Jan. 5, 1943. P. E. MEYER 2,307,632

SEGMENTAL GRINDING WHEEL

Filed Feb. 27, 1942 2 Sheets-Sheet 1

Fig. 1.

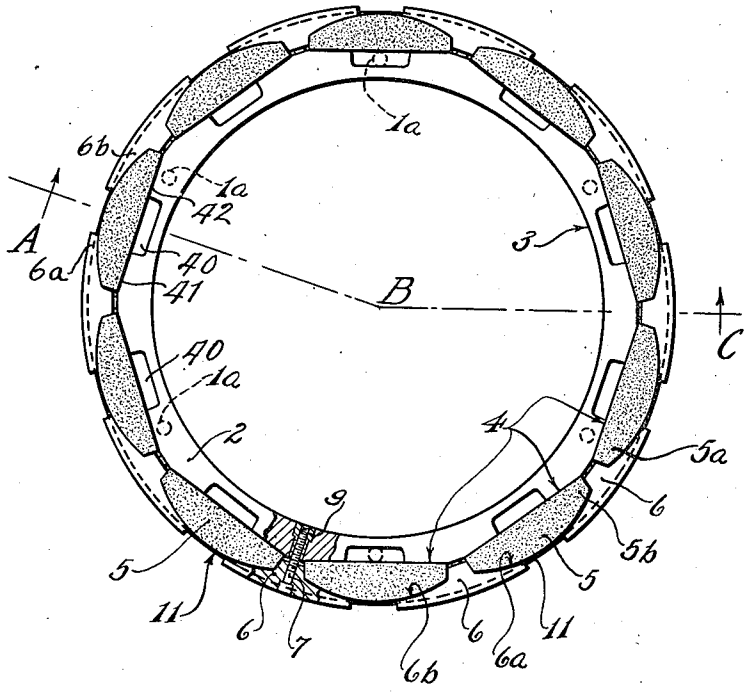
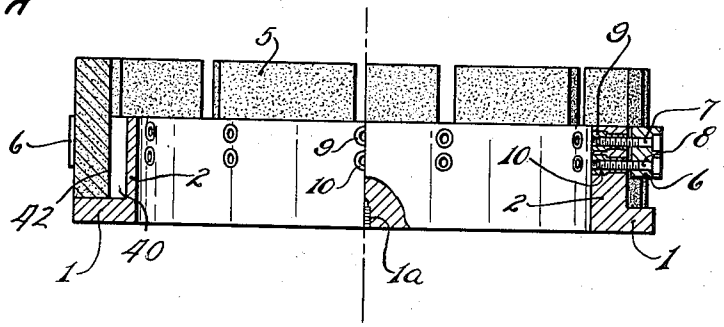


Fig. 2.



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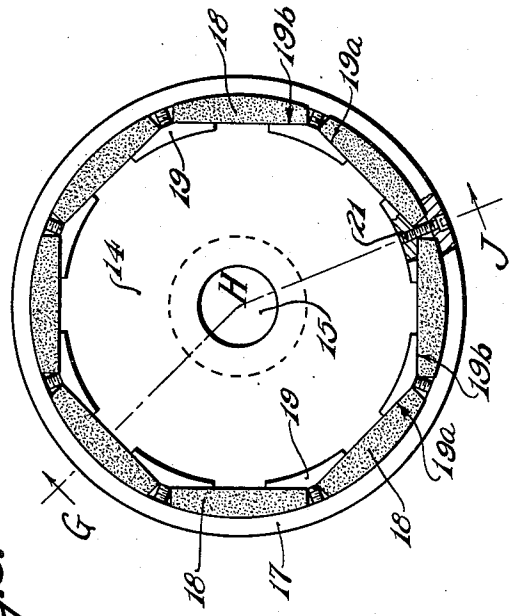


Fig. 5.

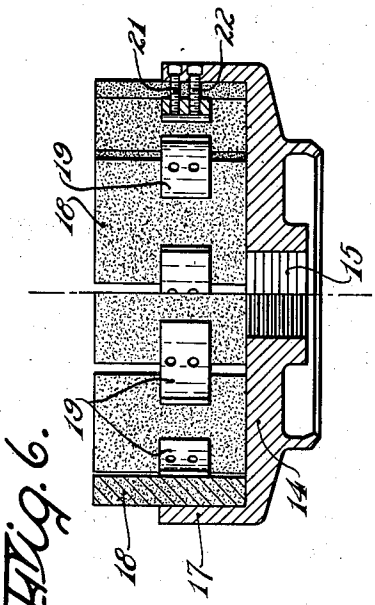


Fig. 6.

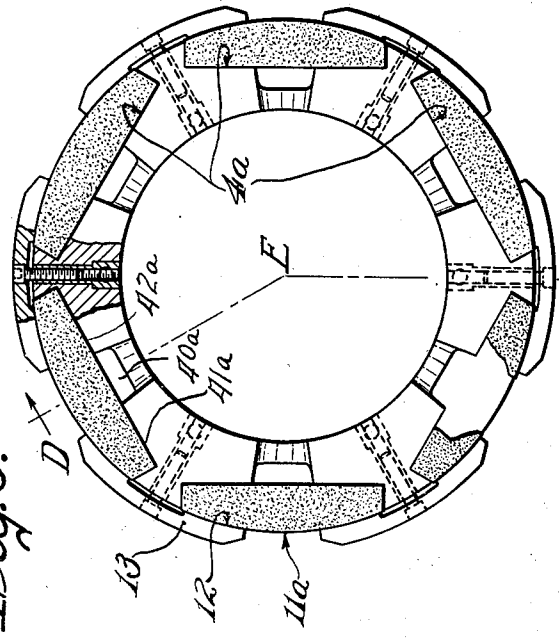


Fig. 3.

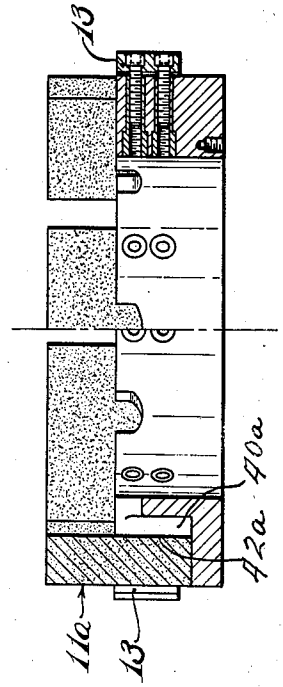


Fig. 4.

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SEGMENTAL GRINDING WHEEL

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Application February 27, 1942, Serial No. 432,555

2 Claims. (Cl. 51—209)

This invention relates to improvements in chucks for surface grinders of the type generally known as segment wheel grinders and shown for example in Patent 2,082,404, June 1, 1937.

The general object of the invention is to improve the efficiency, durability, and ease of operation of such chucks and in particular to provide sturdy and secure clamping means for the grinding segments which will be relatively self-cleaning and not subject to being clogged by grinding sludge.

The improved action of the chuck in gripping the side faces of the segments over a relatively large area adjacent the working face of the wheel, as will be described, contributes to a steadier and faster grinding action of the wheel and renders the machine of which it forms a part, much more serviceable.

The present embodiment of the invention may assume different forms and for purposes of illustration several of the best forms for carrying out the purposes of the invention are herein disclosed. In principle of operation these several forms are essentially the same, and from a structural standpoint may be said to consist primarily of an annular head with a projecting flange against the outside of which the segmental grinding elements are clamped in what may be called the exterior type and on the inside of said flange in what may be called the interior type.

Further features and advantages of the invention will become apparent from the following description, taken in connection with the accompanying drawings, in which

Fig. 1 is a top plan view of the chuck—exterior type;

Fig. 2 is a section taken along line A—B—C of Fig. 1;

Fig. 3 is a top plan view of another form;

Fig. 4 is a section along line D—E—F;

Fig. 5 is a top plan view of the chuck—interior type; and

Fig. 6 is a cross section of the same, taken along line G—H—J.

Referring more particularly to the drawings and to the exterior type of chuck shown in Figs. 1 and 2, it will be seen that the body of the chuck comprises an annular head portion 1 having projecting therefrom adjacent its inner rim the circular flange 2. The head portion 1 of the chuck is adapted to be fastened in the usual way to the face plate on the spindle of a surface grinding machine as by means of bolts indicated at the dotted line circles 1a.

As indicated in Fig. 1, the interior surface 3 of this flange 2 is cylindrical in shape while the exterior surface indicated at 4 is of prismatic shape, in the present form having the ten sides of a decagonal prism. It is understood that the number of sides or prismatic faces for the flange 2 may vary to suit the number of segmental grinding elements which it is desired to hold in the chuck. The chuck shown in Fig. 1 is intended to hold ten segmental grinding elements arranged in longitudinal side to side relation around the outside of said flange 2, one of said elements as indicated at 5 being located at each of the prismatic faces 4 of the outer surface. As shown in Figs. 1 and 2, each of these prismatic faces 4 is recessed at its intermediate portion at 40 to provide a pair of spaced apart flat seats 41, 42 for contact engagement with the inner flat surface of the segmental grinding elements. These grinding elements are the usual character well known in the art, made either of natural stone or of synthetic material held together by a vitrified, resinous, or other suitable binder, and are designed to employ their flat end surfaces for the grinding action. They are clamped in the chuck so as to project outwardly therefrom with their outer end surfaces in the same plane. As these working faces wear away in use they are adapted to be manually extended or adjusted in position from time to time by the usual unclamping and reclamping operation of the chuck holding means.

The chuck holding means comprises essentially a series of clamping lugs, one of which is indicated at 6, which are positioned and arranged on the outside of said grinding elements and overlie the adjacent sides 5a and 5b of two segmental grinding elements. These clamping lugs 6 preferably have curved inner surfaces 6a and 6b as shown, which fit against the outer curved surfaces of the segmental grinding elements. As shown in Figs. 1 and 3, this overlapping engagement by the clamping lugs is approximately equal in extent to the contact at the inside of said grinding elements with the spaced apart flat seats. Each clamping lug 6 is secured to the flange 2 of the chuck body by means of fastening bolts 7 and 8 which extend between the adjacent sides of two segmental grinding elements, as shown in Fig. 1. Sleeve sockets 9 and 10 for said bolts may be provided as shown, and it will be understood that when the bolts 7 and 8 are screwed into their sockets they act to pull inwardly the clamping lugs 6 to firmly clamp and wedge the segmental grinding elements 5 against their respective flat faces 4 of the outer surface of the flange 2.

It will be observed that in the form of the chuck shown in Figs. 1 and 2, the arc of curvature for the outer surfaces 11 of the segments 5 does not have a center in common with that of the annular chuck body 1. In other words, the center of rotation B of the chuck is not the center of the arcuate surfaces 11 whereby the outer edges of the several grinding surfaces have no tendency to track with one another, but on

the contrary, each one wipes over the surface ground by its predecessor. Moreover, the surfaces 6a and 6b of the clamping lugs 6 are at an inclination to one another and this relative angularity gives them a wedging action between the sides of adjacent grinding elements when drawn up tight by the fastening bolts.

A further advantage in employing segments with arcuate outer surfaces of smaller radius than the chuck as a whole is that in a chuck of large radius, the grinding elements may still be of a pronounced segmental shape,—viz. have a relatively narrow grinding nose surface and tail surface and relatively wide intermediate body grinding surface. I have found it desirable to maintain as far as possible the advantages of the segmental shape grinding action in all sizes of chucks from small to large.

On the other hand, when the chuck is of a diameter not too large as shown in Figs. 3 and 4, it is practical to employ a faceted outer surface 4a on the holding flange of pentagonal form and with five segmental grinding elements. In this case a pronounced segmental shape for the grinding elements is maintained even when the outer arcuate surfaces 11a thereof have a curvature on a center in common with that of the chuck, namely at E.

The several features of construction of this form of chuck shown in Figs. 3 and 4 are the same as previously described except for the differences above noted wherein the outer surface 11a of the segments and the inner surface 12 of the clamps 13 are both of a curvature having a center at the chuck center E. In this form the faces 4a are similarly recessed at their intermediate portion 40a to provide spaced apart flat seats 41a and 42a for the grinding element.

Referring to Figs. 5 and 6, I have therein shown an interior type of clutch designed to leave a relatively large open space within the circular grinding surface for the mounting of feed mechanism or other devices as may be desirable. In this form the head portion of the chuck is indicated at 14, having a central opening 15 adapted to be fastened to a suitable operating spindle (not shown). The projecting flange of said chuck is indicated at 17, and it will be observed that the interior surface of this flange is cylindrical and is adapted to receive thereagainst the several segmental grinding elements such as 18 in longitudinal side to side relation, with the curved surfaces of said grinding elements 18 fitting against the interior cylindrical surface of 17, as shown in Fig. 5. The clamping lugs for said segmental grinding units are indicated at 19 and as shown overlap as in the first described form, the adjacent sides of two segmental grinding elements.

The engaging surfaces 19a and 19b of the clamping lugs 19 are also at an angle to one another so as to have a wedging action against the adjacent side portions of the grinding segments. Fastening bolts 21 and 22, see Fig. 6, extend between the sides of the adjacent segmental grinding elements and serve to connect clamping lugs 19 with the flange 17. When screwed home, these bolts draw the clamping lugs 19 against the segmental grinding elements for holding them securely against the inner side of flange 17. In this type of chuck also it will be appreciated that the centrifugal forces brought into play when the chuck is rotated, serve to retain the segmental grinding elements securely against the flange 17 and thus contribute to the stability of the whole structure when in operation.

In all forms of the chuck illustrated the clamping lugs are constructed and arranged to engage the relatively wide side faces of the grinding elements at points adjacent the working ends of said segments. This insures a firm, steady, hold on the segments at all times, which is desirable for uniform grinding action. Furthermore, this arrangement is such that as the working ends of the segments wear off adjustments may be made through the clamping lugs to provide additional working length of grinding segment.

It will also be observed that the simplicity of the present clamping means is such that all parts of the same are readily accessible for cleaning and are relatively free of corners and pockets for the lodgment of grinding sludge.

It is to be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. In a surface grinder, in combination, an annular head having a projecting flange portion prismatically shaped on its exterior surface, each prismatic face of said exterior surface being recessed at its intermediate portion to provide spaced apart flat seats, a plurality of segmental grinding elements disposed in longitudinal side to side relation around said flange portion each with an inner flat face in contact with a pair of spaced apart flat seats on the exterior of said flange, means for clamping said segmental grinding elements against said flange comprising a plurality of clamping lugs disposed on the outside of said segmental grinding elements, each lug arranged to overlap the adjacent sides of two segmental grinding elements to the extent of the spaced apart flat seats in contact with the inside of said grinding elements, and each lug having a curved inner surface adapted to engage the outer curved surfaces of said segmental grinding elements, and fastening means extending between each pair of adjacent segmental grinding elements, for connecting said lugs to said flange portion.

2. In a surface grinder, in combination, an annular head having a projecting flange portion prismatically shaped on its exterior surface, each prismatic face of said exterior surface being recessed at its intermediate portion to provide spaced apart flat seats, a plurality of segmental grinding elements disposed in longitudinal side to side relation around said flange portion each with an inner flat face in contact with a pair of spaced apart flat seats on the exterior of said flange, said segmental grinding elements having outer curved surfaces with a shorter radius of curvature than that of the annular head in which said segmental grinding elements are mounted, means for clamping said segmental grinding elements against said flange comprising a plurality of clamping lugs disposed on the outside of said segmental grinding elements, each lug arranged to overlap the adjacent sides of two segmental grinding elements to the extent of the spaced apart flat seats in contact with the inside of said grinding elements, and each lug having a curved inner surface adapted to engage the outer curved surfaces of said segmental grinding elements, and fastening means extending between each pair of adjacent segmental grinding elements, for connecting said lugs to said flange portion.

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