

(No Model.)

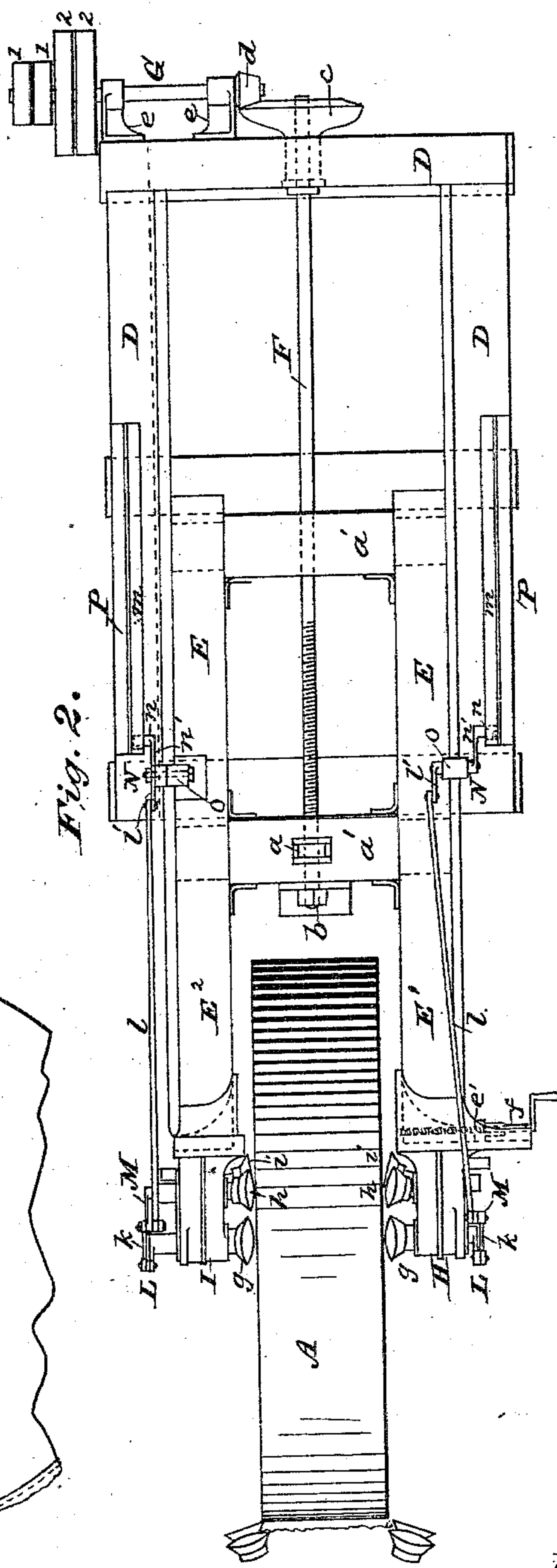
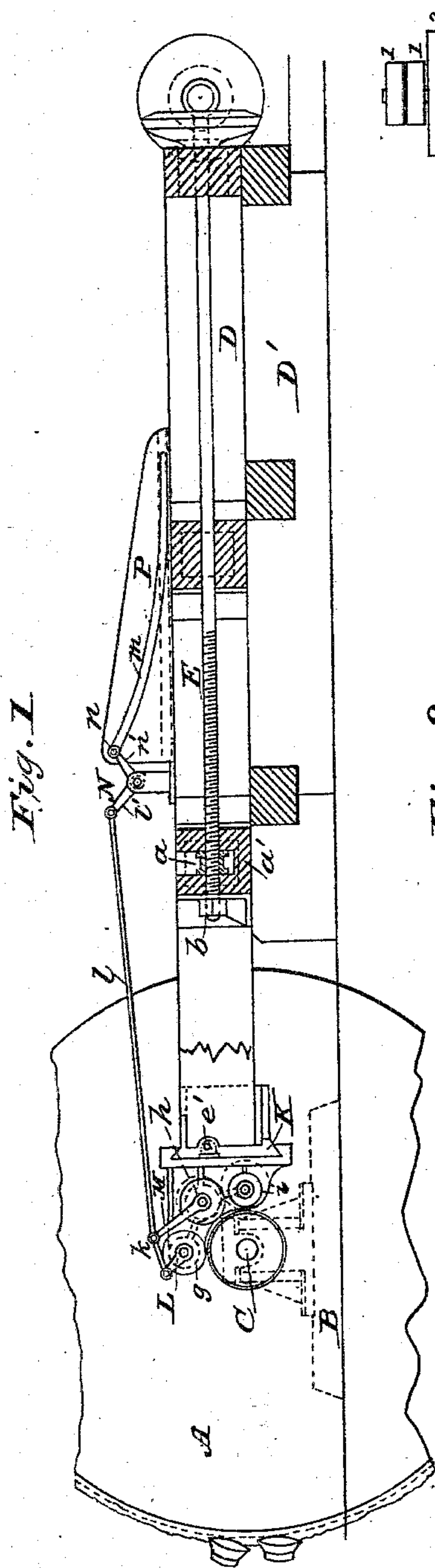
2 Sheets—Sheet 1.

F. TRIER.

MACHINE FOR DRESSING GRINDSTONES.

No. 295,081.

Patented Mar. 11, 1884.



Witnesses:

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Inventor.

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(No Model.)

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Fig. 5.

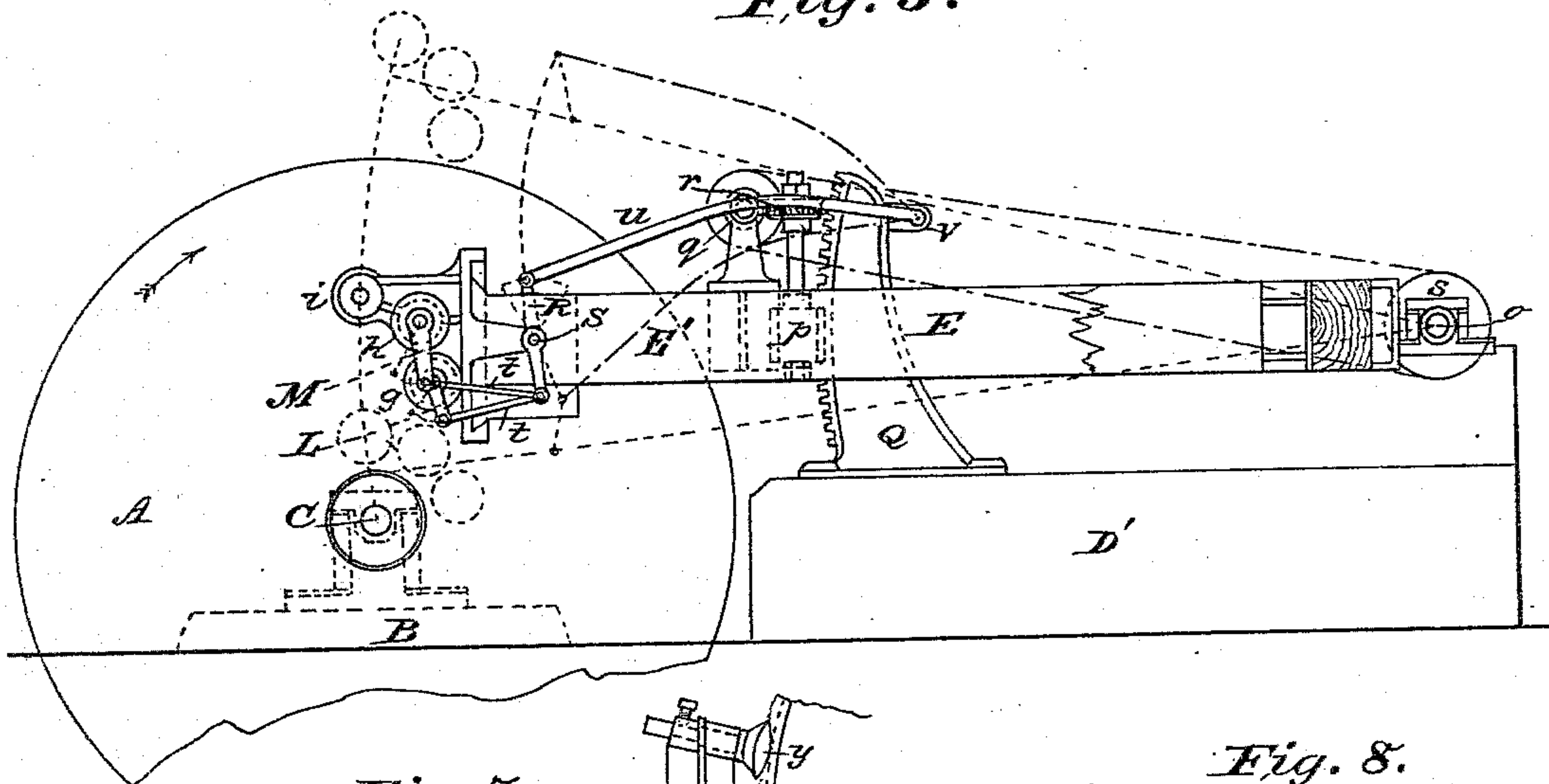


Fig. 3.

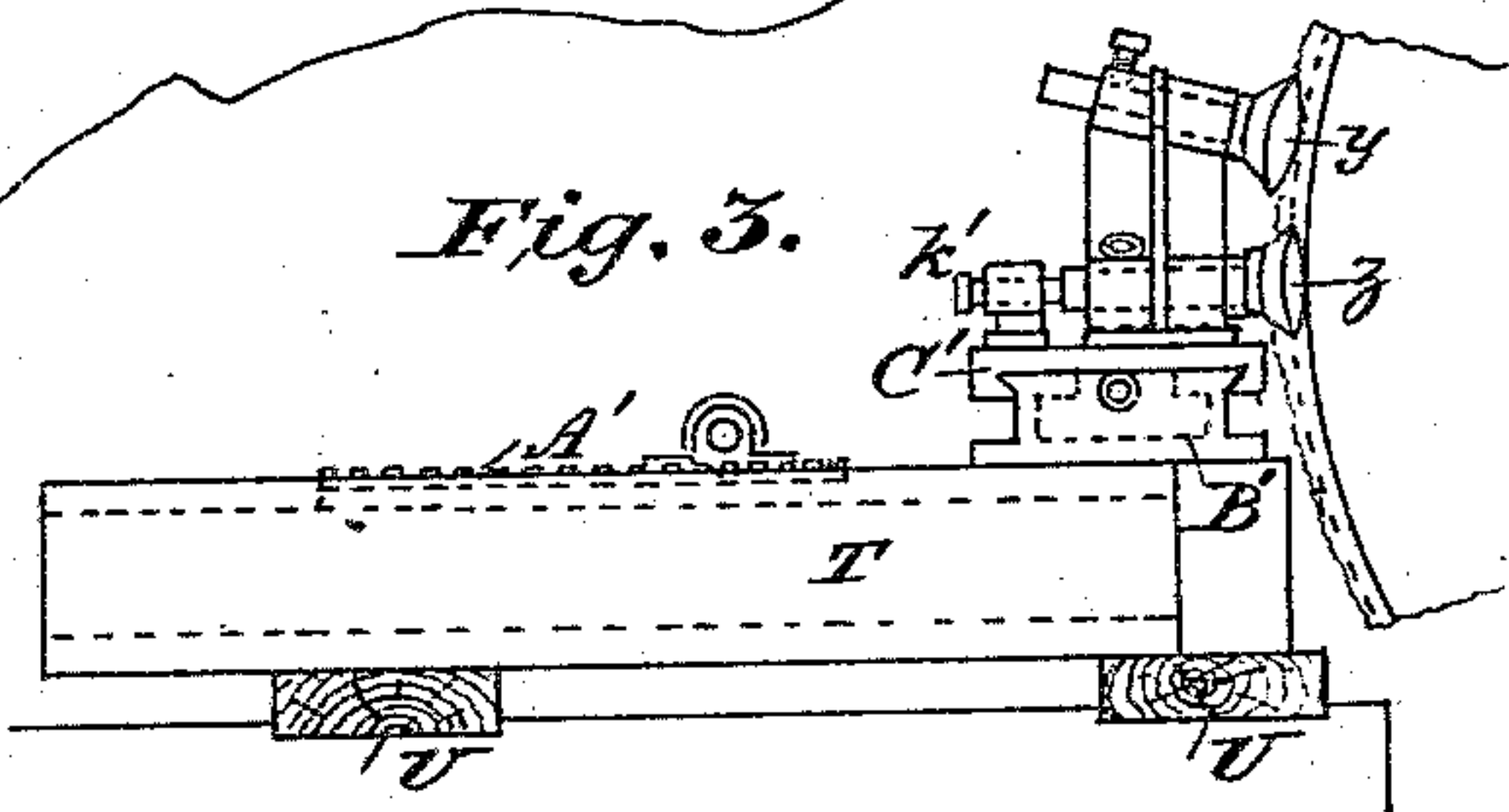


Fig. 8.

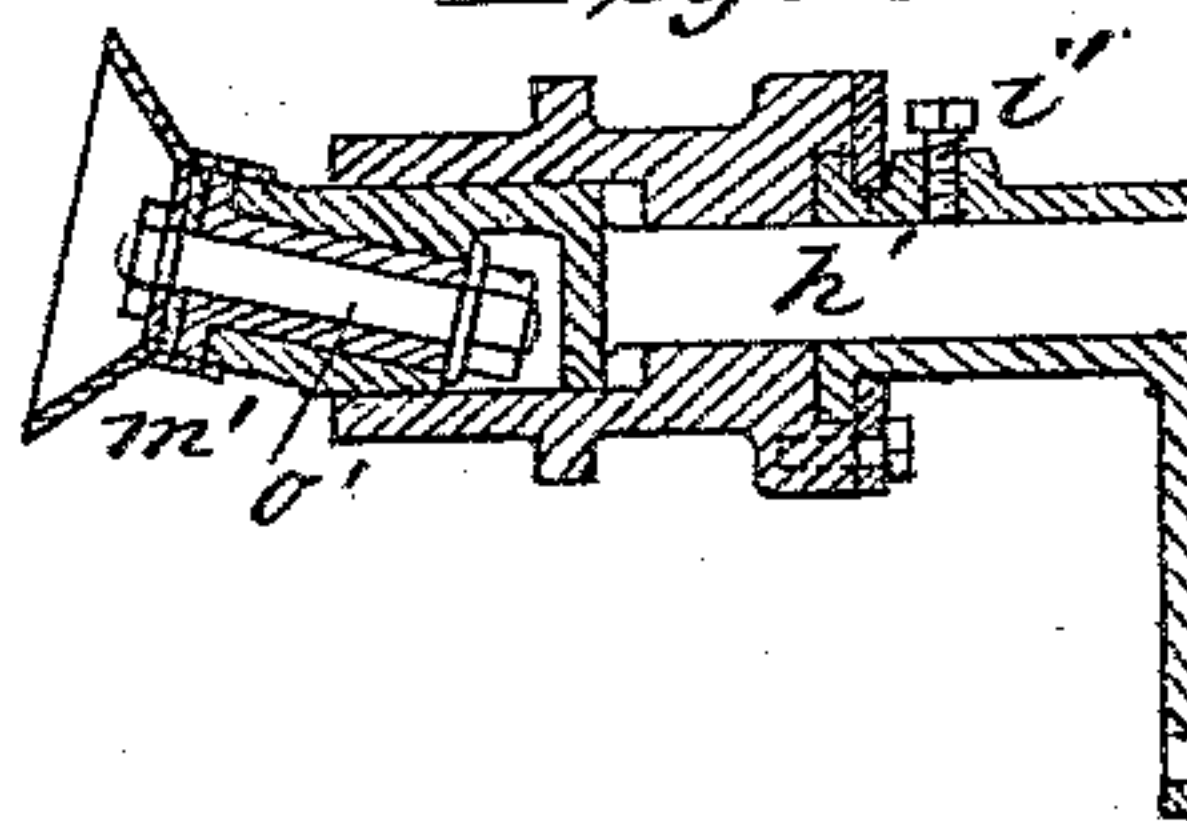


Fig. 4.

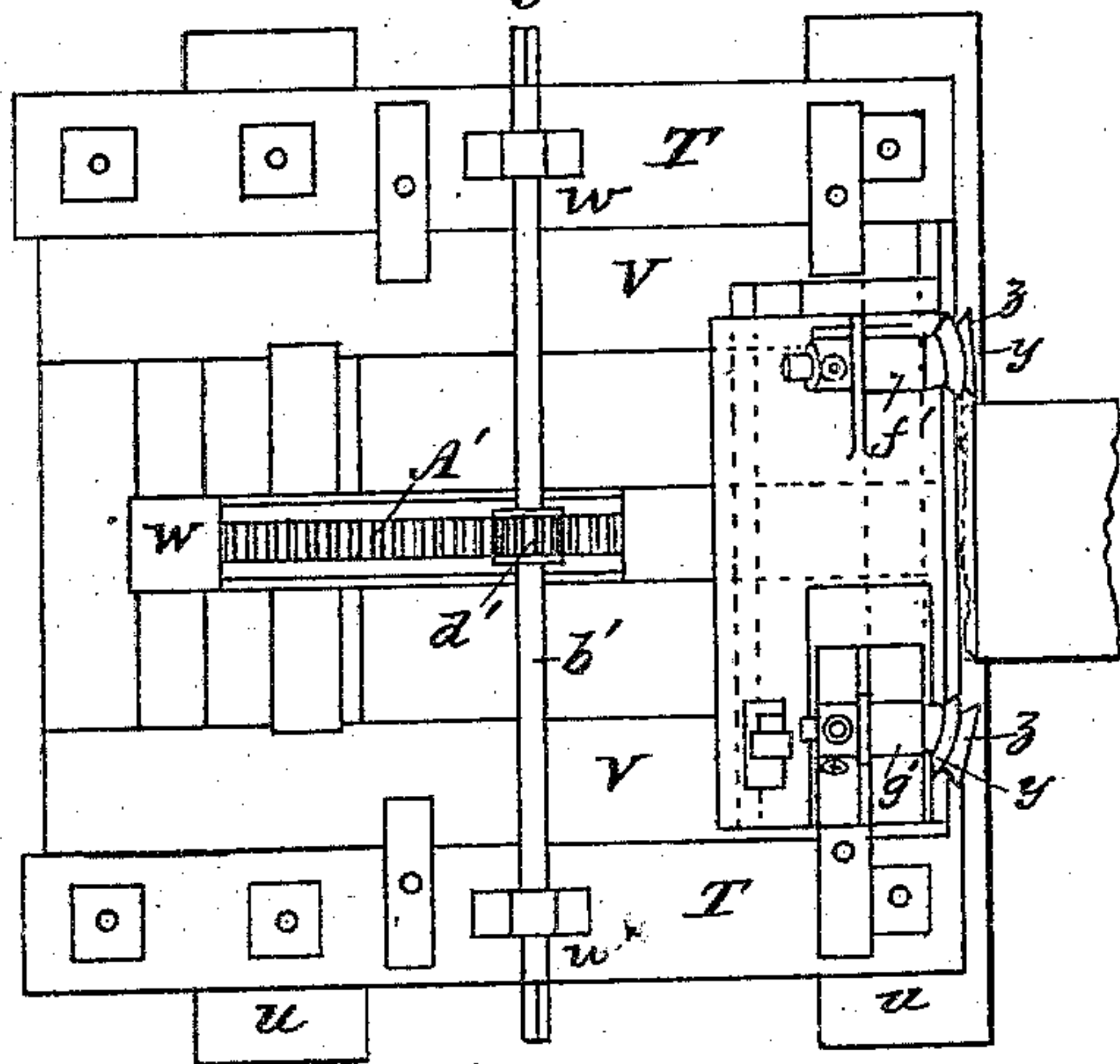


Fig. 6.

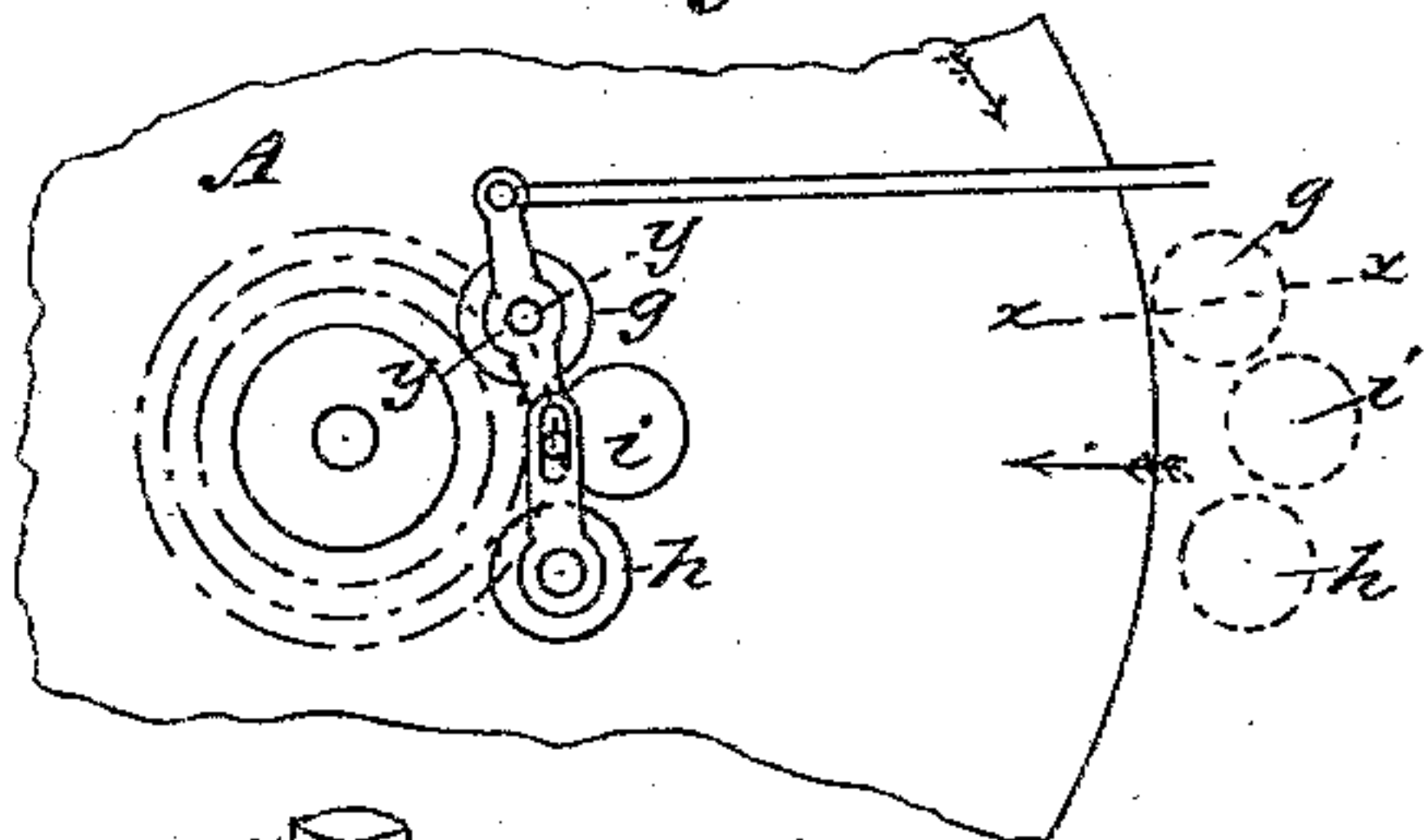
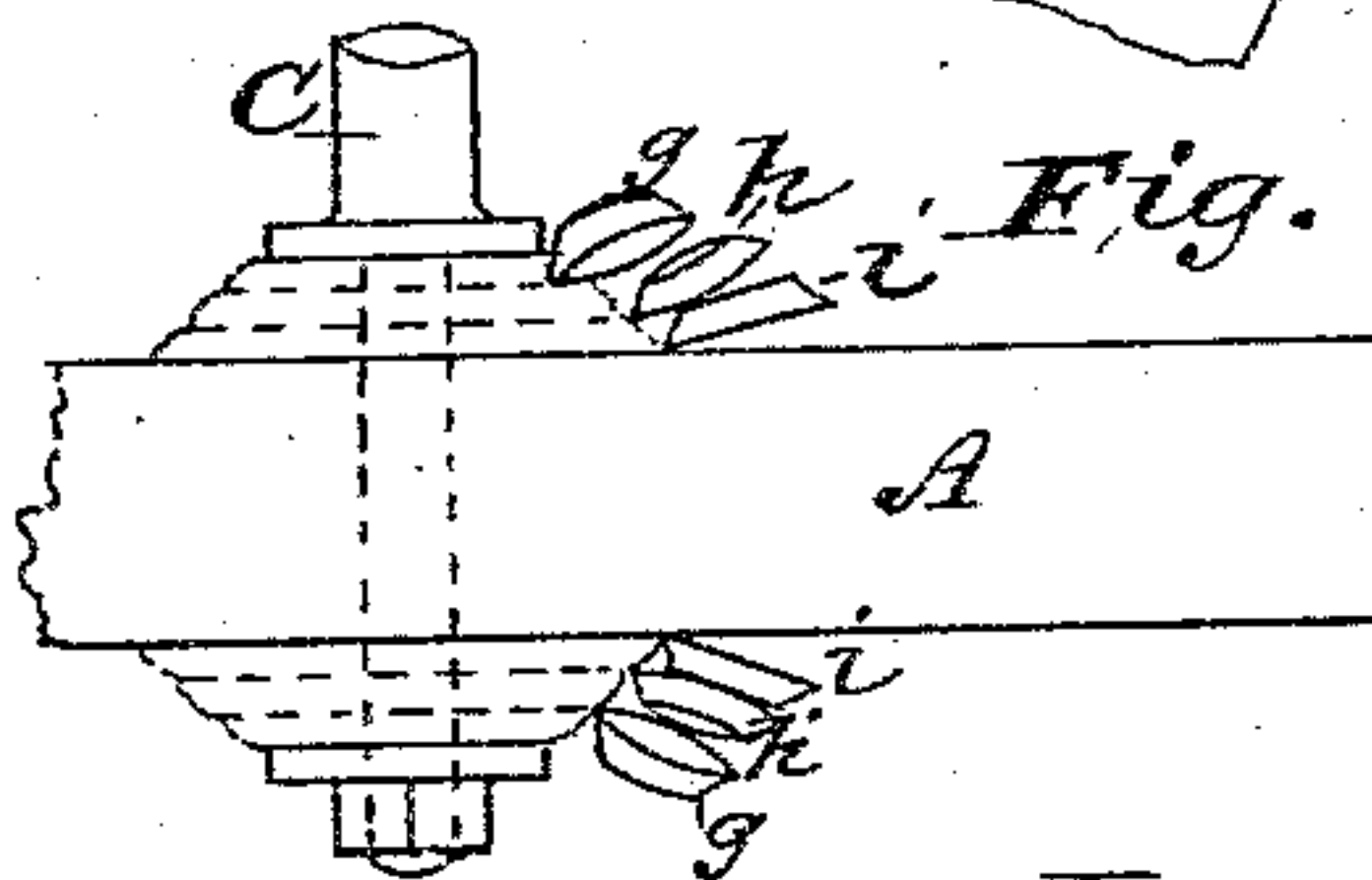


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANK TRIER, OF WESTMINSTER, ENGLAND, ASSIGNOR TO A. C. BALDWIN,
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MACHINE FOR DRESSING GRINDSTONES.

SPECIFICATION forming part of Letters Patent No. 295,081, dated March 11, 1884.

Application filed October 18, 1883. (No model.) Patented in England January 20, 1883, No. 341.

To all whom it may concern:

Be it known that I, FRANK TRIER, a subject of the Queen of Great Britain, residing at Westminster, England, have invented certain new and useful Improvements in Machines for Dressing Grindstones, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements on machines for the manufacture of grindstones, and appertains to that class of machines for which Letters Patent of the United States were granted to me August 29, 1882, No. 263,444, in which circular metallic cutters are used, said cutters being free to turn on their axes when brought in contact with the revolving stone to be dressed, for which I have received Letters Patent in England No. 341 of January 20, 1883.

The object of my present invention is to mount the cutters in suitable adjustable frames with relation to the stone to be dressed, so that said cutters can be brought in contact with the stone at the same or different angles and their relative positions with relation to the axis of the stone to be dressed automatically changed; and to this end my invention consists in mounting the cutters for turning the sides of the stone in sliding or swinging frames adapted to be advanced toward the eye or center of the stone, said cutters being adjustably secured in said sliding or swinging frames with relation to the angle of inclination of the cutters and the depth of cut or kerf intended to be made on the stone, said cutters being also arranged in pairs or groups, each one of which operates on the stone at different points and at different depths—one or more to chip off the rough portions of the stone, while one or more are adapted to finish and true the stone.

My invention consists, further, in mounting pairs or groups of cutters in a separate frame for truing the edge of the stone and making said stone with a plain or straight face, or with a beveled or rounded face.

Referring to the drawings, Figure 1 is a longitudinal view, partly in section, of the mechanism for dressing the sides of the stone. Fig. 2 is a top or plan view. Fig. 3 is a side

elevation of the cutters and cutter-frames used in dressing or truing the edge of the stone, and used in conjunction with the devices shown in Figs. 1 and 2. Fig. 4 is a plan view of Fig. 3. Fig. 5 is a side elevation of a modification, in which the cutter-carrying frames are pivoted and adapted to be swung to and from the center or eye of the stone. Figs. 6 and 7 show a modification of devices for holding the cutters. Fig. 8 is a sectional view of the cutter, cutter-bar, and cutter-holder.

A indicates the grindstone to be made or dressed, which is mounted on a firm and suitable base, B, by means of a spindle or shaft, C, passing through a central eye or opening in the stone. The shaft C is supported in suitable bearings secured to the base B, and is provided with any suitable device for imparting to the stone a rotary motion.

D D are guides which are fixed to the timbers or sills D', between which guides the cutter-carrying frame E is mounted, and adapted to be slid back and forth toward and from the stone to be dressed by means of a screw-shaft, F, working in a nut, a, held in one of the cross-pieces a' of the cutter-carrying frame E. The cutter-carrying frame E is composed of two beams or extended arms, E' and E'', framed or joined together by cross-pieces a'. The inner end of the screw-shaft F is provided with a nut, b, while the outer end of said screw-shaft is provided with a bevel-wheel, c, which meshes with a gear or bevel wheel, d, secured to the inner end of the shaft G. The shaft G is attached to the stationary part of the foundation or guide timbers in suitable brackets, ee, and the outer end of said shaft is provided with two sets of pulleys, 1 1 and 2 2, which are driven by belts from the shaft C, on which the stone is mounted. The belt on the pulleys 2 2 gives the working-speed to the screw F, to feed the cutter-frame forward to the work, while the belt on pulleys 1 1 gives a quick return or reverse motion to the screw F, to rapidly withdraw the cutter-carrying frame from the work.

The projecting ends of the beams E' and E'' carry cutter-holders H and I, with one or more cutters mounted thereon. They are shown in

the drawings as carrying three cutters each; but the number may be varied to suit the size or hardness of the stone. The cutter-holder on the arm or beam E' is mounted on a slide, K, fixed to the end of said beam, and by means of the fixed nut *e'* and screw *f* the cutters are adapted to be moved back and forth on the slide K, to meet the varying thicknesses of the stone to be dressed. The cutter-holder I on the beam E² is shown as a fixture; but it also may be mounted on a slide similar to that on the beam E'. For further and independent adjustment to the face of the stone, each cutter is carried on a cutter-bar, which can be thrust forward or drawn back in its socket, and which will be more fully described with reference to Fig. 8.

g, *h*, and *i* are the cutters, and are arranged in the following order with reference to the stone: *g* takes the first or outermost cut, *h* the next, and *i* the finishing cut. The movement of *i* as the cutter-carrying frame advances is in a radial line toward the center of the grindstone; but this is not the case with the cutters *g* and *h*. It will be understood that as the cutters are inclined more or less to the face of the stone it is imperative, in order to work properly, that the point of contact or cut must lie in or near a straight line passing through the center of the cutter and the center of the grindstone; and it will be seen that in the case of the cutter *g* this line varies as the cutter advances from nearly horizontal line *xx* to the inclined position *yy*, as shown by the lines marked with these letters in Fig. 6. The variation in the case of the cutter *h* is not quite so great. To effect the automatic movement or adjustment of the cutters to the requisite position as the cutter-frame advances, I employ the following devices: L and M are levers or arms secured to the cutter-bars of the cutters *g* *h*. These arms are in turn coupled together by means of a link, *k*, while the arm M is connected by means of the rod *l* to arm *l'* of a bell-crank lever, N, mounted in a bracket, O, which is secured upon and carried by the cutter-carrying frame E.

P P are bars secured to the frame D, and are provided with curved slots or grooves in which the studs *n* on the arm *n'* of the bell-crank lever N move. In the travel of the cutter-frame toward the stone the stud *n* on the arm *n'* of the bell-crank lever follows the upward inclination of the guiding-slot *m*, thus lowering the arm *l'* of the bell-crank lever, pushing the outer ends of the arms or levers L and M forward by means of the rod *l* and link *k*, thus causing the cutters to assume the proper position in relation to the stone. Figs. 6 and 7 show in plan and elevation a modified arrangement of cutters, in which the cutter *g* is above and the cutter *h* is below the center of the stone, and require to be adjusted in reverse direction, which is done by attaching the lever or arm on the cutter-bar of the cutter *g* to the lever or arm on the cutter-bar of the cut-

ter *h*, so that when the arm of the cutter-bar of *g* is thrown in one direction the arm of the cutter-bar *h* will be thrown in a reverse direction.

In Fig. 5 a modification of the cutter-carrying frame is shown. In this instance the cutter-holding frame is pivoted to the bed of the machine at O', and is raised by balance-weights, or by any other convenient means, until the cutters are above the circumference of the stone to be dressed, and in the dressing or working operation the cutters are brought down to the work by means of the worm *p*, working in the toothed segmental rack Q, secured to the base or foundation D'. Motion is imparted to the worm *p* by a worm, *q*, and worm-wheel *r*, and by belt from a pulley, *s*, on axle *o*. The said axle receives its motion by a belt from the shaft C, on which the grindstone is mounted, and by which it is driven. The worm *p* is provided with suitable devices for throwing the same out of gear with the rack Q, so as to allow the cutter-carrying frame to be raised into the position shown in dotted lines in Fig. 5. As in the arrangement shown in Figs. 1 and 2, it is here likewise necessary to turn the cutters *g* and *h* as they descend to the work in order to make them attack the stone in the proper direction. To effect this the levers or arms L and M of the cutter-bars are connected by rods *t* to a lever, R, which is keyed on a rocking shaft, S, on the other end of which is secured another lever R, which is connected by a rod, *u*, to the fixed center *v*, and as the cutter-carrying frame descends the effect of this arrangement of rods and levers is to turn round the cutter-bars into the desired position, as shown by the cutters in dotted lines, near the eye of the stone, as shown in Fig. 5. The part of the machine by which the edge or periphery of the stone is turned is illustrated in Figs. 3 and 4, the former showing a side elevation and the latter a plan view.

T T are wooden beams bolted to the foundation to form a fixed frame, and U are sills, to which the beams T T are secured in any suitable manner. On the sills U are mounted a movable frame, which consists of two side beams, *v*, a central beam, *w*, with cross-ties to connect the side and central beams together.

W W are pedestals bolted to the beams T T, in which is secured the shaft *b'*, upon which is keyed the pinion-wheel *d'*, which gears into the rack A', bolted to the central beam, W, so that by turning the shaft *b'* with a hand-winch or other suitable device, and by which the movable frame carrying the cutters is moved to and from the stone to be dressed within the fixed frame T T. Upon the movable frame is bolted the slide B', which carries the slide-rest C'. *f'* and *g'* are cutter-holders. *f'* is formed in one piece with or bolted as a fixture to the slide C'; but to meet the requirements of stones of varying thicknesses, *g'* is a separate piece, and can be bolted to C' at different distances from the other holder *f'*.

With reference to Fig. 8, I will now describe the cutter-holder.

In the cutter-holders f' and g' are placed the cutter-holding bars h' .

5 i' is a set-screw for holding the bars h' in position.

k' , Fig. 3, is a screw acting on the end of the bar h' , carrying the cutter z , by which it may be allowed to gradually run back out of the
10 cut. The cutters are held on a bushing, m' , within the apertured end of the holding-bars L' by means of a bolt, o' . The aperture in the cutter-bar which receives the bushing is made at an angle, so that by turning the cutter-bar
15 h' the cutter can be placed at any desired angle with relation to the stone.

The operation of dressing the edge or periphery of the grindstone is as follows: The cutters y and z are fixed in position, z being
20 somewhat in advance of y . The stone rotating on its shaft, the slide-rest C is moved on the slide B' , so as to bring the cutters in the holder g' into contact with the stone. The cutters, as soon as brought in contact with the
25 rolling stone, also rotate, rolling on the stone and chipping it off as they advance. When by the movement of C' the cutters are about half-way across the breadth of the stone, the set-screw K is gradually unscrewed, allowing
30 the cutter z to recede from the stone, thus forming a sloping face on the stone. When the cutter z is thus out of cut the movement of C' is reversed, the cutters in the holder f' are brought into play, and commencing from
35 the other side of the stone finish the operation. Single cutters on each side may be employed. I may also employ, in lieu of the separately-mounted cutters, concentric cutters—*i. e.*, two or more conical cutters on the same holder—
40 each being free to rotate on its own axis or bearing. This style of cutter, however, forms the subject-matter of a separate application filed November 6, 1883, Serial No. 110,971. I do not claim in this application a slide and

cutter bar in which the cutter-spindle is set at
45 an angle, so that by the partial rotation of the bar the angle of the cutter can be reversed, as this is embraced in an application filed by me October 18, 1883, Serial No. 109,360. Neither
do I claim a holder for the cutters, composed 50 of a tube or cylinder having an aperture for receiving the bushing of the cutter, and adapted to be turned in its seat to adjust the position of the cutter, as this feature is embraced in an application filed by me November 6, 1883, 55 Serial No. 110,969.

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

1. In a machine for making grindstones, a 60 frame provided with projecting parallel arms carrying slides and cutters, and adapted to be moved toward and from the stone to be dressed, in combination with the journals for the stone-spindle, arranged at right angles to the line of
65 feed of the frame, as set forth.

2. In a stone-dressing machine, a movable frame bearing a series of cutters, said cutters being mounted in the cutter-bars with their
70 axes inclined to the axes of the bars, the cutter-bars being connected by means of arms to a rod which is automatically moved by the forward movement of the frame, whereby the relative positions of the cutters are changed
as they are moved toward the eye of the stone. 75

3. The combination of the cutters g and h , mounted in the cutter-bars, with their axes inclined to the axes of said bars, the pivots of which are provided with arms L and M , and connected together by the bars or links K , with
80 the rods l , bell-crank levers N , guides P , and guide-slots M .

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

FRANK TRIER.

Witnesses:

J. ENGLERT,
K. CHRIST.