C. PEASE.

BOTTOM FINISHING MACHINE.

APPLICATION FILED MAR. 9, 1906.

960,391.

Patented June 7, 1910.

4 SHEETS—SHEET 1.

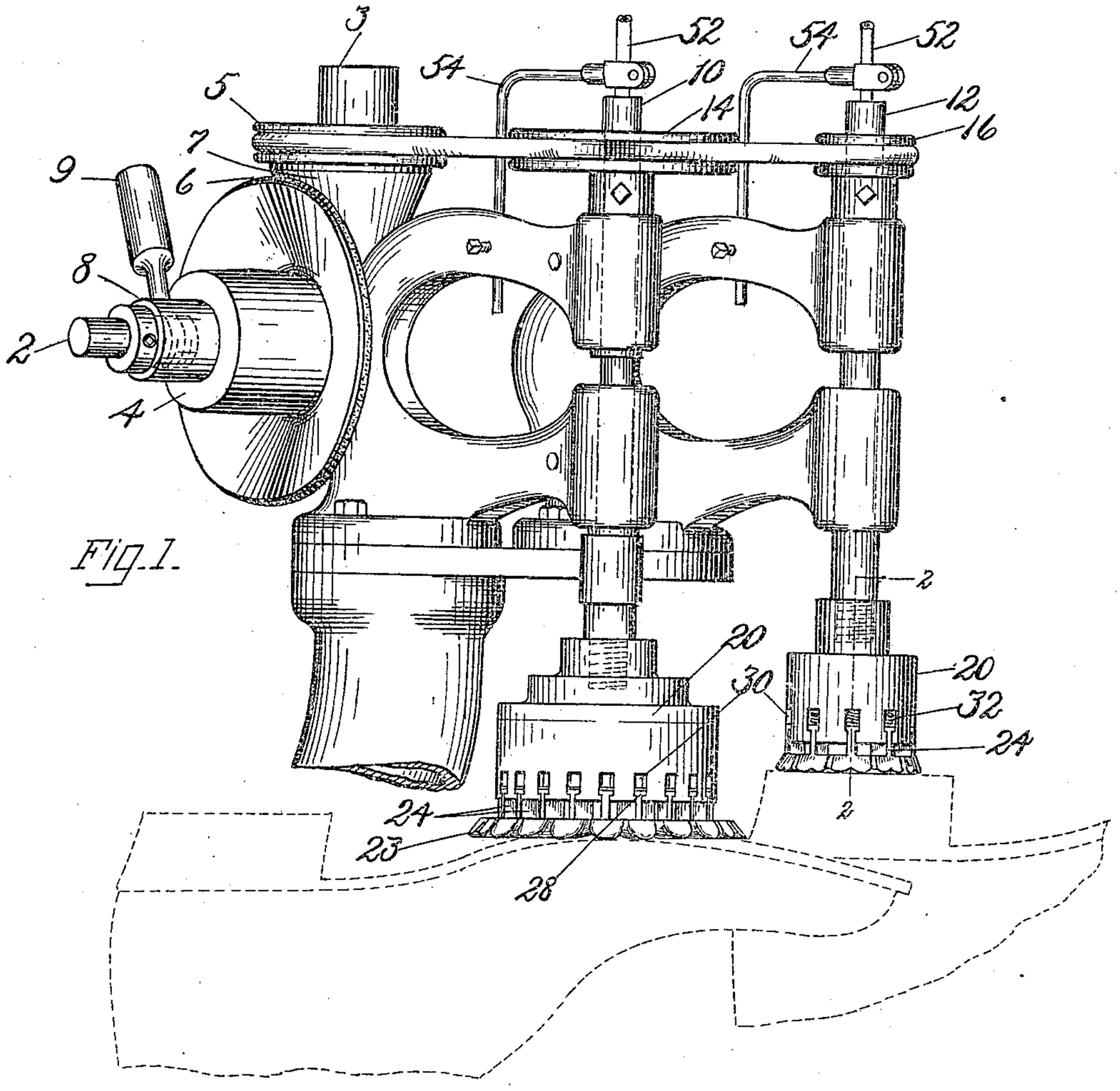

Fig. 1.

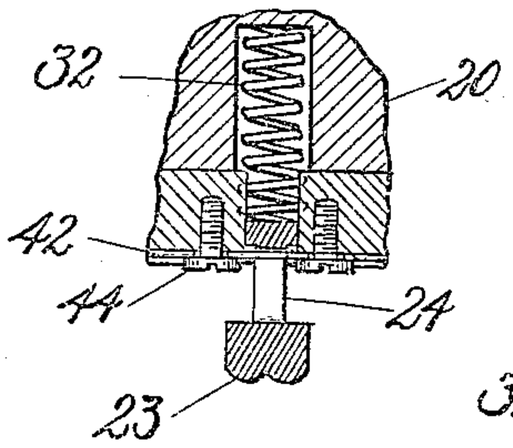

Fig. 3.

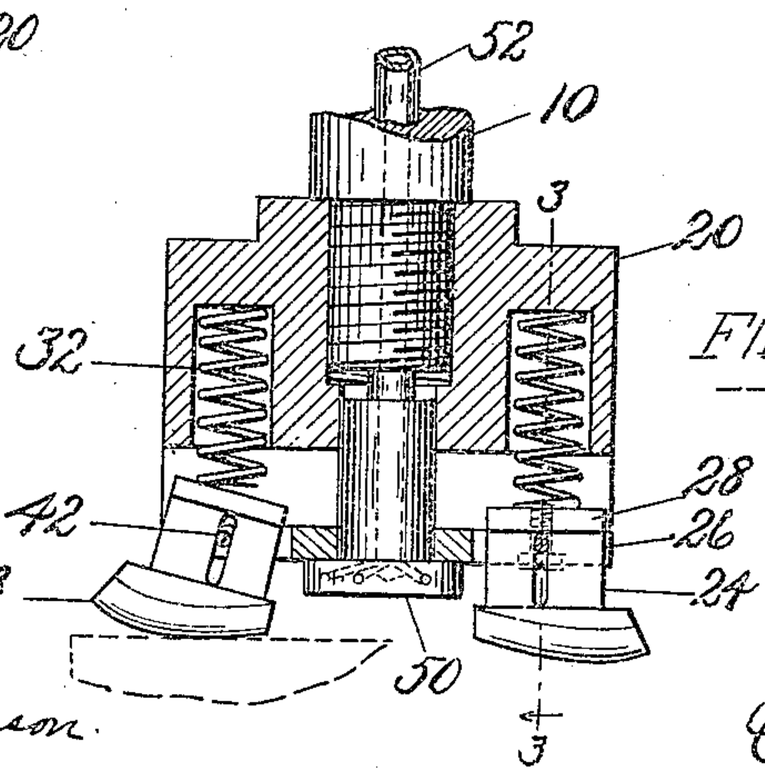

Fig. 2.

WITNESSES.

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4 SHEETS—SHEET 2.

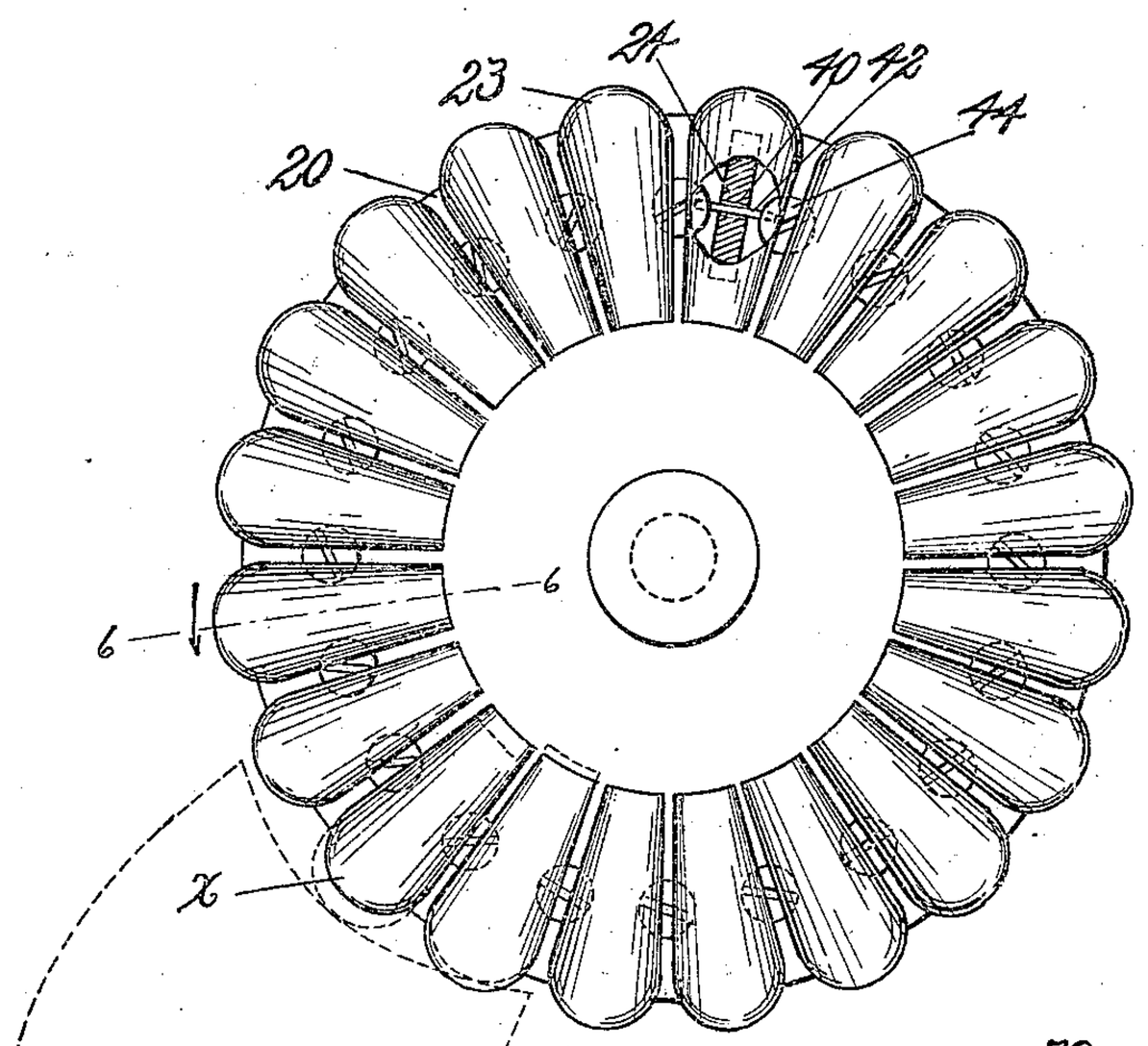

Fig. 4.

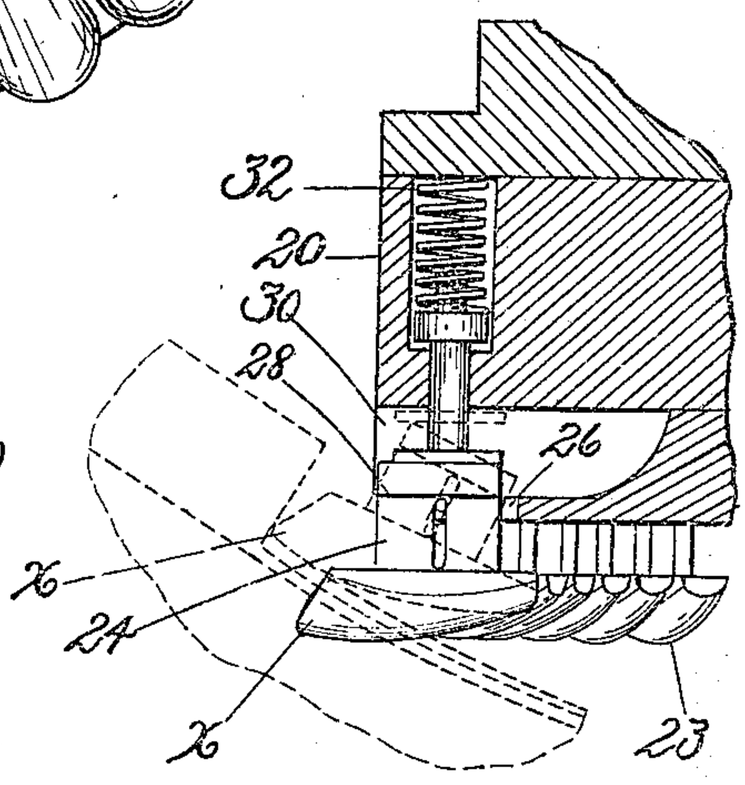

Fig. 6.

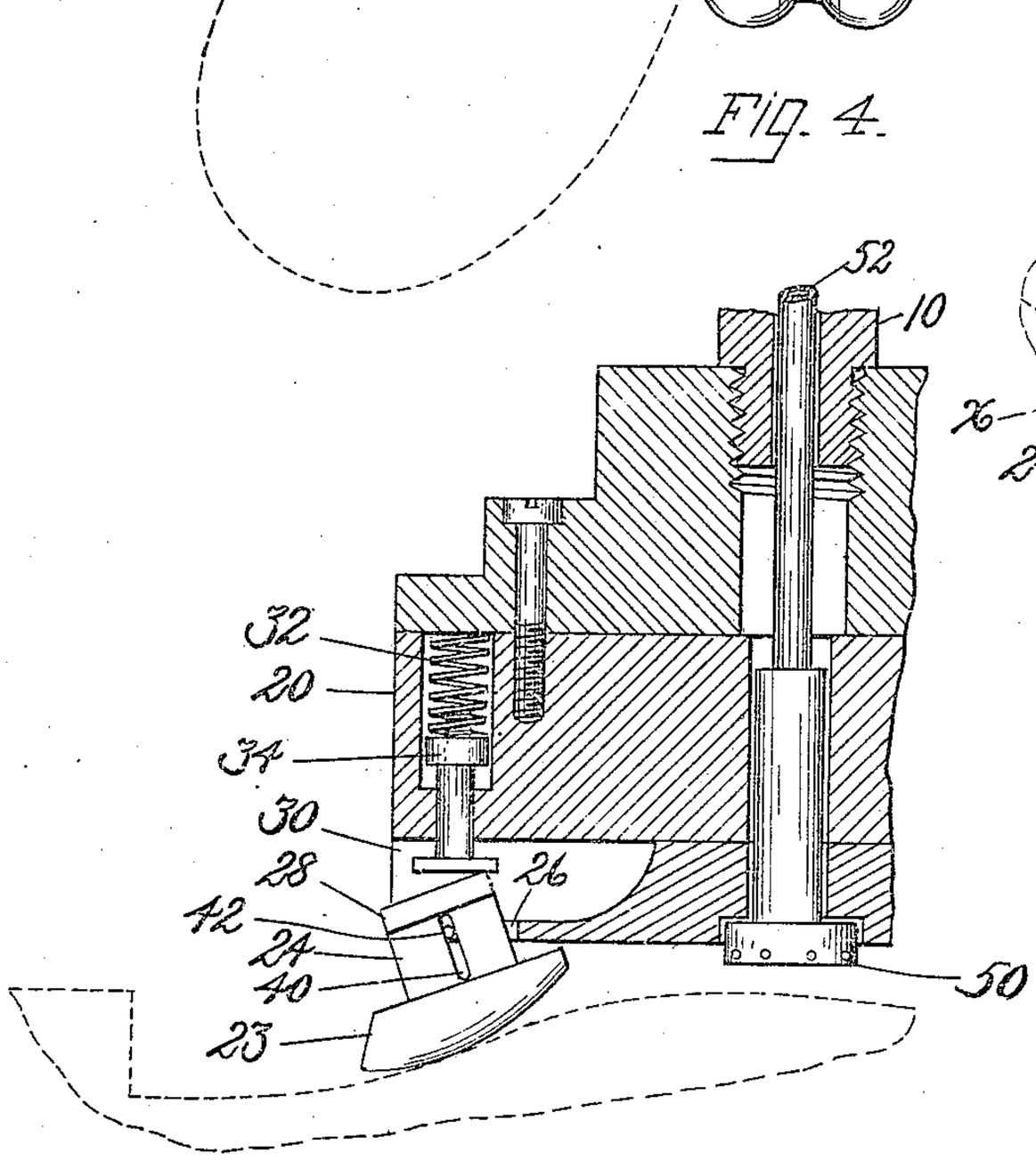

Fig. 5.

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4 SHEETS—SHEET 3.

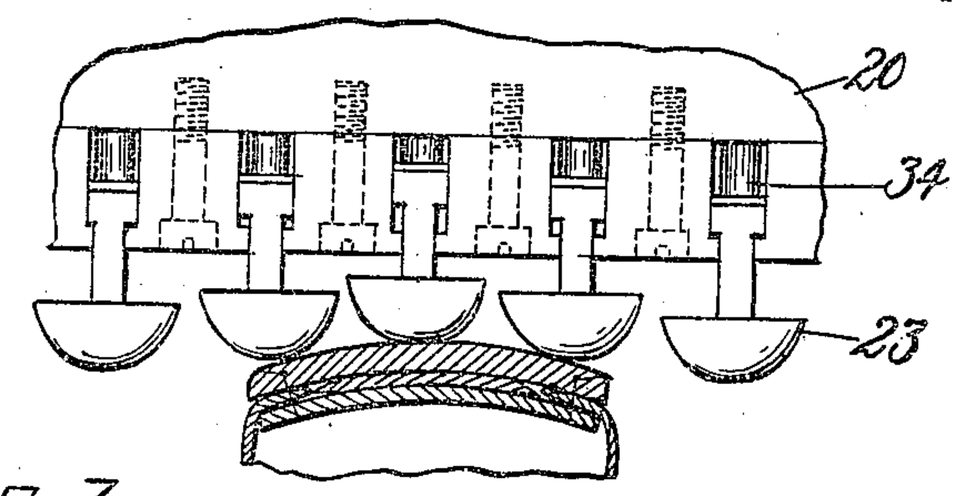


Fig. 7.

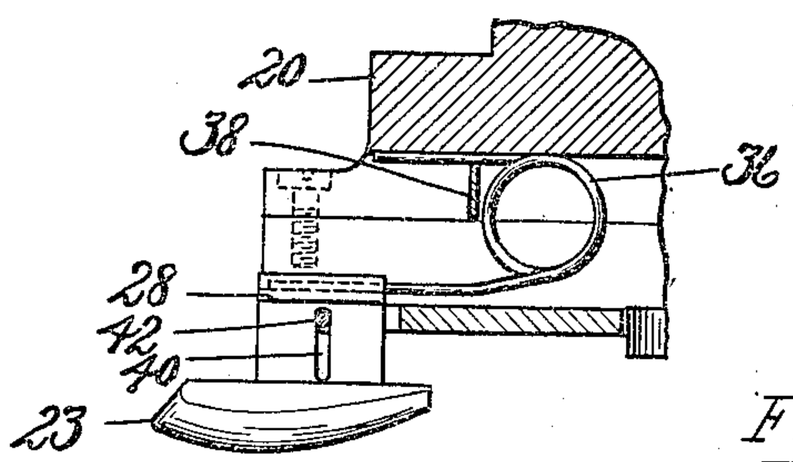
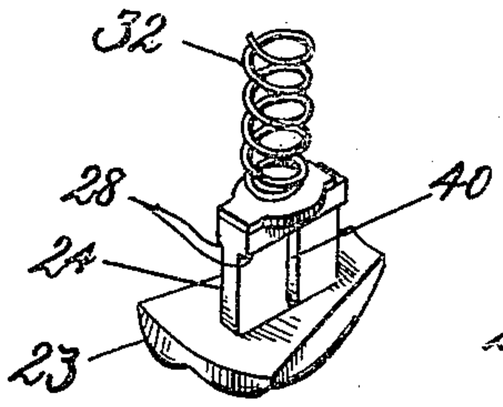


Fig. 8.

Fig. 10.



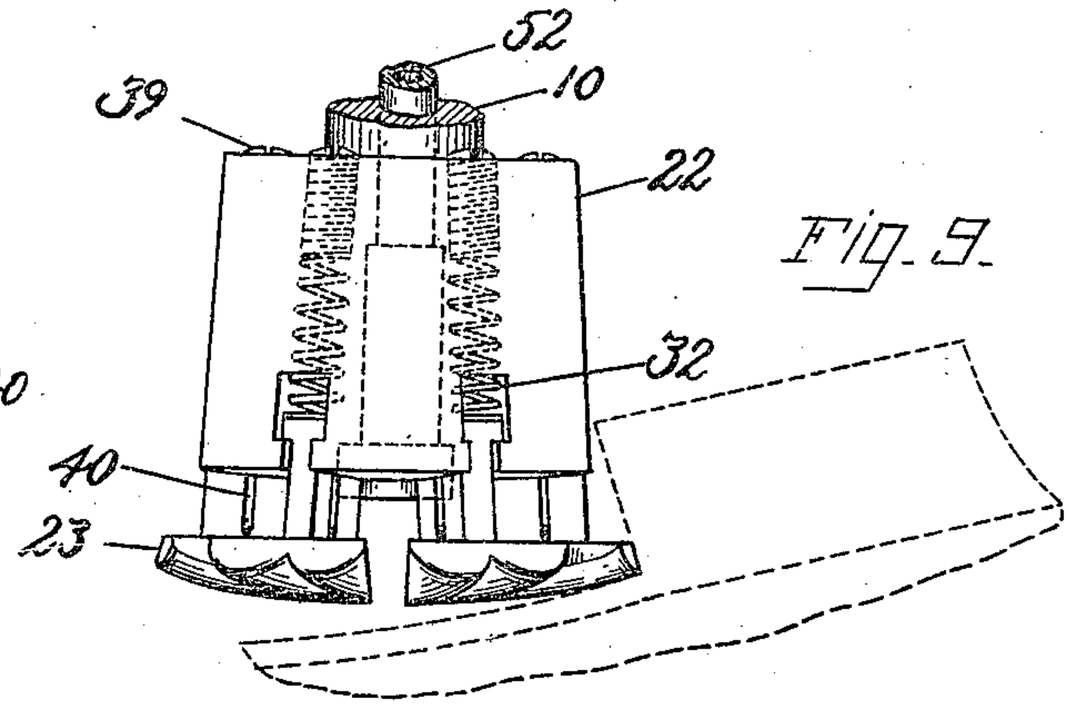


Fig. 9.

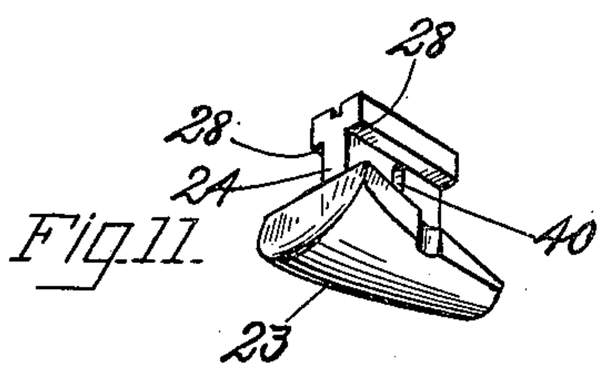


Fig. 11.

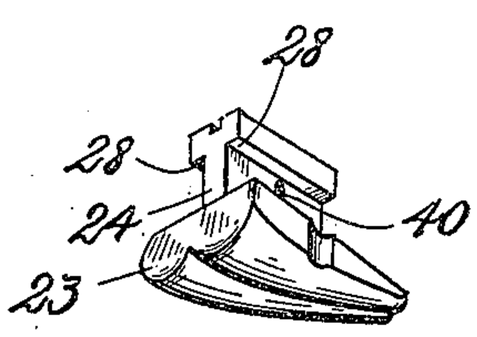
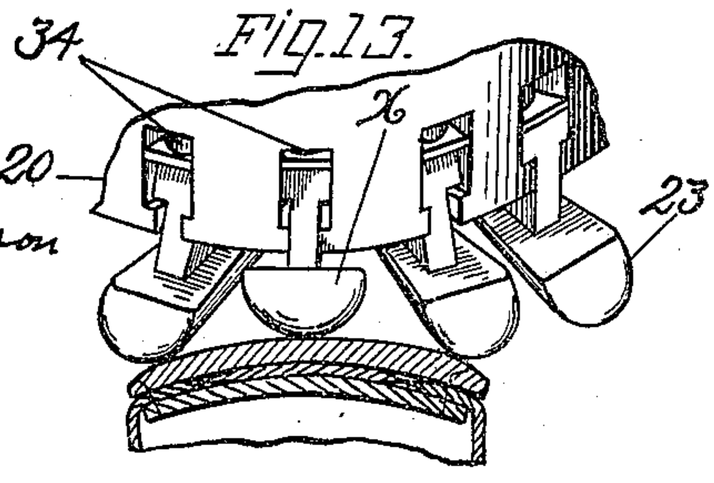


Fig. 12.

Fig. 13.



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960,391. Patented June 7, 1910.

4 SHEETS—SHEET 4.

Fig. 15.

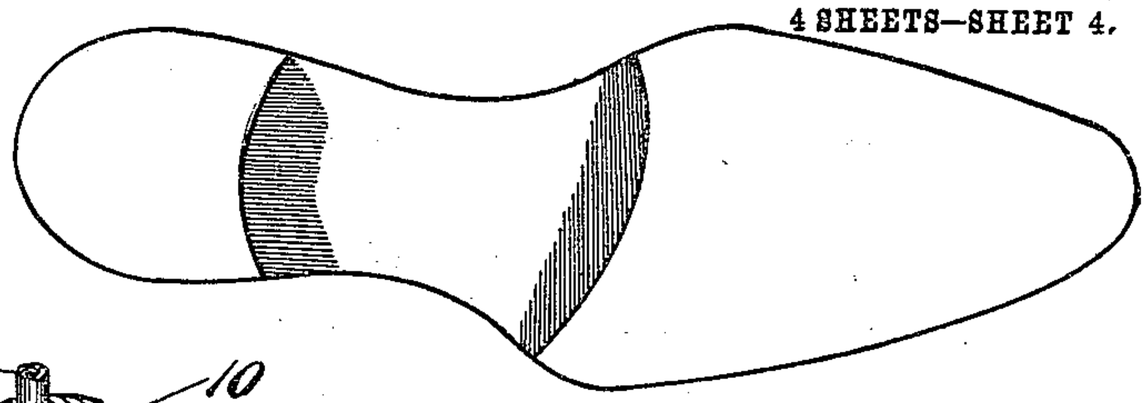
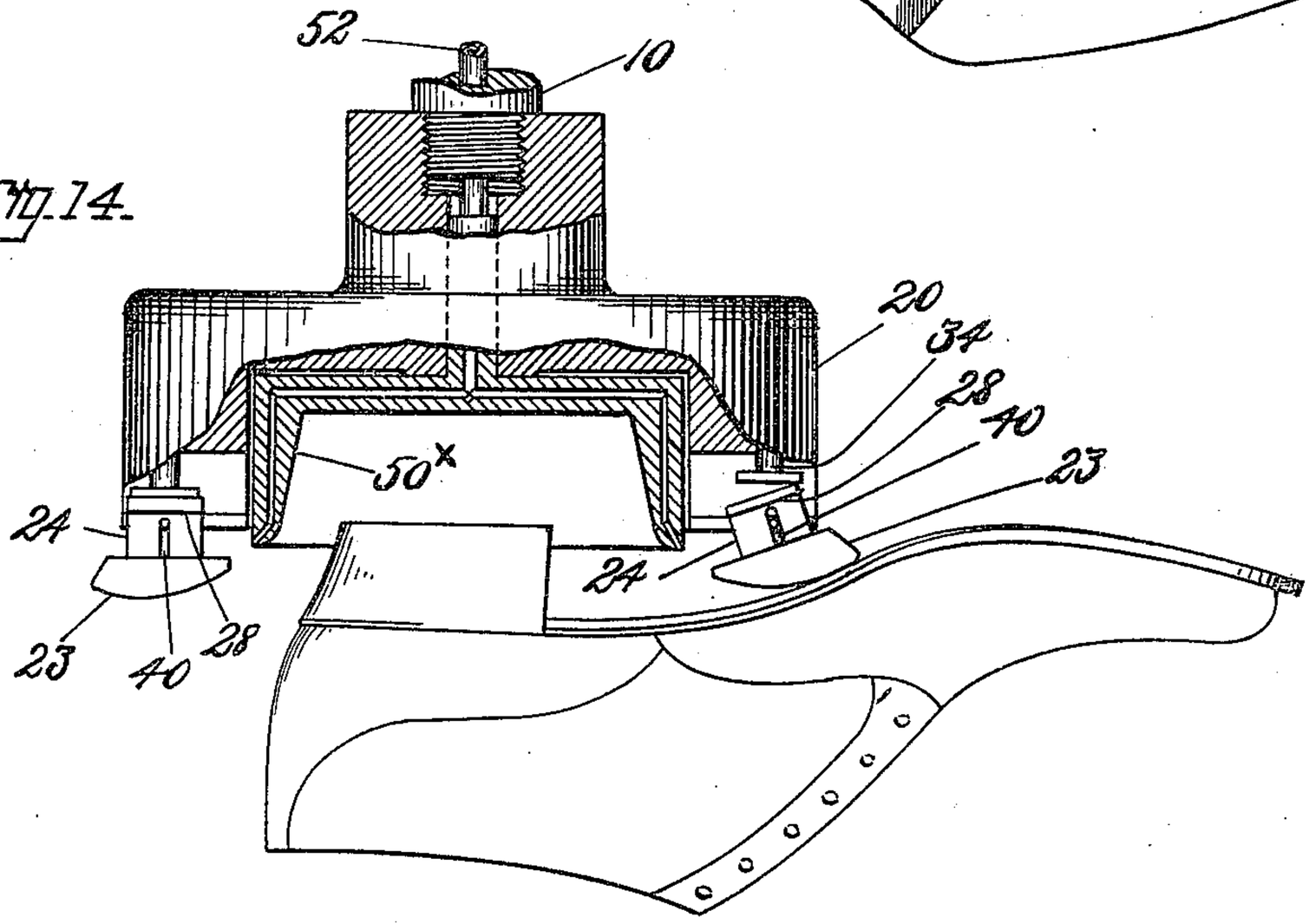


Fig. 14.



WITNESSES.

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Arthur L. Russell

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UNITED STATES PATENT OFFICE.

CHARLES PEASE, OF SALEM, MASSACHUSETTS, ASSIGNOR TO UNITED-XPEDITE FINISHING COMPANY, OF BERWICK, MAINE, A CORPORATION OF MAINE.

BOTTOM-FINISHING MACHINE.

960,391. Specification of Letters Patent. **Patented June 7, 1910.**

Application filed March 9, 1906. Serial No. 305,093.

To all whom it may concern:

Be it known that I, CHARLES PEASE, a citizen of the United States, residing at Salem, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Bottom-Finishing Machines, 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 burnishing machines and particularly to machines for burnishing the bottoms of shoes.

In the manufacture of the better grades of shoes it is usual to apply to the shoe bottoms a finishing composition containing wax and a desired coloring material and then to burnish the surfaces to be finished by rubbing them with a heated iron which melts the wax and polishes the surfaces. This operation is performed by hand labor and is slow and, as some skill and judgment are required in the case of the heated iron to avoid injuring the stock, the process is expensive.

The object of the present invention is to provide a machine by which the burnishing of shoe bottoms can be performed with great rapidity and at less cost than heretofore.

An important feature of the invention consists in a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face in a plane extending transversely of the axis of rotation of the tool and arranged for rocking movement. Preferably the burnishing elements are also arranged for movement independently toward and from the normal plane of the acting face to adapt the tool better to conform to the contour of a surface being burnished. As herein shown the burnishing tool comprises a rotary head having movably mounted upon its lower end face a plurality of approximately sector-shaped burnishing elements. The burnishing elements are connected to the head to slide upwardly therein and to rock independently thereon and means is provided for holding the burnishing elements yieldingly in a normal position. This construction permits the face of the tool to conform readily to the contour of the bottom surface of a boot or shoe, each burnishing element taking automatically and independently of the other burnishing elements a position determined by the contour of the portion of the work over which it is passing at any instant. Preferably each burnishing element of a burnishing tool intended for use on the sole of a shoe forms but a small portion of the acting face of the tool and light springs may, therefore, be used for holding the burnishing elements in their normal position. This construction has the advantage that each burnishing element yields readily and therefore the marginal portion of a sole may be burnished without danger of cracking the finishing material on the edge of the sole, as would be liable to be done if the burnishing elements of the tool were acted upon by stiff springs.

A further feature of the invention consists in a burnishing tool comprising a head or carrier and a plurality of burnishing elements forming the acting face of the tool and mounted on the head for movement toward and from the edge of the tool. While this feature of the invention is not limited to circularly moving tools, it is herein shown as embodied in a rotary burnishing tool in which the burnishing elements are arranged on the lower end face of a head or carrier to move transversely of the acting face of the tool. As herein shown, the burnishing elements are arranged to have a rocking movement in substantially radial lines toward and from the edge of the tool and said elements may also if desired yield vertically. This feature of the invention is of particular importance in a bottom finishing tool which is used in burnishing the portion of the shank of a shoe adjacent to the breast of a heel. This portion of the shoe bottom is difficult to finish satisfactorily because the burnishing tool is liable to strike and mar the corner of the heel when the operator attempts to present the heel in position for the tool to act on the shank close to the breast of the heel. In using a tool embodying this feature of my invention a shoe may be so presented at an angle to the acting face of the tool and inclined laterally that the burnishing elements will rock upwardly as they pass over the shank and may therefore be made to reach to the breast of the heel without striking the edge face of the heel at the corner. This may be done conveniently even where the breast of the heel is concave so that the burnishing tool has to reach back

of the breast corners of the heel in finishing the middle part of the shank. This latter movement is the more readily effected because the surface of a shank is transversely convex and as each burnishing element in turn rides over the higher middle portion of the shank it is rocked outwardly farthest in passing the deepest portion of the concavity in the breast of the heel. Another advantage incident to this feature of the invention is that the burnishing elements can move inwardly from their normal position when their outer ends meet a guiding surface or an obstruction. This construction enables a given portion of the path of the acting face of the tool to be controlled by pressing the burnishing elements inwardly as well as outwardly and allows the burnishing elements to pass obstructions without injury to the tool or to the work. For example, if a shoe is so presented that the outer ends of the burnishing elements strike the corner of the heel they will yield inwardly and pass the obstruction without seriously marring the corner; also the breast of a heel may, if desired, be held against the outer ends of the burnishing elements while the rear portion of the shank is being burnished, and when so presented the burnishing elements will follow the contour of the breast and burnish the lower portion of the breast as well as the rear portion of the shank in the angle formed by their meeting faces. Preferably the burnishing tool is heated in order that it may melt and polish the wax contained in the finishing composition which has been applied to the work, and for this purpose a heating device is centrally supported in the tool in position to heat the burnishing elements.

It is the practice to finish the shanks of some shoes differently from the foreparts, as, for example, with finishing compositions of different colors. In burnishing such shoes it is important to be able to work up to the line of separation between the shank and the differently finished forepart without liability of rubbing over the line. For this reason it is desirable when burnishing the shank adjacent to the line of separation from the forepart to present the shoe to the burnishing tool with the forepart extended toward the operator so that he may watch the progress of the operation as the line is approached. In thus presenting the shoe the heel must be kept out of the path of the burnishing elements so that it shall not be struck and marred by them.

A further feature of this invention consists in a circularly moving burnishing tool adapted to burnish the shank of a shoe adjacent to the forepart and having provision for receiving the heel of the shoe out of the path of the burnishing elements. As herein shown the burnishing tool is a rotary tool having an annular acting face and provided with a recess within said annular acting face to receive the heel of the shoe while the shank is being burnished. This construction allows the shoe to be presented for burnishing the shank up to the line of separation from the forepart while the shoe is held with the toe outward and without danger of the heel coming in contact with the burnishing elements and being marred thereby. Preferably a non-rotary shield is provided in the recess in the burnishing tool to avoid the heel being struck by the moving burnishing elements, if it should accidentally be moved into their path.

These and other features of the invention, including certain details of construction and combinations of parts, will be hereinafter more fully described and pointed out in the claims.

In the drawings, which represent a convenient construction of burnishing machine embodying my invention,—Figure 1 is a perspective view of the upper portion of the machine; Fig. 2 is a sectional view of one of the tools shown in Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a bottom plan view of the larger tool shown in Fig. 1 and illustrates the position of certain of the burnishing elements of the tool when acting upon the shank of a shoe adjacent to the breast of the heel; Fig. 5 is a vertical section of the tool shown in Fig. 4, illustrating the position of one of the burnishing elements when the tool is acting upon the forepart and shank of a shoe; Fig. 6 is a view similar to Fig. 5 and shows the position of certain of the burnishing elements as seen from the section line 6—6 of Fig. 4, said elements being shown in the relative positions occupied by them while burnishing the shank of a shoe adjacent to the breast of the heel; Fig. 7 shows a side elevation of a portion of the tool and a section through the shank or other portion of a shoe presenting a convex surface to be burnished; Fig. 8 is a detail view illustrating a modified construction; Fig. 9 illustrates a further modification in which the head of the tool is tapering to adapt the tool for working upon the shank adjacent to the breast of the heel; Fig. 10 is a perspective view of one of the burnishing elements employed in the tool shown in Fig. 9; Figs. 11 and 12 are perspective views of burnishing elements such as are used in the modification shown in Fig. 8; Fig. 13 is a side elevation of the portion of the burnishing tool shown in Fig. 6, the shank of the shoe being shown in section; Fig. 14 shows a modification; Fig. 15 shows a shoe bottom upon which the tool shown in Fig. 14 is particularly adapted for use.

The frame supports stub shafts 2 and 3 upon which rotate belt pulleys 4 and 5. The pulley 4 is longitudinally movable on the

shaft 2 and has a flange 6 adapted to engage frictionally a face 7 of the pulley 5 for driving the latter. A collar 8 is screwed upon the shaft 2 and has a handle 9 by which it may be turned to press the flange of the pulley 4 into engagement with the pulley 5. Reverse movement of the collar 8 discontinues the pressure and permits the pulley 5 and the parts driven by it to come to rest. The frame also supports tool shafts 10 and 12 which are shown as arranged in vertical bearings and provided with pulleys 14 and 16, respectively, by which they are driven from a belt running over the pulley 5.

Any desired number of tool shafts may be provided according to the number of tools which it is desired to employ in the machine and the shafts may be arranged in any preferred way and actuated by any suitable mechanism. The illustrated construction shows one simple and convenient arrangement.

The burnishing tools, which are shown as screwed upon the lower ends of the tool shafts so that they can be readily detached to permit tools of different styles to be conveniently interchanged, comprise a head which may be cylindrical, as shown at 20 in Figs. 1 and 2, or frusto-conical, as shown at 22 in Fig. 9. The burnishing elements 23 are mounted upon the lower end face of the head and may be of any desired shape and number. As herein shown, they are narrow blocks, the acting faces of which resemble a truncated sector and said blocks are arranged in an unbroken series around the margin of the end face of the tool head and extend from the margin or from points a short distance outside the margin radially toward the center of said face. The length of the burnishing elements is not essential, but they are herein shown as stopping short of the center of the end face of the head in order to leave in the middle of said end face a space for a purpose to be mentioned. The burnishing elements are preferably yieldingly mounted in the tool head and are shown as provided with relatively narrow necks 24 which fit slots 26 of a corresponding width in the lower end face of the head. The burnishing elements are provided at the upper end of the neck 24 with laterally extending flanges 28, as shown in Fig. 1 and in detail views of the burnishing elements found in Figs. 11 and 12. The head 20, which for convenience in manufacture is formed of a plurality of concentric plates as shown in Figs. 5 and 6, has a plurality of recesses 30 into which the flanges and shanks of the burnishing elements may be upwardly moved, as illustrated in Figs. 5, 6, and 7. The lower walls of the recesses 30 form bearings against which the flanges 28 normally rest.

Preferably the burnishing elements are held in their lowermost position by light springs which permit each burnishing element to yield upwardly when work is pressed against the acting face of the tool. This provision of a large number of small burnishing elements each pressed upon by a light spring enables the acting face of the tool, which is formed by such burnishing elements, to conform readily to the surface contour of the work being burnished. A tool thus constructed is very effective even on light soles which would be injured by a burnishing tool comprising a small number of burnishing elements held in position by stiff springs.

As shown in the main views, the burnishing irons are acted upon by spiral springs 32 contained in sockets in the head 20 and acting through plungers 34, the lower ends of which rest upon the flanges of the burnishing elements. The plungers may be omitted, if desired, as shown in Figs. 2 and 10, wherein the springs are arranged in direct engagement with the flanges 28 of the burnishing elements. Fig. 8 shows a third construction in which a two-armed spring 36 is held in position by a keeper 38 and has one arm in engagement with the head 20 while the other arm rests in a groove between the flanges 28. Means may be provided, if desired,—as, for example, the adjusting screws 39 shown in Fig. 9—for varying the tension of the springs which act upon the burnishing elements. This may be desirable to adapt the tool for different classes of work. For burnishing shoes having thin soles light springs are preferable because they allow the acting face of the tool to conform to the surface of the sole without applying sufficient pressure to the work to break down the edge of the sole or crack the finishing material on the edge of the sole. For burnishing heavy soles the springs may be advantageously adjusted to greater tension or stiffer springs may be used.

Preferably the burnishing elements have a capacity for rocking movement as well as for vertical sliding movement. To this end the recesses 30 are shaped to permit the heads or flanges 28 of the burnishing elements to move freely therein, as shown in the drawings, and preferably also the shank 24 of each burnishing element is provided with a vertical slot 40 which is traversed by a pivot pin 42 secured to the lower face of the head 20 by screws 44, as shown most clearly in Figs. 3 and 4. This construction permits each burnishing element to rock radially with relation to the head 20 and either outwardly or inwardly with relation to the normal path followed by the burnishing element when the tool is rotated. This radial rocking movement is effected against the pressure of the spring 32 and may or may not be accompanied by a direct vertical sliding movement of the tool, as will be un-

derstood from the several positions of the burnishing elements illustrated in the drawings. This provision for rocking movement of the burnishing elements in radial lines is of importance in burnishing all of the curved surfaces of a shoe bottom, and it will be understood that substantially all of the surfaces of the shank and sole of a shoe are curved surfaces, for it enables each burnishing element to conform to the surface over which it passes. This provision for radial rocking movement of the burnishing elements is of particular importance, however, in burnishing the portion of the shank of a shoe which is adjacent to the breast of the heel. It is found in practice that it is difficult to burnish this portion of the shank without allowing the burnishing tool to strike and mar the corners of the heel. With the construction of burnishing tool herein shown the danger of striking the corner of the heel is very much reduced, because the burnishing elements may be made to rock outwardly as they pass over the shank and it is therefore not necessary to hold the shoe with the corners of the heel as near to the normal path of the burnishing elements as would otherwise be required. In this outward rocking movement the burnishing elements are projected outwardly beyond their normal path by presenting the shoe to the tool with the surface to be burnished at an angle to the acting face of the tool—as, for example, in the position shown in Fig. 6.

The burnishing tools are caused to rock outwardly as they ride over the surface of the shank and by tipping the shoe laterally so that greatest pressure is applied to the tool by the edge of the shank last to be acted upon, each burnishing element may be made to rock gradually as it moves across the shank and therefore to approach as close to the breast of the heel at any point in the width of the shank as may be desired by the operator. This outward movement of the burnishing elements as they pass over the shank of the shoe is illustrated in Figs. 4 and 6 in which the burnishing element *x* is shown in dotted lines in the position which it is caused to occupy by reason of its rocking movement. The usually convex cross sectional shape of the shank of a shoe, indicated in Figs. 6 and 13, causes the burnishing elements to rock outwardly as shown in Figs. 6 and 13 as they ride toward the higher middle portion of the shank even when the shoe is not tipped laterally as above suggested. As before stated, the burnishing elements may rock inwardly as well as outwardly and this capacity for movement of the burnishing elements is of value in burnishing a shank adjacent to the breast of the heel.

The breast of the heel may, if desired, be pressed against the outer ends of the burnishing elements and said elements will rock inwardly and follow the contour of the breast while they burnish the shank and also, it may be, the breast in the angle between said surfaces. This capacity of the burnishing elements to move radially with relation to their normal circular path permits the acting face of the burnishing iron to conform to the edge contour of the surface being burnished—as, for example, in the way in which the tool conforms to the edge contour of the rear end of the shank just described. The working face of the burnishing elements may be shaped as desired and in Figs. 10 and 11 are shown two styles which have been found effective. The head of the tool may be made tapering or in the form of a truncated cone as shown in Fig. 9 to allow the shoe to be tipped toward the tool without causing the breast of a high heel to contact with the head. While a single tool may be used for burnishing the entire bottom of the shoe, a separate tool of relatively small diameter is shown in Fig. 1 which is adapted to be employed for burnishing the heel.

Preferably the burnishing irons are heated to enable them to act to the best advantage upon the finishing material with which shoe bottoms are treated before being burnished. It is found that the rotating burnishing elements create a current of air moving outwardly from the tool which renders it difficult to heat the irons by a flame directed inwardly toward them. In view of this condition the machine is provided, as herein shown, with a gas burner 50 located centrally upon the lower face of the tool in the space between the inner ends of the burnishing elements. The burner is provided with a plurality of perforations which direct several gas flames outwardly toward the burnishing elements and heat said elements effectively as they rotate with relation to the burner. Gas is shown as supplied to the burners of the several tools by tubes 52 which are held above the tool shafts by clamps 54.

In a modification shown in Fig. 14 the burnishing tool is provided with a heel-receiving recess located within the annular acting face formed by the burnishing elements. The recess is preferably large enough to permit the heel to be moved about in it as the shoe is presented in position for the tool to act upon the shank along the line which separates the shank from a differently finished forepart. This line of separation varies in form and position in different shoes, being sometimes straight and at other times curved while usually it extends obliquely across the shoe bottom as shown in Fig. 15. In order that the shank may be burnished accurately up to this line it is

important that the recess be larger than the heel so that different shoes may be presented in the most convenient position to the tool. Preferably the tool is provided with a guard or shield to prevent the edges of the heel from contacting with the inner ends of the burnishing elements. As herein shown the non-rotatable heater is formed with a downwardly extending flange 50ˣ having suitable ducts, as illustrated in the drawings, for the passage of gas and constitutes a guard or shield. The shield obviously might be independent of the device for heating the burnishing elements.

Having explained the nature of the invention and having described a construction embodying the same, I claim as new and desire to secure by Letters Patent of the United States:

1. In a machine of the class described, a burnishing tool comprising a rotary head and a plurality of relatively movable burnishing elements arranged upon the end face of the head in close proximity to form a substantially continuous annular acting face.

2. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face in a plane extending transversely of the axis of rotation of the tool and arranged for rocking movement.

3. In a machine of the class described, a rotary burnishing tool comprising a plurality of yieldingly supported burnishing elements presenting an acting face in a plane extending transversely of the axis of rotation of the tool and arranged for independent rocking movement.

4. In a machine of the class described, a burnishing tool comprising a head and a plurality of burnishing elements mounted on the end of the head to form the acting face of the tool and movable toward and from the edge of said acting face.

5. In a burnishing tool, a head, and a plurality of burnishing elements forming the acting face of the tool and connected to the head for sliding movement toward and from the head and for rocking movement toward and from the edge of the tool.

6. In a machine of the class described, the combination with actuating means, of a burnishing tool operatively connected therewith and comprising a head and a plurality of burnishing elements forming the acting face of the tool extending transversely of the axis of rotation of the tool and connected to the head for movement toward and from the plane of the acting face of the tool and transversely of said acting face.

7. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face in a plane extending transversely of the axis of rotation of the tool and arranged for movement in substantially radial lines with relation to the axis of rotation of the tool.

8. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face extending transversely of the axis of rotation of the tool and mounted for movement to vary the edge contour of the tool, substantially as described.

9. In a machine of the class described, a burnishing tool comprising a rotary head and a plurality of burnishing elements presenting an acting face in a plane extending transversely of the axis of rotation of the tool, and a connection between the burnishing elements and the head to permit the burnishing elements to yield inwardly from the edge when an obstruction is encountered by the outer ends of said elements.

10. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face extending transversely of the axis of rotation of the tool and arranged for vertical sliding and transverse rocking movement.

11. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements presenting an acting face extending transversely of the axis of rotation of the tool and arranged for independent vertical sliding movement and for transverse rocking movement to enable them to conform to the surface being acted upon, and means for yieldingly holding said burnishing elements in a normal position.

12. In a machine of the class described, a rotary burnishing tool comprising a head and a plurality of burnishing elements presenting an acting face extending transversely of the axis of rotation of the tool, said burnishing elements being pivotally connected to the head by a pin and slot connection, and means for holding the burnishing elements yieldingly in a normal position.

13. In a machine of the class described, a rotary burnishing tool comprising a series of burnishing elements arranged to present an acting face in a plane extending transversely of the axis of rotation of the tool, and heating means centrally arranged with relation to said burnishing elements.

14. In a machine of the class described, a burnishing tool comprising a rotary head and a plurality of burnishing elements movably mounted upon the head to present an acting face in a plane extending transversely of the axis of rotation of the head, and a non-rotatably supported gas burner centrally arranged with relation to the acting face of said tool.

15. In a machine for burnishing shoe bottoms, a rotary burnishing tool having a yielding annular acting face and a central

recess to receive the heel while the shank of the shoe is being burnished by said acting face.

16. In a machine of the class described, a rotary burnishing tool comprising an annular acting face formed by a plurality of relatively movable burnishing elements and having a recess located within said acting face to receive the heel of a shoe while the shank of a shoe is being burnished.

17. In a machine of the class described, a rotary burnishing tool comprising a plurality of burnishing elements arranged to present an annular acting face and a central recess to receive the heel of the shoe while the shank of the shoe is being burnished, said burnishing elements being mounted for radial movement toward and from the axis of rotation of the tool.

18. In a machine of the class described, a burnishing tool comprising a plurality of burnishing elements arranged to present an annular acting face and movable transversely of said acting face, said tool having a central recess to receive the heel of a shoe while the shank of the shoe is being burnished by the acting face of the tool.

19. In a machine for burnishing shoe bottoms, a rotary burnishing tool having an annular acting face and a central recess to receive the heel of the shoe while the shank is being burnished, combined with a guard arranged to prevent the heel from engaging the burnishing elements.

20. In a machine for burnishing shoe bottoms, a rotary burnishing tool having an annular acting face and a central recess to receive the heel of the shoe while the shank is being burnished, combined with a heel guard arranged between said heel receiving space and the burnishing elements, and having provision for heating the burnishing elements.

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

CHARLES PEASE.

Witnesses:

BERNARD BARROWS,

ARTHUR L. RUSSELL.