E. F. BEUGLER.

VERTICAL HOOP DRIVING MACHINE.

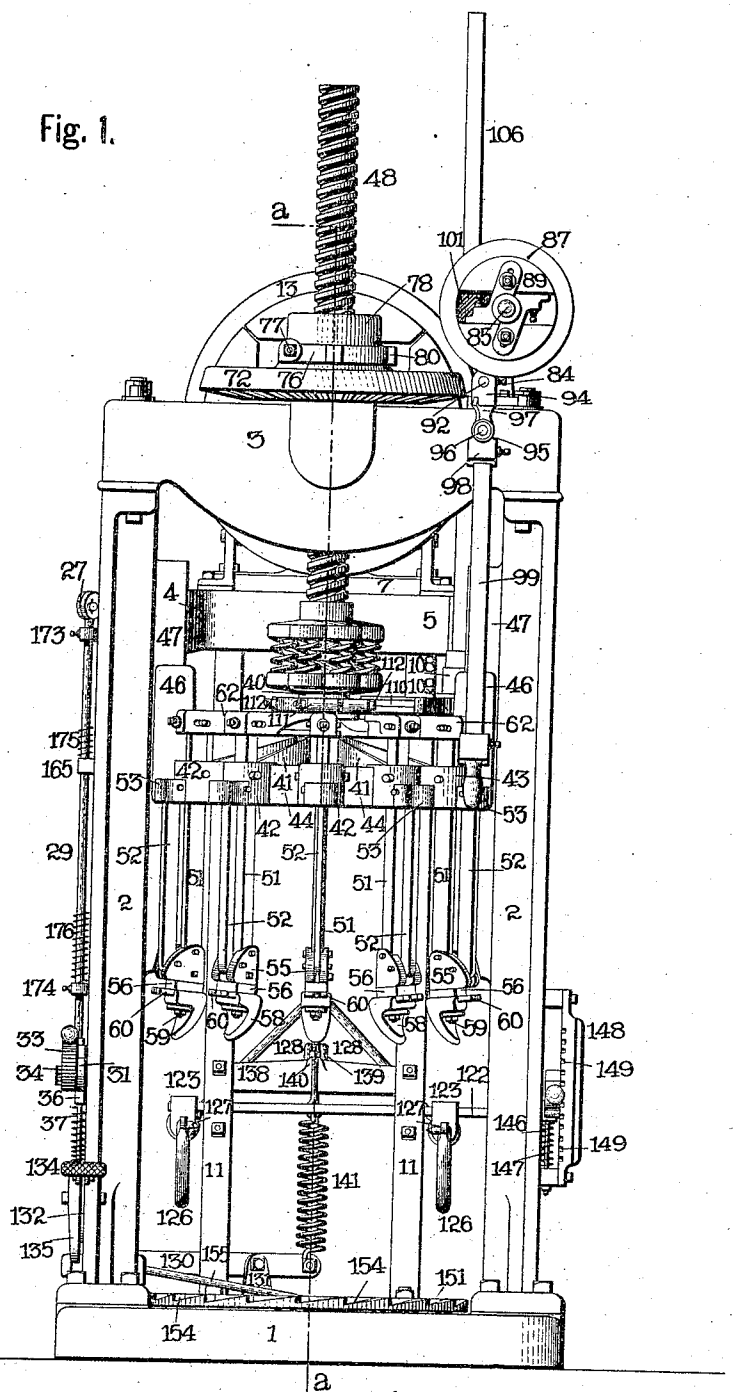
APPLICATION FILED JAN. 13, 1906.

944,356.

Patented Dec. 28, 1909.

10 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

L. M. Sangster

Geo. A. Neubauer.

Edwin F. Beugler Inventor.

By Sangster Attorney.

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10 SHEETS—SHEET 2.

Fig. 2.

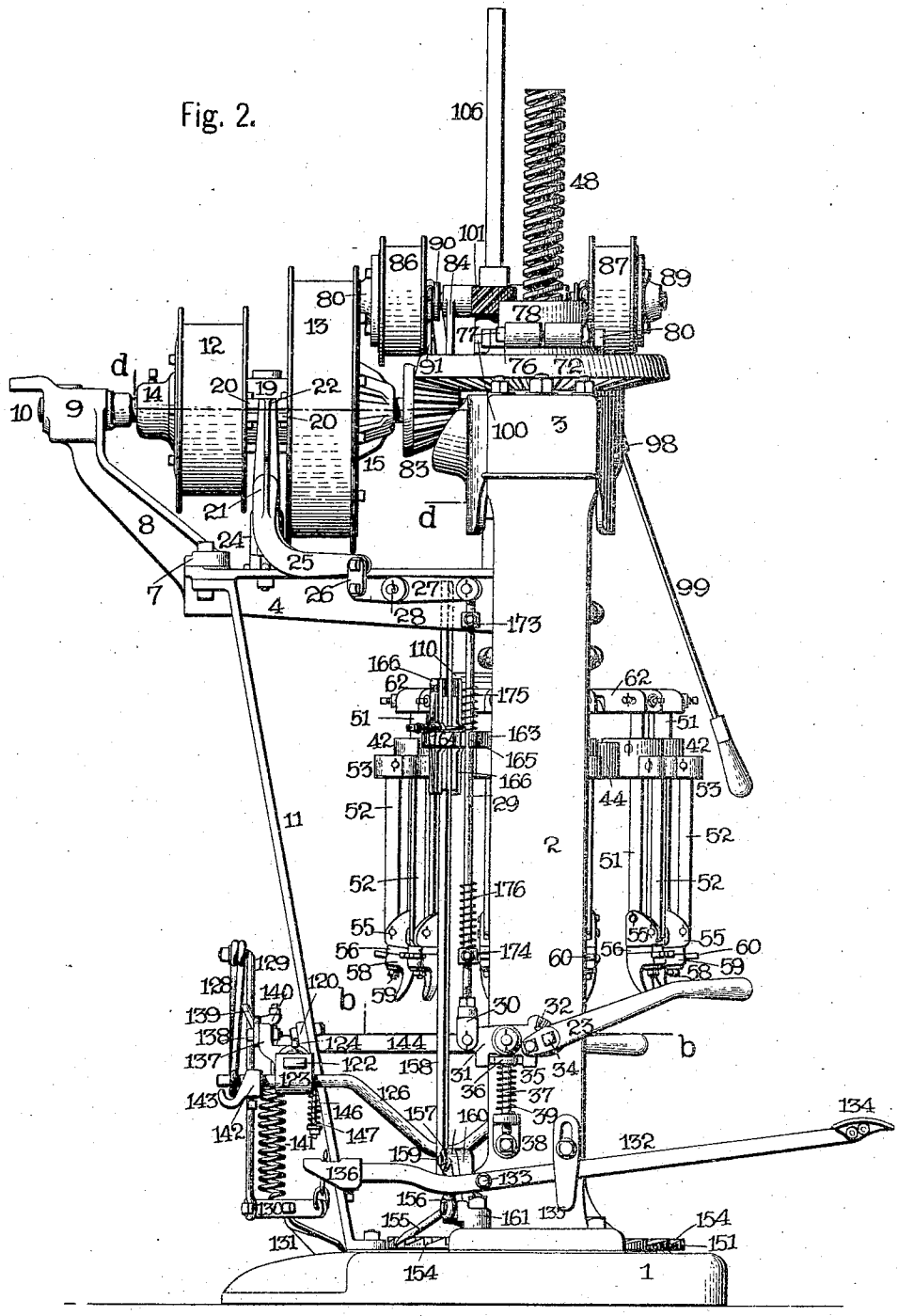

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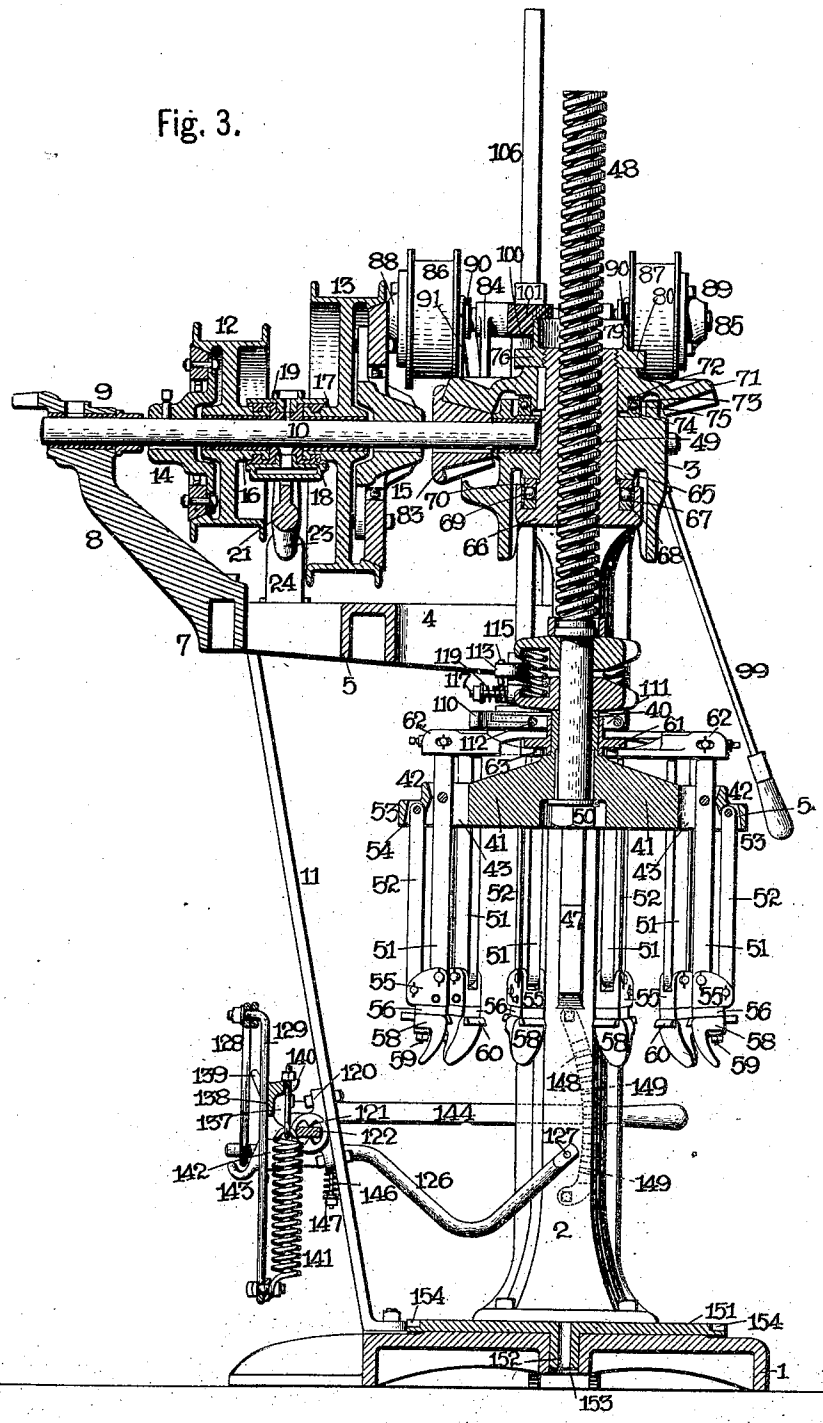
Fig. 3.



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10 SHEETS—SHEET 4.

Fig. 4.

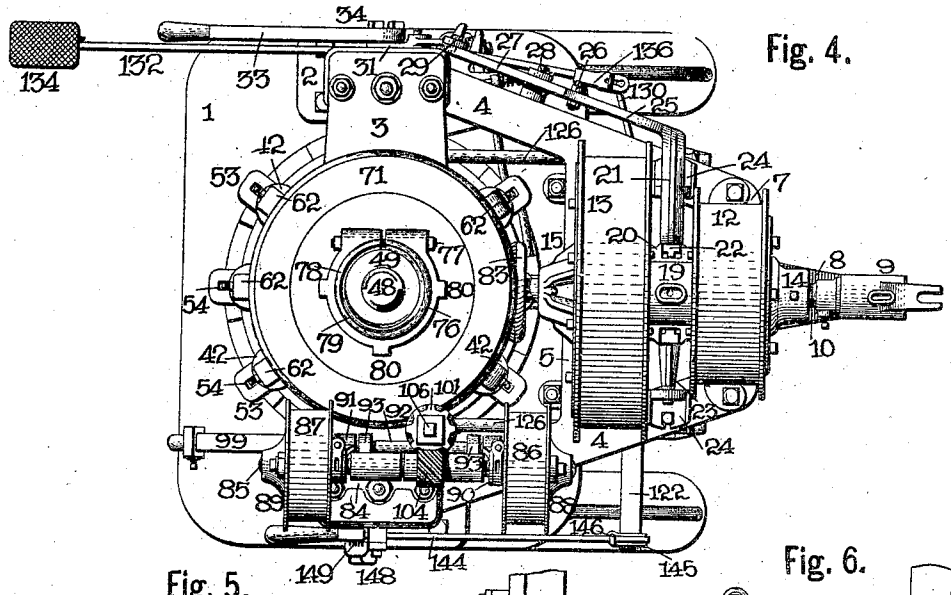
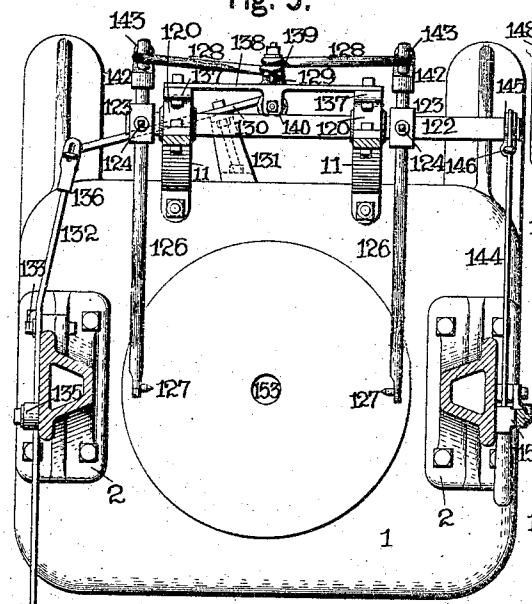


Fig. 5.



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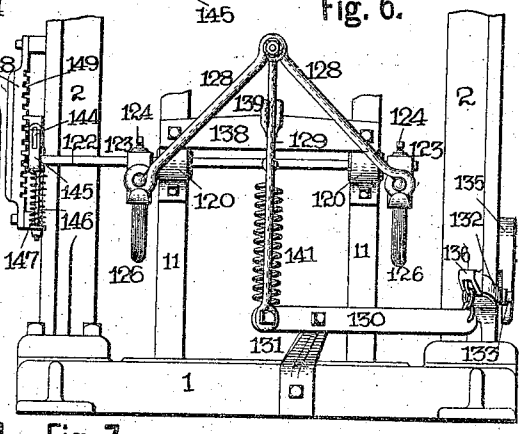

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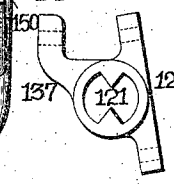

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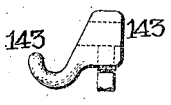


Fig. 9.

Fig. 10.

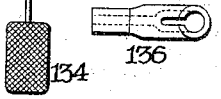


Fig. 11.

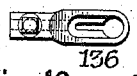


Fig. 12.

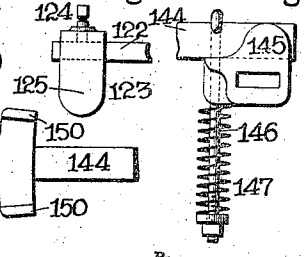
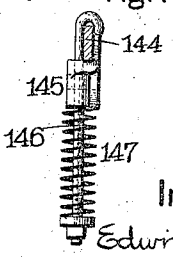


Fig. 13.

Fig. 14.



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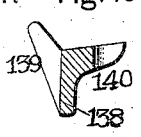
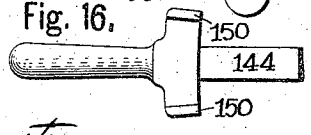


Fig. 16.



Witnesses.

L. M. Daugster.

Geo. A. Neubauer.

Inventor.

Edwin F. Beugler

By C. J. Daugster Attorney.

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10 SHEETS—SHEET 5.

Fig. 18.

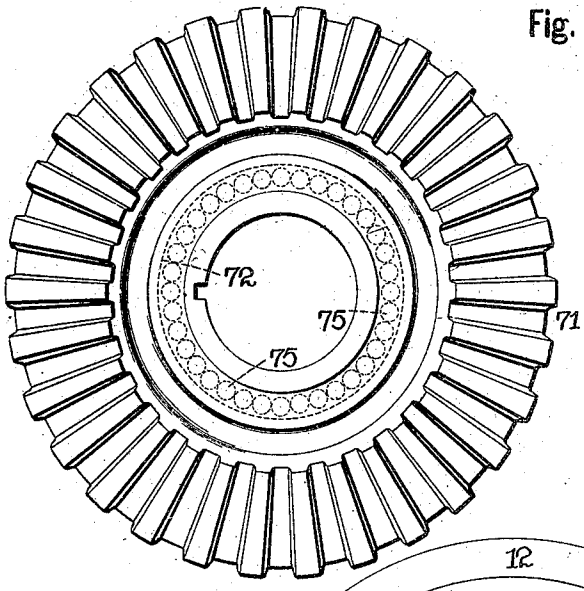

Fig. 17.

Witnesses.

L. M. Langster.

Geo. A. Neubauer.

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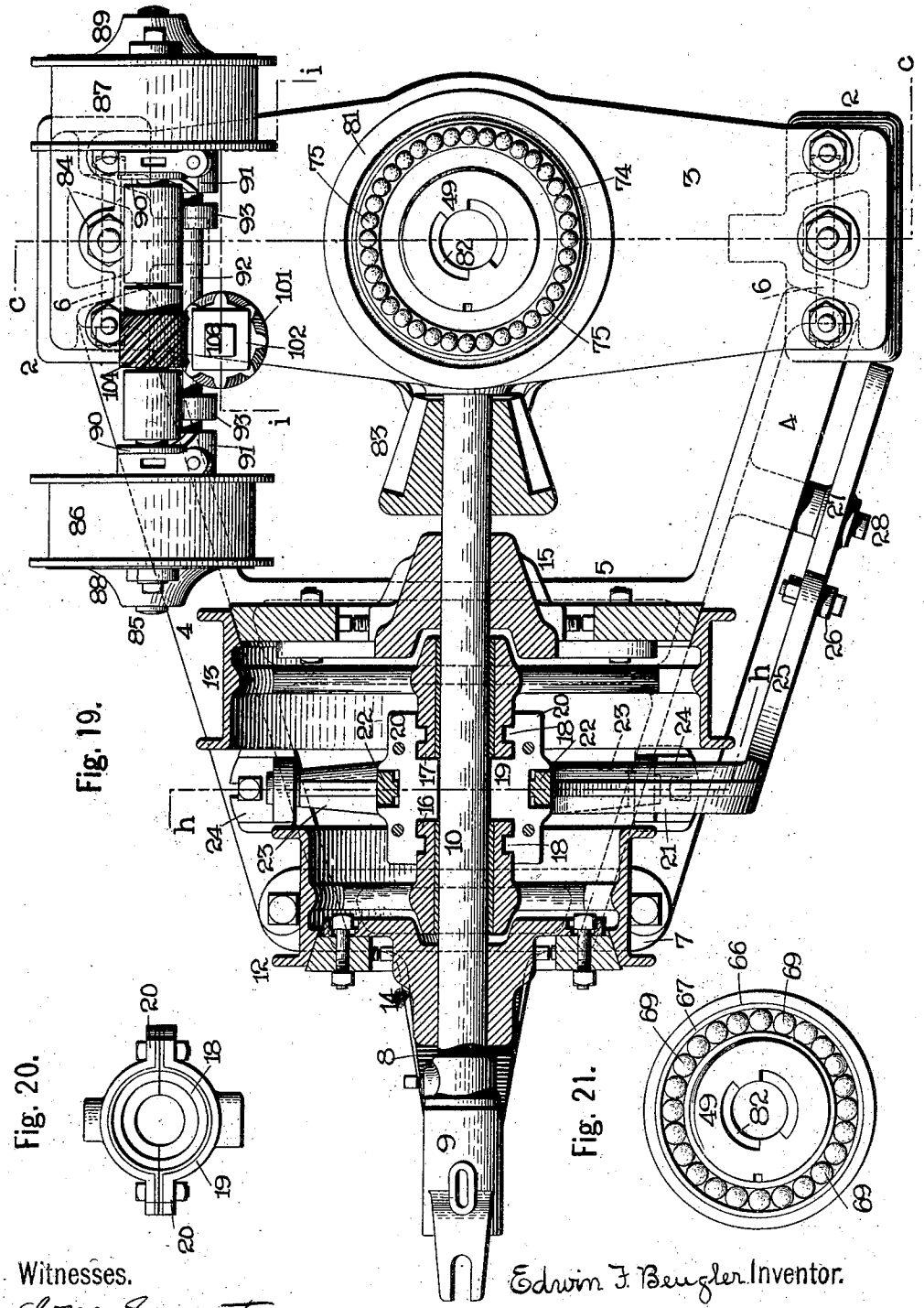

Fig. 19.

Fig. 20.

Fig. 21.

Witnesses.

L. M. Sangster.

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Fig. 23.

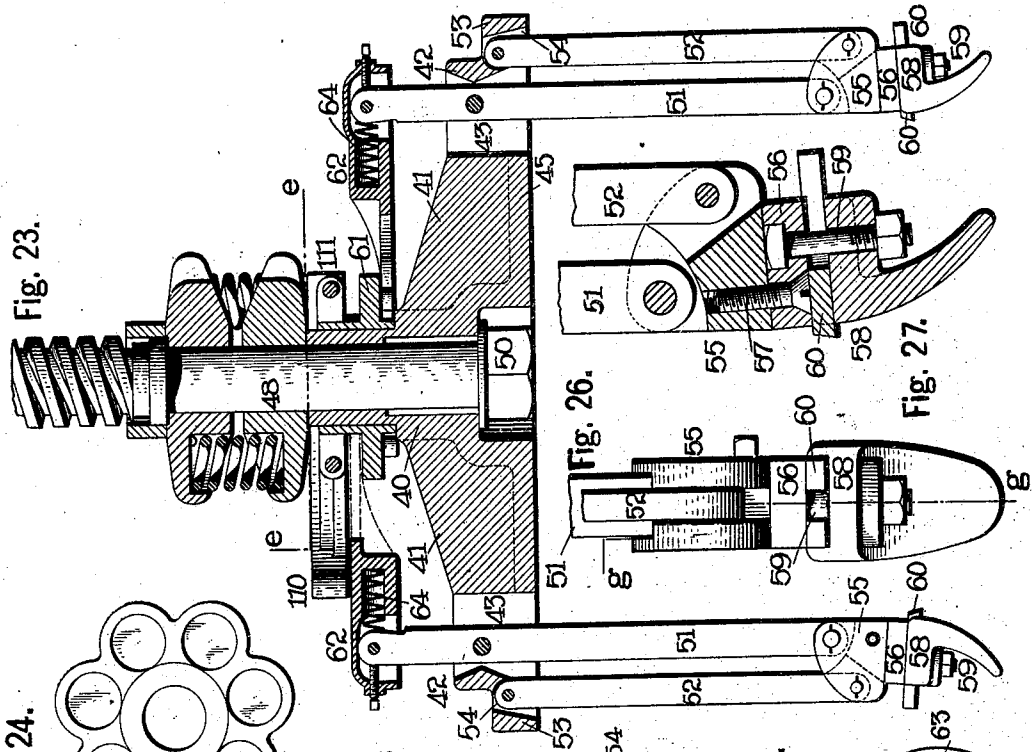
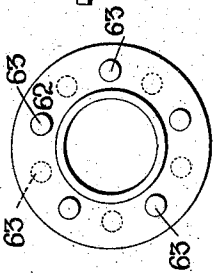


Fig. 26.

Fig. 27.

Fig. 24.

Fig. 25.



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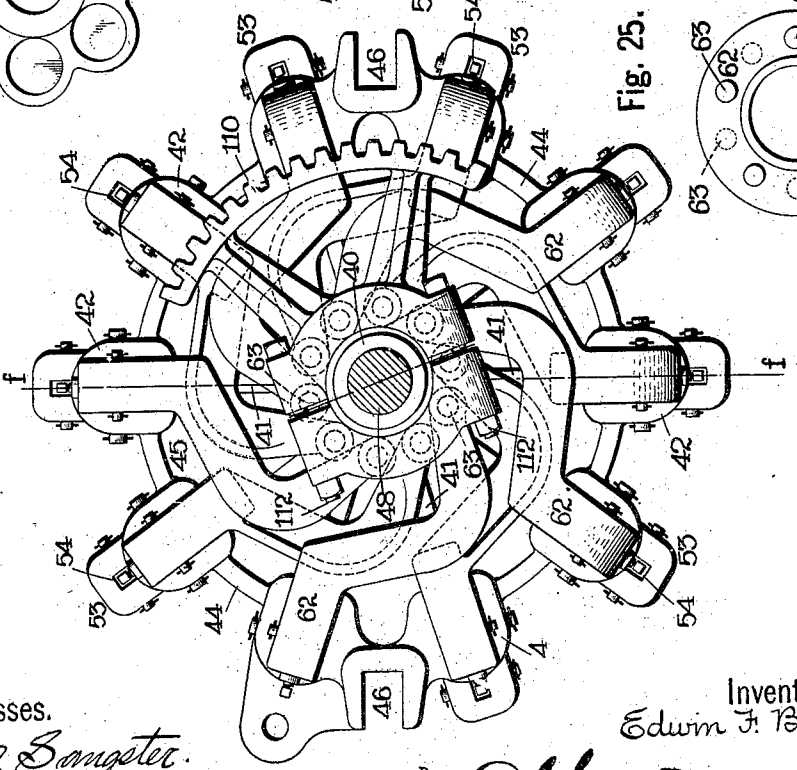

Witnesses.

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10 SHEETS—SHEET 8.

Fig. 28.

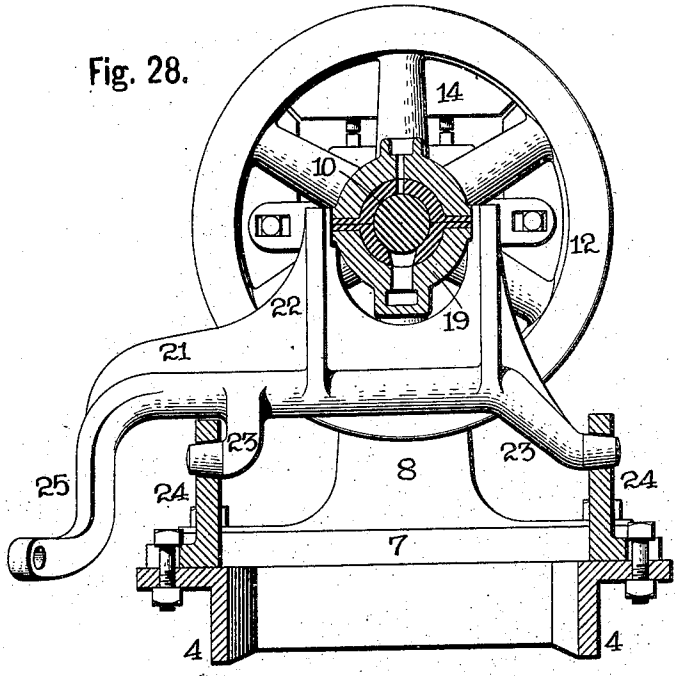


Fig. 30.

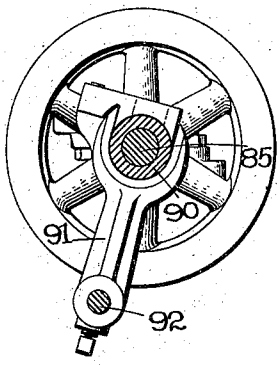


Fig. 31.

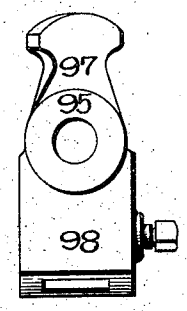


Fig. 29.

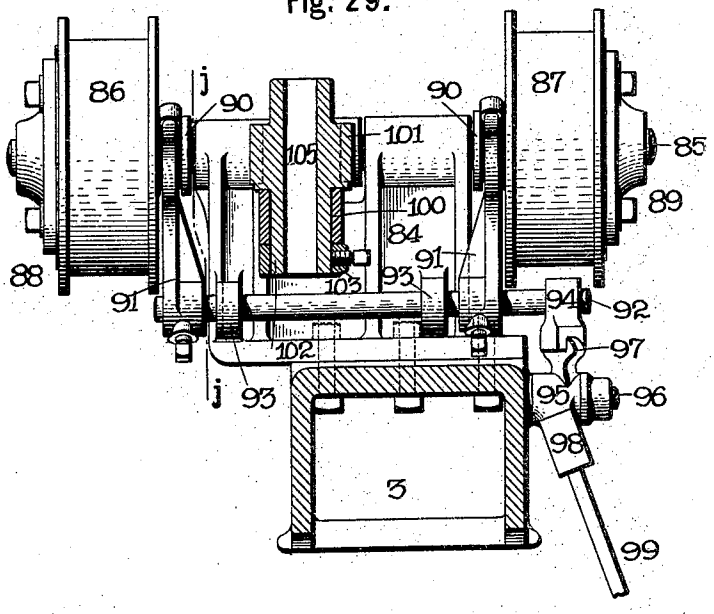


Fig. 32.

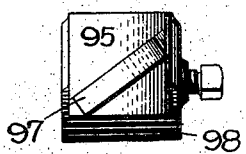
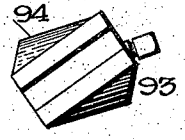


Fig. 33.



Witnesses.

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10 SHEETS—SHEET 9.

Fig. 34.

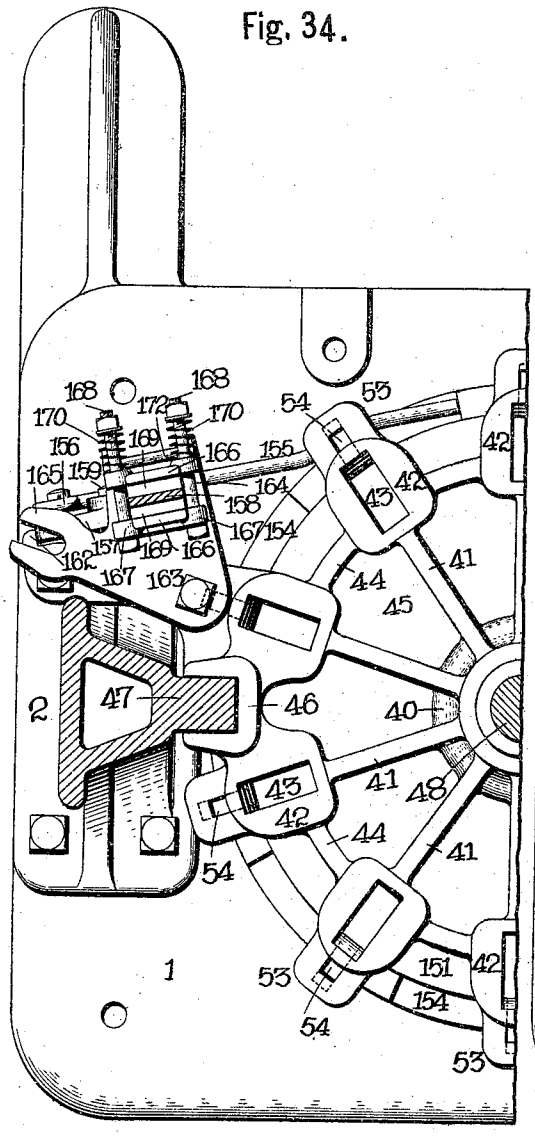


Fig. 35.

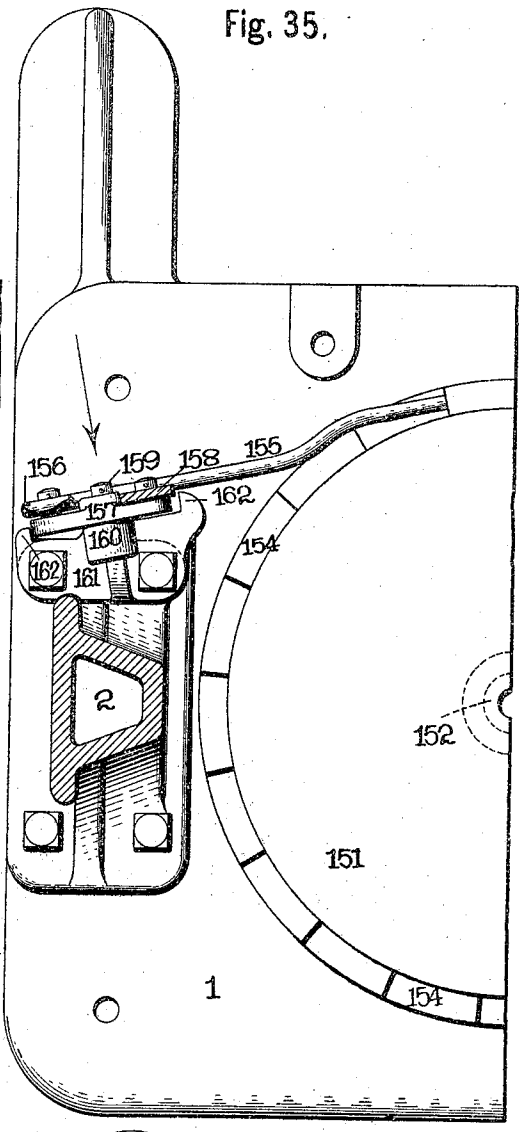
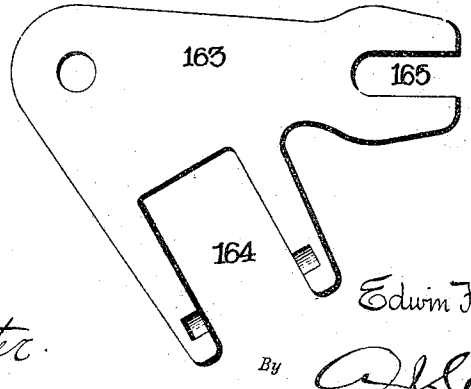


Fig. 36.



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10 SHEETS—SHEET 10.

Fig. 37.

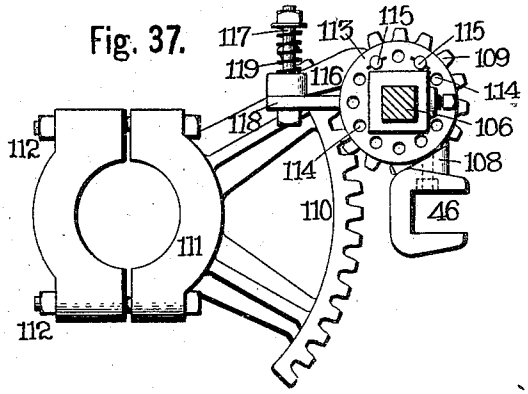
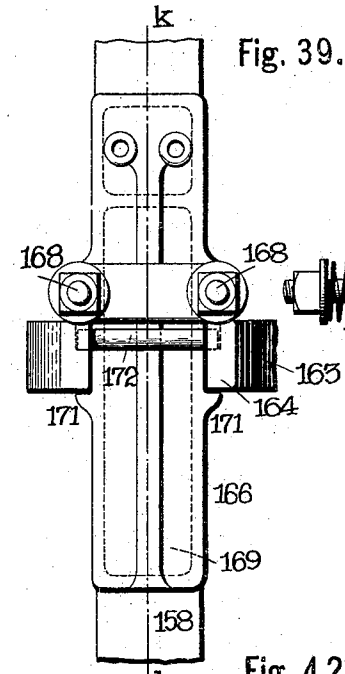


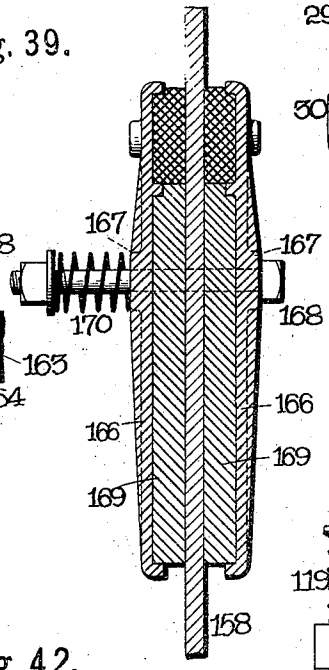
Fig. 38.

Fig. 40.

Fig. 41.

Fig. 39.





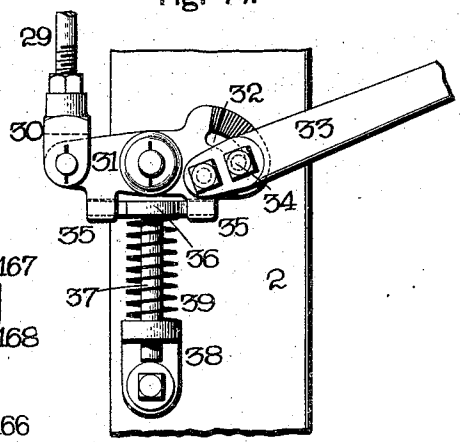
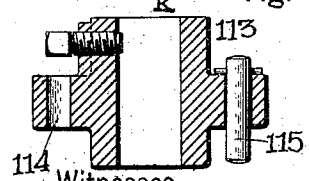


Fig. 42.

Fig. 44.



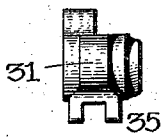
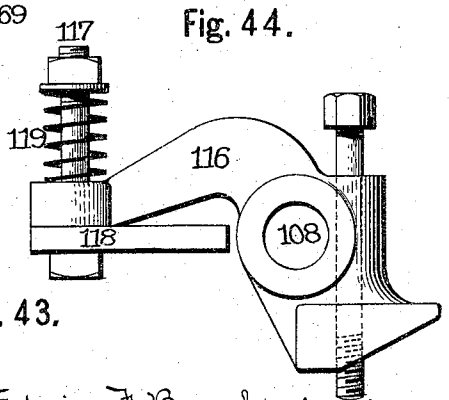


Fig. 43.



Witnesses.

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Geo. A. Neubauer.

Edwin F. Beugler. Inventor.

By A. J. Saugster Attorney.

UNITED STATES PATENT OFFICE.

EDWIN F. BEUGLER, OF BUFFALO, NEW YORK, ASSIGNOR TO EDWARD B. HOLMES, OF BUFFALO, NEW YORK.

VERTICAL HOOP-DRIVING MACHINE.

944,356. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed January 13, 1906. Serial No. 295,906.

To all whom it may concern:

Be it known that I, EDWIN F. BEUGLER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Vertical Hoop-Driving Machines, of which the following is a specification.

This invention relates to that class of machines used in the manufacture of barrels or the like known as vertical machines and is chiefly designed to be employed for driving hoops on tight-barrels or barrels adapted to contain liquids.

One of the features of the invention has reference to a screw bar which is unrotatably attached at its lower end to the driver head and passes through a rotatable screw sleeve on the machine frame, whereby the construction is simplified and lightened and great strength of structure is obtained at the juncture of the driver head and screw bar and the operation of the driver head and its component parts is rendered smoother and easier.

Another feature has reference to a power device for radially shifting the driving arms whereby they are shifted powerfully and accurately with great despatch and by minimum exertion on the part of the workman.

Another feature has reference to a bottom plate upon which the barrels are supported which is partially rotated automatically when the hoop driving mechanism is elevated to prevent the drivers contacting with the hoop at the same points again should it be necessary to lower the hoop driving mechanism more than once in order to drive the hoops firmly in place.

The principal objects of the invention are to obtain great strength of structure, to vertically operate the hoop driving mechanism smoothly and easily to provide for radially shifting the driving arms powerfully and accurately with a minimum of exertion on the part of the operator and to prevent the hoop drivers pressing against the same points on a hoop on successive descents of the hoop driving mechanism.

The invention also relates to certain details of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings in which,—

Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation of the machine. Fig. 3 is a central vertical section through the machine on line *a a*, Fig. 1. Fig. 4 is a top plan view of the machine. Fig. 5 is a horizontal section through the frame on line *b b*, Fig. 2, showing a plan view of the mechanism for turning the barrel end for end. Fig. 6 is a fragmentary rear view of the lower portion of the machine frame showing a rear elevation of the mechanism for turning the barrel end for end. Fig. 7 is an enlarged detached side view of one of the bearing blocks for supporting the horizontal rocking bar of the barrel turning mechanism. Figs. 8 and 9 are enlarged views of the hook for retaining the lower ends of the diagonal links of the hoop turning mechanism. Figs. 10 and 11 are enlarged top and bottom views of the block on the rear end of the foot lever of the barrel turning mechanism. Fig. 12 is an enlarged view of the connection between the horizontal rocking bar and one of the angular rods for lifting the barrel. Figs. 13 and 14 are enlarged views of the connection between the horizontal rocking bar and its operating lever. Fig. 15 is an enlarged detached section through the horizontal plate for supporting the foot lever returning ring. Fig. 16 is an enlarged fragmentary view of the outer end of the lever for operating the horizontal rocking bar. Fig. 17 is a vertical section through the upper part of the machine on line *c c*, Fig. 19. Fig. 18 is an enlarged detached bottom view of the bevel gear wheel which is keyed to the revolving nut, the ball bearing being shown in dotted lines. Fig. 19 is an enlarged detached top plan view of the upper portion of the machine, the bevel gear wheel being removed from the nut and a section being taken through the driving pulleys and driving gear on line *d d*, Fig. 2. Fig. 20 is an enlarged detached view of the sliding collar for shifting the pulleys. Fig. 21 is an enlarged detached plan view of the revolving nut. Fig. 22 is an enlarged detached top plan view of the hoop driving mechanism, a transverse section being cut through the vertical screw bar on line *e e*, Fig. 23. Fig. 23 is a section through the hoop driving mechanism on line *f f*, Fig. 22, all but two of the driving arms being

omitted. Fig. 24 is an enlarged detached top plan view of the lower collar of the hoop driving mechanism for supporting the cushion springs. Fig. 25 is an enlarged detached plan view of the flanged collar to which the inner ends of the angular connecting links are pivoted. Fig. 26 is an enlarged fragmentary view of the lower end of one of the driving arms showing an outside view of the driver. Fig. 27 is a section on line *g g*, Fig. 26. Fig. 28 is a vertical section on line *h h*, Fig. 19. Fig. 29 is a vertical section on line *i i*, Fig. 19. Fig. 30 is a vertical section on line *j j*, Fig. 29, looking toward the left. Figs. 31 and 32 are enlarged detached front and plan views, respectively, of the rocking collar which operates the power mechanism to close the drivers. Fig. 33 is an enlarged detached bottom view of the slotted block which is operated by the rocking collar shown in Figs. 31 and 32. Fig. 34 is an enlarged plan view of one-half of the driving head and the base, showing the friction clutch for operating the barrel rotating plate in position and also the manner of attaching it to the driving head, and a section being cut through one of the vertical side frame members and the vertical screw bar. Fig. 35 is an enlarged plan view of one-half of the base, showing the bell-crank and pawl for operating the rotating plate. Fig. 36 is an enlarged detached plan view of the forked arm which supports the friction clutch. Fig. 37 is an enlarged detached plan view of the segmental gear and pinion for closing and opening the driving arms. Fig. 38 is an enlarged detached elevation of the bell crank and pawl, and its supporting block. Fig. 39 is an enlarged detached side elevation of the friction clutch, also showing a fragment of the forked support. Fig. 40 is a section on line *k k*, Fig. 39. Fig. 41 is an enlarged fragmentary side view of one of the vertical side frame members, showing the hand lever for controlling the driving pulleys. Fig. 42 is an enlarged detached central section through the stop collar on the vertical sliding shaft. Fig. 43 is a detached end view of the horizontal portion of the lever shown in Fig. 41. Fig. 44 is an enlarged detached top view of the cushioned stop plate and its support.

In referring to the drawings for the details of construction, like numerals designate like parts.

The frame of the machine consists of a base 1, vertical side members 2, and a horizontal top girt 3, which has its ends bolted to the upper ends of the vertical side members 2, see Figs. 1 and 17. A supplementary frame for supporting one end of the driving shaft is supported from the base 1, and side members 2, as shown in Figs. 2, 3, 17 and 19. This frame has two rearwardly and diagonally extending portions or frame members 4, which are joined or connected at about their middle by a cross bar 5, the whole preferably being formed in one integral piece. The front ends of the diagonally extending frame members 4, are secured to the vertical side members 2, and near the upper ends thereof by bolts 6, see Fig. 19, where these bolts are shown in dotted lines, and project laterally therefrom in a horizontal direction gradually converging toward each other. The rear ends of these converging frame members 4, are connected by a cross bar 7, which has a diagonally extending arm 8, extending from about the middle of its rear side. This arm is preferably formed integral with the bar 7, and terminates in a bearing 9, in which one end of a horizontal driving shaft 10, is supported. The other end of the driving shaft 10, is supported in a bearing which is formed in the rear side of the top girt 3, see Figs. 3 and 19.

Diagonally extending bars 11, which have their lower ends bolted to the rear portion of the base 1, support the rear end of the supplementary frame, the upper ends of these bars being secured to the rear ends of the diagonal portions 4, and to the ends of the cross bar 7, by bolts, see Fig. 2.

Two driving pulleys 12 and 13, are mounted loosely upon the shaft 10, and rotate in opposite directions. Two friction clutches 14 and 15, are keyed to the shaft, one clutch being placed adjacent to each of the pulleys 12 and 13, see Figs. 3 and 19. The hubs 16 and 17, of the pulleys are elongated and extend toward each other and each of the hubs is provided with an annular groove in each of which an annular flange 18, extending from a split collar 19, is snugly fitted. The collar 19 is made in two halves and has opposed flanges 20, through which bolts are passed to secure the two halves together and around the hubs 16 and 17. The collar 19, is shifted to bring either of the pulleys 12 or 13, into engagement with its adjacent friction clutch by a pivoted yoke 21, which has two vertically extending arms 22, see Fig. 28. These arms constitute a fork which straddles the split collar 19, the upper ends of the arms 22, fitting snugly in depressions or notches which are formed in the outer edge of the flanges 20.

The yoke 21, is provided with two depending portions 23, the ends of which extend at right angles and are tapered as shown in Fig. 28. These tapered ends serve as pivots upon which the yoke rocks, and are supported in bearing plates 24, which are adjustably secured to the top surface of the supplementary frame by bolts, see Figs. 19 and 28. The yoke 21, has an angular arm 25, formed integral therewith, said arm being connected at its forward end by a link 26, to the rear end of a lever 27, which is

fulcrumed on a pin 28, extending from the side of the supplementary frame, see Figs. 2, 19 and 28. The other end of the lever 27, is pivoted to the upper end of a vertically extending rod 29, the lower end of which is screwed into a forked block 30. This forked block 30, is pivoted to the rear end of a horizontal lever 31, which is fulcrumed on a pin extending from one of the side frame members 2. The forward end of this lever 31, is enlarged and is provided with a curved slot 32. The rear end of a diagonally extending handle 33, is fastened by a bolt to the enlarged portion of the lever 31, and another bolt 34, passes through the handle 33, and the curved slot 32. A portion of the outer surface of the enlarged end of the lever 31, is roughened or serrated as shown in Fig. 41, and the handle 33, is similarly roughened upon its inner surface so that when the bolt 34, is tightened the handle 33 and lever 31, are locked tightly together. By loosening the nuts upon the bolts the handle may be adjusted to various heights.

The lever 31, has two forked depending lugs 35, and a cross bar 36, which is fastened to the upper end of a vertical stem 37, fits between these forked lugs. The lower end of the stem passes loosely through an opening in the horizontal portion of an angle plate 38, which is bolted to the side member 2. A spiral spring 39, encircles the stem between the plate 38, and the cross bar 36, and serves to normally maintain the lever 31, in a horizontal position.

The hoop driving mechanism is supported between the vertical side frame members 2, so as to be capable of a vertical up and down movement, and is illustrated in Figs. 1, 2, and 3, and Figs. 22 to 27 inclusive.

The driving head is preferably in the form of a spider as shown in Figs. 1, 3, 22, 23 and 34, and has a central hub 40, which is reduced at its upper end, see Fig. 23. A series of radial ribs or arms 41, extend from this central hub, and connect at their outer ends with an annular series of equally spaced blocks 42, which are provided with vertical slots 43. A circular rim 44, connects these blocks with each other and to a horizontal bottom portion 45, which extends from the bottom of the central hub to the rim 44. The hub 40, arms 41, blocks 42, rim 44, and horizontal bottom portion 45, are all made in one integral piece as shown in Figs. 22, 23 and 34.

The driving head is provided with two forked portions 46, which are placed oppositely to each other and are formed integral with the head. These forked portions constitute guides in which slideways 47, extending from the inner side of each side frame member 2, fit. The forked portions or guides 46, extend above the head so as to provide a comparatively long bearing for the slideways, see Fig. 1. The driving head is securely fastened to the lower end of the vertical screw bar 48, which has a comparatively heavy and coarse screw thread cut thereon for the greater part of its length, and which is supported by a revoluble nut 49, see Fig. 3. The lower end of the screw bar 48, is slightly reduced in diameter and is fitted into a vertical opening in the hub 40, of the driving head. The extreme lower end of the screw bar 48, is provided with a screw thread and a nut 50, which is seated in a depression formed in the bottom of the hub 40, is screwed upon the lower end of the screw bar 48, and securely fastens the driving head to the screw bar. Keys are driven into the bar 48, and the lower portion of the hub 40, and prevent any rotating movement of the bar in said hub, see Figs. 3 and 23.

The drivers are equal in number to the number of blocks 42, and each driver is secured to the lower ends of a pair of driving arms as shown in Figs. 23, 26 and 27. Each pair of driving arms comprises a main driving arm 51, and a supplementary arm 52, which is shorter in length than the main driving arm 51, and extends parallel therewith. Each main driving arm 51, extends through one of the slots 43, in the blocks 42, to which it is pivoted by a pin as shown in Fig. 23. It will be seen by referring to the said figure that the pivoting pin of the main driving arm is placed close to the upper end of said arm.

Each of the blocks 42, has an extension 53, which is provided with a vertical slot 54, in which the upper end of the supplementary driving arm 52, is pivoted by a pin. A triangular shaped block 55, is pivoted by pins to the lower ends of each pair of driving arms 51 and 52, see Figs. 23 and 26. By referring to Fig. 23 it will be seen that the to the lower ends of each pair of driving arms 52, are in a lower plane than that of the pivoting pins of the main driving arm, and it will also be seen that the distance between the centers of the upper and lower pivoting pins of the supplementary driving arm is exactly equal to the distance between the centers of the upper and lower pivoting pins of the main driving arm.

Each triangular block 55, has one of its edges curved and a depression is formed in this curved edge in which the lower ends of the parallel driving arms 51 and 52 are seated, see Figs. 26 and 27. The bottom edge of each triangular block is slightly beveled or tapered and a rectangular block 56, is secured to said bottom edge by a countersunk screw 57, see Fig. 27. A guide block 58, is secured to the rectangular block 56, by a bolt 59, and said guide block is provided with a top depression in which a driving plate 60, is seated, so that the driving plate will be interposed between the

rectangular block 56, and the guide block 58. The driving plate 60, is provided with a slot through which the bolt 59, passes, and the head of said bolt is seated in a depression in the top face of the rectangular block 56, see Fig. 27. The inner edge of the driving plate is preferably chamfered as shown in Figs. 23 and 27, and extends slightly beyond the guide block 58, so as to fit over and grip the hoop.

The upper ends of the main driving arms 51, extend beyond the blocks 42, and are connected to a shiftable collar 61, by means of angular connecting links 62. This shiftable collar is fitted around the reduced upper end of the hub 40, of the driving head and is supported upon the shoulder which is formed by reducing the end of the hub, see Fig. 23. The shiftable collar 61, has a horizontally extending flange formed integral therewith, and an annular series of vertical pins 63, extend from the flange, alternately from its top and bottom surfaces, see Fig. 25.

The inner ends of the angular connecting links 62, have openings in which the pins 63, fit, and their outer ends are enlarged and provided with pockets in which the upper ends of the main driving arms 51, are seated. The links are held in place by pins which pass through the main driving arms and through slots in the connecting links, see Figs. 1, 2 and 3. A spiral spring 64, is seated in the pocket of each connecting line 62, and bears outwardly against the main driving arm, see Fig. 23. The arm 51, has a slight movement against the spring 64, as the connecting pin has a slight longitudinal movement in the slots in the connecting link.

The screw bar 48, and the driving head are given a vertical reciprocating movement by the revoluble nut 49, which is mounted on ball bearings in the top girt 3, see Figs. 3, 17 and 19. The top girt 3, has a central depending portion 65, which is provided with a central vertical opening. The revolving nut 49, is in the form of a comparatively long sleeve and has a heavy peripheral flange or enlargement 66, at its lower end. This flange 66, has a comparatively deep annular groove formed in its top surface, and the outer wall of this groove has a lining in the form of a ring 67, of hardened metal such as steel, which is fitted tightly in place. A heavier ring 68, of similar metal is placed in the bottom of the annular groove and a series of hardened metal balls 69, are placed upon the ring 68. A ring 70, which is similar to the ring 68, is placed upon the balls 69, as shown in Fig. 18, and these rings 67, 68 and 70, and the balls 69, constitute the lower ball bearing.

The upper end of the revoluble nut 49, extends above the top surface of the top girt 3, and a large bevel gear wheel 71, has a central hub which is provided with an opening through which the upper end of the nut 49, extends, see Fig. 17. The gear wheel 71, is securely fastened in place by a key as shown in Fig. 3. The lower end of the hub of the bevel gear 71 is reduced and a thin washer 72, of hardened metal is placed against the shoulder formed by reducing the hub. A ring 73, of hardened metal is placed around the reduced portion of the hub and upon the washer 72. A similar ring 74, is placed upon the top surface of the top girt 3, directly beneath the ring 73, and a series of hardened metal balls 75, are interposed between the rings 73 and 74, see Fig. 17. This constitutes the upper ball bearing.

The upper extremity of the nut 49, is exteriorly screw threaded and a lock nut 76, formed substantially as shown in Figs. 1, 2, 3, 4 and 17, is screwed thereon. This lock nut 76, is split, and is provided with lateral lugs through which a clamping bolt 77, is passed. The lock nut 76, has an annular upwardly extending flange 78, which forms a well or oil pot 79, in which lubricating material is placed to lubricate the screw bar 48, see Figs. 3 and 17. Radial lugs 80, are formed on the split nut 76, and are adapted to be grasped by a suitable tool to tighten the lock nut.

An annular upwardly extending flange 81, is formed upon the top surface of the top girt 3, around the upper ball bearing and serves to retain the lubricating material which lubricates the said bearing. If the bearings should become loose because of the wearing of any of the parts, the clamping bolt 77, is loosened, and the split nut 76, is rotated to draw up the nut 49, until the bearings are properly adjusted and then the clamping bolt 77, is tightened to lock the split nut 76, in place. The nut 49, is provided with an internal screw thread 82, which engages the screw thread on the bar 48. The bevel gear wheel 71 and the nut 49, are revolved by means of a small gear 83, which is mounted on the main driving shaft 10, and which meshes with the gear wheel 71, see Figs. 2 and 3. The collar 61, is shifted or partially rotated by a power mechanism to move the driving arms and drivers toward or from the barrel. This mechanism is located on the top girt and is illustrated in Figs. 1, 2, 3, 4, 17, 19, 22, 23, 29, 30, 31, 32, 33, 37, 42, and 43.

A bracket 84, is secured by bolts to the top surface of the top girt 3, and near one end thereof and forms a bearing in which a short horizontal shaft 85, is supported. The ends of this shaft extend beyond the bearings and two oppositely rotating pulleys 86 and 87, are mounted loosely upon the shaft, one at each end thereof. Two fric-

tion clutches 88 and 89, are securely fastened to the extremities of the shaft, one being adjacent to and adapted to engage with each of the pulleys 86 and 87, see Figs. 2, 4, 19 and 29.

The hubs 90, of the pulleys 86 and 87, are elongated and each hub is provided with a peripheral groove in which the forked upper end of an arm 91, is adapted to fit. These two arms 91 are fastened by set screws to a horizontally extending sliding bar 92, which is slidably mounted in lugs 93, projecting from the bracket 84, see Fig. 29. A block 94, is secured by a set screw to the forward end of the sliding bar 92, and has a diagonally extending groove or depression formed in its bottom surface, see Fig. 33.

A rocking collar 95, is supported upon a pin 96, projecting from the front of the top girt 3, and said collar 95, has a vertical extension or lip 97, which extends diagonally across the collar and the upper end of which is adapted to seat in and operate in the groove, see Fig. 29. A block 98, extends diagonally from the lower surface of the collar and has a pocket formed therein in which the upper end of a hand lever 99, is fitted and secured in place by a set screw.

It will be seen that by moving the hand lever 99, to the right or to the left, the collar 95, will be rocked upon the pin 96, and by means of the diagonally placed lip 97, will impart a transverse movement of the block 98, and sliding bar 92, and so bring either of the pulleys 86 or 87 into engagement with its adjacent friction clutch and revolve the shaft 85, in either direction at the will of the operator.

A horizontally extending bearing portion 100, projects laterally from one side of the bracket 84, and has a vertical opening formed therein. A diagonal gear 101, is seated upon the bearing 100, and has an elongated hub 102, which projects through the opening in the bearing. A collar 103, is secured by a set screw to the lower extremity of the hub 102, and prevents any vertical movement of the diagonal gear 101. This gear meshes with a similar diagonal gear 104, which is keyed to the shaft 85, see Fig. 19.

A vertical opening 105, which is square in cross section is formed in the diagonal gear 101, and its hub 102, and a vertically extending square sliding shaft 106, is passed through the opening 105, and is adapted to slide therein. This square shaft 106, passes through an opening 107, in the top girt 3, and has its lower end rounded and supported in a bearing block 108, which is secured by a bolt to one of the forked portions 46, on the driving head, see Fig. 37. A pinion 109, is secured to the lower extremity of the shaft 106, and meshes with a segmental gear 110, which has a split hub 111, see Figs. 22 and 37. This split hub 111, is clamped around the upper end of the shiftable collar 61, by clamping bolts 112.

It will be seen that the rotation of the shaft 85, will rotate the square shaft 106, and by means of the pinion 109, and segmental gear 110, will give the collar 61, a partial rotation, and so by means of the connecting link 62, will operate the driving arms.

A collar 113, having a peripheral flange is fastened to the lower portion of the square shaft 106, and said flange has an annular series of vertical openings 114, formed therein in which pins 115, may be placed, so that they project below the flange, see Fig. 42.

The bearing block 108, has a laterally projecting arm 116, through the outer end of which a bolt 117, is passed. A horizontally extending plate 118, is secured to the arm 116, by the bolt, and a spiral spring 119, encircles the bolt and is held in place by a washer and a nut screwed upon the outer end thereof. The plate 118, extends toward the bearing block 108, and acts as a stop against which the pins 115, strike to limit the rotative movement of the shaft 106.

A mechanism for turning the barrel end for end is provided and is illustrated in Figs. 1 to 15, inclusive. A bearing block 120, is bolted to each of the diagonal frame bars 11, a short distance above the base and has V shaped bearing points 121, see Fig. 7, upon which a horizontal rocking bar 122, is supported. The ends of this bar 122, project beyond the bearings and a block 123, is placed upon the bar outside each of the bearings 120, see Fig. 5. The openings in the blocks 123, through which the bar passes are slightly larger than said bar and the blocks are held in place by cone pointed set screws 124, which bear against the bar 122, and permit the blocks 123, to have a slight pivotal movement. An opening 125, is formed in each of the blocks 123, below the opening through which the bar 122, passes and said openings 125, extend at right angles to the upper openings. Two angular lifting bars 126, have their rear ends passed through the openings 125, in the blocks 123, and have their forward ends flattened and provided with laterally extending cone points 127, see Figs. 3 and 5. The forward ends of the angular bars 126, extend forward just far enough so that the cone points 127, will grip a barrel a short distance below the center. The rear ends of the angular lifting bars 126, extend beyond the blocks 123, and two diagonally extending connecting links 128, connect the rear ends of the bar 126, to the upper end of a vertically extending rod 129. This rod 129, has its lower end pivoted by a bolt to one end of a horizontal lever 130, which is fulcrumed on a bolt passing through a bracket 131, see Fig. 2. The other end of

the lever 130, is connected by a chain to the rear end of a foot lever 132, which is pivoted to one of the side frame members 2, by a bolt 133. The foot lever extends into convenient reach of the operator and has a foot treadle 134, bolted to its forward end. The height of this foot lever 132, can be adjusted by means of a slotted stop block 135, which is adjustably secured to the side frame member 2, and has a finger extending over the foot lever as shown in Figs. 2 and 6. A casting or block 136, is secured to the rear end of the foot lever and has a vertical opening and a slot through which the chain is passed. The chain is drawn up through the opening and then slipped back into the slot and held there.

Each of the bearing blocks 120, has a projecting lug or extension 137, and a horizontal bar 138, is secured by bolts at its ends to these lugs 137. This bar has a fork 139, projecting from the middle of its rear side, which serves as a guide for the vertical rod 129. The bar 138, also has a forwardly projecting slotted lug 140, which supports an eye bolt to the lower end of which one end of a spiral spring 141, is fastened. The lower end of the spring 141, is fastened to the bolt which connects the vertical bar 129, and the horizontal lever 130, see Figs. 1 and 3. The purpose of this spring is to return the parts of the barrel turning mechanism to their normal positions after the barrel has been turned end for end upon the release of the foot lever 132.

A block 142, having a hook portion 143, is secured by a set screw to the rear portion of each of the angular lifting bars 126, between the blocks 123, and the lower ends of the diagonal connecting links 128, so that the hook portions 143, extend beyond the ends of the connecting links 128, and retain them in place on the angular lifting bars, see Fig. 2.

The height of the front ends of the angular lifting bars 126, may be adjusted so that different sizes of barrels can be operated upon. This is done by tilting the horizontal bar 122, in either direction, on the V shaped bearing points 121, of the blocks 120, and so raising or lowering the front ends of the angular lifting arms so that barrels of different sizes may be impaled at a point just below the center upon the cone points 127. This is done by a lever 144, which has its rear end fastened to a block 145, having a horizontal opening through which one end of the horizontal bar 122, passes, see Fig. 13. The lever is secured to the block by a bolt 146, which extends through the block and has its upper end bent over the top edge of the lever. The bolt extends below the block and is encircled by a spiral spring 147, which is held in place by a washer and nut screwed upon the lower end of the bolt, see Figs. 13 and 14.

A curved bar 148, is secured by bolts to lugs extending from the adjacent vertical side member 2, of the machine frame so that there is a space between the bar 148, and the member 2, and the bar has a series of radial depressions 149, formed in its inner surface as shown in Figs. 1 and 6. The front end of the lever 144, is shaped to form a handle and has two radial lugs or teeth 150, which fit into the depressions 149, and hold the lever in any position it may be placed to tilt the horizontal bar 122.

The barrel turning mechanism operates as follows,—When the hoops have been driven upon the upper end of the barrel, the operator depresses the foot lever 132, which draws down the vertical bar 129, by means of the lever 130. This spreads the rear ends of the angular lifting bars 126, by means of the diagonal connecting links 128, and so brings the front ends of the angular bars 126, against the sides of the barrel and embedding the cone points 127, therein. The operator now grasps the handle at the forward end of the lever 144, and lifts said lever thereby tilting the horizontal bar 122 and raising the barrel. As the barrel is gripped below the center by the cone points it will automatically swing on the cone points and turn bottom up. The operator now returns the lever 144, to its former position and releases the foot lever, when the spring 141, returns the parts to their former position. The remaining hoops are now driven upon the barrel.

A device is provided for giving the barrel a slight rotation at each upward movement of the driving mechanism so that if the hoop should not be driven home at the first downward movement of the driving mechanism and a second pressure upon the hoops be necessary, the drivers will not grip the hoops in exactly the same place as before but at a different point and so give a more equal pressure all around the barrel. This mechanism is illustrated in Figs. 1, 2, 3, 34, 35, 36, 38, 39 and 40.

A circular plate 151, has a pin 152, extending from the middle of its bottom surface which pin fits in an opening 153, formed in the middle of the base 1, so that the plate 151, rests upon the base and is capable of being rotated thereon, see Fig. 3. This plate 151, has an annular series of ratchet teeth 154, formed in its top surface at its outer edge which are adapted to be engaged by a pawl 155. This pawl is in the form of a rod, one end of which is curved to engage the teeth 154, and the other end of which is bent to form an eye 156, see Fig. 38. This eye fits over a pin extending from the lower end of the longer arm of a bell crank 157,

the shorter arm of which has a pin which extends through an opening in the lower end of a long vertically extending bar 158. The bell crank 157, is pivoted on a pin 159, extending horizontally from the upper end of a vertical arm 160, which is formed integral with a block 161, see Figs. 35 and 38. This block 161, is secured in place by two of the bolts which fasten the vertical side member 2, to the base. The block 161, has two lateral extensions or lugs 162, which serve as stops to limit the movement of the longer arm of the bell crank 157, see Fig. 38. The bell crank 157, is operated to rotate the plate 151, by a friction device which is supported from the driving head.

An arm 163, which is provided with two forks 164 and 165, is secured to the driving head by a bolt so that the larger fork 164 straddles the bar 158. This bar 158, extends upward to about the height of the supplemental frame as shown in Fig. 2. Two recessed plates 166, are supported by the fork 164, one on either side of the bar 158, each of the plates having lateral lugs 167, through which bolts 168, are passed to secure the two plates together. Each plate 166, has two recesses on its inner face, the lower and longer recess of each plate having a block 169, of friction material such as wood, fitted therein as shown in Fig. 40. The upper recess of each plate is filled with wool or waste which has been previously saturated with a lubricant. The friction blocks 169, engage with the flat faces of the bar 158, and are adapted to grip the same, being pressed against said bar by spiral springs 170, which encircle the ends of the bolts 168, see Fig. 40. The gripping power of the friction blocks may be varied by tensioning the springs 170.

The lugs 167, support the plates 166, in the fork 164, and lugs 171, extending from each side edge of the plates fit against the bottom surface of the fork and prevent the friction device from being carried upward out of the fork, see Fig. 39. The top surface of the fork 164, has two depressions formed therein in which a pin 172, is fitted to retain the friction device in place in the fork, see Figs. 36 and 39.

It will be seen by the above description and by referring to the drawings, that as the driving head moves upward after driving a hoop into place, the friction device above described will grip the bar 158, and carry said bar upward until the longer arm of the bell crank 157, strikes one of the stops 162, or, referring to Fig. 38, from the position shown in full lines to the position shown in dotted lines. This moves the pawl 155, as shown which gives the circular plate a partial rotation. When the bell crank has reached the limit of its movement the friction device will slide on the bar 158, and said bar remains stationary. At the downward movement of the driving mechanism the bar 158, will move downward and return the bell crank 157, and pawl 155, into the position shown in full lines in Fig. 38, ready for the next stroke.

The friction device is tensioned by the springs 170, so that its grip upon the bar 158, is just strong enough to move the circular plate 151, but will slide upon the bar when the bell crank reaches the limit of its movement. The fork 165, of the arm 163, straddles the vertical rod 29, and upper and lower collars 173 and 174, are secured by set screws to the rod above and below the fork 165, see Fig. 2. Spiral springs 175 and 176, encircle the rod 29, above the fork 165, and the collar 174, and serve as cushions between the fork 165, and the collars 173 and 174. The driving pulleys 12 and 13, are automatically released from the friction clutches 14 and 15, by the fork 165, coming into engagement with the springs 175 and 176, which are stopped by the collars 173 and 174, and thus moving the rod 29, either up or down and withdrawing the pulleys as before described.

The operation of the machine is as follows,—A barrel is placed in position on the rotating plate as shown in Figs. 1, 2 and 3, and the handle 33, moved by the operator to bring the pulley 12, into engagement with the friction clutch 14, thus lowering the driving mechanism. The operator now moves the lever 99, and closes the drivers around the barrel, the downward movement of the driving mechanism driving the hoops home. The lever 99, is now moved in the opposite direction to open the drivers, and the handle 33, moved to disengage the pulley 12, from the friction clutch 14, and bring the pulley 13, into engagement with the friction clutch 15, which raises the driving mechanism. The remaining hoops are driven into place in the same manner as above, and when all the hoops have been driven upon one end of the barrel it is turned end for end as before described, and the hoops driven upon the other end of the barrel.

I claim as my invention.

1. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, whereby the hoops if more than one descent of the hoop driving mechanism is deemed necessary will not be pressed at the same points on successive descents.

2. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said

hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, including a supporting plate upon which said barrel is mounted and means for partially rotating said plate, whereby the hoops if more than one descent of the hoop driving mechanism is deemed necessary will not be pressed at the same point on successive descents.

3. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism including a supporting plate upon which said barrel is mounted, and mechanism automatically operated by the movement of the hoop driving mechanism for partially rotating said plate, whereby the hoops if more than one descent of the hoop driving mechanism is deemed necessary will not be pressed at the same points on successive descents.

4. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, including a supporting plate upon which said barrel is mounted and automatic means for partially rotating said plate, whereby the hoops if more than one descent of the hoop driving mechanism is deemed necessary will not be pressed at the same points on successive descents.

5. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, including a supporting plate upon which said barrel is mounted having a ratchet part and a pawl engaging said ratchet.

6. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, including a supporting plate upon which said barrel is mounted having a ratchet part and a pawl engaging said ratchet operated from the machine power.

7. In a machine of the class described, the combination with hoop driving mechanism and means for raising and lowering said hoop driving mechanism, of means for imparting a partial rotation to said barrel after each operative movement of the hoop driving mechanism, including a supporting plate upon which said barrel is mounted and having a ratchet part, a pawl engaging said ratchet, a bell crank to which said pawl is pivoted and a friction device supported from the hoop driving mechanism for operating the bell crank.

EDWIN F. BEUGLER.

Witnesses:
L. M. SANGSTER,
GEO. A. NEUBAUER.