J. GOULDBOURN.

MACHINE FOR BREASTING HEELS.

APPLICATION FILED JULY 10, 1906.

955,865.

Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.

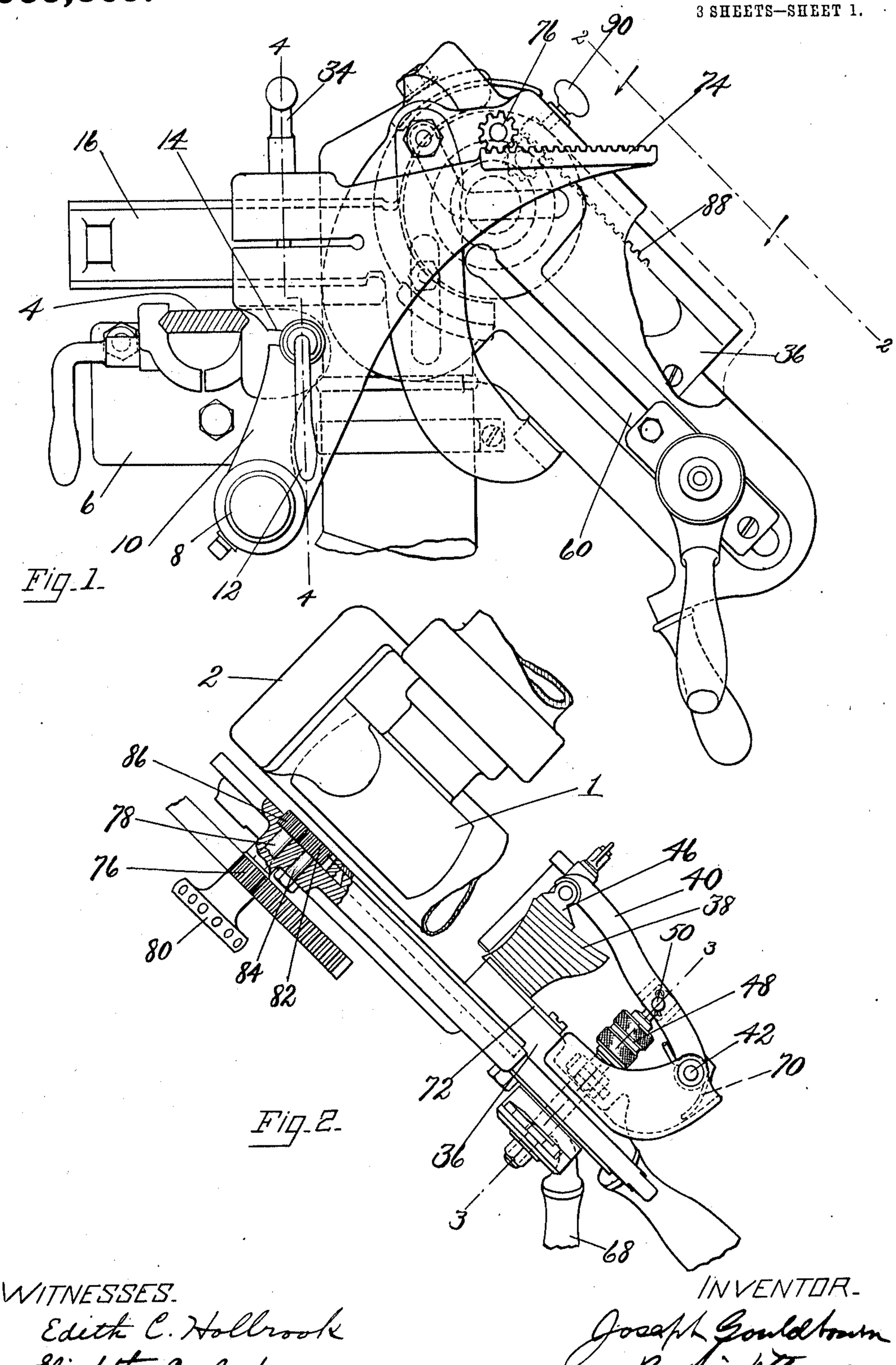

Fig. 1.

Fig. 2.

WITNESSES.

Edith C. Hollbrook

Elizabeth C. Coupe

INVENTOR.

Joseph Gouldbourn

By his Attorney

Nelson W. Howard

J. GOULDBOURN.

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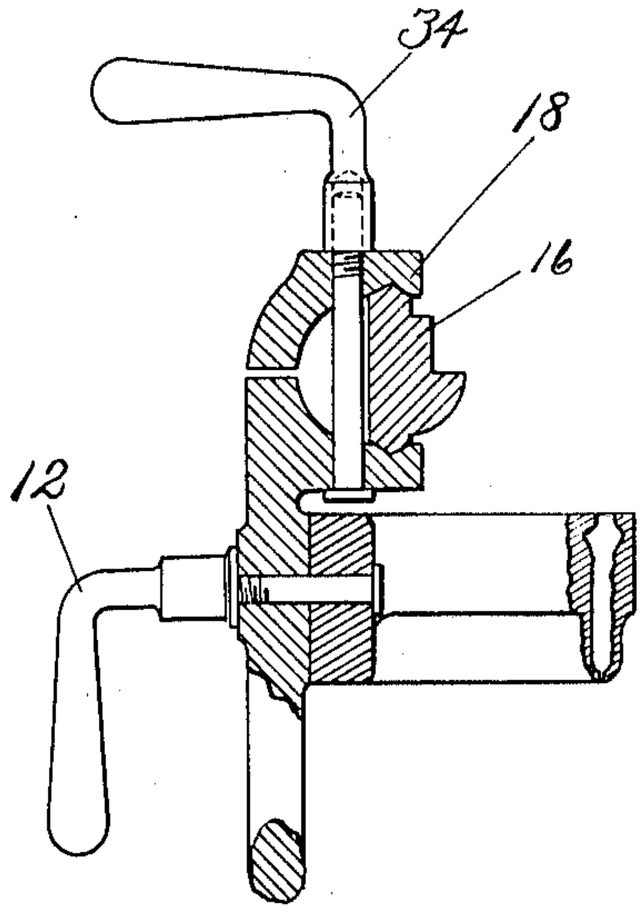

Fig. 4.

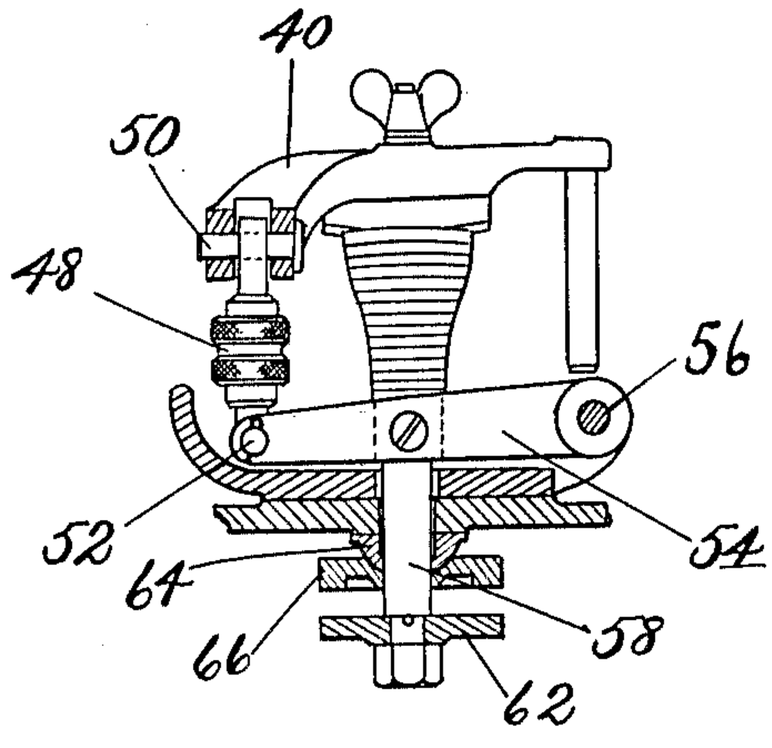

Fig. 3.

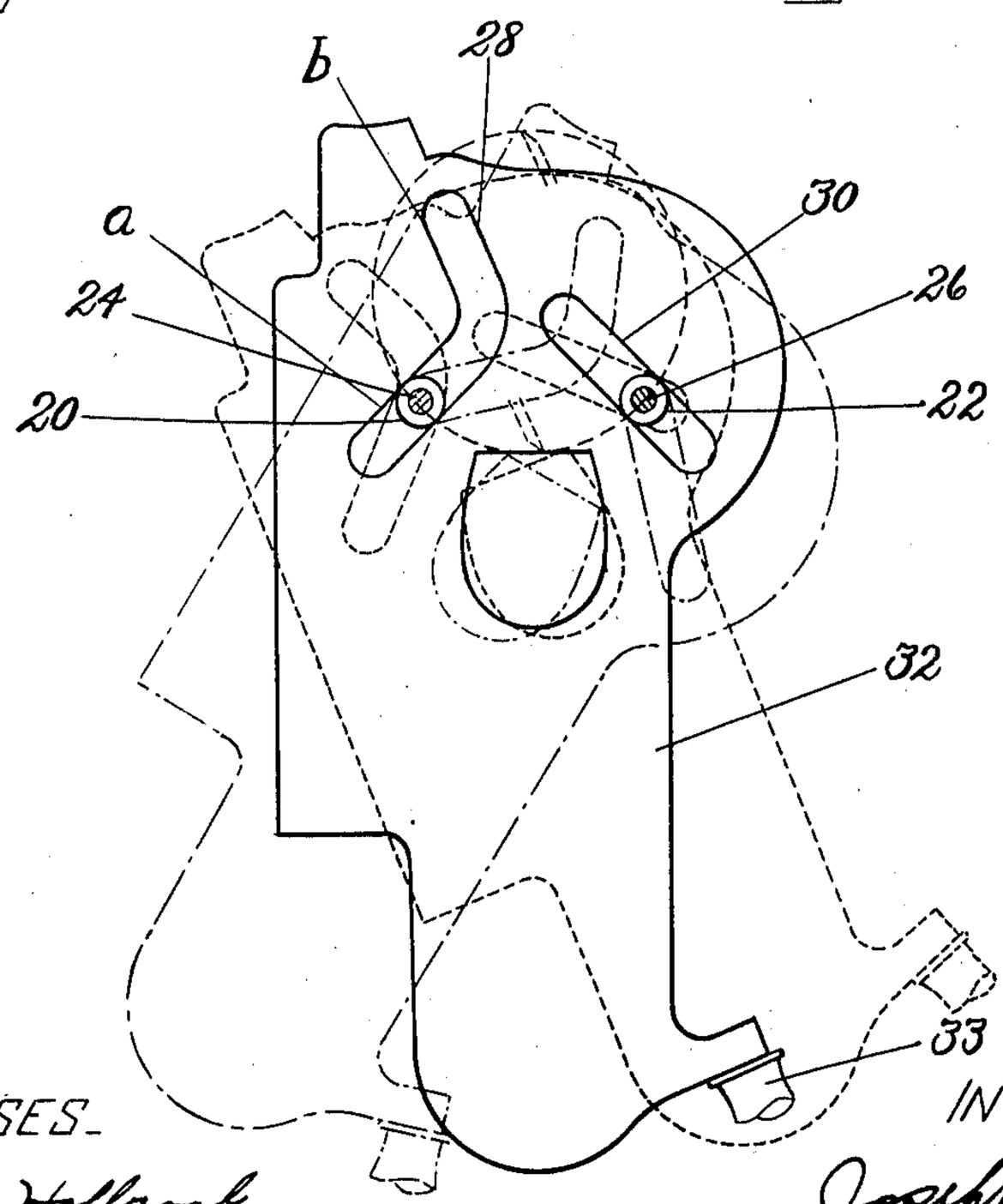

Fig. 5.

WITNESSES.

Edith C. Holbrook

Elizabeth C. Coulpe

INVENTOR.

Joseph Gouldbourn

By his Attorney,

Nelson W. Morsell

J. GOULDBOURN.

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3 SHEETS—SHEET 3.

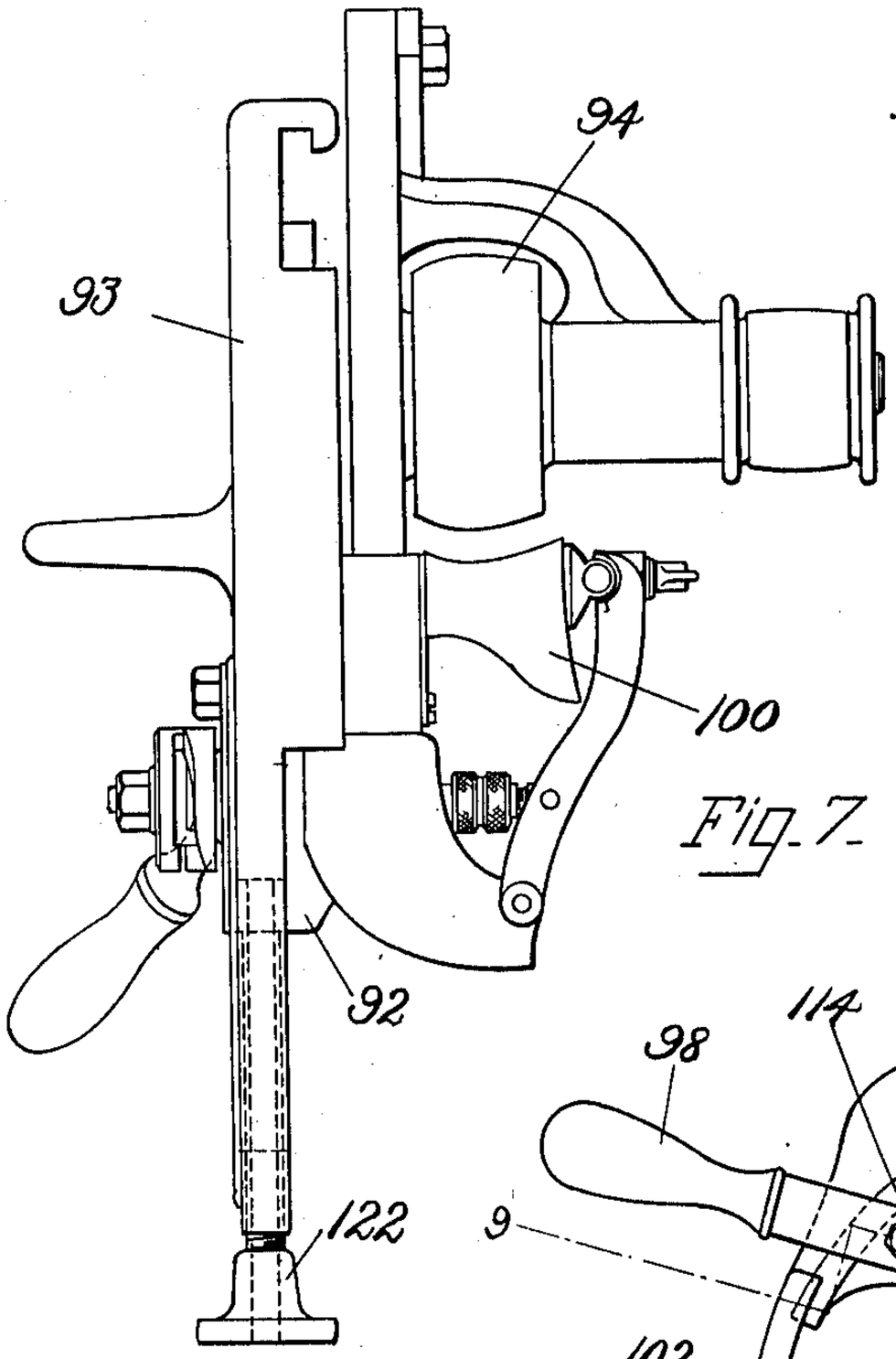

Fig. 7.

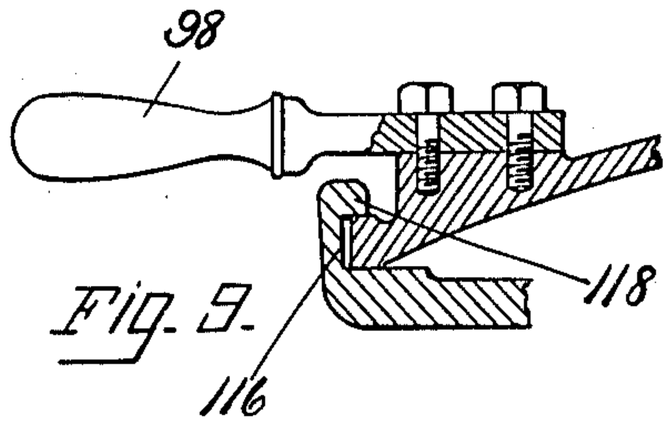

Fig. 9.

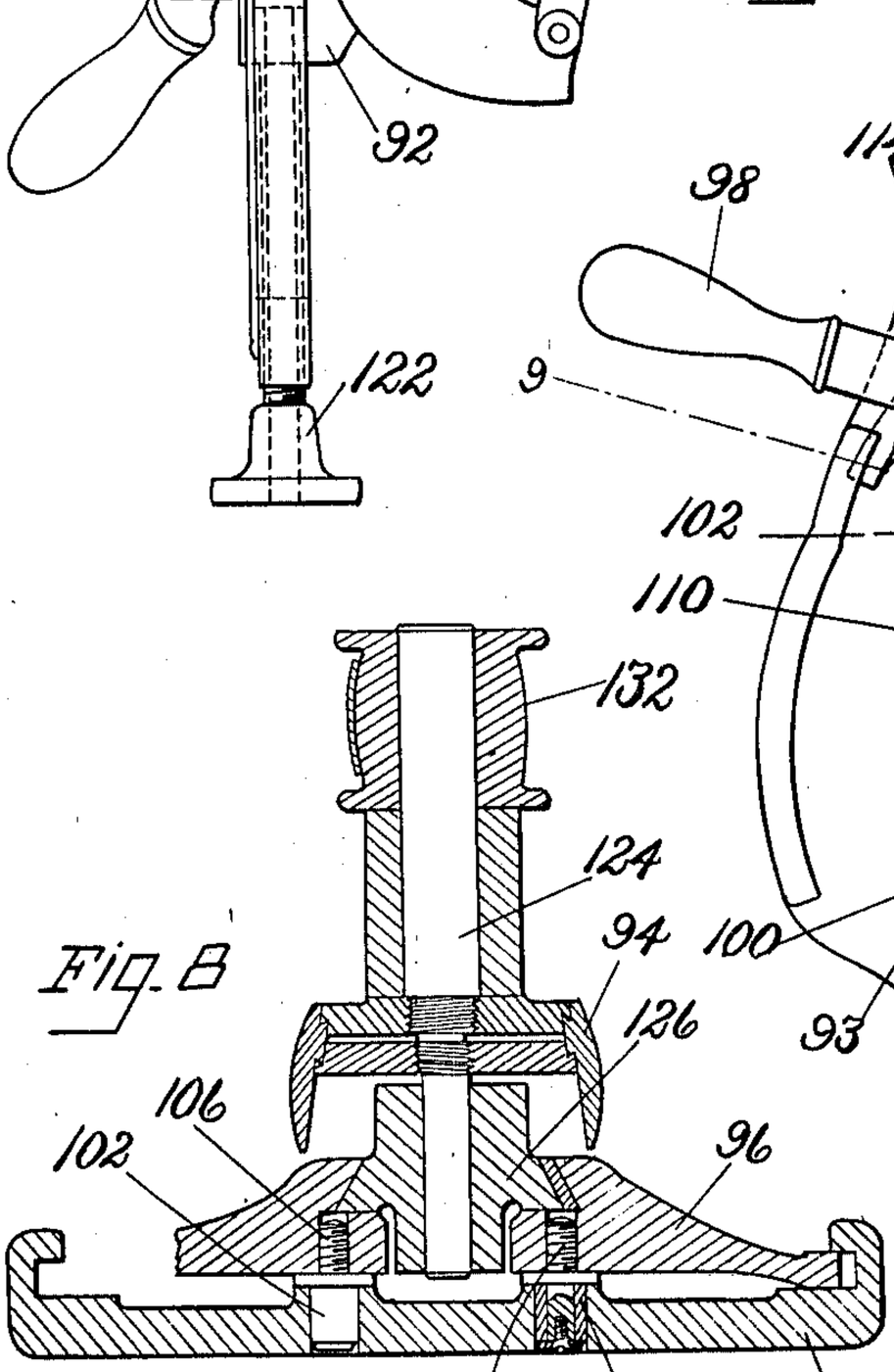

Fig. 8

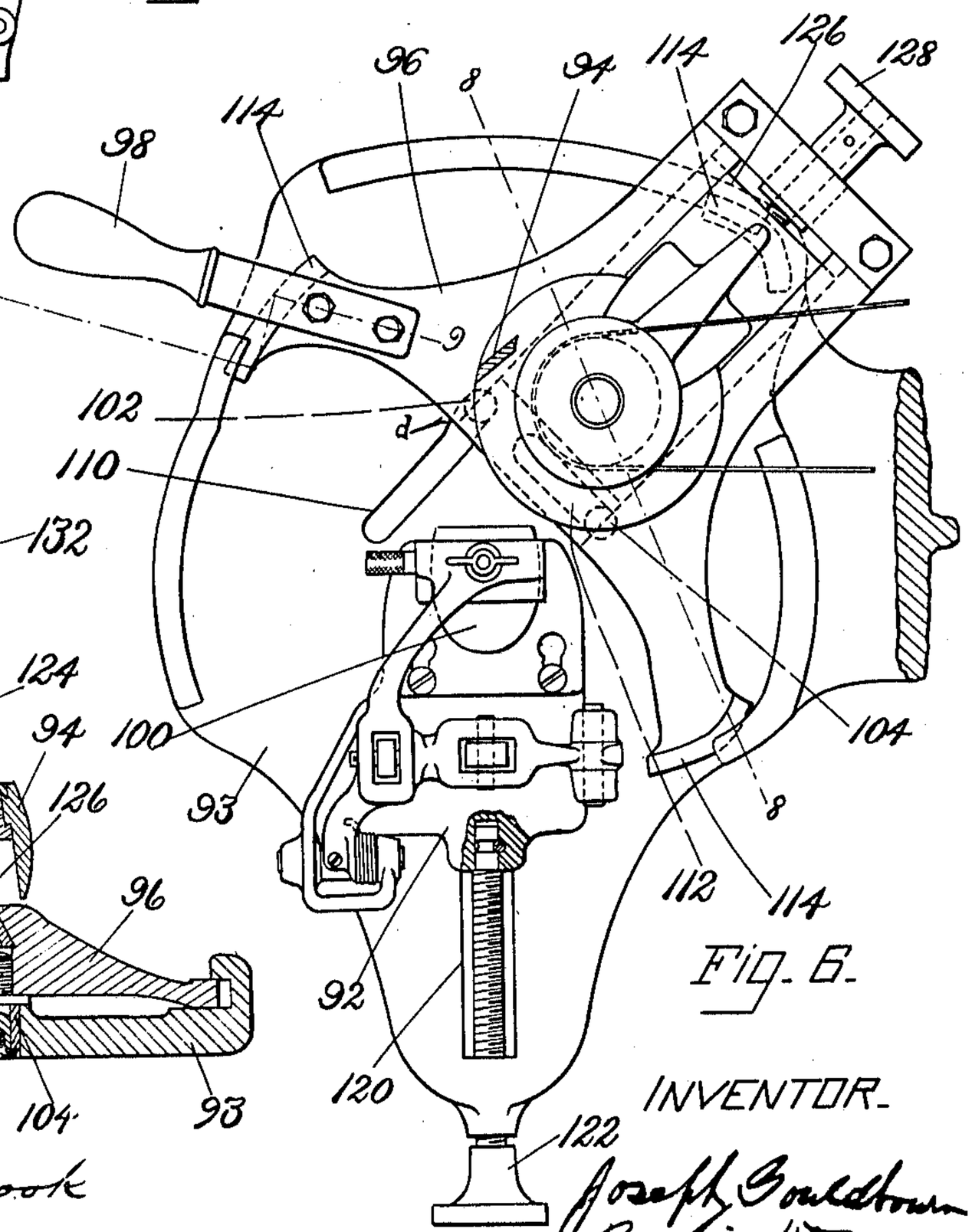

Fig. 6.

WITNESSES.

Edith C. Hallcrook

Elizabeth C. Coupe

INVENTOR.

Joseph Gouldbourn

By his Attorney,

Nelson W. Howard

UNITED STATES PATENT OFFICE.

JOSEPH GOULDBOURN, OF LEICESTER, ENGLAND, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR BREASTING HEELS.

955,865. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed July 10, 1906. Serial No. 325,516.

To all whom it may concern:

Be it known that I, JOSEPH GOULDBOURN, a subject of the King of England, residing at Leicester, in the county of Leicester, England, have invented certain Improvements in Machines for Breasting Heels, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for breasting heels.

In the manufacture of boots and shoes it is desired to trim the breasts of heels to contours which vary according to different circumstances, such as the style or the height of the heel.

The principal object of the present invention is to provide a machine permitting breasts of heels to be trimmed to various contours, said machine being so constructed as to secure by its adjustment such variation as may be desired.

A machine embodying my invention allows various contours to be produced without the employment of interchangeable parts, such as guide templets, cams, or cutters of various sizes.

The embodiment of the invention herein shown by way of example is arranged to permit variation in the contour of the line in which the breast and tread of a heel meet and is, moreover, adapted for trimming heels before they are secured to boots or shoes. It will be understood, however, that machines embodying my invention may be arranged to permit variation in contour of the line in which the breast and side of the heel meet or the construction may be such that heels may be trimmed after being secured to boots or shoes.

An important feature of the invention consists in the provision of a cutter and a work support which are arranged for relative traversing movement and mechanism for controlling the path of the relative traverse arranged for adjustment to permit the degree of curvature of the breast surface formed by the cutter to be varied. The construction shown is such that the contour produced may be either concave, convex, or straight, and the degree of concavity or convexity may be varied as desired.

In the preferred embodiment of the invention a cutter-carrying member and a work-supporting member are arranged for relative movement, and mechanism is provided for controlling said movement constructed to cause two separated points on the cutter-carrying member to have a simultaneous traverse relatively to the heel-carrying member along paths which in the arrangement shown are straight and angularly disposed to each other. It will be found that by suitably locating the cutter and the work support with relation to said mechanism the contour of the heel breast produced may be of different degrees of concavity or convexity or may, if desired, be straight. The controlling mechanism may be arranged to control also the relative movement of the cutter and work into and out of cut. The relation chosen between the cutter or the work support and the controlling mechanism may at times be such that the work is out of or too far within the range of the cutter, and the present invention accordingly includes means for shifting the cutter relatively to the work while maintaining unaltered the relation of the work or the cutter to said controlling mechanism. Provision is thus made for varying the depth of the cut either from time to time or during the treatment of a single breast. According to a convenient construction one of said members is adjustably sustained upon a movable controlling device, the other member being mounted in stationary position. The controlling device is adjustable with relation to the stationary member in order to vary the path of the member sustained upon said device. The parts are so connected that adjustment of a member upon said device and of the device itself may be simultaneously made. Where said adjustments are simultaneously made mechanism is preferably provided for independently adjusting the relations between the cutter and the heel in order to vary the depth of the cut.

I have shown herein two embodiments of the invention in one of which the cutter is stationary and the work is moved into contact therewith and in the other of which the cutter is arranged for movement and the work is stationary. The cutter employed is a rotary cutter and the work support shown is arranged to permit a heel to be held in operative relation to the cutter. In the embodiment of the invention in which the cutter is stationary the parts are so ar-

ranged that in the operation of the machine the heel is moved about the periphery of the cutter and is simultaneously rocked to a predetermined degree so that the heel is trimmed to a predetermined contour differing from that of the cutter. Where the cutter is arranged for movement the parts are arranged to cause the center of the cutter to move in a predetermined path from side to side of the heel.

Other features of the invention, including details of construction and combinations of parts, will be hereinafter described and defined in the claims.

In the drawings,—Figure 1 is a side elevation of part of a heel-breasting machine showing a construction embodying the present invention in which construction a rotary cutters is mounted in fixed bearings and the heel is secured upon a movable member or plate; Fig. 2 is a view of certain of the parts shown in Fig. 1, looking in the direction of the arrows in that figure; Fig. 3 is a detail sectional view on the line 3—3 of Fig. 2; Fig. 4 is a sectional view on the line 4—4 of Fig. 1; Fig. 5 is a diagrammatic view of the cutter, heel, and member or plate showing in chain, full, and dotted lines, respectively, three positions assumed by the parts during the breasting operation; Fig. 6 is a side elevation of part of a heel-breasting machine showing an alternative construction according to the present invention wherein the heel is stationary and the cutter is mounted in bearings supported upon a movable member or plate; Fig. 7 is a front elevation of the parts shown in Fig. 6; Fig. 8 is a sectional view of the cutter, member or plate, and adjacent parts on the line 8—8 of Fig. 6; Fig. 9 is a sectional detail on the line 9—9 of Fig. 6.

Referring first to Figs. 1 to 5, a rotary cutter 1 is secured to a shaft journaled in the main frame 2 of the machine and rotated by any usual means. A lug 4 (Fig. projects from the main frame 2 and mounted upon it is a bracket 6 upon which is fulcrumed at 8 an arm 10. The arm 10 may be clamped in adjusted position by a clamping handle 12 that is supported on the bracket 6 and engages a slot 14 formed in the arm 10. A slide 16 is adjustably mounted in guideways 18 (Fig. 4) in the arm 10 and carries two rollers 20, 22 (Fig. 5) mounted upon studs 24, 26, each roller extending into one of two cam grooves 28, 30 formed in a controlling member or plate 32 movably supported by said rollers and studs on the slide 16 and formed with a handle 33. A clamping handle 34 is provided to retain the slide 16 in adjusted position.

Movably mounted upon the controlling plate 32 is a heel carrier 36 upon which a heel 38 is adapted to be held by means of a suitable clamp 40 pivoted at 42 to the carrier 36 and having its free end adapted to bear, by way of a contact piece 46, upon the "seat" of the heel, the top lift of the latter resting upon the carrier 36. To operate the clamp an adjustable link 48 is connected to it at 50 and is also connected at 52 (Fig. 3) to a lever 54 pivoted at 56 to the carrier 36. Pivotally connected to the lever 54 is a rod 58 that extends through a hole in the carrier and also through a long straight slot 60 formed in the controlling plate 32 to permit adjustment of the carrier on the plate as hereinafter described. A spiral cam piece 62 is rigidly attached to the lower end of the rod 58 and a loose washer 64 and a loose spiral cam piece 66, provided with a handle 68, are interposed between the cam piece 62 and the controlling plate 32. A movement of the handle 68, therefore, will by the interaction of the spiral cam pieces 62, 66 and lever 54 cause the link 48 and clamp 40 to be depressed and thereby not only clamp the heel upon the carrier 36, but also clamp the latter to the controlling plate 32. A spring 70 is provided to elevate the clamp 40 when the handle 68 is moved reversely. To position the heel upon the carrier there may be suitable interchangeable recessed plates 72 to receive and position the top lift.

The operation of the parts as thus far described is as follows:—The heel having been clamped to the carrier 36 and the latter simultaneously clamped to the controlling plate 32 in the position thereon shown in Fig. 1, the operator, by means of the handle 33 on the plate, moves the plate in the path in which it is guided by the cam grooves 28, 30 in conjunction with the rollers 20, 22 aforesaid. The groove 30 is a straight slot, while the other groove 28 is a longer slot comprising two portions *a* and *b*. These cam grooves first allow the heel to advance toward the cutter 1 so that when the junction between the portions *a* and *b* of the groove 28 reaches the roller 20 on the stud 24 the breast of the heel is brought into close proximity to the cutter. A continued movement of the plate by the operator now causes the portion *a* of the groove 28 to travel along past the roller 20 and the groove 30 to reverse its direction of motion on the roller 22. This action of the cam grooves and rollers so guides the plate 32 that the heel moves in a curved path past the cutter slightly rocking or rotating relatively thereto and is trimmed thereby to a curvature which is different from that of the acting face of the cutter. If it be desired to trim the breast to a smaller curvature, that is to say, one nearer approaching a straight line, it is only necessary in the present construction to adjust the heel carrier 36 from the position on the plate 32 shown in Fig. 1 to a position in which it is

nearer to the cam grooves 28, 30, and as this may move the heel too far within the range of the cutter, also to adjust the cutter slightly away from the heel or what amounts to the same thing, to adjust the controlling plate 32 and carrier 36 together forwardly in the machine. To this end the following mechanism is provided:—The arm 10 has an extension upon which rack teeth 74 are formed. Engaging with these rack teeth is a pinion 76 on a shaft 78 journaled in the controlling plate 32 and provided with an operating handle 80. An intermediate pinion 82 on a second shaft 84 on the plate 32 gears with a second pinion 86 fixed on the shaft 78 and also meshes with a rack bar 88 attached to the heel carrier 36. To adjust the parts as described, it is only necessary, therefore, to unclamp the carrier 36 from the controlling plate 32 and the slide 16 from the arm 10 and then to turn the operating handle 80 and thereby move the carrier 36 on the plate 32 toward the cam grooves 28, 30 and the carrier 36, plate 32, and slide 16 in company toward the front of the machine, and finally to re-clamp the carrier and slide in their new positions. With the parts as re-adjusted it will be found that during the breasting operation the heel will rock relatively to the cutter through a greater angle while it is in engagement with the cutter than it did before, and thereby more material will be trimmed from the sides of the breast which consequently will have a curvature more nearly approaching a straight line.

Fig. 5 is a diagrammatic view of the controlling plate 32 but showing the side thereof opposite to that seen in Fig. 1. Of the three diagrams comprising this figure that indicated in dotted lines shows the relative position of the controlling plate 32, the heel 38, and the cutter 1 at the beginning of the breasting operation, while those indicated in full and chain lines show, respectively, the positions of the parts at the middle and end of the breasting operation. When the controlling plate, the cutter 1, and the heel are adjusted into the relative positions shown on each of the diagrams comprising Fig. 5, the breast of the heel will be trimmed straight, that is to say, the line forming the junction between the tread face and breast edge of the top lift or the corresponding face and edge of any of the other lifts of the heel will be a straight line.

It will be understood that if a curvature equaling that of the cutter face be required for the breast of the heel or if a convex curvature be desired, the parts can be adjusted into positions in which such desired curvatures can be obtained.

Preferably the parts are so arranged that the amount of material trimmed from the center of the breast is the same in all of the above described adjustments, that is to say, the thickness at the center line of the heel will be constant even though the breast be concave, flat, or convex.

Provision is made, according to the present invention, for readily interrupting and remaking the operative connections between the carrier on the controlling member and the devices by which said member is controlled, in order that the relationship that existed prior to the interruption between said two elements may be readily varied to alter the relative position of the heel and cutter and thereby vary the depth of cut. In the embodiment of the invention illustrated in Figs. 1 and 2 the chain of connections between the carrier 36 and the slide 16 can be interrupted by lifting the plate 32 and thereby moving the pinion 76 and rack teeth 74 out of engagement. The carrier 36 may then be adjusted upon the plate 32 without altering the position of the slide 16. A set screw 90 is provided for locking the carrier 36 in its adjusted position.

Referring now to Figs. 6 to 9 of the drawings, in the construction illustrated therein a heel carrier 92 is mounted directly upon the machine frame 93 and a rotary cutter 94 is carried by a controlling plate 96 provided with a handle 98 by means of which it may be moved by the operator to bring the cutter into engagement with and to cause it to travel past the heel 100 to effect the breasting of the same. The path of motion traversed by the cutter is controlled by two rollers 102, 104, mounted upon studs 106, 108 screwed into the controlling plate, which rollers engage respectively with two cam grooves 110, 112 formed in the machine frame. To retain the controlling plate in position on the machine frame it has three lugs 114 which engage respectively with surfaces 116 and overhanging flanges 118 formed upon the machine frame 93.

With the parts adjusted as shown, the operation of the machine is as follows:—The handle 98 is moved downwardly causing the controlling plate 96 first to swing about the roller 104 on the stud 108 as a center while the roller 102 on the stud 106 is traveling along the curved part *d* of the cam groove 110 thus bringing the cutter into engagement with the corner of the breast of the heel. A continued downward movement of the handle 98 next causes the rollers to travel along the grooves 110, 112 and thereby so guide the controlling plate that the center of the cutter travels in substantially a straight line and consequently the cutter is caused to breast the heel with a straight cut. When it is desired to give a concave curvature to the breast of the heel the cutter is adjusted to a position on the controlling plate 96 nearer to the grooves 110, 112 than that in which it is shown in Fig. 6. But

this adjustment of the cutter will necessitate an adjustment of the position of the heel carrier 92 on the machine frame; otherwise the cutter will be too far within range of the heel 100. In order that these adjustments may be readily obtained both cutter and heel carrier are adjustably mounted upon the parts that support them. The heel carrier 92, which is provided with a heel-clamp similar to that described in connection with the construction illustrated in Figs. 1 to 5, is mounted in guideways 120 on the machine frame and is provided with an adjusting device 122 comprising a screw engaging a screw-threaded lug on the machine and connected to the carrier by a pin and groove connection. The cutter is secured to a shaft 124 carried in bearings on a slide 126 mounted in guideways in the controlling plate 96.

An adjusting device 128, similar to the device 122, is provided to enable the slide 126 and cutter 94 to be adjusted on the controlling plate. The cutter is driven from any suitable source of power by a belt extending over a pulley 132 fast upon the shaft 124, any usual belt-tightening device being employed to obtain the desired tension of the belt on the pulley 132 during the movement of the cutter.

It will be understood that if it is desired to impart a convex curvature to the breast of the heel the cutter 94 will be adjusted to a position farther from the grooves 110, 112 than that in which it is shown in Fig. 6.

The path of relative motion of the heel-carrying member and the cutter-carrying member obviously may be controlled by cam slots other than those shown—for instance, three slots of a similar shape to the lugs 114, Fig. 6; but to enable the heel to be breasted to any curvature from that of the cutter to a straight line or even a convex curvature these slots must be arranged so that two points—for example, 106, 108—on the cutter-carrying member describe paths 110, 112 relatively to the heel-carrying member, which paths are straight and angularly disposed to each other or are non-concentric.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A heel-breasting machine having in combination a cutter, means for sustaining a heel to be acted upon by the cutter, and mechanism for moving relatively said cutter and heel-sustaining means to trim the breast of the heel, said mechanism being arranged for adjustment to permit the breast to be trimmed either to a straight or curved contour.

2. A heel-breasting machine having in combination a cutter, means for sustaining a heel to be acted upon by the cutter, and mechanism for moving relatively said cutter and heel-sustaining means to trim the breast of the heel to a curved contour, said mechanism being arranged for adjustment to permit the curvature of the face formed by the cutter to be varied.

3. A heel-breasting machine having in combination a cutter, a work support, and a device for controlling relative movement of said cutter and work support arranged to cause successive portions of the heel breast from side to side of the heel to be brought successively into contact with the cutter, said device being constructed to permit the heel breast to be trimmed in a curved path from side to side of the heel the curvature of said path being variable.

4. A heel-breasting machine having in combination a rotary cutter, means for sustaining a heel to be acted upon by the cutter, and means for moving the heel about the periphery of the cutter and for simultaneously rocking the heel to a predetermined degree about an axis parallel to the axis of the cutter whereby the heel is trimmed to a predetermined contour differing from that of the cutter.

5. A machine of the class described having in combination a cutter and a work support arranged for relative movement along the breast of a heel to trim the same, a device for causing the path of relative movement of said devices to be of a predetermined curvature, means permitting relative adjustment of the heel support and said device, and means permitting relative adjustment of the cutter and said device whereby the curvature of relative movement of the cutter and the work support may be varied.

6. A heel-breasting machine having in combination a cutter and a work support arranged for relative movement, mechanism for controlling said movement constructed to cause the work support and a heel to first approach the cutter and then move relatively in a curved path and means permitting relative adjustment of the work support and said mechanism, whereby to vary the curvature to which the breast of the heel is trimmed.

7. A heel-breasting machine having in combination a cutter-carrying member and a work-carrying member, one of said members having two angularly disposed straight guides and the other member having pivotal devices arranged for engagement with said guides.

8. A heel-breasting machine having in combination a cutter arranged for movement in a fixed path, a work support, mechanism for imparting an oscillating movement to the work support to move a heel in a curved path intersecting the path of the cutter, means for adjusting the work support with relation to said mechanism whereby the

curvature of the path of the work support may be varied, and means for simultaneously adjusting said mechanism with relation to the cutter whereby the work support is maintained in operative relation to the cutter.

9. A heel-breasting machine having in combination a cutter arranged for movement in a fixed path, a work support, mechanism for imparting an oscillating movement to the work support to move a heel in a curved path intersecting the path of the cutter, means for adjusting the work support with relation to said mechanism whereby the curvature of the path of the work support may be varied, and means permitting independent adjustment of the work support relatively to said mechanism whereby the path of cut may be varied.

10. A heel breasting machine having in combination a cutter arranged for movement in a fixed path, a work support, mechanism for imparting a movement to the work support to move a heel in a curved path intersecting the path of the cutter, means for adjusting the work support relatively to said mechanism and for simultaneously adjusting said mechanism relatively to the cutter whereby the path of movement of said work support may be varied and its operative relation to the cutter maintained, said parts being arranged to permit independent adjustment of the work support relatively to said mechanism.

11. A heel breasting machine having in combination a cutter, a work support, a controlling member sustaining said work support and arranged to impart thereto a movement in a curved path relatively to the cutter, mechanism for adjusting said work support along said member whereby to vary the curvature of its path of movement and means to clamp a heel to said work support and to simultaneously secure said work support in adjusted position.

12. A heel breasting machine having in combination a cutter, a work support, a controlling member sustaining said work support and arranged to impart thereto a movement in a curved path relatively to the cutter, mechanism for adjusting said work support along said member and for simultaneously adjusting said member relatively to the cutter, and means to secure said parts in adjusted position.

13. A heel breasting machine having in combination a cutter, a work support, a controlling member sustaining said work support and having means arranged to impart thereto a movement in a curved path relatively to the cutter, a rack supported from the frame of the machine, a rack carried by the work support and gearing sustained by said member and coöperating with said racks to adjust the work support relatively to said means and to adjust said member relatively to the cutter, said gearing being arranged for disconnection from the first-mentioned rack.

14. A heel breasting machine having in combination a cutter, an arm sustained by the machine frame and provided with a rack and with guideways, a slide adjustable in said guideways and supporting two spaced rollers, a controlling member having angularly-disposed grooves to coöperate with said rollers in imparting to said member a movement in a curved path relatively to the cutter, a work support movable on said member and provided with a rack, gearing carried by said member in mesh with said racks whereby to adjust the work support relatively to said grooves and to adjust said member relatively to the cutter, and means for clamping the parts in adjusted position.

15. In a machine for breasting the heels of boots and shoes, the combination with a revolving cutter, of a table, a slide provided with clamping means for holding the heel, a lever connected to said slide for causing the heel to move in a curved path, and means whereby the direction of the curved path may be varied.

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

JOSEPH GOULDBOURN.

Witnesses:

ARTHUR ERNEST JERRAM,

GRACE HOLMES.