June 4, 1940. H. J. SMITH ET AL 2,203,510

METHOD AND MACHINE FOR MAKING PAPER CUPS

Filed Dec. 13, 1934 5 Sheets-Sheet 1

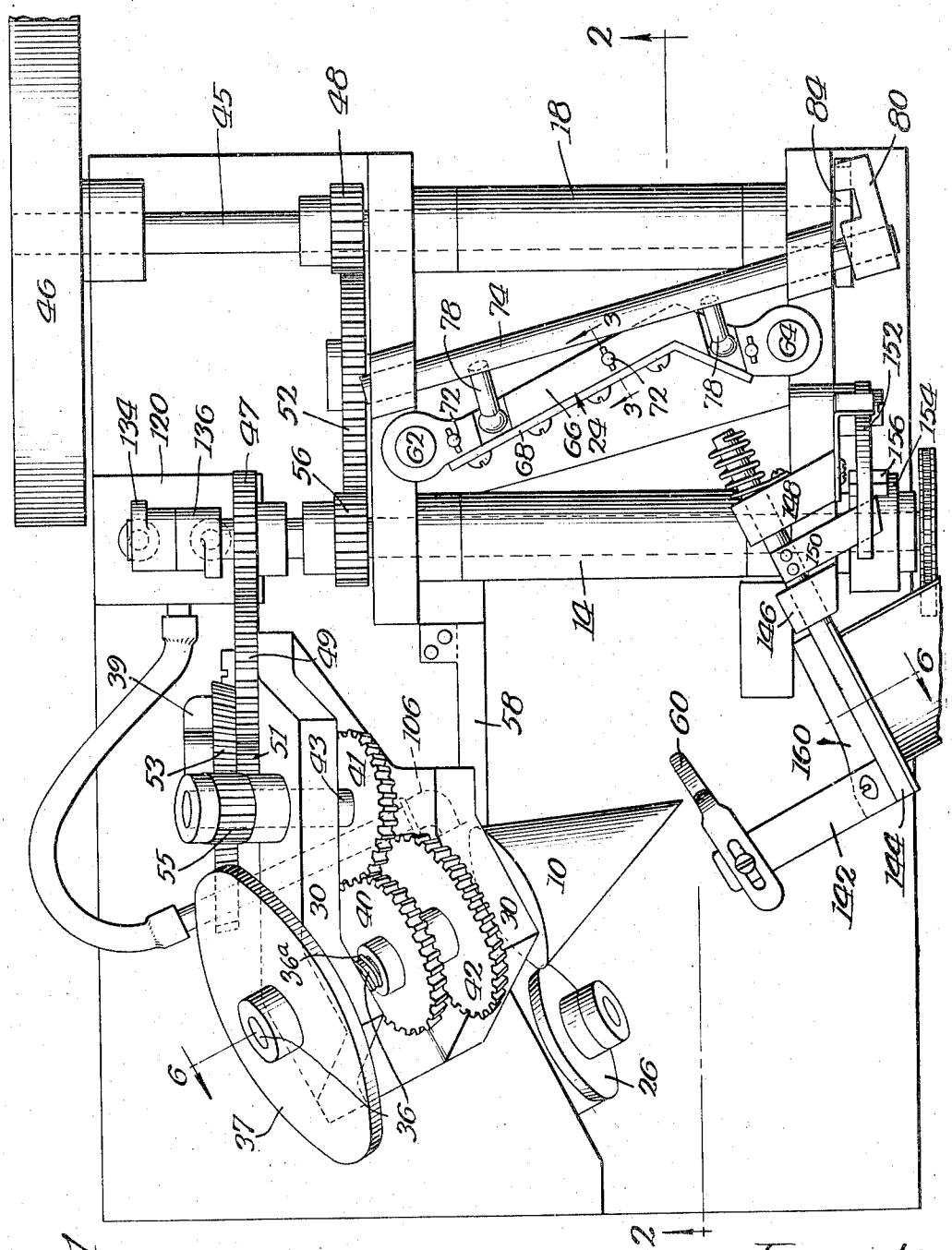


Fig. 1

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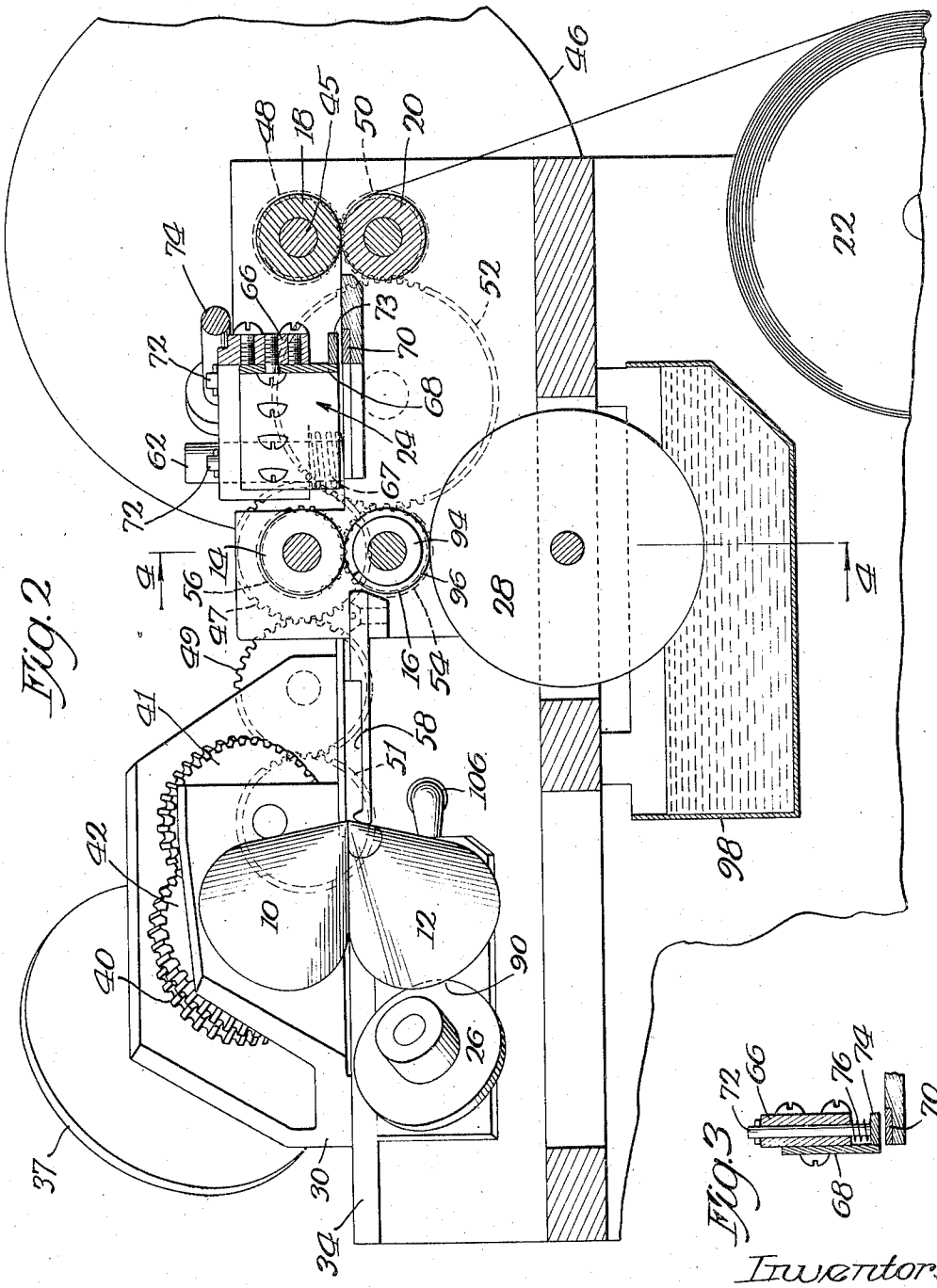


Fig. 2

Fig. 3

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Fig. 4

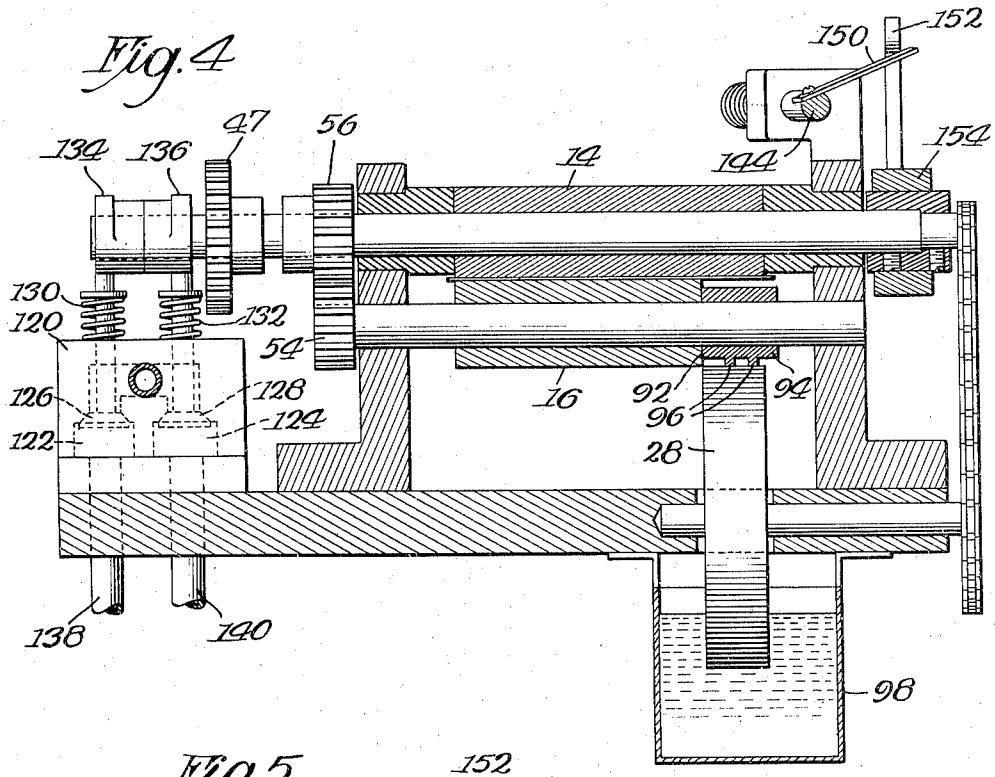
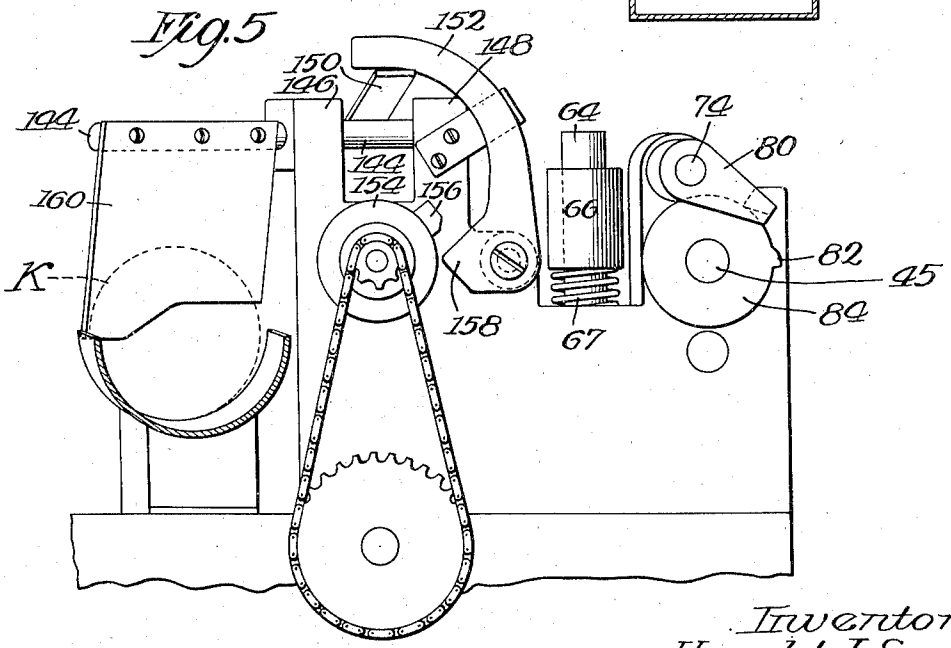


Fig. 5



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METHOD AND MACHINE FOR MAKING PAPER CUPS

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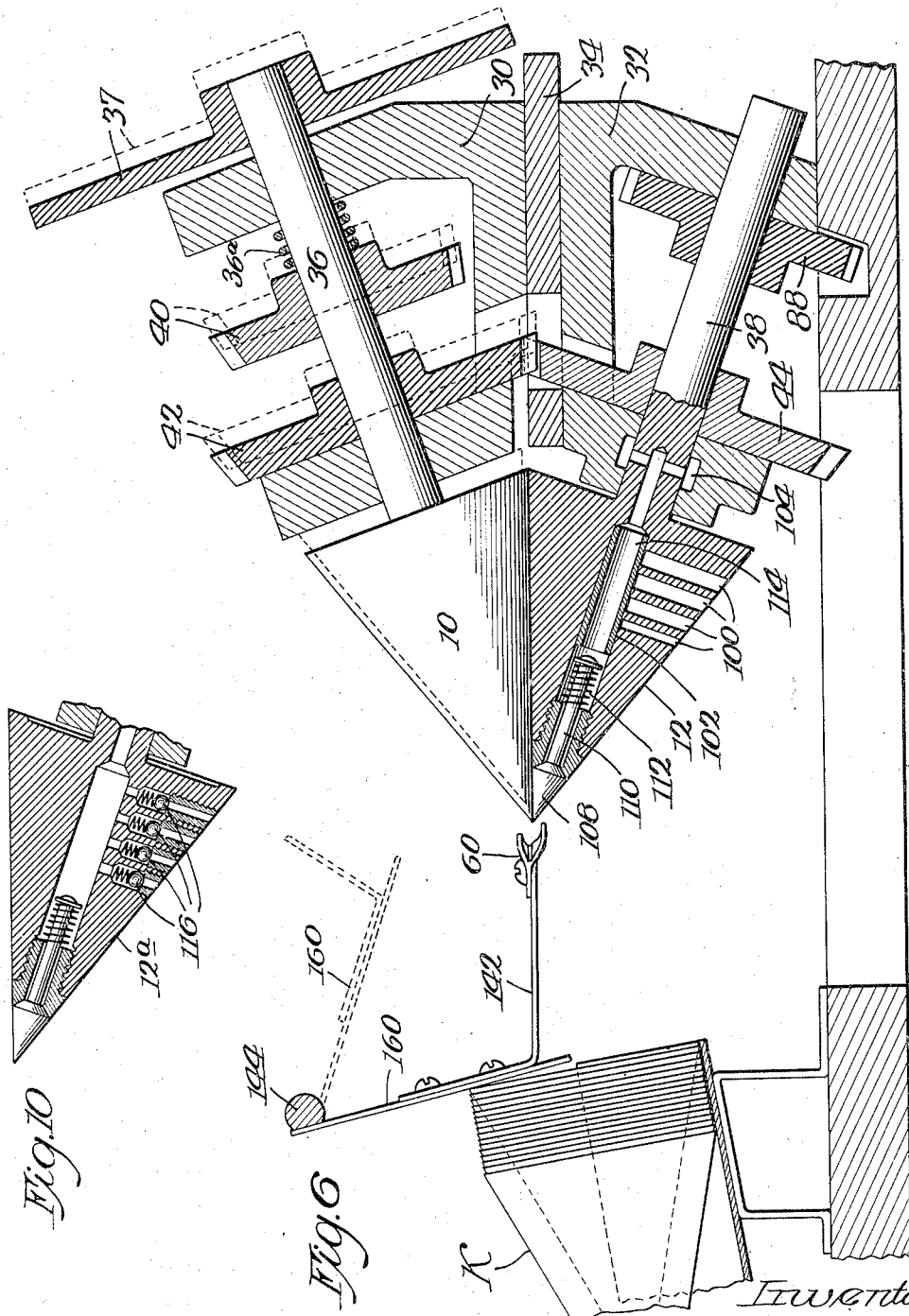


Fig. 10

Fig. 6

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Fig. 9

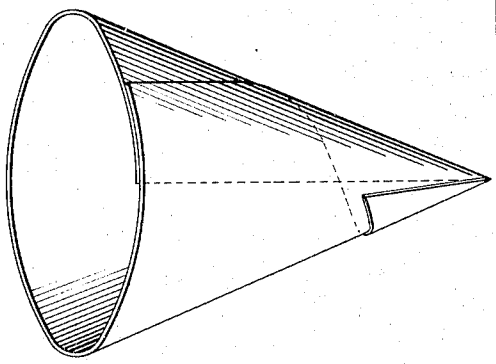


Fig. 8

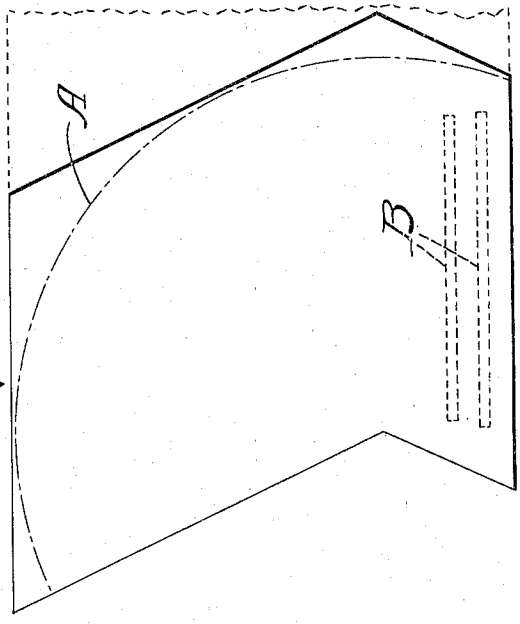
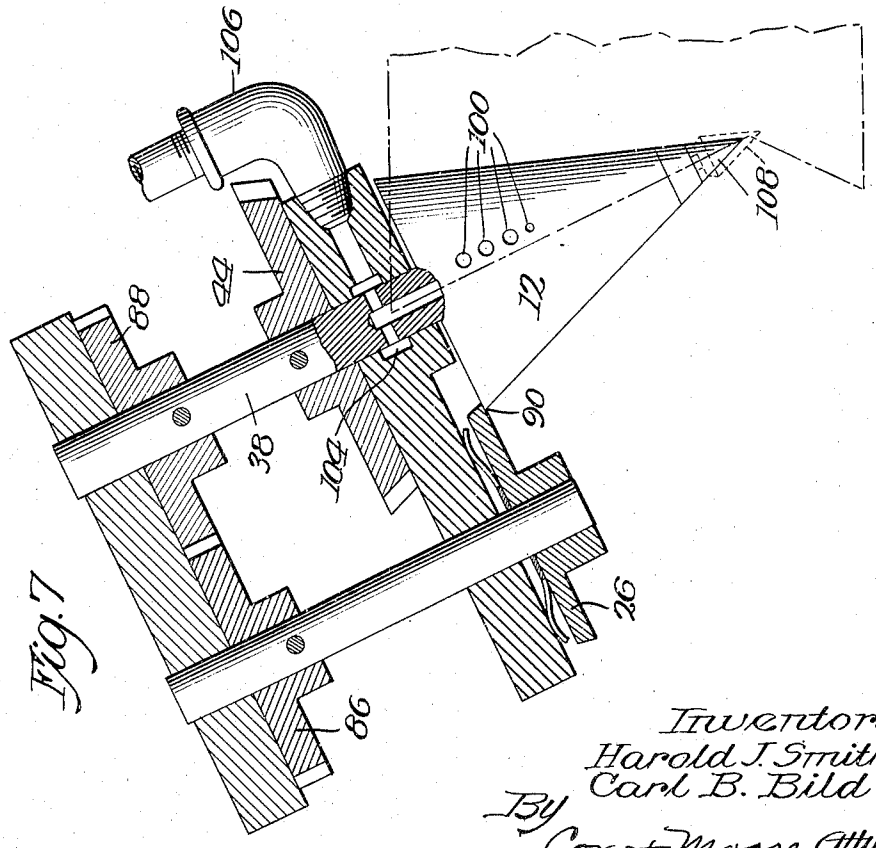


Fig. 7



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Patented June 4, 1940 2,203,510

UNITED STATES PATENT OFFICE

2,203,510

METHOD AND MACHINE FOR MAKING PAPER CUPS

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Application December 13, 1934, Serial No. 757,250

24 Claims. (Cl. 93—36.2)

This invention relates to an improved method of manufacturing paper cups of the cone-shaped variety, and likewise to a machine capable of performing the method.

Heretofore, in the manufacture of such cups, it has been customary to cut finished blanks from a roll of paper and stack them in a magazine, from which they are fed, one by one, to the instrumentalities that form the cups. This procedure is objectionable for a number of reasons. In the first place, it results usually in a substantial waste of paper, and secondly, it involves several steps such as die cutting and magazining, that have been found to be unnecessary.

To the end of overcoming the foregoing objections, the invention herein contemplates feeding paper in a continuous strip from a roll to the forming instrumentalities. In the course of travel of the paper, it is cut into semi-finished blanks of the desired shape. Thus the steps of die cutting and magazining are eliminated.

Another object of the invention consists in providing a novel machine for performing the method, said machine being comparatively simple in design and construction, and efficient and economical in operation. A feature of the invention which contributes to the accomplishment of this object resides in the provision of a machine comprising a pair of cooperating forming cones, means for feeding a strip of paper in the direction of the cones, together with means for severing the strip, as it is being fed, into blanks of the desired configuration.

Other objects and features of the invention will become apparent from a reading of the following specification, in the light of the accompanying drawings, in which—

Figure 1 is a top plan view of a machine constructed in accordance with the invention;

Figure 2 is a view in side elevation, partly in section, taken along the line 2—2 of Figure 1;

Figure 3 is a detailed view of a cutting mechanism shown in Figure 2;

Figure 4 is a view in section taken along the line 4—4 of Figure 2;

Figure 5 is a view in front elevation of a certain portion of the machine that is depicted in Figure 1;

Figures 6 and 7 are detailed views of the forming instrumentalities;

Figures 8 and 9 illustrate the cup blank and the completed cup formed therefrom; and

Figure 10 shows a modified type of forming cone.

Referring to Figures 1 and 2, the machine comprises, generally speaking, a pair of forming cones 10 and 12; two pairs of feeding rolls 14, 16 and 18, 20, for furnishing a strip of paper from a roll 22 to the forming instrumentalities; a knife mechanism 24 for severing the strip into segments or semi-finished cup blanks; a rotary knife 26 located adjacent to the lower forming cone, adapted to shape the blank into a finished condition; together with means 28 for applying glue to the semi-finished blank as it passes from the cutting mechanism 24 on its way to the forming instrumentalities.

These four units, namely, (1) the forming cones, (2) the feeding rolls, (3) the gluing means, and (4) the cutting mechanism, constitute the main operating elements of the machine. All other parts and devices merely contribute to the successful and efficient functioning of the four named units.

The upper forming cone 10 is mounted in an angular U-shaped bracket 30, which is clearly illustrated in Figure 6. The lower cone is mounted in a bracket 32 located beneath the bed 34 of the machine. The upper cone is provided with a shaft 36 that is journaled in bearings formed in the bracket 30. Similarily the lower cone is provided with a shaft 38 journaled within bearings formed in the bracket 32. A gear 40, pinned to the shaft 36 of the upper cone, is arranged to be driven in a manner that will hereafter be described, and a second gear 42, also pinned to the shaft, engages a driven gear 44 fixed to the shaft 38 of the lower cone. Both the gear 42 and the gear 44 have the same diameter and number of teeth, which causes the two cones to be rotated at the same speed.

Turning now to the feed rolls, it will be seen, as shown in Figures 1, 2 and 4, that these comprise two pairs of vertically aligned rolls. The upper roll 18 of the rear pair is mounted upon the shaft 45 on which there is a pulley 46 that is driven from a suitable source of power. Referring to Figure 1, it will be seen that a gear 48 is fixed to the shaft, and referring now to Figure 2, it will be seen that the gear has engagement with another gear 50 of the same size and diameter that is fixed to the shaft that carries the lower feed roll 20. Thus both rolls are driven at exactly the same rate of speed. An idler 52 is driven by the lower gear 50 and in turn drives a gear 54 pinned to the shaft of the feed roll 16. Again in this instance the upper feed roll 14 is provided with a gear 56 identical to the lower gear 54, and thus it will be seen that all four of

the feed rolls are driven at exactly the same rate of speed.

The strip of paper that leaves the roll 22 is firmly gripped by the two pairs of feed rolls, which may be made of metal or rubber, or any other suitable material, and is advanced in the direction of the forming cones 10 and 12. It will be observed that the bites between the feeding rolls and the forming cones lie within the same horizontal plane, whereby the paper is fed directly toward the line of contact between the cones 10 and 12. To assist the paper in being carried from the forward pair of feeding rolls 14, 16 to the forming cones, and to prevent the possibility of the paper bending out of line, the machine is provided with a guide or rest 58 (Figure 1) over which the edge of the paper is fed, and with a guide finger 60 located adjacent to the points of the cones and carried in a manner that will hereinafter be fully described. Accordingly, as the forward edge of the paper is fed to the left in the direction of the cones, (looking down upon the machine as shown in Figure 1), the right-hand edge of the advancing strip moves across the rest 58, and the left-hand edge moves into engagement with the guide 60, whereby the blank is properly presented to the forming cones. The rear edge of the blank leaves the rollers 14 and 16 just about the time the blank is picked up by the former 12.

The task of severing the blank into its finished form is divided into two separate operations. First, the cutting mechanism 24 that is located between the feed rolls severs the continuous strip into blanks of semi-finished form, and lastly, the rotary cutting knife 26 located adjacent to the lower forming cone 12 completes the severing operation.

Referring now to the first of these instrumentalities, which is illustrated in Figures 1, 2 and 3, it will be seen that the frame of the machine is provided with a plurality of vertical posts 62, 64 for supporting a knife frame 66. The latter is adapted to move vertically upon the posts and to afford resiliency to its downward movement, a compression spring 67 (Figure 2) encircles each post and lies between the bottom of the knife frame and the framework of the machine. Thus, as the frame is moved downwardly it meets the resistance of the spring, and when downward pressure upon the frame is relieved the springs expand, thereby returning the frame to its operative position.

The frame is provided on its forward side with a knife blade 68 that has edge to edge engagement with a cutting plate 70, mounted in the framework of the machine. As shown in Figures 2 and 3, the knife frame 66 has slideably mounted thereon a plurality of plungers 72, the lower extremities of which are equipped with a presser plate 73. Compression springs 76 surround the lower extremities of the plungers and give a resilient backing to the presser plates 73. In operation, as the paper is fed beneath the cutting mechanism, the latter is actuated to cause the knife to descend. At the instant the cutting blade 68 engages the paper, the presser plate 73 likewise engages it, holding that portion of the paper adjacent to the line of cut momentarily stationary. As the knife rises, the presser plate holds the paper down thereby permitting the knife to rise above it, then moves out of engagement with the paper, permitting it to move on forward. The cutting mechanism operates so quickly that the momentary halting of the paper while it is cut does not interfere with proper feeding; at best it causes only a slight overlap in adjacent blanks.

The mechanism for actuating the knife comprises a bar 74 that extends above the knife frame, and is provided with a plurality of presser arms 78 which engage within recesses formed within the knife frame. Rigidly attached to the end of the bar 74 is an actuating arm 80 which, as clearly illustrated in Figure 5, is arranged to be engaged by a raised surface 82, carried by a cam 84, pinned to the outer extremity of the shaft of the upper feed roll 18.

The cutting mechanism that has just been described severs the continuous strip of paper into a series of blanks, having an outline such as that illustrated in Figure 8. In this condition the blank is in a semi-finished form, and in order to be of such a finished shape as will permit the formation therefrom of a cone-shaped cup, it must be severed along the dotted line A. To this latter end, the lowermost forming cone 12, around which the blank is wrapped, has mounted in cooperating relationship therewith the rotary cutting knife 26. The latter is driven as shown in Figure 7 by a gear 86 pinned to the shaft of the cutting tool, the gear 86 being driven by a cooperating gear 88 that is fixed to the shaft of the lower cone.

It will accordingly be seen that the rear edge of the cone cooperates with the cutting tool 26 and forms a cutting line at the point 90, which represents the line of contact between the knife and the cone. Accordingly, it will be understood that the semi-finished blank passing from the feed rolls has a certain amount of surplus material on it. However, as it wraps itself around the lower forming cone the surplus material is removed by the action of the cutting tool or rotary knife 26.

As stated in the beginning, the machine is equipped with means for applying glue or cement to the semi-finished blank, and to this latter end the lower feed roll 16 of the forward pair is cut away at the point 92, as shown in Figure 4, to afford space for a glueing roll 94. The glue is applied in two strips, as indicated by the reference numeral B in Figure 8, and to accomplish this the glue roll 94 is provided with two raised portions or ridges 96. The latter engage the surface of a glue carrier wheel 28 and thereby receive glue from the pot 98 within which the wheel rotates. Thus, as the blank is fed through the feed rolls 14 and 16 its left-hand edge, as viewed when looking down upon the machine as shown in Figure 1, receives the glue. It is for this reason that the left-hand edge of the blank is not guided on its way to the cone. However, the right-hand guide 58 and the forward edge guide 60 afford the necessary support for the advancing blank.

From so much of the description as has already been given, it will be seen that the continuous strip of paper is fed from the roll 22, through the rear feeding rolls, is severed into semi-finished blanks, is next fed between the forward feed rolls at which point glue is applied, and is then wrapped around the lowermost cone while the surplus material is removed by the action of the rotary cutting tool 26. In order to insure proper gripping of the blank between the cones and proper wrapping of the blank around the lowermost cone, the latter is provided, as shown in Figures 6 and 7, with a plurality of openings 100 that communicate with a hollow

bore 102 formed interiorly of the lower cone. This bore or passage way is in communication with an annular recess 104 formed within the bracket 32. A tube or conduit 106 (Figure 7) communicates with the annular recess 104 and thereby is likewise in communication with the openings 100 formed within the outer surface of the cone. By means of suitable apparatus, a vacuum is built up within the conduit 106, causing a vacuum or suction to be formed within the openings 100. The speed of rotation of the various operating units is such that the semi-finished blank presents itself to the lower cone in the manner shown in Figure 7. In this way the forward edge of the blank overlies the vacuum openings 100 and the suction causes the blank to adhere firmly without moving.

After the cup has been completely formed around the lower cone it is necessary to discharge it therefore, and to this latter end the cone is formed with a tip which constitutes a valve and plunger. Thus, also as shown in Figures 6 and 7, the tip 108 is mounted upon a shaft 110 that is normally held in a retracted position by means of a compression spring 112. The conduit 106 is adapted not only to establish a vacuum within the hollow bore 102 of the cone, but is also arranged to apply pressure alternatively within the bore. When pressure is applied it accomplishes two results. In the first place it causes the plunger to move outwardly, thereby loosening the cup from the cone, and secondly, it permits compressed air to escape from the opening in which the plunger is normally seated, and the force of the air causes the complete removal of the cup from the cone. In other words, the plunger initiates the stripping action and the compressed air then blows the cup completely off the cone.

The drive to the cones 10 and 12 is as follows: A beveled pinion 41 secured to the shaft 43 rotatable in bracket 30 meshes with the bevel gear 40 and drives the same. The shaft 43 is in turn driven from the shaft carrying the upper feed roll 14 through the intermediacy of the spur gear 47 on the said shaft, idler 49 rotatably mounted on the bracket 30, gear 51 rigidly connected to the gear 53, and gear 55 on the shaft 43. Gear 42 on shaft 36 drives shaft 38 through gear 44 on the latter shaft.

When the cup is discharged from the lower cone 12, the upper cone 10 is retracted to the dotted line position shown in Figure 6, and in the following manner:

A disk 37 is secured to the rear end of the shaft 36. A projection 39 on the rear face of the gear 53 periodically engages the inside face of the disk 37 as the gear rotates, and due to the fact that the disk 37 and projection 39 rotate in planes at an angle to each other, a longitudinal displacement of the disk, and consequently of said cone 10, takes place. As soon as the projection 39 moves out of engagement with the disk 37, the cone 10 falls by gravity into its operative position shown by full lines in Figure 6, or if desired, a spring 36a or any other desired means may be used for moving the cone back into operative position.

In order that the interior bore 102 may serve alternatively as a pressure and vacuum and chamber, the openings 100 are provided with a suitable valve member. In Figure 6 this member comprises a rubber tube 114 which, when vacuum is applied, collapses, allowing the vacuum to be transmitted to the openings 100. In the event pressure is applied the tube is restored to its normal condition and the pressure causes the plunger 108 to move outwardly.

In Figure 10 a modified form of valve arrangement is shown in which vacuum causes the valves 116 to open and pressure causes them to close. It will be appreciated that the construction of the plunger 108, 110 is such as will permit the free flow of air through the end of the cone. In other words, pins are employed instead of washers, and where washers are used they are smaller than the recess in which they are located, in order that the free egress of air will not be impeded.

In order that the vacuum and pressure will be established at correct intervals, certain mechanism illustrated in Figures 1 and 4 is provided. The conduit 106 is connected with a valve block 120 which contains two valve chambers 122 and 124, each of which is controlled by a valve 126, 128. The stems of the valves extend vertically and are surrounded by compression springs 130, 132, whereby, under normal conditions, both valves remain closed.

A plurality of cams 134, 136 are mounted upon the outer extremity of the shaft of the upper forward feed roll 14 and are timed to operate the valves at proper intervals. An air passageway 138 communicates with the valve chamber 122 and a vacuum passage way 140 leads to the other chamber 124. In operation the cams 134, 136 open first one valve and then the other at proper points in the operation of the machine, permitting the establishment within the lower cone of either pressure or vacuum, as desired.

There remains one last instrumentality to be described. The forward edge guide 60 is mounted upon a finger 142 which is secured to a stacking mechanism. As shown in Figure 6 the stacking mechanism is adapted for movement between either of two positions, in the upper dotted line of which access to the stack of cups K is afforded. In the operation of the machine the stacking mechanism is moved into the dotted line position just as the cup is blown from the lower cone. The force of the compressed air blows the cup into the stack, whereup the mechanism descends from the dotted line position and engages the rim of the completed cup, causing it to nestle properly within the stack. In this position the guide 60 will stop the oncoming blank at a point beyond the apex of cone 12 substantially at the apex of the V-shaped notch in the edge of the blank, whereafter the wrapping of the blank about cone 12 will cause the same to pivot about the guide 60 and prevent the blank from advancing too far.

The operation of the stacking mechanism is as follows: A pivot bar 144 (Figure 1) is mounted within brackets 146, 148 and has affixed thereto an actuating finger 150. Looking now at Figure 5, the actuating finger is adapted to be engaged by a curved lever arm 152. The shaft of the upper feed roll 14 is provided with a cam 154, as shown in Figures 4 and 5, having a raised portion 156 that once during each cycle of operation of the machine engages a projection 158 formed on the curved lever arm, causing the upper extremity of the arm to be depressed momentarily and the stacking plate 160 to be moved into the dotted line position of Figure 6. Owing to the brevity of the raised portion 156 the stacking plate 160 occupies the dotted line position but an instant only, whereupon it falls down, by gravity, into the full line position, thus completing its operation.

The description of the machine has been completed. It will be appreciated, it is believed, that

it is extremely simple in design and construction, and likewise rapid and efficient in operation. Its operating instrumentalities are comparatively few. By dispensing with the provision of a magazine, the necessity of feeding blanks one by one from one end of a stack is likewise dispensed with, and thus simplicity itself governs.

As for the method, it is contemplated that its patentability resides in the formation of cone-shaped cups from a continuous strip of paper, the width of which is approxmiately the width of the cup blank, in such a manner that a minimum loss of paper results. In some respects this minimum loss is due to the shape of the blank itself which permits a sound, leak-proof cup to be obtained from a blank of extremely simple design. For example, the forward edge of the blank comprises nothing more than an obtuse angle.

It must be appreciated that certain variations of devices in the machine, as well as in the blank, and even the precise steps of the method described herein may be made without constituting a departure from the true scope of the invention as set forth in the following claims.

Having described the invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a cup forming mechanism, the combination with a pair of rotatable conical members rotatable about axes in substantially the same plane but at such an angle with respect to each other as to maintain opposed elements of their conical faces substantially parallel to each other, one of said conical members constituting a form upon which the cup is shaped and the other of said conical members constituting a presser member for holding the material of the cup against said first mentioned conical member, means for moving one of the conical members longitudinally of the axis thereof after the cup is formed, in a direction away from the vertex of the angle formed by the axes of said cones, whereby the surfaces of said cones are separated, whereafter the cup may be ejected off the cone on which the cup is formed.

2. In conical cup receptacle forming mechanism, the combination of means for feeding blanks along a predetermined path to a forming position, forming mechanism at such position including a conical former, and guide means adjacent said forming mechanism for engaging the advance edge of a blank to arrest the movement of that portion of that edge as adjacent portions of said edge are brought into engagement with said conical former, whereafter the blank pivots about said guide means as the blank is wrapped about said conical former.

3. In a receptacle forming mechanism, the combination with means for feeding a blank along a given path, forming mechanism for forming the receptacle, means for moving said receptacle off said forming mechanism after the same is formed and guiding mechanism for guiding the blank on to said forming mechanism, a portion of said guiding mechanism being located in the path of movement of said receptacle as the latter is moved off the forming mechanism, and means for moving said portion of the guiding mechanism out of the path of said receptacle when the receptacle is moved off said forming mechanism.

4. In a machine for forming sheet material into cones, the combination of a conical mandrel, means for delivering a sheet of material, leading edge first, to said mandrel, means to apply adhesive to a trailing edge of said sheet as it is so delivered, means to rotate the mandrel to thereby wrap the sheet thereon from the leading edge toward the trailing edge and to lap the trailing edge carrying the adhesive upon said leading edge whereby to form a conical shell in place on said mandrel, said mandrel having a relatively shiftable apexial portion, and means to shift the same after the sheet has been so wrapped upon the mandrel in order to loosen the resulting shell on the mandrel.

5. The method of manufacturing conical shells which comprises feeding a strip of material along a given path, severing the strip to form blanks, rotating each blank about a point substantially in its leading edge while rolling the same to conical form and simultaneously trimming circularly the edges of the blank forming the base of said conical shell.

6. The method of forming conical shells which comprises feeding a strip of material, severing the strip into blanks and feeding the blanks successively to a forming station, rolling up each blank, about a point substantially in its leading edge at said station to form a cone while trimming the edges of the blank which forms the base of said cone along a circular trim line.

7. The method of forming conical paper cups which comprises feeding a strip of paper along a predetermined path, successively severing the strip as it travels to form blanks having leading and trailing edges, feeding the blanks successively to a forming station and successively rolling up each blank to form a cone by turning it about a point substantially in its leading portions while rolling up the blank from its leading edge circularly toward one of the side edges, and securing the side edge on the leading edge.

8. In a container making machine, continuously rotating forming means including a mandrel and a rider, the latter bearing on a blank carried by the mandrel from substantially the reception of the blank until just prior to its discharge, and means arranged to move one of said forming means axially in a direction toward the mouth end of the cup and away from the tip end during rotation to separate the mandrel and rider sufficiently to permit the ejection of a formed container and the admission therebetween of a blank to be formed.

9. In a machine for making conical paper cups, feeding means arranged to continuously feed a strip of stock, cutting means arranged to successively sever blanks from the continuously moving strip by repeatedly cutting off the end of the strip crosswise along a line other than straight across said strip, and a forming mandrel of substantially conical shape positioned in the path of a severed blank to receive the leading edge of the blank and wind the blank about a substantially intermediate part of said edge and so that said intermediate part defines the tip end of said cup.

10. In a machine for making conical paper cups, a forming element shaped to have a conical cup formed therearound, feeding means arranged to continuously feed a stock strip towards said forming means, and cutting means arranged to successively strike blanks from said continuously moving strip by repeatedly cutting off the end of said strip generally transversely, said forming element receiving a severed blank with a part of the blank projecting beyond the end

of the forming element to define the lower end of said cup.

11. The method of making a conical paper cup, which comprises feeding a strip of stock along a predetermined path, successively cutting off the end of said strip substantially transversely but along a line other than straight across said strip, and forming a conical cup from a blank so severed from said strip by rolling the blank about a substantially intermediate point of the leading edge so that said point defines the tip end of the cup being formed.

12. In a machine of the class described, means for forming a cup from a blank of flexible material, said means comprising a cup forming mandrel having means associated therewith for securing an edge portion of the blank thereto, and a rotatable presser roll movable axially to engage a blank on said mandrel during the formation of a cup thereon and movable out of engagement with the cup when completed, said mandrel having means associated therewith for discharging a finished cup therefrom.

13. In a machine of the class described, means for forming a cup from a blank of flexible material, said means comprising a rotatable cup forming mandrel having means associated therewith for securing an edge of the blank thereto, and a presser roll rotatable with said mandrel and movable axially in one direction to engage a blank on the mandrel during the formation of a cup thereon and movable axially in the opposite direction out of engagement with the cup when completed, said mandrel having means associated therewith for discharging a finished cup therefrom.

14. In a machine of the class described, means for forming a cup from a blank of flexible material, said means comprising a rotatable cone-shaped cup forming mandrel having means associated therewith for securing an edge portion of the blank thereto, a cone-shaped presser roll rotatable with said mandrel and movable axially in one direction to engage a blank on said mandrel during the formation of a cup from said blank and movable axially in the opposite direction out of engagement with the cup when completed, and a cutter adjacent the base of said mandrel for trimming the open end portion of a cup, said mandrel having means associated therewith for discharging a finished cup therefrom.

15. A machine for making cups of the character described from a web of paper comprising a folding mechanism, a feeding mechanism for feeding the end of said blank to said folding mechanism, said feeding mechanism comprising a bed, a cutting die mounted on said bed and comprising a vertically movable reciprocating member adapted to cut off a portion of said web near the end thereof, a pair of feed rolls in said feeding mechanism for moving said web through said cutting device, a pair of rotatable shafts on which said feed rolls are mounted and means on at least one of said shafts for directly operating the said cutting device in synchronism with said feed rolls.

16. A machine for making cups of the character described from a web comprising a folding mechanism, a feeding mechanism for feeding the end of said web towards said mechanism in position to be engaged thereby, a cutting device positioned between said feeding and folding mechanisms for cutting off the end of said web in the form of a cup blank prior to the delivery thereof to the said folding mechanism; said cutting device comprising a first member on a plane with said feeding mechanism, guide members, a second cutting member reciprocally movable on said guide members and adapted to cut off a portion of said web, a pair of rotatable shafts in said feeding mechanism, feed rolls on said shafts and means on said shafts for directly operating the said second member of the said cutting device.

17. In a machine of the class described, means for forming a cup from a blank of flexible material, said means comprising a rotatable cone-shaped cup forming mandrel having means associated therewith for securing an edge portion of the blank thereto, a cone-shaped presser roll rotatable with said mandrel and on an axis extending at an angle to the axis of the mandrel, said presser roll being movable axially in one direction to engage a blank on said mandrel during the formation of a cup from a blank thereon and movable axially in the opposite direction out of engagement with the cup when completed, and a rotatable cutter adjacent the base of said mandrel for trimming the open end portion of the cup, said mandrel having a blow-off port connected with a source of air pressure supply for discharging a finished cup therefrom.

18. In a cup forming machine, a frame, a main drive shaft rotatably mounted therein, a rotatable cup forming mandrel having means associated therewith for securing an edge portion of a cup blank thereto, a rotatable presser roll operatively related to said mandrel, resilient means for urging said presser roll axially to yieldingly engage a cup blank on said mandrel, and means operatively related to said roll and drive shaft for moving the presser roll away from said mandrel to release a finished cup formed thereon.

19. A machine for making cups of the character described from a web of paper comprising a folding mechanism, a feeding mechanism comprising a pair of rotatable shafts, feed rolls on said shafts for feeding the end of said web towards said folding mechanism, a vertically movable reciprocating cutting device for cutting off the end of said web in the form of a cup blank, and means connected to at least one of said rotatable shafts for operating said cutting device.

20. A method of making conical paper cups, including the steps of feeding an elongated strip of paper along a predetermined path, successively severing the end of the strip thereacross along a line other than straight transversely across the strip to provide from said cut-off end portions of the strip blanks each having a leading and a trailing edge, feeding the blanks successively to a forming station after severance, and successively forming a conical cup from each blank by rolling the blank into conical shape about an apexial point substantially at an intermediate part of said leading edge and so that said apexial point defines the tip of the conical cup.

21. A method of making conical paper cups with adhesively held overlapped portions, including the steps of feeding an elongated strip of paper along a predetermined path, successively severing the end of the strip along a line other than straight across the strip to provide blanks each having a leading and a trailing edge, feeding the severed blanks successively to a forming station, applying adhesive to one of the overlapped portions of each severed blank as the blank is fed to the forming station, and successively rolling each blank into conical shape about a point substantially at an intermediate part of said lead-

ing edge and so that said end point defines the tip end of the cup.

22. In a machine for making conical paper cups having adhesively held overlapped portions, a forming element shaped to have a conical paper cup formed thereon, feeding means arranged to advance an elongated stock strip generally towards said forming element, cutting means arranged to successively sever blanks from the leading end of said strip along a line of cut other than straight across said strip, feeding means arranged to successively advance the severed blanks to said forming element in such position that a portion of the leading blank edge defined by the line of cut extends beyond the end of said forming element, and gluing means associated with the second said feeding means arranged to apply adhesive to one of the resultant overlapped portions of each severed blank.

23. In a machine for making conical paper cups, a forming element shaped to have a conical cup formed thereon, feeding means arranged to continuously advance a stock strip, cutting means arranged to successively sever blanks from said continuously moving strip by cutting the strip in a general transverse direction but along a line of cut other than straight across said strip to provide blanks each having a leading edge, feeding means to successively advance the severed blanks to a position to be picked up by said forming element, and a stop member located in the path of the oncoming blank and adjacent the forming element when the latter is in position to pick up the blank for forming, said stop member contacting the leading edge of the blank to maintain the blank in proper position to be picked up by the forming element.

24. In a container making machine, forming means, feeding means for continuously advancing a strip of stock towards said forming means, cutting means to completely sever a blank from said continuously advancing strip prior to the start of the forming operation, and trimming means associated with said forming means to shape a blank while the same is being formed.

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