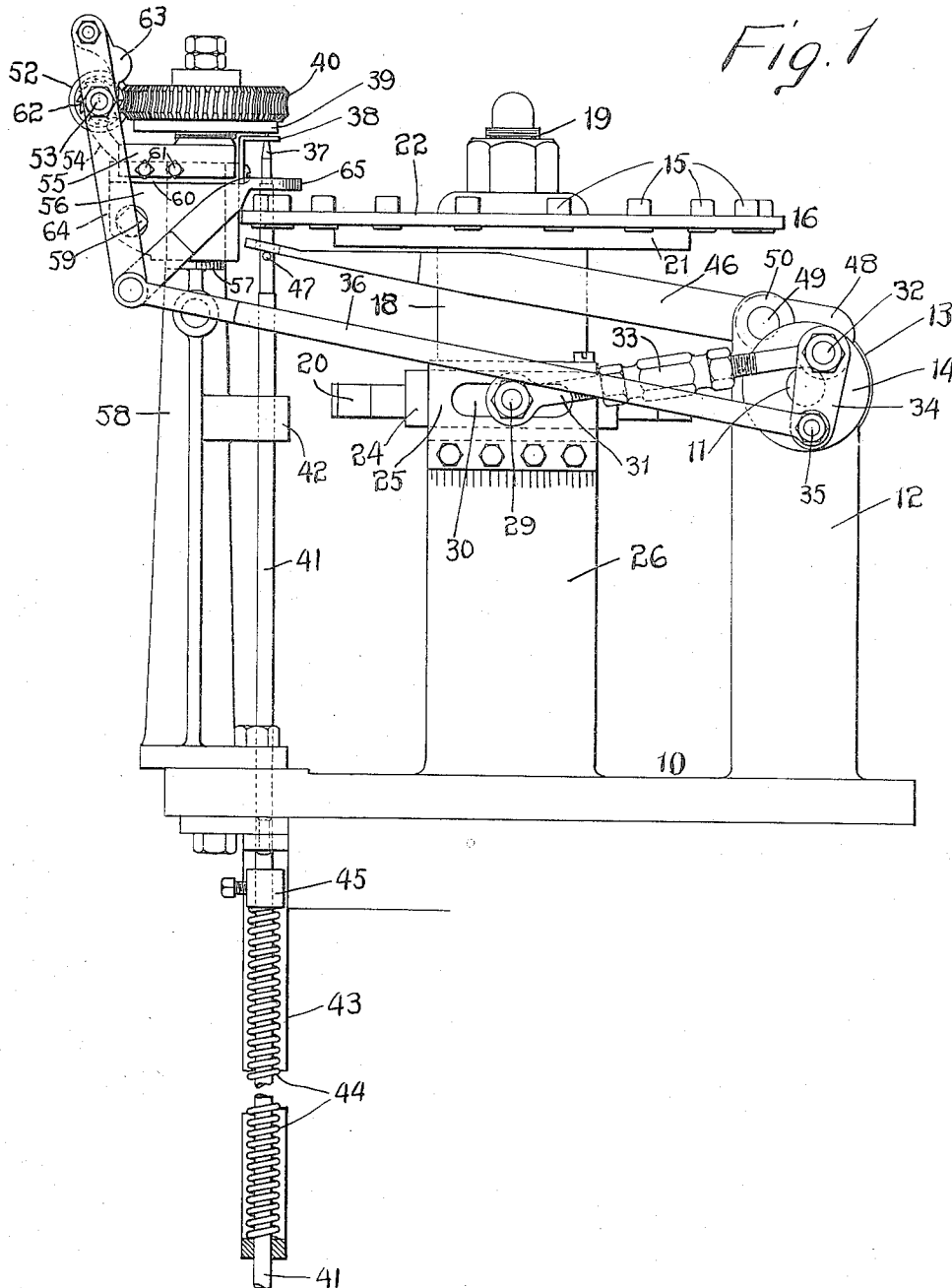


J. L. MAHONEY.
MACHINE FOR PUNCHING RUBBER NIPPLES.
APPLICATION FILED DEC. 16, 1914.

1,144,045.

Patented June 22, 1915.

3 SHEETS—SHEET 1.



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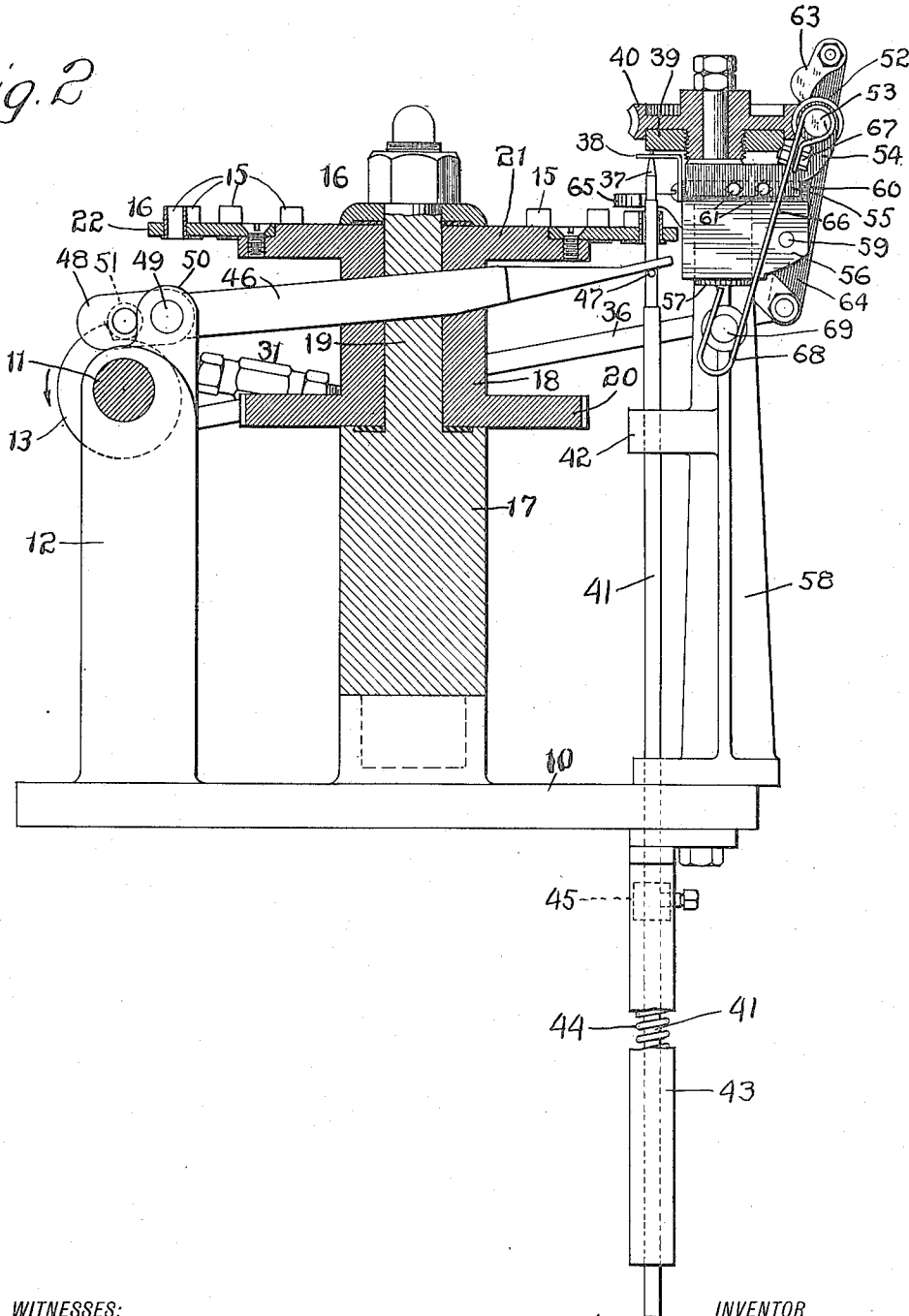
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Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3

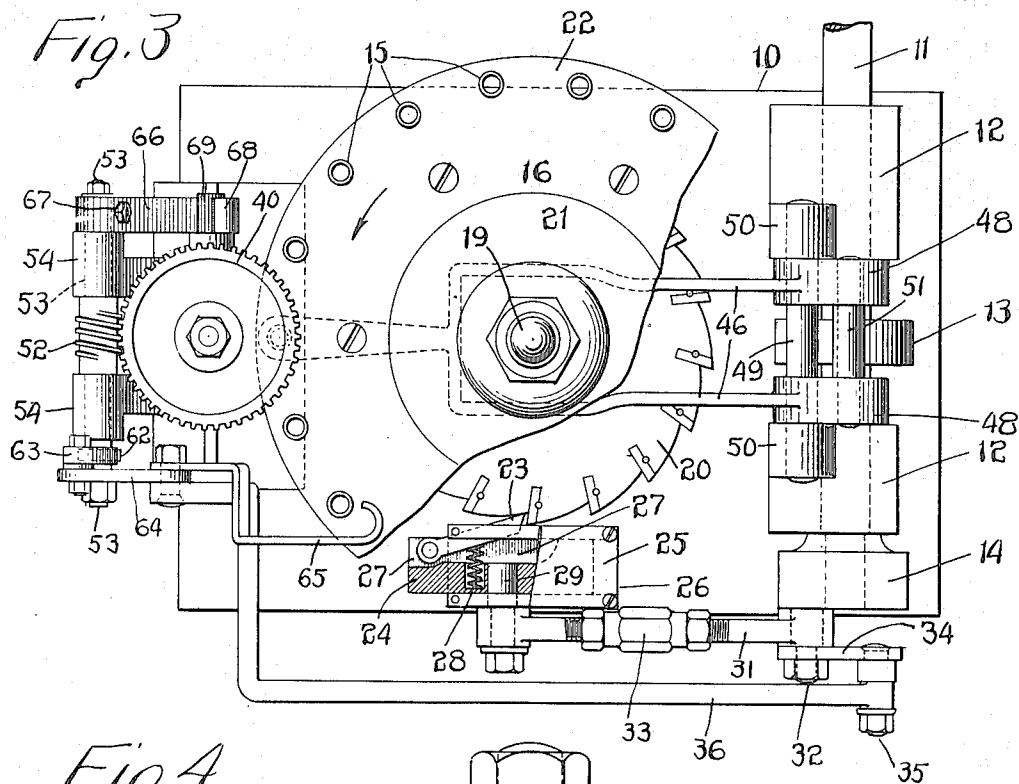


Fig. 4

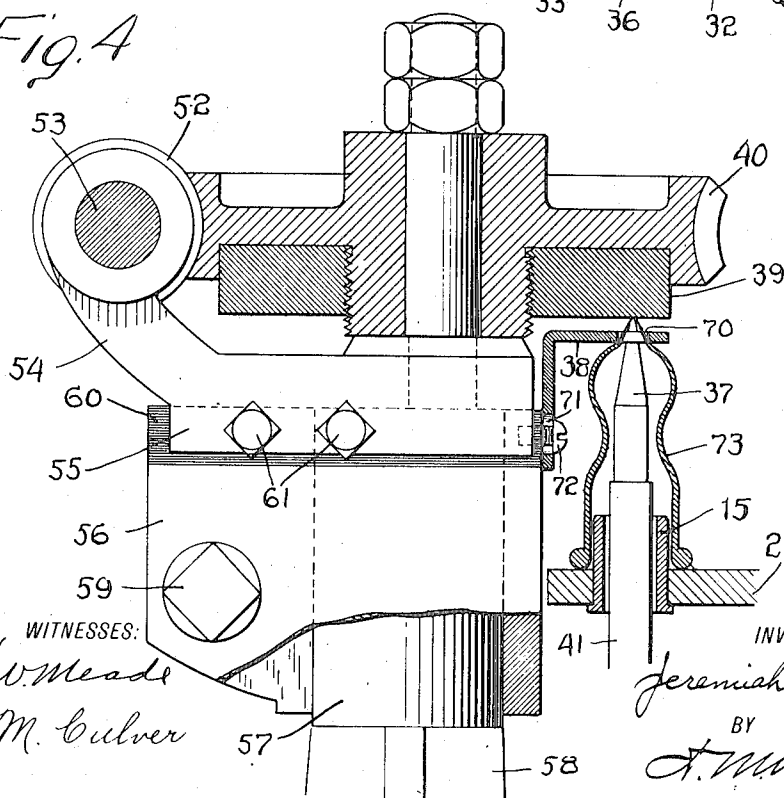
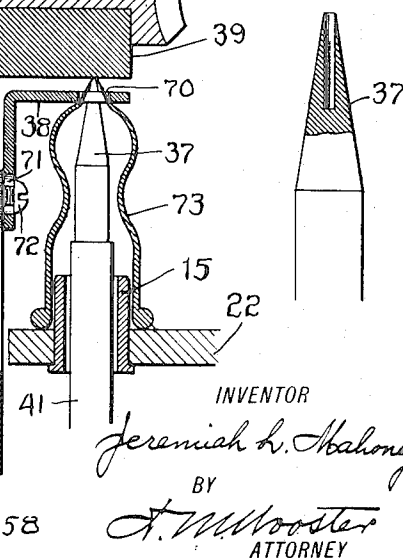


Fig. 5



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UNITED STATES PATENT OFFICE.

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MACHINE FOR PUNCHING RUBBER NIPPLES.

1,144,045.

Specification of Letters Patent.

Patented June 22, 1915.

Application filed December 16, 1914. Serial No. 877,503.

To all whom it may concern:

Be it known that I, JEREMIAH L. MAHONEY, a citizen of the United States, residing at New Haven, county of New Haven, State of Connecticut, have invented an Improvement in Machines for Punching Rubber Nipples, of which the following is a specification.

This invention has for its object to provide a machine for punching the central holes in rubber nipples, of any size that may be required, uniformly and very rapidly. Heretofore, so far as I am aware, this work has been done entirely by hand, the result being that there was necessarily more or less variation in the size of the holes and the holes were made more or less to one side of the center of the tip, both being serious objections. Another objection to hand work is that the punchings are frequently not cut out all the way around, owing to the fact that the operator cannot always hold the punch exactly vertical to the punch block.

In order to overcome these objections and to enable me to produce nipples wholly free from the defects and imperfections found in all nipples heretofore produced, I have devised a simple and easily operated machine which does not require special mechanical skill to operate, but whose operation can be quickly learned by others than skilled mechanics and which will punch more than four times as many nipples in a given time as can be punched by the most skilled operator and in which the holes shall all be central and shall all be just alike and of any required size.

With these and other objects in view I have devised the novel nipple punching machine which I will now describe referring to the accompanying drawings forming a part of this specification and using reference characters to indicate the several parts.

Figure 1 is an elevation of my novel machine; Fig. 2 a view partly in elevation and partly in section, as seen from the opposite side; Fig. 3 a plan view, a portion of the top plate of the carrier being broken away and the operating mechanism for the carrier being partly in section; Fig. 4 a detail view on an enlarged scale, partly in elevation and partly in section, illustrating the

construction and operation of the punching mechanism, and Fig. 5 is a view on an enlarged scale partly in section, of the punch detached.

10 denotes the base which may rest upon a suitable bench or table and which carries all the operative parts of the machine.

11 denotes the driving shaft to which power is applied in any ordinary or preferred manner, not shown, and which is journaled in standards 12 extending upward from the base. This shaft carries a cam 13 and a crank disk 14. The nipples to be operated upon are placed upon thimbles 15 arranged in a circle on an intermittently rotating carrier, shown as spool shaped and indicated as a whole by 16. This carrier is mounted to rotate on a standard 17 extending upward from the base and comprises a hub 18 journaled on a spindle 19 upon the standard, a ratchet 20 which rests upon a shoulder on the standard and a disk 21 to which a ring-shaped carrying plate 22 is rigidly secured. The carrying plate is provided with holes and the thimbles, which project a suitable distance above the plate, are secured in the holes by a drive fit. The thimbles are adapted to carry different sized nipples and do not have to be changed in changing from one size of nipples to another as the nipples need not fit the thimbles closely.

Intermittent rotary motion is imparted to the carrier by means of a pawl 23 carried by a slide 24 and engaging ratchet 20. The slide reciprocates in a housing 25 supported by a standard 26 extending upward from the base. The pawl lies in a recess 27 in the slide and is retained in engagement with the teeth of the ratchet by means of a spring 28 socketed in the slide.

29 denotes a pin rigidly set in the slide and extending through a slot 30 in the side of the housing. 31 denotes a connecting rod pivoted on pin 29, its other end being pivoted on a crank pin 32 extending from disk 14. Connecting rod 31 is provided with a turnbuckle 33 in order to permit the rod to be lengthened or shortened in adjusting the throw of the slide and pawl. Crank pin 32 has rigidly secured thereto a crank arm 34 carrying a crank pin 35 upon which a connecting rod 36 is pivoted, the function of which will presently be explained.

The nipples on the thimbles are punched by means of a punch 37 in coöperation with a stretcher plate 38 and a ring-shaped punch block 39 carried by a worm wheel 40, as will be more fully explained. The punch is carried by a rod 41 which extends downward through a guide 42, through the base and through a bracket 43. A relatively strong spring 44 coiled about the rod and bearing against the bracket and against a collar 45 adjustable on the rod acts normally to raise the rod and punch.

46 denotes a lever at the front end of which is a hole through which the punch rod passes loosely, the lever bearing on a cross pin 47 in the punch rod. The rear end of this lever is bifurcated, the branches being provided with enlargements 48 which are mounted to oscillate on a rod 49 secured in ears 50 on standards 12. The rear ends of the enlargements comprise the short arms of the lever. A cross pin extends between them on which is mounted a roller 51 which is engaged by cam 13. The configuration of this cam is clearly shown in Fig. 2.

Figs. 1, 2 and 4 show the position of the parts at the instant a punching operation is performed. From this position the rotation of cam 13 will tilt the rear end of lever 46 and press the punch rod and punch downward against the power of spring 44, until the high portion of the cam is reached, when roller 51 will pass the shoulder and drop down upon the low portion of the cam and cause the punching operation to be performed by the power of the spring.

In order to insure that the punch will strike the punch block in a different place at each blow, the worm wheel by which it is carried is caused to rotate slowly. This is effected by means of a worm 52 on a shaft 53 journaled in brackets 54 carried by a slide 55 which is adapted for adjustment on a block 56. The block is divided upon one side and is clamped upon a head 57 extending upward from a standard 58 by means of a bolt 59. The top of the block is provided with ways 60 on which the slide may be moved, the slide being locked in position after adjustment by means of bolts 61. Shaft 53 carries a ratchet 62 which is engaged by a pawl 63 carried by a lever 64 which is fulcrumed on shaft 53. The other end of this lever is pivoted to connecting rod 36 and receives motion from crank arm 34. Lever 64 has rigidly secured thereto a hook-shaped take-off 65 which removes a punched nipple from one of the thimbles and causes it to drop off into a suitable chute or receptacle, not shown. In Fig. 3 the take-off is shown in the retracted position. Movement toward the left removes a punched nipple. The timing of the movements is substantially as follows: The carrier is of course stationary at the instant

the punching operation takes place. After the punching operation the punch is retracted by means of cam 13, then the carrier starts to move forward and at practically the same instant the take-off moves toward the left from the position in Fig. 3 and removes a punched nipple. As soon as the forward movement of the carrier ceases, the punch is released and punches another nipple which is removed from its thimble by the take-off, as before.

In order to prevent the possibility of backward movement of shaft 53 and the ratchet I provide a friction strap 66 which encircles the shaft and is closed about it as tightly as may be required by means of a bolt and nut 67. The other end of this strap, which is of metal, is provided with a hook 68 which engages a stud 69 projecting from standard 58. The hook is made long enough not to interfere with the vertical adjustment of block 56 on head 57. It will be noted that by simply loosening bolt 59 the block, slide, worm wheel and worm shaft may be raised or lowered as much as may be required. This adjustment is sometimes desirable in changing from relatively large to relatively small nipples and vice versa. It is obvious that in time the continuous blows of the punch will cut something of a channel in the punch block. When this interferes to the slightest extent with the perfect working of the machine, slide 55 and the parts carried thereby may be adjusted upon block 56 by simply loosening bolts 61, which will cause the punch to strike the punch block in a circular path, of greater or less diameter, as may be.

The size of the holes punched in the nipples may be regulated by raising and lowering stretcher plate 38. It will of course be obvious that the more the nipple is stretched by the punch before it is actually cut by the joint action of the punch and punch block, the smaller will be the hole in the nipple.

It is also obvious that adjustment would be required to produce the same size hole in changing from large to small nipples or vice versa. The stretcher plate is shown as made L-shaped, the horizontal arm being provided with a hole 70 through which the tip of the nipple is carried and stretched by the punch until a hole is cut in the nipple by the joint action of the punch and the punch block. The other arm of the stretcher plate is provided with a slot 71 through which a screw 72 engaging block 56 passes. By loosening this screw the stretcher plate may be raised or lowered as required to produce a hole of the required size in any of the several sizes of nipples. The operation of punching a nipple will be clearly understood from Fig. 4 in which the nipple is indicated by 73.

Having thus described my invention I claim:

1. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a stretcher plate having a hole, a punch block and a punch adapted to be passed through each thimble when in alinement with the stretcher plate.
2. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a punch block and a vertically movable punch adapted to be passed through each nipple and to engage the punch block.
3. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a rotating punch block and a vertically movable punch adapted to be passed through each nipple and to engage the punch block.
4. A machine of the character described comprising an intermittently rotating carrier for nipples, a punch block and a vertically movable punch adapted to be passed through the carrier and to engage the punch block.
5. A machine of the character described comprising an intermittently rotating carrier having holes, thimbles for nipples set in said holes, a punch block and a punch adapted to be passed through the thimbles successively and to engage the punch block.
6. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a stretcher plate having a hole, a rotating punch block and a punch adapted to be passed through the thimbles successively and through the stretcher plate.
7. A machine of the character described comprising an intermittently rotating carrier having holes, thimbles for nipples set in said holes, a punch block and a punch adapted to be passed through the nipple successively and through the stretcher plate.
8. A machine of the character described comprising a carrier having thimbles for nipples and a ratchet, a pawl engaging the ratchet, a reciprocating slide by which the pawl is carried, a punch block, a stretcher plate and a punch adapted to be passed through the thimbles successively and through the stretcher plate.
9. A machine of the character described comprising an intermittently rotating carrier comprising a carrying plate, thimbles for nipples carried by said plate, a stretcher plate having a hole with which the nipples are successively placed in alinement, a punch block and a punch.
10. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a stretcher plate above the carrier, a punch block above the stretcher plate and a punch adapted to be passed upward through the thimbles successively when in alinement with the stretcher plate.
11. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a punch block, a spring actuated punch adapted to pass through the nipples successively and engage the punch block and a cam and intermediate connections for retracting the punch against the power of the spring and then releasing it.
12. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a punch block, a punch, a rod by which the punch is carried, a spring acting on the rod to throw the punch to operative position, a lever engaging the rod and a shouldered cam engaged by the lever which retracts the rod and punch against the power of the spring and then releases them permitting the spring to actuate the punch.
13. A machine of the character described comprising an intermittently rotating carrier for nipples, a punch block, a punch, a rod by which the punch is carried, a spring acting on the rod, a bifurcated lever engaging the rod and having enlargements comprising short arms, a roller between the enlargements and a shouldered cam engaged by the roller.
14. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a punch block, a worm wheel by which the punch block is carried, a shaft carrying a worm engaging said wheel, and a ratchet, a lever carrying a pawl engaging the ratchet, a connecting rod by which the lever is oscillated and a punch adapted to be passed through the nipples successively and to engage the punch block.
15. A machine of the character described comprising an intermittently rotating carrier having thimbles for nipples, a punch block, a worm wheel by which the punch block is carried, a shaft carrying a worm engaging said wheel, and a ratchet, a lever carrying a pawl engaging the ratchet, a take-off secured to the lever and acting to remove punched nipples from the thimbles, a connecting rod by which the lever is oscillated, and a punch adapted to be passed through the nipples and to engage the punch block.
16. The combination with an intermittently rotating carrier having thimbles for nipples and a punch adapted to be passed through the thimbles successively, of a rotating punch block and a stretcher plate through which the punch passes before engaging the punch block.
17. The combination with an intermit-

4
tently rotating carrier having thimbles for nipples and a punch adapted to be passed through the thimbles successively, of a rotating punch block and a take-off for removing punched nipples from the thimbles.

5 18. The combination with an intermittently rotating carrier having thimbles for nipples and a punch adapted to be passed through the thimbles successively, of a rotating punch block, a stretcher plate through
10 which the punch passes before engaging the punch block and means for removing punched nipples from the thimbles.

15 19. The combination with an intermittently rotating carrier having thimbles for nipples and a spring actuated punch adapted to be passed through the thimbles successively, of a rotating punch block and means for retracting the punch against the power
20 of the spring and then releasing it.

20 20. The combination with an intermittently rotating carrier having thimbles for nipples and a spring actuated punch adapted to be passed through the thimbles successively, of a rotating punch block, means for retracting the punch against the power of the spring and then releasing it, and a stretcher plate through which the punch
25 passes before engaging the punch block.

30 21. The combination with an intermittently rotating carrier having thimbles for nipples, a punch adapted to be passed through the thimbles successively, a stretcher plate through which the punch passes and
35 means for adjusting the stretcher plate to regulate the size of the holes punched.

40 22. The combination with a spool shaped carrier having a carrying plate and thimbles for nipples, of means for imparting intermittent rotary motion to the carrier, a punch adapted to be passed through the thimbles successively, and a rotating punch
45 block.

45 23. The combination with a spool shaped carrier having a carrying plate and thimbles for nipples, of means for imparting intermittent rotary motion to the carrier, a stretcher plate, a punch adapted to be passed through the thimbles successively and
50 through the stretcher plate, and a punch block.

55 24. The combination with a spool shaped carrier having a carrying plate and thimbles for nipples, of means for imparting intermittent rotary motion to the carrier, a punch adapted to be passed through the thimbles successively, a stretcher plate, a punch block, and means for rotating the punch block.

60 25. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a ring shaped punch block and means for
65 imparting rotation thereto.

26. The combination with a spool shaped carrier having a carrying plate and thimbles for nipples, of means for imparting intermittent rotary motion to the carrier, a punch adapted to be passed through the thimbles
70 successively, a stretcher plate, a punch block, means for rotating the punch block and means for adjusting the punch block vertically and horizontally.

75 27. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a ring shaped punch block and a worm
80 wheel by which the punch block is carried.

85 28. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a rotating punch block and means for removing punched nipples from the thimbles.

90 29. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a punch block and a take-off.

95 30. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a ring shaped punch block, a worm wheel
100 by which it is carried, a worm engaging said wheel, a worm shaft, means for imparting intermittent rotation to said shaft and means for retaining said shaft against backward movement.

105 31. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a punch block, a worm wheel by which it is
110 carried, a shaft carrying a worm engaging said wheel and a ratchet, a pawl engaging the ratchet and a friction strap encircling the shaft to prevent backward movement.

115 32. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch adapted to be passed through the thimbles successively and through the stretcher plate, a punch block, a worm wheel by which it is
120 carried, a shaft carrying a worm engaging said wheel and a ratchet, a pawl engaging the ratchet, a lever by which the pawl is carried, a take-off for punched nipples carried by the lever and means for oscillating the lever.

125 33. The combination with an intermittently rotating carrier having thimbles for nipples, and a stretcher plate, of a punch 13

adapted to be passed through the thimbles successively and through the stretcher plate, a punch block, a worm wheel by which it is carried, a shaft carrying a worm engaging
 5 said wheel and a ratchet, a pawl engaging the ratchet and an adjustable block by which the worm wheel and shaft are carried.

34. The combination with an intermittently rotating carrier having thimbles for
 10 nipples and a punch adapted to be passed through the thimbles successively, of a rotating punch block and means for adjusting the punch block relatively to the punch whereby the punch is caused to strike the
 15 block in a new circular path.

35. The combination with an intermittently rotating carrier having thimbles for nipples and a punch adapted to be passed through the thimbles successively, of a rotating punch block, operating mechanism
 20 therefor and an adjustable block by which said parts are carried.

36. The combination with an intermit-

tently rotating carrier having thimbles for nipples and a punch adapted to be passed
 25 through the thimbles successively, of a punch block, a worm wheel by which said block is carried, operating means for the worm wheel, a vertically adjustable block and a slide horizontally adjustable on said
 30 block by which the worm wheel and operating means are carried.

37. The combination with an intermittently rotating carrier having thimbles for nipples, a stretcher plate and a punch adapted to be passed through the thimbles successively and through the stretcher plate, of a rotating punch block and means for adjusting said block vertically and horizontally.
 40

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

JEREMIAH L. MAHONEY.

Witnesses:

GEORGE R. COOLEY,
 MARILLA I. FIERO.