

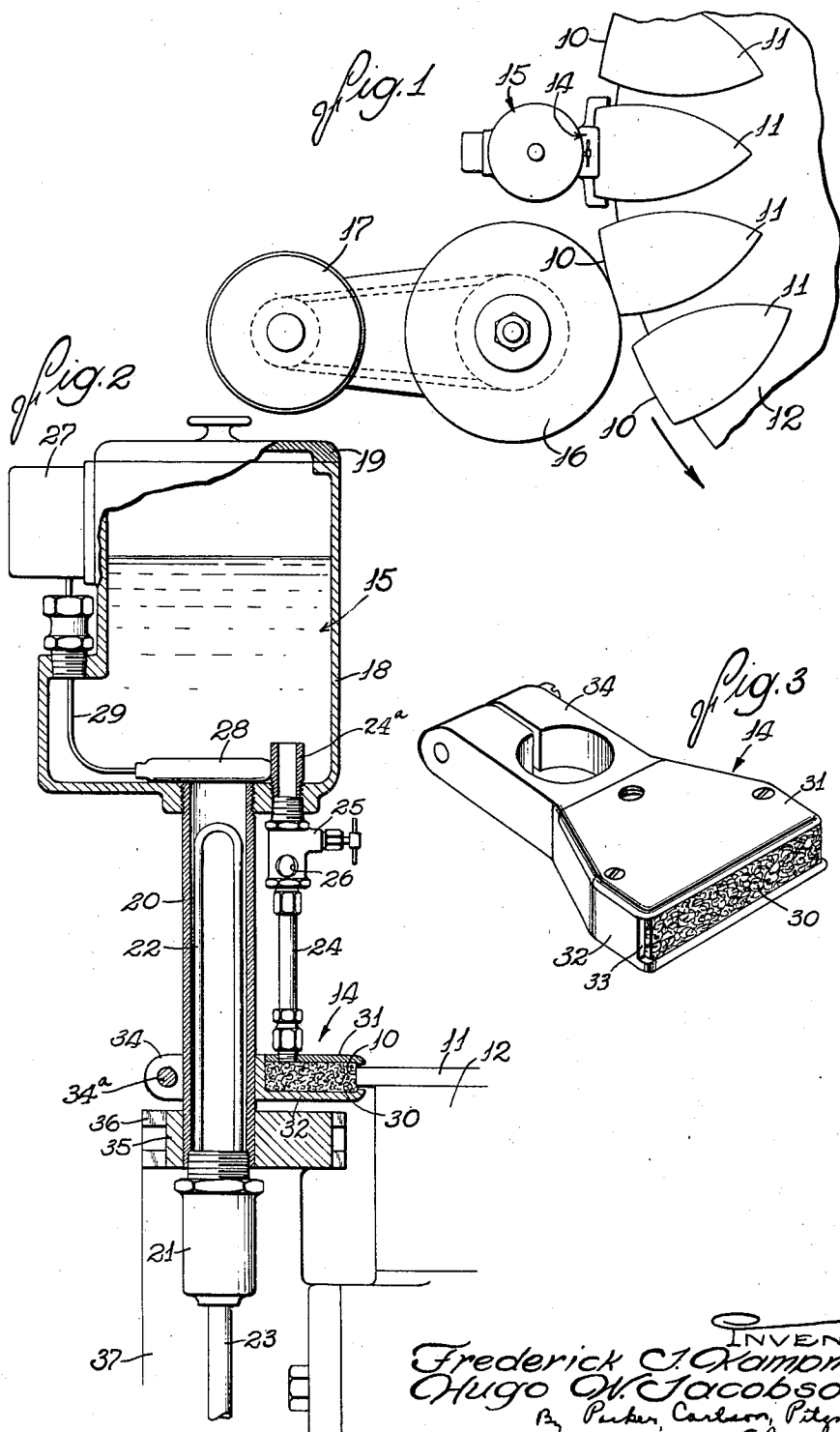
July 8, 1941.

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2,248,503

METAL POLISHING APPARATUS

Filed March 13, 1939



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UNITED STATES PATENT OFFICE

2,248,503

METAL POLISHING APPARATUS

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Application March 13, 1939, Serial No. 261,496

10 Claims. (Cl. 51—263)

This invention relates to metal polishing or buffing and more particularly to the manner of applying the grease compound commonly utilized to facilitate the polishing operation and eliminate scratches on the polished surface.

Such compounds are handled in stick form and are composed mainly of tallow combined with stearate to impart hardness. In the course of polishing, the ordinary practice is to press the stick against the abrasive wheel intermittently. By this procedure, it is impossible to insure an adequate and even distribution of the compound between the surfaces of the work and abrasive wheel.

The primary object of the present invention is to overcome the prior difficulties by applying the buffing compound directly to the work surface preliminary to polishing whereby to provide for even distribution of the compound and the use of a minimum quantity thereof.

A more detailed object is to apply the compound in liquid form and to utilize the normally cool condition of a metal work piece to congeal the liquid film and cause it to be retained on the work.

The invention also resides in the novel mechanism by which the compound is applied to the work and maintained in a liquid state.

Further objects and advantages of the invention will become apparent as the following description proceeds, taken in connection with the accompanying drawing, in which—

Figure 1 is a fragmentary plan view of a polishing apparatus by which the invention may be practiced.

Fig. 2 is an enlarged side elevation partly in vertical section of the apparatus of Fig. 1.

Fig. 3 is an enlarged detail perspective view of the polishing compound applicator.

For purposes of explanation and illustration, the invention has been shown and described herein as applied to the polishing of the butt end surfaces 10 of flat iron shoes 11 (Fig. 1). It will be appreciated, however, that this application is purely exemplary in character and that the invention may also be utilized for the polishing of a large variety of other types and forms of articles. We do not intend to limit the invention by such disclosure or application, but aim to cover all modifications and alternative constructions, methods, and uses falling within the spirit and scope of the invention as expressed in the appended claims.

Briefly stated, the novel method of polishing herein disclosed preferably includes the steps of

applying a lubricant type of polishing compound in liquid form directly to the surface to be polished so that a uniform coating is formed over the surface, and then buffing or rubbing the coated surface with a suitable abrasive. Preferably, the polishing compound is a heavy greasy substance which is solid at normal temperatures but readily meltable by heat so that it will congeal and adhere as a thin film when applied to a work piece which is cooler than the temperature at which the compound will congeal. By applying the grease in liquid form, an even distribution over the whole work surface is accomplished so that the final polish will be equally uniform, and yet a minimum amount of polishing compound is required.

In the particular apparatus shown herein (Fig. 1) for carrying out the method outlined above, the work pieces in the form of flat iron shoes 11 are mounted on a rotatable table or work support 12 and held by suitable clamps (not shown) in a position to expose their end surfaces 10 at the periphery of the table. With the table 12 rotating counter-clockwise, the pieces 11 first pass an applicator 14 which coats them with a liquid polishing compound supplied from a molten body 15. The pieces are then advanced past a buffing or polishing wheel 16 driven by a suitable electric motor 17, the surfaces 10 being polished progressively from end to end.

The molten compound is contained in a tank 18 having a removable cover 19. Threaded in the bottom of the tank is a vertical conduit or pipe 20 having its lower end closed by a suitable threaded cap 21. The conduit 20 defines a heating chamber for the polishing compound and houses a resistance type electric heater element 22 supplied with current through a flexible cable 23. Polishing compound in solid form is placed in the reservoir 18 and is liquified by the heater 22, a sufficient amount of compound being supplied to maintain a body of liquid of substantial depth in the reservoir. The heater maintains the compound at a temperature between 250 degrees Fahrenheit to 350 degrees Fahrenheit and within which temperature range the compound, of the tallow and stearate mixtures commonly used, is reduced to a free flowing state.

A regulated flow of liquid passes from the reservoir 18 to the applicator 14 through a supply tube or conduit 24 (Fig. 2). The upper end of this conduit is threaded in the bottom of the reservoir and the lower end discharged into the interior of the applicator which is hereinafter described. A manually adjustable flow regu-

lating valve 25 is interposed in the supply conduit 24 and a sight gauge 26 permits accurate regulation of the rate of flow by means of the valve.

To regulate the temperature of the liquid polishing compound in the reservoir 18, a suitable thermostatic control for the electric heater element 22 has been provided. This regulator has been shown herein as including a switch mechanism 27 adapted to control the supply circuit for the heater element 22. The switch mechanism 27 is of conventional construction and is actuated in the usual manner by the expansion and contraction of a suitable gas or liquid within a thermostatic bulb 28 connected to the switch actuating mechanism through a tube 29.

The upper end 24^a of the supply conduit 24 is extended into the reservoir 18 a substantial distance above the top of the thermostatic bulb 28. Consequently, the liquid level cannot fall so low as to uncover the bulb 28, and as a result, the thermostatic control always responds accurately to the temperature of the liquid polishing compound which is being heated.

The applicator 14 embodies a pad 30 of porous material such as felt clamped by a top plate 31 in a sheet metal casing 32. The latter is of channel cross section and is rigid with a split block 34 apertured to fit around the conduit 20 to which it is clamped by a screw 34^a. The forward edges of the applicator housing 32 are notched as indicated at 33 so as to receive the butt ends of the work pieces 11 and permit the latter to engage the wick firmly and depress the latter as they pass. The liquid polishing compound supplied directly to the pad 30 from the supply conduit 24 permeates the pad and is applied in an even coating over the entire work surfaces 10 as the forward face of the pad wipes across these surfaces during the advance of the work pieces.

The support for the wick 30, the conduits 20 and 24, and the reservoir 18 are all preferably made of metal having a high heat conductivity such as aluminum. Thus, heat is transferred by conduction from the heater 22 to all parts of the device and particularly to the applicator 14 so that the polishing compound is maintained in a free flowing state clear to the point of application to the work surface.

By virtue of the unitary assembly of the liquifier 15 and applicator 14, the apparatus can be readily adjusted in position to accommodate a particular series of work pieces which are to be polished. Lateral adjustment of this unitary assembly toward and away from the table 12 is accomplished by mounting it on a slide 35 (Fig. 2), which is adjustable in position along a guide-way 36 fixed to the bed 37 of a machine. The yieldable character of the pad 30 of the applicator 14 of course permits of a fairly wide tolerance in the positioning of the work pieces 11 on the table 12 without seriously interfering with the coating of the work pieces.

The buffing or polishing wheel 16 may be of conventional form. It may, for example, be made of laminations of compressed felt material which has been dipped in a suitable adhesive and a layer of granular abrasive imbedded in the adhesive.

In the operation of the polishing machine described, the reservoir 18 is filled with chunks of polishing compound such as that described. The heating element 22 melts the compound and the temperature regulating apparatus serves to keep the temperature at a value such as to maintain the compound in a free flowing liquid state. This liquid flows down the supply conduit 24 and

through the pad 30 of the applicator 14, the valve 25 being adjusted so that the pad 30 is maintained thoroughly saturated.

After the flow of polishing compound has been initiated, as described above, the work support 12 may be set in rotation and the buffing wheel and driving motor 17 started. Thereafter, the work pieces 11 are presented in succession to the applicator 14 and as the saturated pad 30 is wiped across the work piece surfaces 10, the latter are coated with a thin uniform film of the compound. The relatively cool mass of metal of the work piece chills this film so that it congeals sufficiently to remain in place on the vertical surfaces 10. Thereafter, the coated surfaces 10 are presented to the polishing wheel 16 which buffs them from end to end in the course of the rotation of the table 12.

From the foregoing, it will be seen that each of the work piece surfaces 10 is coated with a thin uniform layer of polishing compound prior to its contact with the polishing wheel 16 so that even though a minimum amount of polishing compound is utilized, there will be no scratching of the work piece surfaces, and a uniform high grade polish will be obtained over the entire work surface.

We claim as our invention:

1. A metal polishing apparatus comprising, in combination, means for melting and maintaining a body compound in a free flowing liquid state, a pad of porous material such as felt, means for supplying liquid polishing compound from said body to said pad, an abrasive polishing wheel, and means for moving a succession of work pieces sequentially past said pad to wipe a coating of polishing compound thereon and then past said polishing wheel for buffing the same, said pad and wheel being spaced to permit congealing of the coating on each work piece prior to engagement with said wheel.

2. A metal polishing apparatus comprising, in combination, means for melting and maintaining a body compound in a free flowing liquid state, a pad of porous material such as felt, means for supplying liquid polishing compound from said body to said pad, an abrasive polishing wheel, and means for moving a succession of work pieces sequentially past said pad to wipe a coating of polishing compound thereon and then past said polishing wheel for buffing the same.

3. In a polishing apparatus, the combination of a power driven buffing wheel, means for presenting work pieces successively to said wheel to effect buffing the surfaces thereof, a porous pad positioned to wipe across the work surfaces to be buffed prior to engagement thereof by said wheel, and means for supplying molten buffing compound to said pad.

4. In a polishing apparatus, the combination of a power driven buffing wheel, means for presenting work pieces successively to said wheel to effect buffing the surfaces thereof, a porous pad positioned to wipe across the work surfaces to be buffed prior to engagement thereof by said wheel, a metallic casing supporting said pad, a metallic reservoir containing a body of molten buffing compound, a metallic conduit for conducting the molten compound from said reservoir to said casing to maintain said pad impregnated, and a heater for said reservoir adapted to maintain said conduit and said casing at a temperature above the melting point of the compound.

5. A metal polishing apparatus comprising, in combination, a reservoir adapted to contain a body of meltable compound, an applicator for applying the molten compound from the reservoir to a work piece surface, and a heater arranged in heat exchanging relation with both said reservoir and said applicator.

6. A metal polishing apparatus comprising, in combination, a reservoir adapted to contain a body of meltable polishing compound, a tubular metal heating vessel communicating with said reservoir below the liquid level in the latter, an applicator for applying heated liquid from said reservoir to a work piece surface, said applicator including a porous pad adapted to wipe across the work piece surface and a metal support for said pad disposed in heat exchanging relation with the walls of said vessel, means for supplying liquid polishing compound from said reservoir to said pad, and a heater disposed in said vessel for heating the liquid therein and for supplying heat through the vessel walls and said applicator support to said pad, to retain the polishing compound in the latter in a liquid state.

7. A metal polishing apparatus comprising, in combination, a reservoir adapted to contain a body of meltable polishing compound, a vertical tubular metal vessel closed at its lower end and opening at its upper end into the bottom of said reservoir, an applicator for applying heated liquid from the reservoir to the surface of a work piece to be polished, said applicator including a porous pad and a metal housing therefor having an open end through which the pad is exposed for wiping liquid on a work piece surface moved across the same, a metal clamp for attaching said housing to said tubular vessel while establishing a thermally conductive path therebetween, a conduit for draining liquid from said reservoir into said pad, and a heater dis-

posed in said vessel for heating the liquid therein and for supplying heat through said thermally conductive path to said pad, to retain the polishing compound in the latter in a liquid state.

8. A metal polishing apparatus comprising, in combination, a reservoir adapted to contain a body of meltable polishing compound, a heater arranged in heat exchange relation with the contents of the reservoir, a regulating device for said heater including a thermostatic element located in the lower portion of said reservoir, and an applicator for applying liquid polishing compound to a work piece surface, said reservoir having an outlet communicating with said applicator for the gravity flow of liquid to the latter, said outlet being located above said thermostatic element to thereby prevent draining of the liquid to such a low point as to expose the element.

9. A metal polishing apparatus comprising, in combination, a reservoir containing buffing compound in a molten state, an applicator for applying the liquid compound from the reservoir to work surface, means for moving a succession of work pieces in a predetermined path past said applicator, said reservoir and applicator being supported as a unitary structure, and means for adjusting the position of said unitary structure with respect to the path of the work pieces.

10. In a metal polishing apparatus, the combination of means for heating a body of buffing compound to a molten state, work advancing means for presenting a succession of metal work pieces to a buffer, and means for applying compound melted by said first named means to the work pieces prior to their presentation to the buffer by said work advancing means.

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