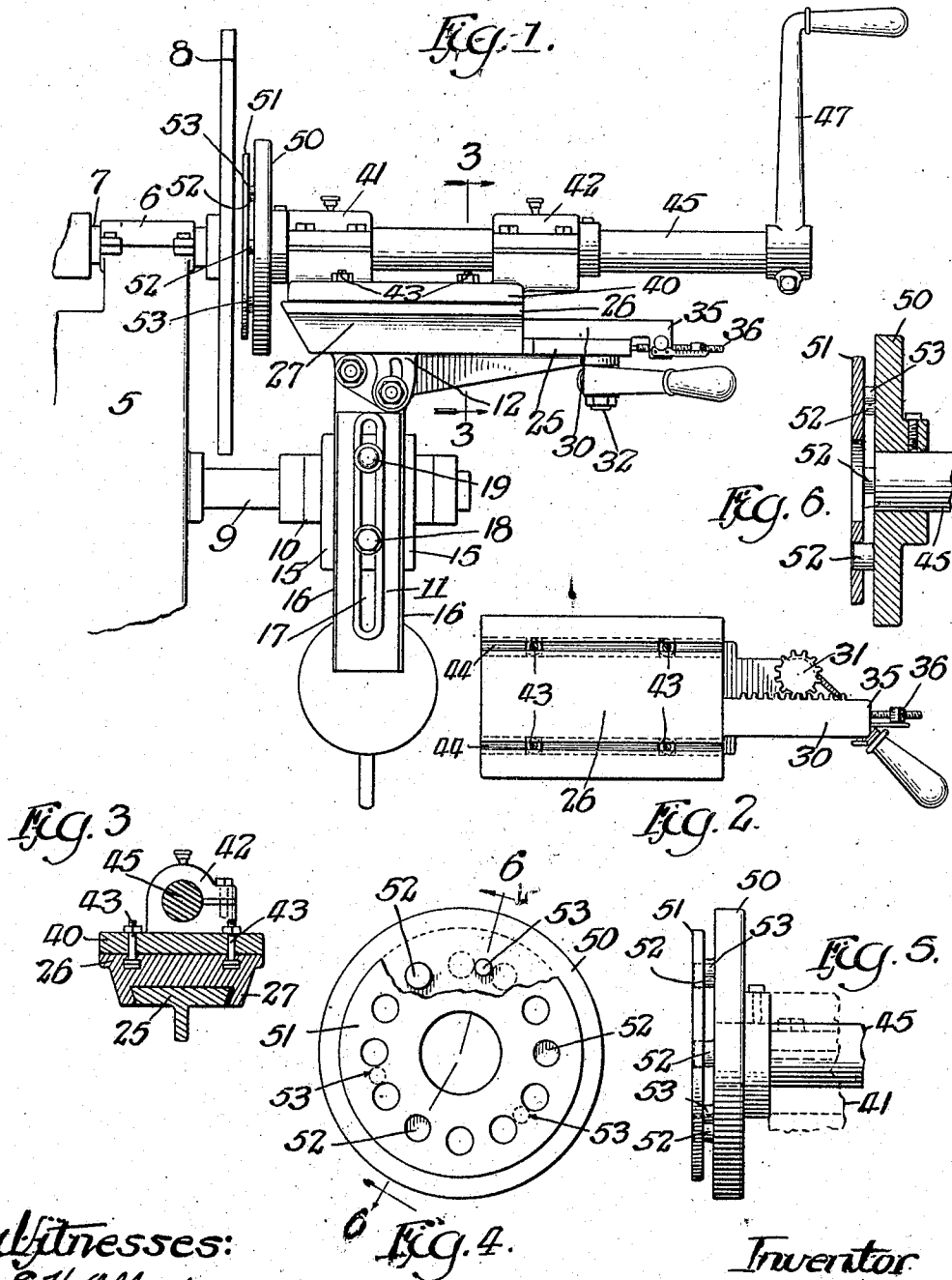


J. MILLER, JR.
GRINDING MACHINE.
APPLICATION FILED JAN. 29, 1909.

937,379.

Patented Oct. 19, 1909.



Witnesses:
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UNITED STATES PATENT OFFICE.

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GRINDING-MACHINE.

937,379.

Specification of Letters Patent.

Patented Oct. 19, 1909.

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To all whom it may concern:

Be it known that I, JOHN MILLER, Jr., a citizen of the United States, and a resident of Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Grinding-Machines; and I, JOHN MILLER, Jr., do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in grinding or polishing machines and more especially to flat surface grinding machines, or what are generally known as disk grinders.

The invention relates more particularly to a work holding attachment, which is provided with means for backing or supporting the object to be ground, adapted to maintain the same in the plane of the grinding wheel or disk.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

The holding attachment may be used in connection with the improved feed table described and shown in my prior application for Letters Patent No. 372,412, filed May 7, 1907, parts of which are shown in the accompanying drawings, in which,

Figure 1 is a side view showing my improved work supporting device in place upon a grinding machine table. Fig. 2 is a plan view of the feed table showing the means for advancing the said feed table toward the grinding wheel. Fig. 3 is a vertical section taken upon line 3-3 of Fig. 1. Fig. 4 is a face view of a disk, with a part broken away, and the holding device for the same. Fig. 5 is a side view of the disk to be ground and the supporting device therefor. Fig. 6 is a detail sectional view taken upon line 6-6 of Fig. 4.

As shown in said drawings, 5 designates a pedestal for a grinding machine provided with a head stock 6 in which is journaled a spindle or rotary arbor 7 carrying a flat faced grinding wheel or disk 8. Below the disk 8 is rigidly fixed a cylindrical shaft 9 which extends outwardly from the pedestal parallel to the said spindle or arbor 7. Upon the said shaft 9 is mounted a hub 10 carrying an upright arm 11 upon the upper

end of which is carried a work table 12. Said hub is adapted to be either turned upon said shaft, permitting the table to oscillate in a plane parallel to the grinding wheel or disk, or to be clamped or secured to the shaft in various positions with respect to the grinding disk.

Upon one side face of the hub 10 are two parallel vertical flanges 15, 15 adapted for sliding engagement with parallel edges 16, 16 of the vertical arm 11. Said arm is provided with a longitudinal slot 17 through which pass cap screws 18 and 19, said cap screws extending into and having screw-threaded engagement with the hub 10 and serving to adjustably secure the said arm to the said hub.

The work table 12, which consists of a horizontal base member 25 and a table top 26 having horizontally sliding engagement therewith, is mounted upon the upper end of the vertical arm 11. The base member 25 is pivoted to the upper end of the arm 11 so as to swing on an axis parallel with the face of the grinding disk and is thereby adapted to be tilted into positions of varying angularity with respect to the plane of the grinding wheel or disk. The base member 25 is narrower than the table top 26 and is formed with its side edges inwardly and downwardly beveled giving dovetail form thereto. The side margins of the said base member engage the inner faces of two longitudinal flanges 27, 27 on the under surface of said table top 26. On the rear end of the table top 26, or that end remote from the face of the grinding wheel or disk, is an arm or extension 30 provided with laterally facing rack-teeth adapted to mesh with a gear pinion 31 mounted upon the rear end of the base member 25, which latter is extended rearwardly beneath the path of the said arm 30. Said pinion 31 is mounted or affixed to the upper end of a vertical shaft 32 having bearing in the rear end of the base member 25. To the lower end of the said shaft 31 beneath the base member 25 is attached a horizontally swinging hand lever by means of which the table top 26 is advanced toward and retracted from the face of the grinding wheel or disk 8. At the outer end of the arm 30 on the table top is a depending lug 35 in which is mounted a micrometer screw 36 arranged in the path of and adapted for contact with the outer

end of the base member 25. Said screw constitutes an adjustable stop for accurately stopping the forward movement of the table 26 at any predetermined point.

5 Mounted upon the table top 26 is a flat plate 40 upon which are formed two journal bearings 41 and 42. The said plate is secured to the table top by means of square headed bolts 43, 43 which extend through
10 the said plate with the heads thereof engaging rectangular grooves 44, 44 in the said table top. Supported in the said bearings 41 and 42 is a longitudinally arranged rotatable shaft 45 which is perpendicular to
15 the face of the grinding wheel 8 and to the inner end of which is attached a disk holding plate 50 hereinafter referred to. To the outer end of the said shaft is attached a crank handle 47 by means of which the work
20 may be rotated. The holding plate 50 is mounted upon the shaft 45 with its face in a plane parallel with the working face of the grinding disk 8.

The piece of work to be ground is indicated in the drawings by 51 and as therein shown has the form of a flat disk provided with a central circular aperture and a series of annularly arranged holes, such disk being like the seed-dropping disks used in the seed-dropping mechanism of corn planters. Said
25 disk 51 is so supported on or by the holding plate 50 that its outer face, which is to be ground or finished, may be rotated in contact with the grinding wheel 8 and at the same
30 time may be maintained in position generally parallel with the holding plate 50 and with the working face of the said grinding disk. For this purpose the said holding plate is provided with two sets of pins or lugs, the
40 pins of the separate sets being designated by the reference numerals 52, 52, 52 and 53, 53, 53, respectively. The pins 52, 52 constitute the means by which the disk 51 is held from turning upon and caused to rotate
45 with the plate 50 and will hereafter be referred to as the driving pins. The said driving pins are adapted to engage with the edges of any aperture, or with other holding edges or shoulders with which the disk to be
50 ground may be provided. Said driving pins may be distributed over the face of the plate 50 in any suitable manner, depending upon the shape of the work to be ground or the location of the holding edges or shoulders thereon. Instead of the driving pins herein
55 referred to there may be employed other suitable holding and driving means, such as a magnetic clutch, or an expansion clutch when there is a central, circular opening in the disk to be ground. The pins 53, 53, 53 constitute bearing pins by means of which the disk 51 is retained in position generally parallel with the plane of rotation of the grinding wheel 8. The said bearing pins
60 are three in number and are arranged at

equal distances apart upon the face of the plate 50 and preferably at equal distances from the axis of rotation of the said plate. The said bearing pins are somewhat shorter than the holding pins but of sufficient length
70 for contact with the back of the disk 51 when it is in position for engagement with the holding pins. In case the driving pins engage with apertures extending through the disk or piece of work to be ground, as in the case
75 of the seed-dropping disk illustrated, the bearing pins will be made of such length as to prevent said driving pins from projecting beyond the outer face of the disk, as clearly seen in Figs. 5 and 6.

The grinding attachment described is intended more particularly for grinding or finishing upon one side thereof disks or like objects (such as the seed-dropping disk referred to) which are made of cast metal and
85 are left rough or unfinished on their rear faces. Such a disk or object if rough or irregular on its rear face could not be supported in the grinding operation by resting directly against the flat face of the work
90 holding plate 50, because, by reason of roughness or irregularity of its rear face, the object would not come to firm bearing against the said plate and would be liable to tip or tilt in the grinding operation. The three
95 backing pins, arranged as described, afford a three-point bearing against which the work rests in the grinding operation and by which the same will be firmly supported notwithstanding irregularity or roughness of its rear
100 face; the object being held by said bearing pins in position generally parallel with the face of the grinding disk. The outer face of the object when so supported may not be exactly parallel with the grinding disk, but, as
105 the result of the grinding operation, the finished surface formed thereon will be parallel with the face of the work holding plate and generally parallel with its irregular rear face. In other words, the device described
110 affords a simple and convenient means for supporting, during the grinding of its front face, a flat object or disk which has been left rough or unfinished on its rear face.

I claim as my invention:—

1. In a disk grinding machine, the combination with a rotating grinding disk having a flat working face, and a rotative work holding shaft which is parallel with the axis of rotation of the grinding disk and is movable toward and away from the face of the same, of a work holder carried upon the end of the said shaft adjacent to the face of the grinding disk and provided with three backing pins and with means adapted for driving engagement with the work.

2. In a disk grinding machine, the combination with a rotating grinding disk having a flat working face, and a rotative work holding shaft which is parallel with the axis

of rotation of the grinding disk and is movable toward and away from the face of the same, of a work holder carried upon the end of the work holding shaft adjacent to the face of the grinding disk and provided with a driving pin and with three backing pins. In testimony, that I claim the foregoing

as my invention I affix my signature in the presence of two witnesses, this 16th day of January A. D. 1909.

JOHN MILLER, JR.

Witnesses:

A. F. SPAULDING,
E. F. HANSEN.