Sept. 12, 1939. B. B. RAMEY 2,172,407

PAD FOR SANDERS AND THE LIKE

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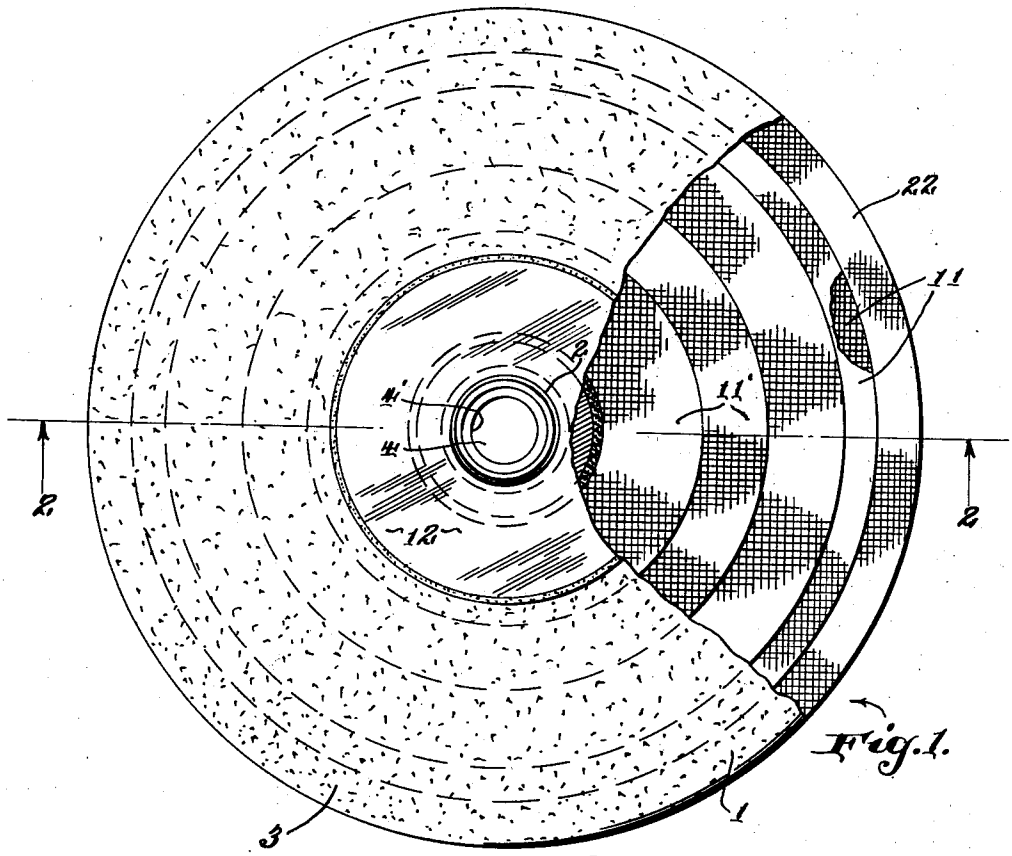


Fig. 1.

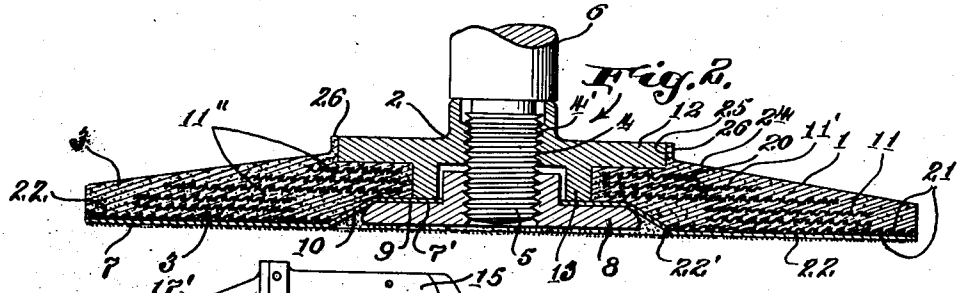


Fig. 2.

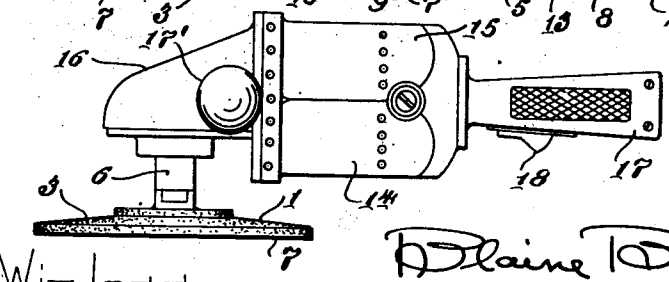


Fig. 3.

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PAD FOR SANDERS AND THE LIKE

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6 Claims. (Cl. 51—197)

The present application is, in part, a continuation of application No. 169,620, filed October 18, 1937.

The invention relates to the treatment of metal and other surfaces by means of a manually portable power-driven tool, and more particularly to sanding and kindred operations in which an abrasive sheet or disc of any desired fineness and quality is supported on a rotary pad whereby the abrasive sheet is held in contact with the surface to be treated and moved over the same in a manner suitable to the surfacing operation being performed, it being understood that the term "sanding" as used herein may indicate the application in this way of either fine or coarse abrasive and that the pad of the invention may be employed in various surfacing operations from coarse sanding to polishing.

The prior are includes various flexible pads for this purpose. A type of pad which is in extensive use at the present time consists of a felt disc with one or more flexible steel backing plates or discs and a hub to which the plate or plates are attached, the hub being adapted to be mounted on the spindle of a sanding or similar machine.

This type of sanding pad is subject to failure by the wearing of the felt and the breaking of the steel plates due to the flexing action which is essential to the sanding operation as performed by the hand-controlled portable power-driven type of sanding machine. While a more durable pad can be produced by the use of heavier or harder felts and heavier steel backing discs. The flexibility of the complete pad and the resilience of the felt are very much reduced, so that the sanding operation cannot be performed to the degree of satisfaction attained wih a more flexible pad.

The sanding pad of the invention meets the requirements of use and overcomes the difficulties referred to in that it has greater flexibility than can be attained with the thinnest and most flexible steel plates that can be used in the manner above described, and it is also resilient to the full extent which is desirable for this purpose. In addition to possessing the highest degree of flexibility and resilience, the improved pad of the invention is usable for a period many times in excess of the flexible steel and felt pads previously used for this purpose, as it is not appreciably reduced by wear as is the felt, nor is it subject to breakage by flexing within a period which is many times the life of any previous pad or disc used for this purpose.

While the prior patents disclose rubber pads and reinforced rubber pads, so far as can be ascertained, none of these have been in use, whereas the pad of the preceding application above cited, have been extensively used and sold and have proved highly satisfactory in every way. While the pad of this invention is particularly adapted to use on portable sanding and similar tools of the portable type of which an example is herein illustrated, it is also capable of use for the general purposes of a sanding or similar pad.

In the accompanying drawing, I have illustrated a sanding pad embodying the features of the invention in the preferred form. In the drawing:

Fig. 1 is a top plan view of the sanding pad removed from the spindle.

Fig. 2 is a section at righ angles to the plane of Fig. 1 and taken on the line 2—2 in Fig. 1.

Fig. 3 is a side elevation on a reduced scale of a portable electrically-driven sanding or polishing tool with the pad attached and carrying a sanding disc ready for operation.

Referring to the drawing by numerals, each of which is used to indicate the same or similar parts in the different figures, the sanding pad 1 comprises a hub 2 of metal or other suitable material, and a rubber, or fabric and rubber, disc 3. The hub 2, as shown has a flange or plate to which the disc 3 is secured in any suitable manner, as hereinafter described. The disc 3 is highly flexible and is referred to herein as a flexible disc.

In the form shown, the hub 2 is centrally apertured at 4 and threaded at 4' to engage the correspondingly formed and threaded end 5 of the sanding or similar tool spindle or shaft 6. The shaft end 5 being threadedly engaged with the hub 2, the abrasive disc or sheet 7, which is suitably formed in accordance with the regular practice, is secured to the pad, and the pad or more particularly the hub 2, is secured to the shaft by means of a flanged nut 8 which engages the lower end of the shaft 5, the flange 9 of said nut being seated in a saucer-like depression 10 in the lower face of the disc 3 and overlying the central portion of the abrasive sheet 7 which, according to the prevailing practice, is circular to conform to the pad, which is likewise circular, the abrasive sheet 7 being known in the trade as an abrasive disc. To provide a positive attachment for the abrasive or surfacing sheet 7 to the hub, the hub 2 or the flange 12 thereof may be provided with a downwardly disposed circular boss or shoulder 13 which supports the inner edge por-

tion 7' of the disc 7 oppositely to the flange 9 of the nut 8. Any other suitable support for the abrasive sheet in opposition to the nut may be substituted for shoulder 13.

In the most approved construction, the flexible disc 3 is reinforced by means of fabric sheets or rings 11 and 11', to be further described. These may be embodied in the rubber 21 prior to vulcanization. In the use of the pad constructed in accordance with the description of the above entitled application, it was found that though this pad was in almost every way highly satisfactory, the continual flexing of the disc 7 in sanding resulted in chafing between the back of the disc and the contacting surface of the pad at 21 in Fig. 2, and after a considerable period of use the outer edge portion of the pad was gradually worn away so that the pad presented an undesirably thin outer edge. By placing a layer of fabric on the surface of the pad, the fabric being indicated by reference character 22, it is found that the chafing action is limited to the contact between the disc and the fabric, and the relatively soft rubber is thus protected greatly extending the life of the pad. The fabric also serves as an additional reinforcing sheet.

The fabric sheet 22 is shaped in accordance with the bottom surface of the disc, preferably having an opening 22' substantially of the diameter of the depression 10. This protective fabric is preferably attached by vulcanization being imbedded in the surface of the rubber.

In accordance with the preferred practice in producing this article, the pad is molded and vulcanized to the hub 2, which is placed in a suitable mold of the shape of the finished pad, suitable layers of fabric and rubber being placed in the mold with the rubber in contact with the flange 12 of the hub, and suitable pressure being applied, the mold is also subjected to vulcanizing heat for a period sufficient to cure the rubber giving it full resilient qualities. The fabric is thus embodied in the rubber and the rubber is vulcanized to the hub, the surface sheet 22 being at the same time vulcanized in and to the bottom surface of the pad. Attaching the rubber to the hub in this way eliminates the need for rivets or screws which add to the cost and weight and increase the danger of separation.

It is of importance that the rubber disc 3 is not only highly flexible but that it is molded in such a way that it is gradually reduced in thickness from the shoulder 20 immediately adjacent this hub toward the outer periphery to give exactly the right degree of flexibility at all points.

It is also of importance that the fabric 11 and 11' which is preferably arranged with the sheets overlapping at 11'' near the shoulder 20, serves to support the rubber, reducing the extreme pliability of the rubber, so that the disc is not too pliable; and that it also serves as a reinforcement to prevent cracking of the rubber as it is flexed, particularly adjacent the periphery of the hub at 20 as shown where the maximum reinforcing effect is produced. The type of fabric used is subject to a considerable degree of variation, medium or light weight duck being satisfactory.

For the purpose of more securely attaching the rubber 24, or rubber and fabric forming the flexible disc 3, to the hub, the mold may be so shaped as to permit the rubber to enclose the peripheral edge 25 of the disc, forming a peripheral edge or lip 26 which engages the edge 25, increasing the area of adhesive contact between the rubber and the metal. It will be noted that the diameter of the flange 12 is a little less than half the diameter of the disc and properly described as approximately one half the diameter of the disc. It will also be noted that the reinforcing effect, is gradually reduced from just outside the periphery of the hub flange 12 toward the periphery of the disc, the fabric sheet 22, also having a reinforcing effect, though its most important function is to protect the rubber from abrasion through the flexing of the disc 7.

After vulcanization the pad is ready for use, being attached to any suitable sanding or polishing machine, of which the machine 14 in Fig. 3 is an example. The machine illustrated is electrically driven, having a field casing 15, gear casing 16, hand grip and control 17, 17', switch 18, and spindle 6. An electric motor within the field casing 15 drives spindle 6 through suitable reducing gearing, not shown. The pad 1 is mounted on the end of spindle 6, as already described in connection with Fig. 2.

Important accomplishments of the invention are, first, the production of a sanding pad of just the right degree of graduated resiliency; second, the production of such a pad which is not subject to failure by breaking or cracking over a long period of use greatly in excess of the life of a flexible metal-supported pad; third, the production of a sanding or similar pad of resilient quality but not subject to reduction or abrasion by wear due to the flexing of the disc 7 after the manner of the well-known felt and similar sanding pads, and unprotected rubber pads; fourth, the production of a fabric-reinforced rubber sanding or similar pad or disc with a rigid hub support, the pad being tapered and arranged to prevent cracking at or near the edge of the support.

I have thus described a sanding pad embodying the features of my invention in the preferred form, the description being specific and in detail in order that the manner of constructing, applying, operating, and using the invention may be fully understood; however, the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A pad for use on a rotary surfacing machine and adapted to operatively support a sheet of surfacing material, the pad having a flanged hub of rigid material adapted for attachment to the shaft of a sanding machine, and a disc composed of rubber and having fabric embodied therein to control the flexibility of the rubber and prevent cracking, the fabric being radially disposed, the rubber disc being attached to the hub flange by adhesion, the disc having a reducing taper as to its thickness outwardly from the periphery of said flange, and positive means for clamping the surfacing sheet to the hub, the fabric being in the form of a plurality of sheets concentric with the axis of the disc and of different diameters, and being arranged in overlapping relation, the maximum overlap and the maximum reinforce being adjacent the outer periphery of the flange, and the offset providing a gradual decrease of the reinforce outwardly from said periphery, the sheets also having central apertures of different sizes whereby the reinforcing effect is decreased inwardly from said area of maximum reinforce.

2. A pad for use on a surfacing machine of the rotary type and adapted to support an abrasive sheet, the pad comprising a hub of rigid material for attachment to the shaft of said machine, and

a flexible rubber disc mounted on the hub concentrically therewith, the hub having a radial flange of a total diameter of approximately one-half the diameter of the disc to the radial surface of which the disc is adhesively secured, the disc having a reinforce of textile fiber embodied therein and extending from near the center of the disc outwardly approximately to its outer periphery, the outer edge of the flange being of considerable extent in the direction of the axis of the disc and presenting an extended surface on which the rubber is adhesively secured, the thickness of the reinforce being gradually reduced outwardly from a point substantially adjacent the outer edge of the flange, and the pad having a substantially uniform taper from the edge of the hub flange to the outer edge of the paid.

3. A pad for use on a rotary surfacing machine and adapted to operatively support a sheet of surfacing material, the pad having a flanged hub of rigid material adapted for attachment to the shaft of a sanding machine, and a disc composed of rubber and having fabric embodied therein to control the flexibility of the rubber and prevent cracking, the fabric being radially disposed, the rubber disc being attached to the hub flange by adhesion, the disc having a reducing taper as to its thickness outwardly from the periphery of said flange, and positive means for clamping the surfacing sheet to the hub, the fabric being in the form of a plurality of sheets concentric with the axis of the disc and of different diameters, and being arranged in overlapping relation, the maximum overlap and the maximum reinforce being adjacent the outer periphery of the flange, and the offset providing a gradual decrease of the reinforce outwardly from said periphery, the sheets also having central apertures of different sizes whereby the reinforcing effect is decreased inwardly from said area of maximum reinforce and a sheet of fabric integrally attached to and protecting the surface of the rubber which immediately underlies and supports the surfacing sheet.

4. A pad for use on a surfacing machine of the rotary type and adapted to support an abrasive sheet, the pad comprising a hub of rigid material for attachment to the shaft of said machine, and a flexible rubber disc mounted on the hub concentrically therewith, the hub having a radial flange of a total diameter of approximately one-half of the diameter of the disc to the radial surface of which the disc is adhesively secured, the disc having a reinforce of textile fiber embodied therein and extending from near the center of the disc outwardly approximately to its outer periphery, the outer edge of the flange being of considerable extent in the direction of the axis of the disc and presenting an extended surface on which the rubber is adhesively secured, the thickness of the reinforce being gradually reduced outwardly from a point substantially adjacent the outer edge of the flange, and the pad having a substantially uniform taper from the edge of the hub flange to the outer edge of the pad, and a sheet of fabric integrally attached to and protecting the surface of the rubber which immediately underlies and supports the abrasive sheet.

5. A pad for use on a surfacing machine of the rotary type and adapted to support an abrasive sheet, the pad comprising a hub of rigid material for attachment to the shaft of said machine and a flexible rubber disc mounted on the hub concentrically therewith and projecting radially therefrom providing a radial flat surface to support the abrasive sheet and a protective and reinforcing sheet of fabric integrally attached to and overlying and substantially covering the surface of the pad which supports the abrasive sheet.

6. A pad for use on a rotary surfacing machine and adapted to operatively support a sheet of surfacing material, the pad having a flanged hub adapted for attachment to the shaft of the machine, and a disc composed of flexible rubber underlying and secured to the hub flange and projecting outward radially therefrom and having fabric embodied therein to control the flexibility of the rubber beyond the flange and prevent cracking, the fabric comprising a plurality of disc-like sheets substantially parallel to the plane of the rubber disc, and a protective and reinforcing sheet of fabric closely attached to the rubber disc overlying the surface thereof covered by the surfacing sheet and adapted to contact the sheet of surfacing material to protect the surface of the pad from wear due to the flexing of the surfacing sheet.

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