Feb. 24, 1953 S. P. BRUCE 2,629,368

GRINDING WHEEL DRESSING MECHANISM

Filed Sept. 17, 1949 2 SHEETS—SHEET 1

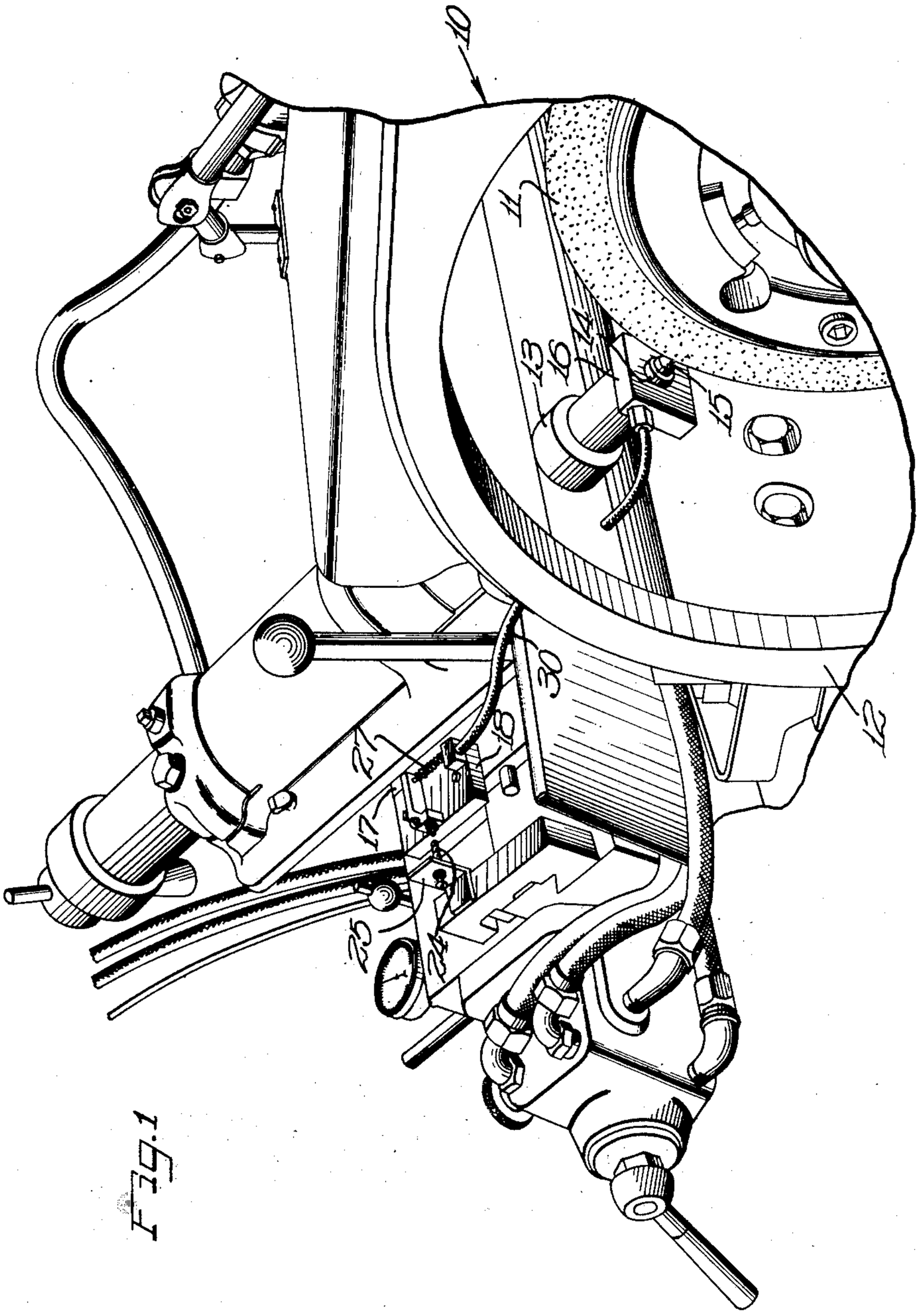

Fig. 1

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Fig. 2

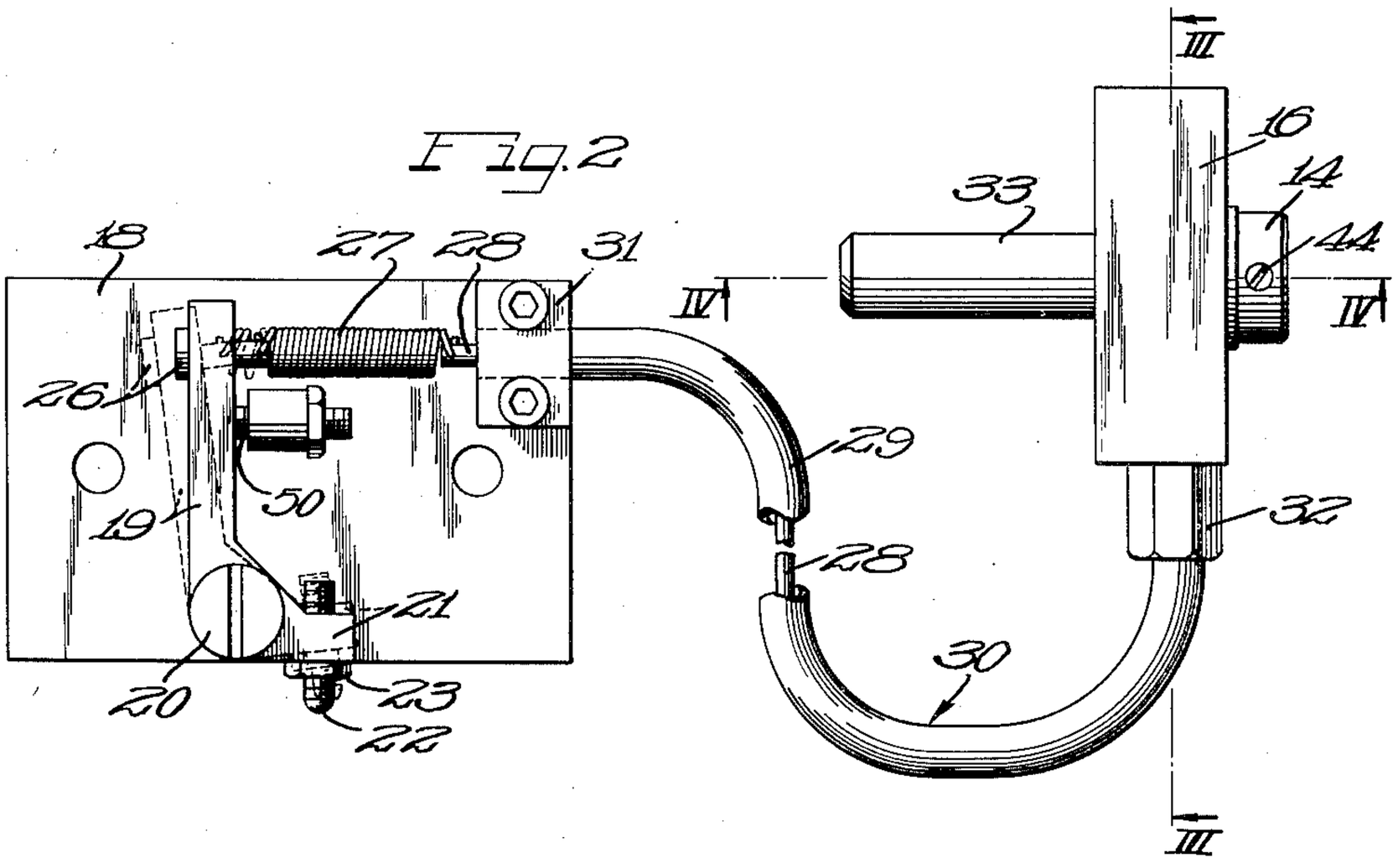


Fig. 3

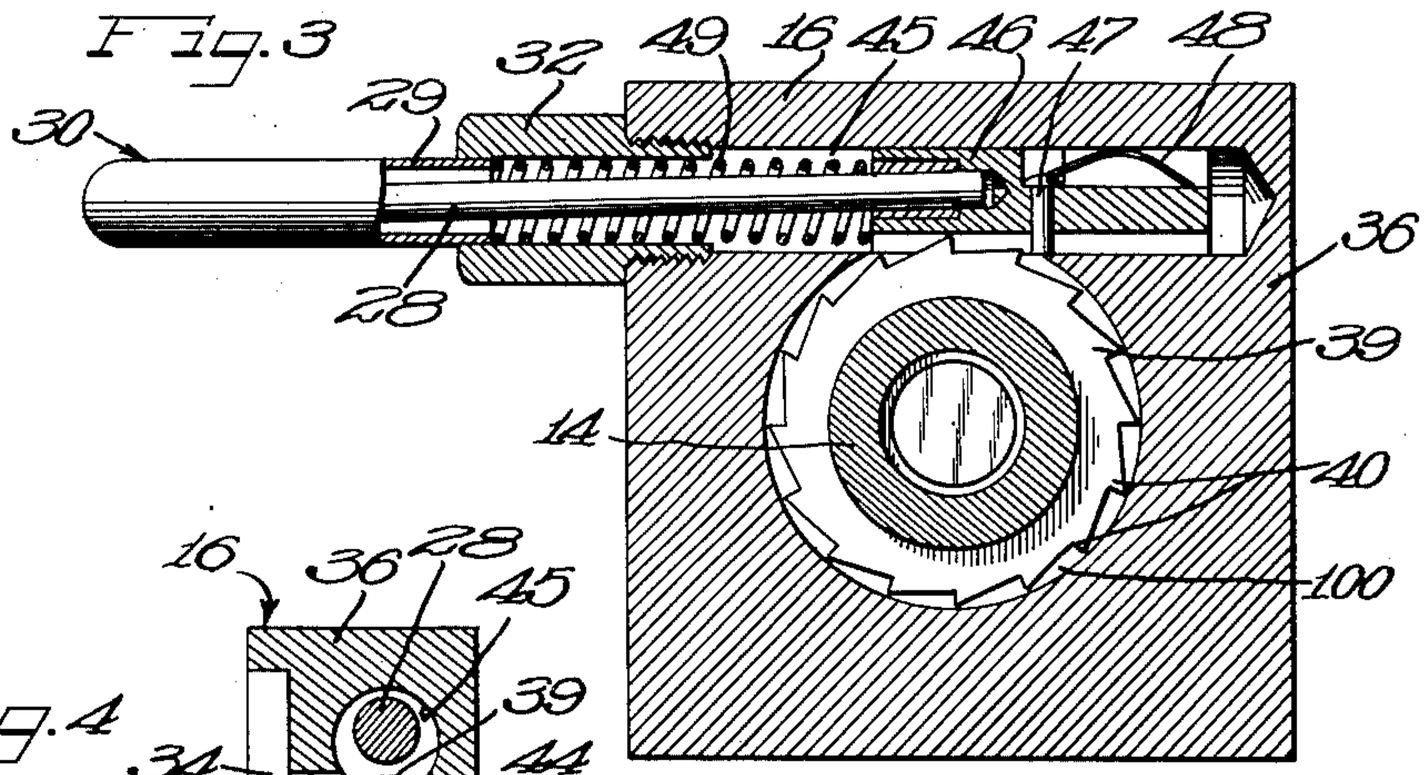
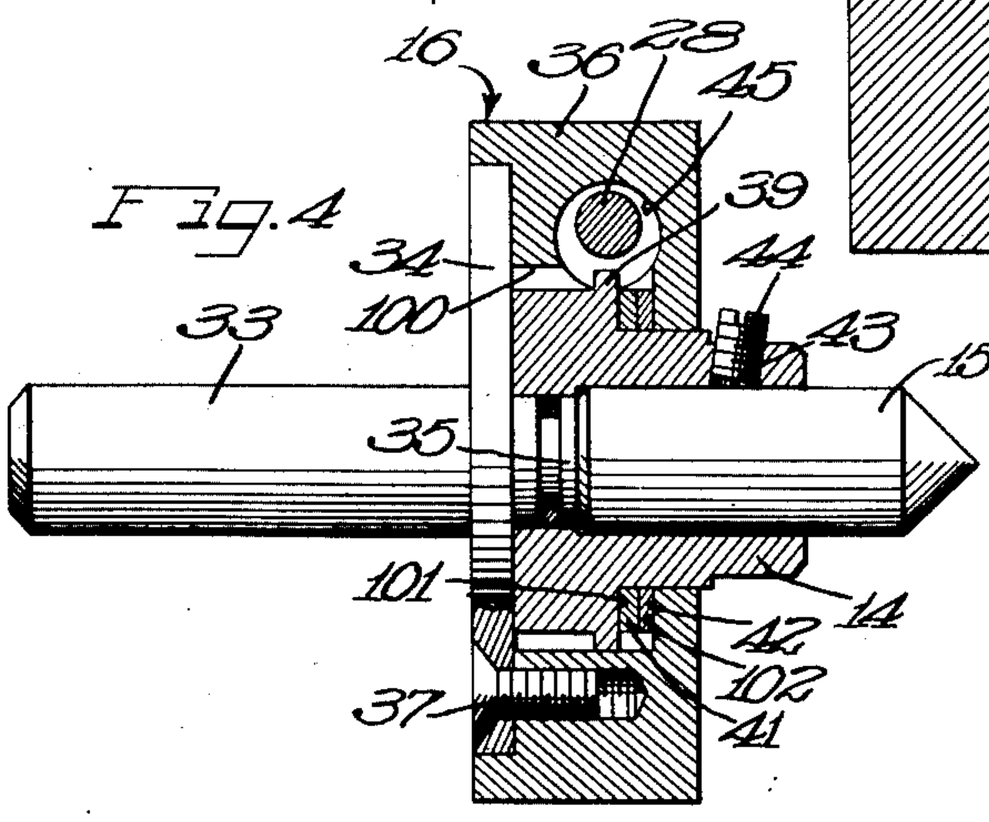


Fig. 4



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GRINDING WHEEL DRESSING MECHANISM

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Application September 17, 1949, Serial No. 116,315

3 Claims. (Cl. 125—11)

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The present invention relates to a grinding wheel dressing mechanism for use in conjunction with dressing tools, such as diamond point tools which are used to true or dress the surface of an abrasive wheel.

As abrasive wheels become worn or otherwise out of true from long use, it is customary practice to dress or true the cutting surface of the wheel by passing the cutting tool, such as a diamond point, across the surface of the wheel parallel to the axis of rotation to thereby dress or reshape the wheel to its proper configuration. After prolonged use, a diamond dressing tool tends to have the diamond point worn unevenly, resulting in "flats" being formed on the diamond point. These flat surfaces impair the usefulness of the tool to a substantial degree, so that a dressing tool must be replaced long before the diamond itself is worn down to unusable dimensions.

To overcome this difficulty, in my previously filed application Serial No. 744,749 entitled "Grinding Wheel Dressing Mechanism," filed April 29, 1947, now Patent No. 2,597,616, dated May 20, 1952, I have described and claimed a rotatable tool holder for mounting a diamond dressing tool. This tool holder operates to impart step-by-step rotation to the grinding tool at regular intervals to cause all faces of the diamond to be worn evenly. After a number of dressing operations, the diamond ultimately acquires a generally pyrimidal arrangement of surfaces which not only provides ideal cutting edges for dressing the surfaces of the abrasive wheel, but permits the use of a diamond point for a much longer period of time.

While this improvement has been eminently successful in prolonging the useful life of diamond tools, certain grinding wheel installations present difficulties with respect to the mounting of the means for the indexing tool due to the limited amount of space available.

In my copending application Serial No. 74,775 entitled "Grinding Wheel Driving Mechanism," filed February 5, 1949, I have described and claimed certain remote indexing means for periodically indexing the rotatable tool holder, the indexing means being operable in a position remote from the dressing tool, and capable of being installed in grinding wheel dressing assemblies having a limited amount of usable space.

The present invention relates to still another remote indexing means for actuating diamond dressing tools to index the same periodically, and contains certain structural advantages over the assemblies described in my aforementioned copending application, Serial No. 74,775.

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An object of the present invention is to provide a grinding wheel dressing assembly carrying a rotatable tool holder together with means including a remote indexing mechanism for automatically rotating the tool holder and the tool carried therein.

Another object of the present invention is to provide a mechanism for periodically rotating a diamond dressing or trueing tool in a compact assembly which is adapted for mounting within conventional grinding wheel assemblies.

Other and further objects of the invention will become apparent from the following description and the discussion of the attached drawings.

On the drawings:

Figure 1 is a fragmentary perspective view of a grinding wheel assembly of the Cincinnati centerless type with a mechanism for periodically rotating a diamond tool associated therewith.

Figure 2 is a top plan view of the remote indexing means and associated tool holder assembly of the present invention;

Figure 3 is an enlarged sectional view taken along the line III—III of Figure 2; and

Figure 4 is a cross-sectional view taken along the line IV—IV of Figure 2.

As shown on the drawings:

Reference numeral 10 denotes generally a grinding assembly of the Cincinnati centerless type having an abrasive wheel 11 and a guard mounting 12 spaced therefrom and partially surrounding the periphery of the grinding wheel 11. While the drawings illustrate the grinding wheel assembly as comprising a centerless type grinder, it will be obvious that the dressing assembly herein described will find use in connection with other types of grinding wheel assemblies. A slide 13 extending through the guard 12 and slidably mounted therein, carries a tool holder 14 which in turn carries a dressing tool, which may be a diamond tool 15. The rotatable tool holder 14 is mounted within a tool housing 16 which houses means for periodically rotating the same, as will be hereinafter more fully described.

The slide 13 is mounted for reciprocatory movement across the surface of a wheel 11 in a direction parallel to the axis of the grinding wheel 11. The slide 13 is part of a carriage 17 which also carries a block 18.

As is best seen in Figure 2, the block 18 carries an arm 19 which is pivotally mounted as by means of a pin 20 to the block 18. An ear portion 21 formed in the arm 19 carries a pin 22, which is secured within the ear 21 by means of a nut 23.

As the carriage 17 reaches a position where the diamond point 15 has completed a traverse across

the surface of a grinding wheel 11, the pin 22 contacts a stop 24 (Fig. 1) which is secured adjustably within a mounting member 25 carried by the extreme end of the grinding wheel assembly.

An end portion of the arm 19 is provided with a headed pin 26 projecting therethrough and transversely apertured to serve as an anchor for one end of a spring 27. The other end of the spring 27 is connected to the projecting end of a flexible shaft 28 enclosed within a sheath 29, the inner flexible shaft 28 and the sheath 29 forming a flexible cable 30. One end of the sheath 29 is anchored within an apertured clamping member 31, which is rigidly secured to the block 18. Thus, the inner flexible shaft 28 is free to move lengthwise within the cable 30 when tension is applied to the same.

The other extremity of the sheath 29 is secured, as by means of soldering, in a bushing 32 which is threaded into the tool holder housing 16. This tool holder housing 16, which is carried by the slide 13, contains a mounting shank 33 for securing the housing within the slide 13. The mounting shank 33 has a large diameter flange portion 34 and a smaller diameter head 35 which act as a thrust seat and pilot for the holder 14 and its associated diamond tool. A cover member 36 is provided in the housing 16 and is secured to the flange 34 by means of screws 37.

Disposed within a cylindrical recess 100 formed in the cover member 36 is the rotatable tool holder 14 having an annular flange portion 39 formed with teeth 40 to constitute a ratchet wheel. The rear face of the tool holder 14 abuts the flange 34 against which it is urged by a spring washer 42 acting through a bearing washer 41. The bearing washer 41 and spring washer 42 are positioned about the holder 14 between the opposed faces 101 and 102 respectively of the flange 39 and the cover member 36. The tool holder 14 is also provided with a threaded aperture 43 at a suitably inclined angle for receiving a locking screw 44 to hold the diamond tool within the holder 14.

To provide for the assembly in the housing 16 of means for indexing the ratchet wheel 39 at periodic intervals, the cover member 36 of the housing 16 is provided with a blind bore 45 which extends across the cylindrical recess 100 more or less tangentially thereof and opens into said recess. The bushing 32 is threadedly received into the open end of said bore 45. Slidably disposed within the bore 45 is a detent retainer 46. The retainer 46 is secured as by means of soldering to the end of the flexible shaft 28 of the cable 30. The retainer carries a detent pin 47 within a transversely extending aperture provided therein. A leaf spring 48 resiliently urges the pin 47 into engagement with a tooth 40 of the ratchet wheel 39 as the retainer 46 is moved axially in one direction. A spring 49, one end of which is seated against the sheath 29 of the cable 30 biases the retainer 46 toward an inoperative position where the pin 47 is out of contact with any of the teeth 40 of the ratchet wheel 39.

The operation of the device is as follows. As the carriage 17 reaches a position where the dressing tool 15 has completed a traverse of the face of the grinding wheel 11 and the diamond point is out of contact with the grinding wheel, the pin 22 contacts the stop member 24, causing the arm 19 to pivot about the pin 20 into the position

shown by the dotted lines in Figure 2. In this position, tension is applied through the spring 27 to the inner flexible shaft 28 of the cable 30. The pin retainer 46 is thus moved outwardly of the blind bore 45 against the action of the spring 49. In so moving, the detent pin 47 comes into contact with a tooth 40 of the ratchet wheel 39. Contact of the pin 47 and the tooth 40 causes the ratchet wheel to rotate a predetermined amount, determined by the spacing between the teeth of the ratchet wheel 39. In the embodiment shown in Figure 3, wherein 16 teeth are provided on the ratchet wheel 39, the diamond dressing tool 15 will be rotated through an angle of 22½° each time the diamond tool makes a complete traverse back and forth across the surface of the grinding wheel 11.

As the carriage 17 is reciprocated for another pass across the grinding wheel, the spring 49 urges the pin retainer 46 inwardly into the position shown in Figure 3. During such movement inwardly of the bore 45, the detent 47 rides freely over one or more of the teeth 40 of the ratchet wheel 39. The spring 48 permits the retraction of the pin, or detent, 47 as it rides over the inclined faces of the teeth 40.

At the same time the movement of the ratchet pin retainer 46 acts through the inner flexible shaft 28 of the cable 30 to bring the arm 19 back to the position shown in Figure 2. The pivotal movement of the arm 19 is limited in its return by means of an adjustable threaded stop 50 mounted upon the block 18. The carriage 17 is then ready for another pass across the surface of the grinding wheel.

From the foregoing, it will be evident that I have herein provided a simple and efficient means for rotating a diamond dressing tool. The arrangement of the elements is such that the indexing means requires a minimum amount of space and may be incorporated into grinding wheel assemblies which have small clearances between the grinding wheel and the guard assembly.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A grinding wheel dressing assembly, a grinding wheel, a carriage arranged to traverse the surface of said grinding wheel, a tool housing carried by said carriage, a tool holder rotatably mounted within said housing, a ratchet wheel carried by said holder, a ratchet pin retainer mounted for reciprocating movement within said housing, a ratchet pin carried by said retainer, a spring urging said ratchet pin into contact with said ratchet wheel, a flexible cable having one end secured to said retainer, an arm pivotally secured to said carriage, a spring connecting said arm to the other end of said cable, said arm being arranged to pivot upon the completion of a traverse of said carriage across the surface of said grinding wheel and to thereby bring said ratchet pin into contact with said ratchet wheel and rotate the same a predetermined amount.

2. In a grinding wheel dressing assembly, a rotatable grinding wheel, a carriage mounted for traversing movement across the surface of said grinding wheel, a stationary abutment located at one end of said traversing movement, a housing, a rotatable tool holder carried by said housing, an actuating member adjacent said tool

holder, said actuating member engaging said tool holder at a point radially spaced from the turning axis thereof to rotate said tool holder through a predetermined angular displacement, a flexible cable having one end connected to said actuating member, and pivotal means connected to the other end of said cable and carried by said carriage at a point remote from said housing, said last named means being arranged to engage said stationary abutment on said dressing assembly at the completion of a traverse of said carriage and thereby impart limited rotary motion to said tool holder.

3. In a grinding wheel dressing assembly, a rotatable grinding wheel, a carriage mounted for traversing movement across the surface of a grinding wheel, a housing carried by said carriage, a tool holder rotatably mounted within said housing, a ratchet wheel carried by said holder, a ratchet pin retainer mounted for reciprocating movement within said housing, a ratchet pin carried by said retainer, a spring urging said ratchet pin into contact with said ratchet wheel, a flexible cable having one end secured to said retainer, pivotal means carried by said carriage remote from said housing and secured to the other end of said cable for supplying tension to said cable at the completion of

a traverse of said carriage across the surface of said grinding wheel to thereby move said retainer and bring said pin into contact with said ratchet wheel and rotate the same a predetermined amount.

STANFORD P. BRUCE.

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