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F. J. TONE

1,765,808

SURFACING APPARATUS

Filed Feb. 23, 1926

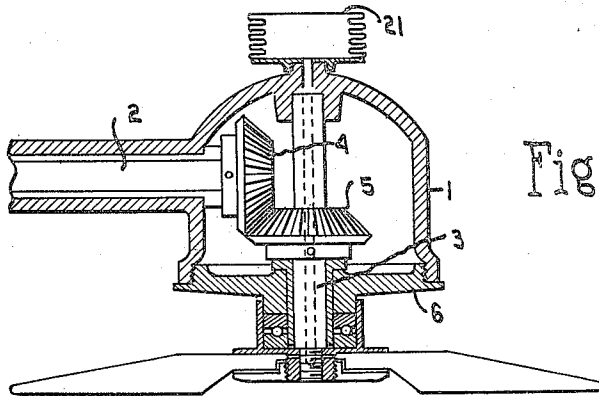


Fig. 1.

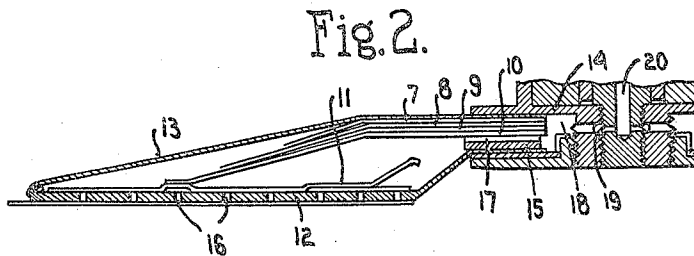


Fig. 2.

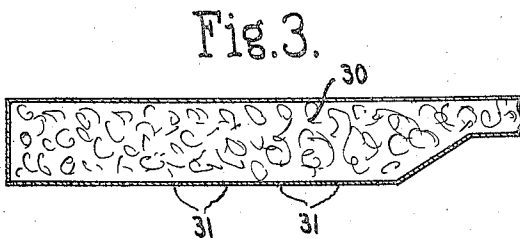


Fig. 3.

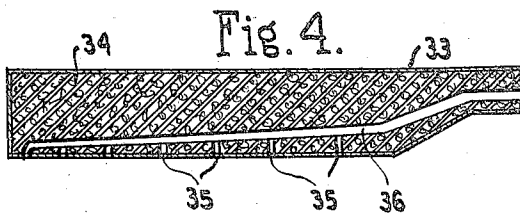


Fig. 4.

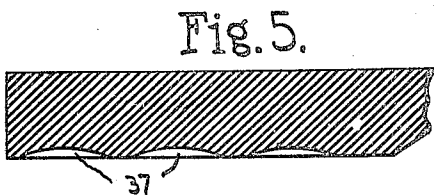


Fig. 5.

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UNITED STATES PATENT OFFICE

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SURFACING APPARATUS

Application filed February 23, 1926. Serial No. 90,174.

The present invention, relating, as indicated, to surfacing apparatus is more particularly directed to an improved supporting pad for supporting and holding sheets of surfacing material, such for example as abrasive covered sheets or plates of paper, cloth, polishing elements or the like for use either in mechanically operated machines or in hand-operated blocks. The principal object of the present invention is to provide a simple and rapid means for securing to a supporting block or pad a sheet of abrasive paper without the use of mechanical fastening means.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawing and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a transverse sectional view of a surfacing machine with which my improved supporting pad may be used; Fig. 2 is an enlarged sectional view of one form of supporting pad which may be employed with the apparatus of Fig. 1; Fig. 3 is another type of supporting pad; Fig. 4 is a transverse sectional view of still another modification of the supporting pad; and Fig. 5 is a sectional view of a further modification.

Referring now to Fig. 1 there is shown one form of surfacing apparatus consisting of a frame or casing 1 which may be provided with suitable operating handles, and which carries shafts 2 and 3 operatively connected by means of engaged bevel gears 4 and 5, respectively. The shaft 2 may be driven by any suitable means, such for example as a flexible shaft extending from a source of power, while the shaft 3 extends through the bottom 6 of the casing, and carries at its lower end a supporting pad, which may be of various forms. In Fig. 2 I have shown this pad as consisting of a series of resilient plates 7, 8, 9, 10 and 11, these plates

overlapping and reinforcing each other and constituting a flexible, resilient supporting means for a compressible pad 12, against which the surfacing disk of paper or cloth, carrying abrasive on one surface, is to be held. The overlapping resilient plates 7, 8, 9, 10 and 11 are completely enclosed in a flexible cover 13, an intermediate portion of which is formed as a compressible pad 12, and both the plates and cover are clamped at their inner edges between members 14 and 15 to constitute a completely sealed chamber which surrounds the supporting plates and has as its lower wall the compressible pad 12, it being understood that, except for the pad portion 12, the cover 13 is imperforate. The pad 12 is provided with a plurality of suction ports 16 leading to the interior of the chamber, while the only other port or opening into the chamber is a port 17 leading through a circular chamber 18 and second port 19 to a suction conduit 20 formed in the shaft 3 and leading upwardly through an extension of this shaft to any suitable suction means. In Fig. 1 I have shown one form of such suction means consisting of expansible and collapsible chamber 21. This chamber, when collapsed, which can be effected manually, and then allowed to expand, draws air through the central conduit 20 in the shaft and from the chamber formed around the supporting elements 7, 8, 9, etc., in this way placing a suction upon all of the ports 16. It will be understood that any other suitable suction means may be substituted for the expansible and collapsible chamber 21, depending upon the suction which is required, and if necessary a suitable pump or similar apparatus may be employed.

To apply the surfacing disk to my improved pad it is only necessary to place the disk concentrically against the lower surface of the pad 12, and while holding it firmly against this pad to apply suction to the conduit 20. This is done by first collapsing the expansible member 21 and then allowing it to expand while the disk is held against the pad. The actual movement of air is slight so that with a relatively small expansible

chamber 21 a very effective suction can be applied to the disk and one which is sufficient to hold the disk in close contact with the pad at all times. The degree of suction required will of course vary under certain conditions, and if necessary other and more powerful suction means can be applied.

In Fig. 3 I have shown a modification of the pad construction. The pad there shown consists of a compressible felt disk 30 which is completely enclosed in a casing formed of rubberized fabric, rubber or some similar material, said casing being imperforate except for a plurality of suction openings in its lower surface. The suction is applied to the felt in the same manner as to the chamber formed within the casing 13 in the construction of Fig. 2, that is, through a central suction conduit in the shaft, and the pad, which is of felt, is sufficiently porous to permit the suction to be effective through the openings 31.

In Fig. 4 I have shown a pad 34 consisting of porous or so-called spongy rubber enclosed with a casing 33 which is imperforate except for suction openings in its one surface registering with ports 35 in the pad 34 in communication with a conduit 36 formed in said pad. When suction is applied to the conduit 36 the action through the suction openings 35 is precisely the same as in the preceding forms of pads and acts to hold a surfacing disk tightly against the lower surface of the pad.

In Fig. 5 I have shown another form of compressible pad of soft rubber which is provided with suction recesses 37 on its lower surface. The pad operates by being pressed firmly against a surfacing disk when it is sufficiently compressible to flatten at the side walls of the recesses 37 and to hold thereagainst the surfacing disk by suction.

It will of course be understood that while in Figs. 3, 4 and 5 the supporting pad has been shown with a depressed central portion it is not essential that this be depressed, and in certain cases the entire lower surface of the supporting pad may be perfectly flat, that is, it may lie in the same plane. It will also be apparent that the present invention is in no way limited to use with a rotary surfacing disk, as it may equally well be employed in connection with other types of apparatus, in which the surfacing disks are not rotated, but are oscillated or reciprocated, or it may be employed in connection with manually operated blocks, in which the entire surfacing device consists merely of a suitably formed block which is held in the hand of the operator.

The invention may of course also be used in still other forms of apparatus, such, for example, in machines having cylindrical or conical surfacing elements, in which event the suction means may be employed to retain

the surfacing elements on the operating cones or cylinders.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A surfacing machine comprising a casing enclosing a shaft having a suction conduit therein, a compressible disc secured to said shaft, said disc being provided with a plurality of suction openings in one surface, means placing in communication said suction openings and said conduit in said shaft, and means mounted on said casing for exhausting air from said shaft conduit.

2. A supporting disc consisting of a pad of compressible and porous material, and a cover therefor imperforate except for a plurality of suction openings in one surface, whereby suction applied to the interior of said porous pad will produce a suction through said openings.

3. In combination, a pad for surfacing machines comprising a tubular supporting element, a compressible pad mounted on the same and having a plurality of openings in one surface, a suction conduit connecting said openings with the interior of said element, and manually operable means mounted adjacent said element for convenient operation and adapted to exhaust air from the interior of said element.

4. A pad for surfacing machines comprising a tubular supporting element, a compressible pad of porous material mounted to enclose one end of the same and providing a space thereabout, and an otherwise imperforate cover having a plurality of suction openings in one surface enclosing said pad, the interior of said element being connected to such space within said pad.

5. The combination of a compressible supporting pad of porous material, a casing enclosing said pad, said casing being imperforate except for a plurality of suction openings in one surface, and a surfacing member disposed against said surface of said pad and held thereagainst by the suction exerted through said openings.

Signed by me, this 16 day of February, 1926.

FRANK J. TONE.