

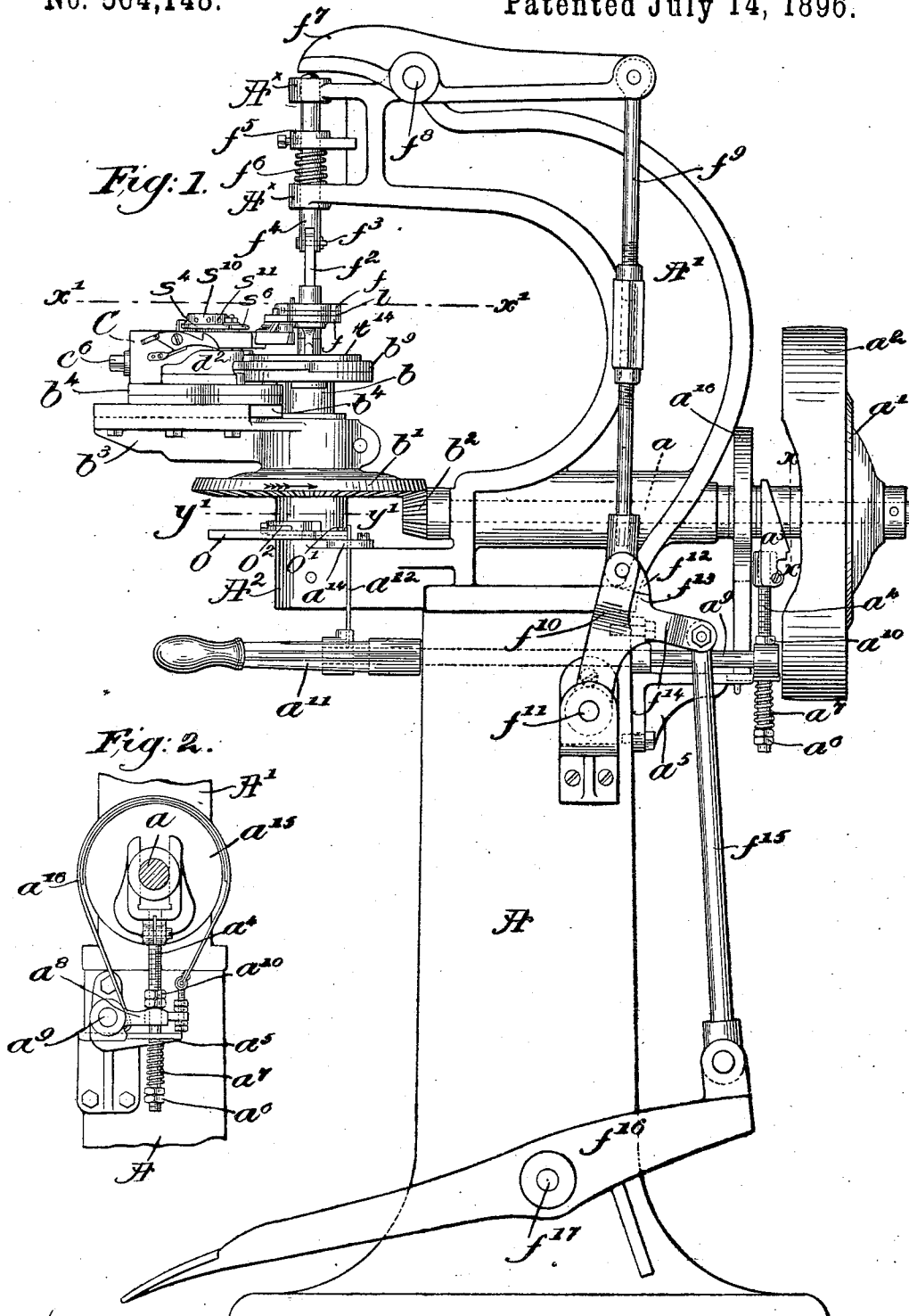
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7 Sheets—Sheet 1.

J. A. CROSBIE.
SOLE ROUNDING MACHINE.

No. 564,148.

Patented July 14, 1896.



Witnesses
Thomas F. Drummond
Edward F. Allen.

Inventor
John H. Crosbie.
by Crosby & Rogers, Attys.

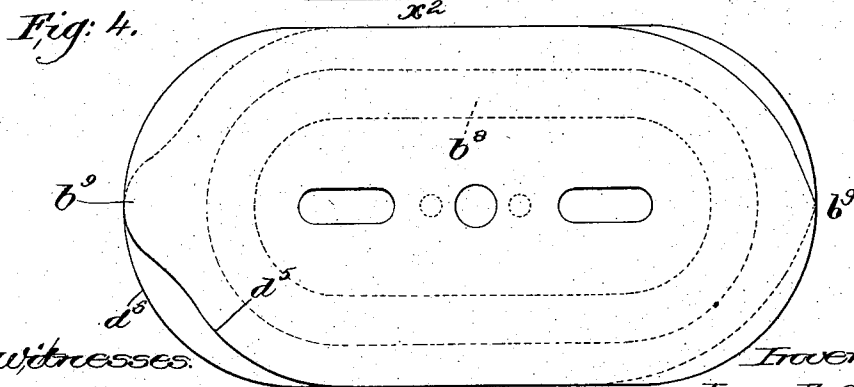
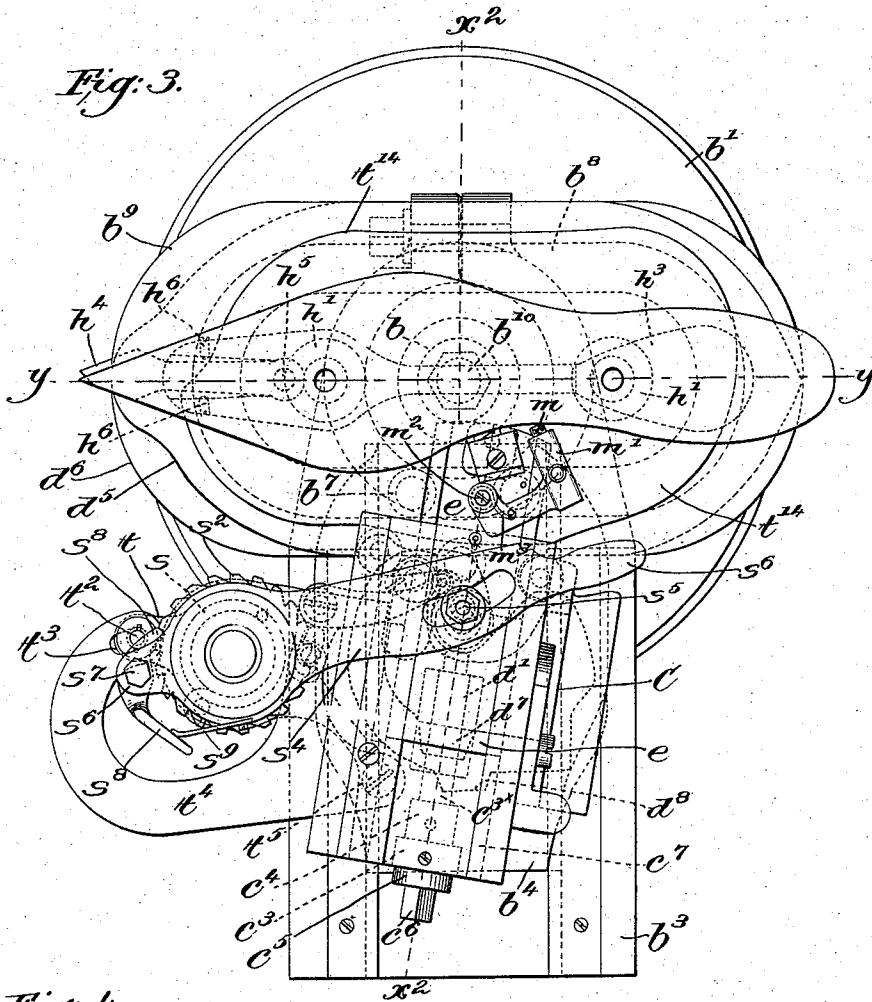
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Fig: 4.^a

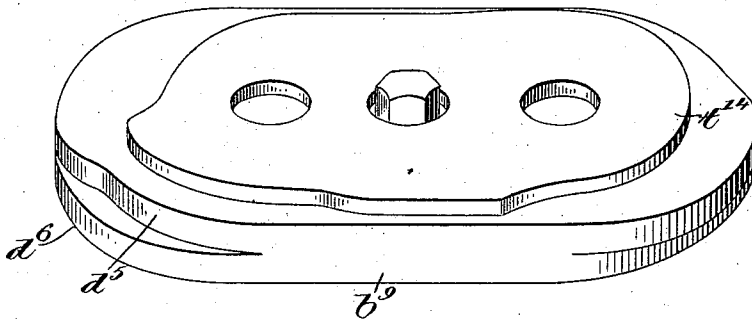


Fig: 10.

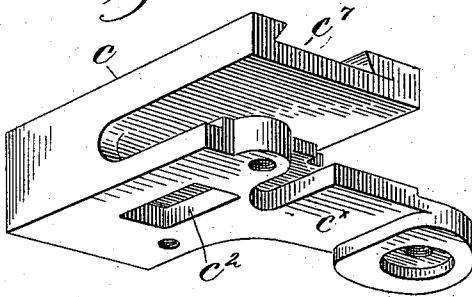


Fig: 11

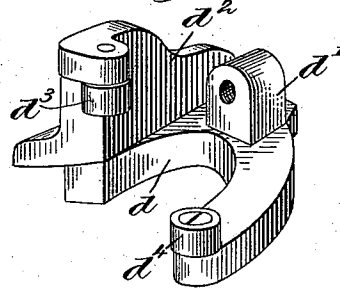


Fig: 12.

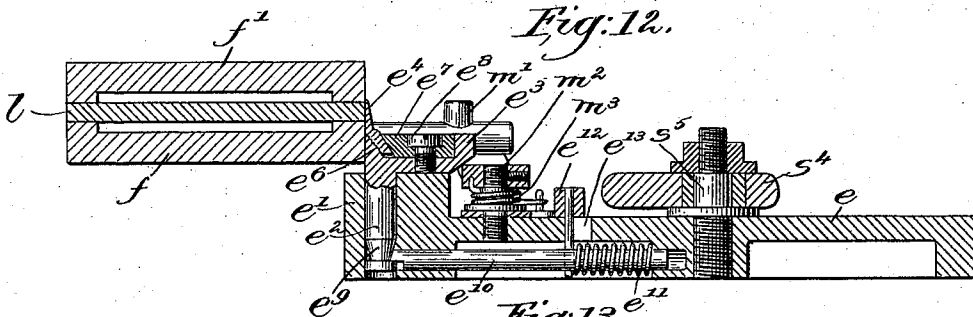


Fig: 13.



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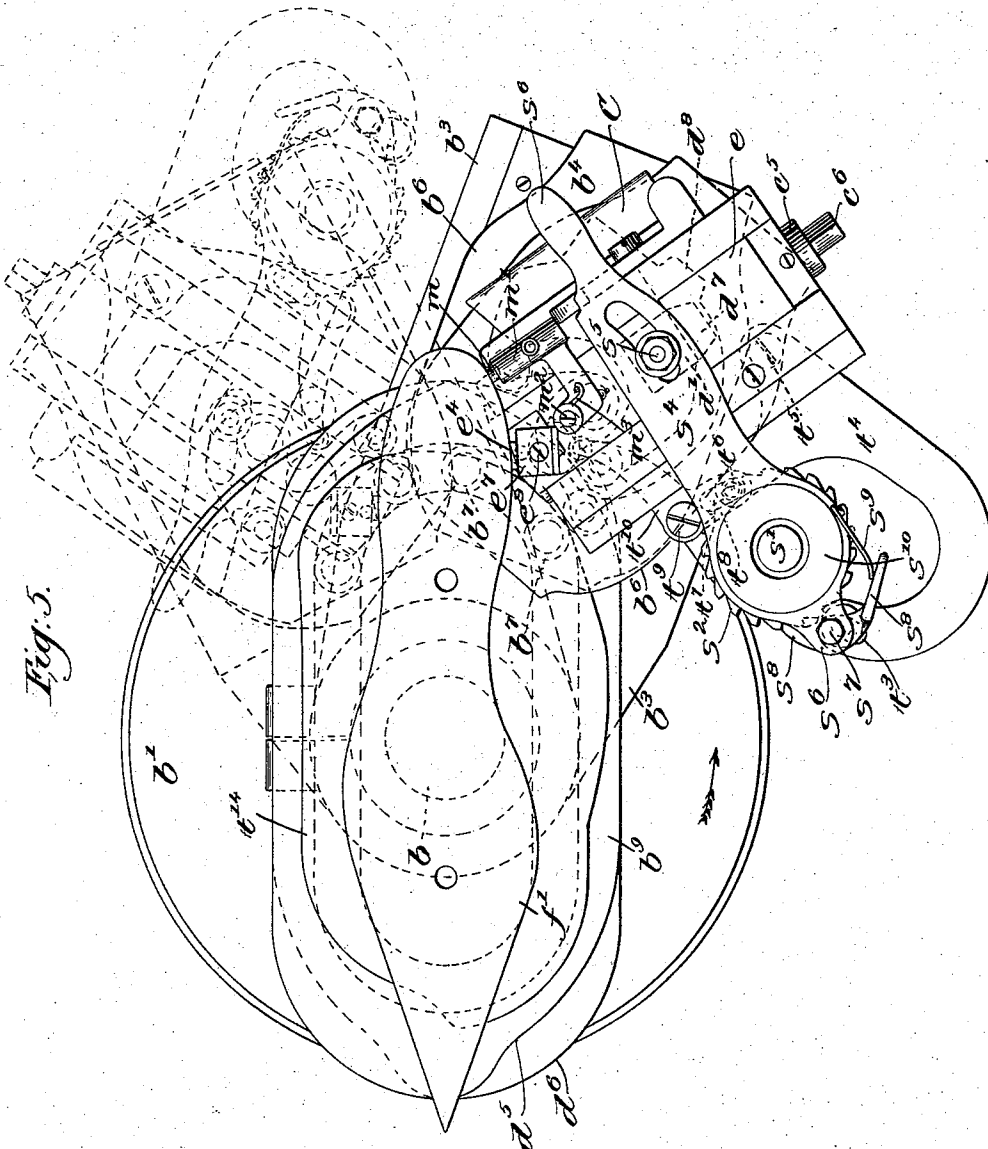
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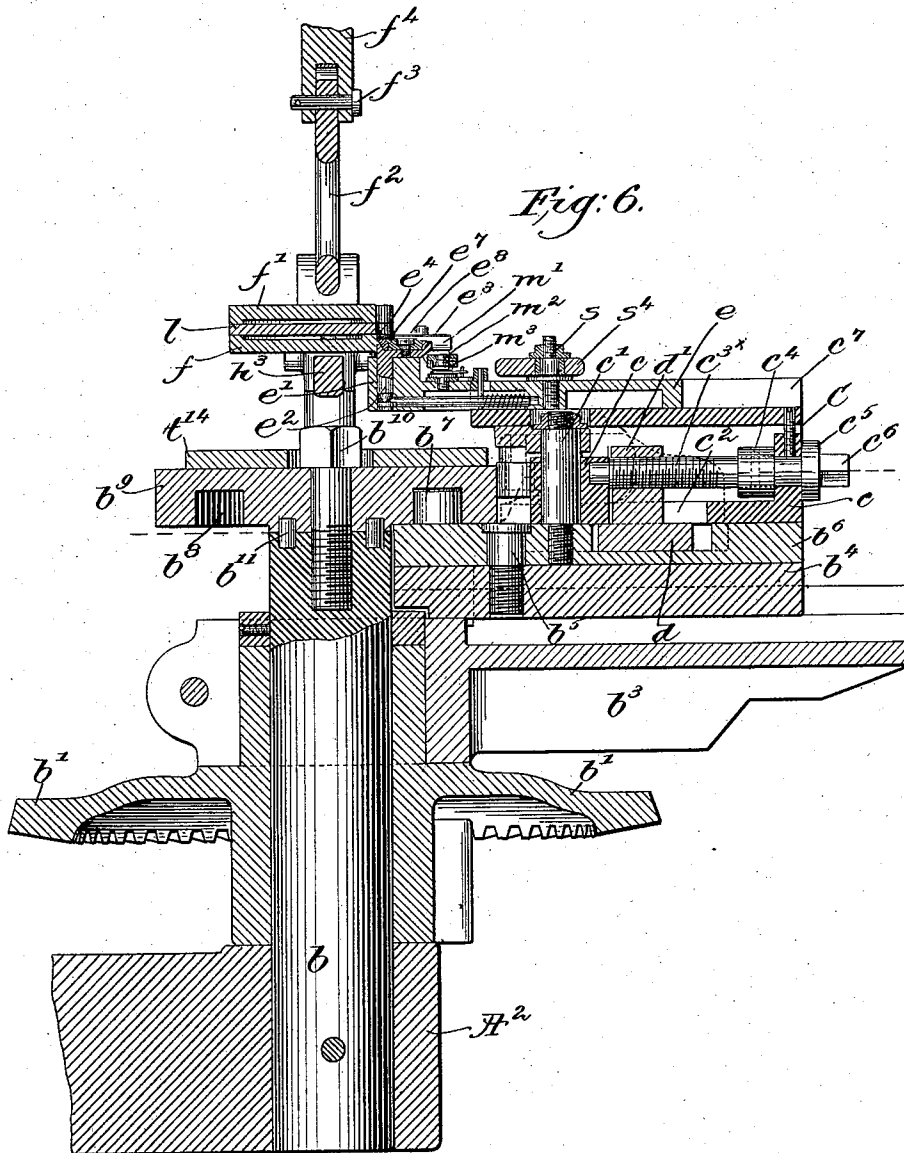
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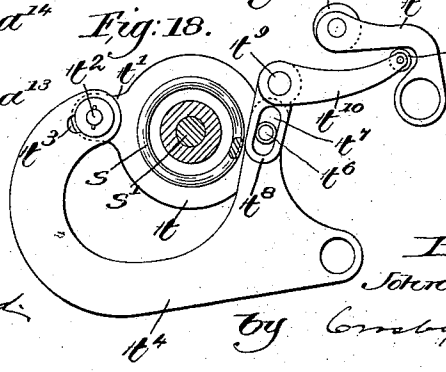
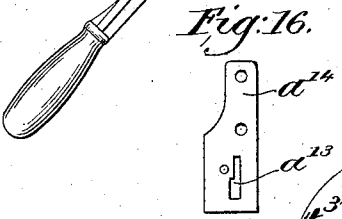
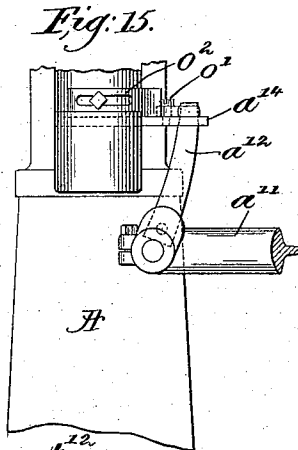
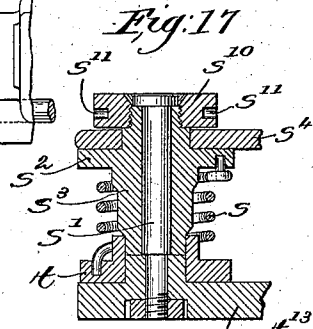
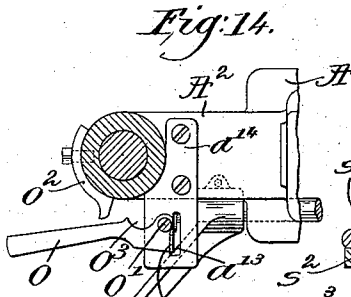
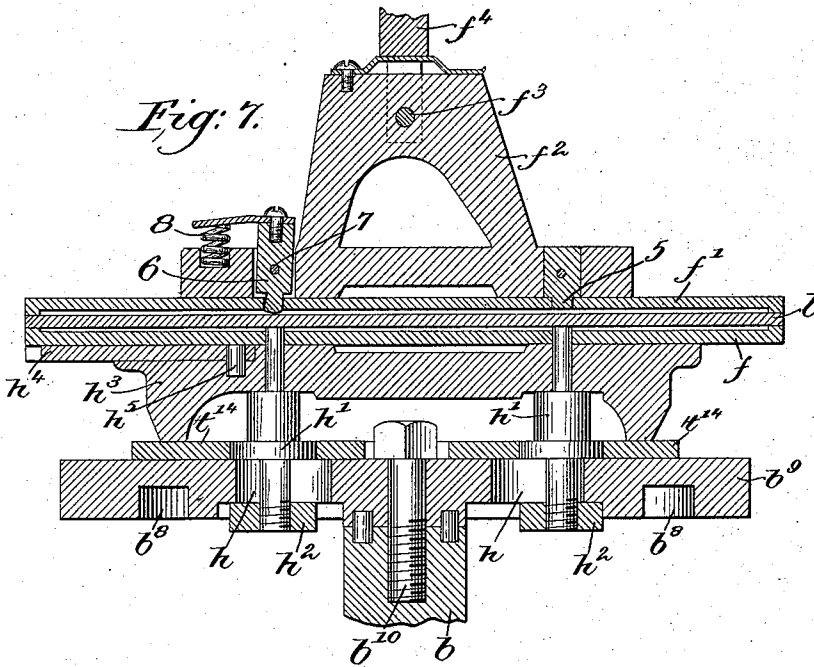
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(No Model.)

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Fig. 9.

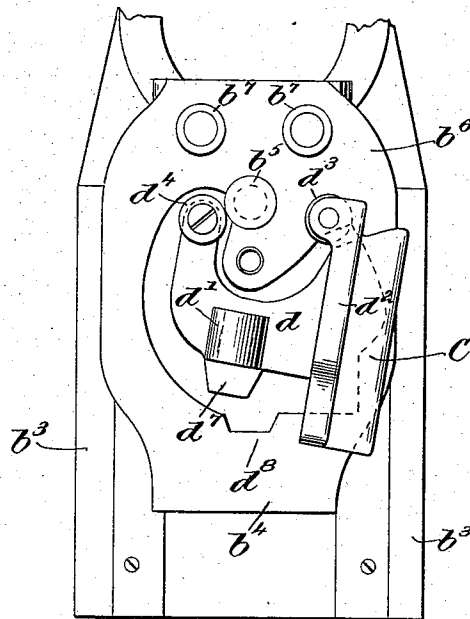
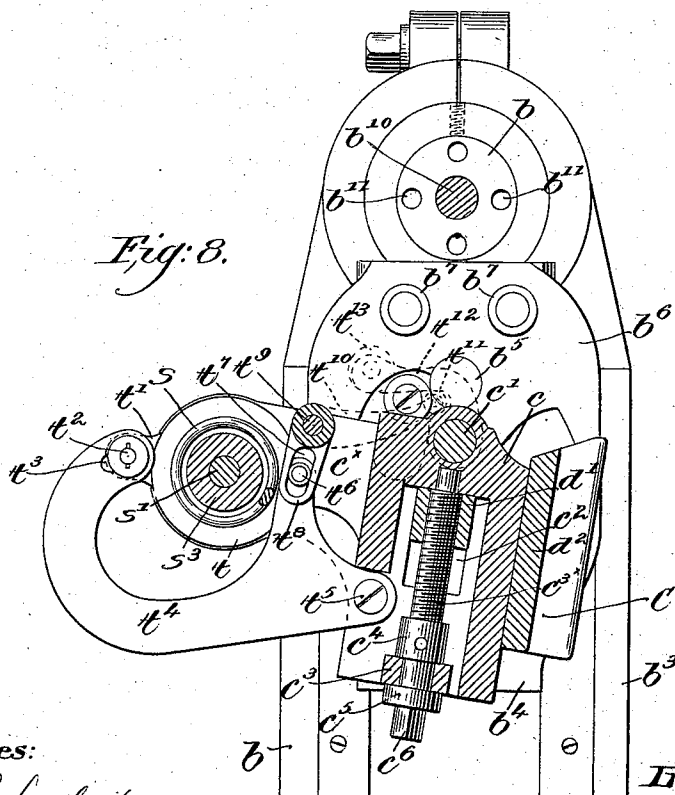


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN A. CROSBIE, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO FRANK F. STANLEY, PRINCIPAL TRUSTEE, OF SWAMPSCOTT, MASSACHUSETTS.

SOLE-ROUNDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,148, dated July 14, 1896.

Application filed December 18, 1895. Serial No. 572,494. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. CROSBIE, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Sole-Rounding Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object to provide a novel and improved rounding-machine, that is, a machine for running around and trimming the edge of a sole to make it conform in shape to a stated form or pattern.

15 In order that the nature of my invention may be clearly understood, reference may be had to United States Patent to James N. Moulton, No. 522,166, dated June 26, 1894. Referring to said patent, particularly to Figures 1, 3, and 4 thereof, it will be found that the sole-blank to be trimmed or rounded is clamped between suitable upper and lower clamps, the lower one also constituting the pattern. The knife is caused to travel around 25 and in contact with this pattern to trim the sole edge in conformity therewith, said knife being mounted upon a slide carried in a swinging member, which latter in turn is pivotally mounted upon a carriage adapted to slide radially on and with relation to a rotatable arm or carrier, a suitable spring acting upon the knife slide or holder keeping the parts always pressed toward the axis of rotation of the arm or carrier, so that the knife always 35 hugs the edge of the pattern. As the rotatable arm swings around its axis two rollers on the swinging members travel in a path-cam fixed upon the standard and hold the said swinging member in a position with its axis at substantially right angles to the axis of the pattern, until the toe is reached, in order that the knife may move out and in to follow the contour of the pattern, said cam acting to swing the said swinging member 40 around the toe just as the knife reaches the toe. When the cam is constructed so as to swing the swinging member around to the opposite side of the pattern just as the knife reaches the toe or heel of the pattern, the knife will, 45 of course, travel freely around the toe and heel of the pattern. If, however, with the

same cam a longer pattern be substituted, the swinging member will be swung from one to the other side of the pattern, or, at least, the cam will attempt to so swing it before 55 the knife has reached the toe or heel, and the result will be that as soon as the axis of this swinging member, while being carried from one to the other side of the pattern, reaches a position nearly or quite coincident 60 with the side line of the pattern, the knife will thereafter fail to move outwardly on the said swinging member to pass around the toe, and will stick and cause some of the parts to break. To obviate this difficulty, it has 65 always been necessary in the Moulton machine to substitute a longer cam when the longer patterns are used, in order that the swinging member might be held in a line substantially at right angles to the axis of 70 the pattern until the toe should be reached, and then swing to the opposite side of the pattern as the cutter rounds the toe. This change of cams has involved a loss of time and caused trouble which I have, by my 75 present invention, sought to avoid.

In studying machines of the Moulton type I have discovered that the same cam may be employed for use in connection with the longer pattern if some means were provided to prevent the swinging member H from too quickly 80 swinging from one to the other side of the pattern, for so long as the said member stands in a position at right angles to, or, it may be, at an angle of forty degrees, or somewhat less, 85 with relation to the side line of the pattern, the knife will move outwardly in the said swinging member to follow the pattern without binding and sticking. I have, therefore, constructed a machine containing my invention, 90 which machine is hereinafter illustrated, wherein I have mounted upon the swinging member, corresponding to that of the Moulton machine, a second or auxiliary swinging member, which has a swinging movement relatively to the main swinging member, the 95 knife being mounted upon this auxiliary swinging member. By providing suitable means, as a cam or cams, for controlling the position of this auxiliary swinging member 100 I am enabled to maintain the latter in such an angular position with relation to the edge

of the pattern as to permit the knife to freely move outwardly and inwardly thereon, until the toe or heel is reached, notwithstanding the main swinging member may have been, 5 by its fixed cam, swung into such a position as would in the Moulton machine cause the knife to stick.

In the Moulton machine the tension of the spring pressing the knife against the pattern 10 must be much greater as the knife rounds the toe and heel than while the knife is traveling along the shank of the pattern, and in my improved machine I have provided means for varying the tension of this spring so that 15 the pressure of the knife upon the pattern shall be substantially constant at all points in its circumference.

My invention also comprehends novel means for clamping the sole in position to prevent drawing of the pattern under the action 20 of the knife.

The above, together with other features of my invention, will be hereinafter fully described, and set forth in the claims.

25 In the drawings, Fig. 1 is a side elevation, partially broken away, of a machine containing one embodiment of my invention; Fig. 2, a sectional detail on the dotted line $x\ x$, Fig. 1, looking to the left. Fig. 3 is a top or 30 plan view of the head of the machine, showing the pattern, the cams, the knife, and rotating carrier therefor, the same in effect being a view looking downward from the dotted line $x'\ x'$, Fig. 1; Fig. 4, a top or plan view of 35 the cams shown in Fig. 3; Fig. 4^a, a perspective view of the said cams; Fig. 5, a view corresponding to Fig. 3 with the parts in different positions. Fig. 6 is a vertical section on the dotted line $x^2\ x^2$, Fig. 3, looking toward 40 the right; Fig. 7, a vertical section through the clamps and main cam, the section being taken on the dotted line $y\ y$, Fig. 3; Fig. 8, a view looking down upon the rotatable arm or carrier, the same showing the main and 45 auxiliary swinging members mounted thereon, and the means for varying the tension of the knife-spring, part of the view being in section; Fig. 9, a top view of some of the parts shown in Fig. 8, the spring-carrying arms and 50 means for varying the tension of the spring being omitted; Figs. 10 and 11, perspective views of parts shown in Fig. 9; Fig. 12, an enlarged sectional detail through the auxiliary swinging member and pattern, the section being on the line $x^3\ x^3$, Fig. 3; Fig. 13, a 55 perspective detail of the preferred form of knife; Fig. 14, a horizontal section on the dotted line $y'\ y'$, Fig. 1, looking down; Fig. 15, a left-hand partial side elevation of Fig. 14; Fig. 16, a detail of the catch-plate shown in Fig. 14; Fig. 17, a sectional detail of the spring and means for varying the tension thereof; and Fig. 18 a diagram showing the levers, &c., for varying the tension of the 60 spring, to be referred to.

In the embodiment of my invention herein selected for illustration and shown in the

drawings, A is a suitable standard, provided with a proper base, said standard at its upper 70 end having secured to or forming part of it an overhanging arm or gooseneck A'. In this gooseneck is journaled in suitable bearings a shaft a , having fast upon its rear end a conical friction-disk a' , adapted to coöperate with a 75 friction-pulley a^2 , loosely mounted upon said shaft and adapted to be pressed into and withdrawn from contact with said disk a' by the rising and falling wedge a^3 , pivotally mounted upon the upper end of a rod a^4 , depending 80 through a suitable bracket a^5 , fast on the standard A and provided at its lower end with nuts a^6 , between which and said bracket is interposed a suitable spring a^7 , tending to normally depress the rod and its attached 85 wedge and thereby release the clutch. The wedge is raised to operate the clutch and support the shaft by means of an arm a^8 , fast on a shaft a^9 , journaled in the standard, said arm acting upon and beneath one or more nuts 90 a^{10} , threaded upon the said rod a^4 .

At the front of the machine the shaft a^9 is fitted with a suitable handle a^{11} , by which it may be operated, and to hold it in its running position against the action of the spring a^7 I have provided said shaft adjacent the handle 95 with a spring-finger a^{12} , the end of which moves in a notched opening a^{13} in a catch-plate a^{14} , applied to an arm A² of the standard. (See Figs. 1, 15, and 16.)

When the handle is depressed, the wedge is 100 raised and the clutch operated to support the shaft, the spring-finger catching in the notch of the catch-plate a^{14} .

By disengaging the spring-finger referred to the spring a^7 immediately moves the wedge 105 to release the clutch and stop the machine.

In order that the machine may be quickly stopped when the clutch is released, I have provided the shaft a with a brake wheel or pulley a^{15} , which is partially encircled by a 110 brake-strap a^{16} , connected at one end with the bracket a^5 and having its other end adjustably connected with the extended end of the wedge-operating arm a^8 .

When the wedge is depressed by the spring 115 a^7 to release the clutch, the same movement, by depressing the arm a^8 , draws the strap about the brake-wheel to quickly stop the shaft. When the arm a^8 is raised to operate the clutch and start the shaft, the same move- 120 ment releases the brake.

Referring now particularly to Figs. 1 to 6, inclusive, the arm A² of the standard is fitted to receive and hold the fixed non-rotatable shaft or stud b , about which loosely turns 125 the bevel-wheel b' , in mesh with and driven by a corresponding pinion b^2 on the main shaft a . To the hub of this bevel-gear b' is firmly attached an arm or carrier b^3 , which, therefore, rotates with the bevel-wheel b' , 130 said rotatable carrier b^3 being provided at its upper side with suitable radial guides for and to receive the radially-sliding carriage b^4 . (See Figs. 8 and 9.) To this radially-sliding

carriage b^4 I have, in the present instance, pivoted upon the stud b^5 what I shall hereinafter denominate as the "main swinging member" b^6 , provided at its end adjacent the axis of the rotatable carrier with the two roller-studs b^7 , which, during the rotations of the carrier, travel in the cam-groove b^8 in a cam-plate b^9 , rigidly secured to the top of the stud or shaft b , as herein shown, by means of a suitable screw b^{10} and the dowel-pins b^{11} . (Shown in Fig. 6.) This cam (hereinafter designated by the reference-letter b^8) constitutes what I denominate as the "main cam," the same being herein shaped (see dotted lines, Fig. 4) to present two long, straight, and parallel runs connected by circular runs at their opposite ends, and, as herein shown, is substantially like the cam in the Moulton machine, it fulfilling in the machine herein shown substantially the same functions as the Moulton cam.

In the Moulton machine referred to, the knife-slide is mounted directly upon the swinging member corresponding to my member b^6 , but instead thereof in my construction, as shown, I mount upon the main swinging member b^6 another, and what I term an "auxiliary swinging member" C, the same being pivoted to swing about a stud c' , rising from the said main swinging member. This auxiliary swinging member C is shown as made up of two parts relatively adjustable, the part c being shown in perspective in Fig. 10, the second part d being shown in perspective Fig. 11.

In the machine the two parts are positioned as shown in Figs. 6 and 8, wherein the part c is placed upon the part d , with the ear d' on the part d rising through a rectangular guide-opening c^2 in the part c , the side flange d^2 of the part d rising at the right-hand side of the part c , as best shown in Fig. 8. The two parts c and d of this auxiliary swinging member are connected by a suitable adjusting-screw c^x , threaded in the lug d' and loosely mounted at its opposite end in a portion c^3 of the principal part c , the said screw being restrained from longitudinal movement in the said portion c^3 by suitable collars c^4 and c^5 , said screw being also provided with a squared or other suitable head c^6 , by which it may be rotated and thereby cause movement of the lug d' and its attached part d relatively to the part c .

The part d of the auxiliary swinging member C is shown as provided (see Fig. 11) with two roller-studs d^3 d^4 , separated somewhat in plan view, (see Fig. 9,) and also arranged horizontally in different planes, that is, with the stud d^3 higher than the stud d^4 , in order that they may act respectively upon the two upper cam-faces d^5 d^6 , formed upon the exterior of the cam-plate b^9 , in which is formed the main cam b^8 referred to. The use of these two cams d^5 and d^6 upon the rollers referred to will be hereinafter fully set forth.

Referring now to Figs. 2, 3, 6, and 10, the

part c of the auxiliary swinging member is shown provided at its upper side with a preferably dovetail groove c^7 , in which is arranged to slide the head e , (shown in section, Fig. 12,) said head being provided at its inner end, adjacent the axis of rotation of the carrier b^3 referred to, with a suitable projection e' , on which is swiveled the shank e^2 of the knife-holder e^3 , to which the knife e^4 is attached.

In the present instance of my invention the knife e^4 is provided with an angularly-extended toe having one side formed to present a series of steps e^5 , which cooperate with a corresponding series of steps e^6 on the holder e^3 , the knife being held in desired adjusted position, determined by said steps, by a suitable clamping-plate e^7 and screw e^8 . (See Fig. 12.) The head e is moved normally to the left, Figs. 6 and 12, holding the knife-holder in contact with the pattern f by a suitable spring, shown as a coil s , encircling a stud s' on an arm c^x of the part c of the auxiliary swinging member, and at its upper end the said spring, as shown, engages a ratchet-toothed wheel s^2 , having its hub s^3 loosely surrounding the said stud s' , and having loosely mounted upon its upper end the arm s^4 , which (see Figs. 3 and 5) engages a stud s^5 (see Figs. 6 and 12) on the sliding head e .

Viewing now Figs. 5 and 17, the arm s^4 has a rearwardly-extending ear s^6 , to which is pivoted at s^7 the pawl s^8 , pressed by a spring s^9 into normal engagement with the teeth of the ratchet-wheel s^2 , so that the action of the spring upon the ratchet-wheel s^2 is, through the pawl, communicated to the spring-arm. A nut s^{10} , threaded upon the hub of the ratchet-wheel, (see Fig. 17,) serves to hold the spring-arm in its position, and by rotation of the said nut, by the insertion of a suitable pin in one or another of the sockets s^{11} in its periphery, the ratchet-wheel with its connected spring s may be rotated one or more teeth of the ratchet-wheel to vary the tension upon the spring, the pawl in each instance retaining the ratchet-wheel and lever in the new relatively-adjusted position.

At its lower end the spring s engages a disk t , which (see Fig. 8) is provided with an ear t' , having a stud t^2 , which enters a slot t^3 in the hooked lever t^4 , fulcrumed at t^5 on the part c of the auxiliary swinging member C, said lever t^4 having a laterally-extended ear provided with a preferably roller stud t^6 , entering a slot t^7 in the arm t^8 of the bell-crank lever pivoted at t^9 on the arm c^x , the other arm t^{10} of said lever (shown in dotted lines, Fig. 8, and in full lines, Fig. 18) having a roller t^{11} journaled in its end, which roller enters a recess in the elbow-lever t^{12} , pivoted about the pin c' , referred to, and having its end provided, in turn, with a suitable roller t^{13} , adapted to run upon the surface-cam t^{14} , mounted upon the main cam-plate b^9 , as best shown in Figs. 4^a and 6. This cam t^{14} is so shaped that it moves the roller t^{13} and its con-

nected system of levers during the operation of the machine, to rotate in one or the other direction the disk t , to which the lower end of the spring s is attached, to counteract the tendency of the arm s^4 to vary the tension upon the spring. As the cutter follows the irregular outline of the pattern the parts are so arranged that when the knife moves back, thereby tending to tighten the spring, the disk t is by its cam t^4 caused to follow around in the same direction to restore the tension to normal, and vice versa, so that a constant pressure is exerted upon the surface of the pattern instead of the very irregular pressure found in machines as at present constructed.

Referring now to Figs. 1, 6, and 7, the cam-plate b^9 , within the cam-groove b^8 and at opposite sides its center, is shown provided with the slots h h , diametrically in line and receiving the threaded shanks of the posts h' , which posts are retained in adjusted position by suitable nuts h^2 , threaded upon the lower ends of the said shanks. The posts h' at their upper ends receive loosely upon them the two-legged stand h^3 , upon which rests the pattern f previously referred to and herein constituting one of the clamping members, said posts h' also preferably projecting upwardly through the pattern f to hold the latter in proper position. The cooperating clamping member f' is shown removably attached to a clamping-head f^2 , to which is jointed at f^3 the forked lower end of a spindle f^4 , rising through the projecting ears A^x on the overhanging arm A' , and provided between said ears with a suitable fast collar f^5 , between which and the lower ear referred to is interposed a spring f^6 , tending to move the said clamping member f' normally downward upon and to clamp the leather shoe-sole l , placed between the two members f' and f . At its upper end the spindle f^4 is acted upon by the short arm of a lever f^7 , pivoted to the overhanging arm A' at f^8 , and having its opposite or long arm connected by a suitable link or connecting-rod f^9 with a T-shaped lever f^{10} , pivoted to the standard at f^{11} . (See Fig. 1.) The lower end of the link f^9 is fitted with a projecting toe f^{12} , adapted to contact with a portion f^{13} of the lever f^{10} to form a stop to prevent the lever and link moving into a central position. The arm f^{14} of the lever f^{10} is connected by a link f^{15} with the treadle f^{16} , fulcrumed to the standard at f^{17} .

The lever f^{10} and link f^9 constitute in effect a toggle, so that when the treadle is depressed into its position Fig. 1, the link f^{15} by lifting on the lever f^{10} throws the latter and the lower end of the link f^9 to the left into their position Fig. 1, until arrested by the stop f^{13} referred to, such movement acting to press with great force the upper clamping member f' upon the leather sole l , clamping the latter between the clamping members f' and f with such force as to absolutely prevent drawing of the sole during the cutting or rounding operation.

The upper clamping member f' is preferably detachably connected with its head f^2 in suitable manner, said clamping member in the present instance being provided with two holes arranged axially the members, one receiving the depending pin 5, the other to receive the reduced end of a swinging lock-piece 6, pivoted to the head at 7 and normally retained in its position Fig. 7, gripping one wall of its hole in the clamping member by a suitable spring 8. By swinging this lock-piece 6 against the action of its spring the clamp f' may be released and removed.

The operation of the machine is as follows, viz: The sole to be rounded or trimmed is placed in position between and securely held by the clamping members f and f' . The operator now moves the handle a^{11} to operate the clutch and start the machine, rotation of the bevel-gear b' in the direction of the arrow, Figs. 1 and 5, acting to swing the arm or carrier b^3 in the same direction around the pattern. This rotative movement of the carrier causes the roller-studs b^7 on the main swinging member b^6 to travel around in the main cam b^8 . While the angular position of the rotating carrier b^3 is constantly changing as it swings in a circle, the main swinging member b^6 remains always in a position at right angles to the longitudinal axis of the pattern so long as its two rollers b^7 travel in the straight path of the main cam b^8 . When short patterns are employed, the ends of the patterns approximate in location the turns at the end of the main cam b^8 , so that just as the cutter reaches the heel or toe and is ready to round the same the rollers b^7 swing into said curved end of the cam and turn the main swinging member quickly around the heel or toe, causing the knife mounted thereupon, and always pressed with its holder against the pattern by the spring s referred to, to neatly and accurately follow the heel and toe portion of the pattern and trim the sole thereat. In the majority of instances, however, the patterns of varying sizes project to greater or less distances lengthwise beyond the cam b^8 , as shown best in Fig. 5, where the heel and toe project for nearly an inch, and frequently the projection is more, beyond the curved end portion of the cam. In such instances, in machines as heretofore constructed, the rollers of the main swinging member would reach the curved end of the cam and swing into said curved end before the knife had approached, say, within one or one and one-half inch of the end of the pattern, the result being that a rapid turning of this swinging member from a position at right angles to the longitudinal axis of the pattern around the end of the cam, into position approximately parallel with the side of the pattern, would cause the knife to clamp and lock against the side of the pattern, frequently causing breakage of parts. This difficulty is avoided in my present invention, which will be best understood by reference to

Fig. 5, for, notwithstanding the main swinging member b^6 is shown as having partially rounded the curved end of the main cam and as standing at such an angular position with the side line of the pattern as would of itself cause the knife to lock against the pattern instead of retreating in its slideway to follow the pattern, yet by my invention the auxiliary swinging member C is, by its two rollers $d^3 d^4$, held in such angular position with relation to the pattern edge that the knife-carrying sliding head mounted in the said auxiliary swinging member may still work back and forth to permit the knife to follow the curved edge of the pattern, and the cams d^5 and d^6 are so shaped that when the knife reaches and is ready to round the toe or heel, the auxiliary swinging member is then, and only then, swung quickly from one to the other side of the pattern, overtaking and passing beyond the angular position of the main swinging member, the main and auxiliary swinging members then assuming the dotted positions Fig. 5. It will thus be seen that the auxiliary swinging member does not begin to swing from one to the other side of the pattern until after the main swinging member has passed through a considerable portion of its swinging movement, yet when the auxiliary swinging member does swing it moves much more quickly than its main member and reaches the desired angular position at the opposite side of the pattern before its main member has reached such position.

By my invention, operating as thus described, the auxiliary swinging member which carries the knife, by holding its cutting position on the side of the pattern until the last moment and then swinging quickly to the opposite side of the pattern, successfully carries the knife around the sharpest or most pointed toes, wherein has heretofore been encountered the greatest difficulty in rounding-machines.

The swinging member which carries the knife, while deriving its principal or approximate movements from the main cam b^8 , is, however, controlled as to its angular position by its own peculiarly-shaped cams $d^5 d^6$, so that its angular position is varied from the normal angular position which it would otherwise receive from the main cam referred to.

To enable the knife and its holder to freely follow the pattern-surface, I have herein provided a novel oiling device consisting of a piece of felt m , projecting from the end of an oil-receiving holder m' on the end of an arm pivoted at m^2 , to the sliding knife-carrying head, a spring m^3 acting to press this felt m , saturated with oil, against the periphery of the pattern immediately in advance of the knife and its holder. I have also provided a novel device for locking the knife-holder in position, the same being best shown in Fig. 12. Referring to said figure, the depending shank e^2 of the holder is provided with a reduced neck portion e^9 , which is engaged by the end of a locking-pin e^{10} , mounted

to slide in the sliding head e and acted upon by a spring e^{11} , which presses the said pin normally into position, engaging the head of the shank and locking the knife-holder in position, yet permitting free rotation of the knife-holder. The pin e^{10} is provided with a finger-piece e^{12} , rising through a slot e^{13} in the sliding head, and by means of which the pin may be slid back to release the knife-holder shank to enable the same to be readily removed for sharpening.

When the long patterns are used and it becomes necessary to hold the auxiliary swinging member and its knife-sliding head in an angular position, differing from the angular position of the main swinging member, in order that the knife may properly round the heel and toe, the auxiliary member must be guided by its own cams $d^5 d^6$, but when the shorter patterns are employed this independent movement of the main and auxiliary swinging members is unnecessary, and in such instances the operator, by means of the screw c^{8x} , draws the lug d' and its attached member d back relatively to the part c of the auxiliary swinging member, so as to remove its rollers $d^3 d^4$ from contact with their cams. When the member d is thus drawn back to remove its rollers from contact with their cams, a tapering projection d^7 on the said member d is drawn into a correspondingly-tapered recess d^8 in the main swinging member b^6 , thereby locking the two swinging members together as one, when the machine may then be operated practically upon the principle of the Moulton machine described, the main cam b^8 alone then performing all the work of guiding the parts.

Referring now to Figs. 1 and 14, I have provided an automatic stop for automatically disengaging the clutch and stopping the machine after the knife has made a complete round of the sole. This automatic stop-motion consists, as herein shown, of a handle-like lever o , pivoted at o' to the catch-plate a^{14} and having its stub end standing normally in front of the spring-finger a^{12} in its position in the holding-notch of the catch-plate. A lug o^2 on the depending portion of the hub of the bevel-wheel b' , at the end of a complete rotation of the said wheel, which indicates the finish of a rounding operation, engages the handle-lever o and moves the same to push the spring-finger a^{12} out from its holding-notch, permitting the spring a^7 to stop the machine, as described, the lug o^2 , before the machine comes to a standstill, passing into recess o^3 in the lever o , in order that the said lever may be freely pushed back by the spring-finger as the latter enters the notch, when the machine is again started.

Referring to Figs. 3 and 7, the stand h^3 is provided with a steel tongue h^4 , pivoted to the stand at h^5 and arranged in a suitable recess having diverging walls to provide a limited lateral swinging movement to the said tongue, suitable adjusting or stops crews h^6

(shown in dotted lines, Fig. 3) being also employed, if desired, to vary the limited movement of the tongue in either direction. These screws are so adjusted that when the tongue is in its extreme position in one direction its opposite edge lies flush with the edge of the pattern adjacent thereto; so that when the knife moves past the sharp-pointed toe portion of the pattern, which of itself would not for any considerable period resist the pressure of the spring pressing the knife against it, it will act principally upon this steel tongue, which will receive most of the pressure and thereby relieve the point of the pattern of most of the pressure. As the knife swings around to the opposite side of the point this tongue is by its beveled point thrown against the opposite stop-screw, so that its other edge lies flush with the edge of the pattern now followed by the knife. The tongue is made to swing in order that it may be adapted for the different widths or shapes of patterns, so that a single tongue suffices for all types of patterns that need reinforcement near the toe portion.

So far as known to me I am the first, in a rounding-machine, to provide a main cam, a rotatable carrier, a swinging member mounted thereon and actuated by the said cam, a knife mounted upon the swinging member, with means for holding the knife in an alined position, different from the position it would normally be held in by the cam. I am also the first, so far as I am aware, to employ a plurality of cams to position the knife-carrying members during the travel of the knife around the pattern, as distinguished from a single cam, such as employed in the Moulton machine. I am also the first, so far as I am aware, to provide the rotating carrier with main and auxiliary swinging members, with means for moving the same into and holding them in different relative angular positions, for the purpose specified. I therefore consider myself entitled to claim these features broadly, without limitations in the way of constructional detail. My invention, therefore, in the above and other respects as well, is not limited to the particular construction or movement herein shown and described, for it is evident the same may be varied without departing from the spirit and scope of my invention.

I claim—

1. A rounding-machine containing the following instrumentalities, viz: a pattern, a cam, a rotatable carrier, a swinging member mounted thereon and moved radially thereof by said cam, and means independent of said cam to hold the said swinging member in an angular position or positions at variance with the natural cam-actuated positions thereof, substantially as described.

2. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a swinging member mounted thereon, and a plurality of cams acting simul-

taneously to position said swinging member on said carrier, substantially as described.

3. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a plurality of cams, a swinging member mounted on said carrier, and connections intermediate the same and said cams whereby the former is given a movement radially and also angularly with relation to said carrier, substantially as described.

4. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a swinging member mounted on and rotatable with said carrier, a cam to vary the radius of the path of movement of said swinging member, and means independent of said cam to vary the angular position of said swinging member, substantially as described.

5. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a main swinging member mounted thereon, and its cam, an auxiliary swinging member mounted on said main swinging member, means to vary the relative angular positions of the two swinging members, and a knife mounted upon the said auxiliary swinging member, substantially as described.

6. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a main swinging member mounted thereon, and its cam, an auxiliary swinging member mounted on said main swinging member, means to vary the relative angular positions of the two swinging members, and a knife and its sliding head mounted on said auxiliary swinging member, substantially as described.

7. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a main swinging member mounted thereon, and its cam, an auxiliary swinging member mounted on said main swinging member, means to vary the relative angular positions of the two swinging members, a knife and its sliding head mounted on said auxiliary swinging member, a spring to press said knife always in operative position with relation to said pattern, substantially as described.

8. A rounding-machine containing the following instrumentalities, viz: a pattern, a knife, means to carry the same around the said pattern, a spring to press the knife always into operative position relatively to the pattern, and means to automatically vary the spring during movement of the knife about the pattern to compensate for the irregularities in the contour of said pattern whereby a substantially uniform pressure exerted by the spring is maintained, substantially as described.

9. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a swinging member mounted thereon and its cam, a knife and its sliding

head mounted upon the swinging member, a spring to press the said knife and its head toward said pattern, and means to ease on the said spring at one end when the tension is increased at the opposite end, and vice versa, substantially as described.

10. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a swinging member mounted thereon, and its cam, a knife and its sliding head mounted upon the swinging member, a spring to press the said knife and its head toward said pattern, and a cam, and intervening connecting devices to ease on the said spring at one end when the tension is increased at the opposite end, and vice versa, substantially as described.

11. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a main swinging member and its cam, an auxiliary swinging member and its cam or cams, and means to hold the said auxiliary swinging member out of operative engagement with its cam or cams leaving the same under the control of the main-swinging-member cam, substantially as described.

12. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a main swinging member and its cam, an auxiliary swinging member and its cam or cams, means to hold the said auxiliary swinging member out of operative engagement with its cam or cams leaving the same under the control of the main-swinging-member cam, and means to lock the two swinging members as one when said auxiliary member is out of operative engagement with its cam, substantially as described.

13. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a sliding carriage thereon, the main swinging member mounted on said carriage, and its cam, the auxiliary swinging two-part member pivotally mounted upon said main swinging member, a cam or cams acting upon one of the parts of the said auxiliary member, and adjustable means for con-

necting said part with the other part of said swinging member, the knife and its sliding head mounted on said auxiliary swinging member, all to operate, substantially as described.

14. A rounding-machine containing the following instrumentalities, viz: a pattern, a rotatable carrier, a swinging knife-carrying member, and controlling means therefor, a knife, the sliding carrying-head therefor and an oiling device pivotally mounted upon said sliding head and adapted to follow said pattern to lubricate the bearing of the knife or its holder thereupon, substantially as described.

15. A rounding-machine containing the following instrumentalities, viz: the standard or frame, the knife, and means to operate the same, the clamping members between which the leather sole is held, the links f^9 and f^{15} , the lever connecting the same and arranged to form a toggle-joint, and the treadle, all operating substantially as described.

16. In a rounding-machine, the combination with a pattern, and a support therefor, of a reinforcing member movably mounted on said support to relieve the pattern of a part of the pressure of the knife or its holder thereupon, substantially as described.

17. In a rounding-machine, the combination with a pattern and its support, of a swinging reinforcing-tongue to operate, substantially as described.

18. In a rounding-machine, a swinging reinforcing-tongue, and adjustable limiting-stops therefor, substantially as described.

19. In a rounding-machine, a swinging reinforcing-tongue having a tapering point to enable it to be swung from one to another position by the parts moving in contact with the pattern, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN A. CROSBIE.

Witnesses:

FREDERICK L. EMERY,
AUGUSTA E. DEAN.