No. 823,857. PATENTED JUNE 19, 1906.

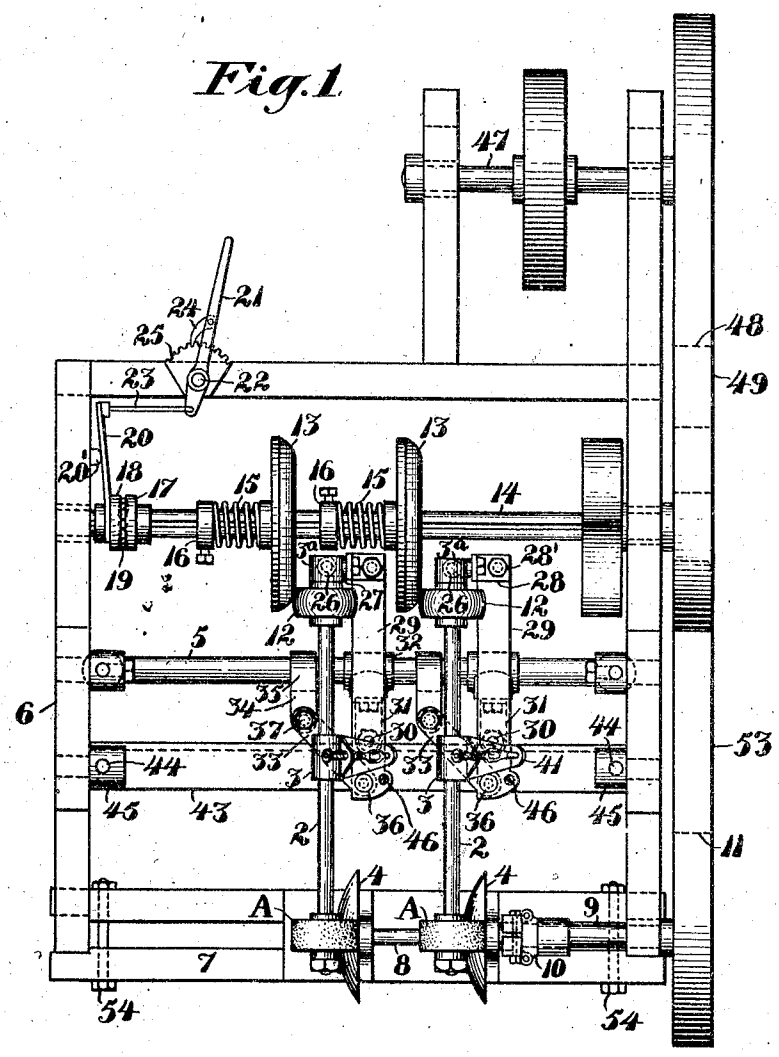
G. B. GREENE.

GRINDER FOR CULTIVATOR DISKS AND TOOLS.

APPLICATION FILED SEPT. 2, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-

F. C. Fliedner

B. House

Inventor;

George B. Greene

By Geo. H. Strong. Atty

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3 SHEETS—SHEET 2.

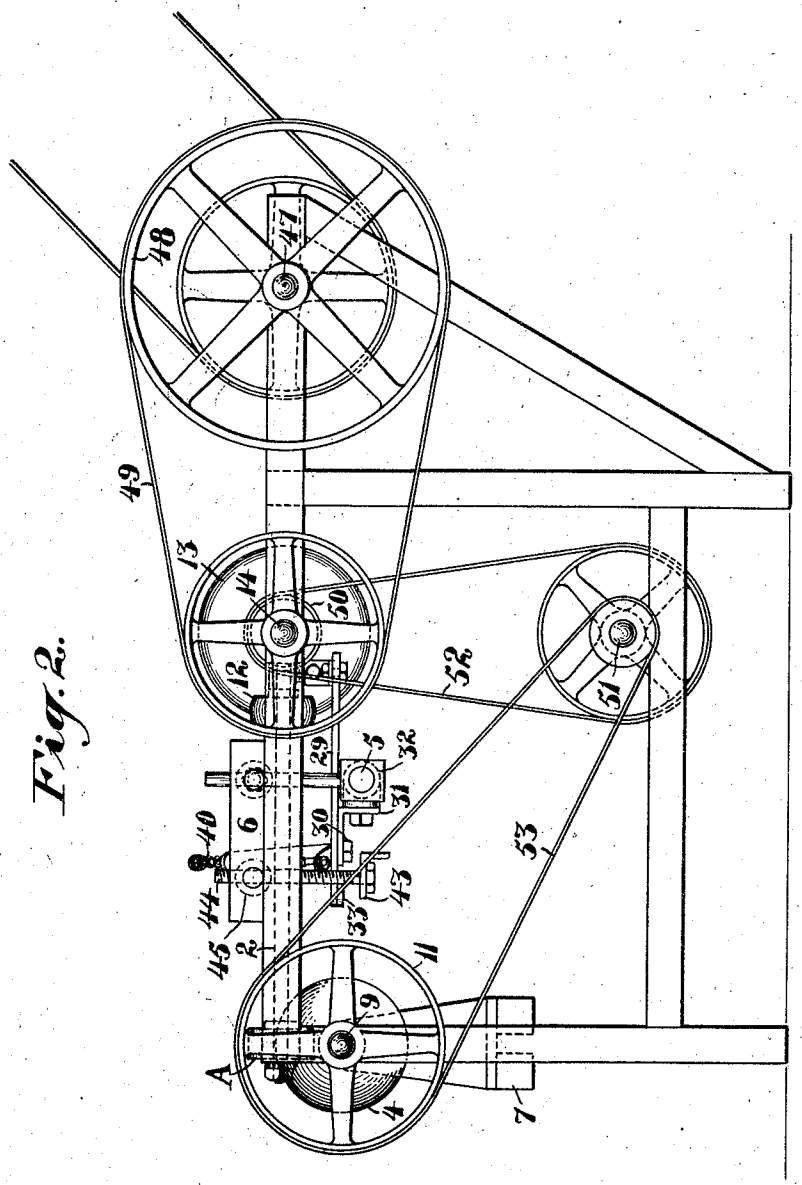


Fig. 2.

Witnesses:-

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3 SHEETS—SHEET 3.

Fig. 3.

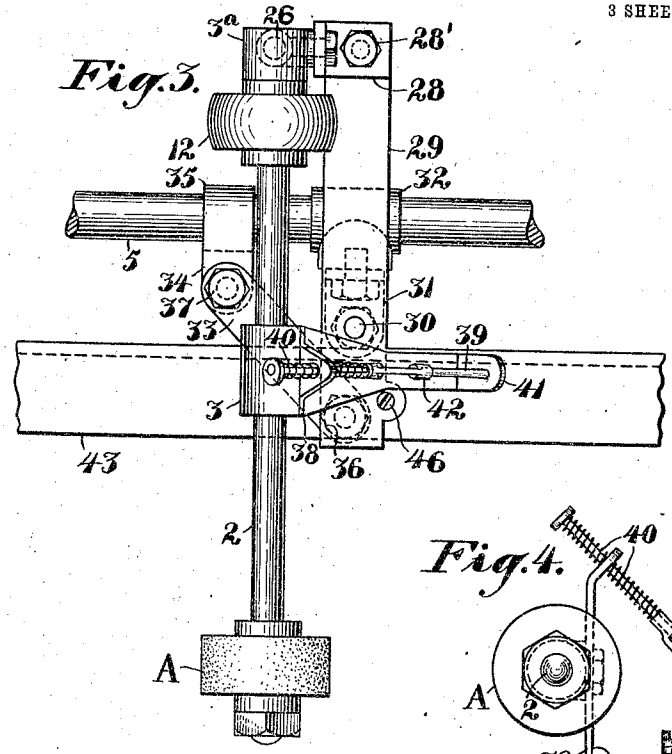


Fig. 4.

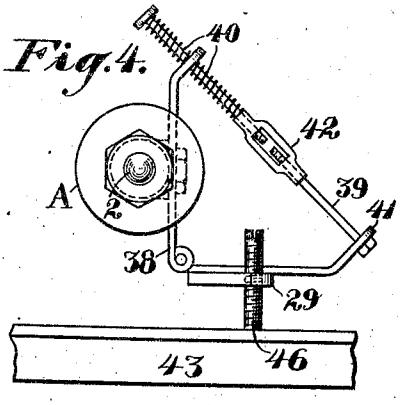
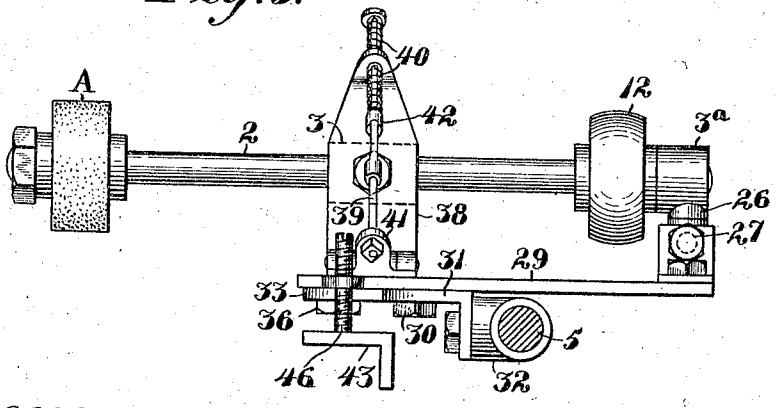


Fig. 5.



Witnesses:-

F. C. Fliedner

[illegible]

Inventor;

George B. Greene

By Geo. H. Strong. atty

UNITED STATES PATENT OFFICE.

GEORGE B. GREENE, OF COURTLAND, CALIFORNIA.

GRINDER FOR CULTIVATOR DISKS AND TOOLS.

No. 823,857. Specification of Letters Patent. Patented June 19, 1906.

Application filed September 2, 1905. Serial No. 276,812.

To all whom it may concern:

Be it known that I, GEORGE B. GREENE, a citizen of the United States, residing at Courtland, in the county of Sacramento and State of California, have invented new and useful Improvements in Grinders for Cultivator Disks and Tools, of which the following is a specification.

My invention relates to grinding-machines, and especially to an apparatus for grinding and sharpening disks of cultivators, disk plows, and the like.

The concavo-convex disks such as are employed for cultivating the soil become so dull by continued use as to need regrinding or sharpening from time to time. These disks are usually arranged in gangs fixed to shafts which are rotatably mounted in brackets or standards carried by the machine. The mounting of a disk on its shaft is such that it is seldom exactly true, and when the shaft is turned a more or less noticeable wabble to the disk is present. Where it is attempted to grind the peripheral edges of a disk by rotating the latter on its axles, it is necessary to make some provision by which the grinder will act properly upon the surface of the disk and accommodate itself automatically to the wabble of the disk.

The object of my invention is to provide a simple practical machine by which the disks may be evenly ground on their own axis, and in which machine every necessary adjustment is made or arranged for whereby the grinders may accommodate themselves to every inequality in the revolution of the disks, and in which machine the disks are given a rotatative movement coördinate with the action of the grinders, and also which machine is adapted to grind with equal facility disks of different sizes.

The invention consists of the parts and the construction and the combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a plan view of my machine. Fig. 2 is an elevation of the same. Fig. 3 is a plan of the grinder-shaft carriage. Fig. 4 is a front view of same. Fig. 5 is a side elevation of same.

A represents the grinders, which may be of carborundum, emery, or any other abrasive substance suitable for the purpose. These grinders are mounted upon shafts, as at 2, of which there may be as many as desired, standing approximately parallel with each other and turnable in journal boxes or bearings, as at 3 and 3^a, whereby the grinders may be disposed in a position convenient to grind the disks 4. The boxes 3 3^a are mounted on suitable carriages (hereinafter to be described) on the rod 5, which is adjustably mounted on frame 6 of the machine. These disks may be mounted on individual shafts in the particular machine with which they are ordinarily identified as a disk plow or they may be arranged in gangs of two or more disks fixed upon a single shaft, as in cultivators and the like.

My machine is designed to grind with equal facility the single disk of disk plows or the multiple disks of cultivators and to grind disks of different sizes. In cultivators the disks are usually fixed to a shaft which is suitably journaled in brackets or standards carried by the frame of the cultivator. The disks may be removed from the cultivator by detaching the standards from the cultivator-frame. My machine is constructed to permit the disks to be supported directly upon their own shafts and their own standards during the grinding process and to permit of the disks being quickly adjusted relative to the grinders.

7 is a shelf or carrier vertically adjustable in suitable guides in the frame 6 and disposed relative to the grinders. The brackets or standards in which the disk-shaft 8 is journaled are stood on the carrier and bolted or otherwise temporarily secured thereto with the disks pointing upward. The disk-shaft is coupled to a driving-shaft 9 by means of a socket-piece or chuck 10. The shaft 9 carries the pulley 11, through which power is transmitted to revolve the disks to present all portions of their edges to the grinders A.

The grinding-shafts 2 have fixed upon them the friction-rollers 12, which are adapted to contact with corresponding friction-disks 13, slidably mounted on the shaft 14. As here shown, the shaft 14 has a feather-way, and the disks 13 have each a feather to fit this feather-way, and each disk is supported on the side opposite to its roller 12 by a spring 15 and an adjustable collar 16. The disks 13, like the carriages of the shafts 2, are adjustable to suit the conditions and the distances between the disks which are to be ground. Thus it may be convenient where a series of disks on a single shaft are in position in the machine to have the grinders operate in

pairs on alternate disks, first upon the first and third of the disks and then to move the grinders and their carriages so that the grinders will operate upon the second and fourth of the disks, or in any other suitable relation.

The shaft 14 is supported so as to have a limited lengthwise movement in its boxes and carries respective fixed and loose collars 17 18, between which collars are arranged a series of antifrictional balls 19. A spring-lever 20, which is fulcrumed at 20', engages the loose collar 18 and is adapted to be operated to move the shaft and the disks 13 to cause the latter to press with greater or less force upon the rollers 12. The spring-lever 20 is operated from the hand-lever 21, which is fulcrumed, as at 22. The two levers are connected by a link 23, and the lever 21 is held in any suitable position by means as the pawl 24 engaging the rack 25. The spring-lever 20 provides a yielding bearing for the end of the shaft 14 and allows a limited lengthwise movement of the shaft, while the springs 15 permit the drive-disks 13 to have a limited sliding movement on the shaft quite independent of the latter.

The adjustments of the collars 16 and the springs 15 and the operation of the lever 21 are such as to press the drive-disks 13 against the roller 12 with just the proper frictional contact to properly drive the grinders. Each grinding-shaft 2 is so mounted that it is capable of a movement in any direction, so that the grinders may move to and from a disk either laterally or in a vertical plane. These various adjustments for the grinder and its shaft are provided by the following means: The rear box 3^a is adapted to swivel about a substantially vertical axis 27 26, turnable about a horizontal axis, which latter is supported upon an angle-plate 28. The latter is adjustably secured to a bar or plate 29. The bar 29 is pivoted at 30 to an underneath angle-plate 31, which latter is pivoted on a horizontal axis carried by a suitable bearing or T 32, which is turnable and slidable on the bar 5. The forward end of plate 29 is pivotally connected by a link 33 to an angle-plate 34, which latter is pivoted to a second bearing or T 35, which is turnable and slidable on the bar 5. By loosening the nuts 36 37 on the pivot-bolts which connect the link 33 to plates 29 and 34 the bearings 32 35 may be separated more or less, as desired, to correspondingly tilt the plate 29 and shaft 2 relative to the supporting-bar 5. Shaft 2 is free to slide in its front box 3. The latter is mounted on a hinged standard 38, which is movable in a plane transverse to plate 29 to permit of a lateral movement of the grinder relative to a cultivator-disk. The upper end of the standard is normally held in a substantially vertical position by a brace-rod 39 and the springs 40, the lower end of the rod 39 being loosely supported at 41 and the springs 40 being arranged one on each side of the standard with suitable stops for the outer ends of the springs. The tension of the springs may be regulated by suitable means, as a turnbuckle 42. Thus it is seen that the standard 38 is permitted a limited rocking movement on its hinge and along rod 39 between the springs 40, the latter forming a resilient support as desired for the standard. The bearings or sleeves 32 35 being freely turnable on the shaft 5 permit the grinder-shaft and connected parts to be turned in a vertical plane about the rod 5, and thus tilted up entirely out of the way to allow the disks which are to be ground to be moved along on the carrier 7 or to be inserted into or taken out of the machine. These sleeves or bearings 32 35 also being freely slidable on the rod 5 permit the grinder-shaft and its carriage to be moved to bring the grinder into proper coincidence with the particular disk to be ground. The forward downward movement of a grinder-carriage is limited by an adjustable cross-bar 43. This cross-bar 43, like the bar 5, is hung from the frame 6 by screws 44, turning in respective swivel-nuts 45 on frame 6. The screws 44 and the nuts 45 permit of the bars 43 and 5 to be adjusted both vertically and horizontally. In order to effect a still more delicate adjustment of a grinder to a disk and to permit each grinder to be independently adjusted relative to its particular disk, a set-screw 46, carried by the grinder-carriage, is adapted to bear on the bar 43. Motion is imparted to shafts 14 and 9 from any suitable source of power and by any appropriate connections. I have here shown a power-shaft 47, carrying a band-pulley 48, which latter is connected to a pulley on shaft 14 by a belt 49. Shaft 14 carries a second pulley 50, from which motion is transmitted to a counter-shaft 51 by the belt 52. From shaft 51 power is transmitted to pulley 11 on shaft 9 by the belt 53. Thus it is seen that both the grinders and the disks to be ground are turned from the same source of power, and by suitably proportioning the several driving connections the disks are rotated at a rate of speed coördinate with the rotation of the grinders. It will be understood that power to drive the shafts 14 and 9 may be transmitted by belts, chains, or gears driven by hand or by any suitable or convenient motor.

The operation of the device is as follows: The disk or disks to be ground are suitably secured on the carrier 7 and connected with the shaft 9. The vertical adjustment of the carrier 7 is effected by suitable means, as shown at 54, to bring the upper edge of the disk into proper operative position relative to a grinder. The carriage for the grinder is shifted lengthwise of the bar 5 into proper position, and such adjustments of the several members of the carriage are made as to cause

the grinder to present itself properly to the edge of the disk. Thus by loosening the nuts 36 37 the bearings 32 35 may be separated more or less, which will cause the plate 29 to turn on its fulcrum 30ª and incline the plate 29 more or less in relation to the bar 5. Inasmuch as the bearings 3 and 3ª are carried by the plate 29 it results in a corresponding inclination of the shaft 2 laterally of bar 5 and permits the grinders to be set at any angle to accommodate the grinder to disks of different types or to disks having different amounts of dish. By loosening the pivot-bolt 28′ of the angle 28 the grinder-shaft may be still further tilted and advanced or retracted. The proper adjustment of the bearings 32 35 having been made, the nuts 36 37 are tightened, the proper adjustments of the various angle-plates 28, 31, and 34 having been made to conform to the position of alinement of the shaft 2. Any adjustment of the grinder further than afforded by the bar 43 may be effected by the adjusting-screw 46. A disk 13, corresponding to this grinder, is then moved up into contact with the roller 12 and the spring 15 suitably compressed by the collar 16 and the latter locked to the shaft 14. The lever 21 is then moved to operate through the yielding spring-lever 20 to shift the shaft in the direction of the roller 12 and cause the drive-disk to press against the roller with sufficient frictional contact to drive the grinder properly. The shafts 14 and 9 being set in motion, the abrading force of the grinder may be varied by the proper manipulation of the lever 21. The swivel connections 26 and 27 of the rear bearing 3ª and the resiliently-supported hinged standard 38, which carries the front bearing 3ª, admit of a universal movement of the grinder to and from the disk in every direction, so that the grinder acts around the entire circumference of the disk with a substantial uniform pressure and with uniformity of result irrespective of the irregularities of revolution or the amount of wabble of the disk being ground.

It is possible that various modifications in my invention may be made without departing from the principle thereof, and I do not wish to be understood as limiting myself to the specific construction as herein shown and described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a disk-grinding machine, the combination of means for supporting and for revolving a disk, a grinder having a movement laterally and vertically with respect to the disk, means to revolve the grinder, and means to effect said lateral and vertical movement and to maintain the grinder in operative contact with the disk.

2. In a disk-grinding machine, a grinder-shaft, a swivelly-mounted box for one end of the shaft, a grinder on the other end of the shaft, a spring-supported box for the shaft between its ends, and means to revolve the shaft.

3. In a disk-grinding machine, a grinder-shaft, a swivelly-mounted box for one end of the shaft, a spring-supported box for the shaft between its ends, means to revolve the shaft, and means to vary the tilt of the shaft.

4. In a disk-grinding machine, the combination of a support, a carriage rockable on said support, a grinder-shaft mounted on said carriage to have a swiveled movement sidewise and vertically, a grinder on said shaft, and means to rotate the shaft.

5. In a disk-grinding machine, the combination of a support, a carriage rockable on said support, a grinder-shaft mounted on said carriage to have a swiveled movement sidewise and vertically, a grinder on said shaft, and means to rotate the shaft, said carriage having also a lateral sliding movement on its support.

6. In a grinding-machine, the combination of a fulcrum-shaft, two sleeves turnable thereon and one slidable on the shaft with respect to the other, boxes carried by one sleeve, a grinder-shaft supported in said boxes, a grinder in the grinder-shaft, and articulated connections between the two sleeves to permit a change in the inclination of the grinder-shaft with respect to said fulcrum-shaft, and means to revolve the grinder-shaft.

7. In a grinding-machine, the combination of a fulcrum-shaft, two sleeves turnable thereon, and one slidable on the shaft with respect to the other, boxes carried by one sleeve, a grinder-shaft supported in said boxes, a grinder in the grinder-shaft, and articulated connections between the two sleeves to permit a change in the inclination of the grinder-shaft with respect to said fulcrum-shaft, and means to revolve the grinder-shaft irrespective of said changes in inclination.

8. In a grinding-machine, the combination of a fulcrum-shaft, two sleeves turnable thereon and one movable to and from the other, swivelly-mounted boxes carried by one sleeve, a grinder-shaft supported in said boxes, a grinder on said shaft, means to revolve said shaft, and articulated connections between the boxes to allow of a change in inclination of the grinder-shaft with respect to said fulcrum-shaft.

9. In a grinding-machine, a rotary grinder, a shaft therefor, a swiveled bearing for one end of said shaft and a spring-support bearing for the other end of the shaft to permit the latter to have a horizontal and vertical movement, and means to operate the shaft.

10. In a grinding-machine, a grinder, a shaft therefor, boxes for said shaft, a resilient support for one of said boxes, and means to support the other box to permit it to be rocked in either horizontal or vertical planes.

11. In a grinding-machine, a support, a carriage turnable on said support, a shaft mounted on said carriage, a grinder on the shaft, and means to permit the shaft a swiveled movement on the carriage.

12. In a grinding-machine, a grinder, a shaft therefor, boxes for said shaft, a movable carriage, an oscillating resilient support for one of said boxes on said carriage, and connections between the carriage and the other box to permit the latter to move both vertically and horizontally.

13. In a grinding-machine, a support, an oscillating carriage thereon, a shaft swivelly mounted on said carriage, a grinder on said shaft, and means permitting a change in the angle of inclination of the shaft relative to the axis of oscillation of said carriage.

14. In a grinding-machine, a support, a carriage turnable and slidable on said support, a grinder-shaft and grinder-boxes for the shaft mounted on the grinder permitting an oscillatory movement of the shaft relative to said carriage in a plane at the right angles to the plane of oscillation of the carriage.

15. In a grinding-machine, a carrier, a grinder-shaft, grinder, mountings for said shaft on the carrier to permit an oscillatory movement of the shaft on the carriage, a friction-pulley on the shaft, and a resiliently-supported drive disk or pulley engageable with said friction-pulley.

16. In a grinding-machine, a supporting-rod, a carriage turnable and slidably mounted on the rod, a grinder-shaft mounted on the carriage and capable of a limited oscillatory movement, a grinder, and means to operate the shaft, said last-named means including a friction-roller on the shaft, and a resiliently-supported driving-disk.

17. In a grinding-machine, a supporting-rod, a carriage turnable and slidably mounted on the rod, a grinder-shaft mounted on the carriage and capable of a limited oscillatory movement, a grinder, means to operate the shaft, and means for vertically and horizontally adjusting said carriage-support.

18. In a grinding-machine, a grinder-shaft, a grinder, means for supporting said shaft to permit it to have a limited movement in all directions, and a vertically-adjustable work-support disposed relative to said grinder.

19. In a grinding-machine, a grinder, a grinder-shaft, a resilient oscillating support therefor, a drive-shaft, connections between the drive-shaft and the grinder-shaft, means for supporting a disk to be ground, and means to rotate the disk.

20. In a grinding-machine, a grinder, a grinder-shaft, an oscillating carriage, adjustable boxes for said shaft on said carriage, a drive-shaft, and frictional driving connections between the drive-shaft and the grinder-shaft.

21. In a grinding-machine the combination of a grinder, a grinder-shaft, an oscillating carriage for the shaft, a friction-pulley on said shaft, a drive-shaft, and a resiliently-supported driving-disk rotatable and slidable on said drive-shaft and engageable with said drive-roller

22. In a grinding-machine the combination of a grinder, a grinder-shaft, an oscillating carriage for the shaft, a friction-pulley on said shaft, a drive-shaft, a resiliently-supported driving-disk rotatable and slidable on said drive-shaft and engageable with said drive-roller, and means for giving a reciprocatory movement to said drive-shaft.

23. In a grinding-machine, the combination of means for simultaneously supporting and rotating a plurality of disks, a plurality of grinders for said disks, means for independently supporting said grinders to permit them to follow their respective disks and to accommodate themselves thereto during the grinding operations, and means for operating said grinders simultaneously.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE B. GREENE.

Witnesses:
S. H. Norman,
D. B. Richards.