No. 614,112. Patented Nov. 15, 1898.

T. KNUDTSON.

DISK SHARPENING DEVICE.

(Application filed Jan. 11, 1897.)

(No Model.)

Fig-1

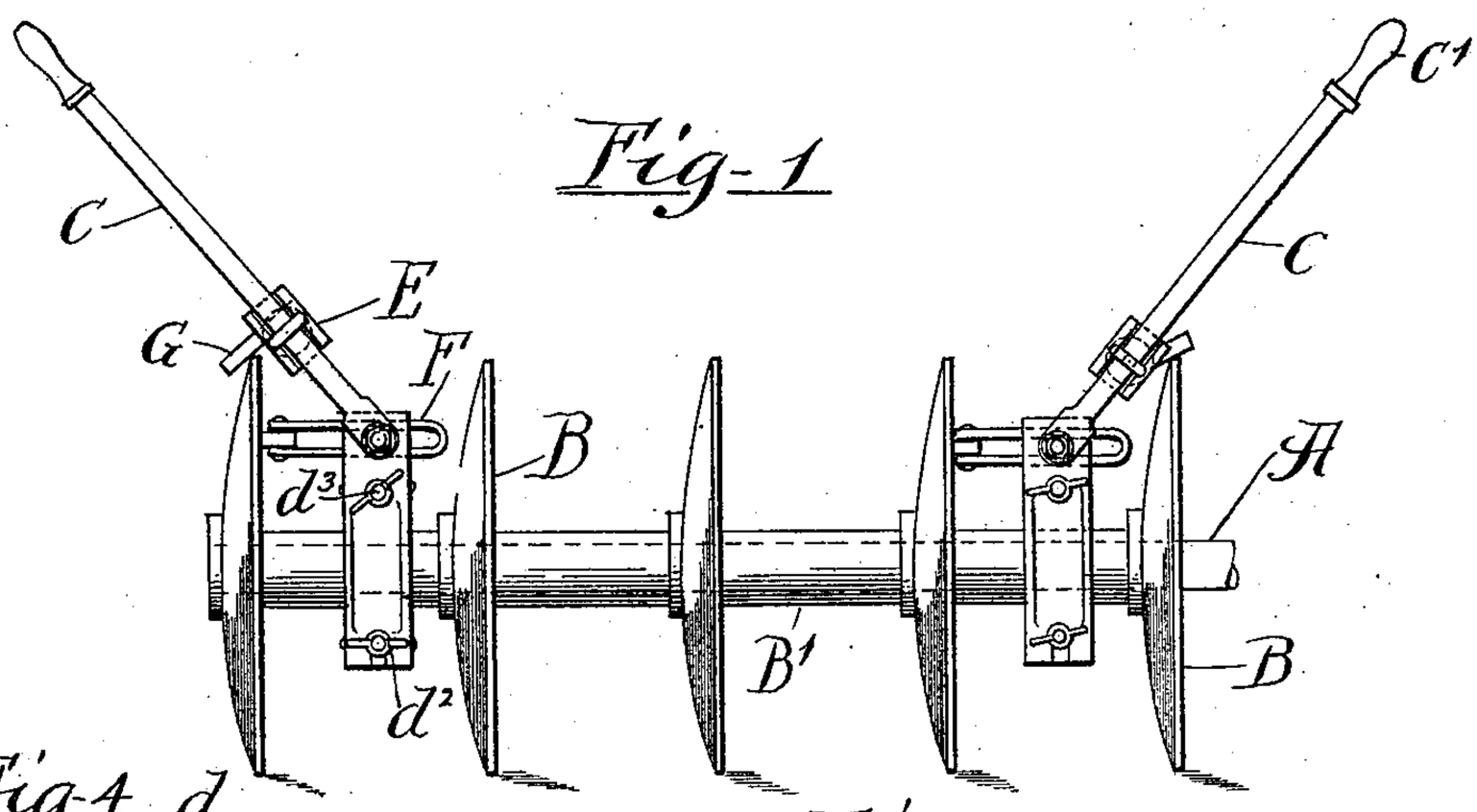


Fig-4

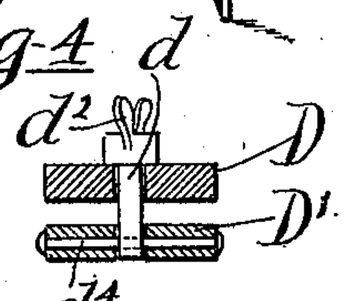


Fig-5

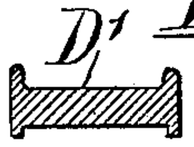


Fig-2

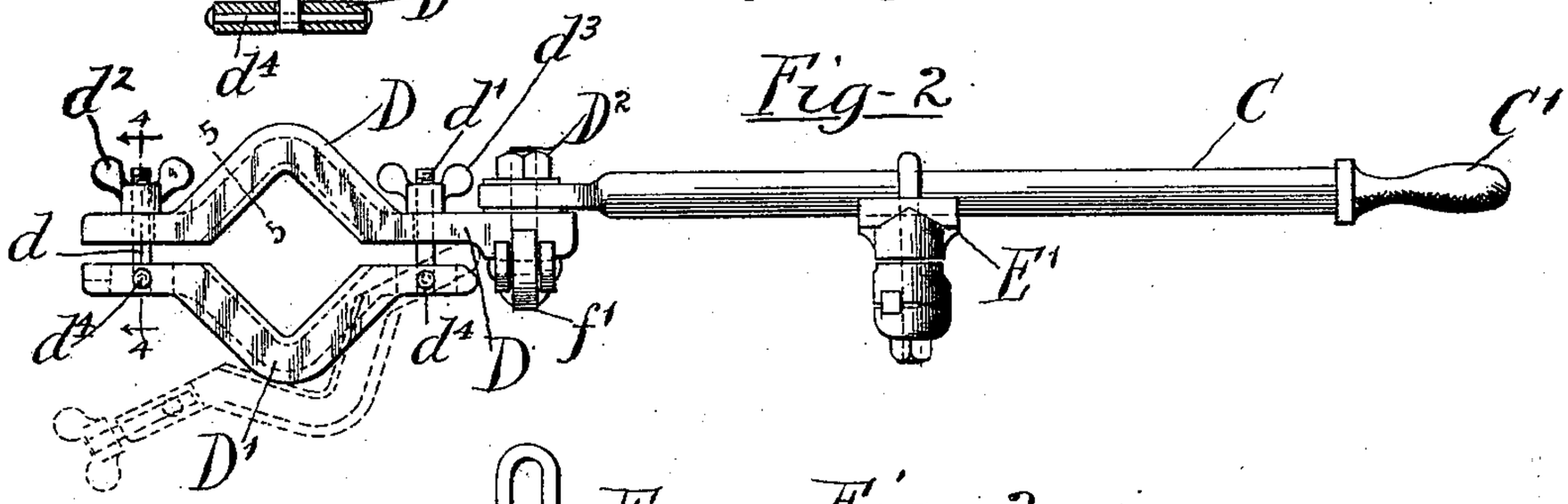


Fig-3

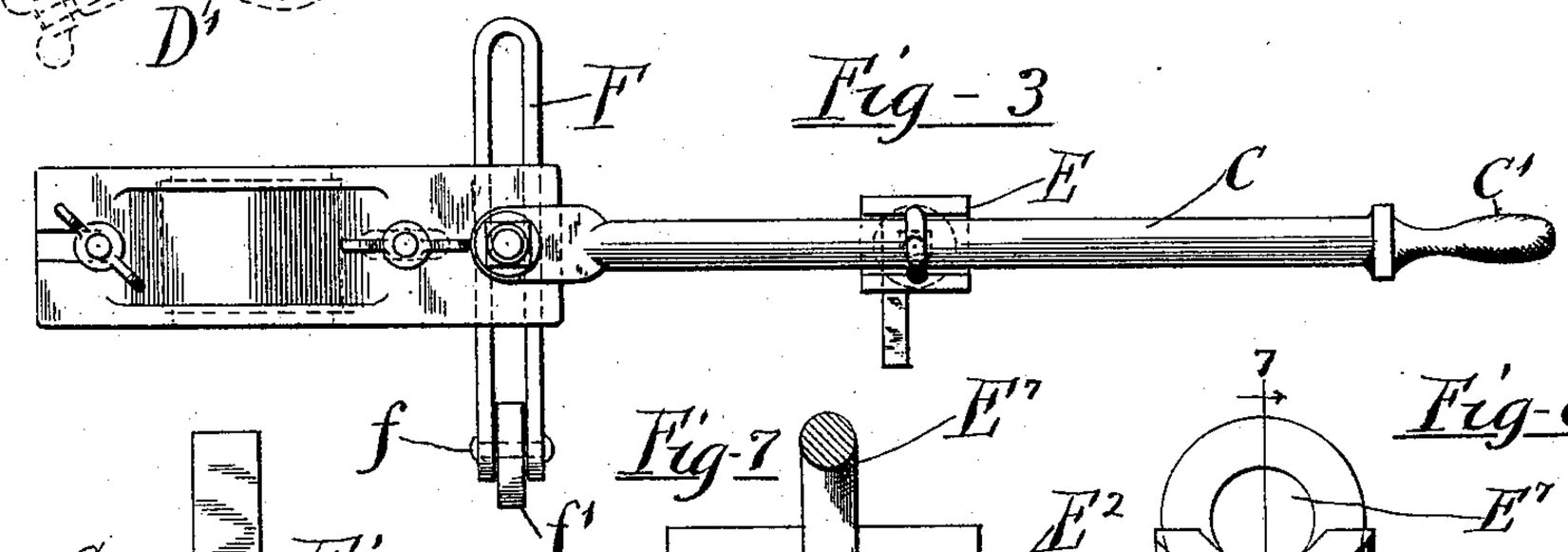


Fig-8

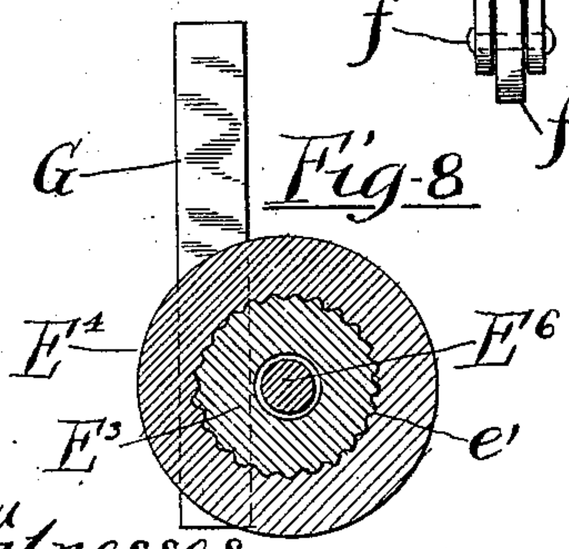


Fig-7

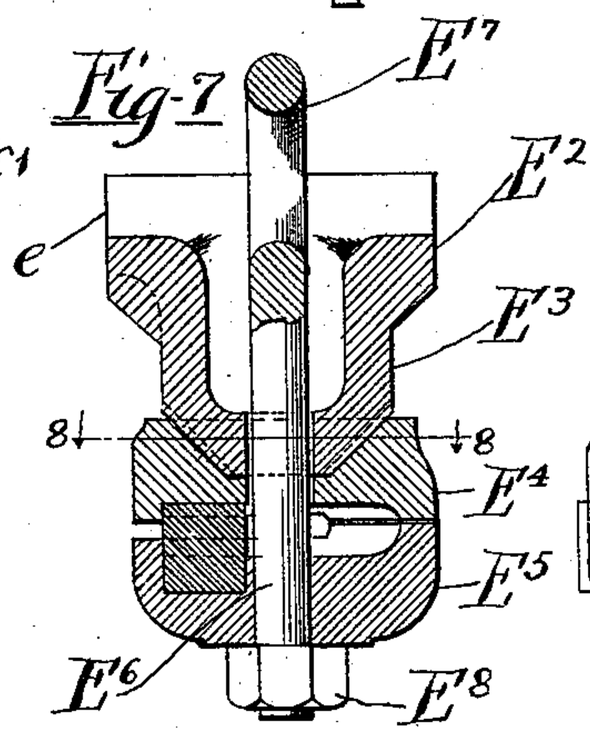
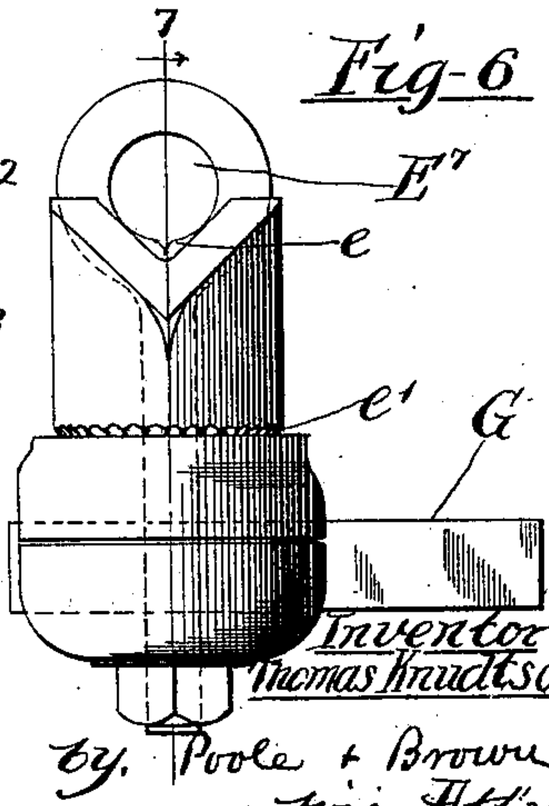


Fig-6



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UNITED STATES PATENT OFFICE.

THOMAS KNUDTSON, OF MALTA, ILLINOIS, ASSIGNOR OF ONE-HALF TO THEODORE O. BERG, OF LEE, ILLINOIS.

DISK-SHARPENING DEVICE.

SPECIFICATION forming part of Letters Patent No. 614,112, dated November 15, 1898.

Application filed January 11, 1897. Serial No. 618,715. (No model.)

To all whom it may concern:

Be it known that I, THOMAS KNUDTSON, of Malta, in the county of De Kalb and State of Illinois, have invented certain new and useful Improvements in Disk-Sharpening Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in devices for sharpening the circular disks of rotating harrows or pulverizers of that class comprising a lever which is adapted to be pivotally secured to the shaft carrying said disks and which lever is provided intermediate its ends with a sharpening-tool, so located on the lever that it may be brought to bear against the peripheries of said disks and by movement thereon scrape the metal therefrom, and thus sharpen the disks.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims, and will be readily understood by reference to the accompanying drawings, in which—

Figure 1 illustrates a portion of one of the disk-shafts of a rotating harrow or pulverizer with my sharpening device mounted thereon in two different positions. Fig. 2 is a side elevation of the sharpening device removed. Fig. 3 is a top plan view thereof. Fig. 4 is a cross-section thereof, taken on line 4 4 of Fig. 2. Fig. 5 is a cross-section taken on line 5 5 of Fig. 2. Fig. 6 is a side elevation of the tool-holding devices. Fig. 7 is a longitudinal vertical section of the tool-holding device, taken on line 7 7 of Fig. 6. Fig. 8 is a sectional detail taken on line 6 6 of Fig. 7.

As shown in said drawings, A designates one of the main shafts of a disk harrow, B B the cutting-disks, non-rotatively mounted thereon, and B′ B′ short filling-sleeve sections, also non-rotatively mounted on said shaft between said disks.

The sharpening device consists generally of a straight rigid lever C, provided at one end with a handle C′ and at its other end is pivotally connected to a pair of clamping-jaws D D′, by which the device is pivotally connected to one of the main carrying-shafts of a rotating harrow. Said lever is provided intermediate its ends with an adjustable tool-holding device E, and is also preferably provided at its point of connection with the gripping-jaws with an adjustable antifriction bearing-bracket F, by which the tool may be held more positively to its work in the operation of sharpening and by which the angle of said tool on the disk may be varied as desired.

The jaws D D′ are shown as bent outwardly at their middle portion to provide room between the same for the shaft A, upon which they are to be clamped. Said jaws are preferably bent to inclose between them when in place upon each other a rectangular-shaped figure the sides of which lie at an angle to a line passing between the jaws; but obviously the form thereof may be varied as desired or found convenient. The ends of each jaw stand parallel with the corresponding end of the adjacent jaw, and a hole is drilled through the adjacent ends, through which pass securing-bolts d d', provided with wing-nuts d^2 d^3, by which the jaws may be clamped together. Instead of providing heads for the lower end of the bolts d d' they are shown as and are preferably pivotally connected to the lower jaw D′ by means of pins d^4, passing through said jaw from side to side thereof and through the bolts d d'. The outer end of the upper jaw D is provided with a slot which extends from the bolt-hole thereof to its extreme end, so that the bolt d may be swung outwardly out of engagement with the upper jaw without the necessity of removing the nut therefrom. In order to allow said bolt to be thus swung downwardly, the hole in the lower jaw within which it is pivoted will be made of sufficient length to provide room for the lower end of the bolt between its point of pivot and the inner side of said hole. The upper face of the lower jaw at this point will preferably be provided with a shallow recess extending longitudinally from the bolt-hole therein to the outer end thereof, within which the bolt d will lie when swung downwardly, as shown in dotted lines in Fig. 2. The bolt-hole at the rear end of the lower jaw will be made of greater diameter than the bolt d', so that said

jaw will be free to swing downwardly when released from the upper jaw at its opposite end. The rear end of the upper or stationary jaw is extended beyond the lower or swinging jaw and is provided adjacent its end with a bolt-hole, through which passes a bolt D^2, by which the lever C is pivotally connected therewith, so as to swing in a plane parallel with the shaft A only, said lever being rigid with the jaw in all other directions.

Means for adjustably securing the cutting-tool upon the lever C is provided as follows: Said securing device is designated as a whole by E, comprising a supporting-block E′, herein shown as having a rectangular-shaped base E^2 and a generally cylindric body E^3. The base E^2 of said block is provided with a recess *e*, (shown as of V shape in cross-section,) within which is adapted to rest the cylindric-shaped lever C. The end of the block E opposite the base E^2 preferably has the form of a conical frustum and is provided on its inclined surface with corrugations *e′*. Said block is hollow throughout the greater part of its length, but is provided on its end, opposite the base thereof, with a relatively small hole for the passage of a bolt therethrough, as will hereinafter appear. E^4 E^5 designate circular clamping-jaws, between which the rectangular-shaped cutting-tool G is adapted to be secured, said jaws E^4 E^5 being provided in their adjacent faces, at one side thereof, with oppositely-arranged notches or recesses, within which said tool is adapted to rest when said parts are in their operative position. The inner face of the jaw E^4 or that adjacent the supporting-block is recessed to conform to the shape of the conical end of said base, and the surface of said recess is provided with corrugations which interfit with the corrugations of the adjacent end of the supporting-block and thereby lock said parts from movement upon each other. Said clamping-jaws E^4 E^5 are centrally apertured, the apertures registering with the central aperture of the supporting-block E′. The several parts of the tool-holding device thus described are secured rigidly together by means of a bolt E^6, passing through the central apertures thereof. One end of the bolt is provided with an eye E^7, which encircles the lever C, and the opposite end thereof is provided with a nut E^8, by which the several parts of the device may be clamped in their operative position and to the lever. The block E is provided, on each side thereof, with a transverse notch or recess, within which the eye portion of the bolt is adapted to rest, of a depth equal to the diameter of the bolt, so that the inner surface of said eye portion E^7 will lie flush with the surface of the recess *e*, on each side thereof, and thus provide a solid bearing throughout the length of the recess *e* for the lever C. With this construction it will be seen that the tool-holding device E may be adjusted to any position upon the lever C, either longitudinally or circumferentially, and that the clamping-jaws E^4 E^5 may be moved upon the base E′, so as to adjust the cutting-tool G to any position within the circle of which it forms the radius.

The bearing F is constructed of a single piece of metal bent upon itself to form a U-shaped bracket the free ends of which are connected by means of a pin or rivet *f*, which forms an axle, upon which is mounted a disk or pulley *f′*, adapted to freely rotate thereon. Said bracket is secured intermediate the pulley *f* and the opposite end thereof upon the upper end of the clamping-jaw D, adjacent the inner end of the lever, but as herein shown upon the opposite side of said jaw, by means of the same bolt which pivotally secures the lever to said jaw. The purpose of this antifriction-bracket is to transmit the force or thrust exerted by the lever C to some solid or rigid body, usually the disk being sharpened or an adjacent disk with which the bracket will have rolling contact, so that the pressure of the cutting-tool upon the periphery of the disk may be positive and constant. As the clamping-jaws D D′ will not fit tightly upon the shaft A it will be obvious that a slight longitudinal movement of the bracket one way or the other will serve to vary the angle of the knife somewhat upon the periphery of the disk.

The operation of the device will be obvious from the foregoing description, but may be briefly stated as follows: When it is desired to sharpen the disks of a rotating harrow, the device will be attached to one of the main shafts thereof between two disks, with the pulley *f* of the bearing-bracket engaging the disk immediately adjacent to that which it is desired to sharpen. The cutting-tool is now adjusted upon the periphery of the disk to the desired angle by loosening the nut E^8 of the bolt E^6 and turning the clamping-jaws E^4 E^5 upon the supporting-block E′ and, if necessary, by moving the entire tool-holding device longitudinally upon the lever C. When the desired angle of the cutting-tool is secured, the nut E^8 is again tightened upon its bolt. The lever C is now grasped and pressed with considerable force upon the adjacent edge of the disk and at the same time drawn backward and forward thereon, so as to scrape the metal therefrom, and thus sharpen the disk. The position of the device as just described will be seen in Fig. 1, at the right hand thereof. This operation may be continued upon all the disks until the end disk is reached, when, as no bearing can be had for the clamping-jaws D D′ of the sharpening device adjacent to that side which is to be sharpened, said pivotal connection must be made upon the opposite side of the disk and the cutting-tool adjusted at such an angle to the lever that said lever will need to be pulled upwardly away from the disk instead of being pressed thereon, as heretofore described. When the device is used as last described, the pulley *f* will bear against the disk being

sharpened, but on the opposite side thereof, as the force exerted by the lower end of the lever is directed toward the disk being sharpened instead of away from it, as in the previous operation. This position of the device will be seen in Fig. 1, at the left-hand side thereof.

From the foregoing description it will be obvious that the two methods described may be used alternately, and that illustrated at the left hand of Fig. 1 need not be limited to sharpening the extreme end of a series of disks. In other words, the device may be pivoted between any two disks on the shaft and one of said disks sharpened by the method first described, or by pressing the tool down upon the periphery thereof, and the opposite disk is sharpened by adjusting the tool as shown at the left of Fig. 1. The bearing-bracket F obviously need not be changed in shifting the lever from one disk to the other. In this manner two adjacent disks may be sharpened without the necessity of changing the position of the clamping-jaws D D′, the only adjustment required being in the tool-holding device E.

While I have shown what I deem to be a preferred embodiment of my invention, it will be obvious that many changes in the details thereof may be made without departing from the spirit of the invention and without involving more than ordinary mechanical skill. I do not wish, therefore, to be limited to the exact construction herein shown.

I claim as my invention—

1. A disk-sharpening device comprising a lever, a cutting-tool mounted thereon, means for pivoting said lever to a disk-carrying shaft comprising clamping-jaws adapted to be secured upon said shaft, pivotal connections between said lever and clamping-jaws and a bearing-bracket mounted on said clamping-jaws and adapted for engagement with one of said disks, said bracket having slotted engagement with the clamping-jaws whereby the angle of the cutting-tool with relation to the disks may be adjusted as desired.

2. A disk-sharpening device comprising a lever, a cutting-tool attached thereto, means for pivoting said lever to a disk-carrying shaft comprising clamping-jaws adapted to be secured upon said shaft, pivotal connections between said lever and clamping-jaws and a bearing-bracket adjustably secured to said clamping-jaws and having engagement with one of said disks.

3. A disk-sharpening device comprising a lever, a cutting-tool attached thereto, means for pivoting said lever to a disk-carrying shaft comprising clamping-jaws adapted to be secured upon said shaft, pivotal connections between said lever and clamping-jaws and a bearing-bracket adjustably secured to said clamping-jaws and arranged to engage either the disk being operated upon by the cutting-tool or the next adjacent disk when said tool is in its operative position upon one of the disks.

4. A disk-sharpening device comprising a lever, a cutting-tool carried thereby, an adjustable clamp for pivotally securing said lever to a disk-shaft comprising two clamping members one of which is provided on each end with a screw-threaded bolt pivotally attached thereto, the other jaw being provided on one end with a bolt-aperture and at its opposite end with a slot, within which said bolts are adapted to rest and nuts having engagement with said bolts.

5. A disk-sharpening device comprising a lever, a cutting-tool attached thereto, means for pivotally connecting said lever to a disk-carrying shaft and an antifriction bearing-bracket adjustably connected to said lever and adapted to have engagement with either the disk operated upon by the cutting-tool or the next adjacent disk when said tool is in its operative position upon one of said disks.

6. A disk-sharpening device comprising a lever, a cutting-tool attached thereto, means for pivotally connecting said lever to a disk-carrying shaft comprising clamping-jaws, pivotal connections between said clamping-jaws and lever and a bearing-bracket connected with said clamping-jaws and having rolling engagement with one of said disks.

7. A disk-sharpening device comprising a lever, a cutting-tool attached thereto, means for pivotally connecting said lever to a disk-carrying shaft comprising clamping-jaws, pivotal connections between said clamping-jaws and lever, a bracket connected to said lever and provided at one end with a roller which has engagement with one of the disks, and means permitting movement of said bracket transversely of the lever.

8. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried by said lever and means for adjustably securing said tool to the lever comprising clamping-jaws between which the tool is placed and a clamping-bolt engaging said lever and jaws for clamping the cutting-tool between the jaws and securing said jaws to the lever.

9. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby and means for adjustably securing said tool to the lever comprising clamping-jaws provided with oppositely-arranged recesses within which the tool is placed and a clamping-bolt engaging the lever and jaws for clamping the cutting-tool between the jaws and securing said jaws to the lever.

10. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby and means for adjustably securing the tool to said lever comprising clamping-jaws between which the tool is placed, each provided with an axial aperture, and means for securing said jaws together and to the lever comprising a bolt secured to said lever and passing through said axial aperture.

11. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby and means for adjustably securing the tool to said lever comprising a supporting-block, clamping-jaws mounted upon said block between which the cutting-tool is secured and a clamping-bolt engaging said lever and jaws for securing said parts rigidly together and to the lever.

12. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby, and means for securing the tool to said lever, comprising a supporting-block, clamping-jaws mounted on said block between which the tool is placed, interfitting connections between one of said jaws and the supporting-block and means for securing said parts rigidly together and to the lever.

13. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby, and means for adjustably securing the tool to said lever comprising a supporting-block provided with a recess within which the lever rests, clamping-jaws mounted on the opposite end of said block between which the cutting-tool is placed, interfitting connections between one of the jaws and said block, and means for rigidly securing said parts together and to the lever comprising an eyebolt secured to the lever and passing through central apertures in said block and jaw.

14. A disk-sharpening device comprising an oscillatory lever, a cutting-tool carried thereby, means for adjustably securing the tool to said lever comprising clamping-jaws between which the tool is placed and means for securing said jaws upon each other and to the lever whereby said jaws and the tool carried thereby may be adjusted to any angular position with relation to said lever.

15. In a disk-sharpening device, the combination with an oscillatory lever and a cutting-tool carried thereby, of means for securing said tool to said lever comprising clamping-jaws between which the tool is placed and means for securing the jaws together and to the lever, said jaws being so constructed and arranged that the tool carried thereby may be adjusted in any angular position with relation to the axes of said jaws.

16. A disk-sharpening device comprising a lever, means for pivoting the said lever to a disk-carrying shaft comprising clamping-jaws adapted to be secured upon said shaft, pivotal connections between said jaws and lever, a bracket adjustably secured to said jaws and having rolling engagement with one of the disks on said shaft and a cutting-tool adjustably mounted on said lever intermediate its ends.

In testimony that I claim the foregoing as my invention I have affixed my signature, in presence of two witnesses, this 4th day of January, A. D. 1897.

THOMAS KNUDTSON.

Witnesses:
LEWIS LARSON,
HENRY CRAW.