April 13, 1948. G. A. OLSEN 2,439,751

ABRASIVE DISC HOLDER

Filed July 13, 1946

Fig. 1

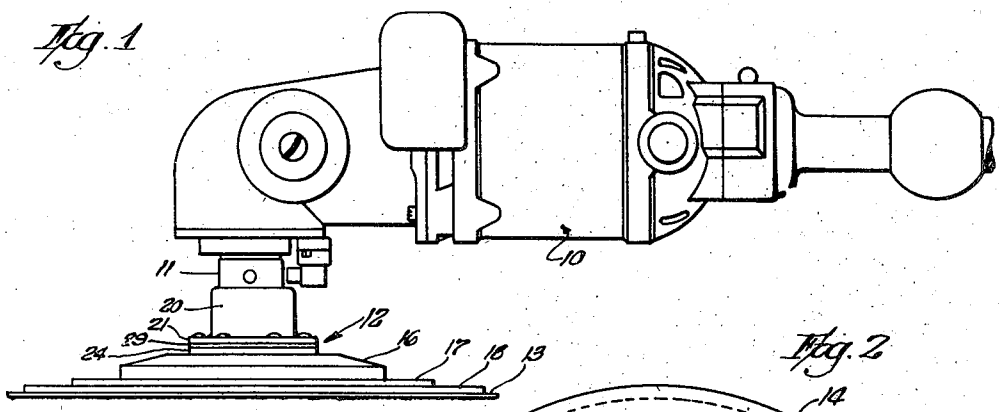


Fig. 2

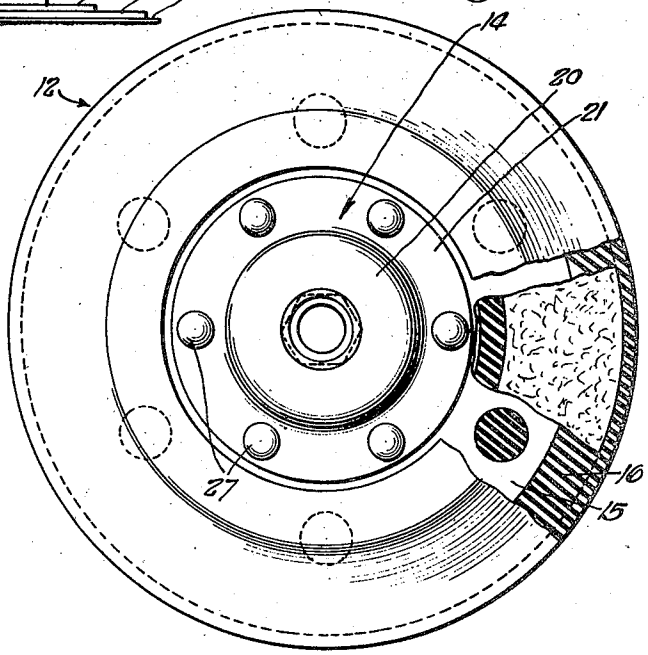


Fig. 4

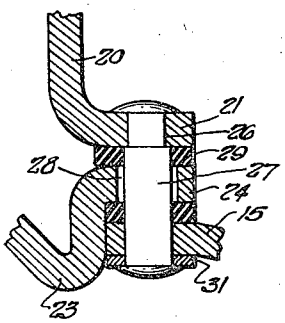
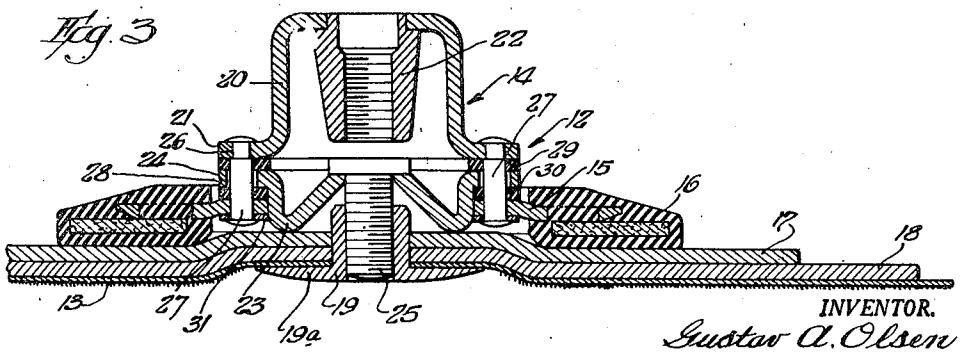


Fig. 3



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ABRASIVE DISC HOLDER

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6 Claims. (Cl. 51—197)

1

This invention relates to abrasive disc holders of the kind widely employed by automobile body finishers and others for smoothing rough surfaces; and it has to do more especially with an improvement in the type of abrasive disc holder described in United States Patent 2,132,917, granted to F. O. Albertson October 11, 1938.

In the holder of the Albertson patent the abrasive disc is secured against a resilient hard rubber pad which affords a certain amount of flexibility at and near the periphery of the disc—which flexibility is very essential to good results, but is not adapted to cushion shock components transmitted through the disc in the plane of rotation.

My object is to improve the performance characteristics of abrasive disc holders, such as that described in the Albertson patent, to the end of achieving smoother operation and reduction of shock, and, by so doing, to provide an equipment which will turn out a better job and, generally, with concomitant saving of time.

I have found that the above-stated object substantially can be realized by incorporating in the hub of the disc holder suitable resilient means which serve to introduce a limited yieldability near the axis of rotation, both in the plane of rotation and all planes normal thereto, with the result that the abrasive disc is better able to cope with unusually irregular surface conditions.

In the drawing which accompanies this specification:

Fig. 1 is a side elevational view of a sanding machine including a disc holder embodying the subject improvement;

Fig. 2 is a top plan view, partly in section, of the improved disc holder, on a larger scale than Fig. 1;

Fig. 3 is a sectional view of the disc holder taken along the plane of the axis of rotation thereof; and

Fig. 4 is an enlarged detail view depicting the novel construction by which the desired hub flexibility is achieved.

Referring to Fig. 1, the sanding machine there shown is a portable tool comprising a motor 10 having a suitable built-in right angle transmission including a drive-shaft 11 to which the abrasive disc holder 12 is detachably connected—the drive-shaft being provided with a threaded end for that purpose.

The holder 12 with attached abrasive disc 13 is shown in detail in Figs. 2–4 inclusive.

The major components of the disc holder are a hub 14, an annular disc 15 carried by the hub and concentric therewith, a molded hard rubber ring 16 generally referred to as a "pad," a pair of superposed backing discs 17 and 18, and a flanged nut 19 which serves to secure the abrasive disc 13 and backing discs 17, 18 to the holder. At

2

16a is indicated fabric reenforcement for the ring or table 16.

Hub 14 includes a cup-shaped member 20 having an outwardly directed flange 21 and carries an internally threaded sleeve 22 by means of which the holder can be detachably connected to drive-shaft 11 of the machine. Sleeve 22 may be brazed, welded or otherwise firmly secured to member 20 or it may be cast or forged integrally therewith. Hub 14 also includes a driven member 23 disposed in co-axial alignment with member 20 and having an external flange 24. A depending threaded stud 25 is brazed or otherwise firmly attached to member 23 in axial alignment with sleeve 22 and form a part of the hub. Nut 19 is threaded onto stud 25 and has a thin slightly convexed head or flange 19a which bears against the face of abrasive disc 13. The abrasive disc, together with backing plates 17, 18, are detachable from the holder by removing nut 19 from stud 25.

Flange 21 of member 20 conveniently is provided with six equally spaced holes 26 located on a circle concentrically with the axis of rotation of the hub, and in these are rigidly secured, as by riveting, six pins 27.

Flange 24 of member 23 is similarly provided with six equally spaced holes 28 which are in registration, individually, with pins 27 and of substantially larger diameter than the pins so that member 23 can rotate slightly relatively to the pins and to member 20.

Likewise, annular disc 15 is provided with six holes by means of which it is firmly mounted on pins 27 concentrically with the axis of rotation of the holder. The periphery of disc 15 is embedded in pad 16 and maintains the latter in concentric relation to the hub. Disc 15 also serves to centralize hub member 23.

As shown most clearly in Figs. 3 and 4, there is interposed between flange 21 and flange 24 a resilient spacer in the form of a gasket or washer 29, preferably of "neoprene" or other soft rubberlike material; and similarly interposed between flange 24 and disc 15 is a second resilient spacer in the form of a gasket or washer 30 which also is made of material such as "neoprene." The assembly comprising washers 29 and 30, flanges 21 and 24, and disc 15 are secured together because the headed end of each pin bears against a metal washer or ring 31. The riveting of pins 27, being performed at the shouldered ends thereof, does not unduly compress the parts which such pins hold in assembly. Spacers 29 and 30 may, alternatively, consist each of a single annulus or of several washers individual to pins 27.

Driving power is transmitted from driving member 20 through pins 27, thence through resilient spacers 29, 30 to the driven member 23, and

thence via stud 25 and nut 19 to abrasive disc 13 and backing plates 17, 18. The central openings in the abrasive disc and backing plates are non-circular and preferably hexagonal, and the shank of nut 19 is of corresponding form to fit said openings whereby to provide a positive driving connection to the abrasive disc.

The resiliency afforded by spacers 29 and 30 permits the abrasive disc to yield to a limited extent to any extra hard spots which may be encountered in the surface being worked upon, such for example as weld seams, and this not only reduces the amount of shock felt by the operator but it also has been found definitely to result in superior workmanship—which probably is attributable to the workman being better able to steady the machine against shock-producing conditions and to minimized nervous strain. Whatever the correct explanation may be, the fact remains that workmen express a distinct preference for disc holders constructed in accordance with the present invention, and it is a demonstrated fact that, on the whole, they do distinctly better work with disc-holders so equipped. Equipment comprising my improved abrasive disc-holder is especially adapted to do fine work when "feathering" the edges of surface coatings of metal finishing enamel and the like.

Having thus illustrated and described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an abrasive disc holder, a hub comprising a first hub member having an outwardly projecting flange, a second hub member co-axial with said first hub member and having an outwardly projecting flange in face-to-face relation to the first-mentioned flange, a plurality of spaced pins rigidly attached to one of said flanges and each passing loosely through an opening in the other of said flanges, a cushion of resilient material clamped between and separating said flanges and operating as the torque transmitting medium between said hub members, and means for attaching an abrasive disc to said second hub member.

2. In an abrasive disc holder, a hub comprising a driving member and a driven member co-axial therewith, said members having complementary flanges, a plurality of parallel pins rigidly connected to one of said flanges and extending loosely through the other flange, a resilient spacer between said flanges and functioning as a torque transmitting medium between said members, said pins serving to clamp said flanges against said spacer, and means for detachably connecting an abrasive disc to said driven member co-axially with said hub.

3. In an abrasive disc holder, a hub comprising a driving member and a driven member co-axial therewith, a plurality of spaced pins rigidly connected to one of said members and disposed around the axis of rotation of said hub and extending parallel to said axis, an annular disc mounted on said pins concentrically with said hub and projecting outwardly therefrom, an annular pad carried by said disc, said driven member having a flange interposed between said driving member and said disc, a first resilient cushioning means interposed between said driving member and said flange, a second resilient cushioning means interposed between said disc and said flange, said first and second cushioning means and said flange being clamped by said pins between said driving member and said disc, and means for detachably connecting an abrasive disc to said driven member co-axially with said hub.

4. In an abrasive disc holder, a hub comprising a cup-shaped driving member adapted for attachment to a drive-shaft and having an external flange concentric with its axis of rotation, a plurality of pins secured to said flange and circumferentially spaced in a circle concentric with the axis of rotation of the hub, said pins extending parallel to said axis, an annular disc carried by said pins and extending outwardly therefrom radially to the hub, a driven member forming a part of said hub and having an external flange interposed between the first-mentioned flange and said disc, resilient spacing means interposed between said flanges and embracing said pins, additional resilient spacing means interposed between said disc and the flange of said driven member and embracing said pins, the last-mentioned flange being normally out of contact with said pins, said driven member being adapted to rotate to a limited extent relatively to said driving member due to the yieldability of said spacing means, said driving and driven members and said disc and spacing means being clamped together by said pins, a threaded stud carried by said driven member co-axially therewith, and a flanged nut co-operative with said stud for detachably securing an abrasive disc to the holder.

5. In an abrasive disc supporting device, a first hub member and a second hub member, the first hub member being adapted to be mechanically connected with a motor for rotation thereby, an abrasive disc table associated with the second hub member and capable of limited axial movement relative thereto but incapable of radial movement relative thereto, the two hub members being provided with opposed annular surfaces occupying planes transverse to the rotational axis of the first hub member, the table and the second hub member being provided with opposed annular surfaces occupying planes transverse to said rotational axis, annular cushions of relatively soft yielding material interposed between the opposed surfaces of the hub members and between the opposed surfaces of the table and the second hub member, a plurality of pins by which the first hub member is connected with the table, and a plurality of apertures in the second hub member through which such pins freely extend with substantial clearance.

6. In an abrasive disc holder a hub comprising a driving member and a driven member co-axial therewith, a plurality of parallel pins rigidly connected to one of said members and extending loosely through the other member, a resilient spacer between said driving member and said driven member and functioning as a torque transmitting medium between said members, said pins serving to clamp said driving and driven members against said spacer, and means for detachably connecting an abrasive disc to said driven member coaxially with said hub.

GUSTAV A. OLSEN

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