Dec. 29, 1931. H. E. DOW 1,838,812

FINISHING MACHINE

Filed March 14, 1929

Fig. 1.

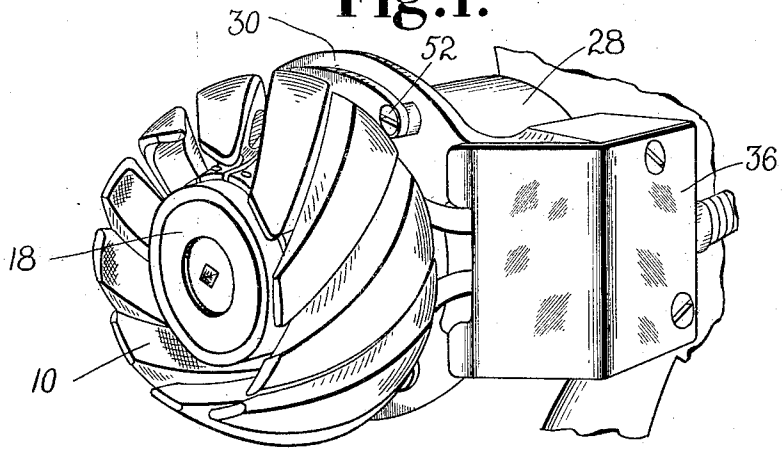


Fig. 3.

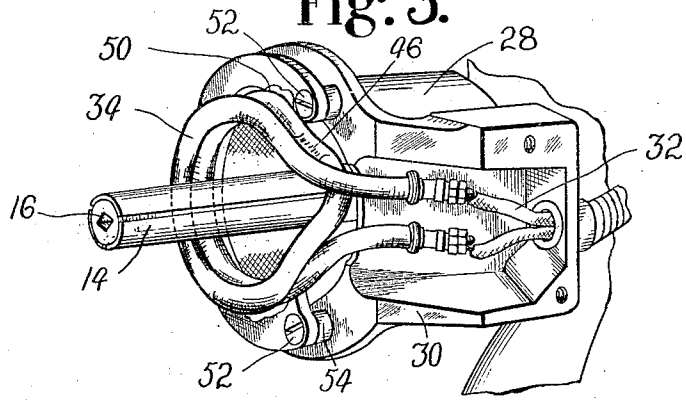
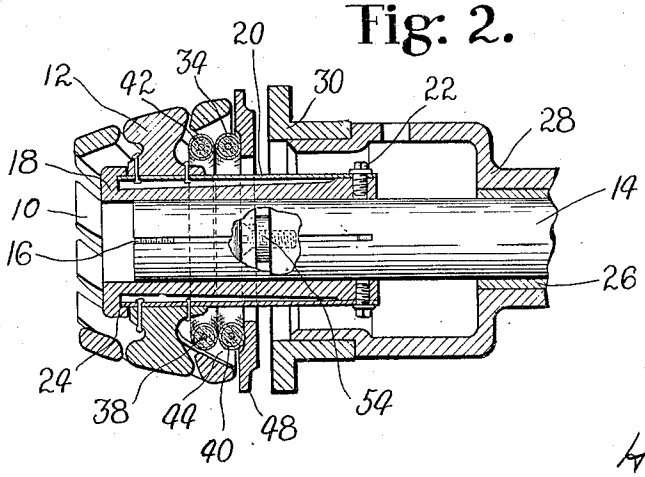


Fig. 2.



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By his Attorney

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1,838,812

UNITED STATES PATENT OFFICE

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FINISHING MACHINE

Application filed March 14, 1929. Serial No. 346,993.

This invention relates to finishing machines and is illustrated as embodied in a machine for burnishing and polishing soles and heels of shoes of the type disclosed in United States Letters Patent No. 743,988, granted November 10, 1903, to C. Pease.

The operation of finishing the heel of a shoe consists in applying a coating of melted wax or other polishing material to the sides and rear surfaces of the heel and subsequently working the wax into the heel and burnishing the heel surface by presenting it to a heated rotating burnishing tool. The heel is then polished by means of a rapidly rotating brush or roll.

It is an object of the present invention to provide improved means for heating a tool adapted for performing heel burnishing operations. The invention is illustrated as applied to the heating of a burnishing tool of the type disclosed in United States Letters Patent No. 616,432, granted on December 20, 1898, to Z. Beaudry, but, as will be made more apparent hereinafter, it should be understood that a device embodying the invention may be used with any burnishing tool having a similarly recessed or overhanging end.

In accordance with the above object of the invention, one feature thereof as embodied in the illustrated machine comprises a heating unit supported in juxtaposition to a burnishing tool having a recessed end face and between the tool and the adjacent tool shaft bearing by a means constructed and arranged to direct the air in the recess of the tool heated by the unit against the adjacent portion of the tool bounding the recess. As herein illustrated, this means comprises a baffle plate which forms a substantial closure for the recess by being placed in juxtaposition to the end of the tool which overhangs the heating unit. The air in the recess, which rises as it is heated by the heating unit, is thus hindered from escaping past the end of the tool. By supporting the heating unit in juxtaposition to the tool, a large part of the surface of the heating unit is brought into close association with that of the tool, thereby to effect an efficient transfer of heat to the tool from the heating unit.

In machines in which a well heated tool is carried on the end of a rotating shaft projecting from a nearby bearing, there is a likelihood of the heat from the tool being conducted along the shaft rapidly enough to cause it to seize in the adjacent shaft bearing. In order that a minimum quantity of heat shall reach the tool-shaft bearing of the illustrated machine from the heating unit and baffle plate which supports it, they are spaced slightly from the frame of the machine, thereby to insulate the heating unit therefrom. As illustrated, the space between the heating unit and baffle plate, and the frame of the machine constitutes a vertical air channel extending across the hub of the tool and hence the air in the space is free to rise vertically, as it is heated, about the portion of the tool hub and shaft adjacent to the bearing and away from the adjacent tool-shaft bearing which is horizontal.

The illustrated heating unit comprises a substantially annularly shaped coil of "sheath-wire" which has been found to be an advantageous form of material for use as an electrical resistance heating unit. As it is frequently desirable to change the burnishing tool in accordance with the shape of the heels to be operated upon, it is desirable that tools may be removed easily from, and replaced on, the shaft without interfering with attachments or any part of the machine. To this end, and in accordance with another feature of the invention, the illustrated heating unit, although surrounding the hub of the tool in juxtaposition to the work engaging elements thereof, is constructed and arranged to allow the ready removal of the tool from the shaft.

These features, including the detailed construction of the illustrated machine, will now be more fully described and set forth in the claims and illustrated in the accompanying drawings, in which

Fig. 1 is a perspective view of a part of the machine in which the invention is embodied,

Fig. 2 is an axial sectional elevation, and

Fig. 3 is a perspective view with the burnishing tool removed showing the heating unit and its mounting.

In the illustrated machine a burnishing tool 10 comprising a plurality of work engaging elements 12 is adjustably fixed on a rotatable tool shaft 14 by means of a nut 16 which, when threaded into the end of the tool shaft 14, expands the slotted portion of the tool shaft into intimate contact with the bore of a hub 18 of the tool 10. The work engaging elements 12 of the tool are riveted to resilient metallic strips 20 each of which is fastened to the hub at one end by screws 22 and is restrained from excessive outward movement at its opposite end by means of a shoulder 24 on the corresponding end of the hub 18. Reference may be made to the above-mentioned Beaudry patent for a more detailed description of the illustrated burnishing tool.

The tool shaft 14 is journaled in a bushing 26 supported in the frame 28 of the machine. The outer extremity of the frame 28 is shouldered to receive a casing 30 in which connections 32 between the source of power and a heating unit 34 are housed, as illustrated in Fig. 3. A cover plate 36 (Fig. 1) may be fastened to the casing 30 in any convenient manner to protect the connections.

The heating unit 34 comprises a resistance 38, the ends of which are connected to the source of power and which is enclosed in a metallic sheath 40, being insulated therefrom by a refractory material 42 which completely fills the sheath. In order to provide a heating unit of efficient form, the illustrated heating unit is substantially annular to conform with the substantially annular recess 44 resulting from the individual recesses in the several work engaging elements of the burnishing tool which are symmetrically disposed about the hub 18 of the tool 10. It is to be understood, however, that the sheath wire may be wound into a coil of a shape other than that illustrated without departing from the scope of the invention, so long as the coil conforms substantially to the form of the recess in which it is enclosed. In order to reduce the tendency of the coil to change its shape, owing to expansion or contraction on account of the large range of temperature change to which it is ordinarily subjected, the coils of the heating unit are held together preferably by welding them at several points as indicated at 46.

In order to provide an effective heating unit, the illustrated unit 34 has been made in which substantially equal to the extent of the overhang of the inner ends of the work engaging elements of the tool, as shown in Fig. 2. The heating unit 34 is also supported in close association with the tool by means of a baffle plate 48 to which the heating unit is welded, as illustrated at 50, and which in the illustrated machine is fastened to the casing 30 by means of screws 52. In order to insulate the baffle plate 48 and heating unit from the frame 28, thereby to prevent excessive heating of the adjacent tool shaft bearing, the baffle plate 48 which supports the heating unit 34 is spaced slightly from the casing 30 by means of washers 54. An opening is thus provided beween the baffle plate and the adjacent portion of the frame in which heated air is free to rise vertically and hence away from the adjacent tool shaft bearing.

Since heels of different shapes require burnishing tools having correspondingly shaped work engaging surfaces, it is desirable that the burnishing tools for use in the illustrated machine may be removed from and replaced on the tool shaft readily. To this end the heating unit and baffle plate are so constructed that their inside diameter is enough greater than the over-all diameter of the hub 18 across the extremes of the screws 22 to allow the hub to pass easily through the heating unit and baffle plate when the tool is removed from the shaft 14.

In preparing the machine for use, a suitable burnishing tool is placed on the shaft 14 in juxtaposition to the baffle plate. A substantial closure of the recess is thus provided by the baffle plate which hinders the progress of heated air past the end of the tool and directs it toward the portion of the tool bounding the recess which is adjacent to the work engaging surface thereof. It may be noted that the clearance between the heating unit and the adjacent portion of the tool need be great enough only to allow for the radial movement of the work engaging elements as they are forced toward the axis of the tool by engagement of the work therewith.

The position of the heating unit on the end of the frame 28 may be varied by adjusting the casing 30 which may be clamped to the frame 28 by any convenient means (not shown); and the temperature of the heating unit may be regulated at will by varying the current passing through it by means of any suitable device such as a rheostat.

It will now be appreciated that the illustrated device furnishes an efficient means for heating a burnishing tool since the heat emitting surface of the heating unit and the heat absorbing surface of the burnishing tool are relatively large and in juxtaposition. Not only is the transfer of heat from the heating unit to the tool readily accomplished, but it may be as readily controlled by any suitable device such as a rheostat and also the baffle plate as used in the illustrated organization hinders the escape of heated air from the vicinity of the tool and directs it toward the portion of the tool which is to be heated.

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

1. In a burnishing machine, a shaft rotat-

ably supported in a bearing in the frame thereof, a tool fixed to said shaft in proximity to the bearing, means between the tool and the bearing for heating said tool, and means for supporting said heating means in juxtaposition to said tool constructed and arranged to direct the air heated by said unit against the adjacent portion of the tool, said heating unit and supporting means also being spaced from the bearing to retard transmission of heat to the bearing.

2. In a burnishing machine, a frame, a rotating shaft journaled in a bearing in the frame, a tool comprising a hub fixed to said shaft and a work engaging portion having a recessed end face, means disposed within the recess of said tool for heating it, and means for supporting said heating means cooperating with the adjacent end of said bearing to form an air channel extending across the hub of said tool.

3. In a burnishing machine having a bearing and a tool shaft rotatably mounted therein, a tool comprising a hub carrying a part having a work engaging face spaced from said bearing, said hub extending toward said bearing, means for heating the work engaging face of said tool, and a support for said heating means cooperating with the adjacent end of said bearing to form a vertically disposed air channel extending across the hub of said tool in order to prevent heating of its end adjacent to the bearing.

4. In a burnishing machine, a rotating shaft journaled in the frame thereof, a tool having a recessed end face fixed to said shaft, means within the recess in said tool and surrounding a portion thereof for heating it, and a baffle plate in juxtaposition to said tool for supporting said heating means and for substantially closing said recess in the tool, thereby to conduct the heated air therein into contact with said tool.

5. In a burnishing machine, a rotating shaft journaled in the frame thereof, a tool comprising a hub adjustably fixed to said shaft and having a recessed end face, and a sheath-wire heating unit spaced from said tool but within said recess and surrounding said hub constructed and arranged to allow the ready removal of the tool from the shaft.

6. In a burnishing machine, a rotating shaft journaled in the frame thereof, a tool comprising a hub adjustably fixed to said shaft and having a recessed end face, a sheath-wire heating unit within said recess and surrounding said hub, and means for supporting said heating unit in spaced relation from the frame.

7. In a burnishing machine, a rotating shaft, journaled in the frame thereof, a tool having a recesed end face, a sheath-wire heating unit in juxtaposition to said tool within said recess, and a baffle plate spaced from the frame for supporting said heating unit and for substantially closing said recess whereby the heated air therein is directed against the adjacent portions of the tool.

8. In a burnishing machine, a rotating shaft journaled in the frame thereof, a tool comprising a hub adjustably fixed to said shaft, a plurality of work engaging elements fixed to said hub one end of each of which elements is recessed, and a sheath-wire heating unit enclosed in said recesses and constructed and arranged to allow the ready removal of the tool from the shaft.

9. In a burnishing machine, a rotating shaft journaled in the frame thereof, a tool comprising a hub adjustably fixed to said shaft, a plurality of work engaging elements fixed to said hub one end of each of which is recessed, a sheath-wire heating unit in said recesses and surrounding said hub, and a support for said unit enclosing it within the recesses, said heating unit and support being constructed and arranged to allow the ready passage of the hub therethrough whereby the tool may be easily removed.

10. In a burnishing machine, a rotating tool comprising a plurality of radially disposed work engaging elements one end of each of which is recessed, a heating unit in justaposition to said tool and partially filling said recesses, and means supporting said heating unit and substantially closing the said recesses, thereby to hinder the escape of the heated air past the tool.

11. In a burnishing machine, a rotating tool comprising a hub carrying at its outer end a plurality of radially disposed work engaging elements one end of each of which is recessed, a heating unit in juxtaposition to said tool and partially filling said recesses, and means for substantially closing the space between the heating unit and the adjacent work engaging face of the elements, thereby to hinder the escape of the heated air past the work engaging elements of the tool, said means also being arranged to expose a portion of the inner end of the tool hub to facilitate its cooling.

In testimony whereof I have signed my name to this specification.

HARRY E. DOW.

CERTIFICATE OF CORRECTION.

Patent No. 1,838,812. December 29, 1931.

HARRY E. DOW.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 56, for "which" read width; page 3, line 94, claim 10, for the misspelled word "justaposition" read juxtaposition; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of October, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.