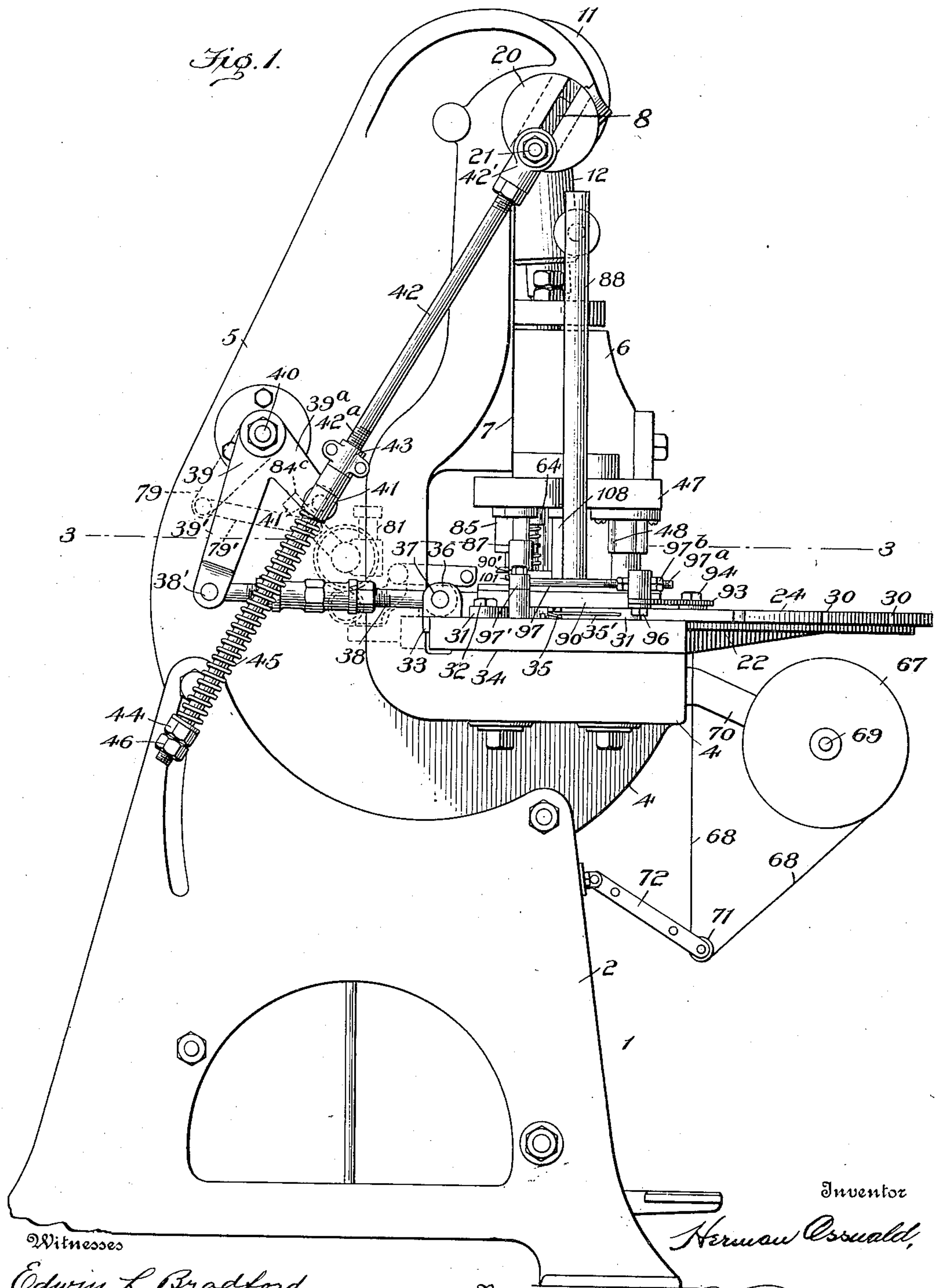


908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.
6 SHEETS—SHEET 1.



Witnesses
Edwin L. Bradford
O. O. Waigh

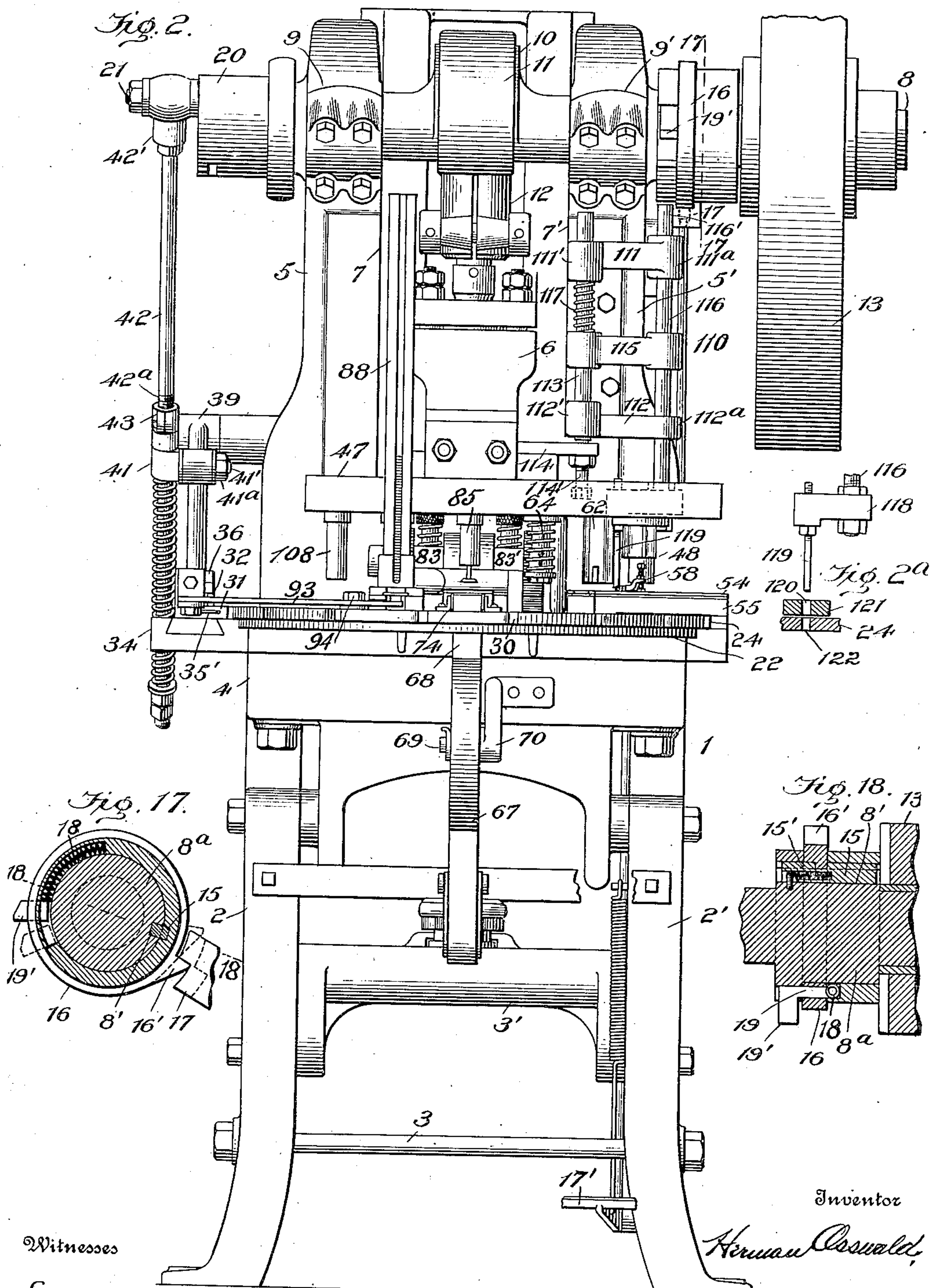
By

Inventor
Herman Osswald,
Attorney

908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.
6 SHEETS—SHEET 2.



Witnesses

Edwin L. Bradford
C. C. Wright

334

Inventor

Herman Osswald

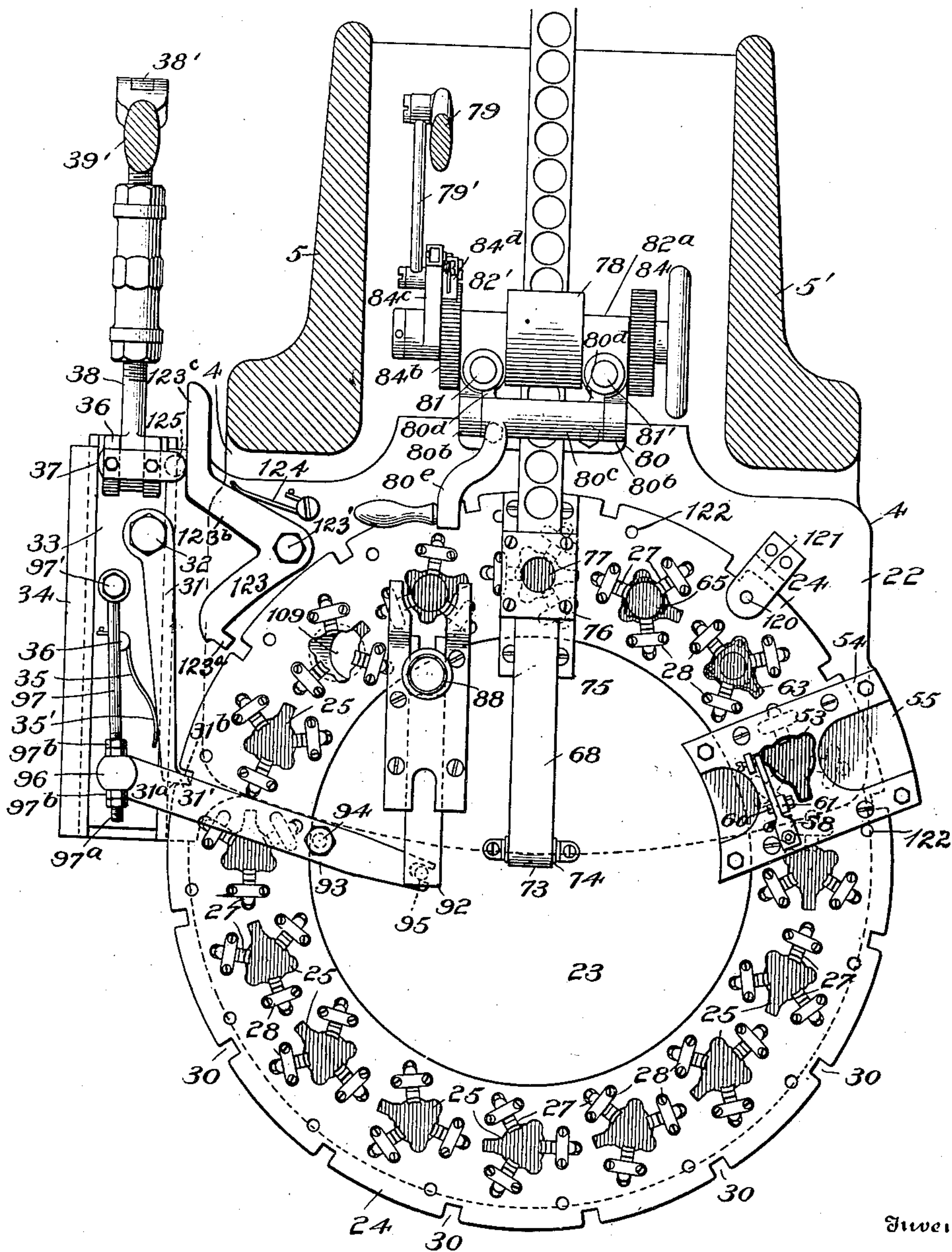
Edmund M. Oswald
Attorney

908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.
6 SHEETS—SHEET 3.

Fig. 3.



Inventor

Witnesses

Edwin L. Bradford
C. C. Wright

Herman Osswald

By

Edward H. Alexander

Attorney

908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.
8 SHEETS—SHEET 4.

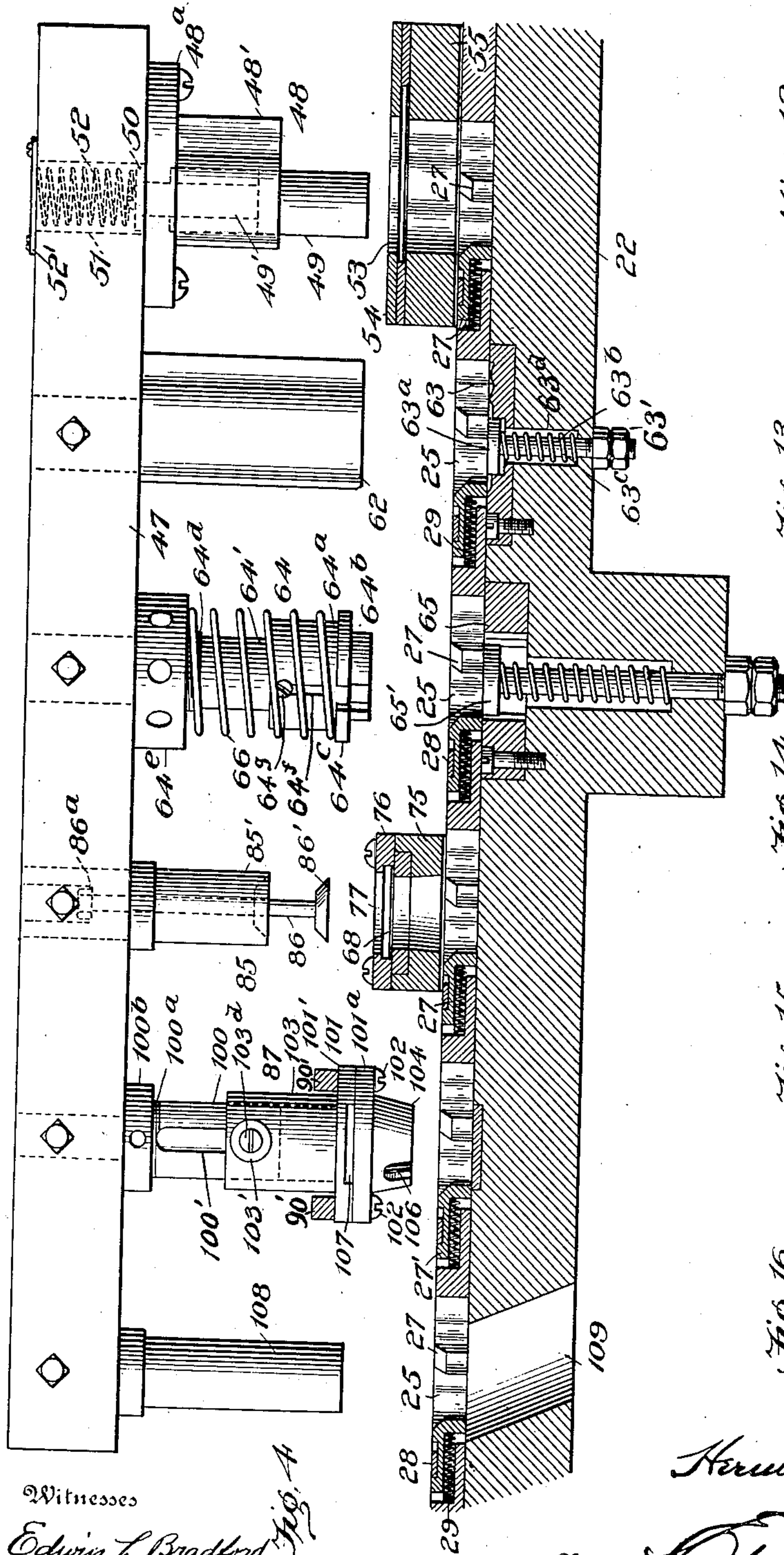


Fig. 12.

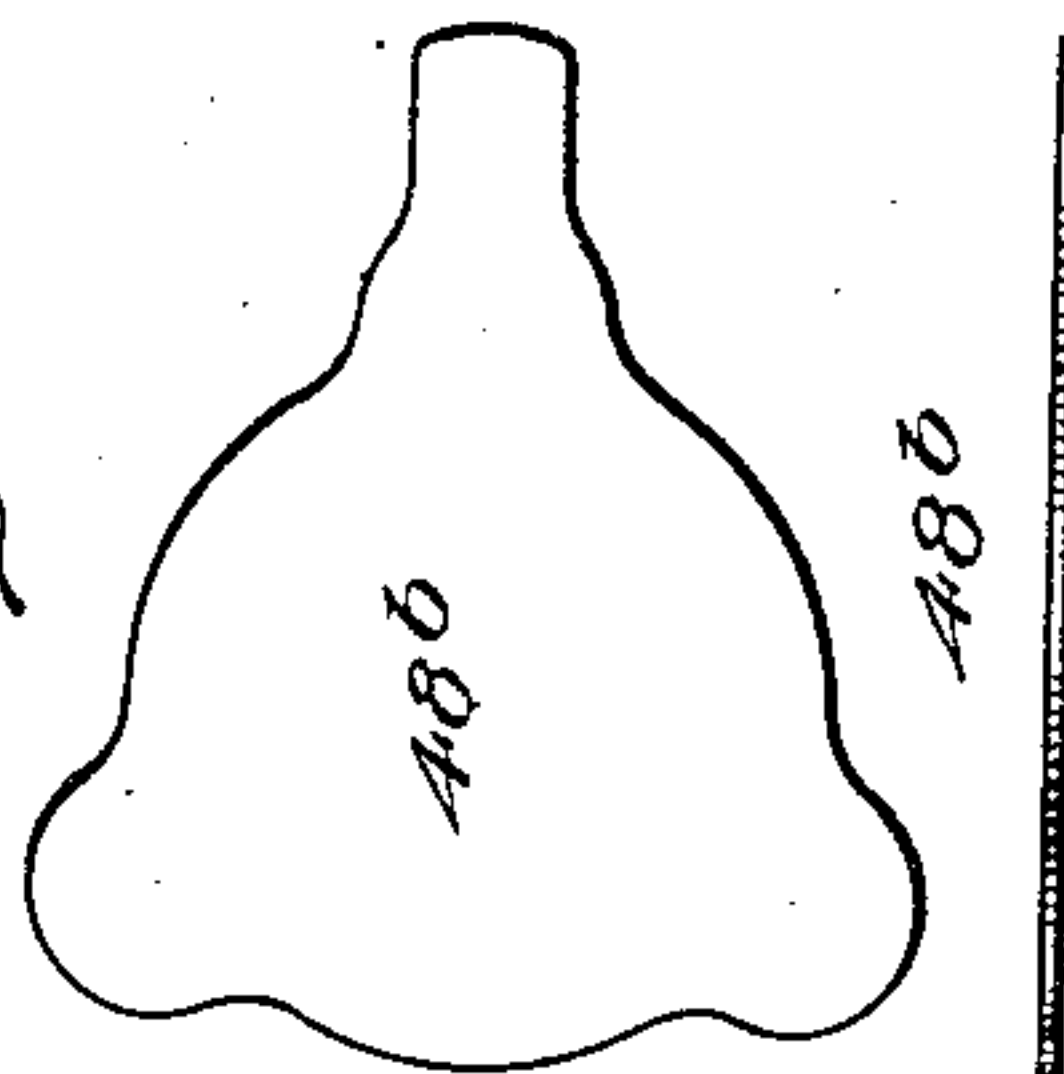


Fig. 13.

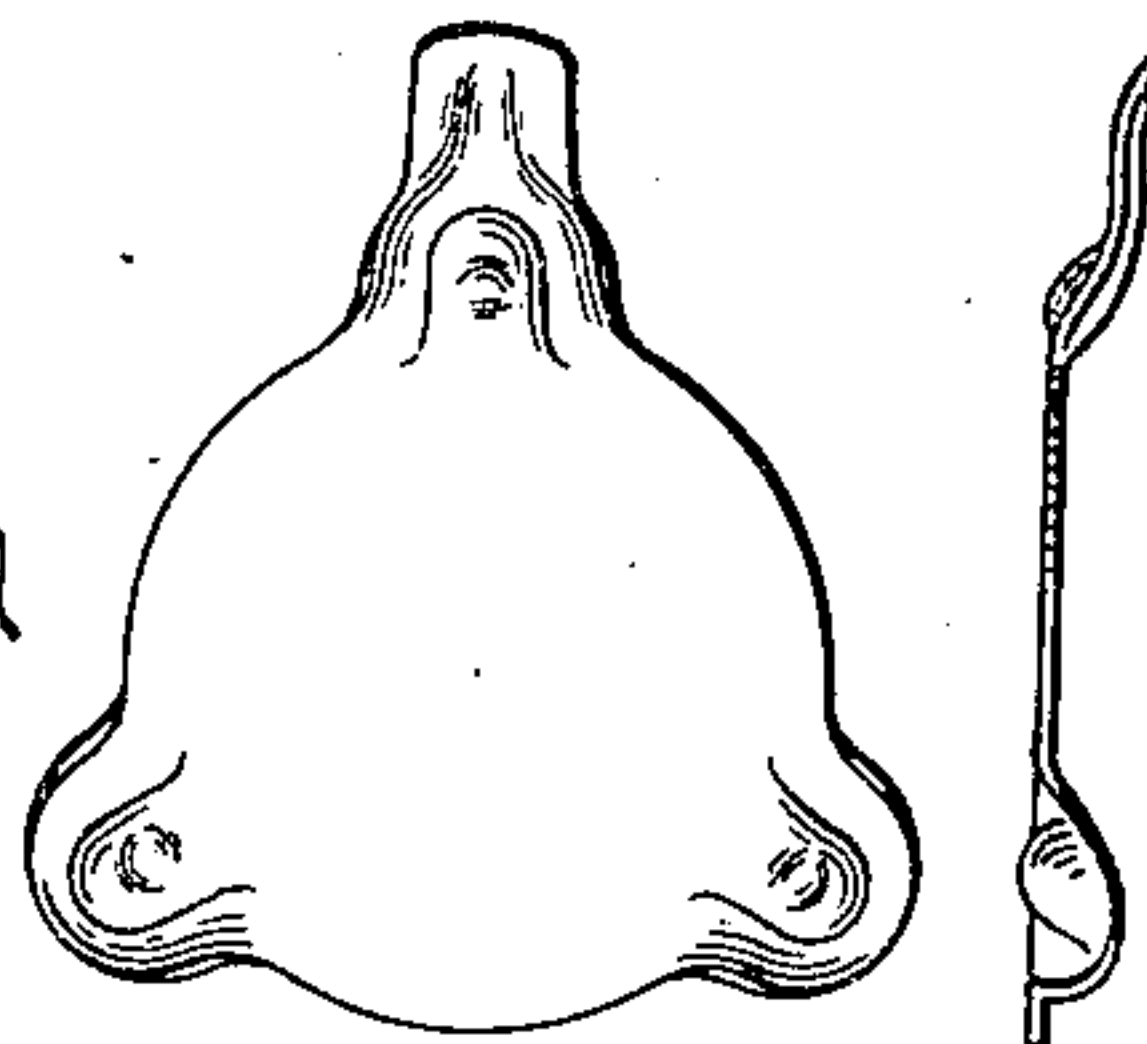


Fig. 14.

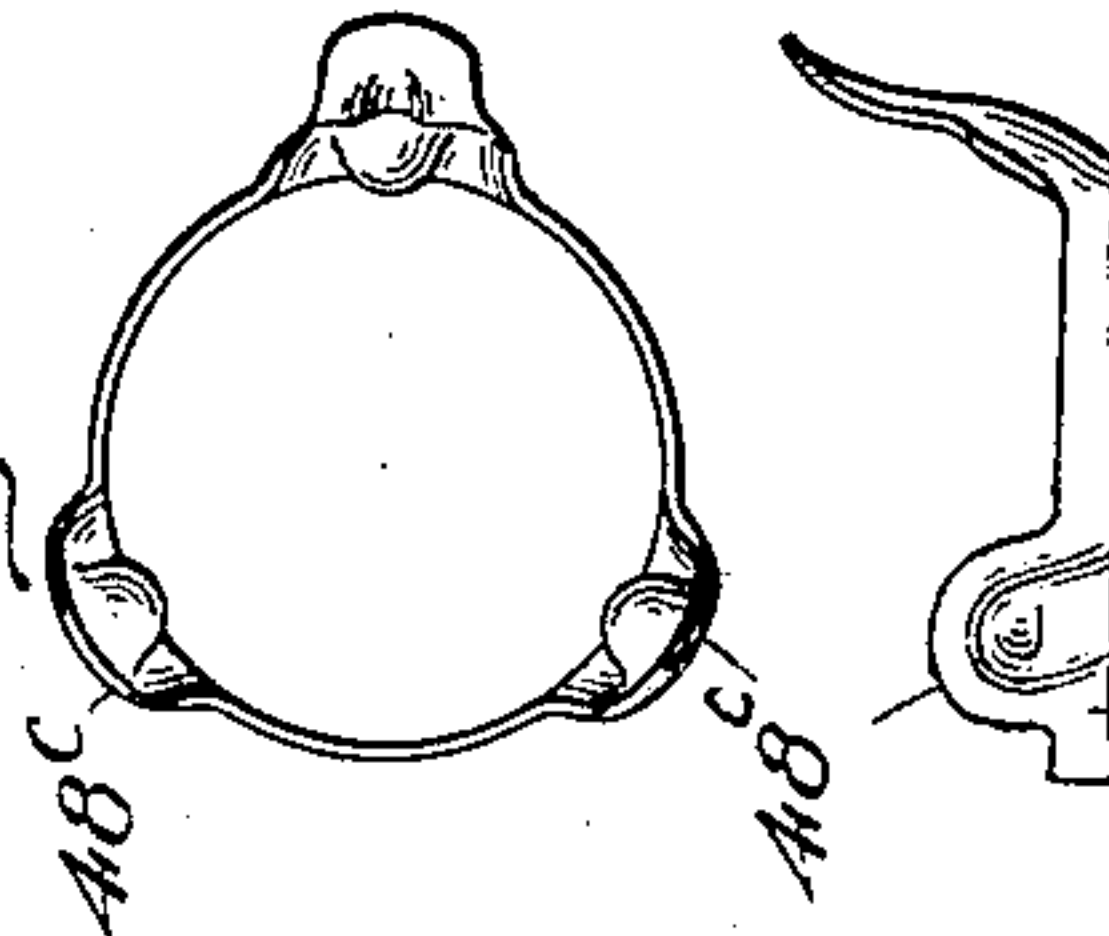


Fig. 15.

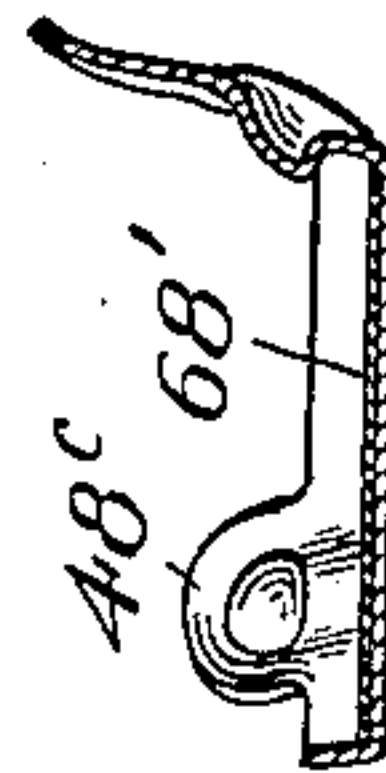


Fig. 16.



Inventor

Herwan Osswald,

By

Edwin P. Mendenhall,

Attorney

Witnesses

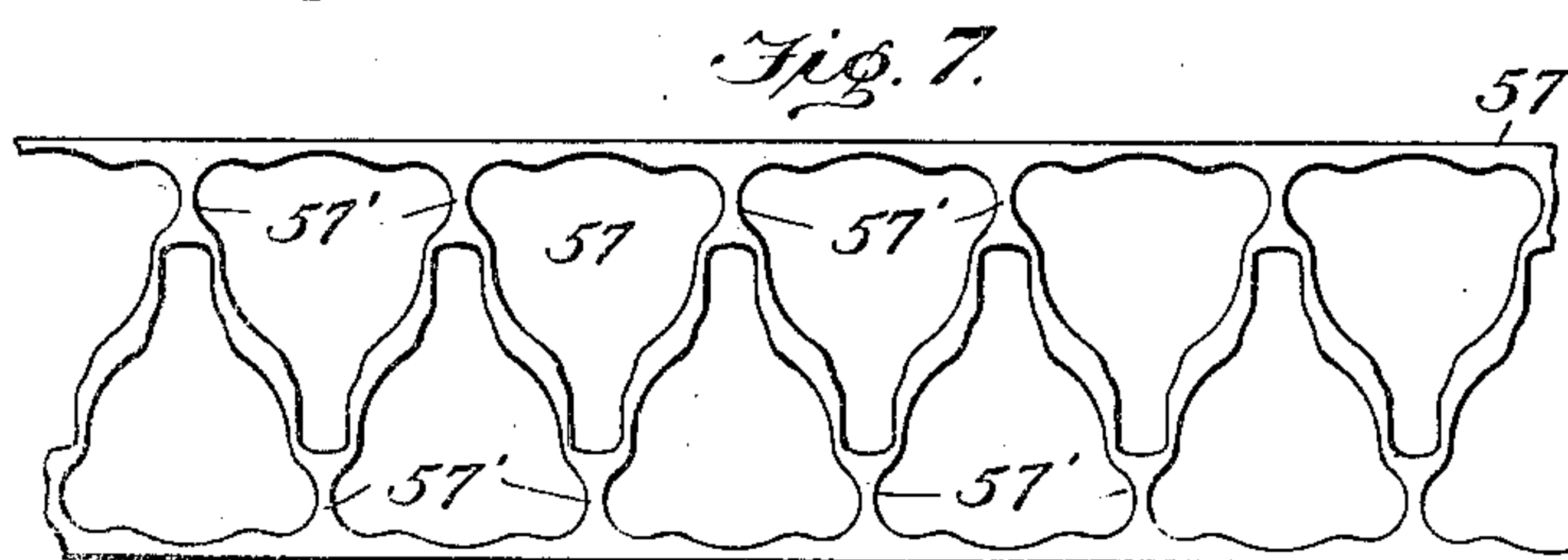
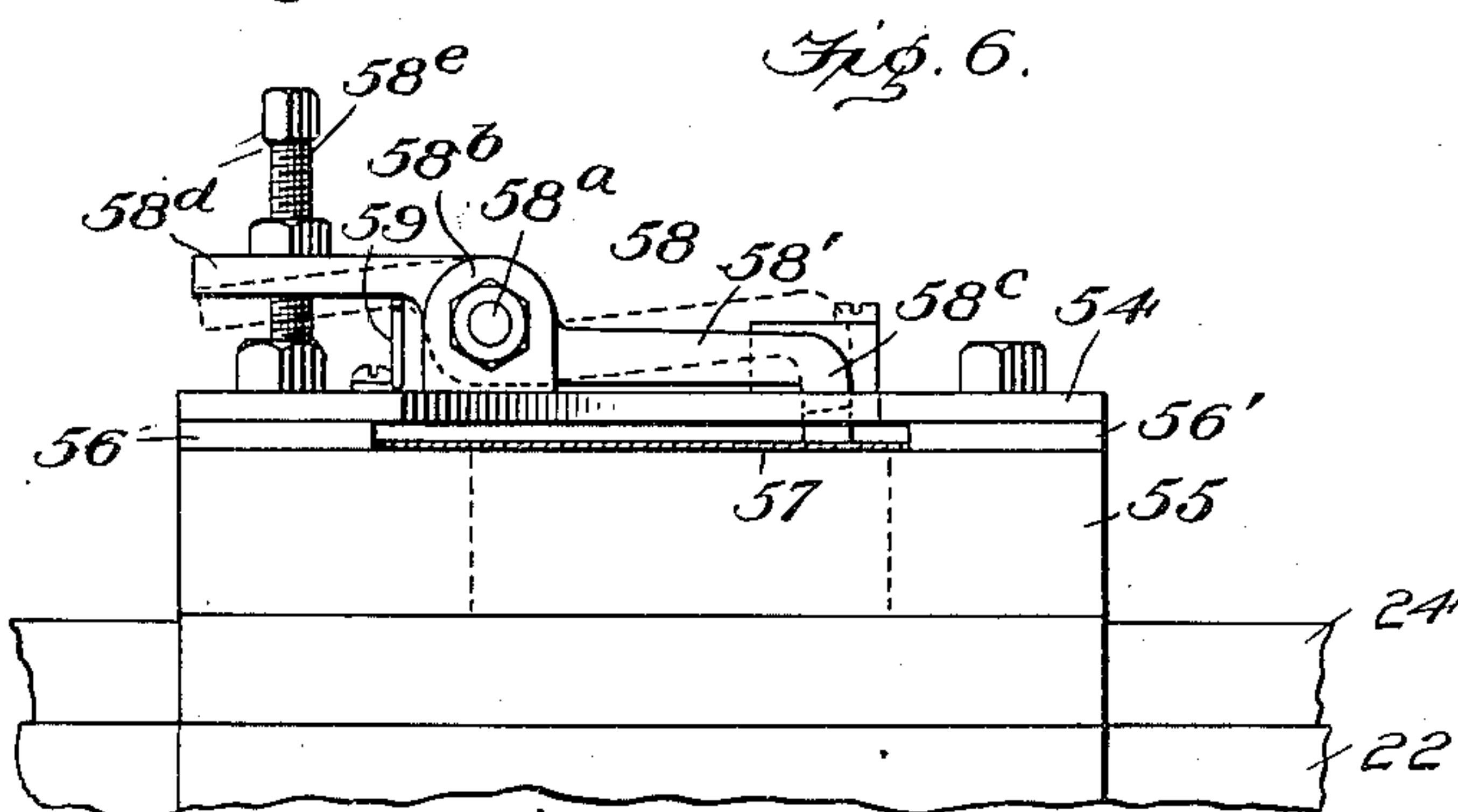
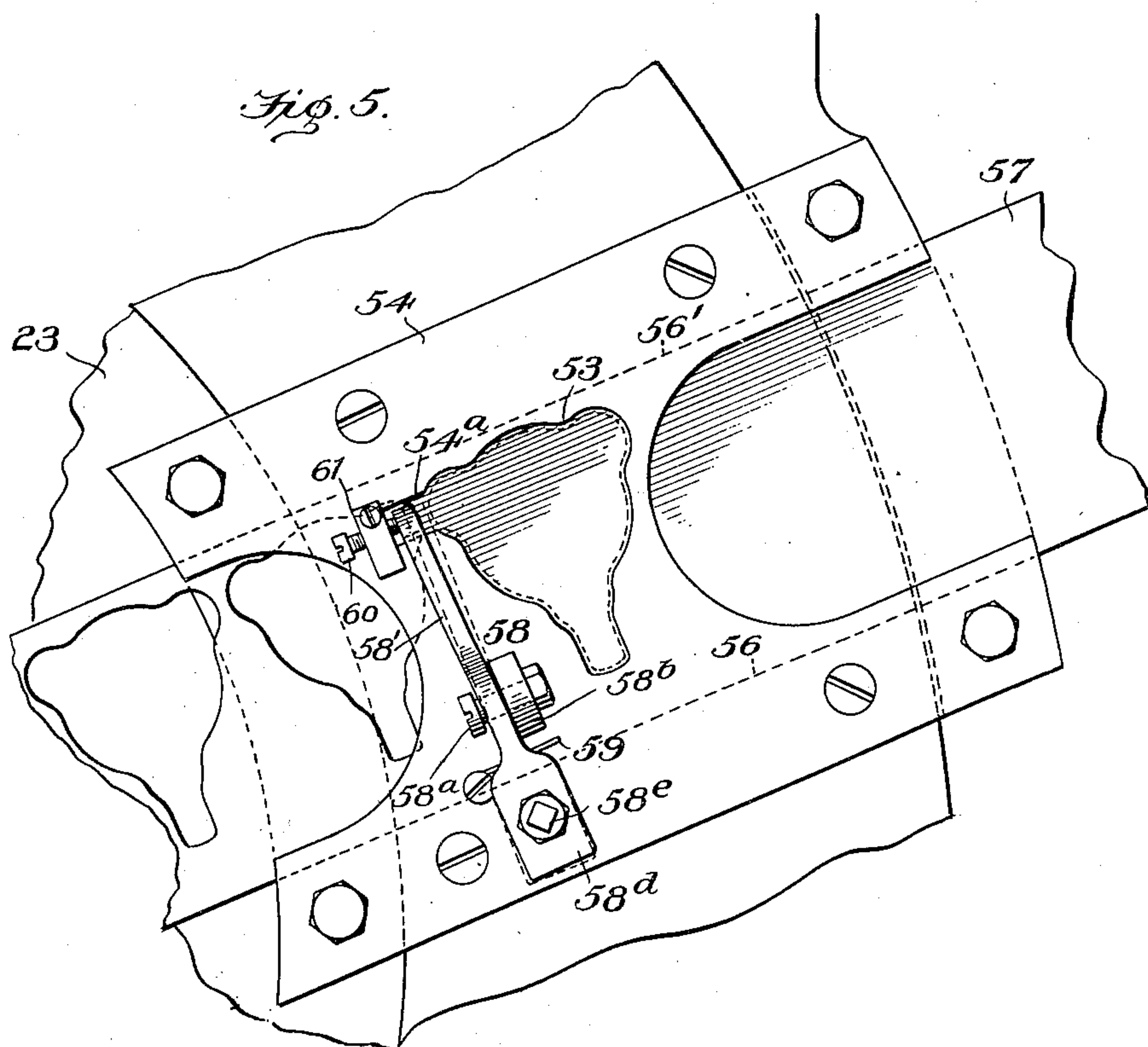
Edwin L. Bradford
C. C. Wright

908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.

6 SHEETS—SHEET 5.



Inventor

Witnesses

Edwin L. Bradford
C. C. Wright

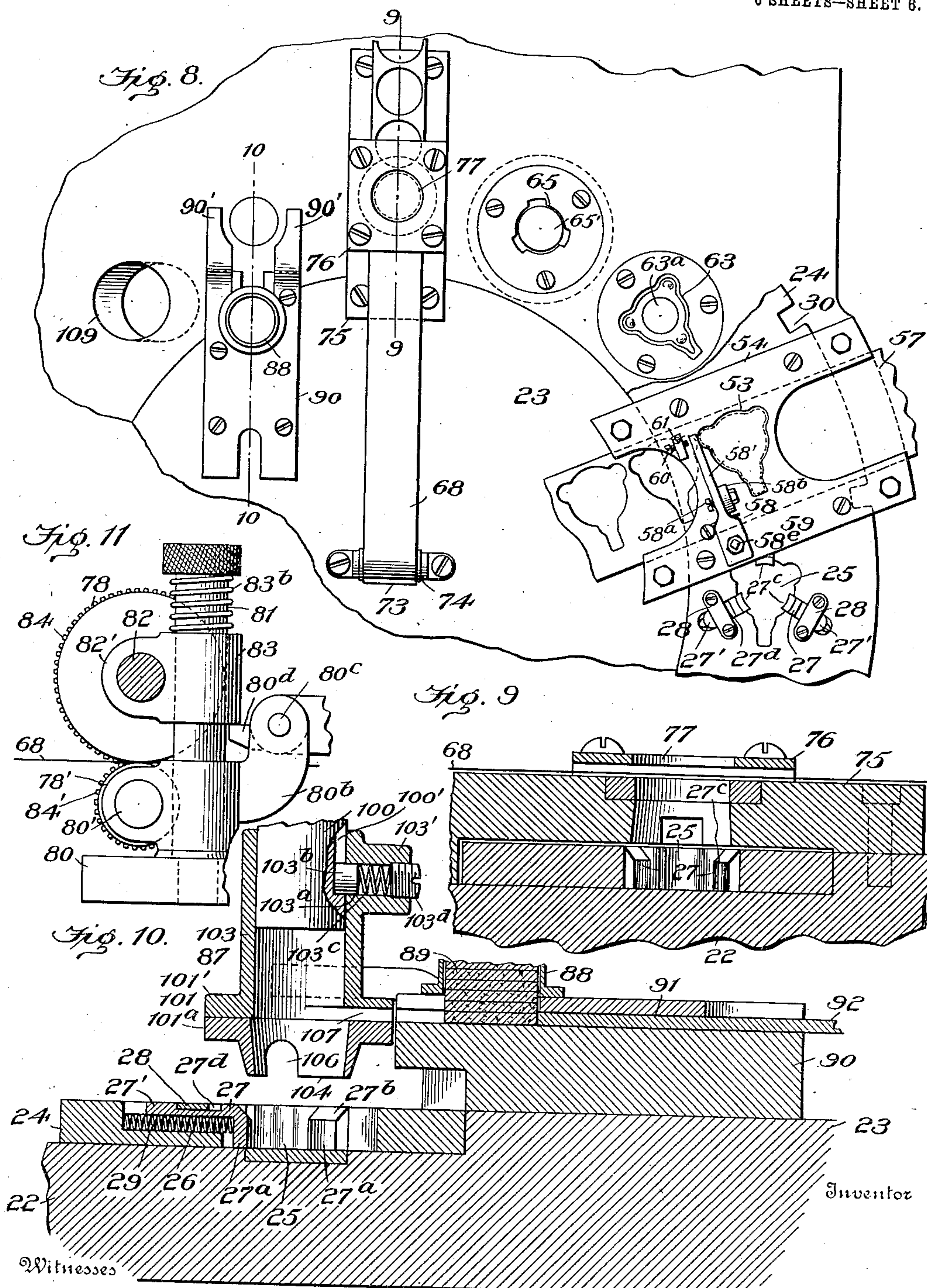
By

Herman Osswald,
Attorney

908,319.

H. OSSWALD.
BOTTLE CAP MAKING MACHINE.
APPLICATION FILED MAY 31, 1907.

Patented Dec. 29, 1908.
6 SHEETS—SHEET 6.



Edwin L. Bradford
C. C. Wright

By

Herman Osswald,
Attorney

UNITED STATES PATENT OFFICE.

HERMAN OSSWALD, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE V. & O. PRESS COMPANY,
OF GLENDALE, NEW YORK, A CORPORATION OF NEW YORK.

BOTTLE-CAP-MAKING MACHINE.

No. 908,319.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed May 31, 1907. Serial No. 376,620.

To all whom it may concern:

Be it known that I, HERMAN OSSWALD, a citizen of the United States, residing at Brooklyn, county of Kings, State of New York, having invented certain new and useful Improvements in Bottle-Cap-Making Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to a machine for making bottle caps.

It has for its principal object to make complete, ready for application to the mouth of a bottle, a sheet metal cap or closure with suitable cushioning and packing materials therein.

Figure 1 is a side elevation of a machine embodying my improvements. Fig. 2 is a front elevation of the same. Fig. 2^a is a detail view, partly in section, of the safety clutch-disconnecting mechanism. Fig. 3 is a section on the line 3—3, Fig. 1. Fig. 4 is a view showing the various punches in front elevation above the bed plate, and the bed plate dies and rotary dial thereon, in section. Fig. 5 is a plan view of the guide for the sheet metal strip from which the bottle caps are formed, and a portion of the rotary dial plate. Fig. 6 is a side elevation of the parts shown in Fig. 5. Fig. 7 is a plan view of a strip of metal showing how the blanks for making the bottle caps are struck therefrom. Fig. 8 is an enlarged plan view of a portion of the bed of the press, only a fragment of the rotary dial plate being shown. Fig. 9 is a section on the line 9—9, Fig. 8. Fig. 10 is a section on the line 10—10, Fig. 8. Fig. 11 is a side elevation of a part of the paper feed mechanism, detached. Fig. 12 shows a bottle cap blank as struck from the strip of metal of which the blanks are formed. Fig. 13 shows the blank after it has been acted upon by the first punch and forming die. Fig. 14 shows the finished metal cap formed by the second punch and die. Fig. 15 is a section of a metal cap blank showing a piece of paper introduced into it by the paper punch. Fig. 16 is a section showing a completed bottle cap as it leaves the cork disk inserting mechanism. Fig. 17 is a section on the line 17—17, Fig. 2. Fig. 18 is a section on the line 18—18, Fig. 17.

In the drawings, 1 indicates as an entirety the main frame of the machine. This may be of any suitable construction. For illus-

tration, I have shown it, of the nature of a press frame, comprising two side standards or supports 2, 2', suitably joined near their lower ends by cross and positioning bars 3, 3'.

4 is a bed supported by the said standards and having extending upwardly from either side of the rear thereof the uprights 5, 5'.

6 is a vertically reciprocable slide mounted to move up and down in suitable guides 7, 7', carried by the uprights 5, 5', respectively. The mounting and operation of this slide may be of any suitable and well known nature. For example, I have shown a main drive shaft 8, horizontally disposed and mounted transversely at the upper end of the main frame in bearings 9, 9', carried by the uprights 5, 5', respectively. Between these bearings, the said shaft 8 has secured to or formed integrally with it an eccentric 10, which is connected by suitable eccentric straps 11 and pitman 12 to the upper end of the slide 6.

13 is a power transmitting wheel, preferably a belt wheel, loosely mounted on one end of the said main shaft 8. This belt wheel is locked to and released from the said shaft by means of a dog 15 fitted to slide longitudinally of the shaft in a groove 8' in an enlargement 8^a on the shaft, the outer end of the said dog being adapted to be projected into and withdrawn from the path of travel of suitable lugs or projections on the inner face of the hub of the said wheel. Since the mechanism for connecting the said power transmitting wheel 13 to and disconnecting it from the drive shaft 8 forms no part of this invention, it is not deemed necessary to describe it in detail, as any suitable clutch mechanism may be employed for the purpose. The specific one shown in the drawings is fully described and claimed in my Letters Patent of the United States, No. 772,113, dated October 11th, 1904. It is sufficient for the purposes of this application to know that the dog 15 is normally pressed outwardly by the spring 15', Fig. 18, and that its movement is controlled by the rotation of the ring 16, having cam and groove connection with said dog by means of which the dog is permitted to move outwardly when the ring 16 is revolved a predetermined distance about the axis of the shaft 8, and is withdrawn when the switch plate 17 (Fig. 17) engages the lug 16' on the ring 16, and prevents

the further rotation of the ring 16 and the unclutching of the dog 15.

When the switch plate 17 is withdrawn to release the ring 16, the latter is rotated, as indicated by dotted lines, Fig. 17, by means of a spring 18 bearing against a dog 19 extending through the ring 16 and having an outwardly extending lug or arm 19', and this permits the outward movement of the dog 15 and its engagement with the power wheel 13. The movement of the switch plate 17 may be controlled by a foot treadle 17' having suitable connection, not shown, with the said switch plate.

20 is a disk diametrically grooved and secured to or formed integrally with the shaft 8 at its opposite end to the one carrying the belt wheel 13, and preferably outside of the upright 5. The groove in the disk 20 is preferably T-shaped in cross section to receive the head and shank of a crank pin or arm 21, which is adjustable along said groove relatively to the axis of the shaft 8.

22 is a horizontally disposed plate, secured in any suitable manner to the upper surface of the bed 4 and carrying a pivot or center plate 23, which may be formed integrally with it, or secured to it in any suitable manner.

24 is a rotatable annular dial having an annular series of cap-receiving apertures 25 through it, each one of which apertures is shaped preferably to the form of the metal blank from which each metallic cap is made.

26 are grooves, three in number, extending in the said dial plate 23 radially from the center of each cap aperture or blank receiver 25 therein.

27 are reciprocable cap or blank-engaging grippers or jaws, each having a horizontally disposed arm 27' mounted in one of said grooves 26, and a downwardly extending vertically disposed arm 27^a, which preferably rests at its lower end upon the upper surface of the plate 22. Each of these grippers has its upper inner corner beveled, as indicated at 27^b, to permit the easy introduction of a cap blank into the holder, and the inner vertical face of each gripper is grooved, as indicated at 27^c, to conform to the curvilinear surface of the cap or cap blank. The upper surface of each gripper is transversely grooved, as indicated at 27^d, to receive a transversely arranged retaining strip or plate 28, which at either end is secured to the dial plate 24 and is adapted to hold the gripper in its groove or recess 26.

29 is a spring bearing at its outer end against the vertical wall of the groove or recess 26 and at its inner end against the vertical leg 27^a of the sliding gripper or jaw mounted in the groove, and is adapted to normally press the gripper toward the center of the cap-receiving aperture 25.

30 are notches equally spaced apart about the periphery of the dial plate 24 and adapted to receive the toothed or pointed end 31' of a pawl 31, which latter is pivoted at 32 to a slide 33 mounted in a guide 34 carried by the main frame.

35 is a spring wound about a stud 36 carried by the slide 33. The front end 35' of the said spring presses against the front free end of the pawl 31 and tends normally to force the tooth 31' on the pawl toward the dial plate 24. The front face 31^a of the said pawl tooth is straight and adapted to engage and press against the front wall of the recess 30 in the dial plate which it enters. From this straight front face 31^a, on its dial side, the tooth is curved away from the dial, as indicated at 31^b, so that the pawl will readily disengage itself from the dial plate as it moves rearwardly with the slide 33.

Near its rear end the slide 33 carries two upwardly projecting ears or lugs 36 between which, by means of a pin 37, is pivoted an adjustable connecting rod 38. The rear end of this connecting rod is pivotally connected at 38' to one arm 39' of a bell crank lever 39, which is secured to a rock shaft 40 extending through and suitably mounted in the upright 5 of the main frame.

41 is a sleeve carrying a laterally projecting pin or pivot 41' rotatably mounted in the front end of the arm 39^a of the bell crank lever 39; this pin 41' being held in position by means of a nut 41^a.

42 is a rod having its upper end pivotally connected at 42' to the crank pin 21. Intermediate of its ends this rod 42 is screw threaded as indicated at 42^a to receive a two-piece internally screw threaded adjustment nut or collar 43. The rod 42 extends loosely through the sleeve 41 and has a coiled spring 45, which surrounds the rod, interposed between said sleeve and a nut 44 at its lower end.

46 is a lock nut for the nut 44.

47 is a horizontally disposed punch-carrying head or plate, detachably secured to the lower end of the vertically movable slide 6. Projecting downward from this plate 47 are a series of punches arranged with their axes in the arc of the circle containing the centers of the cap-receiving apertures 25 in the dial 24, in such manner that when the slide 6 moves downwardly, each one of the said punches will register with and enter one of six consecutive recesses 25 in the said dial. Of these punches, the first one on the right of the series, looking at the machine from the front, is represented by 48, it being the punch for cutting or striking the metal blank 48^b from which the bottle cap is formed, out of the stock or strip of sheet metal. This punch comprises a cutting plunger or head 48' of the shape of the blank to be cut and

preferably having at its upper end a flange 48^a, which is detachably secured to the plate 47. The head 48' is hollow and has fitted snugly into it a cylinder 49 which is adapted to reciprocate vertically.

49' is a rod extending upward from said cylinder 49 and having detachably secured to its upper end a plate 50, fitted into a vertically disposed opening 51 through the plate 47.

52 is a coiled spring arranged in the said opening 51 and adapted to press at its lower end against the plate 50 and to normally force the latter to the bottom of the passageway 51, 52' being a plate detachably secured to the top of the plate 47 and fitted over the passageway 51 therethrough, and against which the upper end of the spring 52 presses.

Beneath the cutting punch 48 is arranged the cutting die 53 and the guide 54 for the strip or stock of metal. This guide comprises a base plate 55 preferably arranged radially across the dial plate 24 and detachably secured at its outer end to the bed of the main frame and at its inner end to the pivot plate 23.

56, 56', are thin metallic plates arranged longitudinally, one at either side, of the guide base, 55 and having their inner surfaces spaced apart substantially the distance of the width of the strip of metal 57 from which the blanks are to be cut. The die plate 54 is detachably secured at each side to the guide plate bed 55, it resting upon the plates 56, 56'. The die aperture 53 extends through said die plate, and is arranged to register with the cutting punch 48', and with the blank-receiving apertures 25 in the rotary dial or blank conveyer 24.

58 indicates as an entirety a feed governing device for the strip of metal 57. Of this automatic feed controlling device, 58' is a trigger pivotally connected at 58^a to a lug or upward projection 58^b carried by the die plate 54. The trigger is mounted relatively loosely upon the pivot 58^a, so as to be capable of slight lateral vibration or oscillation at each end, as indicated in dotted lines in Fig. 5. This is preferably accomplished by having the hole through the trigger somewhat larger in dimensions than is the shank part of the pivot 58^a on which the trigger is mounted. At its rear end the trigger carries a downwardly projecting point or finger 58^c which is adapted to be projected into the plane of the path of travel of the strip 57 through the extension 54^a of the die opening 53 through the die plate 54. The forwardly extending arm 58^d of the trigger carries a stud screw 58^e for varying the upward throw permitted to the finger end of the trigger.

59 is a spring having one end secured to the die plate 54 and its other end bearing against the arm 58^d of the trigger and tending nor-

mally to press the finger end 58^c of the trigger toward the die opening 53. This is for the purpose of facilitating the hand feeding of the strip 57. After the cap blank has been struck from the strip by the punch 48, the operator presses down momentarily on the arm 58^d of the trigger, and when he ceases, the finger end 58^c is moved toward the die opening 53 and will rest upon the metal of the strip 57 at 57' (Fig. 7), if the operator has not advanced the strip 57. If he has, the finger 58^c will drop into the opening in the strip from which the last cap blank was struck, and will permit the feed of the strip until the said finger engages the rear wall of said cap blank opening and is forced against the outer end of an adjusting screw 60 carried by a block 61, detachably secured to the die plate 54.

62 represents the second punch in the series carried by the punch plate 47, it being adapted to enter the opening 25 in the dial plate 24 next in series to the opening 25 in registry with the die 53, and to force the metal cap blank 48^b, as cut by the punch 48' and die 53, to the shape shown in Fig. 12, into a die 63 carried by and inserted in the plate 22. The punch 62 and die 63 form the blank into the shape shown in Fig. 13.

63' is an ejector for the die 63. It comprises a head 63^a carried by a shank 63^b, about which is arranged a coiled spring 63^c, which at its upper end bears against the ejector head 63^a and at its lower end against the bottom wall of a recess 63^d in the plate 22. After the punch 62 has struck the cap blank into the die 63, the ejector 63' elevates the blank into proper position in the dial plate 24.

64 indicates as an entirety the next punch in the series to the punch 62, carried by the punch plate 47. 64' indicates the shank of this punch 64, and 64^a a head mounted to move up and down on said shank 64' and having its lower end 64^b shaped to enter a die 65 carried by the plate 22, and to form there-with into the shape shown in Fig. 14, the cap blank as delivered from the punch 62 and die 63, this operation completing the forming of the metal blank which comprises the body of each bottle cap.

64^c is an annular flange carried by the punch head 64^a above the part 64^b thereon. The shank 64' of the punch is screw threaded at 64^d to receive an adjusting nut or collar 64^e, between which and the flange 64^c, and surrounding the shank 64' is a coil spring 66 which normally presses downward on the head 64^a. The latter is vertically slotted at 64^f to receive the shank of a screw or stud 64^g carried by and extending laterally from the shank 64'. This connection between the head 64^a and shank 64' permits the vertical movement of the former relative to the lat-

ter, while at the same time preventing rotary movement of these two elements relatively to each other. The stud 64^s also serves to limit the downward travel of the head 64^a under the action of the spring 66.

65' represents as an entirety an ejector for the die 65. As it is similar in detail to the ejector 63' for the die 63, further description of it is not necessary.

10 The next step in the formation of the bottle cap is to insert in the metallic blank, after its shaping has been completed by the punch 64 and die 65, a disk of paper, preferably paraffined or waxed paper. For this purpose a paper reel 67 carrying a roll of paper 15 68, of suitable width, is pivotally mounted on a horizontal axis 69 at the front end of an arm 70 extending forward from the bed 4 of the main frame. The strip of paper 68 is preferably carried downwardly from the front of the reel 67 about a roller 71 mounted in a swinging frame 72 suitably secured at its upper end to the main frame of the machine. From this roller 71 the strip of paper is led 25 upwardly through an opening 73 in the pivot plate 23 and about a horizontally disposed roller 74 suitably mounted on the said plate. Thence it is carried rearwardly through a horizontally disposed guide 75 by means of 30 which the paper is led above the dial 24; this guide being supported by and detachably secured to the pivot plate 23 at its front end and to the plate 22 at its rear end.

76 is a die plate detachably secured upon 35 the guide 75 and having through it the circular die opening 77, the center of which is arranged to be coincident with the center of each cap-blank-receiving opening 25 in the rotary dial 24 that registers with said die 40 opening. The strip of paper 68, after it leaves the guide 75, is passed between two friction gripping and advancing rolls 78, 78'.

79 is a rocker arm secured on the inner side of the upright 5 to the inner end of the rock 45 shaft 40.

80 is a bearing plate or bracket suitably supported upon the main frame and extending rearwardly between the uprights 5, 5', from a point adjacent to the rear edge of the 50 dial 24. 81, 81' are standards carried by said bracket 80, at either side thereof and on opposite sides of the path of travel of the paper strip 68. 80' is a horizontally disposed transversely arranged shaft mounted in suitable bearings upon the said bracket 80, and 55 carrying the paper feed roll 78'. The co-operating paper feed roll 78 is carried by a shaft 82 mounted at either end in bearings 82', 82^a, carried respectively by the vertically rising and falling bearing boxes 83, 83', 60 mounted upon the standards 81, 81', respectively. The feed rollers 78, 78' are normally held in forced contact with each other by means of springs 83^b interposed between the

bearing boxes 83, 83', and nuts at the upper 65 ends of the standards.

84, 84' are intermeshing gears carried by the shafts 82, 80', respectively, at one side of the bracket 80. 84^b is a ratchet wheel 70 secured to the shaft 82 at the opposite end thereof from the gear wheel 84.

84^c is a pawl carrier loosely mounted on the shaft 82 adjacent to the ratchet wheel 84^b. 84^d is a spring controlled pawl carried 75 by said pawl carrier 84^c.

79' is a rod connecting the rocker arm 79 with the pawl carrier 84^c.

At each side of its front end the bracket 80 supports an upwardly extending ear or lug 80^b, preferably connected with the bearing 80 boxes for the shaft 80'. Between these lugs is mounted a rocking tripper 80^c, having at either side rearwardly extending lugs or projections 80^d each adapted to engage the 85 under surface of the adjacent vertically rising and falling bearing block 83 or 83'.

80^e is a lever arm extending forward from the rock shaft 80^c into the vertical plane of travel of the slide 6, or a trip carried thereby, and adapted to be engaged by the slide or 90 said trip carried by it and forced downwardly, so as to cause the upward throw of the lugs 80^d, 80^d, consequent elevation of the bearing boxes 83, 83', and the separation of the paper feed rolls 78, 78'. This releasing of the gripping action of the feed 95 rolls 78, 78' on the strip of paper 68 at the time when the latter is being operated upon by the paper cutter punch, insures the proper alinement of the paper strip between 100 said feed rolls at the time when said rolls are operating to feed the strip forward, since after the paper disk is cut from the strip, the strip can right itself between the rolls 78, 78', and then as they close together and 105 grip it, their action upon the strip will be a straight line action, and one which it has been found accomplishes the proper feeding of the paper under all circumstances.

85 is a punch or cutter for cutting a disk of 110 paper out of the strip 68 and inserting it into one of the formed metal caps after it has been acted upon by the punch 64. 85' is a hollow shank detachably secured in the punch head 47. 86 is a rod fitting into said 115 shank 85 and carrying at its lower end a circular disk 86' and at its upper end a nut 86^a. The disk 86' is beveled to seat in a conical recess in the lower end of the punch. This disk, as the punch descends, first engages the 120 paper strip 68 and rests upon it until the punch strikes out the paper disk 68', when under the action of gravity the disk 86' drops downward away from the punch and forces the paper disk into the metal cap blank beneath it. 125

After the insertion of the disk of paper, the formed metal cap is advanced another

step into position beneath the cork-inserting mechanism at 87.

88 is a vertically disposed longitudinally slotted magazine for holding and feeding 5 disks of cork 89. This magazine is supported upon the top of a horizontally disposed guide 90 detachably secured upon the pivot plate 23 and having in it a longitudinally disposed guideway 91, which is 10 adapted to direct and guide the disks of cork from the magazine 88 into the cork-inserting mechanism 87.

92 is a reciprocable slide fitted into the guideway 91 and adapted to engage with the 15 last cork disk delivered thereto by the magazine 88 and to advance it into the inserting mechanism 87 when the latter is elevated.

93 is a swinging arm pivoted at 94 to the pivot plate 23 and having slot and pin connection at 95 with the slide 92. At its opposite end the arm 93 has pivotally connected 20 to it a pivot block 96.

97 is a rod pivotally connected at 97' to the slide 33 and having its opposite end screw 25 threaded at 97^a and extending through a horizontally disposed passageway in the pivot block 96. 97^b are adjusting and locking nuts on the rod 97 for adjusting this pivot block 96 therealong and securing it in 30 any desired position.

Of the cork disk-inserting mechanism 87, 100 is a punch detachably and adjustably secured at its upper end to the punch plate 47. For the latter purpose the punch is 35 externally threaded, as indicated at 100^a, adjacent to said punch plate, and provided with a nut 100^b for adjustment purposes.

101 is a reciprocable cork disk-receiving head mounted on the punch 100 to move up 40 and down therewith a predetermined distance in either direction while permitting the said punch to move up and down within it at certain times. This head is preferably formed in two sections 101' and 101^a, separable on horizontal lines and having laterally extending flanges detachably connected 45 together by screws 102. The upper part 101' has a hollow cylindrical upward extension 103 adapted to receive the punch 100. The said punch is longitudinally grooved for a portion of its length, as indicated at 100'. 50

103' is a laterally projecting boss at the upper end of the part 101' of the head. It has a passageway 103^a extending through it at 55 right angles to the punch 100. 103^b is a friction disk or plate, preferably made of some fibrous material, placed in said passageway 103^a and having its inner end projecting therefrom and fitted into the groove 100' in the punch 100. This friction disk 103^b is normally held in forced engagement with the 60 bottom wall of the groove 100' by means of a spring 103^c interposed between the said friction disk and an adjusting screw 103^d suit-

ably fitted into the outer end of the boss 103'. 65 The frictional engagement between the said friction disk 103^b and the punch 100 is at all times sufficient to cause the movement together in either direction of the punch 100 and the head 101, while at the same time per- 70 mitting the relative movement of the punch to the head in the event that the movement of the head is limited or stopped. The lower part 101^a of the said head carries a downwardly projecting hollow cork guide 104, 75 tapering both externally and internally. This taper cork guide has three vertically extending recesses 106 suitably disposed to receive the projections or lugs 48^c of the cap. At its front and bottom the part 101' of the 80 head is recessed as indicated at 107 to form an opening through which the cork disks are introduced into the conical passageway 104 when the said opening is in registry with the cork guide 91, as shown in Fig. 10. The 85 tongue and groove nature of this friction controlled connection between the punch 100 and the head 101 insures that the said head will not turn relative to the punch, so as to throw the opening 107 in the head out of 90 alinement with the cork disk guide 91, when the head is in its most elevated position. The top plate of the cork guide 90 is bifurcated at its rear end as indicated at 90', 90'. These arms extend out into the path of travel 95 of the flanged part of the head 101, with which they engage, as shown in Fig. 4, to limit the upward travel of the said head and the proper positioning of the cork-receiving opening 107 therein, relative to the cork guide 91. 100

108 is a punch detachably secured to the punch head 47, arranged to register with the dial opening 25 next adjacent to the one beneath the cork inserting mechanism 87, and adapted to force the finished cap from the 105 dial carrier through a suitable discharge opening 109 in the plate 22. As the caps are discharged they may be received by any suitable device for the purpose.

In order to prevent mutilation of either 110 the punches or the dial carrier, should they not be in proper relative positions to operate correctly, as the punches are descending, I have provided automatically acting safety clutch disconnecting mechanism, shown as 115 an entirety at 110, on one side of the main frame.

111 is a bracket carried by the upright 5' and itself supporting the hollow vertical guides 111' and 111^a. 112 is a similar bracket carried by the upright 5' and having the vertically disposed hollow guides 112', 112^a. 120

113 is a rod fitted into the guides 111' and 112' and adapted to slide up and down therein. 125

114 is an arm extending laterally from the slide 6 and carrying at its outer end a vertically adjustable screw 114' adapted to en-

gage at its upper end with the lower end of the rod 113.

115 is a strap or bar rigidly secured at its inner end to the rod 113 and at its outer end to the rod 116, which latter rod is mounted to slide up and down in the guides 111^a, 112^a.

117 is a coiled spring surrounding rod 113 between the guide 111' and the inner end of the strap 115. The rod 116 is of sufficient length to have its upper end 116' extend when in elevated position into the circular path of travel of the controlling dog 19 of the clutch. At its lower end the rod 116 carries an arm 118 from the inner end of which projects downwardly a rod 119. The lower end of this rod is adapted to enter a guide passageway 120 in a guide block 121 secured to the plate 22 on the main frame. The axis of this hole 120 lies in the circumference of a circle containing the axes of a series of holes 122 of equal diameter arranged near the periphery of the dial 24, and each adjacent to one of the notches 30 therein. As the slide 6 descends, forcing the punches carried thereby toward the dial plate, if the said plate is in proper position relative to the punches, the safety rod 119 will enter one of the holes 122, it being forced downward under the action of the spring 117, the upper end 116' of the rod 116 will be moved downward out of the path of travel of the clutch controlling dog 19, and the punches will operate as intended. If, however, the dial plate 24 is not absolutely properly positioned relative to the punches as the latter descend, the safety rod 119 will engage the top of the dial plate, and the upper end 116' of the rod 116 will remain in the path of travel of the clutch controlling dog 19 and will engage therewith and prevent the operation of the slide 6, and the punches from being forced into engagement with the dial 24. I make no claim herein to the idea of this safety attachment for preventing the operation of the punches unless the dial plate is properly positioned, as the same is the subject matter of my patent hereinbefore referred to.

In operation, to form one complete bottle cap or closure, a strip of metal 57 is fed to the guide 54 and power applied for rotating the belt wheel 13. The foot treadle 17' is pressed downwardly and the clutch dog 15 is thrown into position to connect the fly wheel to the main shaft 8, and the slide 6 is caused to descend toward the dial carrier 24, which is in proper position to have the punches carried by the punch head 47, each enter one of a series of adjoining blank-receiving openings 25 in the dial carrier.

The punch 48 enters the die 53 and strikes or cuts from the metal strip 57 a cap blank 48^b of the form shown in Fig. 12 and the cylinder 49, under the action of the spring 52, is then forced downwardly and inserts the

said cap blank into the cap blank receiving section beneath it. The slide 6 then starts on its upward stroke and by the time the last one of the punches or elements carried by the punch head 47 is withdrawn from the rotatable dial 24, the tooth 31' on the pawl 31 has dropped into the adjacent recess 30 in the dial plate and the slide 33 begins to move forward causing the rotation of the dial carrier 24 one step. This brings the cap blank 48^b as cut by the punch 48, under the punch 62. Again the slide 6 descends and the punch 62 acts upon the cap blank in cooperation with the die 63. The slide 6 then starts on its upward stroke, the dial carrier is rotated one step, and the cap blank brought into proper position beneath the punch 64. When the slide next descends the punch 64 and the die 65 complete the formation of the metal cap blank. The dial plate then advances the metal blank, as finally formed one step into registry with the circular die opening 77 and the paper disk cutter 85 descends and cuts a disk of paper from the strip 68 and the head 86' inserts it in the cap blank 48^b.

Each time as the slide 33 moves forward to rotate the dial carrier one step, the swinging bar 93 forces the slide 92 inwardly and causes a cork disk 89 to be ejected from the slide 91 and introduced through the opening 107 into the head 100 of the inserting mechanism 87. When the dial carrier advances the cap blank the next step in its course of travel after it has received a disk of paper, as the slide 6 descends, the conical projection on the cork-inserting mechanism 87 engages the metal cap blank and the punch head 100 descends and forces the cork disk through the conical passageway 104 and into the cap blank, thereby completing the bottle cap or closure. Upon the next step by step movement of the dial plate, the punch 108 in descending with the punch plate 47 forces the completed bottle cap from the dial plate 24 through the discharge opening 109 in the main frame of the machine.

I have described the course of formation and travel of but a single blank through the machine into completed form. It will be understood that in regular operation, the punches and cutters carried by the punch plate 47 operate continuously and simultaneously upon cap blanks in different stages of formation, giving the machine a high capacity and efficiency.

When the apparatus is operated at high speed, I have found it advisable to employ a locking pawl for the dial plate or carrier 24, so that neither momentum of the latter nor the action of the pawl 31 in moving rearward along the periphery of the said dial, will tend to move the dial out of its proper position for any step.

123 is a bell crank lever pivotally con-

connected at 123' to the plate 22. One arm of said lever carries a pawl tooth 123^a adapted to enter, one after another, the recesses 30 in the periphery of the dial plate 24, and the other arm 123^b extends at an angle to the first one and carries a rearwardly projecting extension 123^c.

124 is a spring having one end secured to a plate 22, and its other end bearing against the arm 123^b of said bell crank lever, and adapted normally to press the lever so as to force the pawl tooth 123^a toward the dial plate 24.

125 is an anti-friction roller suitably mounted upon the slide 33 and adapted to engage with the said extension 123^c to throw the pawl tooth 123^a away from the dial 24. After the slide 33 moves forward a predetermined distance, the roller 125 is carried away from the extension 123^c and the spring 124 acts to set the pawl tooth 123^a.

The foregoing description of a closure-making apparatus, and the drawings accompanying it, illustrate an embodiment of my invention for making a closure with a cap blank of somewhat peculiar shape. It will be understood that the apparatus is readily adaptable for the making of closures, the cap blanks of which may be of any desired shape. Furthermore, while I have shown and described the disks 89 as made of cork, it will be readily appreciated that they may be made of any other suitable substance for the purpose.

The strip of metal 57 employed in the machine herein shown and described, is of sufficient width to be fed through the machine, first with one side uppermost and then with the other side uppermost, in order to economize material by striking cap blanks from a single strip of metal so as to leave the blank apertures in the strip in staggered relation to each other, as shown in Fig. 7.

What I claim is:—

1. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the formation of several of said closures, including means for forming a metal cap blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of paper into the metal cap as formed, means for inserting a cork disk into the metal cap as formed, a carrier for holding several closures in different stages of formation in position to be operated upon in proper sequence by all of the aforesaid means, said carrier having cap blank receiving sections, and means for centering cap blanks in said sections in the different shapes assumed by the said cap blanks during their formation.

2. In an apparatus for making closures

comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the formation of several of said closures, including means for forming a metal cap blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of paper into the metal cap as formed, means for inserting a cork disk into the metal cap as formed, and an endless carrier having cap blank-receiving sections, each arranged to receive an unformed metal cap blank, to accommodate and hold said metal cap blank properly centered relative to said forming and inserting means in the different shapes and sizes which the said blank assumes and to position the same cap blank to be operated upon in proper sequence by said forming means, said paper disk inserting means, and said cork disk inserting means.

3. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the formation of several of said closures, including means for striking a cap blank from a strip of sheet metal, means for forming said metal cap blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of paper into the metal cap as formed, and means for inserting a cork disk into the metal cap as formed, and a carrier for holding several closures in different stages of formation in position to be operated upon in proper sequence by the aforesaid cap blank-forming means, paper disk inserting means and cork disk inserting means, and arranged to receive each metal cap blank as it is struck from said strip of metal and to accommodate and hold said metal cap blank properly centered relative to said forming and inserting means in the different shapes and sizes which the said blank assumes.

4. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the formation of several of said closures, including means for striking a cap blank from a strip of sheet metal, means for forming said metal cap blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of paper into the metal cap as formed, and means for inserting a cork disk into the metal cap as formed, and a carrier having cap blank-receiving sections, each arranged to receive an unformed metal cap blank as struck from the strip of metal and to accommodate and hold the said blank properly

centered relative to said forming and inserting means in the different shapes and sizes which the said blank assumes to position the same blank to be operated upon in proper sequence by said forming means, said paper disk inserting means, and said cork disk inserting means.

5. In an apparatus for making closures, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, a carrier having cap blank-receiving sections, each arranged to receive an unformed metal cap blank and to position the same blank for the operation of said sets of shaping elements in proper sequence upon it and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation.

6. In an apparatus for making closures comprising a sheet metal cap with a disk of cork inserted therein, the combination of cap blank-shaping elements arranged to change the contour of a metal cap blank and to shape the blank as desired, means for inserting a cork disk into each metal cap as finally shaped, a carrier having cap blank sections, each arranged to receive a metal cap blank and to position the same blank for the operation of said shaping elements and said cork disk-inserting means in proper sequence upon it and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation.

7. In an apparatus for making sheet metal caps, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several of said caps during which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation.

8. In an apparatus for making sheet metal caps, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several of said caps during which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements, and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation, and means for inserting unformed metal cap blanks in said blank-receiving sections of the carrier.

ing which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements, and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation and means for imparting a step by step movement to said carrier.

9. In an apparatus for making sheet metal caps, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several of said caps during which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, an endless carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation.

10. In an apparatus for making sheet metal caps, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several of said caps during which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements, and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation, and means for inserting unformed metal cap blanks in said blank-receiving sections of the carrier.

11. In an apparatus for making sheet metal caps, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several of said caps during which steps the contours of a plurality of cap blanks are changed, means for simultaneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements, and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation, and means for inserting unformed metal cap blanks in said blank-receiving sections of the carrier.

taneously actuating said sets of shaping elements, a carrier having cap blank-receiving sections arranged to hold several cap blanks in different stages of formation, each of said cap blank-receiving sections being arranged to receive an unformed metal cap blank and to position the same blank to be operated upon in proper sequence by said sets of shaping elements, and means for centering the said cap blanks in the said cap blank receiving sections in the different shapes assumed by the said cap blanks during their formation, and means for striking a metal cap blank from a strip of metal and inserting it in one of said cap blank-receiving sections.

12. In an apparatus for making closures comprising a sheet metal cap with a disk of cork inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for inserting a cork disk into each metal cap as finally shaped, means for simultaneously actuating said set of shaping elements and said cork disk inserting means, and a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping elements, and also to hold a formed cap in position to receive a cork disk from said disk inserting means.

13. In an apparatus for making closures comprising a sheet metal cap with a disk of paper inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for inserting a disk of paper into each cap blank as finally shaped, means for simultaneously actuating said sets of shaping elements and said paper disk inserting means, and a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping elements, and also to hold a formed cap in position to receive a paper disk from said disk inserting means.

14. In an apparatus for making closures comprising a sheet metal cap with a disk of paper inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for simultaneously actuating said

sets of shaping elements and said paper disk cutting and inserting means, a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon by said shaping elements, and also to hold a formed cap in position to receive a paper disk from said paper disk cutting and inserting means, and means for feeding a strip of paper to said disk cutting and inserting means.

15. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for inserting a cork disk into each cap as finally shaped, means for simultaneously actuating said sets of shaping elements, said paper disk cutting and inserting means, and said cork disk inserting means, and a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping elements and to hold two formed caps, one in position to receive a paper disk from said paper disk inserting means, and the other in position to receive a cork disk from said cork disk inserting means.

16. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for inserting a cork disk into each cap as finally shaped, means for simultaneously actuating said sets of shaping elements, said paper disk cutting and inserting means, and said cork disk inserting means, and an endless carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping elements and to hold two formed caps, one in position to receive a paper disk from said paper disk inserting means, and the other in position to receive a cork disk from said cork disk inserting means.

17. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of a plurality of sets of metal

cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are
 5 changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for inserting a cork disk into each cap as finally shaped, means for simultaneously actuating said sets
 10 of shaping elements, said paper disk cutting and inserting means, and said cork disk inserting means, and a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks
 15 during their formation in position to be operated upon in proper sequence by said shaping elements and to hold two formed caps, one in position to receive a paper disk from said paper disk inserting means, and the other
 20 in position to receive a cork disk from said cork disk inserting means, and means for imparting a step by step movement to said carrier.

18. In an apparatus for making closures
 25 comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the for-
 30 mation of several closures during which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for inserting a
 35 cork disk into each cap as finally shaped, means for simultaneously actuating said sets of shaping elements, said paper disk cutting and inserting means, and said cork disk inserting means, and a carrier arranged to
 40 hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping elements and to hold two formed caps,
 45 one in position to receive a paper disk from said paper disk inserting means, and the other in position to receive a cork disk from said cork disk inserting means, and means for feeding cork disks to said disk inserting
 50 mechanism.

19. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of a plurality of sets of metal
 55 cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a
 60 strip of paper and inserting it into a cap blank as finally shaped, means for inserting a cork disk into each cap as finally shaped, means for simultaneously actuating said sets of shaping elements, said paper disk cutting
 65 and inserting means, and said cork disk in-

serting means, and a carrier arranged to hold several metal cap blanks in the different shapes assumed by said cap blanks during their formation in position to be operated
 upon in proper sequence by said shaping ele- 70
 ments and to hold two formed caps, one in position to receive a paper disk from said paper disk inserting means, and the other in position to receive a cork disk from said cork
 disk inserting means, means for feeding cork 75
 disks to said disk inserting mechanism, and means for imparting a step by step movement to said carrier.

20. In an apparatus for making closures comprising a sheet metal cap with a disk of 80
 paper and a disk of cork inserted therein, the combination of a plurality of sets of metal cap blank-shaping elements for simultaneously performing progressive steps in the formation of several closures during 85
 which steps the contours of a plurality of cap blanks are changed, means for cutting a disk from a strip of paper and inserting it into a cap blank as finally shaped, means for insert-
 ing a cork disk into each cap as finally shaped, 90
 means for simultaneously actuating said sets of shaping elements, said paper disk cutting and inserting means, and said cork disk inserting means, and a carrier arranged to hold
 several metal cap blanks in the different 95
 shapes assumed by said cap blanks during their formation in position to be operated upon in proper sequence by said shaping ele-
 ments and to hold two formed caps, one in position to receive a paper disk from said pa- 100
 per disk inserting means, and the other in position to receive a cork disk from said cork
 disk inserting means, means for feeding cork 105
 disks to said disk inserting mechanism, and means for feeding unformed metal cap blanks
 to said carrier.

21. In an apparatus for making bottle closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for form- 110
 ing a blank of metal into a cap of the desired shape during the operation of which the contour of the cap blank is changed, means for
 cutting and inserting a disk of paper into the metal cap as finally shaped, means for insert- 115
 ing a disk of cork into the cap as finally shaped, mechanism for simultaneously operating said cap forming means, said paper
 disk cutting and inserting means, said cork disk inserting means, and a carrier having 120
 sections, each arranged to receive an unformed metal cap blank and to convey said blank step by step into the positions where
 said forming means, said paper disk cutting and inserting means, and said cork disk in- 125
 serting means can operate upon it in proper sequence and means for centering cap blanks in said sections in the different shapes assumed by the said blanks during their for-
 mation. 130

22. In an apparatus for making closures, the combination of a plurality of sets of metal cap blanks shaping elements arranged to operate in sequence to form a cap of the
5 desired shape, and a carrier having cap blank-receiving sections, each section provided with yielding walls arranged to receive between them a metal blank and to engage and hold said cap blank in the different
10 shapes into which it is formed by said shaping elements.

23. In an apparatus for making closures, the combination of a plurality of sets of metal cap blank shaping elements arranged
15 to operate in sequence to form a cap of the desired shape, a carrier having cap blank receiving sections, each section provided with yielding walls arranged to receive between them a metal cap blank and to engage and
20 hold said cap blank in the different shapes into which it is formed by said shaping elements, and means for striking a cap blank from a strip of metal and inserting it in one of said blank-receiving sections.

24. In an apparatus for making closures, the combination of means for simultaneously performing progressive steps in the formation of several sheet metal caps, and a carrier having cap blank-receiving sections, each
30 section provided with yielding walls arranged to receive between them a metal blank and to engage and hold said blank in the different shapes into which it is formed during the different steps in its formation.

25. In an apparatus for making closures, the combination of means for simultaneously performing progressive steps in the formation of several sheet metal caps, a carrier having cap blank-receiving sections, each
40 section provided with yielding walls arranged to receive between them a metal blank and to engage and hold said blank in the different shapes into which it is formed during the different steps in its formation, and means
45 for striking a cap blank from a strip of metal and inserting it between the yielding walls of one of said blank-receiving apertures.

26. In an apparatus for making closures, the combination of a plurality of sets of metal
50 cap blank-shaping elements arranged to operate in sequence upon a cap blank, and a carrier having cap blank sections provided with yielding walls arranged to receive between them a metal cap blank, each one of
55 said cap blank-receiving sections being arranged to position a metal cap-blank for operation of said sets of shaping elements in proper sequence upon it.

27. In an apparatus for making closures, the combination of a plurality of sets of metal cap blank-shaping elements, each set of elements including a die and a punch, and a carrier having cap blank sections provided with yielding engaging walls arranged to re-
65 ceive between them a metal cap blank, and

each section adapted to position the same blank for operation of said sets of shaping elements in proper sequence upon it.

28. In an apparatus for making sheet metal bottle caps, the combination of means
70 for performing progressive steps upon a cap blank in the formation of a sheet metal cap, and a carrier having cap blank-receiving sections, with gripping walls arranged to accommodate themselves to the different shapes
75 into which said metal blank is formed during the different steps in its formation.

29. In an apparatus for making sheet metal closures, the combination of a carrier having a cap blank-receiving section with
80 gripping walls arranged to receive between them a metal cap blank, and to accommodate themselves to the different shapes into which said cap blank is formed during the progressive steps in its formation, and a plu-
85 rality of sets of cap blank-shaping elements arranged to operate in sequence upon the metal cap blank while it is in said carrier section.

30. In an apparatus for making sheet
90 metal closures, the combination of an endless carrier having cap blank-receiving sections with gripping walls arranged to receive between them a metal cap blank, and to accommodate themselves to the different
95 shapes into which said cap blank is formed during the progressive steps in its formation, a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape,
100 and means for imparting a step by step movement to said carrier to center said cap blank-receiving sections one after the other in proper sequence relative to each of said
105 sets of punches and dies.

31. In an apparatus for making sheet metal closures, the combination of a plurality of sets of dies and punches for forming by progressive steps a cap of the desired shape from a blank of metal, a carrier for advancing
110 metal cap blanks to be operated upon in proper sequence by said sets of dies and punches, said carrier having yielding cap blank-engaging walls which accommodate themselves to the different shapes of the
115 metal blank in its different stages of formation, and means for automatically inserting an unformed metal blank between said yielding engaging walls.

32. In an apparatus for making closures,
120 the combination of a plurality of sets of metal cap blank-shaping elements arranged to form by progressive steps a cap of the desired shape, and a carrier having cap blank-receiving sections, each section provided
125 with a plurality of radially movable spring pressed walls arranged to receive between them the metal cap blank.

33. In an apparatus for making closures comprising a sheet metal cap with a disk of
130

paper and a disk of cork inserted therein, the combination of a carrier having a cap blank-receiving section, means for introducing an unformed metal blank into said section, and
 5 means for performing progressive steps in the formation of a closure from said metal cap blank while it is in said section, including means for forming the blank into the desired shape of cap during the operation of
 10 which the contour of the cap blank is changed, means for inserting a paper disk into the cap so formed, means for inserting a cork disk into said cap and means for centering cap blanks in said sections in the different shapes
 15 assumed by the said blanks during their formation.

34. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the
 20 combination of a carrier having a cap blank-receiving section and means for centering a cap blank in said section in the different shapes assumed by the said blank during its formation, means for introducing an un-
 25 formed metal blank into said section, means for performing progressive steps in the formation of a closure from said metal cap blank while it is in said section, including means for forming the blank into the desired shape
 30 of cap during the operation of which the contour of the cap blank is changed, means for inserting a paper disk into the cap so formed, and means for inserting a cork disk into said cap, a power shaft, power transmitting de-
 35 vices interposed between said shaft and said carrier, and power transmitting devices interposed between said blank forming means, said paper disk inserting means, said cork disk inserting means, and said power shaft.

40 35. In an apparatus for making closures comprising a sheet metal cap with a disk of paper and a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the forma-
 45 tion of several of said closures, including means for forming a metal cap blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of paper into the
 50 metal cap as formed, and means for inserting a cork disk into the cap as formed, a carrier for holding several closures in the different shapes assumed by said cap blanks during their formation in position to be operated
 55 upon in proper sequence by all of the afore-said means, a main power shaft, power transmitting devices interposed between said power shaft and said carrier for imparting a step by step movement to the latter, and
 60 power transmitting devices interposed between said power shaft and said blank forming means, said paper disk inserting means, and said cork disk inserting means.

36. In an apparatus for making closures,
 65 the combination with means for forming

metal caps of the desired shape from metal blanks, of an endless carrier having a plurality of cap blank-carrying sections arranged in series, and each provided with yielding blank gripping walls, a die arranged
 70 to register with each one of said cap blank-carrying sections in succession, means for guiding a strip of metal over said die, and a punch cooperating with said die and arranged to strike a cap blank from said strip
 75 of metal and to insert it into one of said carrying sections.

37. In an apparatus for making closures, the combination with means for forming
 80 metal caps of the desired shape from metal blanks, of a carrier having a plurality of cap blank-carrying sections arranged in series, a die arranged to register with each one of said cap blank-carrying sections in suc-
 85 cession, means for guiding a strip of metal over said die, a punch cooperating with said die and arranged to strike a cap blank from said strip of metal and to insert it into one of said carrying sections, and a feed regulator hav-
 90 ing a finger arranged to automatically enter an aperture in the metal strip from which a cap blank has been struck and to engage with one wall of said aperture to limit the forward feed of said strip of metal.

38. In an apparatus for making closures,
 95 the combination with means for forming metal caps of the desired shape from metal blanks, of a carrier having a plurality of cap blank-carrying sections arranged in series, a die arranged to register with each one of said
 100 cap blank-carrying sections in succession, means for guiding a strip of metal over said die, a punch cooperating with said die and arranged to strike a cap blank from said strip of metal and to insert it into one of said
 105 carrying sections, and a feed regulator for said metal strip, having a finger arranged to enter an aperture in said strip from which a cap blank has been struck and to engage the rear wall of said aperture as the said metal
 110 strip is fed into position to have another cap blank struck therefrom and thereby limit the forward feed of said strip.

39. In an apparatus for making closures, the combination with means for advancing
 115 a formed cap into position to receive a cork disk, of a reciprocating cork disk-carrying head, means for introducing a cork disk into said head, and means for forcing said cork disk from said head into the cap positioned
 120 to receive it.

40. In an apparatus for making closures, the combination with means for advancing
 125 a formed cap into position to receive a cork disk, of a reciprocating cork disk-receiving head arranged to direct a disk into a formed cap, and a plunger in said head for forcing the disk therefrom and into the said cap.

41. In an apparatus for making closures,
 130 the combination with means for advancing

a formed cap into position to receive a cork disk, of a reciprocating cork disk-receiving head having a tapering discharge duct with its lower end arranged to register with the mouth of the formed cap, and a plunger within said head for forcing the cork disk therefrom into the said formed cap.

42. In an apparatus for making closures, the combination with means for advancing a formed cap into position to receive a cork disk, of a reciprocating cork disk-receiving head, means for introducing a cork disk into said head, and means for discharging the cork disk from said head and inserting it into the cap positioned to receive it.

43. In an apparatus for making closures, the combination with means for advancing a formed cap into position to receive a cork disk, of a reciprocating cork disk-receiving head, means for introducing a cork disk into said head, means for discharging the cork disk from said head and inserting it in the cap positioned to receive it, and a friction controlled operating connection between said head and said disk-discharging means.

44. In an apparatus for making closures, the combination with means for advancing a formed cap into position to receive a cork disk, of a reciprocating disk-carrying head, a plunger arranged to reciprocate within said head and to force a cork disk therefrom into the cap positioned to receive it, and a sliding friction governed connection between said head and said plunger.

45. In an apparatus for making closures, the combination with means for advancing a formed cap into position to receive a cork disk, of a reciprocating cork disk-carrying head, a plunger fitted to move up and down within said head and to discharge disks from said head, a friction controlled operating connection between said plunger and said head, means for introducing cork disks into said head, and a stop for limiting the travel of said head relative to said disk-introducing means.

46. In a machine for making closures, the combination of means for advancing a formed cap into position to receive a disk of paper, a paper disk cutter adapted to cut a disk from a strip of paper and to direct it into the cap positioned to receive it, and a paper strip feeding mechanism arranged to intermittently feed a strip of paper beneath said cutter and to release said strip of paper when the said cutter has struck a disk from the strip and is directing it into the cap, and to reengage and advance said strip of paper after said punch is withdrawn from the hole in said strip last made by it.

47. In a machine for making closures, the combination of means for advancing a formed cap into position to receive a disk of paper, a paper cutter adapted to cut a disk from a strip of paper and direct it into the

cap positioned to receive it, and a paper strip feeding mechanism including a pair of rolls between which a strip of paper is intermittently gripped, means for separating said rolls during the operation of said paper cutter, and means for causing said rolls to grip and advance said sheet of paper when said paper cutter is withdrawn from the hole in the strip last made by it.

48. In a machine for making closures, the combination of a guide for a strip of paper, a paper cutter adapted to strike a disk from the portion of a strip of paper in said guide, means for intermittently gripping and feeding forward a strip of paper, including feed rolls arranged to grip the strip of paper between them, means for releasing the gripping pressure of said rolls during the operation of said cutter, and means for directing a formed cap into position to receive a disk of paper struck by said cutter from the strip of paper.

49. In an apparatus for making closures, the combination of a paper cutter adapted to strike a disk from a strip of paper, means for intermittently gripping and feeding forward a strip of paper to be operated upon by said paper cutter, said means including a pair of feed rolls arranged to receive the strip of paper between them, means normally tending to press said rolls together, means for intermittently rotating said rolls, means for separating said rolls during the operation of said paper cutter, and means for directing a formed cap into position to receive a disk of paper struck by said paper cutter from the strip of paper.

50. In apparatus for making closures, the combination of a paper cutter adapted to strike a disk from a strip of paper, means for intermittently gripping and feeding a strip of paper to be operated upon by said paper cutter including a pair of feed rolls arranged to receive the strip of paper between them, means normally tending to press said rolls together, means for rotating said rolls, and means for separating said rolls for an interval of time during the operation of said paper cutter and means for inserting a disk of paper after it is cut from the strip into a closure positioned to receive it.

51. In apparatus for making closures, the combination of a paper cutter adapted to strike a disk from a sheet of paper, and means for feeding a strip of paper to be operated upon by said paper cutter, including a pair of feed rolls arranged to intermittently grip and advance the paper between them and to release their grip upon said paper for an interval of time during the operation of said paper cutter and means for inserting a disk of paper after it is cut from the strip into a closure positioned to receive it.

52. In an apparatus for making bottle closures, the combination of a suitable frame, a reciprocable slide mounted on said frame,

a cap blank shaping die supported on the frame, a punch cooperating with said die and carried by said reciprocable slide, paper disk cutting and inserting means, including a paper cutter carried by said slide, cork disk inserting means, including a plunger carried by said slide, a carrier having a plurality of sets of yielding cap blank engaging walls for holding several closures in different stages of formation in position to be operated upon in proper sequence by said punch, said paper disk inserting means, and said cork disk inserting means, and means for actuating said slide and for imparting a step by step movement to said carrier.

53. In an apparatus for making bottle closures, the combination of a suitable frame, a reciprocable slide mounted on said frame, a blank cutting die supported on said frame, a cutting punch cooperating with said die and carried by said reciprocable slide, cap blank shaping dies supported on said frame, punches for cooperating with said dies and carried by said reciprocable slide, a paper disk cutting and inserting means, including a paper cutter carried by said slide, cork disk inserting means including a plunger carried by said slide, a carrier having a plurality of sets of yielding cap blank engaging walls for holding several closures in different stages of formation in position to be operated upon in proper sequence by said punches, said paper disk inserting means, and said cork disk inserting means, and means for actuating said slide and for imparting a step by step movement to said carrier.

54. In an apparatus for making bottle closures, the combination of a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape during the operation of which the contour of the cap blank is changed, means for cutting and inserting a disk of paper into a formed cap blank, including a paper cutter, means for inserting a cork disk into a formed cap blank, including a plunger, a reciprocable slide carrying said punches, said paper cutter and said plunger, a carrier for holding several closures in different stages of formation in position to be operated upon in proper sequence by said punches and dies, paper disk inserting means, and cork disk inserting means, said carrier having cap blank receiving sections, means for centering cap blanks in said sections in the different shapes assumed by said cap blanks during their formation, and means for actuating said slide and for imparting a step by step motion to said carrier.

55. In an apparatus for making bottle closures, the combination of a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape during the operation of which the contour of the cap blank is

changed, means for cutting and inserting a disk of paper into a formed cap blank, including a paper cutter, a reciprocable slide carrying said punches and said paper cutter, a carrier having cap blank receiving sections, means for centering cap blanks in said sections in the different shapes assumed by said cap blanks during their formation, and means for actuating said slide and for imparting a step by step movement to said carrier.

56. In an apparatus for making bottle closures, the combination of a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of cork into a formed cap blank, including a plunger, a reciprocable slide carrying said punches and said plunger, a carrier having cap blank receiving sections, means for centering cap blanks in said sections in the different shapes assumed by said cap blanks during their formation, and means for actuating said slide and for imparting a step by step movement to said carrier.

57. In an apparatus for making bottle closures, the combination of a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape during the operation of which the contour of the cap blank is changed, means for cutting and inserting a disk of paper into a formed cap blank, including a paper cutter, a reciprocable slide carrying said punches and paper cutter, a carrier for holding several closures in different stages of formation in position to be operated upon in proper sequence by said shaping means and said disk inserting means, said carrier having cap blank receiving sections, each section being arranged to receive an unformed cap blank and to accommodate and hold said cap blank properly centered relative to said punches and dies and said disk inserting mechanism in the different shapes and sizes which the said blanks assume, and means for actuating said slide and for imparting a step by step movement to said carrier.

58. In an apparatus for making bottle closures, the combination of a plurality of sets of punches and dies arranged to operate in sequence upon a metal cap blank to form it into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of cork into a formed cap blank, including a plunger, a reciprocable slide carrying said punches and said plunger, a carrier for holding several closures in different stages of formation in position to be operated upon in proper sequence by said shaping means and said disk inserting means, said carrier having

cap blank receiving sections, each section arranged to receive an unformed cap blank and to accommodate and hold said cap blank properly centered relative to said punches and dies and said disk inserting mechanism in the different shapes and sizes which the said blanks assume, and means for actuating said slide and for imparting a step by step movement to said carrier.

59. In an apparatus for making sheet metal bottle caps, the combination of metal shaping elements and a carrier having cap blank receiving sections with gripping walls arranged to accommodate themselves to the different contours of a cap blank in course of formation, and to center the blank within the receiving section.

60. In an apparatus for making sheet metal bottle caps, the combination of metal shaping elements, paper disk inserting means, cork disk inserting means, and a carrier having cap blank receiving sections with gripping walls adapted to accommodate themselves to the different contours of a cap blank in course of formation, and to center the blank within the receiving section for operation upon it by said metal shaping elements and inserting mechanisms.

61. In an apparatus for making closures comprising a sheet metal cap having a disk of cork inserted therein, the combination of means for simultaneously performing progressive steps in the formation of several of said closures, including means for striking a cap blank from a strip of sheet metal and for forming the said blank into the desired shape during the operation of which the contour of the cap blank is changed, means for inserting a disk of cork into the metal cap blank as formed, and a carrier having cap blank receiving sections each arranged to receive an unformed metal cap blank as struck from the strip of metal and to accommodate and hold said blank properly centered relative to said forming and inserting means in the different shapes and sizes which the said blank assumes, and to hold the said blank in position to be operated upon in proper sequence by said forming means and said cork disk inserting means.

In testimony whereof I affix my signature, in presence of two witnesses.

HERMAN OSSWALD.

Witnesses:

LOUIS HAUBT,
L. D. PRESTON.