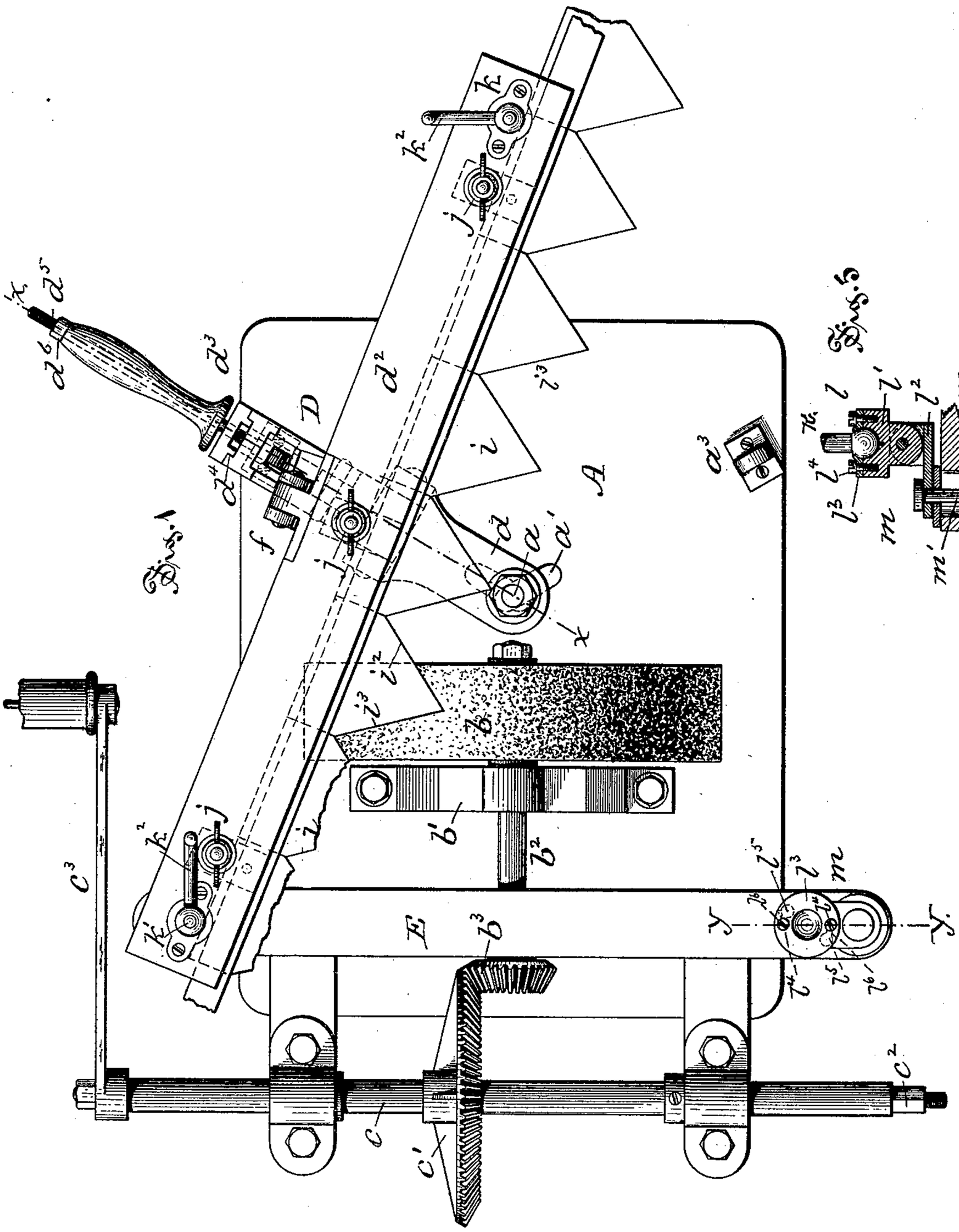
(No Model.) 3 Sheets—Sheet 1.

W. S. WILLIAMS.

MACHINE FOR GRINDING MOWING MACHINE KNIVES.

No. 353,908. Patented Dec. 7, 1886.



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(No Model.) 3 Sheets—Sheet 2.

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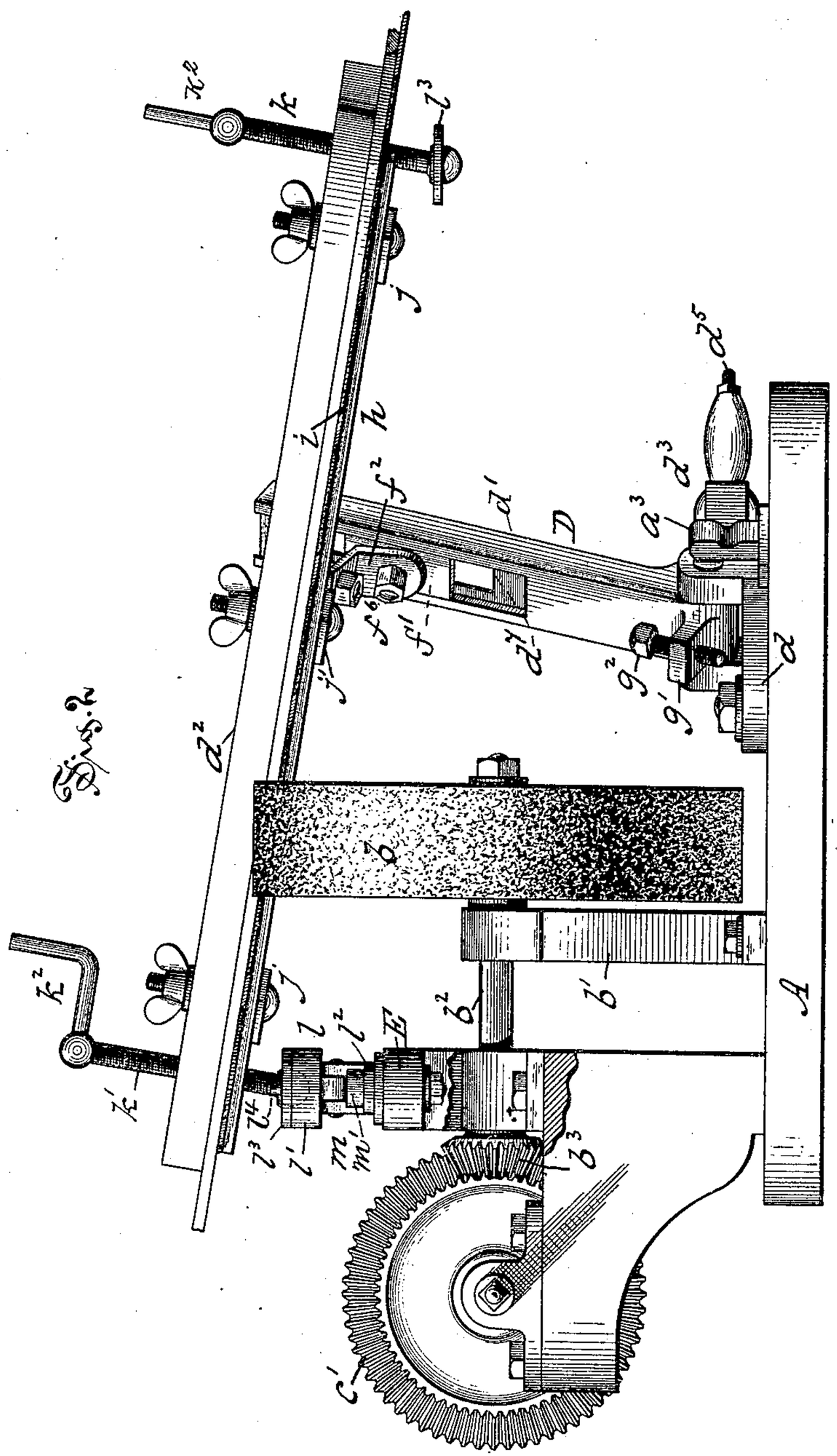

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3

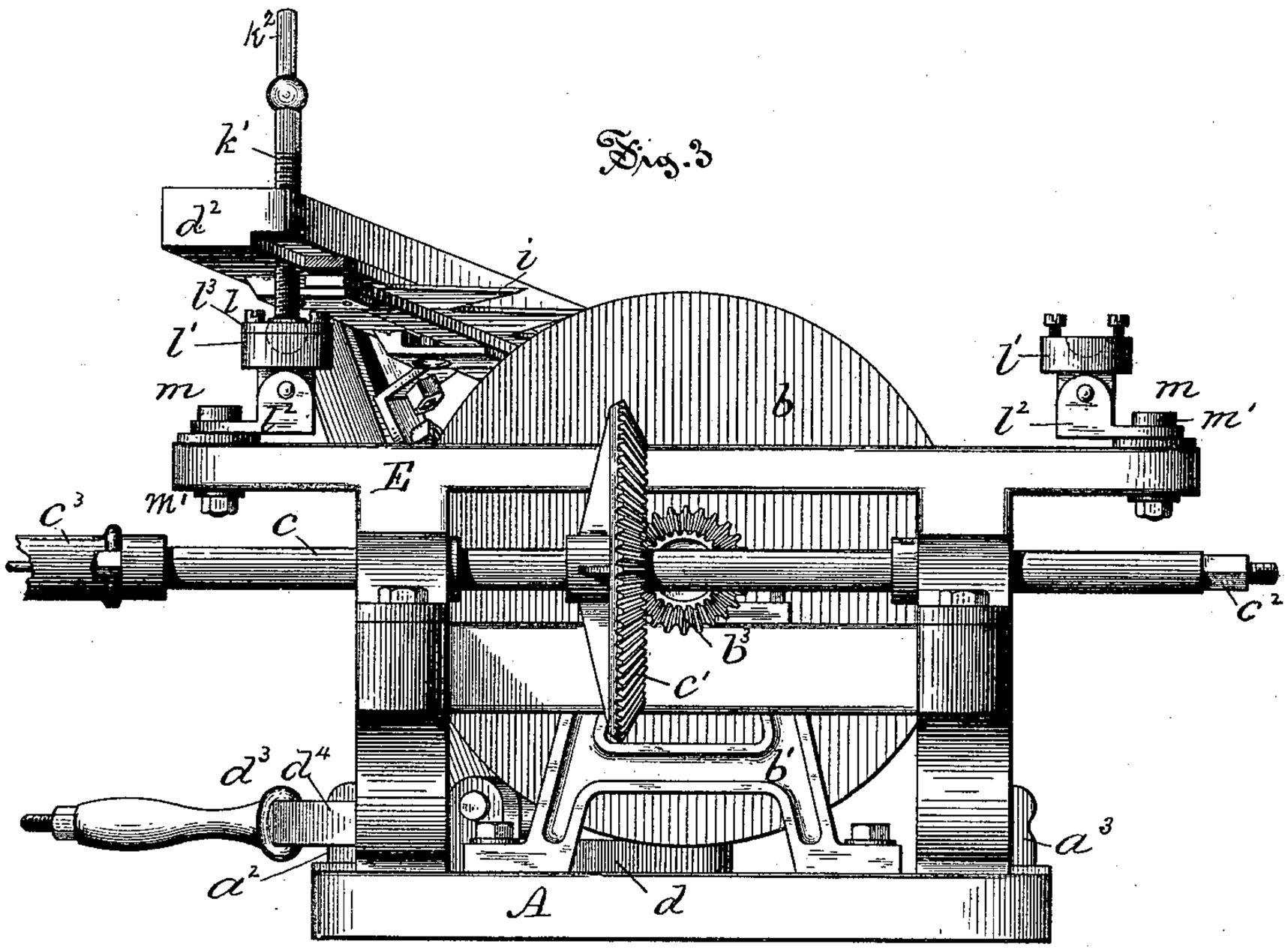


Fig. 6

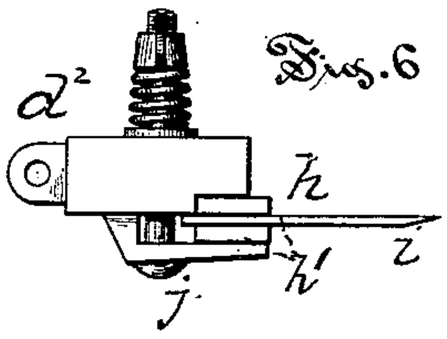
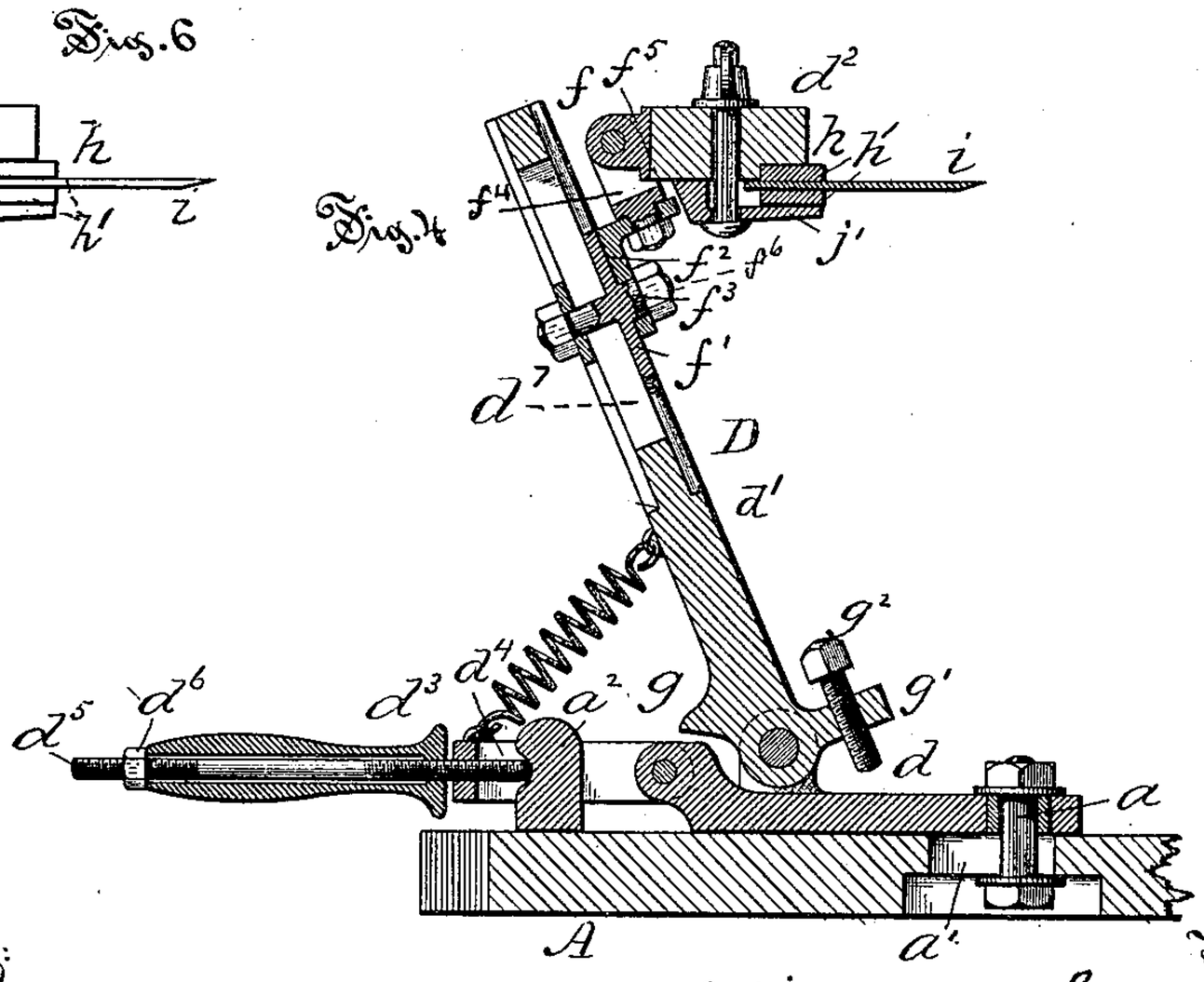


Fig. 4



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UNITED STATES PATENT OFFICE.

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MACHINE FOR GRINDING MOWING-MACHINE KNIVES.

SPECIFICATION forming part of Letters Patent No. 353,908, dated December 7, 1886.

Application filed April 19, 1886. Serial No. 199,334. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. WILLIAMS, of East Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Grinding Mowing-Machine and Harvester Knives, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

My invention relates to the class of devices for holding the knives used in mowers, harvesters, and machines of the like class for the purpose of sharpening the teeth; and the object of my invention is to provide a device by the use of which knives of this class may be accurately and uniformly ground.

To this end my improvement consists in a blade-clamp attached to a bar that is hinged and pivoted to a rocking bar at a point near the center of the former, and having a fixed support at one end of the clamp-bar, in combination with the several hinges and pivots, whereby the edge of a given tooth of the cutting-bar is presented to a grindstone in proper position to grind a beveled cutting-edge on the tooth as the bar is rocked back and forth, and in details of the construction of the several parts and in their combination, as more particularly hereinafter described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a top or plan view of my improved grinding device. Fig. 2 is a front view in elevation. Fig. 3 is an end view. Fig. 4 is a sectional view taken on line *x x* of Fig. 1. Fig. 5 is a detail sectional view of the device connecting the clamp-bar and the fixed rest, taken on line *y y* of Fig. 1. Fig. 6 is a detail view of the blade-holding clamps with springs about the clamping-screws.

In the accompanying drawings, the letter A denotes a bed, table, or standard supporting a grindstone, *b*, on the bearings *b'*. To the shaft b^2, to which the stone is secured, is fast a bevel gear-wheel, b^3, and in mesh with it is a larger bevel-gear, *c'*, fast to a shaft, *c*, that is arranged at right angles to the shaft b^2, and presents on each end a squared part, c^2, to receive a crank-handle, c^3, by means of which the stone may be turned from either side of the stone-support by changing the handle from one end of the shaft to the other. The precise form, material, and arrangement of the grinder and its supports are not essential to my invention, as any convenient grinder and frame may be used.

The main features of my improvement are embodied in the holder D and a fixed rest, E. The holder D consists of a base-block, *d*, a rocking bar, *d'*, hinged to the base-block, and a blade-bar, d^2, that is connected to the rocking bar by an adjustable swivel-joint, *f*. The block *d* is pivoted to the bed A by means of the bolt *a*, that passes through the block and through a slot, *a'*, in the bed, so that the block may be swung upon the bed with the bolt as a pivot, and carrying with it the holder and connected parts. To the outer end of this block is hinged a latch, d^3, composed of the strap d^4, with a nut formed in the cross-bar at the end, and a screw-bolt, d^5, borne in the nut, and having a handle fitting about the bolt between the cross-bar and a nut, d^6, on the outer end of the bolt. The inner end of the bolt takes into a socket or recess in the outer face of the lug a^2, which is secured to the bed A.

The rocking bar *d'* is hinged at its lower end to the block *d* by means that allow it to swing back and forth in a plane at substantially right angles to the plane of the base-block *d*, and the bar has near the bottom and on the back side a projection, *g*, that by contact with the block forms a stop that limits the backward play of the bar, while on the front side it bears a lug, *g'*, and a screw-bolt, g^2, passing through the lug and forming an adjustable stop, that by contact with the blocks determines the extent of the forward play of the bar.

The carriage *f'* is secured to the rocking bar *d'* by means of a bolt passing through the longitudinal slot d^7 in the bar and a nut on the rear end of the bolt taking against a strap that straddles the slot and rests in a grooved way in the bar.

To the carriage *f'* is pivotally secured an angle-arm, f^2, which is held by a threaded nut, f^6, fitted on a threaded lug projected from the bolt f^3, which secures the carriage to the holder D. The angle-arm is arranged to turn on the bearing, and is set in any desired position by

clamping the carriage to the holder D. One part of the arm projects forward from the bar, and to it is pivoted one part, f^4, of the swivel-joint, the other part, f^5, being hinged to the forked upper end of the part f^4. The blade-bar d^2 is fastened to this upper part of the swivel-joint, and it bears a blade-clamp, h, between the jaws h' of which a knife or cutter blade, i, may be clamped by means of the clamps j, that are located near the outer ends of the blade-bar, and the clamp j', located near the center of the bar. On the outer ends of this blade-bar are secured the bevel-adjusters $k\,k'$, by means of which, in connection with the fixed rest E, the angle of the blade i, with respect to the grinding-surface and the bevel of the cutting-edge of the blade, is determined.

Each of the adjusters $k\,k'$ is formed of a threaded shaft provided with a crank-arm, k^2, above the bar, in convenient position to raise and lower the screw that passes through a threaded socket fastened in the bar. The lower end of this screw-shaft is preferably rounded to form the ball of a ball-and-socket joint, l, that forms part of the universal joint m, that connects the fixed rest and the blade-bar.

The socket-piece l' is hinged between the upright ears or lugs on the arm l^2, that is pivotally connected to the rest E by means of the bolt m' passing through a slot in the rest, and the socket-piece of the ball-and-socket joint l is made up of two parts, the upper part or plate, l^3, being permanently attached to the lower end of the screw-shaft of the adjusters $k\,k'$. The holding-plate l^3 is formed with apertures l^5, having turning-slots l^6 leading therefrom, the purpose being to admit the placing of plates over the heads of the screws l^4, and being turned partly around to the limit of the slots under the heads of the screws, and then lock the plates to the socket-piece. The plates may be removed by turning them in reverse direction until the heads of the screws come into the apertures. If necessary, the screws may be clamped tight when the plate is set.

The several parts of the machine having been put together, substantially as shown in Fig. 1, a cutter, i, is clamped to the blade-bar, the limit of the forward play of the rocking arm determined by adjusting the screw g^2, the bevel to which the edge i^2 of the blade to be ground is determined by means of the adjuster k', and then by a back-and-forth rocking movement imparted to the holder D the edge i^2 is ground accurately as to the shape of cutting-edge and bevel thereof. After having ground a single edge of one of the teeth, the blade i is unclamped, is slid lengthwise until another tooth is brought into proper position for grinding, and is again clamped, and the grinding operation repeated. As soon as one edge of all the teeth have been ground, the base-block is unclamped, is swung sidewise upon the central pivot, and is clamped to the lug a^3 upon the opposite side of the base from the lug a^2, the adjuster k' having been unclamped from the universal joint m, and the adjuster k fastened to the joint at the other end of the fixed rest E.

The method of adjusting the parts and grinding the edges i^3 of the several teeth is precisely similar to that already described for grinding the edges i^2.

The function of the hinge of the swivel-joint f and of the ball-and-socket joint l is to permit the blade-bar to be swung upward and backward, so as to examine the cutting-edge of the blade being ground.

It is obvious that any cutting-blade—as of a plane, chisel, or like tool, or one having an edge beveled upon both sides—may be readily ground by my improved device by clamping the blade to the holder with its edge at an angle to the bar, substantially in the position of the cutting-edge i^2 in relation to the stone or grinder b.

In order to adapt the clamps j to more readily hold a cutter-bar near the end, that is often thicker than the rest of the bar, I make the clamp hold with a yielding pressure by placing a spring about the bolt above the blade-bar and below the nut, as shown in Fig. 6.

I do not limit myself to the precise construction of the several elements making up the holder, rest, rocking bar, and connecting-joints, as it is obvious that many variations may be made in these without departing from my invention.

I claim as my invention—

1. In combination with a base-block, a rocking bar hinged to the base-block, a blade-bar bearing a blade-clamp and connected to the rocking bar by a swivel-joint, and a fixed rest with means whereby the blade-bar is pivotally connected to the rest, all substantially as described.

2. In combination with a base or support, a base-block, d, pivotally connected to the bed, a rocking bar hinged to the base-block, a blade-bar bearing a blade-clamp, a fixed rest, and means whereby the blade-bar is pivotally connected to the rest, all substantially as described.

3. In combination with a bed, a base-block, d, with a connected latch, d^3, the locking-lugs fast to the bed or table, a rocking bar hinged to the base-block, a blade-bar bearing a blade-clamp and attached to the rocking bar by a swivel-joint, a fixed rest, and a universal joint, whereby the fixed rest and blade-bar are connected, all substantially as described.

4. In combination with the bed A, supporting a grindstone, b, the shaft b^2, bearing the bevel-gear b^3, the shaft c, bearing the bevel-gear c', and having its outer ends squared to receive a crank-handle, holder D, hinged to the base-block, and blade-bar d^2, with the blade-clamps, the fixed rest E, and the universal joint m, connecting the rest and the blade-bar, all substantially as described.

5. In a tool-grinder, in combination, a rocking bar attached to a bed and adapted to swing toward and from a grindstone, a blade-clamp hinged and pivoted to the rocking bar, and a fixed rest, with means whereby the blade-supporting clamp may be given a swinging play to and from the grinding-surface, swinging and turning upon the latter joint and upon the pivotal connection with the rocking bar, all substantially as described.

6. In a device for grinding tool-blades, a base, a rocking bar hinged to the base, a blade-bar connected to the rocking bar by a swivel-joint and to a fixed rest by a universal joint, the blade-bar in the back-and-forth motion required to grind the blade rocking upon two pivotal supports, all substantially as described.

7. In a device for grinding tool-blades, a base-block, *d*, a rocking bar, *d'*, hinged to the base and bearing the adjustable stop g^2 and the stop *g*, a blade-bar, d^2, connected to the rocking bar by a swivel-joint, *f*, and to a fixed rest by a universal joint, *m*, all substantially as described.

8. In combination with a base-block, *d*, a rocking bar, *d'*, hinged to the base-block, a swivel-joint, *f*, borne on the adjustable carriage *f'*, attached to the rocking bar, the blade-bar d^2, attached to the joint and bearing a blade-clamp, and a fixed rest connected to the blade-bar by a universal joint, the blade-bar in the back-and-forth motion required to grind the blade rocking upon two pivotal supports, all substantially as described.

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