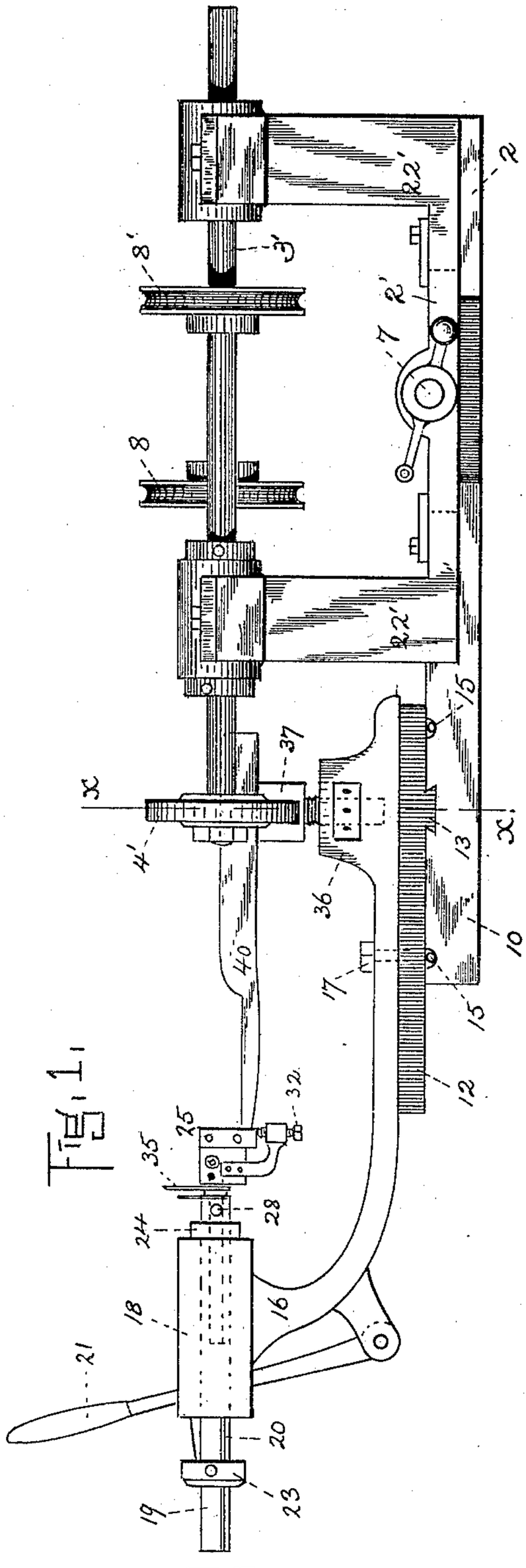
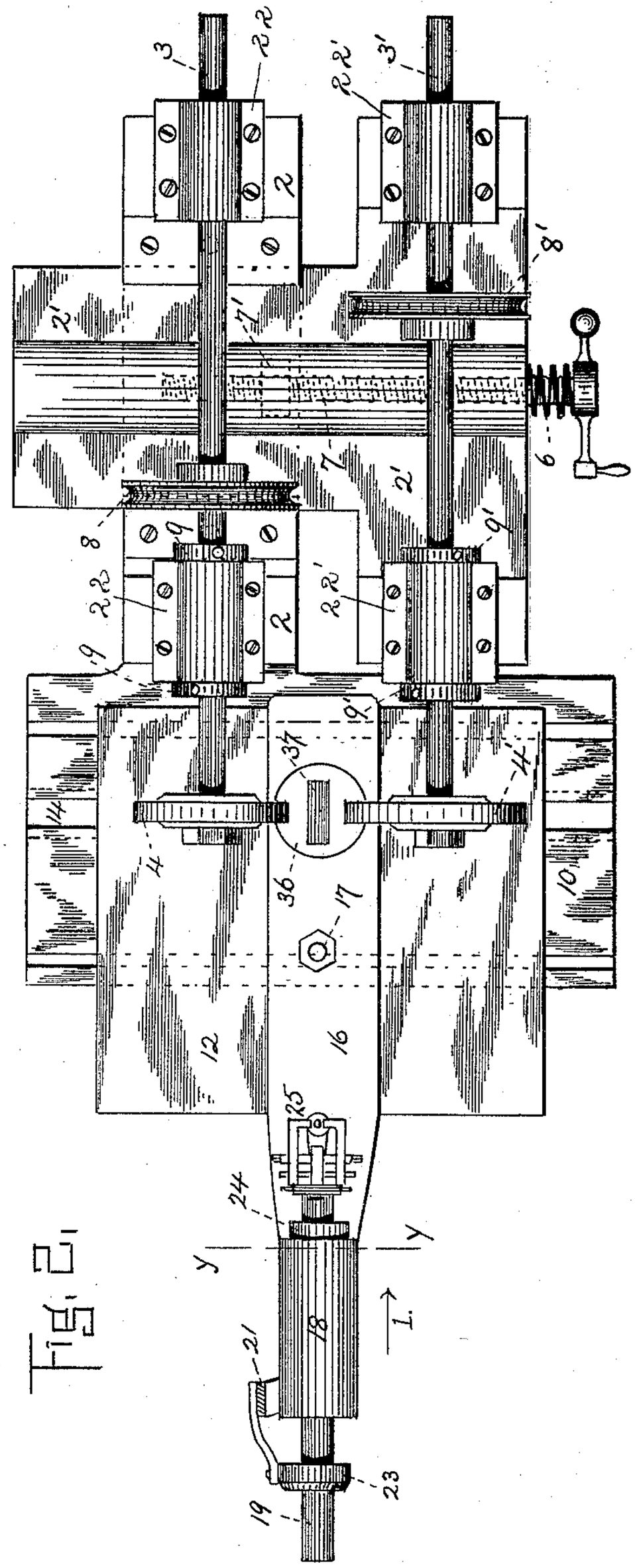
(No Model.) 2 Sheets—Sheet 1.

J. J. FIFIELD.

MECHANISM FOR CONCAVING RAZORS.

No. 466,777. Patented Jan. 12, 1892.





Witnesses.

Francis C. Stanwood

Geo F Ward

Inventor.

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(No Model.) 2 Sheets—Sheet 2.

J. J. FIFIELD.

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Fig. 3.

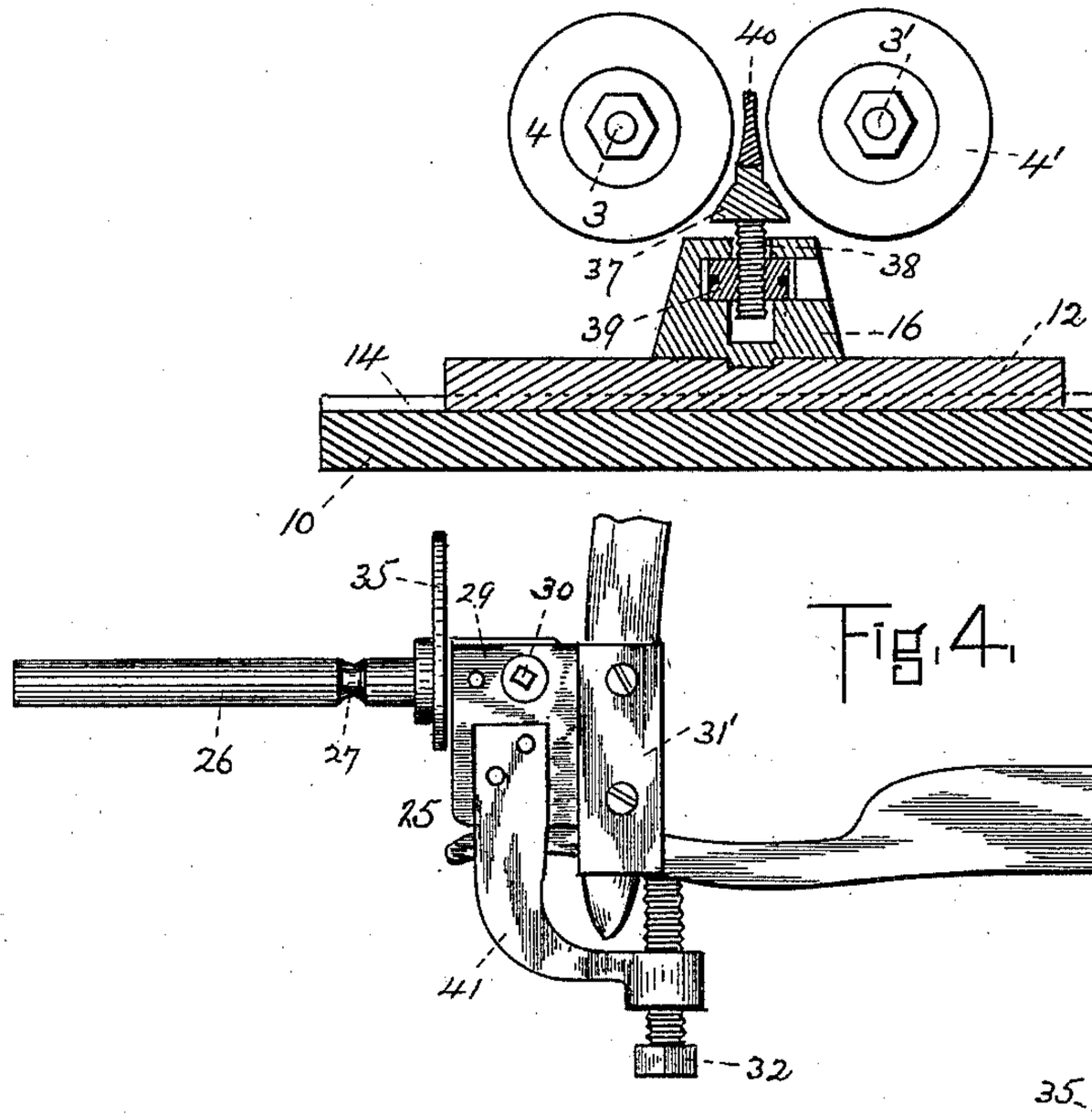
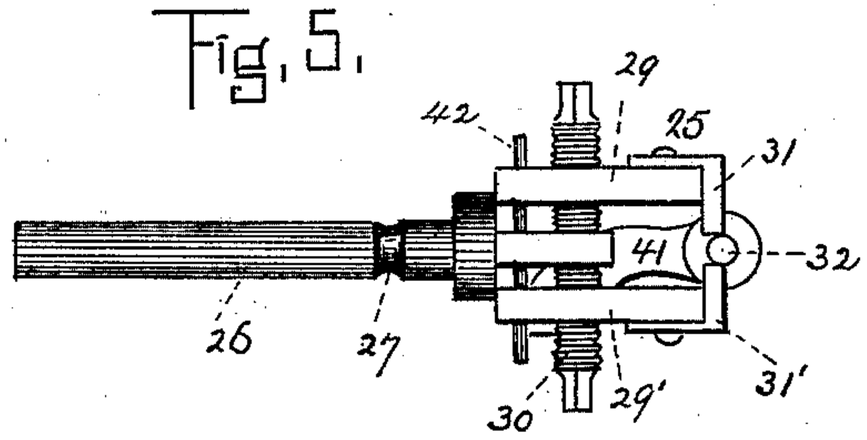


Fig. 4.

Fig. 5.



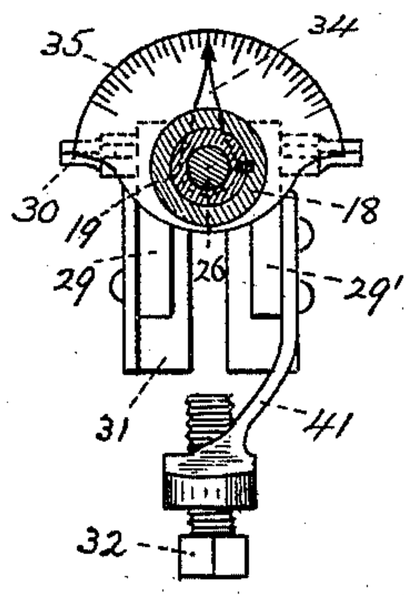


Fig. 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES J. FIFIELD, OF CHELSEA, MASSACHUSETTS.

MECHANISM FOR CONCAVING RAZORS.

SPECIFICATION forming part of Letters Patent No. 466,777, dated January 12, 1892.

Application filed February 27, 1891. Serial No. 383,041. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. FIFIELD, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Mechanism for Concaving Razors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to mechanism by which tools are to be ground and furnished with a cutting-edge, particularly razors, and this act, speaking in general terms, is called "concaving."

The object of my invention is to enable a razor to be concaved mechanically and upon both sides simultaneously. This necessitates a free movement of the carriage in which the instrument is held to compensate for the cutting away of the metal upon the sides, and, further, to enable each grinding-wheel to operate equally on each side of the razor. In this is embodied the primary feature of my invention.

My novel assemblage of parts consists of two rotary grinding-wheels, one adapted to advance or recede from the other, together with a carriage having free movement at right angles to the shafts carrying the grinding-wheels, and a tool-holder mounted upon said carriage and capable of moving in paths parallel with the shafts of the grinding-wheels to cause the knife or razor to pass lengthwise between the wheels, and, lastly, of the feed mechanism by which the movable grinding-wheel is advanced toward the other and cooperating wheel as the tool is reduced in thickness.

The drawings represent in Figure 1 a side elevation, and in Fig. 2 a plan, of a machine embodying my invention. Fig. 3 is a sectional elevation on line x x in Fig. 1. Fig. 4 is a side elevation, full size, of the tool-holder. Fig. 5 is a plan of the same. Fig. 6 is an end view on line y y in cross-section, looking in direction of arrow 1.

In said drawings, 2 represents a fixed bed-plate provided with standards 22, in which is journaled a rotary shaft 3, furnished with a cutting or grinding wheel, as an emery-disk 4, at one end. A movable bed-plate 2′, provided with standards 22′, carrying a shaft 3′, parallel with the shaft 3 and likewise furnished with a grinding-wheel 4′, is mounted upon the fixed bed-plate 2 and is pressed against by a spring 6. This spring 6 is controlled by a screw-rod 7, which engages a nut 7′. Hence the movable bed-plate, with its standards, is advanced or retracted by the screw-shaft, while in case the feed movement produced thereby causes the disk 4′ to bear too hard against the tool in process said pressure is relieved by the compression of the spring 6. This obviates the danger of throwing off belts or of exerting too much friction upon the tool. (See Fig. 2.) Said shafts are to have opposite rotary motion by means of the grooved pulleys 8 8′, while endwise adjustment of said shafts is controlled by the collars 9 9′. Thus these shafts can be caused to approach or recede, but always remain in parallelism.

At one end of the fixed bed-plate and beneath the grinding-disks is secured or cast a flat plate 10, which serves to support a movable carriage 12. The latter is provided with a rib 13 upon its under side and engages an undercut groove 14 in the top side of the support. Furthermore, longitudinal grooves are cut in said plate to receive balls 15 to further reduce the friction and enable the motion of the carriage to be perfectly free, it being understood that the path of travel of said carriage is at right angles to the shafts 3 3′. Upon said carriage is mounted a tool-holder 25, the latter being secured in a bracket 16, removably united with said carriage at 17. Said bracket is provided with a short tube or sleeve 18, which receives a shaft 19, non-rotary, but with a spline-and-groove connection 20 to permit of end traverse through its sleeve. An operating-lever 21 serves to actuate said shaft and produces the proper end movement by attachment to the collar 23 thereupon, the latter operating with the collar 24 to limit the end movement or reciprocations, according to the length of the razor, knife, or other tool to be ground.

The tool-holder proper at 25 is composed of

a spindle 26, adapted to enter the sliding shaft 19, but permitted to turn by means of the annular groove 27 and the engaging screw-pin 28. Furthermore, said tool-holder is provided with a pair of holding-plates 29 29′, attached to the head of said spindle and controlled by a stout screw 30, right-and-left handed, while a guide-pin 42, which passes through the tail ends of said plates, is designed to steady the latter and hold them in proper position as they approach or recede from each other. Said holding-plates are fitted with removable jaws 31 31′ to enable different shapes to be employed, as circumstances require, while a pendent arm 41, interiorly screw-threaded at its extremity, receives an adjusting-screw 32 to aid the jaws in holding the tool rigidly in its proper place. Thus it is evident by the above assemblage of parts that the tool-holder, having axial movement or adjustment, can be caused to reciprocate endwise by aid of the operating-lever and its shaft. Hence the tool is thrust back and forth for its entire length between the rotating grinding-disks. In this instance by using two disks, but when operating upon one side only of the tool, and in order to obtain the same angle upon both sides, I have affixed a dial 34 upon the shaft 19, while a graduated segmental or semicircular plate 35 is mounted upon the spindle. Thus the exact angle at which the tool is presented on one side to the grinding-disk is indicated, and a similar bevel or angle can be produced by axial rotation of the spindle of the tool-holder until a corresponding angle is indicated for the other side. Preferably, however, both sides are to be acted upon simultaneously, and for this reason the carriage is given perfectly free movement, as will be hereinafter explained.

An adjustable tool-support 36 is provided for the front end of the tool, and said support is positioned on the inner end of the bracket 16 and consists of a grooved block 37, having a pendent screw-post 38, which engages a nut 39. The latter is contained in a boss cast or otherwise formed upon the bracket. Thus rotation of the nut causes vertical rise or fall of the block and a consequent adjustment of the tool to be operated upon. This adjustment serves to position the tool properly between the grinding-disks.

The operation is as follows: The razor 40 or other instrument to be ground, with the edge uppermost, is secured in the tool-holder 25 by inserting the rear end between the jaws and clamping the latter by means of the bolt 30. The holding-screw 32 is now brought to bear until the instrument is in the desired position, (see Fig. 4,) with the back resting in the grooved block 37 of the tool-support. (See Fig. 3.) The collars 23 24 are now adjusted upon the shaft 19 to permit the razor to be thrust for the entire length of the blade between the grinding-disks. When the above adjustments are completed, the grinding-disks are set in motion, while the screw-shaft 7, (see Fig. 2,) with its spring 6, holds the disk 4′ against the tool, which in its turn is pressed against the opposing disk 4. Hence an equal pressure is brought to bear upon both sides of the razor. In order to cause the disks to cut equally on both sides of the razor, the carriage 12 is free to move transversely of the rotating shafts 3 3′ to center the razor between the grinding-disks. Thus it will be seen that as the razor is ground away it is free to move laterally, and this lateral or centering movement is automatically effected by the pressure of the disk 4′, so that uniform grinding action ensues. This centering movement, automatically produced, is one of the important features in my invention. In order to allow the carriage to move with perfect freedom, I have provided ball-bearings to reduce the friction to a minimum.

At the same time that constant pressure and grinding action is produced laterally of the tool in process endwise reciprocating movement is imparted to said tool by means of the levers 21, the latter causing the shaft 19 to advance and retreat, together with the spindle 26 and tool-carrier 25. In this manner the grinding-disks are brought in contact with the blade of the tool for its entire length. Since lateral pressure is being constantly exerted upon both sides of the blade, all that is now necessary is to continue the reciprocations of the blade between the disks until the desired edge is produced. The tool may then be removed and applied to an oil-stone or a strop.

What I claim is—

1. The combination, with two oppositely-rotating shafts, suitably mounted, and their grinding-disks, of a self-centering or automatically-adjustable carriage freely movable at right angles to the longitudinal axes of said shafts, and a tool-holder mounted upon said carriage and adapted to have right-line reciprocations in parallelism with said shafts, substantially as herein set forth.

2. In combination with two standards, one fixed, the other movable, two revoluble parallel shafts, one upon each standard, and the oppositely-moving grinding-disks upon said shafts, a carriage upon said fixed standard freely movable transversely of the longitudinal axes of said shafts, a tool-holder mounted upon said carriage and adapted to reciprocate in parallelism with said shafts, and a tool-support vertically adjustable between the grinding-disks, substantially as and for the purposes specified.

3. In mechanism for grinding tools, a fixed standard, a revoluble shaft thereupon furnished with a grinding-disk, a guide-plate upon said standard, and a carriage freely movable transversely of said shaft, with a tool-holder reciprocating in parallelism with said shaft, combined with a movable standard, its actuating feed-shaft, the spring 6, a revoluble shaft upon said standard parallel to that upon the fixed standard, and a grav-

ity-disk, the two grinding-disks adapted to rotate oppositely and co-operate substantially as described.

4. In mechanism for grinding tools, two oppositely-rotating shafts with grinding-disks, one movable with respect to the other, a carriage adapted to travel transversely of said shafts, and a sleeve-bracket secured to the standard, combined with a sleeve-shaft reciprocating in said bracket, its adjustable collars to limit the reciprocations, and a tool-holder mounted in said sleeve-shaft and adapted to rotate axially therein, substantially as stated.

5. The combination, with two oppositely-rotating grinding-disks, a freely-moving carriage, and a sleeve-bracket thereon, of a non-rotary reciprocating sleeve-shaft, the adjustable collars 23 24, an actuating-lever, and a tool-holder axially revoluble therein, said tool-holder being composed of twin holding-plates having removable jaws, a common guide-pin, an actuating clamping-screw, and a pendent adjusting-screw, substantially as set forth and explained.

6. In mechanism for grinding tools, two oppositely-rotating grinding-disks, a freely-movable carriage, and an adjustable tool-support between said disks, combined with a sleeve-shaft adapted to reciprocate, as set forth, an index-finger mounted upon said shaft, a spindle axially revoluble in said sleeve-shaft, a graduated dial affixed to said spindle, and a tool-holder at one end of the latter, substantially as described.

7. The combination, with two oppositely-revolving disks, their operating-shafts adjustable endwise by collars 9 9′, one shaft being adapted to move toward or away from the other, but in parallelism, and a movable carriage provided with a tool-support 36, fitted with the adjustable grooved block 37, of the bracket 16, its sleeve 18, the reciprocating shaft 19, the indicator upon said shaft, and the spindle 26, carrying a graduated dial and a tool-holder, substantially as set forth and explained.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES J. FIFIELD.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.