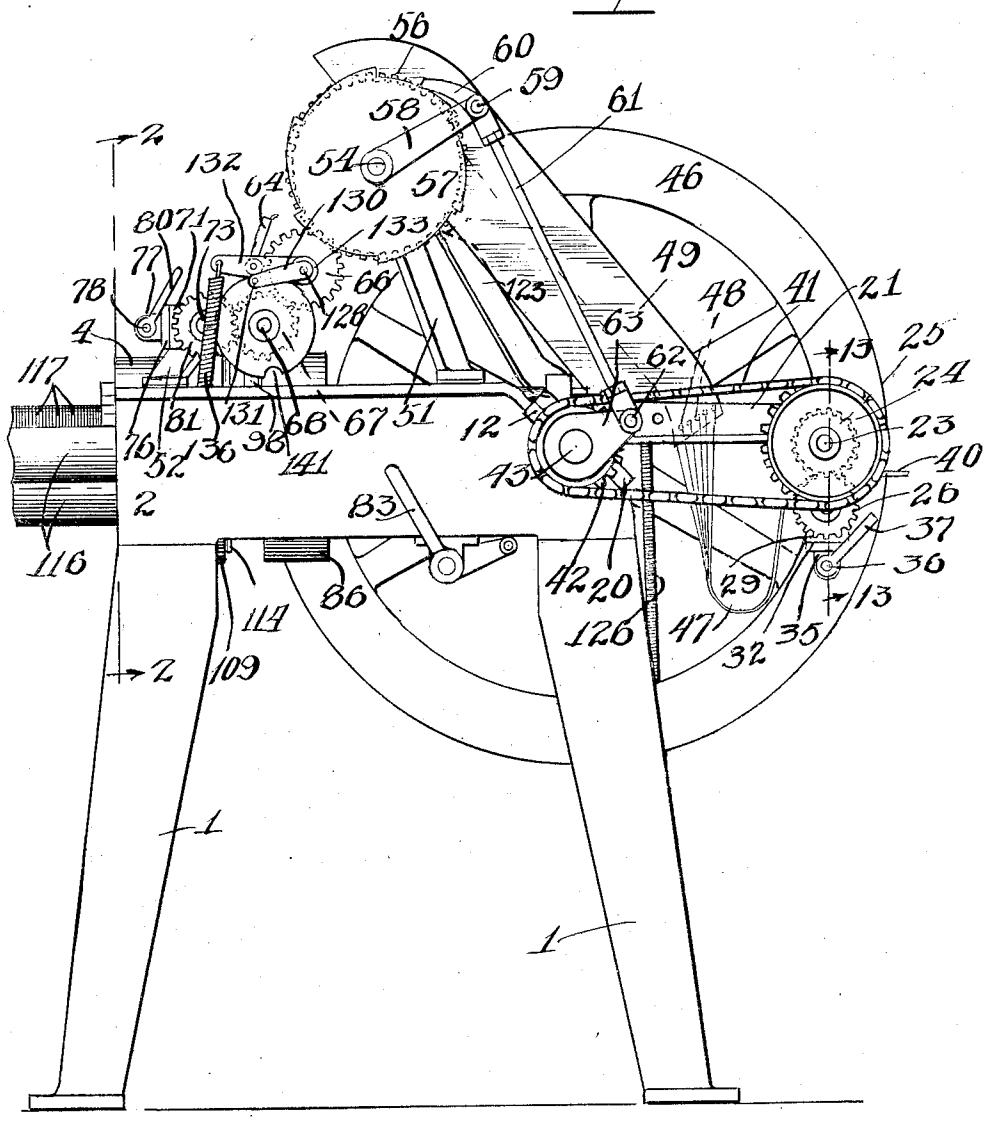
May 8, 1928. 1,669,164

R. HOLMAN

CUP BLANK PUNCHING MACHINE

Filed Sept. 15. 1924 6 Sheets-Sheet 1

Fig. 1



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CUP BLANK PUNCHING MACHINE

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Fig. 2

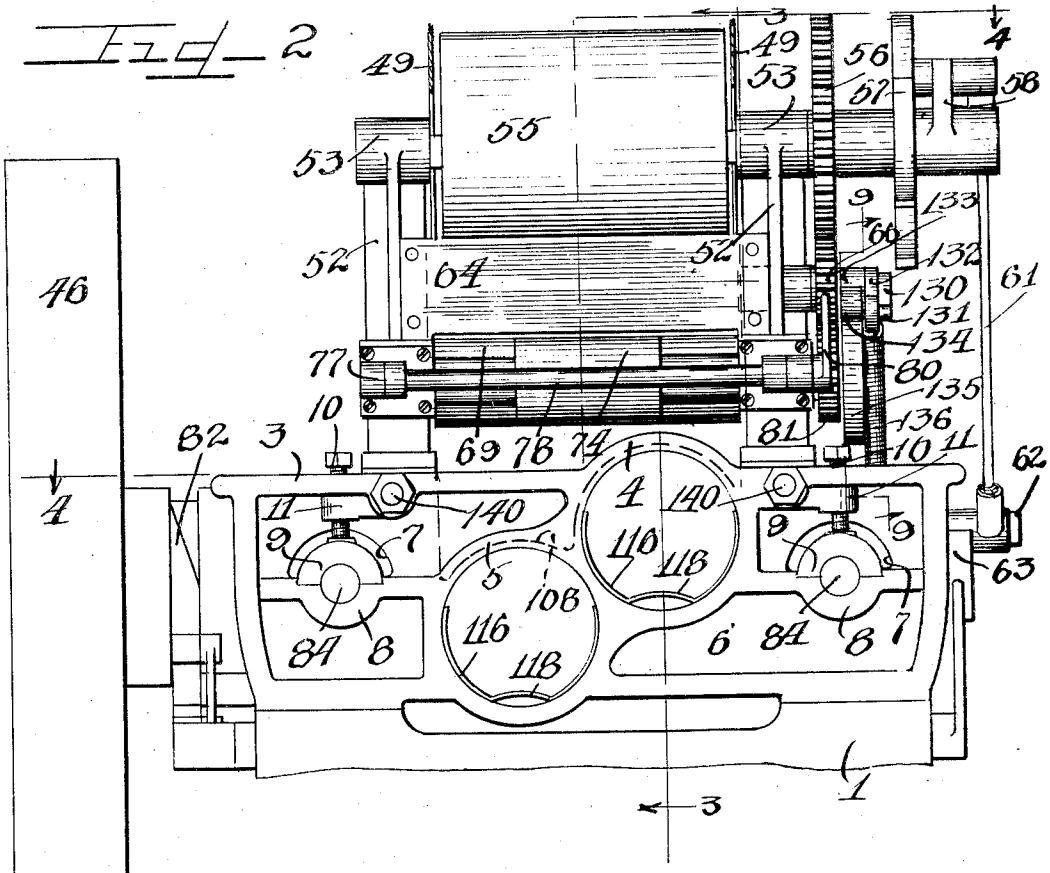


Fig. 9

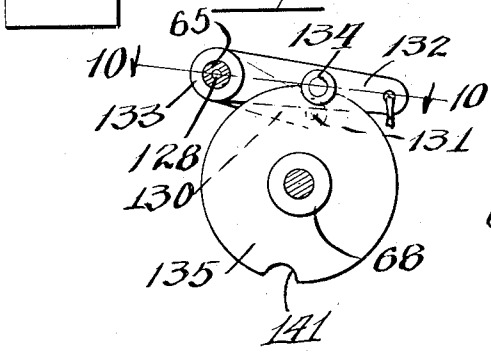
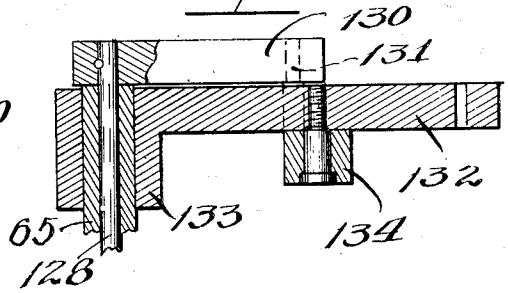


Fig. 10



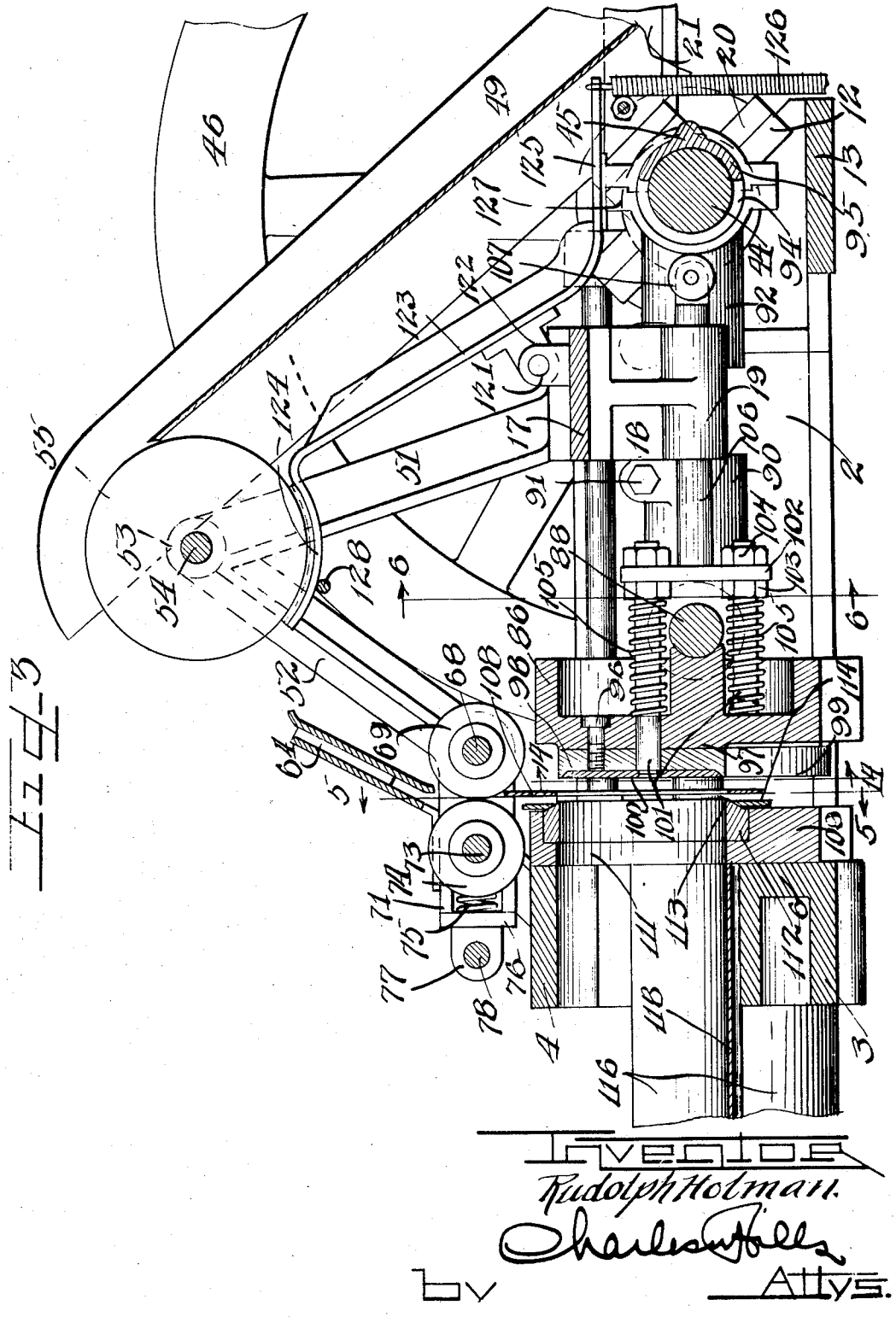
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CUP BLANK PUNCHING MACHINE

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May 8, 1928. 1,669,164

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CUP BLANK PUNCHING MACHINE

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Fig. 4

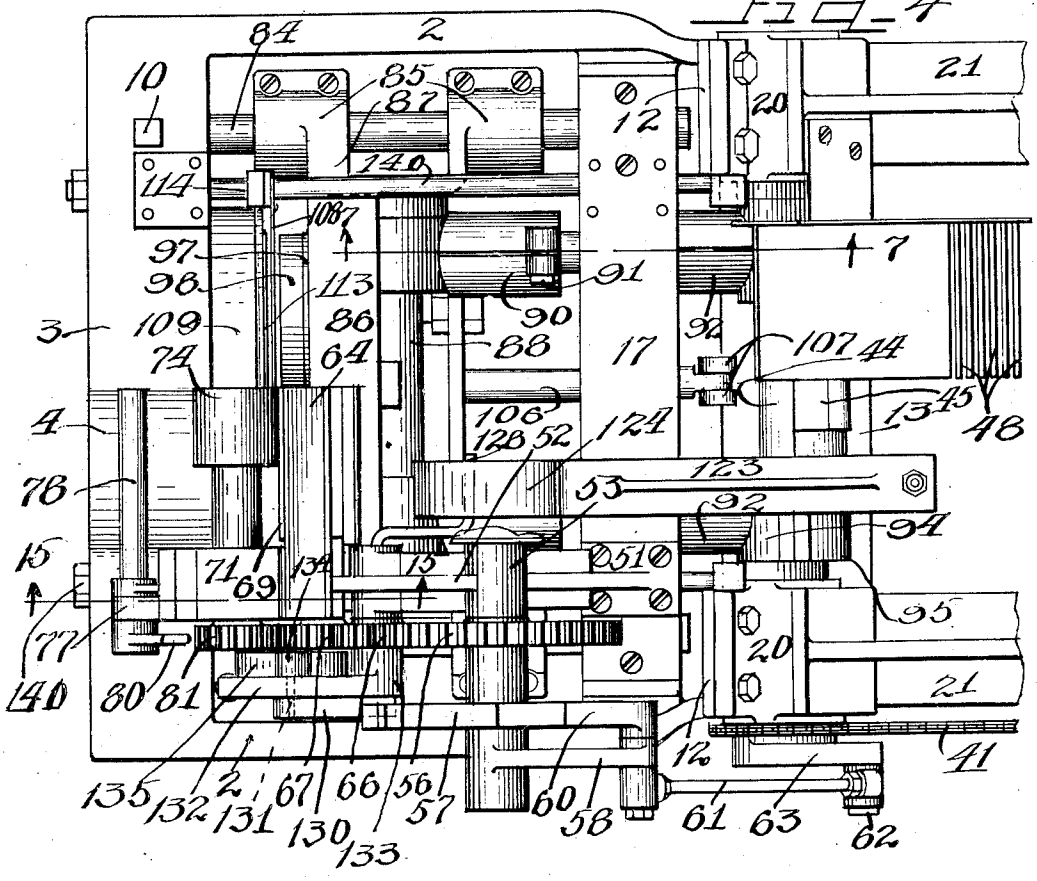
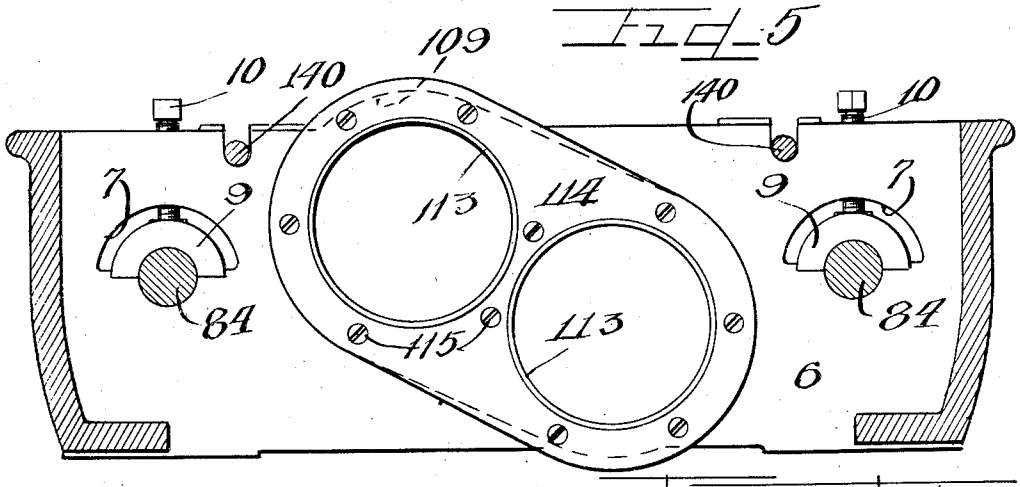


Fig. 5



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CUP BLANK PUNCHING MACHINE

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Fig. 6

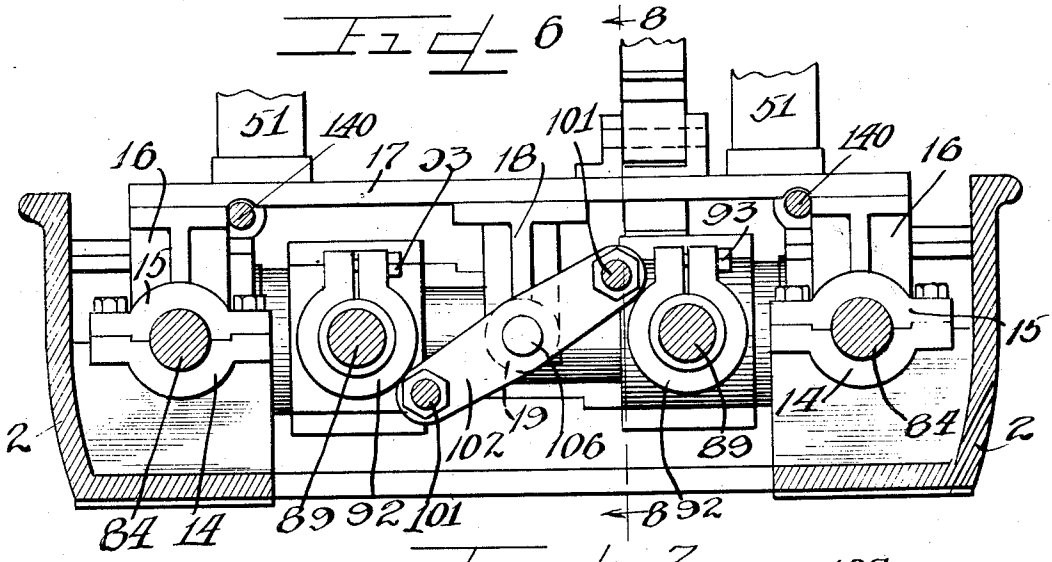


Fig. 7

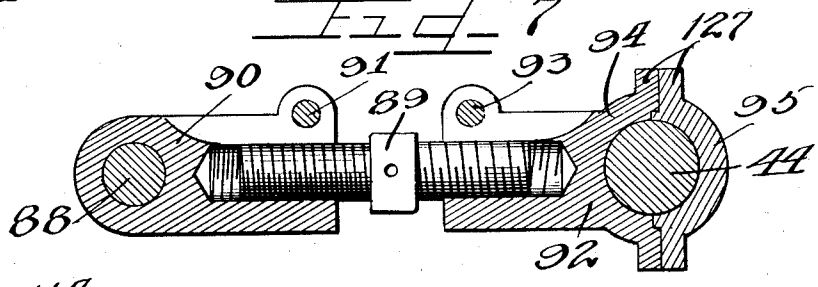
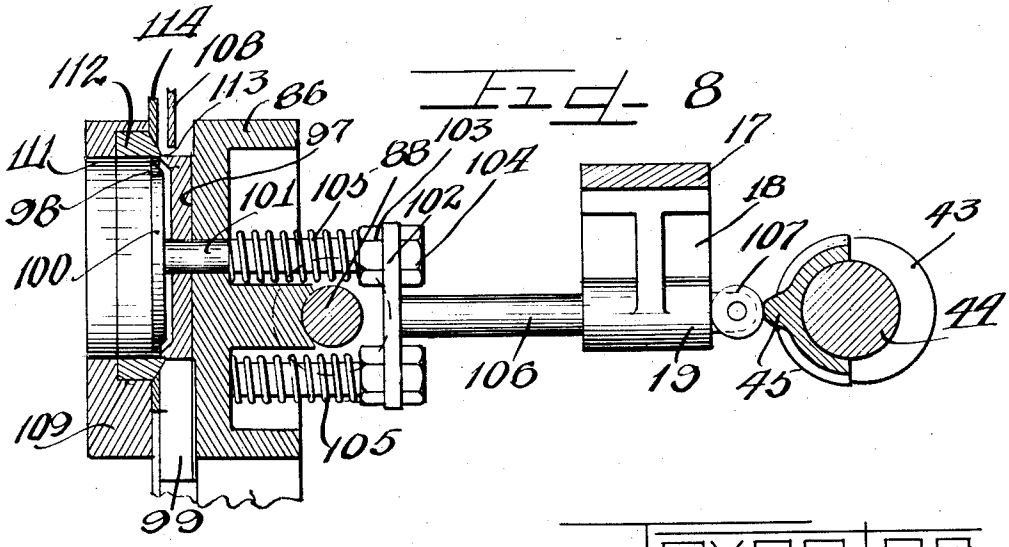


Fig. 8



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CUP BLANK PUNCHING MACHINE

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FIG. 13

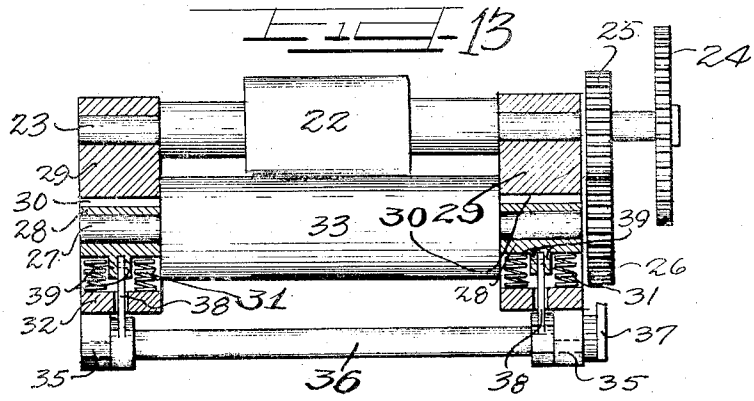


FIG. 15

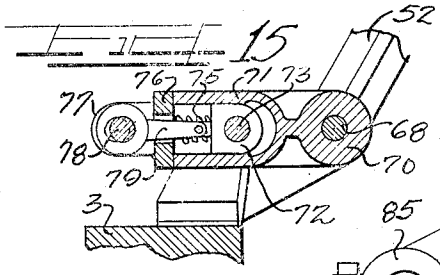


FIG. 14

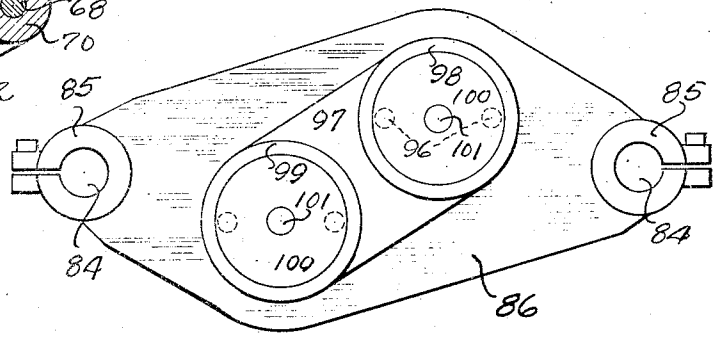


FIG. 11

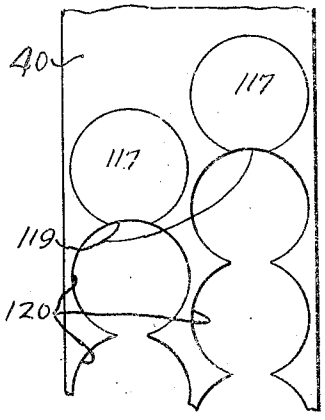
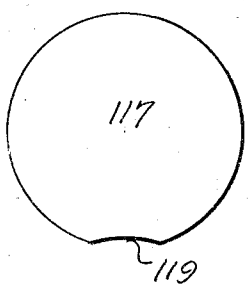


FIG. 12



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BY

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Patented May 8, 1928. 1,669,164

UNITED STATES PATENT OFFICE.

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CUP-BLANK-PUNCHING MACHINE.

Application filed September 15, 1924. Serial No. 737,658.

This application is a continuation in part of the Rudolph Holman application, Serial No. 612,608, for a "sundae cup blank punching machine", filed January 15, 1923, which has been abandoned in lieu of this application.

In punching out sundae cup blanks from a strip of paper of a given standard width considerable waste is produced due to the fact that only one cup blank of a diameter of half the width of the strip of paper can be punched from the width of the paper, since there is not sufficient clearance to allow two blanks spaced side by side to be punched from the width of the strip of paper.

For the purpose of saving material and getting a greater number of cup blanks from a given length of paper, this invention has been developed to produce a punching machine which is adapted to punch cup blanks in staggered relation from the strip of paper whereby the waste of paper is materially reduced and a greater number of cup blanks can be punched from a given length of paper in a given time.

It is an object of this invention to provide a punching machine wherein a maximum number of cup blanks of a required diameter are adapted to be punched from a strip of material by means of a double punch mechanism the punch members of which have the axes thereof disposed in an inclined plane across the plane of feed of the material.

It is also an object of the invention to provide a cup blank punch machine wherein superimposed strips of material are adapted to be continuously fed into the machine and intermittently advanced into the field of operation of a double punch mechanism a distance less than the diameter of the blanks to be cut to permit the punch mechanism to punch cup blanks in staggered relation from the material, with said cup blanks having a portion of the periphery thereof cut away.

It is another object of this invention to provide a punch machine wherein a material feeding mechanism is adapted to be automatically locked and unlocked at predetermined times by the operation of a brake mechanism associated with a guide drum over which the material passes before being advanced by the feeding mechanism in order that the material to be punched will positively be advanced only a predetermined amount to insure the punching out of perfect cup blanks.

It is a further object of the invention to provide a punch machine adapted to automatically punch a substantially circular blank from a strip of material, said blank having an arc-shaped notch in the periphery thereof.

It is furthermore an object of the invention to provide a punch machine wherein strips of material are continuously fed into the machine between feed rollers and are adapted to hang in a loop before passing through a separating means and over an intermittently operated brake controlled drum and through a guide before passing between a second set of feed rollers to obviate tearing of the material as it is being fed to the punching mechanisms.

It is an important object of this invention to provide a punch machine of simple and effective construction adapted to punch a plurality of cup blanks in staggered relation from strips of material and deposit the cup blanks in suitable discharge troughs having longitudinal guides therein over which the notched portions of the cup blanks are adapted to slide.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevation of a sundae cup blank punch machine embodying the principles of this invention.

Figure 2 is a fragmentary rear end elevation taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary sectional view taken on line 3—3 of Figure 2.

Figure 4 is a plan view taken on line 4—4 of Fig. 2.

Figure 5 is a detail sectional view taken

on line 5—5 of Figure 3 with parts omitted.

Figure 6 is a transverse sectional view taken on line 6—6 of Figure 3.

Figure 7 is a detail section taken on line 7—7 of Figure 4 with parts in elevation and with parts omitted.

Figure 8 is a detail section of the punch and die mechanism taken on line 8—8 of Figure 6.

Figure 9 is a detail sectional view of the feed control mechanism taken on line 9—9 of Figure 2 with parts shown in elevation.

Figure 10 is an enlarged detail section taken on line 10—10 of Figure 9.

Figure 11 is a plan view of a punched out portion of the strip of material showing two sundae cup blanks punched out but still in position.

Figure 12 is a plan view of one of the sundae cup blanks produced by the machine.

Figure 13 is a sectional view of the material feed roller mechanism taken on line 13—13 of Figure 1 with parts shown in elevation.

Figure 14 is a view of the punch mechanism taken on line 14—14 of Figure 3.

Figure 15 is a fragmentary detail section taken on line 15—15 of Figure 4.

As shown on the drawings:

The reference numeral 1 indicates supporting legs upon which a horizontal frame is supported. The frame comprises side sills 2 connected at their rear ends by a cross beam 3 having integrally formed in the middle portion thereof upper and lower blank guide sleeves 4 and 5 which are disposed in an inclined plane, that is with one of said sleeves positioned to one side and at a higher elevation than the other. The cross beam also embraces a back or brace plate 6 having semi-circular openings 7 near the ends thereof above lower semi-cylindrical bearing members 8. Disposed in each opening 7 is a semi-cylindrical upper bearing member 9 adapted to be held in position by means of a set screw 10 threaded through a sleeve 11 integrally formed on the cross beam.

The front end of each frame sill 2 is provided with an inclined half bearing 12. A cross bar 13 integrally connects the front ends of the frame sills 2. Integrally formed on the inner side of each frame sill 2 is an inwardly directed bearing member 14 having bolted thereon an upper bearing member 15. Each upper bearing member 15 is provided with an integral upright arm or standard 16 (Figure 6). Rigidly secured to the standards 16 is a transverse bar or plate 17. Fastened to the bottom of the middle part of the cross bar 17 is a downwardly directed bracket or arm 18 having a guide sleeve 19 formed thereon.

Bolted or otherwise secured to the sill half bearing members 12 are half bearing members 20 having arms 21 secured thereon and extending outwardly in front of the machine. Positioned between the outer ends of the arms 21 is a short upper paper feed roller 22 secured on a shaft 23 journalled in bearings 29 on the ends of the arms 21. One end of the roller shaft 23 projects through one of the arm bearings 29 and has fixed on the end thereof a large sprocket 24. Also fixed on the shaft 23 between the sprocket 24 and the bearing 29 is an upper gear 25 which meshes with a lower gear 26. The lower gear 26 is fixed on one projecting end of a lower roller shaft 27 which is journalled in movable bearing sleeves 28 disposed within slots or openings 30 in the lower portion of the bearings 29. Coiled springs 31 are disposed in the bearing slots 30 between the bearing sleeves 28 and closure plates 32 secured across the lower ends of said bearings 29 (Figure 13). Mounted on the lower shaft 27 between the bearings 29 is a lower paper feed roller 33 which is longer than the upper feed roller 22. The upper feed roller 22 is made short to have rolling contact with only the middle peripheral portion of the lower feed roller 33.

Formed on each of the plates 32 is a bearing lug 35 for supporting an eccentric shaft 36 having a lever 37 fixed on one end thereof to permit the eccentric shaft 36 to be manually rotated. Fixed on each end of the shaft 36 adjacent the inner side of the plate bearing lug 35 is an arm or crank 38 which projects through an opening in the plate 32 to permit the end of the crank to be pivotally connected to the respective bearing sleeve 28 between lugs 39 formed on each of said bearing sleeves. The lever 37 may be manually operated to partially rotate the eccentric shaft 36 to cause the cranks 38 to pull the movable bearing sleeves 28 downwardly against the action of the springs 31 to thereby separate the lower or longer feed roller 33 from engagement with the upper or shorter feed roller 22 to permit the ends of a plurality of superimposed strips of paper or material 40 to be punched to be inserted between the feed rollers. Release of the lever 37 permits the springs 31 to move and resiliently hold the lower roller 33 and the strips of paper 40 against the upper feed roller 22. The top feed roller 22 is shorter than the lower feed roller 33 to engage only the middle portion of one of the strips of paper leaving the margins thereof free so that the paper will be fed evenly into the punch machine.

The paper feed mechanisms are operated from the sprocket 24 which is driven by an endless chain 41 engaged around the sprocket 24 and around a smaller sprocket 42 which is mounted on a main crank shaft 43 journalled in the machine frame bearings 12—20. The crank shaft 43 is provided with a crank

pin 44 having a cam 45 integrally formed radially on the middle portion thereof (Figure 8). Engaged on one projecting end of the crank shaft 43 is a fly wheel 46 adapted to be rotated by a belt from any suitable driving unit.

After passing between the main feed rollers 22 and 33, the superimposed strips of prepared paper 40 are permitted to hang loosely in the form of a loop 47 (Figure 1) and are then conducted upwardly through a comb comprising a plurality of parallel bars or rods 48 supported in the mouth or lower entrance end of a channel-shaped trough 49 supported on the machine frame. As shown in Figure 3 the inverted V-frames are supported on the cross bar 17 and on the cross beam 3. The V-frames comprise rearwardly inclined upwardly projecting front braces 51 and forwardly inclined rear braces 52. The brace members 51 and 52 converge and are connected at their upper ends by a bearing 53. Journalled in the top bearings 53 of the V-frames is a shaft 54 on which a drum or cylinder 55 is secured. The drum is shorter than the width of the paper 40 and is positioned between the upper ends of the side flanges of the trough 49. The flanges or side plates of the trough 49 are provided for the purpose of causing the strips of paper to register with one another. Fixed on the drum shaft 54 is a gear 56. Also mounted on the drum shaft 54 to the outside of the gear 56 is a ratchet wheel 57. Rotatably engaged on the drum shaft 54 to the outside of the ratchet wheel 57 is a crank arm 58 on the outer end of which is supported a stub shaft or pin 59. Pivoted on one end of the pin 59 is a pawl 60 positioned to coact with the ratchet wheel 57. Pivoted to the other end of the pin 59 is the upper end of a connecting rod 61, the lower end of which is pivotally connected to a crank pin 62. The crank pin 62 is mounted on a crank arm 63 to which the sprocket 42 is fastened. The crank arm 63 is mounted on the end of the main crank shaft 43.

The strips of paper, after passing over the drum 55, pass downwardly through a guide chute 64 into a secondary feed mechanism similar in construction to the primary feed mechanism illustrated in Figure 13. Supported in a bearing on one of the V-frame brace members 52 is a hollow shaft 65 on one end of which a small intermediate gear 66 is fixed to mesh with the large gear 56. Meshing with the intermediate gear 66 is a gear 67 which is fixed on one end of a roller shaft 68 on which a roller 69 is fixed. The roller shafts 68 is journalled in bearings 70 on the V-frame brace members 52. Also formed on the V-frame brace members 52 are horizontal housings 71 having bearing members 72 movably disposed therein in which the ends of a roller shaft 73 are journalled. A feed roller 74 is fixed on the shaft 73. The roller 74 has the ends thereof reduced in diameter so that only the middle portion of the strips of paper 40 will be pressed thereby. The roller 74 is resiliently held in contact with the roller 69 by coiled springs 75 positioned within the housings 71 and held in place by closure plates 76 (Figure 3). Each of the plates 76 has a lug 77 formed thereon. The lugs 77 are apertured and support an eccentric shaft 78. Fixed on the eccentric shaft 78 are cranks 79 which project through openings in the plates 76 to permit the ends of the cranks 79 to be pivotally connected to lugs on the movable bearing members 72 (Figure 15). A lever 80 is fixed on one end of the shaft 78 to permit the eccentric shaft 78 to be manually rocked or rotated to pull the feed roller 74 away from the roller 60 to permit the strips of paper to be inserted between the rollers without rotating said rollers. The roller shaft 73 has a gear 81 fixed on one end thereof in mesh with the gear 67 to receive a drive therefrom.

The feeding mechanisms are driven from the crank shaft 43 which in turn receives its drive from the fly wheel 46 through a clutch mechanism 82 (Figure 2) which may be of any desired type. The clutch 82 is adapted to be operated by a handle or lever 83 (Figure 1) to connect or disconnect the crank shaft 43 with the fly-wheel.

After passing downwardly between the secondary feed rollers 69 and 74, the registering strips of paper 40 pass into the field of operation of a punch and die mechanism. Slidably engaged in the bearing members 8—9 and 14—15 are two parallel horizontal guide rods 84 on which are clamped the split sleeves 85 of a punch plate 86. The two split sleeves or clamps 85 provided at each end of the punch plate 86 are integrally connected to said punch plate by means of a yoke 87 (Figure 4). Supported by the yokes 87 parallel to and in back of the punch plate is a shaft or rod 88. The punch plate rod 88 is connected to the crank shaft crank pin 44 by means of adjustable connecting members each comprising a double ended fine and course threaded stub 89, the fine threaded end of which is threaded into a partially split sleeve 90 provided with a clamp bolt 91. The end of the sleeve 90 is apertured to permit the same to be engaged on the punch plate rod 88. The other or coarse threaded end of the stud 89 is threaded into a partially split sleeve 92 provided with a clamp bolt 93. One end of the sleeve 92 has a half bearing member 94 integrally formed thereon. A half bearing 95 is bolted to the half bearing member 94 around the crank pin 44. The punch plate 86 is thus connected to be reciprocated from the crank shaft.

Secured to a boss 97 on the punch plate

86 by screws 96 (Figure 3) are two punch rings 98 and 99 (Figure 14) with the punch ring 98 positioned to one side of and at a higher elevation than the punch ring 99. The punch rings 98 and 99 are axially aligned with the blank guide sleeves 4 and 5 respectively. Positioned in each of the punch rings 98 and 99 is a blank discharge disk 100 having a stem or rod 101 secured to the center thereof and slidably projecting through openings in the boss 97 and the punch plate 86. The two disk stems 101 are connected by an inclined bar 102 held in place by nuts 103 and 104 which are threaded onto the threaded ends of the stems 101 on opposite sides of said connecting bar 102. Coiled springs 105 are engaged around the stems 101 between the punch plate 86 and the nuts 103 and serve to hold the blank discharge disks 100 seated within the punch rings, as illustrated in Figure 3. Fixed to the middle portion of the bar 102 is one end of a plunger rod 106 which slidably projects through the guide sleeve 19 on the bracket 18. The other end of the rod 106 is notched and has a double roller 107 rotatably engaged thereon in the plane of operation of the cam 45 on the crank pin 44.

Secured to frame tie rods 140 is a stripper plate 108 which projects downwardly between the upper portions of the punch rings 98—99 and the die mechanisms. The die mechanisms are mounted on the inner side of the frame cross beam plate 6 and comprise a die plate 109 fastened to said plate 6 by screws or other suitable means. The die plate 109 is mounted in a tilted position and has openings 111 therein which register with the openings in the guide sleeves 4 and 5. The die plate 109 is also recessed at the inner portions of the openings 111 to receive die rings 112 having cutting edges 113. The die cutting edges 113 project through openings in a shield 114 fastened to the face of the die plate 109 by screws 115 (Figure 5).

Projecting into the blank guide sleeves 4 and 5 are blank guide troughs 116 for receiving the punched-out sundae cup blanks 117. Each of the troughs 116 is formed with a longitudinal convex center rail 118 (Figure 2) to afford a guide for the concave notches 119 (Figure 12) of the sundae cup blanks 117.

Figure 11 illustrates a strip of paper 40 punched in a staggered form showing two cup blanks 117 still in place and the staggered openings 120 from which cup blanks have been removed. Figure 11 also shows the small amount of waste paper resulting from the improved punch mechanism arrangement.

Formed on the bar 17 (Figure 3) is a lug 121 to which a bracket 122 is pivotally connected. Secured to said bracket 122 is an inclined arm 123, the upper end of which is bent to form a leather lined brake shoe 124 adapted to contact the peripheral surface of the drum 55. Formed at an angle on the lower end of the brake arm 123 is a control arm 125 to the end of which a coiled spring 126 is connected. The spring 126 has the lower end thereof connected to one of the legs 1 of the machine frame. The spring 126 serves to hold the brake shoe 124 in frictional contact with the drum 55 to hold the same locked against rotation. The bearing members 94 and 95 have lugs 127 integrally formed thereon (Figures 3 and 7) and said lugs 127 are positioned to coact with the control arm 125 of the brake mechanism to raise the control arm 125 against the action of the spring 126 at predetermined times to cause release of the brake shoe 124.

When the brake shoe 124 is released it actuates one end of a bent rod or crank pin 128, the other end of which projects through the hollow shaft 65 on one of the brace members 52. Secured to a projecting end of the crank rod 128 (Figures 9 and 10) is one end of a crank arm 130, the free end of which carries a pin 131. The pin 131 projects beneath the lower edge of a lever or arm 132. The lever 132 is provided at one end with a sleeve or hub 133 which is rotatable on the hollow shaft 65. A roller 134 is rotatably supported on one side of the lever 132 and is normally adapted to alternately seat in oppositely disposed notches 141 in the periphery of a cam disk 135. The notched cam disk 135 is secured on one end of the shaft 68 on which the feed roller 69 is mounted. A coiled spring 136 has one end connected to the end of the lever 132 and the other end attached to the machine frame.

The operation is as follows:

Before starting the improved sundae cup blank punching machine the levers 37 and 80 are manually operated to separate the feed rollers 33 and 74 respectively from engagement with the respective rollers 22 and 69. A plurality of superimposed strips of prepared paper 40 are inserted between the primary feed rollers 22 and 33 and are permitted to hang loosely in the form of the loop 47 before they are conducted upwardly and separated by the comb bars 48 (Figures 1 and 4). After being separated by the comb bars the strips of paper 40 pass through the trough 49, the walls or side flanges of which act to shift said strips of paper transversely with respect to one another to cause said strips of paper to register evenly one upon the other. From the trough 49 the registering strips of paper pass over the drum 55 and then pass downwardly through the guide chute 64 before passing between the separated secondary feed rollers 69 and 74. The levers 37 and 80 are then released and the springs 31 and 75 act to respective-

ly move the rollers 33 and 74 toward the respective rollers 22 and 69, thereby engaging the strips of paper 40 between the rollers. Attention is called to the fact that the movable spring controlled rollers 22 and 74 are shorter than the rollers 33 and 69 to permit said short rollers 22 and 74 to engage only the middle portion of the strips of paper 40 leaving the margins of said paper free. This arrangement permits the strips of paper to be fed evenly through the machine.

The control or starting lever 83 is now operated manually to shift the clutch mechanism 82 so that a drive from the pulley 46 is transmitted to the crank shaft 43, and from said crank shaft to the primary and secondary paper feed mechanisms by means of the sprocket 42 and the crank arm 63.

When the machine is in operation the bearing 94—95 (Figure 3) is given an eccentric motion so that the bearing lugs 127 move into and out of engagement with the brake arm 125. When the lugs 127 are in their lowered position the spring 126 pulls the brake arm 125 downwardly thereby moving the brake shoe 124 into a frictional or braking contact with the drum 55 to hold the same locked against rotation. With the brake shoe 124 in contact with the drum 55 the spring 136 pulls the lever 132 downwardly to move the roller 134 into one of the notches 141 in the periphery of the cam disk 135 thereby locking the feed roller 69 so that no feeding of the paper 40 will take place between the feed rollers 69 and 74. The downward movement of the lever 132 causes the arm 130 to swing downwardly thereby causing the crank rod 128 to be moved toward the bottom of the brake shoe 124.

With the continued movement of the crank shaft 43 the bearing 94—95 moves into a position wherein the bearing lugs 127 move upwardly against the brake arm 125 against the action of the spring 126. The brake shoe 124 is thus moved downwardly out of frictional or braking engagement with the drum 55. As the brake shoe 124 is released it actuates the crank rod 128 thereby swinging the arm 130 upwardly, causing the pin 131 to move the lever 132 upwardly to release the roller 134 from its locking engagement with the cam disk 135. The secondary feed rollers 69 and 74 are thus unlocked and act to feed the paper 40 downwardly therebetween.

Rotation of the primary feed rollers 22—33 acts to feed the strips of paper inwardly at a continuous rate of speed with the paper forming the loop 47 before being separated by the comb bars 48. The strips of paper are shifted into registering relation one with the other by the side flanges of the trough 49. As the paper is being fed into the machine by the primary feed rollers the crank arm 63 actuates the rod 61 and the pawl 60 which in turn acts to rotate the ratchet wheel one-sixth of a revolution with each rotation of the crank shaft 43. Rotation of the ratchet wheel causes rotation of the gear 56 and the drum 55 so that the paper is pulled up through the guide trough 49 by the drum 55 and by the action of the secondary feed rollers 69 and 74.

The feeding operation of the secondary feed rollers is intermittent and causes the paper to be advanced a predetermined distance into the field of operation of the punch and die mechanisms. The brake 124 and the locking roller 134 afford an arrangement permitting only a predetermined quantity of paper to be fed through the rollers at a time.

As the paper is advanced the crank pin 44 actuates the adjustable connecting members 89—95 which cause reciprocation of the punch plate 86 and the punch rings 98 and 99 mounted thereon. With the advance of the punch mechanisms the registering strips of paper are forced into engagement with the cutting edges 113 of the die rings 112 causing a plurality of groups or stacks of circular disks to be punched from the strips of paper. The first two sets of blanks punched from the strips of paper are circular and are not of the desired shape. Such circular blanks are punched out only when a new strip of paper is started into the machine.

With the two preliminary sets or groups of circular blanks punched from the paper, the registering strips of paper are advanced by the feed mechanisms a predetermined distance slightly less than the diameter of the blanks to be punched. With the next advance of the punch plate 86 the punch rings 98 and 99 force the paper against the cutting edges 113 of the die rings 112 thereby causing two groups or stacks of cup blanks 117 to be punched from the strips of paper with each of said cup blanks having a concave notch 119 in the periphery thereof, as illustrated in Figures 11 and 12.

As the punch rings 98 and 99 coact with the die ring cutting edges 113 the cam 45 on the crank pin 44 moves into engagement with the rollers 107 (Figure 8), thereby causing the stem 106 to slide outwardly in the guide sleeve 19 forcing the two rods 101 to slide in the punch plate against the resistance of the springs 105. The disks 100 are thus moved out of the punch rings 98 and 99 and push or force the two sets of punched-out cup blanks 117 into the die rings 112, thereby preventing said cup blanks from springing back toward the punch rings with the danger of having them become tangled up with the waste portions of the strips of paper. When this operation occurs the

punch plate 86 starts to move back to normal position, thereby causing the stripper plate 108 to strip the punched portions of the strips of paper 40 off of the retreating punch rings 98 and 99 to permit the paper to be advanced the required distance ready for the next punching operation.

With each operation of the punch two groups or sets of cup blanks 117 are punched out of the strip of paper and are forced into the die rings 112. As the cup blanks stack up they act to force one another through the die rings and into the discharge troughs 116 with the notched portions 119 of said cup blanks sliding over the complementally curved guide rails 118 of said troughs. The cup blanks are thus gradually moved outwardly in the troughs 116, as shown in Figure 1, and may be removed in stacks as desired.

Due to the novel relation of the punch and die mechanisms, the strips of paper 40 are punched with the holes therein arranged in staggered relation (Figure 11), leaving very little waste material, thereby obtaining the maximum number of cup blanks 117 from a strip of paper of a given standard width with a minimum amount of waste. As the cup blanks 117 are punched from the strips of paper the concave notches 119 therein are always disposed at the bottom, as shown in Figure 12, so that said cup blanks can be discharged in proper relation one to the other with the notches 119 aligned longitudinally of the stack of cup blanks.

To prevent the strips of paper 40 from being torn as they are fed into the machine, the paper is permitted to hang loosely in a loop, as at 47, so that when the pawl and ratchet mechanism is actuated to operate the drum 55 and the secondary feed rollers the tension exerted on the strips of paper will not be sufficient to tear them.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A cup blank punch machine comprising punch and die mechanisms, a primary paper feed mechanism, a secondary paper feed mechanism, and a crank shaft mechanism connected for continuously operating said primary feed mechanism and intermittently operating said secondary feed mechanism to cause paper to be fed between said punch and die mechanisms.

2. A cup blank punch machine comprising punch and die mechanisms, means for operating the punch mechanism, a primary paper feed mechanism driven by said means for feeding paper into the machine, a guide trough through which the paper is conducted, a drum driven by said means for drawing the paper through said guide trough, and a second paper feed mechanism driven from said means for receiving the paper from said drum and feeding the same between said punch and die mechanisms.

3. A cup blank punch machine comprising punch and die mechanisms, a crank shaft, means for driving the same, mechanisms actuated by the crank shaft for operating the punch mechanism to cause cup blanks to be punched from paper, a primary paper feed device, means for operating the same from said crank shaft to cause paper to be fed into the machine, a guide trough through which the paper is conducted, a drum, pawl and ratchet means operated by the crank shaft for rotating said drum to cause advance of the paper through the machine, and a secondary paper feed mechanism operable from the crank shaft for receiving the paper from said drum and intermittently feeding said paper between said punch and die mechanisms.

4. A cup blank punch machine comprising a die mechanism, a punch mechanism, a crank shaft, means for driving the same, adjustable connecting members connecting the crank shaft with said punch mechanism, primary roller feed members for feeding paper into the machine, means for driving the primary roller feed members from said crank shaft, a guide trough through which the paper is adapted to be drawn, a rotatable shaft, a drum secured thereon, a gear on said drum shaft, pawl and ratchet mechanisms connected to be driven from said crank shaft to rotate said gear and drum, and a secondary roller feed mechanism adapted to be operated by said gear to receive the paper from said drum and feed said paper between the die mechanism and said punch mechanism.

5. A cup blank punch machine comprising a die mechanism, a punch mechanism, spring controlled disks supported by said punch mechanism, a crank shaft, means for driving the same, adjustable connecting members connecting the crank shaft with said punch mechanism, a cam on said crank shaft for operating said spring controlled disks at predetermined times, primary feed members for feeding paper into the machine, means for driving the primary feed members from said crank shaft, a registering trough through which the paper is adapted to be drawn, a rotatable shaft, a drum secured thereon, a gear on said drum shaft, a ratchet wheel on said drum shaft, a pawl mechanism operated from the crank shaft for rotating the ratchet wheel to cause rotation of said gear and drum, and secondary feed members adapted to be operated by said drum shaft gear to receive the paper from said drum and feed said paper between

the die mechanism and said punch mechanism.

6. A cup blank punch machine comprising a die mechanism, a punch mechanism, a crank shaft, means for driving the same, adjustable connecting members connecting the crank shaft with said punch mechanism to operate the punch mechanism, rods slidably engaged with said punch mechanism, disks on said rods, springs on said rods for holding the disks seated, means connecting said rods, and a cam on said crank shaft for actuating said means to cause unseating of the disks.

7. A cup blank punch machine comprising a die mechanism, a punch mechanism, a crank shaft, means for driving the same, members connecting the crank shaft with said punch mechanism to cause reciprocation of the punch mechanism, rods slidably engaged with the punch mechanism, disks on said rods, springs on said rods for holding the disks seated in the punch mechanism, a bar connecting said rods, a stem on said bar, a roller on said stem, and a cam on said crank shaft adapted to coact with said roller at predetermined times to actuate said stem and rods to cause unseating of the disks.

8. A cup blank punch machine comprising a die mechanism, a punch mechanism, mechanisms for feeding a strip of paper between said die mechanism and said punch mechanism, a crank shaft mechanism for operating said punch mechanism to cause cup blanks to be punched from said strip of paper, disks carried by said punch mechanism, means for operating said disks from the crank shaft to cause discharge of the cup blanks, and a stripper plate between said die mechanism and said punch mechanism for stripping the strip of paper from the punch mechanism after a punching operation.

9. In a cup blank punch machine, the combination with paper feeding mechanisms, of an apertured stationary die plate, die rings mounted therein in offset relation, a shield secured to said die plate with the die rings projecting therethrough, a slidable punch plate, means for reciprocating the same, punch rings mounted on the punch plate in offset relation to coact with the die rings to punch cup blanks from a strip of paper, a stripper plate between said die rings and said punch rings, disks seated in said punch rings, and mechanisms adapted to be operated by said means to cause unseating of said disks to discharge the punched out cup blanks.

10. In a cup blank punch machine, the combination with paper feeding mechanisms, of an apertured stationary die plate, die rings mounted therein in offset relation, a slidable punch plate, a crank shaft for reciprocating the same, punch rings mounted on the punch plate in offset relation to coact with the die rings to punch cup blanks from a strip of paper, disks, means for holding the disks seated in the punch rings, and cam means on said crank shaft adapted to coact with said disk seating means to unseat the disks to cause discharge of the punched out cup blanks.

11. In a cup blank punch machine, the combination with paper feed mechanisms, of an apertured die plate, die rings mounted therein at different elevations, guide members, a punch plate slidably mounted thereon, punch rings mounted on said punch plate at different elevations and aligned with said die rings, disks seated in said punch rings, rods secured to said disks and slidably projecting through said punch plate, a bar rigidly connecting said rods, springs coiled on said rods between said bar and said punch plate to hold the disks seated within the punch rings, a crank shaft, members connecting the punch plate with the crank shaft whereby said punch plate is reciprocated to cause cup blanks to be punched from a strip of paper, a stem secured to said bar, a roller rotatably supported in the end of the stem adjacent the crank shaft, and a cam on the crank shaft adapted to coact with said roller to unseat the disks after a punching operation to cause discharge of the cup blanks.

12. A cup blank punch machine comprising a frame having guide sleeves formed thereon, cup blank troughs projecting into said guide sleeves, a die plate secured to said frame having openings therein registering with said guide sleeves, die rings in said die plate openings, an apertured shield secured to said die plate with the die rings projecting therethrough, guide members on said frame, a punch plate slidably supported thereon, a rod supported on one side of the punch plate, adjustable members pivoted on said rod, a crank shaft to which said adjustable members are connected, means for driving the crank shaft, punch rings mounted on said punch plate, a stripper plate between said die rings and said punch rings, disks seated in said punch rings, rods secured to said disks projecting through said punch plate, a bar connecting said rods, springs on said rods to hold the disks seated in said punch rings, a stem secured to said bar, a roller on said stem, and a cam on said crank shaft adapted to coact with said roller to unseat said disks at predetermined times.

13. A cup blank punch machine comprising die and punch mechanisms, a pair of feed rollers, means for separating said rollers to permit strips of material to be punched to be inserted between the rollers, a rotatable material feed drum, a registering trough between said drum and said pair of feed

rollers to afford a means for registering the strips of material after leaving the rollers and before passing over said drum, a second pair of feed rollers adapted to receive the material after passing over the drum and feed the material between said die and punch mechanisms, means for separating said second pair of feed rollers, a crank shaft mechanism, and mechanisms operated by said crank shaft for actuating the punch mechanism, said drum and both sets of feed rollers.

14. In a cup blank punch machine, the combination with a die mechanism, a punch mechanism, a crank shaft, means connected with the crank shaft for operating the punch mechanism, disks carried by the punch mechanism, slidable means connected with said disks, and cam means on said crank shaft for actuating said slidable means to cause unseating of said disks.

15. In a cup blank punch machine, the combination with die and punch mechanisms, of a material feed mechanism for feeding a material between said die and punch mechanisms, said feed mechanism comprising a rotatable roller, a second roller of shorter length slidably and rotatably supported adjacent said first mentioned long roller, springs for resiliently holding said shorter roller in contact with said longer roller, and means for separating said shorter roller from said longer roller when desired.

16. A cup blank punch machine comprising die and punch mechanisms, means for operating the same, feed means for feeding a material between said die and punch mechanisms a distance less than the diameter of the cup blanks to be punched to cause the punch mechanism to punch out cup blanks each having a concave notch in the periphery thereof, cup blank receiving troughs connected with the die mechanism and having convex guide members longitudinally formed therein, and means associated with the punch mechanism for moving the cup blanks into said troughs with the notches in said blanks fitting over the convex guide members in said troughs to hold the cup blanks axially aligned.

17. A cup blank punch machine comprising a die mechanism, a punch mechanism, a crank shaft, means for driving the same, adjustable connecting members connecting the crank shaft with said punch mechanism, primary roller feed members for simultaneously feeding a plurality of strips of paper into the machine, means for driving the primary roller feed members from said crank shaft, a guide trough through which the strips of paper are adapted to be drawn, a comb in said guide trough for separating the strips of paper to permit said strips of paper to be shifted to register one above the other as they are drawn through said trough, a rotatable shaft, a drum secured thereon, a gear on said drum shaft, pawl and ratchet mechanisms connected to be driven from said crank shaft to rotate said gear and drum, and a secondary roller feed mechanism adapted to be operated by said gear to receive the registering strips of paper from said drum and feed said strips of paper between the die mechanism and said punch mechanism.

18. A cup blank punch machine comprising a die mechanism, a punch mechanism, spring controlled disks supported by said punch mechanism, a crank shaft, means for driving the same, adjustable connecting members connecting the crank shaft with said punch mechanism, a cam on said crank shaft for operating said spring controlled disks at predetermined times, primary feed members for feeding superimposed strips of paper into the machine, means for driving the primary feed members from said crank shaft, a guide trough through which the strips of paper are adapted to be drawn, means in said trough for separating said strips of paper so that they will be properly registered one above the other as they are drawn through said trough, a rotatable shaft, a drum secured thereon, a gear on said drum shaft, a ratchet wheel on said drum shaft, a pawl mechanism operated from the crank shaft for rotating the ratchet wheel to cause rotation of said gear and drum, and secondary feed members adapted to be operated by said drum shaft gear to receive the registering strips of paper from said drum and feed said strips of paper between the die mechanism and said punch mechanism.

19. A cup blank punch machine comprising die and punch mechanisms, a pair of feed rollers, means for separating said rollers to permit strips of material to be punched to be inserted between the rollers, a rotatable material feed drum, a guide trough between said drum and said pair of feed rollers, separators at the entrance end of said trough to cause separation of the strips of material to permit said strips of material to be adjusted to register one over the other as they are drawn through said trough and before passing over said drum, a second pair of feed rollers adapted to receive the registering strips of material after passing over the drum and feed said strips of material between said die and punch mechanisms, means for separating said second pair of feed rollers, a crank shaft mechanism, and mechanisms operated by said crank shaft for actuating the punch mechanism, said drum and both sets of feed rollers.

20. A cup blank punch machine comprising a frame, a die mechanism mounted thereon, a cup blank receiving trough connected with said die mechanism, a guide rail in

said trough, a punch mechanism supported on said frame for coaction with said die mechanism, means for feeding a material between said die and punch mechanisms, means for operating the punch mechanism to cause cup blanks to be punched from said material, and cup blank discharge means associated with the punch mechanism for pushing the cup blanks through the die mechanism into said trough with said guide rail serving to properly align the cup blanks.

21. In a cup blank punch machine, the combination with die and punch mechanisms, of feed means for feeding a plurality of superimposed strips of material into the machine, means for separating said strips of material and then adjusting said strips to register one over the other, and a feed mechanism for feeding the registering strips of material into the field of operation of said die and punch mechanisms.

22. In a cup blank punch machine, the combination with die and punch mechanisms, of feed means for feeding a plurality of superimposed strips of prepared paper into the machine, a comb for separating the strips of paper after passing through said feed means, a trough for adjusting the strips of paper transversely so that they will register one with the other, and a feed mechanism for feeding the registering strips of paper into the field of operation of said die and punch mechanisms to permit groups of cup blanks to be punched out of said strips of paper with each operation of said die and punch mechanisms.

23. In a cup blank punch machine the combination with a die mechanism, of a cup blank receiving trough having the bottom thereof raised to form a longitudinal convex blank guide, a punch mechanism adapted to coact with said die mechanism to punch cup blanks having concave notches in the peripheries thereof, and means mounted on the punch mechanism for pushing the punched cup blanks through the die mechanism into said trough with the concave notches of said cup blanks registering with the convex guide in said trough.

24. In a cup blank punch machine the combination with die and punch mechanisms, of a plurality of feed mechanisms for feeding a plurality of strips of prepared material to said die and punch mechanisms to permit stacks of cup blanks to be punched from said strips of material, and mechanisms disposed between the feed mechanisms adapted to first separate the strips of material and then adjust the same transversely so that said strips of material will have the side edges thereof registering before entering the die and punch mechanisms.

25. A cup blank punch machine comprising punch and die mechanisms, a primary paper feed mechanism, a secondary paper feed mechanism, locking means for the secondary paper feed mechanisms, and means for operating said punch mechanism and both of said paper feed mechanisms when the locking means is released to cause paper to be fed between said punch and die mechanisms to have cup blanks punched therefrom.

26. A cup blank punch machine comprising punch and die mechanisms, a primary paper feed mechanism, a secondary paper feed mechanism, locking means for the secondary paper feed mechanism, a brake device operated from the machine for controlling the operation of said locking means, and means for operating said punch mechanism and both of said feed mechanisms when the locking means is released.

27. A cup blank punch machine comprising punch and die mechanisms, a primary paper feed mechanism, a secondary paper feed mechanism, a locking mechanism for said secondary paper feed mechanism, a brake device governing the operation of said locking mechanism, and a crank shaft mechanism connected for continuously operating said primary feed mechanism and intermittently actuating the brake device to release the locking mechanism at predetermined times to cause paper to be fed between said punch and die mechanisms by said secondary feed mechanism.

28. A cup blank punch machine comprising punch and die mechanisms, means for operating the punch mechanism, a primary paper feed mechanism driven by said means for feeding paper into the machine, a guide trough through which the paper is conducted, a drum driven by said means for drawing the paper through the trough, a brake device for co-action with said drum, a second paper feed mechanism driven from said means for receiving the paper from the drum and feeding the same between said punch and die mechanisms, and a spring controlled locking device adapted to be released by the brake device at predetermined times to permit the second paper feed mechanism to operate to feed the paper a predetermined distance between said punch and die mechanisms.

29. A cup blank punch machine comprising punch and die mechanisms, a crank shaft, means for driving the same, mechanisms actuated by the crank shaft for operating the punch mechanism to cause cup blanks to be punched from paper, a primary paper feed device, means for operating the same from said crank shaft to cause paper to be fed into the machine, a guide trough through which the paper is conducted, a drum, pawl and ratchet means operated by the crank shaft for rotating said drum to cause advance of the paper through the machine, a brake device adapted to coact with

the drum to lock the same against movement, a controlling means for the brake device, a secondary paper feed mechanism operable from the crank shaft for receiving the paper from said drum, and a locking device connected with said secondary paper feed mechanism adapted to be released by said brake device to permit the secondary feed mechanism to feed the paper between said punch and die mechanism.

30. A cup blank punch machine comprising a die mechanism, a punch mechanism, mechanisms for feeding a strip of paper between said die mechanism and said punch mechanism, a crank shaft mechanism for operating said punch mechanism to cause cup blanks to be punched from said strip of paper, a locking device for said feeding mechanisms, a brake device for controlling the operation of said locking device at predetermined times, disks carried by said punch mechanisms, means for operating said disks from the crank shaft to cause discharge of the cup blank, and a stripper plate between said die mechanism and said punch mechanism for stripping the strip of paper from the punch mechanism after a punching operation.

31. In a cup blank punch machine, the combination with paper feeding mechanisms, a die and punch mechanism for receiving paper from the feeding mechanisms to punch cup blanks from the paper, a locking mechanism connected with said feeding mechanism, and means for releasing the locking mechanism at predetermined times to permit the feeding mechanism to feed only a predetermined quantity of paper into the die and punch mechanism at a time.

32. In a cup blank punch machine, the combination with die and punch mechanisms, of a material feed mechanism for feeding a material between said die and punch mechanisms, a notched disk connected with said feed mechanism, a locking roller coacting with said disk to hold the feed mechanism locked, and means for releasing the locking roller at predetermined times to permit the feed mechanism to advance predetermined quantities of the material between the punch and die mechanisms.

33. In a cup blank punch machine, the combination with die and punch mechanisms, of feed means for feeding a plurality of strips of material into the machine, means for separating said strips of material, and then adjusting said strips to register one over the other, a drum over which the strips of material pass, a brake device coacting with the drum, a feed mechanism for feeding the registering strips of material into the field of operation of said die and punch mechanisms, locking means for said feed mechanism to hold the same locked against operation, and means adapted to be operated by the brake device to release the locking means.

34. In a cup blank punch machine, the combination with die and punch mechanisms, of feed means for feeding a plurality of superimposed strips of paper into the machine, a device for separating the strips of paper after passing through the feed means, a trough for adjusting the strips of paper transversely so that they will register one with the other, a drum over which the registering strips of paper pass, a brake coacting with said drum, a feed mechanism for feeding the registering strips of paper into the field of operation of said die and punch mechanisms, a locking device for said feed mechanism, and means adapted to be actuated when said brake is released to cause unlocking of the locking device to permit the feed mechanism to advance the strips of paper only a predetermined amount.

35. In a punch machine of the class described the combination with a primary feeding means, of a drum, a driving means for operating said primary feeding means and said drum to cause a material to be advanced thereby, a punch and die mechanism, a secondary feeding means for advancing the material into the punch and die mechanism, a guide chute for said material between said drum and said secondary feeding means, a locking device for said secondary feeding means, resilient means for holding the locking device in locked position, a control member connected with the locking device, a brake coacting with said drum, and means operated by the driving means to release the brake to cause the same to actuate said control member to unlock the locking device.

36. In a punch machine of the class described, the combination with a punch and die mechanism, a feeding means for advancing a material into the punch and die mechanism, a locking device for holding the feeding means locked against operation, a guide drum over which a material to be punched passes before being advanced by the feeding means, a brake controlling the operation of said drum, and a release mechanism for said locking device adapted to be actuated to unlock the locking device when said brake is released.

In testimony whereof I have hereunto subscribed my name.

RUDOLPH HOLMAN.