

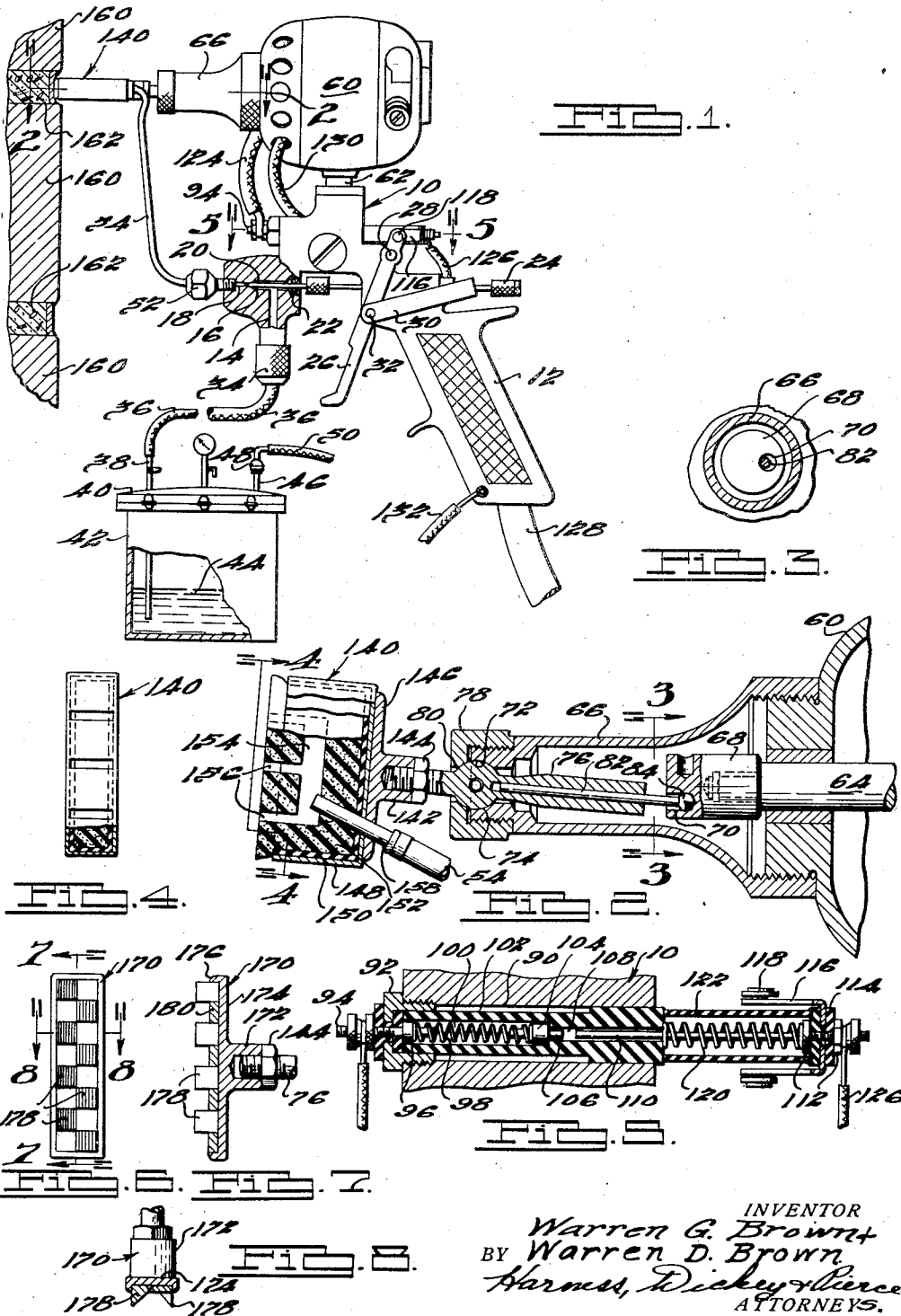
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APPARATUS FOR TREATING MASONRY AND LIKE SURFACES

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APPARATUS FOR TREATING MASONRY AND LIKE SURFACES

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This invention relates to apparatus for treating, among other things, masonry surfaces, the principal object being the provision of apparatus of this type that is relatively simple in construction, and efficient in operation.

While apparatus constructed in accordance with the present invention is adaptable to a relatively wide variety of uses, it has been designed for and, therefore, is particularly adaptable for the treatment of masonry surfaces broadly in accordance with the method disclosed in United States Letters Patent No. 1,931,643, issued to Warren G. Brown, one of the joint inventors herein, on the 24th day of October, 1933, on Caulking compound and method of application. Accordingly, for ease and simplicity of description the explanation of the present invention will be limited to its application to the treatment of masonry surfaces, its adaptability to other uses thus being made apparent.

Objects of the invention include the provision of apparatus including a head adapted to operate upon a masonry surface and means for vibrating the head; the provision of apparatus of the type described that is manually operable and is portable; the provision of means for treating masonry and like surfaces including a head for contact with the surface to be treated, power means for vibrating the head, and means for delivering material to the working face of the head at will during operation; the provision of apparatus as above described in which the material delivered to the working surface of the head is deliverable only while the head is being driven; and the provision of a head of novel construction for use in connection with apparatus as above described.

The above being among the objects of the present invention the same consists in certain novel features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawing, and then claimed, having the above and other objects in view.

In the accompanying drawing which illustrates a suitable embodiment of the present invention and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a partially broken, partially sectioned side elevational view of apparatus constructed in accordance with the present invention, part of the apparatus being shown in reduced size, illustrating the same in the act of operating upon a fragment of a masonry surface, shown in section, to waterproof a joint thereof;

Fig. 2 is an enlarged fragmentary sectional

view taken centrally through the axis of the operating head and associated parts of the apparatus shown in Fig. 1 as on the line 2-2 thereof;

Fig. 3 is a transverse sectional view taken on the line 3-3 of Fig. 2;

Fig. 4 is a partially broken, partially sectioned front elevational view of the operating head, taken as on the line 4-4 of Fig. 2;

Fig. 5 is an enlarged transverse sectional view taken on the line 5-5 of Fig. 1 and illustrating in detail the construction of the switch for controlling the operation of the electric motor;

Fig. 6 is a face elevational view of a modified form of head construction for the apparatus shown in Fig. 1;

Figs. 7 and 8 are sectional views of the head shown in Fig. 6 and taken as on the lines 7-7 and 8-8, respectively, thereof.

In United States Patent No. 1,931,643 above referred to is disclosed a method of treating masonry surfaces comprising applying a mixture consisting principally of Portland cement, finely divided iron, and water to the surface to be treated, or to the joint between the bricks or blocks thereof, and working such mixture into the cracks and pores or other voids of the surface until it has thoroughly penetrated the same, and then after the mixture has taken an initial set, removing the excess of such material from such surface so as not to detract from the architectural appearance of the building. The particles of iron or other expanding material in that portion which has thus been worked into the cracks and pores of the surface oxidizes and thereupon swells so as to completely fill all of the voids in the surface being treated and thereby renders it waterproof.

The method disclosed in United States Patent No. 1,931,643 for working such material into the surface being treated is to take a relatively stiff brush and work the material into the surface therewith. In order to obtain the desired penetration of the material into all of the voids in the surface it is, of course, necessary to more or less scrub such material thoroughly into the surface and where this operation is conducted with a brush by hand involves a considerable amount of more or less tedious work and this is particularly so where the mortar only between the bricks or blocks of a masonry surface is being treated to render it waterproof.

The present invention provides an apparatus including a head adapted to act upon the mixture to work it into the surface and mechanism for causing such head to be rapidly vibrated by power means. Accordingly, by the employment

of the present invention the manual effort required by the previous practice is eliminated to a material degree and instead it is only necessary for the workman to press such head against the surface being acted upon and to slowly move it over the surface, the vibratory movement of the head during such movement serving to quickly and efficiently drive the mixture into any crack or other void in the surface in an improved manner.

Furthermore, in accordance with the present invention means are provided for discharging the mixture through the head onto the surface thereby to provide a continuous supply of the material at that area of the surface being acted upon. Preferably means are provided for controlling the flow of the mixture to the head at will but only during such times as the head is actually being vibrated by its motor. By this means an adequate supply of the material or mixture is assured at all times without providing an excess of the same and no material is delivered to the surface unless the head is vibrating and, therefore, in a condition to work it into the surface being treated.

Referring now to the accompanying drawing and particularly to Fig. 1 the apparatus there shown includes a main body portion which serves as the principal supporting structure and which is indicated generally at 10, it being shown as of cast construction and provided with a handle 12. It may be noted that the main portion of the apparatus illustrated in Fig. 1, minus the motor for driving the vibrating head, is substantially similar to commercial types of spray guns and in fact almost any conventional type of spray gun now found on the market may be readily converted for use in connection with the present invention by eliminating the air supply, and substituting the controls for the electric motor disclosed herein in place of the usual air supply control found in such spray guns.

The main body 10 is provided with a material inlet passage 14 which opens into a cross-passage 16 which is reduced as at 18 to form a shoulder against which the point of an elongated needle valve 20 is adapted to seat to close the passage 18 against the flow of material from the passage 16. The needle valve 20 is provided with a packing 22 where it emerges from the rear end of the passage 16 and it projects rearwardly through the body 10 at the upper end of the handle 12 and is provided with an adjustable stop or abutment 24 on its rearwardly projecting end. A trigger 26 is pivotally mounted on the body 10 at 28 and is provided with a link 30 pivoted thereto at one end as at 32. The opposite end of the link 30 slidably embraces the needle valve 20 forwardly of the stop 24 so that the initial movement of the trigger 26 will move the free end of the link 30 along the needle valve 20 without any movement of the needle valve until the link 30 abuts the stop 24, whereupon further movement of the trigger 26 in a counter-clockwise direction of movement as viewed in Fig. 1 will then withdraw the needle valve 20 and open the passage 18 to the flow of material thereto from the passages 14 and 16. The passage 14 is connected through a suitable fitting 34 to a flexible tube 36 the opposite end of which is connected to a pipe 38 extending through the cover 40 of and to a point adjacent the bottom of a container 42, shown in reduced size in Fig. 1, and in which a suitable amount of the material 44 with which it is desired to treat the masonry surface, is contained.

A second pipe 46 extending through the cover 40 of the container 42 may be connected through a check valve 48 with a flexible hose or tube 48 leading to a suitable source of air under pressure so that the material 44 within the container 42 may be placed under a suitable pressure tending to discharge it out through the pipe 38 and hose 36. The outlet passage 18 in the main body 10 communicates through a suitable connection 52 and flexible tube 54 with the vibrating head which will later be described in detail.

An electric motor 60 is mounted upon a short pedestal 62 secured to the upper face of the main body 10 and is positioned with the axis of its shaft 64 horizontal and projecting forwardly therefrom. Referring now to Fig. 2 it will be noted that a housing 66 is threaded onto the forward end of the casing of the motor 60 in concentric relation with respect to the shaft 64 and that within the housing 66 the forward end of the shaft 64 has fixed thereto an enlargement 68 provided with an opening 70 in its forward end face eccentric to the axis of the shaft 64. The reduced forward end of the housing 66 is formed to provide a partially spherical seat 72 against which is received a ball 74 formed intermediate the ends of an elongated member 76 and the ball is maintained in engagement with the seat 72 by means of a nut 78 threadably received upon the outer end of the housing 66 and provided with a central aperture 80 through which the forward end of the member 76 projects. The end of the member 76 received within the housing 66 is provided with a central bore in which is slidably received a pin 82 the inner end of which is formed to provide a ball 84 received in the opening 70. As will be readily understood, as the motor shaft 64 rotates when the motor 60 is energized the ball 84 on the end of the pin 82 will be caused to travel in a circular path and will thus cause the opposite ends of the member 76 to likewise travel rapidly in a circular path but will not cause rotation of the member 76. This movement of the ends of the member 76 is of a more or less vibratory nature.

In order to control the operation of the electric motor 60 switch mechanism shown in Fig. 1 and illustrated in detail in Fig. 5 is provided and is mounted in a bore 90 extending horizontally through the main body 10. The forward end of the bore 90 is closed by a threaded plug 92 through which projects a binding post 94 suitable insulated therefrom and interiorly provided with a head 96 which is engaged by a compression spring 98. The compression spring 98 is received within the forward end of an enlarged central bore 100 of a cylindrical member or plug 102 formed of electrical insulating material received within and extending the full length of the bore 90. The bore 100 extends rearwardly in the member 102 to a point slightly beyond its mid-position at which point it slidably receives a plug member 104 of electrical conducting material having pin portions 106 projecting from opposite ends thereof, the forwardly projecting pin portion receiving the rear end of the springs 98 thereon which, accordingly, constantly urges the plug 104 in a rearward direction toward the end of the bore 100. A smaller bore 108 concentric with the bore 100 extends from the rear end of the bore 100 centrally through the member 102 to the rear end of the same. In the forward end of the bore 108 the rear pin member 106 of the plug 104 is received and in the rear portion of the bore 108 a metallic pin 110 is axially slidably received.

The pin 110 projects rearwardly beyond the insulating member 102 and its rear end portion is threaded for reception of a pair of nuts 112 between which is received on the pin 110 a peripherally grooved block 114 formed of electrical insulation material. A yoke 116 is secured at its center in the groove of the block 114 and its opposite and forwardly extending arms are pivotally connected at 118 to the upper extremities of the trigger 26 which project upwardly above the pivot point 28, as illustrated in Fig. 1. A compression spring 120 surrounds the projecting end of the pin 110 and is maintained under compression between the end of the member 102 and the forward nut 112 and a relatively soft rubber sleeve 122 is provided in surrounding relation with respect to the spring 120 so as to afford an electrical insulation for the same against accidental contact with some external object without interfering with axial movement of the pin 110.

As best illustrated in Fig. 1, one lead 124 for the motor 60 extends to and is connected to the binding post 94 and the rear end of the pin 110 which also serves as a binding post is connected by a lead 126 which extends down through the handle 12 and preferably through an armored cable 128 secured to the lower end thereof to the positive side a suitable source of electrical energy. The other lead 130 for the motor 60 may be led down through the handle 12 in a similar manner independently of the switch mechanism described, or it may be grounded directly to the main body portion 10 and thence through the armored cable 28 to a suitable ground, or the main body portion 10 may be independently grounded by means of a conductor such as 132 suitably secured to the handle 12 as indicated, or to any other suitable location on the main body portion 10.

The length of the pin 110 and yoke 116 are so proportioned with respect to each other and with respect to the leverage arm of that portion of the trigger 26 projecting above its pivot point 28 that when the trigger 26 is in released position the forward end of the pin 110 is spaced from the rearwardly projecting pin portion 106 of the plug 104. When the trigger 26 is pulled the yoke 116 connected thereto acting through the block 114 and forward nut 112 moves the pin 110 forward into contact with the rearwardly projecting pin portion 106 of the plug 104, thereby making electrical contact therewith and permitting a circuit to be established through the lead 126, pin 110, block 104, spring 98, and end 96 through the binding post 94 and thus cause the motor 60 to be energized. The amount of movement of the trigger 26 required to close the circuit through the switch mechanism illustrated in Fig. 5 is preferably so proportioned that the circuit is closed before the yoke 30 contacts the abutment 24 on the needle valve 20 and in such case upon continued movement of the trigger 26 after such contact has been established through the switch mechanism illustrated in Fig. 5 and which continued movement is permitted through compression of the spring 98, the yoke 30 will come into contact with the abutment 24 and will withdraw the needle valve 20 rearwardly so as to open the passage 18 to the flow of material there-through. Accordingly, with this arrangement it will not be possible to discharge any material through the device except when the motor 60 is running and this is important as will hereinafter be more fully appreciated.

Although in the broader aspects of the present

invention any suitable type of operating head may be applied to the forward end of the member 76 operated by the motor 60, in accordance with a further phase of the present invention a special design of such head is provided.

Referring particularly now to Figs. 2 and 4 it will be noted that the head shown in the present case is indicated generally at 140. The head 140 in the present case includes a supporting member comprising a boss portion 142 threadably received upon the outer end of the member 76 and secured against relative movement thereon by means of a lock nut 144. By this means the head is caused to move or vibrate bodily upon operation of the motor 60. The boss portion 142 carries at its forward end a transversely extending flange 146 of rectangular contour. A relatively deep rectangularly shaped metallic pan member 148 is arranged with its bottom in contact with the forward face of the flange 146 and is rigidly fixed thereto in any suitable manner such as welding, brazing, soldering, or the like. The pan member 148 is lined with an impermeate rubber lining 150 which in turn is filled with a sponge rubber block or core 152 which projects forwardly beyond the forward edges of the pan 148 and lining 150 a material distance as indicated. The block or core 152 is interiorly provided with a transverse passage 154 and a plurality of minor passages 156 in open communication therewith and opening out onto the outer or operating face of the block or core 152. A metallic tube 158 extends from the passage 154 through the block 152, lining 150, member 148 and flange 146 and projects rearwardly beyond the rear face of the flange 146 at which point it is suitably connected to the flexible tube 54.

As will be readily understood, when the trigger 26 is operated to withdraw the needle valve 20 from seating relation with respect to the shoulder formed between the bores 16 and 18, the material 44 under pressure within the container 42 will then be fed through the passages 14, 16 and 18 and through the connection 52 into the flexible tube 54 and will be delivered therefrom into the passage 154 in the head 140 and from which passage it will flow out through the various minor passages 156 to the forward or operative face of the head 140. It will, of course, be understood that such material will be fed to the head 140 only where trigger 26 is moved sufficiently beyond the point necessary to close the switch mechanism illustrated in Fig. 5 and actuate the motor 60. Accordingly, it will be understood that a workman in operating the apparatus thus described may actuate the trigger 26 to effect continuous operation of the motor 60 and consequent vibratory movement of the head 140 and either effect a continuous or intermittent discharge of the material 44 into and from the head 140.

Again referring to Fig. 1 it will be noted that a portion of a typical masonry wall is illustrated as including a plurality of bricks 160 each separated from its neighbor by a conventional layer 162 of mortar. Where it is desired to waterproof the mortar joint 162 the operation is carried on substantially as indicated in Fig. 1. In such case, presuming the container 42 is provided with a suitable amount of material 44 therein under a suitable pressure and the electric leads for the device are connected to a suitable source of power in a suitable manner, a workman will grasp the apparatus shown in Fig. 1 by the handle 12 and will present the head 140 to the mortar joint 162 to be operated upon so that the length of

the face of the head 140 extends in the direction of length of the joint to be operated upon. The trigger 26 is then pulled a sufficient distance to start the motor 60 to operate and then a sufficient further distance to effect a discharge of a suitable amount of material 44 through the face of the head 140. Usually then the trigger 26 is released sufficiently to temporarily interrupt the flow of material 44 through the head 140 but not sufficient to stop the operation of the motor 60 and the head 140 is guided back and forth over that portion of the mortar joint 162 to which such material has been delivered and until it is assured that the vibratory movements of the head 140 acting on the discharged material has sufficiently forced such material into the joints to fill all voids, pores and cracks therein. The apparatus is then moved along the joint 162 further, the trigger 26 is further pulled in order to discharge more material 44 to the joint and is then released to interrupt the flow of the material to the joint and the operation is repeated. It will, of course, be appreciated that where it is desired to point-up the joints 162 as well as to waterproof the same, more of the material 44 will be discharged through the head 140 to these joints than in a case where waterproofing only and no pointing-up is desired. It will also be appreciated that because of the relatively rapid vibratory movements of the head 140 and the fact that a workman may press it against the surface being treated with a material amount of pressure, or may cause the head to be manually vibrated toward and from the surface being treated, the material 44 discharged from the face of the head 140 will be rapidly and efficiently worked into such surface so as to quickly and efficiently fill all voids, pores and/or cracks therein.

In many instances it will be desirable when operating upon a masonry surface of the character illustrated in Fig. 1 for instance, to clean out the exposed faces of the joints 162 before applying the material 44 thereto and working it into such surface. In such case by providing the apparatus shown in Fig. 1 with a head of the character illustrated in Figs. 6, 7 and 8 instead of the head 140, such apparatus may be employed for cleaning out such joints.

Referring to Figs. 6, 7 and 8 the head there shown and indicated generally at 170 comprises a boss portion 172 corresponding in all respects to the boss portion 142 and flange 146 previously described except that in this case the flange portion 174 is provided with a forwardly projecting marginal flange portion 176 forming a relatively shallow recess in the forward face of the flange portion 174. Within this recess is positioned a plurality of triangularly shaped teeth 178. The teeth 178 are arranged with their bases in contact with the bottom of the recess provided at the forward face of the flange portion 170 and with their legs projecting perpendicularly thereto at the outer edge of the recess and are arranged in alternately oppositely facing direction over the length of the head. The length of the base of each tooth is preferably of a smaller dimension than the width of the recess in the face of the flange 174, although not necessarily so, and in any case the ultimate result is that the head is provided with two rows of longitudinally aligned transversely spaced and longitudinally staggered teeth 178. These teeth 178 are preferably secured in place within the recess in the forward face of the flange portion 174 by

bracing material or splter 180, or in any other suitable manner. The teeth 178 may be formed of any suitably hard material adapted to withstand the abrasive effects of the mortar joints 162 or other surface being acted upon but one material which has been found to be particularly suitable for this use is tungsten carbide.

It will be appreciated that where the apparatus illustrated in Fig. 1 is provided with a cutting head of the type illustrated in Figs. 6, 7 and 8, the source of the material 44 is cut off and in operation the motor 60 is operated and the operator presses the tooth face of the head 178 into the mortar of the joints and simply works it along over the surface of the same, the rapid vibratory movement of the head causing the teeth 178 to cut away the outer surface of the joints 162 being acted upon and thus to present a clean, firm surface to be later acted upon by the head 140 and the material 44 fed there-through.

From the above it will be understood that by the use of the apparatus provided in accordance with the present invention masonry or other surfaces may be operated upon in the manner specified and particularly when employing a head of the type 140 described is enabled to effect a penetration of the pores, voids, and/or cracks in a masonry surface with a sealing material in a quick, easy and efficient manner.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

What we claim is:

1. In apparatus of the type described, in combination, a support, a motor mounted thereon, a head, means connecting said head and motor so constructed and arranged as to repeatedly shift the center of mass of said head in opposite directions transversely to the axis of said motor during operation of said motor, and control means carried by said support for controlling the energization of said motor.

2. In a device of the class described, in combination, a support, a motor carried thereby, a head, means connecting said head and motor so constructed and arranged as to repeatedly shift the center of mass of said head in opposite directions transversely to the axis of said motor during operation of said motor, and a trigger controlled switch mechanism carried by said support for controlling the energization of said motor.

3. In a device of the class described, in combination, a supporting member, a motor carried thereby, an operating head driven by said motor, means for delivering a fluid mixture to said head, a valve for controlling the flow of said mixture to said head, a switch for controlling the operation of said motor, and control means common to said valve and switch mounted on said support for controlling both said valve and said switch.

4. In a device of the class described, in combination, a supporting member, a motor carried thereby, an operating head driven by said motor, means for delivering a fluid mixture to said head, a valve for controlling the flow of said mixture to said head, a switch for controlling the operation of said motor, and a single manually operable control element operatively connected to both said valve and switch mounted on said support for controlling both said valve and said switch.

switch, the connection between said control element and said valve and switch being so constructed and arranged to close said switch in advance of opening said valve during operation of said control means in one direction.

5 5. In a device of the class described, in combination, a supporting member, a motor carried thereby, a head driven by said motor and provided with passages in the working face thereof, means for delivering a fluid material through
10 said passages, valvular means carried by said support for controlling the flow of said fluid to said passages, and a control member carried by said support cooperable with said valve means
15 to control the position thereof whereby to regulate the flow of said fluid.

6. In apparatus of the class described, in combination, a support, a motor carried thereby, a head carried by said motor, a driving connection between said head and said motor so constructed and arranged as to impart bodily vibratory movement to said head upon operation of
20 said motor, a yieldable core in said head projecting therefrom and providing an operating face therefor, passages in said core leading to said face, means for discharging a fluid material into said passages, valvular means carried by
25 said support for controlling the flow of said fluid to said passages, switching means carried by said support for controlling the operation of said motor, and a control means carried by said support common to said valvular means and said switching means.

7. In apparatus of the class described, in combination, a support, a motor carried thereby, a head carried by said motor, a driving connection between said head and said motor so constructed and arranged as to impart bodily vibratory movement to said head upon operation of
35 said motor, a yieldable core in said head projecting therefrom and providing an operating face therefor, passages in said core leading to said face, means for discharging a fluid material into said passages, valvular means carried by said
40 support for controlling the flow of said fluid to said passages, switching means carried by said support for controlling the operation of said motor, and a control means carried by said support operatively connected to both said valvular means and said switching means, said control
45 means being so constructed and arranged as to close said switching means in advance of opening said valvular means during movement thereof in one direction.

8. In apparatus of the class described, an operating head comprising, in combination, a hollow rigid support open on one side, a body of yieldable material substantially filling said support and projecting from the open side thereof and

providing a substantially plane working face for contact with a surface to be operated upon, said body of yieldable material having an opening therein opening onto said face, and means associated with said support for feeding a fluid
5 through said opening.

9. In apparatus of the class described, an operating head comprising, in combination, a hollow support open on one side, an impermeable rubber lining for said support, a core of sponge rubber
10 contained within said liner and projecting beyond the open face of said support, said sponge rubber having an opening therein leading to the face of said projecting portion thereof and having a communicating passage interiorly thereof,
15 and means projecting through said support for conducting a fluid to said passage.

10. In apparatus of the type described, in combination, an operating head including, in combination, a pan-like support, an impermeable
20 rubber lining for said support, a mass of sponge rubber filling said lining and projecting beyond the open face of said support to provide an operating face for said head, said sponge rubber having a plurality of openings therein opening upon
25 said face and having a passage interiorly thereof communicating with all of said openings, and means projecting through said support and lining and projecting through said sponge rubber to said passage for the purpose of conducting a
30 fluid to said passage for discharge from said openings.

11. In apparatus of the type described, an operating head including, in combination, a support, a plurality of triangularly shaped independently formed teeth of relatively hard
35 material differing from the material of said support arranged in staggered relation upon the face of said support, and means bonded to said teeth and said support for fixing said teeth with
40 respect to said support.

12. In apparatus of the type described, in combination, an operating head comprising, in combination, a support providing a relatively elongated base, a plurality of triangularly shaped
45 teeth of relatively hard material arranged in spaced relation with respect to each other longitudinally of said face on opposite sides thereof and in staggered relation with respect to each other longitudinally thereof, the base of the triangle of each of said teeth being arranged parallel to said face, the leg of the triangle of each of said teeth being arranged at an outer edge of said face, and means bonded to said teeth and said support fixing said teeth with respect to
55 said support.

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