

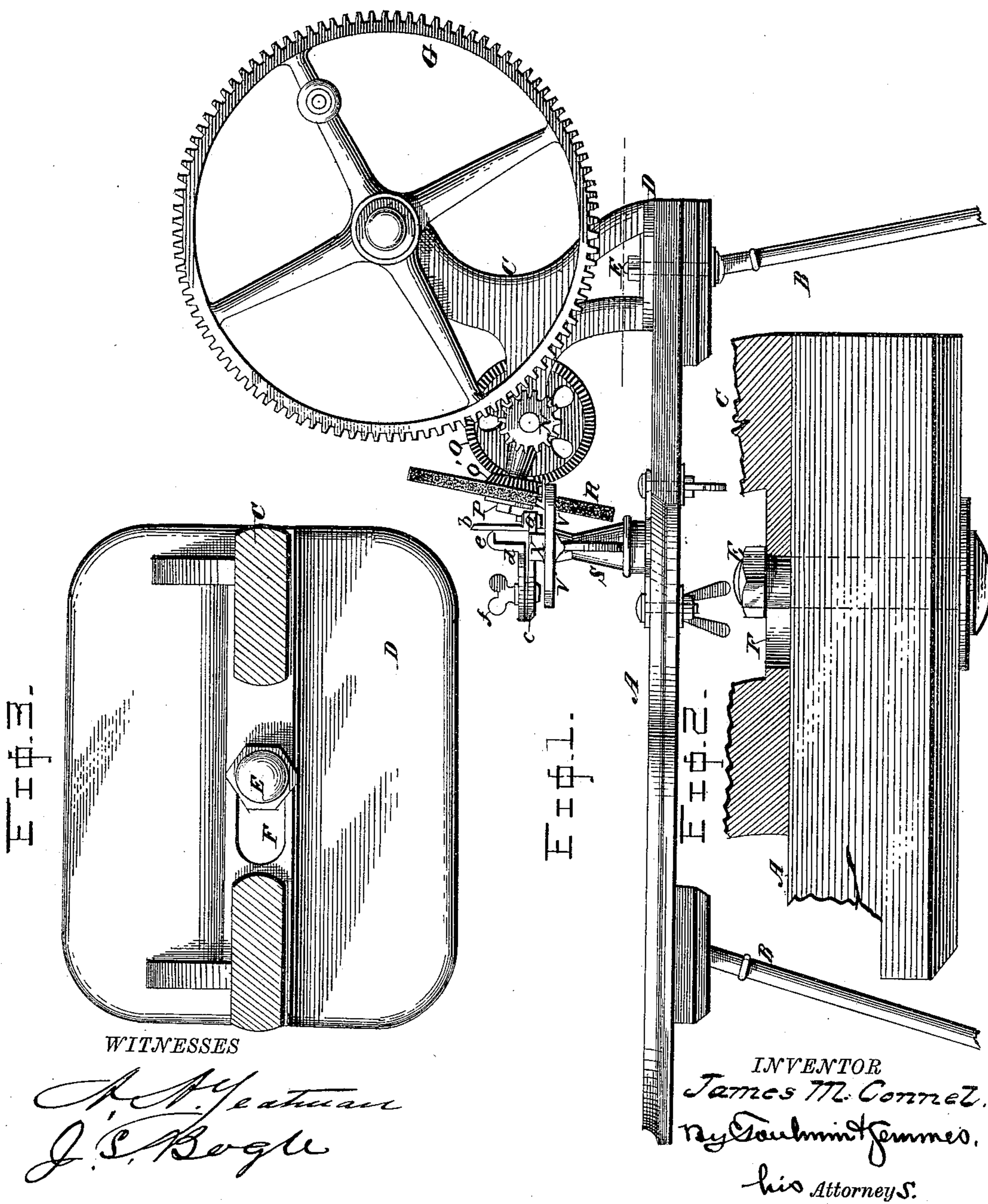
(Model.)

4 Sheets—Sheet 1.

J. M. CONNEL.
SHARPENING MACHINE.

No. 373,517.

Patented Nov. 22, 1887.



(Model.)

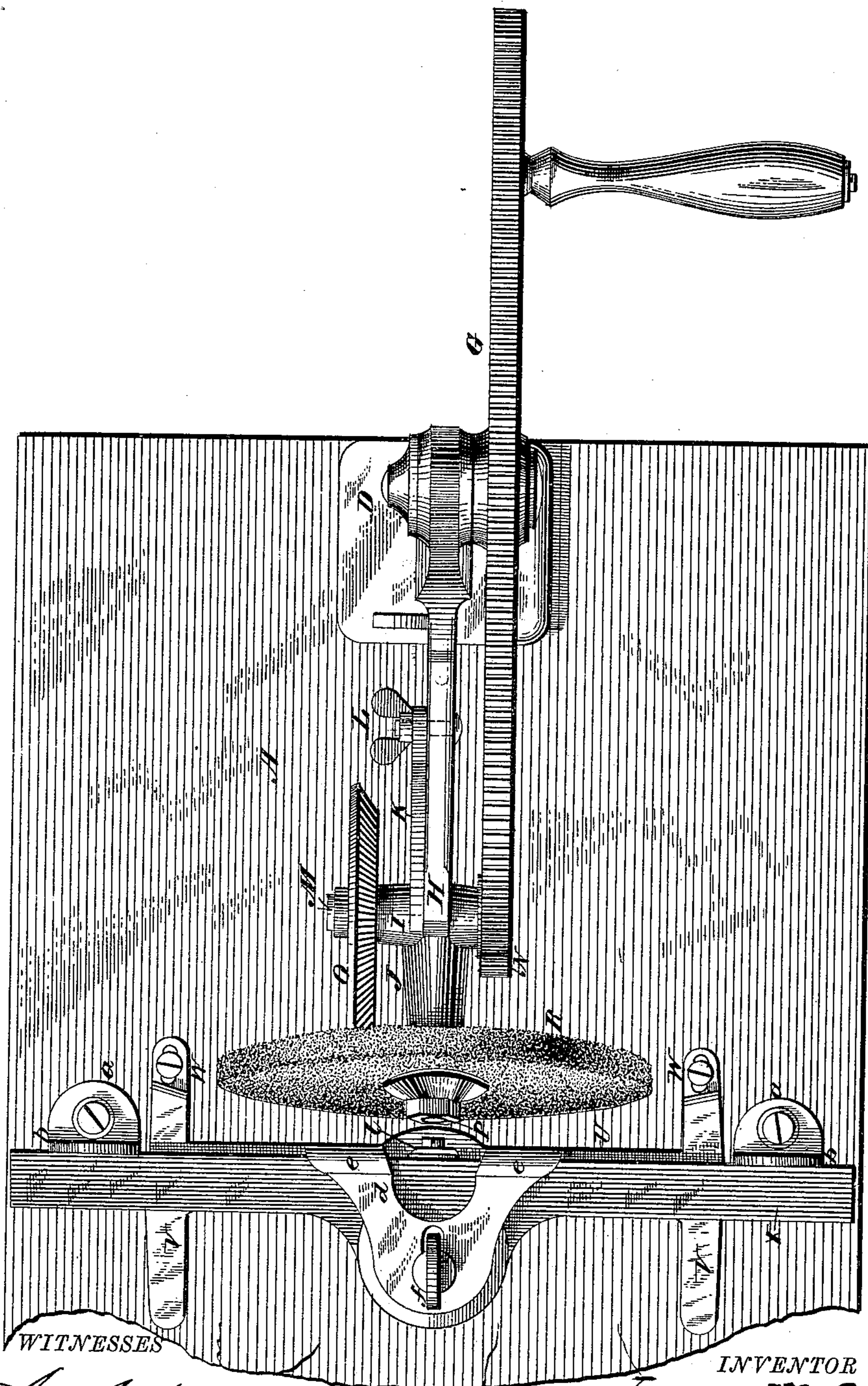
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Fig. 4.



WITNESSES

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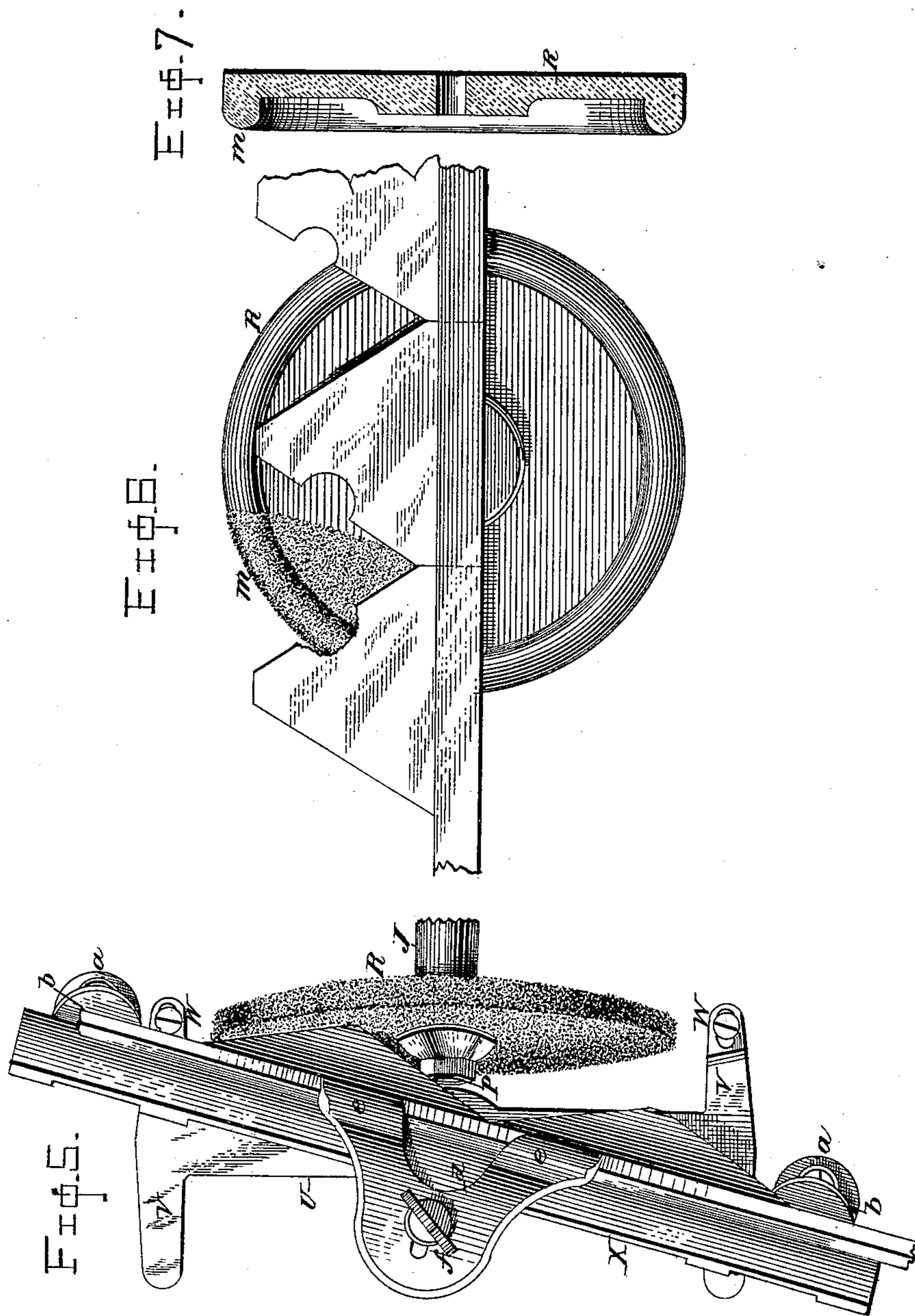
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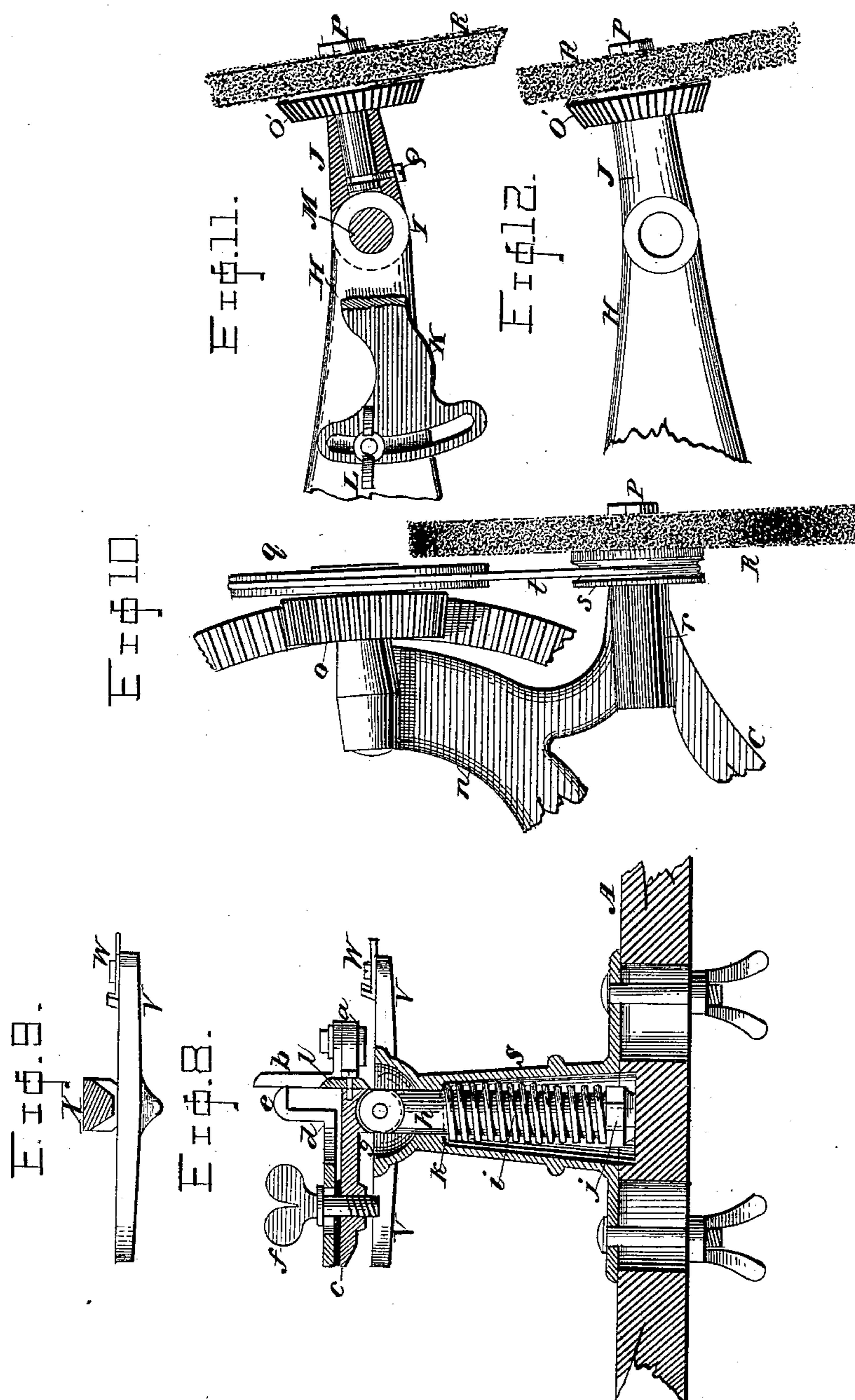
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UNITED STATES PATENT OFFICE.

JAMES M. CONNEL, OF NEWARK, ASSIGNOR OF ONE-HALF TO JAMES S. BOGLE, OF SPRINGFIELD, OHIO.

SHARPENING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 373,517, dated November 22, 1887.

Application filed January 15, 1887. Serial No. 224,444. (Model.)

To all whom it may concern:

Be it known that I, JAMES M. CONNEL, a citizen of the United States, residing at Newark, in the county of Licking and State of Ohio, have invented certain new and useful Improvements in Sharpening-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in sharpening and grinding machines, and is designed with special reference to sharpening mowing-machine knives or sections, and the guards or fingers therefor, whereby the peculiar shape of the knives and the angle of the bevel thereof may be reached by the sharpening-wheel and a fine cutting-edge rapidly and uniformly produced without in any wise losing the original shape of the knives and angle of the bevel, and whereby, also, the edges of the fingers of the finger-bar may be likewise readily reached by the sharpening-wheel.

25 To these ends my invention consists, essentially, in the construction and combination hereinafter described, and pointed out in the claims.

30 In the accompanying drawings, forming a part of this specification, and on which like reference letters indicate corresponding parts, Figure 1 represents a side elevation of my improved machine entire; Fig. 2, a partial sectional and partial side elevation of the mechanism-standard and the table or support; Fig. 3, a partial plan and partial sectional view of the standard; Fig. 4, an enlarged plan view of the machine with one end of the table broken off; Fig. 5, a detached plan view of the knife-bar holder and sharpening-wheel, showing a bar in position and a knife undergoing operation; Fig. 6, a face view of the gap-sharpening wheel, with a bar whose knives are gapped, one of which is being sharpened; Fig. 7, a diametrical sectional view of the gap-sharpening wheel; Fig. 8, a sectional view of the knife-bar-holding device entire; Fig. 9, a section of the movable member thereof and an elevation of the fixed member; Fig. 10, a side elevation of a portion of the operating mechanism and of the sharpening-wheel, showing a modification of the means of transmit-

ting motion; Fig. 11, a sectional and side view of the standard and the adjusting-arm which carries the sharpening-wheel, and Fig. 12 a view showing the standard and the arm which supports the sharpening-wheel shaft in one piece.

55 The letter A designates a table or support, constructed, preferably, of wood and fashioned at one end to form a seat, suitable legs, B, being provided to sustain it at a proper height. Upon this support is adjustably mounted a metallic standard, C, of such configuration as to afford bearings for the several shafts of the operating mechanism and sharpening-wheel. The base D of the standard is held to the support by a bolt and nut, E, a slot, F, admitting of adjusting the standard to and from the knife-bar holder, so as to remove and replace the sharpening-wheel, as occasion may require. This means of fastening also admits of swinging the mechanism round into a convenient position for bringing the guards or fingers of the finger-bar into engagement with the sharpening-wheel for the purpose of sharpening them at their sides, where the slots occur through which the blades or sections work. It may be observed in this connection that the guards or fingers should be kept sharp, as well as the knives, in order to prevent them from becoming clogged and reducing the full capacity of the mowing-machine. Sharp guards also lessen the horse-power required to draw the mower.

85 In the standard C is mounted the shaft of the driving gear-wheel G, having a handle by which it is revolved by hand. The end H of the standard is bored to receive the shaft M, (presently to be described,) and is rounded off at its end to fit into the rounded open slot in the hub I of an arm, J. This arm is held and adjusted to different positions by the slotted extension K, projecting from the hub I, (see Fig. 4,) and the set-screw L, passed through a slot in the extension K and an opening in the standard. By this means the sharpening-wheel is adjusted and held at varying declinations relative to the knife-bar holder, for the purpose of enabling that holder to more readily present the bevel and incline of the cutting-edge of a knife to the wheel, irrespective of the particular angle of the edge or bevel of the

knife. The shaft M passes through the hub I and the end H of the standard and forms a fulcrum for the hub. This shaft carries a pinion, N, which meshes with the gear-wheel G, and also carries a bevel-pinion, O, by which motion is transmitted to a pinion, O', on the sharpening-wheel shaft P, having a bearing in the arm J. This shaft is retained against longitudinal movement, as by a groove therein and a screw, Q. (See Fig. 11.)

The sharpening-wheels R are of two shapes, and are preferably of emery, whose well-known abrasive or cutting qualities render it peculiarly applicable to my purposes. These wheels, as already intimated, are secured rigidly on the shaft P, being interchangeable, according to the work to be done. It will be perceived at once that the relative sizes of the gear-wheel and the several pinions will greatly multiply the speed of rotation of the sharpening-wheel over that of the driving-wheel, whereby the speed best adapted to secure the full capacity of abrasive wheels is obtained.

I will now advert to a description of the knife-bar holder. This consists of a hollow pedestal, S, having a flanged lower end adjustably held to the support A by bolts passing through slots in the same, the adjustment being to set the holder the proper distance from the wheel, the standard C, as already noted, being also adjustable. From opposite sides of the pedestal extend T-arms U, to the cross ends V of which are secured the adjustable stops W, which determine the swing of the movable member of the holder. This member consists of a bar, X, having lips *a*, to which are bolted stops *b*, against which the knife-bar fits when placed upon the member X. A wing, *c*, extends from about the middle of the member X, and upon it is mounted a clamp, *d*, having lugs *e*, which set over the edge of the knife-bar and hold it firmly upon the said member, the clamp itself being held by a binding-screw, as *f*. A slot in the clamp allows it to be set to suit the thickness of different knife-bars.

A lug, *g*, depends from X, and is pivoted to the upper end of a longitudinally-yielding stem, *h*, having a spiral spring, *i*, coiled about it, and a shoulder or nut, *j*, against which the spring acts, its other end bearing upward on an interior shoulder, *k*, of the pedestal. This stem *h* is also capable of turning in the pedestal, and therefore the movable member X can be moved at its ends in the arc of a circle, as suggested by comparing Figs. 4 and 5, so as to bring the inclination of the cutting-edge of the knife coincident to the face of the sharpening-wheel. The other movement of the movable member is a rocking movement to bring the bevel of the knives flatly against the face of the wheel, and it is this declination of the bar-holder to the face of the wheel and the readiness with which the operator can hold it in this position that preserves to the blades, no matter how frequently sharpened, the same bevel that they originally have, and avoids all

rounding of that bevel, which at once seriously affects the capacity of the knives.

In Fig. 5 I have illustrated a knife-bar holder and the movable member of the holder swung toward the wheel at one end, so as to bring the incline of the cutting-edge against and in alignment with the face of the wheel, and also rocked or tipped toward the wheel, so as to secure the proper declination between that member and the wheel-face to present the bevel flatly against the said face. This double movement of the member X of the holder and the various adjustments already alluded to make the machine capable of sharpening any size and shape blade and of preserving the original bevel, irrespective of the angle thereof. To prevent the possibility of the knives losing their temper from heating I swing first one end and then the other of the member X toward the wheel, so as to partially grind first one knife and then the other. As the knives are thus sharpened the bar is moved along the holder until all the knives are sharpened. A stop, *l*, of the member X serves the same function as the stops *b* when the bar is so far along that a stop *b* no longer guides it. The arm J may be a continuation of the end H of the standard C, instead of being adjustable, as seen in Fig. 12.

In Fig. 6 I have shown the other form of sharpening-wheel, in which *m* designates the gap or nick sharpening surface, being an annular bead formed on the wheel and approximately semicircular in cross-section. The figure shows two gaps of different sizes already sharpened and another undergoing operation. This is a great advantage, for it is found that the blades cut as well, or nearly so, when gapped as when regular, provided the gaps are sharpened and are of the same bevel as the knife generally. I am not aware that this sharpening of gaps and preserving the bevel of the knives has ever been accomplished by any other machine; therefore I would clearly be understood as not confining myself to the details of construction shown and described, for these may be largely varied without departing from my invention.

In Fig. 10 I have illustrated an equivalent manner of operating the sharpening-wheel to the way shown in the other figures. This modified construction consists in providing the standard C with a portion, *n*, which carries the shaft of a pinion, *o*, arranged to mesh with teeth in the side, instead of the periphery, of the driving-wheel G, and which pinion or its shaft also carries a belt-pulley, *q*. The standard also has a portion, *r*, in which is mounted the sharpening-wheel shaft P, having a smaller belt-pulley, *s*, over which passes the belt *t*. Thus a high speed is given the sharpening-wheel.

Referring back to the spring-actuated stem, I would observe that the spring acts to draw the knives quickly away from the sharpening-wheel when the operator relieves the pressure. Again, in sharpening gaps I do not change

in any wise the angle or shear of the cutting-edge of the knives. This is important in practice, because if the angle is changed or the edge hollowed out the knife becomes deficient.

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

1. In a sharpening-machine, the combination, with a sharpening-wheel and its operating mechanism, of a knife-bar holder secured near the wheel and composed of a pedestal, and arms having bar-stops, and of a movable bar and clamping devices, and a joint connecting the said bar with the pedestal, and having a spring which exerts a downward pressure, whereby the movements of the bar with respect to the pedestal are substantially of the character described.

2. In a sharpening-machine, the combination, with a support which forms a seat, a standard thereon, a driving-wheel, a sharpening-wheel, and intermediate gearing to increase the sharpening-wheel speed over the driving-wheel speed, mounted in said standard, of a knife-bar holder composed of a pedestal secured to that support, and having arms and stops and a yielding and rotatable pressure-held stem, and a movable member pivoted to the stem, having bar-stops and clamping devices and capable of swinging to and from the wheel and of tipping back and forth.

3. In a sharpening-machine, the combination, with a sharpening-wheel having an annular bead forming a gap-sharpening portion, and operating mechanism for the said wheel, of a knife-bar holder, a portion of which is composed of a movable member, and a joint which connects said member with the fixed portion and allows it to swing to and from the wheel and to tip back and forth.

4. In a sharpening-machine, the combination, with a standard and an arm pivoted thereto and having a projection extending rearward from its pivotal point, and a device to secure it adjustably to said standard, of a shaft carried by said arm, and a sharpening-wheel mounted on said shaft and standing sub-

stantially at a right angle to said arm, a driving-wheel whose shaft is mounted in said standard, and intermediate gearing mounted upon the fulcrum of said arm, and arranged to transmit motion from the driving-wheel to the sharpening-wheel, whatever be the adjustment of the latter, whereby the face of the sharpening-wheel may be presented at different angles with respect to a perpendicular, and motion be imparted to said wheel.

5. In a sharpening-machine, the combination, with a sharpening-wheel set with its face at an angle to a perpendicular, and mechanism to rotate it, of a knife-bar holder a part of which is composed of a movable member, and a joint between the movable member and fixed portion, which allows the movable member to swing to and from the wheel and to tip back and forth, for the purpose described.

6. In a sharpening-machine, the combination, with a sharpening-wheel having mechanism to rotate it, set with its face at an angle to a perpendicular, and having an annular bead forming a gap-sharpening portion, of a knife-bar holder having a movable member capable of swinging to and from the wheel and of tipping back and forth, whereby the gap is sharpened with the same bevel as the knife generally.

7. In a sharpening-machine, a knife-bar holder composed of a hollow pedestal having T-arms carrying adjustable stops, a stem within it, a spring which acts downward upon the stem, and a movable member consisting of a bar pivoted to said stem and having a clamp near the middle, end stops, and intermediate stops.

8. In a sharpening machine, a gap-sharpening wheel composed of abrasive material and having an annular bead on the face thereof approximately semicircular in cross-section.

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

J. M. CONNEL.

Witnesses:

J. S. BOGLE,

A. A. YEATMAN.