Oct. 23, 1956 G. R. VASBINDER 2,767,523

GRINDING WHEEL

Filed Oct. 14, 1955

FIG. 1.

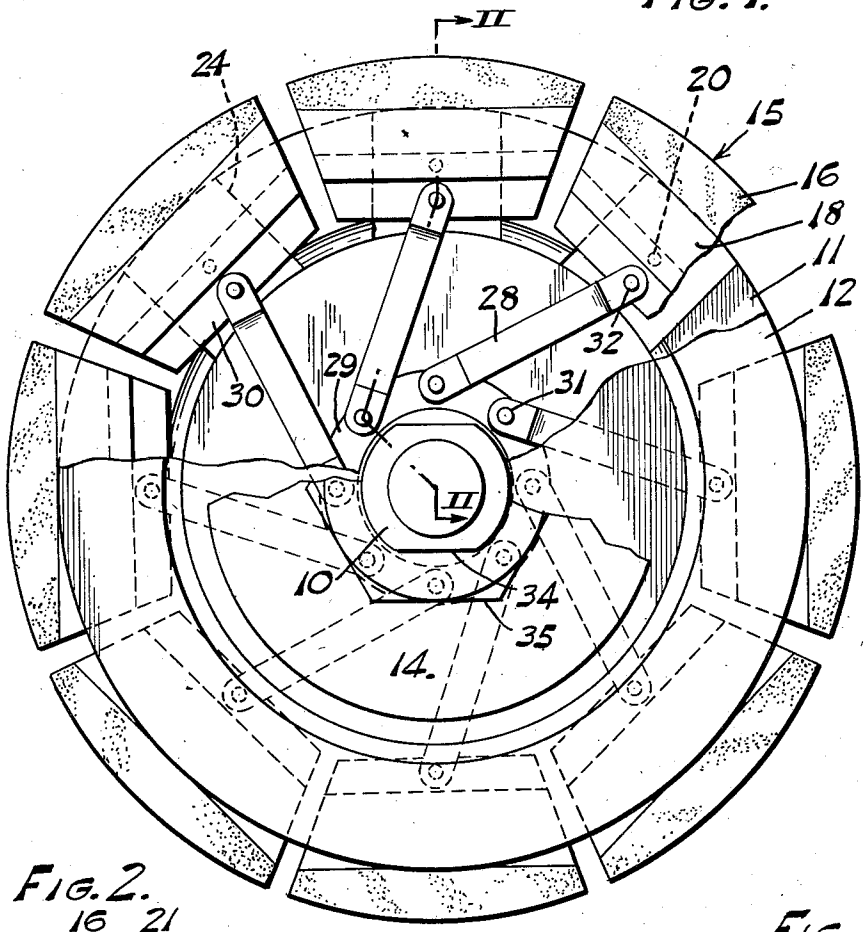


FIG. 2.

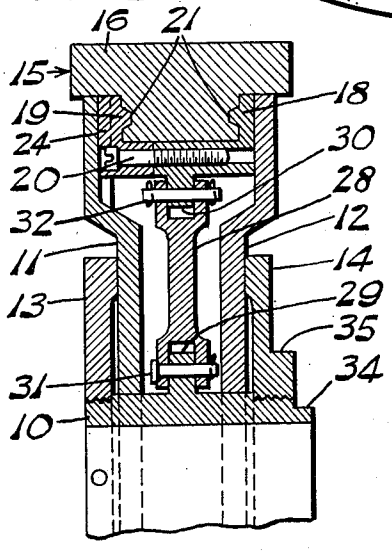


FIG. 3.

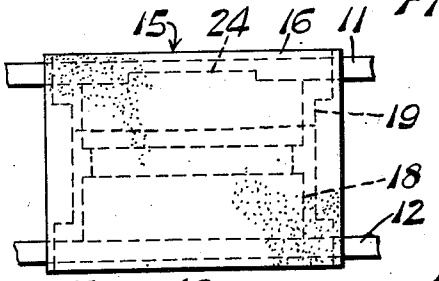
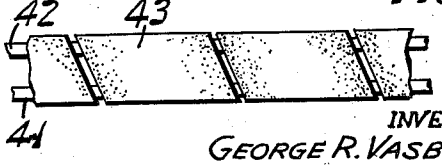


FIG. 4.



INVENTOR:
GEORGE R. VASBINDER
BY
Beau, Brooks, Buckley & Beau,
ATTORNEYS.

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GRINDING WHEEL

George R. Vasbinder, Buffalo, N. Y.

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10 Claims. (Cl. 51—184.1)

This invention relates to grinding or similar abrasive wheels having means for radial expansion whereby the effective working or abrading diameter of the wheel may be selectively adjusted or varied.

It is well known that grinding and other abrasive wheels having a peripheral grinding or abrading surface decrease in diameter progressively as work proceeds and the abrasive material wears away. In some kinds of grinding and abrading operations this decrease in diameter is of no particular significance but in others the decrease in diameter is intolerable and often necessitates employing some other, and frequently more expensive or less satisfactory, method or means for effecting a given grinding or abrading operation.

Apart from the matter of wear and consequent change in diameter, certain jobs may require the use of a wheel of a certain effective diameter, by reason of which the ability to adjust or vary the effective abrading diameter or radius is of great practical value.

The present invention provides an abrasive wheel wherein the peripheral grinding or abrading portion of the wheel is made up of a plurality of segments which are mounted and guided for joint radial inward and outward movement, whereby the effective diameter of the working surface portion of the wheel may be varied at will between predetermined limits. Furthermore, the arrangement of the present invention is such that the inward and outward radial adjusting movements of the several abrasive segments are controlled and guided in such manner that the movements are directly radial and without any possibility or likelihood of angular or other movements which would tend to disturb or disrupt the general circularity of the abrasive surface.

The wheel of the present invention is further so arranged that the radial movements of the several segments are accurately synchronized and take place jointly upon a single adjusting movement or manipulation, each segment moving straight out or in in a radial direction in the same degree as all other segments and with no bodily inclination, cocking or other misalignment.

Various other objects and advantages incident upon use of the abrading or grinding wheel of the present invention will appear from a study of the following specification and the accompanying drawing. However, it is to be understood that the embodiments set forth in the specification and illustrated in the drawing are by way of example only and that the principles of the present invention are not limited thereto or otherwise than as defined in the appended claims.

In the drawing:

Fig. 1 is a general side elevational view of one form of the abrasive wheel of the present invention with portions thereof broken away for added illustration;

Fig. 2 is a cross-sectional view taken approximately on the line II—II of Fig. 1;

Fig. 3 is a fragmentary plan view of the abrasive wheel of Fig. 1 showing one of the abrasive segments thereof; and

Fig. 4 is a fragmentary view looking at the abrasive surface of a modified form of the abrasive wheel of the present invention.

Like characters of reference denote like parts throughout the several figures of the drawing and, referring particularly to Fig. 2, the numeral **10** designates a central

supporting bushing for the grinding wheel assembly generally. A pair of discoidal members **11** and **12** are mounted on bushing **10** for free rotation and a pair of clamp rings or flanges **13** and **14** are threaded onto the opposite ends of bushing **10** in such manner that they may bear in clamping relation against the external surfaces of discoidal members **11** and **12**.

The numeral **15** designates generally one of a series of segmental members, each comprising an abrasive block portion **16** and a mounting and clamping portion. As shown in Fig. 2 the mounting or clamping portion comprises a pair of clamping blocks **18** and **19** which are removably held in the relationship shown in Fig. 2 by a screw **20** which passes through block **19** and threads into block **18**. As thus arranged the clamping blocks **18** and **19** form a channel for receiving the abrasive block **16**. The clamping blocks **18** and **19** and the abrasive block **16** are provided with complementary tongue and groove formations as at **21** so that the abrasive block **16** is clamped within the channel formed by blocks **18** and **19** in an interlocking manner.

Clamping block **19** is formed with a radially extending key formation **24** which fits slidably in a complementary groove formation in discoidal member **11**, the latter being formed with a plurality of radiating equally spaced grooves for receiving the keys **24** of each of the clamping blocks **19**. The assembly comprising the blocks **18** and **19** and abrasive member **16** is thus guided for radial bodily movement between the discoidal members **11** and **12**.

Radial inward and outward movement of the segment members **15** is controlled by a series of links **28** which act between bushing **10** and the blocks **18** of the segments. An external annular flange **29** is formed on bushing **10** and an internal annular flange **30** is provided on clamping block **18**. The opposite ends of the several links **28** are bifurcated as clearly shown in Fig. 2 and pivotally engage the flanges **29** and **30** as at **31** and **32**.

One end of hub member **10** is externally flatted as at **34** and flange member **14** is provided with a hexagonal hub formation **35**. The flat **34** and hexagonal hub formation **35** are engaged by wrenches or the like to tighten and loosen flange member **14** to clamp and unclamp the segment clamping blocks **18** and **19** between discoidal members **11** and **12**. With this clamping relationship loosened one may grasp any of the segments **15** and rotate the same relative to hub member **10**, which relative rotation will move the segments radially inward or outward, depending on the direction of relative rotation. The segments will move synchronously since each link **28** will receive the same degree of angular adjustment as the others.

As the parts are shown in Fig. 1 and Fig. 2 the segments **15** are in their innermost radial position since the abrasive blocks **16** are abutting the external peripheries of the discoidal members **11** and **12**. If the segments **15** be moved in a counterclockwise direction relative to hub **10**, as viewed in Fig. 1, the links **28** will tend to assume a more erect or more nearly radial position which will move all of the segments **15** radially outwardly in like degree, their movements being guided by the key formation **24** and the complementary groove in clamp block **19**.

Fig. 4 shows fragmentarily a modified arrangement of the abrasive block portions or segment portions of the grinding wheel of the present invention. The details of construction not shown in Fig. 4 are the same as in Figs. 1, 2 and 3. Referring to Fig. 4, the numerals **41** and **42** designate a pair of discoidal members similar to the discoidal members **11** and **12** of the preceding embodiment.

In Fig. 4 the abrasive block portions of the segment

members are designated 43 and it will be noted that their facing ends are cut off obliquely (or helically) with respect to the periphery of the abrasive wheel generally. This produces an overlapping action as between the abrasion effected or produced by the several successive segments, much in the manner of the helical cutting flutes of a helical milling cutter.

In grinding flat surfaces the segments 43 of the embodiment of Fig. 4 will overlap in their action in an obvious manner to produce a smoother grinding action and, therefore, a smoother surface.

I claim:

1. In a grinding wheel, a central supporting bushing, a plurality of circumferentially arranged abrasive segments, discoidal means rotatably mounted on said bushing and having radially extending guiding formations for guiding said segments toward and away from said bushing, a plurality of links each pivoted at its inner end to said bushing and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said bushing projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said discoidal means relative to said bushing to maintain a desired radial adjustment of said segments.

2. In an abrasive wheel, a central supporting bushing, a plurality of circularly arranged abrading segments, discoidal means rotatably mounted on said bushing and having radially extending guiding formations for guiding said segments toward and away from said bushing, a plurality of links each pivoted at its inner end to said bushing and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said bushing projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said discoidal means and said segments against relative movement to maintain a desired radial adjustment of said segments.

3. In a grinding wheel, a central supporting bushing, a plurality of circumferentially arranged abrasive segments, a pair of discoidal members rotatably mounted on said bushing to engage opposite sides of said segments and having radially extending guiding formations for guiding said segments toward and away from said bushing, a plurality of links each pivoted at its inner end to said bushing and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said bushing projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said discoidal means relative to said bushing to maintain a desired radial adjustment of said segments.

4. In an abrading wheel, a central supporting bushing, a plurality of circumferentially arranged abrasive segments, a pair of discoidal members rotatably mounted on said bushing to engage opposite sides of said segments and having radially extending guiding formations for guiding said segments toward and away from said bushing, a plurality of links each pivoted at its inner end to said bushing and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said bushing projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said discoidal means and said segments against relative movement to maintain a desired radial adjustment of said segments.

5. In an abrading wheel, a central supporting member, a plurality of circumferentially arranged abrasive segments, discoidal means rotatably mounted on said bushing and having guiding formations for guiding said segments for radial sliding movement toward and away from said bushing, a plurality of links each pivoted at its inner end to said bushing for angular movement in the plane of said wheel and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said bushing projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said segments to maintain a desired radial adjustment thereof.

6. In a grinding wheel, a central support member bushing, a plurality of circumferentially arranged abrasive segments, discoidal means rotatably mounted on said support member and having radially extending guiding formations for guiding said segments toward and away from said support member, a plurality of links each pivoted at its inner end to said support member and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said support member projects and retracts said segments jointly in a radial direction, and means having threaded engagement with said support member for selectively and releasably securing said discoidal means relative to said segments to maintain a desired radial adjustment of said segments.

7. In an abrading wheel, a central support member bushing, a plurality of circumferentially arranged abrasive segments, discoidal means rotatably mounted on said support member and having radially extending guiding formations for guiding said segments toward and away from said support member, a plurality of links each pivoted at its inner end to said support member and at its outer end to one of said segments whereby joint rotation of said segments and said discoidal means relative to said support member projects and retracts said segments jointly in a radial direction, and means having threaded engagement with said support member for selectively and releasably securing said segments against radial movement.

8. In an abrading wheel, a central supporting member, a plurality of circumferentially arranged abrading segments, means mounted for rotation relative to said supporting member and having radially extending guiding formations for guiding said segments for radial inward and outward movement, a plurality of links each pivoted at its inner end to said supporting member and at its outer end to one of said segments whereby joint rotation of said segments and said rotatably mounted means relative to said support member projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said rotatably mounted means relative to said supporting member to maintain a desired radial adjustment of said segments.

9. In an abrading wheel, a central supporting member, a plurality of circumferentially arranged abrading segments, means mounted for rotation relative to said supporting member and having radially extending guiding formations for guiding said segments for radial inward and outward movement, a plurality of links each pivoted at its inner end to said supporting member and at its outer end to one of said segments whereby joint rotation of said segments and said rotatably mounted means relative to said supporting member projects and retracts said segments jointly in a radial direction, and means selectively and releasably securing said rotatably mounted means and said segments against relative movement to maintain a desired radial adjustment of said segments.

10. In an abrading wheel, a central supporting member, a plurality of circumferentially arranged abrading segments, means mounted for rotation relative to said supporting member and having radially extending guiding formations for guiding said segments for radial inward and outward movement, a plurality of links each pivoted at its inner end to said supporting member and at its outer end to one of said segments whereby joint rotation of said segments and said rotatably mounted means relative to said supporting member projects and retracts said segments jointly in a radial direction, and means having threaded engagement with said supporting member for securing said rotatably mounted means relative to said segments to maintain radial adjustment of the latter.

No references cited.