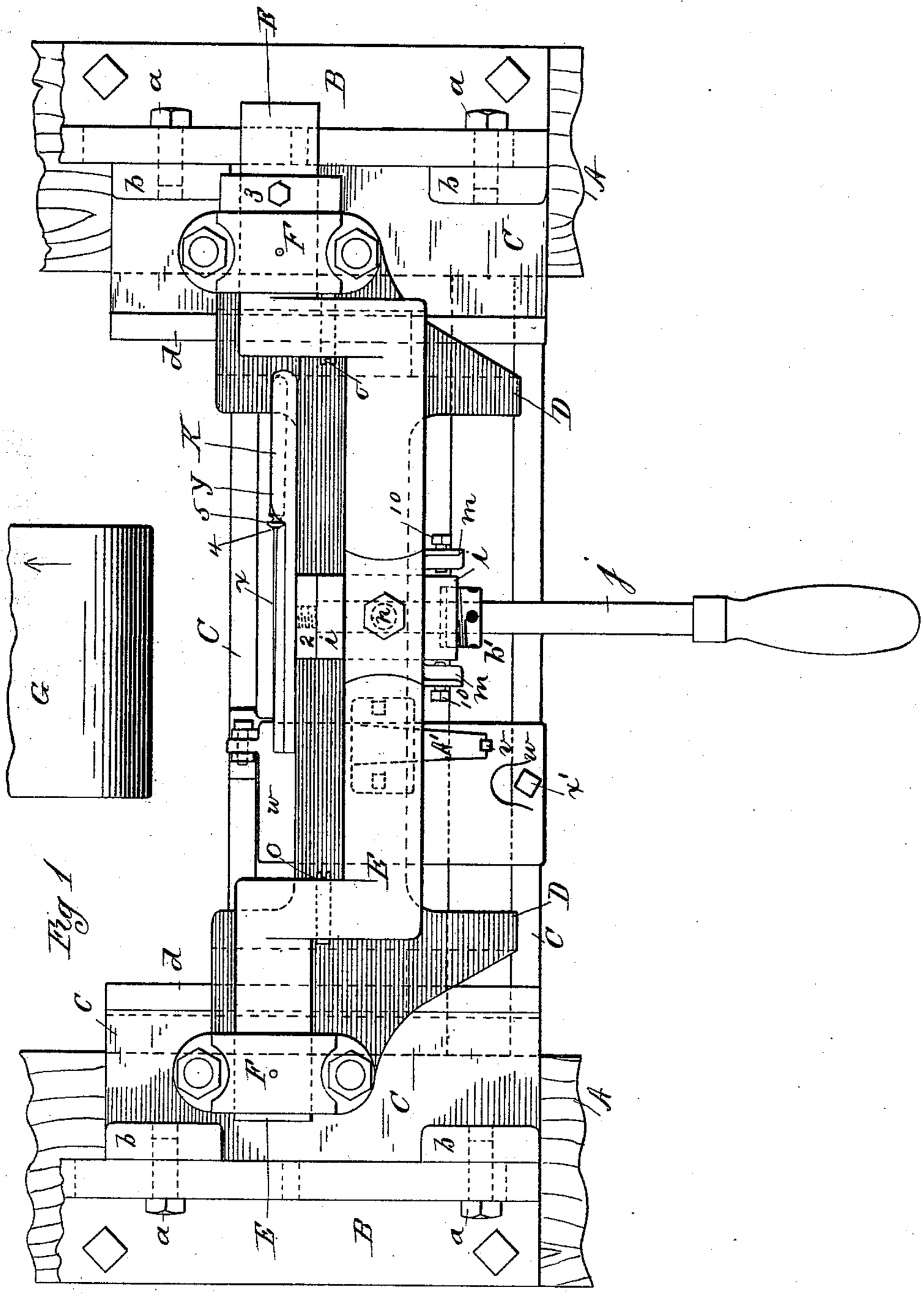
(No Model.) 4 Sheets—Sheet 1.

J. H. LA FAVE.

KNIFE GRINDING DEVICE.

No. 542,388. Patented July 9, 1895.



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(No Model.)

4 Sheets—Sheet 2.

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Fig 2

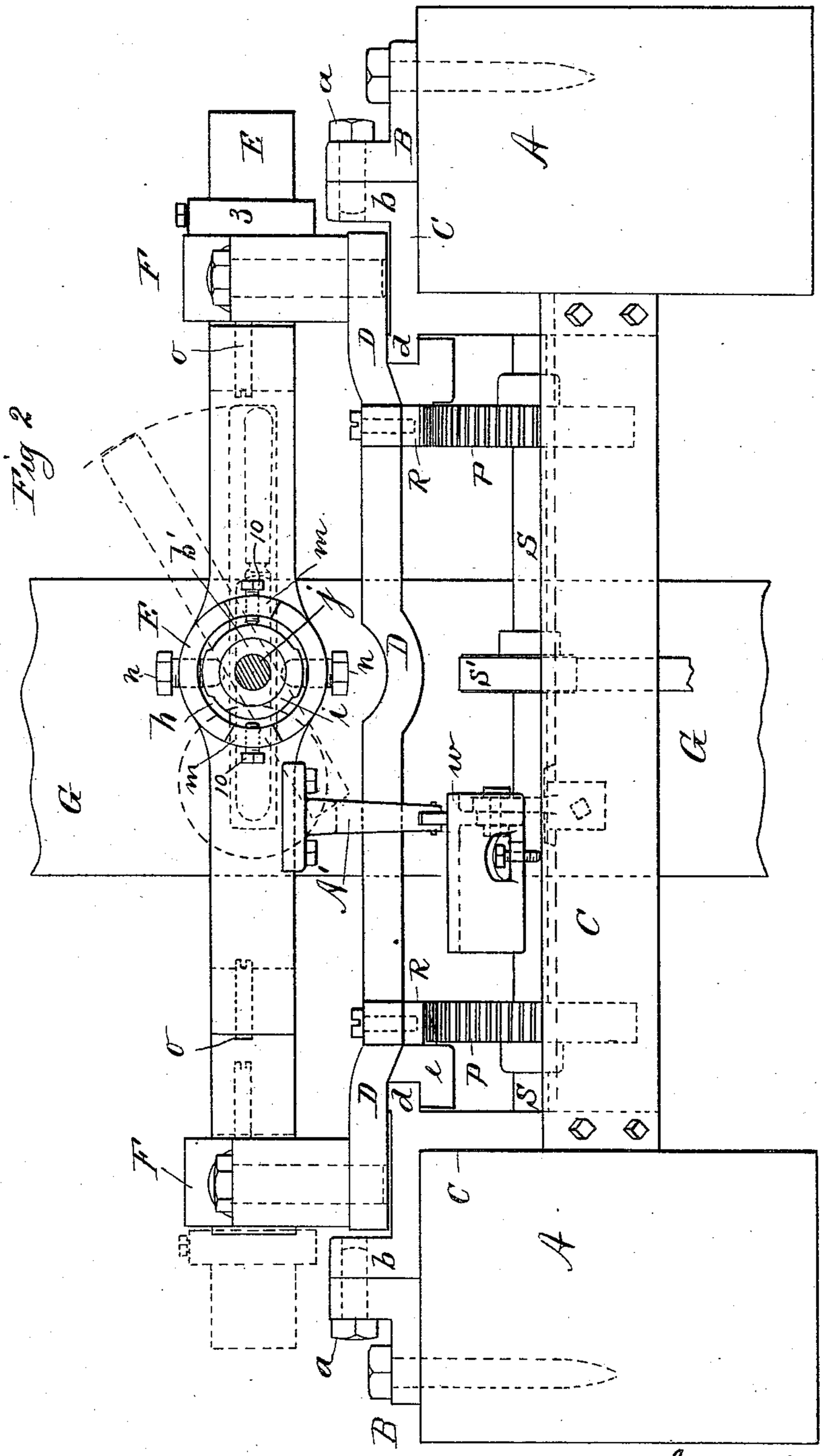

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Fig 3

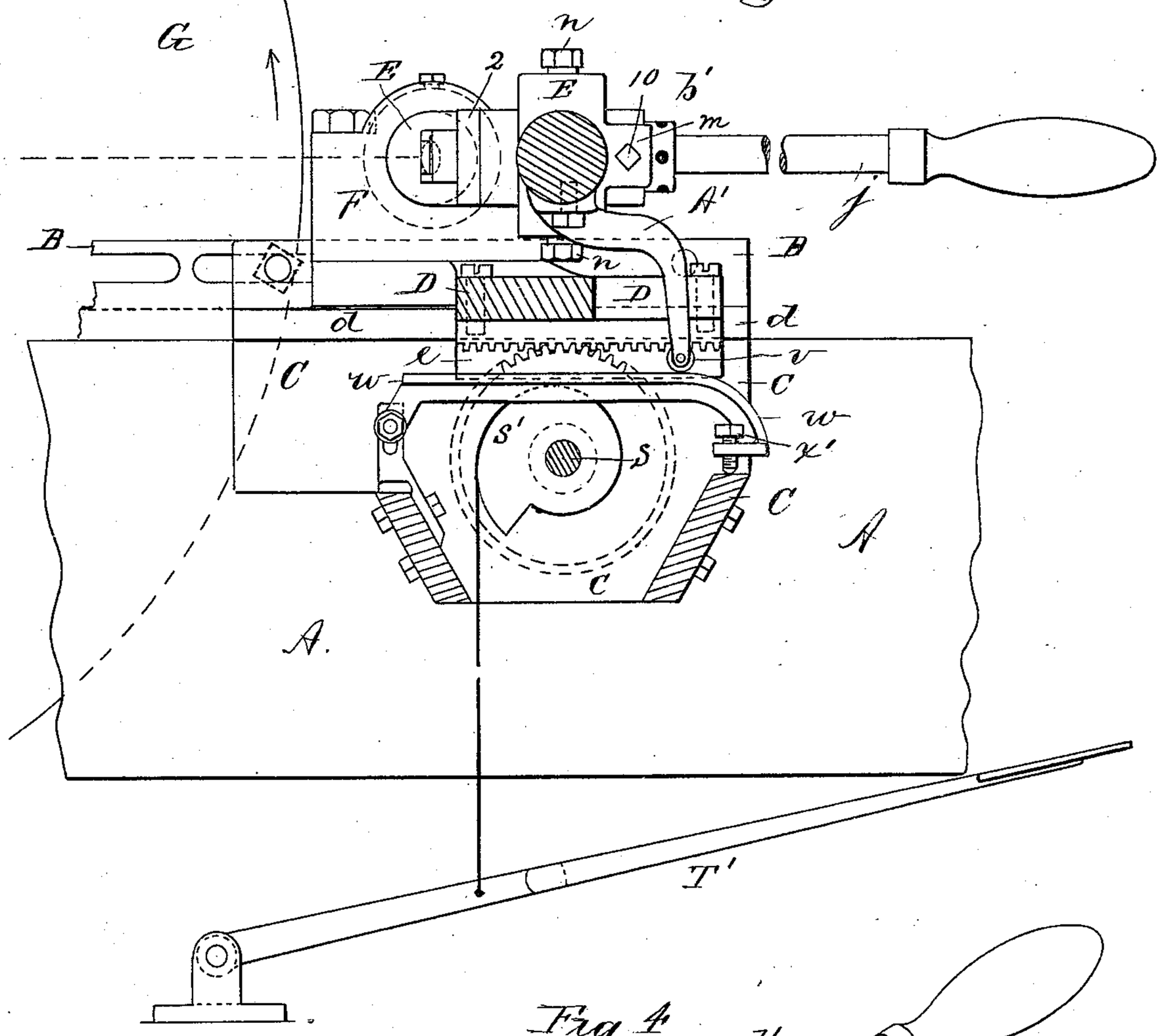

Fig 4

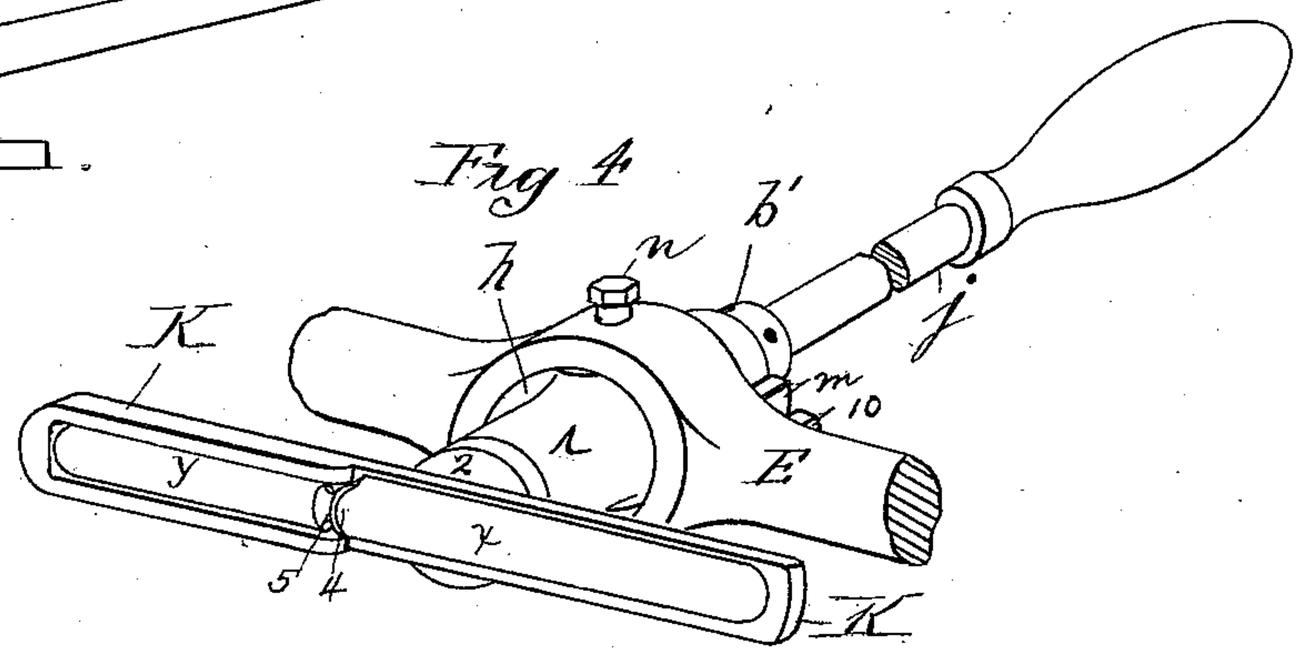

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Fig 5

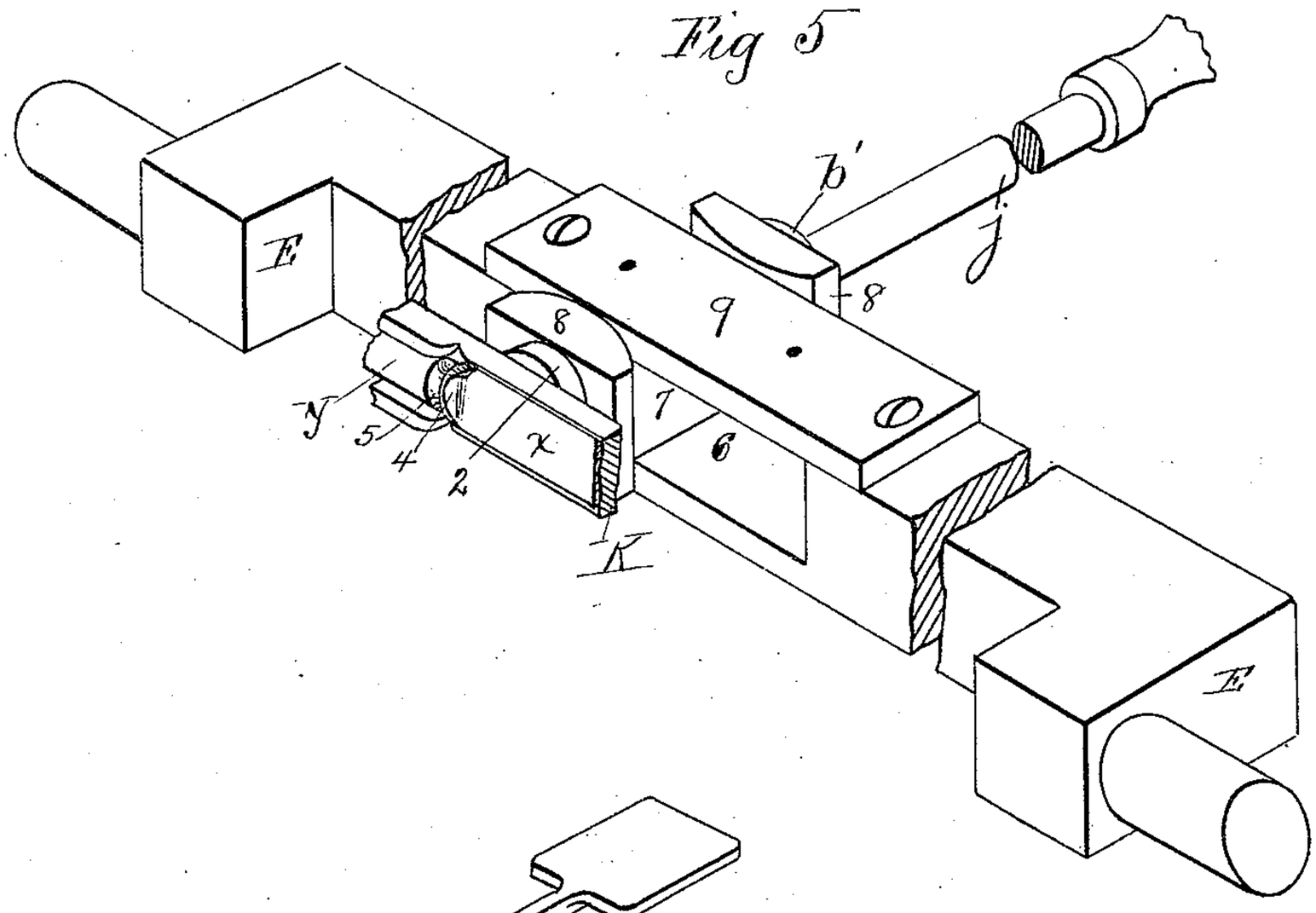
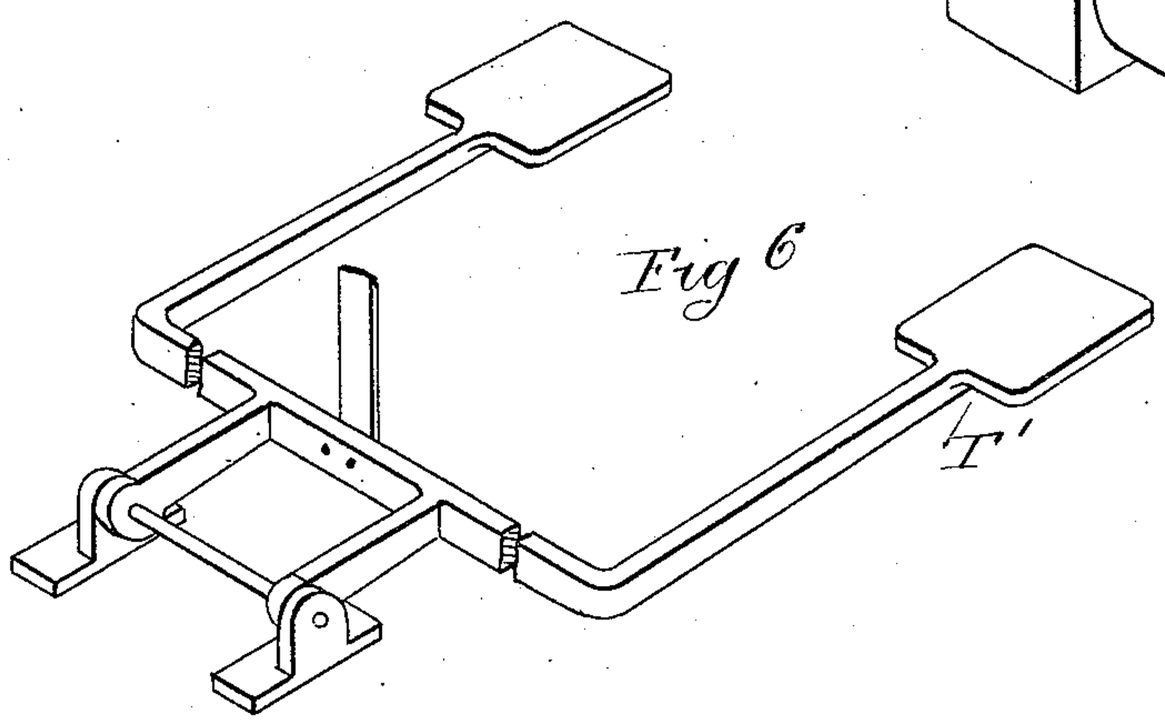


Fig 6



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UNITED STATES PATENT OFFICE.

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KNIFE-GRINDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 542,388, dated July 9, 1895.

Application filed October 13, 1894. Serial No. 525,798. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. LA FAVE, a citizen of the United States of America, residing at Toledo, in the county of Lucas and State of Ohio, have invented new and useful Improvements in Knife-Grinding Devices, of which the following is a specification.

This invention relates to devices for holding objects against a grindstone or other similar grinding element for grinding the same in the process of finishing the surface of said objects, the object being to provide improved devices for supporting table and other knives and analogous articles while grinding the same and for giving to said articles all requisite movements relative to the grindstone, such as are usually given thereto by hand-operators, but which provide for more accurate manipulation of the parts being operated upon than can be given when held by the hands; and the invention consists of a machine embodying the structural elements, all as hereinafter fully described, and more particularly pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a plan view of the machine, showing it in place on and attached to the frame of a grindstone. Fig. 2 is a front elevation of the machine in the position shown in Fig. 1. Fig. 3 is an end view of the machine shown in Figs. 1 and 2 and showing, besides, the treadle which operates to move parts of the device toward the grindstone. Fig. 4 is a perspective view of the central portion of the rock-shaft, in which the device for holding the knife is pivotally attached. Fig. 5 is a perspective view of a modified construction of the rock-shaft and of the means for attaching the knife-holding device, which may, if desired, be used instead of the construction shown in Fig. 4. Fig. 6 is a perspective view of the treadle apart from the machine.

In the drawings, A represents the horizontal timbers of a grindstone-frame as ordinarily constructed, between which the stone is hung on an arbor running in suitable bearings. On the top of said timbers and parallel with the sides thereof are bolted two angle-strips B of cast-iron, having horizontal slots therein in their vertical sides, through which bolts are passed to fasten the frame C of the grinding device at any desired distance from the face of the grindstone by means of the screws *a*, Figs. 1 and 2, passing through the said slots and screwing into lugs *b* on the frame C. By these means the frame C may be advanced toward the stone as the latter wears away, and thus bring the devices holding the work to be ground within such distance from the stone as will permit it to be moved up against the latter by means of the devices actuating the sliding table whose movement is in that direction limited.

The frame C is made to fit closely between the timbers A, yet capable of movement therebetween toward the stone, as the latter wears down and has cast on the side plates thereof two gibs *d*, one on the inner upper edge of each on which the sliding-table moves back and forth to and from the stone, said table engaging with the said gibs by means of the lugs *e*, cast on the under side thereof, as shown in Fig. 2.

The sliding table D has on either end thereof two bearings F, in which is hung the rock-shaft E. This rock-shaft E is made with an offset, as shown in Fig. 1, of such depth as will bring the work to be ground (see blade *x*, Fig. 1) substantially in the axial line of said rock-shaft between its bearings.

The central part of the rock-shaft is enlarged and has a circular opening *h* through it, as shown in Figs. 2 and 4. In this opening is pivotally secured a sleeve *i*, which passes through the rock-shaft by two screws *n*, one from above and one from below, whereby the said sleeve may have an oscillating movement in said opening *h* in a horizontal plane. Passing through said sleeve and capable of being turned therein is the handle *j* of the device for holding the knife, which device is termed "flat-stick." The handle *j* of the flat-stick is prevented from turning too freely in the sleeve *i* by means of a circular bushing *b'* screwed into the end of the sleeve, which compresses any suitable packing around said handle. Fig. 1 shows said bushing on the handle, there indicated in dotted lines as entering the sleeve *i*, and the packing is indicated under said bushing in dotted lines.

The flat-stick or knife-holding element K is made, preferably of cast-iron and has a

flat surface against which the blade *x* rests while being ground and a recessed handle portion adapted to receive the handle *y* of a knife, said handle portion being made sufficiently long to be grasped by the hand of the operator, (see Fig. 4,) as in hand-grinding.

A round boss 2 is cast on the back side of the flat-stick of substantially the same diameter as the sleeve *i*, said boss and said sleeve being faced off smooth on their adjoining surfaces to afford a good bearing between them. Into this boss 2 is screwed the end of the handle *j* of the flat-stick, (see Fig. 1,) and said handle is frictionally held in operative position in said sleeve, as shown, and against a too-free turning or rocking movement by the packing-nut and packing *b'*, above described, and said handle, with the sleeve *i*, has the aforesaid oscillating movement.

Projecting rearwardly from the edges of the opening *h* are two lugs or ears *m*, through each of which a set-screw 10 passes, which set-screws serve to limit the swing of the handle *j* of the flat-stick, horizontally, for the purpose described farther on.

In that portion of the rock-shaft at right angles to its axis are placed two screws *o*, which serve to determine the endwise movement of the rock-shaft between its bearings, as will be fully described, and on one end of the rock-shaft is placed a collar 3 for holding said shaft in any given horizontal position in its bearings relative to the face of the stone.

On the under side of the sliding table are two racks R, which are respectively engaged by the pinions P on shaft S, which is hung in the sides of frame C, as shown in Fig. 2. On said shaft S is a cam S', over which a strap or belt is passed, the end of which is secured thereto, connecting with a bifurcated treadle T', (see Figs. 3 and 6,) suitably pivoted below the machine, as shown in Fig. 3.

The treadle is made, preferably, of such width as will bring the pedal part of each foot close to the frame A, either inside or outside, as may be desired.

The "snail" cam on shaft S is used in order that the movement of the table D shall be more rapid at the commencement of its movement toward the stone and decreasing in speed and power as it approaches the stone.

On the under side of the rock-shaft, to one side of its center, is secured the downwardly-curved arm A', having on its lower end a friction-roll *v*. Said roll bears on an adjustable track *w*, having a horizontal surface and a downwardly-curved outward end. This track *w* is pivoted to the front of the frame C on the cross-bar, as shown in Fig. 3, and on the curved end of the track is an adjusting set-screw *x'*, bearing against the upper side of frame C, whereby the pitch of said track is regulated. By means of these adjustments at both ends of the track *w* the latter can be so adjusted as to guide the rock-shaft toward and from the stone in any desired plane, according to the width of the blade to be ground, and so that the blade can be brought into its first contact with the stone on the lower edge thereof or at any other desired point.

The curved end of the track is for the purpose of allowing the handle *j* of the flat-stick to be depressed, so that the operator can examine the work by drawing back the sliding table far enough to let the end of the arm A' run down the curved end of the track *w* as far as may be necessary to allow the work being ground to be conveniently inspected as the grinding progresses.

The operation of my grinding-machine is as follows: The frame C having been placed on the timbers A sufficiently near the stone to allow the knife or work to be ground to be moved up forcibly against it by means of the sliding table actuated by the rack and pinions, as before described, the said frame is secured in said position by passing the screws *a* through the cast-iron angle-irons B and into the lugs *b* on the frame and setting them up tightly. The frame having been so secured the collar 3 on rock-shaft E is loosened and a knife is put into the flat-stick, and the table D is then moved up toward the stone sufficiently near to allow the rock-shaft to be so adjusted laterally in its bearings that the corner of the stone, which is slightly rounded, will be in such position relative to the blade of the knife as will render it impossible for the stone to cut into the neck 4 or the rim 5 of the blade. When this lateral adjustment of the rock-shaft E has been completed the collar 3 is moved up against the outside of the bearing, as seen in Fig. 1, and screwed there, and the screw *o* in the rock-shaft is screwed against the side of the bearing opposite the collar until it just touches said bearing. This screw *o* serves only as a gage by which to set the rock-shaft readily if, for any reason, it is necessary to remove the collar 3. The next step is to adjust the track *w* by means of the adjusting-screw *x'* on the front end of said track in such position that when the knife to be ground is carried up to the stone by means of the sliding table the arm A', bearing on said track *w*, will so guide the rock-shaft that the lower edge or back of the blade will come in contact with the stone first and the blade be ground from back to edge as in hand-grinding. Said adjustment of the track *w* having been made the next step is to limit the horizontal reciprocating motion of the handle of the flat-stick by turning up the set-screws passing through lugs *m* on the rock-shaft to such a point as may be desirable. The object of this adjustment is to prevent the knife-blade, through carelessness of the workman, from being presented to the stone at too great an angle from the face of said stone, whereby the corner of the stone might cut too deeply into the blade at its point of contact nearest the handle. These various adjustments having been completed a knife to be ground is placed in the flat-stick with the edge of the blade uppermost, (the stone running in

a direction away from the workman, as shown by the arrow thereon,) the right hand of the workman grasping the handle end of the flat-stick and the left hand the handle *j* thereof. The foot is placed on the treadle and the latter pressed down, whereby the sliding table carrying the rock-shaft and its knife-holding devices is moved forcibly toward the grindstone until the blade comes in contact with it, so guided, as before described, by the arm A′ running on track *w* that the lower side or back of the blade is the first point to touch the stone. Holding the flat-stick in substantially a level position by the right hand, the left hand now moves the handle back and forth in a horizontal plane within the limits allowed by the set-screws passing through lugs *m*. This movement permits the operator to present the blade at such varying angles relative to the face of the stone as to enable him to grind a little, more or less, on the ends of the blade, and thus give it its proper taper from the point to the handle. The workman then, giving the handle *j* a reciprocating motion vertically, grinds the blade from the back to the edge thereof until he has given it a sufficient taper in that direction. The blade is then finished and the carriage is drawn back by hand far enough to allow the operator to remove the knife and insert another in its place in the flat-stick, and so proceed until a sufficient number have been ground on one side of the blade. Then the collar 3 is loosened and removed from the rock-shaft E, which is moved through its bearings toward the other edge of the stone, and grasping the handle end of the flat-stick the workman revolves it on its handle *j* in the sleeve through a half-circle, which brings it, relative to the left-hand edge of the stone, into substantially the position it occupied relative to the right-hand edge from which it had just been displaced, and by adjusting the rock-shaft E, by means of the other screw *o*, as in the first instance, to bring the blade to its proper position as to the edge of the stone, the collar 3 is secured in place, as shown in dotted lines, Fig. 2. The handle end of the flat-stick having been reversed, when a knife is put into it with the edge of the blade up as before, the unground side of the blade is presented to the stone and the grinding proceeds as before. By alternating the grinding from one side to the other the stone is kept true.

Referring to the modified construction illustrated in Fig. 5, the rock-shaft E thereof has the slot 6 therein, in which is freely fitted the box 7, having the flanges 8 8 thereon, which serve to retain the box against too free endwise movement in said slot, but permit it to have a certain swinging movement in a horizontal plane. The strip 9 secures said box in the shaft E in the position shown. The flat-stick handle *j* passes loosely through said box 7, and its extremity is screwed into flat-stick K as it is in the construction shown in Fig. 1, and it is also provided with the nut *b*′, and the frictional packing of that figure. Thus it will be understood that by said modified construction a knife held on the flat-stick thereof may be given substantially the same motions as are imparted to it by the constructions shown in Figs. 1 to 4, inclusive; but in the modified construction the box 7, instead of swinging pivotally, as on the two screws *n* in the first-described construction, must move between the upper and lower surfaces of the slot 6, when horizontal movements are imparted to the handle *j* of the flat-stick. When the handle *j* is raised or depressed the rock-shaft swings on its bearings, as in the former construction.

It is apparent that the first-described construction is capable of closer adjustment and easier movements than the modified construction shown in Fig. 5, and is to be preferred.

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

1. A device for holding knives and analogous articles while grinding the same, consisting of a knife-holding element, a handle, to one end of which said knife-holding element is attached, a supporting sleeve for said handle within which it may have a rocking movement, and with which it may oscillate in a horizontal plane, combined with devices for supporting said knife-holding element, handle, and sleeve, substantially as and for the purpose set forth.

2. A device for holding knives and analogous articles while grinding the same, consisting of a knife-holding element, a handle, to one end of which said knife-holding element is attached, a supporting sleeve for said handle within which it may have a rocking movement, and with which it may oscillate in a horizontal plane, combined with a rock-shaft on which said sleeve is hung in a position to one side of the axial line thereof, whereby said knife-holding element is supported substantially on said axial line, substantially as set forth.

3. A device for holding knives and analogous articles while grinding the same, consisting of a knife-holding element, a handle, to one end of which said knife-holding element is attached, a supporting sleeve for said handle within which it may have a rocking movement, and with which it may oscillate in a horizontal plane, combined with a rock-shaft on which said sleeve is hung in a position to one side of the axial line thereof, a guide-track having a curved end pivoted under and at right angles to said rock-shaft, and an arm extending from said rock-shaft and having one end bearing and movable on said track, substantially as set forth.

4. A device for holding knives and analogous articles while grinding the same, consisting of a knife-holding element, a handle, to one end of which said knife-holding element is attached, a supporting sleeve for

said handle within which it may have a rocking movement, and with which it may oscillate in a horizontal plane, combined with a rock-shaft on which said sleeve is hung which is longitudinally adjustable in its bearings, and means for securing said shaft in different positions to which it may be so adjusted, and bearings for said rock-shaft, substantially as set forth.

5. A device for holding knives and analogous articles while grinding the same, consisting of a knife-holding element, a handle, to one end of which said knife-holding element is attached, a supporting sleeve for said handle within which it may have a rocking movement, and with which it may oscillate in a horizontal plane, a rock-shaft on which said sleeve is hung, a sliding table, D, having bearings thereon in which said rock-shaft is supported having racks, R, on the under side thereof, a frame, C, under said table, D, a shaft, S, hung in said frame, having pinions thereon engaging with said racks, and a treadle and devices connecting the same with said shaft, S, whereby the same is rotated and the table, D, is moved toward the grindstone, combined and operating substantially as set forth.

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