Nov. 16, 1954 F. R. MARINDIN 2,694,513

HAT POUNCING MACHINE

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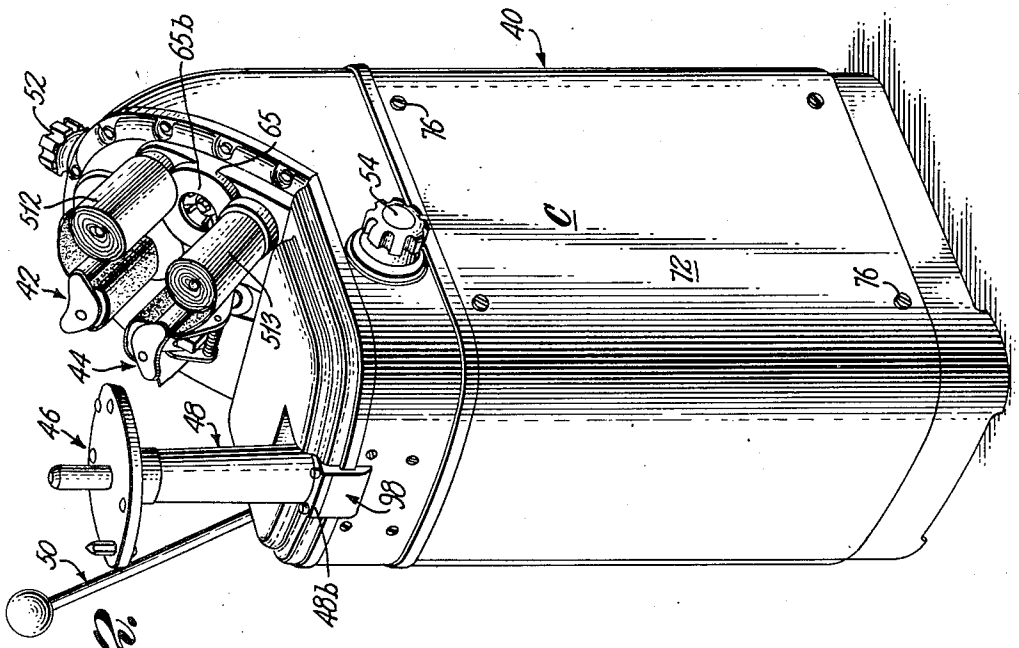


Fig. 2.

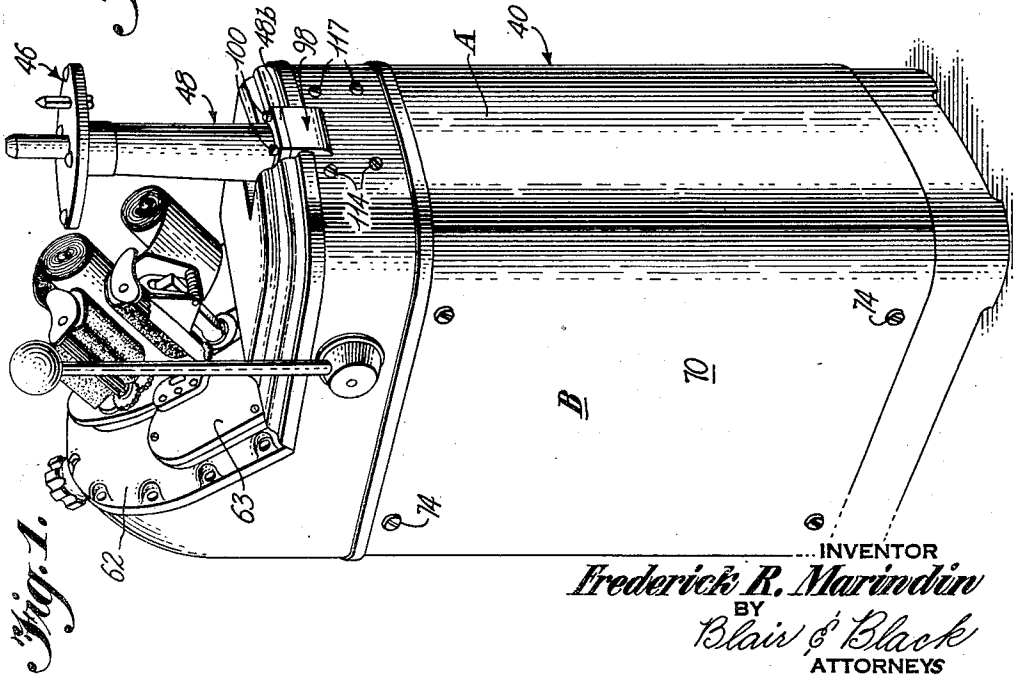


Fig. 1.

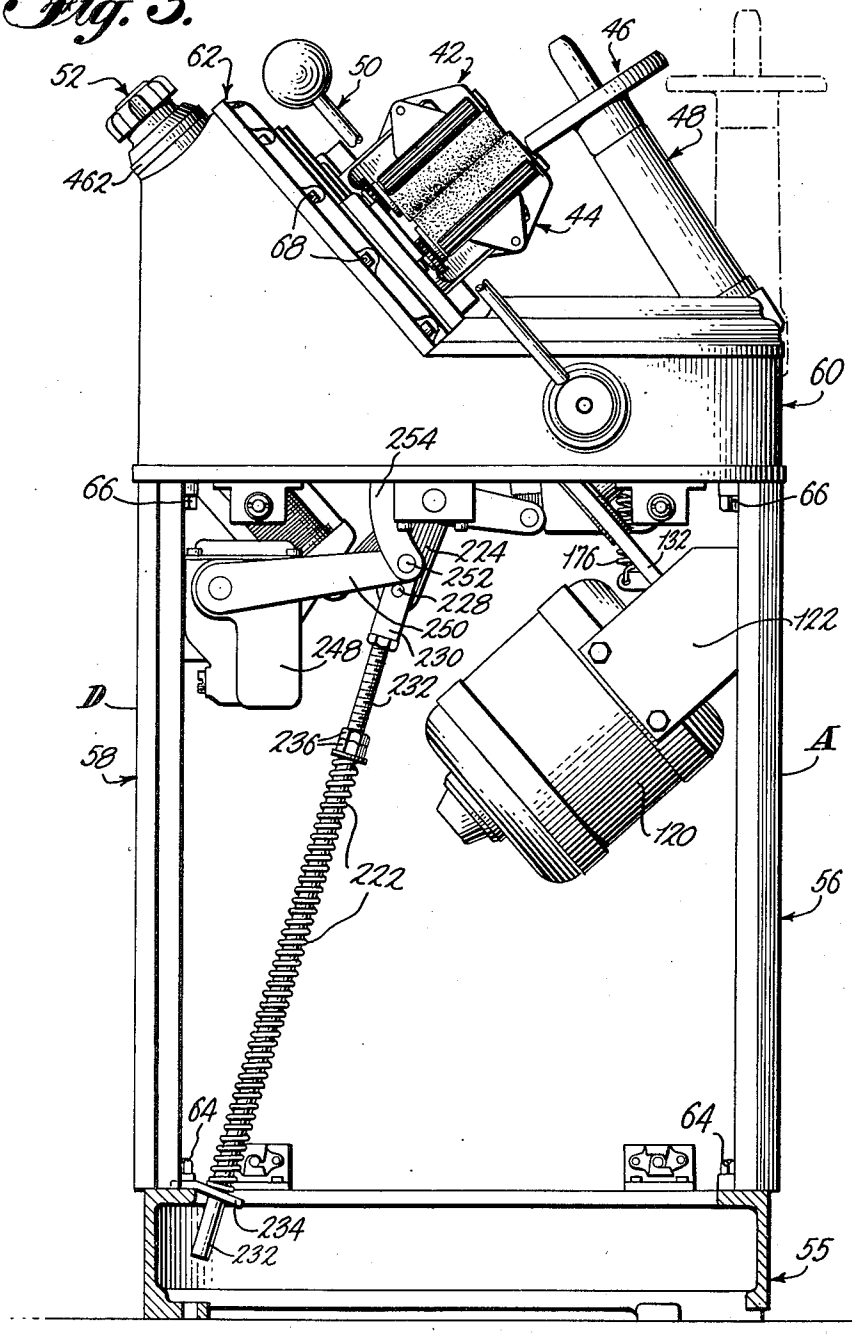
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Fig. 3.



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Fig. 4.

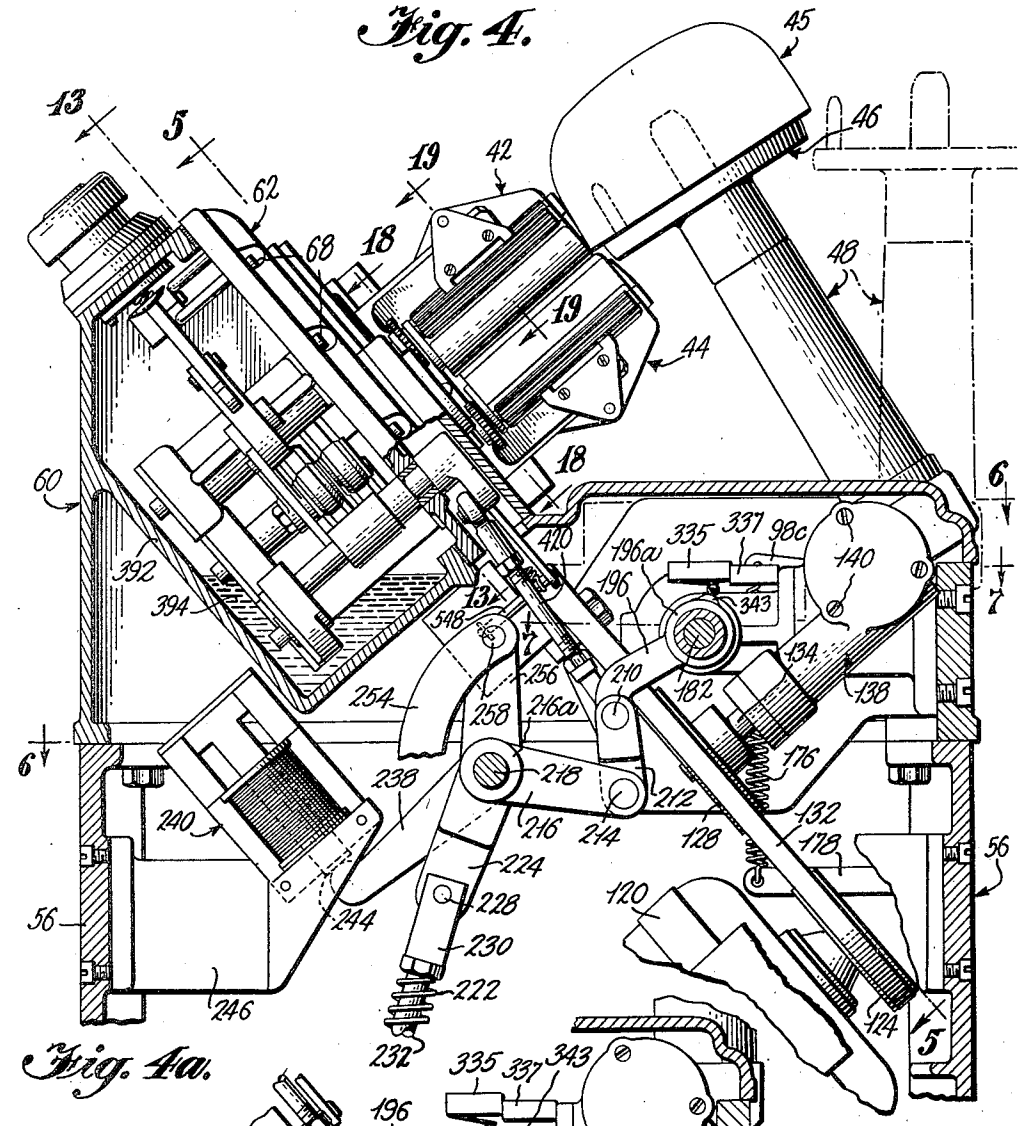
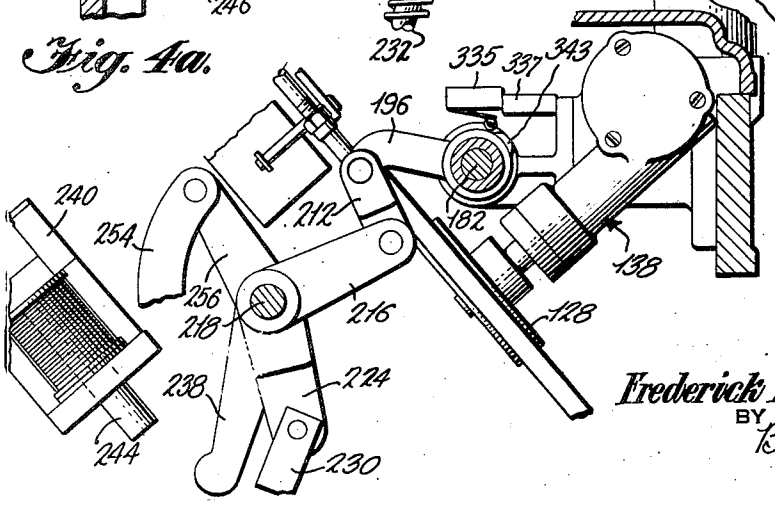


Fig. 4a.



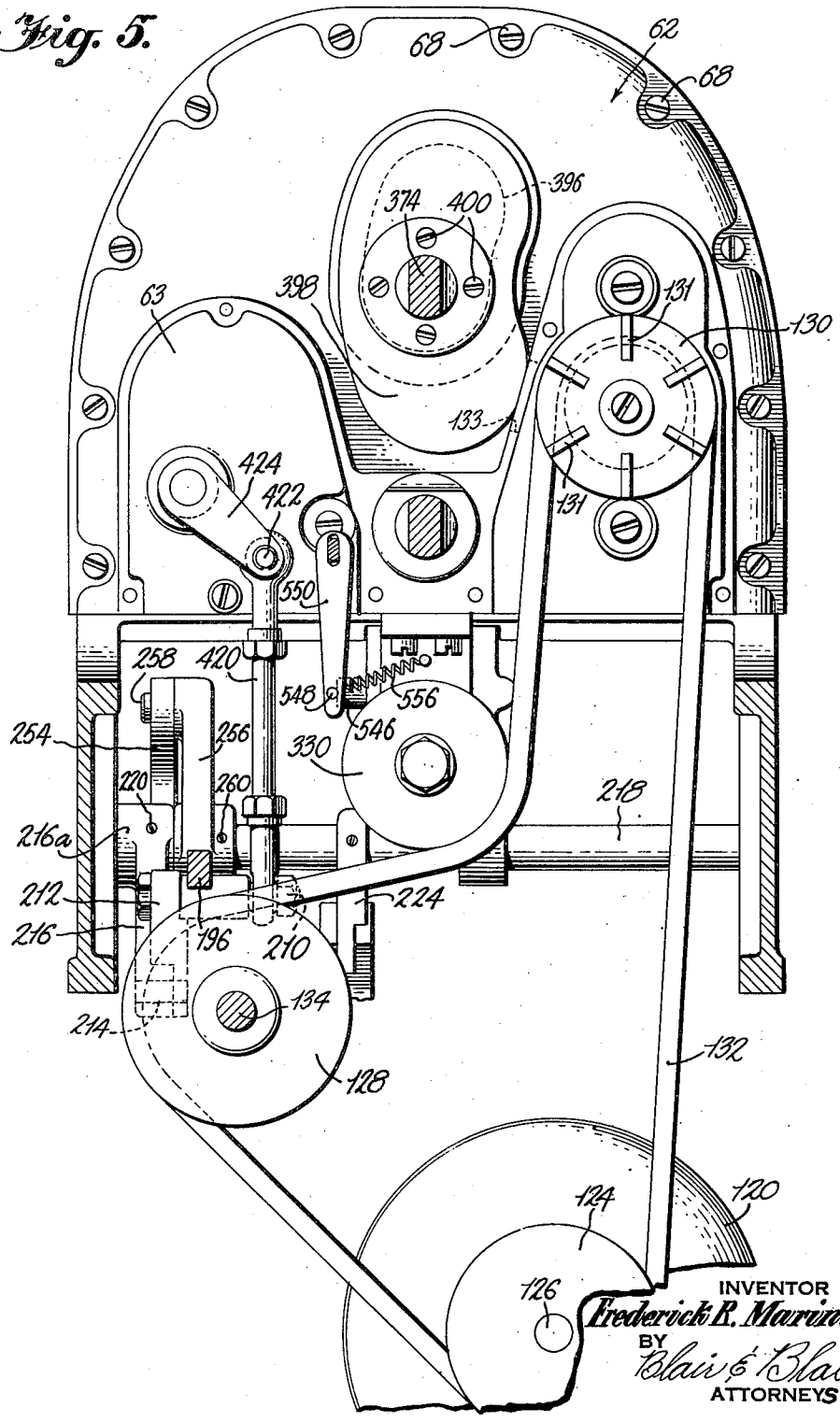
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Fig. 5.



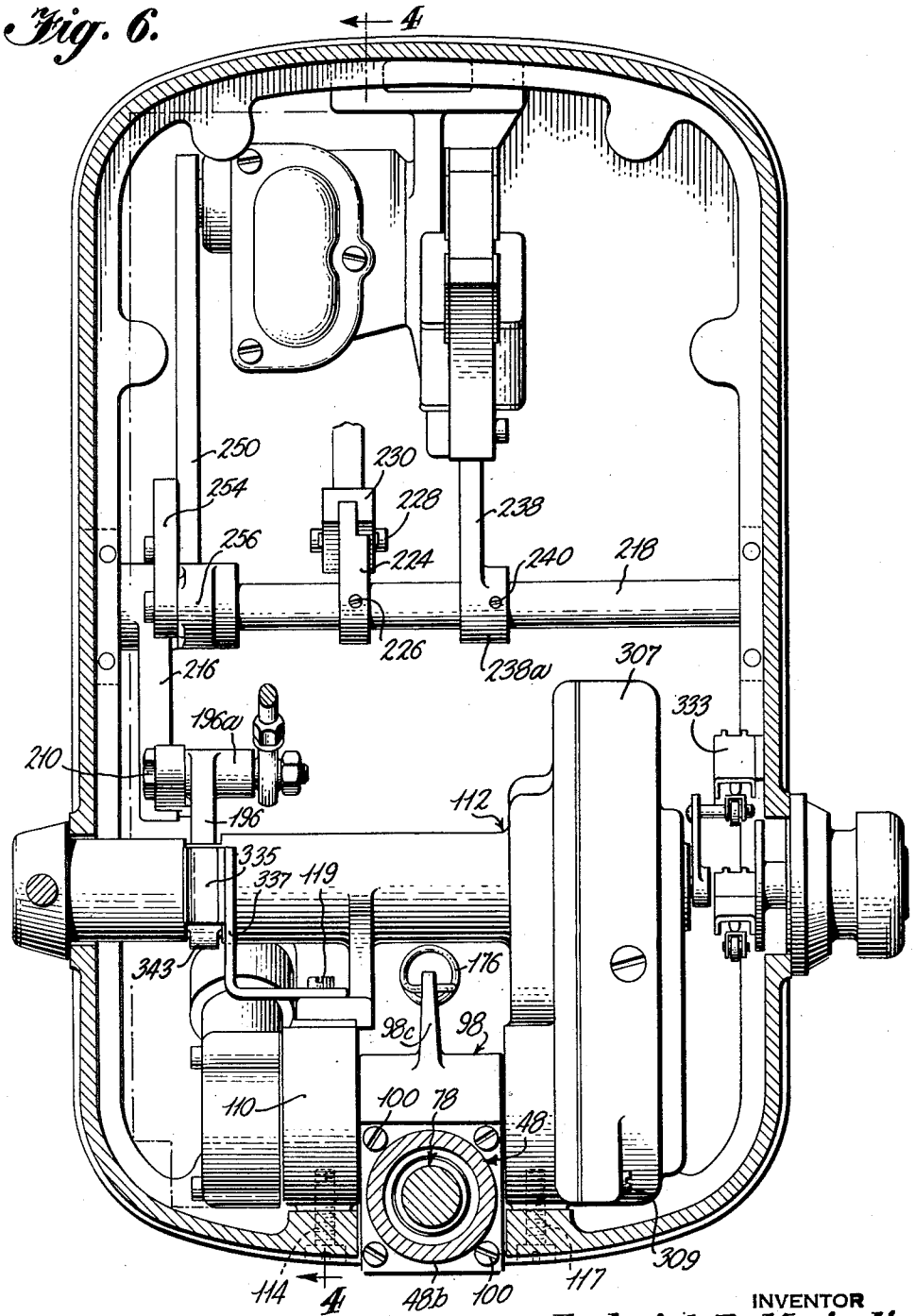
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Fig. 6.



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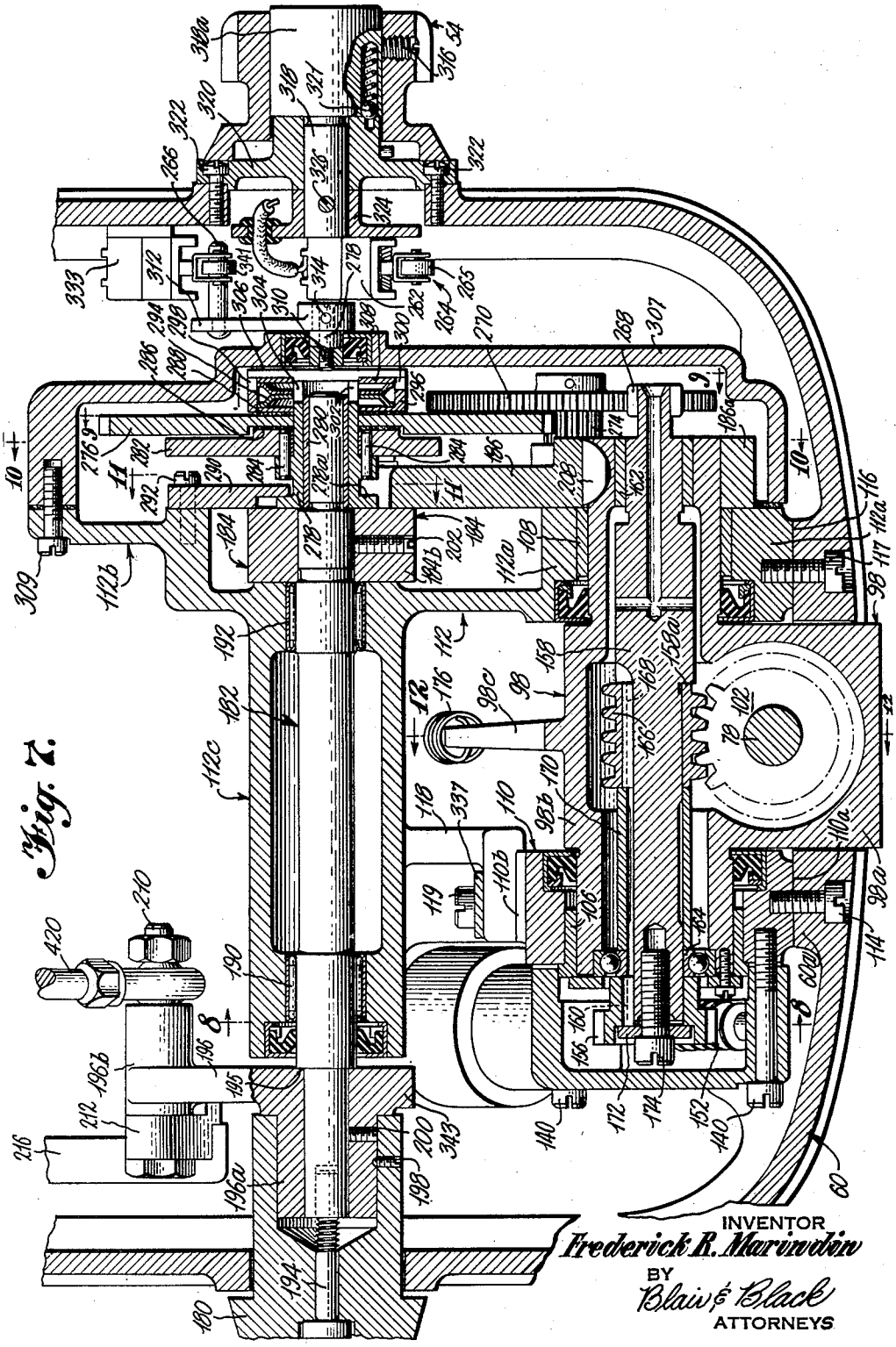


Fig. 7.

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Fig. 7a.

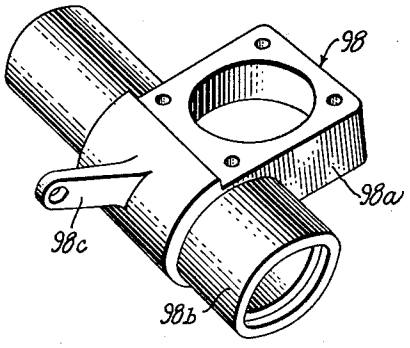


Fig. 7b.

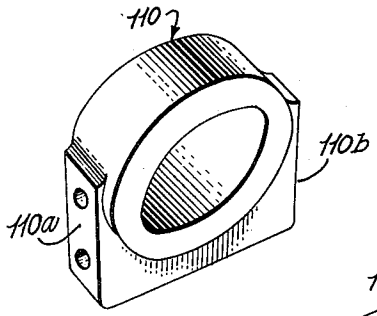
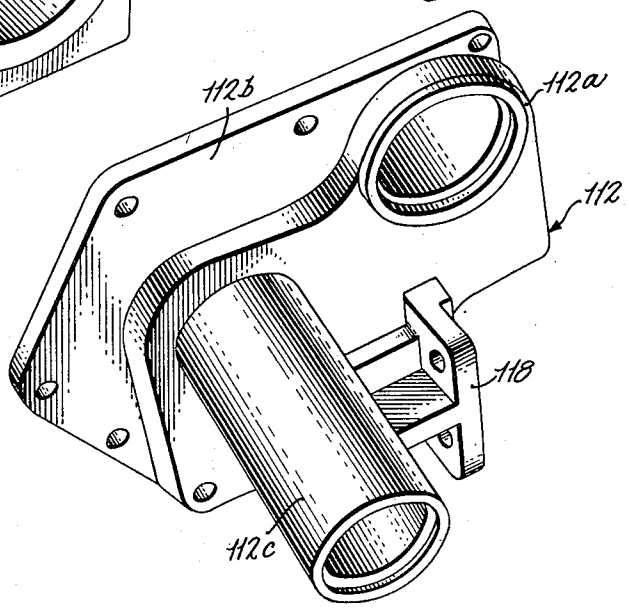


Fig. 7c.



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Fig. 8.

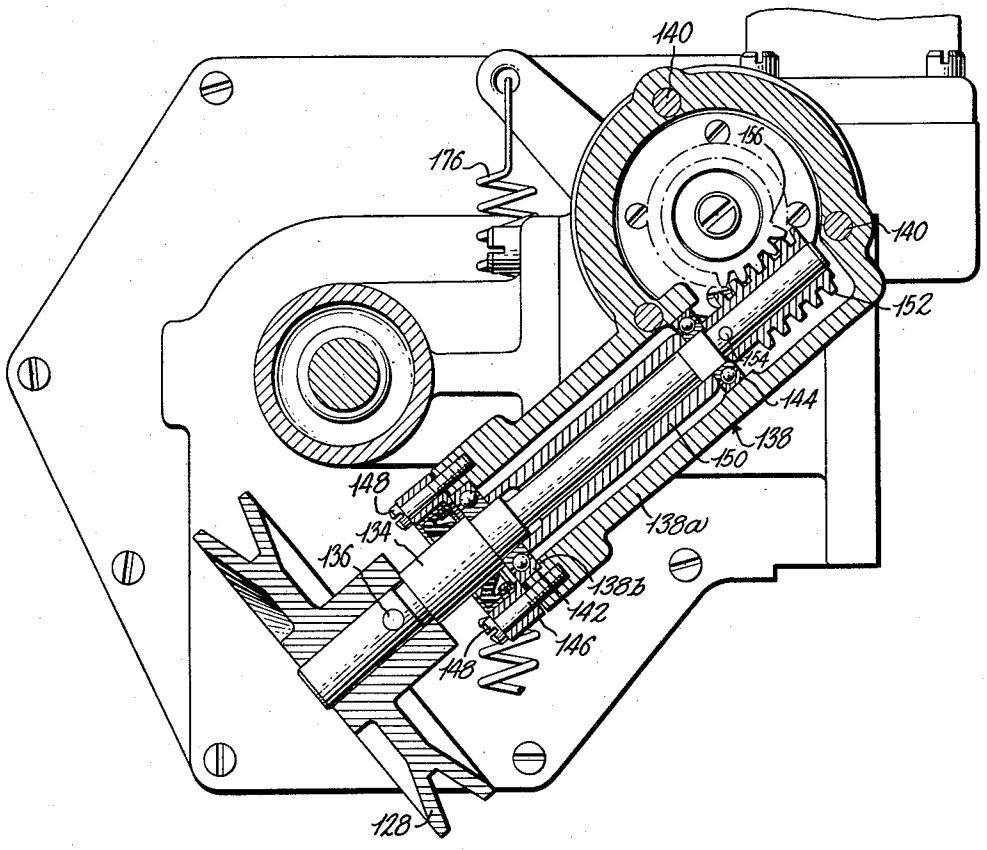
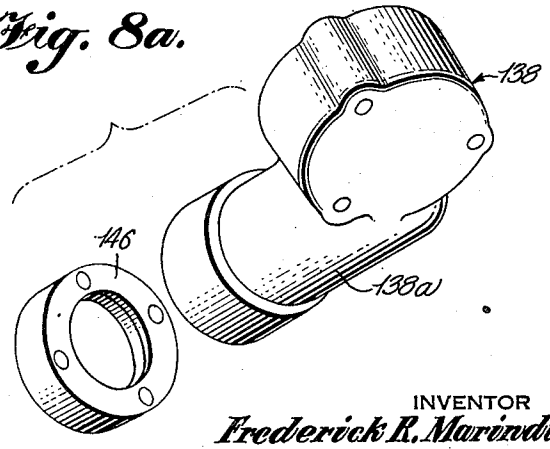


Fig. 8a.



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Fig. 9.

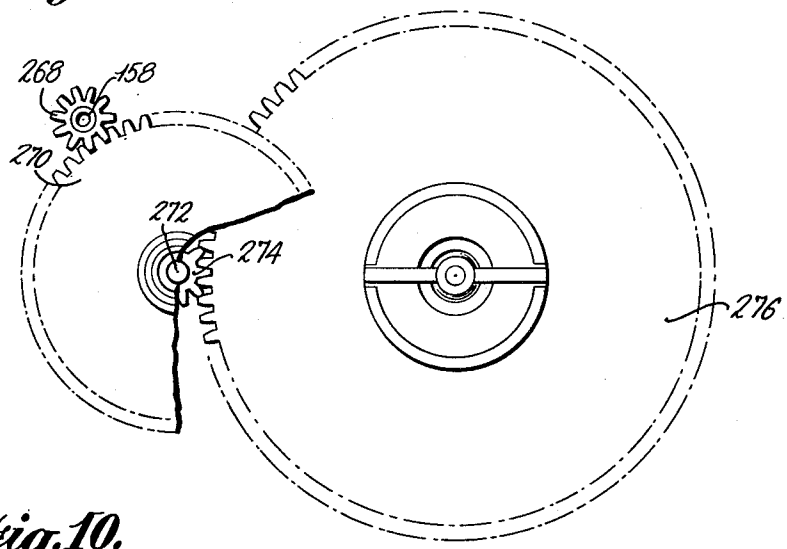
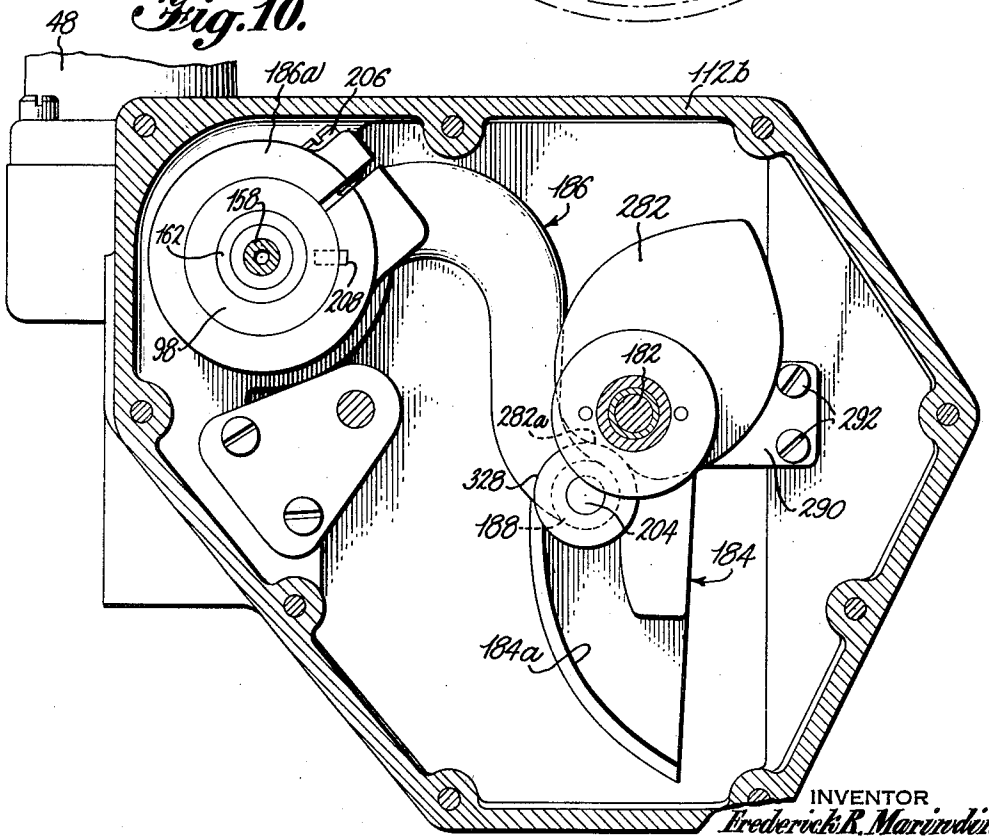


Fig. 10.



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Fig. 10a.

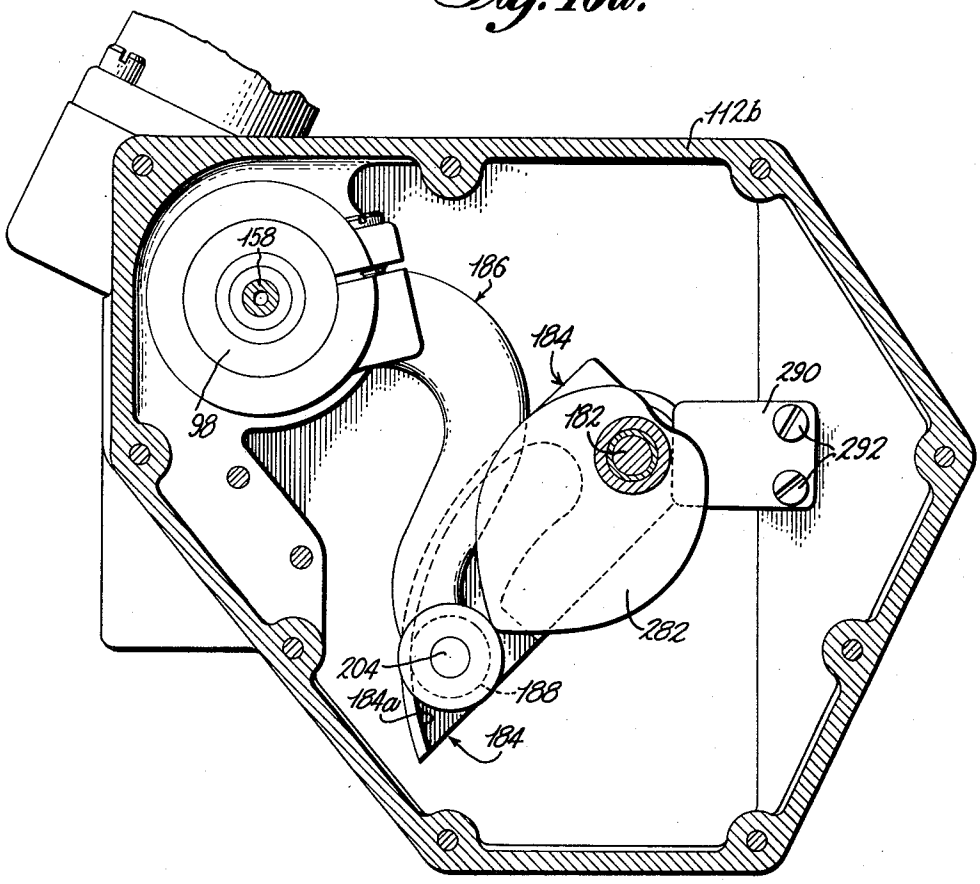
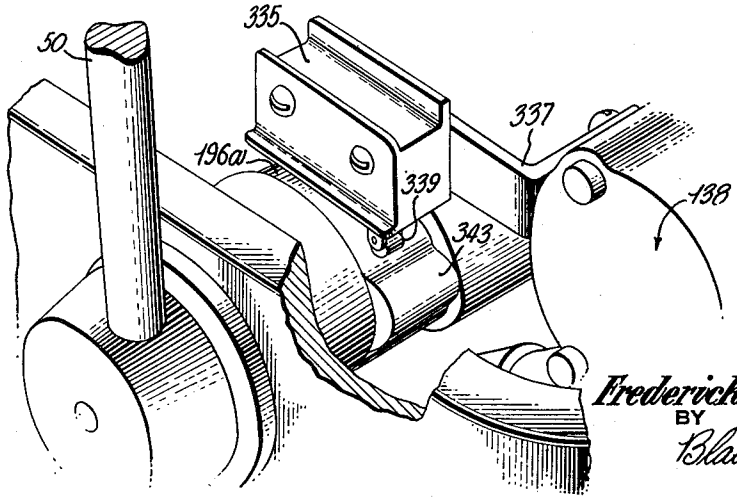


Fig. 26.



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Fig. 12.

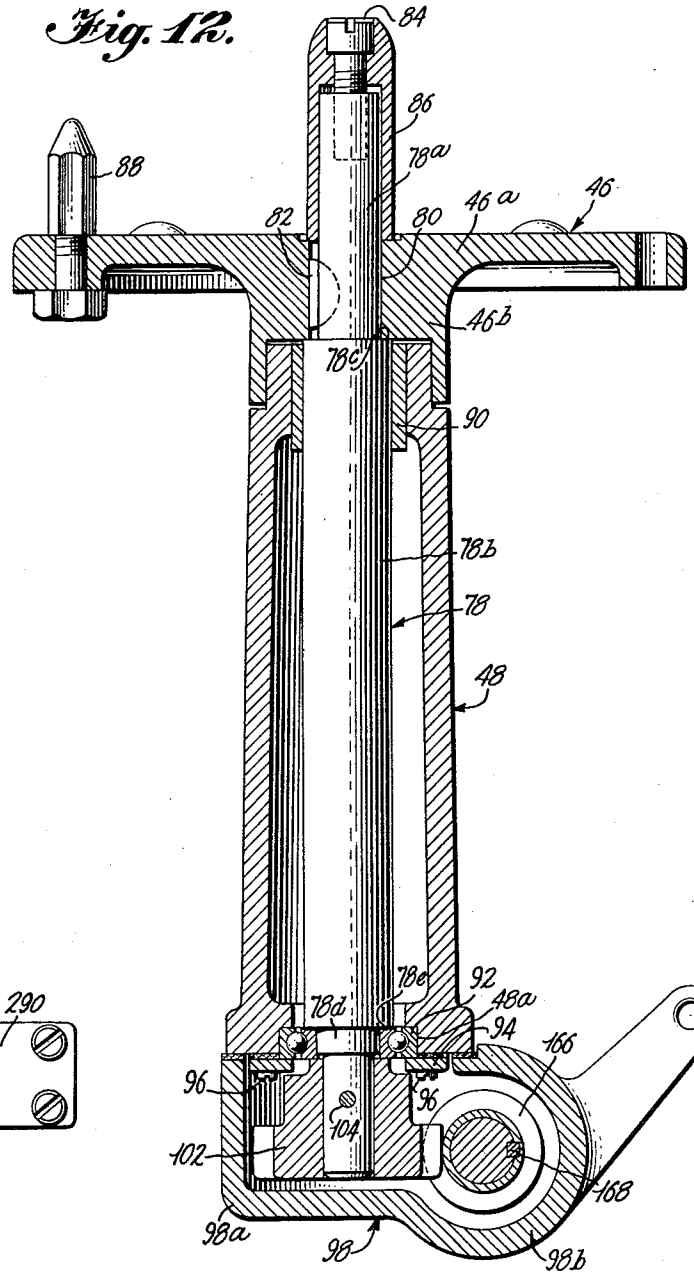
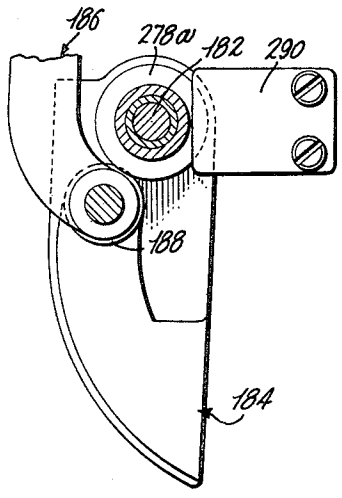


Fig. 11.



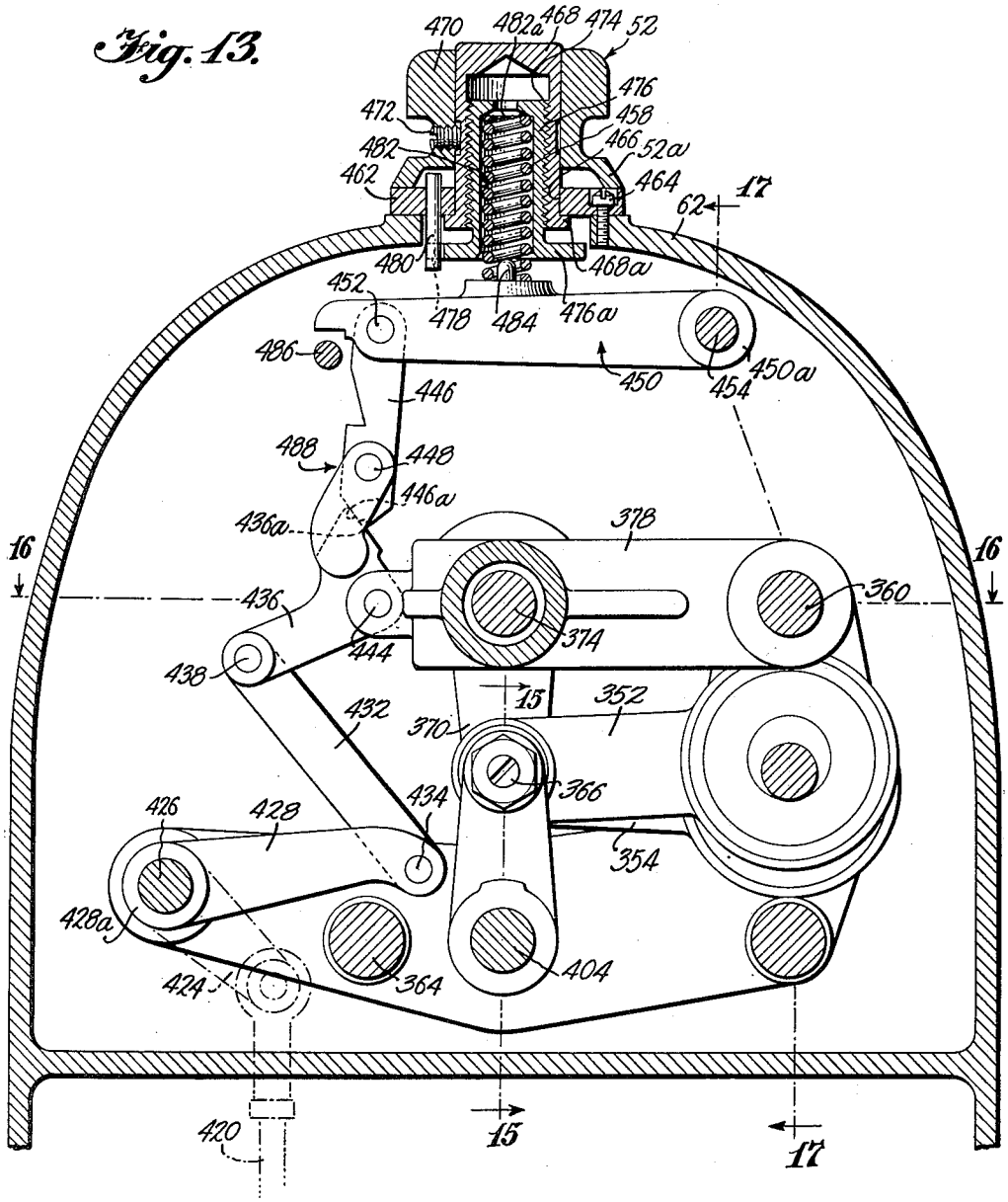
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Fig. 13.



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Fig. 14.

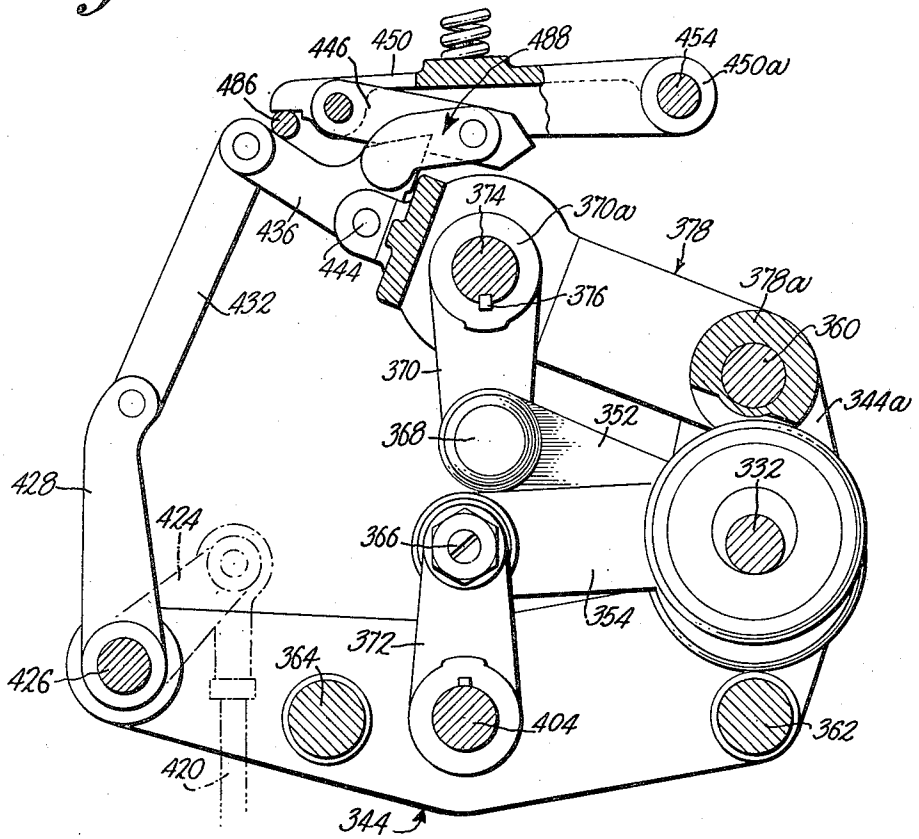
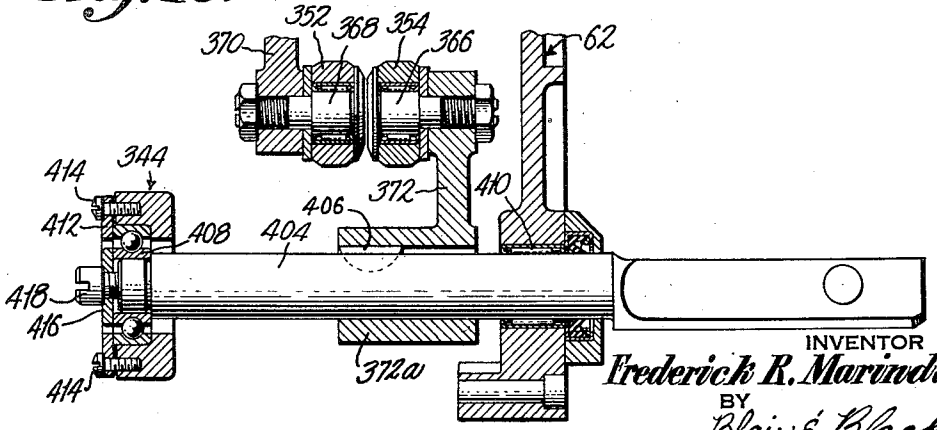


Fig. 15.



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Fig. 19a.

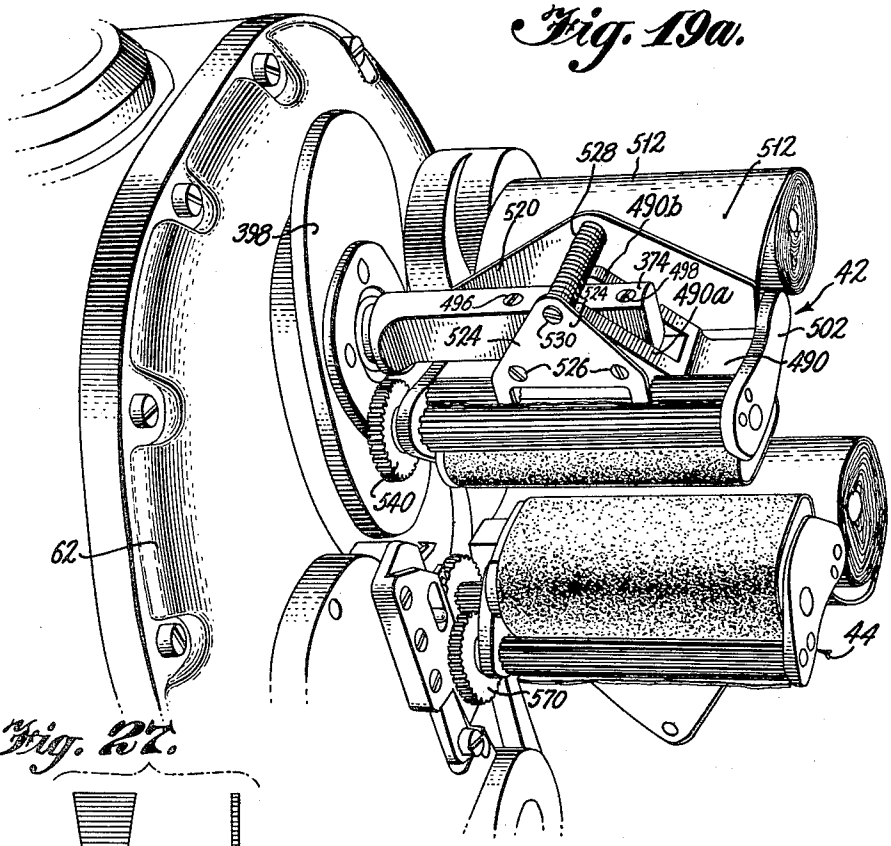


Fig. 27.

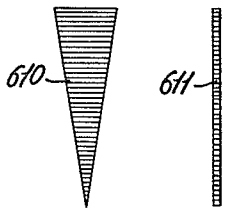


Fig. 25.

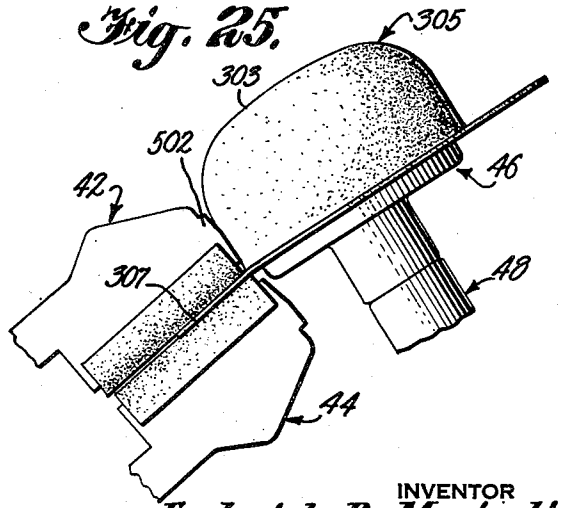
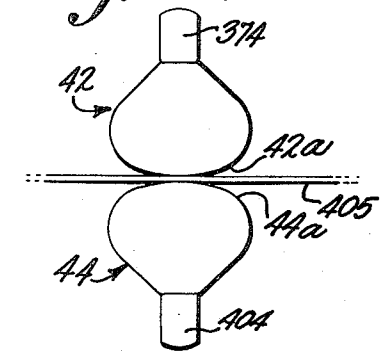


Fig. 22.



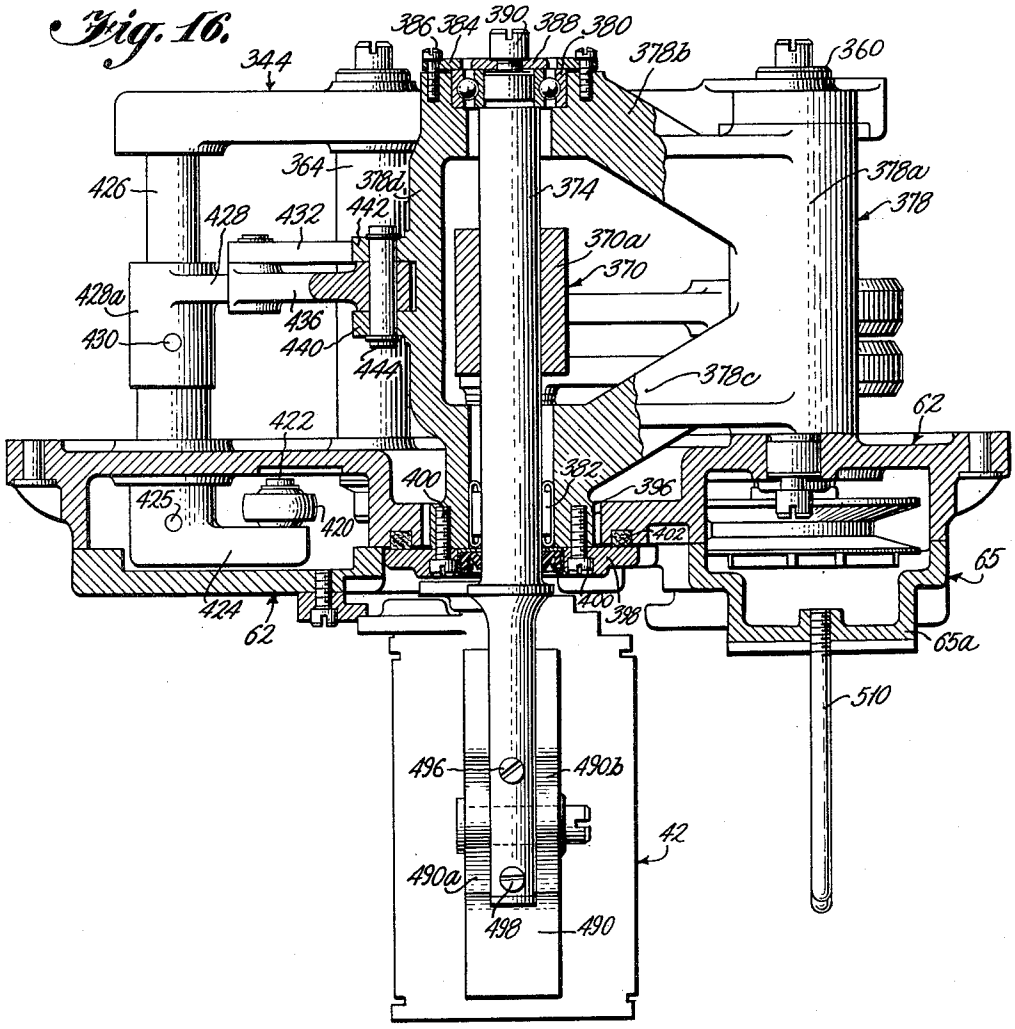
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HAT POUNCING MACHINE

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Fig. 16.



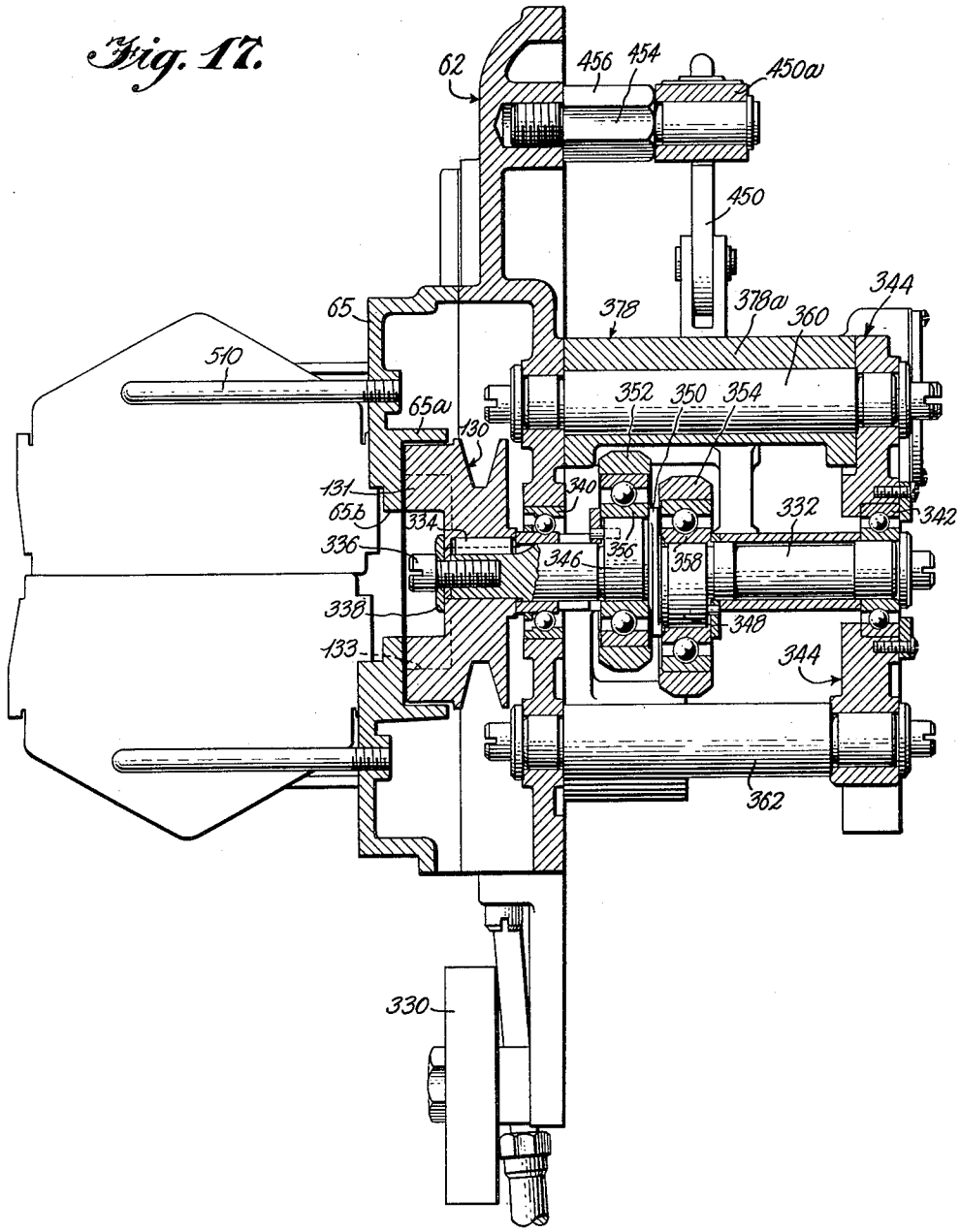
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Fig. 17.



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Fig. 18.

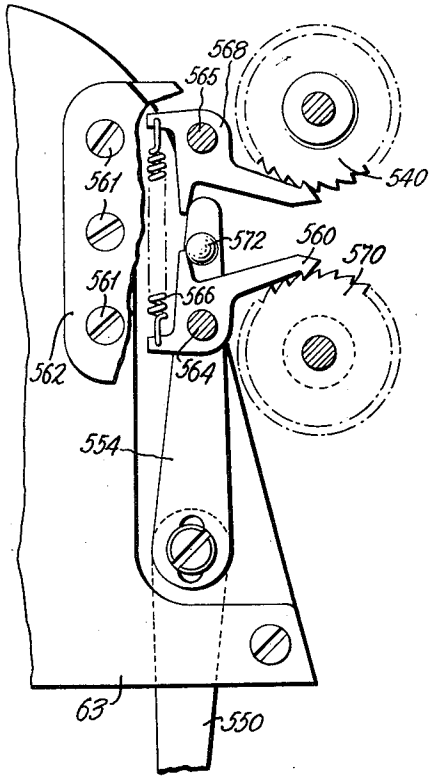


Fig. 19.

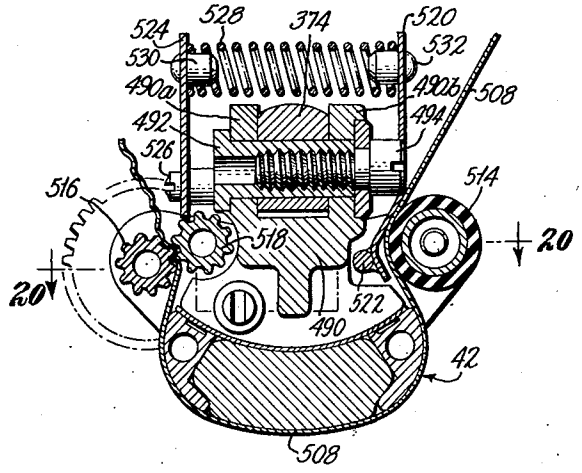


Fig. 20.

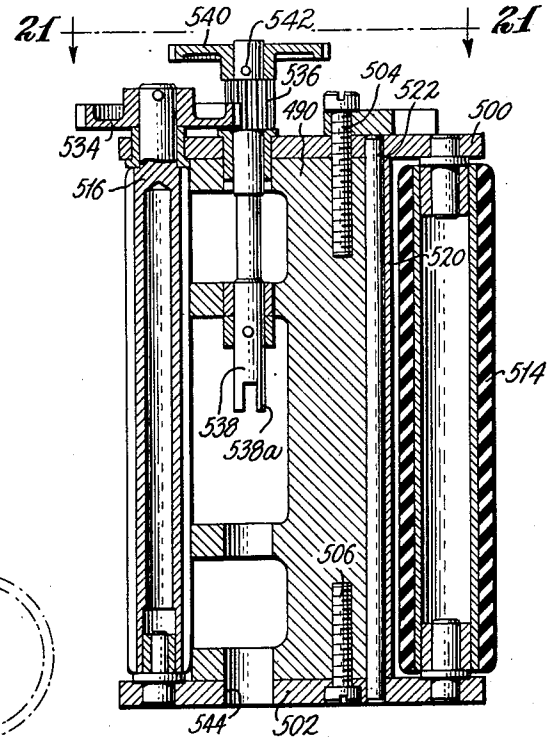
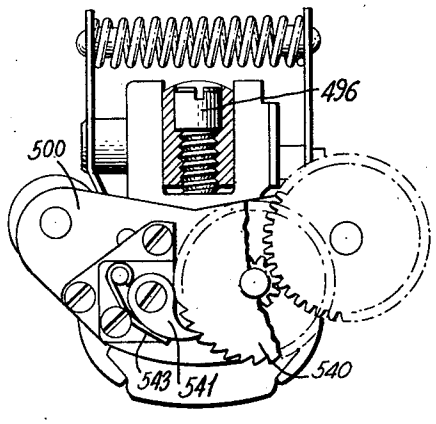


Fig. 21.



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Fig. 23.

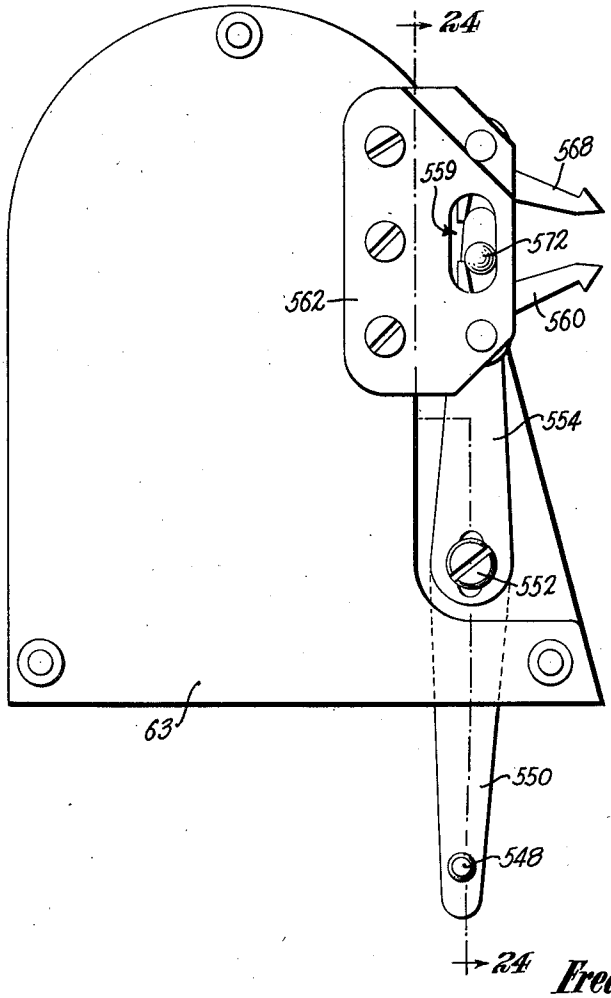
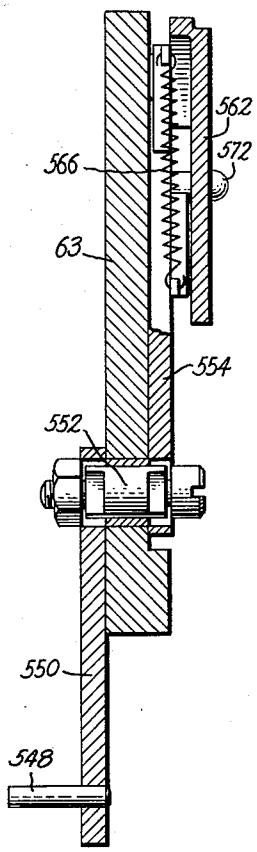


Fig. 24.



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United States Patent Office 2,694,513 Patented Nov. 16, 1954

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HAT POUNCING MACHINE

Frederick R. Marindin, Newtown, Conn., assignor to Doran Brothers, Incorporated, Danbury, Conn.

Application April 3, 1950, Serial No. 153,634

26 Claims. (Cl. 223—20)

This invention relates to a machine for pouncing the brim of a hat and to a method of pouncing.

One of the objects of this invention is to provide a hat brim pouncing machine which is simple, practical, and thoroughly durable in use. Another object is to provide a machine of the above character which will be strong and well able to withstand continuous hard usage. Another object is to provide a machine of the above character in which the pouncing tools are so actuated that the brim of the hat will be pounced more efficiently and with better results than heretofore achieved. Another object is to provide a machine of the above character which will be small and compact. Another object is to provide a machine of the above character by means of which the operator may pounce a maximum of hat brims in a minimum of time. Another object is to provide a machine of the above character which may be operated by unskilled labor with a minimum of instruction. Another object is to provide a machine of the above character which is provided with simple controls to permit the operator to set the machine to pounce at different pressures for different periods of time. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of the same to one or more of the others, all as will be exemplified in the structure to be hereinafter described and the scope of the application which will be indicated in the following claims.

In the accompanying drawings in which is shown one of the various possible embodiments of this machine,

Figure 1 is a perspective view of the machine taken from the left-hand side thereof;

Figure 2 is a perspective view of the machine taken from the right-hand side thereof;

Figure 3 is a side elevation of the left-hand side of the machine, certain parts being broken away and the side plate removed to more clearly illustrate the machine;

Figure 4 is a vertical section of the upper portion of the machine taken substantially on the line **4**—**4** of Figure 6;

Figure 4*a* is a view of certain parts shown in Figure 4 in different relative positions;

Figure 5 is a diagonal transverse section of the machine taken on the line **5**—**5** of Figure 4 showing the drive for the pouncing pads and hat together with other mechanism;

Figure 6 is a horizontal staggered section taken on the line **6**—**6** of Figure 4;

Figure 7 is a horizontal staggered section taken on the line **7**—**7** of Figure 4;

Figures 7*a*, 7*b*, and 7*c* are perspective views of certain castings in the machine;

Figure 8 is a vertical section taken on the line **8**—**8** of Figure 7 showing a portion of the drive for the hat;

Figure 8*a* is a perspective view of castings forming a portion of the housing for mechanism driving the hat body;

Figure 9 is a vertical section taken on the line **9**—**9** of Figure 7;

Figure 10 is a vertical section taken on the line **10**—**10** of Figure 7;

Figure 10*a* is a view similar to Figure 10 with certain parts in different relative positions;

Figure 11 is a vertical section taken on the line **11**—**11** of Figure 7;

Figure 12 is a vertical section taken on the line **12**—**12** of Figure 7 showing the tower on which the hat is mounted;

Figure 13 is a diagonal transverse section taken on the line **13**—**13** of Figure 4;

Figure 14 is a view of a portion of the mechanism shown in Figure 13, the parts being in different relative positions;

Figure 15 is a vertical section taken on the line **15**—**15** of Figure 13;

Figure 16 is a horizontal section taken on the line **16**—**16** of Figure 13;

Figure 17 is a vertical section taken on the line **17**—**17** of Figure 13;

Figure 18 is a diagonal transverse section taken on the line **18**—**18** of Figure 4;

Figure 19 is a transverse section of one of the pouncing pads taken on the line **19**—**19** of Figure 4;

Figure 19*a* is a perspective view of the pouncing pads on an enlarged scale;

Figure 20 is a staggered longitudinal section of one of the pouncing pads taken on the line **20**—**20** of Figure 19;

Figure 21 is an elevation of the rear end of one of the pouncing pads taken from the line **21**—**21** of Figure 20;

Figure 22 is a diagrammatic illustration of the pouncing operation;

Figure 23 is an elevation illustrating a portion of the sandpaper feeding mechanism;

Figure 24 is a vertical section taken on the line **24**—**24** of Figure 23;

Figure 25 is a diagrammatic view showing the position of a hat body during pouncing;

Figure 26 is a perspective view of a portion of the machine showing two of the switches and mechanism associated therewith; and

Figure 27 diagrammatically illustrates different types of pad contacts.

Similar reference characters refer to similar parts throughout the several views of the drawing.

For purposes of description, the side of the machine marked A in Figure 1 shall be known as the front of the machine, the side B shall be known as the left-hand side of the machine, the side C (Figure 2) shall be known as the right-hand side of the machine, and the side D (Figure 3) shall be known as the rear of the machine.

In general, referring to Figures 1 and 2, the machine includes a framework and housing, generally indicated at **40**, on which is mounted a pair of pouncing pads, generaly indicated at **42** and **44**. These pouncing pads are mounted on shafts by which the pads are reciprocated in opposite-phase relationship with respect to each other about their longitudinal axes. Pouncing pads **42** and **44** are so mounted that they may be moved toward and from each other or into and out of pouncing position by mechanism to be described hereinafter. A hat support, generally indicated at **46**, is mounted on a tower, generally indicated at **48**, which, together with the support **46**, is movable toward and from pouncing pads **42** and **44** (Figures 1 and 3). Movement of the tower **48** toward and from the pouncing pads moves the brim of a hat mounted on support **46** into and out of pouncing position between the pouncing pads.

A control lever, generally indicated at **50**, is movable forwardly and backwardly with respect to the machine, and in addition to other functions to be described hereinafter, controls the movement of hat support **46** and pouncing pads **42** and **44** into and out of pouncing position. A control knob **52** (Figure 1) is connected by mechanism to be described hereinafter to pouncing pad **42** so that the user of the machine, by setting this knob, may control the degree of pressure with which pad **42** is pressed toward pad **44** and thus control the amount of pouncing done by the pads during any given pouncing operation.

Another control knob **54** (Figure 2) is mounted on the right-hand side of the machine and is connected to suitable mechanism to be described hereinafter so that the user may be setting knob **54** control the number of revolutions made by hat support **46** before any given

pouncing operation is automatically stopped. When a given operation is ended by the mechanism associated with knob **54**, pouncing pads **42** and **44** automatically separate, tower **48** moves to an upright or non-operative position, as shown in Figure 2, and control lever **50** moves to an inoperative position or the position it occupies in Figures 1 and 2.

The framework of the machine is composed of five main castings, namely, a base casting, generally indicated at **55** (Figure 3), a front casting, generally indicated at **56**, a rear casting, generally indicated at **58**, a head casting, generally indicated at **60**, and a casting, generally indicated at **62**, which supports the pouncing pads and certain other mechanism associated with them. Front and rear castings **56** and **58** are connected at their lower ends to base casting **55** in any suitable manner, such as by screws **64**, and head casting **60** is connected to the upper ends of castings **56** and **58** by screws **66**. Casting **62** is connected to head casting **60** by screws **68**. The open sides of the machine are closed by plates **70** and **72** (Figures 1 and 2) in any suitable manner, such as by screws **74** and **76**.

Hat support **46** (Figure 12) is mounted upon a shaft, generally indicated at **78**, which in turn is rotatably mounted on tower **48**. The upper section **78***a* of shaft **78** is of smaller diameter than the center section **78***b* of shaft **78**, thus providing a shoulder **78***c*. Hat support **46** includes a plate **46***a* having a hub **46***b* formed thereon through which a hole **80** extends. This permits hat support **46** to be mounted on section **78***a* of shaft **78**, the lower face of hub **46***b* engaging shoulder **78***c*. Support **46** is keyed to shaft **78** by key **82** and is held in position on shaft **78** by means of screw **84**, which acts through cap **86** to hold support **46** in position. Hat support **46** is provided with a pin **88**, which, together with cap **86**, forms the locating pins on which the hat block (not shown) is mounted.

Shaft **78** has a section **78***d* of reduced diameter on its lower end to form a shoulder **78***e*. Shaft **78** extends through a combination thrust and radial bearing **92**, shoulder **78***e* abutting against the upper surface of the inner raceway of this bearing. Bearing **92** is held in position in a recess **48***a* in the lower end of tower **48** by a retaining ring **94** and screws **96**. The upper end of shaft **78** is mounted on sleeve bearing **90**. Thus, shaft **78** and support **46** are rotatably mounted on tower **48**.

The lower end of tower **48** is connected to a casting, generally indicated at **98** (Figures 6, 7, 7*a*, and 12), by means of screws **100** which pass through a flange **48***b* (Figures 1 and 6) formed on the lower end of tower **48**. Casting **98** is pivotally mounted on the machine to permit tower **48** to move toward and from the pouncing pads **42** and **44** (Figures 2 and 3), and includes a tower supporting section **98***a* (Figures 7, 7*a*, and 12) which act as the housing for a helical gear **102** connected to the lower end of shaft **78** by means of pin **104**. Casting **98** also includes a tubular section **98***b* which is pivotally mounted on the machine on sleeve bearings **106** and **108** mounted in casting **110** (Figures 7 and 7*b*) and casting **112**.

Casting **110** (Figure 7*b*) is provided with a flat face **110***a* which abuts against a boss **60***a* extending rearwardly from the forward end of head casting **60**. Casting **110** is connected to head casting **60** by means of screws **114** (Figures 6 and 7). Casting **112** (Figures 7 and 7*c*) is composed of three sections, namely, section **112***a* for supporting casting **98**, section **112***b* for supporting the timing mechanism associated with knob **54**, and a section **112***c* for supporting the control shaft connected to control handle **50** (Figure 2). Casting **112** is connected to the machine by connecting the forward face **116** of section **112***a* (Figures 7 and 7*c*) by screws **117** and to front casting **60** by means of a supporting bracket **118** extending forwardly from section **112***c* and connected to the rear face **110***b* (Figures 7 and 7*b*) of casting **110** by screws **119**. Bearings **106** and **108** (Figure 7) support section **98***b* of casting **98** so that the axis about which casting **98** pivots is transversely positioned with respect to the machine. Thus, casting **98** mounts tower **48** so that hat support **46** (Figures 2 and 12) moves in a plane toward and from the pouncing pads **42** and **44**.

Hat support **46** (Figure 3) is driven by a motor **120** which is mounted on casting **56** by means of bracket **122**. Motor **120** acts through a pulley **124** mounted on its drive shaft **126** (Figures 4 and 5) to drive pulleys **128** and **130** through belt **132**. The hub of pulley **128** is mounted on the lower end of a shaft **134** (Figures 4 and 8) and connected thereto by a pin **136**. Shaft **134** is mounted within the downwardly extending portion **138***a* of a casting **138** (Figures 8 and 8*a*), the upper end of which is connected to casting **110** by means of screws **140** (Figures 4, 7 and 8). Section **138***a* (Figures 8 and 8*a*) of casting **138** is of tubular shape, and shaft **134** is mounted within section **138***a* by means of combination thrust and radial bearings **142** and **144**.

The outer raceway of bearing **142** is mounted within an annular recess **138***b* in casting **138** and is held in position therein by means of a retaining ring **146** and screws **148**. A sleeve **150**, mounted on shaft **134**, extends between the inner raceway of bearing **142** and the inner raceway of bearing **144** to hold bearing **144** properly positioned within casting **138**. Shaft **134** is held in assembled relationship with respect to bearings **142** and **144** by means of the hub of a worm gear **152** connected to shaft **134** by means of set screw **154**.

Worm gear **152** (Figures 7 and 8) engages and drives a gear **156**, which is mounted on and keyed to a shaft **158** by key **160**. Shaft **158** is rotatably mounted within section **98***b* of casting **98** (Figures 7 and 7*a*) by means of radial bearing **164** and sleeve bearing **162**. A worm gear **166** is mounted on the center section of shaft **158**, is keyed thereto by a key **168**, and its right-hand end abuts against a shoulder **158***a* formed on shaft **158** by reducing the diameter of the left-hand portion of the shaft. Gear **166** is held in position on shaft **158** by means of a sleeve **170** which extends from the left-hand end of gear **166** to the right-hand face of the inner raceway of radial bearing **164**. Gear **156** is connected to shaft **158** by means of a washer **172** and screw **174**, the right-hand end of the hub of gear **156** bearing against the left-hand face of the inner raceway of bearing **164**. Gear **166** meshes with gear **102** mounted on the lower end of tower shaft **78**.

Thus, referring to Figures 4, 5, 7 and 8, motor **120**, acting through pulley **124** and belt **132**, drives pulley **128**, and thus shaft **134**. Shaft **134**, acting through worm gear **152** and gear **156** (Figure 7), drives shaft **158**. Shaft **158**, acting through worm gear **166**, drives gear **102**, which in turn drives shaft **78** (Figure 12) and thus hat support **46**. It will be noted that as the hat support moves toward and from the pouncing pads, a driving connection between the motor and the hat support is maintained at all times, because during this movement of tower **48**, the teeth of gear **102** (Figures 7 and 12) simply ride around worm gear **166**.

As pointed out hereinabove, tower **48** (Figure 12) is pivotally mounted by means of casting **98** (Figure 7) on the machine so that it may move hat support **46** (Figure 2) toward and from pouncing pads **42** and **44**. Tower **48** is at all times biased toward the pouncing pads by means of a spring **176** (Figures 4 and 7) which is connected to an arm **98***c* (Figure 7*a*) formed on casting **98** and to a bracket **178** (Figure 4) secured to front casting **56**. Spring **176** is under tension at all times, and thus tower **48** is normally biased toward pads **42** and **44**. Movement of tower **48** toward and from pouncing pads **42** and **44** (Figure 4) is controlled by control lever **50** (Figure 2).

In general, control lever **50** is connected by means of a hub **180** (Figure 7) to a control shaft, generally indicated at **182**. Control shaft **182** has an arm, generally indicated at **184** (Figures 7 and 10), which has a cam groove **184***a* formed in its right-hand side. An arm, generally indicated at **186**, is connected by means of its hub **186***a* to the right-hand end of casting **98**. Arm **186** has a roller **188** mounted on its lower end, which rides in groove **184***a* (Figures 7 and 10). Arm **184** in Figure 10 is in the position it occupies when the hat support is in inoperative position or in the position it occupies in Figure 2. When lever **50** is moved rearwardly to the position it occupies in Figure 3, shaft **182** is turned in a clockwise direction, as viewed in Figure 10. As arm **184** turns with shaft **182**, cam groove **184***a* is moved to a position at which roller **188** (Figure 10) can move to the left, as viewed in this figure, thus permitting spring **176** (Figures 4 and 7), acting through arm **98***c*, to move tower **48** into operative position.

In detail, shaft **182** is mounted within section **112***c* of casting **112** (Figures 7 and 7*c*) upon bearings **190**

and 192. Hub 180 of handle 50 is mounted on and connected to the hub 196a of arm 196 by means of a set screw 198. Hub 196a is mounted on the left-hand end of shaft 182 and is connected thereto by a set screw 200. Hubs 180 and 196a are further secured to shaft 182 by means of a screw 194, which acts through hub 180 to hold hub 196a against seat 195. At the other end of shaft 182, the hub portion 184b of arm 184 is mounted on shaft 182 and connected thereto by a set screw 202.

Referring to Figure 10, roller 188 is mounted on the lower end of arm 186 by means of stud shaft 204. Hub 186a of arm 186 is of the split ring type and is connected to casting 98 by means of screw 206 and key 208 (Figures 7 and 10). Cam groove 184a is so designed that when it is in the position it occupies in Figure 10 tower 48 is locked in an inoperative position. This is caused by the fact that groove 184a, acting through roller 188, prevents spring 176 (Figure 4) from moving arm 186 (Figure 10) in a clockwise direction. When arm 184 is moved in a clockwise direction by control lever 50, cam groove 184a is so shaped that it permits roller 188 to move in a clockwise direction (Figure 10a), but at all times groove 184a controls the movement of hat support 46 (Figure 3) as it moves into operative position. During pouncing, because of the oval shape of the hat block, tower 48 moves toward and from the pouncing pads, spring 176 maintaining the body of the hat in contact with the end plate 502 (Figure 25) of pad 42 and the brim in pouncing position between the pads.

As is best shown in Figure 7, the hub 196a of arm 196 is mounted on the right-hand end of control shaft 182 (Figure 7). Arm 196 has a portion 196b formed on its outer end, which supports a bolt 210 extending therethrough parallel to control shaft 182. Bolt 210 (Figure 4) pivotally connects arm 196 (Figure 4) to a link 212. Link 212 is connected by pivot pin 214 to an arm 216 (Figures 4, 5, and 6), the hub 216a of which is mounted on and connected to secondary control shaft 218 by set screw 220 (Figure 5). Thus, as control shaft 182 (Figure 4) is turned by handle 50 (Figure 3) into and out of operative position, arm 196 acts through link 212 and arm 216 to turn shaft 218 (Figure 4).

Spring 222 (Figures 3 and 4) acts through arm 224 to hold control lever 50 in or out of operative position. Arm 224 (Figures 3, 5, and 6) is mounted on secondary control shaft 218 and connected thereto by means of set screw 226. The lower end of arm 224 (Figure 4) which extends downwardly from shaft 218 is pivotally connected by means of pivot pin 228 and connector 230 to a rod 232. Rod 232 extends downwardly in the machine, its lower end extending through a hole in bracket 234 (Figure 3), the hole being of sufficient size to permit rod 232 to move freely upwardly and downwardly. Spring 222 is mounted on rod 232 and at all times is under compression between nuts 236 and bracket 234. Thus, spring 222 at all times resiliently urges rod 232 upwardly in the machine.

When control lever 50 (Figure 3) is moved to operative position, control shaft 182 (Figure 4), acting through arm 196, link 212 and shaft 218, moves arm 224 to the position it occupies in Figure 4. When the control lever 50 (Figure 3) is moved to an operative position, arm 224 (Figure 4) is so positioned with respect to rod 232 that spring 222 (Figure 3) acting through rod 232, arm 224 (Figure 4), shaft 218, arm 216, link 212 and arm 196 exerts a resilient force upon shaft 182, tending to turn it in a counterclockwise direction, and thus holds the control lever 50 (Figure 3) in operative position.

As will be described more fully hereinafter, at the end of each operating cycle, a solenoid 240 (Figure 4) is energized to effect the movement of all elements of the machine to inoperative positions. To accomplish this, the core 244 of solenoid 240 engages and moves an arm 238 connected to shaft 218 in a counterclockwise direction (Figure 4). Solenoid 240 is mounted on rear casting 56 by a bracket 246 and is energized by mechanism associated with timing control knob 54 (Figure 2). When solenoid 240 is energized, its core 244 engages and moves an arm 238 connected to shaft 218 in a counterclockwise direction (Figure 4). As arm 238 turns shaft 218 in a counterclockwise direction, the pivotal connection 228 between arm 224 and rod 232 is moved to the right (Figure 3) past center so that spring 222 (Figure 3) acts upon arm 224 to move it in a counterclockwise direction to the position it occupies in Figure 4a. As arm 224 turns, it acts through shaft 218, arm 216, link 212, arm 196 and control shaft 182 to move arm 184 (Figure 10) from the position it occupies in Figure 10a to the position it occupies in Figure 10. Arm 184, acting through cam slot 184a, roller 188 and arm 186 turns casting 98 in a counterclockwise direction, and thus moves tower 48 (Figure 4) to an inoperative position.

To dampen the movement of the control tower 48 (Figure 3) into and out of operative position, a dash pot 248 (Figure 3), mounted on rear casting 58, is provided. The arm 250 of dash pot 248 is connected by pivot pin 252 to a link 254 (Figures 3 and 4), which in turn is connected to an arm 256 (Figure 5) by a pivot pin 258. Arm 256 is connected to shaft 218 by means of set screw 260. Thus, dash pot 248 is connecetd to shaft 218 and through arm 216, link 212, and arm 196 to control shaft 182 (Figure 4). Accordingly, dash pot 248 dampens the movement of all elements associated with shafts 182 and 218 as the elements move into and out of operative position.

As pointed out hereinabove, control knob 54 (Figures 2 and 7) may be set to control the number of revolutions made by hat support 46 (Figure 3) during each operation. In general, knob 54 is connected to a microswitch 262, so that as knob 54 is turned, the contact arm 264 of the switch may be turned through an arc of 360°. During each operation, a pin 266 (Figure 7) is moved in a circle, the axis of which is aligned with the axis of knob 54 by mechanism associated with hat support drive shaft 158. The distance that arm 264 is separated from pin 266 when knob 54 is set by the operator determines the number of revolutions hat support 46 (Figure 2) makes during each cycle of operation, for when switch 262 is closed, solenoid 240 (Figure 4) is energized, ending the cycle of operation as described hereinabove. At the end of a cycle of operation, as the tower 48 (Figure 4) moves to an inoperative position, mechanism associated with pin 266 (Figure 7) moves pin 266 back to its "home" position so that the machine is ready to begin another cycle of operation.

Specifically, a gear 268 (Figures 7 and 9) on the right-hand end of shaft 158 drives a gear 270 rotatably mounted on a stud shaft 272 mounted on section 112a of casting 112 (Figure 7). A pinion 274 connected to gear 270 drives a gear 276 rotatably mounted on a sleeve 278. Sleeve 278 is rotatably mounted on the right-hand end of shaft 182 by means of a bearing 280 and has a heart-shaped cam 282 mounted thereon and connected thereto by pins 284. Gear 276 has a pair of clutch plates 286 and 288 mounted on opposite sides thereof on sleeve 278. Sleeve 278 is held in position on shaft 182 by means of a stop 290, the lower end of which extends into an annular groove 278a in sleeve 278, and which is secured to casting 112 by screws 292 (Figures 7 and 10).

Movement of sleeve 278, and thus cam 282, to the left, as viewed in Figure 7, is prevented by the engagement of the left-hand end of sleeve 278 with arm 184, and movement to the right is prevented by stop 290. To exert pressure upon clutch plates 286 and 288, and thus frictionally connect gear 276 to cam 282, a spring 294 is provided. Spring 294 is positioned within a housing 296 slidably mounted on the right-hand end of sleeve 278. Housing 296 is provided with a pair of diametrically-aligned slots 298 and 300, and the right-hand end of sleeve 278 is provided with aligned slots 302 and 304. A bar 306 is positioned in slots 298, 300, 302 and 304. A screw 310 threaded into a hole axially positioned in the right-hand end of sleeve 278 bears against bar 306, which in turn acts through disc 308 to place spring 294 under compression. Thus, by adjusting screw 310 the compression of spring 296 may be selected so that it maintains resilient pressure upon clutch plate 288 at all times. Thus plate 288, acting in conjunction with plate 286, frictionally connects gear 276 to cam 282 and sleeve 278. An arm 312 is mounted on the right-hand end of sleeve 278 and connected thereto by a set screw 314. Pin 266 mounted on arm 312 is driven through an arc during each operating cycle and controls the operation of the machine as will be described hereinafter.

During each cycle of operation, as shaft 158 is driven to turn hat support 46 (Figure 3) gear 268 (Figures 7

and 9) drives gear 276 through gears 270 and 274. Gear 276, through clutch plates 286 and 288, drives heart-shaped cam 282 and housing 296, which in turn drive sleeve 278 because of their connection thereto. Sleeve 278 acts through arm 312 to drive pin 266. It should be noted that gears 268, 270, 274 and 276 form a gear reduction train so that each time hat support 46 (Figure 2) makes a complete revolution, pin 266 (Figure 7) makes only a fraction of a single revolution.

Knob 54 is connected by set screw 316 to the head 318*a* of a shaft 318 rotatably mounted on a support 320 connected to the side of casting 60 by screws 322. A switch support 324 is connected to the inner end of shaft 318 by a pin 326. Microswitch 262 is mounted on support 324 in any suitable manner so that when knob 54 is turned, the contact arm 264 of the microswitch moves in an arc having as its axis the axis of shaft 318.

Microswitch 262 controls solenoid 240 (Figure 4), and when switch 262 is closed by pin 266 (Figure 7), solenoid 240 actuates arm 238 (Figure 4) to end an operating cycle. Thus, as the number of revolutions made by hat support 46 (Figure 3) is dependent upon the distance separating pin 266 (Figure 7) from the contact roller 265 of switch 262 at the beginning of a cycle of operation and as pin 266 makes only a fraction of a revolution during each revolution of hat support 46, spring actuated detent means 321 is provided so that knob 54 may be set in a number of different stations, each station being separated from the preceding one by a distance sufficient to permit hat support 46 to make another revolution before pin 266 engages switch contact roller 265. Thus, by adjusting knob 54, the operator may increase or decrease the distance separating roller 265 from pin 266, and thus increase or decrease the number of revolutions made by hat support 46 during a cycle of operation.

At the end of a cycle of operation, pin 266 must be moved back to its "home" position. This is accomplished by coaction between heart-shaped cam 282 (Figures 7 and 10) and a roller 328 (Figure 10) mounted on arm 186. As pointed out hereinabove, during a cycle of operation arm 184 moves in a clockwise direction, permitting spring 176 (Figure 3) to move casting 98, and thus arm 186 (Figure 10), downwardly away from shaft 182. As gear 276 (Figure 7) drives cam 282 during the cycle of operation through clutch plate 286, heart-shaped cam 282 is turned in a clockwise direction, as viewed in Figure 10*a*. At the end of a cycle of operation, as control shaft 182 turns, roller 328 engages the edge of heart-shaped cam 282. Because of the cam's shape, as roller 328 moves upwardly it causes the cam to turn until roller 328 is positioned in dwell 282*a*. Because cam 282 is connected to arm 312 by pins 284 and sleeve 278, pin 266 is moved back to "home" position.

Thus, mechanism has been described in which pin 266 and switch arm 264 may be separated different predetermined distances by adjusting knob 54. During the cycle of operation, pin 266 is moved in an arc until it engages switch contact roller 265, at which time solenoid 240 (Figure 4) is energized to end the cycle of operation. As control shaft 182 (Figure 7) is turned by spring 222 (Figure 3), the mechanism described hereinabove acts through heart-shaped cam 282 (Figure 7) to move pin 266 back to "home" position so that the machine is ready for another cycle of operation.

As will be described more fully hereinafter, pouncing pads 42 and 44 (Figure 4) are mounted on shafts, the axes of which are at all times at right angles to plate 62, which is connected to head casting 60 by screws 68. The shaft on which pad 42 is mounted is movable upwardly and downwardly, its axis being at all times parallel to the axis of the shaft on which pad 44 is mounted. When the control lever is moved into operative position, pad 42 moves downwardly (Figure 4) and is resiliently pressed toward the face of pad 44 at all times during the pouncing operation. During pouncing, the pads are oscillated in opposite phase relationship with respect to each other. It will be noted that pads 42 and 44 are angularly positioned with respect to the top of the machine so that the brim of a hat mounted on support 48 is in its normal position with respect to the crown during the pouncing operation.

Pads 42 and 44 are oscillated by motor 120 (Figure 5). Motor 120 drives pulley 130 through belt 132 which runs over pulleys 128 and 330. Pulley 130 (Figure 17) is keyed to the forward end of a crankshaft 332 by a key 334. Pulley 130 is held in position on shaft 332 by a screw 336 acting through washer 338. Crankshaft 332 is mounted upon bearings 340 and 342, which are mounted upon supporting plate 62 and upon a supporting framework, generally indicated at 344, respectively. Supporting framework 344 (Figures 14 and 17) is L-shaped and is rigidly mounted upon supporting plate 62 by three supports 360, 362 and 364. Crankshaft 332 has a pair of cranks 346 and 348 formed thereon which are separated by a shoulder portion 350. Cranks 346 and 348 are balanced with respect to the axis of shaft 332 and drive a pair of crank arms 352 and 354 (Figures 13, 14 and 17) with an oscillating movement through a pair of bearings 356 and 358. Crank arms 352 and 354 (Figure 14) extend substantially transversely across the machine and are pivotally connected by bolts 366 and 368 (Figure 15) to a pair of rocking arms 370 and 372.

Rocking arm 370 includes a hub portion 370*a* (Figures 14 and 16) through which the shaft 374 of pad 42 extends. Rocking arm 370 extends downwardly from shaft 374 and is keyed thereto by a key 376 (Figure 14). Shaft 374 is mounted on a supporting member, generally indicated at 378, the hub portion 378*a* of which is pivotally mounted on supporting member 360. Supporting member 378 (Figure 16) includes a pair of arms 378*b* and 378*c* which extend inwardly from hub portion 378*a* and on which the bearings 380 and 382 for shaft 374 are mounted. Bearing 380 is preferably a combination thrust and radial bearing, its outer race being connected to arm 378*b* by ring 384 and screws 386, and its inner race being connected to shaft 374 by washer 388 and screw 390. By mounting shaft 374 (Figures 14 and 16) on supporting member 378, shaft 374 can be raised and lowered, and this permits the pouncing pads 42 and 44 (Figure 4) to be moved into and out of pouncing position with respect to each other.

As is best shown in Figure 4, a partition 392, which is a part of casting 60, forms an oil reservoir 394, into which the lower portion of the mechanism mounted on the rear of plate 62 extends. This ensures the lubrication of this mechanism during operation of the machine. To prevent oil from leaking through the opening 396 (Figure 16) in casting 62 through which shaft 374 passes, a plate 398 is connected to arm 378*c* of supporting member 378 by screws 400. Plate 398 abuts on a gasket 402 which extends entirely around hole 396, and thus prevents oil from leaking from the interior of the upper portion of the machine.

Shaft 404 (Figure 15) on which pad 44 (Figure 4) is mounted, is driven by rocking arm 372 (Figures 14 and 15). Rocking arm 372 includes a hub portion 372*a* (Figure 15) which is keyed to shaft 404 by means of a key 406. Shaft 404 is pivotally mounted by bearings 408 and 410, which are mounted on supporting framework 344 (Figures 14 and 15) and on casting 62. Bearing 408 is a combination thrust and radial bearing, its outer race being connected to supporting member 344 by ring 412 and screws 414, and its inner race being connected to shaft 404 by washer 416 and screw 418.

In operation, as shaft 332 (Figures 14 and 17) is driven, crank arms 352 and 354 are oscillated by cranks 346 and 348. The oscillating movement by crank arms 352 and 354 is transferred to rocking arms 370 and 372, and through them to pad shafts 374 and 404. Thus, as shaft 332 is driven, the pads 42 and 44 (Figure 2) are driven with an oscillating action in opposite phase relationship with respect to each other.

Movement of the pouncing pads into and out of operative position is controlled by movement of control shaft 182. As pointed out hereinabove, control shaft 182 (Figures 4 and 7) is actuated by handle 50 (Figure 3), solenoid 240 or spring 222. When control shaft 182 is moved into an operative position, arm 196, which is keyed thereto, is in the position it occupies in Figure 4, and the pouncing pads 42 and 44 are in operative position with respect to each other. When the control shaft is moved in a clockwise direction, as viewed in Figure 3, arm 196 is raised and it acts through mechanism to be disclosed hereinafter to move pads 42 and 44 into an inoperative position, as shown in Figures 1 and 2.

As described hereinabove, arm 196 (Figures 4 and 7) is connected to control shaft 182 and turns therewith. Arm 196 has a hub portion 196*b* through which extends a bolt 210. A link 420 (Figures 4, 5, and 16) is piv-

otally connected at its lower end to bolt 210 and at its upper end by a pin 422 to an arm 424. Arm 424 (Figure 16) is pinned by a pin 425 to a shaft 426 rotatably mounted on casting 62 and supporting framework 344. As shaft 426 is turned by arm 424, it actuates an arm 428 (Figures 13 and 16) pinned to shaft 426 by means of pin 430. Arm 428 is pivotally connected to a link 432 by a pivot pin 434, and link 432 is in turn pivotally connected to toggle link 436 by a pivot pin 438. As pointed out hereinabove, supporting member 378 is pivotally mounted on shaft 360 (Figure 14) and it includes a pair of arms 378*b* and 378*c* (Figure 16) connected by a section 378*d*. A pair of lugs 440 and 442 extending to the left from section 378*d*, as viewed in Figure 16, form a bracket to which toggle link 436 is pivotally connected by pivot pin 444 (Figure 14). Toggle link 436 is pivotally connected to toggle link 446 by means of a pivot pin 448, and link 446 in turn is connected to pressure bar 450 by means of pivot pin 452. Pressure bar 450 (Figure 14) includes a hub portion 450*a* (Figures 14 and 17) which is pivotally mounted on a stud shaft 454. The forward end of stud shaft 454 is threaded into head casting 62, and hub 450*a* is maintained in spaced relationship with respect to head casting 62 by means of a collar 456.

As will be more fully described hereinafter, a spring 458 (Figure 13) acts through pressure bar 450 and the toggle joint comprising links 436 and 446 to resiliently press pouncing pad 42 toward pad 44 (Figure 4) during operation of the machine. Mechanism, generally indicated at 52 (Figure 13), is provided to permit the operator to adjust the degree of pressure exerted by spring 458, and thus the degree of pressure exerted by pads 42 and 44 on a hat brim during pouncing. This mechanism includes a supporting plate 462 (Figures 3 and 13) which is connected to casting 62 by screws, one of which is shown at 464. Plate 462 has a hole 466 extending therethrough within which is rotatably mounted a member 468. Member 468 has an annular flange 468*a* extending outwardly from its lower edge beneath plate 462 and a knob 52 is mounted on the upper end of member 468 by a set screw 472. Knob 52 and member 468 form a unit which is rotatably mounted on plate 462. Member 468 has a threaded adjustable member 476 mounted thereon. Member 476 has an annular flange 476*a* extending outwardly from its lower edge. A recess 478 in the edge of flange 476*a* is adapted to receive a stationary pin 480 mounted on plate 462. The purpose of pin 480 is to prevent member 476 from rotating, but permit it to move upwardly and downwardly with respect to plate 462 as knob 52 is turned. Member 476 has a hole 482 therein in which spring 458 is positioned. The upper end of spring 458 abuts against a seat 482*a* formed at the upper end of hole 482, and the lower end of spring 458 bears against the upper surface of pressure bar 450. Spring 458 is held in position with respect to pressure bar 450 by a pin 484.

In operation, when knob 52 is turned, member 468 turns with it. As member 468 turns, the threads thereon act upon the threads on member 476 to move member 476 upwardly or downwardly, pin 480 preventing member 476 from rotating. Thus, if it is desired to increase the pressure upon bar 450, knob 52 may be turned to move member 476 downwardly which results in compressing spring 458. When it is desired to decrease the pressure upon bar 450, the knob 52 is turned in the opposite direction so that member 476 is moved upwardly. The flange 52*a* of knob 52 is provided with suitable indexing means so that the operator may set the degree of pressure exerted by spring 458 on bar 450 during pouncing at the degree desired for the pouncing operation being run on the machine.

When the pouncing pads 42 and 44 (Figures 1 and 2) are in inoperative positions with respect to each other, the pouncing pad shafts 374 and 404 are in the positions they occupy in Figure 14. At this time, link 420 is in a raised position and acts through arm 424, shaft 426, arm 428, link 432 and toggle link 436 to hold supporting member 378 in a raised position. At this time, it will be noted that pressure bar 450 engages a pin 486 which is mounted on casting 62, and thus pressure bar 450 does not exert any pressure upon toggle link 446.

When the machine is placed in operation, link 420 is moved downwardly (Figure 13) and it acts through arm 424, shaft 426, arm 428, and link 432 to move the toggle joint, generally indicated at 488, to an operative position. At this time, the pivotal connection 448 between toggle links 436 and 446 is positioned to the left of the line connecting the axes of pivot pins 452 and 444. Further movement of the toggle joint to the left is prevented by engagement of the surfaces 446*a* and 436*a* of toggle links 436 and 446. At this time, the toggle links form a rigid connection between pressure bar 450 and supporting member 378 so that spring 458 exerts pressure downwardly upon supporting member 378 to resiliently urge pad 42 toward pad 44. Thus, movement of the pouncing pads into and out of operative position is controlled by movement of link 420.

When the solenoid 240 (Figure 4) is energized due to the closing of switch 262 (Figure 7) at the end of a cycle of operation, solenoid 240 acts through arm 238 to turn shaft 218 in a counterclockwise direction. After pivot pin 228 (Figure 3) in moving to the right passes center position, spring 222 acts through arm 224 to continue the counterclockwise movement of shaft 218 started by solenoid 244. Shaft 218 (Figure 4) acts through arm 216 and link 212 to move arm 196, and thus bolt 210 and link 420 (Figures 4, 5, and 13) upwardly. As link 420 moves upwardly, as described hereinabove, it acts through arm 424, shaft 426, arm 428, link 432 and toggle link 436 to move toggle joint 488 to an open position or to the position it occupies in Figure 14. As toggle joint 488 is moved to an open position by link 420, supporting member 378 is raised so that pad 42 is moved to the position it occupies in Figures 1 and 2. Thus, at the end of a cycle of operation, pouncing pads 42 and 44 are automatically moved to inoperative positions.

As pouncing pads 42 and 44 are substantially similar in construction, details of construction will be limited to pouncing pad 42. Pad 42 (Figures 16, 19, 19*a* and 20) includes a frame 490 which supports the mechanism of the pad and connects the pad to the pad actuating shaft 374 (Figures 16 and 19). To connect frame 490 to shaft 374, frame 490 is provided with a pair of ears 490*a* and 490*b* which extend upwardly on opposite sides of shaft 374. The outer end of shaft 374 has its sides and bottom squared to receive the lugs 490*a* and 490*b*. A nut 492 extends through holes in lugs 490*a* and 490*b* and through shaft 374, and coacts with bolt 494 to mount frame 490 on shaft 374. It will be noted, referring to Figure 19, that the undersurface of shaft 374 is spaced from frame 490. A pair of set screws 496 and 498 (Figure 16) are provided to hold pad 42 in adjusted position with respect to shaft 374. By adjusting screws 496 and 498, pad 42 may be adjusted so that the longitudinal axis of the pad face is positioned at a slight angle to the axis of shaft 374. When each pad is so adjusted, the portions of the pad faces which pounce the outer portions of the brim of a hat are closer together than the forward ends of the pad faces. Thus, when the machine is in operation, because of the resiliency of the pad faces pouncing is in the form of a triangular band 610 (Figure 27). Thus, during a pouncing operation, for each oscillation of the pads the pouncing effect is greatest at the outer edge of a hat brim and decreases inwardly along the face of the pads to the inner portion of the hat brim. Because the rear portions of the pad faces pounce a greater surface area than the forward ends of the pad faces during each revolution of a hat, by adjusting the pad faces as described hereinabove, even pouncing of all surfaces of the brim is obtained during each pouncing operation.

A pair of end plates 500 and 502 (Figures 19*a*, 20 and 21) are connected to ends of frame 490 in any suitable manner, such as by screws 504 and 506. These plates support mechanism for holding sandpaper 508 (Figures 19 and 19*a*) in position on and feeding it across the face of pad 42. The supply of sandpaper for pad 42 is contained in a roll 512 (Figures 2 and 16) which is mounted on pin 510 (Figures 16 and 17), the lower end of which is threaded into plate 62. From sandpaper roll 512 (Figure 19*a*) the sandpaper 508 (Figures 19 and 20) passes around a rubber roller 514 (Figures 19 and 20), rotatably mounted on plates 500 and 502, thence across the face of pad 42 and between feeding gears 516 and 518.

To maintain sandpaper 508 in engagement with roll 514, and to prevent it from becoming loose on the face of pad 42, a friction plate 520 is provided. Friction plate 520 includes a shaft 522 (Figures 19 and 20) which pivotally mounts plate 520 on end plates 500 and 502. A plate 524 (Figures 19 and 19*a*) is mounted on lug 490*a* by means of screws 526. A spring 528 under compres-

sion is mounted on a pair of pins **530** and **532** on plates **524** and **520**, and at all times resiliently urges movement of plate **520** in a clockwise direction about shaft **522** (Figure 19). Thus, when sandpaper **508** is positioned between friction plate **520** and roller **514**, it is at all times held in contact with the pad face, yet may be fed by feeding gears **516** and **518** across the pad face at any time.

Feeding gear **516** (Figures 19 and 20) is rotatably mounted on plates **500** and **502** and has a gear **534** connected thereto. Gear **534** meshes with a pinion **536** mounted on and connected to a shaft **538** which is also rotatably mounted on pad **42**. Shaft **538** has a ratchet wheel **540** pinned to its rear end by means of pin **542**. An opening **544** is provided in plate **502** to permit the forward end **538***a* of shaft **538** to be engaged by a key so that shaft **538** may be manually turned. When shaft **538** is manually turned, it drives feeding gear **516** through pinion **536** and **534**, and gear **516** coacts with feeding gear **518** to feed sandpaper across the face of the pad.

During each cyclical operation, feeding gears **516** and **518** (Figure 19) are turned a fraction of a revolution to feed the sandpaper from rolls **512** and **513** (Figure 2) across the faces of pads **42** and **44**. To actuate feeding gears **516** and **518** (Figure 19), a solenoid having a core **546** (Figure 5) is energized once during each cycle. When core **546** is actuated, it moves to the left, as viewed in Figure 5, and acts on a pin **548** (Figures 4, 5, 23 and 24) extending rearwardly from the lower end of an arm **550**. Arm **550** is connected to a shaft **552** which is mounted on and extends through a cover plate **63** connected to plate **62**. An arm **554** (Figure 18) is connected to the forward end of shaft **552** and extends upwardly therefrom. When solenoid core **546** (Figure 5) is actuated, arms **550** and **554** (Figures 18 and 23) move in a clockwise direction, and when the solenoid is deenergized, a spring **556** (Figure 5), which is connected to pin **548** and to the machine, moves arms **550** and **554** in a counterclockwise direction.

A pair of detents **560** and **568** (Figures 18 and 23) are pivotally mounted by pivot pins **564** and **565** on a supporting plate **562** connected to cover plate **63** by screws **561**. Detents **560** and **568** are actuated by a pin **572** mounted on the upper end of arm **554**. A spring **566** is provided connecting detents **560** and **568** and at all times resiliently urges movement of the detents into clockwise and counterclockwise directions, respectively. Pin **572** extends forwardly through an opening **559** (Figure 23) in supporting plate **562**, and thus actuating movement of pin **572** and arm **554** is limited by the width of opening **559**.

When the solenoid is energized, its core **546** (Figure 5) moves to the left and moves arms **550** and **554** (Figures 18 and 23) in a clockwise direction. This permits the nose portions of detents **568** and **560** to engage sandpaper feeding ratchet wheels **540** and **570** of pads **42** and **44**, and as the pads reciprocate, the ratchet wheels and detents coact to feed sandpaper. When the solenoid is deenergized, spring **556** (Figure 5) moves arms **550** and **554** (Figures 18 and 23) in a counterclockwise direction. As arm **554** moves to the left, it acts through its upper end and pin **572** to move detents **560** and **568** in counterclockwise and clockwise directions, respectively. This moves them out of engagement with ratchet wheels **540** and **570**, stopping the feeding of sandpaper.

To prevent ratchet wheels **570** and **540** from moving in clockwise and counterclockwise directions (Figure 18), each pad is provided with a pawl similar to pawl **541** (Figure 21), which is held in engagement with its ratchet wheel by a spring **543**. Thus, when arm **554** moves to the right (Figure 18) and detents **560** and **568** move into actuating positions with respect to the ratchet wheels, the pawls associated with the ratchet wheels prevent their being turned in the wrong direction. Thus, during each pouncing operation, the sandpaper is fed partially across the face of each pouncing pad and the used paper feeding from between each pair of feeding gears is torn off from time to time by the operator.

As pads **42** and **44** pounce a brim, pojum removed from the brim falls downwardly onto plate **62**. To remove the pojum from the machine, pulley **130** (Figure 5) is provided with a series of vanes **131**. These vanes are enclosed in a housing **65***a* (Figure 17) formed on plate **65**. An intake opening **65***b* (Figures 2 and 17) is provided in plate **65** and as vanes **131** are driven, a steady stream of air is blown out of an opening **133** in the side wall of housing **65***a* facing the rear ends of pads **42** and **44**. This stream of air effectively blows all pojum off the machine and thus keeps its exterior and exposed mechanisms clean.

The switch **335** (Figures 6 and 26) controlling the operation of motor **120** (Figures 4 and 5) is mounted on a bracket **337** secured to the machine by screws **119**. The switch arm of switch **335** is provided with a roller **339** (Figure 26). As handle **50** is moved into operative position, the hub **196***a* (Figures 6 and 7) turns with it in a counterclockwise direction (Figure 4) and a lobe **343** on hub **196***a* engages switch arm roller **339** to close switch **335**. When switch **335** is closed, the circuit to motor **120** (Figure 3) is completed. At the end of the cycle of operation, when arm **196** moves upwardly as described hereinabove, it moves lobe **343** out of engagement with roller **339** (Figure 26) and thus breaks the circuit to motor **120**.

The solenoid controlling the operation of the sandpaper feeding mechanism is controlled by a switch **333** (Figure 7) having a roller **341** on its switch arm. As pin **266** moves through its arc during an operating cycle, it engages roller **341** and closes switch **333**. For the period of time that pin **266** engages roller **341** and holds switch **333** closed, the solenoid having core **546** (Figure 5) is energized. This results in sandpaper being fed across the faces of the pads, as described hereinabove. By adjusting switch **333** toward or from the arc described by pin **266**, the operator may select the period of time switch **333** will be closed during each operating cycle, and thus the amount of sandpaper that will be fed.

In operation, the operator first sets knobs **52** and **54** (Figure 2), knob **52** being set at the desired pouncing pressure and knob **54** being set at the number of revolutions the operator desires a hat to make during any given pouncing operation. Next, a hat is mounted upon hat block **45** (Figure 4) and block **45** is mounted on hat support **46**. At the time that hat block **45** is mounted on support **46**, tower **48** is in a vertical position, as shown in Figures 1 and 2. Next, control lever **50** is moved from inoperative position (Figure 1) to operative position (Figure 3).

As lever **50** moves toward operative position, it turns shaft **182** (Figures 4, 7 and 10) in a clockwise direction as viewed in Figure 10. As shaft **182** turns, arm **184** (Figure 10) turns in a clockwise direction, which permits roller **188** and arm **186** (Figure 7) to be moved in a clockwise direction, as viewed in Figure 10, by spring **176** (Figures 4 and 7), acting through casting **98** (Figure 7) to which arm **186** is connected.

As spring **176** turns casting **98** in a counterclockwise direction (Figure 4), tower **48** (Figure 3) moves into operative position with respect to the pouncing pads. Tower **48** moves rearwardly until the crown **303** (Figure 25) of hat **305** engages supporting plate **502** (Figures 20 and 25). At this time, the brim **307** of hat **305** is positioned between pouncing pads **42** and **44**. It should be noted that regardless of the size of the hat block mounted on support **46**, tower **48** is so mounted and constructed that during pouncing the crown of the hat always rides upon plate **502** as the hat support rotates. As the major and minor axes of the hat block move into contact with plate **502**, tower **48** moves outwardly and inwardly so that the entire brim of the hat is always positioned between the pouncing pads. It will also be noticed, referring to Figure 4, that the lower pad is offset forwardly a slight distance with respect to the upper pouncing pad **42**. This insures pouncing of that portion of the brim extending beneath the lower edge of the hat's crown.

In addition to controlling movement of hat support **48** into operative position, control lever **50** also controls the movement of the pouncing pads **42** and **44** into operative position. As pointed out hereinabove, as control shaft **182** moves in a counterclockwise direction, as viewed in Figure 4, arm **196** moves downwardly. Arm **196** acts through bolt **210** (Figures 4 and 5), link **420** and arm **424** to turn shaft **426** in a clockwise direction, as viewed in Figure 14. As shaft **426** turns, arm **428** acts through link **432** to move toggle joint **488** into a closed position (Figure 13). Because of the connection of supporting member **378** to toggle link **436**, supporting member **378** and thus shaft **374** is moved downwardly toward shaft **404** moving pad **42** (Figure 4) into pounc-

ing position with respect to pad 44. Groove 184*a* (Figure 10), which controls the movement of the brim of a hat into pouncing position, is so shaped that the brim of the hat to be pounced is positioned between pads 42 and 44 before pads 42 and 44 reach pouncing position.

Referring to Figure 22, in which the pouncing pads 42 and 44 and a hat brim 405 are diagrammatically illustrated, in order to obtain a new and improved pouncing effect, the radius of curvature of each of the pouncing faces 42*a* and 44*a* of pads 42 and 44 is the same. Furthermore, the radius of curvature of each pad face has the axis of shafts 374 and 404 as its axis. Because of the resiliency of the pads, by adjusting screws 496 and 498 (Figure 19*a*) the contact between the pad faces and the brim may be varied all the way from a line contact 611 (Figure 27) to a triangular band 610. As each pad is oscillated by its shaft, the entire face of each pad is utilized to pounce the brim 405, and each pad, as it rolls, effects a cutting action on the hat brim 405 in contrast to the rubbing action heretofore used. Also, because of the relatively short radius of curvature of the pad faces, and because of rolling movement of the pads, the pojum removed from the hat brim during pouncing is fed out from beneath the pads as pouncing is effected. Thus, the pojum cannot affect the pouncing action as it is thrown outwardly from the surface being pounced. This is in contrast to pouncing action heretofore achieved, in which the pojum collected on the surface being pounced and interfered with the pouncing action because it was positioned between the pad faces and the surface being pounced.

As described hereinabove, the operator, by turning knob 52, sets the pressure at which he desires to pounce. As knob 52 is turned, it acts through threaded member 468 to move member 476 upwardly or downwardly to decrease or increase the compression of spring 458. Spring 458 acts upon bar 450, which, when toggle joint 488 is in a closed position, because of its connection to link 446 of toggle joint 488, transmits the pressure of spring 458 to supporting member 378 and thus to pad 42. Thus, by turning knob 52, which is suitably indexed, the operator may set the pouncing pressure at whatever pressure is required for the particular pouncing operation being undertaken.

When switch 335 is closed, the circuit to motor 120 (Figures 3 and 5) is completed, and motor 120 drives pulleys 128 and 130 through belt 132. Pulley 128 (Figure 8) drives hat support 46 (Figure 4) through shaft 134 (Figure 8), worm gear 152, helical gear 156, shaft 158 (Figure 7), worm gear 166, pinion 102 and shaft 78 (Figure 12). It will be noted that the driving connection between shaft 158 (Figure 7) and shaft 78 permits tower 48 (Figure 4) to move toward and from pouncing pads 42 and 44 without affecting the drive to shaft 78. Thus, during pouncing, as the major and minor axes of the hat block 45 cause the support 48 to move outwardly and inwardly with respect to the pouncing pads 42 and 44, the driving connection is maintained at all times.

Pulley 130 (Figure 5) is operatively connected to and drives the pouncing pads. Pulley 130 (Figure 17) drives the pads through shaft 332, which has a pair of cranks 346 and 348 formed thereon. Cranks 346 and 348 drive a pair of crank arms 352 and 354 (Figures 13 and 14) with an oscillating movement in opposite phase relationship with respect to each other. The oscillating movement of crank arms 352 and 354 is transfered to shafts 374 and 404 through bolts 368 and 366 and rocking arms 370 and 372. Thus, as pads 42 and 44 (Figure 3) are mounted on shafts 374 and 404 (Figures 15 and 16), they are oscillated in opposite phase relationship with respect to each other as soon as lever 50 (Figure 3) moves into operative position.

Prior to placing the machine in operation, knob 54 is set so that support 46 (Figure 1) will make a predetermined number of revolutions during an operating cycle. When knob 54 is turned, the contact roller 265 (Figure 7) is adjusted with respect to pin 266, the distance between pin 266 and roller 265 determining the number of revolutions of the hat support during an operating cycle. When an operating cycle begins, shaft 158 drives gear 276 through pinion 268 (Figure 9), gear 270, and pinion 274. Gear 276 through clutch plate 286 (Figure 7) drives cam 282, which drives sleeve 278. As sleeve 278 turns, pin 266 is moved through an arc toward roller 265. When pin 266 contacts roller 265, it closes switch 262, which completes the circuit to solenoid 242 (Figure 4), ending a cycle of operation.

Solenoid 242 acts through arm 238 to turn shaft 218 in a clockwise direction until rod 232 and arm 224 move past center position. At this time, spring 222 acts through rod 232 and arm 224 to turn shaft 218 to an inoperative position. As shaft 218 turns, it turns shaft 182 through arm 216, link 212 and arm 196. As arm 196 moves upwardly, it acts through link 420 (Figure 5), arm 424, and shaft 426 (Figure 13) to move arm 428 upwardly. Arm 428 acts through link 432 to break toggle joint 488 and move it to an open position, as shown in Figure 14. This raises support 378 and thus shaft 374 out of operating position so that pads 42 and 44 are separated (Figure 1).

At the same time, when shaft 182 turns in a counterclockwise direction as viewed in Figure 10*a*, arm 184 moves downwardly to the position it occupies in Figure 10. This causes arm 186 to move upwardly, swinging tower 48 and thus hat support 46 forwardly out of operating position. Also, as arm 186 moves upwardly, it acts upon the periphery of heart-shaped cam 282 to turn it to "home" position (Figure 10). When cam 282 is turned, it acts through sleeve 278 (Figure 7) and arm 312 to move pin 266 back to its "home" position so that it is separated from roller 265 by the same distance it was at the beginning of an operating cycle.

At this time, the hat block may be readily removed, another block mounted on support 46, handle 50 pushed rearwardly and the machine will automatically run through another cycle of operation. If desired, the setting of knobs 52 and 54 may be changed either before or during a cycle of operation if more or less pouncing pressure or a greater or less number of revolutions of the hat support 46 is desired.

It will thus be seen that an efficient and practical pouncing machine has been described, which is automatic in operation. In this machine the pouncing pressure and the number of revolutions of the hat during an operating cycle may be readily set by the operator. At the end of a cycle of operation of the machine, it is reset so that it is ready for another operating cycle. Furthermore, a new method of pouncing has been disclosed which gives improved pouncing results. It will thus be seen that the several objects hereinabove mentioned, as well as many others, have been successfully accomplished.

As many possible embodiments may be made of the mechanical features of the above invention, and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinabove set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a machine for pouncing the brim of a hat, in combination, a support, a pair of shafts mounted on said support, a pair of pouncing pads connected to said shafts having juxtaposed pouncing faces, means to oscillate said shafts in opposite phase relationship with respect to each other, a support for a hat, said support mounting a hat so that its brim lies between the pouncing faces of said pouncing pads, the faces of said pouncing pads contacting opposite sides of the brim of said hat and engaging said brim on substantially line contacts, said line contacts being aligned with respect to each other on directly opposite sides of said hat brim, the portions of the pouncing faces of said pads pouncing the outer portions of said brim being positioned closer together than the portions of said faces pouncing the brim adjacent the crown of said hat, whereby more pouncing is effected by the portions of the pad faces pouncing the outer portions of the brim, the degree of pouncing during each pouncing movement decreasing steadily from the outer portion transversely across the brim to the crown of the hat, the pouncing faces of said pads lying in the surfaces of geometrical cylinders having substantially the same axes as the shafts on which the pads are mounted.

2. In a machine for pouncing the brim of a hat, in combination, a support, a pair of shafts, a pair of pouncing pads mounted on said shafts having juxtaposed pouncing faces, means for driving said pads through said shafts with an oscillating movement in opposite phase relationship with respect to each other, means mounting one of said shafts on said support, means mounting the other shaft

on said support for movement transversely of its longitudinal axis toward and from the other shaft, spring means for resiliently urging said movable shaft toward the other shaft, a control lever, toggle joint means connected to said movable shaft and actuated by said control lever, said toggle joint means when moved to a closed position by movement of said lever to an operative position forming a rigid connection between said spring and said movable shaft to permit said spring to resiliently press said movable shaft toward said other shaft and thus move the faces of said pads into engagement with the hat brim being pounced, and means for moving said toggle joint to an open position with said spring disconnected from said movable shaft when said control lever is moved to an inoperative position.

3. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, and means connecting said control lever to said movable pad and to said hat support, said control lever controlling the operation of said driving means whereby when said control lever is moved into operative position said support and pads are moved into operative positions with respect to each other and said driving means is placed in operation.

4. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, said control lever controlling the operation of said driving means, whereby when said control lever is moved into operative position said support and pads are moved into operative positions with respect to each other and said driving means is placed in operation, and mechanism for feeding sandpaper across the faces of said pads, means connecting said control lever to said mechanism, said control lever controlling the operation of said mechanism.

5. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, said control lever controlling the operation of said driving means whereby when said control lever is moved into operative position said support and pads are moved into operative positions with respect to each other and said driving means is placed in operation, and spring means for holding said control lever in operative position, said spring means at the end of a cycle of operation moving said movable pad and said hat support to inoperative positions.

6. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, and switch means controlling the operation of said driving means, said control lever controlling the movement of said movable pad and said hat support into operative position and closing said switch means when it is moved into operative position, whereby when said control lever is moved into operative position said hat support and movable pad move into operative positions and the driving means for said pads is placed in operation.

7. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, said control lever controlling the operation of said driving means whereby when said control lever is moved into operative position said support and pads are moved into operative positions with respect to each other and said driving means is placed in operation, and timing mechanism for automatically moving all of said elements to inoperative positions at the end of a given number of revolutions of said hat support.

8. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, said control lever controlling the operation of said driving means whereby when said control lever is moved into operative position said support and pads are moved into operative positions with respect to each other and said driving means is placed in operation, spring means for moving said hat support and pads out of operative positions at the end of an operating cycle, and timing means operatively connected to said spring means, said timing means actuating said spring means at the end of an operating cycle to cause said spring means to move said hat support and said movable pouncing pad out of operative position.

9. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, and settable time mechanism controlling the length of operation of the machine, said timing mechanism being settable to cause said hat support and pads to move into inoperative positions after a predetermined number of revolutions of said hat support, said control lever being operable to place said machine in operation.

10. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, settable time mechanism controlling the length of operation of the machine, said timing mechanism being settable to cause said hat support and pads to move into inoperative positions after a predetermined number of revolutions of said hat support, said control lever being operable to place said machine in operation, and means for resetting said timing mechanism at the end of a cycle of operation so that during each cycle of operation said hat support makes the same number of revolutions unless the timing mechanism is reset.

11. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having juxtaposed pouncing faces, means mounting one of said pads for movement into and out of operative position, means for driving said pouncing pads with an oscillating motion in opposite phase relationship with respect to each other, a support for a hat movable into and out of operative position, means for rotating said support, a control lever, means connecting said control lever to said movable pad and to said hat support, switch means controlling the operation of said driving means and said rotating means,

said control lever controlling the movement of said movable pad and said hat support into operative position and closing said switch means when it is moved into operative position, whereby when said control lever is moved into operative position said hat support and movable pad move into operative positions and the driving means for said pads is placed in operation, means for moving said hat support and pads out of operative positions with respect to each other and for opening said switch means, and settable timing mechanism operatively connected to said last-mentioned means, said timing mechanism causing said last-mentioned means to stop the operation of the machine at the end of a predetermined number of revolutions of said hat support.

12. In a machine for pouncing the brim of a hat, in combination, a support, means mounting a pair of pouncing pads having juxtaposed faces mounted on said support, said pads being movable into and out of operative position with respect to each other, means for oscillating said pads in opposite phase relationship with respect to each other, a hat support, means for moving said hat support into and out of operative position with respect to said pads, means for rotating said hat support, means controlling the movement of said pads and hat support into and out of operative position, and settable timing mechanism operatively connected to said last-mentioned means, said timing mechanism causing said controlling means to move said hat support and pads out of operative position at the end of a predetermined number of revolutions of the hat support.

13. In a machine for pouncing the brim of a hat, in combination, a support, means mounting a pair of pouncing pads having juxtaposed faces mounted on said support, said pads being movable into and out of operative position with respect to each other, means for oscillating said pads in opposite phase relationship with respect to each other, a hat support, means for moving said hat support into and out of operative position with respect to said pads, means for rotating said hat support, means controlling the movement of said pads and hat support into and out of operative position, settable timing mechanism operatively connected to said last-mentioned means, said timing mechanism causing said controlling means to move said hat support and pads out of operative position at the end of a predetermined number of revolutions of the hat support, resetting mechanism for said timing mechanism, means connecting said resetting mechanism to said hat support, said resetting mechanism being operated when said hat support moves to an inoperative position and resetting said timing mechanism so that said hat support makes the same number of revolutions during each cycle of operation.

14. In a machine for pouncing the brim of a hat, in combination, a support, means mounting a pair of pouncing pads having juxtaposed faces mounted on said support, said pads being movable into and out of operative position with respect to each other, means for oscillating said pads in opposite phase relationship with respect to each other, a hat support, means for moving said hat support into and out of operative position with respect to said pads, means for rotating said hat support, means controlling the movement of said pads and hat support into and out of operative position, switch means controlling said oscillating means and rotating means, control lever operatively connected to said pads, said hat support and said switch means, said control lever being operable to place said machine in operation, and settable timing mechanism, means operatively connecting said timing mechanism to said switch means, hat support and pads, said timing mechanism after a predetermined number of revolutions causing said hat support and pads to be moved to inoperative positions and opening said switch means to stop rotation of said hat support and oscillation of said pads.

15. In a machine for pouncing the brim of a hat, in combination, a support, means mounting a pair of pouncing pads having juxtaposed faces mounted on said support, said pads being movable into and out of operative position with respect to each other, means for oscillating said pads in opposite phase relationship with respect to each other, a hat support, said hat support being movable into and out of operating position with respect to said pads, means for rotating said hat support, a control shaft, a control lever connected to said shaft, means on said shaft connected to said hat support, said means controlling movement of said hat support into and out of operative position, and means on said shaft operatively connected to one of said pads, said means moving said last-mentioned pad into and out of operative position, whereby movement of said control lever acts through said shaft to control movement of said hat support and pads into and out of operative position.

16. In a machine for pouncing the brim of a hat, in combination, a support, a pair of shafts mounted on said support, the axes of said shafts being parallel to each other, a pair of pouncing pads, the faces of said pads being juxtaposed with respect to each other, adjustable means mounting each pad on each shaft for adjusting said pads so that a line extending longitudinally of the face of one pad is either parallel or positioned at an angle to a line extending longitudinally of the face of the other pad, whereby the contact between said pads during pouncing action is either a line contact or a triangular band, and means for oscillating said pads in opposite-phase relationship with respect to each other.

17. In a machine for pouncing the brim of a hat, in combination, a pair of pouncing pads having resilient cylindrically shaped pouncing faces, means for rotatably supporting a hat with its brim interposed between the faces of said pads, the faces of said pads being opposed with respect to each other and having their longitudinal axes extending transversely across the brim of a hat mounted on said means during pouncing, the longitudinal axes of said pads being closer together at the outside of the brim of the hat being pounced whereby a greater portion of each pad engages the outer edge of the brim then engages the inner portion of the brim thus making the portion of either pad face in engagement with the brim at any given time triangular in shape with the apex of the triangle positioned adjacent the crown of the hat, and means for oscillating said pads during pouncing about their longitudinal axes in opposite phase relationship with respect to each other, a relatively small portion of the total pouncing face of each pad contacting the brim of a hat from the crown of the hat to the outer edge of the brim at any given time during pouncing whereby the portion of the surface of each pad face engaging said hat brim continuously changes during each stroke of said pads so that pojum cut from the brim of said hat during each stroke of said pads is removed from beneath the contacting pads by the rolling cutting action of the pads.

18. In a machine for pouncing the brim of a hat, in combination, a pair of shafts having parallel longitudinal axes, means mounting one of said shafts for movement into and out of pouncing position, a pair of pouncing pads having cylindrically shaped pouncing faces mounted on said shafts, means rotably mounting a hat, means for driving said last mentioned means, the longitudinal axes of the faces of said pads extending transversely across the brim of the hat being pounced, means for oscillating said shafts during pouncing in opposite phase relationship with respect to each other, a relatively small portion of each pad engaging opposite sides of said hat brim during pouncing, whereby as said pads turn during each stroke successive sections of the pad faces engage and pounce the brim feeding the pojum cut from the brim from beneath the portion of the pads engaging the brim and a control lever, means connecting said control lever to said driving means and to said movable shaft, said control lever controlling both the movement of said movable shaft and the starting and stopping of said driving means.

19. In a machine for pouncing a hat brim, the combination of, a pair of pouncing pads having opposed convex pouncing faces, a pair of parallel shafts, means rigidly mounting said pads on said shafts in juxtaposition with portions of their pouncing faces opposed and in position to pounce the brim of a hat disposed therebetween, and means for imparting rotational oscillation to said shafts about their axes to thereby reciprocate said pads thereabout, the radius of the circle of such oscillatory movement and the radius of the curvatures of each of said pouncing faces being substantially equal to effect engagement of said pads with said brim substantially along a continuous line whereby the portion of the pouncing face of each pad engaging said hat brim continuously changes during each stroke of said pads so that pojum cut from said brim during each stroke of said pads is removed from the contacting faces thereof by the rolling and cutting action of the pads.

20. The combination defined in claim 19 in which the means mounting said pads on said shafts are adjustable to increase the pressure of said pads on the hat brim at either end.

21. In a machine for pouncing a hat brim, the combination of, a pair of pouncing pads having opposed pouncing faces and mounted in juxtaposition with portions of their pouncing faces opposed and in position to pounce the brim of a hat disposed therebetween, means for adjusting the position of said pads with respect to each other so that the axes about which they rotate are non-parallel whereby a greater portion of the faces of said pads contacts the brim of such hat near the edge thereof than near the crown portion thereof, and means for imparting rotational oscillation to said pads about their axes to thereby reciprocate said pads thereabout, the radius of the circle of such oscillatory movement and the radius of the curvatures of each of said pouncing faces being substantially equal so that said pads engage said brim in an area roughly the shape of a triangle with a small base.

22. In a machine for pouncing the brim of a hat, the combination of, a supporting framework, a fixed shaft rotatably mounted in said framework, a movable shaft, means rotatably mounting said movable shaft in said framework for movement toward and from said fixed shaft, a pair of pouncing pads mounted on said shafts with juxtaposed pouncing faces, a spring fixedly related to said framework and capable of urging said movable shaft toward said fixed shaft, and a leverage system interposed between said means and said spring which when moved to one position forms a straight line connection between said spring and said means so that said spring urges said movable shaft toward said fixed shaft and which when moved to a non-linear position breaks said straight line connection and moves said movable shaft away from said fixed shaft.

23. In a machine for pouncing the brim of a hat, the combination of a supporting framework, a base plate in said framework, a fixed shaft rotatably mounted in said base plate, means including an arm pivotally connected to said base plate to move toward and from said fixed shaft, a shaft rotatably mounted in said arm, a pair of pouncing pads mounted on said shafts with juxtaposed pouncing faces, a spring fixedly associated with said framework and spaced from said arm, a pair of parts forming a toggle connection between said arm and said spring, and a control mechanism for moving said toggle connection into a substantially straight line position so that said spring urges said arm and last mentioned shaft toward said fixed shaft and for moving said toggle into a substantially nested position to break the connection between said arm and said spring and move said arm and said last-mentioned shaft away from said fixed shaft.

24. In a machine for pouncing the brim of a hat, the combination of, a supporting framework, a base plate in said framework, a fixed shaft rotatably mounted in said base plate, an arm pivotally connected to said base plate, a shaft rotatably mounted in said arm above said fixed shaft, a spring fixedly related to said framework, a pair of pouncing pads mounted on said shafts with juxtaposed pouncing faces, a second arm pivotally connected to said framework and located between the free end of said spring and said first-mentioned arm, means forming a toggle connection between the free ends of said arms, and control means for moving said toggle connection to a straight line position and a nested position.

25. In a machine for pouncing the brim of a hat, the combination of, a supporting framework, a base plate in said framework, a fixed shaft rotatably mounted in said base plate, an arm pivotally connected to said base plate, a shaft rotatably mounted in said arm above said fixed shaft, a compression spring having one end connected to said framework, an arm pivotally connected to said framework disposed between the free end of said spring and said first arm, a supporting pin disposed between the free end of said last-mentioned arm and said first-mentioned arm so that said spring may urge said last-mentioned arm thereagainst, means forming a toggle connection between the free ends of said arms, and means for moving said toggle connection into a straight line position where said second-mentioned arm is moved away from said supporting pin so that said spring urges said first-mentioned arm toward said fixed shaft and for moving said toggle connection into a nested position where said first-mentioned arm moves away from said fixed shaft and said second-mentioned arm rests on said supporting pin.

26. The combination as defined in claim 25 in which there is a control lever mounted on said framework and a linkage system connected to move said toggle connection into either of said two positions.

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