

C. F. STACKPOLE.
BURNISHING MACHINE.
APPLICATION FILED DEC. 19, 1911.

1,041,692.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

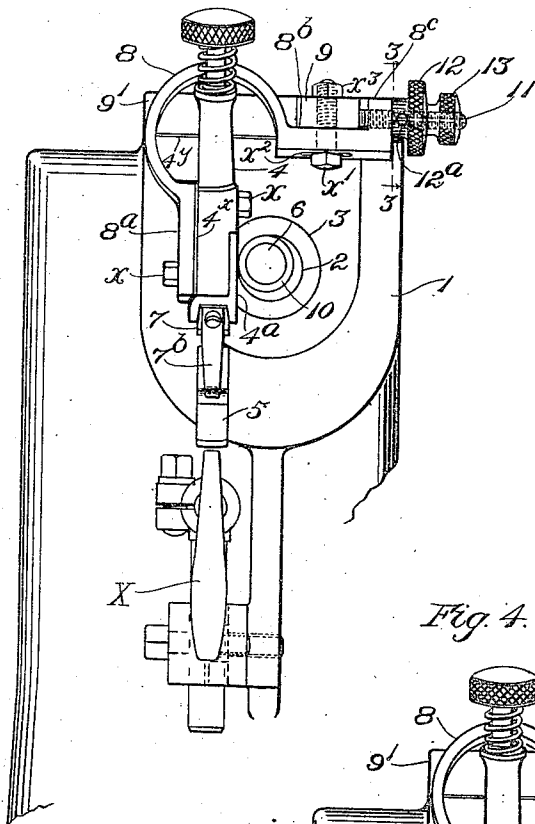


Fig. 2.

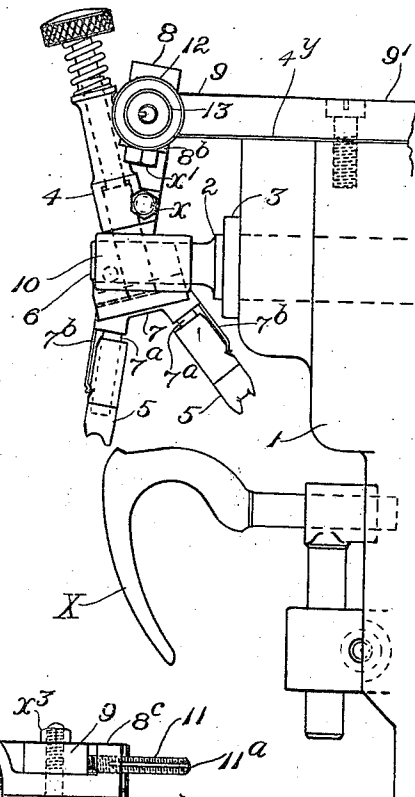


Fig. 4.

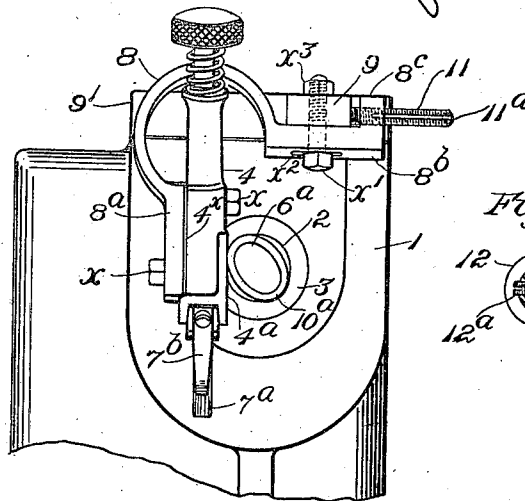


Fig. 5.

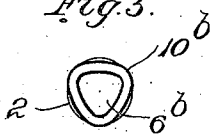
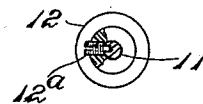


Fig. 3.



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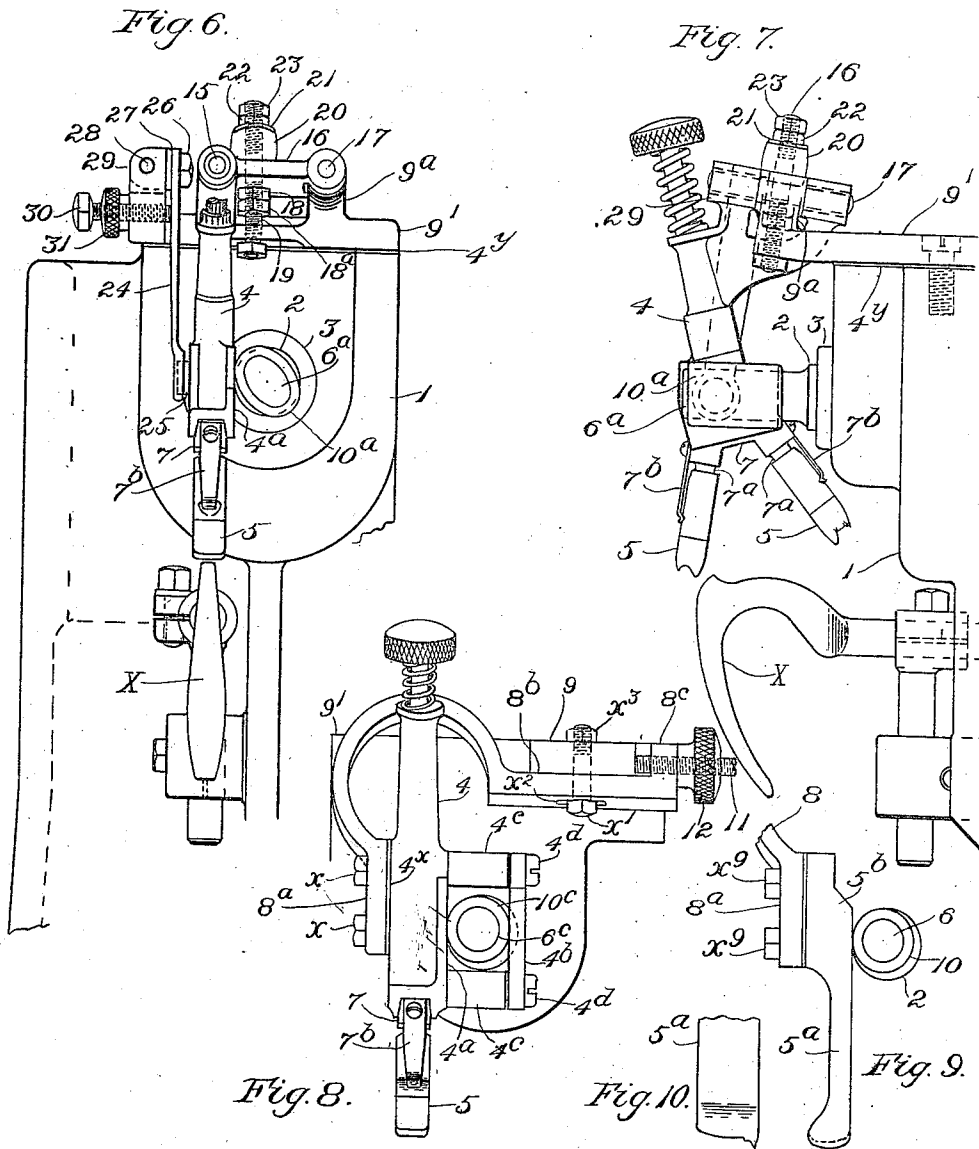
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES F. STACKPOLE, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO
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BURNISHING-MACHINE.

1,041,692.

Specification of Letters Patent.

Patented Oct. 15, 1912.

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To all whom it may concern:

Be it known that I, CHARLES F. STACKPOLE, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Burnishing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention comprises improvements in actuating devices for reciprocatory tools, more particularly the tools employed in edge-burnishing machines used in the manufacture of boots and shoes. Also, in means of heating such tools.

General objects of the invention are to provide actuating means of simplified character and construction; to obviate liability to spotting or staining the work with lubricating oil; to enable a high speed of movement of a tool to be attained without noticeable jar or vibration; to provide for the heating of the tool without the use of flame or steam, as heretofore usual in practice, or electricity as proposed in some instances; and to provide for the control and regulation of the degree of heat.

In the drawings,—Figure 1 shows in front elevation the upper portion, or head, of an edge-burnishing machine having applied thereto embodiments of the features of the invention. Fig. 2 is a side-elevation of the parts which are represented in Fig. 1. Fig. 3 is a detail view in section in the plane of line 3, 3, of Fig. 1, a portion of the adjusting nut being broken away. Fig. 4 is a front elevation on the same order as Fig. 1, but showing a different form of cam for actuating the tool, the collar and lock-nut being removed from the adjusting-screw for the spring-mounting of the tool-carrying arm. Fig. 5 is a detail view showing a third form of cam. Fig. 6 is a view similar to Fig. 1 but showing a different mode of supporting the tool-carrier, and a different means of applying spring-tension, the upper end of the spindle of the tool-stock being broken away. Fig. 7 is a side elevation of the parts which are shown in Fig. 6. Fig. 8 is a front elevation of a construction in which the cam works within a yoke in connection with the tool-carrying arm. Fig. 9 is a detail view illustrating a simplified construction in which the tool or its stock is directly engaged by the cam. Fig. 10 is a

detail view of the working end of the tool of Fig. 9.

Having reference to the drawings,—in each of the main views the head of the supporting frame of a burnishing machine is shown at 1, and 2 is a rotary shaft which is mounted in the said head in bearings applied to the latter, one of the said bearings being partly shown at 3. Only the forwardly-projecting end-portion of the shaft is represented. This end-portion is operatively combined with the tool-carrying arm 4, for the purpose of occasioning reciprocatory movement thereof, as is explained hereinafter in dealing with the features of the invention. The tool-carrying arm may be constructed and equipped to carry a single tool 5, as in some instances in practice, or a plurality of tools, as also common. It is shown provided with a shifting tool-stock 7 having two projecting pins 7^a, 7^b, on which two tools 5, 5, are mounted. The said tool-stock 7 is mounted rotatably upon the arm 4 in well-known manner providing for enabling either of the said tools to be shifted into working position, and the tools have sockets receiving and fitting said pins with capacity to turn slightly thereon under the restraint of latching springs 7^b, 7^b, as usual, excepting that by preference the sockets are somewhat longer than ordinarily in practice.

X is a work rest located in convenient position below the tool-carrier and tools, it being shaped to constitute a finger-hold, as usual.

Referring now more particularly to the parts more immediately involved in the invention:—the rotary shaft 2 is operatively combined with the tool-carrying arm 4 by means of a cam or its equivalent in connection with said shaft, acting upon the said arm. The construction of the cam and arm, and the manner of mounting the arm, may vary. In Figs. 1 and 2 the cam 6 is constituted by a simple eccentric; in Figs. 4, 6 and 7 the cam 6^a is a two-throw elliptical cam; in Fig. 5 the cam 6^b is a three-throw triangular cam. The precise shape in cross-section of the cam is not material, but the general contour should be rounded and free from sharp or sudden changes in direction. In the said figures (1 to 7, inclusive) a surface 4^a upon or in connection with the tool-carrying arm is maintained in contact with the cam by spring-tension acting in connection

tion with the said arm, the outstanding eccentric or projecting prominence or prominences of the cam acting to push the arm and tool in one direction and the spring-tension effecting the return of the arm and tool in the reverse direction. The means and manner of applying the spring-tension may vary.

Figs. 1, 2 and 4 show a novel means of supporting the tool-carrying arm and at the same time securing the desired spring-tension in connection with the same to insure proper co-action with the cam. In the said figures the arm 4 is attached by bolts x , x , to one side of a downwardly-projecting extension or lug 8^a constituting one extremity of a C-spring 8 of circular curvature, the said spring having its opposite extremity constituted by a second extension or lug 8^b projecting outwardly in a horizontal direction. The extension or lug 8^b is made fast by a bolt x' to the under side of a forwardly-projecting portion 9 of a plate 9' which is bolted upon the top of head 1. Thereby the spring is supported upon the machine-head, so that in turn it supports the arm 4. The longitudinal axis of the arm 4 and the tool 5, and that of the extension or lug 8^b, are in planes which are radial or approximately so with respect to the center of the C-spring. Such planes in this instance are at right angles with each other. To permit adjustment of the tool-carrying arm bodily toward and from the center of shaft 2, the hole x^2 made through extension or lug 8^b of spring-mounting 8 for the reception of bolt x' , is in the form of an elongated slot. A nut x^3 upon the threaded stem of bolt x' above the support 9 serves in conjunction with the bolt, when turned down upon the latter, to clamp the spring-mounting in the position into which it has been adjusted. The tension of the C-spring operates to hold the surface 4^a of the tool-carrying arm in contact with the cam. The said spring yields transversely as the said cam operates to push the said arm and tool forward. It yields vertically to the upthrust of the work presented by the operative beneath the lower end of the tool which is in action, and operates to cause the tool to act with yielding down-pressure upon the work. In operation, the tool-carrying arm vibrates about a point located centrally of the C-spring, or nearly so.

In connection with the cam 6 and the arm 4 I provide a surfacing of anti-attribution material which receives the actual contact and pressure between the cam and arm. This surfacing preferably, though not necessarily in all cases, is composed of vulcanized fiber. I have shown the same applied to the cam by fitting a sleeve-like shell or jacket of the anti-attribution material to the cam, such shell surrounding the periphery of the cam. The shell 10 in Figs. 1 and 2 is circular in cross-

section to fit the cam 6 of such figures. The shells 10^a of Figs. 4, 6 and 7 are elliptical to fit the elliptical cams 6^a, 6^a, of such figures, and the shell 10^b of Fig. 5 is triangular to fit the triangular cam 6^b of such figure. The employment of vulcanized fiber, or of other anti-attribution material in conjunction with the cam or its equivalent and the tool-carrying arm 4 renders unnecessary the use of oil or the like as lubricant between them. There is, therefore, no liability of injury to the work by spotting or staining from flying or spattering oil. Such spotting or staining is very common in the case of machines at present in use employing for the actuation of the tool-carrier a crank and a connecting-rod with split boxes or bearings. The employment of the C-spring as a mounting and support for the arm 4 in the general construction shown in Figs. 1, 2 and 4, dispenses with all pivotal supporting bearings in connection with such arm, and still further eliminates the occasion for the use of lubricating oil in proximity to the work, and the liability of spotting or staining of the latter.

The cam is rotated at a high rate of speed in practice. In consequence of the contact of its shell of vulcanized fiber with the metallic surface 4^a of the arm 4 at such high rate of speed, a considerable amount of heat is generated, and such heat is transmitted to the tool or tools 5, heating the same properly for the desired results in burnishing. To enable the degree of heat which is imparted to the tool to be regulated, provision is made for varying at will the spring-tension which bears the surface 4^a against the cam, and consequently the pressure between such surface and that of the cam. To this end, in Figs. 1, 2 and 4 the C-spring is made adjustable upon its support 9, as explained hereinabove, so that surface 4^a of the arm 4 may be caused to press with greater or less force, as may be required, against the cam. For convenience in making the adjustment, and in order that the heating action may be regulated to a nicety, I have combined adjusting-screw devices with the spring-mounting 8. The character and construction of such devices may vary in practice. In Figs. 1, 2, 3, 4, an upturned ear 8^c of extension or lug 8^b of the spring-mounting has a screw-threaded hole tapped horizontally therethrough, such hole having screwed into the same the threaded stem of an adjusting-screw 11, the inner end of which makes contact with one side of support 9. Upon this screw, outside the ear 8^c, is mounted a collar 12 having a knurled flange for convenience in rotating the collar by hand. The said collar has a radial threaded hole which is occupied by a screw 12^a, the reduced inner end of which enters a groove 11^a, Fig. 3, formed in the adjusting-screw 11 and extending lengthwise

of the latter. By turning the collar the screw is turned within the threaded hole in the upturned ear 8^c of the extension or lug 8^b, so that the inner end of the screw shall project more or less from the ear toward the support 9. Thereby is determined the position which the arm 4 shall occupy when the end of the adjusting-screw and the side of support 9 are in close contact with each other. Bolt α' is loosened to permit of the adjustment, and tightened again after the spring-mounting and arm have been adjusted, to hold them in the required position. At 13 is a lock-nut upon the outer portion of screw 11, such lock-nut serving to clamp the collar 12 against the outer surface of ear 8^c to prevent accidental loss of adjustment of the screw and the spring-mounting and arm.

At 4^x, Figs. 1 and 4, is a layer of asbestos or other heat non-conducting material, interposed between tool-carrying arm 4 and the extension or lug 8^a of the spring-mounting, to obviate the transmission of heat to the said spring. A similar layer 4^y is or may be applied between plate 9' and the top of head 1 of the machine to deaden the sound.

Figs. 6 and 7 show a different form of mounting for the tool-carrying arm, and a different means of producing the spring-tension and regulating the latter. In these figures the tool-carrying arm 4 is hung at its upper end by means of a pivot 15 to a horizontally extending arm 16. The arm 16 in its turn is hung by a pivot 17 to an upright portion 9^a of the top-plate 9'. The horizontal arm 16 and tool-carrying arm are afforded vertical support by means of a nut 18 upon a screw-threaded stem 19 set in a portion of plate 9 and rising therefrom. Said stem passes through a hole in the arm 16. The latter rests upon the nut 18, below which is a lock-nut 18^a upon the stem. By turning the nuts up or down, the arm may be adjusted to occupy normally a higher or lower position as required. The stem is surrounded above the horizontal arm 16 by an expanding spring composed of a block of rubber 20, which is confined between the top of the arm and a washer 21 held in place by an adjustable nut 22 and locknut 23 upon the top portion of the stem 19. The spring 20 yields slightly to accommodate the upthrust from the work which is pressed upward by the operative against the working end of the tool. The spring-tension which maintains the surface 4^a of the tool-carrying arm pressed against the actuating cam is applied by means of a leaf-spring 24 having one end thereof engaged with a support upon the fixed framework, and the other end thereof arranged to act in connection with the tool-carrying arm 4. With the latter end is composed a small leather block 25, which is interposed between the spring and

the arm 4 to take the wear due to relative lengthwise movement of the arm and spring as they swing back and forth together, and in addition obviate noise. The upper end of the spring 24 is fastened by a screw 26 to a small block 27 that is mounted by means of a transverse pivot 28 upon small uprights 29 rising from the top-plate 9. An adjusting-screw 30 has its threaded stem fitted to a threaded hole that is tapped through the base-portion of the said uprights, and its inner end engages the leaf-spring 24. By turning the said adjusting-screw 30 the tension of spring 24 is varied, and thereby the degree of force with which the surface 4^a of the tool-carrying arm is pressed against the cam is regulated. A lock-nut 31 is applied to the adjusting-screw 30, the said lock-nut making contact with the outer surface of the said base-portion of uprights 29.

Fig. 8 shows a construction in which an eccentric-shaped cam 6^c and shell 10^c similar in form to the cam 6 and shell 10 of Figs. 1 and 2, and acting at one side thereof against a surface 4^a of the tool-carrying arm 4, act at the other side against one surface of a plate or strip 4^b supported by posts 4^c, 4^d, projecting from the arm 4. The plate or strip 4^b is held to the said posts by means of screws 4^e, 4^f. These screws may be turned to adjust the closeness of fit of the surface 4^a and plate or strip 4^b against the opposite sides of the eccentric-cam. In this construction the cam acts positively in effecting the return-movement of the tool-carrying arm, and by adjustment of the screws 4^e, 4^f, wear and resulting play of the relatively-moving surfaces may be taken up, and the heating action may be regulated. The extent, vertically, of the space inside the yoke within which the eccentric-cam works permits the desired vertical yielding action of the tool-carrying arm and tool during the operation of burnishing the edge of a shoe-sole.

Fig. 9 shows a construction in which the tool, 5^a, is integral with a stock 5^b, which is rigidly attached by bolts α'' , α''' , to the extension or lug 8^a of the C-spring mounting 8, and a rotating cam 6 with its anti-attrition surfacing 10 engages directly with the said tool-stock to actuate and heat the tool. The form of the said tool is illustrated in Figs. 9 and 10.

I claim as my invention:

1. In a burnishing machine, in combination, an actuating cam, and a tool-carrier maintained in immediate engagement with the said cam by spring tension, said cam producing the movement of the tool-carrier in one direction and the spring tension producing the movement in the other direction, the moving contact between the cam and a surface in connection with the tool-carrier imparting the heat required for the burnishing action of the tool.

2. In a burnishing machine, in combination, a tool-carrier, a rotating cam actuating said tool-carrier, and anti-attrition surfacing dispensing with the use of oil between the said parts and also effecting the heating of the tool for the burnishing action through moving contact between the said surfacing and the surface contacting therewith.
3. In a burnishing machine, in combination, a tool-carrier, and a rotating cam-surface of anti-attrition material operatively engaging with said tool-carrier to actuate the same, and effecting the heating of the tool for the burnishing action through the movement of such cam-surface relative to the surface which contacts therewith.
4. In a burnishing machine, in combination, a tool-carrier, a rotating cam-body for actuating said tool-carrier, and an anti-attrition shell or jacket upon said cam-body engaging with a surface in connection with said tool-carrier, and effecting the heating of the tool-carrier and tool for the burnishing action through moving contact between said shell or jacket and a surface in connection with the tool-carrier.
5. In a burnishing machine, in combination, a tool, a tool-carrier, a rotating cam engaging said tool-carrier, and a spring maintaining the tool-carrier in continuous engagement with said cam, said cam and spring imparting reciprocatory movement to said tool-carrier and also imparting the heat required for the burnishing action to the tool in consequence of the moving contact of the cam-surface with the tool-carrier.
6. In a burnishing machine, in combination, a tool, a tool-carrier, a rotating cam imparting reciprocatory movement to the tool-carrier and also imparting the heat required for the burnishing action to the tool in consequence of the moving contact of the cam-surface with the surface engaged thereby, and means for varying the said heating action.
7. In a burnishing machine, a rotating cam, a tool-carrier, and means in connection with said tool-carrier for permitting the latter to yield vertically and also for holding it with spring-tension in contact with said cam.
8. In a burnishing machine, in combination, a rotating cam, and a spring-held tool-carrier adapted to yield vertically and also held by spring-tension in continuous engagement with the said cam.
9. In a burnishing machine, in combination, a rotating cam, a tool, a tool-carrier, means in connection with said tool-carrier for permitting the latter to yield vertically and also for holding it with spring-tension in contact with said cam, whereby the tool-carrier and tool are reciprocated and heat is imparted to the tool, and means for adjusting the spring-tension to regulate the heating action.
10. In a burnishing machine, in combination, a rotating cam, a tool-carrier, and a spring-mounting for said tool-carrier supporting the latter and also holding it elastically in engagement with said cam.
11. In a burnishing machine, in combination, a rotating cam, a tool-carrier, a spring-mounting for said tool-carrier holding it by spring-tension in engagement with said cam, and means for adjusting the spring-mounting to vary the heating action of the cam.
12. In a burnishing machine, in combination, a rotating cam, a tool-carrier engaged by said cam, and a C-spring mounting for said tool-carrier supporting the latter and maintaining it in contact with the cam.
13. In a burnishing machine, in combination, a rotating cam, a tool, a tool-carrier engaged by said cam, a C-spring mounting for said tool-carrier, and means to adjust the said mounting to vary the pressure between the tool-carrier and cam and thereby regulate the heating of the tool.
- In testimony whereof I affix my signature in presence of two witnesses.
- CHARLES F. STACKPOLE.
- Witnesses:
NATHAN B. DAY,
CHAS. F. RANDALL.