Aug. 21, 1928.

1,681,648

C. S. ROOT

RUBBING MACHINE

Filed Oct. 30, 1925

FIG-1

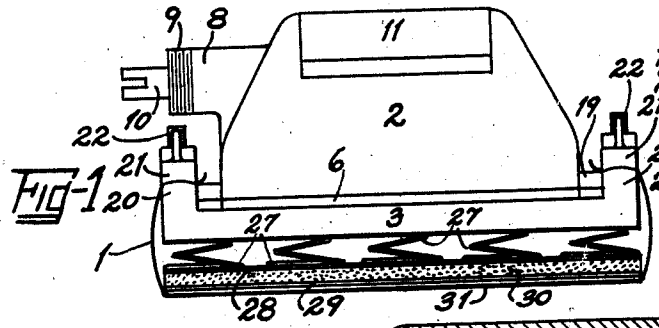


FIG-2

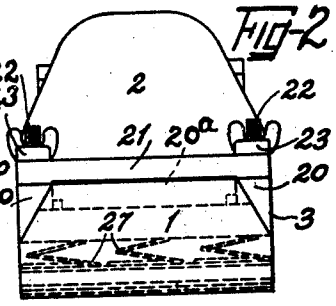


FIG-3

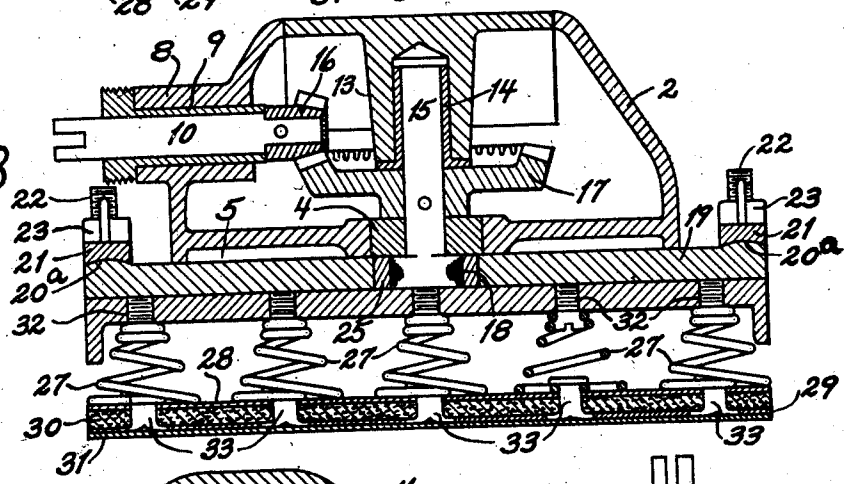


FIG-4

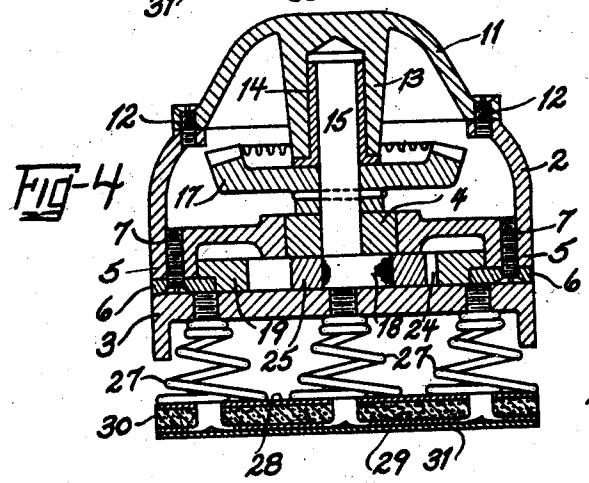


FIG-5

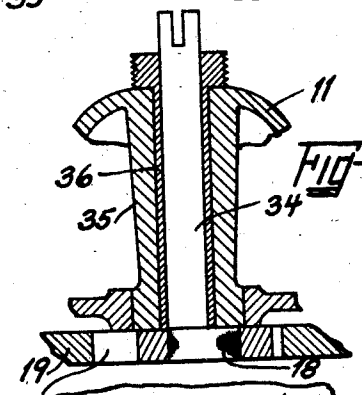
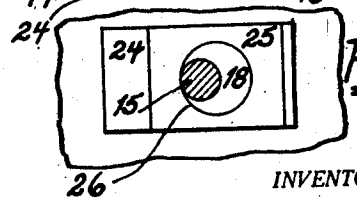


FIG-6



INVENTOR.

Charles S. Root,

BY

Frank A. Cutter,

ATTORNEY.

Patented Aug. 21, 1928.

1,681,648

UNITED STATES PATENT OFFICE.

CHARLES S. ROOT, OF SPRINGFIELD, MASSACHUSETTS.

RUBBING MACHINE.

Application filed October 30, 1925. Serial No. 65,758.

My invention relates to improvements in portable rubbing machines, of the type having relatively reciprocating upper and under elements, for smoothing and polishing automobile bodies, woodwork of various kinds, and the like, and consists essentially of upper and under casings of peculiar construction, mechanism in said upper casing for reciprocating said lower casing, when the same is applied to the surface to be "finished" and the machine is held in the hand by the upper casing and moved over such surface, said mechanism being operated or driven from a distant motor, through the medium of a flexible-shaft connected with said mechanism, and a specially constructed cushion carried by the lower casing, for the abrasive or polishing strip used with the machine, together with attaching or fastening means for such strip, and such other parts and members as may be necessary or desirable in order to render the machine complete and serviceable in every respect, all as hereinafter set forth.

One object of my invention is to produce a rubbing machine, of the character described, which is small, compact, light in weight, comparatively simple and inexpensive in construction, with few parts and those not liable to break or get out of order, capable of being applied with practically equal facility to curved as well as flat surfaces, and withal highly practicable and efficient.

Another object is to furnish the machine with a cushion or yielding support which possesses the desired degree of flexibility or resiliency, while at the same time affording the necessary resistance backing, for the abrading or polishing strip.

A further object is to provide the machine with means for easily and quickly changing the abrading or polishing strip, hereinafter termed the finishing strip.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a rubbing machine which embodies a practical form of my invention; Fig. 2, an end elevation of said machine; Fig. 3, an enlarged, central, longitudinal, vertical section through said machine; Fig. 4, an enlarged, central, transverse, vertical section through the machine; Fig. 5, an enlarged, fragmentary, sectional detail illustrating a modification in the driving or operating mechanism, and, Fig. 6, an enlarged top plan of the members which directly impart the reciprocating motion, such members being positioned as in Figs. 4 and 5.

Similar reference characters designate similar parts throughout the several views.

In the first two views a finishing strip 1 is shown attached to the machine and ready for use. This strip may be an abrading strip or a polishing strip, this depending on the particular use which is to be made of the machine at any given time. The finishing strip is changed when worn out, or whenever it is necessary to substitute for a strip of the polishing type one of the abrading type, or vice versa.

In its general make up the machine comprises upper and under casings 2 and 3, respectively, guiding means and reciprocating means for said casings, and a cushion carried by said lower casing and upon which both casings bear or rest, said cushion being the support for the rubbing portion or reach of the finishing strip 1.

Secured in position in the center of the floor of the casing 2 is a bearing 4, and said casing has at the sides downwardly-extending flanges 5—5. Two gibs 6 are securely fastened to the under sides of the flanges 5 by means of a plurality of screws 7, two of such screws appearing in Fig. 4. The gibs 6 extend inwardly beyond the inner sides of the flanges 5. At one end of the casing 2, in the longitudinal center thereof, is a horizontal bearing 8 which is provided with a bushing 9 for a spindle 10.

The casing 2 has an opening in the top which is closed by means of a cover 11. The cover 11 fits in between the ends of the aforesaid opening and rests on the upper edges of the casing 2, and is secured to said casing by means of a plurality of screws 12, two of which are shown in Fig. 4. Depending from the center of the cover 11 is a bearing 13 which has a bushing 14 therein for a vertical spindle 15.

Secured to the inner terminal of the spindle 10 is a small bevel-gear 16. The outer terminals of the spindle 10 and the bushing 9 are constructed in the usual manner for the attachment thereto respectively of the rotary and non-rotary elements of a flexible-shaft (not shown). Secured to the spindle 15 and

intermeshing with the bevel-gear 16 is a large bevel-gear 17. The spindle 15 is journaled at the lower terminal in the bearing 4, and said spindle has secured thereto below said bearing an eccentric 18.

It will now be seen that rotary motion imparted to the horizontal spindle 10 is transmitted to the vertical spindle 15 and the eccentric 18, through the medium of the bevel-gears 16 and 17.

Rising from each corner of the casing is a post 20 having a convex top, and secured to the top of said casing between said posts is a guide-plate 19. The end portions of the guide-plates 19, between the posts 20, are flush with the ends of the casing 3, and such portions have convexities on top to form seats 20^a—20^a for clamp-bars 21—21. The convexities of the posts 20 and seats 20^a are similar, except that preferably the latter are slightly higher than the former, in order to afford a good clamping bed for the strip 1. The clamp-bars 21 have concave bottoms to correspond with the convexities of the seats 20^a and posts 20. A screw 22 is set in each post 20, and a thumb-nut 23 is provided for said screw. Each clamp-bar 21 is perforated vertically adjacent to its ends to receive each pair of screws 22, and said screws project above said clamp-bar to have mounted thereon two of the thumb-nuts 23. The terminals of the finishing strip 1 are inserted between the curved surfaces of the seats 20^a and clamp-bars 21 and there secured by tightening the thumb-nuts 23.

The longitudinal edges of the guide-plate 19, between the seats 20, are cut back and undercut to bear against the inner sides of the flanges 5 and receive the inner portions of the gibs 6. The upper casing 2 is considerably shorter than the distance between the end posts 20 and the seats 20^a, consequently the under casing 3 can be reciprocated while said upper casing is held stationary, said lower casing being supported and guided by means of its guide-plate 19 and the gibs 6 and flanges 5.

In the center of the guide-plate 19 is an oblong opening or slot 24, and arranged to reciprocate in said slot is a rectangular drive-block 25, said drive-block being shorter than the slot but having a sliding fit with the longitudinal sides thereof. In the center of the drive-block 25 is a round opening 26 of the size of the eccentric 18 and in which said eccentric 18 is received. When the spindle 15 is revolved the eccentric 18 rotates in the opening 26 and causes the drive-block 25 to reciprocate in the slot 24, and at the same time said drive-block is caused by said eccentric to move first in one direction and then in the other lengthwise of the machine, with the result that the guide-plate 19 is caused to reciprocate longitudinally and to impart longitudinal reciprocation to the casing 3, assuming that the casing 2 be held against the action of the reciprocating mechanism.

The cushion to which reference has been made comprises a plurality of helical springs 27, upper and under flexible sheets 28 and 29, respectively, with a pad 30 between, and a bottom flexible sheet 31. The sheets 28, 29, and 31 are preferably made of rubber, and the pad 30 is preferably made of felt.

There are fifteen springs 27 in the present example, but such number may vary. Each spring 27 is attached at the upper end to the top of the casing 3, by means of a screw 32 which is tapped into such top from below, and a rivet 33 is employed to attach the sheets 28 and 29 and the pad 30 to said spring at the bottom, such rivet having its lower end upset in the sheet 29, and extending upwardly therefrom, through said pad and said sheet 28, to have the head of the rivet engaged with the spring. The sheet 31 may be cemented or otherwise secured to the under side of the sheet 29, and covers the upset ends of the rivets 33. The finishing strip 1 extends under the sheet 31 and over the ends of the cushion and of the casing 3 to be secured beneath the clamp-bars 21, in the manner hereinbefore explained.

The flexible sheets and pads, of the cushion just described, provide a normally flat and sufficiently substantial backing for the finishing strip 1, so that the same can be used on flat surfaces to the best advantage, and the springs 27 afford a yielding support for such backing and strip of a character which enables the cushion to conform to curved surfaces, and to do so without seriously or even materially in most cases interfering with the satisfactory and efficient operation of said strip. The springs 27 enable the cushion to yield in all necessary directions, but always there is the sufficient backing or support for the finishing strip provided by the flexible and yielding members attached to said springs.

It is understood, of course, that the cushion and finishing strip move or reciprocate with the casing 3.

Briefly the operation of the machine as a whole is as follows:

After clamping the finishing strip 1 to the casing 3, the operator grasps the casing 2 in his hand, turns on the power, and applies the under side of said strip to the surface to be smoothed or polished. The machine is moved slowly over the surface being treated, and the casing 3, with its cushion and the strip 1, is rapidly reciprocated on such surface. The rubbing action produced by the driving mechanism, on the surface being operated on, and the movement of the machine by the hand of the operator over such surface, expeditiously brings about the desired results.

The strip 1 is removed from the machine,

after loosening the thumb nuts 23, by withdrawing the ends of said strip from between the seats 20 and the clamp-bars 21. A new finishing strip may then be placed in position and secured by means of the clamp-bars and thumb-nuts.

If desired, the gear drive may be dispensed with, and the flexible-shaft attached directly to a vertical spindle 34, which spindle has the eccentric 18 at the lower end, and is adapted at the upper end to have attached thereto the rotary element of said flexible-shaft. This arrangement is illustrated in Fig. 5, wherein the cover 11 has a bearing 35 that takes the place of the bearings 13 and 4 in the other construction, and in which is a bushing 36, the head of said bushing being above the cover 11 and adapted to have attached thereto the non-rotary element of the flexible-shaft. The operation of a machine thus modified is generally similar to or practically the same as that of the machine wherein the gear drive is employed.

Although I am aware that portable rubbing machines comprising relatively reciprocating parts are old, and do not seek to claim such a machine broadly, some change in matters of shape, size, arrangement, and construction, in addition to those hereinbefore specifically pointed out, may be made without departing from the spirit of my invention or exceeding the scope of what is claimed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a rubbing machine, a flat-bottom casing, a plurality of helical springs arranged with their small ends uppermost and attached to the underside of said casing, a normally flat pad of yielding material under and extending to and ending approximately at the outermost edges of the outer springs, and means to secure said pad to the large bottom ends of the springs, whereby is formed a cushion for a finishing strip.

2. In a rubbing machine, a casing, a plurality of helical springs arranged with their small ends uppermost and having said ends attached to said casing, flexible sheets and an intermediate yielding pad, means to secure said sheets and pad to said springs at their bottom ends, and a flexible sheet secured to the under side of the lower of said first-named sheets and covering said securing means, said springs, sheets, and pad forming a cushion for a finishing strip, and being unattached except by the small ends of said springs to said casing, whereby great freedom of movement in all directions is permitted to said cushion.

CHARLES S. ROOT.