

Sept. 10, 1935.

E. CONTI

2,014,227

PACKAGING MACHINE

Filed Oct. 2, 1929

20 Sheets-Sheet 1

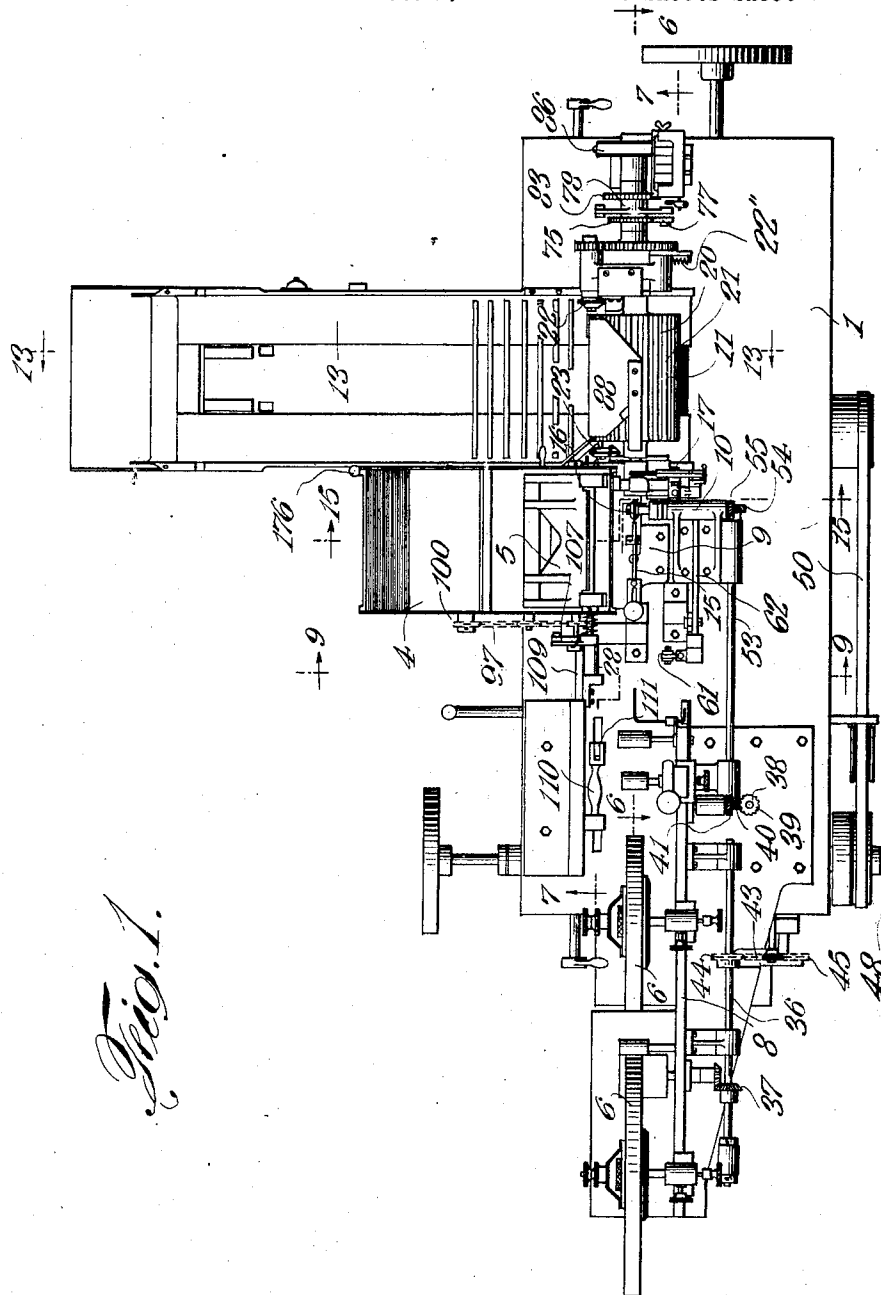


Fig. 1.

INVENTOR

EUGENE CONTI.

BY

Emery, Booth, Varney & Whittermore
ATTORNEYS

Sept. 10, 1935.

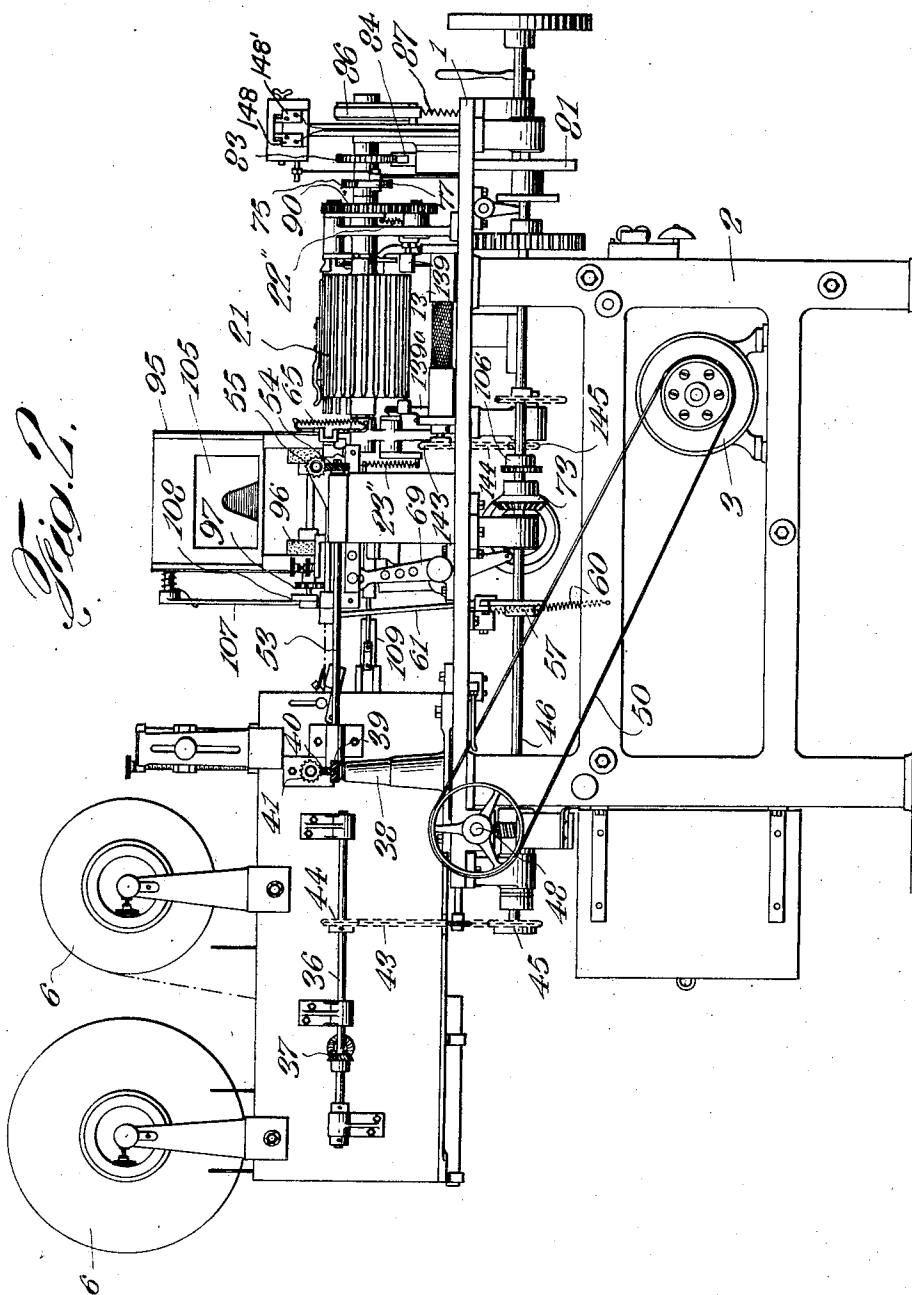
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INVENTOR

EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore

ATTORNEYS

Sept. 10, 1935.

E. CONTI

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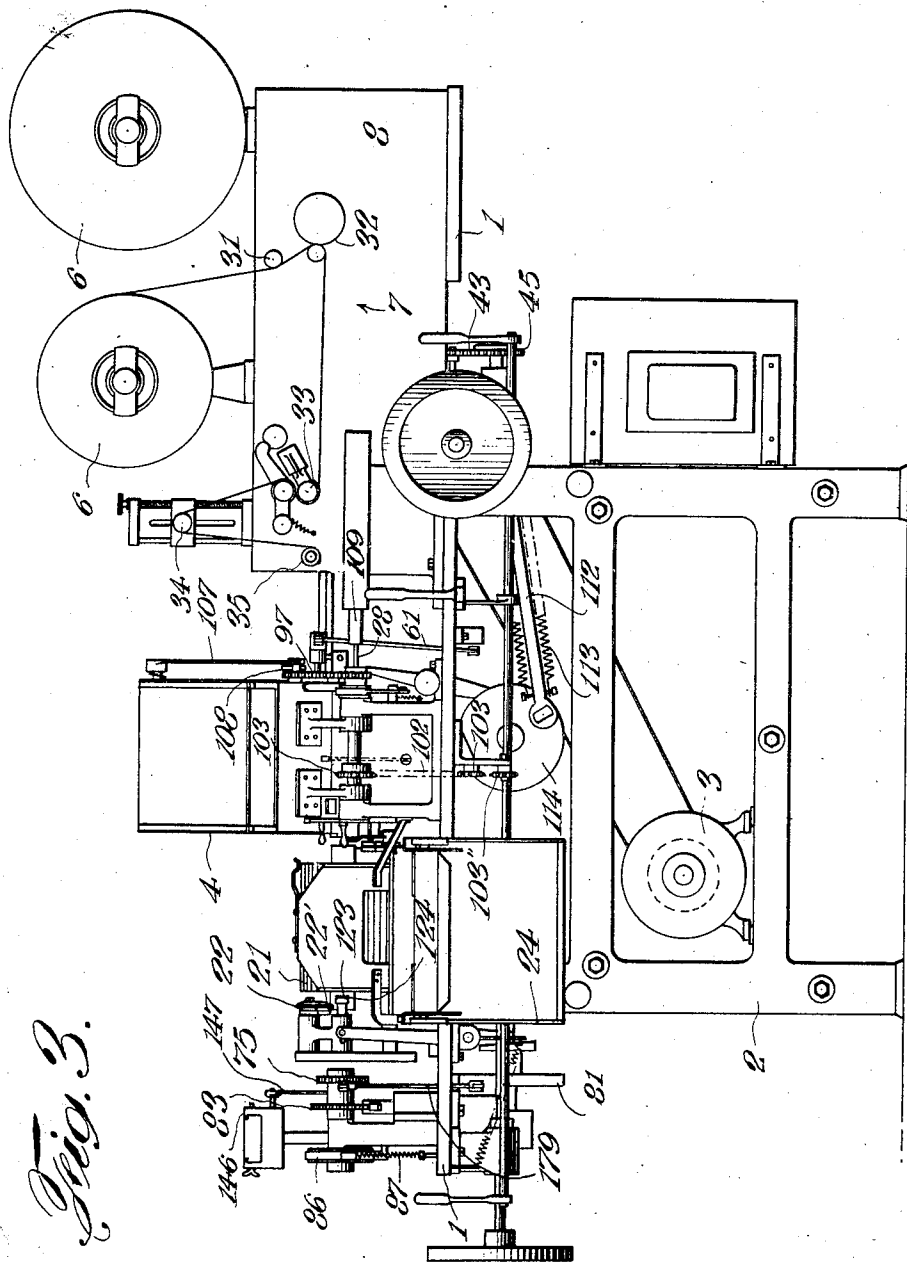


Fig. 3.

INVENTOR
EUGENE CONTI
BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

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E. CONTI

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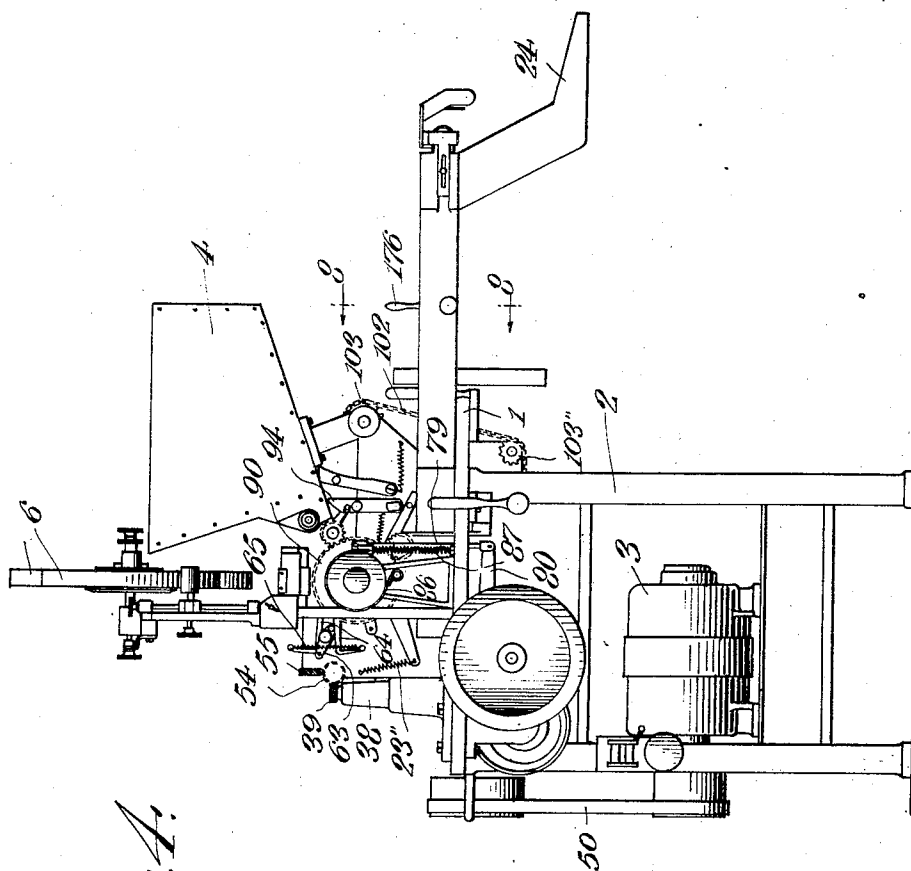


Fig. 4.

INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

E. CONTI

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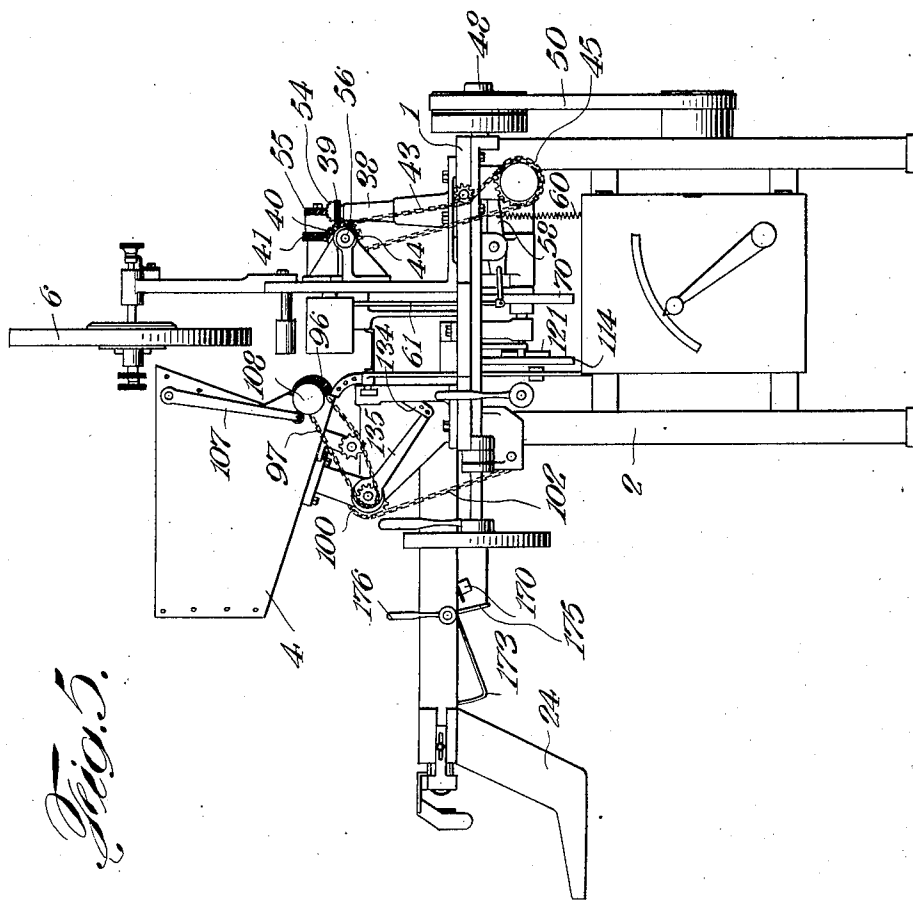


Fig. 5.

INVENTOR

EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore

ATTORNEYS

Sept. 10, 1935.

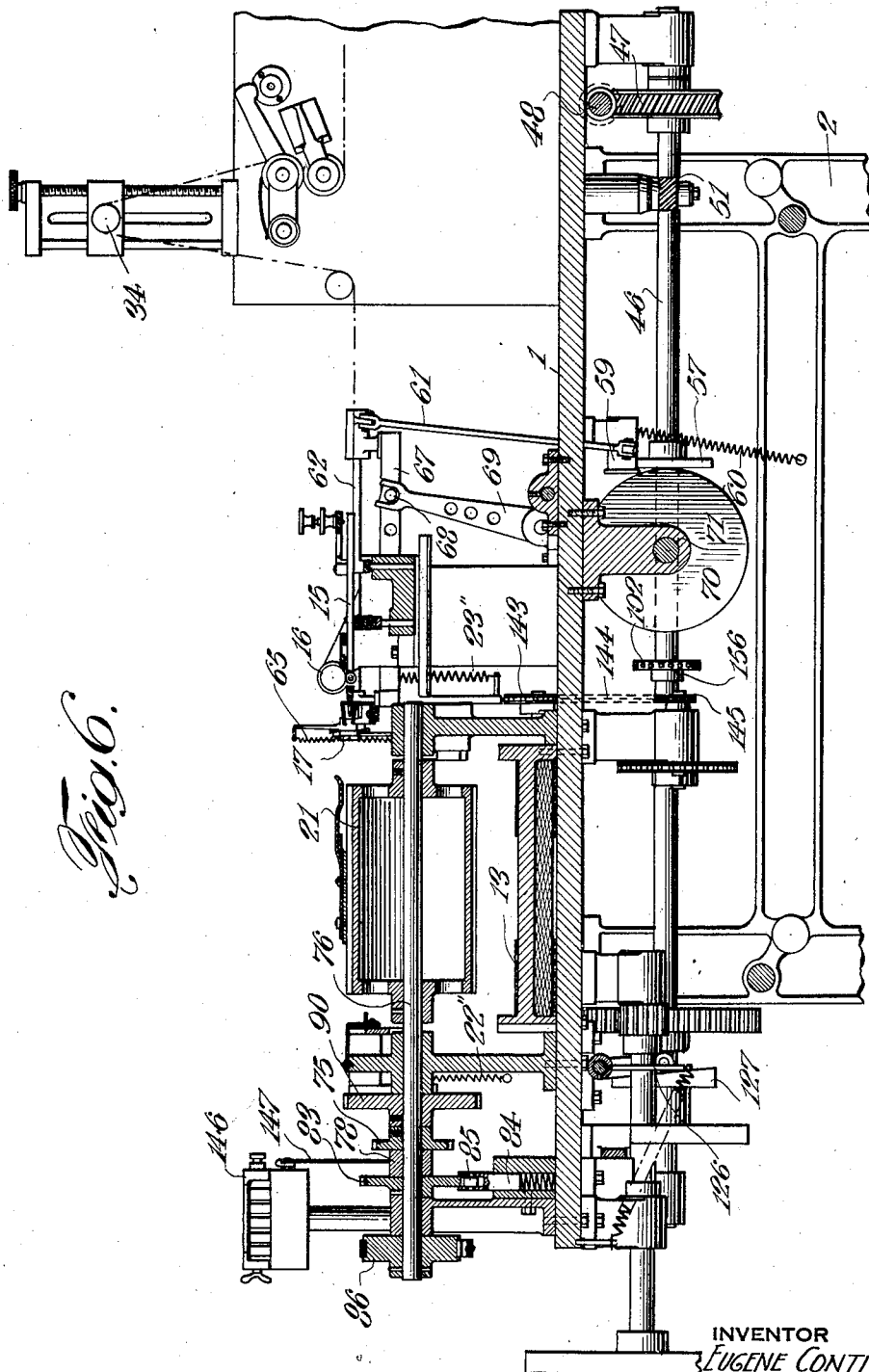
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INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittermore
ATTORNEYS

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E. CONTI

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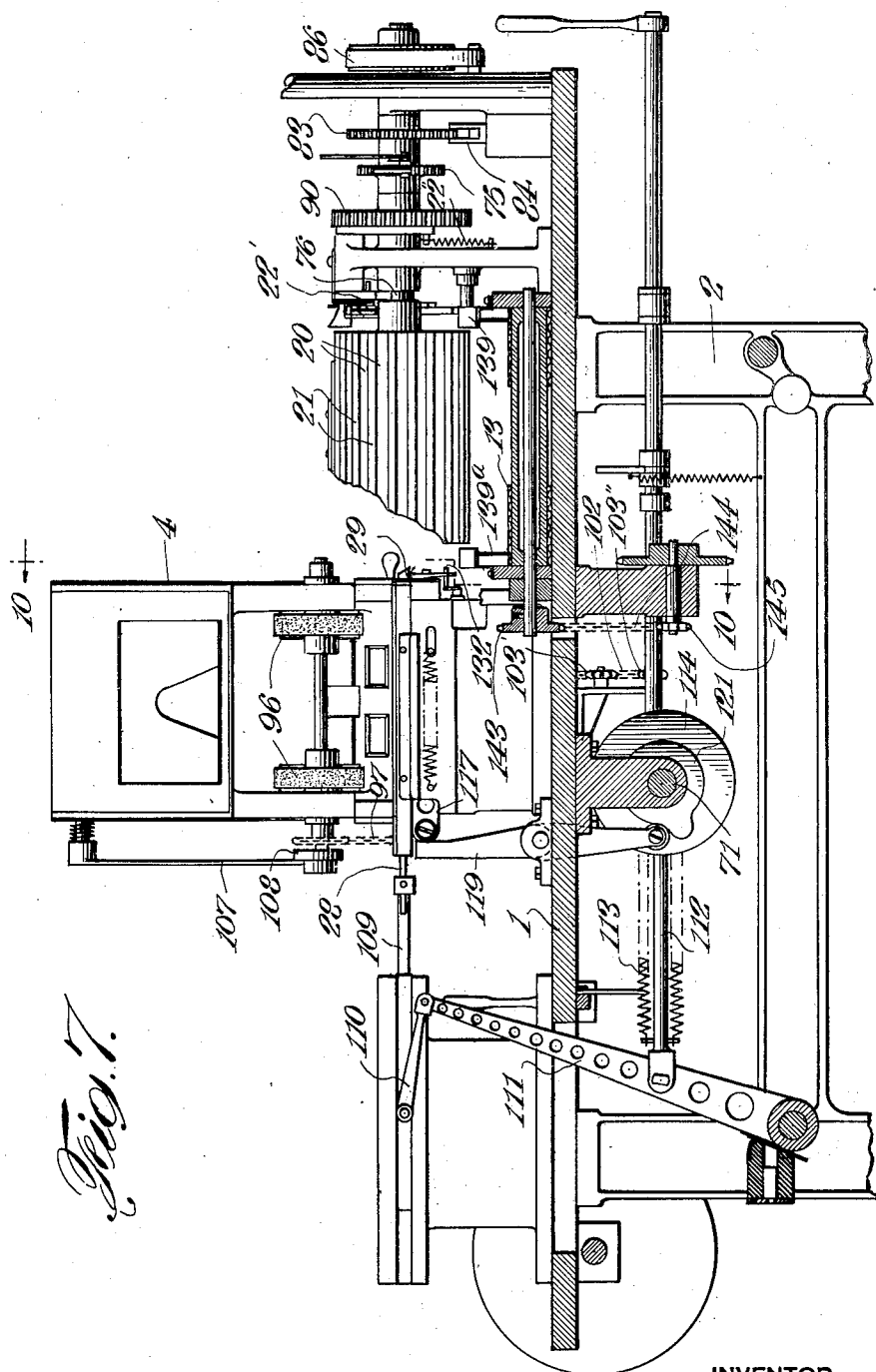


Fig. 7.

INVENTOR

EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore

ATTORNEYS

Sept. 10, 1935.

E. CONTI

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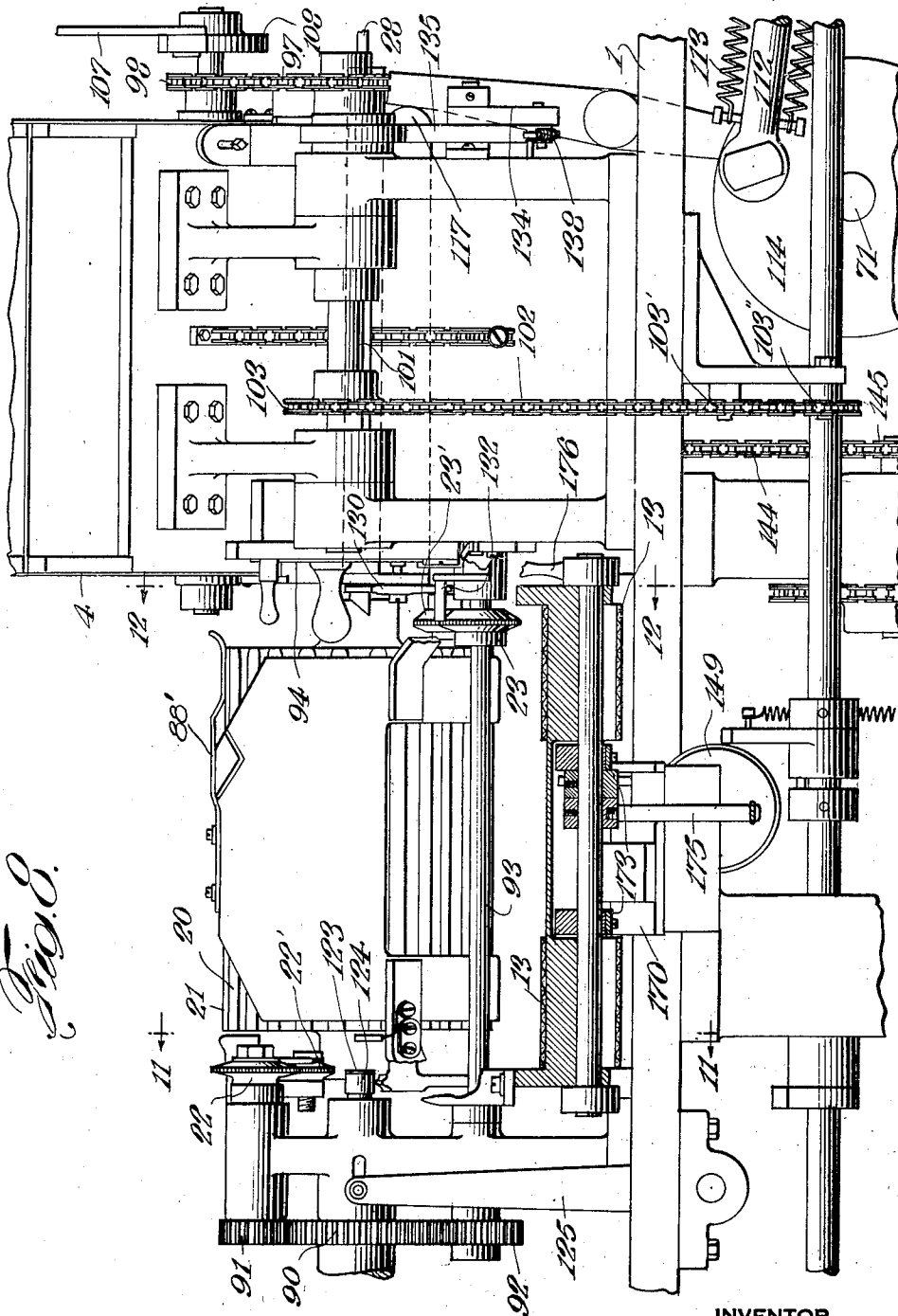


Fig. 8.

INVENTOR

EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

E. CONTI

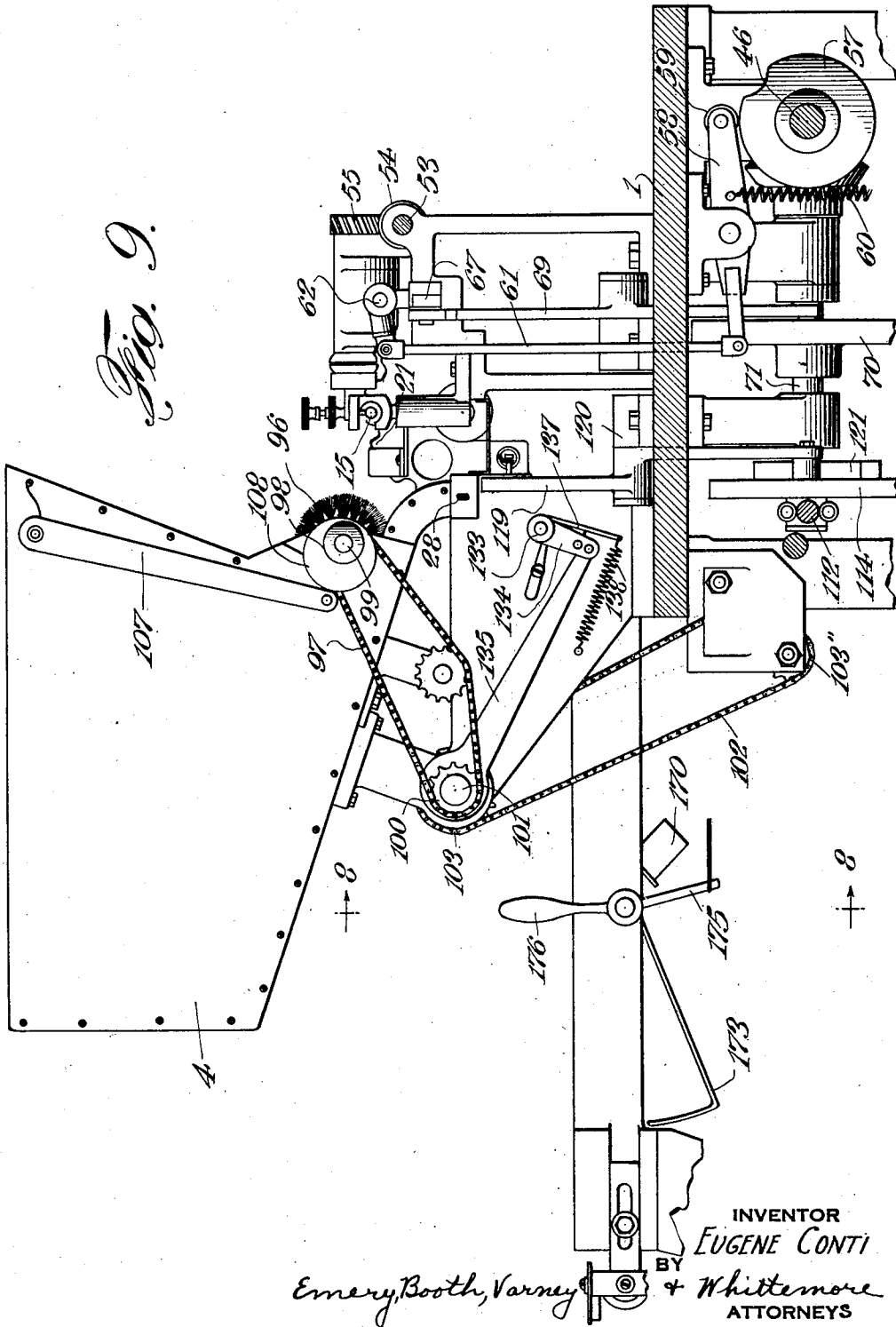
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Fig. 9.



INVENTOR
EUGENE CONTI
BY Emery, Booth, Varney + Whittlemore
ATTORNEYS

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E. CONTI

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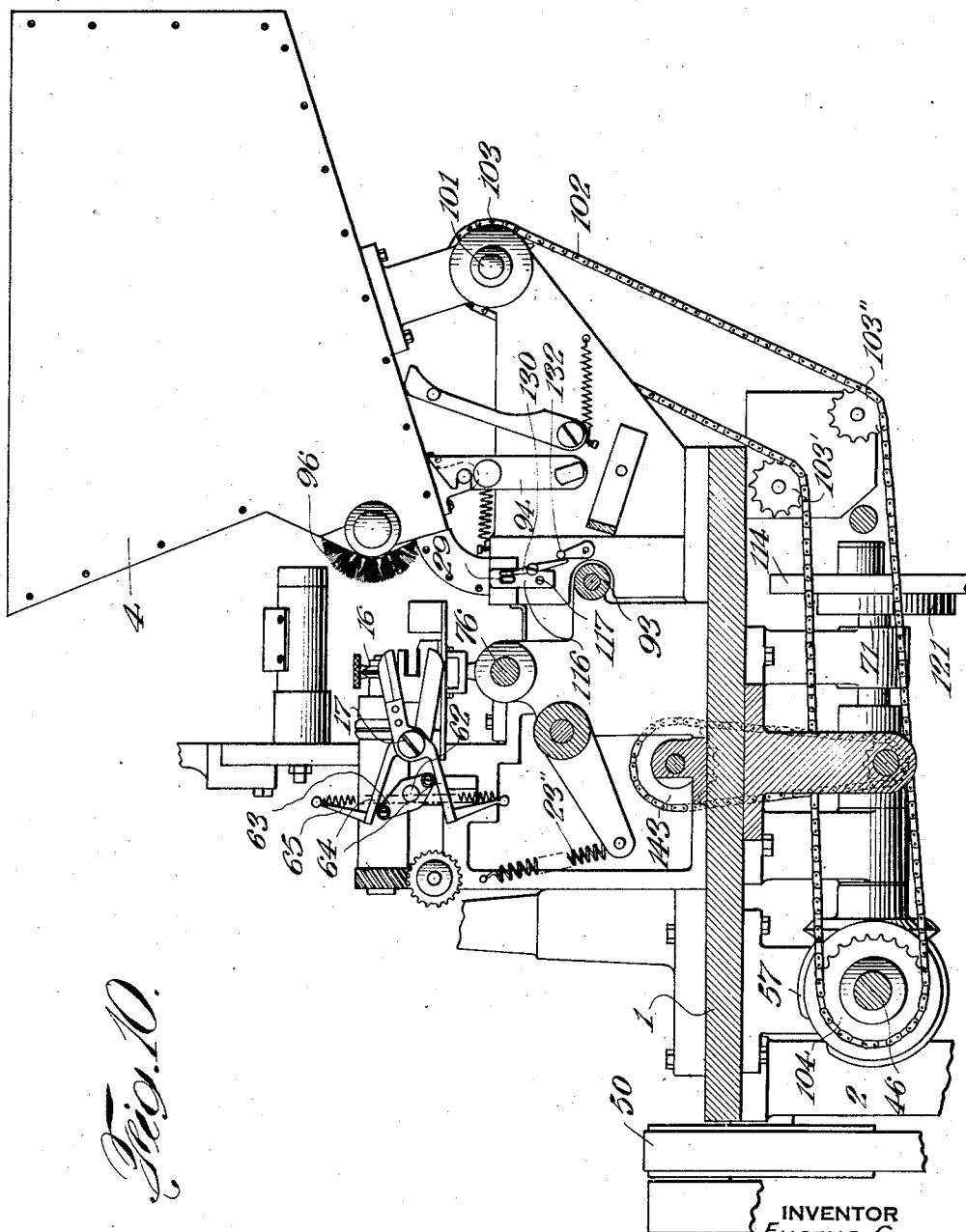


Fig. 10.

INVENTOR
EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

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E. CONTI

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Fig. 12.

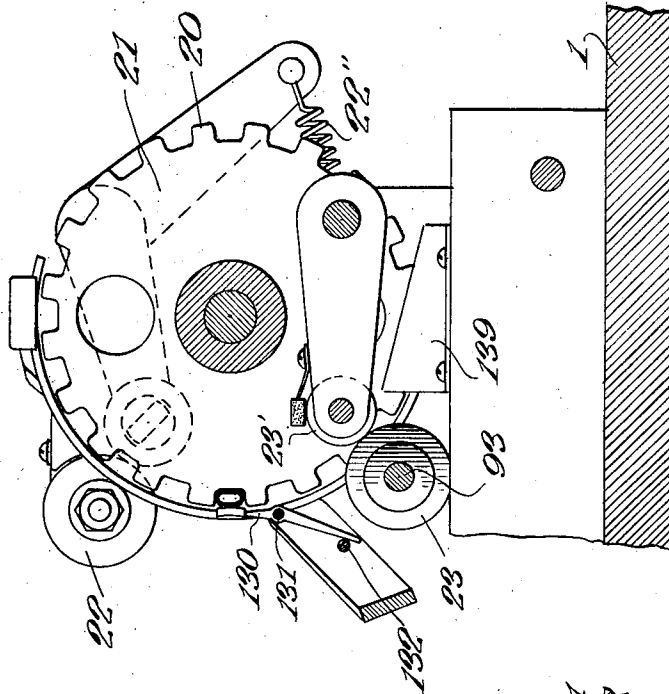
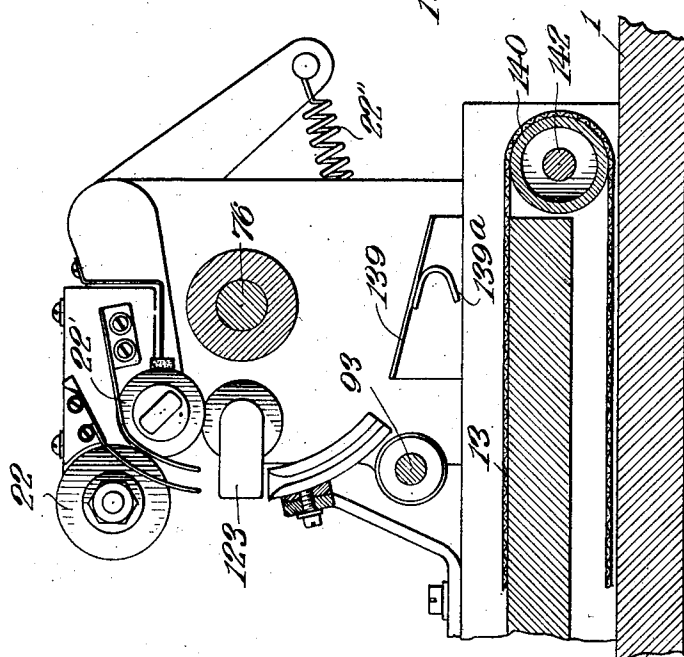


Fig. 11.



INVENTOR

EUGENE CONTI

BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

E. CONTI

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Fig. 14.

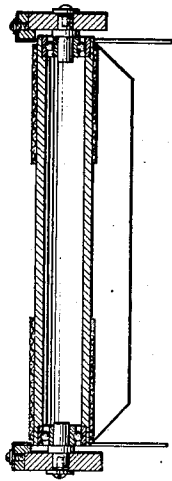
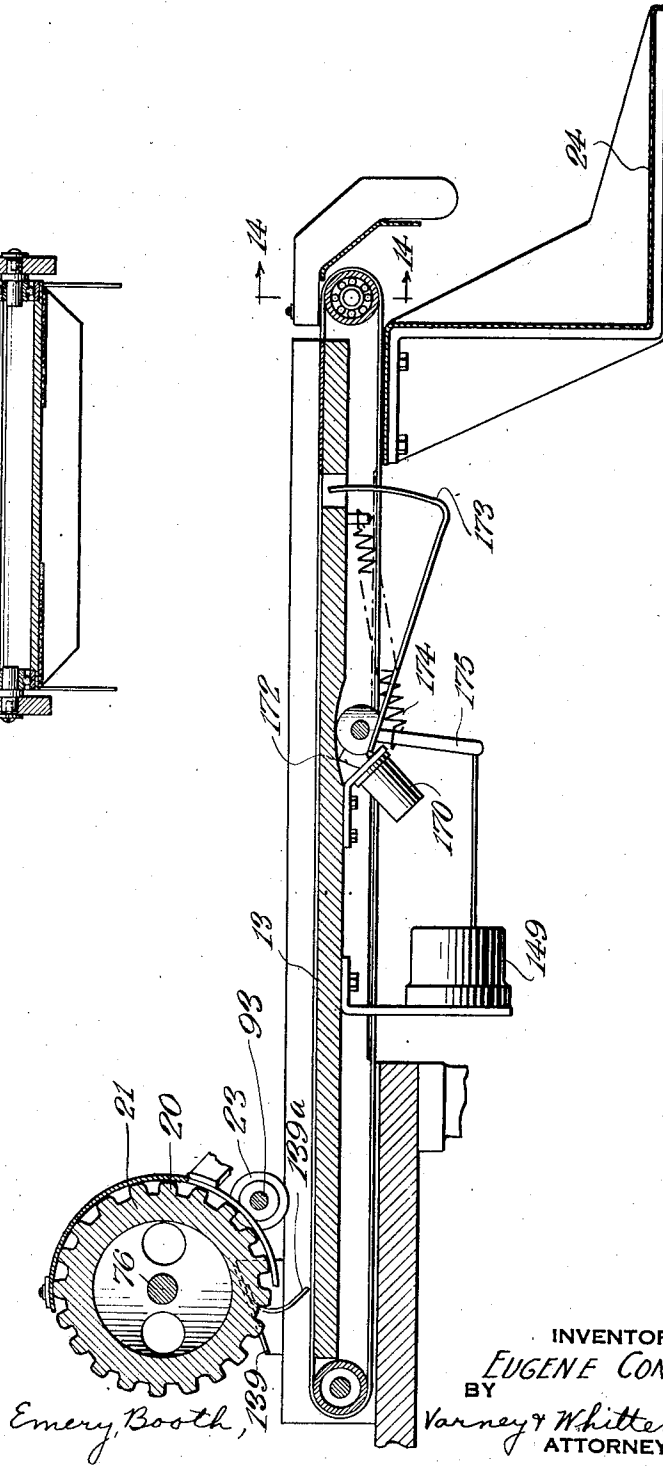


Fig. 13.



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INVENTOR
EUGENE CONTI
BY
Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

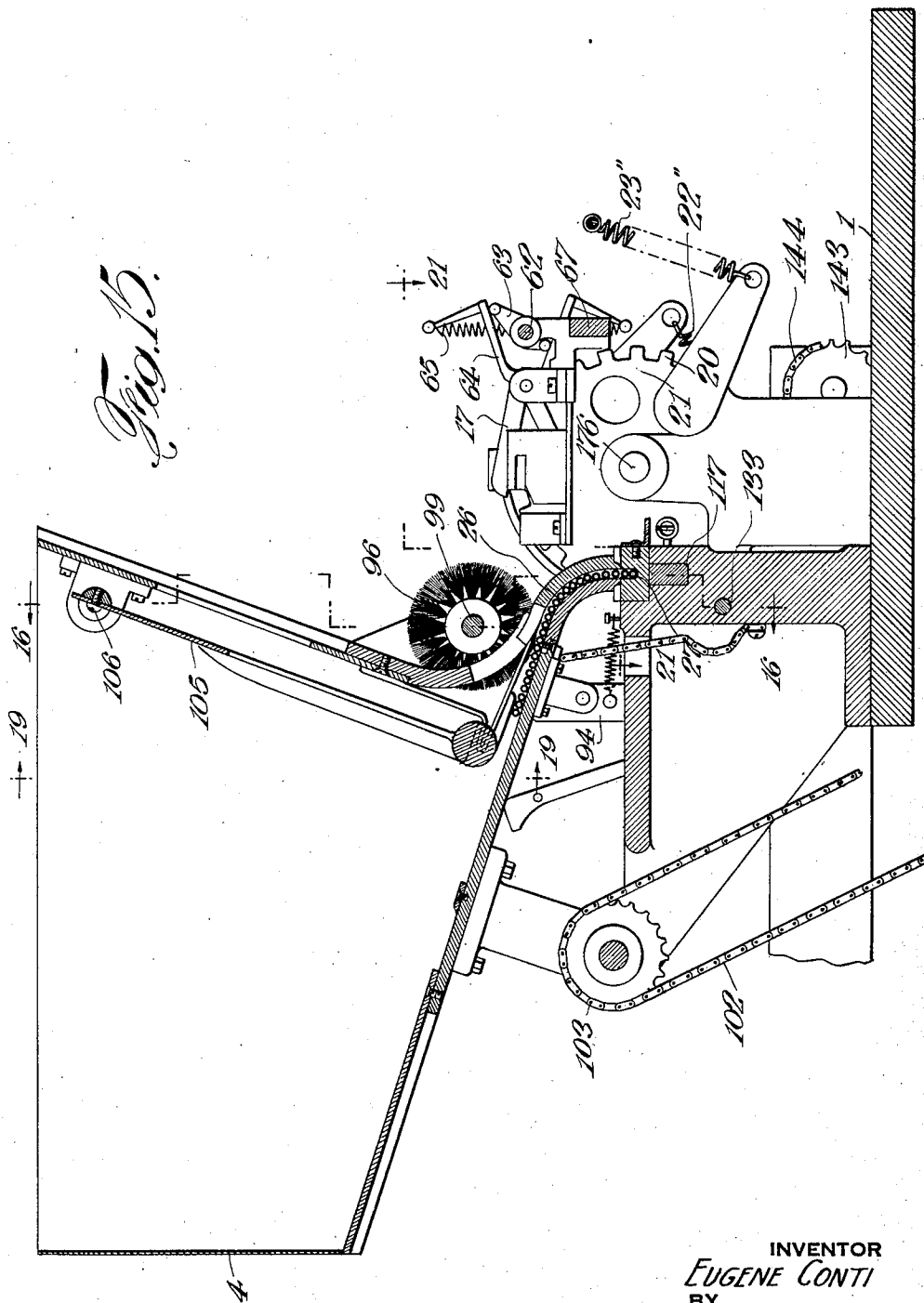
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INVENTOR
EUGENE CONTI
BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

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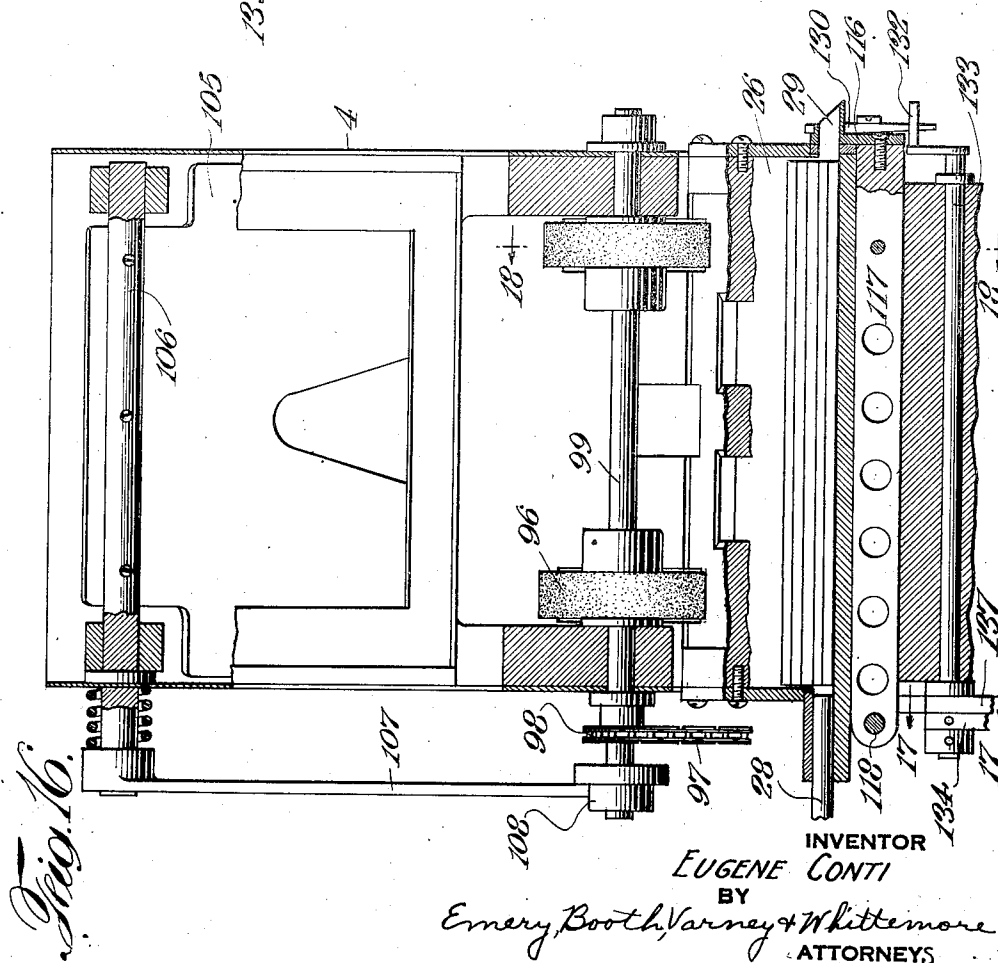
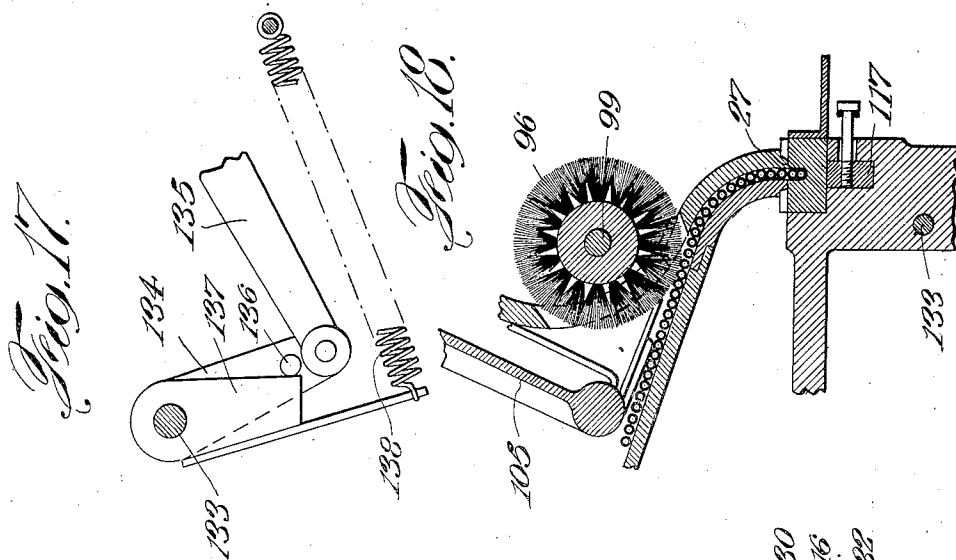
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INVENTOR
EUGENE CONTI

BY

Emery Booth, Varney & Whittemore
ATTORNEYS

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Fig. 20.

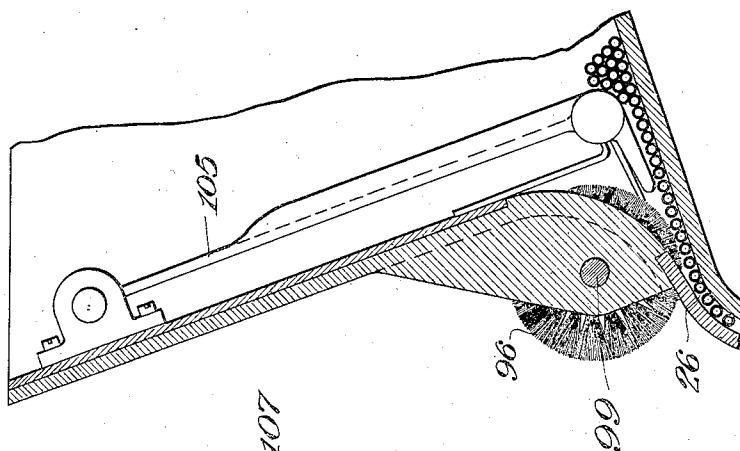
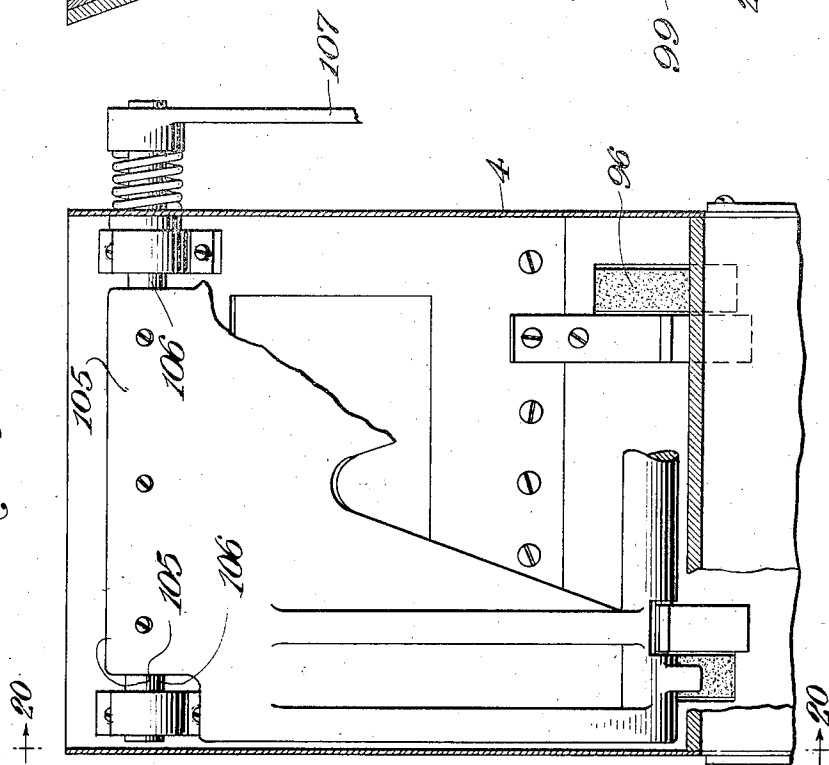


Fig. 19.



INVENTOR
EUGENE CONTI
BY

Emery, Booth, Varney & Whittemore
ATTORNEYS

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E. CONTI

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Fig. 22.

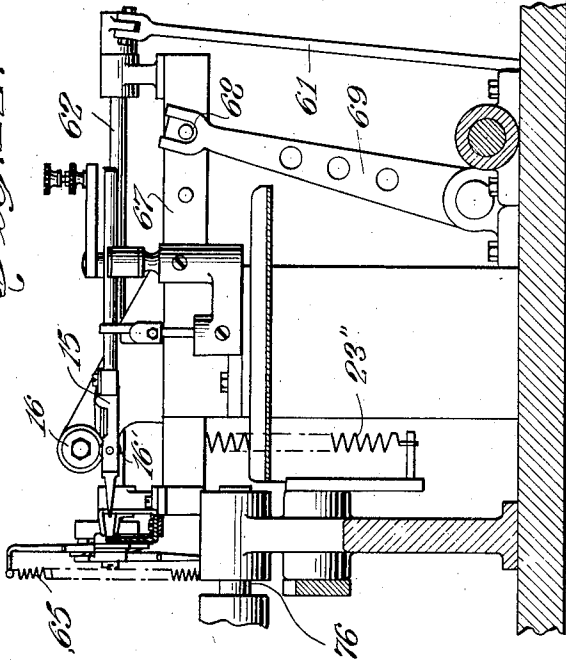


Fig. 23.

Fig. 25.

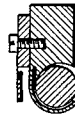


Fig. 26.

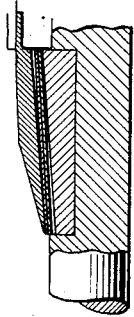


Fig. 21.

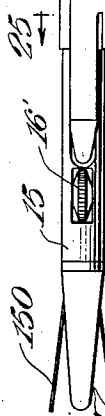
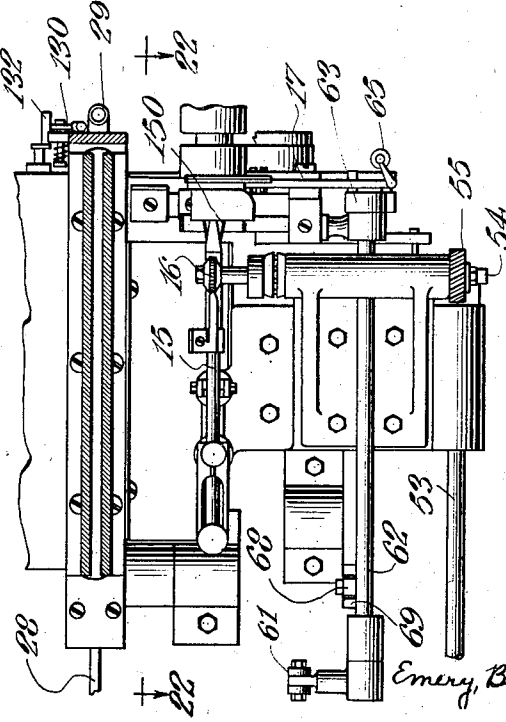
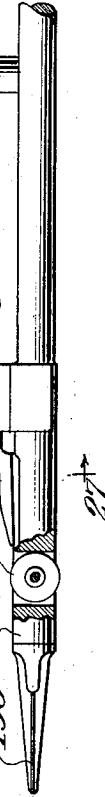


Fig. 24.



INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

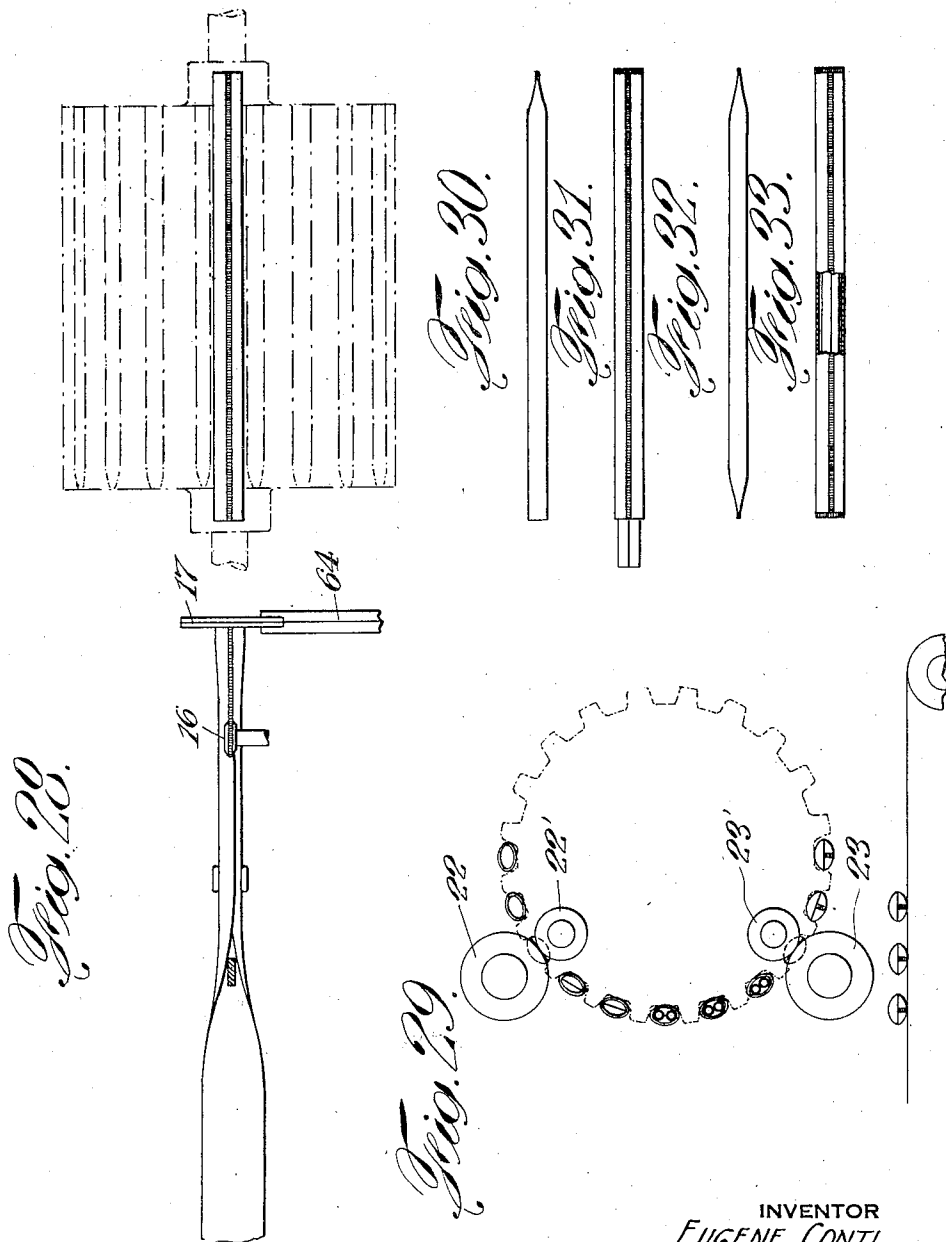
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INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

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Fig. 35.

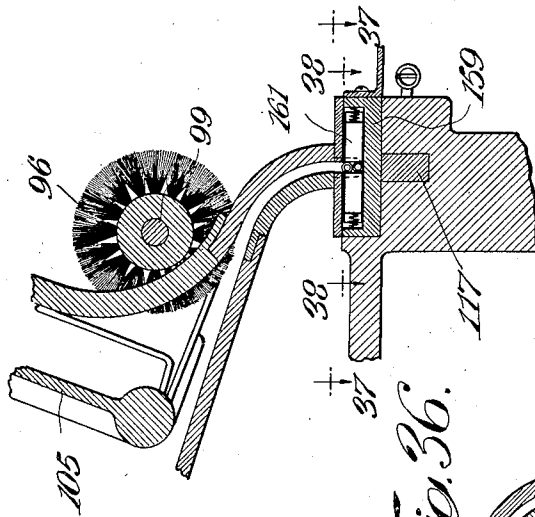


Fig. 36.

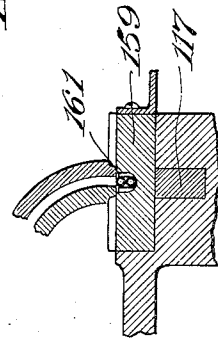
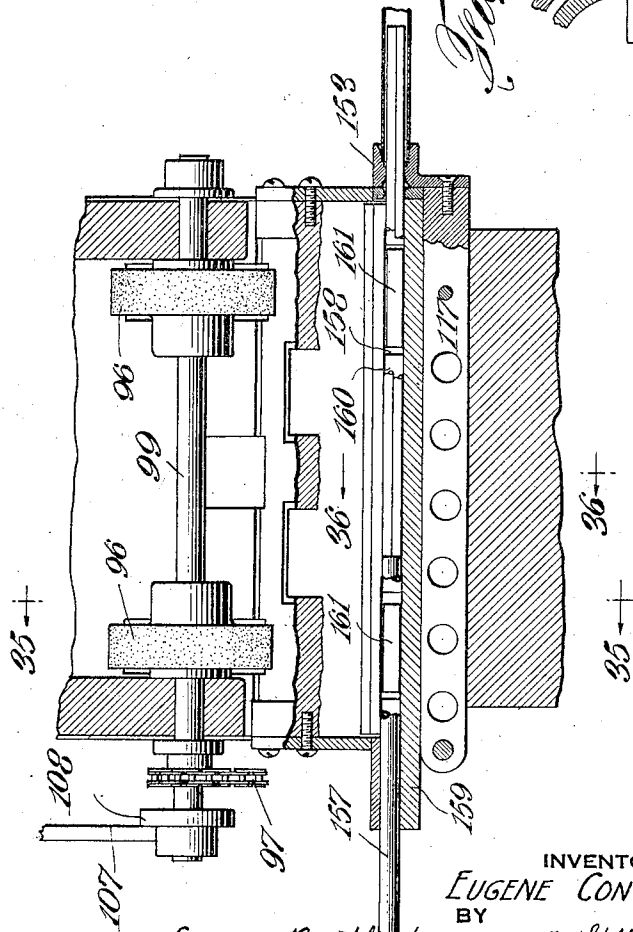


Fig. 34.



INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittemore
ATTORNEYS

Sept. 10, 1935.

E. CONTI

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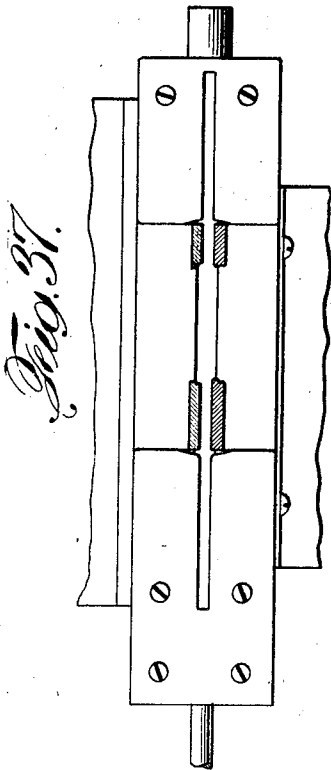
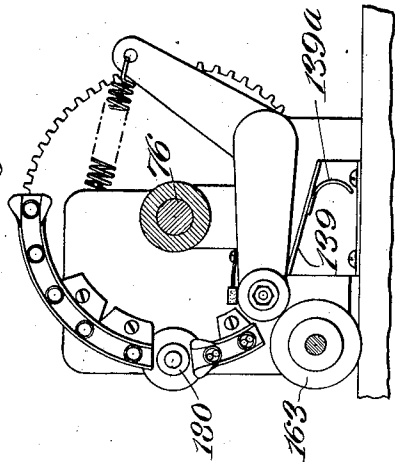
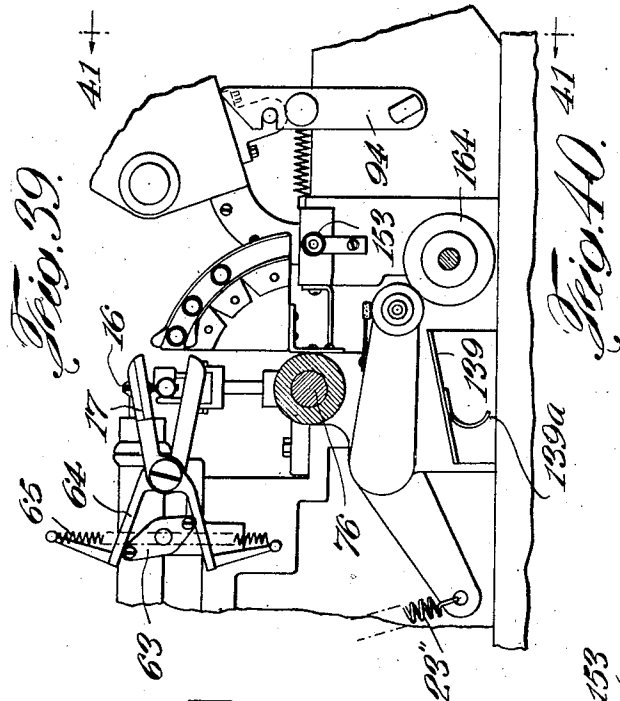
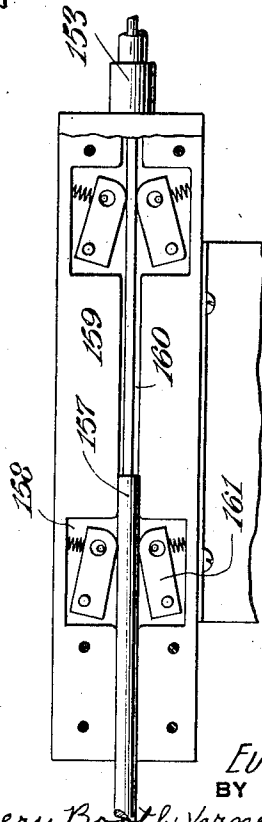


Fig. 30.



INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittermore
ATTORNEYS

Sept. 10, 1935.

E. CONTI

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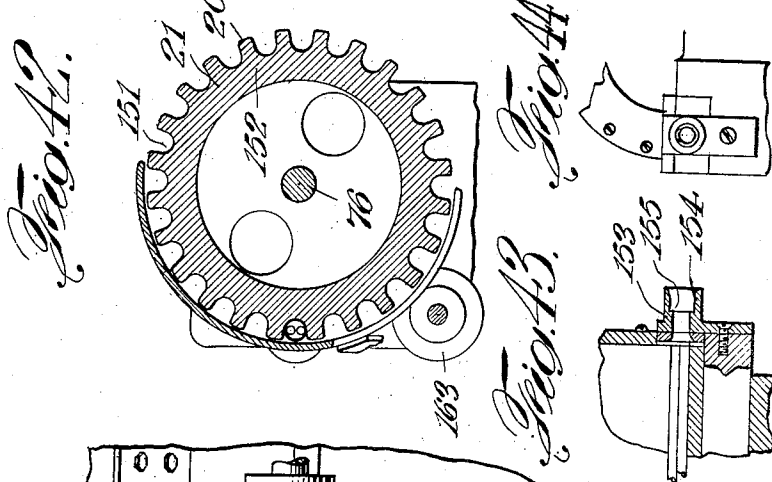
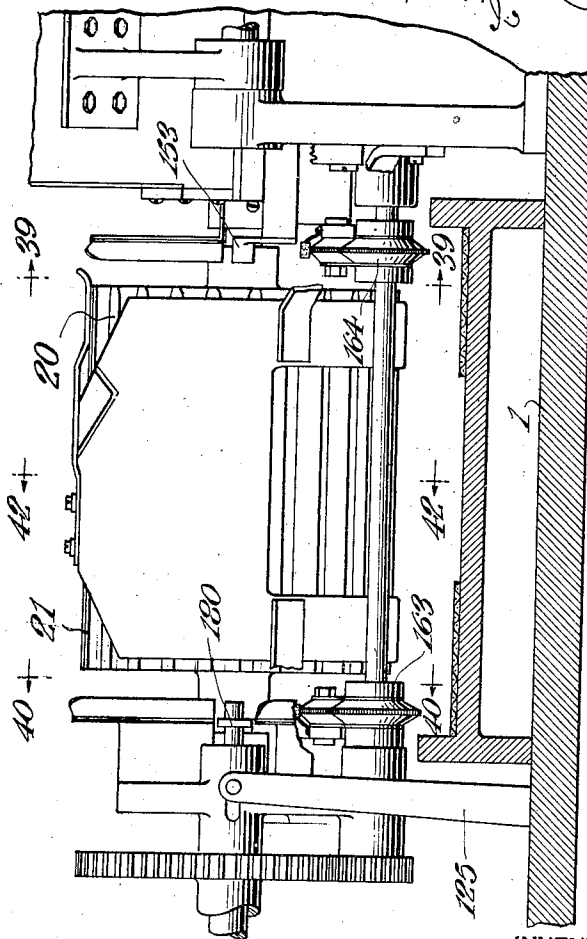


Fig. 41.



INVENTOR
EUGENE CONTI
BY
Emery, Booth, Varney & Whittemore
ATTORNEYS

UNITED STATES PATENT OFFICE

2,014,227

PACKAGING MACHINE

Eugene Conti, Mount Vernon, N. Y., assignor to
Alexander Herz, New Rochelle, N. Y.

Application October 2, 1929, Serial No. 396,711

16 Claims. (Cl. 93—5)

This invention relates to packaging machines and to various component parts of such machines.

It is an object of the invention to provide an automatic machine for forming containers and for inserting articles into said containers, and it is a further object to provide a machine which shall operate rapidly and efficiently, and in many respects be an improvement in the art to which it pertains.

More particularly, the invention relates to the packaging of "drinking straws" or similar articles in closed paper tubes, and it is an object of the invention to provide means for rapidly packaging such articles without damage to either article or container.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawings, in which,

Figure 1 is a top plan view.

Figure 2 is a front elevation.

Figure 3 is a rear elevation.

Figures 4 and 5 are opposite end elevations.

Figure 6 is a section on the line 6—6 of Figure 1.

Figure 7 is a section on the line 7—7 of Figure 1.

Figure 8 is a section on the line 8—8 of Figure 4.

Figure 9 is a section on the line 9—9 of Figure 1.

Figure 10 is a section on the line 10—10 of Figure 7.

Figure 11 is a section on the line 11—11 of Figure 8.

Figure 12 is a section on the line 12—12 of Figure 8.

Figure 13 is a section on the line 13—13 of Figure 1.

Figure 14 is a section on the line 14—14 of Figure 13.

Figure 15 is a section on the line 15—15 of Figure 1.

Figure 16 is a section on the line 16—16 of Figure 15.

Figure 17 is a section on the line 17—17 of Figure 16.

Figure 18 is a section on the line 18—18 of Figure 16.

Figure 19 is a section on the line 19—19 of Figure 15.

Figure 20 is a section on the line 20—20 of Figure 19.

Figure 21 is a section on the line 21—21 of Figure 15.

Figure 22 is a section on the line 22—22 of Figure 21.

Figures 23 and 24 are top plan and side elevation views respectively of the tube forming mandrel.

Figure 25 is a section on the line 25—25 of Figure 23.

Figure 26 is a section on the line 26—26 of Figure 27.

Figure 27 is a section on the line 27—27 of Figure 24.

Figure 28 is a semi-diagrammatic view showing the longitudinal tube closing operation.

Figure 29 is a semi-diagrammatic view showing the end tube closing operation.

Figures 30, 31, 32 and 33 are views of the container at various stages, Figure 30 showing the empty tube, Figure 31 showing the insertion of the straws into the empty tube, Figure 32 showing a side elevation of the completed tube, and Figure 33 showing a top plan view of the completed tube.

Figure 34 is a view similar to Figure 16 showing a modified form of the apparatus.

Figure 35 is a section on the line 35—35 of Figure 34.

Figure 36 is a section on the line 36—36 of Figure 34.

Figure 37 is a section on the line 37—37 of Figure 35.

Figure 38 is a section on the line 38—38 of Figure 35.

Figures 39 and 40 are sections on the lines 39—39 and 40—40 of Figure 41.

Figure 41 is a section on the line 41—41 of Figure 39.

Figure 42 is a section on the line 42—42 of Figure 41.

Figure 43 is a section on the line 43—43 of Figure 44, and

Figure 44 is an end elevation of the mouthpiece.

Referring to the drawings, and particularly to Figures 1, 2, 3 and 4, the various parts of the machine are mounted for convenience on a table 1 having legs 2. The actual operating parts of the machine are mounted for the most part above the top of the table 1, while the motive power, in this case, an electric motor 3, and the driving connections to the various operating mechanisms are mounted for the most part below the table top. In the illustrative machine selected for purposes of description which is adapted for the packaging of drinking straws in individual paper tubes, the straws may be contained in a hopper 4 having a feeding mechanism located and generally designated by the numeral 5.

The paper from which the packaging tube is formed is carried on reels 6 and a printing mechanism designated generally by the numeral 7 is arranged adjacent the said reels, both the reels and the printing mechanism being conveniently mounted on a vertical plate 8 which is mounted at one end of the table 1. Other parts of the machine which may be designated generally for convenience in description are the tube forming mechanism 9, tube cutting mechanism 10, tube carrying mechanism 11, the plunger mechanism

illustrated in Figures 7 and 16 for inserting the straws into the tubes, and the conveyor 13 for discharging the finished product.

A brief description of the operation of the machine prior to the detailed description may be helpful in understanding the latter. A strip of paper from one of the reels 6 (the other reel being held in reserve) is fed through the printing mechanism 7 which imprints thereon at tube length intervals any desired printed matter such as the name of the customer. After leaving the printing mechanism the strip is fed lengthwise of the table 1 and is passed around the mandrel 15, forming part of the tube forming mechanism, which rounds up the strip into tube formation with overlapping edges, said edges being secured together by means of crimping rollers 16 and 16'. After the tube is formed it is fed forward still further and the desired tube lengths are severed by means of the reciprocating scissors 17 which are operated by the tube cutting mechanism 18 hereinafter described in detail. The severed tube is received in one of the grooves 20 of the drum 21, which said drum is rotated step by step to carry the tube to straw receiving position. Meanwhile, the straws which are contained within the hopper 4 are fed downwardly through the slot 26 (see Figure 15) into a groove 27 from which they are ejected by a plunger 28 (see Figure 16) through a nozzle 29 which directs them accurately into the end of the tube. Thereafter, the ends of the tube are closed by pairs of crimping rollers 22 and 23 and the finished filled tube is dropped from the cylinder 21 onto the conveyor 13 which deposits them in a box or other container which may be placed on the shelf 24.

Referring now to Figures 1 and 3, the printing mechanism comprises an idler guide roller 31, cooperating printing rollers 32, feed rollers 33, adjustable idler roller 34 and idler roller 35. This printing mechanism, which is of the same general type as disclosed in Herz and Conti Patent No. 1,465,921 need not be described in further detail herein, except to note that both the printing rollers 32 and the feed rollers 33 are positively driven, the printing rollers being driven by the shaft 36 through meshing bevel gears 37, while the feed rollers are driven by the vertical shaft 38 through meshing gears 39, 40 and 41. Shaft 36 is driven by the chain 42 which rides on sprockets 44 and 45 and mounted respectively on the shafts 36 and 46, shaft 46 being driven by meshing spiral gears 47, one of which is mounted on the jack shaft 48 carrying a pulley 49 over which runs a belt 50 which is connected to the electric motor 3. Shaft 38 is driven by meshing spiral gears 51, one of which is mounted on the shaft 46.

Gear 40 is mounted on one end of shaft 53 which carries on its other end the gear 54 meshing with gear 55 which drives the crimping roller 16. Thus by proper selection of gears, the crimping roller 16 may be caused to operate at a peripheral speed substantially equal to the peripheral speed of the printing rollers and feed rollers and the strip is fed forward rapidly and evenly.

As the strip is fed forwardly, it is wrapped around the mandrel 15, the edges of the strip being gradually brought closer and closer together until they overlap, at which time the crimping rollers 16, 16' secure the overlapping edges together, thus forming the tubular container.

In order to sever the tube into suitable lengths the cutting mechanism 18 is provided comprising a scissors 17 and actuating connections, and also means for reciprocating the scissors during the

cutting operation in the direction of movement of the tube in order to prevent buckling. Referring to Figures 2, 6, 9 and 10, the shaft 46 carries a cam 57 which cooperates with rocker arm 58 having a roller 59 held in engagement with the cam face by means of spring 60. Connected to the rocker arm is a link 61 having a universal joint connection with shaft 62 which carries at its other end a rocker 63 having rollers to engage the rearwardly extending arms 64 of the scissors, said arms being normally under tension tending to close the scissors by means of spring 65. As will be observed, the scissors are thus closed once during each revolution of shaft 46.

To permit reciprocation of the scissors, they and their associated parts are mounted on a slide 67, one end of which is provided with a pin 68 for engagement with the forked end of the rocker 63. The other end of the rocker extends downwardly for engagement with the cam 70 which is mounted on jack shaft 71. Shaft 71 is rotated by bevel gears 72 and 73, gear 73 being mounted on shaft 46. Thus, since the gears 72 and 73 rotate in 1 to 1 relationship the scissors are reciprocated once during each revolution of shaft 46 and the forward stroke of the reciprocation is timed to occur during the closing movement of the scissors.

The severed tubes are received in the grooves 20 of the drum 21, the drum being rotated step by step so that an empty groove is presented to receive each severed tube. Means are provided for rotating the drum comprising a ratchet 75 secured to the drum shaft 76 and a pawl 77 carried by the rocker 78. This rocker is connected by link 79 to one end of rocker 80, the other end of which rides on cam 81 carried on shaft 46. Thus for each revolution of shaft 46 the drum 21 is advanced one step, the advancing movement being timed to take place immediately after the severed tube is received.

Means are provided for accurately indexing the drum, such means comprising an index wheel 83 mounted on shaft 76 and a spring pressed plunger 84 having a roller 85 adapted to co-operate with the depressions in the periphery of wheel 83.

Means are also provided to prevent overthrow of the drum due to inertia, such means comprising a friction brake 86 having a spring 87 to tension the same.

In order to hold the tubes in the grooves of the drum after they are deposited therein and until they are filled and sealed, a shield or guard member 88 is provided which extends around the drum in close proximity thereto. A guide member 88' is also provided for the purpose of guiding the tubes into the grooves of the drum, and this member may be conveniently mounted on the member 88, adjacent the receiving end of the drum.

Means is provided for flattening the ends of the tubes as they approach the crimping rolls. As shown in Fig. 11 this means comprises converging plates 89 for flattening the tubes as the drum rotates them thereby.

Means are provided for closing the ends of the tubes comprising two pairs of crimping rollers 22 and 23. In the machine illustrated in Figures 1 to 33 inclusive the rollers 22, 22' close one end of the tube prior to the filling operation while rollers 23, 23' close the other end of the tube after the tube is filled. In order to drive the crimping rollers a gear 90 is mounted on shaft 76 which gear meshes with gear 91

to drive roller 22. Gear 90 also meshes with gear 92 which drives the roller 23 through shaft 93. Rollers 22' and 23' are idler rollers and are rotated by engagement with rollers 22 and 23, respectively, being held in yielding engagement therewith by springs 22'' and 23''.

The straws which are to be inserted in the tubes are contained within a hopper 4 which is pivotally mounted on shaft 101 and is normally held in feeding position by latch 94. The hopper is provided at its lower front corner with a slot 26 through which the straws are fed to the groove 27. In order to assist in feeding the straws through the slot 26, brushes 96 are provided which rotate in counter-clockwise direction (as seen in Figure 15), the said brushes being driven by chain 97 which runs over sprocket 98 on the brush shaft 99, and sprocket 100 on shaft 101. Shaft 101 in turn is driven by chain 102 which runs over sprocket 103, idler sprockets 103' and 103'' and sprocket 104 on shaft 46.

It is also desirable, in order to insure regularity of feed to keep the straws in the hopper in motion. Accordingly, a plate 105 is pivotally mounted inside the hopper on shaft 106, which said shaft is provided with an arm 107 extending into engagement with the cam 108 mounted on shaft 99. As the shaft rotates, the plate 105 is oscillated thus causing the straws to be kept constantly in motion.

After the straws are deposited in groove 27, they are moved longitudinally of the groove for insertion in the tubes by the plunger 28. The said plunger is carried on a slide 109 which is actuated through link 110 and lever 111. Connected to lever 111 is a link 112 which may preferably be of the telescoping variety normally held in contracted position by springs 113. The said link is connected eccentrically to disk 114 mounted on shaft 71, and thus operates the plunger to discharge the straws in the groove once for each revolution of shaft 71. This discharging movement is timed to occur between successive advancing movements of the drum 21 in order that the straws may be inserted in the tubes while they are held stationary.

Prior to insertion of the straws in the tube, the tube is moved longitudinally in the direction of the nozzle in order that the end of the tube may be telescoped with the nozzle during the inserting operation. This movement of the tube is effected by plate 123 which is mounted on slide 124, which said slide is connected to rocker arm 125, the other arm 126 of the rocker extending into engagement with cam 127 mounted on shaft 46.

After insertion of the straws into the tube, the tube is returned longitudinally to its former position in the groove 20. This movement is preferably effected by suitable movement of the nozzle. For this purpose the nozzle is mounted at one end of slide 117 which is connected near its other end by means of pin 118 to rocker 119. This rocker is pivotally mounted on table 1 at 120 and has an arm extending downwardly into engagement with cam 121 mounted on shaft 71. This cam is so shaped and timed as to cause the nozzle to be moved momentarily toward the drum immediately after the tube filling operation is completed, thus pushing the filled tube back to its original position in groove 20.

During the tube filling operation it is also desirable to provide means to hold the tube and nozzle in telescoped relation in order that the tube may not be dislodged by the entering straws. In

the present embodiment, such means comprises the finger 130, pivotally mounted on shaft 131 and adapted to be oscillated by engagement of crank 132 therewith. The said crank is mounted on shaft 133, which shaft is connected through a lost motion connection to arm 134 which is connected to eccentric link 135 mounted on shaft 101. Motion of the link 135 in a direction to withdraw the finger 130 is transmitted positively through pin 136 which engages shoulder 137. When the link 135 moves in the opposite direction the finger is moved yieldingly into contact with the nozzle by spring 138. The motion of finger 130 is so timed that it is caused to engage the nozzle immediately after the tube is engaged therewith but prior to insertion of the straws, and to disengage the nozzle immediately after insertion of the straws.

After the tubes are filled and sealed, they are dropped from the drum 21 onto the endless belt 20 conveyor 13. To assist removal of tubes from the drum (see Fig. 11) a deflector 139 is located at each end of the drum to deflect the ends of the tubes axially outward. The deflector includes a curved plate 139a to stop the travel of the tubes with the drum and cause them to drop upon the conveyor. This conveyor includes rollers 140 and 141 over which the belt runs. Roller 140 is mounted on shaft 142 which carries sprocket 143. Chain 144 runs over this sprocket and sprocket 145 on shaft 46 to drive the conveyor.

Means are also provided for automatically counting the filled tubes, and for insuring that only predetermined quantities thereof shall be fed to the cartons placed to receive them on shelf 24. As shown in Figures 2, 6, and 7 a counting mechanism 146 of standard construction is connected by link 147 to one end of rocker 78 so that each advancing movement of the drum 21 to receive a new tube is registered on the counting mechanism.

Mounted on the back of the counting mechanism are a pair of electrical contact members 148, 148' adapted to make electrical contact with the counting mechanism at predetermined intervals. These contact members are connected by suitable conductors to a two way switch 149 which is in turn connected electrically to the magnet 170. When the magnet is energized by reason of an electrical contact within the counting mechanism, the latch 171 is withdrawn from the path of lug 172 thus permitting the pivotally mounted fingers 173 to swing upwardly, under the influence of spring 174 across the conveyor path to intercept the passage of additional tubes. At the same time arm 175 operates switch 149 to break the circuit and to condition the switch for completion of the circuit when another contact is made.

When the machine operator has removed the filled carton and replaced it with another, handle 176 is operated to return fingers 173 to the position shown in Figure 13, thus permitting the new carton to be filled with the predetermined number of tubes.

Figures 34 to 44 inclusive illustrate a slightly modified form of machine. In the form illustrated in Figures 1 to 33 inclusive the tube as formed is flattened slightly by wires 150 which protrude from the sides of the end of mandrel 15, and as shown in Figure 29 the grooves 20 are shaped to receive the flattened tubes. Furthermore the nozzle is elongated in shape to receive the end of the flattened tube. For certain purposes, however, it may be desirable to use a round

tube. In such cases, the wires 150 are omitted from the mandrel 15 and the round tubes are received in half-round grooves 151 of drum 152. Instead of an elongated nozzle, a round mouth-
 5 piece 153 may be used having a flaring lip 154 to guide the entering tube into engagement with shoulder 155.

One advantage of the round form of tube is that the grooves 151 may be shaped to fit the
 10 tubes fairly snugly. It is thus possible in this form of machine to dispense with the finger 130 which is used in the other form to hold the tube in engagement with the nozzle. In the modified
 15 form the frictional engagement of the tube with the walls of the groove is ordinarily sufficient to prevent disengagement of the tube and nozzle during the filling operation.

However, in the modified form additional means are provided to prevent such disengagement. Instead of moving the tube toward the
 20 mouthpiece 153, the tube remains fixed in its groove and the mouthpiece is moved toward and into telescoped engagement with the tube. In order to accomplish this, it is only necessary to
 25 change the position of cam 121 on shaft 71 to cause the mouthpiece to move just prior to insertion of the straws in the tube instead of just after as in the other form.

At the same time that the mouthpiece is being
 30 moved toward one end of the tube, backing member 180 is moved into engagement with the other end of the tube to support the same and to prevent longitudinal displacement of the tube in the groove. The member 180 may be connected to
 35 rocker arm 125, and, to secure proper motion of member 180 it is only necessary to change the position of cam 127 to cause engagement with the tube simultaneously with the tube filling operation.

In the modified form it is desirable also to use
 40 a round plunger 157 for inserting the straws in the tube. As this necessitates the use of a groove wider than the diameter of the straws, means must also be provided for supporting the straws,
 45 one above another in the groove. For this purpose recesses 158 are provided in the groove plate 159 adjacent the groove 160, and pivotally mounted in said recesses are spring pressed members 161, normally separated by a distance only sufficient
 50 to receive the straws from the hopper. As the plunger advances, however, to eject the straws, as shown in Figures 34 and 38, the members 161 separate to permit passage of the plunger. Immediately upon withdrawal of the plunger
 55 the members 161 return to normal position to receive the next pair of straws.

It is also desirable in some cases to close the ends of the tubes simultaneously instead of successively. Accordingly, in the modification illustrated in Figures 34 to 44 inclusive, means are
 60 provided for closing the ends of the tubes simultaneously after filling, such means comprising the pairs of crimping rollers 163 and 164. This construction has the advantage that it enables both
 65 sets of crimping rollers to be driven in unison through a common shaft 165 which is driven by gear 90 as in the other form.

Various safety devices adapted to stop the machine in the event of jamming or breaking of the
 70 paper strip are incorporated in the machine and are disclosed in the drawings, but inasmuch as these have been described in the Herz and Conti patent before referred to, they will not be described in detail herein.

75 What is claimed is:

1. In a machine for packaging articles in open-ended containers in combination, a movable conveyor for successively receiving containers and comprising a shaft, means for rotating said shaft,
 5 and an elongated drum mounted on said shaft to be rotated thereby, said drum being provided with a plurality of grooves on its periphery extending the full length of the drum to successively receive said open-ended containers and to support the same with their ends extending a
 10 substantial distance beyond the drum ends; and means for inserting articles to be packaged through the open end of each container, means associated with said conveyor for closing the
 15 ends of said container, said means including a crimping roll at each end of the drum, a second crimping roll spring-pressed against said first roll and adapted to be driven thereby; means for rotating said first mentioned roll, the ends of
 20 each container being passed by the movement of the conveyor between said crimping rolls to thereby close the ends, and means for flattening the ends of said container as it approaches the crimping rolls.

2. In a machine for packaging articles in open-
 25 ended containers, a movable conveyor for successively receiving containers and comprising a shaft, means for intermittently rotating said shaft, and carrying means mounted on said shaft to be rotated thereby and provided with a plu-
 30 rality of elongated grooves extending from end to end of the carrying means for successively receiving said open-ended containers; means for inserting articles to be packaged through the open end of each container as the same is sup-
 35 ported by the conveyor, comprising a nozzle; means for telescoping the end of said nozzle with the end of each container to guide articles into the end of the container; receiving means for receiving a predetermined number of said articles
 40 to be packaged; means for removing said articles from the receiving means and for inserting them into the container through said nozzle; means for removing the nozzle when said articles have been inserted into said container, said nozzle
 45 moving means carrying the nozzle into position with the container and removing it therefrom without necessitating movement of the container, and means for closing the ends of said container with the article enclosed therein.

3. In a machine for packaging articles in open-ended containers, a movable conveyor for successively receiving containers and comprising a shaft, means for intermittently rotating said shaft, and a drum mounted on said shaft to be
 50 intermittently rotated thereby, said drum being provided with a plurality of grooves in its periphery extending from end to end thereof to receive said open-ended containers, said shaft and the drum carried thereby being momentarily
 55 stationary while receiving each container and supporting the same with their ends extending a substantial distance beyond the ends of the drum, a guard member closely overlying the surface of said drum for a part of the periphery of the same to keep said containers in position with-
 60 in said grooves until discharged therefrom, a guide member adjacent the receiving end of the drum for guiding tubes axially into said grooves; means for inserting articles to be packaged
 65 through the open end of each container as the same is supported upon the conveyor, comprising a nozzle; means for telescoping the end of said nozzle with the open end of said container; means for receiving a predetermined number of said
 75

articles; means for removing said articles from the receiving means and for inserting them into the container through said nozzle; means for simultaneously closing the ends of said container after said articles have been inserted therein; and means for removing the nozzle when said articles have been inserted into said container.

4. In a machine for packaging articles in open-ended containers, a movable conveyor for successively receiving containers and comprising a shaft, means for intermittently rotating said shaft, a detent and brake means for holding said shaft in rotated positions, and a drum mounted on said shaft to be intermittently rotated thereby, said drum being provided with a plurality of grooves in its periphery extending from end to end thereof to successively receive containers, said shaft and the drum carried thereby being momentarily stationary while receiving each container and supporting the same with their ends extending a substantial distance beyond the ends of said drum; means for inserting articles to be packaged through the open end of each container as the same is supported upon the conveyor, comprising a nozzle; means for periodically telescoping said nozzle with the open end of each container; receiving means for periodically receiving a predetermined number of articles to be packaged; means for holding the container in position on the drum while moving the nozzle member into telescoping relation therewith so as to receive articles from the receiving means; means of removing said articles from the receiving means for inserting them into the container through said nozzle; and means for removing the nozzle when said articles have been inserted into said container without moving the container on the drum.

5. In a machine for packaging articles in a flexible tube in combination; means for feeding articles into said tube including a bell-shaped tubular nozzle or mouthpiece having an annular ledge for positioning the end of said tube; means for bringing the tube into alignment with said mouthpiece; and means for forcing the mouthpiece into telescopic relation with said tube.

6. Apparatus of the character described comprising in combination, a groove open at its ends, means to introduce straws laterally into said groove, a plunger movable through said groove to feed a predetermined number of said straws and for excluding other straws until the return of the plunger, and resilient means operating constantly to urge straws into said groove.

7. Apparatus of the character described comprising in combination, a feeding groove adapted to receive straws of smaller width than said groove, and means associated with said groove for positioning straws toward the center of said groove.

8. Apparatus of the character described comprising in combination, a feeding groove adapted to receive straws of smaller width than said groove, means associated with said groove for positioning straws toward the center of said groove, and a plunger approximately the size of said groove movable therethrough to eject said straws, said straw-positioning means being retractile from said groove to permit said plunger to pass.

9. Apparatus of the character described comprising in combination, a straw feed groove larger than the straws to be fed, spring-pressed guides limiting the space for straws within said groove,

means to limit the inward position of said guides and means urging said guides inward but permitting their retraction for passage of a plunger through said groove.

10. Apparatus of the character described comprising in combination a rotary carrier for tubes, means for inserting straws into the tubes, means for crimping the ends of the tubes, and means to flatten the ends of the tubes as they approach the crimping means.

11. Apparatus of the character described comprising in combination, a rotary carrier for tubes, means for inserting straws into the tubes, crimping rollers positioned along the path of the tubes and the carrier, and converging guides directing the ends of the tubes to the rollers and flattening them prior to their introduction to the rollers.

12. Apparatus of the character described comprising in combination, a tube carrier, means to feed straws into tubes on said carrier at a given station, a nozzle to guide straws into the tubes, means to move said nozzle into telescopic relation with tubes in normal position on said carrier, and means to back the other end of the tubes to prevent movement when engaged by said nozzle.

13. Apparatus of the character described comprising in combination, a tube carrier, means to feed straws into tubes on said carrier at a given station, a nozzle to guide straws into the tubes, means to move said nozzle into telescopic relation with tubes in normal position on said carrier, and means to back the other end of the tubes to prevent movement when engaged by said nozzle, said backing means being movable against the end of the tube simultaneously with the nozzle.

14. Apparatus of the character described comprising in combination, a tube carrier, means to feed straws into tubes on said carrier at a given station including a nozzle moved into telescopic relation with the tubes and a backing member to prevent endwise movement of the straws away from the nozzle, and means disposed adjacent the ends of the carrier for crimping both ends of the tube simultaneously after it passes the straw-inserting means.

15. Apparatus of the character described comprising in combination, a tube carrier, means to feed straws into tubes on said carrier at a given station including a nozzle moved into telescopic relation with the tubes and a backing member to prevent endwise movement of the straws away from the nozzle, and means disposed adjacent the ends of the carrier for crimping both ends of the tube simultaneously after it passes the straw-inserting means, said crimping means including two positively driven corrugated rolls on a shaft extending across the carrier and resilient corrugated rolls associated with the positively driven rolls at each end of the carrier.

16. Apparatus of the character described comprising in combination, a tube carrier moved intermittently to bring tubes to a filling station, straw feeding means aligned with the tubes at said station, a flared mouthpiece adapted to embrace the tube externally to support the same and direct straws therein, means causing the tube to be firmly engaged in said mouthpiece and means to insert straws through said mouthpiece into said tube when thus engaged with the mouthpiece.

EUGENE CONTI.