June 7, 1955 G. A. LARSON 2,709,879

ABRASIVE SLEEVE HOLDER

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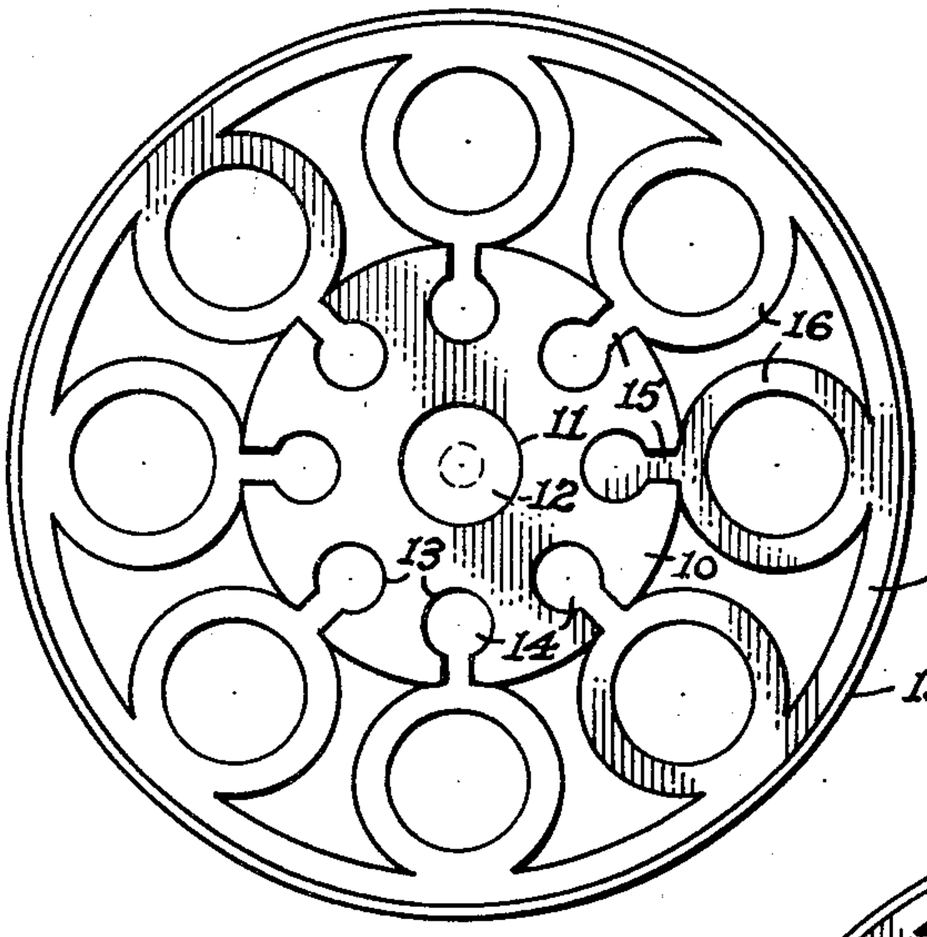

Fig. 1

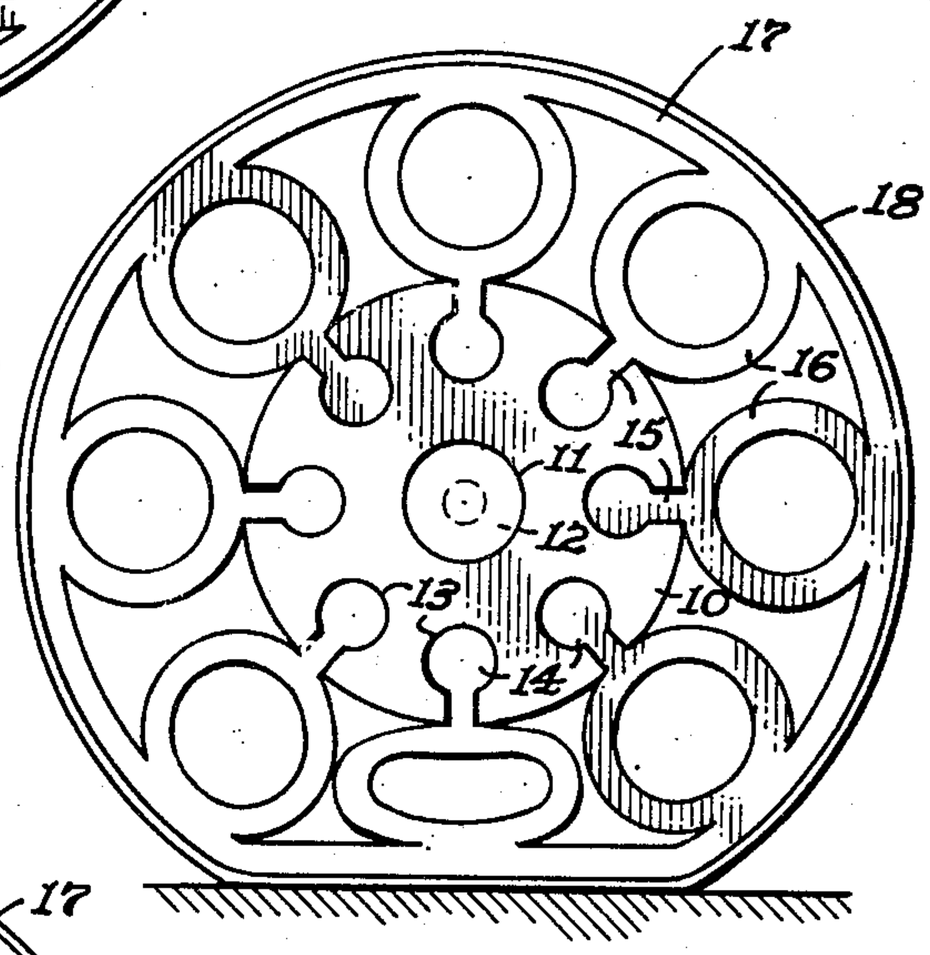

Fig. 2

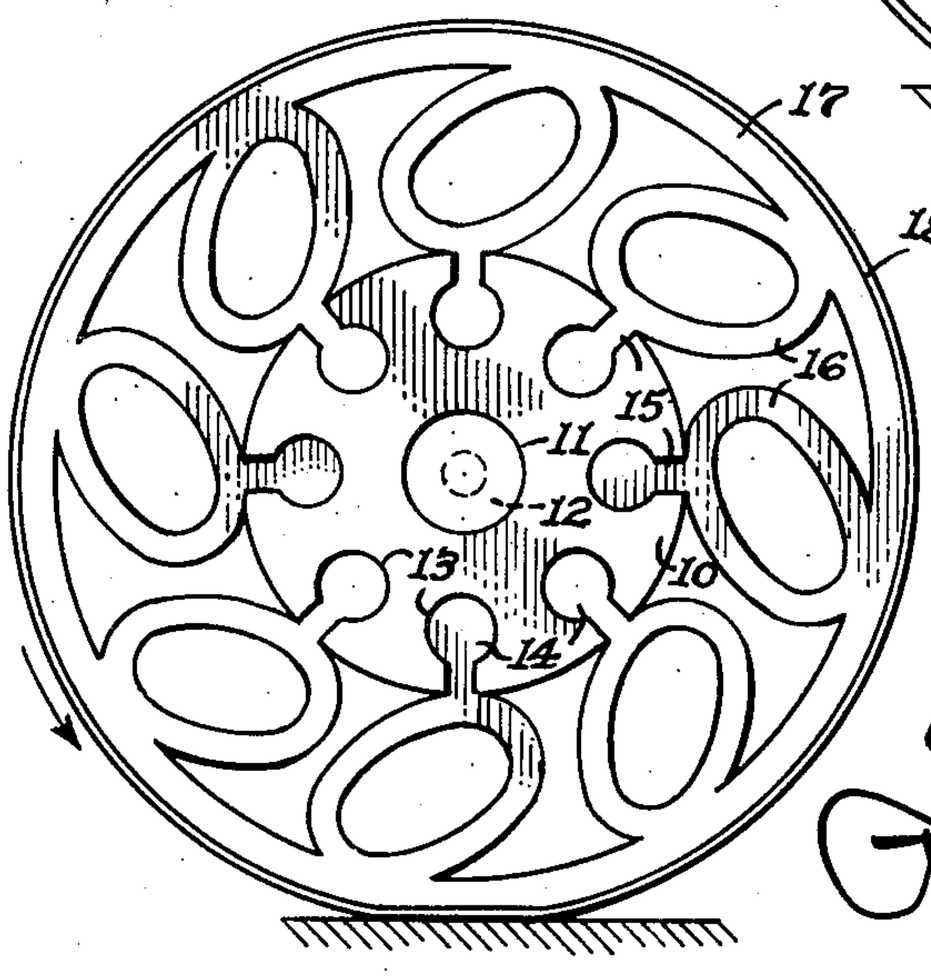

Fig. 3

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ABRASIVE SLEEVE HOLDER

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1 Claim. (Cl. 51—191)

This invention relates to abrasive sleeve holders of the kind disclosed in my Patent No. 2,483,422, issued October 4, 1949, and No. 2,548,166, issued April 10, 1951.

These holders comprise a rotary hub from which extend in equally circumferentially spaced relation a plurality of resilient arms, the outer ends of which support a rim adapted to support a flexible endless band of abrasive material. The band can be slipped onto or off the holder when it is stationary and contracted to its normal diameter, slightly less than its running diameter. The radial yieldability of the holder is as much for the purpose of enabling the band and holder to give and thereby conform easily to the contour of the surface of the work being sanded as it is for expansibility in response to centrifugal force so that the holder will automatically enlarge enough to grip the band firmly and hold it against turning or shifting axially relative to the rim and press it firmly but resiliently against a surface to be sanded. One of the most difficult problems with these holders is that of securing smoothness of operation and close uniformity of pressure on the work throughout the circumference of the holder in its rotation, and it is the principal object of the present invention to improve the construction of the holder with that problem in mind.

Referring to the drawing:

Fig. 1 is a view in side elevation of a holder made in accordance with my invention fitted with an endless sleeve of flexible abrasive material, and

Figs. 2 and 3 are similar views illustrating the radial and circumferential yieldability of the holder.

The same reference numerals are applied to corresponding parts throughout these views.

Referring to the drawing, the reference numeral **10** designates a hub which may be of metal, wood, plastic material, or medium hard rubber having a center hole **11** in which may be entered a bushing or shaft, as indicated in dotted lines at **12**, for drive purposes. The hub is provided on its periphery with a plurality of equally circumferentially spaced radial keyhole slots **13** into which the enlarged inner end portions **14** of a plurality of circumferentially spaced radial arms **15** are entered with a close fit, thereby anchoring to the hub **10** the radially inner sides of a plurality of equally circumferentially spaced rubber tubes **16**. The arms **15** are molded of rubber integral with the tubes **16**. A continuous rim **17** is also molded of rubber integral with the tubes **16** on the diametrically opposite side from the arms **15**. This rim has an outside diameter approximately equal to but slightly less than the inside diameter of the abrasive sleeve or band **18** which fits on the holder and is adapted to be driven with it, the difference in diameters being such that when the holder is turned at the usual operating speed, centrifugal force causes sufficient expansion of the rim **17** of the holder to grip the band and hold it against turning or shifting axially relative to the rim, and press it firmly but resiliently against a surface to be sanded.

In operation, when the holder is stationary, the abrasive sleeve or band **18** may be slipped on or off easily. Hence, replacement of a worn out band presents no problem and takes very little time. When the holder is driven at the usual operating speed, the band supporting arms or spokes defined by tubes **16** elongate under centrifugal force and rim **17** is likewise expanded so that the band **18** is gripped to provide a friction driving connection preventing turning of the holder relative to the band when the band contacts the surface of a piece of work, as in Fig. 3. As some pressure is applied, the band **18** flattens at the point of engagement, as appears in Fig. 3, providing surface to surface engagement instead of only line contact. This flattening is possible only because the rim **17** is free to yield and the arms or spokes **16** with the rim. See Fig. 2, which illustrates the radial yieldability of the rim **17** and spokes **16**. Fig. 3 shows the same yield with the holder in rotation. Notice in Fig. 3 that all of the spokes **16** are distorted quite evenly in a circumferential direction as a result of the resistance to rotation set up by the band **18**, which causes a certain amount of lag of rim **17** in relation to hub **10**. It is especially important to note that the continuity of rim **17** insures smoothness of operation and close uniformity of pressure on the work throughout the circumference of the rim in its rotation, because there are no gaps in the rim that can open up. Any resistance to rotation imposed on the rim **17** at any point is distributed as uniformly as possible to all of the spokes **16**, as clearly appears in Fig. 3, and that accounts for the smoothness of operation, because it insures having each spoke in the same distorted condition as it arrives at the work, assuming no change in pressure against the work.

The molded part of this holder may be of synthetic rubber, such as the Buna rubbers, including Buna S, and neoprene, as well as compounds of natural rubber. However, any other material having similar physical characteristics may be used.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claim has been drawn to cover all legitimate modifications and adaptations.

I claim:

A rotary radially expansible and compressible holder for a circular band of substantially nonstretchable but readily flexible abrasive material, said holder comprising a rotary drive hub, and a band supporting structure carried thereon and rotatable therewith molded in one piece of rubber-like material, said structure comprising a continuous circular flexible rim normally concentric with and surrounding said hub, and a plurality of flexible tubular arms disposed between the hub and rim in equally circumferentially spaced relation, each arm being of a diameter approximately equal to the radial distance from said hub to said rim and disposed with the axis thereof parallel to the axis of the hub, said arms being connected on diametrically opposite sides thereof with the hub and rim, the outside diameter of said rim when said structure is static being approximately equal to the inside diameter of said band whereby said band is readily slidable onto and off said rim but is gripped frictionally for rotation with said rim when said rim enlarges in diameter under centrifugal force active on said arms and rim when said hub is rotated at a predetermined operating speed.

No references cited.