July 24, 1934. A. E. NELSON ET AL 1,967,447

ADJUSTABLE DISK AND TOOL GRINDER

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Fig. 1.

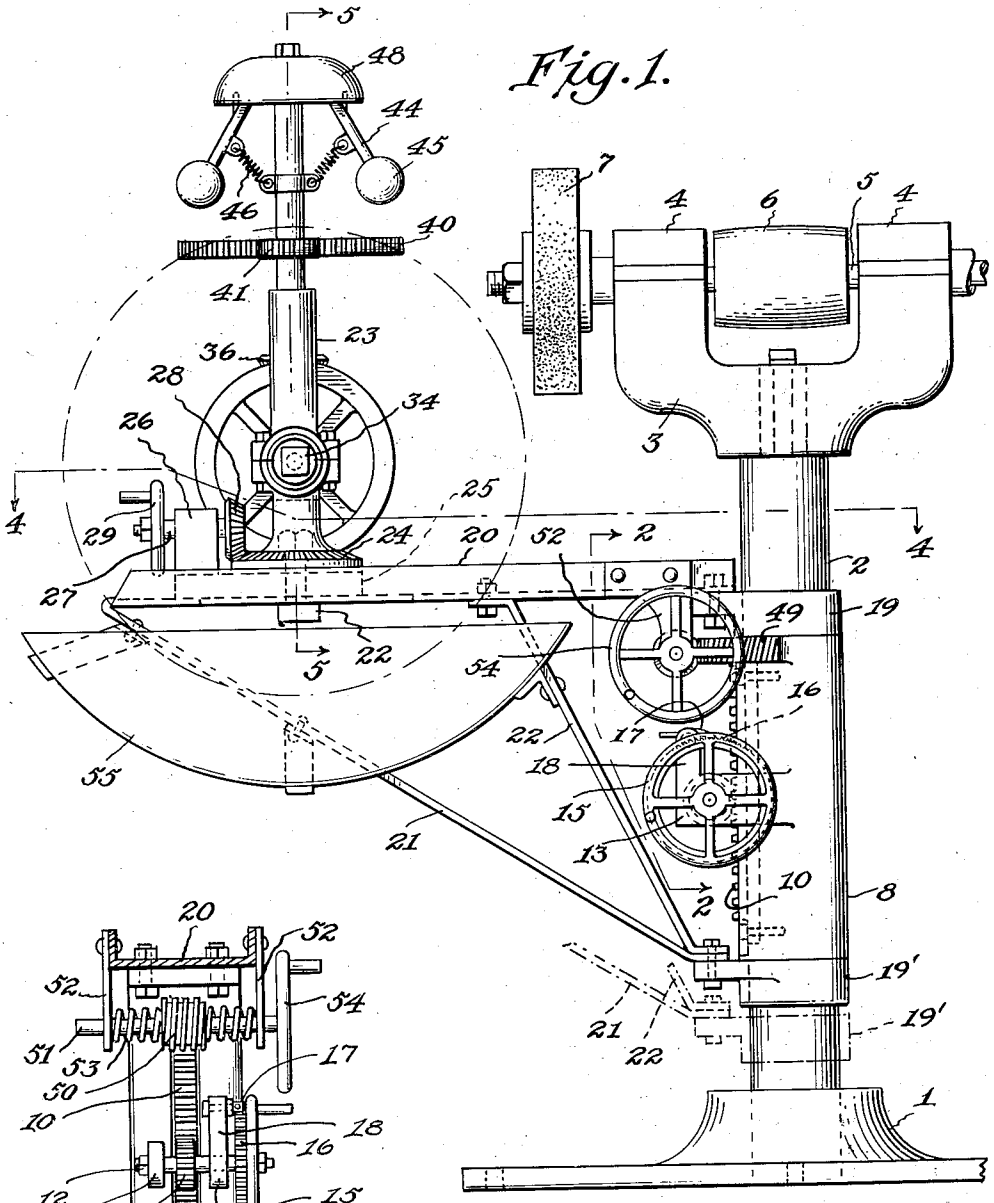


Fig. 2.

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Fig. 3.

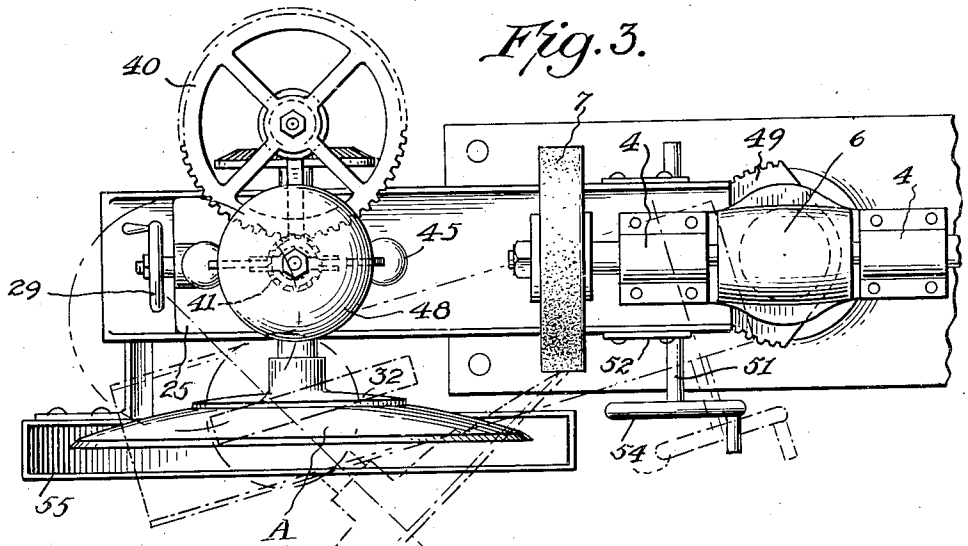


Fig. 4.

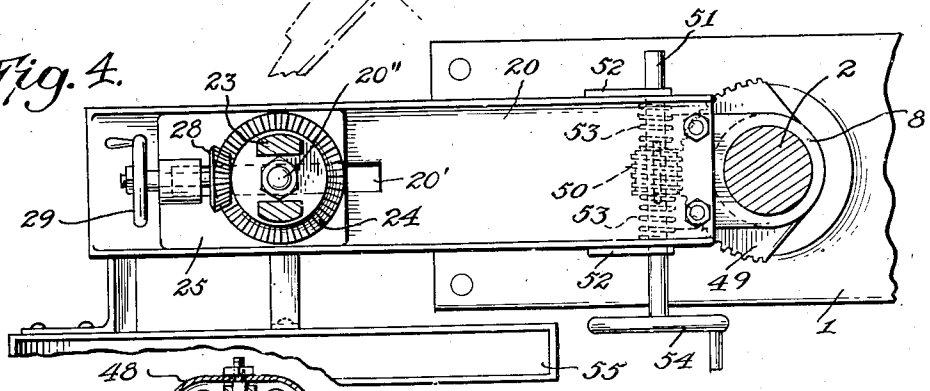
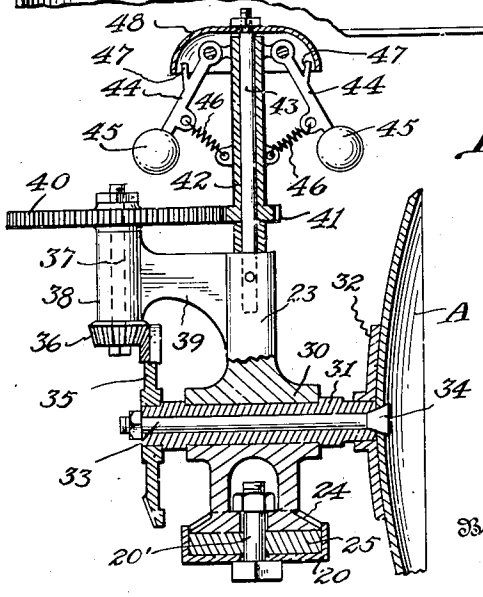


Fig. 5.



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UNITED STATES PATENT OFFICE

1,967,447

ADJUSTABLE DISK AND TOOL GRINDER

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Application August 25, 1932, Serial No. 630,457

4 Claims. (Cl. 51—106)

This invention relates to a grinding mechanism for tools but is more especially concerned with the grinding or sharpening of disks such as are used on disk harrows or disk plows.

One of the primary objects of the invention resides in the provision of a grinding machine in which the disk to be ground is driven from the periphery of the grinding wheel, there being means to provide the necessary lag in the disk to accomplish the desired grinding effect.

A further object of the invention consists in providing a plurality of adjustments whereby the machine is not only capable of grinding disks of all sizes but also is capable of presenting the edge of the disc at the most favorable angle with respect to the grinding wheel.

A still further object of the invention resides in the provision of a novel spring device in the tool or disk holder whereby the disk is automatically pressed against the grinding wheel with the desired pressure but which provides the resiliency necessary to take care of any unevenness in the disk or the grinding wheel.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which

Figure 1 is a side elevational view of the apparatus, parts being broken away.

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary plan view of the machine, showing in dotted outline an adjustment of the disk to grinding position.

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 1; and

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 1.

Referring to the drawings in more detail, the numeral 1 indicates the base of the apparatus and is provided with a vertically extending standard 2 on the upper end of which is mounted a yoke 3 provided with bearings 4. Within the bearings 4 is a shaft 5 on which is mounted a pulley 6 to which power may be applied by a driving belt. On the ends of the shaft 5 are mounted grinding wheels 7.

Slidably mounted on the standard 2 is a sleeve 8 provided with a vertically extending slot 9 as indicated more clearly in Figure 2. Fixedly secured on the standard 2 is a rack 10 which extends through the slot 9 so as to cooperate with a pinion 11 keyed on a shaft 12. The shaft 12 is mounted in bearings 13 and 14 carried by the sleeve 8 and is also provided with an operating wheel 15. Fixed to the wheel 15 is a ratchet wheel 16 with which a pawl 17 is adapted to cooperate. The pawl 17 is pivotally mounted in an extension 18 of the bearing bracket 13. With this construction it will be apparent that the sleeve 8 and the mechanism carried thereby, which will presently be described, may be raised or lowered by merely rotating the wheel 15 in the proper direction, and will be supported in their adjusted positions by the pawl 17 which locks the wheel against rotation.

Pivotally mounted on standard 2 above the sleeve 8 by means of a ring 19 is a bracket 20 which is suitably braced by means of rods 21 and 22 which have their upper ends secured to the bracket and their lower ends fixed to a ring 19'. The bracket 20 is provided with a longitudinally extending slot 20' through which extends a bolt 20'' which is adapted to lock the tool-carrying mechanism in its adjusted position with respect to the grinding wheel 7. The main part of the tool-carrying mechanism is a standard 23 formed with a bevel gear 24 on its lower end which seats upon a plate 25. Both the plate 25 and the bevel gear 24 are provided with openings through which the bolt 22 extends, and it will be apparent that by loosening up on the bolt 22 the plate 25 and the standard 23 may be moved longitudinally of the bracket by reason of the slot 21. Mounted on the plate 25 is a bearing member 26 in which is supported a shaft 27. Shaft 27 is provided with a bevel gear 28 for co-operation with gear 24 and the opposite end of the shaft is provided with an operating wheel 29. By loosening the bolt 22 it will be obvious that the standard or pedestal 23 may be rotated about its longitudinal axis by merely operating the hand wheel 29.

Extending transversely of the standard 23 is a bearing 30 through which extends a hollow axle 31 to one end of which is fixed a concave plate 32. Extending through the axle 31 is a bolt 33 provided with an enlarged recangular head 34. This bolt is adapted to pass through the conventional opening at the center of the disk used on disk harrows and clamps the same against the concave plate 32 so that the disk, which is indicated by the letter A, will transmit its rotary movement to the axle 31. On the opposite end of the axle 31 is fixed a bevel gear 35 which meshes with a bevel gear 36 fixed on the lower end of a shaft 37 mounted in bearing 38 on bracket 39. On the upper end of shaft 37 is a gear wheel 40 which meshes with a pinion gear 41 fixed to a sleeve 42. This sleeve 42 is

mounted on pedestal 23 by means of a bolt 43 which extends downwardly through the sleeve 42 and is secured in a socket in the upper end of the pedestal.

Pivoted adjacent the upper end of the sleeve 42 are two arms 44 each provided at its lower end with a weight 45. These arms will normally hang vertically by reason of gravity and are swung outwardly, as in the ordinary governor, through centrifugal force when the sleeve 42 is rotated. Springs 46 have their respective ends secured to the arms 44 and to the sleeve 42 so as to limit the extent of radial movement of the arms 44. Each of these arms is provided with a finger 47 which is adapted to frictionally engage the inner surface of a brake member 48 secured to the upper end of bolt 43.

Suitably mounted or formed on the upper end of sleeve 8 is a worm rack 49 adapted to cooperate with a worm 50 fixed to a shaft 51. This shaft is rotatably mounted in bearing brackets 52 depending from the bracket 20 adjacent the standard 2. Mounted on the shaft 51 between the respective ends of the worm 50 and the brackets 52 are two compression springs 53 which serve to hold the worm 50 centrally of the transverse dimensions of the bracket 20 and also to exert the desired pressure of the disk A on the grinding wheel 7. Rotary movement is imparted to the worm 50 by means of a hand wheel 54 secured to one end of the shaft 51. For the purpose of preventing the disk from being unduly heated so as to affect the temper of the steel a water trough 55 is provided. This trough is suitably secured to the braces 21—22 and is so disposed as to receive the lower edge of the disk when the latter is mounted on the clamp 32—34.

In the operation of the device the disk to be ground is clamped to the axle 31 in the manner heretofore described, and suitable adjustments are made in accordance with the particular size of the disk so as to present the disk to the grinding wheel at an angle of substantially 45 degrees, and otherwise adjust the same to best adapt the disk to the grinding operation. For instance, the disk may be raised or lowered by operating the wheel 15 which operates the pinion 11 so as to raise or lower the sleeve 8. Likewise, the radial position of the bracket 20 which carries the tool-supporting pedestal 23 may be adjusted by operating the hand wheel 54. The longitudinal position of the pedestal 23 with respect to the bracket 20 may be adjusted by loosening up the bolt 22 and sliding the pedestal base plate 25 in the proper direction. Also the circumferential adjustment of the pedestal may be made by operating the hand wheel 29. The degree of pressure with which the disk engages the grinding wheel is also regulated by the hand wheel 54 which may be adjusted so as to cause one or the other of the springs 53 to press the disk against the periphery of the grinding wheel.

With the disk properly adjusted as shown in dotted lines in Fig. 3, power is applied to the pulley wheel 6 to cause a rotation of the grinding wheel 7. Rotation of this wheel will, of course, impart a rotary movement to the disk A, which is in turn imparted to the sleeve 42 by means of gears 35, 36, 40 and 41. When the sleeve 42 reaches a speed sufficiently great to cause the fingers 47 to engage the brake member 48 the rotation of the disk A will, of course, be damped and thus caused to lag behind the rotation of the grinding wheel 7. The desired frictional contact between the edge of the disk and the grinding wheel so as to form the proper edge on the disk, is thus provided. As already stated, undue heating of the disk is prevented by means of the water trough 55 in which the lower edge of the disk rotates.

From the foregoing description taken in connection with the accompanying drawings it will be apparent that we have devised a grinding mechanism more especially for use in grinding the disks of disk harrows and disk plows; that a plurality of adjustments are provided so as to adapt the mechanism to various sizes of disks, and also to present the edge of the disk to the grinding wheel in the most favorable manner; that novel means are provided for not only obtaining the desired pressure between the disk and the grinding wheel, but also to provide for inaccuracies in the contour of either the disk or the grinding wheel; and that automatic means are provided to produce a lag between the disk and the grinding wheel so as to provide the necessary frictional contact between the disk and the wheel.

In accordance with the patent statutes we have described what we now believe to be the preferred form of the construction, but inasmuch as various minor changes may be made in the details of structure without departing from the spirit of the invention, all such changes are intended to be included within the scope of the appended claims.

What we claim is:

1. In a disk grinder, a grinding wheel, means for rotating the wheel, adjustable means for rotatably supporting a disk with its edge in contact with the periphery of the grinding wheel, and a speed-responsive brake associated with the disk-supporting means for limiting the speed of rotation of the disk.

2. In a disk grinder, a grinding wheel, means for rotating the wheel, adjustable means for rotatably supporting a disk with its edge in contact with the periphery of the grinding wheel, and a speed-responsive brake connected with the rotatable disk support for limiting the speed of rotation of the disk.

3. In a disk grinder, a grinding wheel, a pivotally mounted bracket, means for rotatably supporting a disk on said bracket, a worm and worm rack for moving said bracket on its pivot to bring the disk into proper relationship with the grinding wheel, a pair of bearings on the bracket and in which said worm is slidably mounted and spring means disposed between said worm and bearings.

4. In a disk grinder, a grinding wheel, means for rotating the wheel, a pivotally mounted bracket, means for rotatably supporting a disk on said bracket, a worm and worm rack for moving said bracket on its pivot to bring the disk into proper relationship with the grinding wheel, and a speed-responsive brake associated with said rotatable disk support for limiting the speed of rotation of the disk.

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