July 13, 1943. A. J. DREMEL 2,324,292

HAND SANDER

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Fig. 1.

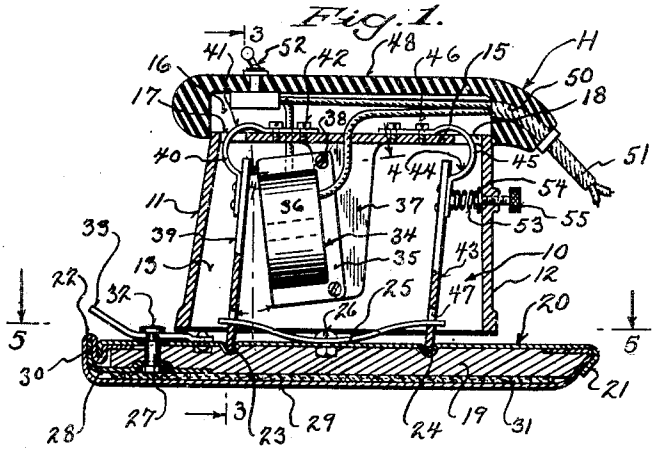


Fig. 4.

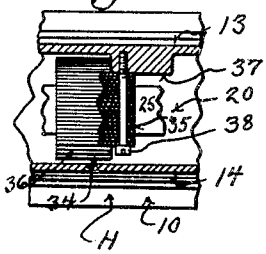


Fig. 2.

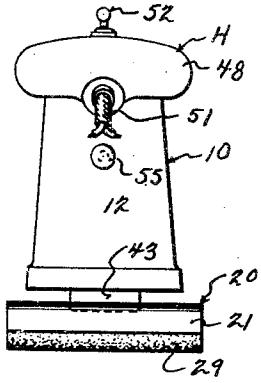


Fig. 3.

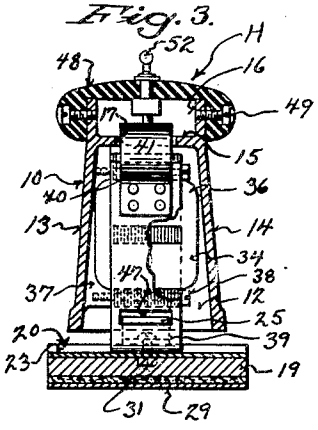
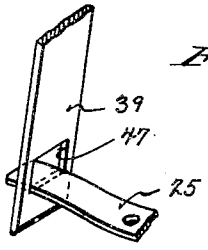


Fig. 6.



INVENTOR
ALBERT J. DREMEL

BY Young & Wright

ATTORNEYS

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Fig. 5.

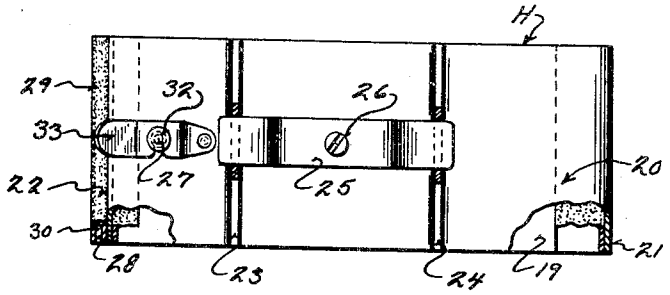
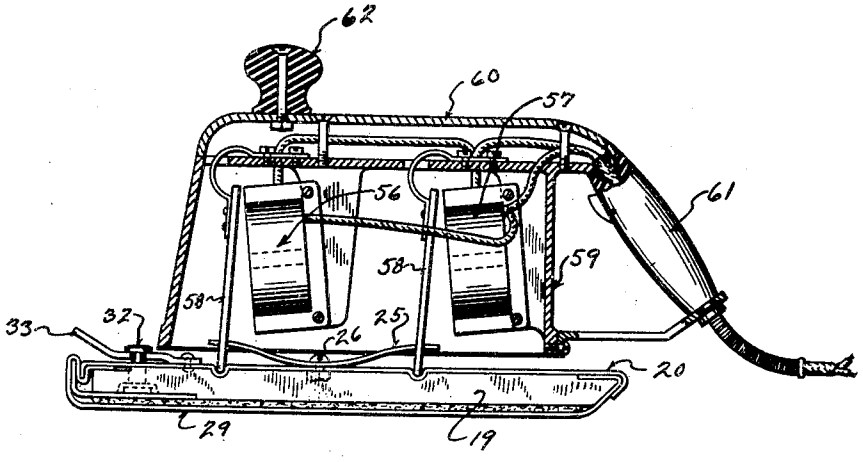


Fig. 7.



INVENTOR
ALBERT J.DREMEL

BY Young & Wright

ATTORNEYS

Patented July 13, 1943

2,324,292

UNITED STATES PATENT OFFICE

2,324,292

HAND SANDER

Albert J. Dremel, Racine, Wis.

Application September 22, 1941, Serial No. 411,875

15 Claims. (Cl. 51—170)

This invention appertains to portable hand tools and more particularly to an electrically operated sander for finishing and smoothing surfaces.

One of the primary objects of my invention is to provide a hand sander embodying a block for supporting the abrasive strip and means for rapidly reciprocating the block from an alternating electro-magnet.

Another salient object of my invention is the provision of means for resiliently supporting the block from a suitable casing in which the alternating electro-magnet is housed, with means including an armature, forming a part of the support, for reciprocating the block.

Another important object of my invention is to provide novel means for arranging the electromagnet in the housing relative to the normal position of the armature, whereby the arc through which the armature swings, will be such as to impart a minimum amount of outward thrust to the block during the rapid reciprocation thereof and thereby eliminate vibration and jar upon the surface being smoothed.

A further object of my invention is to provide adjustable means under the control of the operator for regulating the stroke of the armature, whereby to govern the stroke of the sanding block.

A further important object of my invention is to provide novel means for arranging the casing, the block and hand grips relative to one another whereby the sander can be readily and easily handled and manipulated to the best of advantage.

A still further important object of my invention is to provide a hand sander which will be powerful in action, but yet light in weight and which will be durable and efficient in use, one that will be simple and easy to manufacture and one which can be placed upon the market at a reasonable cost.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims. It being understood that such changes in the precise embodiments of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated a complete example of the disclosed embodiments of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is a vertical sectional view through my novel sander.

Figure 2 is a rear end elevational view thereof.

Figure 3 is transverse sectional view through sander taken on the line 3—3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 1 looking in the direction of the arrows illustrating the means employed for securing the electromagnet within the casing.

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 1 looking in the direction of the arrows illustrating the means of connecting an abrasive strip with the sanding block and its carrier.

Figure 6 is a detailed fragmentary perspective view illustrating the means employed for connecting the sanding block with the armature.

Figure 7 is longitudinal sectional view of a slightly modified form of my hand sander.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout several views, the letter H generally indicates my improved hand sander and the same includes a casing 10 open at its lower end. This casing 10 can be formed from any desired materials and the same is preferably in the nature of a casting. As illustrated, the same includes front and rear end walls 11 and 12, and connecting side walls 13 and 14 which can gradually flare outwardly toward their lower ends. The upper edges of the end and side walls are connected by a top wall 15 and the side edges of this top wall can be provided with longitudinally extending spaced flanges 16, for a purpose, which will be later set forth. The top wall adjacent to its front and rear ends is provided with openings 17 and 18, the purpose of which will also be later described.

Mounted below the casing 10 is the sanding block 19 and its carrier 20. This carrier 20 may be in the form of a flat metal plate having its rear end provided with a downwardly and inwardly inclined lip 21. The extreme front end of the carrier 20 has formed thereon rib 22. The plate or carrier 20 intermediate its ends and at spaced points is provided with transversely extending guide ways or seats 23 and 24.

Fastened to the upper face of the plate or carrier 20 between the guide ways 23 and 24 is a

bowed leaf spring 25. This spring is secured at its central portion to the plate or carrier 20 by means of suitable fastening element such as a bolt 26. The resilient arms of the spring extend in opposite directions from the bolt.

The sanding block 19 can be formed from wood or any other desired material and the same is adapted to fit snugly against the lower face of the plate or carrier 20. The forward end of the block 19 has secured thereto by means of a stud or the like 27 a clamping plate 28 for the abrasive strip 29.

The front end of the plate 28 is up-turned as of 30 and is adapted to extend in front of the rib 22 as is clearly shown in Figure 1 of the drawings. A cushion pad such as a piece of felt 31 can be placed between the abrasive strip and the lower face of the block. The stud 27 is adapted to extend through the block and when the block is in its operative position the stud rides through an opening in the carrier 20. The upper end of the stud is provided with a head 32 which is adapted to being engaged by swinging latch 33 mounted on the carrier 20.

To apply a strip of abrasive to the block it is merely necessary to fold the ends of the abrasive strip over the ends of the block and then to insert the rear end of the block under the lip 21. The block can now be swung up against the carrier 20 until the head of the stud rides through the carrier. At this time the rib 22 on the carrier will engage the adjacent end of the abrasive strip and the latch 33 can then be moved under the head 32 of the stud. This will effectively hold the block and the abrasive strip in position.

In order to bring about the efficient and economical reciprocation of the block and its carrier, I provide an alternating electro-magnet 34 in which the armature operates with the cycle of the current. The electro-magnet 34 can be of the same type as shown in my Patent No. 2,233,862 issued to me March 4, 1941. Hence, this magnet can include an E shaped core 35 formed by a plurality of laminations. A conventional winding 36 is provided for the magnet and is protected by a suitable cover. Formed on the side wall 13 of the housing or casing 10 is a boss 37 and the magnet can be secured to the boss by suitable screws 38 which pass through the laminations of the core and into said boss.

Cooperating with the magnet 34 is an armature 39 the outer end of which rides in the transversely extending guide way 23 of the carrier. The inner end of the armature 39 is riveted or otherwise attached to one end of a leaf spring 40, provided intermediate its ends with an arcuate flexing portion 41. The leaf spring 40 extends through the opening 17 in the casing and its upper end is fastened by means of screws 42 to the upper face of the top wall 15.

A swinging guide plate 43 of the same size and character as the armature is mounted in rear of the electro-magnet 34 and the lower end thereof is rounded and is fitted within the guide way 24 in the carrier. The upper end of the guide plate 43 has riveted thereto a leaf spring 44 which is provided intermediate its ends with an arcuate flexing portion 45. This spring extends through the opening 18 and is secured by screws 46 to the upper face of the top wall 15 of the casing.

The lower ends of the armature 39 and the swinging guide plate 43 are provided with transversely extending slots 47 which receive the ends of the bowed leaf spring 25. Hence, this leaf spring 25 functions to connect the block and its carrier to the armature 39 and the guide plate 43 for movement therewith.

A suitable manipulating handle 48 can be carried by the top of the casing or housing 10 and this handle can be formed from hard rubber or other plastic material. As clearly shown in Figure 3, the hand grip 48 extends over the upstanding flanges 16 of the housing and the hand grip can be connected therewith by fastening screws 49. The rear end of the handle can be provided with a guide passage way or bore 50 for receiving the electric wiring 51 which extends into the casing or housing 10 for the magnet. The handle or hand grip can also be provided with a suitable switch 52 for opening and closing the circuit to the magnet.

Obviously when current is supplied to the magnet the armature 39 will be rapidly operated and consequently the block with its abrasive strip will be reciprocated.

Particular attention is invited to the position of the electro-magnet relative to this armature and it will be noted that the outer face of the magnet is arranged at an angle to the vertical and that the armature is normally disposed at an angle to the vertical. Both the armature and the magnet lie equal distances on opposite sides of this vertical line (see Figure 1). Likewise, the upper inner end of the armature is closer to the magnet than the outer end of the armature. Hence, the magnetic force of the inner arm of the core of the electro-magnet initially effects the adjacent end of the armature to draw the remaining portion of the armature within the magnetic field of the outer core arm. This is important as this arrangement permits the rapid and progressive overcoming of the resistance to the attraction of the armature as the tension of the spring 40 increases.

By having the magnet disposed at an angle as described and illustrated, the arc through which the armature swings is such that a minimum amount of outward thrust will be exerted on the sanding block. This will reduce vibration and jar during the use of the sander.

To control the active stroke of the block a coil spring 53 is provided and the inner end of this spring engages the guide plate 43 and the outer end of this spring is engaged by a thrust disc 54 carried by the inner end of an adjusting thumb screw 55 which extends through the rear wall of the casing 10. By turning the thumb screw the tension of the spring can be regulated.

In hand sanders where a more powerful operation is required two electro-magnets 56 and 57 can be employed, see Figure 7. In this instance the armature 58 for the rear magnet 57 can take the place of the guide plate 43 shown in Figures 1 and 3. In this form of the invention the top of the housing 59 can receive a cover plate 60 for enclosing the wiring and the like, and the rear end of this cover plate can carry a downwardly and outwardly inclined seat for the upper end of hand grip 61. A bracket can be employed for connecting the lower end of the hand grip to the casing. The wiring cord which can lead from a suitable outlet is led through the handle and under the cover plate 60. The front of the cover plate can carry a suitable manipulating hand nob 62.

Obviously, while I have specifically described my invention as a sander, I can use the device effectively as a polishing tool. In this instance a soft polishing material or brush is substituted for the sand paper.

From the foregoing description it can be seen that I have provided an exceptionally simple and durable form of hand sander which will effectively accomplish its intended purpose.

I claim:

1. A hand sander comprising a casing, a sanding block mounted below the casing, a pair of spaced swinging plates arranged in the casing, said block having seats for the lower ends of the plates, spring means connecting the upper ends of the plates to the casing, at least one of said plates constituting an armature, and an alternating electro-magnet arranged in the casing for attracting said mentioned plate, said magnet having its front face disposed at an acute angle to the normal inactive position of said last mentioned plate and at an acute angle to the block.

2. A hand sander comprising a casing, a sander block mounted below said casing having transversely extending spaced bearing seats, a pair of spaced plates mounted in the casing having their lower ends rockably fitted into said bearing seats, leaf springs connecting the upper ends of the plates to the casing, electro-magnetic means for actuating at least one of said plates, and resilient means connecting the outer ends of the plates to the block for holding said lower ends of the plates in the seats.

3. An electrically operated hand sander comprising a casing, a sanding block mounted below said casing having spaced transversely extending seats in its upper face, plates mounted in said casing having their lower ends received in said seats, spring means connecting the inner ends of the plates to the casing, electro-magnetic means for operating at least one of said plates, and a bowed leaf spring secured intermediate its ends to said block having its ends engaging said plates for normally holding the outer ends of said plates in said seats.

4. An electrically operated hand sander comprising a casing, a sanding block mounted below said casing having spaced transversely extending seats in its upper face, plates mounted in said casing having their lower ends received in said seats, spring means connecting the inner ends of the plates to the casing, electro-magnetic means for operating at least one of said plates, and a bowed leaf spring secured intermediate its ends to said block having its ends engaging said plates for normally holding the outer ends of said plates in said seats, and a manipulating handle carried by said casing.

5. An electrically operated hand sander comprising a support, an alternating electro-magnet secured to the support, an armature exposed to the field of said magnet and inclined relative thereto in its normal inactive position to progressively vary the distance between said armature and magnetic field upon energizing of said armature, a reciprocating sanding block, and means operatively connecting the sanding block to the armature.

6. An electrically operated hand sander comprising a support, an alternating electro-magnet secured to the support, a swinging armature exposed to the field of said magnet, a reciprocating sanding block and means operatively connecting the outer end of the armature to the sanding block, said electro-magnet having its front face inclined at an acute angle to said armature when the armature is in its normal inactive position.

7. An electrically operated hand sander comprising a support, an alternating electro-magnet secured to the support, an armature exposed to the field of said magnet and inclined relative thereto to progressively vary the distance between said armature and magnetic field, a reciprocating sanding block, and means operatively connecting the sanding block to the armature, said electro-magnet having its front face inclined at an acute angle to said armature, when the armature is in its normal inactive position.

8. An electrically operated hand sander comprising a support, an alternating electro-magnet secured to the support, an armature exposed to the field of said magnet, a leaf spring securing the inner end of said armature to the support at one side of the electro-magnet, a reciprocating sanding block, and means operatively connecting the outer end of the armature beyond the electro-magnet to the sanding block, said electro-magnet being inclined at an acute angle to the block and to the normal position of said armature whereby the arc through which the armature swings will be such as to impart a minimum amount of outward thrust to said sanding block.

9. An electrically operated hand sander comprising a casing having its lower end open, a sanding block covering said opening, having a transversely extending bearing seat therein, an alternating electro-magnet secured in said casing, an armature in said casing exposed to the field of said magnet and having its lower end rockably fitted in said seat, resilient means between the block and armature for holding said end of the armature in its operative position in said seat, a yielding connection between the inner end of the armature and the casing, said electro-magnet having its front face inclined at an acute angle to said armature, when the armature is in its normal inactive position.

10. An electrically operated hand sander comprising a casing having its lower end open, a sanding block covering said opening provided with a transversely extending seat, an alternating electro-magnet secured within said casing, an armature exposed to the field of said magnet having its lower end fitted in said seat, a leaf spring connecting the inner end of the armature to the casing, resilient means between the block and the armature for normally holding the outer end of the armature in said seat, the armature being inclined relative to the field of said magnet to progressively vary the distance between said armature and the magnetic field, said magnet being disposed at an angle to the vertical and to the normal position of the armature.

11. An electrically operated hand sander comprising a casing having an outer open end, a sanding block covering said open end provided with spaced transversely extending seats, plates mounted within said casing having rounded lower ends received in said seats, spring means between the block and said plates for resiliently holding the outer ends of the plates in said seats, leaf springs having arcuate flexing portions connecting the inner ends of the plates to the casing, an alternating electro-magnet disposed in said casing, at least one of said plates constituting an armature for said magnet and disposed in the field of said magnet, a spring engaging one of said plates, and manual means for adjusting the tension of said spring.

12. An electrically operated hand sander comprising a casing open at one end, a sanding block

covering said open end provided with spaced transversely extending seats, plates having rounded lower ends fitted into said seats and arranged within said casing, a spring connection between the block and plates for normally holding the outer ends of said plates in said seats, leaf springs having arcuate flexing portions connecting the inner ends of said plates to the casing, a pair of spaced alternating electro-magnets secured in said casing, said plates constituting armatures for the magnets, and a manipulating handle carried by the casing.

13. In a sanding tool, a sanding block, a carrier for said block having a downwardly and inwardly inclined lip at one end, a down-turned rib at the other end, a clamping plate carried by one end of the block, a sanding strip arranged to cover the outer face of the block with its ends extended over the terminals of the block and over said clamping plate, the block being disposed within the inclined lip and movable against the carrier whereby the rib will clamp the strip between itself and said clamping plate, and means releasably connecting the block to the carrier at a point remote from said lip.

14. A hand sander and polisher, comprising a casing, a block mounted below said casing having transversely extending spaced bearing seats, means carried by the block for acting upon a surface, a pair of spaced plates mounted in the casing having their lower ends rockably fitted into said seats, yielding means connecting the upper ends of the plates to the casing, electromagnetic means for actuating at least one of said plates, and resilient means connecting the outer ends of the plates to the block for holding said lower ends of the plates in the seats.

15. An electrically operated hand sander and polisher comprising a casing, a block mounted below said casing having spaced transversely extending seats on its upper face, means carried by the lower face of the block for acting on a surface, plates mounted in said casing having their lower ends received in said seats, yielding means connecting the inner ends of the plates to the casing, electro-magnetic means for operating at least one of said plates and a spring secured intermediate its ends to the block having its ends engaging said plates for normally holding the outer ends of said plates in said seats.

ALBERT J. DREMEL.