Sept. 26, 1950 R. C. HARRINGTON, JR 2,523,697

TOOL FOR HOLDING ABRASIVE MEDIA

Filed Jan. 21, 1949 2 Sheets-Sheet 1

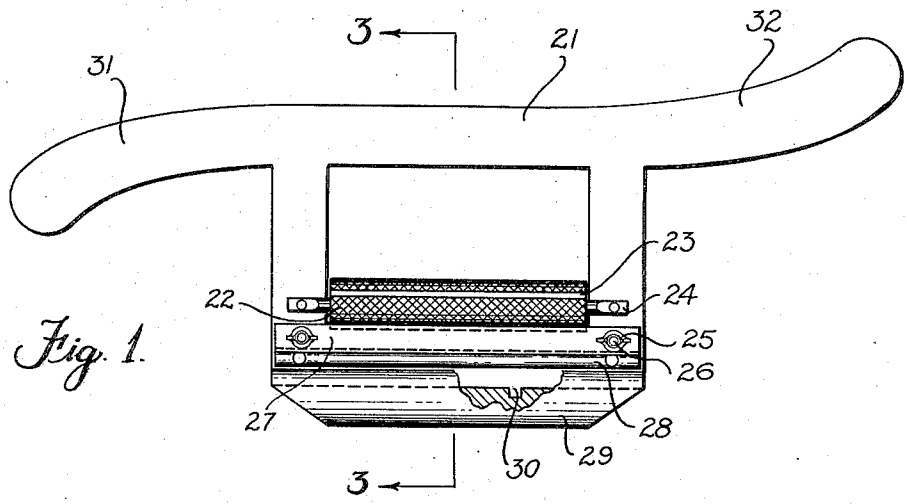


Fig. 1.

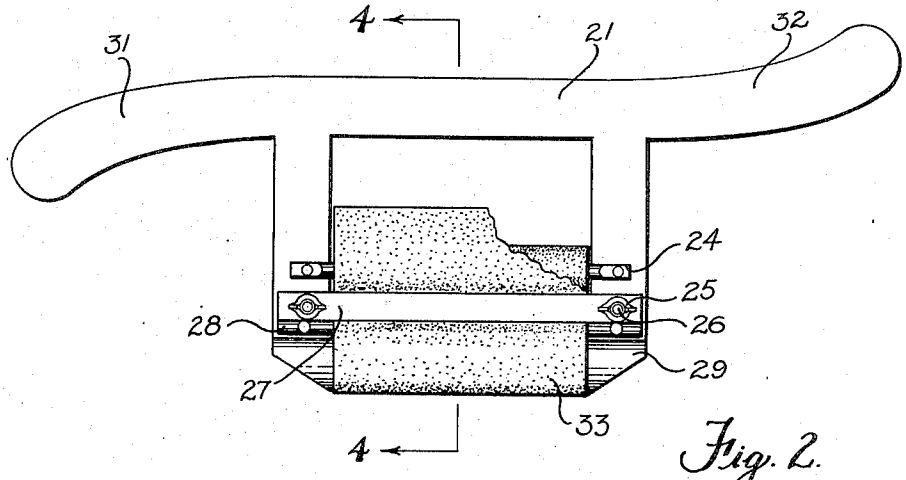


Fig. 2.

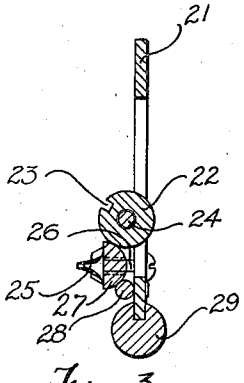


Fig. 3.

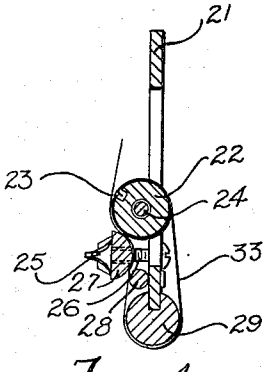


Fig. 4.

INVENTOR

R. C. Harrington, Jr.

Sept. 26, 1950 R. C. HARRINGTON, JR 2,523,697

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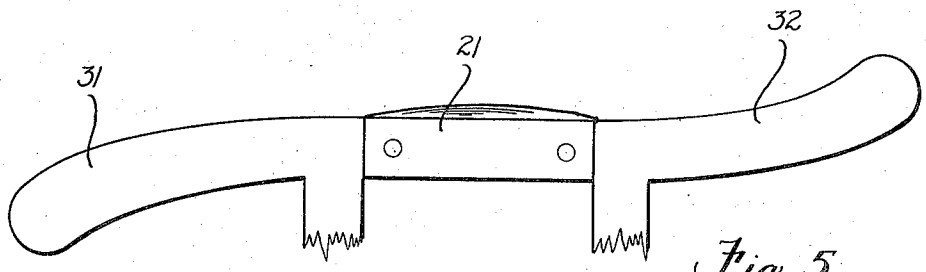


Fig. 5.

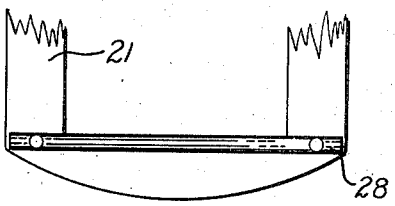


Fig. 6.

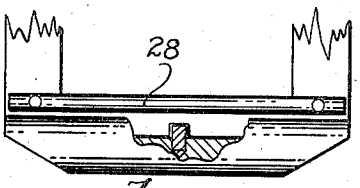


Fig. 8.

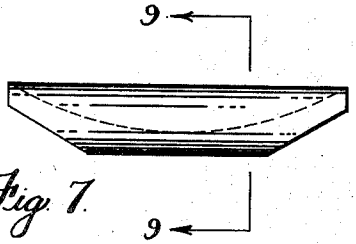


Fig. 7.



Fig. 9.



Fig. 16.



Fig. 15.



Fig. 14.

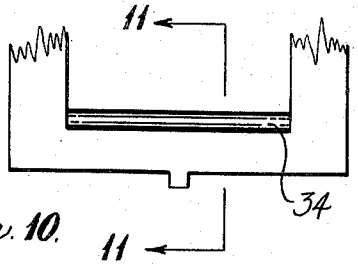


Fig. 10.

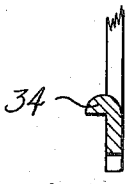


Fig. 11.



Fig. 17.



Fig. 18.



Fig. 19.

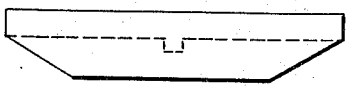


Fig. 12.



Fig. 13.

INVENTOR

R. C. Harrington, Jr.

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TOOL FOR HOLDING ABRASIVE MEDIA

Robert C. Harrington, Jr., Kingsport, Tenn.

Application January 21, 1949, Serial No. 71,831

5 Claims. (Cl. 51—187)

1

This invention relates to a tool of the type frequently referred to in the art as a "sand paper holder." More particularly, however, the present invention is concerned with an improved device comprising a hand tool contour sander.

Many types of "sand paper holders" have been described in the prior art. The earlier and most common type appears to be of a block construction more or less adapted to holding a flat sheet of abrasive or polishing material for application to a flat surface. In many instances, however, it is desirable to sand or polish concave or convex areas or surfaces having other special surface configurations. Hand finishing tools have been suggested having replaceable parts which correspond to prismatic designs or the like over which the sand paper may be placed.

However, known constructions have, in general, adhered to the block design adapted to be held in one hand and have involved in their make up several protruding screw heads and other protruding parts. The square or rectangular block construction may be uncomfortable to hold in the hand and is usually susceptible to the application of only a single hand pressure unless one hand is placed upon the hand holding the block sander which is, of course, not too comfortable or convenient for best working conditions. Such block sanders are fairly complicated to construct and in some instances do not too securely or conveniently hold the sand paper.

The invention described hereinafter is an improved device of the class described and specifically a simpler and more versatile tool for holding abrasive or polishing sheet media as will be apparent as the description proceeds.

This invention has for one object to provide a tool for holding abrasive or polishing media in the form of sheets which is more versatile of operation than similar devices but yet is simpler and less expensive to construct. A specific object is to provide an improved hand tool contour sander which is adaptable to working upon a variety of differently formed surfaces. Another object is to provide a tool of the class described in which a plurality of different insert forms may be readily interchanged. A further object is to provide a hand contour sander which may be used with sheets of sand paper, emery cloth, crocus cloth, or other abrading or polishing media in the form in which they are readily available in hardware stores, for instance. Another object is to provide a simple and relatively inexpensive method for constructing the aforesaid tool.

Other objects will appear hereinafter.

In the accompanying drawings,

2

Figure 1 is an elevational view in partial section, illustrating the manner in which the various elements of my improved sander are assembled, the device being in its unloaded condition, that is, without the insertion of the abrasive sheet material.

Figure 2 is an elevational view, similar to Figure 1, and showing the manner in which the abrasive sheet is clamped in the frame member in operative position.

Figure 3 is a sectional view taken on line 3—3 of Figure 1 and showing in detail the magazine for holding the abrasive sheet material, the sheet clamping or locking element and one of the interchangeable form members around which the abrasive sheet material is carried and held, in operation.

Figure 4 is a sectional view taken on line 4—4 of Figure 2 in all respects similar to Figure 3, except that in this view the abrasive sheet material has been loaded into the device and is shown clamped in operative position, therein.

Figure 5 is a fragmentary elevational view illustrating one form of handle which may be employed as a means of holding and moving the improved sander of my invention.

Figure 6 is a fragmentary elevational view showing the lower part of the frame member including the element which holds the form member about which the abrasive sheet is wrapped in place.

Figure 7 is an elevational view illustrating one type of form and its internal slot which cooperates with the holding member illustrated in Figure 6.

Figure 8 is a fragmentary elevational view, in partial section, illustrating the manner in which the form member in Figure 7 co-acts with the holding member of Figure 6 and also illustrating one means whereby endwise movement of the form member in relation to the holding member is prevented.

Figure 9 is a cross-sectional view taken on the line 9—9 of Figure 7.

Figure 10 is a fragmentary view illustrating one form of locking bar for locking the abrasive sheet in place.

Figure 11 is a fragmentary cross-sectional view taken on the line 11—11 of Figure 10 illustrating the manner in which the locking bar may be formed from the frame member itself as a bent over or rolled down edge or portion thereof.

Figure 12 is an elevational view showing the general shape of the form member as it appears when examined at right angles to the frame member.

Figures 13, 14, 15, 16, 17, 18 and 19 show typical contours of the form member which may be employed in accordance with my invention.

Referring to Figure 1, my improved tool is comprised of an over-all frame **21** which is provided with handles **31** and **32**. It will be noted that the frame is of such a construction that it can be grasped by one hand at the top part of the frame or by both hands at **31** and **32**. That is, the handles **31** and **32** may be of such angular design as lends itself to readily grasping and holding in the hands.

The lower portion of the frame is provided with a locking bar **28** or a rolled down member **34** (see Figures 8, 10 and 11) of circular or similar shape over which the abrasive sheet may not only be conveniently drawn but may be locked against.

The various parts described above can be quickly and economically produced merely through stamping. The member **34**, just referred to, as indicated, lends itself to formation by folding over and down a portion of the cut out part in making the frame.

Mounted adjacent to this locking bar **28** (or member **34**, if this construction is employed) is a roll **22** (see Figures 3 and 4) which revolves on an axle **24**. The roll may be knurled or otherwise roughened on its surface to increase the friction between itself and the flexible abrasive or polishing sheet **33**. This roll is further provided with a slot **23** along its axis into which one end of the abrasive sheet **33** may be inserted in order that it may be securely held.

Mounted between the locking bar and the roll **22** is the clamping bar **27** (see Figures 1 and 2) which cooperates with the locking bar and the roll to tighten and securely hold the sheet **33** in place on the tool. This clamping bar is held in place by means of set screws **25** which are used to tighten or loosen the clamping bar. Further, it can be seen that these three members cooperate in an unusual way to tighten and securely hold the sheet **33**. Reference to Figure 4 which as already indicated is a cross section through **4—4** of Figure 2 shows a sheet of the flexible abrasive media in place on the tool. After the flexible sheet **33** has been slipped under the clamping bar **27**, the wing nuts **25** are tightened. Now since the holes provided for the bolts **26** in the clamping bar are oversize, the clamping bar first bears against the roll **22** which action serves to hold the sheet abrasive on the roll in place, and firmly locks the loose end. As the wing nuts are further tightened, the clamping bar pivots and is forced inward against the sheet abrasive which is now securely held at both ends. Finally, when the sheet abrasive is tight, the clamping bar bears against the circular member **28** or the member **34**, as the case may be and holds the sheet abrasive firmly and tightly in place.

When a new surface of the abrasive sheet is desired, it is only necessary to loosen the set screws **25**, pull the loose end of the sheet abrasive until enough unrolls from the magazine, or roll **22** to present a fresh surface around the outside of the interchangeable form **29**, and again tighten the set screws. Such an arrangement obviously permits great economy in the use of the flexible abrasive media.

As just referred to, mounted below these previously described members is the interchangeable form **29**. This form, of any desired configuration, is grooved to accept the lower portion of the frame and is further provided with a hole or slot to accept the holding lug **30**. In use, the interchangeable form is held securely against the frame of the tool by the tightened flexible sheet, and the lug on the frame cooperates with the slot or hole in the interchangeable form to prevent lateral motion of the interchangeable form.

Referring now to some of the variations that may be made in the construction of my invention Figure 5 shows an alternate shape for the upper part of the frame. In this design, the middle portion of the frame is curved to better fit the hand and is provided with hand grips, which are riveted to the frame.

Figure 6 shows an alternate design for the lower portion of the frame which is simple in design and which holds the interchangeable form securely. The lower portion here is given some simple curved shape, the shape which would correspond to the curvature of a circular saw blade, for example. Consequently, the interchangeable form as shown in Figure 7 could be grooved by a circular saw, and would be ready to fit in place on the frame **21**. Thus, when the flexible sheet abrasive media is tightened around an interchangeable form so slotted as to fit such a frame, it would be securely held in place.

Figure 8 shows still another means of holding the interchangeable form in place on the frame of the tool. In this case, the frame is provided with a cut out portion, and a lug is driven or placed in the interchangeable form. When put together the lug fits into the slot provided for it in the frame of the tool and effectively prevents all motion when held in place by the tightened sheet abrasive media.

Figure 11 indicates how a circular member **34**, which performs the same functions as part **28** of Figure 3, may be formed by folding down a portion of the cut-out part of the frame. Figure 11 is a cross-section view along **11—11** of Figure 10 and shows the design of this circular member in detail.

Figure 12 is a side view of a typical interchangeable form and shows the position of the slot cut to accommodate the lower portion of the frame together with the hole which accepts the holding lug **30** of the frame member.

Figures 13, 14, 15, 16, 17, 18 and 19 are end views of several of the interchangeable forms which may be used with this improved tool.

The many interchangeable forms which may be used with this improved tool make it quite versatile. With various shaped forms, molding and furniture may be finished and many contours may be finely polished which cannot be polished with either the conventional type of hand sander or electric sander. A further importrant use to which this tool is well adapted is the refinishing of gun stocks. For instance, an interchangeable form of the desired radius and with a cross section such as is shown in Figure 9 lends itself to the speedy and expert finishing of barrel grooves in stocks. This is particularly important since no sanders are available at this time which can do this job.

It is further to be understood that a cushioning material such as felt may be placed between the interchangeable form and the flexible sheet abrasive media if such a soft base is desired.

The manufacture of my tool as well as the manner of using the finished tool are apparent from the preceding description. However, a further understanding of the utility of my device will be had from the following example of its operation wherein a sheet of sand paper is inserted and a special form attached so that the device can be used to sand molding, barrel grooves in gun

stocks, and those parts of furniture which have intricate shapes.

In operation, a sheet of flexible abrasive material is cut in three strips of equal width. The end of one of these strips is inserted in the magazine slot with the abrasive surface facing out, and the magazine rotated so that most of the flexible sheet is wound on it. Next, the desired interchangeable form is fitted on the bottom of the frame, and the flexible sheet passed around the form. The free end of the flexible sheet is then passed over the locking bar **28**, under the clamping bar **27**, and over the magazine **22**. The wing nuts **25** are then tightened, and the clamping bar **27** performs its function in a unique manner. As the clamping bar is tightened, it first presses against the magazine, and the free end of the flexible sheet abrasive. This action securely holds one end of the flexible sheet abrasive. At the same time, the free end of the sheet abrasive is tightly held between the magazine and the clamping bar. At this point, the flexible sheet abrasive is held at its two ends. Since the holes in the clamping bar are larger in diameter than the bolts **26** as already mentioned, and since one side of the clamping bar **27** is held against further movement by the magazine **22**, further tightening of the wing nuts causes the clamping bar to rock or pivot about, the magazine as a pivot. This slight rotation serves to draw the flexible sheet **33** abrasive down between the magazine **22** and the locking bar **27** thus causing the flexible sheet to become taut. Further tightening of the wing nuts causes the rotating clamping bar to finally press the flexible sheet abrasive between the clamping bar and the locking bar. At the same time, this tightening of the flexible sheet abrasive **33** holds the interchangeable form **29**, etc. securely to the frame while the lug or other of the means described prevents the interchangeable form **29**, etc. from sliding out of position while the sander is being used.

At this point, the sander is ready for use, and depending upon the shape of the interchangeable form, an article having contours corresponding to the form selected may be abraded or polished.

When the article undergoing sanding requires a great deal of abrading or polishing, the handle like protrusions **31** and **32** are very convenient since they are curved to permit a heavy, yet sensitive pressure, and accurate guiding. On the other hand, the frame may be grasped by one hand about the middle of its upper portion. Such an arrangement permits the article to be held by one hand and sanded with the other, and the tool thus has great versatility.

When the surface of the flexible sheet abrasive under the interchangeable form has become worn, it may be renewed by loosening the wing nuts **25** and pulling on the free end of the sheet until a new surface is presented under the interchangeable form. At this point, the wing nuts are tightened, and the sander is again ready for use.

Further, if it is desired to interchange forms, the wing nuts **25** are loosened, the interchangeable form already in place on the frame pulled down until it disengages its lateral locking means and then pulled out. The newly selected interchangeable form as, for example, one of the forms shown in Figures 13–19 is then slipped in the loop formed by the flexible sheet at the lower portion of the frame, the free end of the flexible sheet pulled until it is tight around the interchangeable form, and the wing nuts **25** again tightened. The tool is now again ready for use.

This hand contour tool has many advantages over those of the prior art, prominant among which are the facts that this improved sander can use sheets of flexible abrasive or polishing media such as sand paper or emery cloth which are readily obtainable whereas other sanders require special rolls of sheet abrasive generally difficult to acquire. The various interchangeable forms can be easily made by anyone with reasonable familiarity with tools, whereas the sanders described in the prior art have forms which are difficult to construct. Further, the frame is characterized by maximum utility in that the handle portion is positioned or set off from the abrasive sheet, and is, therefore, easier to grasp.

While in the above description of the operation I have specifically referred to the use of an abrasive paper, it will be understood that this is merely illustrative and polishing fabric or any other conventional flexible abrasive media may be used in my device. Likewise, in the above description while I have otherwise referred to specific construction for illustration, this construction may be varied, for example, as described in the various alternate views. Hence I do not wish to be restricted except insofar as is necessitated by the prior art and the spirit of the appended claims.

I claim:

1. A hand contour sander comprising in combination, a substantially rectangular unitary and rigid frame composed of side members and upper and lower end members and adapted to be grasped by the upper end member, a cylindrical magazine member rotatably mounted on the side members of the frame adjacent the lower end thereof and adapted to hold a length of abrasive sheet material, a locking bar fixedly attached to the lower end member in parallelism with the magazine member and spaced therefrom, an adjustable clamping bar adapted both to be moved away from and to be brought into surface contact with both the magazine member and the locking bar to permit of insertion and of clamping in place of the abrasive sheet material, an interchangeable rigid form member apertured to receive the lower end member of the frame and adjustable means to move the clamping bar into and out of clamping contact with the abrasive sheet material and the magazine member and the locking bar.

2. A hand contour sander comprising in combination, a substantially rectangular unitary and rigid frame composed of side members and upper and lower end members and adapted to be grasped by the upper end member, a cylindrical magazine member rotatably mounted on the side members of the frame adjacent the lower end thereof and adapted to hold a length of abrasive sheet material, a locking bar fixedly attached to the lower end member in parallelism with the magazine member and spaced therefrom, said locking bar consisting of a rolled down portion of the lower end member, an adjustable clamping bar adapted both to be moved away from and to be brought into surface contact with both the magazine member and the locking bar to permit of insertion and of clamping in place of the abrasive sheet material, an interchangeable rigid form member apertured to receive the lower end member of the frame and adjustable means to move the clamping bar into and out of clamping contact with the abrasive sheet material and the magazine member and the locking bar.

3. A hand contour sander comprising in combination, a substantially rectangular unitary and rigid frame composed of side members and upper and lower end members, said upper end member being projected beyond the respective side members in the form of handles adapted to be grasped by an operator, a cylindrical magazine member rotatably mounted on the side members of the frame adjacent the lower end thereof and adapted to hold a length of abrasive sheet material, a locking bar fixedly attached to the lower end member in parallelism with the magazine member and spaced therefrom, an adjustable clamping bar adapted both to be moved away from and to be brought into surface contact with both the magazine member and the locking bar to permit of insertion of and of clamping in place of the abrasive sheet material, an interchangeable rigid form member apertured to receive the lower end member of the frame and adjustable means to move the clamping bar into and out of clamping contact with the abrasive sheet material and the magazine member and the locking bar.

4. A hand contour sander comprising in combination, a substantially rectangular unitary and rigid frame composed of side members and upper and lower end members and adapted to be grasped by the upper end member, a cylindrical magazine member rotatably mounted on the side members of the frame adjacent the lower end thereof and adapted to hold a length of abrasive sheet material, a locking bar fixedly attached to the lower end member in parallelism with the magazine member and spaced therefrom, an adjustable clamping bar adapted both to be moved away from and to be brought into surface contact with both the magazine member and the locking bar to permit of insertion and of clamping in place of the abrasive sheet material, an interchangeable rigid form member apertured to receive the lower end member of the frame, a sheet of abrasive material wrapped around the magazine member and around the form member and held in clamped position between the clamping bar and the magazine member and locking bar, respectively, by adjustable means, permitting movement of said clamping bar toward and away from contact with the abrasive sheet material and the magazine member and locking bar.

5. A hand contour sander comprising in combination, a substantially rectangular unitary and rigid frame composed of side members and upper and lower end members and adapted to be grasped by the upper end member, a cylindrical magazine member rotatably mounted on the side members of the frame adjacent the lower end thereof and adapted to hold a length of abrasive sheet material, a locking bar fixedly attached to the lower end member in parallelism with the magazine member and spaced therefrom, an adjustable clamping bar adapted both to be moved away from and to be brought into surface contact with both the magazine member and the locking bar to permit of insertion and of clamping in place of the abrasive sheet material, an interchangeable rigid form member apertured to receive the lower end member of the frame, a sheet of abrasive material wrapped around the magazine member and around the form member and held in clamped position between the clamping bar and the magazine member and locking bar, respectively, by adjustable means, said adjustable means comprising threaded studs fixed to the side members and projecting through oversized apertures in the clamping bar, each of said studs being provided with adjusting nuts for moving said clamping bar toward and permitting its movement away from the abrasive sheet material and the magazine member and locking bar.

ROBERT C. HARRINGTON, JR.

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