(No Model.) 2 Sheets—Sheet 1.

C. KOEGEL.

GRINDER.

No. 468,350. Patented Feb. 9, 1892.

Fig. 1.

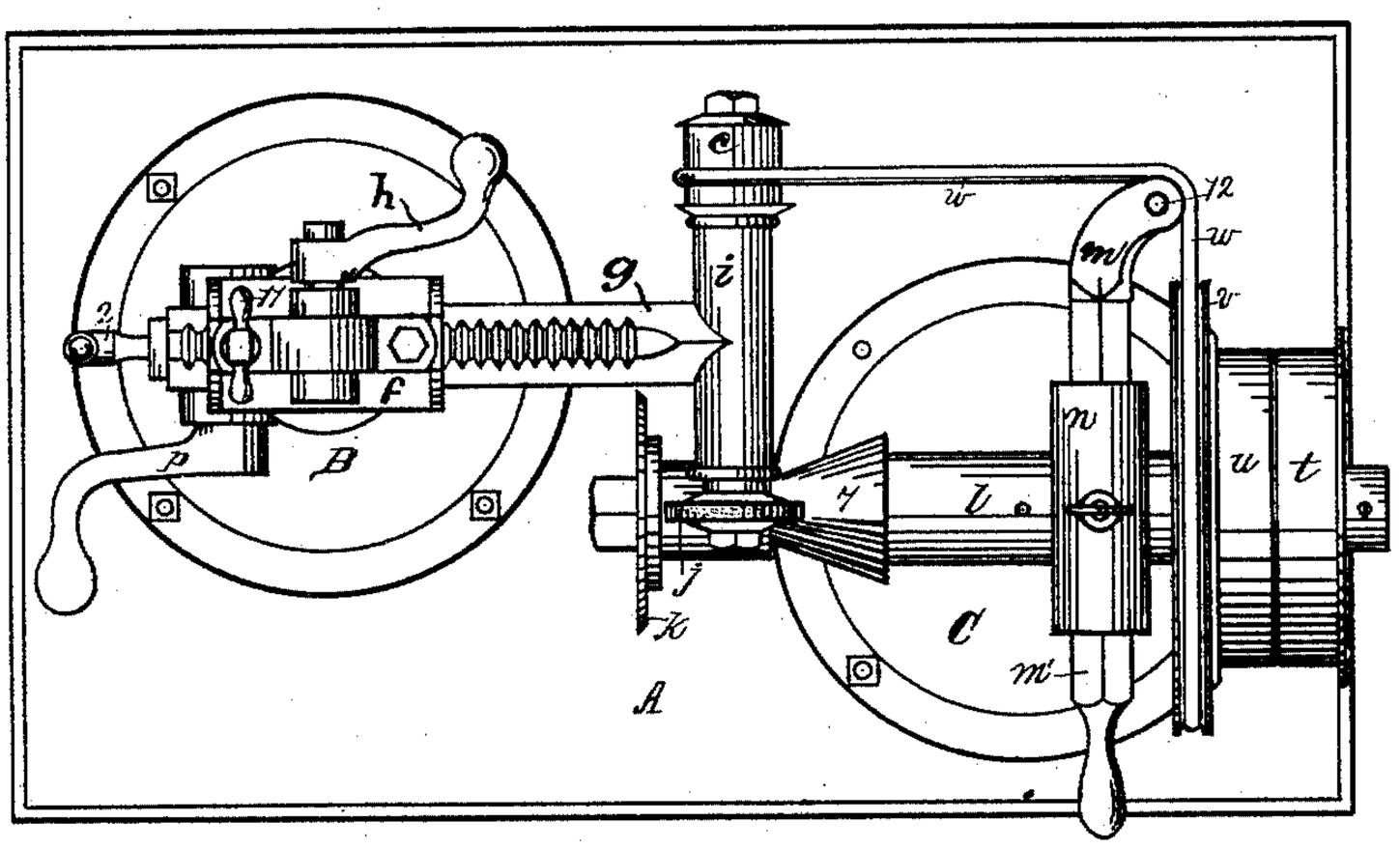
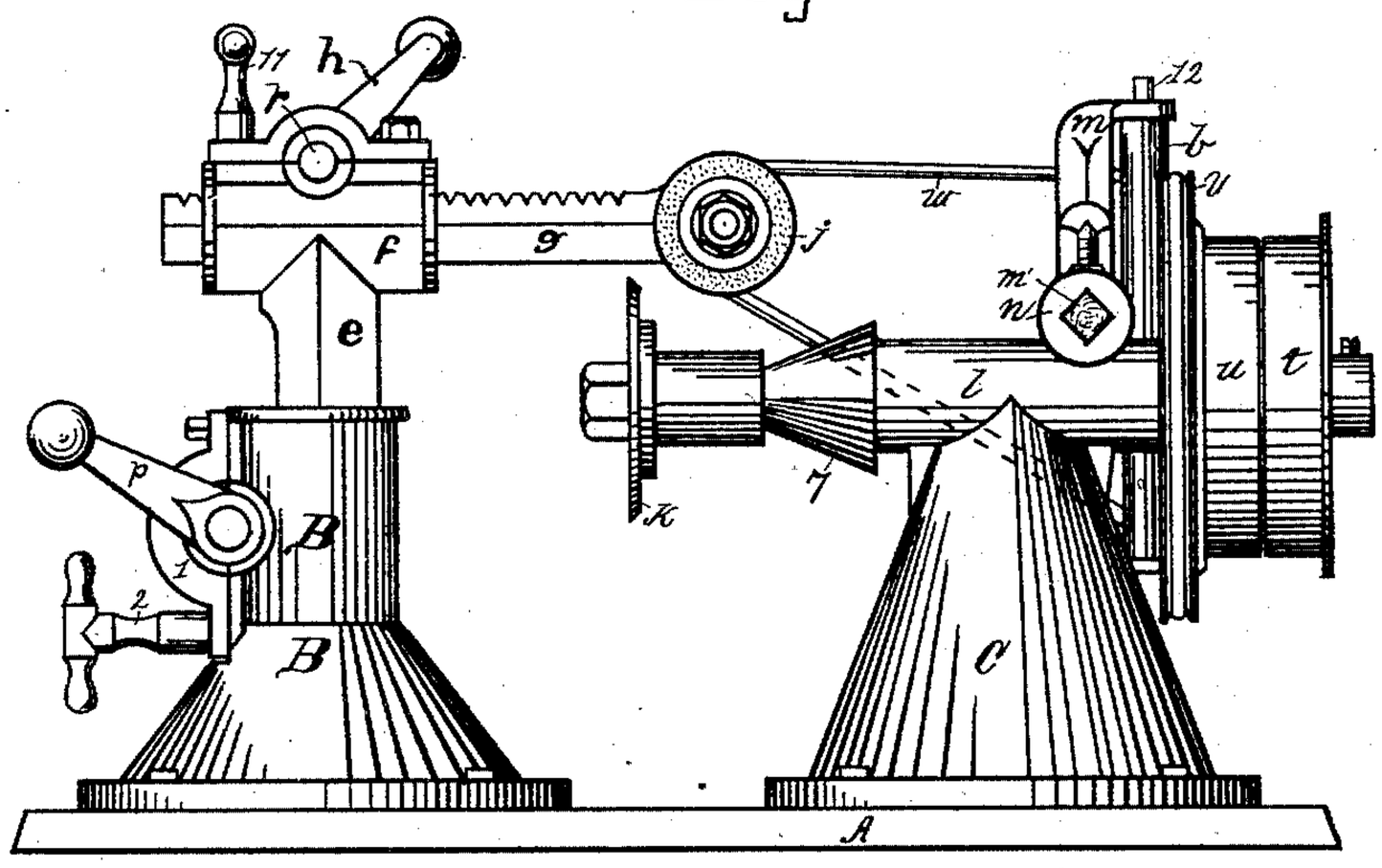


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

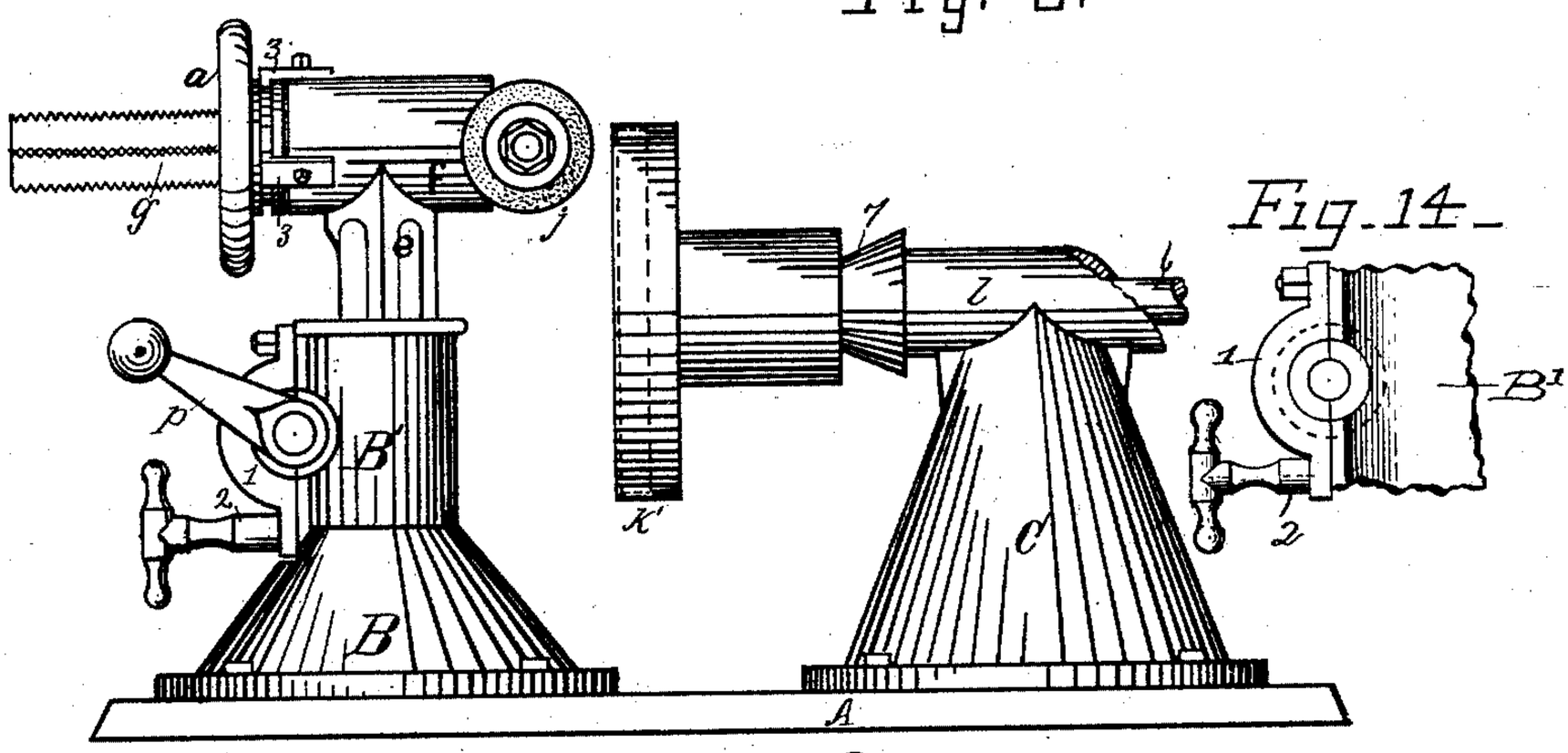

Fig. 14.

Fig. 4.

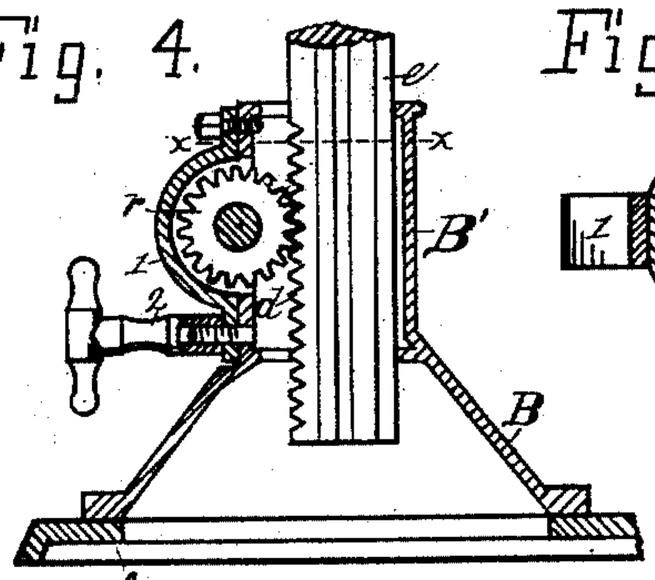

Fig. 5.

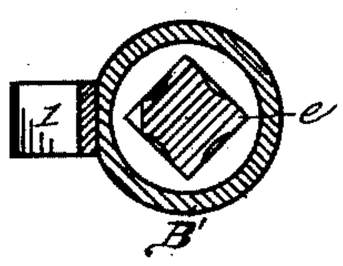

Fig. 6.

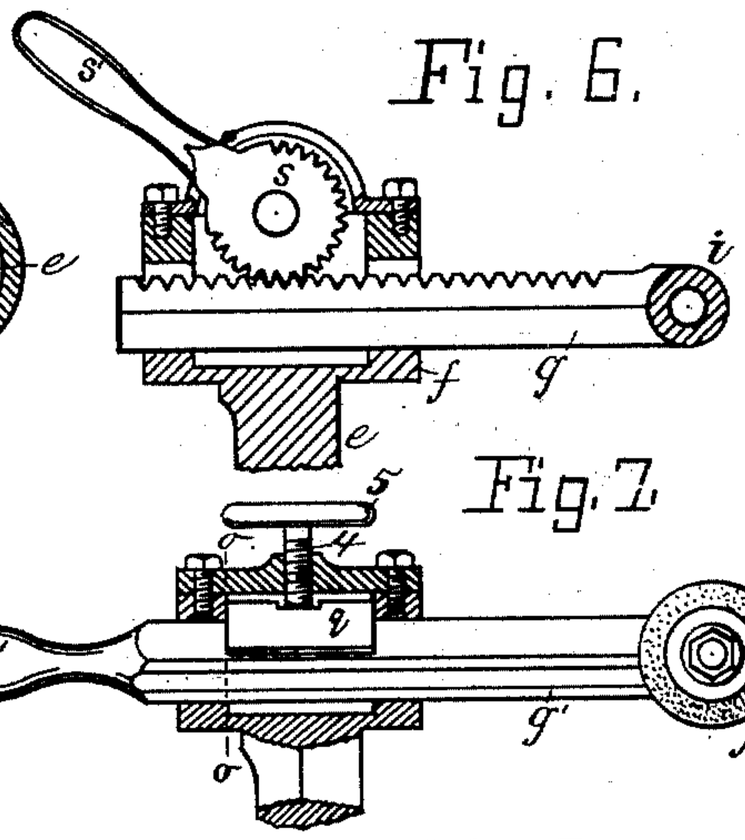

Fig. 7.

Fig. 8.

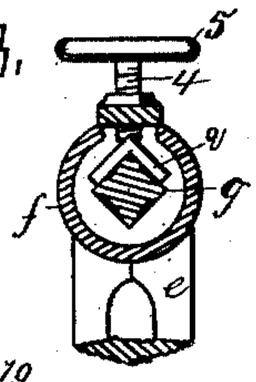

Fig. 11.

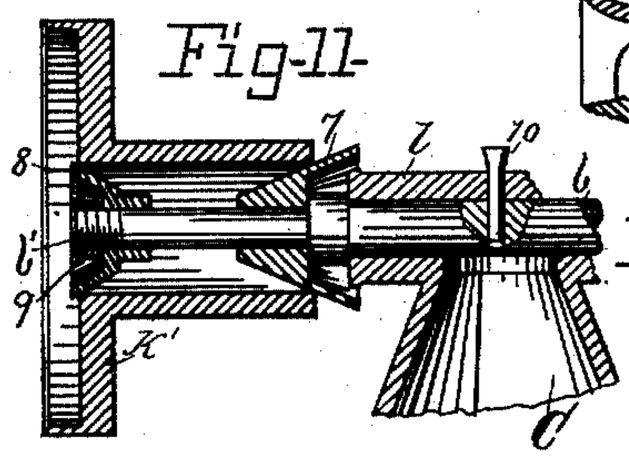

Fig. 10.

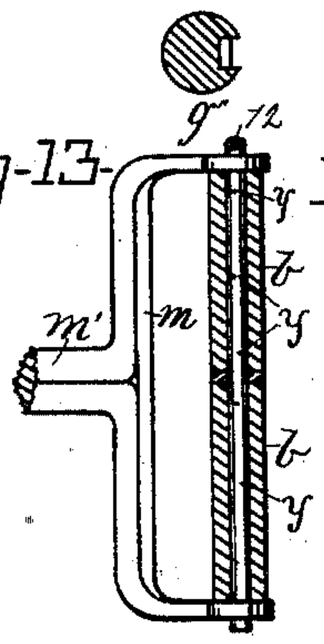

Fig. 9.

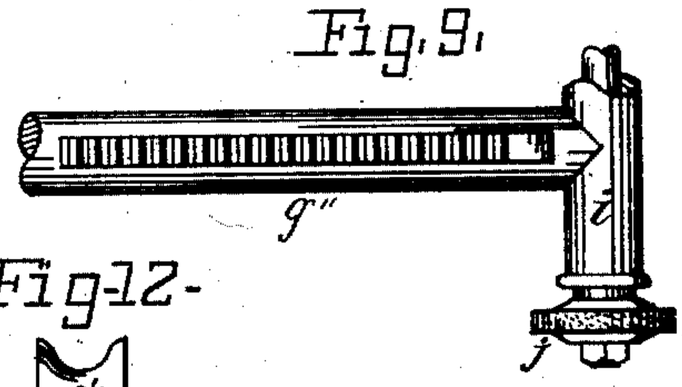

Fig. 13.

Fig. 12.

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CHARLES KOEGEL, OF HOLYOKE, MASSACHUSETTS.

GRINDER.

SPECIFICATION forming part of Letters Patent No. 468,350, dated February 9, 1892.

Application filed December 8, 1890. Serial No. 373,870. (No model.)

To all whom it may concern:

Be it known that I, CHARLES KOEGEL, a citizen of the United States of America, residing in Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Grinders, especially designed for sharpening slitters, of which the following is a specification, reference being had to the accompanying drawings, and letters and figures of reference marked thereon.

In said drawings, like letters and figures of reference indicating like parts, Figure 1 is a plan view of my improved device, illustrating the employment of the same in the grinding of cutters having a disk blade. Fig. 2 is a side elevation of the same. Fig. 3 is a side elevation of the same device, illustrating its application in the grinding of cup-shaped slitters or cutter-blades. Fig. 4 is a side view in section of the grinder-supporting standard. Fig. 5 is a plan view in section of the same, taken on line *x x* of Fig. 4, the gear and lever being removed. Fig. 6 is a side view in section of the box which supports the supporting-bar on which the grinder-shaft is mounted, illustrating a modification in the arrangement of the lever. Fig. 7 is a like view illustrating another modification wherein this bar is moved without the employment of gears and a different locking device is used. Fig. 8 is an end view in section of the same, taken on line *o o*, Fig. 7. Fig. 9 is a plan view of a portion of this bar, illustrating a modification wherein the same is made round and provided with teeth which are below the surface. Fig. 10 is a sectional end view of the bar. Fig. 11 is a side view in section of a cup-shaped slitter mounted upon its shaft, illustrating the manner of securing the slitter in position and of holding the shaft while locking the slitter in place. Fig. 12 is a side view of a modification in the pulley mounted upon the grinder-shaft; and Fig. 13 is a detached view of the idler-support, showing the idlers in section and illustrating the preferred form of shaft for the idlers. Fig. 14 is a side view of a section of the supporting-standard B, showing the means for locking the gear-shaft by clamping the box thereon.

Referring now to the drawings in detail, A indicates a base; B, a supporting-standard for the grinder-wheel mechanism; C, a supporting-standard for the cutter-supporting shaft and parts attached; *e*, a vertical shaft or support, upon which box *f* is mounted; *f*, a box which supports the movable bar upon which the grinder-shaft is mounted; *h*, a lever by which the bar *g* is moved; *i*, the grinder-shaft support; *j*, the grinder; *k*, a disk cutter; *k'*, a cup-shaped cutter; *l*, the cutter-shaft support mounted upon standard C; *m*, idler-carrier; *n*, support for the same; *b*, idler-pulleys; *p*, a lever adapted to vary the height of the grinder-supporter mechanism; *r*, a gear adapted to be moved by lever *p*; *s*, a gear mounted in box *f*, adapted to move bar *g*; *t*, a loose pulley; *u*, a tight pulley; *v*, grinder-shaft-driving belt, and *q* a binding-cap.

The construction shown in Figs. 1 and 2 illustrate the device as preferably arranged for the grinding of disk cutters. The standard C is provided with a box *l*, suitably bored to receive a shaft, upon which shaft at the outer end is mounted the fixed pulleys *u* and *v* and the loose pulley *t*, and its opposite end is adapted to have the cutters mounted thereon while undergoing the grinding or sharpening operation. The pulley *u* is employed as a driving-pulley, and through this motion is given to both the cutter and the grinder. The loose pulley *t* is employed in the usual manner to carry the belt while the machine is at rest. Within the standard B is mounted a support or vertical shaft *e*, adapted to be moved up and down, as required. This motion is produced through the action of a gear *r*, mounted in a suitable support and to which is attached a lever *p*. The shaft *e* is provided at one side or edge with teeth *d*, (see Fig. 4,) which mesh with the teeth on the gear *r*. It will therefore be seen that the rotation of the gear *r* will cause the shaft *e* to be moved up or down, as required. The shaft *e* may be fastened or locked in fixed position in any convenient manner.

In Fig. 4 I illustrate one method of locking the same, it consisting of a cap 1, which covers the gear and projects downward at both sides to bear against the gear-shaft, and a set-screw 2 being provided, which clamps the cap against the gear-shaft and locks the same in position. This shaft, however, is shown in the drawings to be locked in position by the ap-

pliances hereinafter described or by any other convenient mechanism. Upon the vertical shaft *e* is mounted a box *f*, within which is supported the shaft or bar *g*, this being also preferably provided with teeth in its upper surface, which mesh with like teeth on a gear mounted in box *f*, which gear being provided with a crank-arm or lever (similarly to the gear *r*, adapted to raise and lower the vertical shaft *e*) enables me to move the shaft *g* back and forth, as required in the operation of the device.

The lever which operates the gear in box *f* to move the bar *g* and also the lever which operates the gear *r*, which operates to move the vertical shaft *e*, may be made integral with the gear, as illustrated at *s s'* in Fig. 6, and if a box be employed to cover and protect the gear it may be slotted to allow the free passage of the arm or lever *s'*, as indicated in Fig. 6 of the drawings.

In some instances where light work is to be performed the gear and lever may be dispensed with and the bar *g* be provided with a handle *g'*, as shown in Fig. 7, or the rear portion of the bar *g* may be threaded and a hand-wheel *a* mounted thereon, as shown in Fig. 3, the wheel *a* being interiorly threaded and provided with a projecting flange held in position against the box *f* by clamp-pieces 3, which engage the flange on wheel *a*. A like wheel may also be arranged on the vertical shaft *e* and the teeth and gears be dispensed with.

I prefer that the vertical shaft *e* and bar *g* be made substantially square, with the portions at each side between the edges cut away to enable me to more readily make a suitable fit and avoid friction, thus giving a bearing only at the corners and effectually overcoming any tendency to turn in their respective supports. These parts may, however, be made round, as illustrated in Fig. 7, or any other shape may be employed.

As a modification in the method of locking the adjustable parts in position, I show in Figs. 7 and 8 a cap or clamp *q*, arranged to bear against the bar or shaft, and a set-screw 4, having a hand-wheel 5 arranged to bear against the cap or clamp *q* and bear the same against the part to be locked in position. At the end of the bar *g* I provide a bearing or box *i*, (see Figs. 1 and 9,) in which is mounted the revolving shaft which carries the grinding-wheel at one end and is provided at its opposite end with a pulley *c*. Suitable oil-cups may be provided to lubricate the moving parts.

The standard C is provided with a bearing or box *l*, through which the shaft carrying the cutter passes, the cutter being mounted at one end and the pulleys *t u v* at the opposite end.

As the central openings in the cutters and their hubs are of varying sizes, I make the cutter-shaft small enough to accommodate cutters having the smallest openings and provide two cone-shaped collars 7 8, (see Fig. 11,) which fit the shaft, and entering the openings in the cutters and cutter-hubs will maintain the same in exact central position. I prefer that the outer cone-shaped collar 8 be recessed to receive the nut 9 and lie below or flush with its outer face, thus avoiding its projecting into the plane of the grinding operation and avoiding danger of the grinder being brought in contact with any of the mechanism, which otherwise might result during the moving and adjusting of the grinder. Above the box *l* I arrange a box *n*, mounted on box *l* to support and allow a free sliding movement of the stem or shaft *m'* of the idler-frame *m*, a set-screw being arranged in the box *n* to lock the stem or shaft *m'* in the desired position. The idlers *b* are mounted in the idler-frame *m*. (See Figs. 1 and 13.) The belt *w*, which is arranged to drive the grinder, passes around the grooved pulley *v*, over the idlers *b*, and around the pulley *c*. The shaft on which the idlers are mounted is preferably made hollow, and is provided with small openings *y* to allow the oil which is deposited in the tubular shaft to pass out and lubricate the bearings of the idlers.

The operation of the device will be readily understood. The cutter being first mounted upon its shaft and the idler-supporting frame moved back to slacken the grinder-belt *w*, the desired vertical position of the grinder is fixed by raising or lowering the vertical shaft *e*, after which this shaft is locked in position. The desired horizontal position of the grinder is next found by moving the bar *g* until the periphery of the grinder is in contact with the face or incline of the cutting-edge of the slitter, after which the driving-belt *w* is rendered taut by forcing idler-frame outwardly and locking its stem *m'* in position in the box *n*, after which the main driving-belt may be shifted from the loose pulley *t* to the tight pulley *u*, thus causing the cutter-shaft and cutter to revolve, and through the medium of the belt *w* also causing the grinder to revolve, the one revolving at right angles to the axis of the other and insuring an accurate and rapid cutting and sharpening of the cutter. In some instances it will be found best not to lock the bar *g* in fixed position, but to move it carefully with its operating-lever until the grinding-wheel gently touches the cutter, thus graduating the rapidity of the cutting operation. The idler-frame may be moved at the same time to maintain the same tension of the belt *w*, if desired. It will be found in practice, however, that this belt will stretch sufficiently to allow of this trifling movement of the grinder-supporting mechanism to carry the same carefully by the operation of the lever in a direction to bring the grinder in contact with the cutter, thus giving the cutting-edge a fine even finish, and in such cases it will be found that the grinder-belt *w* will stretch slightly and sufficiently to allow of such trifling movement requisite to move the grinder into contact

and away from the cutter without interfering with the rotation of the grinder. Where grinding-wheels of greatly-varying sizes are employed, or where the cutters differ to a considerable extent in size, it will be found that the distance of the requisite movement of the idler-frame to maintain the grinder-belt taut will be considerable, and the angle at which the belt stands to the driven pulley *c* may be such as to tend to cause the belt to slip from the pulley, and in such cases I provide a deeply-grooved or highly-flanged pulley *c'*, as shown in Fig. 12, which is substituted for the pulley *c*. (Shown in Fig. 1.) All danger of the belt *w* slipping from the driving-pulley *v* is avoided by having the traverse of the idler carrier or frame incline with the center of the circumference of this pulley.

To facilitate the locking of the cutters upon the cutter-shaft, I provide the shaft and its box or bearing with an opening, (see Fig. 11,) through which a pin passes and effectually prevents the revolution of the shaft. After the cutter is fastened in position the pin is removed and the shaft becomes free to revolve.

It will be seen that the shape of the bars or shafts which do not rotate may be changed, and that their movement may be produced through the operation of gears, levers, handwheels, or threaded devices, or the same simply moved without the interposition of such mechanism without departing from my invention.

By my arrangement of the belt to drive the grinder being given motion from a pulley mounted on the grinder-shaft it will be impossible to rotate the grinder unless the cutter is being rotated at the same time, as the rotation of the grinder-shaft is dependent upon the rotation of the cutter-shaft. Hence all danger of bringing the rotating cutter in contact with a stationary cutter and thereby notching or otherwise injuring it is avoided. This feature I deem of importance. It will be seen, however, that my arrangement for adjustment, &c., may be employed where the two rotating shafts are driven either together or independently, and some important features of my invention thereby utilized.

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

1. In a grinding-machine, the combination of a vertically-adjustable standard formed with a horizontally-arranged box at its upper end, a horizontally-adjustable bar supported in said box and formed with a grinder-shaft support, a grinder-shaft mounted in said support and provided with a pulley, and means, substantially as described, for rotating said shaft, substantially as set forth.

2. In a grinding-machine, the combination of a vertically-adjustable standard formed with a horizontally-arranged box at its upper end, a horizontally-adjustable bar supported in said box and formed with a grinder-shaft support, a grinder-shaft mounted in said support and provided with a pulley, a cutter-shaft arranged at right angles to the grinder-shaft and provided with a pulley, an idler interposed between the pulleys of the grinder and cutter shafts, and a belt, substantially as set forth.

3. The combination of a supporting-standard B, with shaft *e* adjustably mounted therein, a box *f*, mounted on shaft *e*, a bar *g* adjustably mounted in box *f*, a box *i*, mounted on bar *g*, a rotary shaft mounted in box *i* and having a grinder mounted at one end and having a pulley *c* mounted thereon, a support C, having a box *b*, a rotating shaft mounted therein and adapted at one end to have cutters mounted thereon and having driving-pulleys mounted thereon at the opposite end, idlers mounted in an adjustable frame, and a driving-belt, substantially as and for the purposes stated.

4. In a cutter-grinder, a supporting-standard, a vertical shaft adjustably mounted therein, a box *f*, mounted on the latter, an adjustable bar arranged in said box, a grinder-shaft mounted in said bearing upon said bar, means to lock said vertical shaft and adjustable bar in position, a cutter-shaft, and means to communicate motion to the grinder and cutter shafts, substantially as shown.

5. In a cutter-grinder, the combination of a grinder-supporting shaft mounted in a box *i*, a horizontally-adjustable bar *g*, to which said box *i* is fixed, a box *f*, arranged to receive the bar *g*, means to move and lock the latter in position, a rotating cutter-shaft mounted in suitable supports, and means to communicate motion to the cutter and grinder shafts, substantially as shown.

6. The combination, in a cutter grinder, of an idler-frame, a tubular shaft therein provided with perforations in the sides and closed at one end, and an idler mounted thereon, substantially as shown.

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Witnesses:
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LOUISA KOEGEL.