May 28, 1929. G. A. DE VLIEG 1,715,122

WHEEL DRESSING MECHANISM

Filed Nov. 26, 1924 2 Sheets-Sheet 1

Fig. 1.

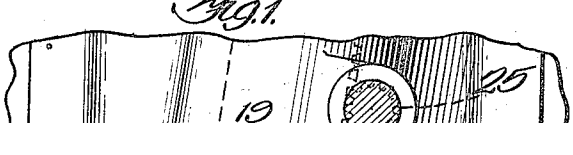
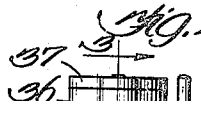


Fig. 2.



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Fig. 4.

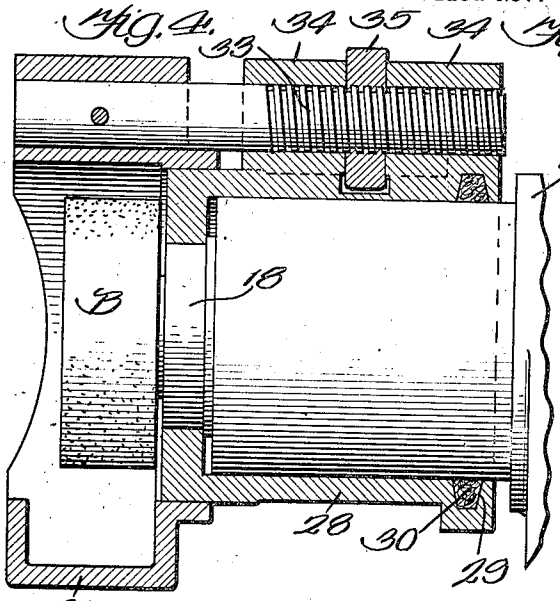


Fig. 6.

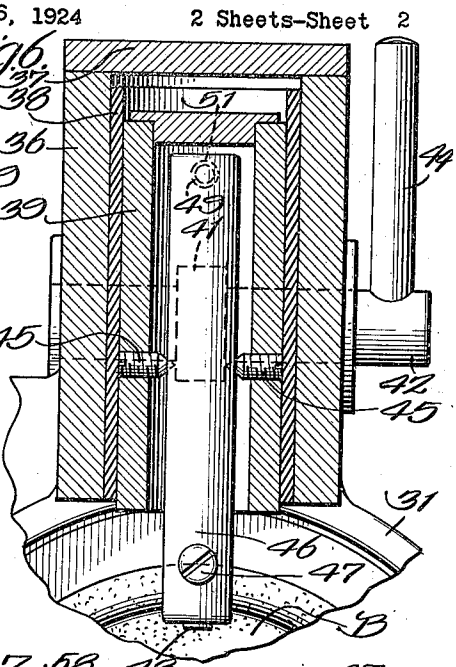


Fig. 5.

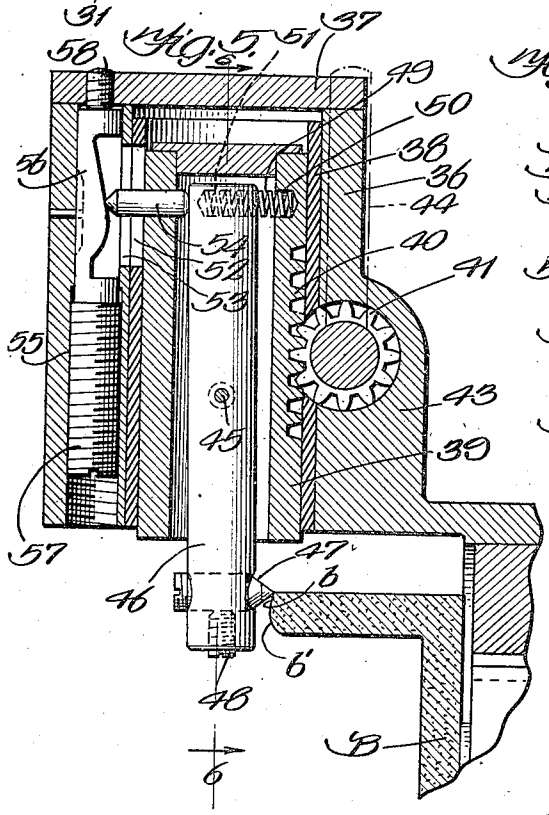
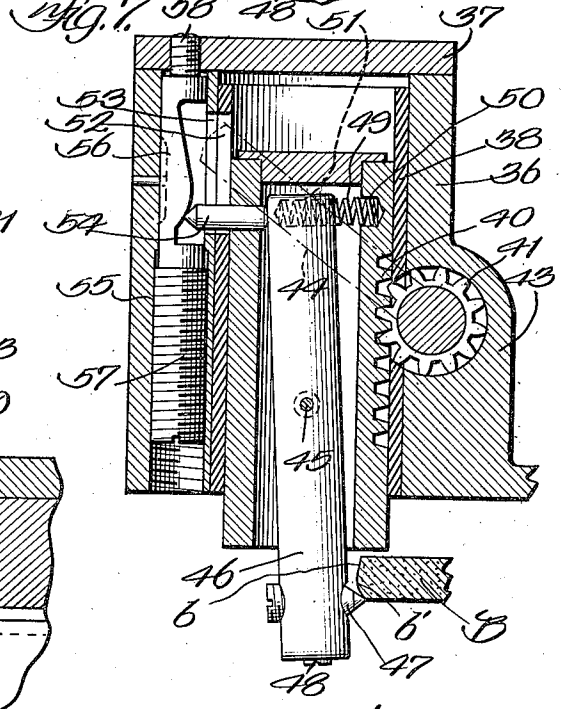


Fig. 7.



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UNITED STATES PATENT OFFICE.

GERARD A. DE VLIEG, OF ROCKFORD, ILLINOIS.

WHEEL-DRESSING MECHANISM.

Application filed November 26, 1924. Serial No. 752,321.

The present invention relates to improvements in dressing mechanisms for grinding wheels, particularly grinding wheels in which the cutting surface is composed of a plurality of curved or irregular elements.

The primary object of the invention is to provide a wheel dressing mechanism in which the dressing tool is given a composite movement, i. e. a movement in a path other than a straight line, to dress the cutting face of the grinding wheel.

A more specific object is to provide a wheel dressing mechanism having means for moving the dressing tool in a rectilinear direction across the cutting face of the grinding wheel, and means operable through said movement for moving said tool laterally of said face, said last means being adjustable to vary the relation of said movements and to change the character of said lateral movement.

Another object is to provide a grinding wheel with a dressing mechanism mounted to move therewith, said dressing mechanism being adjustable relative to said grinding wheel, and the latter being axially adjustable to compensate for wear in the grinding and dressing operations.

A general object is to provide a novel dressing mechanism which is simple and inexpensive in construction, and which is efficient and expeditious in operation.

Further objects and advantages will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is a fragmentary plan view of a grinding machine with a wheel dressing mechanism embodying the features of my invention attached thereto.

Fig. 2 is an end view of the grinding wheel mounting looking along the axis of the spindle.

Fig. 3 is a sectional view taken in the plane of line 3—3 of Fig. 2.

Fig. 4 is an enlarged view, partially in section, taken along line 4—4 of Fig. 2.

Fig. 5 is an enlarged vertical section of the dressing mechanism taken along line 3—3 of Fig. 2, and showing the dressing tool at the outer edge of the grinding face.

Fig. 6 is a vertical section of the dressing mechanism taken in the plane of line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 5, but showing the dressing tool at the inner edge of the grinding face.

While I have illustrated in the drawings and will herein describe in considerable detail the preferred embodiment of the invention, it is to be understood that I do not thereby intend to limit the same to the specific form disclosed, but aim to cover all modifications and alternative constructions falling within the spirit and scope of the appended claims.

Referring to the exemplary embodiment of the invention, 10 represents a supporting standard for the grinding wheel and spindle, and 11 designates the work-carriage of a grinding machine similar to the one disclosed in my copending application Serial No. 109,222, filed May 15, 1926.

A rotary cutter A is shown mounted on a mandrel 12 which is mounted between two centers 13 on a tailstock 14 and a headstock 15 respectively, and which is secured by a dog 15^a to the headstock spindle 16 to rotate therewith. The cutter A is adapted to be ground by a grinding wheel B, which in the present instance is cup shaped and provided with a composite annular cutting face or surface. Each radial element of the cutting face comprises a straight outer line b and a curved inner line b'. The outer part b serves to grind and relieve the cutting edges of the cutter teeth, while the inner part b' is adapted to provide a suitable lead by beveling the ends of the teeth as the cutter is moved into the grinding wheel.

The grinding wheel B is mounted on the forward end of a suitable spindle 17 which extends through an elongated sleeve 18 slidably mounted in a tubular support 19 on the standard 10. Opposite ends of the spindle are journaled in ball bearings 20 mounted in the sleeve 18. The ball bearings 20 are held in place respectively by a nut 21 which serves as the backing for the grinding wheel B, and by a nut 22 threaded into the rear end of the sleeve 18. The sleeve 18 is held against rotation by a key 23, and is adapted to be longitudinally adjusted with the spindle 17 by means of a rack 24 formed on its side and a pinion 25 mounted in the support 19. A pulley 26 is splined to the rear end of the shaft 17, and is journaled at its opposite ends in ball bearings 27. Rigidly keyed to the front end of the sleeve 18 for movement therewith

and telescoping with the reduced front end of the tubular support 19 is a dust guard in the form of a housing 28. The rear end thereof is formed with an annular groove 29 in its inner periphery in which suitable packing 30 is provided to prevent the entrance of foreign particles to the sliding surfaces between the sleeve 18 and the support 19.

The grinding wheel B is enclosed by a hood 31 having an annular flange 32 on its rear side telescoping with the front end of the housing 28. The hood 31 constitutes a holder or support for the dressing mechanism, and is provided with a non-rotatably adjusting screw 33 extending rearwardly through two spaced tubular lugs 34 on the housing 28. A knurled nut 35 is rotatably mounted on the screw 33 between the lugs 34, and serves as a means for adjusting the dressing mechanism axially of the grinding wheel B to compensate for wear.

The hood 31 is formed integral with a tubular guide 36 which is closed at its upper end by a cap or cover 37 and which is provided with a bearing tube 38 extending longitudinally therethrough. Slidably but non-rotatably mounted in the tube 38 is a sleeve 39 which is formed longitudinally on one side with rack teeth 40 meshing with a pinion 41. The latter is mounted on a stub shaft 42 which is supported in an enlargement 43 on the guide 36 and which is provided with a handle 44 whereby the sleeve 39 can be reciprocated vertically.

Pivotally mounted intermediate its ends on a pair of centers 45 threaded through opposite sides of the sleeve 39 is a tool holder in the form of an arm 46. A cutting tool 47 is threaded through a transverse bore in the lower end of the arm, and can be clamped in adjusted position by a set screw 48. The tool 47 is positioned to move back and forth across the annular cutting face of the grinding wheel B in the reciprocation of the sleeve 39. A coil spring 49, the opposite ends of which extend into opposed depressions 50 in the sleeve 39 and 51 in the supper end of the arm 46 respectively, tends to oscillate the arm to move the cutting tool 47 toward and laterally of the grinding wheel B. Extending slidably through two vertically elongated slots 52 and 53, in registry, in the tube 38 and the forward wall of the guide 36, and through the sleeve 39 into engagement with the upper end of the arm 46 opposite the spring 49 is a pin 54 which defines the oscillatory movement of the arm. The pin projects into a vertical bore 55 in the front wall of the guide 36, and rides on a cam or templet 56 removable from and adjustably mounted in the bore. The cam 56 may be of any desired shape or form and in the present instance is provided with a cam face shaped to uniformly move the pin 54 inwardly as the cutting tool 47 is moved across the portion b, and to permit a sudden and variable outward movement of the pin as said tool passes over the portion b'. An adjusting screw 57 threaded into the lower end of the bore 55 serves as a means for accurately positioning the cam face relative to the pin 54, and a screw 58 threaded through the cap 37 into the upper end of said bore 55 serves to clamp the cam in position.

It will be evident that I have provided a novel and advantageous device for grinding wheels having complex or composite cutting surfaces. By adjusting the sleeve 18 longitudinally, the grinding wheel B can be moved relatively to the work blank A to compensate for wear resulting in the machine operation and in the dressing operation. The cutting tool 47 is adjustable with the hood 31 toward and from the annular cutting face of the grinding wheel B. By substituting cams 56 of different shapes and by adjusting the cam in the bore 55, any desired character of movement, such as rectilinear, composite, or curved, can be given the cutting tool 47 to obtain a cutting face of the desired form on the grinding wheel B. The dressing mechanism in general is simple and inexpensive in construction, can be adjusted to accommodate different sized grinding wheels and to compensate for wear, is always conveniently in position for use, and is accurate and efficient in operation.

I claim as my invention:

1. A dressing mechanism having in combination with a grinding wheel, a hood enclosing said grinding wheel, a guide on said hood, a sleeve slidably mounted in said guide, an arm pivotally mounted in said sleeve for movement laterally of the grinding face of said wheel, a cutting tool carried by said arm, means for reciprocating said sleeve, and means for oscillating said arm.

2. The combination with a grinding wheel, of a support, a hood for said grinding wheel mounted in telescoping relation with said support, means for adjusting said hood on said support relative to said grinding wheel, and a dressing mechanism carried by said hood in operative relation to said grinding wheel.

3. The combination with an annular grinding wheel, of a support, a hood for said grinding wheel mounted on said support, means for adjusting said hood axially of said grinding wheel, and a dressing mechanism carried by said hood in operative relation to the cutting face of said grinding wheel.

4. A dressing mechanism having in combination with an adjustable grinding wheel, a tubular support extending radially of said grinding wheel and mounted for adjustment therewith, means for adjusting said support relative to said grinding wheel, a reciprocatory sleeve in said tubular support, a cutting tool supported by said sleeve, means for re-

ciprocating said sleeve to move said cutting tool across the cutting surface of said grinding wheel, and means for varying the position of said cutting tool laterally of said grinding wheel during said reciprocation.

5. A dressing mechanism having in combination with a grinding wheel having an annular grinding face, a support, a reciprocable member mounted in said support and movable in a plane parallel to the face of said grinding wheel, an arm pivotally mounted in said member for oscillation laterally of said plane, a cutting tool on said arm, means for reciprocating said member to move said cutting tool radially across said face, spring means for pivoting said arm to move said cutting tool laterally of and toward said face, and templet actuated means for controlling said pivotal movement.

6. A dressing mechanism having, in combination, a hollow support, a hollow reciprocable member in said support, a pivoted member in said reciprocable member, a cutting tool mounted in one end of said pivoted member, gear means for reciprocating said reciprocable member, and means for oscillating said pivoted member.

7. A dressing mechanism having, in combination with a grinding wheel, a support mounted for movement bodily with said grinding wheel, said support having a housing, a sleeve mounted for reciprocation in said housing, an arm pivotally mounted in said sleeve, one end of said arm extending out of said sleeve and carrying a cutting tool, spring means engaging the inner end of said arm and tending to oscillate said cutting tool toward said grinding wheel, a pin extending through said sleeve and engaging said arm opposite said spring, and cam means engaging said pin and adapted to vary the position of the latter to oscillate said arm upon reciprocation of said sleeve.

8. A dressing mechanism having, in combination, a support, a housing telescoping with said support, a hood adapted to enclose a grinding wheel and telescoping with said housing, means for adjusting said hood on said housing, and a dressing device mounted on said hood and having a dressing tool movable inside said hood.

9. A dressing mechanism having, in combination, a support, a housing mounted on said support, a member slidably mounted in said housing, said member being formed along one side with a rack gear, a pinion meshing with said rack gear, means for rotating said pinion, an arm pivotally mounted intermediate its ends on said member, a dressing tool on one end of said arm, a templet mounted in said housing, a templet follower associated with said arm and engaging said templet so as to control the angular position of said arm, and spring means tending to hold said arm, said pin and said templet in coacting relation.

10. A dressing mechanism having, in combination, a supporting member, a hood adapted to enclose a grinding wheel and telescoping with said supporting member, means for adjusting said hood on said member, and a dressing device mounted on said hood and having a dressing tool movable inside of said hood.

In testimony whereof, I have hereunto affixed my signature.

GERARD A. DE VLIEG.