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PORTABLE RUBBING MACHINE ASSEMBLY

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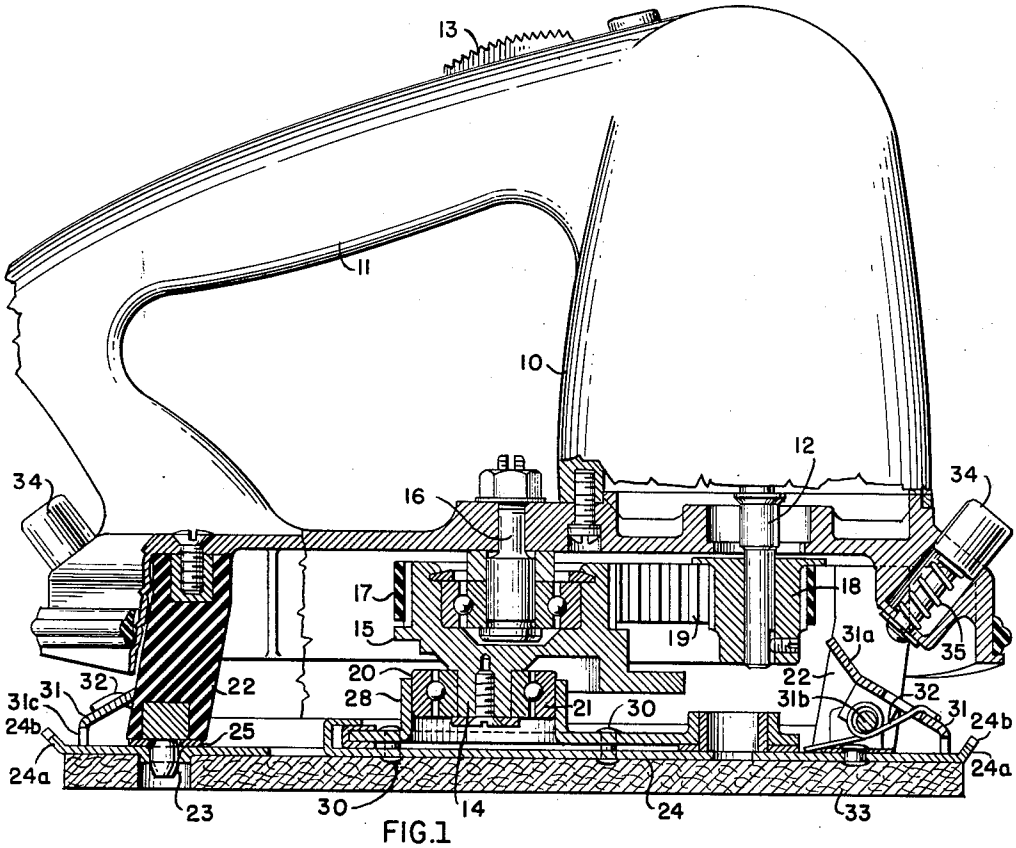


FIG.1

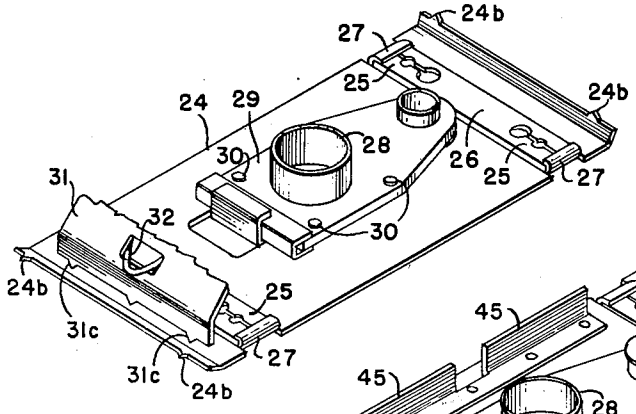


FIG.2

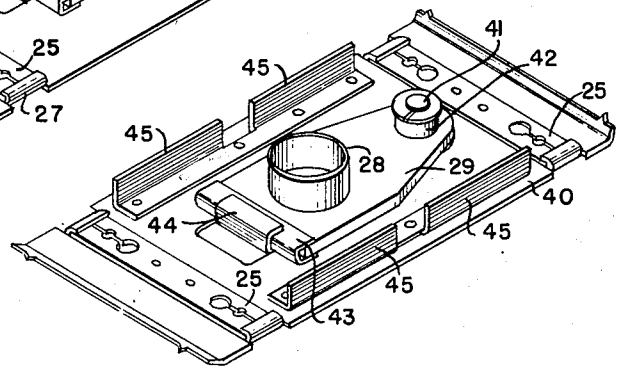


FIG.3

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PORTABLE RUBBING MACHINE ASSEMBLY

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This invention relates to portable rubbing machine assemblies and, more particularly, to such assemblies including readily replaceable or interchangeable rubbing platens.

Heretofore there have been proposed various types of portable rubbing machines, the most usual example of which is the portable sanding machine. While suitable for some uses, such machines have failed to achieve certain desirable operating characteristics. For example, it has been found that for "cutting" or rapid abrading operation an orbital movement of the rubbing platen is desirable, while for finishing operations a straightline reciprocating movement is preferable. Such machines of the prior art have been limited to a single type of motion, so that any given machine is best suited for only one type of operation and is a compromise for other operations.

In addition, portable rubbing machines heretofore proposed have left something to be desired as to the facility of replacing the expendable rubbing element, such as sandpaper sheets. Furthermore, many such prior portable rubbing machines have produced excessive vibration at the frame and handle of the device, resulting in excessive fatigue of the operator.

It is an object of the present invention, therefore, to provide a new and improved portable rubbing machine assembly which obviates one or more of the above-mentioned shortcomings of prior machines of this type.

It is another object of this invention to provide a new and improved portable rubbing machine assembly including readily interchangeable rubbing platens adapting the machine for either orbital or straightline reciprocating rubbing movements.

It is another object of the invention to provide a new and improved portable rubbing machine assembly in which the rubbing platen has a full-floating support from the frame and a minimum of vibration reaction at the handle of the machine.

It is a further object of the invention to provide a new and improved portable rubbing machine assembly in which the expendable rubbing element may be replaced with the greatest facility.

In accordance with the invention, there is provided a portable rubbing machine assembly comprising a manually supportable frame and housing including a driving mechanism; a readily disengageable rubbing platen including disengageable supporting connections to the frame, a disengageable driving connection to the mechanism, and releasable clamping means for an expendable rubbing element, and means mounted on the frame and normally free of the platen when engaging the frame but manually operable to engage the clamping means to release the same.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description taken in connection with the accompanying drawing, while its scope will be pointed out in the appended claims.

Referring now to the drawing:

Fig. 1 is a cross-sectional detail view of a portable rubbing machine assembly embodying the present invention;

Fig. 2 is a perspective view of an interchangeable platen unit for use in the apparatus of Fig. 1 and designed for an orbital rubbing movement; while

Fig. 3 is a perspective view of an interchangeable platen unit for use in the apparatus of Fig. 1 and designed to have straightline motion.

Referring now to Figs. 1 and 2 of the drawing, there is represented a portable universal rubbing machine assembly comprising a manually supportable frame and housing **10** formed with a unitary handle **11** and including a driving mechanism such as an electric motor (not shown) having a downwardly extending driving shaft **12**. A manually operable switch **13** for the motor is included in the handle **11** and it is understood that a suitable extension cord or equivalent will be connected to the handle **11**.

The driving mechanism of the machine also includes a protruding driving element or crank **14** extending from a toothed pully **15** journalled on a stud **16** projecting downwardly from the frame **10** by means of a conventional anti-friction bearing **17**. Mounted on the motor shaft **12** is a toothed pulley **18** which is connected to drive the pulley **15** through a cog belt **19**. A driving roller **20** is journalled on the crank **14** through anti-friction bearings **21**.

The rubbing machine of the invention also is provided with a plurality of resilient stand-off members, such as four cylindrical rubber members **22**, at each corner of the frame, which is generally rectangular. Each of the stand-off members **22** terminates in a projecting disengageable fastener element **23**, preferably in the form of a doubly tapered projecting pin.

The rubbing machine assembly of the invention also includes a readily disengageable rubbing platen, such as the orbital rubbing platen **24** shown in Figs. 1 and 2. This platen includes disengageable supporting connections for securing the platen to the frame and a readily disengageable driving connection to the driving mechanism of the frame. Specifically, the platen includes a plurality of disengageable fastener elements **25**, complementary to the fastener elements **23** of the frame, which may be in the form of snap-action receptacles positioned to receive and engage the projecting fastener elements **23**. As shown more clearly in Fig. 2, each of the fastener elements **25** is formed by a slotted leaf spring member **26** riveted or otherwise secured to the platen **24**. In order to aid in retaining the fastener elements **25** in position during engagement and disengagement, lips **27** are cut out from the platen element **24** and bent over the ends of the elements **25**.

The platen **24** also is provided with a member secured thereto and including an element having a slip-fit engagement with the driving element of the frame, specifically, a receptacle **28** for the projecting driving roller **20** of the frame. The receptacle **28** is designed to have a slip-fit engagement with the roller **20** to facilitate engagement and disengagement in contrast to a press-fit or other secured engagements. The receptacle **28** is formed as a unitary part of a plate **29** which is riveted, or otherwise secured, at **30**, **30** to the platen **24**. In order to minimize the number of different structural elements required for the interchangeable platens, as described hereinafter, the plate **29** includes certain features not used in the case of a platen designed for orbital movement. Since the only connections between the platen **24** and the frame **10** are by means of the snap-action connectors **23**, **25** described and the slip-fit driving engagement between the roller **20**

and the receptacle 28, it is seen that the platen 24 may be readily engaged with, and disengaged from, the frame 10 for replacing or interchanging platens.

The platen 24 also is provided with releasable clamping means for an expendable rubbing element, specifically, a pair of releasable clamping jaws 31, 31 disposed at opposite ends of the platen, supported therefrom on pivots 31*b*, 31*b*, and provided with suitable biasing springs springs 32, 32 for clamping an expendable sheet of rubbing material, such as sandpaper, at opposite ends of the platen. In order that the clamps 31, 31 get a better purchase or grip on the rubbing sheet, the ends of the platen are turned upwardly to form lips 24*a*, 24*a* over which the ends of the rubbing sheet are folded for engagement by the clamps 31, 31. As shown more clearly in Fig. 2, the clamps 31 have projecting teeth 31*c*, while the lips 24*a*, 24*a* have projecting teeth 24*b*, more firmly to grip the rubbing sheet. A suitable rubbing block 33 is secured to the under-surface of the platen 24.

The rubbing machine assembly of the invention also includes means mounted on the frame 10 and normally free of an engaged platen but manually operable downwardly to engage the clamping jaws 31, 31 to release the same. This releasing means may be in the form of a pair of pushbuttons 34, 34 at opposite ends of the frame and normally biased to a position free of the platen unit 24 by springs 35. When the pushbuttons 34, 34 are manually depressed, they are positioned to engage the tailpieces 31*a* of the clamping jaws 31 to release the same.

It is believed that the operation of the portable rubbing machine assembly of the invention will be apparent from the foregoing description. In brief, the platen 24 is initially assembled with the frame 10 by inserting the roller 20 in the receptacle 28, adjusting the position of the crank 14 until the connector receptacles 25 register with the connectors 23 projecting from the frame and then snapping the platen into engagement with the frame. A sheet of rubbing material, such as sandpaper, is then placed on a bench or floor and the rubbing machine assembly firmly disposed thereon and pressed downwardly by means of the handle 11. First one and then the other of the pushbuttons 34 is pressed downwardly, opening its associated clamping jaw 31 so that the sandpaper may be folded over the lip 24*a* and under the jaw 31. Upon release of the pushbutton 34, the clamping jaw 31 clamps the sandpaper to the platen 24, at the same time exerting a certain tension on the paper due to the friction between the paper and the jaw 31 as it rotates about its pivot 31*b*.

In operation of the rubbing machine assembly described, it is seen that the platen 24 has a full-floating support from the frame 10. Its only interconnections are between the resilient stand-off members 22 and the slip-fit engagement between the driving roller 20 and the receptacle 28. Therefore, the platen 24 is completely unrestricted in its direction of motion and will execute an orbital movement which, as stated above, is most effective for "cutting" or rapid abrading operations. In the event that it is desired to operate the machine with a straightline reciprocating motion, as in finishing operations, the platen 24 may be readily disengaged from the frame 10 merely by releasing the snap connectors 23, 25 at each corner of the frame and replacing the platen 24 with another platen designed for straightline reciprocating movement.

Such a straightline reciprocating platen is shown in Fig. 3. The platen 40 is similar to the platen 24 of Fig. 2 except that the receptacle 28 and unitary plate 29 are pivotally supported from the platen 40 by means of a pin 41 on which is journalled a boss or hub 42 formed integrally from the plate 29. The other end of the plate 29 is provided with a U-shaped clip 43 of suitably hardened wearing material, while a bearing surface for the plate 29 during its pivotal movement is provided by a lip 44 extending upwardly and over from the plate 29. In addition, a pair of siderails 45, 45 are secured to each side of the

platen 40 and positioned to engage the side members of the frame 10 to restrict the motion of the platen 40 to straightline reciprocating motion. It will be seen that with this arrangement, the plate 29 and its connected receptacle 28 effectively constitute a connecting rod between the crank roller 20 of the driving mechanism and the platen 40 to impart reciprocating movement thereto. The engagement and the clamping of a suitable rubbing sheet, such as sandpaper, is precisely the same with the straightline reciprocating platen 40 as with the orbital platen 24 described above. It is seen that the manually operable pushbuttons 34 are normally completely out of the path of any element of the platen assembly, thus facilitating ready replacement of platens. They also remain free from the platen elements during their orbital or reciprocating movement in operation of the assembly.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A portable rubbing machine assembly comprising: a manually supportable frame and housing including a driving mechanism; a readily disengageable rubbing platen including disengageable supporting connections to said frame, a disengageable driving connection to said mechanism, and releasable clamping means for an expendable rubbing element; and means mounted on said frame and normally free of said platen when engaging said frame but manually operable to engage said clamping means to release the same.

2. A portable rubbing machine assembly comprising: a manually supportable frame and housing including a driving mechanism; a readily disengageable rubbing platen including disengageable supporting connections to said frame, a disengageable driving connection to said mechanism, and a pair of releasable clamping jaws at opposite ends of the platen for clamping an expendable sheet of rubbing material; and means mounted on said frame and normally free of said platen when engaging said frame but manually operable to engage said clamping jaws to release the same.

3. A portable rubbing machine assembly comprising: a manually supportable frame and housing including a driving mechanism; a readily disengageable rubbing platen including disengageable supporting connections to said frame, a disengageable driving connection to said mechanism, and a pair of releasable clamping jaws at opposite end of the platen for clamping an expendable sheet of rubbing material; and a pair of pushbuttons mounted on opposite ends of said frame and normally free of said platen when engaging said frame but manually operable to engage said clamping jaws to release the same.

4. A portable rubbing machine assembly comprising: a manually supportable frame and housing including a driving mechanism; a readily disengageable rubbing platen including disengageable supporting connections to said frame, a disengageable driving connection to said mechanism, and a pair of releasable clamping jaws at opposite ends of the platen for clamping an expendable sheet of rubbing material; and a pair of spring-biased pushbuttons mounted on opposite ends of said frame and normally free of said platen when engaging said frame but manually operable downwardly to engage said clamping jaws to release the same, whereby operation of said pushbuttons serves to press an applied sheet of rubbing material into firm engagement with said platen to facilitate clamping of said sheet.

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