June 24, 1930. L. S. WERTZ 1,766,419

APPARATUS FOR TREATING MASONRY SURFACES

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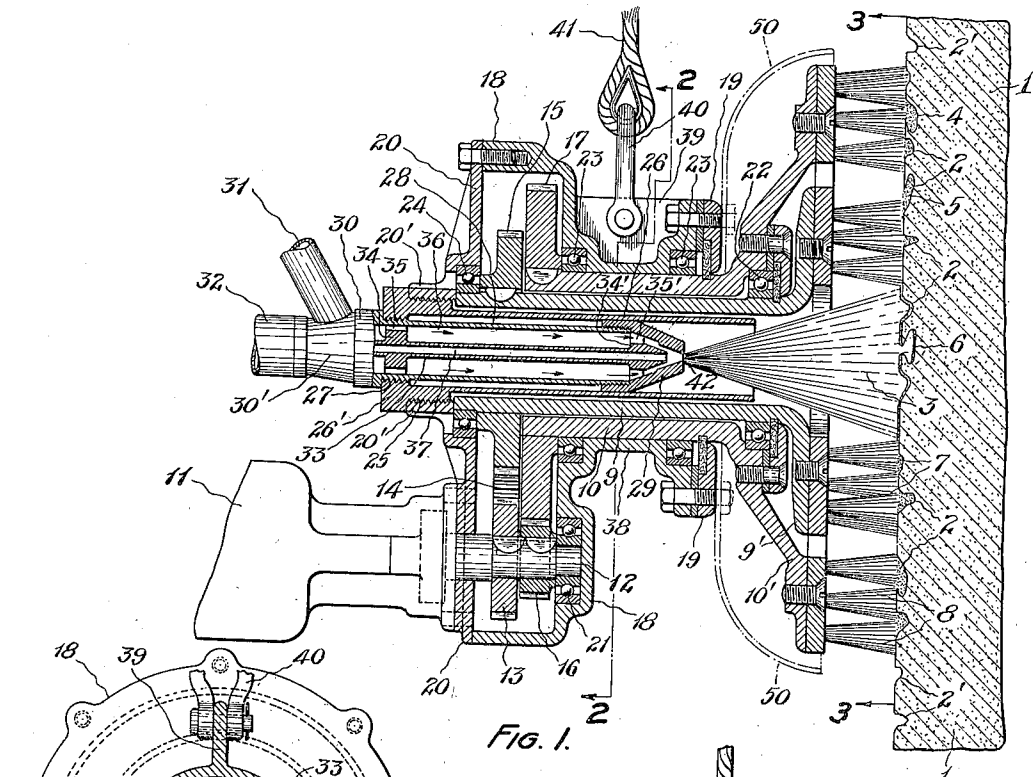


FIG. 1.

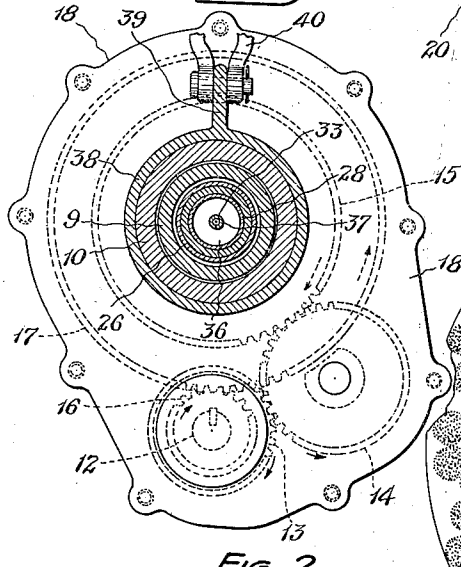


FIG. 2

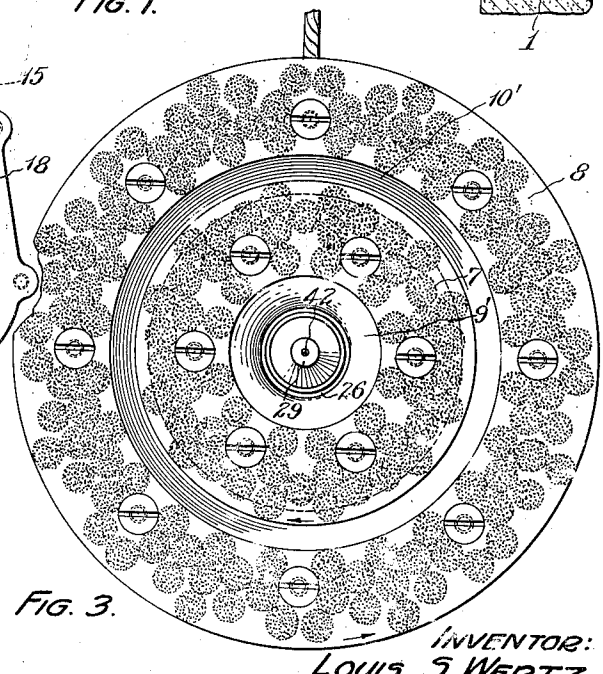


FIG. 3.

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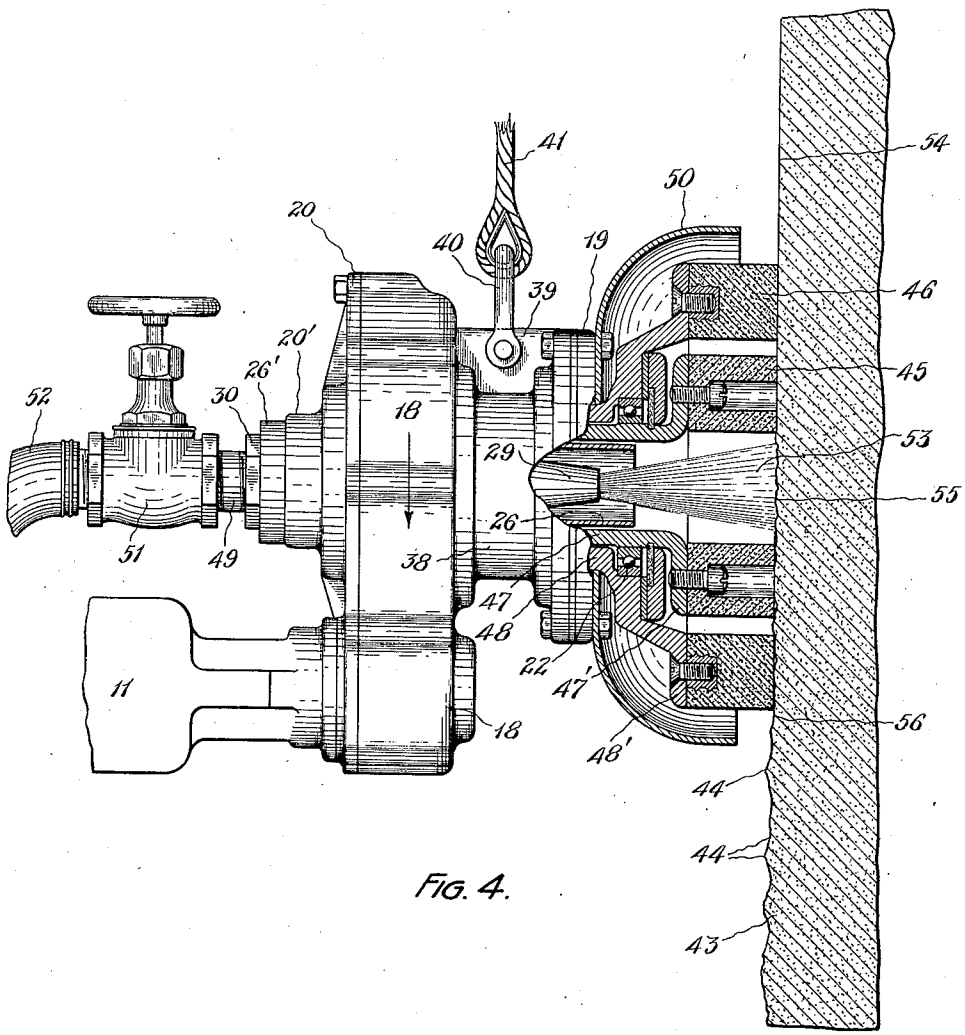


FIG. 4.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING MASONRY SURFACES

Application filed December 7, 1927. Serial No. 238,444.

The invention particularly relates to apparatus of the character noted by which the treating action is effected by a plurality of series of brushes or abrading tools moved in opposite directions and applying pressure to the surface being treated. In the particular embodiment of the invention shown in the accompanying drawings, and hereinafter described in detail, the treating members are two in number, or comprised of two series of members, which are rotated in opposite directions simultaneously. Where the treatment consists only in smoothing the surface, and not primarily in repairing a defective structure, the abrading tools only are used, with or without a blast of air or water, as the conditions require; but where the treatment consists also in a repair operation, there is combined with the two series of oppositely moving treating members, means for applying repair material carried by a blast of air into and filling the voids and defective portions of the structure.

The invention also relates to material-feeding apparatus of the character noted in which the repair material is projected from a nozzle through the body of the brushing and finishing member, and preferably centrally of said member, the latter being positioned outwardly of the projecting nozzle. The claims of this application are limited to apparatus designed both for projecting treating material and for smoothing and finishing the masonry surface.

The annexed drawings and the following description set forth in detail certain means embodying my improved treating apparatus, such means constituting, however, but two of the forms in which the apparatus may be illustrated.

In said annexed drawings:

Figure 1 is a vertical axial section of one form of my improved apparatus, a fragmentary portion of a conventional manually-controlled pneumatic tool adapted to carry repair material under pressure being also shown; as also a fragmentary portion of a motor for driving my improved brush construction;

Figure 2 is a vertical transverse section, taken in the planes indicated by the line 2—2, Figure 1;

Figure 3 is an end view, taken in the plane indicated by the line 3—3, Figure 1; and

Figure 4 is a partial vertical axial section, and partial side elevation, of a second form of my improved apparatus designed for smoothing a masonry surface and not intended also for a repair operation.

Referring to the annexed drawings in which the same parts are indicated by the same respective ordinals in the several views, and particularly describing first that form of apparatus shown in Figures 1, 2 and 3, a masonry wall 1 is shown which has a defective portion consisting of voids 2 which have been filled by a blast of repair material 3 projected from the nozzle opening 42 and carried by air pressure, the surface of the wall subsequent to such filling of the voids being scrubbed under pressure by two concentric annular brushes 7 and 8, through a central open area of which the blast 3 is projected. I direct attention to the fact that some of these voids 4 have hidden pocket portions extending in one direction from the axial line of the void and other of the voids 5 have such hidden pocket portions extending in the opposite direction from their axes, while some of such voids 6 have these pockets extending in both directions from their axes. One purpose of the double series of brushes is to assure the proper working of the repair material into such pockets, irrespective of the shape of the pockets. In addition to providing a construction which is well-balanced and thus more easily handled when being moved comparatively rapidly parallel with the wall so as to produce a comparatively large volume of work, the feed of the repair material centrally of the concentric annular brushes 7 and 8 also helps in completely filling all the wall voids by reason of the symmetrically outwardly flared discharge from the central nozzle 42. Certain voids 2′ are shown at the bottom and top of the structure 1 which have not as yet been filled by the blast 3 of the repair material.

The means for furnishing and applying the blast 3 and for operating the brushes 7 and 8

will now be described. The brush 7 is secured to a flange 9′ formed upon a tubular brush holder 9 and the brush 8 is secured to a flange 10′ surrounding the flange 9′ and formed upon a tubular brush holder 10 surrounding and running upon the outer surface of the brush holder 9 by means of ball bearings 22. Mounted upon a casing 18 is a motor 11 to whose shaft 12 is secured a pinion 13 engaging a pinion 14 which in turn engages a gear 15 secured to the brush holder 9. Also secured to the motor shaft 12 is a pinion 16 engaging a gear 17 secured to the brush holder 10. This drive rotates brush holders 9 and 10 in opposite directions. A plate 20 covers the front of the casing 18. Ball bearings 21, 23 and 24 are provided, respectively, for the motor shaft 12, the movement of the brush holder 10 within the casing 18, and the movement of the brush holder 9 within the cover 20. A flange 20′ of the cover 20 is formed with an internally-threaded portion 25 adapted to engage an externally-threaded end-thickened portion 26′ of a shell 26 extended forwardly within the brush holder 9 to a point somewhat short of the plane of the flange 9′. The portion 26′ of the shell 26 has an internally-threaded portion 27 adapted to cooperate with a second shell 28, forming a nozzle body, and having threaded to its forward end a nozzle 29. Threaded into the other end of this nozzle body 28 is a plug 30 formed with a tapering coupling member 30′ communicating with or preferably integral with a conduit 31 through which repair material may be fed into the coupling member 30′. This coupling member 30′ is adapted to be connected with the discharge spout 32 of any standard pneumatic power machine whereby under manual control, air at a desired pressure can be forced through the nozzle body 28. The material which enters by the pipe 31 is fed into a tubular pipe 33 having a passage 37 communicating with the pipe 31 at one end within the coupling member 30′ and communicating with the interior of the nozzle 29, at the other end, this pipe 33 being formed with an enlarged portion 34 forming a support for one end of the pipe 33 in the nozzle body 28, the nozzle end of the pipe 33 being supported by the enlarged portion 34′, the enlarged portion 34 being provided with air passages 35 leading into the nozzle chamber 36, and the enlarged portion 34′ with air passages 35′ leading into the extreme inner end of the nozzle 29 adjacently the discharge end of the material feed tube 33. As is well known in the art, these pneumatic power devices are under finger control, the material and air sometimes being separately controlled and sometimes jointly controlled, in the latter case the first portion of the trigger stroke opening up the air valve and the latter portion of the stroke gradually opening up the material valve, so as to enable the air under strong pressure to pick up and carry the material forwardly and discharge the same in a blast from the nozzle 29. The effect of this action, as applied to my device, is to positively fill the voids 2′ of the structure 1 with the repair material. The latter is in a liquid or soupy condition so as to completely fill these voids, the repairing being completed by the rotation of the brushes 7 and 8 in opposite directions so as to press and retain the material into the voids and to smooth off the wall surface and effect a thorough and sightly repair job. The oppositely rotating brushes 7 and 8 serve another function, in addition to the thorough repairing and finishing, and that is their relative speeds may be so regulated by suitably selected gears as to eliminate any torque which would render difficult or impossible the application of a single brush, particularly if it were desired to apply the brush flat to the wall 1 instead of working the brush at an angle or upon a brush edge, as is customary in the art when using a single brush. Two hundred revolutions per minute and four hundred revolutions per minute are practical working speeds for the brushes 8 and 7, respectively. I provide flexible supporting means for permitting the operation of this device without the necessity of the operator's sustaining the weight thereof, and the same consist of an ear 39 formed upon the intermediate portion 38 of the casing 18 and a clevis 40 of a rope 41 linked to the ear 39 and passing over any suitable movable support to follow the movement of the machine, a counterweight being provided for balancing the weight of the machine if desired. A protective shield to eliminate spattering of the repair material is afforded by the member 50 secured by the same bolts which clamp an end casing member 19 to the main casing member 18.

Inasmuch as the matter of weight is an important practical consideration in the operation of tools of this character, particularly from the standpoint of the operator's ability to stand-up for any considerable time under the effort necessary to move the tool rapidly from an inconvenient position over a vertical wall, the smoothing and finishing brushes oftentimes consist simply of two brush sections rotated in opposite directions, or even one brush or brush section, this simplification of the brushing medium resulting directly and indirectly in greatly lightening the weight of the complete tool. In the case of using simply a single brush or a single brush section, the difficulties usually attendant upon the use of such a brushing and smoothing medium are considerably alleviated in my construction by the fact that the treating material is projected through the body of the brush, and preferably centrally of the latter.

Referring to the form of device shown in

Figure 4, the same is designed for smoothing a wall, such as a marble structure 43. This structure is shown as having a surface formed with holes and protuberances 44 which it is desired to smooth off by the operation of my device and its oppositely rotating air tools 45 and 46. These abrading tools 45 and 46 are mounted in the flanges 47′ and 48′ of tool holders 47 and 48 respectively and the actuation of the tools is similar to that described with reference to the brushes 7 and 8 of Figure 1. If desired, a blast 53 of air or water is projected from the nozzle 29 from a source 52 controlled by a valve 51 and connected to the abrading device by means of a coupling 49. Different surface portions of the structure 43 are shown in different conditions, a finished portion being denoted by the ordinal 54, a partially finished portion by the ordinal 55, which has been subjected to the action of the lower portion of the abrading tools, and a portion 56 upon which the outer tool 46 is just commencing to work, the direction of movement of the tool being indicated by the arrow shown upon the drive casing 18.

The two concentric rotary brushes 7 and 8 are illustrative only, since it is possible, within the spirit of the invention, to use a larger number of said brushes or brush sections; furthermore, the brushes or brush sections may be reciprocated by suitable mechanism in opposite directions simultaneously instead of being rotated as hereinbefore described in detail and as shown in that embodiment of the invention which appears in the accompanying drawings.

What I claim is:

1. Means for treating masonry walls comprising, a nozzle; means furnishing treating material thereto under air pressure; brush sections positioned outwardly of said nozzle, the blast from the latter centrally intersecting the brush sections; and means for moving a part of said brush sections in one direction and the balance of said brush sections in the opposite direction.

2. Means for treating masonry walls comprising, a nozzle; means furnishing treating material thereto under air pressure; an annular brush positioned outwardly of said nozzle and centrally intersected by the blast from the latter; a second annular brush concentric with said first-mentioned brush; and means for rotating said brushes in opposite directions.

3. Means for treating masonry walls comprising, a nozzle; means furnishing treating material thereto under air pressure; a pair of independent concentric brushes; means permitting the passage of a blast from said nozzle through the body of said brushes and outwardly therefrom; and means for rotating said brushes in opposite directions.

4. Means for treating masonry walls comprising, a casing; a nozzle mounted therein; means for furnishing air under pressure to said nozzle; means for feeding treating material into said air-furnishing means; driving means; a pair of brush holders supported upon said casing; means for rotating said brush holders in opposite directions from said driving means, said brush holders extending forwardly of and symmetrically around said nozzle; and a pair of annular concentric brushes secured to the respective forward ends of said brush holders.

5. Means for treating masonry walls comprising, a nozzle; means furnishing treating material thereto under pressure; brush sections positioned outwardly of said nozzle, the blast from the latter centrally intersecting the brush sections; and means for moving a part of said brush sections in one direction and the balance of said brush sections in the opposite direction.

6. Means for treating masonry walls comprising, a nozzle; means furnishing treating material thereto under pressure; an annular brush positioned outwardly of said nozzle and centrally intersected by the blast from the latter; a second annular brush concentric with said first-mentioned brush; and means for rotating said brushes in opposite directions.

Signed by me this 1 day of Dec., 1927.

LOUIS S. WERTZ.