March 10, 1959 R. E. BATES 2,876,537

POWER OPERATED SCRAPER

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FIG. 1.

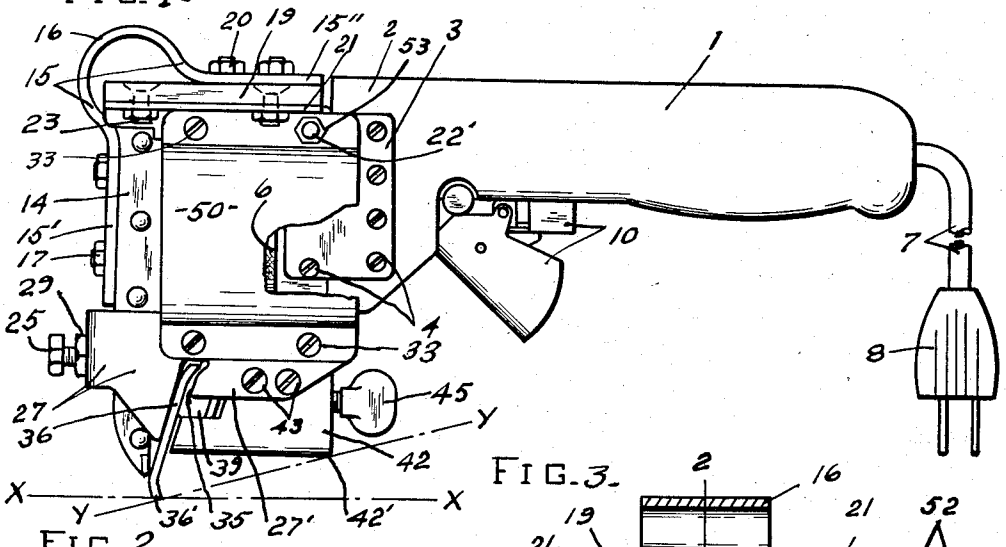


FIG. 2.

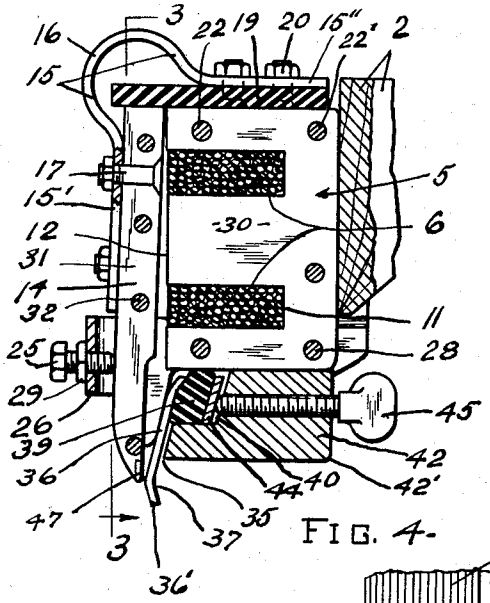


FIG. 3.

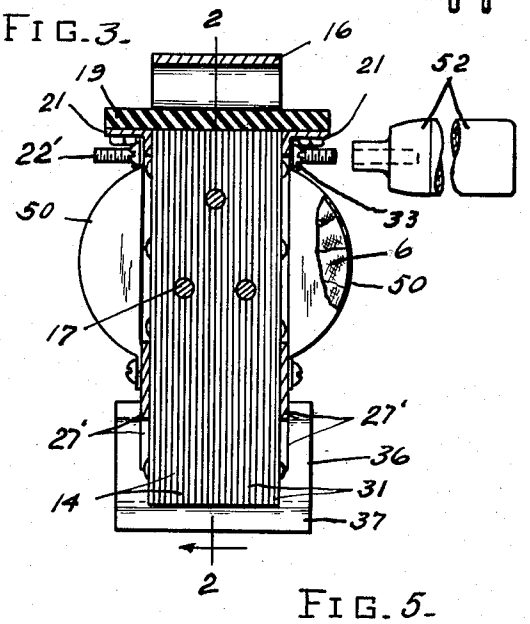


FIG. 4.

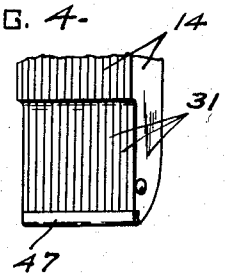
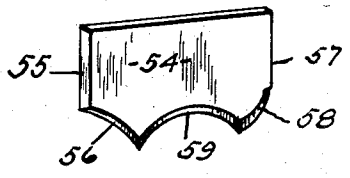


FIG. 5.



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POWER OPERATED SCRAPER

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4 Claims. (Cl. 30—171)

This invention relates to a power operated scraper and pertains more particularly to a scraper which is peculiarly adapted for removing paint, scale, rust, or the like from either smooth plane surfaces or from rough, irregular or curved surfaces.

The main objects of my invention are to produce a universal scraper of the above mentioned character, which is simple, durable and economical in construction and operation, and that offers the maximum amount of safety to the user against electric shock and dust, as well as reducing the fire hazard to a minimum.

In carrying out these objects I have produced a scraper instrument embodying a scraper blade of simple design and an electric motor of the magnetic type for vibrating the scraper blade. I utilize the magnetic pulsations derived from alternating current to effect vibration of an actuator or armature which, in turn, produces sharp, decided vibratory action of the scraper blade by striking said blade in proximity to one of the edges thereof. The vibratory action of the scraper blade thus produced removes such substances as old paint from painted surfaces in flake formation which readily fall of their own weight to the floor or ground. In other words, the particles of paint removed by my scraper are of such size and weight that they will not readily float in the surrounding atmosphere. This eliminates the fire and explosive condition which invariably exists when removing paint with a sanding apparatus. Furthermore, my improved instrument, by scraping paint in flake formation, results in a condition which is far less injurious to the health of the user thereof than when using a power operated sanding device. This is particularly true when the paint removal occurs in a confined area where breathing of the fine dust-like particles produced by a sander is quite unavoidable.

Another important object of this invention is to produce a power operated scraper which will operate on any alternating house current now being used, also at a relative low wattage and without the use of make and break contacts used in many motors. This structure results in low cost of construction and maintenance, prevents interference with radio, television or other electrically operated household appliances, and reduces the possibility of electric shock to a minimum.

Another safety feature of my invention resides in the fact that the vibratory movement of the scraper blade produced by the motor is such that the hand or other portions of the body will not be cut or injured if accidentally brought into contact with the scraper blade when said blade is in operation.

Another important feature of my power operated scraper is the provision of a durable, efficient scraper blade having a cutting edge or cutting edges which may be readily ground or otherwise formed to most advantageously conform the same to the contour of the surface to be scraped.

Another important feature of the invention is to provide simple and efficient means for releasably maintaining the

scraper blade in the operative position with respect to the power operating means therefor whereby said blade may be quickly and easily removed for sharpening or to be replaced by another blade having at least one cutting edge of different contour.

Other objects and advantages pertaining to the specific construction, operation and arrangement of the parts of my invention will more fully appear from the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevation of an electric power operated scraper embodying the various features of my invention, a portion of a shield or guard for the motor being broken away.

Fig. 2 is a detailed longitudinal section view taken substantially on the plane indicated by line 2—2 of Fig. 3.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a detailed perspective view of the free end portion of the motor actuator or armature showing a reinforcing member associated therewith.

Fig. 5 is a perspective view of a modified form of the scraper blade showing one cutting edge thereof provided with curved portions to readily adapt the blade for removing paint or other material from a surface of reverse contours.

My novel scraper as shown in the drawings includes a handle 1 of suitable configuration and which is provided with an integral rectangular supporting head 2 at its forward end. Handle 1 and head 2 are preferably composed of plastic, Bakelite or other similar material which is a non-conductor of electricity. Secured to the head 2 at the forward end thereof as by a pair of plates 3 and screws 4 is a core 5 having a winding or coil 6 adapted to be connected to a source of alternating electric current by a current carrying cable 7 and plug 8. Cable 7 extends outwardly from coil 6 through the handle 1 and may, as indicated in Figure 1, have a suitable electric switch 10 connected on one side thereof for conveniently controlling the supply of electric current to coil 6.

The core 5 is shown provided with a pair of spaced apart slots 11 extending inwardly from the forward side 12 thereof for receiving the coil 6 therein. Adjacent the forward side 12 of core 5 is an armature or actuator 14 of substantially the same width as core 5 but of greater length than said core. A flat substantially L-shaped spring 15 yieldingly maintains armature 14 in cooperative spaced relation with core 5 and with the lower end of armature 14 extending some distance beyond the lower edge of said core. For this purpose spring 15 has one leg 15′ thereof secured by screws or bolts 17 to armature 14. The other leg 15″ of spring 15 is secured to a supporting plate 19 by bolts or screws 20. Plate 19 is of greater width than core 5 and is secured thereto by a pair of angle bars 21, one positioned at either side of said core. Angle bars 21 are secured by bolts or screws 22 and 22′ to core 5 and to plate 19, by screws or bolts 23. Plate 19 is composed of nonconducting material, such as hard rubber, fiber or the like, so that spring 15 is maintained in insulated spaced relation with core 5. Furthermore, spring 15 is formed with an intermediate outwardly curved portion 16 which connects legs 15′ and 15″ to each other and gives said spring member its resiliency.

Spring member 15 is constructed to normally maintain armature 14 in more or less angular relation with the forward face 12 of core 5 and this angular relation of armature 14 and core 5 is determined by a stop screw 25 coacting with spring 15 and screw threaded in the transverse portion 26 of a U-shaped yoke member 27. Yoke 27 has the arms 27′ thereof extended rearwardly from the

transverse of portion 26 along respective sides of core 5 to which they are attached by bolts 28. A lock nut 29 may, as shown, be utilized to maintain stop screw 25 in its adjusted position. It is preferable that both the core 5 and actuator or armature 14 be composed of standard transformer laminations 30 and 21 respectively, having high permeability and which lose their magnetism readily. This also produces a structure which remains relatively cool over an extended time by rapid radiation of heat therefrom. The laminations 31 of the actuator or armature 14 may be permanently secured together by rivets or bolts 32, while laminations 30 of core 5 may be secured together by bolts 22, 22' and 28. It will thus be observed that this construction of the actuator 14 and core 5 of my motor from laminations together with the relatively low wattage required to energize coil 6 and actuate armature 14 results in a motor which has a low operating temperature over a long period of continuous use.

As shown in Figures 1 and 2 of the drawings, the arms 27' of yoke 27 have slots 35 extending inwardly from the lower sides thereof in aligned relation with each other transversely of arms 27' for the reception of a scraper blade 36. Blade 36, as shown in Figures 1, 2, and 3, is a substantially rectangular member in plane view and may be provided with a sharp cutting edge 36'. The blade 36, shown in Figures 1 to 3 inclusive of the drawings, is of hook formation, having its longitudinal edges bent at a slight angle to the body of the blade as at 37 to most advantageously adapt the blade for removing paint from relatively smooth surfaces. Slots 35 are of slightly greater width than the thickness of blade 36 so that said blade may freely vibrate from front to rear with respect to arms 27'. Scraper blade 36 is yieldingly maintained in slot 35 by a resilient pressure pad 39 mounted in a recess 40 formed at the inner forward end of a holding block 42, mounted intermediate arms 27' and secured thereto by screws 43'. Pressure pad 39 may be composed of rubber or other resilient material and has a metal back plate 44 cemented or otherwise secured to the rear side thereof. Back plate 44 is engaged by a thumb screw 45 screw-threaded in block 42 for holding pad 39 in proper pressure engagement with the scraper blade 36.

The relation of slots 35 and actuator or armature 14 are such that the lower longitudinal edge portion of the scraper blade 36 will be normally maintained in spaced relation with the lower end of actuator 14 when said actuator is at rest, but will be engaged by the actuator with short hammer like blows during the vibration of said actuator produced when coil 6 is energized by an alternating electric current and core 5 is thereby magnetized and under the cyclic pulsations of said electric current. The rapid vibration of the scraper blade 36 thus produced will provide the necessary movement of the lower cutting edge of said blade to efficaciously remove paint or other material from a surface over which the scraper blade is moved. In order that the lower edge of actuator 14 may endure for an extended time the action thereof upon blade 36 I have provided said actuator with a hardened steel member or plate 47 electric welded or otherwise secured to the inner face of said actuator at the lower or free edge thereof for directly contacting blade 36.

50 is a pair of substantially semicircular shields or guards for the coil 6, positioned one at either side of coil 6 and secured to angle plates 21 and yoke 27 by the screws 33 and bolt 22'. Guards 50 are preferably composed of fiber or other insulating material to eliminate possibility of electric shock to the user during the operation thereof. Furthermore, I have extended one of the fastening members as 22' at the upper side of core 5 at both its ends beyond the corresponding guard 50 for the reception and support of an auxiliary handle 52 which may be detachably screw threaded on member 22'. In this instance, I use nuts 53 on member 22' for securing said member in place and fastening the core laminations 30, angle plates 21, and guards 50 together.

Referring now to Figure 5 of the drawings, there is shown a modified form of the scraper blade 36 disclosed in Figures 1, 2, and 3. This blade as 54 is a substantially flat rectangular member having one end and a longitudinal side thereof ground to form cutting edges adapted to conform to surfaces having reverse cross-sectional contours or forms to more readily adapt the blade for removing paint or the like therefrom. For instance, one end of blade 54 is ground to form a straight cutting edge 55 which unites at one end with a concave cutting edge 56 extending therefrom to the adjacent longitudinal side of the blade. The other end 57 of blade 54 may, as shown, be substantially flat for a portion of its length and there terminates in a convex cutting edge 58 which extends to the adjacent longitudinal edge of blade 54 where it is formed with the concave cutting edge 56 by a second concave cutting edge 59 which may be of the same or a different curvature than that of cutting edge 56. The purpose of showing the scraper blade 54 of Figure 5 is to illustrate the adaptability of my power operated scraper. It is now obvious that my novel scraper blade may have any one or number of its edges formed to most readily adapt the blade for removing paint or the like from surfaces irrespective of the cross sectional contour of such surfaces.

In the use and operation of my paint scraper, the electro-magnetic coil 6 is energized by connecting the conductor 7 to a source of alternating current supply. Any alternating current is suitable, in particular house currents now available, is sufficient for energizing electro-magnetic coil 6. It will also be apparent that only relatively low wattage is necessary, and that no make and break contact which is necessary in many motors is used. When coil 6 is thus energized, core 5 will be magnetized and under the cyclic pulsations of the electric current, so that the armature or actuator 14 will be rapidly moved toward and away from core 5 by the coaction of the magnetizing and demagnetizing of said core and spring 15. As actuator 14 approaches the limit of its inward movement the outer free end 47 thereof strikes against scraper blade 36 and causes a slight movement of said blade against the holding action of pressure pad 39. This coaction of actuator 14 and pressure pad 39 produces rapid vibratory movement of the blade 36 causing the cutting edge of said blade to swing back and forth through a short arc and thereby cut the paint or other material from the surface over which blade 36 is moved. The effectiveness of the blade 36 to cut hard dry paint or other substances of a similar nature from coated surfaces may be readily controlled by the operator simply by varying the angular relation of blade 36 with the surface being scraped. This angular relation of blade 36 and the surface being scraped may be easily produced by holding handle 1 so that blade 36 will be maintained either in a position substantially normal to the work surface as represented by broken line *x*—*x* or at a more or less acute angle to the work. The minimum amount of this acute angular relation of blade 36 and the work surface over which blade 36 is drawn is determined by the work surface coming in contact with lower corner or heel 42' of holding block 42 as indicated by broken line Y—Y.

While the construction and operation of my scraper shown in the drawings and described above are very simple, I do not wish to be limited to the exact structure shown as various changes both in the form and relation of the parts thereof may readily be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A power operated scraper tool, comprising in combination, a motor of the electromagnetic type including a coil adapted to be connected to an alternating current supply source, a core for the coil, an armature, means including a spring connected to the armature for maintaining said armature in cooperative relation with the

core within the electromagnetic field thereof to be vibrated by the electromagnetic pulsations of said core, the side of said armature opposite the spring being extended beyond the adjacent side of the core, a substantially rectangular scraper blade provided with a cutting edge, and holding means attached to a member attached to the core said holding means including a resilient pressure element engaging the blade in spaced relation to the cutting edges thereof for yieldingly supporting said blade in proximity to the extended portion of the armature whereby said blade is engaged by said armature during the vibration thereof and actuated thereby against the action of the pressure element for the purpose set forth.

2. A power operated scraper tool, comprising in combination, a motor of the electromagnetic type, including a coil adapted to be connected to an alternating current supply source, an actuator means comprising an armature and holding means for the armature connected with one side thereof for yieldingly maintaining said armature in cooperative relation with the core within the electromagnetic field of said core to be vibrated thereby, the armature having a second side thereof, extended beyond the core, a scraper blade, and holding means yieldingly maintaining the scraper blade in cooperative relation with said second side of the armature whereby vibratory movement of said armature will produce vibratory movement of the blade, said holding means being in direct relationship with said blade thereto.

3. A power operated scraper tool comprising in combination, a plate-like rigid scraper blade having a cutting edge, holding means including a resilient pressure element engaging the blade in spaced relation to said cutting edge to yieldingly maintain the blade in a predetermined normal position, and electromagnetic operating means for actuating said blade, an actuator including a striker element adapted to intermittently contact the blade in direct relation to and coacting with the holding means therefor during the vibration of said actuator to produce vibratory movement of said blade from and toward said normal position.

4. A power operated scraper tool, comprising in combination a motor of the electromagnetic type including a coil adapted to be connected to an alternating current supply source, a core for the coil, and an armature mounted in cooperative relation with the core within the electromagnetic field, said armature being vibrated by the electromagnetic pulsations of said core, a plate-like rigid scraper blade having a sharp cutting edge, holding means including a resilient pressure element engaging the blade, said holding means being in spaced relation to said cutting edge of the blade and yieldingly maintaining the blade in a predetermined normal position, said armature including a striker element adapted to intermittently contact said blade, said armature being vibrated said striker element producing vibratory movement of the blade from and toward said normal position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,346,474	Torre	Apr. 11, 1944
2,648,017	Ziherl	Aug. 4, 1953