

No. 694,056.

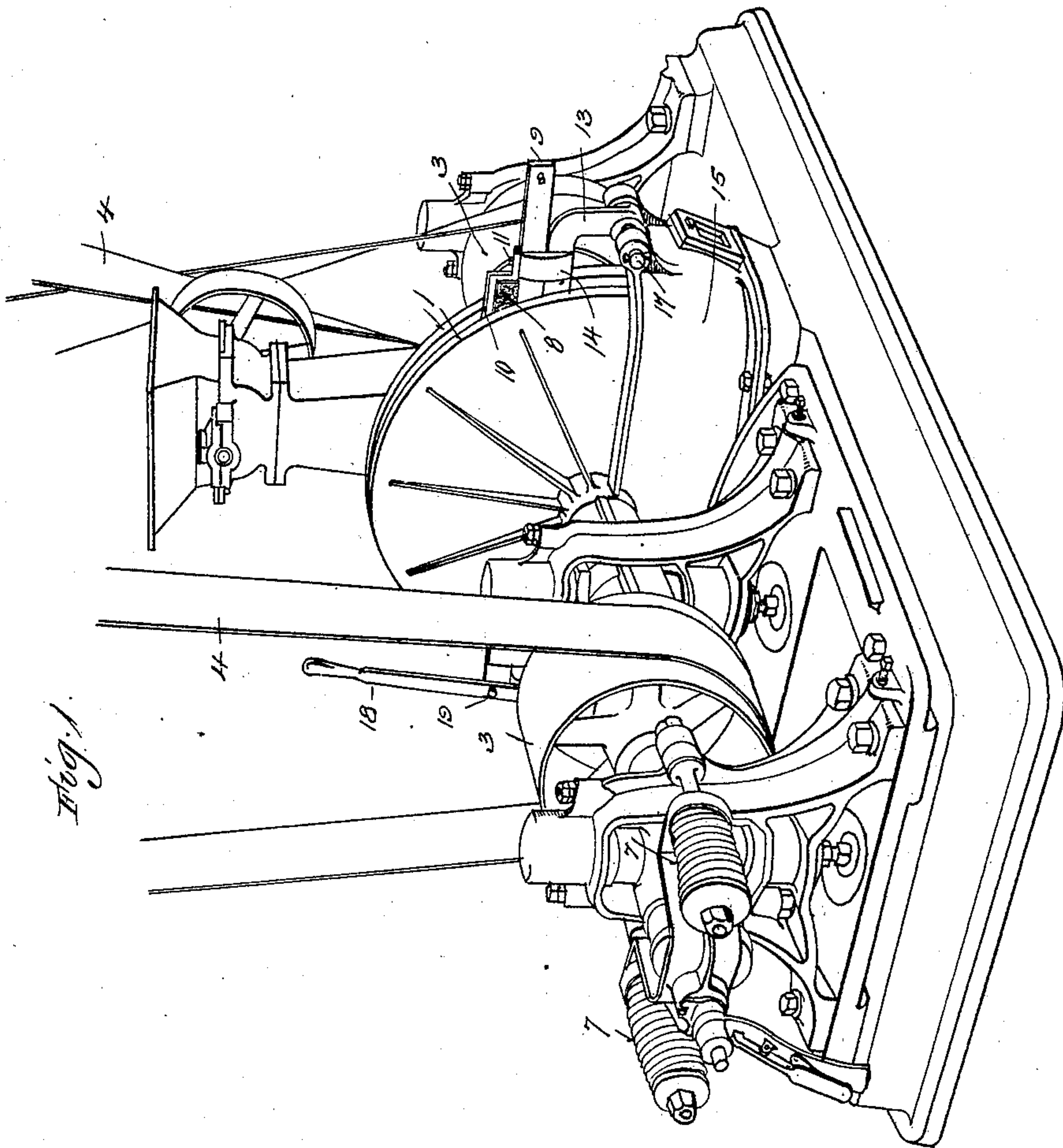
Patented Feb. 25, 1902.

R. H. FOOS & W. E. COPENHAVER.
SHARPENING DEVICE FOR GRINDING PLATES.

(Application filed Nov. 6, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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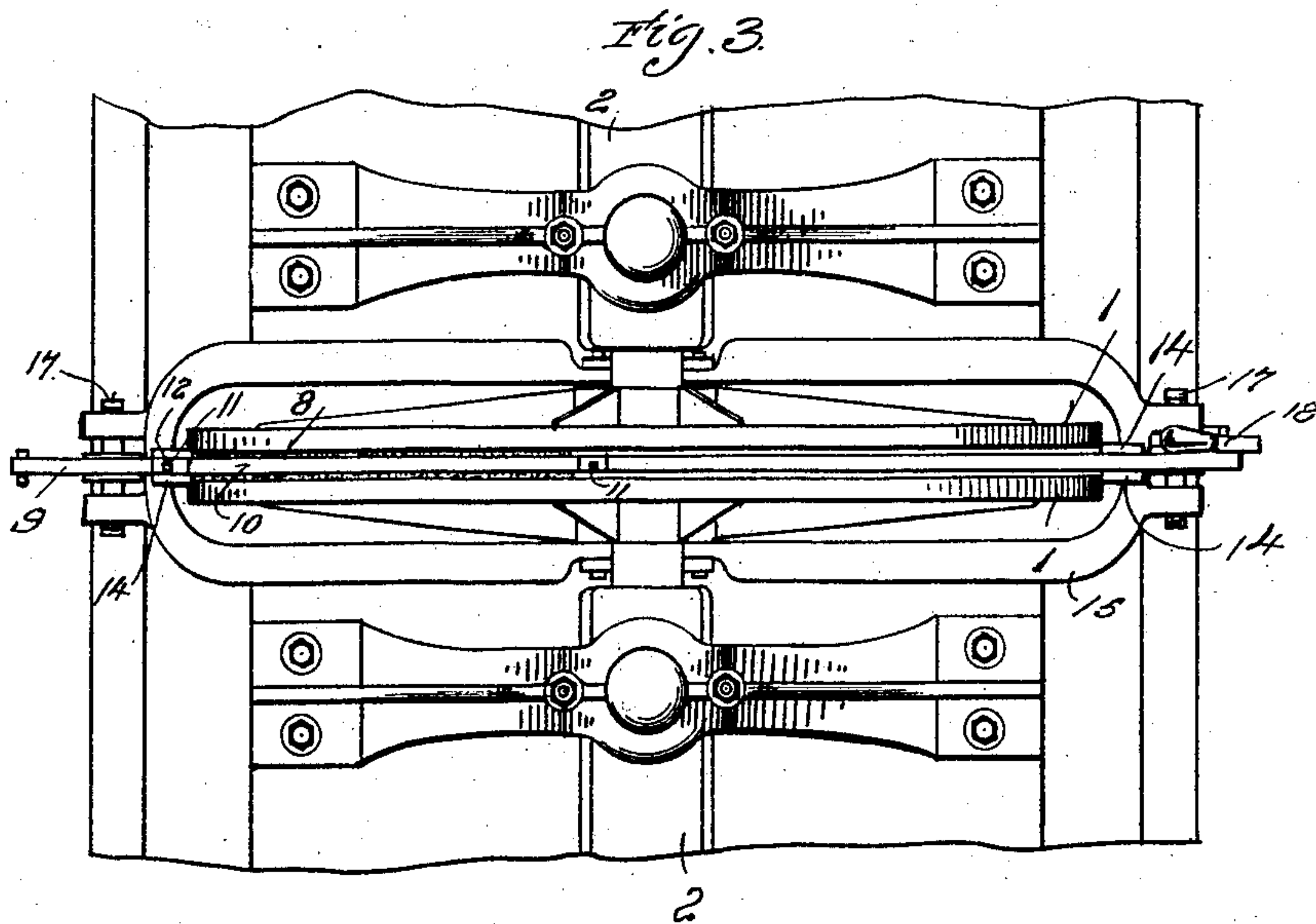
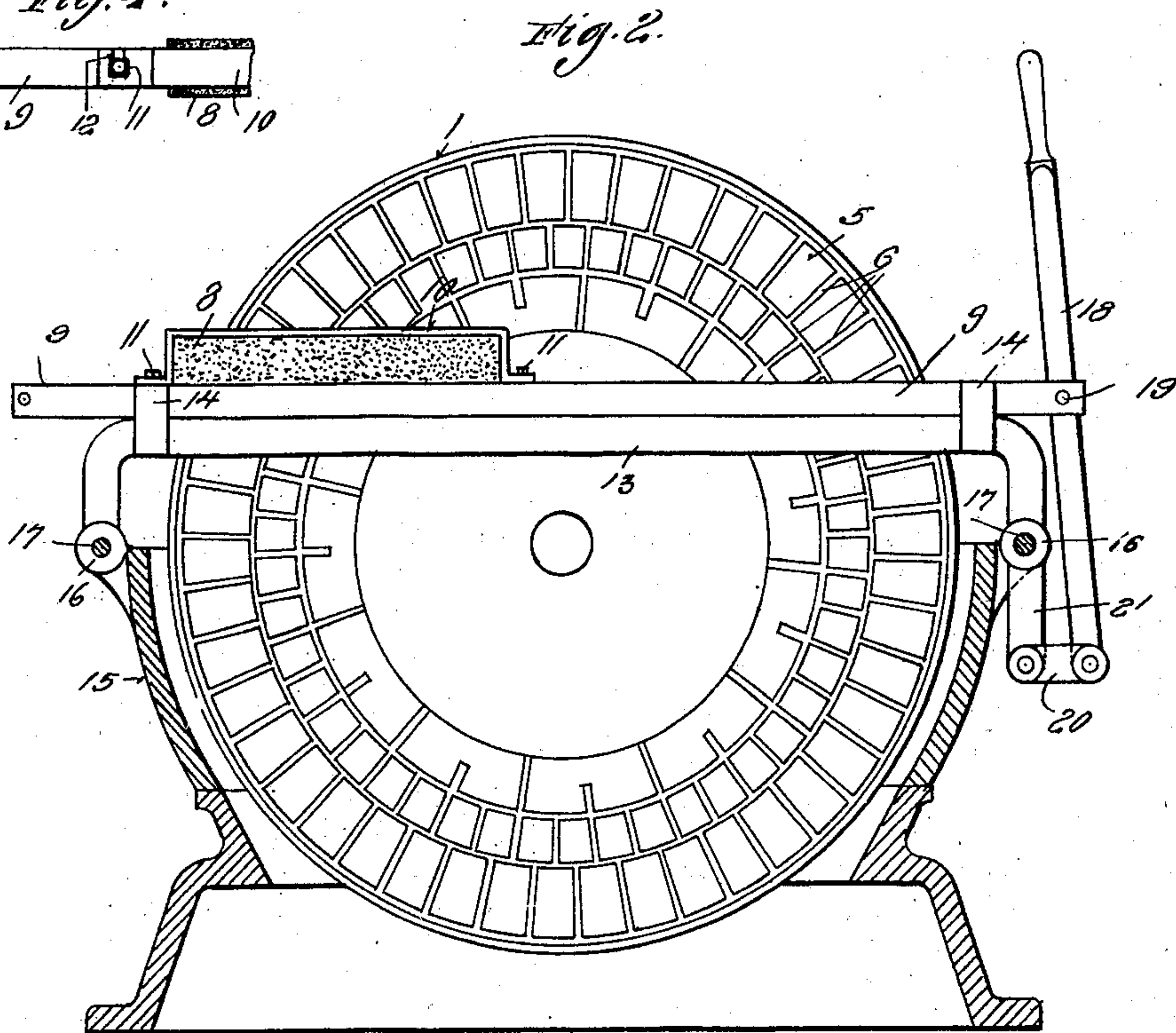
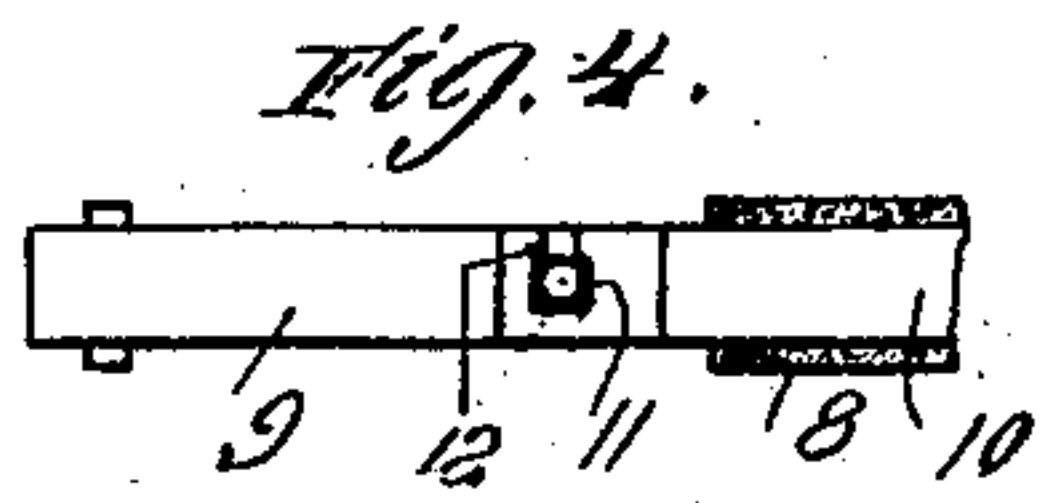
Patented Feb. 25, 1902.

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SHARPENING DEVICE FOR GRINDING PLATES.

(Application filed Nov. 8, 1901.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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SHARPENING DEVICE FOR GRINDING-PLATES.

SPECIFICATION forming part of Letters Patent No. 694,056, dated February 25, 1902.

Application filed November 6, 1901. Serial No. 81,282. (No model.)

To all whom it may concern:

Be it known that we, ROBERT H. FOOS and WILLIAM E. COPENHAVER, citizens of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Sharpening Devices for Grinding-Plates, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to sharpening devices for grinding-plates, being devised more particularly for the purpose of sharpening the grinding-plates of that class of mills known as "attrition-mills," in which the grinding is effected by means of two opposite disks or heads rotating in opposite directions and provided on their working faces with grinding-plates not in contact with each other, but provided with ribs whereby the material as it is fed between the plates is reduced by attrition.

It is the object of our present invention to provide a simple and efficient mechanism whereby the ribs of these grinding-plates when worn may be ground or sharpened in a rapid and accurate manner, restoring the grinding-plates to a proper working condition with a slight expenditure of time and labor.

To this end the invention consists in certain novel features, which we will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of an attrition-mill of a well-known type having our improvement applied thereto. Fig. 2 is a vertical sectional view of the same, taken between the grinding heads or disks, the sharpening device being shown in elevation. Fig. 3 is a plan view of the grinding-disks and sharpening device; and Fig. 4 is a detail plan view, on an enlarged scale, of a portion of the apparatus.

In the said drawings we have shown our improvement applied to a well-known type of attrition-mill having disks or heads 1 revolving opposite each other in parallel planes and mounted on shafts 2, which are driven in opposite directions by any suitable means—as, for instance, pulleys 3 and belts 4, one of

which may be crossed. Each disk or head is faced with grinding-plates 5, having ribs 6, and means are provided for varying the distance between the disks and for holding them in their normal position with a yielding pressure—as, for instance, by springs 7. In mills of this type the ribs 6 are constructed with sharp corners, which in the course of time become worn down or rounded from use, thereby impairing the efficiency of the grinding-plates. It is the object of our invention to restore the efficiency of these plates by grinding down the outer faces of the ribs in a plane parallel with the base of the plate, or, in other words, with the plane of revolution of the head, so that the sharpness of the angles of the ribs is restored. To these ends we employ a block or plate 8 of abrasive material of a thickness such as to adapt it to be inserted between the two disks or heads of the mill, in which position its opposite faces will be in contact with the ribs of the grinding-plates on both of said disks or heads. This block is supported on and carried by a reciprocating bar 9, which forms a carrier for said block. The block is connected with the bar in any suitable manner, and in the present instance we have shown for this purpose a clip or stirrup 10, which embraces the top and ends of the block 8 and which is connected to the top of the bar 9 by screw-bolts 11. The opening in the stirrup for one of these screw-bolts is slotted or cut out to the edge of the stirrup, as indicated at 12, this feature being shown more particularly in Fig. 3, and by reason of this construction it is sufficient to loosen the screw-bolts slightly, when that end of the stirrup which is slotted may be swung laterally, the stirrup turning around the other screw-bolt as a pivot, and thus permitting the block 8 to be readily removed and replaced. The bar or carrier 9 is supported on a bracket or yoke 13, which extends between the disks and which is provided with suitable guides 14, which support and guide the bar or carrier 9 laterally. These guides are preferably located outside of the space between the disks or heads, as shown. The bracket 13 is detachably connected to the

casing 15 of the mill in any suitable manner. We prefer, however, the particular mode of supporting the bracket which is shown in the accompanying drawings. Mills of this class 5 are provided with a casing, which is divided horizontally at about mid-height of the disks or heads, the upper section or cap being removable to give access to the disks and being removed, as shown in the accompanying 10 drawings, during the operation of sharpening the grinding-plates. This cap is connected to the lower portion of the casing by means of apertured lugs 16, and the bracket is preferably supported on the casing by 15 means of pins 17 passing through said apertured lugs and through suitable apertures in the bracket, as shown. This construction enables us to readily apply the entire device to the mill and as readily remove it, while 20 at the same time no additional structural elements are required to be provided on the mill itself to permit the attachment of the sharpening mechanism, and said mechanism may be applied to mills already constructed 25 without requiring any alterations therein or additions thereto.

In order to impart a reciprocating motion to the block 8, we employ a lever-18, which is pivotally connected at 19 to one end of the 30 bar or carrier 9, said lever being also pivotally connected at its lower end to a link 20, which is in turn pivoted to a downward extension 21 of the bracket 13.

It will be understood, of course, that the 35 bracket 13, or at least that portion thereof which lies between the disks or heads, is of less width than the block 8, and the same is true of the bar or carrier 9 and the clip or stirrup 10.

40 In sharpening the grinding-plates the cap or upper casing of the mill is removed and the sharpening apparatus is applied thereto in the manner already described, the disks or heads being in a position such that they bear 45 upon opposite sides of the grinding-block. The mill is then started, the disks rotating in opposite directions, with the ribs of their grinding-plates in contact with the opposite sides of the grinding-block, and this latter is 50 reciprocated across the faces of the disks during this operation. The result is that the ribs of the plates are quickly and accurately ground or sharpened in such a manner as to restore the sharp corners thereof, and thus 5 render them once more efficient. This grinding action takes place in such a manner that the faces of the ribs of each head are ground in the same plane, that plane being the plane of revolution of the head. The sharpening 60 attachment may be readily removed after the operation of sharpening is completed, and the whole operation is performed without removing the heads and also without removing the plates from the heads. It will be understood, of course, that where the mill is of such a 65 character that the springs operate to hold the grinding-block between the heads such spring-

pressure materially facilitates the sharpening operations.

In practice we prefer to allow the grinding- 70 block to move freely laterally with respect to the bar on which it is mounted, since the contact of the heads with the faces of the block will prevent the latter from falling out of place, and this freedom of movement will 75 permit it to properly adjust itself to the planes of rotation of the heads. Mills of this type are usually so constructed that the disks not only run in opposite directions, but at different speeds, and where this is the case we so 80 arrange the apparatus that the grinding-block comes into contact with the face of the more rapidly rotating disk at that part of its surface which is moving downward or toward 85 the bar 9, so that no excessive strain is brought upon the stirrup 10, and the excess of thrust is carried by the bar 9 and bracket 13.

We do not wish to be understood as limiting ourselves to the precise details of construction hereinbefore described, and shown 90 in the accompanying drawings, as these details may obviously be modified without departing from the principle of our invention.

Having thus fully described our invention, what we claim as new, and desire to secure by 95 Letters Patent, is—

1. A sharpening attachment for attrition-mills, comprising a bracket, a carrier mounted to slide thereon, and an abrasive block or plate mounted on the carrier, the opposite 100 sides of said block constituting working faces, substantially as described.

2. A sharpening attachment for attrition-mills, comprising a bracket, a carrier mounted to slide thereon, and an abrasive block supported on said carrier so as to be free to move 105 laterally, the opposite sides of said block constituting working faces, substantially as described.

3. A sharpening attachment for attrition-mills, comprising a bracket, adapted for attachment to the mill frame or casing and to extend between the heads of the mill, a carrier mounted to slide on said bracket, means 110 connected with said bracket for operating the carrier, and an abrasive block or plate of greater width than the carrier and bracket and mounted on the carrier, its opposite sides constituting working faces, substantially as 115 described.

4. A sharpening attachment for attrition-mills, comprising a bracket, adapted for connection to the opposite sides of the mill frame or casing, the body of said bracket adapted to pass between the heads of the mill and provided with guides, a bar or carrier mounted to slide on said bracket and laterally supported 120 by the guides, an abrasive block mounted on said carrier and having a width or thickness greater than that of the carrier and bracket, 125 its opposite sides constituting working surfaces, and an operating-lever connected with the bracket and with the bar or carrier, substantially as described. 130

5. The combination, with the heads or disks of an attrition-mill, and means for rotating the same in opposite directions, of a bracket extending between the same, a carrier slidably mounted on said bracket, and an abrasive block mounted on said carrier and having its opposite sides in contact with the grinding-surfaces of both heads, substantially as described.

6. The combination, with the heads or disks of an attrition-mill, and means for rotating the same in opposite directions, of a bracket extending between the same, a carrier slidably mounted on said bracket, and an abrasive block mounted on said carrier and having its opposite sides in contact with the grinding-surfaces of both heads, said block being free to move laterally with respect to the carrier to permit it to adjust itself to the planes of revolution of the heads, substantially as described.

7. The combination, with the heads of an attrition-mill, and means for rotating the same in opposite directions, of a reciprocating grinding-block supported between said heads and having its opposite sides constituting working surfaces which bear against the grinding-surfaces of the respective heads, and means for holding said heads against said block with a yielding pressure, substantially as described.

8. The combination, with the opposite heads of an attrition-mill, means for rotating

said heads in opposite directions, one of said heads being movable toward and from the other and provided with a spring for yieldingly holding it in position, of a bracket extending between the heads, a carrier slidably mounted on said bracket, and a grinding-block of greater thickness or width than the bracket and carrier and supported on the carrier so as to be free to yield laterally thereof, its opposite sides constituting working faces contacting with the grinding-surfaces of the respective heads, substantially as described.

9. The combination, with an attrition-mill having opposite heads, means for rotating said heads in opposite directions, and a divided casing provided with lugs which serve to attach the removable upper portion of the casing, of a sharpening attachment comprising a bracket adapted to be fitted and secured to said lugs and provided with a carrier slidably mounted thereon, and an abrasive block mounted on the carrier and having its opposite sides constituting working surfaces, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

ROBERT H. FOOS.

WILLIAM E. COPENHAVER.

Witnesses:

CLARENCE M. HOLLENBECH,

VICTOR Y. SMITH.