(No Model.)

A. S. VOSE.

ROTARY TRIMMING MACHINE.

No. 560,873. Patented May 26, 1896.

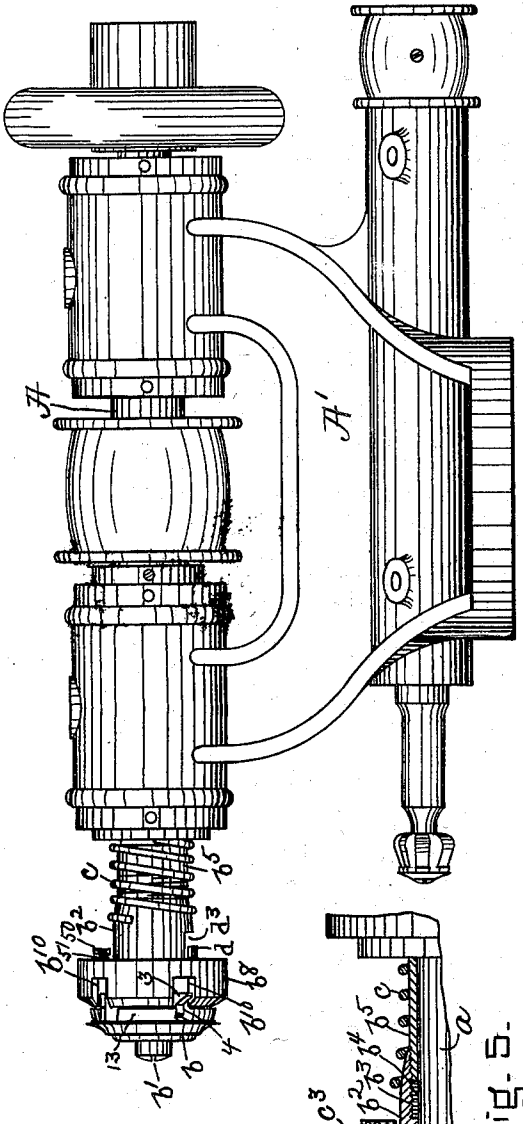

Fig. 1.

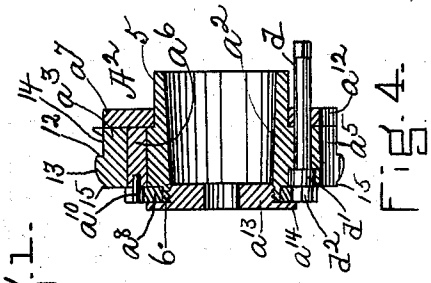

Fig. 4.

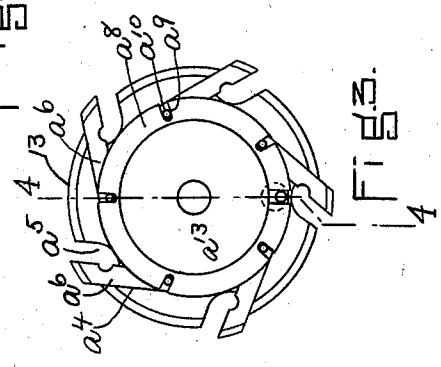

Fig. 3.

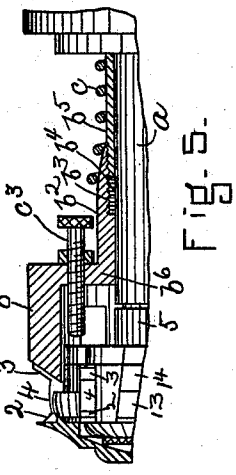

Fig. 5.

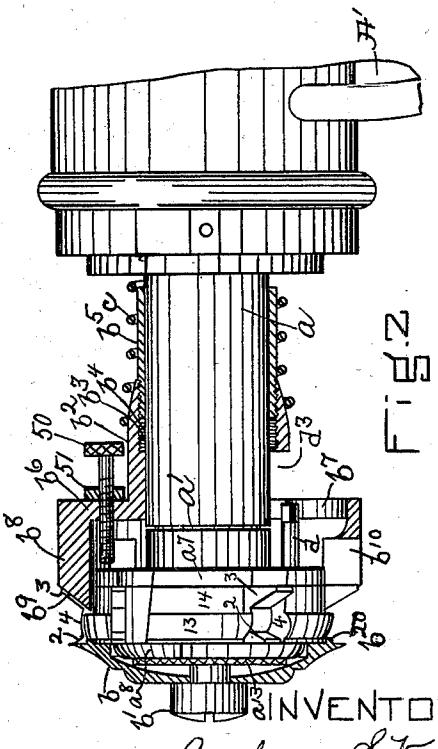

Fig. 2.

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ROTARY TRIMMING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,873, dated May 26, 1896.

Application filed August 27, 1895. Serial No. 560,630. (No model.)

To all whom it may concern:

Be it known that I, AMBROSE S. VOSE, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Rotary Trimming-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to rotary trimming-machines, and is herein shown as embodied in a machine for trimming the edges of the soles of boots and shoes, to which purpose this invention is particularly well adapted, as will be described.

This invention has for one of its objects to provide a machine with which the edges of the soles of boots and shoes may be trimmed in a more efficient and uniform manner, as will be described.

The invention further has for its object to provide a machine capable of trimming in the proper or desired manner soles of varying thickness, whereby the capacity of the machine for handling the work is greatly increased.

In accordance with this invention the machine is provided with an automatically-adjustable sleeve provided with a rest or guard against which the sole of the boot or shoe rests or bears while being trimmed, the said guard being provided with axially-disposed slots for the reception of cutting-lips on the knives or blades and automatically following the contour or shape of the sole, thereby uncovering the trimming or cutting knives to correspond to the thickness of the sole, and consequently obtaining a more uniform and finished trimming of the edge of the said sole.

In accordance with the second feature of this invention the machine is provided with a novel construction of head or wheel carrying the cutters or knives, whereby a single head may be employed with knives having cutting edges of various sizes or widths, and the said head or wheel coöperates with the automatically-adjustable guard in such manner as will enable the knives of varying sizes to perform their work uniformly and to the same degree of excellence, as will be described.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a front elevation of an edge-trimming machine embodying this invention; Fig. 2, a detail, on an enlarged scale, of the left-hand portion of the machine shown in Fig. 1 with parts in section; Fig. 3, an end elevation of the rotary cutter shown in Fig. 1 removed from its shaft; Fig. 4, a section of Fig. 3 on the line 4 4; and Fig. 5, a sectional detail, on an enlarged scale, showing the cutter-head as provided with a wider knife than that shown in Fig. 2 and with the sleeve moved back so as to uncover the said knife.

Referring to Fig. 1, A represents the main shaft, supported in a suitable framework A′, which may be of any usual or suitable construction, but preferably that shown in United States Patent No. 538,055, granted to me April 23, 1895, the main shaft being provided with oppositely-extended tapering journals. The main shaft A, as herein shown, is provided at one end with a cylindrical extension a and with a smaller conical or tapering projection a', upon which is fitted the tapering hub a^2 of the rotary cutter-head or wheel A^2 of a construction as will be described.

The head A^2 consists of an annular body portion or wheel a^3, provided with a plurality of inclined slots a^4 (see Fig. 3) and with concaved or substantially transverse cavities a^5, forming enlargements for the inclined slots a^4, the said slots receiving within them knives, blades, or cutters a^6, provided at their opposite sides with cutting-lips 2 3, having inclined edges and with an intermediate convexed cutting edge 4. The inclined slots a^4 extend entirely through or across the body portion a^3 and are closed at one side by a ring a^7, fitted over an extension 5 of the hub a^2, the said ring being secured to the body a^3 by screws (not shown) or in any other suitable manner. The slots a^4 on the opposite side of the head a^3 are partially covered by a ring a^8, fitted over an extension 6 of the hub a^2 and provided with radial slots a^9, into which are extended laterally-projecting pins or studs a^{10},

secured to or forming part of the knives a^6. The ring a^8 constitutes an adjusting device by which the knives a^6 may be automatically moved into and out of their slots, so as to adjust their cutting edges with relation to the periphery of the body a^3.

The body a^3, in accordance with this invention, has its periphery reduced in diameter from the rear side toward the front side preferably substantially one-half its width, so as to form an annular shoulder 12 and a raised curved surface 13, which latter in practice constitutes the bed for the rotary cutter upon which the edge of the sole rests while it is being trimmed, the reduced portion 14 of the said head being so made for a purpose as will be described. The body a^3 is preferably made on the opposite side of the raised bed 13 of substantially the same diameter as the portion 14, so as to form a substantially narrow annular ledge 15 for a purpose as will be described.

The ring a^7 is made of a diameter substantially equal to the diameter of the head through its reduced portion 14, so that the periphery of the ring a^7 will be substantially flush with the reduced portion 14, and the said ring is provided with concavities a^{12}, forming continuations of the concavities a^5. The extension 6 of the hub a^2 is screw-threaded on its interior and is adapted to receive a screw-threaded nut a^{13}, provided with a flange a^{14}, overlapping the adjusting-ring a^8, and adapted to hold the said ring stationary when the nut a^{13} is set up. The ring a^7 has its concavity a^{12} made of substantially the same size as the concavity a^5, but is a little smaller than the concavity a^5, so that when the ring a^7 is secured to the body a^3 one wall of the concavity a^{12} registers with one wall of the concavity a^5, while the opposite wall of the concavity a^{12} will be out of line with the corresponding wall of the concavity a^5 and will engage the knife and form a side support for its upper end, as clearly shown in Fig. 2.

The rotary cutter or trimmer shown in Figs. 3 and 4 has coöperating with it a shield or guard b, which protects the upper of the shoe from contact with the cutting-point of the lip 2 of the knife, the said guard or shield and the cutter-head being secured to the tapering projection a' of the shaft by a screw b' or in other suitable manner. By constructing the cutter-head with a periphery of two diameters, as represented in Fig. 4, I am enabled to use on the same head cutting-knives provided at their opposite sides with lips 2 3 and having intermediate convexed cutting edges 4 of varying widths or sizes, for by reason of such construction of head I am enabled to employ an automatically-adjustable guard, which protects the sole of the shoe from the cutting-lip 3 of the knife, as will be described. The automatically-adjustable guard may and preferably will be made as herein shown, it consisting of a sleeve b^2, adapted to be loosely mounted upon the cylindrical extension a of the shaft and recessed at its rear portion, as at b^3, the said recess being provided with screw-threads b^4, which are engaged by an externally-threaded sleeve b^5, forming, practically, an adjustable extension of the sleeve b^2, the inner diameter of the extension b^5 being substantially the same as that of the sleeve b^2. The sleeve b^2 is provided with an annular radial flange b^6, which may, for sake of lightness and the passage of chips, be cut out or provided with suitable openings b^7. The radial flange b^6 has secured to or forming part of it a cylindrical extension or axially-disposed flange b^8, provided with an outwardly beveled or inclined edge or face b^9, preferably corresponding in pitch to the pitch or bevel of the cutting-lip 3 of the knife. The axially-disposed flange b^8 has its inner diameter of substantially the same size as the external diameter of the reduced portion 14 of the head, so that the said cylindrical flange b^8 may fit substantially snug upon the reduced portion 14 of the cutter and yet be free to move axially thereon, the said flange constituting a rest or guard for the sole of the shoe.

The cylindrical flange b^8 is provided with inclined slots b^{10}, (shown best in Fig. 1,) and into which extend the cutting-lips 3 of the knives, the said cutting-lips being covered by the said guard when the latter is in what may be termed its "normal" position. (Shown in Fig. 1.)

The diameter of the sleeve b^2 and its extension b^5 is substantially the same as the diameter of the shaft, so that the said sleeve and extension fit closely upon the shaft, so as to obtain a long bearing for the guard or rest and prevent oscillation or tipping of the said guard, which if permitted might cramp or bind the guard on its shaft, and consequently prevent free longitudinal movement thereon and proper trimming of the sole. It will be understood that while the sleeve and its extension are fitted closely or snugly on the shaft to avoid tipping of the guard the said fit is not so close as to interfere with the automatic adjustment of the said sleeve and extension on the shaft longitudinally.

By making the cutter-head of two diameters and employing in conjunction therewith an automatically-adjustable guard, which embraces the reduced portion of the head and moves axially thereon, knives with cutting edges of varying widths may be used on the same head.

By reference to Figs. 1 and 2 it will be seen that the convexed cutting edge 4 of the knife is of substantially the same width as the convexed bed 13 of the cutter-head, whereas in Fig. 5 the convexed cutting edge 4 of the knife is much wider than the bed 13.

When the edge of the sole being trimmed is what may be termed "narrow," the cutting-lip 3 of the knife is kept sufficiently covered by the automatically-adjustable guard b^8 to prevent the edge of the sole being acted upon

by its point, and the cutting edge 4 of the narrow knife performs its work in the proper manner, the cutting-lip 3 of the knife in practice being sufficiently uncovered so as to trim off or bevel the outer corner of the edge of the sole. If the sole is of irregular thickness, the wider parts of the edge of the sole force back the guard b^8 and uncover more of the cutting-lip 3, which latter trims off or bevels more of the outer corner of the edge of the sole. The face b^9 of the guard b^8 is kept in engagement with the outer surface of the sole by the spring c, which encircles the sleeve b^2 and its adjustable extension b^5 and abuts against the bearing for the shaft a. If the sole to be trimmed is of considerable thickness, the substantially narrow knives may be removed from the cutter-head and wider knives substituted therefor—that is, knives having a wide cutting edge 4—as represented in Fig. 5. When a narrow knife is used, the guard b^8, in its normal position substantially covering the cutting-lips 3 of the knives, may abut against the shoulder 12 on the periphery of the head, which shoulder in this case forms a stop for what may be termed the "forward" or "outward" movement of the guard-carrying sleeve b^2; but when wider knives are used on the cutter-head it is desirable that the guard-carrying sleeve b^2 should be limited in its forward or outward movement before it reaches the shoulder 12, so that the cutting edge 4 of the wide knife may be kept uncovered its entire width in the normal position of the guard. To effect this result, an adjustable stop for the guard-carrying sleeve is provided. This adjustable stop may and preferably will be made as a screw-threaded rod c^3, extended through the radial flange b^6 and adapted to engage the cutter-head.

The narrow bed 13 of the cutter-head permits wide and narrow knives to be used on the same cutter-head, which is prohibited in a cutter-head in which the bed or surface upon which the edge of the shoe rests is made as wide as the said head, for by reference to Figs. 1 and 2 it will be seen that if the bed 13 is made as wide as the head and a narrow knife is employed the point of the cutting-lip 3 of the narrow knife would not be covered by the guard and would, in case a thick sole edge was being trimmed, cut into the edge itself. In other words, when the bed 13 of the cutter-head is made wide only one size of knife can be used with the said head, whereas by making the bed 13 narrow, as herein shown and described, and making the remaining portion of the cutter-head of reduced diameter, so that it may have fitted over it a guard to cover the cutting-lip 3 of the knife, knives of various sizes may be used on a single cutter-head with the same efficiency. In the present instance the actuating-ring a^8 is turned by means of a rod d, extended through a hole in the cutter-head and through the ring a^7, the said rod having at one end an enlargement or head d', from which extends an eccentrically-mounted pin d^2, which passes into one of the slots in the ring a^8, and in order to enable the rod d to be easily reached by a wrench or other tool the sleeve b^2 is provided with a slot or opening d^3, (see Figs. 1 and 2,) which extends through the radial flange b^6.

The guard b^8 in its movements in opposite directions is guided by means of a stud or key, (not shown,) but which is attached to the sleeve b^2 and enters a suitable longitudinal slot in the shaft a. The automatically-adjustable guard b^8 possesses the additional function of keeping the inner or stitched side of the sole pressed against the shield or guard b, which insures a uniform turning down to the stitch of the inner side of the sole by the inclined edge of the lips 2 of the knives or cutters. The forward movement of the automatically-adjustable guard is limited, as above described, by the cutter-head, and its rearward movement is limited in the present instance by the extension b^5 engaging the framework of the machine. In order that the range of movement of the guard from its outward limit to its rearward limit may be maintained uniform—that is, the same whether a wide knife or a narrow knife is used on the cutter-head—the extension b^5 is provided, which is capable of being adjusted into and out of the recess b^3 in the sleeve b^2, and in this manner when a narrow knife is used the extension b^5 may be moved out of the threaded recess b^3, whereas when a wide knife is employed the said extension b^5 will be moved into the said threaded recess.

By means of the narrow annular ledge 15 on the cutter-head on the opposite side of the raised bed 13 from the reduced portion 14 the shield b is held locked in its operative position against radial movement with relation to the cutter-head by the engagement with said ledge of the annular flange b^{20} on the inner surface of the shield, as shown in Figs. 2 and 5, so that when the shield is secured to the shaft by the screw b' all danger of the shield moving out of a true central position with relation to the cutter-head is avoided, and consequently all danger of some of the lips 2 being uncovered more than others is also avoided, and also the irregular running of the cutter, due to the shield bearing in the crease of the shoe, which irregularity would be produced by such lateral position of the shield, is avoided. It will thus be seen that the lips 2 on one side of the bed 13 and the lips 3 on the other side of the said bed are uncovered uniformly by the shield b and guard b^8, and therefore the work or trimming performed is uniform and finished. The adjustable stop c^3 may and preferably will be provided with a head 50, constituting a handle or thumb-piece, and in order to avoid possible movement of the stop from its adjusted position by the rotation of the guard a lock for the rod c^3 is provided, the said lock being shown as a check-nut 51. (See Figs. 2 and 5.)

I claim—

1. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters to form a bed narrower than the width of the cutter-head, cutters or knives carried by said head and coöperating with said bed, and a guard longitudinally movable on the said shaft and embracing or fitted over the portion of the periphery of smaller diameter, substantially as and for the purpose specified.

2. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and having its periphery reduced in diameter from one side toward the opposite side for a portion of its width to form a narrow bed 13, and the reduced portion 14, knives or cutters carried by said head and coöperating with the said bed, and an automatically-adjustable guard fitted over the reduced portion 14 of the cutter-head, substantially as and for the purpose specified.

3. In a rotary trimming-machine, a cutter-head or wheel having its periphery reduced in diameter from one side toward the opposite side for a portion of the width of the cutter-head or wheel to form a narrow bed 13, slots or openings in said wheel extended across the periphery of the same and interrupting the continuity of the bed 13, cutters or knives in said slots having inclined cutting-lips 2, 3, and an intermediate convexed cutting edge 4 coöperating with the bed 13, and means to secure the said knives to the said head or wheel, substantially as described.

4. In a rotary trimming-machine, a cutter-head or wheel having its periphery reduced in diameter from one side toward the opposite side for a portion of the width of the cutter-head or wheel to form a narrow bed 13, inclined slots or openings in the said wheel extended across the periphery of the same and interrupting the continuity of the said bed 13, transverse concavities a^5 made in the periphery of the wheel in both the bed 13 and the portion of reduced diameter and communicating with the said inclined slots, knives or cutters inserted in said inclined slots, a ring a^7 fastened to the side of the head or wheel of reduced diameter and provided with concavities a^{12} forming a continuation of the concavities a^5 but of smaller diameter, whereby one wall of the concavities a^{12} laps by and forms a side support for the knives or cutters, and means to adjustably secure the said knives or cutters to said head or wheel, substantially as described.

5. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters to form a bed narrower than the width of the cutter-head, knives or cutters carried by said head and provided with lips 2, 3 and the cutting edge 4 coöperating with said bed, an automatically-operated axially-slotted guard movable in opposite directions on the said shaft, and a stop to limit its movement toward the cutter-head, substantially as described.

6. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters to form a bed narrower than the width of the cutter-head, knives or cutters carried by said head and coöperating with said bed, an automatically-operated guard movable in opposite directions on the said shaft, and an adjustable stop carried by the guard and coöperating with the said head, substantially as and for the purpose specified.

7. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters to form a bed narrower than the width of the cutter-head, knives or cutters carried by said head and provided with lips 2, 3 and cutting edge 4 coöperating with said bed, an automatically-adjustable guard consisting of the sleeve b provided with the radial flange b^6 and the axially-extended annular flange b^8 fitting over and embracing the reduced portion of the periphery of the cutter-head and provided with axial slots b^{10} for the reception of the lips 3, and a spring normally keeping the guard forward toward the narrow bed but adapted to yield and permit the said guard to move away from the said bed, substantially as described.

8. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters to form a bed narrower than the width of the cutter-head, cutters or knives carried by said head and coöperating with said bed, and a sleeve provided with a guard and with an adjustable extension loose on said shaft to move axially thereon, and a spring encircling said sleeve and normally forcing the said sleeve toward the cutter-head, substantially as described.

9. In a rotary trimming-machine; the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head carried thereby and provided with knives or cutters, and a sleeve loosely mounted on the said shaft to move axially thereon and provided with a guard for the said knives, a second sleeve loosely mounted on the said shaft and adjustably connected to the guard-carrying sleeve to form an adjustable extension thereof, a spring to move the said sleeves in one direc-

tion, and stops to limit the simultaneous movement of the said sleeves in opposite directions, substantially as described.

10. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head or wheel carried thereby to rotate therewith and provided with a periphery of different diameters comprising the reduced portion 14, the raised bed 13 and the reduced portion or ledge 15 on the opposite side of the bed 13 from the reduced portion 14, cutters or knives carried by the said head and provided with lips 2, 3, and an intermediate cutting edge 4, a guard fitted over the reduced portion 14 and provided with slots for the reception of the lips 3, and a shield secured to the shaft and provided with the flange b^{30} fitted over the annular ledge 15, substantially as described.

11. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head carried thereby to rotate therewith and provided with a periphery of different diameters to form a smooth reduced portion 14, and a raised bed 13, knives or cutters carried by said head and provided with the cutting-lips 2, 3, and the intermediate cutting edge 4 coöperating with the raised bed 13, and a sleeve loosely mounted on the said shaft and provided with a guard embracing the reduced portion 14 and provided with slots for the reception of the lips 3, and a spring to act on said sleeve, substantially as described.

12. In a rotary trimming-machine, the combination of the following instrumentalities, viz: a rotary shaft, a cutter-head carried thereby and provided with knives or cutters, and a sleeve loosely mounted on the said shaft to move axially thereon and provided with a guard for the said knives, a second sleeve loosely mounted on the said shaft and adjustably connected to the guard-carrying sleeve to form an adjustable extension thereof, and a spring to move the said sleeves in one direction, substantially as described.

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

AMBROSE S. VOSE.

Witnesses:
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