Aug. 6, 1935. E. B. MILLAR, JR 2,010,314

POLISHER

Filed Nov. 9, 1931 2 Sheets-Sheet 1

Fig. 1.

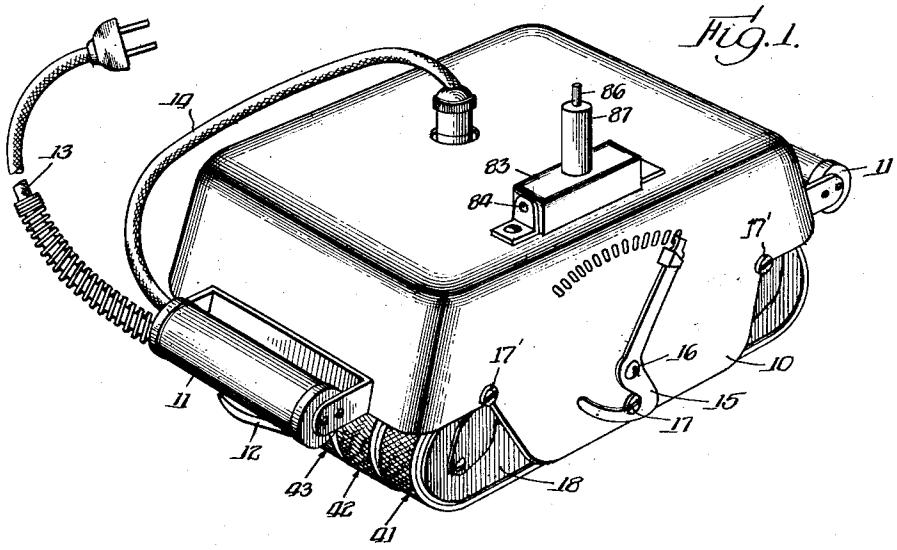


Fig. 8.

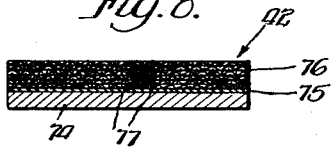
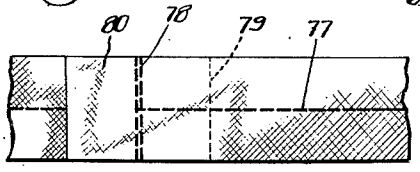


Fig. 2.

Fig. 9.

Fig. 10.



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Fig. 3.

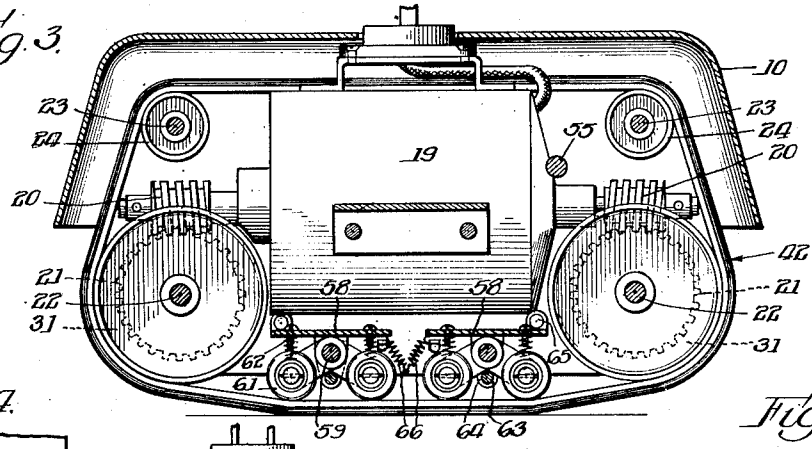


Fig. 4.

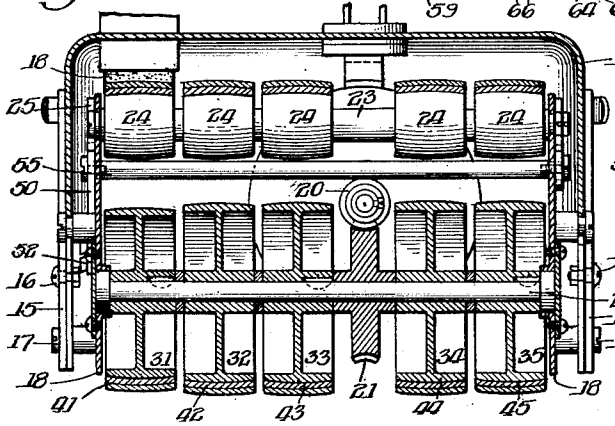


Fig. 5.

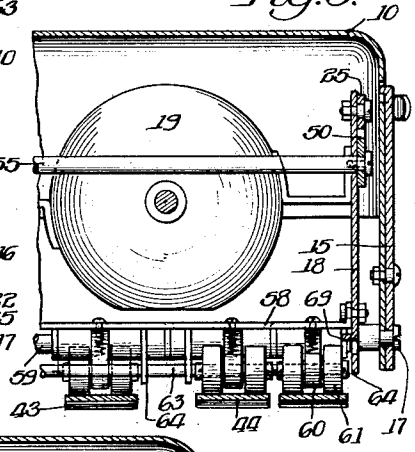


Fig. 6.

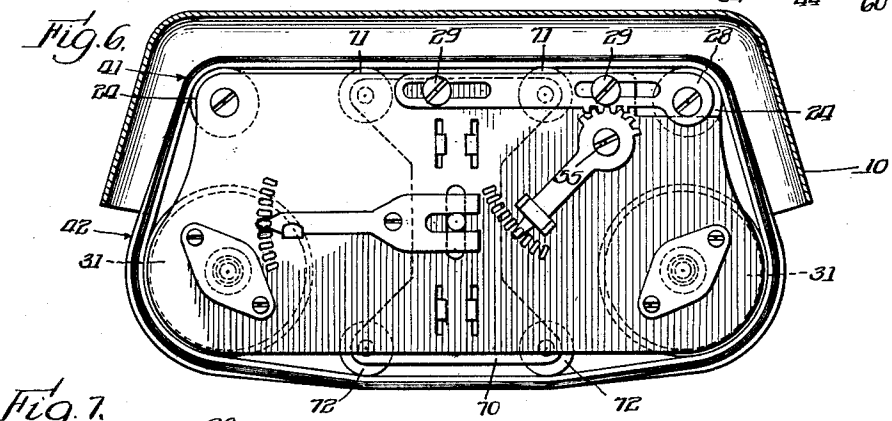
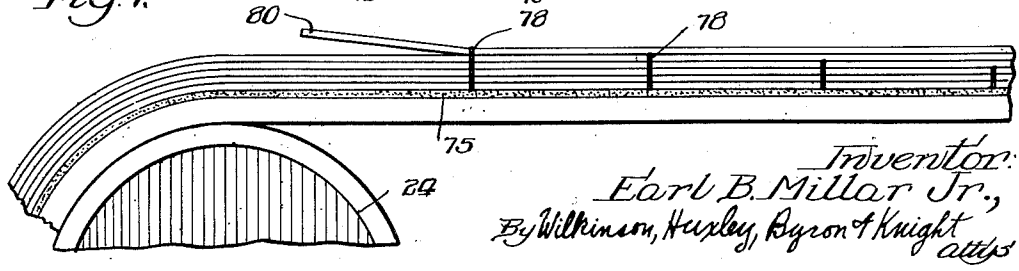


Fig. 7.



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UNITED STATES PATENT OFFICE

2,010,314

POLISHER

Earl B. Millar, Jr., Chicago, Ill.

Application November 9, 1931, Serial No. 573,823

24 Claims. (Cl. 91—54)

This invention relates to polishing machines, and in most of its aspects relates to polishing machines using a plurality of belts rotating in opposite directions.

The preferred situs of this invention is a polishing machine comprising a pair of shafts driven in opposite directions by a suitable motor, several sets of pulleys mounted on said shafts and being alternately keyed to each shaft so that when belts are put around the pulleys the alternate belts will run in opposite directions.

According to the preferred form of the invention, there is also provided what may be called a spring roller mattress for the belts, such that the entire bottom surface of each belt will be pressed against the work being polished. This mattress may desirably be made adjustable in order to permit its use on surfaces of various shapes. In addition, there are provided idler rolls mounted on two shafts, one of which is adjustable, together with means for readily adjusting it so as to tighten up the belts.

Another feature of the invention consists in the addition of an extra belt, together with means for keeping it supplied with wax, so that the surface may be simultaneously waxed with one belt and polished with the others, as the machine is moved along the same. Cleaning or abrading material may be used as well as wax. According to another feature of the invention, the main driving rolls carrying such a waxing belt would be made smaller than the other driving rolls, and a separate adjustable mattress would be provided for this belt so that the belt could be either pressed into contact with the surface to be polished, or not, as desired.

According to still another feature of the invention, the polishing bands are carried on a base of any suitable belting material, such as rubber reinforced with cord, and are made up of removable layers of suitable material, such as cheese cloth, sewed longitudinally approximately through the center, and transversely at approximately every revolution, and secured to the base by an adhesive band. The waxing belt may be similar, or may be provided with a special layer of comparatively non-penetrable material, in order to keep the wax near the surface of the band.

Numerous objects are accomplished by this invention, most of which have been already brought out. The underlying object, however, is to produce a polishing machine which will be commercially practical, and which will satisfactorily polish automobiles, floors and the like, with little personal effort and in only a fraction of the time now required for such work.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate an embodiment of the device, and wherein like reference characters are used to designate like parts,

Figure 1 is a perspective view of the machine;

Figure 2 is a side view of the machine partially in section;

Figure 3 is a longitudinal view of the machine showing its internal construction partly in section;

Figure 4 is a transverse sectional view of the machine taken approximately through the line 4—4 of Figure 2;

Figure 5 is a fragmentary transverse sectional view showing the construction of the roller mattress;

Figure 6 is a longitudinal view illustrating a modification of the invention;

Figure 7 is a longitudinal view of a polishing belt;

Figure 8 is a sectional view of the same;

Figure 9 is a sectional view of the waxing belt; and

Figure 10 is a top fragmentary view of a polishing belt.

Although the invention may take many forms, only two have been chosen for the purpose of illustration. All of the figures except Figures 4 and 6 may be considered as illustrating the same embodiment, though to a large extent they illustrate both embodiments. As seen in Figure 1, the machine comprises a cover 10 having a pair of handles 11 thereon, in one of which is located a switch not shown, having a switch lever 12 operable by a hand holding the handle. From the switch run a pair of flexible electric cords 13 and 14, one of which may be connected to a suitable source of current and the other of which is connected to the motor of the machine. In the form illustrated, this connection is detachable through the cover, but of course the wire may be led through the side of the machine so that it need not be disconnected to remove the cover. The cover may desirably be secured by a hook 15 pivoted on the cover as at 16 and hooking over the peg 17 secured to the inner frame 18 of the machine, the handle of the hook being provided with a ratchet latch

as shown. The cover rests rigidly on the three pegs 17 and 17' on each side as shown.

By reference to Figures 3 and 4 it is seen that the frame 18 carries a motor 19 which drives a pair of worm drives 20, and each of which drives a worm gear 21. The worm gears are oppositely threaded so that they will drive the shafts 22 connected thereto in opposite directions. Each of the shafts bears five crowned pulleys 31, 32, 33, 34 and 35, and to one of the shafts is keyed the first, third and fifth pulley, whereas the others are loose, and to the other shaft are keyed the second and fourth pulleys, leaving the first, third and fifth loose. Also mounted on the frame 18 are the idler shafts 23, each of which carries five crowned idler rolls 24 aligned with the pulleys 31 to 35. Around the first set of pulleys 31 and the associated idlers runs a belt 41, and around each of the other sets of pulleys run the belts 42, 43, 44 and 45. These belts are discussed in detail below. The combination of crowned idler rolls and crowned pulleys keeps the belts properly aligned.

One of the shafts 23 is carried directly by the frame 18, but the other is carried by a pair of sliding racks 28 each of which is slidably mounted on suitable pins or screws 29, as shown best in Figure 2. Engaging each rack is an adjuster 50 provided with teeth 51 engaging teeth on the rack and a handle 52, together with locking means which in the illustrated form comprise an arc of holes 53 in the side frame 18 and a key 54 arranged to spring into said holes. The key 54 is preferably beveled on the upper side, as shown in Figure 2, so as to have a ratchet lock effect without tightening the belt. Both of the members 50 are keyed to a common shaft 55 so that they rotate in unison, and therefore move the racks 28 in unison, keeping the shafts 23 parallel.

The belts may be removed and replaced by removing the cover and shifting handle 52 to release rack 28. Each of the pulleys 31 to 35 and 24 is slightly convex in order to keep the belts centered. In order to keep the belts in contact with the surface being polished across their entire bottoms there is provided a spring roller mattress. Of course the belts could be slid across a solid plate, but this would entail too much friction. The mattress shown best in Figures 3 and 5 overcomes the difficulty of friction and at the same time produces a substantially uniform polishing pressure. Supported in a manner to be described, are mattress backing plates 58 carrying shafts 59. The shafts 59 carry a plurality of mattress arms 60 at the end of each of which is carried a pair of rollers 61. The various arms 60 are independently pivotal and each is independently pressed downwardly by a spring 62 mounted on the plate 58. To limit the downward movement of the arms 60 there are provided stop shafts 63 pivotally suspended from the shaft 59 by the links 64.

The use of the stop shafts in this manner is very advantageous. If for any reason it were found necessary to provide for greater or less movement of the rollers 61, this could be accomplished by using a smaller or larger shaft 63. Likewise if a surface to be polished is more convex than is otherwise provided for, the end rollers 61 may be pressed downwardly further than usual by their springs, since the stop shaft 63 may under such conditions be shifted about the shaft 59.

The backing plates 58 and shafts 59 may be permanently separated from the frame member 18 if desired, in which case the flexibility of the mattress described in the paragraph above will be especially advantageous. However, in order to take care of convex surfaces, it is preferred that the backing plates be mounted as shown, that is, pivoted at their outer ends about a shaft 65 and urged downwardly at their inner ends by springs 66. It will be obvious that with this construction a convex surface will press first on the inner pressure rolls 61 and therefore press the backing plates 58 upwardly about the pivot shaft 65 so as to more readily and uniformly accommodate the convex surface. To limit the downward movement of plates 58, stops 69 may be provided.

According to the form of the invention shown in Figures 4 and 6, the pulleys 31 are made slightly smaller than the pulleys 32 to 35 so as not to press the waxing belt into contact with the surface being polished. In order to press this belt into contact with the surface when desired to keep the belt tight at all times, there is provided a belt shifter 70 which is slidably mounted on the frame 18 as clearly illustrated in Figure 6. The belt shifter carries at its top one or two rollers 71 for keeping the belt tight when the shifter is in its raised position. At its bottom, the shifter carries either single rolls similar to rolls 72 as illustrated, or if desired a group of separately spring pressed rolls similar to rolls 61.

The belts which are preferably provided for this machine are made up as illustrated in Figures 7 to 10. All of the belts are built up on the inner belts 74 which may be made up of a vulcanized rubber having a core of fabric or cord, or any other ordinary belting. Around this inner belt 74 is an adhesive belt 75 which may be made up of a material such as ordinary adhesive tape. Wound around this adhesive belt and sewed to it is the polishing cloth 76 which is sewed to the adhesive layer in a longitudinal line as it is wrapped around it. It is preferred that this longitudinal line of stitching be not quite straight along the center, but that it vary slightly as indicated at the center of Figure 8, in which the vertical lines 77 represent the successive stitches, that on the left stitching only the first layer to the adhesive, and that on the right stitching the outside layer to the first layer. This center stitching should of course preferably be of a wide, loose stitch so that its effect on the shape of the belt will be negligible, but secured periodically so that it will not unravel. As the polishing cloth 76 is wrapped around the adhesive belt 75 it is sewed transversely at slightly more than each round. Thus, as shown in Figures 7 and 10, the outer layer is sewed at 78 and the next layer is sewed at 79. The stitches of 79 do not extend through the outer layer. The portion of the polishing cloth immediately beyond each cross-sewing 78 is preferably left without vertical stitching. Likewise a short portion or tab 80 of this strip is left beyond the stitching 78 when the stitch is cut. This unsewed tab 80 forms a tab to grasp in removing a layer of the belt and also forms sort of a finishing pad which, being entirely free from stitching overcomes any slight effect on the polished surface which might result from the longitudinal stitches 77 or the cross stitches 78. It is desirable therefore when the user of the machine removes one layer of the polishing belts that he cut the strip that he is removing, so

as to leave a similar tab to the tab 80, shown. To give the best results, each belt should be put on the pulleys in such a manner that the tab 80 is stretched in its natural position rather than being folded back. This will make the polishing a little smoother than it would otherwise be.

The waxing belt is quite similar to the polishing belts described, but it is preferably provided with a layer 81 of a material such as huck within two or three layers of its surface, so that when wax is applied to this band it will not settle uselessly in the inner portion of the belt. As several layers of the polishing bands are removed, the outer layers of the waxing band and the canvas layer will also be removed so that the various belts will be maintained at about equal thickness. The polishing strip 76 may of course be of any suitable material, such as a good grade of closely woven cheese cloth, though the inner layer should be of a heavier material, such as muslin, if the outer layers are sewed to it.

Mounted in the cover 10 and over the waxing band 41 is a wax receptacle 83 which is removably secured to the cover by any suitable means, such as the spring clips 84. This wax receptacle includes a plate 85 mounted on a sliding shaft 86 which is pressed toward the belt by means of a spring 87, a cake of suitable wax 88 being provided in said receptacle and pressed against the belt by a spring 87 to keep the belt replenished with wax. If desired, a liquid wax can be used with means for dropping it on the belt, or with a constantly rotating supply brush or roller for applying it to the belt.

In view of the foregoing description and the accompanying drawings, the operation of the device may be explained briefly. Inasmuch as the belts move, some in one direction and some in another, there is almost no tendency of the machine to move in either direction. It is therefore very easy for the operator to slide the polisher along in a direction perpendicular to the movement of the belts. The operator may either move it along, waxing belt first, in which case one motion is sufficient; or if he desires, he may move it forward and backward, the waxing belt being last in the first movement and first in the second movement, so that in the first movement he applies the polish and in the second movement he rubs it in and polishes it.

It is to be understood that many other embodiments of the invention, including some in improved form, will be apparent, and in the course of time more will be devised by those skilled in the art. As examples of some of the slightest changes that might be made without changing the character of the invention, a few might be pointed out. The motor could be located on a separate stand and connected to the pulley shafts by flexible shafts. The upper guide rolls might be dispensed with, and guide pins used in their place, it being merely necessary that each belt be centered as it runs onto the top of one pulley. The belts may be made of many different materials and their parts secured together other than by stitching and adhesive, as shown. It is obvious that the gears may be housed for the purpose of lubrication, and that ball bearings may be used throughout.

It is not desired that this invention be limited to the details described, for its scope includes all such forms or improvements as come within the spirit of the following claims, construed as broadly as the prior art will permit.

What is claimed is:

1. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing band carried by each pair of pulleys, a separate roller for each band yieldably pressing each of said bands outwardly so as to cause said bands to firmly contact the surface being polished between said pulleys, the rollers of each band being independently acting.

2. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing band carried by each pair of pulleys, a plurality of independently yieldable rollers contacting the inside and bottom of each band, and means yieldably pressing said rollers outwardly.

3. A mattress for pressing outwardly the band of a polishing machine, comprising a pair of spaced shafts, a pair of arms pivoted on each shaft, a roller rotatably mounted at the end of each arm, and means resiliently pressing said arms in an active direction.

4. A mattress for pressing outwardly the band of a polishing machine, comprising a pair of spaced shafts, a pair of arms pivoted on each shaft, a roller rotatably mounted at the end of each arm, means resiliently pressing said arms in an active direction, and a stop for limiting the movement of each of said arms.

5. A mattress for the band of a polishing machine comprising a pair of plates pivotally mounted about parallel axes, means for restraining the pivotal movement of said plates, a plurality of rollers supported by each of said plates and located at points spaced on said plates in a direction perpendicular to their axes, and means for yieldably and independently pressing said rollers outwardly.

6. A polishing machine comprising a plurality of pairs of spaced rollers, means for driving said pairs of rollers in opposite directions, a polishing band carried by each pair of rollers, and a mattress for said polishing band comprising a pair of plates pivotally mounted about parallel axes, means for restraining the pivotal movement of said plates, a plurality of rollers supported by each of said plates and located at points spaced on said plates in a direction perpendicular to their axes, and means for yieldably and independently pressing said rollers outwardly.

7. A waxing and polishing machine comprising a plurality of pairs of rollers, means for driving the pairs in opposite directions, one of said pairs having its bottom surface higher than the bottom surface of the remainder of said pairs, a waxing band and polishing bands carried respectively by said pair and said pairs of rollers, and an adjustable shifter for pressing said waxing band to the level of said polishing bands when desired.

8. A waxing and polishing machine comprising a plurality of pairs of rollers, means for driving the pairs in opposite directions, one of said pairs having its bottom surface higher than the bottom surface of the remainder of said pairs, a waxing band and polishing bands carried respectively by said pair and said pairs of rollers, and an adjustable shifter for pressing said waxing band to the level of said polishing bands when desired, said shifter contacting with said band through a plurality of rollers.

9. A hand moved polisher comprising a plurality of pulleys and means to drive said pulleys, a plurality of polishing belts carried by said pul-

leys, a belt tightening roller for each of said belts mounted on a common shaft, and means acting upon both ends of said shaft simultaneously and equally for moving said shaft in a belt tightening direction.

10. A hand moved polisher comprising a plurality of pulleys and means to drive said pulleys, a plurality of polishing belts carried by said pulleys, a belt tightening roller for each of said belts mounted on a common shaft, means acting upon both ends of said shaft simultaneously and equally for moving said shaft in a belt tightening direction, a cover for said pulleys and belts, handles on said cover, and readily detachable means to secure said cover rigidly in position.

11. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing band carried by each pair of pulleys, and each of said bands including a plurality of readily removable layers of polishing cloth.

12. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing belt carried by each pair of pulleys, and each of said belts including a plurality of removable layers of polishing cloth secured to said belt by readily removable stitches at numerous points throughout the circumference of said belt.

13. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing belt carried by each pair of pulleys, and each of said belts including a plurality of removable layers of polishing cloth secured to said belt by readily removable stitches at numerous points throughout the circumference of said belt, said belts each being wrapped in a direction such that the rotation of the belt tends to maintain the wrapping in position.

14. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing belt carried by each pair of pulleys, and each of said belts including a plurality of removable layers of polishing cloth secured to said belt by readily removable stitches at numerous points throughout the circumference of said belt, said belts each being wrapped in a direction such that the rotation of the belt tends to maintain the wrapping in position, the outside end of said cloth being left unstitched to form a smooth finishing tab.

15. A polishing machine comprising a plurality of pairs of spaced pulleys, means for turning said pulleys in opposite directions, a polishing belt carried by each pair of pulleys, each of said bets including a plurality of removable layers of polishing cloth, the thread forming the stitches for each layer being spaced laterally from that of other layers.

16. A belt for a polishing machine comprising an endless base of a durable permanent nature, and a replaceable endless polishing band having an adhesive inner surface securing said band to said belt, and a plurality of layers of polishing cloth at least one of which is readily removable.

17. A belt for a polishing machine comprising an endless base of a durable permanent nature, a replaceable endless polishing band having an adhesive inner surface securing said band to said base, and having a plurality of individually removable layers of polishing cloth and a layer between two of said layers of polishing cloth, said layer being made of a material comparatively impenetrable by wax.

18. As an article of manufacture, a waxing belt comprising an endless base of friction material, and a plurality of outer bands extending around said base, said bands being of a porous material and being substantially saturated with wax, and being secured independently so that they may be removed one at a time.

19. A waxing and polishing machine comprising a pair of spaced shafts, a motor arranged to drive said shafts, a plurality of pairs of aligned pulleys mounted on said shafts, polishing belts on said pulleys and driven thereby, an additional pair of pulleys mounted on said shafts, one of said last named pulleys being fixed to its shaft, and a waxing belt on said last named pulleys and driven continuously thereby, said waxing belt having its outer layers substantially saturated with wax.

20. A waxing and polishing machine comprising a pair of spaced shafts, a motor arranged to drive said shafts, a plurality of pairs of aligned pulleys mounted on said shafts, belts on said pulleys and driven thereby, an additional pair of pulleys mounted on said shafts, one of said last named pulleys being fixed to its shaft, an applicator belt on said last named pulley and driven continuously thereby, and means for automatically supplying a surface treating material to said applicator belt only during the operation of said machine.

21. A waxing and polishing machine comprising a pair of spaced shafts, a motor arranged to drive said shafts, a plurality of pairs of aligned pulleys mounted on said shafts, belts on said pulleys and driven thereby, an additional pair of pulleys mounted on said shafts, one of said last named pulleys being fixed to its shaft, an applicator belt on said last named pulley and driven continuously thereby, and means for pressing a cake of wax firmly against said applicator belt only during the operation of the machine.

22. A waxing and polishing machine comprising a pair of spaced shafts, a motor arranged to drive said shafts, a plurality of pairs of aligned pulleys mounted on said shafts, belts on said pulleys and driven thereby, an additional pair of pulleys mounted on said shafts, one of said last named pulleys being fixed to its shaft, an applicator belt on said last named pulleys and driven continuously thereby at high speed and in the opposite direction to at least one of the other belts, and means for pressing a cake of wax firmly against said applicator belt only during the operation of the machine.

23. A belt for a polishing machine comprising an endless base of a durable permanent nature, a replaceable endless polishing band secured to said base, and having a plurality of individually removable layers of polishing cloth and a layer between two of said layers of polishing cloth, said layer being made of a material comparatively impenetrable by wax.

24. A belt for a polishing machine comprising an endless base of a durable permanent nature, a replaceable endless polishing band having an adhesive inner surface securing said band to said base, and having a plurality of individually removable layers of polishing cloth.

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