Dec. 19, 1961 A. E. TOBEY 3,013,449

ABRADING DISK

Filed Sept. 23, 1955

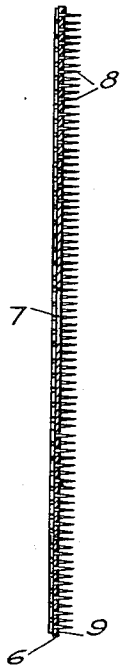


Fig. 1.

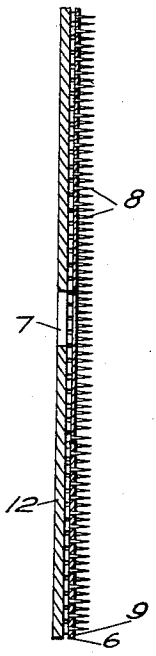


Fig. 2.

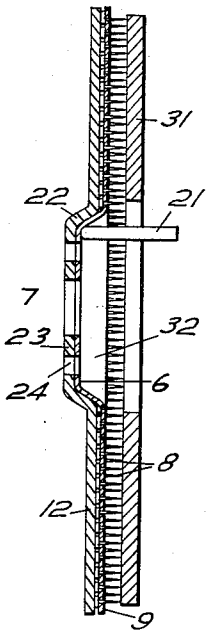


Fig. 3.

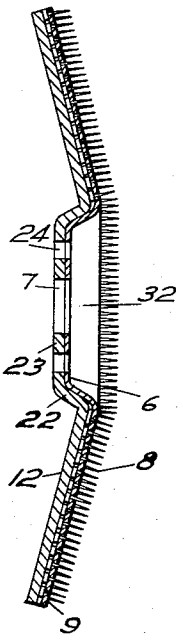


Fig. 6.

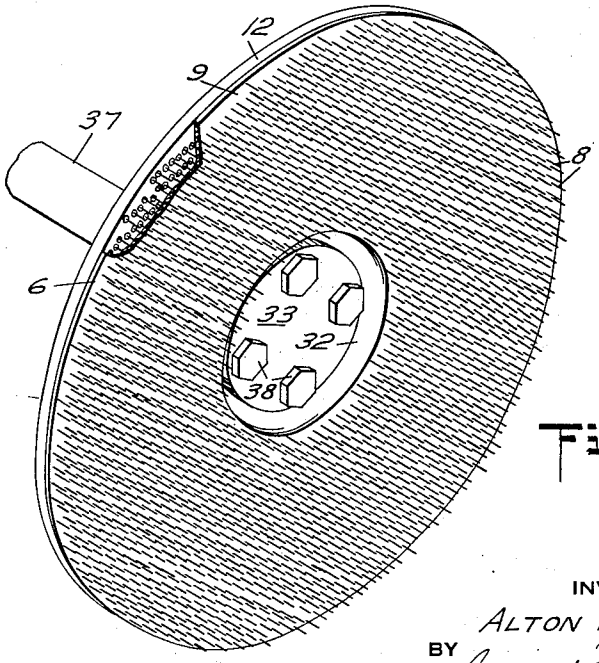


Fig. 4.

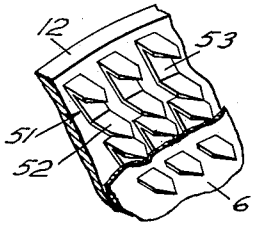


Fig. 5.

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3,013,449
ABRADING DISK

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This invention relates to abrading disks for rough grinding or buffing of surfaces, and is more particularly directed towards such a disk in which the abrading material consists of a plurality of pointed tacks, staples, or like elements.

In many instances it is necessary or desirable to grind or otherwise remove an outer surface portion or layer from some material. By way of example, it is often necessary to remove layers of paint from a wood or metal structure, rubber from tires in preparation for recapping or retreading operations, and similar situations. Heretofore, there have been a large variety of disk abraders utilized for such purposes but none have produced the extremely rough grinding surface for heavy abrasive operations which include the ability to go through nails or other foreign objects which may be engaged by the abrader.

Accordingly, it is an object of the present invention to provide a disk abrader in which a plurality of pointed elements are positioned on a surface of a disk so as to provide a substantially uniform and continuous extremely rough abrading surface on the disk.

Another object of my invention is to provide apparatus of the character described in which novel means are provided in the manufacture of the disk so as to insure the disk retaining a generally planar configuration.

A further object of the invention is to provide an abrading disk which is constructed in two main pieces, one thin piece being utilized for receiving the tacks, staples or other pointed elements, and the other piece acting as a back-up plate for the abrading elements.

Yet another object of the invention is to provide apparatus of the type described which is adapted to receive very short tacks or the like, and which permits the insertion of the tacks with a minimum of difficulty.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

FIGURE 1 is a vertical cross-sectional view of a plurality of tacks mounted on the tack holding portion of the abrading device.

FIGURE 2 is a view similar to FIGURE 1 but showing the back-up plate mounted thereon.

FIGURE 3 is a view of the construction shown in FIGURE 2 during the flanging or forming operation of the central portion of the disks.

FIGURE 4 is a perspective view of the disk abrader in operative condition for work.

FIGURE 5 is a portional perspective view of the disk abrader with staples in place of tacks being utilized.

FIGURE 6 is a vertical cross-sectional view of a slightly modified form of abrading disk.

In broad terms, the abrading device of the present invention is built in a disk-like form with tack or staple ends projecting beyond the surface of the disk so as to provide an abrading surface. Obviously, when mounted on a drill or other tool for rotating the disk, the tacks or other pointed elements must extend beyond any portion of the tool or holder so that only the ends or points will engage the surface of the work. It will be readily appreciated that while no great difficulty would be encountered in providing a plurality of tacks extending through an annular or disk-shaped member, the tacks will wear out after a period of time and therefore it is necessary that the disk be constructed as economically as possible so as to permit periodic replacement, while still maintaining a high degree of efficiency.

In accordance with the above, the disk of the present invention is constructed in the following manner. First, a relatively thin plate **6** is provided, such plate having a circular configuration and a central aperture as indicated at **7**. In practice, the place is in the neighborhood of .015 inch thick and tacks **8** may be readily driven therethrough in any suitable pattern so that a large portion of the outermost surface **9** of the plate is covered with the tack ends. Although the tacks **8** are held in the plate with a substantial degree of frictional security, it is still necessary to prevent rearward movement of the tacks so that the tacks will not fall from the plate when the abrading device is in operation and a load placed on the pointed ends thereof. Accordingly, it is necessary to use a back-up plate such as that indicated at **12**. The back-up plate has the same shape as the tack receiving plate **6**, including the central aperture **7**, and it is positioned rearwardly thereof so as to engage the heads of the tacks and firmly clamp the tacks in position on the plate. With the plates **6** and **12** positioned as shown in FIGURE 2 they may be readily spot welded so as to prevent any relative displacement therebetween. In accordance with the preferred welding practices, a plurality of spot welds are made adjacent the outer and inner peripheries of the adjacent plates and as well as at isolated points intermediate the central apertures **7** and the outer peripheral edges of the plate.

The plate **12** is preferably approximately twice the thickness of the plate **6** and the reason for the alternate thin and thicker plates are as follows. By using a thin plate for the member **6**, shorter tacks may be utilized while still presenting a substantial tack length for abrading. Also, a thinner plate makes it easier to insert the tacks as well as to spot weld the plate **6** to the back-up plate **12**. Insofar as the plate **12** is concerned, being in the neighborhood of .028 inch thick, it is thin enough to permit spot welding to the plate **6**, while having sufficient rigidity to maintain the disk in general planar configuration.

Notwithstanding the foregoing the insertion of the tacks through the plate **6** coupled with the spot welding of the plates together will result in an irregular and non coplanar configuration, and obviously for best results, all of the tack points should lie in substantially a common plane. Accordingly, as shown in FIGURE 3, as the next step in the production of the abrading device, the central portion of the plates, which have not been covered with tacks and which extend for a substantial distance radially outwardly of the central aperture **7** are deformed axially inwardly or rearwardly by means of any suitable forming tool **21**, thereby providing a generally tapered but axially extending shoulder **22** and a collar **23** disposed in spaced parallel relationship to the plane of the plates. This collar portion may have a plurality of holes **24** drilled therethrough for subsequent mounting of the disk on a power tool. This forming operation is accomplished by providing a relatively soft member **31** engageable by the tack points, such member being constructed of aluminum or the like. By forcing the tack points against the member **31** in any suitable manner such as by the application of axial pressure against the plate **12**, the forming tool may be used to draw the metal of the plates **6** and **12** while the tack

points are held in contact on the member. In this way, the forming of the depression **32** defined by flange **22** and collar **23** will actually assist in bringing the plate to a coplanar relationship and in condition for subsequent grinding or abrading operations. The depression **32** previously discussed is utilized to receive a collar **33** such collar engaging the outermost surface of the depression and adapted to hold it against the face plate of a drill shaft **37** by bolts **38**, the latter arrangement being illustrated in FIGURE 4 of the drawing.

From the foregoing description it should be appreciated that the method of producing the abrading disk and the disks themselves are simple yet the disk, by having the generally continuous roughened surface formed by the tacks, and in which the tack points all lie substantially in the same plane, provides an extremely efficient rough abrading device. Also, by virtue of the fact that even the thicker of the plates is not excessively thick, when the bolts **58** are tightened, the plates may be pulled into true with the drill face plate and thereby once again insure a proper operation of the disk.

The construction illustrated in FIGURE 5 utilizes staples **51** in place of the tacks **8**, such staples being formed of strap material and having pointed flanges **52** and a web **53** interconnecting the flanges. In this embodiment, the flanges **52** are driven through the plate **6** with the plate **12** clamping the web **53** between the plates **6** and **12**. Also, the greater thickness of the flanges or prongs **52** are concentric to the axis of the disk with the web extending generally radially thereof, so as to prevent unfolding or bending of the prongs during normal abrading operations.

For certain operations, such as working on the arcuate surface of a tire or the like, optimum results may be obtained by constructing the disk as illustrated in FIGURE 6. As there shown, the plates **6** and **12** are formed in the same manner as hereinabove described, but instead of having the annular portions of the plates coplanar, such portions are tapered rearwardly at an angle of about 12 to 18 degrees to provide a generally frusto-conical abrading surface.

What is claimed is:

1. A method of manufacturing an abrading tool which comprises forcing a plurality of pointed elements through a disk-like metal member, placing a thicker back-up member against the heads of said elements and welding the thicker member to said first member, then placing the points of said elements against a material softer than that of said members and urging said members and elements against said material, and then drawing the central portion of said members together to provide a depression away from the points of the elements while at the same time bringing said members into generally coplanar relationship.

2. A method as set forth in claim 1 further characterized by deforming said members in the area of said pointed elements to provide a frusto-conical abrading surface.

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