

Feb. 17, 1925.

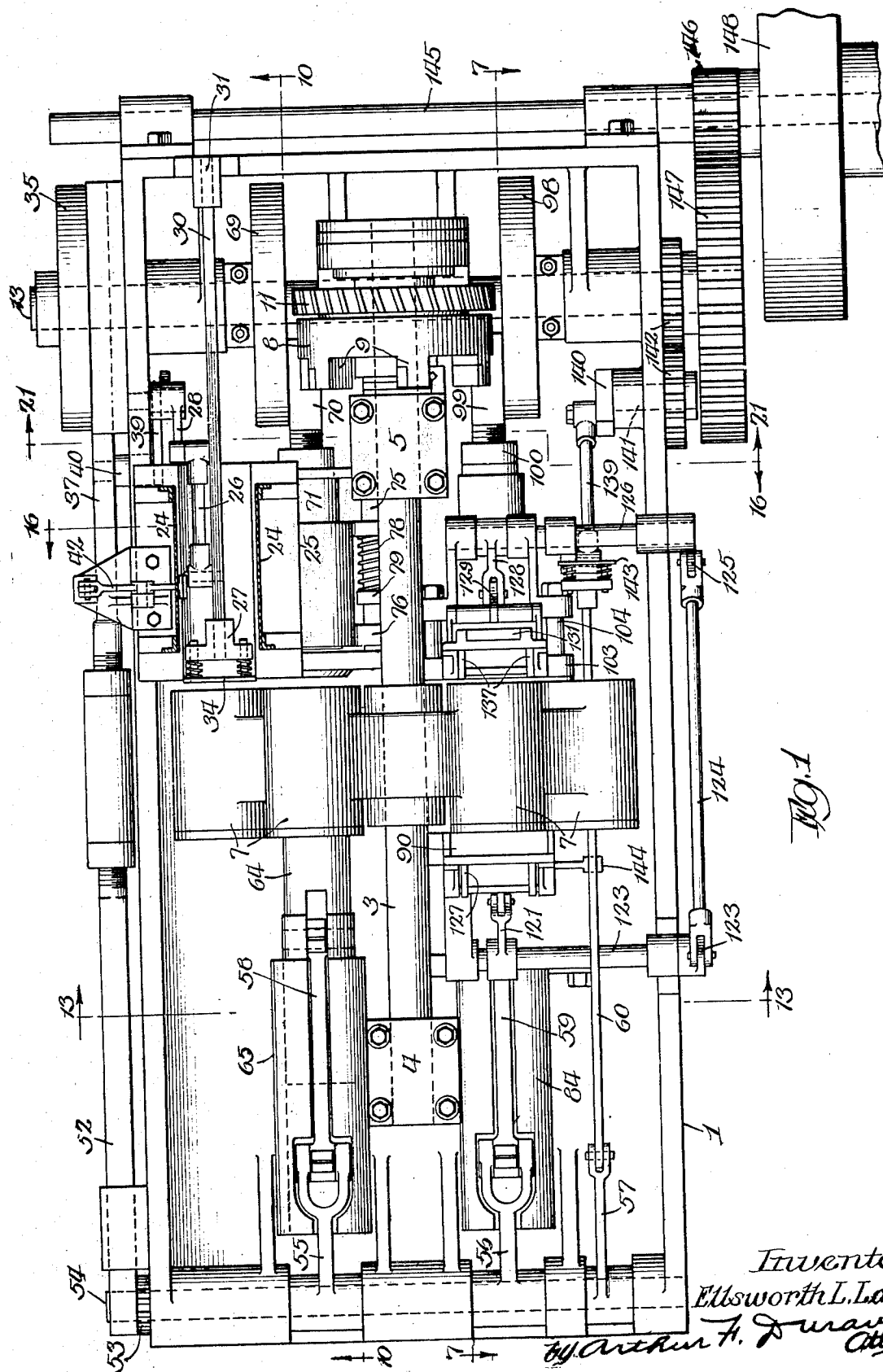
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E. L. LAKE

CONTAINER MAKING MACHINE AND METHOD

Filed Jan. 20, 1923

11 Sheets-Sheet 1



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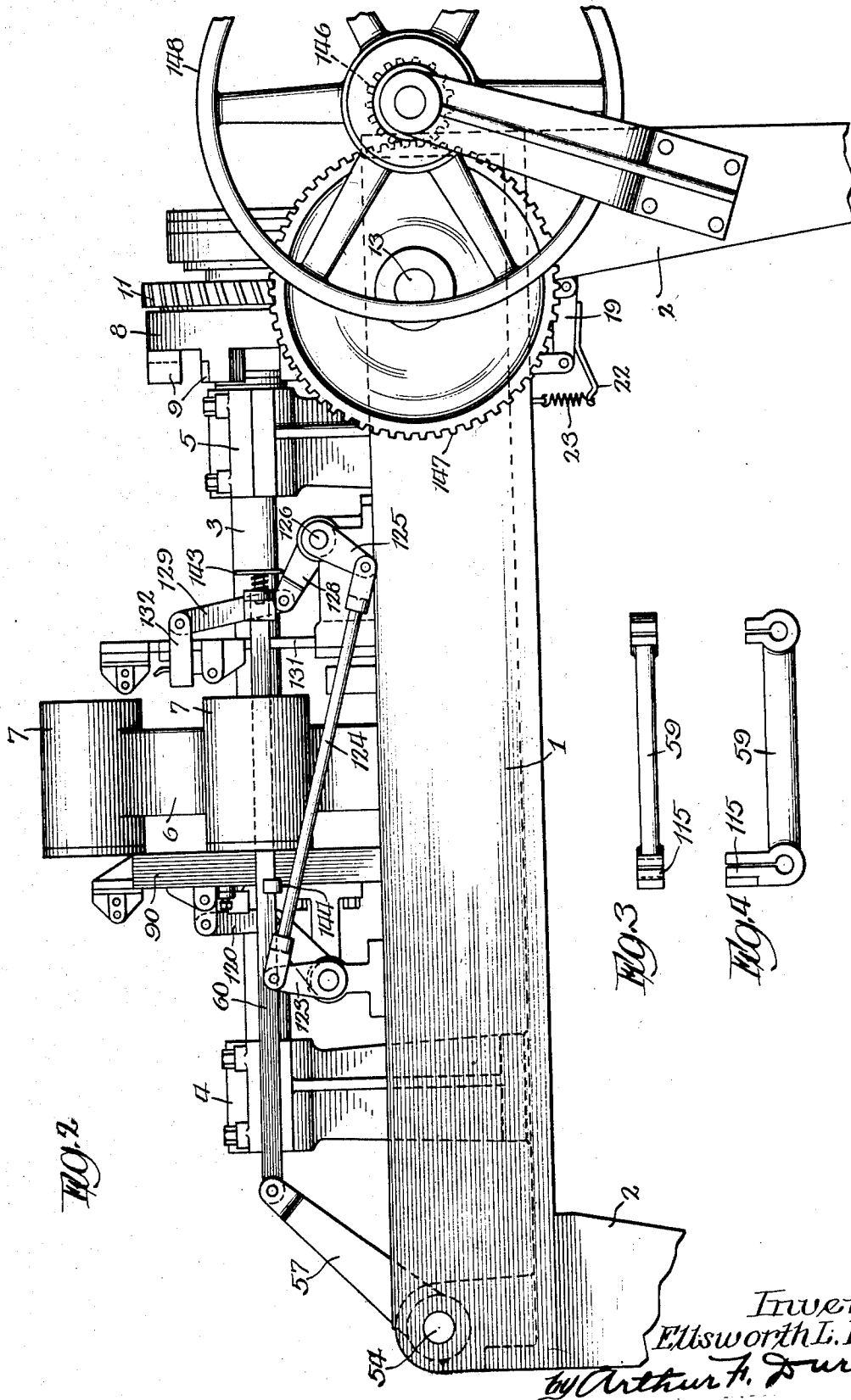
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CONTAINER MAKING MACHINE AND METHOD

Filed Jan. 20, 1923

11 Sheets-Sheet 2



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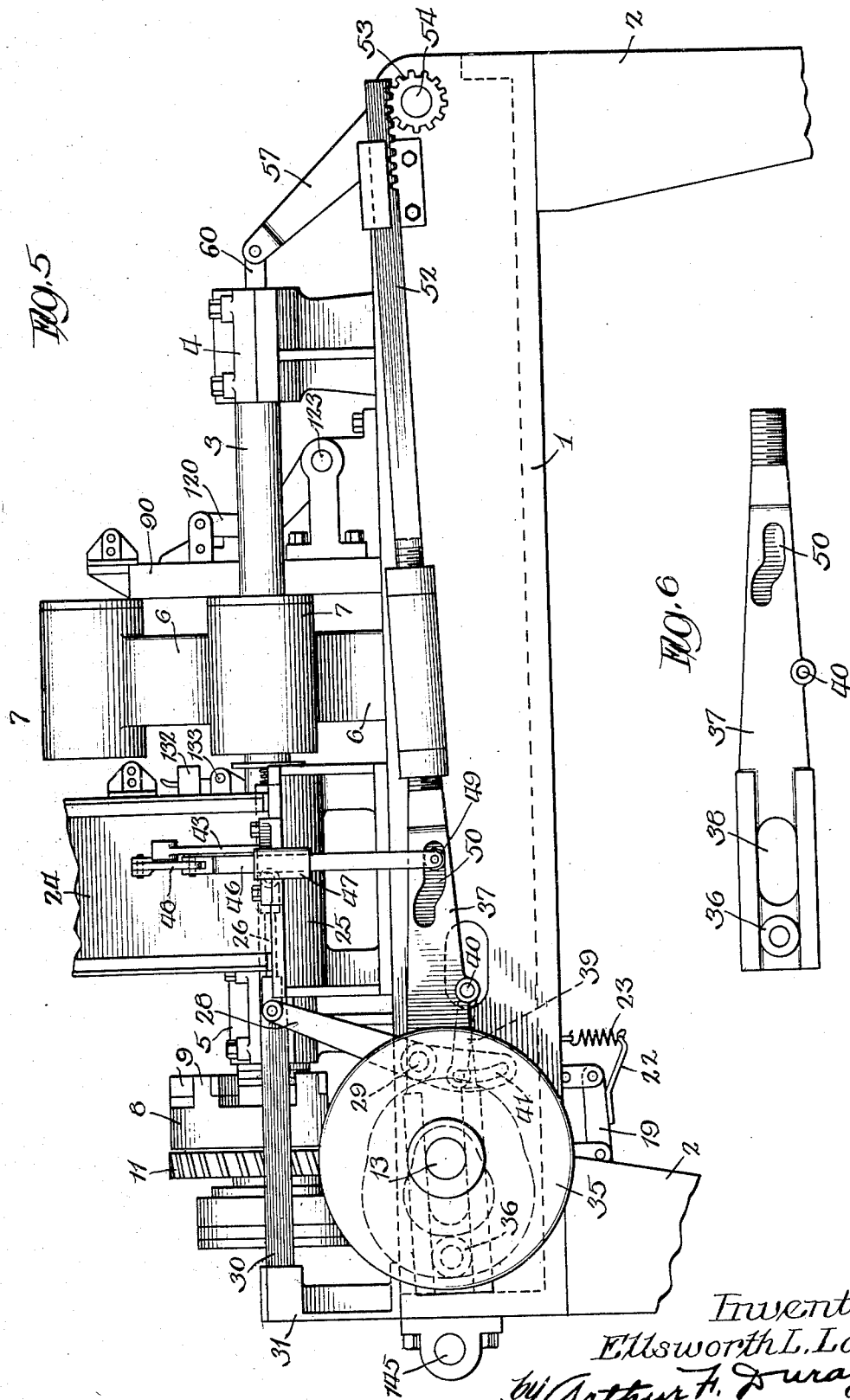
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 3



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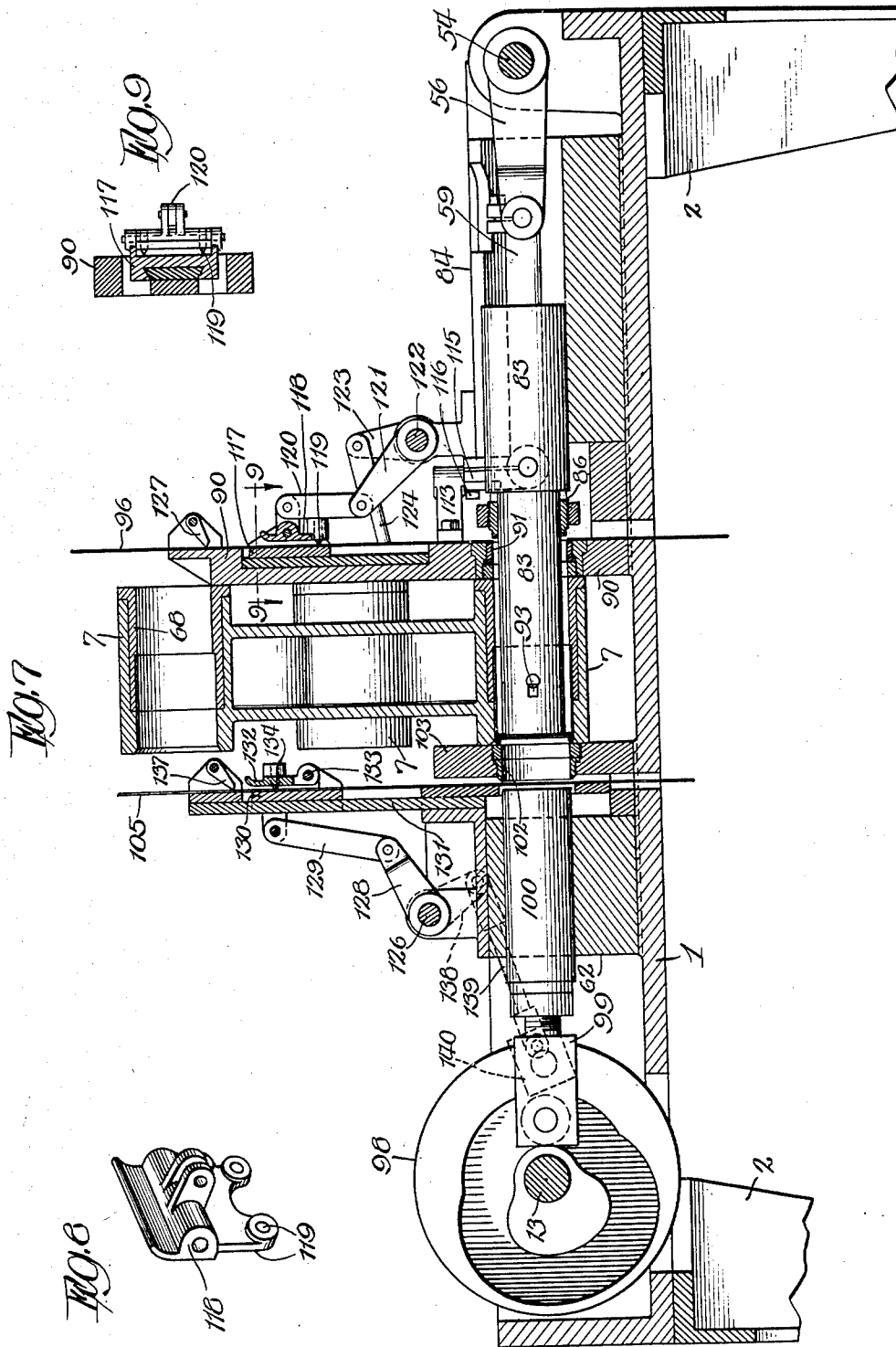
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 4



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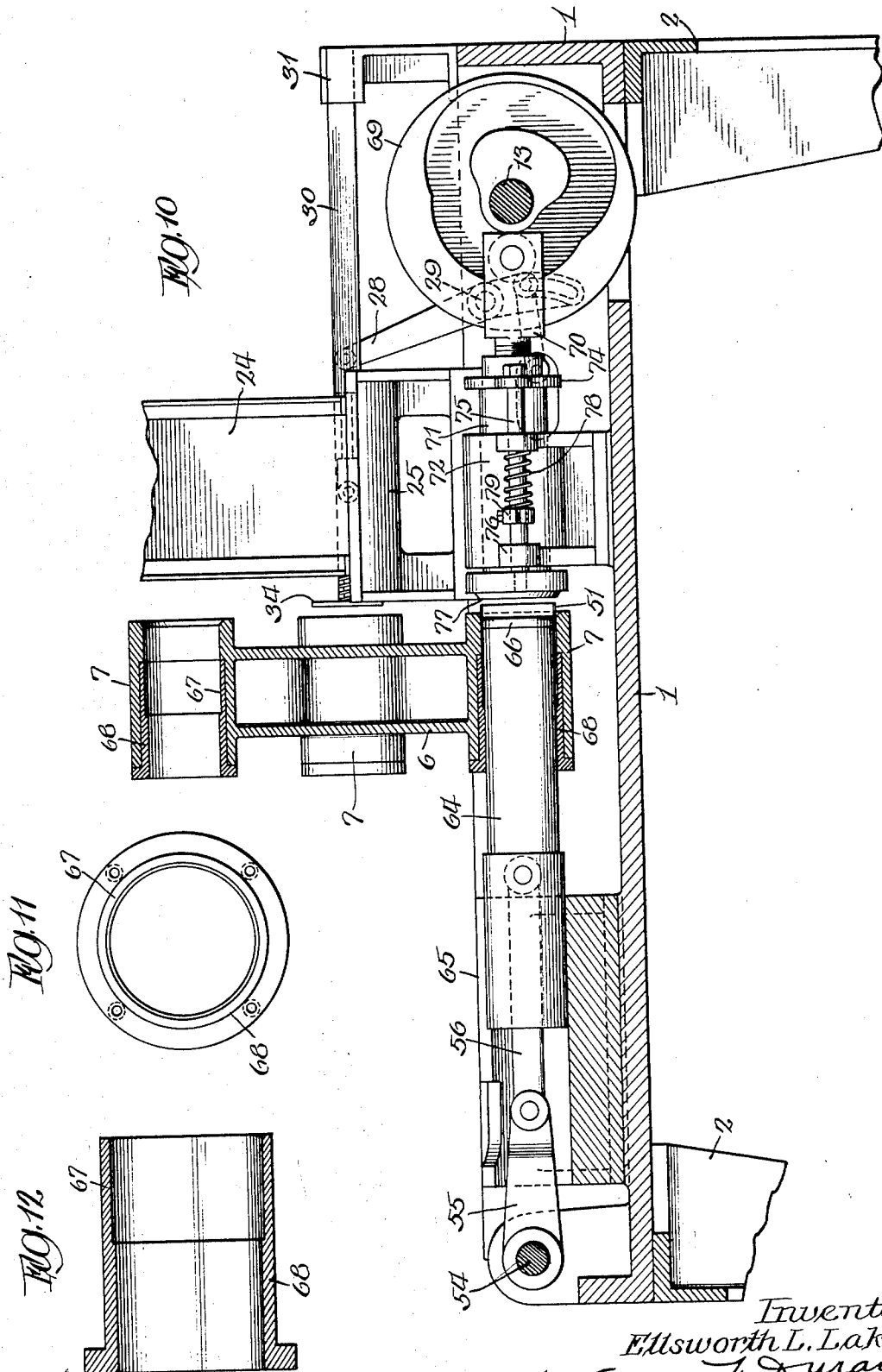
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 5



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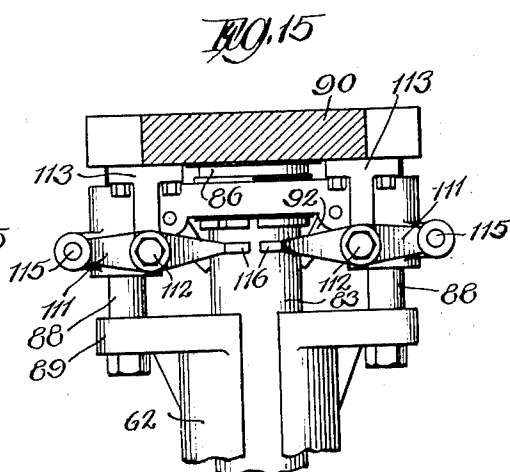
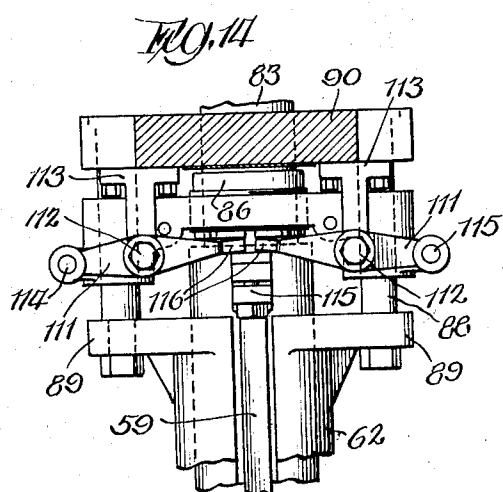
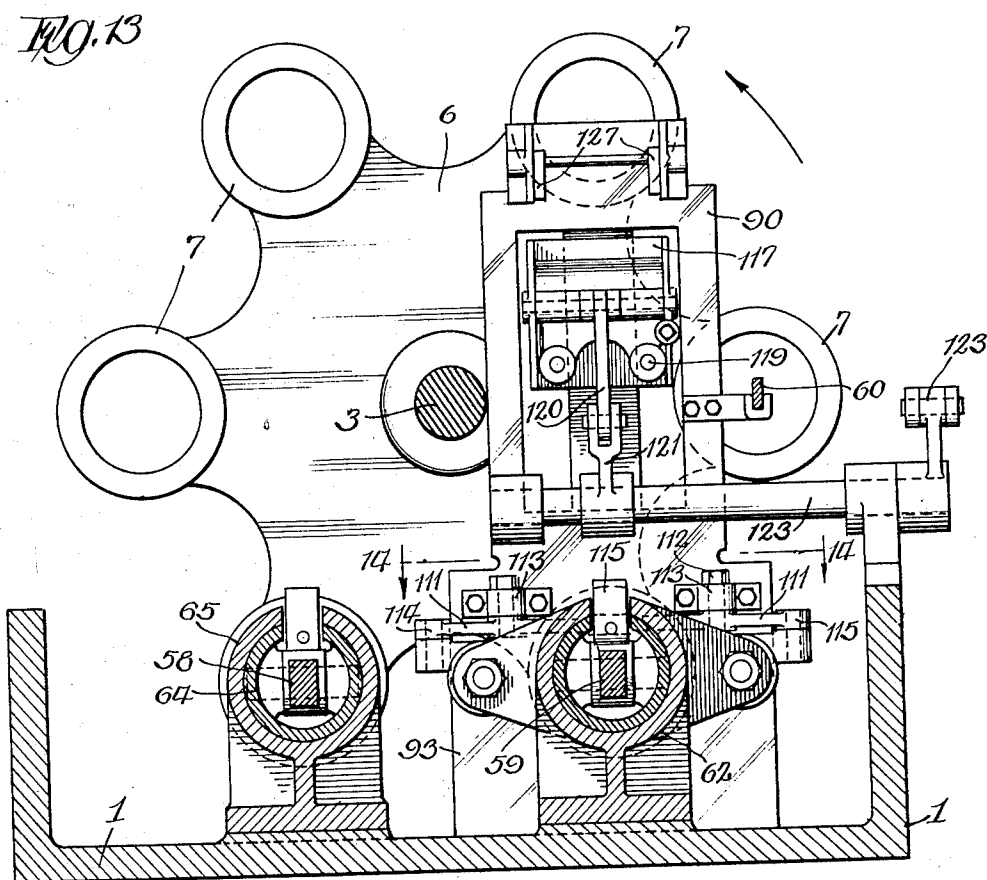
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 6



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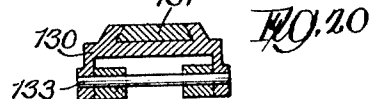
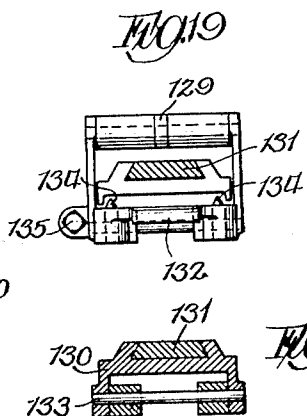
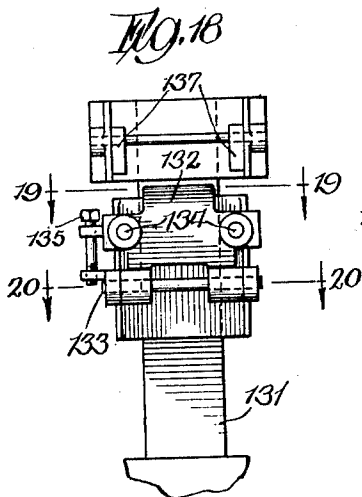
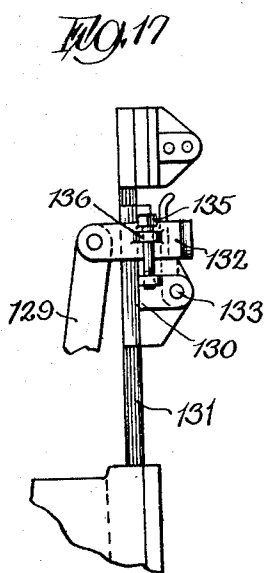
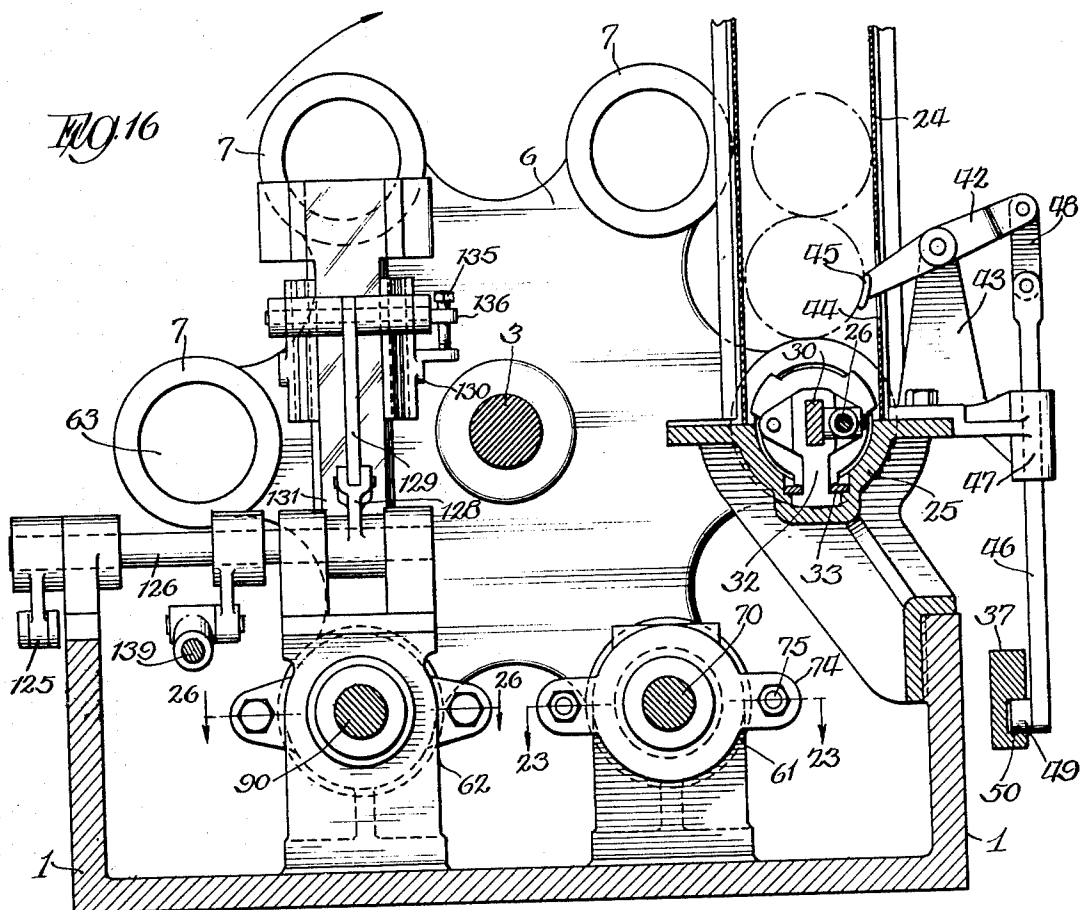
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 7



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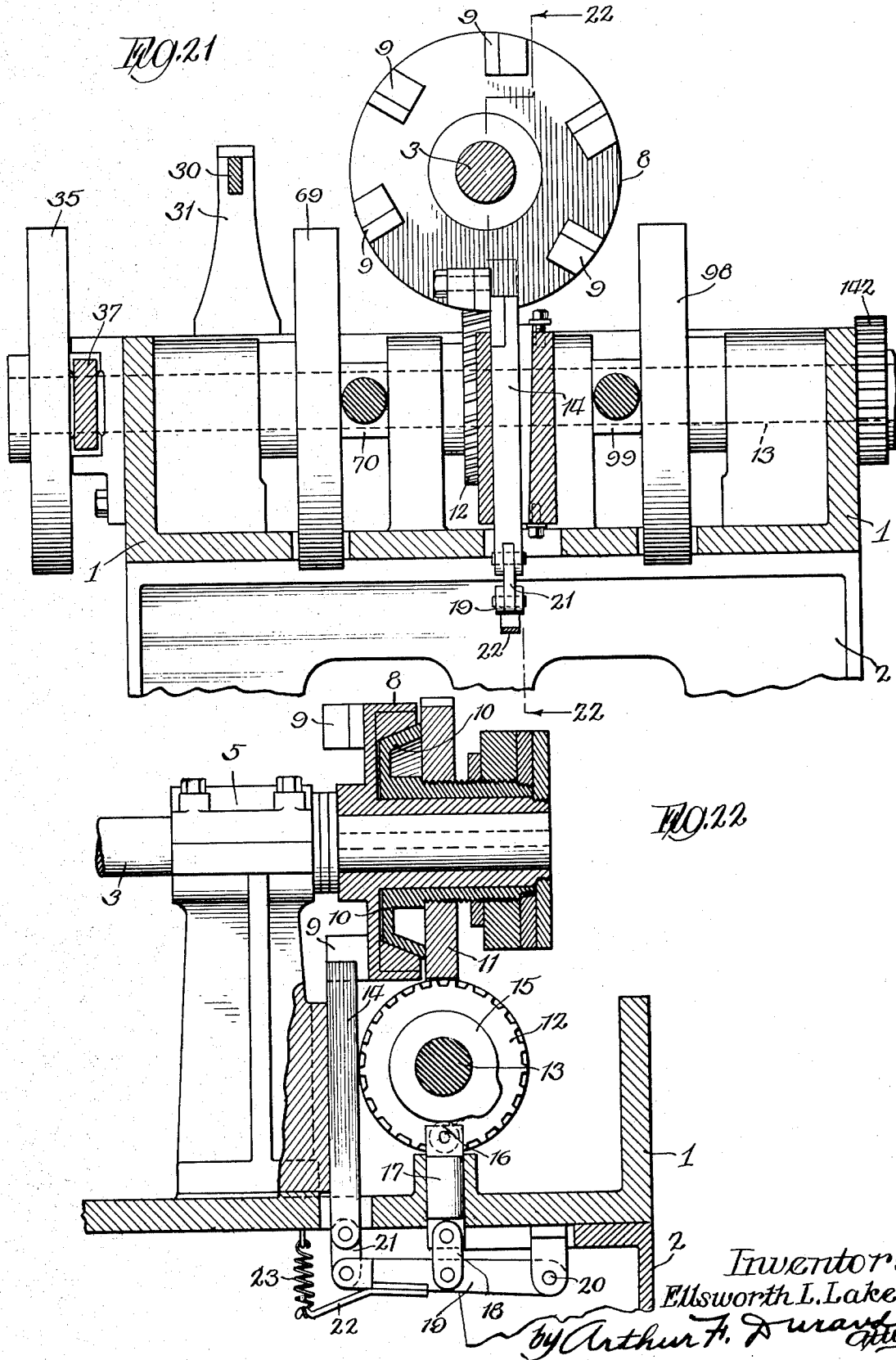
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E. L. LAKE

CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 8



Feb. 17, 1925.

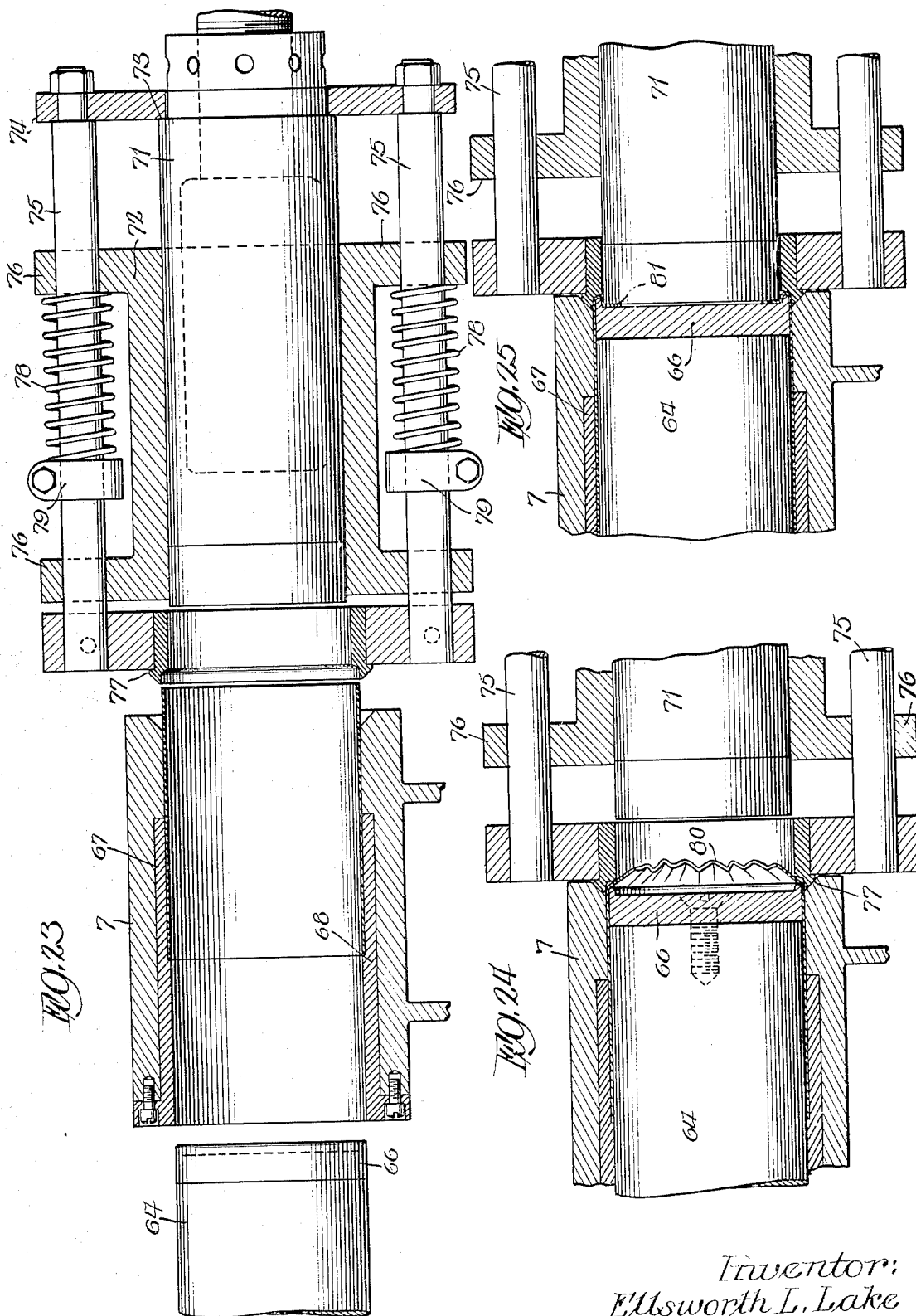
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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 9



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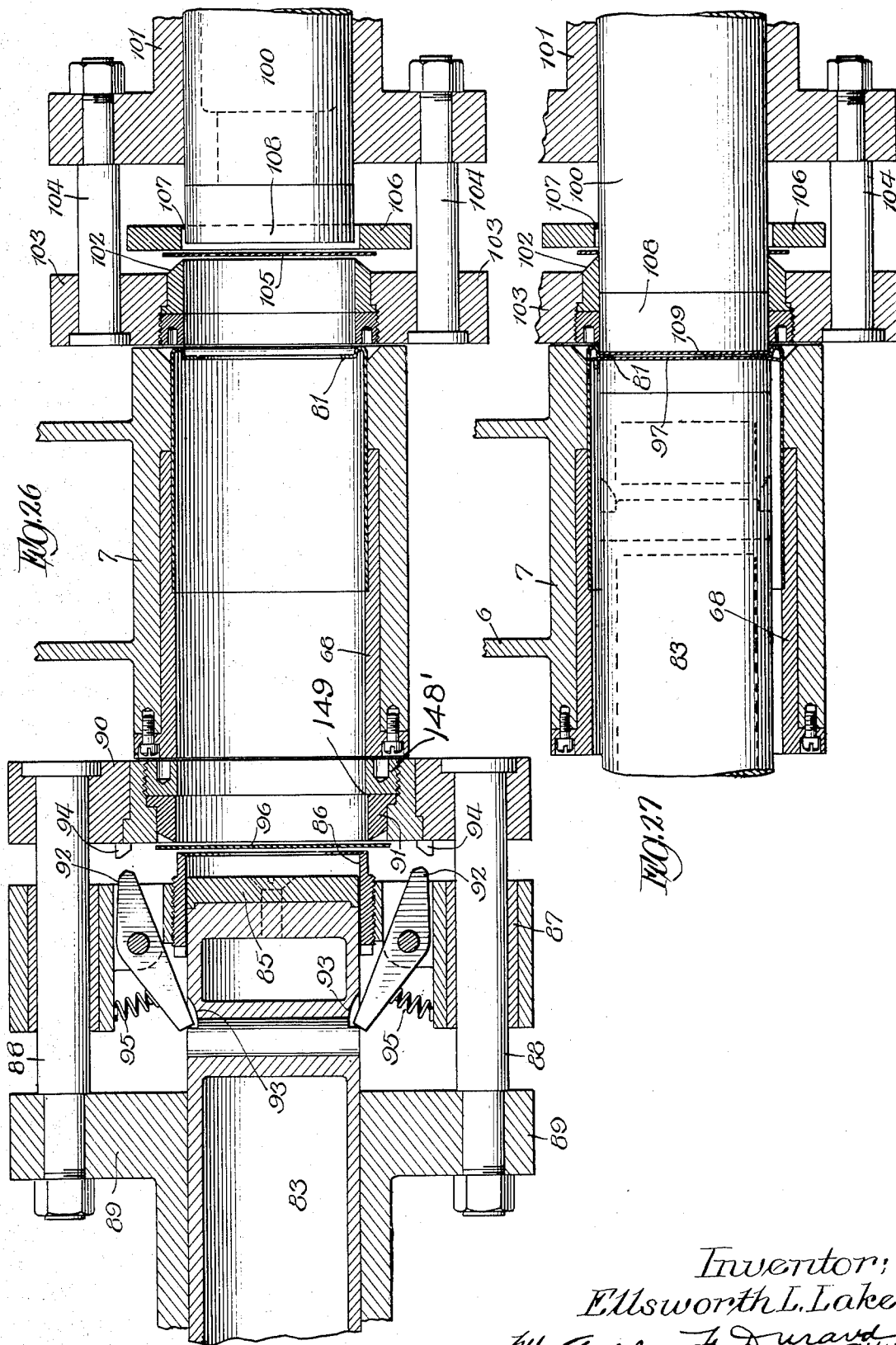
1,526,554

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CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 10



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1,526,554

E. L. LAKE

CONTAINER MAKING MACHINE AND METHOD

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11 Sheets-Sheet 11

FIG. 28

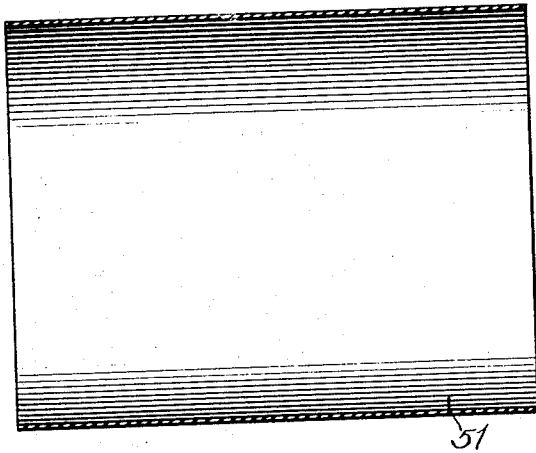


FIG. 29

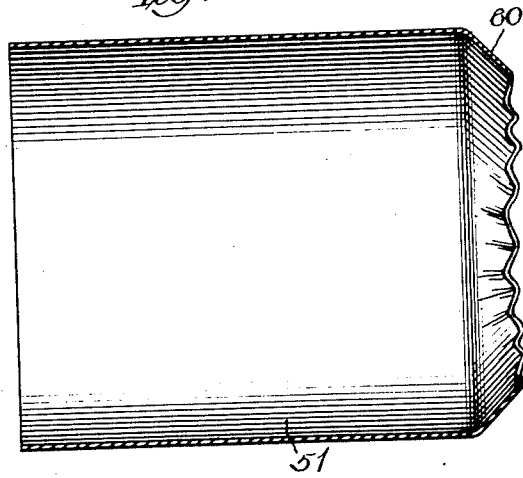


FIG. 30

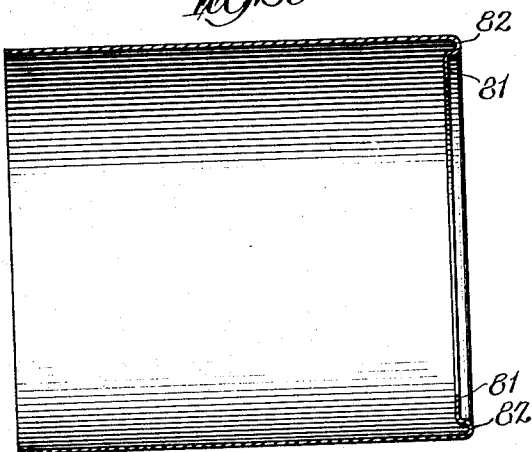


FIG. 31

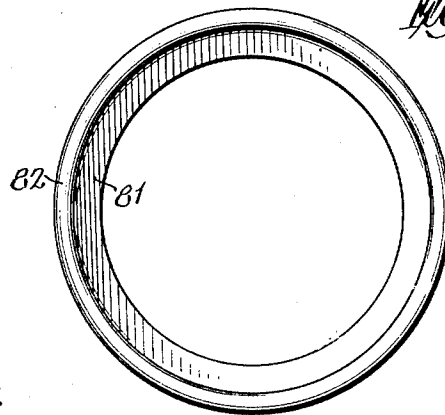


FIG. 32

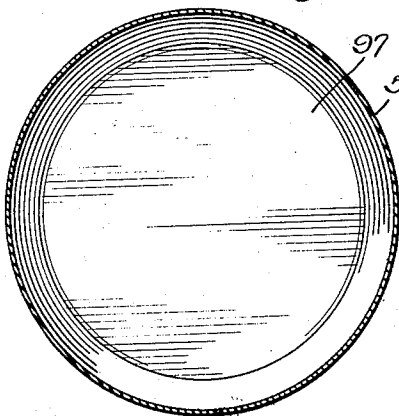


FIG. 33

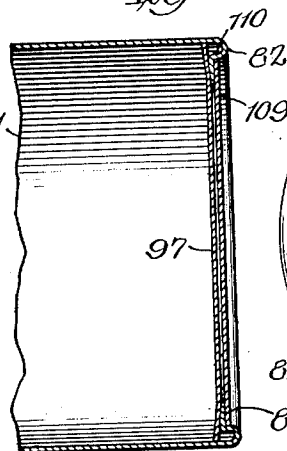
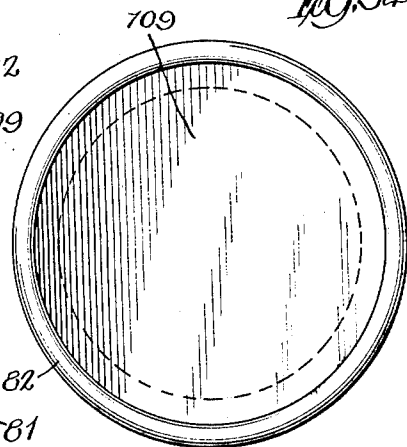


FIG. 34



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UNITED STATES PATENT OFFICE.

ELLSWORTH L. LAKE, OF MONROE, MICHIGAN, ASSIGNOR TO THE WEIS FIBRE CONTAINER CORPORATION, OF MONROE, MICHIGAN, A CORPORATION OF SOUTH DAKOTA.

CONTAINER-MAKING MACHINE AND METHOD.

Application filed January 20, 1923. Serial No. 613,820.

To all whom it may concern:

Be it known that ELLSWORTH L. LAKE, a citizen of the United States, and resident of Monroe, Monroe County, Michigan, has invented certain new and useful Improvements in Container-Making Machines and Methods, of which the following is a specification.

This invention relates to the manufacture of fibre containers, such as those made of paper or other sheet material, and more particularly to the manufacture of round or cylindrical containers of this general character.

Generally stated, the object of the invention is to provide a novel and efficient method of making containers from sheet material, preferably from cylinders of paper or other fibrous material, so that the containers may be manufactured cheaply and economically and employed satisfactorily in use for various purposes.

Another object is to provide a novel and improved machine for making the containers from tubes or cylindrical bodies, by passing the body or tube automatically from one operation to another, so that each tube or body when expelled from the machine will be provided with a bottom wall of the desired character.

It is also an object to provide certain details and features of construction and novel combinations tending to increase the general efficiency and the desirability of a method of and machine for making round or cylindrical fiber containers of this particular character.

To these and other useful ends, the invention consists in the matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which,—

Fig. 1 is a plan of a machine embodying the principles of the invention.

Fig. 2 is a side elevation of said machine.

Fig. 3 is a detail view of one of the parts.

Fig. 4 is a side elevation of the part shown in Fig. 3.

Fig. 5 is a side elevation of said machine, showing the other side thereof.

Fig. 6 is a detail view of one of the parts of said machine.

Fig. 7 is a longitudinal section on line 7—7 in Fig. 1.

Fig. 8 is a detail perspective view of one of the parts.

Fig. 9 is a detail section on line 9—9 in Fig. 7.

Fig. 10 is a longitudinal section on line 10—10 in Fig. 1, looking in the direction indicated by the arrows.

Fig. 11 is an enlarged detail end view of one of the parts.

Fig. 12 is a longitudinal section of the part shown in Fig. 11.

Fig. 13 is a transverse section on line 13—13 in Fig. 1, looking in the direction indicated by the arrows.

Fig. 14 is a horizontal detail section on line 14—14 in Fig. 13, showing the parts in one position;

Fig. 15 is a similar view showing the parts in a different position.

Fig. 16 is a transverse section on line 16—16 in Fig. 1, looking in the direction indicated by the arrows.

Fig. 17 is a detail view.

Fig. 18 is a front elevation of the parts shown in Fig. 17.

Fig. 19 is a horizontal section on line 19—19 in Fig. 18.

Fig. 20 is a horizontal section on line 20—20 in Fig. 18.

Fig. 21 is a transverse section on line 21—21 in Fig. 1, looking in the direction indicated by the arrows.

Fig. 22 is a longitudinal section on line 22—22 in Fig. 21.

Fig. 23 is a horizontal section, on a larger scale, on line 23—23 in Fig. 16, showing the parts in one position.

Fig. 24 is a similar view, with certain parts broken away, showing the parts in a different position.

Fig. 25 is a view similar to Fig. 24, showing the parts in still a different position.

Fig. 26 is a horizontal section on line 26—26, on a larger scale, in Fig. 16, showing the parts in one position.

Fig. 27 is a view similar to Fig. 26, with certain portions broken away for convenience of illustration, and showing the parts in a different position.

Fig. 28 is a longitudinal section of one of the cylinders from which the containers are made.

Fig. 29 is a similar view, showing the first step in forming the bottom end of the cylinder for the reception of the bottom wall.

Fig. 30 is a similar view, showing the second step in the preparation of the cylinder for the reception of the bottom wall.

Fig. 31 is an end view of the crimped or bent cylinder shown in Fig. 30.

Fig. 32 is a transverse section of the container.

Fig. 33 is a longitudinal section of the container, with the mouth or top end portion shown broken away for convenience of illustration.

Fig. 34 is a bottom end view of the container.

As thus illustrated, the invention comprises a body frame 1 of any suitable character, preferably supported by legs 2, whereby the various operative elements of the machine are supported in suitably elevated positions. A longitudinal shaft 3 is supported in bearings 4 and 5, the lower ends of these bearings being suitably attached to the body frame 1 previously mentioned. A tube carrier 6 is keyed upon said shaft in any suitable manner, to be rotated thereby, said tube carrier having six equidistant tube holders 7, which are cylindrical and which have parallel axes extending parallel with the shaft 3 previously mentioned. A friction driven clutch member 8 is suitably secured to one end portion of the shaft 3, and is provided with six stops 9, in proper relation to the equidistant tube holders 7 previously mentioned. The driving clutch member 10 frictionally engages the member 8 and has a spiral gear 11 which is engaged by the spiral pinion 12 on the transverse shaft 13, the latter being suitably supported in bearings on the body frame. It will be understood that the clutch member 10 is loose on the hub portion of the member 8, so that the member 10 can rotate without rotating the shaft 3 of the tube carrier. A vertically reciprocating element 14 is adapted to be interposed in the path of the stops 9, and to be withdrawn from said path, whereby to hold the carrier 6 stationary in each of its six positions, whereby said carrier may rotate a distance each time equal to the distance between any two consecutive tube holders 7, whereby these tube holders always stop in one of the six stationary positions of the carrier. A cam 15 is secured to the shaft 13, and is adapted to engage the roller 16 on the upper end of the vertically reciprocating element 17, which latter is connected by a link 18 with the lever 19, which swings up and down about its axis 20 on the body frame. The free or movable end of the lever 19 is connected by

a link 21 with the lower end of the element 14 previously mentioned. The lever 19 has an arm 22, and a spring 23 connects this arm to a suitable point on the stationary body frame, whereby the locking element 14 is held normally in raised position, so that the carrier 6 is held normally stationary when the cam 15 depresses the element 17. The element 14 is thereby moved downward, out of engagement with one of the stops 9, and the friction clutch member 10 then drives the friction clutch member 8 and rotates the shaft 3 a distance until the element 14 is released by the cam and allowed to engage another stop 9 on the clutch. In this way, therefore, the continuous friction drive is employed for the operation of the rotary tube carrier, but the latter does not have a continuous rotation, but to the contrary is rotated intermittently, inasmuch as the operations to be performed on the tubes (one such tube is shown in Fig. 28) require that the tube carrier be stationary while such operations are being performed, as will hereinafter more fully appear.

Now the tubes are preferably fed automatically to the rotary carrier 6, and for this purpose a vertically disposed hopper 24 is employed to support the tubes one on top of the other so that the tubes are horizontal. At the bottom of this hopper there is a guide 25 in which the lowermost tube slides endwise into the tube holder 7, which at such time is directly opposite this guide. To perform this operation, a plunger 26 is movable longitudinally of the machine, and is provided with a plunger head 27 to engage one end of the tube and push the latter endwise into the tube holder 7 of the rotary carrier. This plunger 26 has its other end connected to a lever 28 which is pivoted on the machine body at 29, and which operates in a manner which will hereinafter more fully appear. The head 27 is secured to the end of the guide bar 30, and the latter slides in a guide 31 suitably mounted on the body frame of the machine. It will be seen that the lower portion of the head 27 has a guiding portion 32 which slides in the guide 30 formed at the bottom of the guide 25 in which the tube rests so as to slide forward into the holder 7 of the carrier. Preferably, the head 27 has a spring backed plate 34 to engage the end of the tube, so that the engagement will be somewhat yielding and will not be liable to do any harm. The shaft 13 previously mentioned has its outer end provided with a cam 35 formed on its inner side with a cam groove to engage the roller 36 on the longitudinally reciprocating member 37, which latter has a slot 38 for the shaft 13, so that the member 37 reciprocates in a manner that will be readily understood. A link 39 connects the pivotal

point 40 on the member 37 with the lower end portion of the lever 28 previously mentioned, so that this lever is vibrated by the reciprocation of the member 37, the connection of said link to said lever involving a slot 41 in the lower portion of the lever to permit adjustment of the link toward and away from the pivotal point 29 of the lever, thereby to vary or change the length of stroke of the lever 28, and to thus regulate the action of the feeding means by means of which the tubes are fed from the hopper into the rotary tube carrier. A lever 42 is pivoted on a bracket 43, which latter is rigid and suitably supported on the body frame. This lever 42 reaches through a slot 44 in one side of the hopper for the tubes, and has an inner end portion 45 adapted to engage the side of the tubes, so that while the lowermost tube is sliding endwise into the rotary tube carrier, the tubes above are supported by the arm 42, so that the weight of the remaining tubes in the hopper is supported by this lever 42, instead of by the lowermost tube which is thus made very free to slide endwise from the bottom of the hopper into the rotary tube carrier. The vertically disposed element 46 slides up and down in a stationary guide 47 carried by the body frame, and the upper end of this element is connected by a link 48 with the outer end of the lever 42, so that the latter is controlled in the desired manner. The lower end of the element 46 has a roller or projection 49 which engages a cam groove 50 in the side of the reciprocating member 37, so that the latter in moving endwise back and forth will move the element 46 up and down and thereby control the tube engaging portion 45 in the desired manner, releasing a tube when necessary, and then promptly engaging the tube next above, so that the tube which is sliding endwise in the guide 25 is never called upon to support the weight of the tubes above. Thus the paper tubes, such as the tube 51 shown in Fig. 28, are automatically fed to the tube holder 7, so that the desired operations may be performed on the tubes, successively, to provide each tube with an end wall, as will hereinafter more fully appear. This point at which the tubes are fed into the carrier 6 is called the first position of the carrier, and is in a plane, it will be seen, coincident with the plane of the shaft 3 by which the carrier is rotated.

The member 37 is connected in any suitable manner with a reciprocating rack bar 52 which engages a pinion 53 on the shaft 54 at the other end of the machine. This shaft 54 is mounted to oscillate in suitable bearings on the body frame, and is provided with crank arms 55, 56 and 57, to which are connected, respectively, the pitmen 58, 59 and 60, for purposes which will hereinafter

more fully appear. Looking at Fig. 16, the next position is at 61, the third position is at 62, and the fourth position is at 63, where the finished containers are expelled from the machine. For use in forming the tubes in the second position, a plunger 64 is provided, which reciprocates in a guide 65, and which is connected to the pitman 58. This plunger 64 has its front end provided with a die 66, as shown in Figs. 23 and 24, which is adapted to slide through the tube holder 7 in this second position, as shown in Fig. 24, to assist in forming the end of the tube. It will be seen that each tube holder 7 has an interior sleeve 67 provided with a shoulder 68 to limit the insertion of the tube in the holder. At the other end of the machine, the shaft 13 has a cam 69 thereon, with a groove therein for engaging the end of the rod or shank 70, which is suitably connected to the plunger 71, which is movable in a stationary guide 72 suitably supported in the body frame. The plunger 71 has a shoulder 73 which strikes the yoke 74, when the plunger is pulled backward by the cam 69, and this yoke 74 has rods 75 which slide in guides 76 and the guide member 72, and which have their forward ends rigidly connected to a die 77 for engaging the edge of the tube. Consequently, when the plunger 71 is moved forward, springs 78 interposed between collars 79 and the guide 76, on the rods 75, force the rods forward, so that the die 77 is pushed forward against the edge of the tube, as shown in Fig. 24, causing the tube to be beveled or bent inward at 80, this bent portion being, of course, more or less puckered along the edge thereof. At the same time, the plunger 64 moves forward and cooperates with the die 77 to produce the effect shown in Fig. 24, and as shown in Fig. 29, and the continued movement of the plunger 71 finally brings the front end of the latter against the portion 80 of the tube, and into the cavity of the die 66, so that the formation of the end of the tube is then as shown in Fig. 25 or in Fig. 30 of the drawings. At such time, therefore, it will be seen that a flat internal flange 81 is formed in the end of the tube, and that a hollow fold 82 forms the medium of connection between this flange and the body of the tube, this fold 82 forming, as will hereinafter more fully appear, the end edge of the finished container. The co-operating dies are formed, as shown, to produce this formation of the tube, preliminary to the reception of the double thickness end wall which is preferably now inserted to form the bottom of the container.

Now in the third position, at 62, certain work is done, as shown in Figs. 26 and 27, to insert the end wall of the container, which is to serve as the bottom when the container

is turned right side up and supported on its hollow edge previously mentioned. The plunger 83 slides in a longitudinal guide 84 and is connected to the pitman 59 previously mentioned. The front end of this plunger 83 is provided with a die 85 which reciprocates in a cutting die 86, the latter being removably mounted in a sliding yoke 87 which slides back and forth on guide rods 88 suitably supported by ears 89 and the upright stationary frame 90, which latter has a stationary cutting die 91 detachably mounted therein. The yoke 87 has pivoted elements 92 adapted at one end to engage the notches 93 in the plunger head 83, so that the latter and the die 86 may move forward in unison from the position shown in Fig. 26, and said arms 92 also have their other ends formed to engage stationary cams 94 on the stationary frame 90 previously mentioned. Springs 95 are provided to normally hold the arms or elements 92 against the sides of the plunger head 83, but when the front ends of the elements 92 engage the cams 94, their rear ends are disengaged from the notches 93, so that the plunger 83 is then free to move forward alone through the die 86 and into the holder 7 and through the tube until it is in the position shown in Fig. 27 of the drawings. A sheet of paper 96, or other suitable sheet material, is fed downwardly in front of the cutting die 91, so that the die 86 will move forward and cut out a disk 97 of sheet material, and this disk will be carried forward by the die 85 and pressed against the flange 81 previously mentioned. A cam 98 has a cam groove for engaging the end of the rod 99, which latter is rigidly connected to the plunger 100, said plunger being mounted to slide in the guide 101 and through the cutting die 102 detachably mounted in a stationary frame 103, said guide and frame being rigidly connected by bolts 104 in any suitable manner. A sheet of paper 105 is fed downward between the die 102 and the stationary plate 106, the latter having an opening 107 through which the plunger 100 passes. The die 108 on the end of the plunger 100 presses the paper 105 against the edge of the cutting die 102, thus cutting out a disk 109, which is pressed by the die 108 against the outer side of the flange 81 previously mentioned. Thus the two plungers 83 and 100 co-operate to compress the two disks tightly against the flange 81 and against each other, and with adhesive between the two disks, a solid bottom wall is formed. It will be seen that the disk 97 is larger than the disk 109, and that it is even a little larger than the diameter of the tube, so that, as shown more clearly in Fig. 33, the outer edge portions of the disk 97 are bent backward a distance toward the mouth of the tube, thus forming a brace or lock tending to resist displacement of the disk 97 away from the flange 81 of the tube. It will be seen that the space 110 in the rounded fold or edge portion 82 is closed by the edge portions of the disk 97, and that a very strong and stiff corner construction is thus provided around the base of the container. Levers 111 are pivoted at 112 on brackets 113 secured to the stationary frame 90, and these levers 111 have their outer ends pivoted at 114 on the yoke 87, so that motion of the yoke back and forth on the rods 88 is accompanied by vibration of said levers. The pitman 59 has an upstanding portion 115 adapted to engage the inner ends 116 of the levers 111, in the extreme forward movement of the pitman 59, thereby to automatically retract the yoke 87 and its die 86 to normal position. In such normal position, the levers 111 occupy the positions shown in Fig. 15, in readiness to be again pressed forward as shown in Fig. 14, when another disk punching and applying operation is performed on the next tube.

Now the sheets 96 and 105 of paper can be fed downward in any suitable or desired manner and by any suitable or desired means, but this is preferably done automatically. For this purpose, therefore, a slide 117 is movable up and down on the frame 90, and has pivoted thereon a member 118 provided with engaging pins 119 to engage the sheet of paper. A link 120 connects the member 118 with the crank arm 121 on the rock shaft 122, and the latter is provided with a crank arm 123 connected by a pitman 124 with a crank arm 125 on the other rock shaft 126 at the other side of the rotary tube carrier. When the shaft 122 is rocked one way, so as to pull the link 120 downward, the points 119 pull the paper downward the desired distance. When the shaft is rocked in the other direction, the points 119 disengage the paper, and the slide 117 moves upward without moving the paper, the latter being held against upward movement by a dog 127 of any suitable character. The shaft 126 has a crank arm 128 connected by a link 129 with the slide 130, which is movable upward and downward on the frame 131, which is suitably mounted on the body frame. The medium of connection between the link 129 and the slide 130 is a pivoted member 132 which is pivoted at 133 on the slide, so that downward movement of the link 129 pulls the member 132 against the paper 105, while upward movement of this link moves the member 132 away from the paper. To limit the movement of the points 134 on the member 132 away from the paper when the link 129 moves upward, which movement is only very slight in order to disengage the paper, bolts 135 have their lower ends rigidly mounted on the slide 130, and the member 132 has ears 136 with large openings therein through which the bolts 135 pass. When the link 129

moves upward, the points 134 are disengaged from the paper 105, and the ears 136 engage the heads on the upper ends of the bolts 135, thus limiting the disengaging movement of the member 132, and the slide 130 then moves upward without moving the paper upward. To keep the paper from moving upward, a dog 137 is arranged to engage the paper, and thus the paper can slide downward, but not upward. The rock shaft 126 is provided with a crank arm 138 connected by a pitman 139 with a rotary crank 140 carried on the short journal 141 suitably mounted at one side of the body frame of the machine. The shaft 14 is connected by gearing 142 with the shaft 13, as shown in Fig. 1, so that rotation of the crank 140 serves to operate the rock shafts 122 and 126 to feed the paper 96 and 105 downward automatically, after each punching and bottom forming operation, and after another tube has been brought into the third position to receive the two disks to form the bottom wall.

As previously stated, the finished containers are expelled whenever a tube holder 7 reaches the position indicated at 63, and for this purpose an automatic discharge mechanism is provided. Said mechanism comprises the crank arm 57 and the pitman 60 previously mentioned, this bar or pitman 60 having a spring backed plate 143 at its other end, said element 60 being supported to reciprocate endwise in the guide 144 supported by any suitable portion of the machine. Therefore, because of the relative timing of the different elements of the machine, after each finished tube or container arrives in the fourth position of the machine, the head 143 moves through the tube holder 7 and through the tube and against the bottom of the latter, until the head 143 is approximately in the position shown in Fig. 2, which results in the displacement of the finished container from the tube carrier. It will be understood, of course, that any suitable or desired means can be employed for catching or deflecting the discharged containers, so that they will be deflected away from the operating elements of the machine, and discharged in any suitable manner.

For driving the machine, a main shaft 145 is provided, having a pinion 146 to engage the gear wheel 147 on the end of the shaft 13, and a pulley 148 is provided on the shaft 145 to receive a driving belt.

Now it will be seen that the tube, such as the tube 51 shown in Fig. 8, is carried from the first position to the second position, from the latter to the third position, and from the latter to the fourth position, before the finished container is expelled from the machine. This being true, it might appear that a rotary wheel or carrier having only four tube carriers would be sufficient, but in practice it is found that one having

six tube carriers, as shown, has certain advantages, inasmuch as it brings the second and third positions between the first and fourth positions, whereby there is ample clearance and room for the paper to be fed downwardly at the third position, without interfering with the operations to be performed in any of the other three positions. Starting, therefore, with the straight tube 51, which may be a tube made by spirally winding a paper, in a well known manner, it will be seen that the first step consists in contracting one end of the tube, as best shown in Fig. 9, and that the next step consists in flattening or ironing out the puckered or gathered end portion thus formed, as shown in Fig. 30, while the final step consists in applying the paper disks to the flattened flange thus formed within one end of the tube, it being understood that the pressure is sufficient to compress the puckered or gathered paper until it is perfectly flat and thus adapted to receive the disks which form the bottom.

Now the machine is shown as being of a character to make round containers, but it will be understood that the invention is not limited to the production of containers of any particular character, although in its more specific aspects the invention is especially adapted for the making of round containers. Furthermore, it is obvious that a cap for a container may be made in the same manner, simply by using a shorter tube, and it will be understood that the invention comprehends the manufacture of not only the container itself, by the method and machinery shown, but also of the cylindrical cap therefor. In other words, the cap for the container will be formed from a shorter tube of slightly greater diameter, but its end wall will be formed by the application of paper disks in exactly the manner shown and described.

Of course, comparatively high speed for a machine and method of this kind is desirable, in order to reduce the cost of production, and in actual practice it is found that a machine such as shown and described may be operated at a speed sufficient to produce fifty or more containers a minute, the different operating parts being so arranged and combined that they operate smoothly and with certainty at high speed to produce the desired results.

With further reference to the construction shown in Figures 26 and 27, it will be seen that the cutting die 91 is held in place by a ring 148' and it will be seen that the inside diameter of this ring 148' is the same as the inside diameter of the sleeve 68, while the inside diameter of the ring 91 is, for the reasons previously explained, somewhat larger. In this way, therefore, when the inside disk 97 is cut by the dies 86 and

- 91, it is then pushed forward against the shoulder 149 formed by the edge of the ring 148', and the edges of the disk are bent backward a distance as previously explained, so that in effect the diameter of the disk is slightly reduced so that it may be pushed by the die 85 into the tube waiting to receive it, as shown in Figure 27, and at such time the dies 85 and 108 co-operate to compress the two disks in the manner shown and described, and the die 85 presses the edges of the disk 97 forward to close the cavity 110 and to tighten this inner disk in the container.
- 15 What I claim as my invention is:
1. A method of making containers from cylinders of sheet material, comprising the bending of the edges inward at one end of the cylinder, so that this end of the cylindrical body will have an external bevel or taper, thereafter forcing this bevel or taper inward toward the other end of the cylinder, compressing this inwardly displaced portion to form a flat internal flange, with a hollow rounded fold to form the medium of connection between said flange and the cylinder, so that said flange is countersunk, thereafter applying disks to the inner and outer surfaces of said flange, leaving said rounded fold to form the end edge of the cylinder or body.
 2. A method as specified in claim 1, said cylinder and disks being made of fibrous material, and said initial operation serving to pucker the said tapered end preliminarily formed on the cylinder or body.
 3. A method as specified in claim 1, said disks being of different diameters and being compressed flatwise together in the opening formed by said flange.
 4. A machine for making containers from cylindrical bodies or tubes, comprising means to first bend the edge of the tube inward at one end thereof, so that this end of the tube will have a bevel or external taper, devices for forcing this bevel or taper inward to form a countersunk flat flange, and instrumentalities for applying an end wall to said flange.
 5. A structure as specified in claim 4, said devices comprising a die having an edge portion to form a hollow rounded flange between the outer edges of said flange and the body of the tube.
 6. A structure as specified in claim 4, said instrumentalities comprising means for automatically cutting disks and applying the same to said flange to form the end wall of the cylinder.
 7. A structure as specified in claim 4, said instrumentalities comprising a die for cutting a disk, and means for applying the disk to said flange.
 8. A structure as specified in claim 4, having provisions whereby said operations are automatically accomplished to permit feeding of the cylindrical body or tube into position and the automatic passage of the tube through the different operations and the final discharge of the container.
 9. A structure as specified in claim 4, in combination with means for automatically feeding the tubes into position to be successively converted into containers in the manner stated.
 10. A structure as specified in claim 4, in combination with means for automatically feeding sheet material into position to form said end wall, said instrumentalities being adapted to cut successive disks from said sheet material.
 11. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising a rotary member having six positions thereof, being formed with a carrier to receive the tube in the first position, devices to bend the end of the tube in the second position, to form an internal flange in this end of the tube, devices to apply an end wall to said flange in the third position, and means to expel the container from the carrier in the fourth position thereof, so that said carrier is empty in the fifth position and also in the sixth position of said rotary member.
 12. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising a rotary member having six equidistant carriers thereon, each carrier adapted to receive the tube in the first position of said member, means to bend the tube at one end in the second position, thereby to form a flange inside the tube, means to cut a plurality of disks and apply them to said flange in the third position of said member, and means to expel the container from each carrier in the fourth position thereof, so that each carrier is empty in both the fifth position and also in the sixth position thereof.
 13. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising means for first forming a flange inside the tube at one end thereof, and means for thereafter applying a disk to said flange.

14. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby
 5 each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising horizontally reciprocating dies to bend and form one end of the tube, and
 10 means thereafter to apply a disk to the formed end of the tube.

15. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said
 15 machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising horizontally reciprocating dies to
 20 first bend and form one end of the tube, means to carry the tube sidewise, and horizontally reciprocating dies thereafter to cut and apply disks to the formed end of the tube.

25 16. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby
 30 each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising means for feeding two strips of sheet material, means for cutting disks from said strips of sheet material, and means for
 35 moving said disks toward each other and finally into engagement with each other to form the end wall of the container.

40 17. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby
 45 each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising dies for forming a disk of sheet material, means for pushing said disk through the tube and into position at the formed end thereof to form said end wall.

50 18. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby
 55 each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising dies for cutting a disk of sheet material, and means for pushing said disk into the formed end of the tube, a distance toward the other end thereof, so that the end
 60 wall formed thereby will be countersunk to provide an edge extending beyond the outer surface of said end wall.

19. In a machine for making containers, the combination of means for carrying a
 65 tube from one position to another, and in-

strumentalities for performing an operation on said tube in each of a plurality of said positions thereof, thereby to provide the tube with an end wall, said instrumentalities comprising reciprocating dies, and a
 70 plunger which enters the path of the carrying means to compress the said end wall in place on the tube.

20. In a machine for making containers, the combination of means for carrying a
 75 tube from one position to another, and instrumentalities for performing an operation on said tube in each of a plurality of said positions thereof, thereby to provide the tube with an end wall, said instrumentalities
 80 comprising reciprocating means adapted to enter the path of said carrying means, while the latter are stationary, to form the end of the tube for the reception of the end wall.

21. In a machine for making containers, the combination of means for carrying a
 85 tube from one position to another, and instrumentalities for performing an operation on said tube in each of a plurality of said positions thereof, thereby to provide the
 90 tube with an end wall, said instrumentalities comprising dies to form a flange on the end of the tube, and cutting means to cut and apply a plurality of disks to said flange
 95 to form the end wall.

22. In a machine for making containers, the combination of means for carrying a
 100 tube from one position to another, and instrumentalities for performing an operation on said tube in each of a plurality of said positions thereof, thereby to provide the tube with an end wall, said instrumentalities
 105 comprising means for feeding sheet material, means to automatically cut and apply a plurality of disks to form said end wall, while the tube is stationary, and means
 110 whereby a second tube is being formed for the ultimate reception of its end wall while the previous tube is actually receiving its end wall.

23. In a machine for making containers, the combination of means for carrying a
 115 tube from one position to another, and instrumentalities for performing an operation on said tube in each of a plurality of said positions thereof, thereby to provide the tube with an end wall, in combination with means
 120 whereby a third tube is automatically fed into said carrying means each time a second tube is being formed for the ultimate reception of its end wall, and while the first tube is actually receiving its end wall, together
 125 with means whereby a previously finished container is always expelled from the carrying means while the latter are being held stationary to permit the desired operations to be performed on each succeeding tube.

24. In a machine for making containers, the combination of a rotary carrier, means
 130 for feeding tubes to said carrier, a recipro-

cating feeding means to feed sheet material, and reciprocating means to cut disks from said sheet material and to insert said disks in the tubes to form an end wall for each container, said reciprocating feeding means comprising a slide at one side of said carrier and a slide at the other side thereof, and devices to move the two slides up and down, together with means on each slide to engage the sheet material when the slide moves down, serving to release the sheet material when the slide moves upward.

25. In a machine for making containers, the combination of a rotary carrier, means for feeding tubes to said carrier, a reciprocating feeding means to feed sheet material, and reciprocating means to cut disks from said sheet material and to insert said disks in the tubes to form an end wall for each container, said means for feeding sheet material comprising a vertically reciprocating slide, means on said slide to engage the sheet material when the slide moves downward, serving to release the sheet material when the slide moves upward, and means for reciprocating the slide.

26. In a machine for making containers, the combination of a rotary carrier, means for feeding tubes to said carrier, instrumentalities for applying an end wall to each carrier, a friction clutch to rotate said carrier, gearing to operate the driving member of said clutch, stops on the friction driven member of the clutch, a movable element for engaging and disengaging such stops, thereby to stop the carrier in different positions for the operation of said instrumentalities, and a cam to automatically operate said element.

27. In a machine for making containers, the combination of a rotary carrier, means for feeding tubes to said carrier, instrumentalities for applying an end wall to each carrier, a friction clutch to rotate said carrier, gearing to operate the driving member of said clutch, stops on the friction driven member of the clutch, a movable element for engaging and disengaging such stops, thereby to stop the carrier in different positions for the operation of said instrumentalities, and a cam to automatically operate said element, said gearing comprising spiral gears, and said cam being mounted to rotate in unison with one of said gears.

28. In a machine for making containers, the combination of a rotary carrier, means for feeding tubes to said carrier, instrumentalities for applying an end wall to each carrier, a friction clutch to rotate said carrier, gearing to operate the driving member of said clutch, stops on the friction driven member of the clutch, a movable element for engaging and disengaging such stops, thereby to stop the carrier in different positions for the operation of said instrumentalities,

and a cam to automatically operate said element, said carrier having six positions, and there being six stops on said clutch, one of said positions being for the feeding of the tube to the carrier, the second position being for the formation of the tube to receive an end wall, the third position being for the discharge of the finished container from the carrier, the fifth position and the sixth position being idle, and said carrier having as many equidistant tube holders as there are positions of the carrier, so that the number of tube holders is equal to the number of stops, and whereby there is always a tube holder in each one of said positions when the carrier is at rest in any position thereof.

29. In a machine for making containers, the combination of a tube holder, means to push the tube endwise into said holder, a stop for the forward end of the tube, thereby to limit the insertion of the tube in the holder, leaving the rear end of the tube projecting a distance from the holder, a die to fold inward the edge portions of said projecting end of the tube, plungers movable toward each other to convert a portion of said inwardly folded edge into a flat annular flange within the tube, one of said plungers having means to co-operate with said die to form a hollow folded edge portion between said flange and the body of the tube, and instrumentalities for thereafter applying a bottom wall to said flange.

30. A structure as specified in claim 29, said instrumentalities comprising dies for cutting two disks of sheet material, and plungers for pushing the said disks toward each other, thereby to compress the disks against said flange.

31. A structure as specified in claim 29, said instrumentalities comprising means for cutting a disk to fit externally against said flange, leaving said hollow edge of the tube extending a distance beyond the outer surface of said disk, and means for cutting a larger disk and forcing it into the tube and against the inner surface of said flange, said last mentioned cutting means being adapted to cut said larger disk in such a manner that its diameter is a little greater than the internal diameter of the tube, thereby to cause the edge portions of this larger disk to bend backward toward the mouth of the wall, when the end wall is entirely in place, thus locking the inner disk against displacement away from the outer disk.

32. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising means for feeding a strip of sheet material, means for cutting a disk of larger diameter

than the inside diameter of the tube, from said sheet of material, means for moving said disk forward toward the tube, and means for reducing the diameter of said disk to enable it to enter said tube.

33. In a machine for making containers, the combination of mechanism for automatically feeding tubes into position in said machine, and instrumentalities whereby each tube is automatically provided with an end wall, and thereafter discharged from the machine, said instrumentalities comprising

means for forming a disk of sheet material, of larger diameter than the inside diameter of the tube, and a ring the inside diameter of which is less than the diameter of such disk, together with means for pushing said disk through said ring to reduce the diameter of the disk, so that it may enter said tube, and for thereafter pressing the edges of the disk forward into position to hold it tightly in the container.

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