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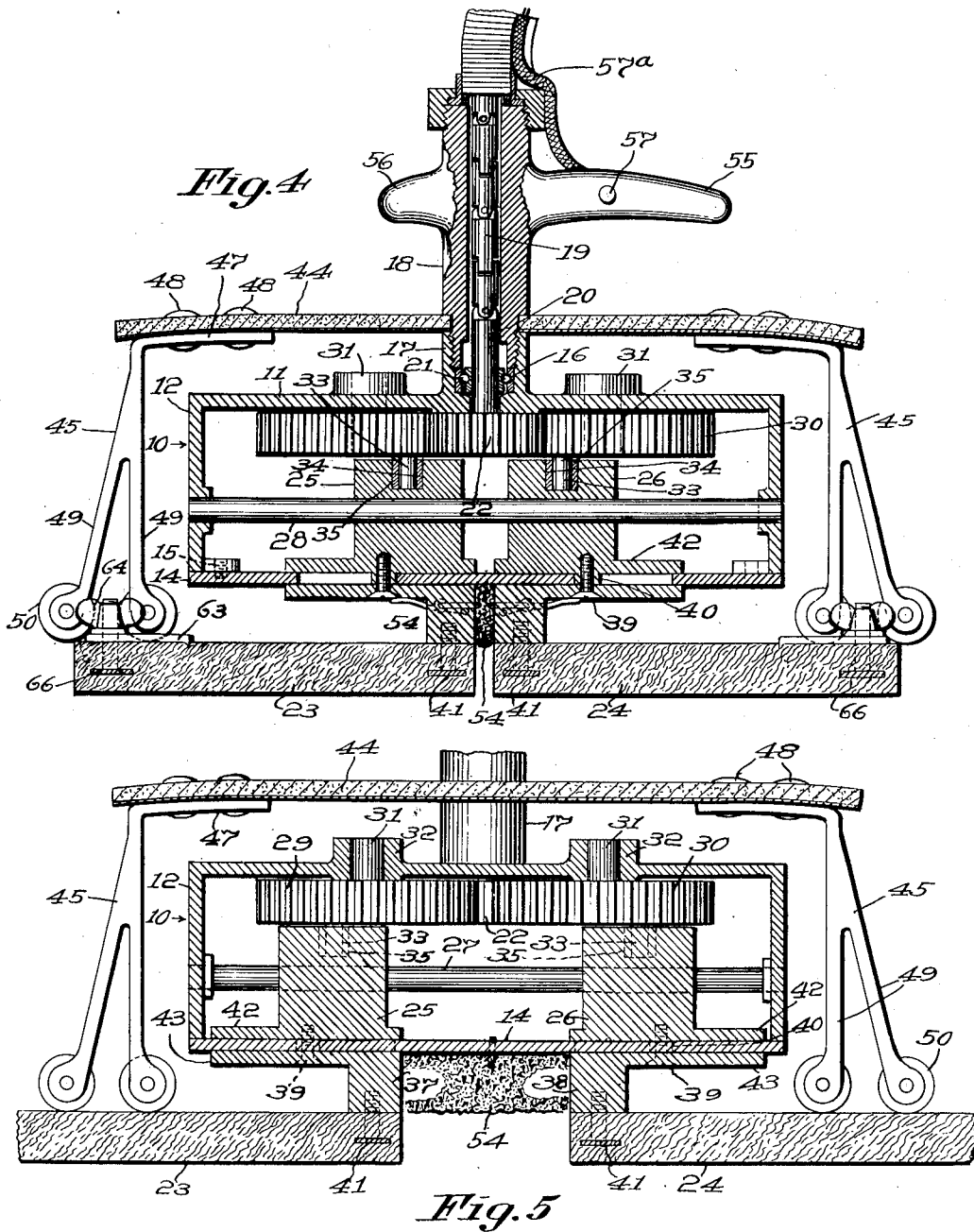
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SURFACE POLISHING MACHINE

Filed Dec. 9, 1925

3 Sheets-Sheet 2



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Fig. 6

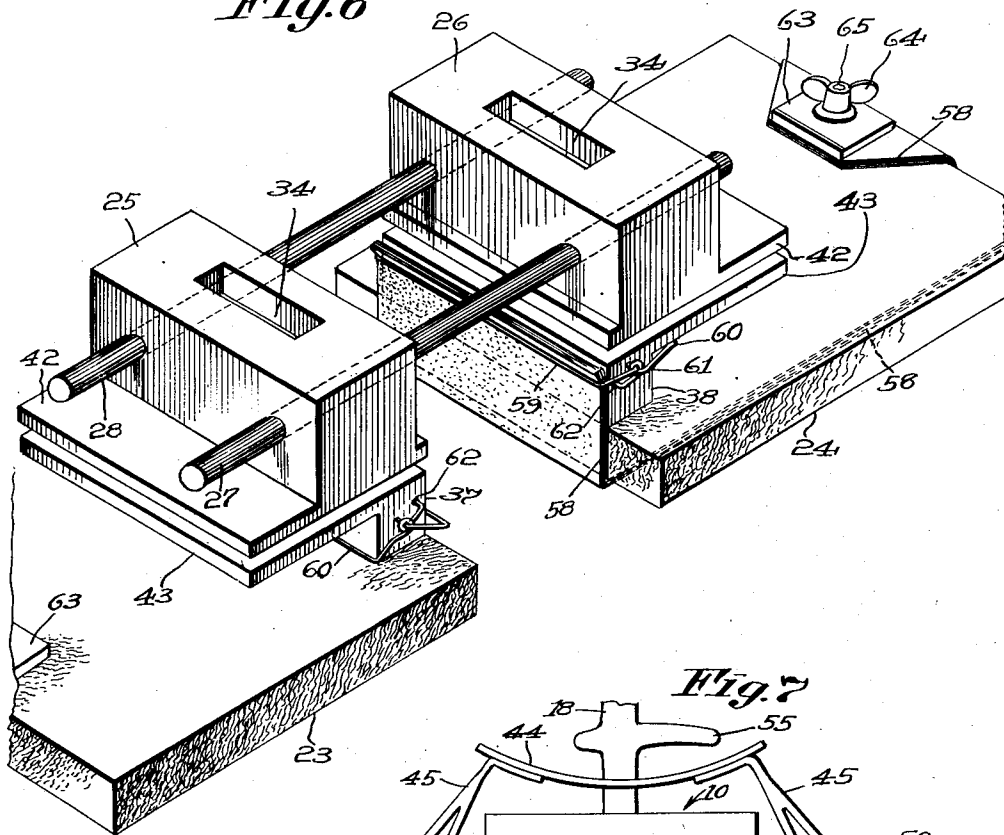


Fig. 7

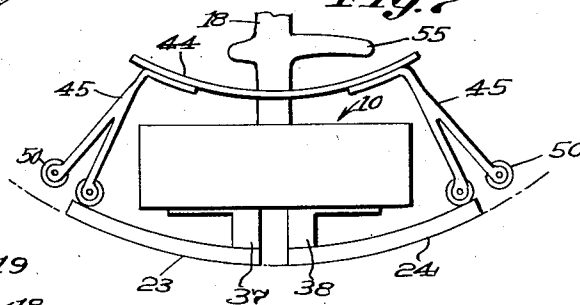
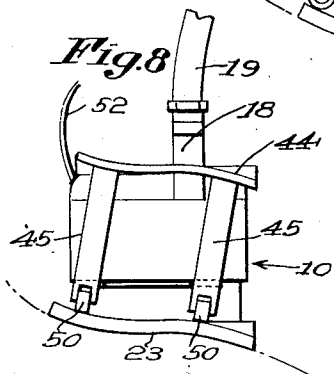


Fig. 8



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UNITED STATES PATENT OFFICE.

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SURFACE-POLISHING MACHINE.

Application filed December 9, 1925. Serial No. 74,390.

This invention relates to machines for polishing surfaces to give them a smooth finish, and more particularly to a machine which is adapted to polish either flat or curved surfaces.

Polishing machines have been proposed heretofore having reciprocating blocks or pad carriers for moving polishing pads back and forth over the surface to be polished, and these proposed machines work very well upon tables, desks and other pieces of furniture having flat surfaces, but they are not adapted to polish curved surfaces. The work of polishing curved surfaces, such as automobile bodies and parts of furniture, has therefore been carried out heretofore by hand and it is slow, arduous work.

The present invention therefore relates to power operated machines which are adapted to polish either flat or curved surfaces, and one important feature of the invention resides in a flexible pad that is associated with its operating means so that the pad may be flexed to conform to either concave or convex surfaces while it is moved back and forth.

Another feature of the invention resides in manually controlled means for flexing the polishing pad so that it will conform to the curvature of the surface being polished.

Another feature of the invention resides in novel means for supplying a liquid to the pad and surface being polished when it is desired to keep the surface wet during the polishing operation or to supply a fluid polishing compound to the surface.

Still other features of the invention reside in the novel construction and arrangement of the operating parts, and in the construction of the casing whereby the fluid supplied to the polishing pad or pads is prevented from entering the casing.

The various features of the invention and novel combination of parts will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form of the invention.

In the drawings:—

Fig. 1 is a perspective view of a surface polishing machine constructed in accordance with the present invention.

Fig. 2 is a top plan view of Fig. 1, the shaft

receiving handle being omitted and part of the upper surface being broken away.

Fig. 3 on a reduced scale is a face view of the floor plate that closes the bottom of the casing.

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 on an enlarged scale is a perspective view of the operating blocks having the flexible pads secured thereto.

Fig. 7 is a side view of the polishing machine applied to a concave surface; and

Fig. 8 is an end view of the polishing machine applied to another curved surface.

The polishing machine of the present invention may be given any size found desirable, but as shown is made relatively small and compact so that the entire machine may be readily handled by one hand of the operator, as indicated in Fig. 1, while at the same time the operator may vary the curvature of the polishing pads by exerting pressure upon different portions of the hand grip, as will be hereinafter more fully pointed out.

The operating mechanism of the polishing machine is preferably enclosed in a tight casing 10 which may be formed of metal, and since it is desirable that the machine be as light in weight as is practical, it may be desirable to form the casing 10 of aluminum. This casing, as will be apparent from the drawings, has an upper wall 11, end walls 12 and side walls 13, and the bottom of the casing preferably is covered by a floor plate 14 which may be removably secured to the casing by screws 15.

The casing 10 is shown as having a rib or bar 16 extending transversely across the central portion of the casing, and this bar 16 is provided with an internally threaded socket 17 adapted to receive the lower threaded end of a hollow handle 18 which is rigidly secured to the casing by screwing the threads at its lower end tightly into the socket 17. The handle 18 is made hollow to receive a flexible driving shaft 19 which may extend to the polishing machine from an electric motor or other driving means located some distance from the polishing machine. The

flexible shaft 19 is secured to a short shaft 20 rotatably mounted within the socket 17 and the shaft 20 may be provided with the anti-friction bearing 21. This shaft extends
 5 into the casing 10 thru the upper wall 11, and at its inner end is provided a pinion 22 which is rigidly secured to the shaft and is disposed near the inner face of the wall 11.

In the embodiment of the invention illustrated the polishing machine is provided with
 10 a pair of flexible pads 23 and 24 which are moved towards and from each other by reciprocatory means to be described. In most cases a pair of pads such as shown is preferable to a single pad, because the movement
 15 of one pad of the pair tends to counteract the movement of the other, thus reducing the tendency of the casing to vibrate under the action of the pad reciprocating means. It
 20 is desirable to point out, however, that it is not essential that two pads be employed in all embodiments of the present invention, but that if desired a single pad may be used.

The means shown for reciprocating the
 25 pads 23 and 24 consists of a pair of blocks 25 and 26 mounted within the casing 10, and in the present case these blocks are slidably mounted upon the parallel bars 27 and 28, the opposite ends of which are rigidly
 30 secured in the end walls 12 of the casing 10, and these bars pass thru holes formed in the blocks 25 and 26, as best shown in Fig. 6. The bars 27 and 28 form a simple and satisfactory means for supporting the blocks for
 35 reciprocatory movement and permit the casing 10 to be made lighter in structure than would be practical if the blocks 25 and 26 were slidably secured to the side walls of the casing. Reciprocatory movement is imparted
 40 to the blocks 25 and 26 by the gears 29 and 30 disposed at the opposite sides of the transverse centre of the casing, and in position to mesh with and be driven by the pinion 22. The gear 29 is rotatably mounted
 45 upon a stub shaft 31 which may be rigidly secured within a boss 32 formed upon the cover plate 11, and the gear 30 is rotatably mounted upon the similar stub shaft 31. Obviously, if desired, the stub shafts 31 may
 50 rotate in the bosses 32, but it is preferable to secure these shafts rigidly in the bosses and to mount the gears 29 and 30 rotatably upon the inner end of these shafts because this construction makes a tighter casing and
 55 forms the bearing for the gears within the casing where it is more readily lubricated. Each of the gears 29 and 30 is shown as having a downwardly extending pin 33 disposed at one side of the central axis of the gear.
 60 These pins 33 project from the lower face of the gears and extend into a transversely extending slot 34 formed in the upper face of the blocks 25 and 26, a sleeve 35 having its outer wall squared to fit the slots 34 is preferably provided upon each of the pins 33,
 the arrangement being such that as the gears 29 and 30 rotate, they will move the blocks towards and from each other, and the slots 34 will permit the pins to partake of their transverse movement as they travel in the
 70 path of a circle around the axes of their respective gears.

It is desirable to make the casing 10 as tight as practical to prevent liquid and the abrasive material which may be used in
 75 polishing surfaces from entering the casing and injuring the operating parts. The floor plate 14 is therefore tightly secured to the lower face of the casing 10 and completely closes the casing, except for the elongated
 80 openings 36 formed in the floor plate to receive means for securing the carriers for the pads to the reciprocating blocks. The polishing pads 23 and 24 as shown are located outside
 85 of the casing 10. It is therefore necessary to provide means for imparting the reciprocatory movement of the blocks 25 and 26 within the casing to these pads, and the means shown to this end consists of the carriers 37 and 38 mounted outside of the casing
 90 in close proximity to the outer face of the floor plate 14. The carriers 37 and 38 are secured to the blocks 25 and 26 respectively by the screws 39 which extend thru the elongated openings 36, and these screws
 95 clamp the carriers firmly against lugs or washers 40 which surround the securing screws. As a result of this construction each carrier is rigidly secured to its block, while at the same time the block and carrier are
 100 free to slide relatively to the floor plate positioned therebetween. As previously stated, an important feature of the present invention resides in the arrangement whereby the reciprocating means for operating the polishing
 105 pads does not prevent these pads from being flexed to conform to either a concave or a convex surface. In the construction shown, each of the carriers is provided with a bar like portion extending transversely of the casing
 110 10 and which projects downwardly a substantial distance from the floor plate 14, and a marginal portion of the flexible pad 23 is secured to the bar like portion of the carrier 37 by the securing screws 41; and the flexible
 115 pad 24 is similarly secured to the bar like portion of the carrier 38 by screws 41. As a result of this construction the major portion of each of the polishing pads lies in spaced relation to the floor of the casing 10 and is free
 120 to flex downwardly, as shown in Fig. 1, or upwardly, as shown in Fig. 7. It is desirable to prevent the polishing liquid and abrasive material from entering the slots 36
 125 formed in the floor plate 14, and to this end the reciprocating blocks 25 and 26 are each provided with a flange portion 42 which covers the slots 36 when the blocks are moved towards each other, as shown in Fig. 4, and the carriers 37 and 38 are likewise provided

with flange portions 43 which cover the outer faces of the openings 36, as will be apparent from Fig. 4. As a result of this construction, the slots 36 are always covered at both their inner and outer faces, and in this manner the entrance of a liquid or abrasive material thru these openings is effectively prevented.

It is desirable to provide the polishing machine of the present invention with manually controlled means for holding the flexible pads in engagement with a curved surface and various means to this end might be provided. In the construction shown a hand grip 44 is mounted above the casing 10 and the hand grip is formed of a sheet of stiff leather or other material having sufficient stiffness to normally retain the pad engaging legs 45 in the substantially vertical position of Figs. 4 and 5, but may be flexed as shown in Figs. 1, 7 and 8 to cause the pads to conform to the curvature of the surface being polished. The sheet of material 44 may have a central portion rigidly secured to the bridge bar 16 by screws or the like 46, and in the construction shown each of the legs 45 has an angularly extending portion 47 which is rigidly secured to the under face of the material 44 by rivets or the like 48. The legs 45 for transmitting pressure from the hand grip plate 44 to the flexible pads may be variously constructed and as shown are provided with spaced, downwardly extending arms 49, each of which is provided with a roller 50 which engages the upper face of a flexible pad, and as a result of this construction the legs 45 will hold the pads in engagement with a curved surface, while at the same time permitting the pads to move back and forth under the action of their operating means.

If the polishing operation is to be carried out while the pads and surfaces acted upon are in a wet condition, it is desirable to provide means for supplying water or a polishing liquid to the pads, and this is accomplished in accordance with the present invention by conducting the liquid to the polishing machine thru a pipe 51 which may be led to the polishing machine alongside the casing of the flexible operating shaft 19, and the pipe 51 is provided with the branch pipes 52 leading to tubes or ports 53 extending downwardly thru the casing 10 adjacent the opposite sides of the casing, and these ports supply the liquid to a flexible pad or sponge 54 which may be held against the outer face of the floor plate 14 between the reciprocating carriers 37 and 38 so that as these carriers approach each other they will squeeze the material 54, as will be apparent from Fig. 4, to force some of the liquid out of the same. As a result of this construction a desired amount of liquid may be squeezed from the material 54 each time the reciprocating pads 23 and 24 approach each other.

The hollow post or handle 18 is preferably provided with a laterally extending portion 55 which lies over the back of the hand of the operator when the polishing machine is in use, as will be apparent from Fig. 1, and the post 18 may also be provided with a lateral projection 56 which lies above the thumb of the operator. The flexible shaft 19 may be operated by an electric motor or other suitable means, and if this shaft is driven by a motor, the same may be controlled by an electric switch or push button 57, having wires 57^a extending to the motor.

In some cases it may be desirable to secure sheets of sand paper or other abrasive material to the lower faces of the pads 23 and 24, and means is therefore shown for securing several sheets 58 of abrasive material to each pad. To this end each of the carriers 37 and 38 is provided with a clamping bar 59 which extends across its inner face so that one end of the sand paper or the like may be clamped between a face of the carrier 37 or 38 and the clamping bar 59. The bar 59 may be moved to and from its clamping position by the operating bar 60 which has transversely extending legs 61 formed at each end of the bar, and these legs are bent at their ends to form the stub shafts 62 which extend into drill holes in each end of the carriers, the arrangement being such that when the operating bar 60 is moved to the position in which it is shown upon the right-hand carrier in Fig. 6, the clamping bar 59 is held in its clamping position, as will be apparent from the drawing, while if the operating bar 60 is moved downwardly to the position in which it is shown upon the left-hand carrier in Fig. 6, the clamping portion 59 will be released. The means shown for securing the opposite ends of the sheets of abrasive material to the flexible pad consists of a clamping plate 63 which is firmly clamped against the upper face of the flexible pad by a thumb nut 64 threaded upon a screw 65, the head 66 of which may be secured within the material of the flexible pad, as clearly shown in Fig. 4.

From the foregoing description and accompanying drawings it will be seen that the present power actuated polishing machine may be easily manipulated with one hand, and that by pressing with the hand upon different portions of the hand engaged plate 44, pressure may be exerted upon different portions of the reciprocating pads to hold them in conformity with the curved surface being polished.

Altho the present polishing machine may be used in various industries to polish either flat or curved surfaces, it is particularly well adapted for use in the automobile industries for polishing automobile bodies, because these bodies are given a hard and highly polished finish that requires much hard work to produce by hand polishing. The flexible

pads of the present machine will readily conform to the curved surfaces of an automobile body and will quickly polish the same.

What is claimed is:—

1. In a surface polishing machine, the combination of a support, a flexible pad to act upon the surface to be polished, means for supporting the pad and having one part of the pad secured thereto with permissive body bending of the free portions of the pad to conform to the curvature of the surface to be polished, means for imparting rubbing movement to the pad, and means associated with and movable relative to said pad supporting means under the control of the operator and positioned to act upon a different portion of the pad from that to which the supporting means is secured to increase the pressure upon a free portion of the pad without increasing the pressure upon the pad supporting means to thereby bend the free portions of the pad in conformity with the surface being treated.

2. In a surface polishing machine, the combination of a support movable over the surface to be polished, a flexible pad to act upon said surface, means for supporting the pad at one portion thereof with permissive body bending of the other portions of the pad as it is moved over the surface to be polished to conform it to the curvature of the surface being polished, means acting through the said pad supporting means for imparting polishing movements in different directions to the pad, and manual means under control of the operator and responsive to variations in hand pressure for bending the free portions of the pad at will to conform the pad to the curvature of the surface being polished during its polishing movements over said surface.

3. In a surface polishing machine, the combination of a flexible pad to act upon the surface to be polished, a support for an edge portion of the pad that the remaining free portions may be bent to conform to the curvature of the surface being polished, means for imparting reciprocating polishing movements to the pad, and means constructed to act at the will of the operator upon a different portion of the pad from that to which said support is secured to increase the pressure upon a free portion of the pad during the polishing movements without increasing the pressure on the pad supporting means to bend the free portion to conform the pad to the curvature of the surface being polished.

4. In a surface polishing machine, the combination of a pad to act upon the surface to be polished, a support secured to one portion of the pad that the other free portions may be bent to conform to the curvature of the surface to be polished and constructed to hold the pad so that it may be reciprocated relatively to said surface, means for imparting reciprocating polishing movements to the pad, a hand piece above the pad, and means

operable by the hand piece and bearing upon the free portions of the pad for bending said free portions of the pad during its polishing movements to conform the pad to the curvature of the surface being polished.

5. In a surface polishing machine, the combination of two pads, a support for each of said pads connected adjacent the edge portion thereof so that the free portions of the pads may be bent about the supports as centres into conformity with the curvature of the surface to be polished and constructed to hold the pad so that it may be reciprocated relatively to said surface, a hand piece above the pads, means between the hand piece and the free portions of the pads that they may be bent at the will of the operator into conformity with the curvature of the surface being treated as the pads are moved over said surface, and means for reciprocating the pad supports to impart polishing movements to the pads.

6. In a surface polishing machine, the combination of a pad to act upon the surface to be polished, a support secured to one portion of the pad that the other free portions may be bent to conform to the curvature of the surface to be polished and constructed to hold the pad for reciprocating movement, means for imparting reciprocating polishing movements to the pad, a flexible hand piece above the pad, a leg extending downwardly from the flexible hand piece and bearing upon the free portion of the pad for bending it at will into conformity with the curvature of the surface being polished.

7. In a surface polishing machine, the combination of two pads, a support for each pad, means for mounting the support for reciprocating movement, means for imparting reciprocating movement of approach and separation to said supports and polishing movement to the two pads, a liquid container positioned between and adapted to be engaged by the two supports during their movements of approach to thereby discharge the contained liquid to the surface being polished.

8. In a surface polishing machine, the combination of a flexible pad adapted to act upon the surface to be polished, means for supporting the pad at one part thereof with permissive bending of the remaining portions of the pad to conform to the curvature of the surface to be polished, means for imparting rubbing movement to the pad, and means under control of the operator and mounted for movement relative to said supporting means to act upon a different portion of the pad from that to which the supporting means is secured for increasing the pressure on a free portion of the pad without increasing the pressure on the portion of the pad to which said supporting means is secured to thereby bend such free portion in conformity with the surface being treated.

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9. In a surface polishing machine, the combination of a flexible pad to act upon the surface to be polished, means for supporting the pad at one part thereof with permissive bending of the remaining portions of the pad to conform to the curvature of the surface to be polished, means for imparting a reciprocatory rubbing movement to the pad, and means under the control of the operator and constructed to act upon a free portion of the pad to increase the pressure on said free portion without increasing the pressure on the portion of the pad to which said supporting means is secured to bend the pad in conformity with the surface being treated and operable to bend the pad both longitudinally and transversely of the direction in which it reciprocates.

10. A surface polishing machine, comprising in combination, a casing, a pair of blocks supported by the casing for reciprocatory movement toward and from each other, means for reciprocating the blocks, a flexible pad connected to each block so that it is reciprocated by its block and is free to bend to conform to the curvature of the surface being polished, a flexible hand grip secured to the casing, and projections extending from the hand grip into engagement with each pad and adapted to bend the pads to conform to a curved surface.

11. A surface polishing machine, comprising in combination, a casing, a pair of blocks supported by the casing for reciprocatory movement, means for reciprocating the blocks, a pair of flexible pads each having a portion connected to one of the blocks so that the remaining portion of the pad is free to bend to conform to a curved surface, and means for exerting pressure upon the free portion of each pad to force it against the surface being polished.

12. A surface polishing machine, comprising in combination, a support, a flexible pad having a portion connected to the support so that the remaining portion of the pad is free to bend to conform to a curved surface, means for reciprocating the pad, and means for exerting pressure upon a different portion of the pad from that to which said support is connected to increase the pressure upon a free portion of the pad without increasing the pressure on the pad supporting means and operable to bend the pad into conformity with the curvature of the surface being polished.

13. A surface polishing machine, comprising in combination, a casing, a block supported by the casing for reciprocatory movement, means for reciprocating the block, a flexible pad having a marginal portion connected to said block so that the remaining portion of the pad is free to bend to conform to a curved surface, and means operable upon a different portion of the pad from that to which said block is secured to increase the pressure on a

free portion of the pad without increasing the pressure on said block to thereby bend the free portion of the pad into conformity with the surface being polished as it is moved over said surface.

14. A surface polishing machine, comprising in combination, a casing, a block supported by the casing for reciprocatory movement, means for reciprocating the block, a flexible pad having a portion secured to the block so that the remaining portion of the pad projects from the block in an unsupported condition, and manually controlled means for exerting sufficient pressure upon the free portion of the pad to bend it and to hold it in conformity with a curved surface while the pad reciprocates.

15. A surface polishing machine, comprising in combination, a casing, a block supported by the casing for reciprocatory movement and having a pad engaging portion of much smaller area than the face of the pad, means for reciprocating the block, a flexible pad secured to the block so that a major portion of the pad projects from the block in an unsupported condition, a hand grip secured to the casing, and means actuated by the hand grip to exert sufficient pressure upon the free portion of the pad to hold it in conformity with a curved surface while the pad reciprocates.

16. A surface polishing machine, comprising in combination, a casing, a block supported by the casing for reciprocatory movement, means for reciprocating the block, a flexible pad secured to the block so that a portion of the pad extends therefrom in an unsupported condition that it may bend to conform to a curved surface, and rollers supported for independent movement and adapted to be forced against the unsupported portions of the pad to increase the pressure upon said unsupported portions without increasing the pressure on said block and adapted to hold the free portions of the pad in conformity with a curved surface as the pad reciprocates relative to the rollers.

17. A surface polishing machine, comprising in combination, a casing, a pair of blocks supported by the casing for reciprocatory movement, means for reciprocating the blocks, a flexible pad secured to each block to be reciprocated thereby and having an unsupported portion that may be flexed to conform to a curved surface, a hand grip comprising a flexible sheet of material mounted above the casing that its opposite end portions may be independently flexed by pressure of the operator's hand, and means extending from the flexible hand grip into engagement with the unsupported portions of the flexible pad whereby a pad may be bent as desired by varying the pressure upon the hand grip.

18. A surface polishing machine, comprising in combination, a casing, a pair of blocks

supported by the casing for reciprocatory movement, means for reciprocating the blocks, a flexible pad secured to each block to be reciprocated thereby and each having a portion that is free to be flexed, and means supported by the casing and responsive to manual pressure to bend the free or unsupported portions of the pads to hold them in conformity with a curved surface as they reciprocate.

19. A surface polishing machine, comprising in combination, a casing, a pair of blocks supported by the casing for reciprocatory movement toward and from each other, means for reciprocating the blocks, a flexible pad secured to each block to be reciprocated thereby and each having a portion that is free to be flexed, legs supported above the free portion of the pad for independent movement and adapted to be forced against the flexible pad to bend or flex different portions of the pad to conform to a curved surface.

20. A surface polishing machine, comprising in combination, a casing, a pair of blocks supported by the casing for reciprocatory movement toward and from each other, means for reciprocating the blocks, pads secured to the blocks, and means for supplying a liquid to the pads and surface being polished, including a liquid absorbing material supported between the reciprocating blocks in position to be squeezed by the blocks as they approach each other, and a conduit for supplying liquid to said material.

21. A surface polishing machine, comprising in combination, a casing, a pair of pads, means supported by the casing for reciprocating the pads towards and from each other, a soft liquid absorbing material positioned between the reciprocating means and arranged so that it will be squeezed as the pads approach each other to release some of the liquid, and means for supplying liquid to said material.

22. A surface polishing machine, comprising in combination, a casing, guide rods mounted in the casing in spaced relation to each other and to the side walls of the casing, a pair of blocks mounted upon the rods for sliding movement within the casing toward and from each other, and adapted to be supported by said rods independently of the side walls of the casing whereby said walls are relieved from the strain of the sliding blocks, means for reciprocating the blocks, and pads secured to the blocks for movement back and forth with the blocks.

23. A surface polishing machine, comprising in combination, a hollow casing, a pair of rods mounted in the casing in spaced parallel relation, a pair of blocks mounted upon said rods for sliding movement toward and from each other, operating means for reciprocating the blocks, flexible pads secured to

the blocks to be reciprocated thereby and having free portions projecting from the blocks, and means for bending the free portions of the pad to conform to the curvature of the surface being treated as the pads are reciprocated.

24. A surface polishing machine, comprising in combination, a casing, guide rods mounted in the casing in spaced relation to the side walls of the casing and having their ends extending into position to be supported by the end wall of the casing, a block mounted upon said rods for sliding movement within the casing, means for reciprocating the block, and a pad connected to the block to be reciprocated thereby.

25. In a surface polishing machine, the combination of a pad support, a flexible pad to act upon the surface to be polished and constituting the sole sustaining means of the polishing machine upon said surface, means for securing one part of the flexible pad to the pad support with permissive body bending of the remaining portions of the pad to conform the pad to the curvature of the surface to be polished as the pad is moved over different curvatures of said surface, means for imparting rubbing movements to the flexible pad in different directions as the pad is moved over the surface to be polished, and means between the pad support and flexible pad responsive to variation in manual pressure for bending the free portions of the pad in conformity with the curvature of the surface being treated.

26. A surface polishing machine, comprising in combination, a casing, a block slidably supported by the casing, means for reciprocating the block, a pad secured to the block and having a portion extending therefrom out of engagement with the block so that it may bend to conform to a curved surface to be polished, and legs supported for independent movement and having rolls adapted to engage the pad and hold a portion of the same in conformity with a curved surface as the pad reciprocates.

27. In a surface polishing machine, the combination of a flexible polishing element, means for supporting the element at one part thereof with permissive bending of the remaining portion of the element to conform to the curvature of the surface being polished, means for imparting a polishing movement to the element in different directions, and means responsive to variations in manual pressure for bending the free portion of the pad in conformity with the surface being polished.

28. In a surface polishing machine, the combination of a support adapted to be moved over the surface to be polished, a polishing element mounted on the support and having a projecting free portion, means interposed between the polishing element and

said support for imparting polishing movement in different directions to the polishing element relative to its support as the support is moved over the surface to be polished, and means between the support and free portion of the polishing element and operable upon said free portion of the element to increase the pressure thereupon without increasing the pressure upon said support to bend said free portion to conform the polishing element to the curvature of the surface being polished as it is moved thereon.

29. In a surface polishing machine, the combination of a plurality of surface polishing elements, a common support on which the polishing elements are mounted and by which they are moved over the surface to be polished, means for imparting to the polishing elements movements relative to each other for polishing the surface being treated, and means between the common support and free portions of the polishing elements for bending either of the polishing elements independently of the other during their relative polishing movements to conform the polishing elements to the curvature of the surface being treated.

30. In a surface polishing machine, the combination of a support movable over the surface to be polished, a polishing element mounted on the support, means for imparting polishing movement to the polishing element relative to the support as it is moved over the surface to be polished, a flexible hand piece mounted above the polishing element, and means between the flexible hand piece and free portion of the pad for bending the pad at will to conform to the surface being treated as the support is moved over the said surface.

31. A surface polishing machine, comprising in combination, a casing, a pad operating

block movably supported by the casing, means for operating the block to impart a non-rotative polishing movement to a pad, a flexible pad having a carrier secured to a portion thereof so that the pad may be flexed, means operable upon a portion of the pad independently of said block to increase the pressure upon said portion without increasing the pressure on the portion of the pad that is secured to said block and adapted to bend the pad in conformity with the surface being polished, and means for removably securing the carrier to the block.

32. A surface polishing machine, comprising in combination, a casing, a pad operating block supported by the casing, means for operating the block to impart a non-rotative polishing movement to a pad, a flexible pad adapted to be flexed while operated by the block to conform to the surface being polished, manually actuated means for flexing the pad in conformity with the surface being polished, and means for removably securing the pad to the block.

33. A surface polishing machine, comprising in combination, a closed casing having a floor plate closing the bottom of the casing, a pad operating block mounted in the casing for reciprocatory movement, a pad carrier secured to the block by means extending through an opening in the floor plate, a flexible pad secured to said carrier so that a portion of the pad may be flexed relatively to the carrier, means adapted to act upon a portion of the pad that is free to flex to bend the same into conformity with the surface being polished, and means for removably securing the carrier to the block.

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

CLAUDE H. THOMPSON.