H. D. CAYLOR & W. A. SCOTT.

MACHINE FOR MAKING PAPER VESSELS.

APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 1.

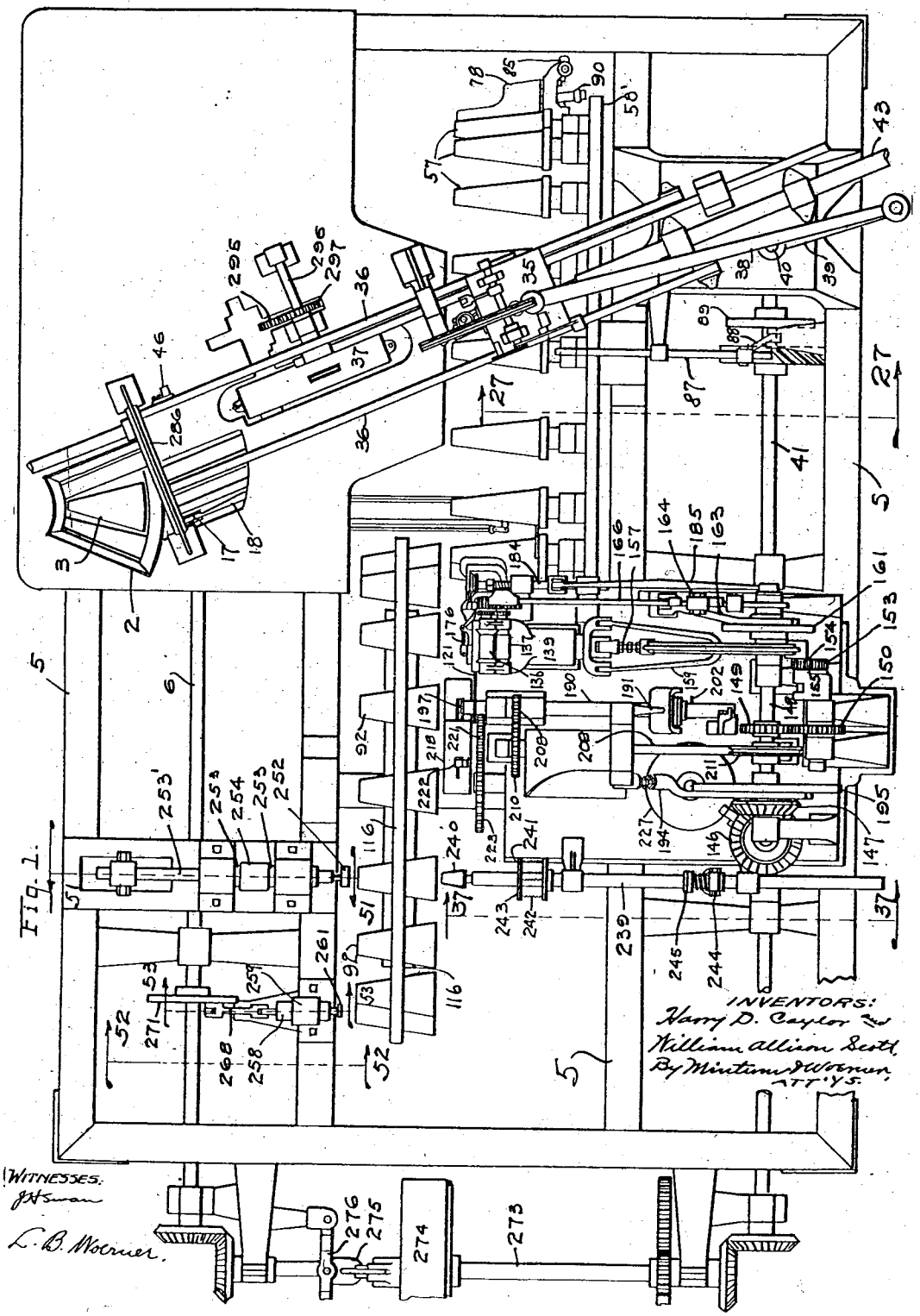


Fig. 1.

WITNESSES.
J. H. Swan
L. B. Mosmer.

INVENTORS:
Harry D. Caylor and
William Allison Scott,
By Minturn & Warner,
ATT'YS.

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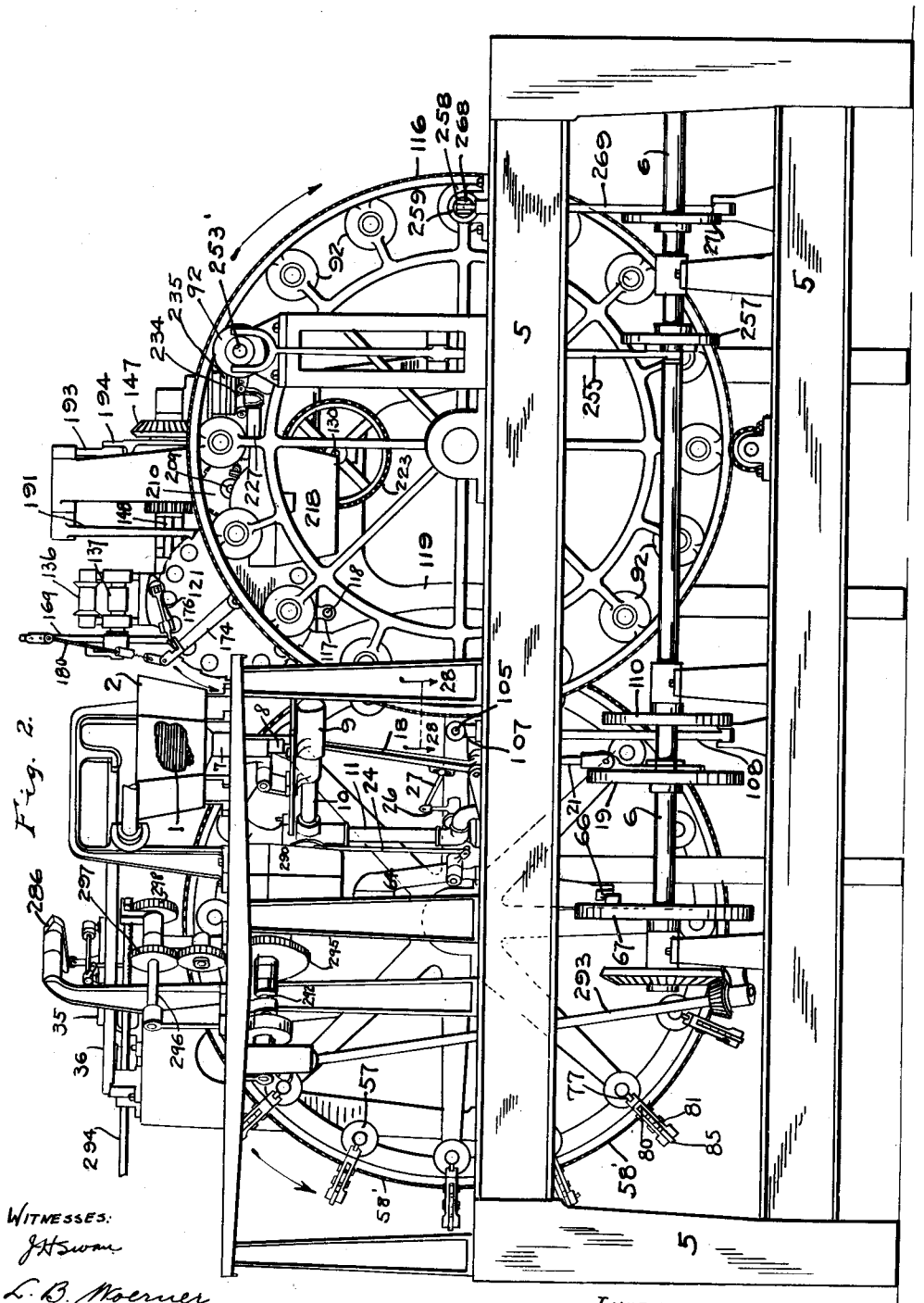


Fig. 2.

WITNESSES:
J. H. Swan
L. B. Woerner

INVENTORS
Harry D. Caylor and
William Allison Scott.
By Minturn & Woerner.
ATTORNEYS.

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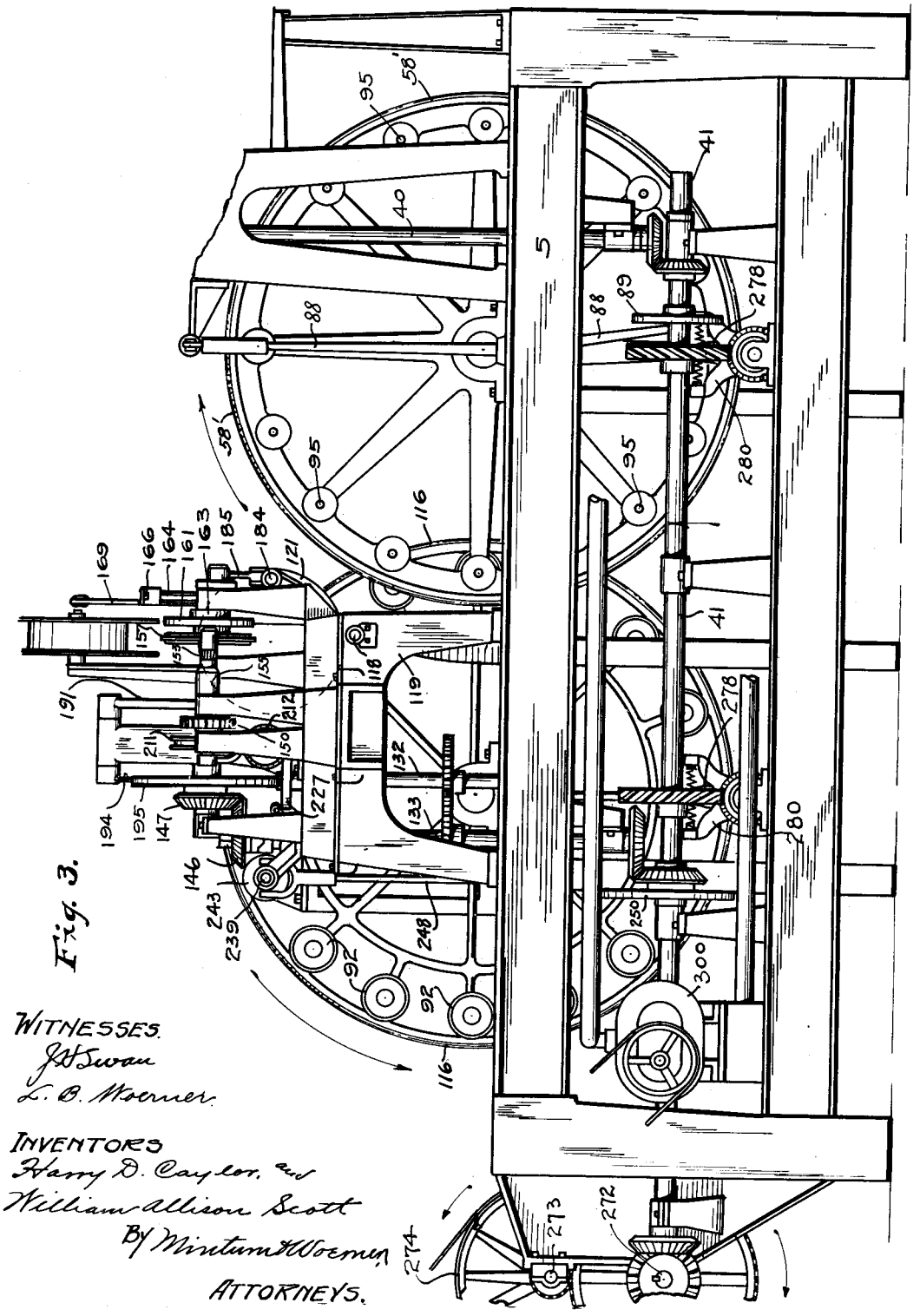


Fig. 3.

WITNESSES.
J. H. Swan
L. B. Woerner

INVENTORS
Harry D. Caylor, and
William Allison Scott
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Fig. 4.

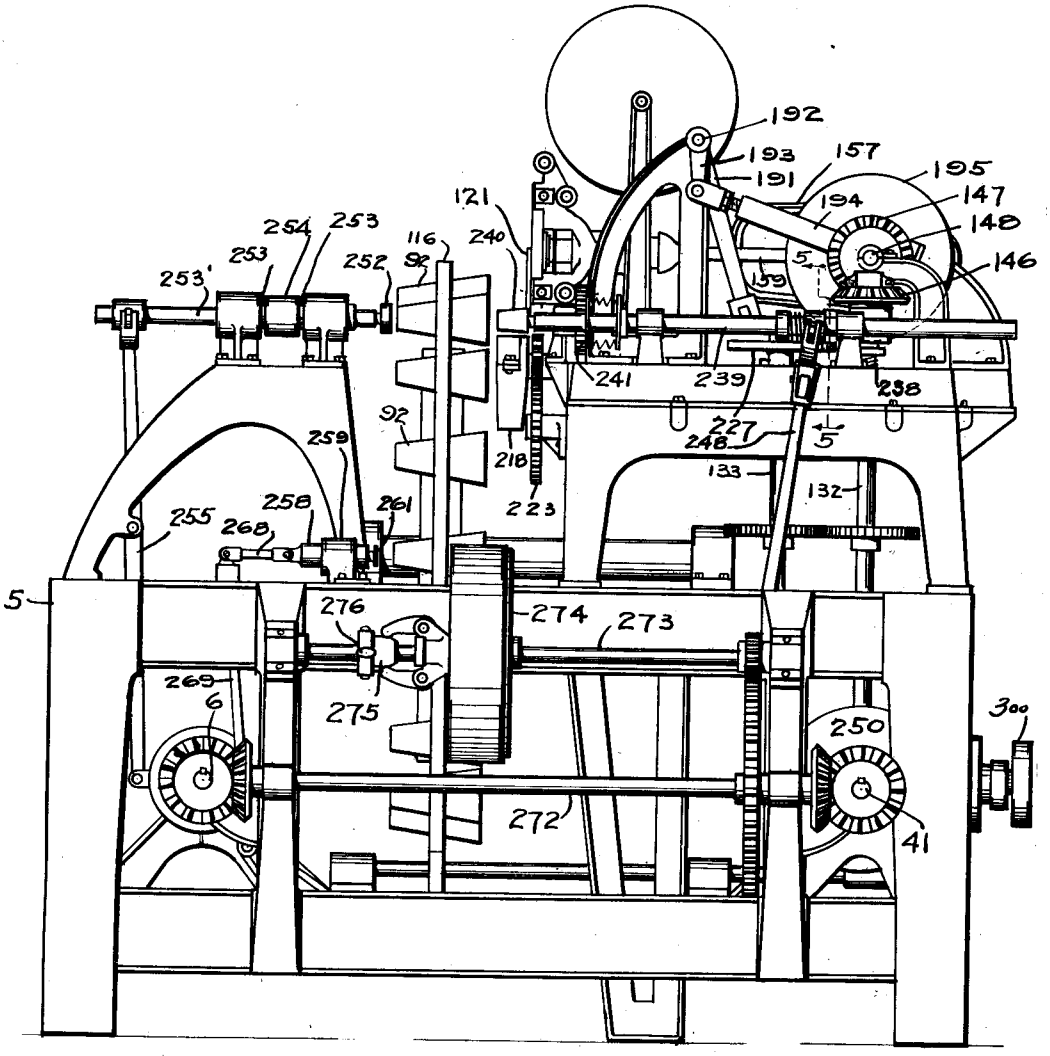
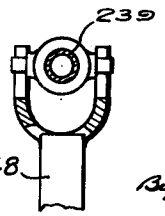


Fig. 5.



WITNESSES.

J. H. Swan.

L. B. Woerner.

INVENTORS.

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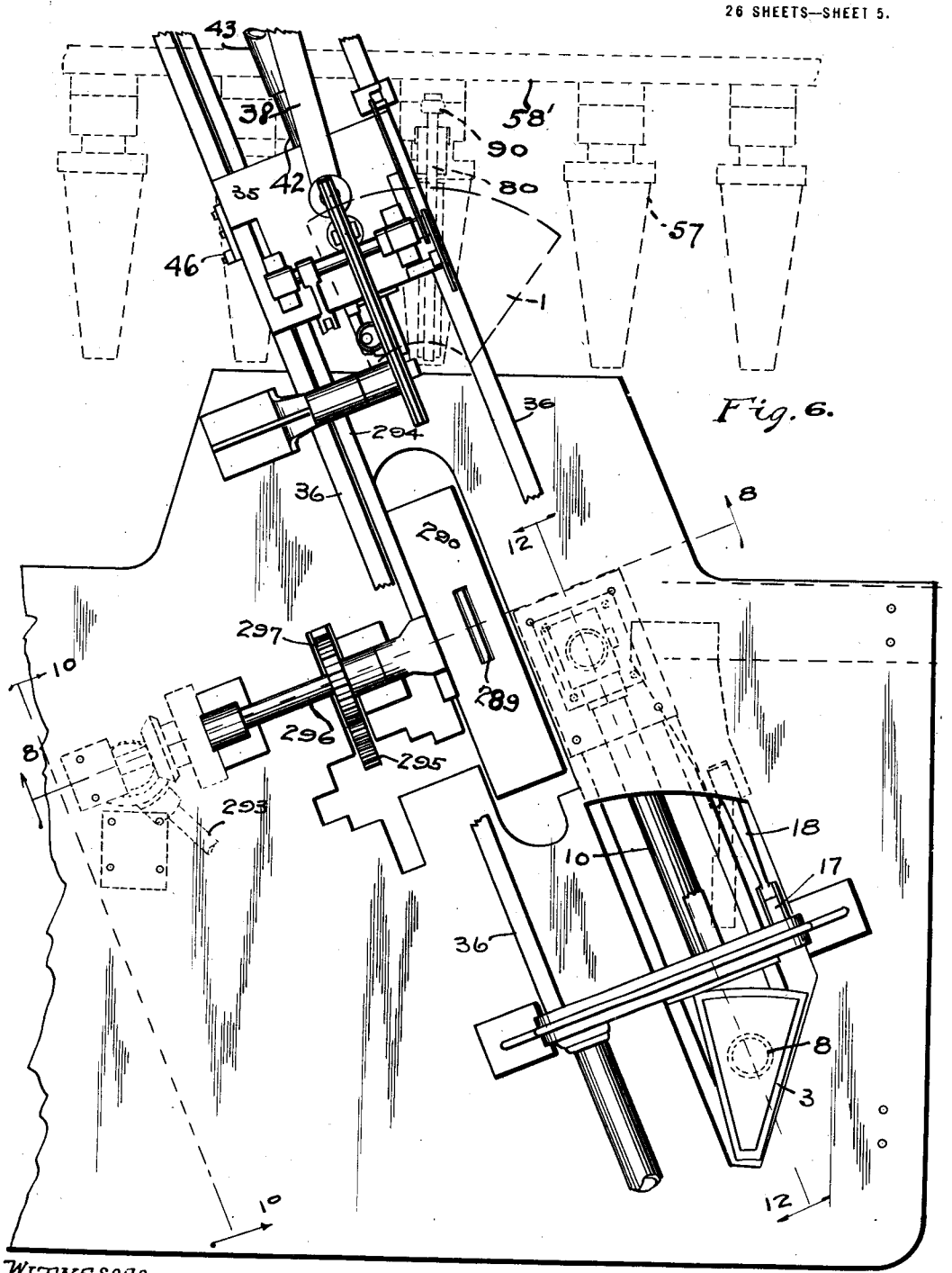


Fig. 6.

WITNESSES

J. H. Swan.

L. B. Moerner.

INVENTORS

Harry D. Caylor 2d

William Allison Scott,

By Minturn & Moerner

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26 SHEETS—SHEET 6.

Fig. 7

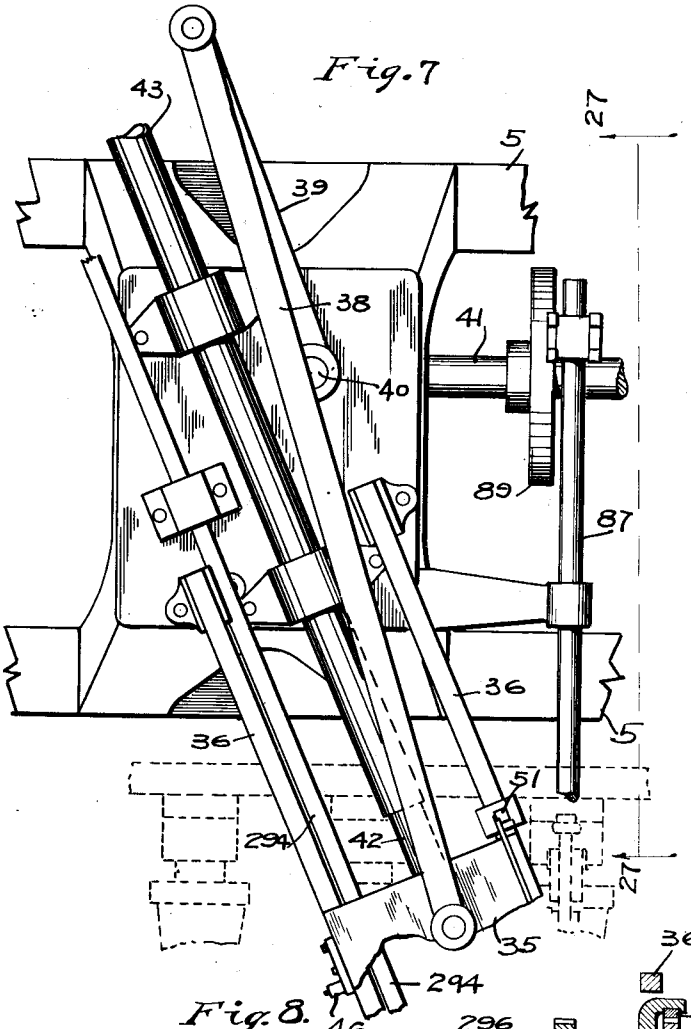


Fig. 9

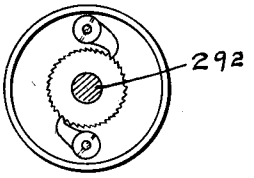
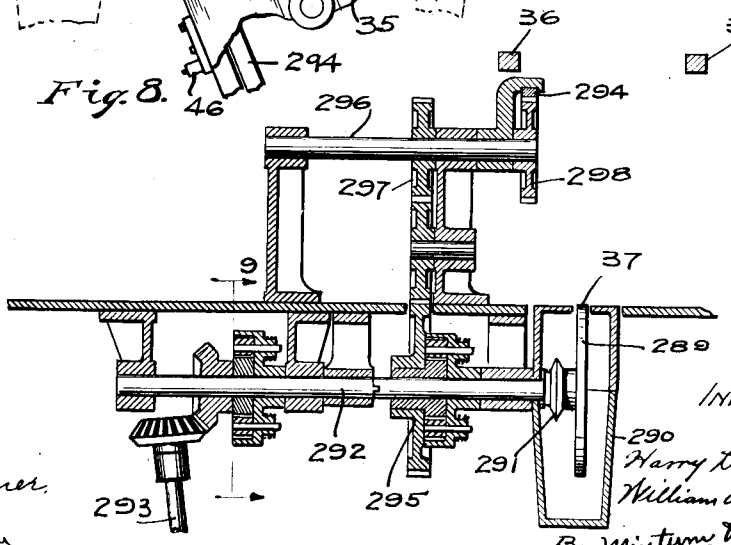


Fig. 8.



WITNESSES.

S. B. Koerner.

J. H. Swan.

INVENTORS

Harry D. Caylor &
William Allison Scott

By Minturn & Woerner
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26 SHEETS—SHEET 7.

Fig. 10.

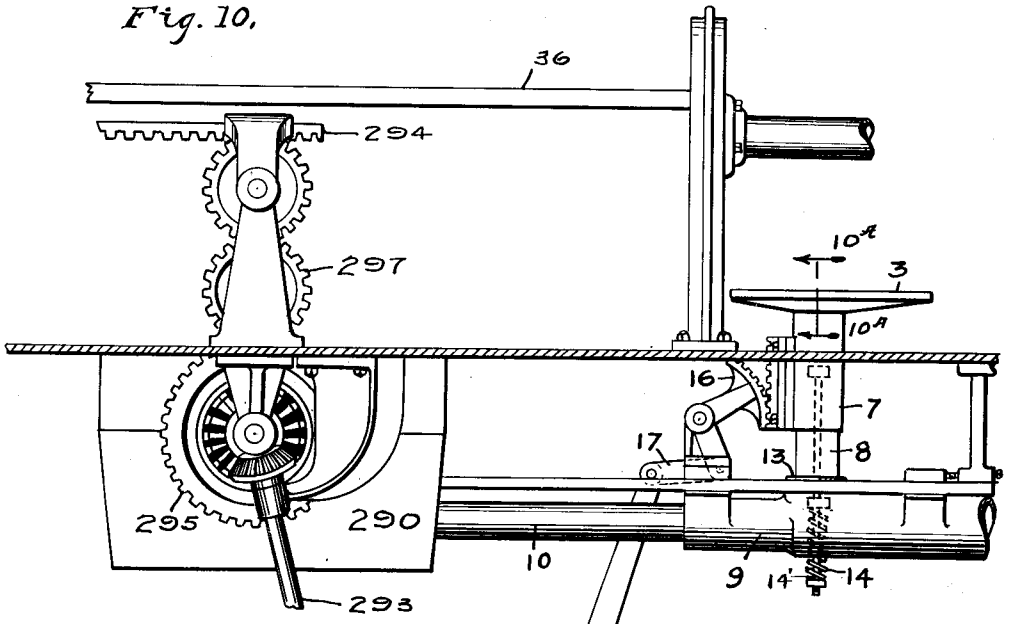


Fig. 10A

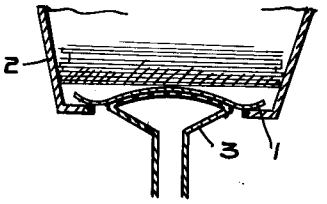
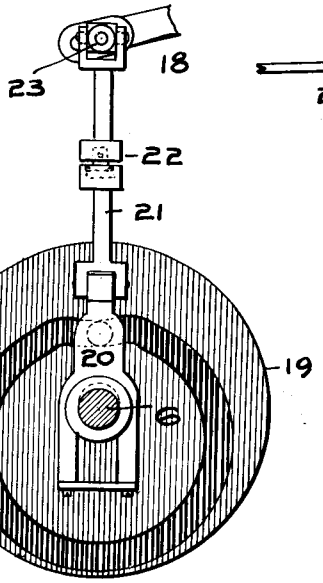
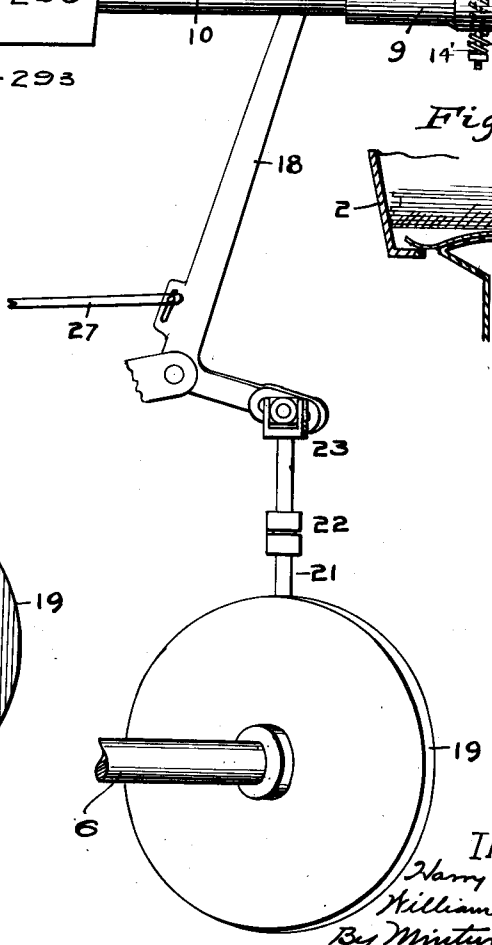


Fig. 11.





WITNESSES,

J. H. Swan.

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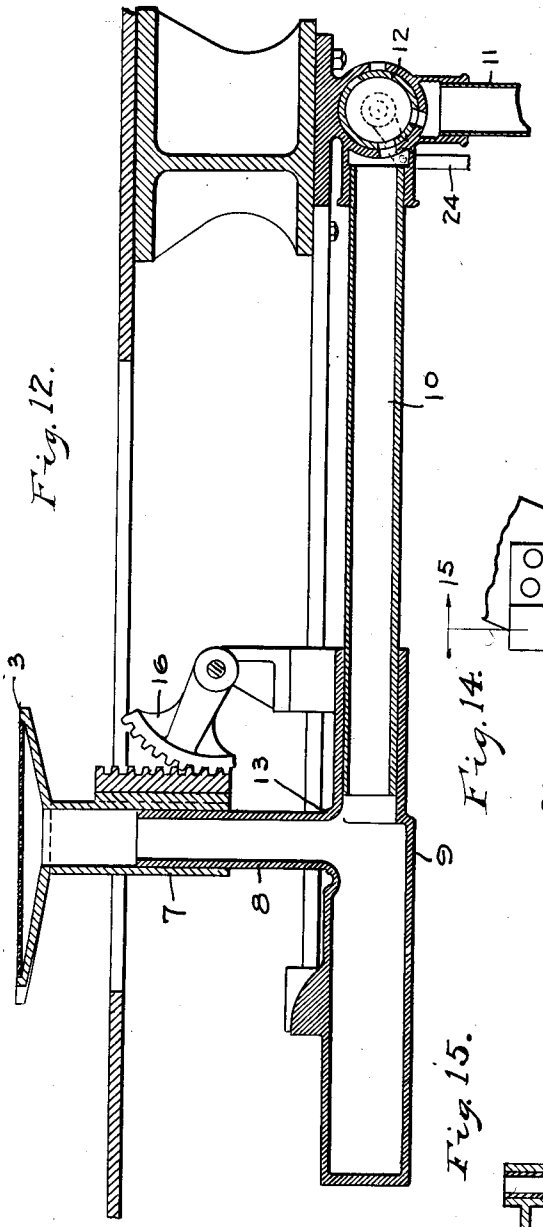


Fig. 12.

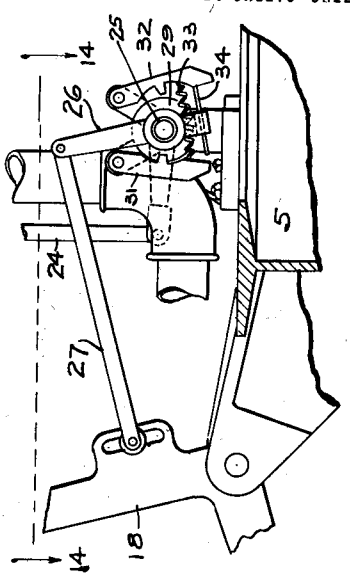


Fig. 13.

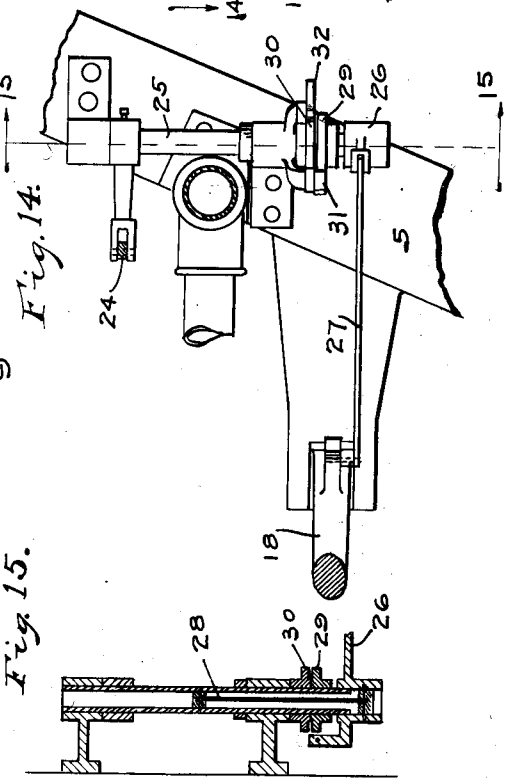


Fig. 14.

Fig. 15.

WITNESSES:
J. H. Swan.
L. B. Woerner.

INVENTORS
Harry D. Caylor and
William Allison Scott.
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Fig. 16.

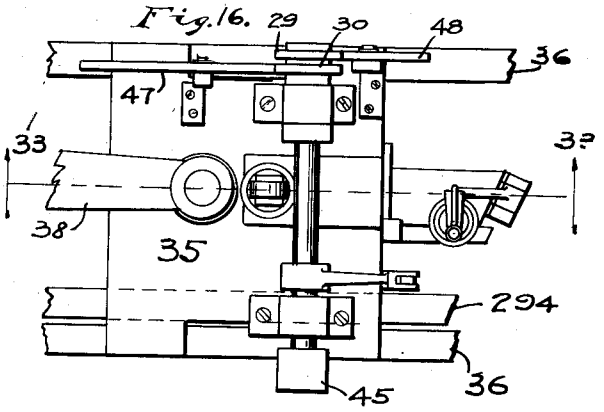


Fig. 19.

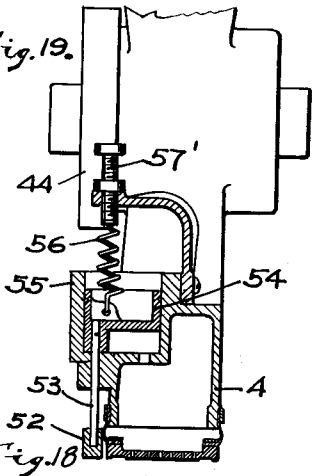


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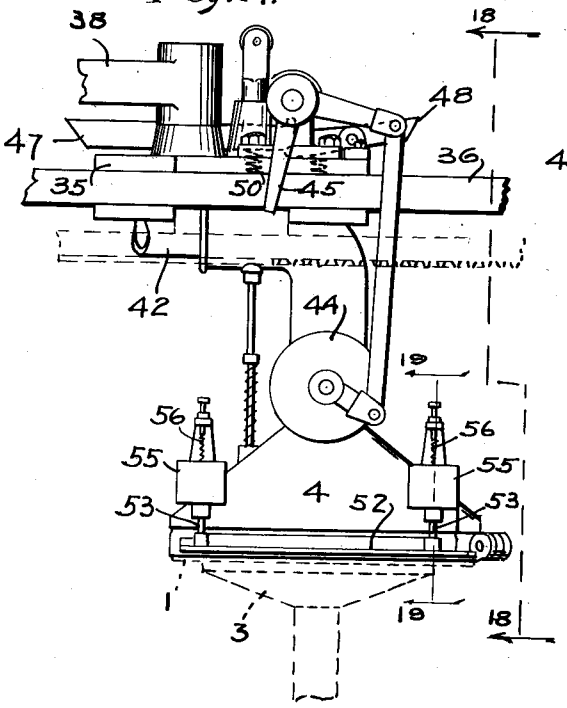
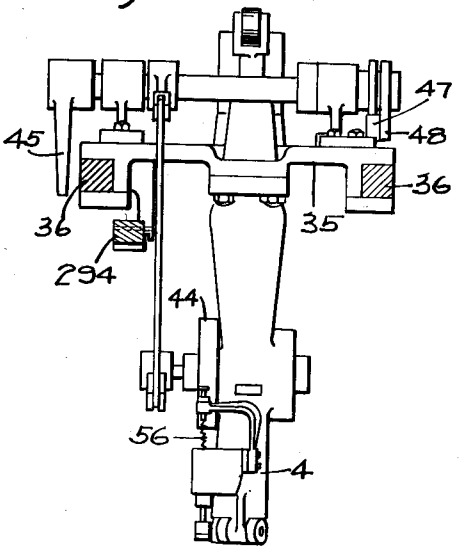


Fig. 18.



WITNESSES:

J. H. Swan

L. B. Moerner.

INVENTORS

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William Allison Scott.

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MACHINE FOR MAKING PAPER VESSELS.

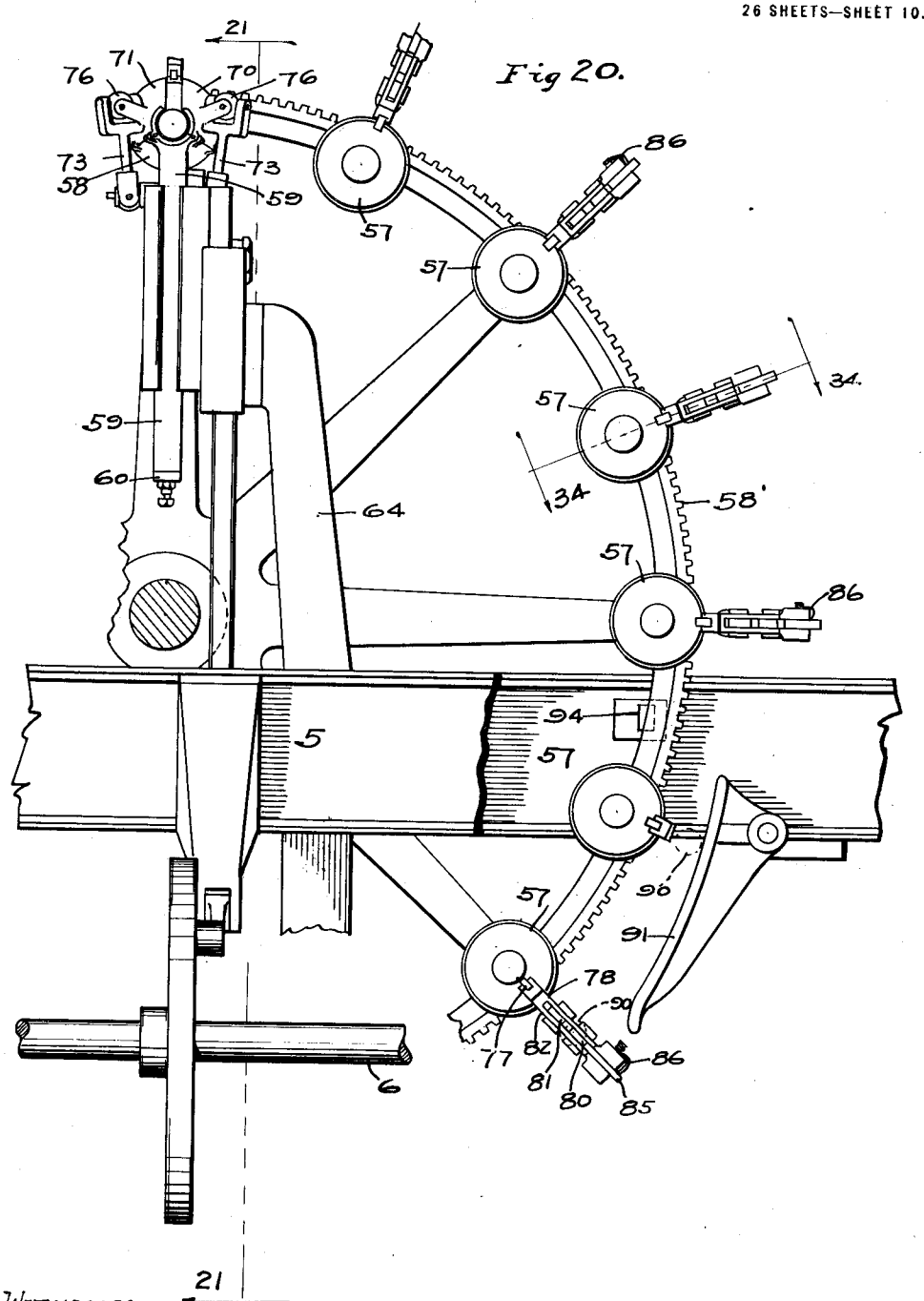
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26 SHEETS—SHEET 10.

Fig 20.



WITNESSES:

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Harry D. Caylor and

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Fig. 22.

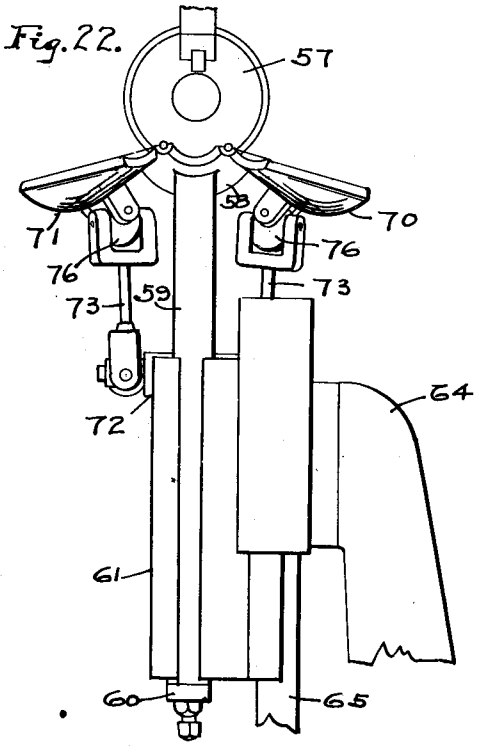
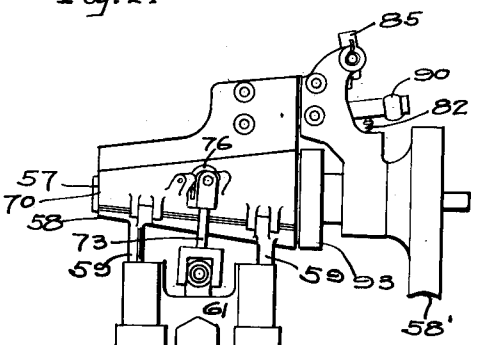
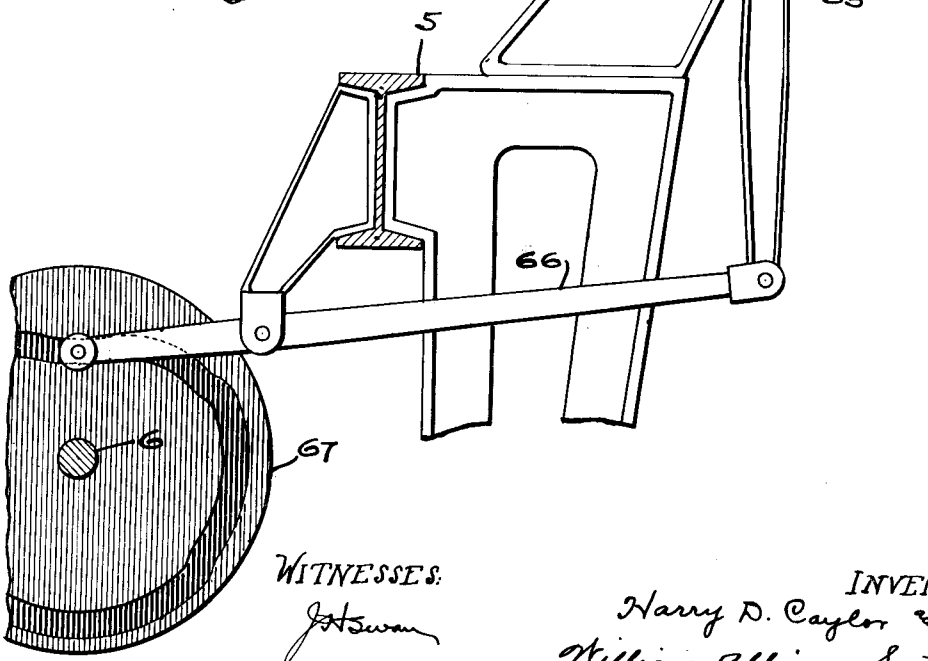


Fig. 21





WITNESSES:

J. H. Swan

L. B. Woerner.

INVENTORS

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William Allison Scott

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25 SHEETS—SHEET 12.

Fig. 23.

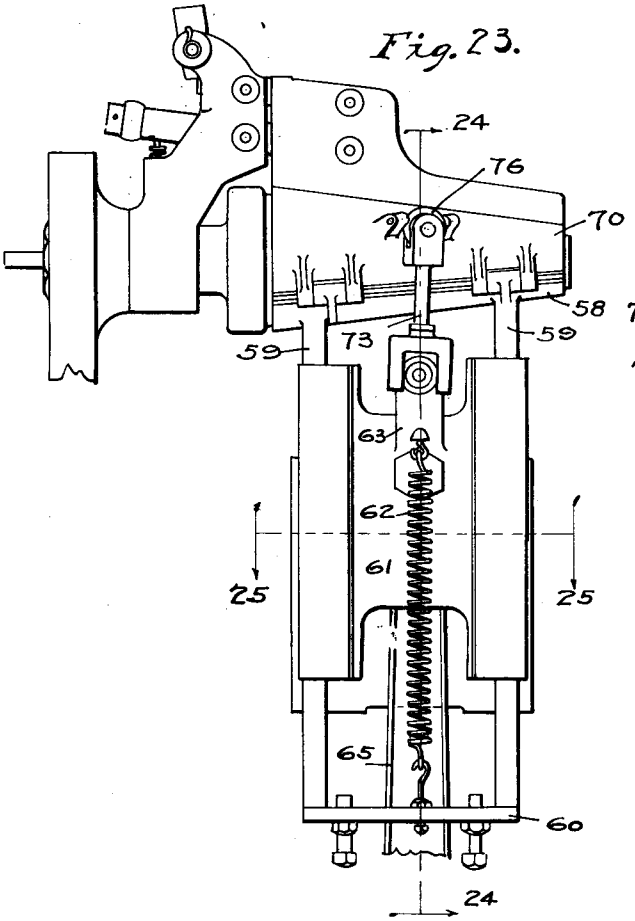


Fig. 24.

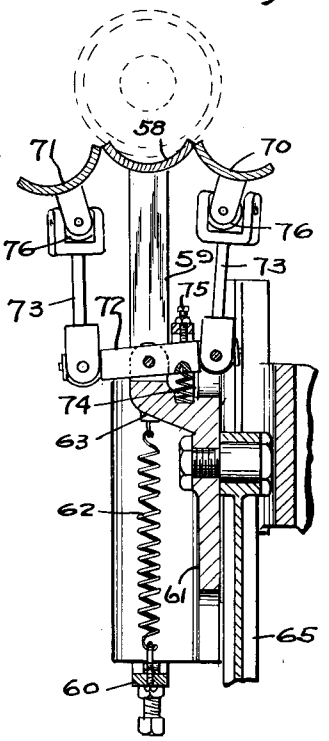


Fig. 25

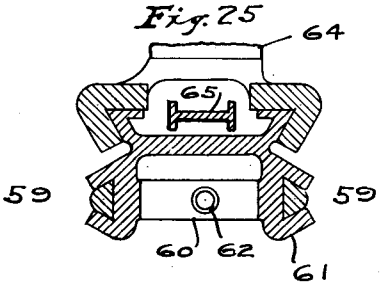
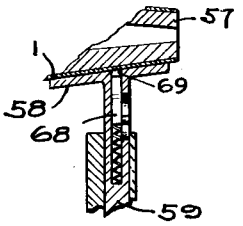


Fig. 26.



WITNESSES.

J. H. Swan.

L. B. Woerner.

INVENTORS

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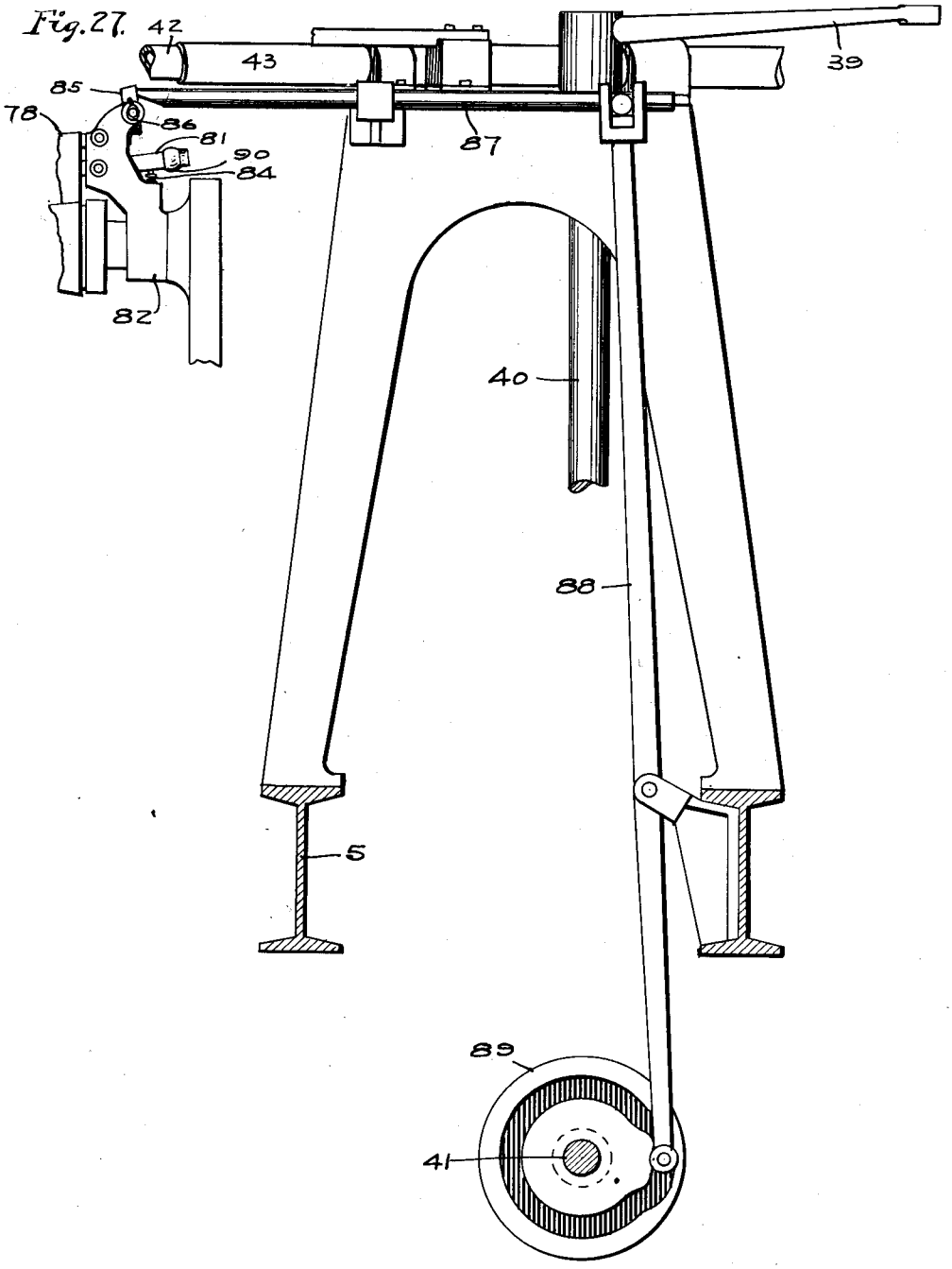
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26 SHEETS—SHEET 13.

Fig. 27.



WITNESSES

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Fig. 28.

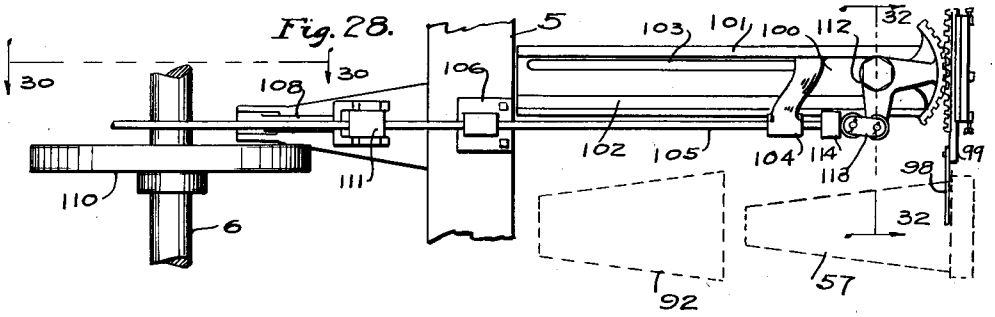


Fig. 29.

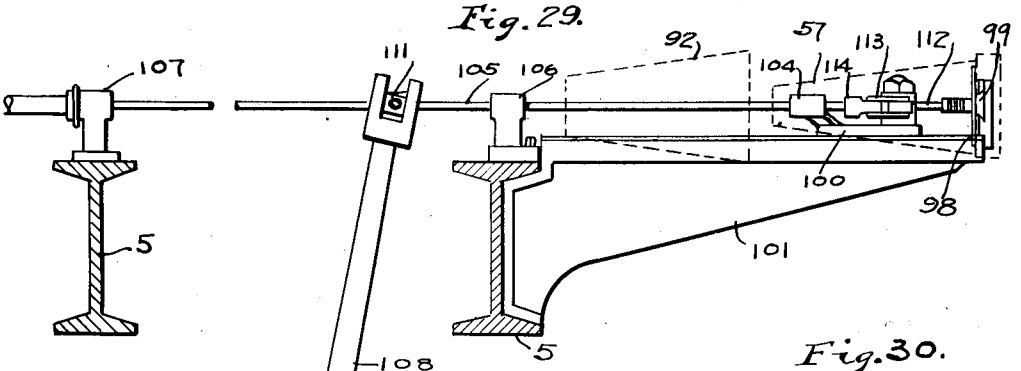
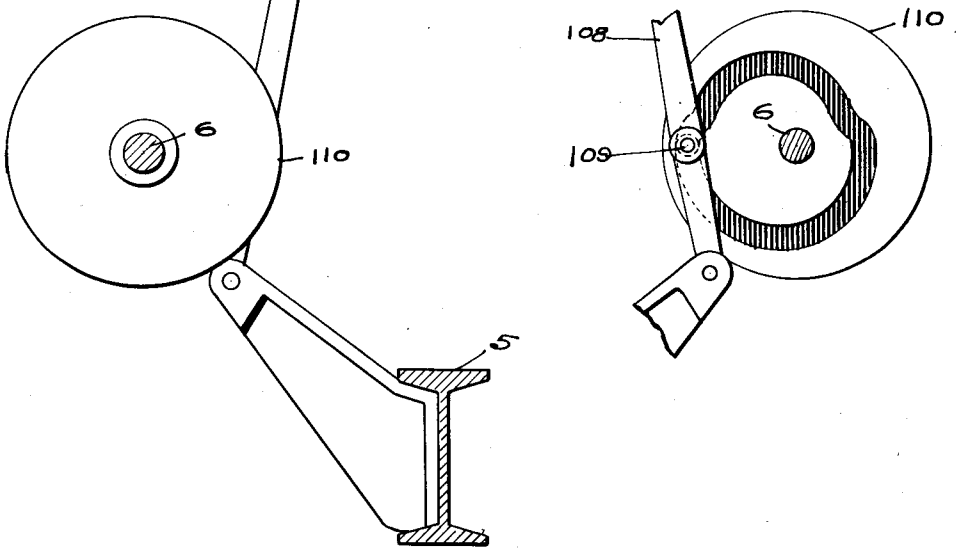


Fig. 30.



WITNESSES

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L. B. Woerner.

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By Minturn & Woerner

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26 SHEETS—SHEET 15.

Fig. 31.

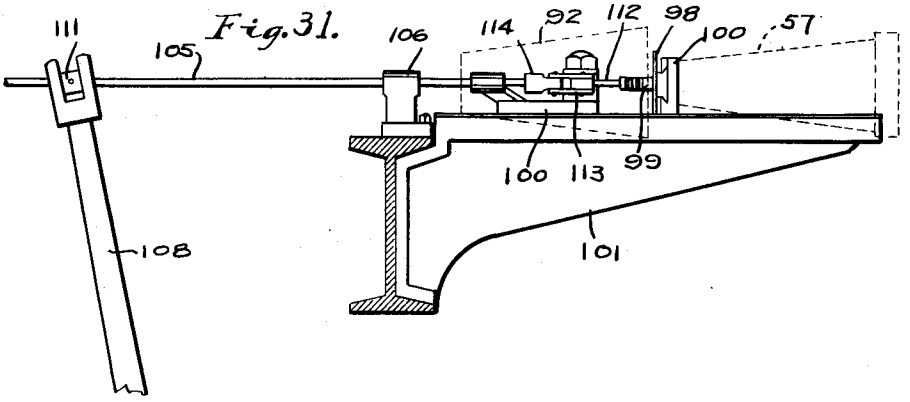


Fig. 32.

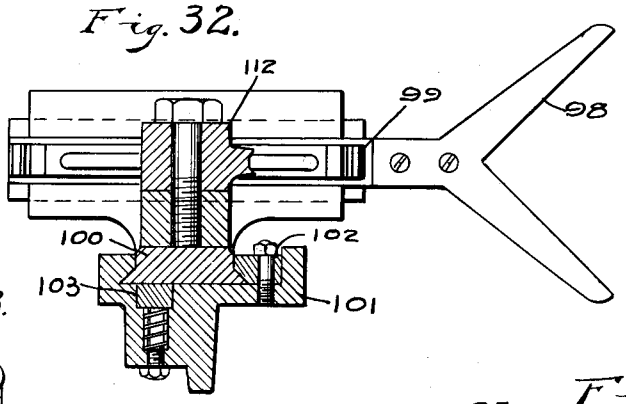


Fig. 33.

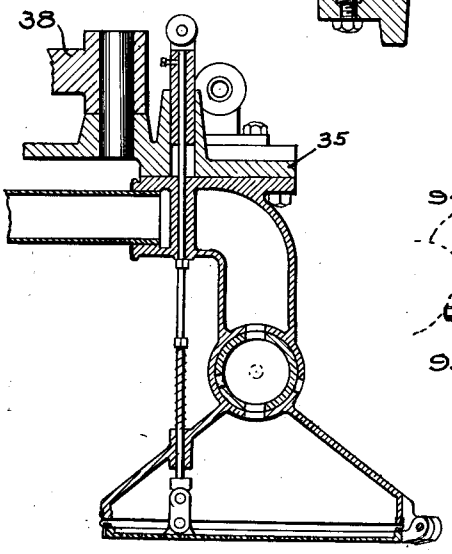
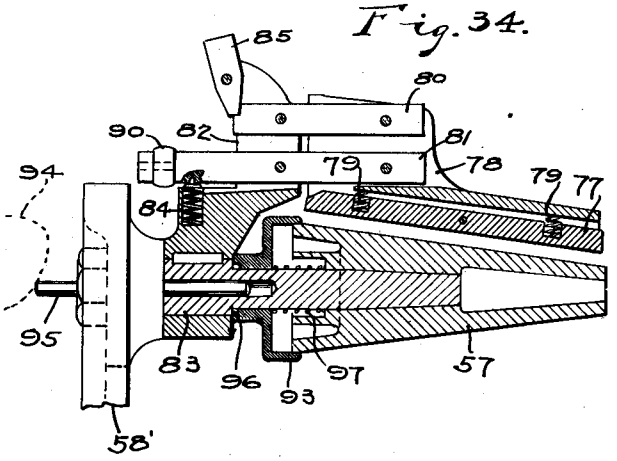


Fig. 34.



WITNESSES.

J. H. Swan.

L. B. Moerner.

INVENTORS

Harry D. Caylor and

William Allison Scott,

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H. D. CAYLOR & W. A. SCOTT.

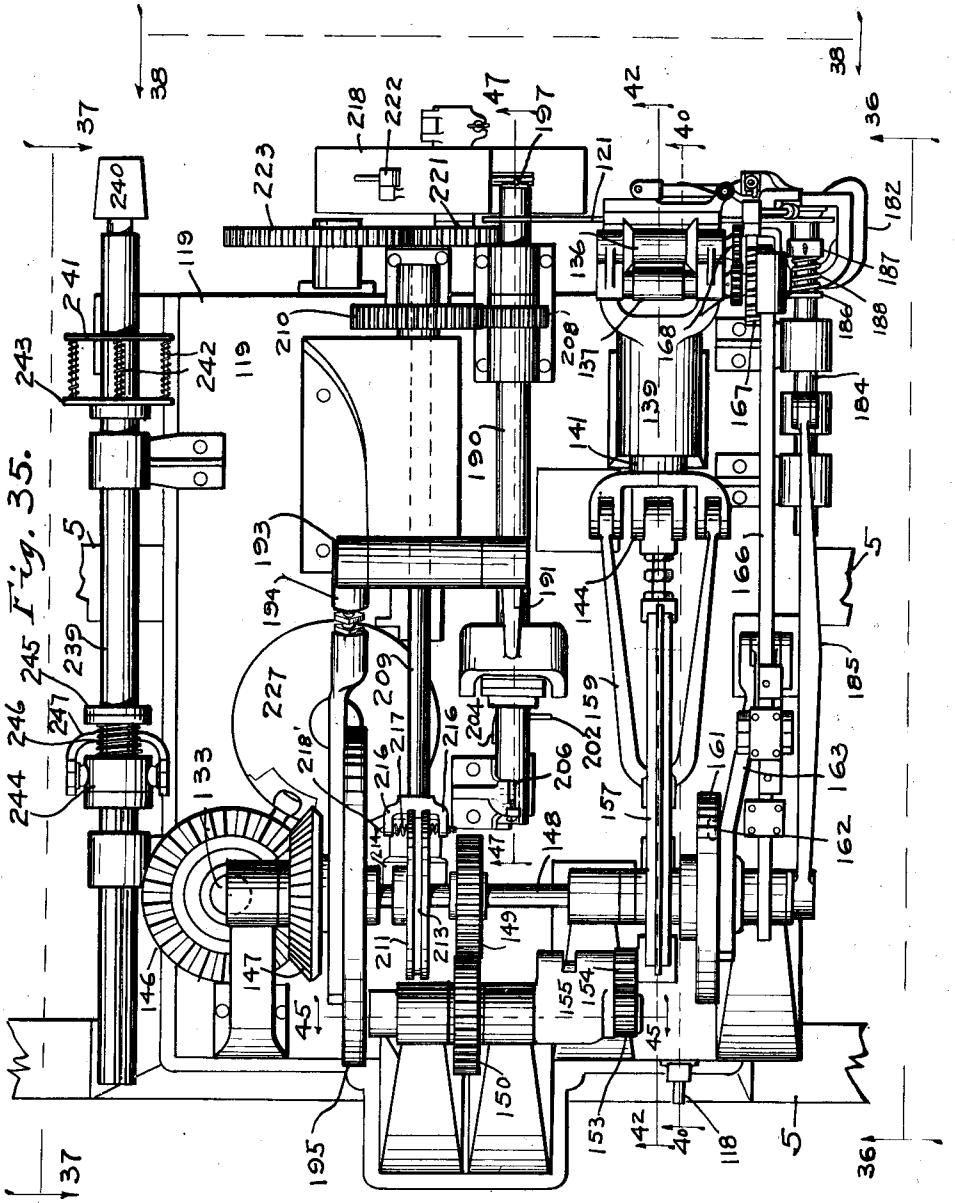
MACHINE FOR MAKING PAPER VESSELS.

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26 SHEETS—SHEET 16.

Fig. 35.



WITNESSES.

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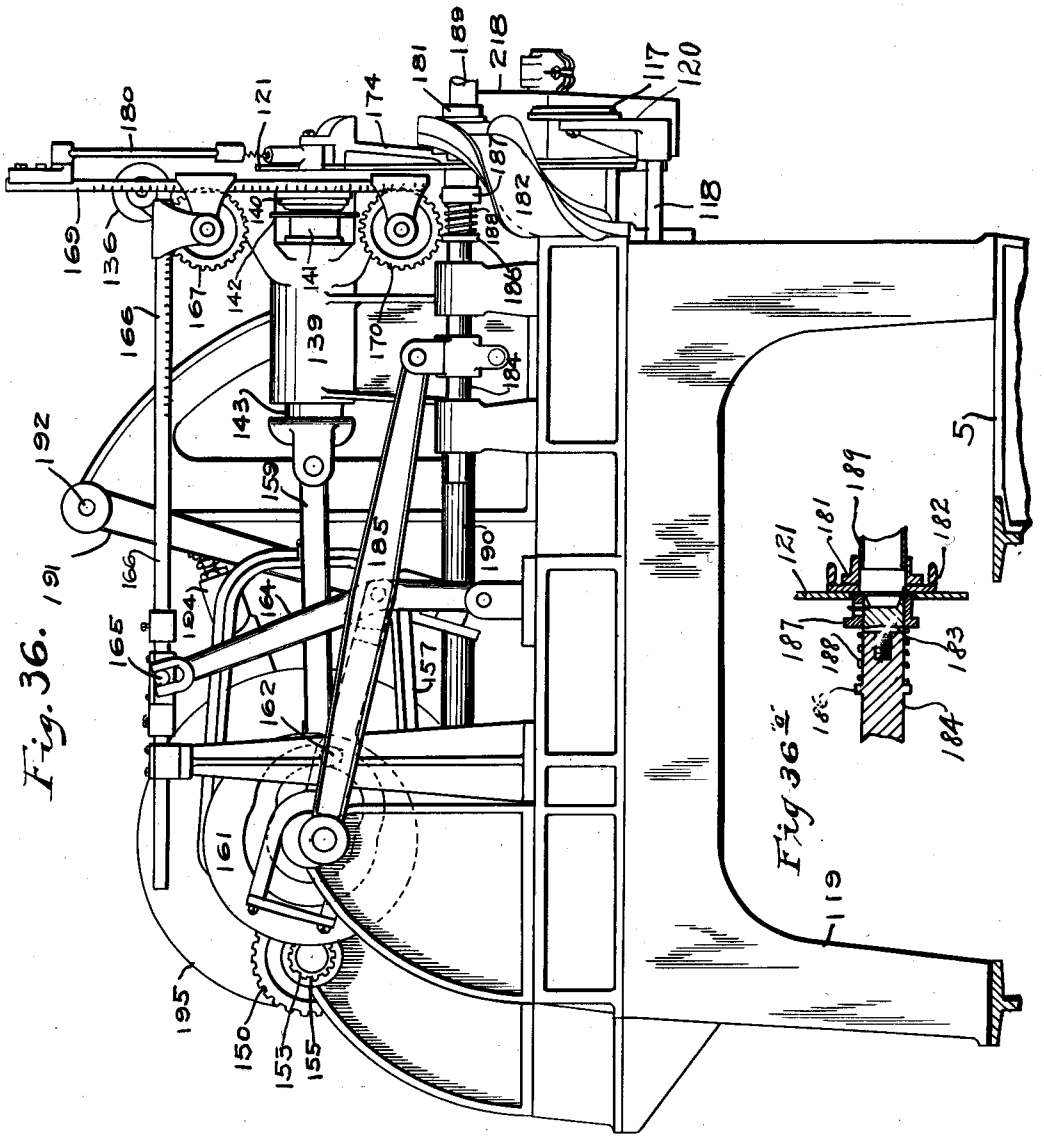


Fig. 36.

Fig 36a

WITNESSES.

J. H. Swan

L. B. Moerner.

INVENTORS

Harry D. Caylor 2nd

William Allison Scott

By Minturn & Moerner

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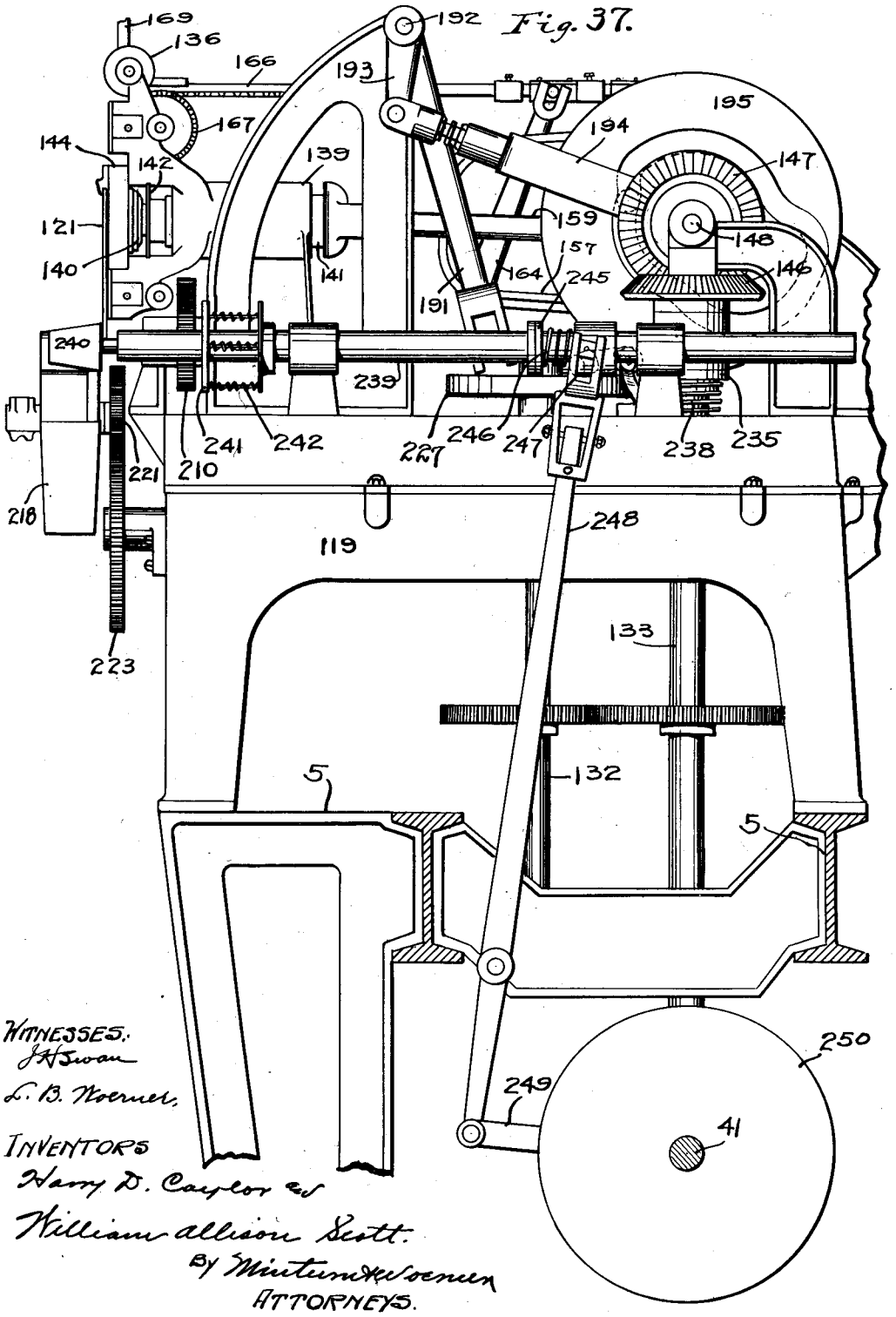
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26 SHEETS—SHEET 18.

Fig. 37.



WITNESSES.
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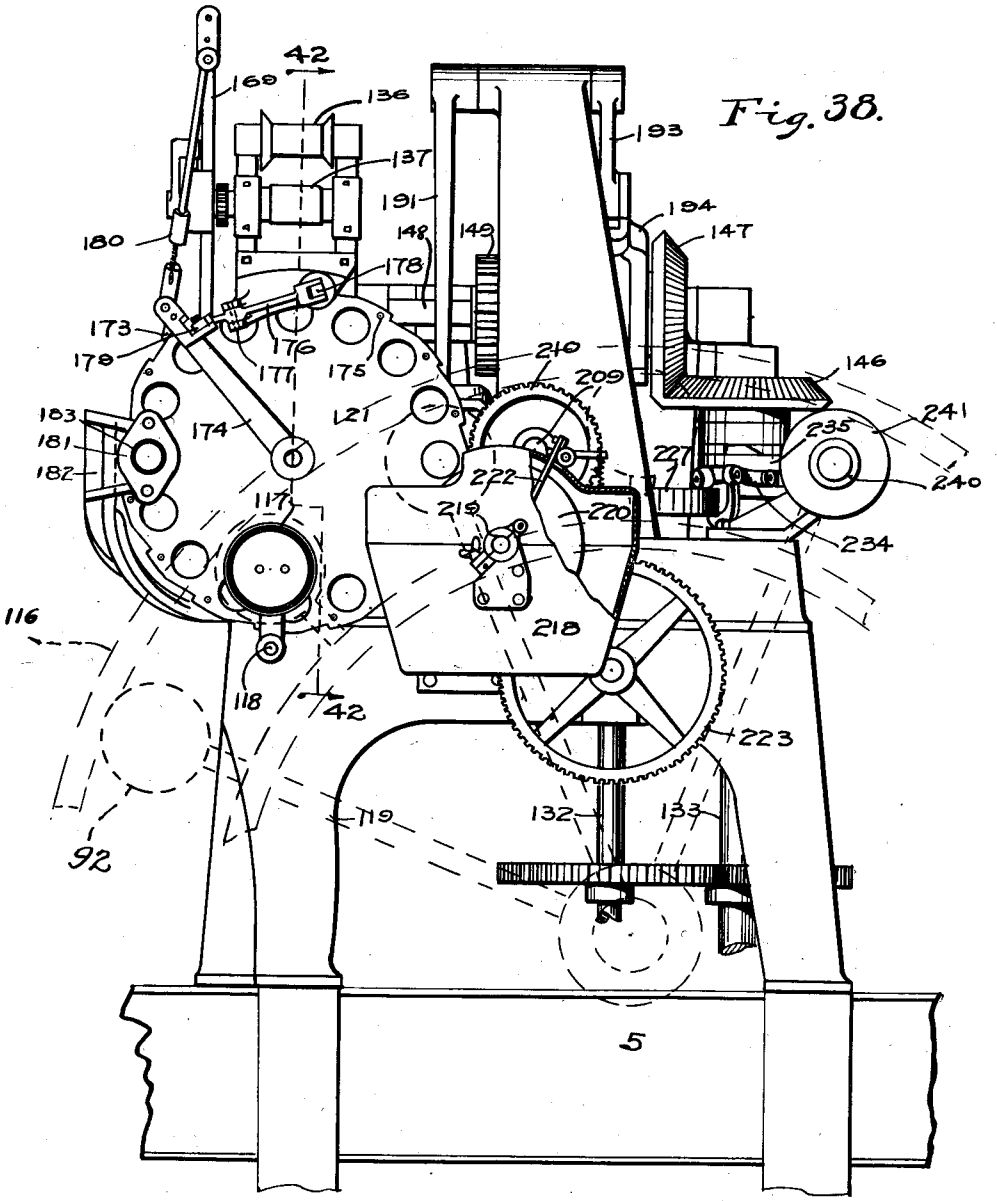


Fig. 38.

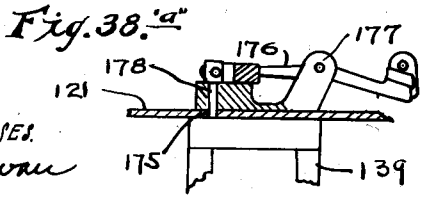


Fig. 38. "a"

WITNESSES.

J. H. Swan

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INVENTORS

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26 SHEETS—SHEET 20.

Fig. 39.

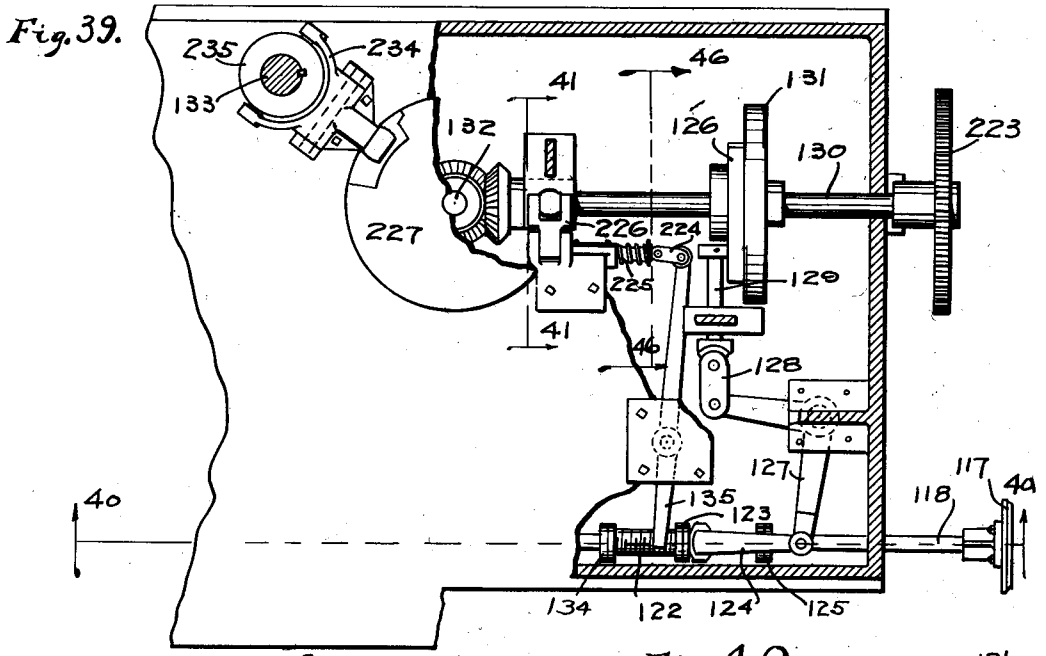


Fig. 40.

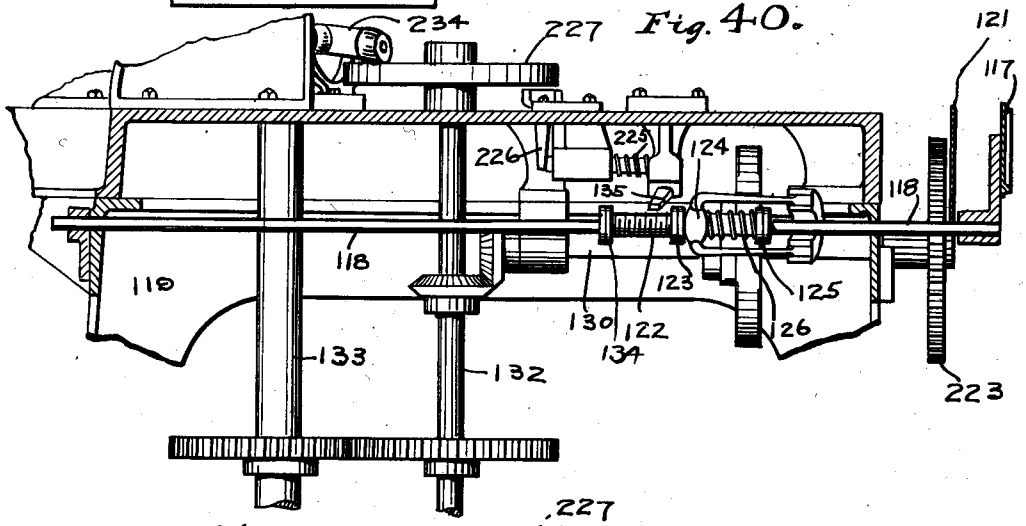
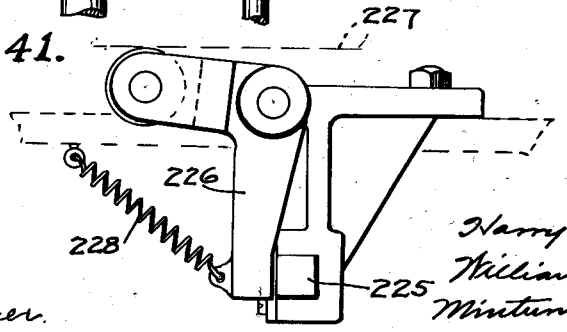


Fig. 41.



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MACHINE FOR MAKING PAPER VESSELS.

APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 21.

Fig. 42.

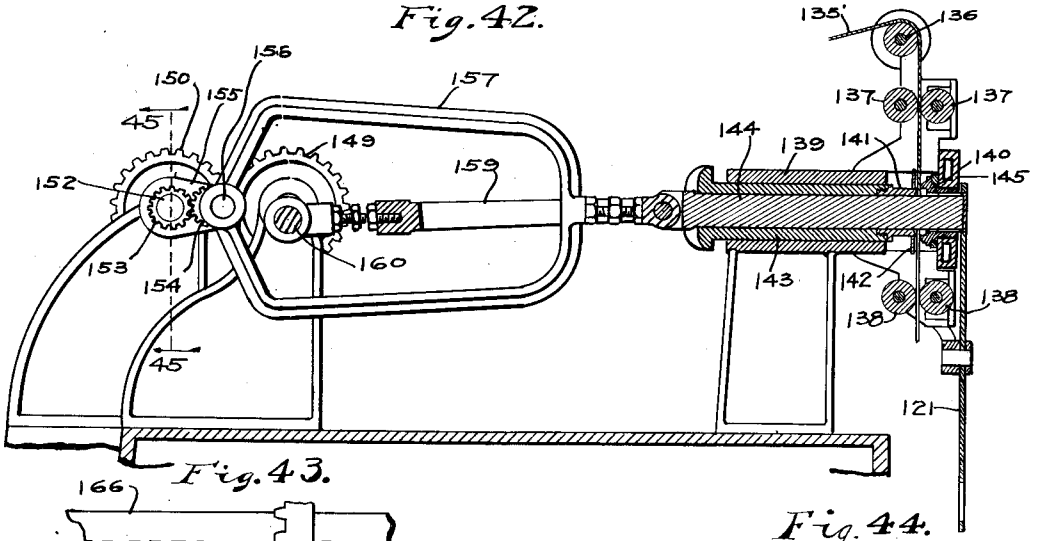


Fig. 43.

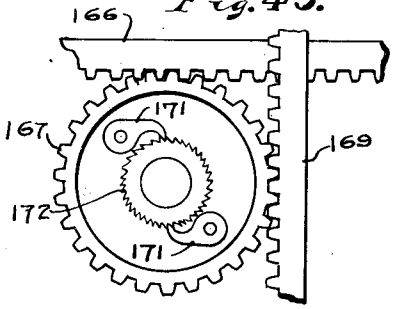


Fig. 44.

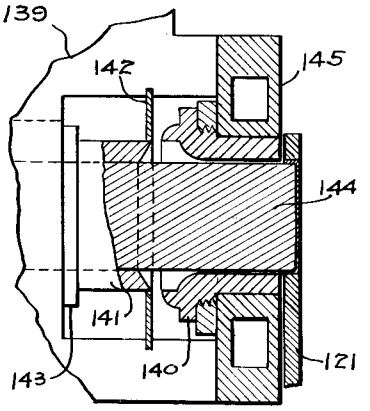


Fig. 45.

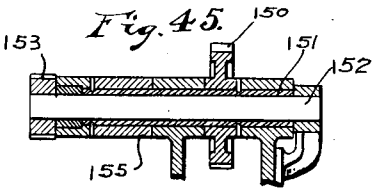
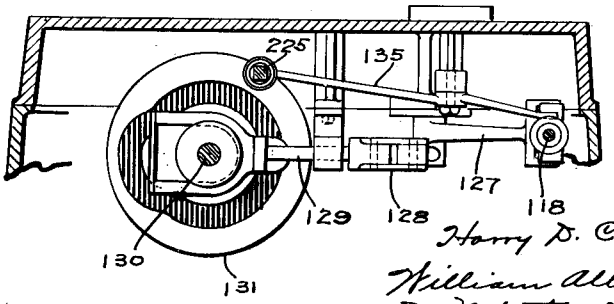


Fig. 46.



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APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 22.

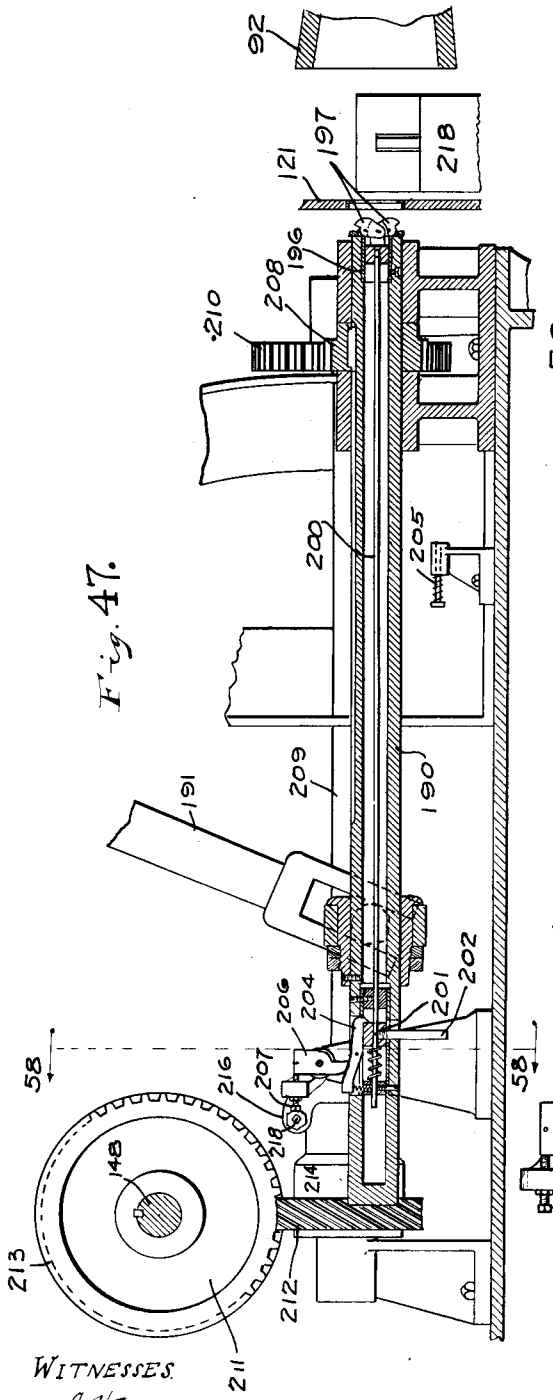


Fig. 47.

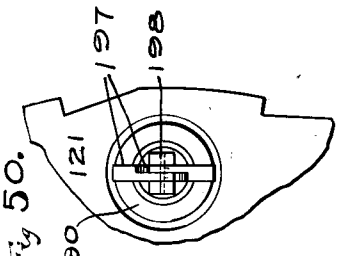


Fig. 50.

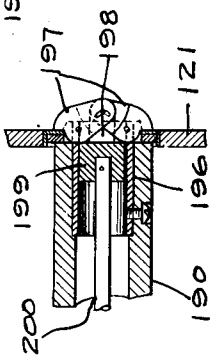


Fig. 49.

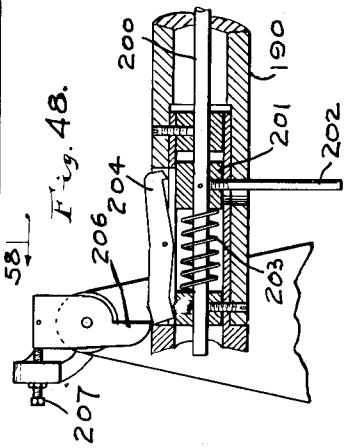


Fig. 48.

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MACHINE FOR MAKING PAPER VESSELS.

APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 23.

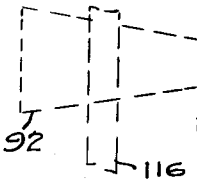
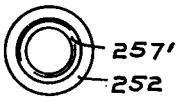
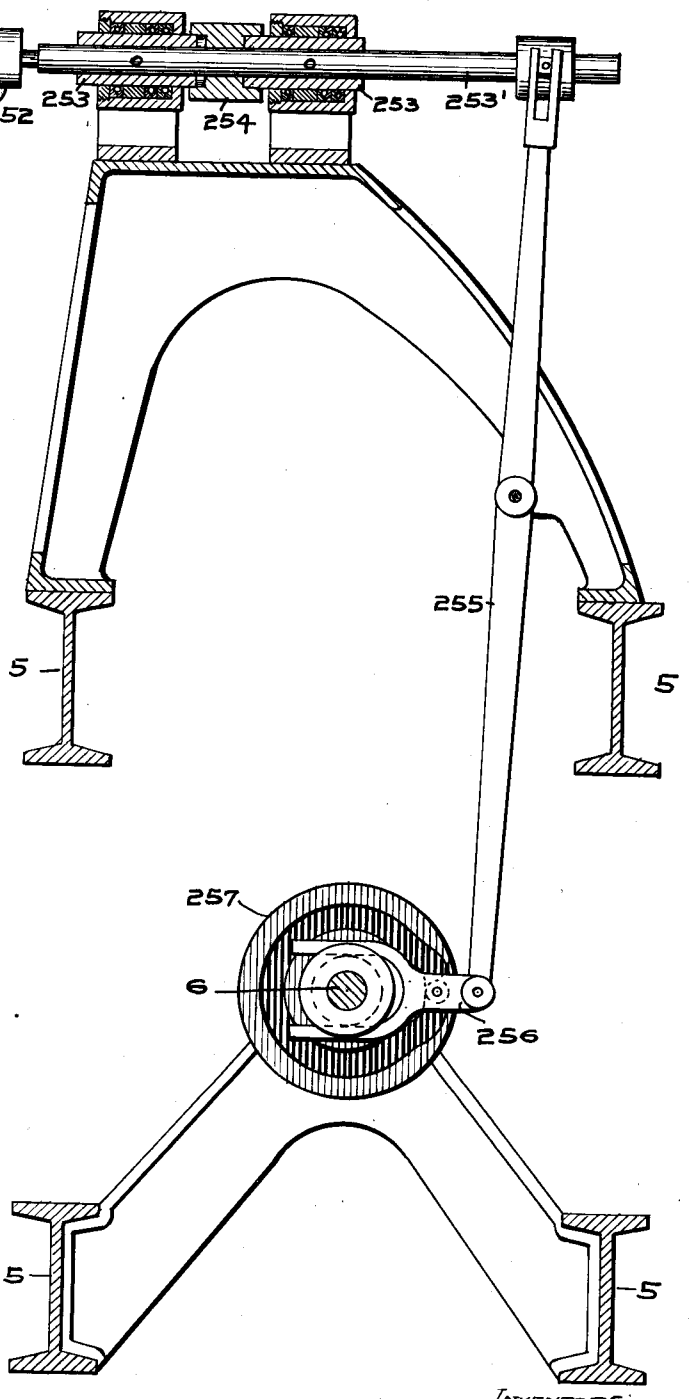


Fig. 51.

Fig. 51A





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MACHINE FOR MAKING PAPER VESSELS.

APPLICATION FILED OCT. 18, 1913.

1,164,922. Patented Dec. 21, 1915.

26 SHEETS—SHEET 24.

Fig. 52

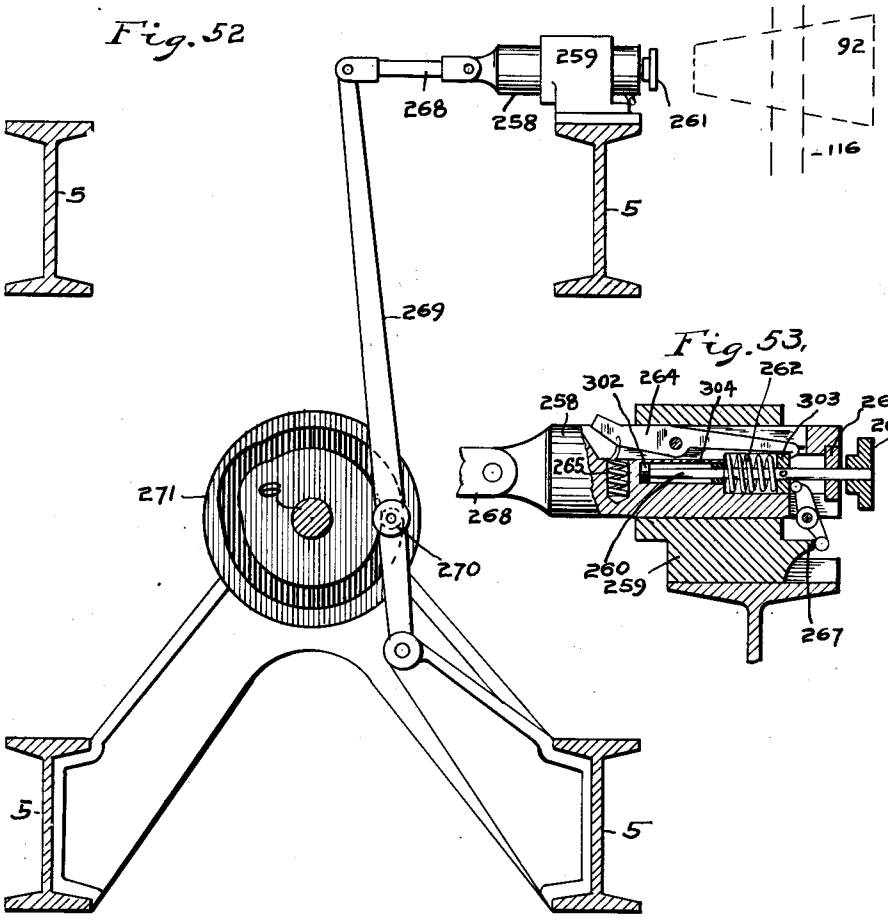
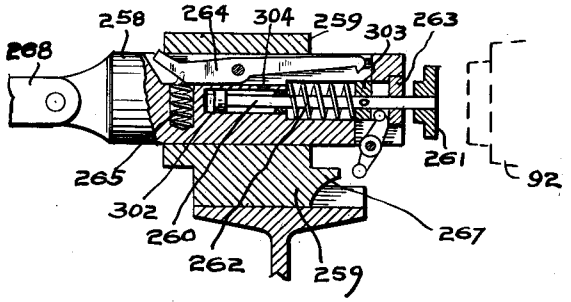


Fig. 53.

Fig. 54.



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APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 25.

Fig. 55.

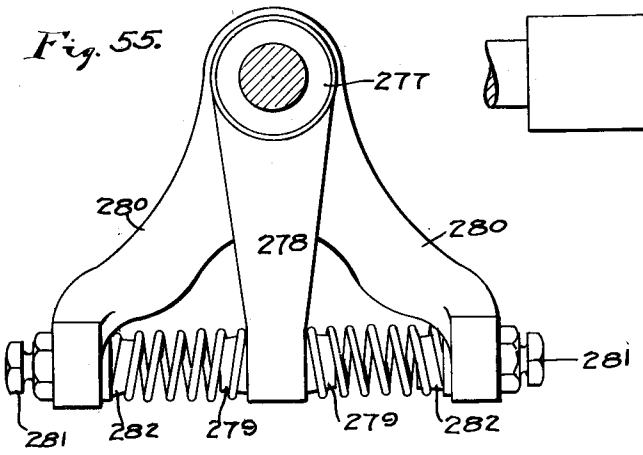


Fig. 56.

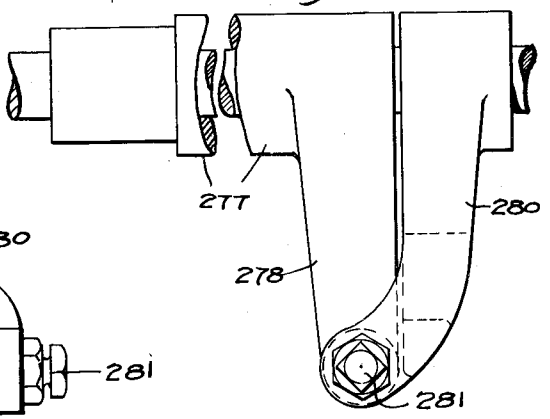


Fig. 57

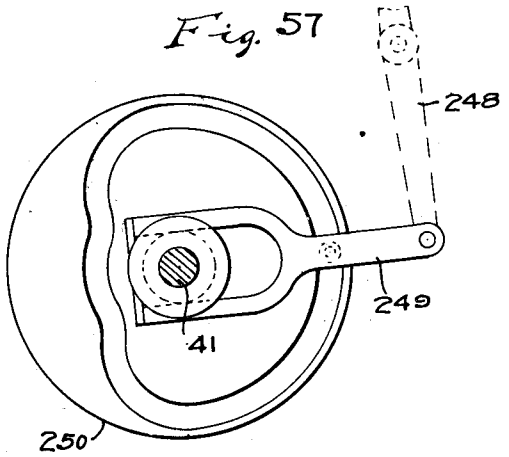
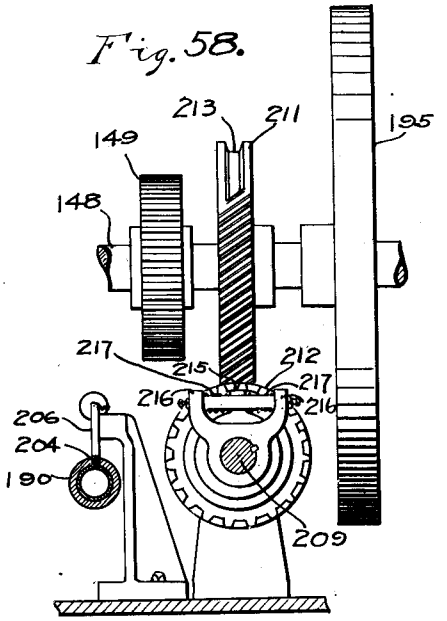


Fig. 58.



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MACHINE FOR MAKING PAPER VESSELS.

APPLICATION FILED OCT. 18, 1913.

1,164,922.

Patented Dec. 21, 1915.

26 SHEETS—SHEET 26.

Fig. 59.

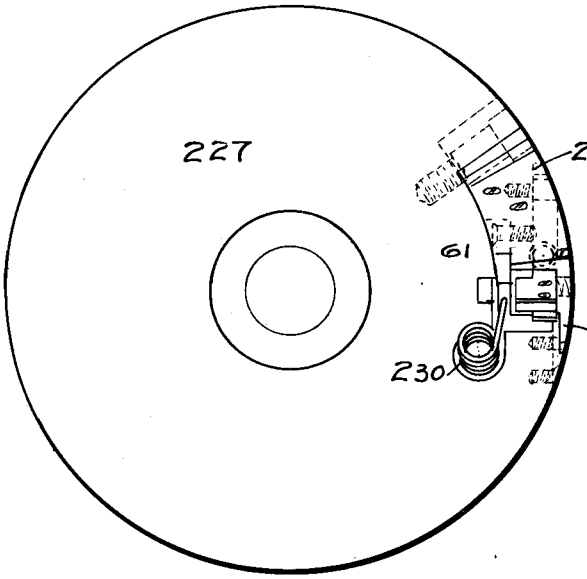


Fig. 60.

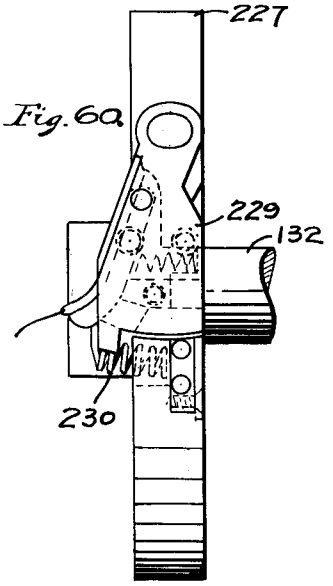
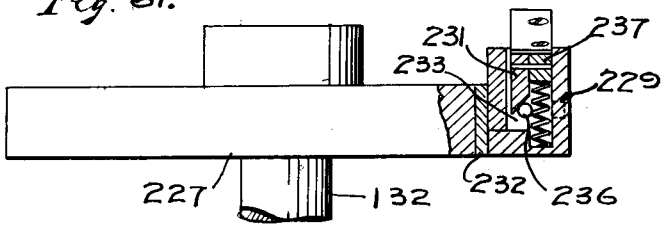


Fig. 61.



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UNITED STATES PATENT OFFICE.

HARRY D. CAYLOR AND WILLIAM ALLISON SCOTT, OF INDIANAPOLIS, INDIANA, ASSIGNORS TO NATIONAL CONING MACHINERY COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

MACHINE FOR MAKING PAPER VESSELS.

1,164,922. Specification of Letters Patent. Patented Dec. 21, 1915.

Application filed October 18, 1913. Serial No. 796,059.

To all whom it may concern:

Be it known that we, HARRY D. CAYLOR and WILLIAM ALLISON SCOTT, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Machines for Making Paper Vessels, of which the following is a specification.

This invention relates to machines for making paper bottles having truncated conical sides and transverse flanged disks glued in said sides to form a bottom and a throat.

The object of this invention is to provide a machine with a receptacle into which paper blanks may be stacked, and which will place the blanks in proper position at the bottom of the receptacle and then automatically and successively take the blanks from the receptacle in single order, coat one edge of the blank with glue, form the flat blank into a truncated cone, and then apply an overlapped edge of this body to the glue coated edge, under pressure, until complete adhesion of the edges is obtained.

A further object of the invention is to punch and flange a throat-piece for said truncated conical body, remove the center of the throat-piece, coat the flange with glue, and then place the glued throat-piece in proper position in the truncated conical body.

A final object of this invention is to bend the edges at the small end of said truncated body inwardly and to spin a bead on this folded edge and then discharge the product from the machine.

Various other objects, more or less subordinate to the above, will hereinafter appear; all of which will be fully explained and specifically pointed out in the appended claims.

We accomplish the objects of our invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of our invention. Fig. 2 is a front elevation of same. Fig. 3 is a rear elevation. Fig. 4 is an end elevation looking at that end of the machine to which power from the motor is initially applied. Fig. 5 is a section on the line 5—5 of Fig. 4. Fig. 6 is a fragment in top plan view of that portion of the machine where the paper blank is handled in its flat condition and is positioned to be bent into conical form around a mandrel which is shown in dotted lines, portions of the superimposed structure being broken away to show the underlying parts. Fig. 7 is a continuation of Fig. 6 showing the mandrels around which the truncated conical bodies are formed, in dotted lines, as in Fig. 6, and also showing parts of the machine on the other side of said mandrels which are not shown in Fig. 6. Fig. 8 is a vertical section on the line 8—8 of Fig. 6. Fig. 9 is a section on the line 9—9 of Fig. 8, the last two figures illustrating details of the mechanism for coating the edge of the blank with glue. Fig. 10 is a vertical section on the line 10—10 of Fig. 6 and shows in elevation the mechanism for raising and lowering the suction head which takes the blanks from the receptacle seriatim and for moving the head horizontally to its transfer position. Fig. 10ª is a vertical section through the receptacle and suction head transversely of the head with the head in position at the bottom of the receptacle to remove a blank. Fig. 11 is a side elevation of the cam wheel shown at the bottom of Fig. 10, illustrating the other side of the wheel. Fig. 12 is a vertical section on the line 12—12 of Fig. 6 showing the assembly of the suction head shown in Fig. 10 with the carriage by which it is supported and showing the three-way valve which controls the suction. Fig. 13 is a detail in side elevation of the mechanism, connected with the same lever which controls the movement of the suction head shown in Fig. 10, for automatically operating the valve which controls the air to the suction head. Fig. 14 is a horizontal section on the line 14 of Fig. 13 showing the same parts in top plan view which are illustrated in side elevation in Fig. 13. Fig. 15 is a section on the line 15 of Fig. 14 showing the spring mechanism located within the hollow horizontal shaft of this device. Fig. 16 is a fragment in top plan view showing the tracks and the sliding carriage thereon, from which the second suction head is suspended. Fig. 17 is a side elevation of the same parts showing the second suction head depending from the carriage, and showing

the first suction head in dotted lines under the second one, in position to transfer a blank. Fig. 18 is a section on the line 18 of Fig. 17 showing the sliding carriage and second suction head in elevation. Fig. 19 is a section on the line 19 of Fig. 17 through one of the dash-pots regulating the suction in the second head, the view being on a larger scale than that on which the last preceding figures are drawn. Fig. 20 shows a fragment of the reel carrying the mandrel on which the blanks are bent to form the truncated conical bodies of the bottles. The wheel is shown in side elevation, on a larger scale than the views heretofore described and particularly illustrates the devices for clamping the lapped ends of the bottle body together while the glue is setting and drying, and the cam for unlocking clamp. It also shows the mechanism for folding the blank around the mandrel. Fig. 21 is a section on the line 21 of Fig. 20 showing the mechanism for folding the blank around the mandrel in elevation viewed at a forty-five degree position from that shown in Fig. 20. Fig. 22 is a view of the folding mechanism which is illustrated at the top of Fig. 20 in closed position and is illustrated in open position in Fig. 22, on a somewhat larger scale. Fig. 23 shows the other side of the same folding mechanism from that shown in Fig. 21, the folding devices being closed and the view being on a larger scale than that shown in Fig. 21. Fig. 24 is a vertical section on the line 24 of Fig. 23, showing the folding devices in open position. Fig. 25 is a horizontal section on the line 25 of Fig. 23. Fig. 26 is a fragment in vertical section of one of the bars which supports the folding sleeves and shows the pilot pin seated in said bar. Fig. 27 is a vertical section on the line 27 of Fig. 1 and shows in side elevation the mechanism for releasing the foot-bar which presses the glued joint. Fig. 28 is a section on the line 28 of Fig. 2 and shows the mechanism for stripping the truncated conical paper body off of the mandrel on which it was formed, this view being on a larger scale and showing a top plan view of the parts. Fig. 29 is a side elevation of the same parts shown in Fig. 28. Fig. 30 is a vertical section on the line 30—30 of Fig. 28 showing the opposite side of the cam wheel from that shown in Fig. 29. Fig. 31 shows the stripping mechanism at the opposite position of its travel from that shown in Fig. 29. Fig. 32 is a vertical section on the line 32—32 of Fig. 28. Fig. 33 is a vertical section of the second suction head and its associated parts, taken on the line 33—33 of Fig. 16. Fig. 34 is a section, on a larger scale, taken on the line 34—34 of Fig. 20, showing the mechanism in detail for operating the foot-bar which presses and holds the glue joint in the paper cone. Fig. 35 is a fragment on a larger scale in top plan view of the throat forming and applying mechanism which is shown near the middle of Fig. 1. Fig. 36 is a section on the line 36—36 of Fig. 35 through the machine frame showing the mechanism of Fig. 35 in elevation on the table on which said mechanism is assembled. Fig. 36[a] is a fragment in vertical section of the throat center punching mechanism. Fig. 37 is a vertical section on the line 37—37 of Fig. 35 and Fig. 1 showing the other side of the table illustrated in Fig. 36, with the mechanism assembled thereon. Fig. 38 is an elevation of the parts looking from the dotted line 38—38 of Fig. 35 Fig. 38[a] is a detail showing the lever for operating the pin which locks and unlocks the throat carrying disk illustrated in Fig. 38. Fig. 39 is a fragment in top plan view of the upper right hand portion of the table shown in Fig. 35 with portions broken away to illustrate in plan view the mechanism for seating a cone-body in the second reel, and the mechanism for automatically cutting out the throat forming, gluing and placing means. Fig. 40 is a vertical section of the parts as shown on a line 40—40 of Figs. 35 and 39. Fig. 41 is a detail on a larger scale taken on the line 41 of Fig. 39 of the bell-crank lever and latch bar which operates in conjunction with the horizontal cam plate shown in Figs. 39 and 40. Fig. 42 is a detail in vertical section on the line 42—42 of Fig. 35. Fig. 43 is a fragment in elevation showing the rack bars and ratchet wheels for operating the paper feed-rolls. Fig. 44 is a detail in partial section of the throat punching and flanging mechanism on a larger scale than said parts are shown in Fig. 42. Fig. 45 is a section on the line 45—45 of Fig. 42. Fig. 46 is a section on the line 46—46 of Fig. 39 showing the cone seating and throat cut-out mechanism. Fig. 47 is a section on the line 47—47 of Fig. 35 showing the mechanism for gripping the throat member of the bottle preparatory to coating the flange of the member with glue and placing the glued member in the truncated conical body. Fig. 48 shows the rod which operates the throat gripping fingers in unlocked position, the reverse of that shown in Fig. 47, this view being on a somewhat larger scale. Fig. 49 is a like sectional view of the other end of the hollow shaft where the throat gripping fingers are mounted and shows the fingers gripping the throat piece. Fig. 50 is a fragment in elevation looking at the outer end of the hollow shaft and gripping fingers shown in Fig. 49. Fig. 51 is a vertical section on the line 51—51 of Fig. 1 showing the mechanism for finishing the small end of the bottle by bending in the edges and spinning a bead on same. Fig. 51[a] is a side view of the spinner head showing the channel to engage the end

of the bottle. Fig. 52 is a section on the line 52—52 of Fig. 1 and shows the knock-out mechanism for removing the finished product from the machine. Figs. 53 and 54 are details in vertical section of the reciprocating barrel in which the knock-out mechanism is assembled, Fig. 53 showing the knock-out mechanism in its locked position and Fig. 54 in its unlocked or released position. Figs. 55 and 56 are details on a larger scale than most of the other figures of the drawing of the shock-absorber interposed between the two cone carrying reels of the machine and their driving shafts; the two figures showing the mechanism in elevation and at angles forty-five degrees apart for the two views. Fig. 57 shows the opposite side of the cam wheel illustrated at the bottom of Fig. 37. Fig. 58 is a section on the line 58—58 of Fig. 47 and shows the mechanism for rotating the flanged throat in contact with the glue wheel for applying glue to said throat. Figs. 59, 60 and 61 are different views of the cam wheel for cutting out the throat forming, gluing and placing mechanism, the sectioned portion of Fig. 61 being on the line 61—61 of Fig. 59.

Like characters of reference indicate like parts throughout the several views of the drawings.

The main frame of the machine is indicated at 5, and 6 is one of the principal driving shafts of the machine.

Referring to Figs. 1 and 2, a hopper 2 is shown in which flat blanks of tag-board, or other suitable paper material which have previously been cut to the required size and shape are placed. The tapering sides of the hopper are to bring the blanks which may be more or less irregularly stacked, into proper position at the bottom of the hopper to be removed one at a time through an opening in said bottom by a suction head 3. This head is hollow and its top plate is perforated, and in order to cause the blanks to be separated and removed one at a time we curve this perforated plate in the direction of a medial line between the straight edges of the blank to be removed. This causes a blank to be drawn down at its straight edges below its middle portion by suction thereby detaching the bottom blank at each visit of the suction head to the hopper, from the ones above. The suction head 3 is supported by an integral sleeve 7 which is mounted telescopically on a pipe 8 extending up vertically from a tubular carriage 9. The tubular carriage 9 slides telescopically on a pipe 10, (see Fig. 2). The pipe 10 is horizontal and connects with a vertical pipe 11 through an elbow which contains a three-way valve 12 adapted to form communication between the two pipes 10 and 11, and to atmosphere, to enable the vacuum in the head 3 to be controlled, and also to be broken for the quick release of a blank. The automatic control of the valve will be hereinafter described.

The downward travel of the head 3 is limited by the contact of its sleeve 7 with a shoulder 13, (see Fig. 10), on the carriage 9, and the lowering of the head is quickened and made more positive by a spring 14, the spring being wrapped around the rod 14′ between a head on the end of the rod and a lug on the carriage 9.

Mounted on an extension of the carriage 9 is a bell-crank lever, the upper end of which has a toothed segment 16 which engages with a rack carried by the sleeve 7. The lower arm of the bell-crank lever is connected by a link 17 with the upper end of a long bent lever 18 fulcrumed to a bracket from the frame of the machine. The lever 18 is oscillated to first raise or lower the head and then move the carriage on the pipe 10, by connection with a cam in the wheel 19 on the shaft 6; and, on account of the conical shape of the finished product requiring the blanks to be glued in a plane at less than a right angle to the longitudinal axis of the cone-carrying mandrels on which the blanks are folded and on which the construction of the bottles is continued, we provide a connection between the lever 18 and cam wheel 19 which partakes of the functions of a swivel and of a universal joint. A pin entering the cam-slot in wheel 19 is carried by a lever 20 which has a lower bifurcated end straddling the shaft 6 to prevent displacement. The upper end of lever 20 is hinged to a rod 21. The rod 21 is in two parts which are connected by a swivel 22. The upper end of the rod is bifurcated and pivoted in the fork is a journal box 23 in which the pivot pin connecting the foregoing structure with the short arm of lever 18, is journaled.

After the suction head 3 has removed a paper blank from the hopper the head is moved by the sliding of the carriage 9 in pipe 10 to a position under the suction head 4 as shown in dotted lines in Fig. 17. The blank is released from the head 3 by changing the position of the valve on the elbow between pipes 10 and 11, permitting air to enter through the pipe 10. The mechanism for automatically opening the valve is illustrated in Figs. 12 to 15 inclusive. An arm on the valve stem is connected by rod 24 with an arm on a lower horizontal barrel 25, which arm is secured thereto by means of a set-screw, so they will rock together. A lever 26 is loosely mounted on the barrel 25 and is connected by a link bar 27 with the lever 18. Secured at one end to the hub of the lever 26 and at the other to the barrel 25 within the latter at a suitable distance from the hub, is a torsion spring 28 the purpose of which is to impart the required potential energy to the barrel when the latter is re-

leased to cause its arm, acting through the rod 24, to throw the valve between the pipes 10 and 11 quickly.

Mounted in a fixed manner on the barrel are two notched disks 29 and 30, and supported from the frame of the machine by brackets are latches 31 and 32, which are alternately in engagement with the notch of a corresponding one of the disks 29 and 30. The latches are drawn toward each other by a spring 33 and one of them is held out of contact with its notched disk by a pin 34, passing through an extension below the barrel of the lever 26. A throw of the lever 18 will release the barrel 25 by releasing one of the latches 31 or 32, and the latch previously out of engagement will immediately lock the shaft so a return movement of the lever 18 will stress the spring 28 for an opposite throw of the valve when the latch is correspondingly released. This valve mechanism is so timed that when the head 3 has reached a position under the head 4, by the action of the lever 18, the suction in head 3 will be removed coincident with the blank being picked up by the head 4. After the head 4 has obtained possession of the paper blank delivered to it by the head 3 it subjects the blank to the mechanism for applying glue to one of its edges and then delivers the blank to the mechanism for folding it into conical form and retains possession until it is seized by pilot pins and held in position on a mandrel ready for the folding mechanism to act.

The head 4 is suspended from a carriage 35 which has a reciprocating travel on track rails 36. The carriage passes the glue wheel 37 which is located between the rails 36. Travel is imparted to the carriage by the connection through rod 38 with a horizontal rotating arm 39 on a vertical shaft 40 (see Figs. 1 and 7), which is driven by bevel gears from the shaft 41 (see Fig. 3). The bottom perforated plate of the head 4 is hinged at one end, the hinge pin being at right angles to the axis of the mandrel on which it deposits its blank. The purpose of this is to allow the perforated plate to change from a horizontal position to an angular one parallel with the adjacent side of the mandrel after it has reached the latter with a paper blank. This swinging of the plate is caused by a rod 285 (see Figs. 16, 17 and 33) which passes through the head and is connected by a link with the perforated plate. A roller on the other end of the rod contacts with a cam 286 (see Figs. 1, 2 and 6) which lowers the rod by a longitudinal movement of the latter. The edges of the perforated plate and head 4 are connected by a bellows 288 (see Fig. 19).

The air in the head 4 is exhausted through a pipe 42, which telescopes in a pipe 43, the latter being connected with a suitable exhaust shown at 300 in Fig. 3, and located in pipe 42 is a three-way valve 44, (see Fig. 33), similar in construction and function to the three-way valve between pipes 10 and 11.

Mounted upon the carriage 35 is a barrel similar to barrel 25 already described, within which is the same construction of torsion spring as 28. A lever 45 secured to the outer end of the torsion spring is thrown by contact with strips, here shown as rollers 46, secured to a rail of the track at the desired points. The notched disks 29 and 30 are engaged by latch bars 47 and 48, pivoted to the carriage and pressed into contact with the disks by springs 50, shown in dotted lines in Fig. 17. The notches in the disks are placed so that only one latch will be in engagement at a time. The release will be by contact of the outer ends of the levers with trips 51 (see Fig. 7) secured to a rail. The trips will be located at proper points to open and close the valve at the right times.

The first travel of the head 4 after leaving the head 3 is past the glue wheel 37 where a narrow strip of glue is to be applied to the under side of one edge of the paper blank. To insure the proper application of the glue, we provide a presser foot 52 of the required location, size and shape, which is carried by vertical guide rods 53. The upper ends of rods 53 are attached to dashes 54 in pots 55. The lower ends of the pots communicate through reduced openings with the interior of the head 4. The dashes are suspended from suitable brackets by springs 56, the tension of which is regulated by set-screws 57'. The purpose of this mechanism is to automatically raise the foot-bar 52, when, for any reason, the head passes the glue wheel without a paper blank. By raising the bar it is kept from being coated with glue which would then be applied to the wrong side of the next blank when the foot was lowered into contact with it. The operation is as follows: When a paper blank is in contact with the perforated bottom of the head 4 the perforations will be closed by the paper. A vacuum will be created in the head and the air being exhausted under the dash in the pot 55 the atmospheric pressure above will force the dash down, thereby lowering the foot 52. But when the air-holes in the head are not closed by the presence there of a paper blank, air will enter to prevent the formation of a vacuum in the head and the action of the springs 56 on the dashes will hold them up and thereby elevate the presser foot 52.

The glue wheel mechanism will be hereafter described.

Assuming that the blank has been properly coated with glue as it was carried by the head 4 past the glue wheel, the next operation is to deposit the blank in position under a cone shaped mandrel preparatory

to its being folded into conical shape thereon. The cone shaped mandrels 57, here shown as sixteen in number, are mounted in an annular series on a reel 58', with the axes of the mandrels all in horizontal position and equidistant from each other. They are each successively brought to a position close to but a little to one side of the head 4 when the latter is at the limit of its travel from where it left the head 3, with the axis of the paper blank immediately under the axis of the mandrel, as shown in dotted lines in Fig. 6, the blank having been received from the head 3 is held by the head 4 at one side of the axis of the blank.

Under the mandrel and also under the blank 1 where the blank is deposited by head 4 as above described is a folder in the form of a funnel shaped sleeve in three longitudinally divided parts, the two outer of which are hinged to the middle one. The interior of the folder conforms in shape to that of the mandrel and is just enough larger to accommodate the paper blank when folded. The middle member 58 is supported by the two vertical bars 59 the lower ends of which are connected by a horizontal bar 60. The bars 59 slide in ways in a head 61 and are drawn normally upward by a spring 62 which is fastened at its lower end to the bar 60 and at its upper end to a lug extension 63 from the head. The head moves in ways here shown as bolted to the upper end of a standard 64 and the standard is supported from the frame of the machine. The head 61 is moved up to press the paper blank against the mandrel by connection with a rod 65 which rod is in turn connected with the long arm of a lever 66. The lever 66 is pivoted to a bracket from the frame of the machine as shown in Fig. 21, and is provided with a pin on its short end which enters a cam-groove in a wheel 67 mounted on the shaft 6. The vertical bars 59 are provided with sockets at the upper ends in which are pilot pins 68. Under each pin is a spring as shown in Fig. 26 which presses the pins outwardly. The pilot pins are retained in their sockets by smaller lateral pins seated in them which play in suitable vertical slots in the wall of the socket. The pilot pins have rubber tips 69. When the blank 1 is thus forced into contact with the mandrel by the middle member 58 the head 61 continues to rise in order to close the two hinged members 70 and 71. The spring 62 permits the arrest of the member 58 and further upward travel of the head. It is necessary that the member 70 close before 71 because it is the one which folds the glue coated edge of the blank and that edge to be under the other edge must of necessity be folded first against its mandrel. This is accomplished by pivoting a lever 72 to the lug extension 63 from head 61, then by connecting the members 70 and 71 with the respective ends of the lever (see Fig. 24) by rods 73, and by pressing that end of the lever which is under the member 70 up in advance of the other end by means of a spring 74. Both folder members 70 and 71 are moved up by the continued upward travel of head 61 after the member 58 has been stopped; and after the member 70 has closed the action of the spring 74 will continue the closing movement of the member 71. An adjustable stop for the lever 72 is provided by a set screw 75 in an extension from the lug 63. Because of the swinging movement of the hinged members 70 and 71, in closing and opening, a universal joint connection 76 is provided between said members and the rods 73, and the rods are similarly connected with lever 72. The purpose of the pilot-pins 68 is to provide two points of initial contact to press the blank against the mandrel in order thereby to insure the accurate placing of the blank in the mandrel and to hold it until the foot gets off of it.

Each mandrel is provided with a foot-bar 77 which is moved into contact with the paper cone along its folded edges as soon as they are brought together and before the cone is released by the folders, for the purpose of pressing the edges into positive contact while the glue is setting to insure a more perfect joint. This foot-bar 77 is pivoted at its middle in a channel in a seam-clamp head 78 and is pressed down by equalizing springs 79 which permit of such adjustment of bar 77 independently of the head 78 as may be necessary because of any irregularity in the positioning of the cone (see Fig. 34). The head 78 is pivoted to a pair of parallel bars 80 and 81 and the bars 80 and 81 are independently pivoted to a bracket 82 which is keyed to the hub of the mandrel stub-shaft 83 as shown in Fig. 34.

The opposite inner end of the bar 81 is pressed outwardly by a spring 84, which normally forces the head 78 toward a cone on its mandrel except for a spring pressed pawl 85. The pawl 85 is pivoted to an extension of the bracket 82 and enters a notch in the adjacent end of the upper bar 80. It is moved automatically toward the notch by a spring 86 which acts on the pivot of the pawl, and the bar is released from the pawl and the head 78 released by dislodging the pawl from its notch. This dislodgment is accomplished by a reciprocating push-rod 87 the operation or which is timed to release the pawl as soon as the folders have closed. The rod 87 passes through a bearing and has trunnions entering a yoke on the upper end of a lever 88.

The lower end of the lever has a pin which operates in a cam-slot in a wheel 89 on the shaft 41, (see Fig. 27). This pressure against the glued joint is continued dur-

ing approximately three-fourths of a revolution of the mandrel-carrying wheel to give the glue ample opportunity to set and the foot-bar 77 is then removed by the contact of a roller 90 on the bar 81 with a cam 91 which is fastened to the frame of the machine in the path of the roller. Previous to this, however, and before the cone-wrapped mandrel has moved from the position where it was initially wrapped, the folders 58, 70 and 71 were opened and lowered by a reverse travel of the head 61.

We will now describe the means for supplying glue to the under side of that straight end of the blank, which, as above described, is folded over first, and to which the other side is to be permanently secured.

A glue-wheel 289 is mounted in a glue-pot 290 containing a suitable quantity of glue, heated to liquid condition. The lower portion of the wheel is submerged in the glue and its periphery thereby covered, carries the glue to the top of the wheel as the wheel turns. This upper periphery projects through a slot in the cover of the glue-box and the paper blank is coated by contact with said projecting periphery. Any accidental escape of glue into the bearings of the glue-wheel shaft is prevented by a guard-wheel 291.

A continued rotation of the wheel is required to keep the glue in good condition and the wheel properly coated, but it is desirable that the rotation of the wheel be such while its periphery is in contact with the paper blank that their rates of travel be correspondingly equal at any given time. A uniform normal rotation of the glue wheel is obtained by connecting its shaft 292 with the drive-shaft 6 through an oblique shaft 239 (see Figs. 2 and 8) and appropriate bevel gears at each end of said oblique shaft. The shaft 292 is in two transversely divided parts, coupled as shown in Fig. 8, to allow the glue-wheel and its attached end of the shaft to be removed without taking out the other shaft-member.

An accelerated speed, over the normal one as above provided for, and also a variable one as required, is transmitted to the glue-wheel by suitable driving connections with a reciprocating rack-bar 294, fastened to the carriage 35. As this carriage controls the travel of the rack and also the travel of the head 4, carrying the paper blank 1 to be glued, it is obvious that the travel of the glue-wheel periphery and blank may be readily timed. A variable rate of travel is imparted to the table by reason of its drive from rotating arm 39 with which it is connected by the rod 38, (see Fig. 7′). The driving connections above referred to, between rack-bar 294 and glue-wheel 289, comprise the shaft 292; a hub 295 mounted on the shaft and having a notched wheel; a spur-gear wheel mounted on the hub and having pawls which are pressed normally into engagement with the ratchet wheel by springs as shown in Fig. 8; a shaft 296 supported above shaft 292 and parallel with the latter; a spur-gear wheel 297 on shaft 296 connected by an intermediate gear wheel with the gear in hub 295, and a spur gear wheel 298 on the shaft 296 engaged by the rack bar 294. The pawls and ratchet connection between hub 295 and its spur-gear prevents a reverse drive of shaft 292 upon the return movement of carriage 35 after it has delivered a glue-coated blank to its forming mandrel. The shaft 292 is connected with the bevel-gear 299 by a similar pawl and ratchet-wheel device (see Figs. 8 and 9) which allows the shaft 292 to rotate faster when driven by the above mechanism from rack-bar 294, than its normal travel as when driven by the described mechanism from shaft 6.

The next operation is to strip the glued paper cone off of the mandrel 57 and to insert it in one of the truncated conical holders 92, (both shown in dotted lines in Fig. 28). The first step is to loosen the cone on the mandrel. This is accomplished by a movement of a sleeve 93 over the large end of the mandrel against the end of the cone, which movement is secured by the action of a cam 94, on the machine frame, against the end of the pin 95 reciprocating in a socket in the axis of the stub-shaft 83. The pin 95 has a smaller transverse pin 96, the projecting ends of which pass through longitudinal slots in the shaft 83, into the recessed ends of the sleeve 93. The return of the sleeve is secured by a spring 97 which is seated in a socket in the mandrel and is wrapped around the shaft 83. After the cone has thus been loosened it is stripped off of its mandrel and simultaneously transferred to a holder 92 by a transfer fork 98 which contacts with the large end of the loosened cone and moves down the slope of the mandrel toward the holder. The required movement of the fork 98 is secured by attachment to a rack-bar 99 slidingly mounted in a head 100. The head 100 slides in a way formed in a bracket 101 which is supported by the frame of the machine. That portion of the head which enters the slideway is dovetailed and the way is correspondingly shaped to fit it, the assembly being provided for by a separately removable guide-member 102 and the tension desired to keep the head 100 from moving back too freely is secured by a spring-pressed bar 103, under the head. An arm 104 carried by the head 100 supports a bearing for a reciprocating rod 105. This rod has two bearings, 106 and 107, (see Fig. 29) on the frame of the machine. The rod is reciprocated by connection with a lever 108

which lever is fulcrumed at its lower end to the machine frame and has a pin 109 which enters a cam slot in a wheel 110 mounted on the shaft 6 (Figs. 29 and 30). The rod 105 has trunnions which enter a block 111 in the bifurcated upper end of the lever 108. This allows the rod to move in a right line. Mounted on the head 100 is a bell-crank 112, one arm of which has a toothed segment which engages the rack-bar 99 and the other arm is connected with the end of the rod 105 by a link 113. Adjacent to this connection, on the rod 105 is a stop head 114 the function of which is to contact with the arm 104, after the toothed segment has reached its limit of travel, and move the head 100 on the slide on bracket 101. This travel of the head 100 moves the transfer fork 98 longitudinally of the mandrel and the simultaneous movement of the rack-bar in a transverse direction to the movement of head 100 changes the position of the transfer fork to conform to the taper of the mandrel. The mandrels 57 are carried by the reel 58′ and the truncated conical holders 92 are carried by a second similar reel 116. These two reels are so positioned that they will overlap and bring the axis of a mandrel 57 and a holder 92 in alinement at the time of the transfer of a cone.

The next operation is to positively seat the cone in the holder in which it has been deposited by a transfer fork. When the reel 116 has advanced the distance of two holders from where the cone was transferred this seating operation is performed. This is accomplished by the pressure against the large end of the cone by a seating-disk 117 mounted on a reciprocating plunger rod 118, in a table 119 on the main frame of the machine. The disk 117 is mounted on an arm 120 extending laterally of the rod 118 (see Fig. 36), to pass around a rotary disk 121 which carries the paper throat for the bottle. Mounted on the shaft 118 is an externally screw-threaded sleeve 122, at the middle of which is a nut 123, and a lock nut back of it. On the sleeve against the nut 123 is the head 124 of a yoke. The bore of the head is enlarged from the middle of the head outwardly to afford a rocking adjustment of the head on the sleeve when the arms of the yoke are oscillated. On the outer end of the sleeve is a nut 125, also held by a lock nut, as shown, and between the nut 125 and the head 124 is a spiral spring 126 which presses the head against nut 123. The spring 126 forces the seating-disk against the cone and is introduced in the construction to permit of an additional travel to the rod 118 in the event that no cone is in position to be seated. This purpose of the additional travel is to make inoperative the throat forming, gluing and placing mechanism which normally operates on a cone as soon as same is placed and has advanced to the next station. The arms of the yoke are connected to the bifurcated arm of a bell-crank lever 127 pivoted to the frame of the machine. The other arm of lever 127 is connected by a link 128 with a rod 129. The latter has a bifurcated head which straddles a shaft 130 and the head has a pin entering a cam-groove in a wheel 131 mounted on shaft 130, (see Fig. 46). The shaft 130 is connected by bevel gears with a vertical shaft 132 and the latter is connected by spur gears with the vertical shaft 133. The shaft 133 is connected by bevel gears with the shaft 41.

The throat forming, gluing and placing mechanism is rendered inoperative by the contact of a horizontal throw-out lever 135 with a nut 134 (see Fig. 40), on the inner end of sleeve 122. The associated parts for rendering the above mechanism inoperative will be better understood after its normal operations are familiar and for that reason we will first describe the means for forming, gluing and placing the throat of the bottle.

The bottle throat is a paper disk turned on its outer edge to form a flange which flange is glued and stuck to the inner walls of the paper cone, forming the body of the bottle. The throat has a central opening through which the bottle is filled and emptied. The paper 135′ (see Fig. 42) in strips wound on a reel (not shown) is fed over a roll 136 and down between a pair of upper rolls 137 and a like pair of lower rolls 138. Between the pair of rolls 137 and 138 are the dies and punches. These are supported by a head 139 on a suitable standard. In the outer end of the head is a die 140 across which the paper passes in going from the upper to the lower pair of rolls, and the circular blank for the throat is punched out by the horizontal reciprocating punch 141. 142 is a stripper plate against the back side of the paper. The punch 141 is hollow and is screwed to a sleeve 143 and the sleeve and punch travel just far enough to cut the blank and push it into the die 140, from which it is discharged by being forced on through a reduced bore in the die by a follower 144 of still less diameter. The action of the follower 144 in pushing the blanks through the reduced bore of the die is to bend the overlapping edges back at right angles to form a flange. This bending operation is assisted by heating the die 140 by means of a steam chamber 145 placed against the outer side of the die. The heating enables the paper to be bent without breaking the fiber and gives it a better set and causes it to take the glue better. This chamber is hollow for the passage therethrough of the follower 144 and flanged throat piece (see Fig. 44) and the passageway registers with that one of a se-

ries of circular openings or throat carrying pockets in the rotary disk 121 happening to be opposite the throat forming mechanism at that time. The throat piece is deposited by the follower in the pocket.

The punch 141 and follower 144 are reciprocated different distances and at different speeds by connection with shaft 133 as follows: Mounted on the upper end of shaft 133 is a bevel wheel 146 which meshes with a bevel wheel 147 on a horizontal shaft 148. (See Fig. 35). Mounted on the shaft 148 is a spur-gear wheel 149 which meshes with a spur-gear 150 on a hollow parallel shaft 151 (see Fig. 45). Mounted in the hollow shaft 151 is a stationary shaft 152, on the front end of which is a sun-wheel 153 of a planetary gear, the planet-wheel 154 operating with which, is mounted on a crank 155 on the front end of the hollow shaft 151. The planet-wheel 154 carries an eccentric-pin 156 (see Fig. 42) from which a pitman 157 is driven. The pitman 157 is pivotally connected with the rod of the follower 144 (see Figs. 35 and 42).

The pitman 157 is split longitudinally of its major portion and is spread apart there to straddle the transmission which drives the hollow punch 141. By this planetary gear we secure a variable speed for the follower which is slow while the paper is being fed, punched and stripped, and moves faster while flanging and seating the throat.

The punch 141 is driven by a pitman 159 from a crank 160 on shaft 148. This pitman is bifurcated, as shown in Fig. 35, to allow the split pitman 157 of the flanging head to work between its bifurcated ends.

Both pairs of the feed rolls 137 and 138 are positively driven by mechanism connecting them with shaft 148, on which shaft is a wheel 161 (see Figs. 35 and 36) having a cam-slot which receives a pin 162, shown in dotted lines, on a lever 163. One end of the lever 163 is bifurcated and straddles and is guided by the shaft 148 and the other end of the lever is pivoted to a lever 164. The lower end of lever 164 is pivoted to the frame of the machine. The upper end is bifurcated to engage a pin 165 on a horizontally reciprocating rack-bar 166. The teeth of bar 166 mesh with those of a cogged wheel 167 on the rear shaft of the upper feed-roll 137. The two rolls 137 are geared together as shown at 168 in Fig. 35.

The two lower rolls 138 are also geared together and are driven by a vertical rack-bar 169 which meshes with wheel 167 and corresponding gear 170 on the back roll 138. The gear wheel 167 is thick enough to accommodate both rack-bars 166 and 169. The continual downward travel of the paper is secured by mounting the gear wheels 167 and 169 on their shafts loosely and by connecting them by pawls 171 with corresponding ratchet wheels 172 mounted in a fixed manner on the shafts. After the throat member is thus seated in the pocket of the rotary disk 121 the disk is rotated to eventually bring the throat opposite a punch for removing its center. The disk has peripheral notches which are successively engaged by a pawl 173 carried by a radial arm 174 which arm is loosely mounted on a stub-shaft supported by a hanger from the head 139 (see Fig. 42). The disk 121 has the same number of pockets as has the reel 116 of cone carrying receptacles 92, and between each two pockets is a hole 175 to receive the pin of a locking lever 176 whereby the disk is positively locked at the end of each advance. The lever 176 is pivoted to a bracket 177 from the head 139. A block 178 is pivotally mounted in a bifurcated end of lever 176 and in this block is a movable pin which is pressed longitudinally by a spring toward the disk 121 so as to automatically enter a hole 175 whenever they come into register. The opposite end of lever 176 is contacted by a cam 179 pivotally attached to a bracket from the lever 174. The bracket has a lug to limit the movement of the cam in that direction and it is pressed normally against the lug by a spring (see Fig. 38[a]). By this construction the cam rides freely over the end of lever 176 on its upward travel but is braced against its lug and presses the adjacent end of the lever 176 toward the disk 121 in the downward travel of lever 174, thus unlocking the disk. The outer end of lever 174 is connected by a divided connecting rod 180 with the rack-bar 169. The rod 180 is in two parts with a telescoping connecting rod around which a coiled spring is wrapped. This provides for an extension of the rod 180 which allows for an initial travel of the lever 174 sufficient to unlock the disk 121. After the throat member is seated in the disk 121 it is carried by successive movements of the disk to a position opposite the punch for removing the throat centers. This is shown in Figs. 35, 36, 36[a] and 38. A die 181 is supported in front of the disk 121 at the proper station below where the throat blank was punched and flanged, by a bracket 182 which is fastened to the machine frame back of disk 121 and is bent around the disk so as to position the die 181 at the proper place. The punch 183 has an annular outer cutting flange which must be kept sharp. The punch is, therefore, removably secured to the end of the horizontal punch shaft 184. The latter is mounted in journals on the machine frame and is reciprocated by connection through a connecting rod 185 with a crank on the shaft 148. The punch shaft 184 has a collar 186 and mounted on the outer end of the shaft 184 is a clamping sleeve 187 which is pressed out by a spring 188 located between the sleeve and collar

causing the sleeve to contact the paper throat and clamp it against the die 181 while the die center is being punched and to strip the throat from the punch. The die 181 discharges into a tube 189 which carries away the punchings.

After the throat center has been punched out as above described the throat blank is carried by successive movements to a diametrically opposite station of the disk 121 where the outer surface of the flange of the throat is covered with glue and the throat is then introduced into a cone-body which has been presented at that station by the reel 116.

A hollow shaft 190 is mounted in suitable bearings on a table 119 supported by the machine frame. It is reciprocated longitudinally by connection through arm 191 with a rock-shaft 192 and arm 193, with a lever 194 having a pin entering a cam-groove in a cam wheel 195. The end of lever 194 adjacent the wheel 195 is bifurcated to straddle the shaft 148 on which the wheel is mounted. The lever 194 is divided transversely and the resulting parts are connected by a threaded pin on which are nuts for adjusting the length of the lever. The lower end of arm 191 is bifurcated to receive a block which is pivoted to a sleeve mounted on the hollow shaft 190. The block slides in the bifurcated end to compensate for the change in its radial distance from axis of shaft 192.

An intermittent travel, due to the shape of the cam-slot in wheel 195, is imparted to the hollow shaft 190, whereby the associated mechanism grasps and removes the throat piece from the disk 121, conveys it to the glue-wheel where it pauses while the glue is applied and then carries the glue coated throat piece into a cone-body and places it, and then returns to repeat the operation.

At the outer end of the hollow shaft is a flange of such diameter as will enter between the flange of the throat with a loose fit.

Mounted adjustably within the same end of the hollow shaft is a sleeve 196 to the outer end of which a pair of gripping fingers 197 are pivoted. (See Figs. 47 to 50 inclusive). The lapped inner ends of these fingers are slotted longitudinally to receive a cross-pin supported by ears 198. The ears are integral with a head 199 which reciprocates in sleeve 196 by reason of the attachment of the head to a rod 200.

The rod 200 passes back to near the inner end of the hollow shaft 190 through a pair of bearings, and mounted on the rod between the bearings is a head 201 which has a trip-pin 202 extending out of the shaft 190 through a suitable longitudinal slot in the latter. A spring 203, wrapped around the rod 200 between the head 201 and rear bearing, normally presses the rod toward the gripping fingers 197 swinging the outer ends of the latter into engagement with the throat-piece and impinging the latter against the flange on the end of shaft 190.

A catch 204 mounted in a longitudinal slot in the top of shaft 190 has an outer hooked end which engages the head 201 at the inner position of the latter. The catch is pressed by a spring in a direction to engage the head, when the head 201 is moved back by compressing the spring 203. This compression of spring 203 is caused by contact of trip-pin 202 with a stop 205 which is so located as to act at the end of the outer travel of the shaft 190 at the moment that the throat-piece is placed in its cone.

Supported on a standard from the table 119 is a pawl 206 adapted to lower the rear end of catch lever 204 when the latter passes in its outward travel, but when passing on its inward travel the pawl swings out of the way. The pawl is held by a spring in normal position to operate the catch 204 and this position is adjusted by a set screw 207.

Keyed on the hollow shaft 190 is a spur-gear wheel 208. The shaft is splined to receive the key, for a longitudinal distance on the shaft which will permit of the required outward travel of the latter in conveying the throat-piece from the glue-wheel to the final position of the throat in its cone. The gear wheel 208 affords means for rotating the shaft 190 and the throat-piece carried by it during the operation of coating the flange of the throat-piece with glue. The gear-wheel 208 is driven from the same shaft 148 on which the cam-wheel 195 is mounted, by the following mechanism. Mounted on suitable bearings is a shaft 209 parallel with the hollow shaft 190, and it is connected by a gear-wheel 210 with the gear 208 on shaft 190. Mounted on the shaft 148 above the shaft 209 is a toothed wheel 211 having worm-teeth around a portion of its periphery to drivingly engage the teeth on a wheel 212, mounted on shaft 209. The wheel 211 has a channel 213 extending around its untoothed periphery into which the tooth of the wheel 212, which is in mesh when the channel is reached, enters, thereby arresting the travel of the wheel 212 and of shaft 209 until the worm at the other end of the groove is reached, whereupon the driving of the wheel 212 will be resumed. The rotation of wheel 212 is transmitted to shaft 190 and the rotations are timed to begin a little before the throat-piece reaches the glue-wheel and to continue until it has entered the cone about a fourth of the length of the latter to sever the thread of glue from the throat to the glue-wheel.

Because of the inertia of the gluing mechanism the wheel 211 would likely shear off the teeth of wheel 212 by the frequent stops and starts. We therefore provide a shock-absorber (see Figs. 35, 47 and 58) com-

prising a sleeve 214 which is loosely mounted on the shaft 209 on which wheel 212 is mounted. This sleeve has an arm 215 and mounted in a fixed position on the shaft 209 is a hub having a pair of spiral arms 216 the ends of which are bent across the arm 215. Spirally wound springs 217 are held between the arm 215 and arms 216. Any desired tension on the springs is secured by set screws 218'.

A glue-box 218 is supported by table 119 and passing through the inner side of the glue-box and mounted in suitable bearings supported by the box is a shaft 219. On the end within the box is a wheel 220 the lower portion of which is submerged in melted glue with which the box is partially filled. 222 is a scraper to remove glue excess from the wheel. The box is covered but has a slot through which the upper portion of the glue-wheel is exposed, and with which exposed part the throat-piece is contacted to glue-coat said piece. Mounted on the end of shaft 219 opposite the glue-wheel is a spur-gear wheel 221 which meshes with a gear-wheel 223 on the end of shaft 130, the manner of driving which shaft has been previously described.

After the throat-piece has been coated with glue, it is carried on by the hollow shaft 190 into a cone properly positioned in the reel 116 to receive it. When the throat-piece has reached the desired position in the tapering cone it is released by the grip-fingers 197, caused by trip-pin 202 contacting with the stop 205, as previously described, and simultaneously with such release the hollow shaft 190 starts on its return movement.

We have thus described the construction and operation of the throat forming, gluing and placing means, all of which is rendered automatically inoperative by the failure of the reel 116 to present a paper cone opposite the throat placing station. When such a vacancy occurs in reel 116 the entire throat operating mechanism becomes inert, and remains so until a cone-body is properly presented by the reel 116 to receive a throat.

We will now describe the means for automatically cutting out said throating mechanism. This mechanism is cut-out when the reciprocating plunger-rod 118 is permitted to travel outwardly by the absence of a cone in 116 to arrest the seating-disk 117 on said rod. This additional travel of the rod 118 causes the inner nut on sleeve 122 to strike the adjacent end of the lever 135 moving that end outwardly and the opposite end of the lever inwardly of the machine. This opposite end of lever 135 is connected by a link 224 with a bolt 225 which is shot by the movement of the lever 135 across the path of an arm of a bell-crank lever 226. Wrapped around the bolt is a spring which normally holds the bolt out of the path of bell-crank 226. The opposite and upper arm of the bell-crank 226 has a roller which bears against the under side of a trip-disk 227 mounted on the upper end of a vertical shaft 132 and vielding contact is secured by a spring 228 (see Fig. 41). The trip-disk 227 (see Figs. 59, 60, and 61) has a lever 229 pivoted in its periphery so as to swing from a projecting position on the under side of the disk to a like position above the disk. The lever 229 is swung normally below the disk by a spring 230 and when it is forced to the upper side of the disk by the roller on bell-crank 226. as when the yielding of the bell-crank is prevented by bolt 225, the lever 229 will be locked above the disk by a spring catch 233 carried by the lever 229 in a detent on the body of the disk. The detent will preferably be made in a plate of hardened steel 232 set into the disk to insure longer wear.

The lever 229 thus projected by the action of the bell-crank roller will be locked by engagement with a spring-catch 233. When so locked in position above the disk the lever 229 contacts with a roller on the overhanging end of a yoke-lever 234. A yoke on the opposite end of lever 234 is connected with the lower member 235, of a clutch-coupling (see Fig. 38) having motion of rotation and translation on shaft 133. The bevel gear 146 is loosely mounted on shaft 133 and has a hub with a clutch-end to mate with the clutch-member 235. A spring 238 normally elevates the clutch-member 235 into coupling contact with its mate. The release catch 233 is by the action of the wedge 231 against a pin 236 carried by the catch. The wedge 231 is pivoted to the under side of a lever 237 which in turn is pivoted to the lever 229. The free end of the lever 237 projects laterally of the lever 229 as shown in Figs. 59, 60 and 61, whereby the roller on yoke 234, by contact with said projection, will swing the lever 237 downwardly and lower the wedge 231 against the pin 236, moving the catch in opposition to its spring and out of said detent. By the above described means the throat forming, gluing and placing mechanism will become inoperative when there is no paper cone in reel 116 at the throat placing station.

The next operation is to turn the small end of the cone in and spin a bead on that end of the paper bottle. As this is done while the cone is in the conical holder, by spinners pressing against the small end of the cone, it is necessary to provide means to retain the cone in its holder in a manner to resist any unseating action of the spinner. To this end we provide a longitudinally reciprocating shaft 239 mounted in

suitable bearings supported by table 119, on which shaft is a head 240 (see Figs. 1, 35 and 37) which is introduced into a paper cone by a longitudinal movement of the shaft, into contact with the inner side of the throat member of the cone. A jogger-plate 241 is yieldingly forced against the broad end of the cone by springs 242 wrapped around guide-pins carried by plate 241 and passing through the parallel plate 243 mounted on the shaft 239.

Splined on the shaft 240, so as to have motion of rotation and translation, is a sleeve 244 and between the sleeve and a fixed collar 245 is a spring 246 which insures yielding contact of the head 240 against the throat of the paper cone and thereby prevents injury to the throat which might otherwise occur should the longitudinal movement of the shaft be excessive. Trunnions on sleeve 244 enter bearing boxes which are received in the bifurcated arms of a yoke 247. The yoke is mounted, here shown as adjustably, on the upper end of a lever 248 (see Fig. 37) which, in turn, is fulcrumed to the machine body and is pivoted at its lower end to a lever 249 (see Fig. 57). The opposite end of the lever 249 is bifurcated to straddle the hub of a wheel 250 on the shaft 41. The wheel 250 has a cam-groove, shown in Fig. 57, in which a pin 251, (shown in dotted lines) mounted on the lever 249, travels to give the desired movement to the shaft 239 and head 240. The above described mechanism holds the cone in its seat. The spinning of the small end of the cone is by a rotary head 252 (see Figs. 1 and 51) mounted on a horizontal shaft 253, in line with shaft 239 but on the opposite side of the reel 116. This shaft 250 is mounted on its own table, supported by the machine frame, in sleeves 253′. The sleeves 253′ are mounted on ball bearings in suitable journal boxes as shown in Fig. 51, and keyed to the shaft is a belt pulley 25, which rotates on the shaft but the latter slides through the pulley when the shaft is adjusted longitudinally. The distance of movement is regulated by the shape of the cam in wheel 257.

On the outer portion of the shaft 253 is a collar with a ring having trunnions with bearings in blocks located in the slotted ends of a bifurcated lever 255. The lever 255 is fastened to the table and its lower end is pivoted to a bifurcated lever 256. The bifurcated end of a lever 256 straddles the hub of wheel 257. The wheel 257 is mounted on shaft 6 and has a cam-groove to receive a pin mounted on the lever 256. The head 252 on shaft 253 is rotated rapidly against the small end of the cone and the end of the cone is simultaneously pressed by the head. The head has a bead-forming groove or channel 257′ (see Fig. 51[a]) in its face to receive the end of the cone and bend it in to form the desired bead. The rapid rotation of the head 252 heats the paper cone by friction and causes the fibers to set better without breaking. The product now being complete so far as this machine is designed to advance it, the next operation is to discharge the paper cone from the truncated conical holders 92 of the reel 116. This knock-out mechanism is illustrated in Figs. 1 and 4, and more in detail in Figs. 52 to 54, inclusive. Figs. 53 and 54 illustrate the mechanism before and after a bottle ejecting operation. A cylindrical barrel 258 is slidingly mounted in a box 259 suitably supported from the machine frame. Mounted in the barrel is a rod 260 which has a head 261 to contact with the small end of the paper cone by a travel of the barrel 258 toward the cone. Then the cone is thrown out by the force of a spring 262. The bore of the barrel is enlarged to receive spring 262 between the bottom of the bore and a disk 303, fastened to the rod. Mounted in a longitudinal slot in the top of the barrel is a pawl-lever 264 having a hook at its inner end to engage the disk 303 and hold the rod with its spring 262 under compression. A spring 265 seated in a socket in the barrel normally elevates the outer end of the pawl-lever 264, but on the inner travel of the barrel the lever is lowered by contacting with the top of box 259, thereby releasing the disk 303. Then the rod 260 will move quickly by the impulse of spring 262 knocking the paper cone out of holder 92, into any suitable receptacle or conveyer (not shown). The bore to receive the inner portion of rod 260 is made large enough to accommodate a piston head 302 on rod 260 and a packing is provided between this bore and that in which spring 262 is seated. The resulting slow escape of the air in the bore acts to keep the disk 303 from knocking out the disk 263, which disk 263 acts as a guide for shaft 260, and as a stop for lever 266 and disk 303. An air-vent 304 is provided from said inner bore.

The resetting of the rod 260 against the tension of spring 262 is accomplished by a lever 266 pivoted in a slot in the lower side of the barrel. A lug 267 projects in the path of the lower end of the lever 266 and by contact swings the upper end of the lever into contact with the disk 303 pushing the latter against the spring and compressing it. This compression is held by the spring-actuated pawl-lever 264. The knock-out mechanism is thus set ready to eject a paper cone by a repetition of the above movements of barrel 258.

Travel is imparted to the barrel 258 by its connection by rod 268 with the upper

end of lever 269 which is fulcrumed at its lower end to a bracket from the machine frame and having a pin 270 entering a cam-groove in a wheel 271 mounted on the shaft 6.

The shafts 6 and 41 are both driven through suitable bevel gears from a counter shaft 272 (see Figs. 1, 3 and 4). The shaft 272 is driven through spur-gears from a shaft 273, parallel with and above it. Mounted loosely on shaft 273 is a pulley 274, to which power from any suitable source (not shown) is transmitted by belt. Mounted on shaft 273 so as to have motion of rotation, and also of translation, is a friction clutch-member 275 which is moved in and out of engagement with a clutch-member on the hub of pulley 272, by a hand lever 276.

Because of the frequent starts and stops of the reels 58′ and 116, and because of their inertia due to their size and weight, it is important to protect their driving gears by shock absorbers. These are duplicated for each reel and are both shown on the machine as illustrated in Fig. 3, and more in detail in Figs. 55 and 56, in which a sleeve 277 is loosely mounted on the respective reel driving shafts. This sleeve has an arm 278 terminating with two oppositely extending spring-holding bosses 279. Mounted in a fixed manner on the shaft 6, close to the arm 278, is a hub with a pair of spread arms 280, the lower ends of which are bent across the arm 278. Set-screws 281 having suitable lock-nuts extend through to movable spring-holding bosses 282. Spirally wound springs 283 are held between the arm 278 and arms 280 by the introduction of the bosses 279 and 282 into the ends of the spring coils. Any desired tension on the springs is secured by means of the set-screws 281.

In starting a reel the spring in front of arm 278 will be compressed and in stopping the reel the strain will be against the spring behind the cone and a cushioning of the strain on the driving mechanism will result.

The operation of our machine is as follows: Suitably formed paper blanks are stacked in the hopper 2 and are removed one at a time through the bottom of the hopper by the suction-head 3. A blank thus acquired is transferred to a suction-head 4 and is carried by the latter over the glue-wheel 37 which coats an edge of the blank with glue, and places the axis of the blank under the axis of one of an annular series of tapering mandrels 57 on the reel 58′ where it is released by the head and is held by pilot-pins in the middle member 58, of a three-part folder while the free ends of the blank are being bent around the mandrel by the movement of the hinge members 70 and 71. The folded cone is then clamped at its lapped edges by a foot-bar 77 and is held by the latter while the reel makes approximately three-fourths of a complete revolution permitting the glue to set. The foot-bar is released by contact with a roller 90, in its path. The cone is next stripped from mandrel 57 and is seated in a conical holder 92, carried by the companion reel 116. This is done by a sleeve 93 and fork 98. The cone is firmly seated in the holder 92 by pressure from the seating-disk 117. The throat for the bottle is punched out of paper strips 135′ by the reciprocating punch 141 and is flanged by being pushed by the follower 144 through the reduced bore of the die, heated to facilitate bending and gluing. The follower seats the flanged throat-piece in one of an annular series of holes in a rotary disk 121, and is carried by the intermittent rotation of the disk into the path of a reciprocating punch 183, which removes the throat-center. A further movement of the disk 121 presents the throat-piece in the path of a reciprocating shaft 190, having mechanism, which grasps the throat-piece, enabling the shaft to carry it to the glue-wheel 220 by which the flange of the throat-piece is coated with glue; and thus coated the throat-piece is carried on by the shaft 190 into a cone positioned in the reel 116 to receive it. Should the holder in the reel 116 be empty at this point the throat-operating mechanism becomes inert and remains inoperative until a cone-body is properly presented by the reel. After the throat has been formed, glued and placed, a bead is spun on the small end of the cone by contact with a rotary head 252, and when the bead is finished the cone is loosened in its conical holder 92 by the pressure of a head 261 against its small end, after which it is ejected by a quick movement of the head. This completes the operation of the machine. We have minutely described the construction and arrangement of the various parts merely as an exemplification of our preferred embodiment but do not desire to be limited thereto unduly, or any further than is pointed out in the claims.

We claim—

1. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, the axes of the mandrels being parallel with the axes of the holders, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, and means

by a longitudinal movement of the body without rotation for transferring said body from the mandrel to one of the holders on the other reel.

2. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, and means for gluing a throat member in the small end of said body.

3. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, means for gluing a throat member in the small end of said body, and means for forming a bead on the small end of the body beyond the throat.

4. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, means for gluing a throat member in the small end of said body, means for forming a bead on the small end of the body beyond the throat, and means for discharging the product from the machine.

5. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, means for punching and flanging a throat member, means for removing the center of said throat member, means for coating the outer surface of the flange with glue, and means for placing the throat member thus coated with glue in the body near the small end of said body.

6. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, means for punching and flanging a throat member, means for removing the center of said throat member, means for coating the outer surface of the flange with glue, means for placing the throat member thus coated with glue in the body near the small end of said body, and means for rendering the throat forming, gluing and placing mechanism inoperative when the holder presented by the reel opposite the coating station is empty.

7. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel-body holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for transferring said body from the mandrel to one of the holders on the other reel, means for punching and flanging a throat member, means for removing the center of said throat member, means for coating the outer surface of the flange with glue, means for placing the throat member thus coated with glue in the body near the small end of said body, means for forming a bead on the small end of the body, and automatic means for discharging the product from the holder.

8. In a machine for the manufacture of paper vessels the combination of a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a

time from the holder, an intermittently rotating reel, tapering mandrels carried by said reel, the axes of said mandrels being parallel with the axis of the reel, means for delivering the blank to a mandrel, means for forming the body of the vessel from said blank by bending it around the mandrel and means for gluing the edges together to hold the form of the body.

9. In a machine for the manufacture of paper vessels the combination of a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, an intermittently rotating reel, a plurality of tapering mandrels carried by said reel, the axes of said mandrels being always parallel with each other and with the axis of the reel, means for applying glue to one edge of the blank, means for delivering the glue coated blank to a mandrel, means for forming the body of the vessel from said blank by bending it around the mandrel, a clamping foot for each mandrel carried by the reel to press the glued edges of the body together until the glue has set, means for releasing the clamps, a second rotating reel having holders with axes parallel to the axes of the mandrels, and means for transferring the glued vessels from the mandrels to the holders.

10. In a machine for the manufacture of paper vessels the combination of a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, an intermittently rotating reel, a plurality of tapering mandrels carried by said reel, the axes of said mandrels being always parallel with each other and with the axis of the reel, means for applying glue to one edge of the blank, means for delivering the glue coated blank to a mandrel, means for forming the body of the vessel from said blank by bending it around the mandrel, a clamping foot for each mandrel carried by the reel to press the glued edges of the body together until the glue has set, automatic means for removing the clamping foot from a glued joint when the holder with said body has reached a pre-determined station by the rotation of the reel, a second rotating reel having holders with axes parallel to the axes of the mandrels, and means for transferring the glued vessels from the mandrels to the holders.

11. In a machine for the manufacture of paper vessels means for conveying the blanks to form the sides of the vessel comprising a carriage having a variable rate of travel, means supported by the carriage for taking physical hold of the blank, a track to guide the travel of the carriage, a rotating glue applying wheel located alongside the track in the path of the blank transported by the carriage, said wheel having a uniform travel except while glue is being applied, means for synchronizing the travel of the wheel and carriage and while the wheel is applying the glue by contact with the passing blank.

12. In a machine for the manufacture of paper vessels means for conveying the blanks to form the sides of the vessel comprising a carriage, means supported by the carriage for taking physical hold of the blank, a track to guide the travel of the carriage, a rotating glue applying wheel located alongside the track in the path of the blank transported by the carriage, and means moving with the carriage to press the blank against the glue wheel as the blank passes the wheel.

13. In a machine for the manufacture of paper vessels means for conveying the blanks to form the sides of the vessel comprising a carriage, means supported by the carriage for taking physical hold of the blank, a track to guide the travel of the carriage, a rotating glue applying wheel located alongside the track in the path of the blank transported by the carriage, means to press the blank against the glue wheel as the blank passes the wheel, and automatic means to make the last means inoperative when the carriage moves without transporting a blank.

14. In a machine for the manufacture of paper vessels reciprocating means for conveying the blanks to form the sides of the vessel, a rotating glue applying wheel located in the path of the blank being conveyed, means to press the blank against the glue wheel while it is being conveyed by said reciprocating means and means to render said blank pressing means inoperative during the travel of said conveying means without carrying a blank.

15. In a machine for the manufacture of paper vessels, reciprocating means for conveying blanks to form the sides of the vessel, a rotating glue-applying wheel located in the path of a blank being conveyed, pneumatic means to press the blank against the glue-wheel, and pneumatic means to render said last means inoperative during the travel of said conveying means without carrying a blank.

16. In a machine for the manufacture of paper vessels a suction head for conveying the blanks to form the sides of the vessel, a rotating glue applying wheel located in the path of the blank being conveyed, a bar carried by the head to press the blank against the glue-wheel, means operated by the suction in the head for moving the bar toward the glue-wheel when the head is carrying a blank and means to move the bar in the opposite direction when there is no blank being carried.

17. In a machine for the manufacture of paper vessels a suction head for conveying the blanks to form the sides of the vessel,

glue applying means located in the path of the blank being conveyed, a bar carried by the head to press the blank against the glue applying means, dash-pots communicating with the suction chamber of the head, dashes in said pots connected with said bar to lower the bar by suction when the air inlets to the head are closed by the presence of a blank, and springs to act in opposition to the dashes and move the bar away from the glue applying means when no blank is present.

18. In a machine for the manufacture of paper vessels a tapering mandrel upon which the blank to form the sides of the vessel is formed, a suction head to convey the blank to the mandrel, an adjustable member of said head in contact with the blank and means to adjust the last member to the same angle as the adjacent side of the mandrel.

19. In a machine for the manufacture of paper vessels a tapering mandrel upon which the blank to form the sides of the vessel is formed, a suction head to convey the blank to the mandrel having a perforated plate to contact with the blank, said plate being hinged at one end to the head, a bellows member connecting the head with the edges of the plate, and means to adjust the hinged plate to the same angle as the nearest side of the mandrel when the head is in position to transfer the blank to the mandrel.

20. In a machine for the manufacture of paper vessels a mandrel upon which the blank is bent to form the sides of the vessel, a reciprocating head, a folder comprising a sleeve in three longitudinally divided parts supported by the head, the outer two of which are hinged to the middle part, means to move the head carrying the open folder toward the mandrel to press the blank between said middle part and mandrel, and means to fold up the two side members against the mandrel, but to fold the one of them in advance of the other, said means comprising a lever with arms and a spring pressing one of the arms.

21. In a machine for the manufacture of paper vessels a mandrel upon which a blank is bent to form the sides of a vessel, a reciprocating head, a folder comprising a sleeve in three longitudinally divided parts supported by the head, the outer two of which are hinged to the middle one, means to move the head carrying the open folder to impinge the blank between the middle part and the mandrel, pilot-pins yieldingly mounted in said middle part to make first engagement of the blank against the mandrel, and means to fold the side parts *seriatim* against the mandrel, said means comprising a lever with arms and a spring pressing one of the arms.

22. In a machine for the manufacture of paper vessels, a mandrel upon which a blank is bent to form the sides of a vessel, a reciprocating head, a folder in three longitudinally divided parts to bend the blank around the mandrel, bar supports for the middle part of the folder slidingly mounted in said head, resilient means connecting the head with the lower ends of said supports, means connecting the head with each of the side members of the folder, and pilot pins carried by said middle part to make first contact of the blank against the holder.

23. In a machine for the manufacture of paper vessels a mandrel upon which a blank is bent to form the sides of a vessel, a folder in the form of a sleeve in three longitudinally divided parts, two of said parts being hinged to an intermediate third part, means to fold said sleeve parts around the mandrel, sockets in one of said parts, pins seated in said sockets said pins having elastic tips and springs to press the pins longitudinally in the direction of the mandrel.

24. In a machine for the manufacture of paper vessels an intermittently rotating reel, a plurality of equidistant mandrels mounted laterally of and on said reel, means for folding a blank around each mandrel when said mandrel reaches a given station by the rotation of the reel, said blank having one end previously coated with glue upon which glued surface the other end of the blank is lapped in folding, a seam-clamp head, carried by each mandrel, a foot-bar carried by the head, and means by moving the head to force the foot-bar against the lapped and glued ends of the blank.

25. In a machine for the manufacture of paper vessels an intermittently rotating reel, a plurality of equidistant mandrels mounted laterally of and on said reel, means for folding a blank around each mandrel when said mandrel reaches a given station by the rotation of the reel, said blank having one end previously coated with glue upon which glued surface the other end of the blank is lapped in folding, a seam-clamp head carried by each mandrel, a foot-bar carried by the head, means by moving the head to force the foot-bar against the lapped and glued ends of the blank, and means to lock the head with the foot-bar out of contact with said lapped ends, while the blank is being wrapped on the mandrel both of said last means being carried by the reel.

26. In a machine for the manufacture of paper vessels an intermittently rotating reel, a plurality of mandrels on said reel, means for folding a blank around a mandrel when it reaches a given station by the rotation of the reel said blanks having an end previously coated with glue against which the other end is lapped in folding, a foot-bar for each mandrel supported from the reel, means to move the foot-bar to press the lapped ends of the blank against the

mandrel, a pawl to lock said foot-bar out of contact with the mandrel while the blank is being formed thereon, and means supported independently of the reel for moving the pawl to unlock the foot-bar.

27. In a machine for the manufacture of paper vessels an intermittently rotating reel, a plurality of mandrels on said reel, means for folding a blank around a mandrel when it reaches a given station by the rotation of the reel said blanks having an end previously coated with glue against which the other end is lapped in folding, a foot-bar for each mandrel supported from the reel, a spring to move the foot-bar in a direction to press the lapped ends of the blank against the mandrel, means to move the foot-bar in opposition to said spring, means to lock the foot-bar out of contact with the mandrel and automatic means supported independently of the reel for unlocking the foot-bar.

28. In a machine for the manufacture of paper vessels an intermittently rotating reel, a plurality of mandrels on said reel, means for folding a blank around a mandrel when it reaches a given station by the rotation of the reel said blank having an end previously coated with glue on which the other end is lapped and folded, a foot-bar for each mandrel supported from the reel, a spring to move the foot-bar in a direction to press the lapped ends of the blank against the mandrel. means to move the foot-bar away from the mandrel, a pawl to automatically engage and lock the foot-bar in this last position and automatic means supported independently of the reel at a fixed station for moving the pawl to unlock the foot-bar.

29. In a machine for the manufacture of paper vessels a mandrel, means for folding a blank around the mandrel said blank having an end previously coated with glue against which the other end is lapped in folding, a seam-clamp head, a pair of parallel levers supporting said head, a foot-bar supported by the seam-clamp head and adapted to press the lapped ends of the blank against the mandrel by movement of the head toward the mandrel, spring means to move the head toward the mandrel, means to move it in the opposite direction, a pawl to engage one of said parallel levers and lock the head in the outer position of the latter and means to release the pawl.

30. In a machine for the manufacture of paper vessels the combination of an intermittently rotating reel, a plurality of mandrels supported by said reel, means for folding a blank around a mandrel when the mandrel reaches a given station by the rotation of the reel said blanks having an end previously coated with glue against which the other end is lapped when folded, a seam-clamp head, a pair of parallel levers pivoted to a support from the reel to which said seam-clamp head is pivoted, a foot-bar adjustably secured to the seam-clamp head, a spring pressing one of said parallel levers to normally move the seam-clamp head in the direction of its adjacent mandrel, means to move the levers in opposition to the last spring, a pawl to hold the levers in the position opposed to said last spring, and automatic means to move the pawl to release the lever.

31. In a machine for the manufacture of paper vessels the combination of a rotating reel, mandrel shafts extending laterally from the reel a mandrel on each shaft, means for folding a paper blank around the mandrel said blank having an end previously coated with glue upon which the other end is lapped in folding, a clamp carried by each mandrel shaft to press the lapped ends together until the glue is set, means to remove the clamp and means to loosen the vessel-body on the mandrel preliminary to its removal.

32. In a machine for the manufacture of paper vessels the combination of a rotating reel, mandrel shafts extending laterally from the reel a tapering mandrel on each shaft, means to form a paper blank around said mandrel one end of said blank having been previously coated with glue upon which the other end is lapped when folded, means carried by each mandrel to clamp the lapped ends together, means to remove the clamp after the glue has set, and means to loosen the vessel body on the mandrel by pressure against its large end.

33. The combination of a shaft a tapering mandrel mounted on the shaft and having a paper vessel body formed thereon, and a reciprocating sleeve, also mounted on the shaft to loosen the paper body by contact with its large end.

34. In a machine for the manufacture of paper vessels the combination of a rotating reel, lateral shaft on the reel, a tapering mandrel carried by each shaft, means for forming a vessel body by bending a paper blank around a mandrel and pressing its previously glued and overlapped ends together, a sleeve mounted concentrically of and on each shaft adapted to slide over the large end of the mandrel into contact with the corresponding end of the paper body, spring means to resist said contact, a pin to move the sleeve and a cam located adjacent the reel in the path of the pin to move the latter in a direction to move the sleeve against said vessel body.

35. The combination of a tapering mandrel having a paper vessel body thereon, a stripper and means to move the stripper longitudinally and also transversely of the axis of the mandrel into contact with the

large end of the vessel body and remove it by a travel of the stripper as a whole in a direction oblique to the axis of the mandrel against the mandrel in the direction of the small end of the latter.

36. The combination of a tapering mandrel having a paper vessel body thereon, means for loosening the body on the mandrel by contact with the large end of the body and a stripper moving in contact with the mandrel toward its small end to remove the vessel body from the mandrel.

37. The combination of a tapering mandrel having a paper vessel body thereon, a reciprocating head, a stripper fork mounted in the head and having movement as a whole in a single direction transverse to that of the head and means to move the fork transversely of the head as the head is moved in the direction of the taper of the mandrel.

38. The combination of a tapering mandrel having a paper vessel body thereon, a reciprocating head, a toothed segment pivotally mounted on said head, a rack-bar moved longitudinally in a direction transverse to the travel of the head by engagement with said toothed segment, a stripper on an end of the rack-bar adapted to contact with the mandrel, and means to move the toothed segment to keep the stripper in contact with the mandrel during a portion of the reciprocating movement of the head.

39. In a machine for the manufacture of paper vessels the combination of a pair of parallel reels, a plurality of tapering mandrels equidistantly mounted on one of said reels, an equal number of similarly mounted truncated conical holders on the other reel, said mandrels and holders having parallel axes being on the adjacent sides of the two reels and said reels being overlapped to bring the axis of each mandrel in alinement with the corresponding holder once at each revolution of the reels, means for forming a vessel body on each mandrel at each forward movement of its reel, means for loosening the vessel body on the tapering mandrel and means for transferring the loose vessel body from the mandrel to a truncated conical holder when the axes of the mandrel and holder come into alinement.

40. In a machine for the manufacture of paper vessels the combination of a pair of parallel reels, a plurality of tapering mandrels equidistantly mounted on one of said reels, an equal number of similarly mounted truncated conical holders on the other reel, said mandrels and holders being on the adjacent sides of the two reels and said reels being overlapped to bring the axis of each mandrel in alinement with the corresponding holder once at each revolution of the reels, means for forming a vessel body on each mandrel at each revolution of its reel, means for transferring the vessel body from a mandrel to a truncated conical holder when the axes of the mandrel and holder come into alinement, and means supported independently of the reels for positively seating the vessel body in said truncated conical holder.

41. In a machine for the manufacture of paper vessels the combination of a pair of parallel reels, a plurality of tapering mandrels equidistantly mounted on one of said reels, an equal number of similarly mounted truncated conical holders on the other reel, said mandrels and holders being on the adjacent sides of the two reels and said reels being overlapped to bring the axis of each mandrel in alinement with the corresponding holder once at each revolution of the reels, means for forming a vessel body on each mandrel at each forward movement of its reel, means for stripping the vessel body from the mandrel and for depositing it loosely in a holder and reciprocating means supported independently of the reel for positively seating it in the holder.

42. In a machine for the manufacture of paper vessels the combination of a pair of parallel reels, a plurality of tapering mandrels equidistantly mounted on one of said reels, an equal number of similarly mounted truncated conical holders on the other reel, said mandrels and holders being on the adjacent sides of the two reels and said reels being overlapped to bring the axis of each mandrel in alinement with the corresponding holder once at each revolution of the reels, means for forming a vessel body on each mandrel at each revolution of its reel, means for loosening the body on the mandrel, means for stripping the body from the mandrel and for depositing it loosely in a holder when the axes of the mandrel and holder come into alinement, and means supported independently of the reel for positively seating the vessel body in the holder.

43. In a machine for the manufacture of paper vessels the combination of a pair of parallel reels, a plurality of tapering mandrels equidistantly mounted on one of said reels, an equal number of similarly mounted truncated conical holders on the other reel, said mandrels and holders being on the adjacent sides of the two reels and said reels being overlapped to bring the axis of each mandrel in alinement with the corresponding holder once at each revolution of the reels, means for forming a vessel body on each mandrel at each revolution of its reel, a reciprocating sleeve to contact the large end of the vessel body and loosen it, a stripper contacting the large end of the loosened vessel body and also contacting the mandrel and moving toward the small end of the mandrel while maintaining said contact thereby discharging the vessel body loosely into the truncated conical holder

while the axis of it and the mandrel are in alinement, and a reciprocating seating disk to contact the large end of the vessel body and press it firmly into the holder.

44. In a machine for the manufacture of paper vessels a hollow truncated conical holder, means for loosely depositing a similarly shaped paper vessel body in said holder, in combination with a reciprocating seating disk moving parallel with the axis of the latter, to contact the large end of the vessel body and force it firmly into the holder and then withdrawing from the vessel.

45. In a machine for the manufacture of paper vessels a hollow truncated conical holder, means for loosely depositing a similarly shaped vessel body in said holder, a reciprocating seating disk to contact the large end of the vessel body and seat it firmly in the holder, in combination with means to form, glue and place a throat member in the vessel body in said holder.

46. In a machine for the manufacture of paper vessels a hollow truncated conical holder, means for loosely depositing a similarly shaped vessel body in said holder, a reciprocating seating disk to contact the large end of the vessel body and seat it firmly in the holder, in combination with means to form, glue and place a throat member in the vessel body in said holder, and means to render the throat forming, gluing and placing means inoperative when no vessel body is in the holder to be seated.

47. In a machine for the manufacture of paper vessels the combination of an intermittently rotating reel, a plurality of equidistant vessel body holders carried by the reel, an intermittently rotating disk having the same number of equidistant throat carrying openings as there are holders in the reel said disk and reel being overlapped to bring the center of each throat opening of the disk once in alinement with the axis of a holder on the reel at each revolution of the disk, means to form and deposit a throat in each carrying opening of the disk, means to transfer a throat from the disk and place it in a bottle body when the center of the throat comes in alinement with the axis of said body and means to coat the outer surface of the flange on the throat with glue during the transfer of the throat from the disk to the bottle body.

48. In a machine for the manufacture of paper vessels the combination of an intermittently rotating reel, a plurality of equidistant vessel body holders carried by the reel, an intermittently rotating disk having the same number of equidistant throat carrying openings as there are holders in the reel said disk and reel being overlapped to bring the center of each throat opening of the disk once in alinement with the axis of a holder on the reel at each revolution of the disk, means to supply a throat member in each carrying opening of the disk, a longitudinally reciprocating shaft adapted to be moved with its end in contact with the inside of the throat, gripping fingers carried by the shaft to grip the throat against the end of the shaft, means to continue the longitudinal movement of the shaft after it has gripped the throat and convey the throat from the disk to a glue applying means, a glue applying means in the path of the disk, means for rotating the throat in contact with the glue applying means and means by the continued longitudinal movement of the shaft for placing the glued throat in a cone body.

49. In a machine for the manufacture of paper vessels the combination of a throat holding member, a vessel body holding member, a hollow shaft in alinement longitudinally with said throat and body holding members, cam operated means for intermittently reciprocating the shaft longitudinally, throat gripping fingers pivoted to that end of the shaft which is nearest the throat holding member, a head within and near the opposite end of the shaft, a rod connecting the head with said gripping fingers, a spring to press the head in a direction to move the fingers into gripping engagement, a glue applying means between the throat and vessel body holding members, means to rotate the shaft when the throat is in contact with the glue applying means, a trip to compress the spring and release the grip of the fingers on the throat when the throat is placed in a vessel body, means to hold the compression of the spring and the gripping fingers in release during the return travel of the shaft, and means to release said last means at the beginning of the outward travel of the shaft.

50. In a throat placing means for the manufacture of paper vessels, a hollow shaft, throat gripping fingers pivoted to the outer end of the shaft, a rod to operate said fingers extending through the hollow shaft to near the opposite end of the latter, a spring to press the rod in a direction to cause the fingers to close and grip the throat, means in the shaft to lock the rod against the action of the spring with the fingers in their open position, external trips, and means contacting with said trips to compress the spring and to cause it to release.

51. In a machine for the purposes specified, the combination with a throat carrying member, of means for punching and flanging the throat and for depositing it in this condition in the throat carrying member, means for moving the throat carrying member so as to present the throat at a center removing station, and a cutting punch at said

last station for cutting away the center opening in the throat.

52. In a machine for the purposes specified, the combination with a throat carrying member, of means for punching and flanging the throat, means for feeding the blank paper to said punching and flanging means, means for depositing the flanged throat in said throat carrying member, means for moving the throat carrying member to present the throat at a center removing station, means to clamp the throat while its center is being removed and a center cutting punch to form the center opening in the throat.

53. In a machine for the manufacture of paper vessels a hollow truncated conical holder, means for loosely depositing a similarly shaped vessel body in said holder, a reciprocating seating disk to contact the large end of the vessel body and seat it firmly in the holder, in combination with the following instrumentality, a throat carrying member, means to punch and flange a throat and deposit it in said throat carrying member, means to remove the center of said throat, means to transfer the throat from the throat carrying member to the vessel body in said conical holder, means for applying glue to the flange of the throat in transit, a rotating shaft, means for actuating the throat carrying member and the throat forming, gluing and placing means from said shaft, a clutch-coupling between said last means and the shaft and means when there is no vessel body in its holder to be seated by said reciprocating seating disk to uncouple said clutch-coupling and thereby render said throat forming, gluing and placing mechanism inoperative.

54. In a machine for the manufacture of paper vessels a hollow truncated conical holder, means for loosely depositing a similarly shaped vessel body in said holder, a reciprocating seating disk to contact the large end of the vessel body and seat it firmly in the holder, a shaft on which said seating disk is mounted, means for moving the shaft longitudinally to reciprocate the seating disk, means to cause the shaft to move farther when the disk is not resisted by contact with a vessel body, throat forming, gluing and placing means, a rotating shaft, means for actuating the throat forming, gluing and placing means from said shaft, a coupling means between said last means and the rotating shaft, and means operated by the further travel of the shaft having said seating disk, occasioned by the absence of a cone to be seated for opening said coupling means.

55. In a machine for the purposes specified the longitudinally reciprocating shaft, means for reciprocating said shaft having resilient connection therewith to vary the length of travel, a cone seating disk mounted on said shaft, a pair of stops also mounted on said shaft, a revoluble shaft, throat forming, gluing and seating means, means to transmit power from the revoluble shaft to said throat forming, gluing and placing means, a clutch-coupling between the last means and said revoluble shaft, a rotating disk having a cam lever adapted to be shifted from one side of the disk to the other, a yoke lever connected with a member of said clutch-coupling, the other end of said yoke lever being in the path of the cam lever of said rotating disk when on the upper side of said disk, a bell-crank lever pivoted to the machine frame under said disk and having a roller in its upper arm contacting with the under side of the disk in the path of the cam lever of said disk when positioned below the disk, a bolt to lock the bell-crank lever in position to force the cam lever to project above the disk and a pivoted lever connected to operate the bolt when its other end which terminates between said pair of stops on which the cone seating disk is mounted.

56. In a machine for the manufacture of paper vessels the combination of a vessel body holding member, a longitudinally reciprocating shaft, throat gripping means on said shaft, a throat glue applying means, cam actuated means for intermittently reciprocating said shaft, a second shaft parallel with the first shaft, gear wheels connecting the two, a toothed wheel on the inner end of the second shaft, a continuously rotating third shaft transverse to the second shaft, a wheel on the third shaft having worm-teeth around a portion of its periphery and a channel around its untoothed periphery said worm-teeth engaging with the teeth of the wheel on the inner end of the second shaft transmitting motion of rotation from the third to second shaft until said peripheral channel is reached which stops the rotation of the second shaft and members driven therefrom until the worm-teeth at the other end of the channel are reached.

57. In a machine for the manufacture of paper vessels the combination of a vessel body holding member, a longitudinally reciprocating shaft, throat gripping means on said shaft, a throat glue applying means, means for intermittently reciprocating said shaft, a second shaft parallel with the first, gear wheels connecting the two, a toothed wheel on the inner end of the second shaft, a third shaft rotating continuously said third shaft being transverse to the second one, a wheel on the third shaft having worm teeth around a portion of its periphery to drivingly engage the toothed wheel on the inner end of the second shaft and a channel in its untoothed periphery permitting the toothed wheel on the inner end of the second

shaft to slide in said channel without rotation, said parts being timed to transmit motion of rotation from the third shaft to the second shaft and thence to the first shaft when the throat carried by the first shaft is at the glue applying means, and a shock-absorber on the second shaft to reduce the strain on the gear wheels connecting the second and third shafts.

58. In a machine for the manufacture of paper vessels the combination of a reel, a plurality of truncated conical body holders carried by said reel, a parallel rotary disk having the same number of throat carrying pockets as there are body holders on the reel, each throat pocket being adapted to register once during each revolution of the disk with one of the body-holders on the reel, means for intermittently rotating the reel, means for intermittently rotating the disk and means for positively locking the disk at each stop.

59. In a machine for the manufacture of paper vessels the combination of a throat punching and flanging means, means for feeding paper to said means to be punched and flanged, a disk mounted to be rotated said disk having a plurality of pockets into which the flanged throats are placed as they are formed, means operated from the paper feed for rotating the disk intermittently to present the pockets successively in position to receive a throat and means to positively lock the disk at each stop.

60. In a machine for the manufacture of paper vessels the combination of a throat punching and flanging means, a paper feeding means, a disk capable of being rotated having a plurality of pockets in which the flanged throats are placed as they are formed said disk having a notch on its periphery for each pocket, an arm swinging radially of the disk, a pawl carried by said arm and adapted to engage with the peripheral notches of the disk, means actuated from said throat forming means to oscillate the arm, and means to lock the disk at each stop of the disk.

61. In a machine for the manufacture of paper vessels the combination of a throat punching and flanging means, a paper feeding means, a disk capable of being rotated having a plurality of pockets in which the flanged throats are placed as they are formed said disk having a notch on its periphery for each pocket, an arm swinging radially of the disk, a pawl carried by said arm and adapted to engage with the peripheral notches of the disk, means actuated from said throat forming means to oscillate the arm, locking indents in the face of the disk, a lever pivoted adjacent to the disk and having means on one end to engage said locking indents, and means at the other end of the lever actuated by the swinging arm to move the lever out of locking engagement.

62. In a machine for finishing the end of a paper vessel having an adjacent transverse member, a spinner head having a grooved side to receive the end of the vessel, means for rapidly rotating the head, means for simultaneously pressing it against the end of the vessel, and means bearing against the inner side of the transverse member of the vessel to prevent the longitudinal movement thereof under the pressure of the spinner head.

63. In a machine for finishing the end of a paper vessel having a transverse member adjacent to that end, means to contact with the end of the vessel to be finished, means for rapidly rotating said contacting means, means for simultaneously pressing said contacting means against the vessel, and means to hold the vessel from longitudinal movement by supporting said transverse member of the vessel.

64. In a machine for finishing the end of a truncated conical paper vessel having a throat member near the end to be finished, a conical holder in which the vessel is seated, means to contact with the ends of the vessel to be finished, means for rapidly rotating said contacting means, means for simultaneously pressing said contacting means against the end of the vessel, a head to contact with the inner side of the throat member of the vessel, and means to place and remove said head.

65. In a machine for finishing the small end of a truncated conical paper vessel having a transverse throat member near said small end, a conical holder in which the vessel is seated, a longitudinally reciprocating shaft at the large end of the holder in the axial alinement therewith, a head on the end of the shaft, yielding means for moving the shaft toward the holder to contact the head with the vessel throat, and means to spin a finish on the small end of the vessel.

66. In a machine for finishing the small end of a truncated conical paper vessel having a transverse throat member near said small end, a conical holder in which the vessel is seated, rapidly rotating means to contact the small end of the vessel, means to press said rotating means against the end of the vessel, a spring pressed jogger plate to contact the broad end of the vessel, and means to contact the inner side of the throat and resist the unseating action of the rapidly rotating means pressed against the small end of the vessel.

67. In a machine for finishing the small end of a truncated conical paper vessel having a transverse throat member near said small end, a conical holder in which the vessel is seated, a head to contact the inner end

of the vessel having an annular groove to receive and form said end, means for rapidly rotating the head, means for simultaneously pressing the head against the vessel, a second head inserted through the large end of the vessel against the adjacent wall of the throat, a shaft on which the head is mounted, a compression spring, means acting through said compression spring to yieldingly move the shaft toward the vessel.

68. In a machine for finishing the small end of a truncated conical paper vessel having a transverse throat member near said small end, a conical holder in which the vessel is seated, a head to contact the inner end of the vessel having an annular groove to receive and form said end, means for rapidly rotating the head, means for simultaneously pressing the head against the vessel, a second head inserted through the large end of the vessel against the adjacent wall of the throat, a shaft on which the head is mounted, a compression spring, means acting through said compression spring to yieldingly move the shaft toward the vessel, a jogger plate to contact the large end of the vessel and loosely mounted on said shaft, and spring means to yieldingly press the jogger plate against the vessel.

69. In a machine for making paper vessels a knockout mechanism for removing the product from its holder comprising a reciprocating barrel, a rod reciprocating in a recess in said barrel, a head on the outer end of the rod to contact the paper vessel to be removed, a fixed sleeve on the rod, a spring bearing against the sleeve to eject the rod, a pawl-lever carried by the barrel to lock the sleeve in the retracted position of the rod, means to release the sleeve from the pawl-lever by the travel of the barrel, and means to cushion the outward movement of the rod.

70. In a machine for making paper vessels a knockout mechanism for removing the product from its holder comprising a reciprocating barrel, a rod reciprocating in a recess in said barrel, a head on the outer end of the rod to contact the paper vessel to be removed, a fixed sleeve on the rod, a spring bearing against the sleeve to eject the rod, a pawl-lever carried by the barrel to lock the sleeve in the retracted position of the rod, means to release the sleeve from the pawl-lever by the travel of the barrel, an air chamber at the inner end of the rod recess in the barrel having a reduced discharge opening and a piston on the rod reciprocating in said chamber.

71. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel body-holders mounted on the other reel, a holder for the blanks to form the sides of the vessel, means for taking such blanks one at a time from the holder, means for applying glue to one edge of the blank, means for delivering the blank thus coated with glue to a mandrel, means for forming the body out of the blank on said mandrel, means for loosening the body on the mandrel, means for transferring said loosened body from the mandrel to one of the holders on the other reel, means for seating the body in said holder, means for punching and flanging a throat member, means for removing the center of said throat member, means for gluing and placing said throat member near the small end in said body, means for spinning a finish on the small end of the body under pressure, means for preventing the unseating of said body by said pressure and means for discharging the product from the holder.

72. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, the axes of the mandrels being parallel with the axes of the reels, a plurality of vessel body-holders mounted on the other reel, means to form vessel bodies on the mandrels, positive means to transfer and seat said bodies in said holders, means to intermittently rotate said reels and shock absorbing means in said last means to reduce the strain on the mechanism at the starting and stopping of the reels.

73. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel body-holders mounted on the other reel, the axes of the mandrels and holders being always parallel with each other, means to rotate the two reels and to stop them with the axis of each mandrel alined with the axis of a holder once during each revolution of the mandrel carrying reel, means to form a previously glue coated blank on a mandrel of said mandrel carrying reel, means carried by the reel for holding the glued joint of the body until the glue has set, means for loosening the body on the mandrel, and means for transferring the loosened body from the mandrel to a holder in the other reel when the mandrel comes in axial alinement with the axis of the holder.

74. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a plurality of vessel body-holders mounted on the other reel, means to rotate the two reels and to stop them with the axis of each mandrel alined with the axis of a holder once during each revolution of the mandrel carrying reel, means to form a previously glue coated blank on a mandrel of said mandrel carrying reel, means carried by the reel for hold-

ing the glued joint of the body until the glue has set, means for transferring the body from the mandrel to a holder in the other reel when the mandrel comes in axial alinement with the axis of the holder, a throat carrying disk having seats for a plurality of throats, means to form and seat the throats in said disk and means to transfer the throat from the disk to a body in a holder on the holder carrying reel and place the throat in said body, and means to coat the throat with glue in transit.

75. In a machine for the manufacture of paper vessels a pair of intermittently rotating reels, a plurality of mandrels mounted on one of said reels, a like number of vessel body-holders mounted on the other reel, means to rotate the two reels and stop them with the axis of each mandrel alined with the axis of a body-holder once during each revolution of the mandrel carrying reel, means to coat an end of a body blank, means to place and form the blank into a body on a mandrel, means for transferring the body to a holder in the other reel when the mandrel and body come in axial alinement, a throat carrying disk having the same number of throat seats as there are body-holders on the reel, means to form and seat throats in said disk, means to transfer a throat from the disk to a body in a holder and place the throat in said body, means to coat the throat with glue in transit from the disk to the body, means to spin a finish on the small end of the body, and means to eject the product from its holder.

76. In a machine for the manufacture of paper vessels, a tapering mandrel, a folder comprising a funnel-shaped sleeve in three longitudinally divided parts the two outer of which are hinged to the middle one, means for depositing a paper blank between the mandrel and folder, a head, means for imparting a reciprocating movement to the head toward and from the mandrel, bar supports for the middle part of the folder slidingly mounted in said head, resilient means connecting the head with the lower ends of said bar supports, said resilient means permitting the head to continue its travel toward the mandrel after said middle part had stopped by contact with the mandrel, and means connecting the head with each of the hinged side parts to fold said side parts against the mandrel by the continued travel of the head.

77. In a machine for the manufacture of paper vessels, a tapering mandrel, a folder comprising a funnel-shaped sleeve in three longitudinally divided parts the two outer of which are hinged to the middle one, means for depositing a paper blank between mandrel and folder, a head, means for imparting a reciprocating movement to the head toward and from the mandrel, bar supports for the middle part of the folder slidingly mounted in said head, resilient means connecting the head with the lower ends of said bar supports, said resilient means permitting the head to continue its travel toward the mandrel after said middle part had stopped by contact with the mandrel, means connecting the head with each of the two hinged side parts to fold said side parts against the mandrel by the continued travel of the head and means to cause one part to fold before the other.

78. In a machine for the manufacture of paper vessels, a tapering mandrel, a folder comprising a funnel-shaped sleeve in three longitudinally divided parts the two outer of which are hinged to the middle one, means for depositing a paper blank between the mandrel and folder, a head, means for imparting a reciprocating movement to the head toward and from the mandrel, bar supports for the middle part of the folder slidingly mounted in said head, resilient means connecting the head with the lower ends of said bar supports, said resilient means permitting the head to continue its travel toward the mandrel after said middle part had stopped by contact with the mandrel, a lever pivoted to the head, means connecting each end of the lever with an adjacent one of the two hinged side parts of said folder and a spring forcing one end of said lever in advance of the other to cause the side member of the folder connected with that end of the lever to fold in advance of the other side.

79. In a machine for the manufacture of paper vessels, a tapering mandrel, a folder comprising a funnel-shaped sleeve in three divided parts of which the two outer parts are hinged to the middle one, means for depositing a paper blank between the mandrel and folder, a head, cam operated means for imparting a reciprocating movement to the head toward and from the mandrel, a pair of bar supports on which the middle part of the folder is mounted said bars being slidingly mounted in the head, a connection between the other ends of the bars, a spring connecting the head with said last connection, a lever pivoted to the head, a rod connecting each end of the lever with a corresponding one of the two hinged side parts of said folder and resilient means for moving one end of the lever in advance of its other end.

80. In a machine of the character described, means for supporting an open ended receptacle, a closure forming device, a closure inserting device, means supporting said closure inserting device for movement into the receptacle, means for directing a closure from said forming device into the path of said inserting device, a crimping means, and

means for operating said crimping means to form a crimp at the end of the receptacle adjacent to said closure.

81. In a machine of the character described, means for supporting an open ended receptacle, a closure forming device, a closure inserting device, means supporting said closure inserting device for movement into the receptacle, means for directing a closure from said forming device into the path of said inserting device, a crimping means, and means for operating said crimping means for action on the receptacle subsequently to the positioning of the closure by said inserting device.

82. In a machine of the character described, a closure inserting device, means for cutting closures, means for advancing closures and receptacles to said device, and means for operating said device to insert a closure advanced by said advancing means into an advanced receptacle.

83. In a machine of the character described, a closure forming means, a closure gripping and inserting device spaced from said forming means, means for conveying closures from said forming means to said device, means for conveying receptacles to said device, and means for operating said device to insert a closure into a receptacle advanced by said conveying means.

84. In a machine of the character described, a closure forming means, a closure inserting device having fingers to grip the closure, means for advancing a closure from said forming means to said device in common with an open ended receptacle, and means for operating said inserting device to insert a closure into the receptacle advanced by said advancing means.

85. In a machine of the character described, a rotary receptacle carrier, a rotary closure carrier disposed at one end of said first named carrier provided with a passage-way for a closure, means for rotating said carriers, and means at the side of the path of said last named carrier for gripping and moving the closure through the said carrier passage-way and inserting the same into a receptacle on said first named carrier.

86. In a machine of the character described, a rotary receptacle carrier, a rotary closure carrier disposed at one end of said first named carrier provided with a seat for a closure, means at the side of the path of said last named carrier for inserting a closure into a receptacle on said first named carrier, means for intermittently rotating said carriers, and means for operating said first named means during the pauses of said carriers.

87. In a machine of the character described, in combination with a closure support provided with a seat for the closure, a pair of closure cutting and forming dies one of which is supported for movement toward and from the other, means for feeding a strip of paper between said dies in a step by step manner, and movable guide means for moving the cut strip of paper out of the path of the formed closures.

88. In a machine of the character described, a closure inserting device, rotatably supported means for advancing a tapered receptacle body to present its base end to said device, means for moving said inserting device into the receptacle body, and means movable with said first means for supporting a closure for the small end of the receptacle body in the path of said inserting device.

89. In a machine of the character described, a closure inserting device, means for advancing a receptacle body to present one end thereof to said device to receive a closure, means for moving said device into the receptacle, and means movable with said first means for supporting at the receiving end of the receptacle body a closure of relatively small diameter.

In witness whereof, we have hereunto set our hands and seals at Indianapolis, Indiana, this 21st day of June, A. D. one thousand nine hundred and thirteen.

HARRY D. CAYLOR, [L. S.]
WILLIAM ALLISON SCOTT. [L. S.]

Witnesses:
F. W. WOERNER,
L. B. WOERNER.