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RESILIENT COUPLING

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FIG. 1.

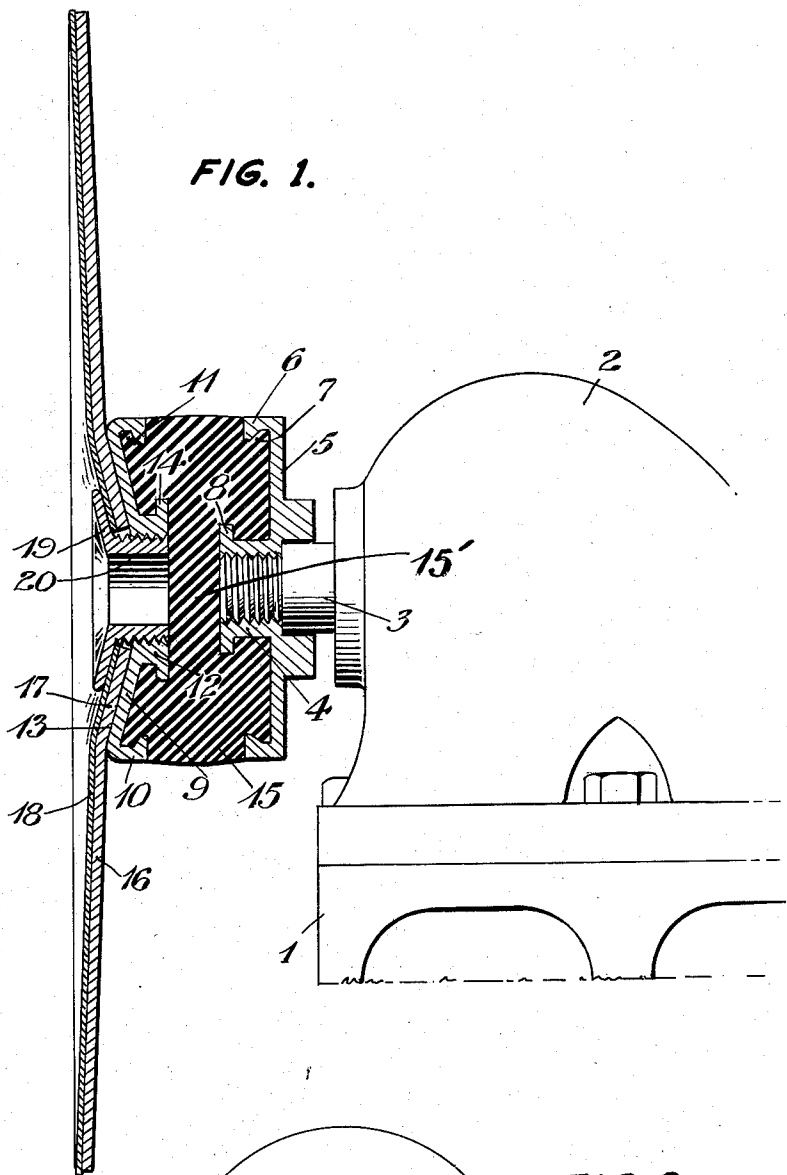
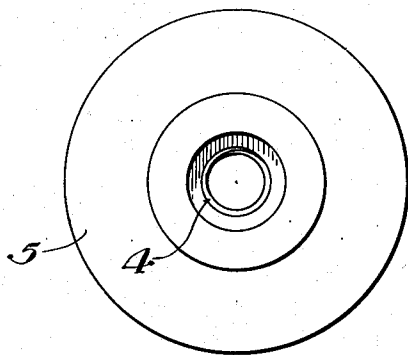


FIG. 2.



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RESILIENT COUPLING

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Application October 20, 1948, Serial No. 55,620

2 Claims. (Cl. 64—13)

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This invention relates to resilient couplings and more particularly to resilient couplings which will introduce or absorb a vibratory oscillating torque in the drive. The present disclosure and application is a continuation in part of the copending application bearing Serial No. 630,798 which was filed November 26, 1945, and is now Patent No. 2,486,078.

Among the objects of the invention is the provision of means for introducing an oscillating or gyrating torque between the motor shaft and the work in grinding, leveling and polishing and eliminating concentric and other scoring effects common in the use of flat abrasive discs and the like.

Another object is the reduction of skill and delicacy in the using of equipment employing revolving discs and other tools, and the increase of speed in reducing planal inequalities in metal and other surfaces or in preparing surfaces.

Another object is the provision of a simple integral unit in the form of an accessory, adaptable for use in combination with existing portable or other grinders and the like, for the above purposes.

The present disclosure relates to the adaptation of this invention for use with flexible abrasive discs in this art, as practiced in automobile body finishing, on flat and curved surfaces and similar uses. The description of this single application is not to be construed as a limitation and is used only as a clear exposition of the present invention.

In renewing a dented automobile fender for instance, it is the generally accepted practice to hammer the dent against a hand block until the general curvature or plane of the fender is roughly restored to normal. However, hammer marks still remain and have to be roughed off by the use of a hand file, so far as the gauge of the material permits. The deeper indentations are filled with a fluxing metal such as hard solder or babbitt before filing. The surface is then reduced to a common plane by the application of the flat face of a grinding disc with appropriate pressure applied, causing the yielding disc to conform to the surface being treated.

Even with the finer grit abrasive discs, score lines are left in the surface which must be masked by fluid primer applied as a paint, and hand rubbed down to a smooth surface when dry, before applying the ultimate lacquer finish. This prior method has certain objectionable results, one of which is that the primer in the deeper score lines eventually shows through the semi-transparent finish coat.

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This invention consists in interposing between the driven shaft and the revolving grinding disc or other tool, a resilient coupling which introduces a vibratory oscillating torque in the drive. This causes a buffing or rubbing action which breaks the concentric axis of rotation of the grinding disc or other tool especially when pressure is applied.

A further object is to provide a greater surface internally, by means of internal radial flanges in devices of this character, for the oscillating and compression actions.

Another object of the present invention is the provision of a resilient coupling for absorbing variations in the plane and angle of rotation and minimizing the transmission of the same to the driving shaft, thus saving much wear and strain on bearings, motors and the driven accessories.

Other objects and advantages will appear as the description proceeds. In the specification and the accompanying drawings the invention is disclosed in its preferred form. But it is to be understood that it is not limited to this form, because it may be embodied in modifications within the spirit of the invention as defined in the claims following the description.

In the one sheet of drawings:

Figure 1 is a vertical section through the axis of a coupling as applied to the rotating shaft of a motorized grinder and an abrasive disc.

Figure 2 is a front elevation showing the face of the detached coupling.

In detail the structure shown in Figure 1 comprises the motor 1, having the reduction gear case 2, with the threaded driven shaft 3 projecting therefrom. The continuation of the motor unit, not shown, normally terminates in a manual grip in the form of a handle from which the service cable extends to a source of power, and is further provided with another handle for two handed control.

The structure of the invention comprises the substantially flat driving head 5 having an internally threaded hub 4 and a concentric peripheral flange 6, undercut as at 7. The hub 4 has an annular flange 8 projecting radially therefrom.

The driven head 9 in opposed relation the driving head 5, has the similar peripheral flange 10, undercut at 11 and integral with the internally threaded hub 12 that is axially aligned with the driving hub 4. The face 13 of the head 9 is preferably countersunk, the angle extending inwardly toward the hub 12. This hub also has the annular flange 14 projecting radially therefrom.

The space between the heads 5 and 9 is filled with a rubber-like resilient material 15 vulcanized

therein and adhering to all contacting surfaces or otherwise secured therein in any suitable manner. The bonding of the resilient material to the heads, the hubs and the flanges forms a unitary structure capable of transmitting torque. The resilient material 15 is keyed to the driving head 5 by its mass within the radial flange 8 and the undercut peripheral flange 6 and to the driven head 9 by the mass between the radial flange 4 and the undercut peripheral flange 10. The resilient body 15 includes a continuous web 15' which passes between the flanges 8 and 14 and provides an extended area against which the flanges may work. The resilient material which separates the driving and driven heads, extends flush with the perimeters of the inturned flanges 6 and 10 to form an integral flexible coupling to the drive shaft 3 against the shoulder of which the hub 4 abuts.

The flexible plate 16 has the depressed center portion 17 fitting snugly within the dished surface 13. This plate is composed of any suitable material such as a plastic sheet, non-fatiguing metal or the like and serves as a backing plate for the abrasive disc 18.

The abrasive disc 18 is free of grit centrally so that it may be depressed to conform with the countersunk or dished surface 13 of the driven plate 9. The abrasive disc 18 and backing plate 16 are held in working position by the head 19 on the nut 20, threaded into the driven hub 12. As will be observed, the tightening of the nut 20 in place causes the plate 16 and the disc 18 to conform to the surface 13 and assume a concave shape. These discs are usually composed of plastic or fibrous material coated on one or both sides with a plastic binder into which a granular abrasive is embedded, the cutting qualities of which range from coarse to the finer grades for polishing.

The particular machine shown in the drawing is manipulated by grasping the two handles on the housing of the motor unit 1—2 one with either hand, and applying the exposed face of the disc 18 to the surface to be worked, while pressure is manually applied. To prevent burning the surface the disc is constantly kept in motion over the surface. The greater the pressure applied to the disc 18 the greater the deviating eccentricity resulting in the oscillating orbit making it practically impossible to form concentric score lines in the surface being worked.

Practice proves that with this invention a greater area may be worked more easily in a given time, with less skill required and with the minimum of refinishing of the surface being treated. Lateral and circular movement of the grinding head is greatly facilitated because of the gyratory effect and the reduced friction (incidental to the concentric scoring of the surface) when this invention is interposed in the motor drive. The gyro-oscillating effect presents less friction per unit of pressure and enlarges the effective area due to the flexible, resilient mass of the cushion 15, through which the driving torque is transmitted.

When off center pressure is applied to the abrasive disc 18 against the surface being worked, the flexible plate 16 yields with the disc to the approximate contour of this surface. This lateral pressure is also exerted against the resilient compound 15 which also yields and distorts the axis

of the drive 3—20, causing the oscillating and buffing action above described. In this connection, superior action and control is secured by the greater compression surface of the radial flanges 8 and 14.

Lambskin, fabric discs, rotary brushes and the like may be substituted for the abrasive disc 18 for polishing the surface. Similarly wire brushes, or stones may be used for leveling surfaces or applying scratch finishes to stone or gritty finishes to building walls, ships' decks and the like. The absence of concentric grinding torque prevents burning and deep scoring of any surface when this invention is interposed in the driving line. The yielding mass of the cushion 15 establishes a gyroscopic balance between the motive power and the tool (disc 18), so that it does not bounce or rebound when applied to the surface being abraded, resulting in easy control of the machine in the hands of the operator.

It is to be understood that this disclosure has been confined to the present adaptation, but it is equally effective in stationary grinding and finishing machines where the surface to be treated is held against the disc 18.

This invention is not to be confused with flexible couplings through which two shafts are driven at fixed axial angles to each other.

Having thus described this invention what I claim and desire to secure by Letters Patent is:

1. A resilient coupling comprising a driving head and a driven head arranged in coaxial spaced relation, each of said heads having an inturned peripheral flange, a central hub on each said head, said hubs extending inwardly toward one another; a radial flange on the inner end of each said hub, said flanges being arranged parallel to each other in spaced relation and perpendicular to the axis of the coupling; a body of resilient material including a web passing between said flanges, disposed between and bonded to said heads and flanges to form a unitary structure; means for attaching the driving head to the spindle shaft of a driving element; and means for attaching a driven element to said driven head.

2. A resilient coupling comprising a driving head and a driven head arranged in coaxial spaced relation, each of said heads having an inturned peripheral flange, a central hub on each said head, said hubs extending inwardly toward each other; a flange on the inner end of each said hub, said flanges being arranged opposed to each other in spaced relation; a body of resilient material including a web passing between said flanges, disposed between and bonded to said heads and flanges to form a unitary structure; means for attaching the driving head to the spindle shaft of a driving element; and means for attaching a driven element to said driven head.

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