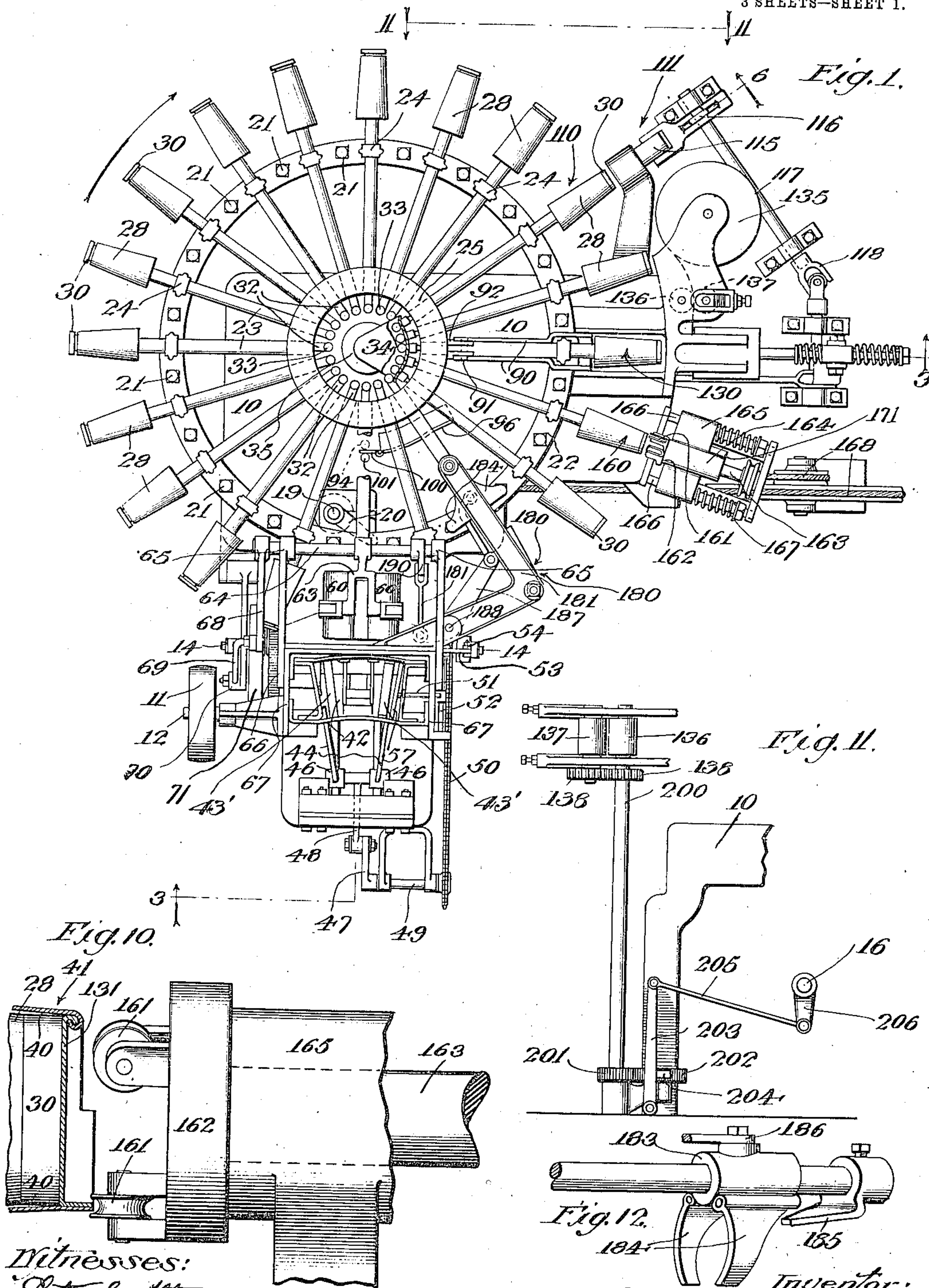


945,875.

J. C. THOMPSON.
CONTAINER FORMING MACHINE.
APPLICATION FILED OCT. 20, 1908.

Patented Jan. 11, 1910.

3 SHEETS—SHEET 1.



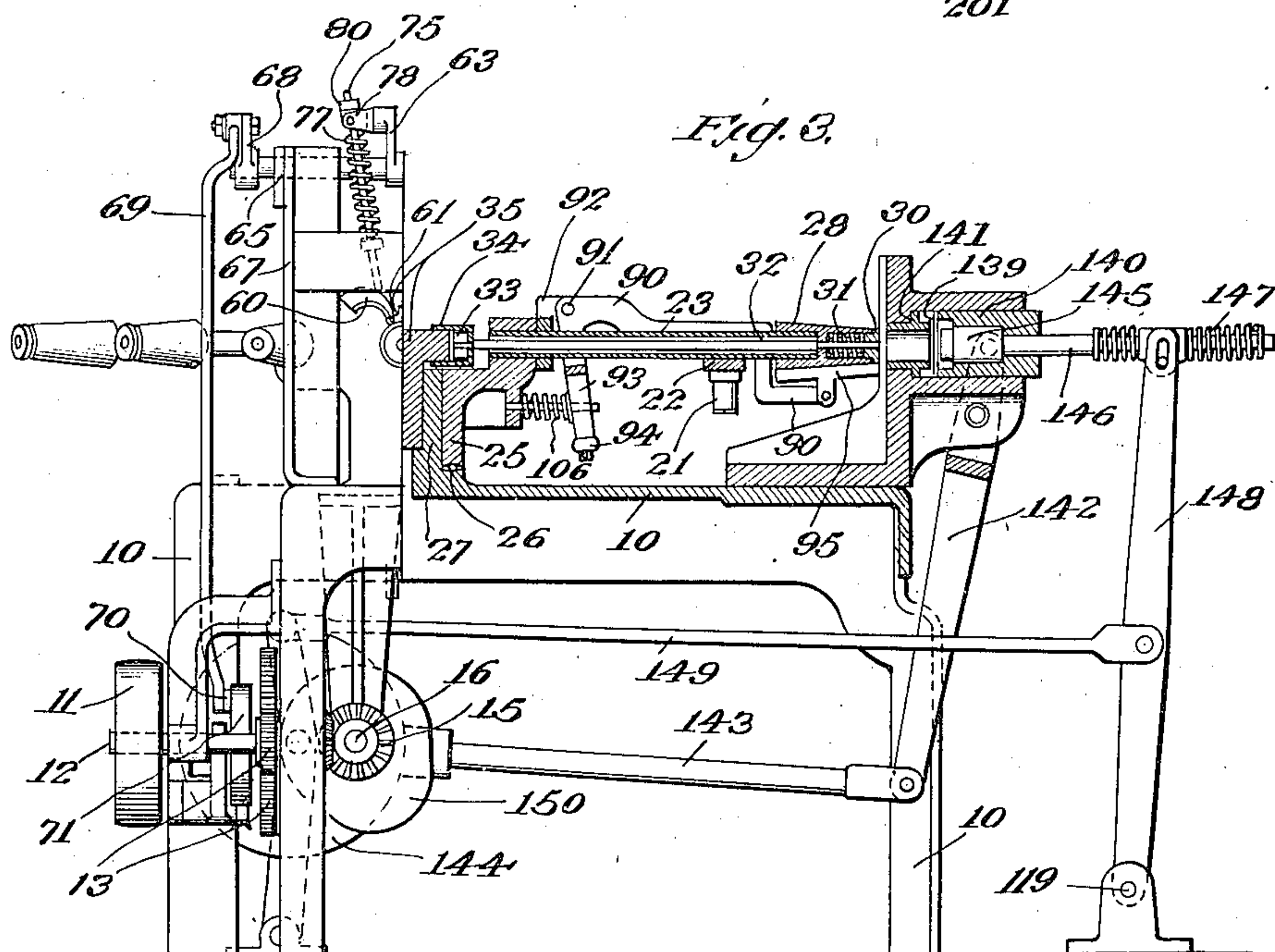
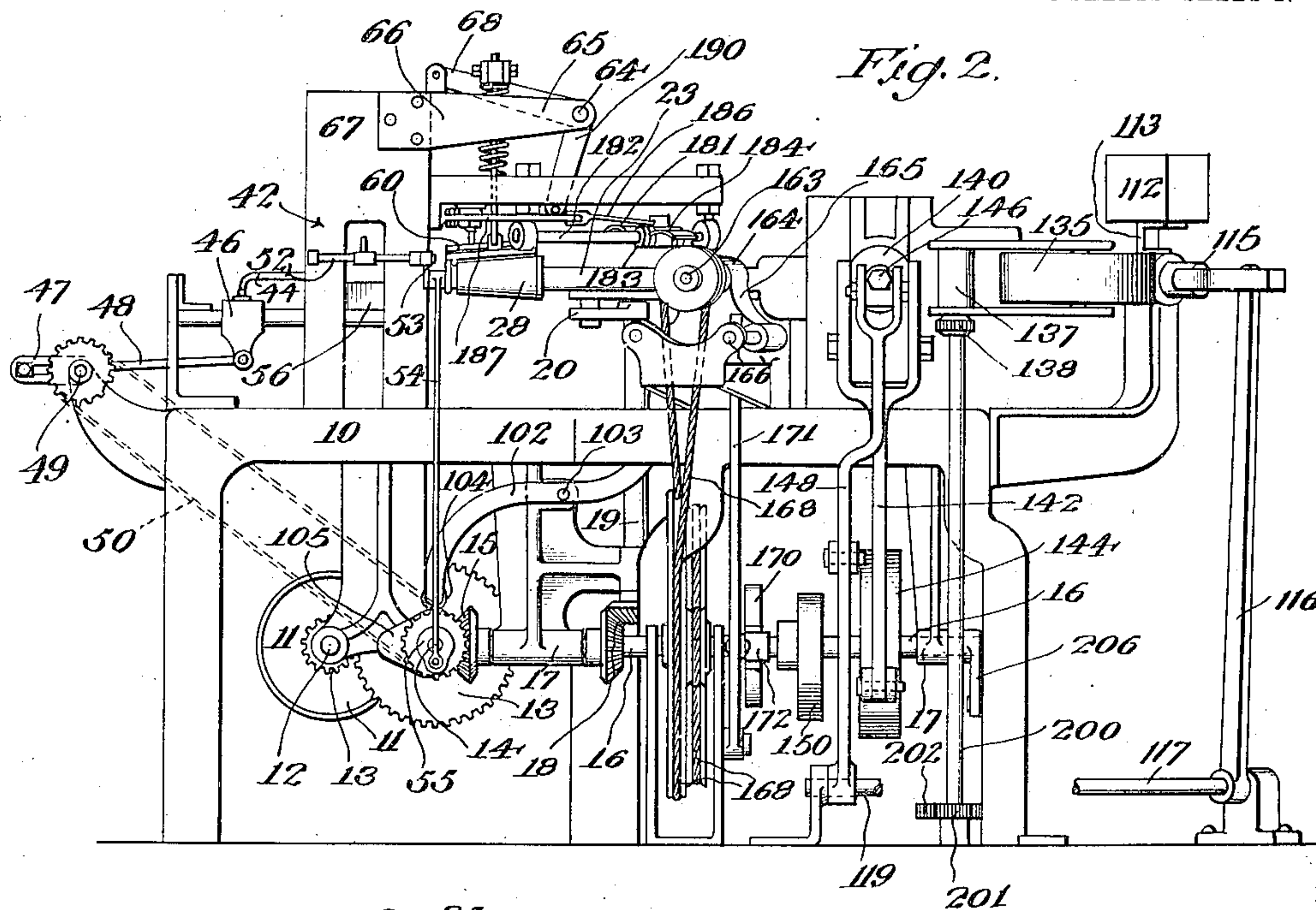
Witnesses:
Lute S. H. Jr.
Chas. H. H.

Inventor:
Jesse C. Thompson.
By James T. [Signature]
Attorney

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3 SHEETS—SHEET 2.



Witnesses:
Lute S. Alter,
C. W. Therington.

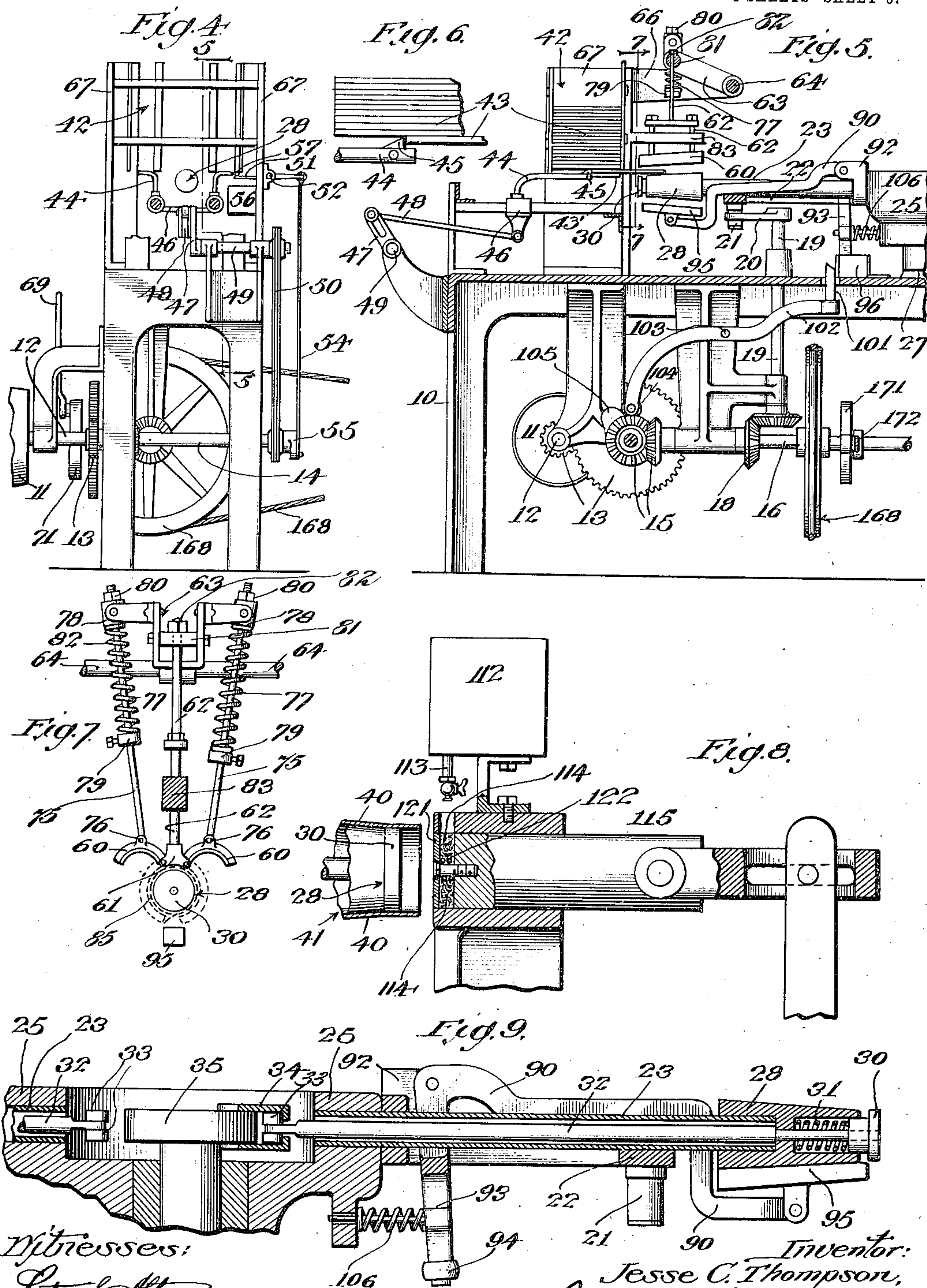
Inventor:
Jesse C. Thompson,
By James T. Buckle
Attorney.

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3 SHEETS—SHEET 3.



Witnesses:
L. S. Allen
C. W. Livingston

Inventor:
Jesse C. Thompson,
By James T. Backeow
Attorney

UNITED STATES PATENT OFFICE.

JESSE C. THOMPSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO THE AMERICAN
SANITARY PAPER CUP COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION
OF ARIZONA TERRITORY.

CONTAINER-FORMING MACHINE.

945,875.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed October 20, 1908. Serial No. 458,736.

To all whom it may concern:

Be it known that I, JESSE C. THOMPSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, in the State of California, have invented new and useful Improvements in Container-Forming Machines, of which the following is a specification.

This invention relates particularly to a machine for forming containers of paper and like substances and is particularly designed with those substances in view.

The embodiment of the invention shown in the drawings and described in the following specification is adapted particularly for making paper containers to be used as milk bottles, but it is obvious that the containers may be used for different purposes and that the machine may be altered to form containers of different configuration without departing from my invention.

In the accompanying drawings: Figure 1 is a plan view of the complete machine. Fig. 2 is a side elevation of the same taken from the right-hand side of Fig. 1. Fig. 3 is a sectional elevation, taken on line 3—3 of Fig. 1. Fig. 4 is an end elevation of the feeder mechanism. Fig. 5 is a longitudinal section of the feeder and forming mechanisms taken on line 5—5 of Fig. 4. Fig. 6 is an enlarged detail showing the feeding of the blanks. Fig. 7 is an enlarged end view of the forming mechanism taken on line 7—7 of Fig. 5. Fig. 8 is an enlarged sectional detail of the gluing mechanism. Fig. 9 is an enlarged longitudinal section of one of the conical forms and its mounting. Fig. 10 is an enlarged sectional view showing the action of the bottom joint rollers. Fig. 11 is a detail showing the feed for the bottom paper roll and taken as indicated by line 11—11 in Fig. 1. Fig. 12 is an enlarged detail view of the ejector mechanism.

In the drawing 10 designates a base frame upon which the various mechanisms of the machine are mounted. Power is supplied to the machine through a pulley 11 mounted on counter shaft 12, this counter shaft being connected by reducing gears 13 with transverse shaft 14. Shaft 14 is connected by bevel gears 15 to longitudinal main shaft 16 which traverses the length of the machine and is mounted in bearing 17 in the lower

part of the frame. Bevel gears 18 connect shaft 16 with a vertical shaft 19 which has an arm 20 mounted upon its upper end adapted to contact during a portion of its revolution, approximately one-sixth, with roller pins 21 projecting from the under face of a ring 22 which is horizontally revolvably mounted upon the upper part of base frame 10. Ring 22 forms the felly of a wheel whose spokes are formed of hollow tubes 23 secured by clamps 24 to the ring and having their inner ends set in a ring member 25 which revolves on ball bearings 26 around a hub 27 projecting upwardly from base frame 10. The complete wheel is thus free to revolve and the arrangements of the parts are such that the engagement of arm 20 with roller pins 21 moves the wheel through a distance exactly equal to the distance between successive pins.

Mounted on the outer ends of hollow tubes 23 are conical forms 28, there being as many radially projecting tubes 23 and forms 28 as there are pins 21 on ring 22. So that, in the successive rotary movements of the wheel the successive conical forms are stopped precisely in the same position. These conical forms are hollow and are provided with a longitudinal movable end 30 which normally stands at a slight distance from the outer end of the form, being held in this position by spring 31 within the form. A rod 32 is connected to each of the movable ends and passes inwardly to the center of the wheel through the hollow radial tube on which the form is mounted. At its inner end rod 32 is provided with rollers 33 which are adapted to engage with cam member 34 mounted on a center member 35 secured in hub 27 previously referred to. This cam member 34 is formed as shown in Fig. 1 and rods 32 are drawn toward the center as the rollers on their inner ends pass into engagement with the cam member, thus drawing ends 30 back against the outer ends of forms 28 as shown in Figs. 3 and 8.

The feeding mechanism for blanks 43 for the side walls 40 of the container 41 includes a hopper 42 in which blanks 43 are placed. The blanks are piled into the hopper on bottom bars 43' as shown in Fig. 5 and two feeder bars 44 are adapted to be reciprocated under the hopper to remove the lowermost

blank. These feeder bars are provided with catches 45 which are set so as to engage the lowermost blank and to move it from the hopper directly over the conical form 28 which is in the position shown in Fig. 5. Feeder bars 44 are mounted upon a reciprocating carriage 46 which is operated from a crank 47 through a connecting rod 48. Crank 47 is mounted on a shaft 49 driven by a sprocket connection 50 from transverse shaft 14 as shown in Fig. 2. Each time a form 28 is brought into position before the feeder the lowermost blank is fed onto the form directly below circular clamps 60. Previous to moving the lowermost blank onto the form the lower face thereof is provided with a strip of glue along one of its edges. This is accomplished by means of a gluer bar 57 supported by an arm 51 from a small shaft 52, this shaft being operated through the medium of an arm 53 and connecting rod 54 from a small crank 55 on the end of transverse shaft 14. A glue box 56 is provided so that bar 57 may dip directly into it, the bar oscillating between its position in the glue box where it dips into the glue and a box where it presses against the lower face of the lowermost blank. This operation of gluing the blank takes place just before the blank is fed by the feeder mechanism into the machine and on to the form. The former mechanism is comprised in a set of circular clamps 60 which are mounted on a member 61 supported by rods 62 from arm 63 which operates the circular clamps 60. Arm 63 is mounted on an oscillating shaft 64 which is journaled in bearings 65 supported by arm 66 from frame 67 which supports the blank hopper. Shaft 64 is oscillated through the medium of arm 68 having a connecting rod 69 attached to its outer end, the connecting rod having a cam follower 70 on its lower end which is operated by cam 71 mounted on transverse shaft 14. Arm 63 is connected to each of clamps 60 through the medium of a rod 75 pivoted at 76 to the clamps. A spring 77 is interposed between swivel member 78 on arm 63 and an adjustable collar 79 on rod 75, the clamp being thus resiliently moved downwardly and inwardly to a position to encircle a portion of conical form 28 upon the downward movement of arm 63. A nut 80 on the upper end of rod 75 provides a positive means for the upward movement of the clamp when arm 63 moves upwardly. Rods 62 which support member 61 upon which clamps 60 are pivoted pass through swivel member 81 on arm 63, nuts 82 on the upper ends of the rods providing for the positive upward movement of member 61 to the position shown in Fig. 7. Upon the downward movement of arm 63 member 61 is drawn by the downward movement of clamp 60 to the position shown in dotted lines, bearing upon

form 28. Rods 62 pass through bearings 83, being thereby held from lateral displacement.

The blank for the formation of the side walls of the container is fed into the position shown in dotted lines at 85 in Fig. 7 and the circular clamps 60 are then immediately operated into the position shown in dotted lines, the blank being thereby carried around the form as shown in dotted lines. By the relative adjustment of springs 77 it is arranged that the motion of left-hand clamp 60 shall take place slightly before that of the right-hand clamp and one edge of the blank is thereby placed over the other edge, the outer edge having upon its inner face the strip of glue which was previously deposited.

Mounted upon each of the radial tubes 23, but shown for convenience in Fig. 1 upon only one of the same, is a clamp arm 90 which is pivoted at 91 to a bracket 92 mounted on the inner end of the tube. An extension 93 projects from the inner pivoted end of the arm and carries a roller 94 on its lower end adapted to engage with a cam member 96 mounted upon base frame 10. At its outer end clamp arm 90 is provided with a clamp member 95 which is adapted to press along the lower part of conical form 28 and to hold the edges of the blank in tight engagement with each other, allowing the glue to set. Rollers 94 hang directly beneath their respective tubes 23 and the roller which is on the tube 23 whose form 28 is in the position shown in Fig. 5 is pressing outwardly against a hinged gate 100 forming a part of cam member 96. This hinged gate is prevented from moving outwardly, and therefore holds the roller 94 from outward movement, by a vertical pin 101 mounted upon the end of a lever 102 pivoted at 103 to the frame. This lever has upon its other end a cam follower roller 104 which is operated by a cam 105 mounted upon transverse shaft 14. At the time when the circular clamps 60 have formed the blank around the conical form and just before the form is rotated to its subsequent position, cam 105 operates this lower pin 101 and gate 100 is thereby allowed to move outwardly under the pressure of spring 106 which normally presses extension 93 and roller 94 outwardly and keeps clamping member 95 in contact with the blank around form 28. Clamping member 95 is thus allowed to press upwardly against the edges of the blank and to hold them in position as shown by dotted line in Fig. 7. In this position the clamping member is moved with the form and the blank in successive motions around the revoluble wheel in the direction indicated by the arrow in Fig. 1, the glue being meanwhile given time to dry thoroughly so that the blank is set in position.

Upon arrival at the position designated by the numeral 110 end 30 of form 28 is drawn inwardly by the engagement of rollers 33 with cam form 34. The blank then projects beyond the end of end piece 30 as it is long enough to come flush with the outside of end piece 30 when the end piece is in its outer position as shown in Fig. 9. This condition is shown in an enlarged detail in Fig. 8, this detail being taken at the position indicated by numeral 110. At this point, the gluing mechanism 111 operates to deposit a strip of glue around the inner lower edge of the circular walls of the container. A glue box 112 is supported in a convenient position and has a spout 113 discharging liquid glue on to a sponge 114 held in a plunger 115 operated by arm 116 projecting upwardly from and mounted upon a shaft 117. This shaft 117 is connected by a universal joint 118 to shaft 119 which is oscillated as will be hereinafter described. The oscillations of shaft 117 are so timed that plunger 115 is forced inwardly and into the projecting end of container 41 while the container is at rest directly in front of the plunger. Sponge 114 is held between the end of plunger 115 and a ring 121, the ring being held normally in a position shown in Fig. 8 by a spring 122. Upon the plunger being forced inwardly ring 121 contacts with end member 30 of form 28 and the sponge is squeezed between the ring and the plunger. The sponge consequently expands radially and comes into contact with the inner walls of the container, leaving an annular strip of glue around the edge thereof.

In the two successive movements from position designated 110 the form passes to the position indicated by numeral 130 and bottom 131 is inserted while the form and the container thereupon are stationary in this position. Fig. 3 is a section taken at this position of the form. The paper for the bottom blanks is fed from a roll 135 by feeding rollers 136 and 137. These rollers are inter-connected by gears 138 so that the strip of paper from roll 135 is fed uniformly into the die mechanism. Roller 136 is mounted on shaft 200 vertically journaled on the frame of the machine. A gear 201 at the lower end of the shaft meshes with a gear 202, this last gear being operated by a pawl 204 mounted on a pivoted arm 203. Arm 203 is oscillated from a crank 206 on the end of shaft 16. The relative sizes of the parts are so designed that the proper amount of paper is fed into the dies on each revolution of shaft 16. The strip of paper is fed to the position shown at 139 directly between die 140 and die shoe 141. Die 140 is operated through the medium of lever 142 and a connecting rod 143 from an eccentric 144 mounted on main longitudinal shaft 16 of the machine. At a proper time

in the cycle of operations of the machine die 140 moves forwardly and cuts a circular blank from paper 139. Former 145 which is contained within die 140 is also moved forwardly with the die and forces the circular blank of paper into the cup shape shown in lower part of Fig. 10 by confining the blank between the former and the hollow interior of die shoe 141. Former 145 is also mounted upon a stem 146 which is resiliently operated through spring 147, lever 148 and connecting rod 149, from cam 150 on main longitudinal shaft 16. After the forward movement of die 140 the former is moved quickly forwardly by the action of cam 150 and the cup shaped bottom is forced into the projecting end of the container, coming into engagement with the annular strip of glue previously deposited thereon. The relative sizes of the container and bottom are such that the bottom fits tightly. After this operation has been completed the container moves to its successive position indicated by numeral 160. Directly opposite this position of the container is a set of rollers 161 mounted upon a revolving frame 162 which is in turn secured upon shaft 163 journaled in bearing 164 on a small slidable frame 165. Frame 165 is mounted on guide rods 166 and is pressed inwardly toward the container by springs 167. Shaft 163 is continuously rotated through the medium of rope drive 168 from main longitudinal shaft 16, the rollers being normally held back against the action of springs 167 by a cam 170 on longitudinal shaft 16 operating slider frame 165 through the medium of a lever 171 and a connecting rod 172. Cam 170 is so designed and placed as to allow springs 167 to press rollers 161 into engagement with the edges of the container side walls and bottom whenever a container is brought to position 160. The rollers bear against the edges as illustrated in the lower part of Fig. 10 and the lower edges are slowly curled to the configuration shown in the upper half of Fig. 10. The rollers are connected by rope drive 168 so as to revolve at a relatively high speed, the curling of the lower edges being thus accomplished quickly during the small interval of time in which the container remains in position 160.

From position 160 the finished container passes through two successive movements to position 180 where it is ejected from the machine. Just before coming to position 180 roller 94 on extension 93 of clamp lever 90 comes into engagement with cam member 96 and clamp member 95 is thereupon removed from engagement with the container. At about the same time roller 33 on the inner end of rod 32 passes out of engagement with cam member 34 and end 30 is allowed to move outwardly. This outward movement

partially moves the container off of form 28. To complete the ejection of the container from the form a frame 181 is hung directly above position 180 of the container and a guide rod 182 is supported therefrom having a slider 183 thereon. This slider is provided with a pair of semi-circular wings 184 which are adapted to fit around form 28 directly beneath and to strip the container therefrom, throwing it off into any convenient receptacle placed beneath. The wings are held apart while slider 183 is at its rear end of its travel by a spreader 185 upon which the wings ride. At the appropriate instant the slider is moved forwardly through the agency of a connecting rod 186 secured to a lever 187 which is pivoted at 188 to frame 181 and is also connected by rod 189 to an arm 190 mounted on oscillating shaft 64. When shaft 64 oscillates under the influence of cam 71 the slider is moved outwardly and the wings strip the container from the form.

From the foregoing description it will be seen that I have provided a machine for forming containers from a flexible or pliable substance. Many minor changes may be made in the mechanism described to suit the needs of containers for any particular use. The bottom and side walls may be united by any sort of joint and the edges of the side walls blank may be beveled if necessary to afford a smooth interior surface. The gist of the invention is seen to consist mainly in the provision of the forms with movable ends as described, these movable ends entering into combination with the different mechanisms for preparing the container for the insertion of the bottom and also the mechanisms for inserting the bottom and forming a liquid tight joint between the bottom and the side walls.

I claim:

1. A container forming machine, comprising an extensible form, means to place a blank around the form, means to contract the form, and means to insert a bottom member for the container within the blank folded around the form.

2. A container forming machine, comprising an extensible form, means to place a blank around the form, means to contract the form so that the blank projects beyond

the end thereof, means to insert a bottom into the projecting end of the blank, and means to form a joint between the bottom and the blank.

3. A container forming machine, comprising an extensible form, means to fold a blank around the form to provide the side walls of a container, means to contract the form to leave the side walls projecting beyond the end thereof, means to place a strip of adhesive upon the projecting end of the side walls, and means to place a bottom for the container into engagement with the adhesive.

4. A container forming machine, comprising an extensible form, means to place a blank around the form while in its extended position to provide the side walls of a container, means to contract the form and leave the side walls projecting beyond the end thereof, means to place a strip of adhesive around the inner periphery of the projecting end, and means to insert a bottom member within the projecting end of the side walls.

5. A container forming machine, comprising an extensible form, means to place a blank around the form while in its extended position to provide the side walls of a container, means to contract the form, means to place a strip of adhesive around the inner periphery of the projecting end of the side walls, means to insert a bottom member within the projecting end, and means to form a joint between the bottom and side walls.

6. A container forming machine, comprising an extensible form, means to place a blank around the form while in its extended position to provide the side walls of a container, means to contract the form, means to place a strip of adhesive around the inner periphery of the projecting end of the side walls, means to insert a cup shaped bottom member within the projecting end, and means to form a joint between the bottom and the side walls.

In witness that I claim the foregoing I have hereunto subscribed my name this 9th day of October 1908.

J. C. THOMPSON.

Witnesses:

JAMES T. BARKELEW,
CEYLON O. THORINGTON.