth a horizontally movable article receiving carriage means to open the bag, a power source and operative connections therefrom to said bag support, all of said releasable means and to the article receiving carriage.

30. In an integrated automatic bag packaging machine for loading a bag for each terminable cycle, a pivotable bag receiving member having timed releasable stops for bag mounting, mechanism for aligning said bag receiving member for bag loading, mechanism for movement of said bag receiving member when the bag thereon is loaded for transferral of loaded bag, a releasable stop to maintain the loaded bag contents during said transferral, a power source and operative connections therefrom respectively to said bag receiving member, all releasable stops, and mechanism for movement of said bag receiving member.

31. In an integrated automatic bag packaging machine adapted for each terminable cycle to load a bag mounted for article receipt, in combination with a cyclically releasable stop, a cyclically movable and cyclically operative article-receiving loading mechanism introduceable into and retractable from the mounted bag comprising a movable outer member the forward edge thereof normally being disposed adjacent said stop, a movable inner member, mechanism for cyclically and intermittently locking said outer and inner members for bag entry and bag loading, a power source and operative connections from the power source to said releasable stop and loading mechanism.

32. In an integrated automatic bag packaging machine as set forth in claim 31 and having biasing means for limited and independent forward travel of said inner member and wherein the operative connections include cam and lost motion connections.

33. In an integrated automatic bag packaging machine for mounting a bag to receive a load of merchandise for each terminable cycle of operation, in combination, a horizontally disposed bag support for an open-mouthed bag, cyclically releasable means to reinforce opposite sides of the mouth, cyclically releasable means to grip opposite sides of the mouth, a horizontally movable article receiving carriage means to open the bag, a power source and operative connections therefrom including cam and lost motion connections to both of said releasable means and to the article receiving carriage.

34. In an integrated automatic bag packaging machine

for loading a bag for each terminable cycle, a movable bag receiving member having a flat surface for bag mounting, mechanism for horizontally registering said bag receiving member for bag loading, mechanism for rotation of said bag receiving member when the bag thereon is loaded for transferral of the loaded bag, a power source and operative connections therefrom to said mechanisms.

35. In an integrated automatic bag packaging machine for loading a bag as set forth in claim 34 wherein said bag receiving member has cyclically timed releasable stops for bag mounting and wherein said operative connections include cam and lost motion connections.

36. In an integrated automatic bag packaging machine for loading a bag for each terminable cycle, a cyclically operable bag pick-up mechanism, a cyclically operable bag feed mechanism comprising pairs of rollers and a chute therebetween, a cyclically operable and pivotal bag mounting mechanism operatively in alignment with said chute, a cyclically operable horizontally movable loading mechanism introduceable into the bag, a cyclically operable transferral mechanism, a power source and operative connections therefrom to said mechanisms.

37. In an integrated automatic bag packaging machine as set forth in claim 36 and having pneumatic mechanisms and wherein said operative connections include pneumatic and cam and lost motion connections.

38. In an integrated automatic bag packaging machine as set forth in claim 36 having means to cyclically register said bag feed mechanism with said bag mounting mechanism.

39. In an integrated automatic bag packaging machine as set forth in claim 36 having means to cyclically register said bag mounting mechanism and said loading mechanism.

40. In an integrated bag packaging machine for loading a bag for each terminable cycle, the combination of a cyclically operable and pivotal bag mounting mechanism operatively in horizontal position for loading, a cyclically operable carraige loading mechanism horizontally movable and introduceable into the bag, a power source and operative connections therefrom to said mechanisms.

41. In an integrated bag packaging machine for loading a bag for each terminable cycle as set forth in claim 40 and having means to cyclically register said loading mechanism with said bag mounting mechanism.

42. In an integrated bag packaging machine for loading a bag for each terminable cycle as set forth in claim 40 wherein the operative connections include cam and lost motion connections.

43. In an integrated bag packaging machine for loading a bag for each terminable cycle, the combination of a cyclically operable and pivotal bag mounting mechanism operatively in horizontal position for loading and including cyclically and pneumatically operative bag mouth-opening means, a cyclically operable carriage loading mechanism horizontally movable and introduceable into the bag, pneumatic mechanisms, a power source and operative connections therefrom including pneumatic connections and cam and lost motion connections to said mechanisms.

44. In an integrated bag packaging machine for loading a bag as set forth in claim 43 wherein said loading mechanism includes a biased member for forced cyclical movement thereof.

45. In an integrated bag packaging machine for loading a bag as set forth in claim 43 and having mechanisms for cyclically registering the bag mounting mechanism and the loading mechanism.

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