

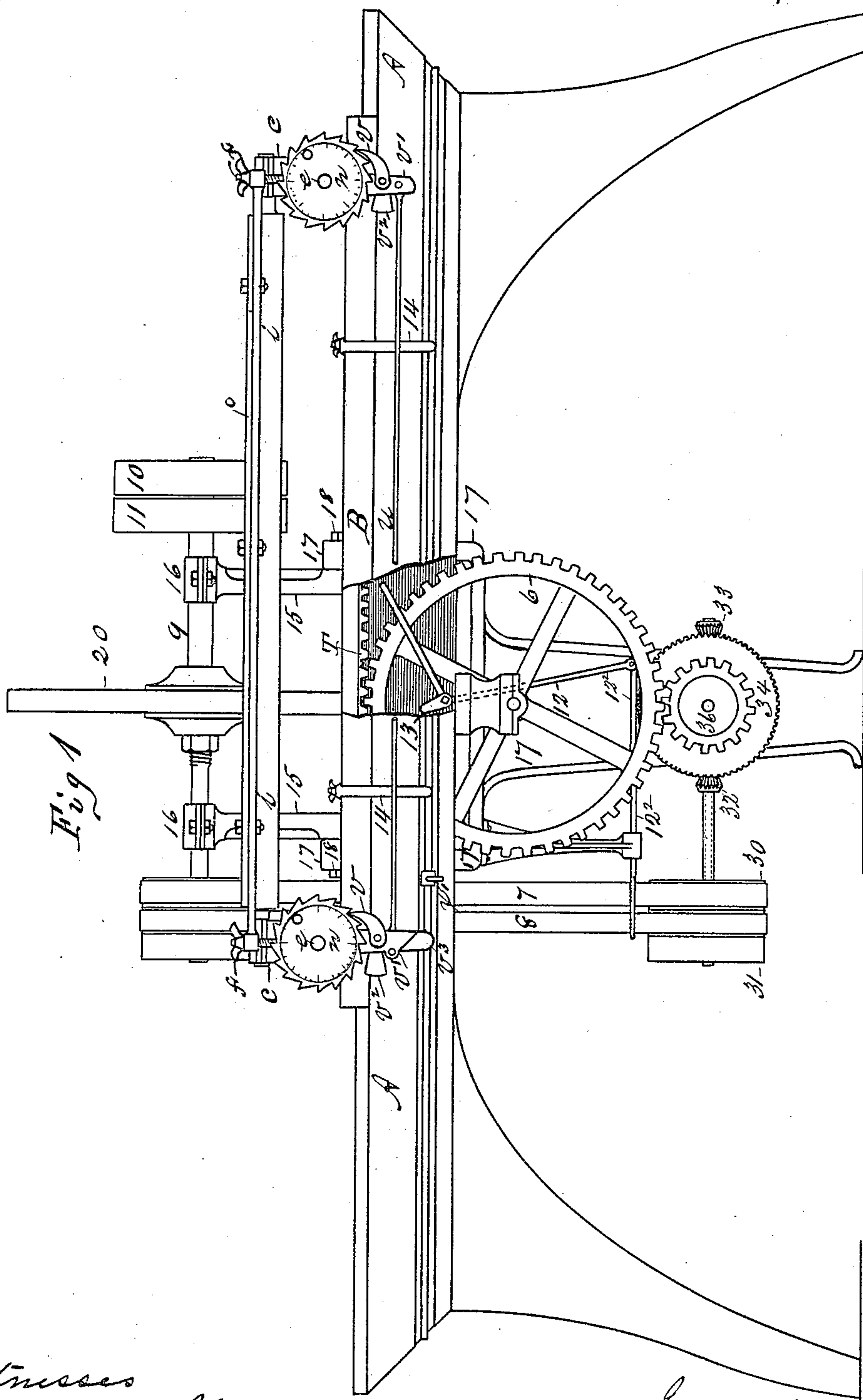
(No Model.)

3 Sheets—Sheet 1.

E. R. HYDE.
KNIFE GRINDING MACHINE.

No. 250,665.

Patented Dec. 13, 1881.



Witnesses
J. D. Garfield
G. N. Bowers

Inventor
Elwin R. Hyde
By Henry A. Chapin
Att'y

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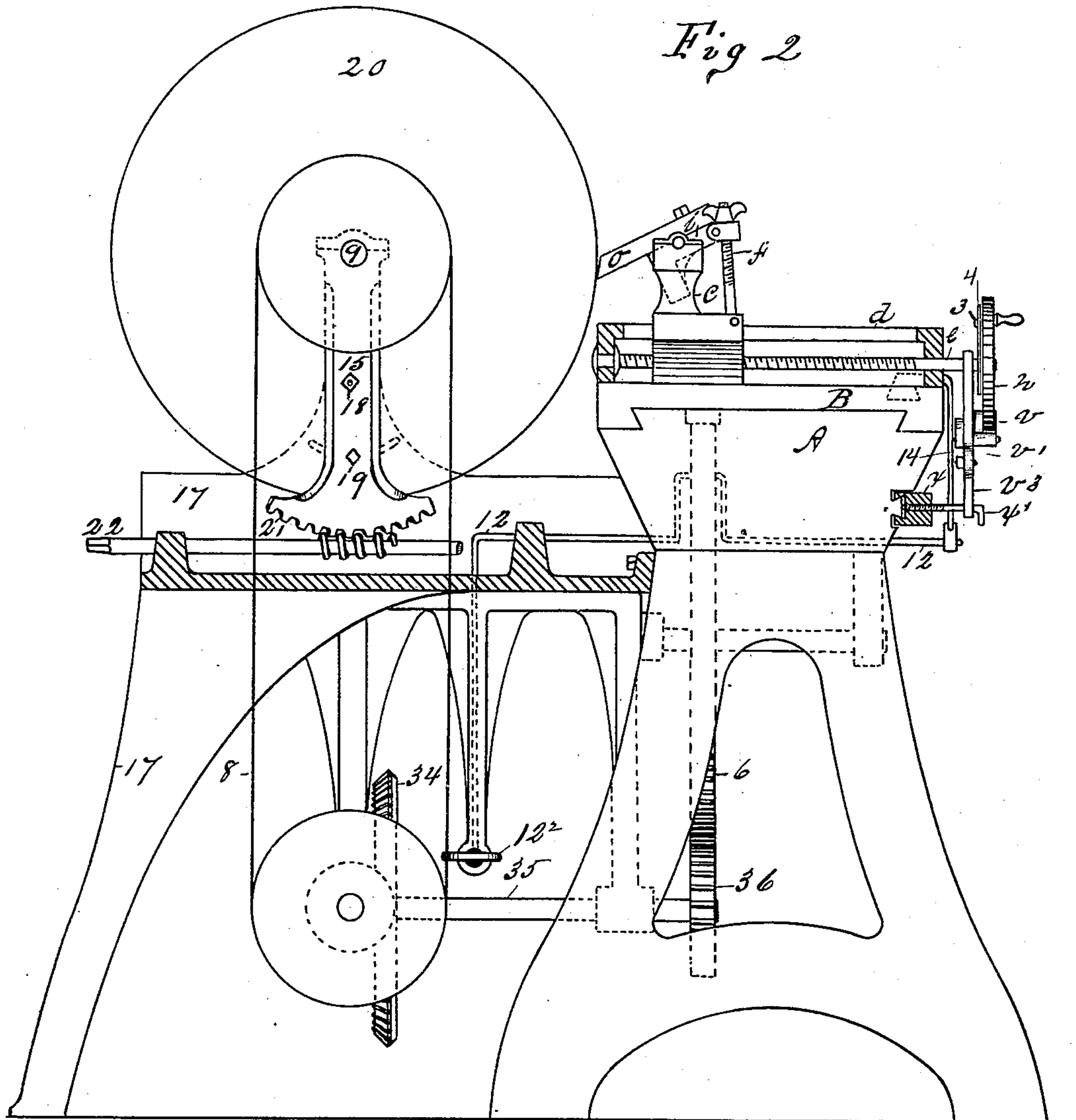
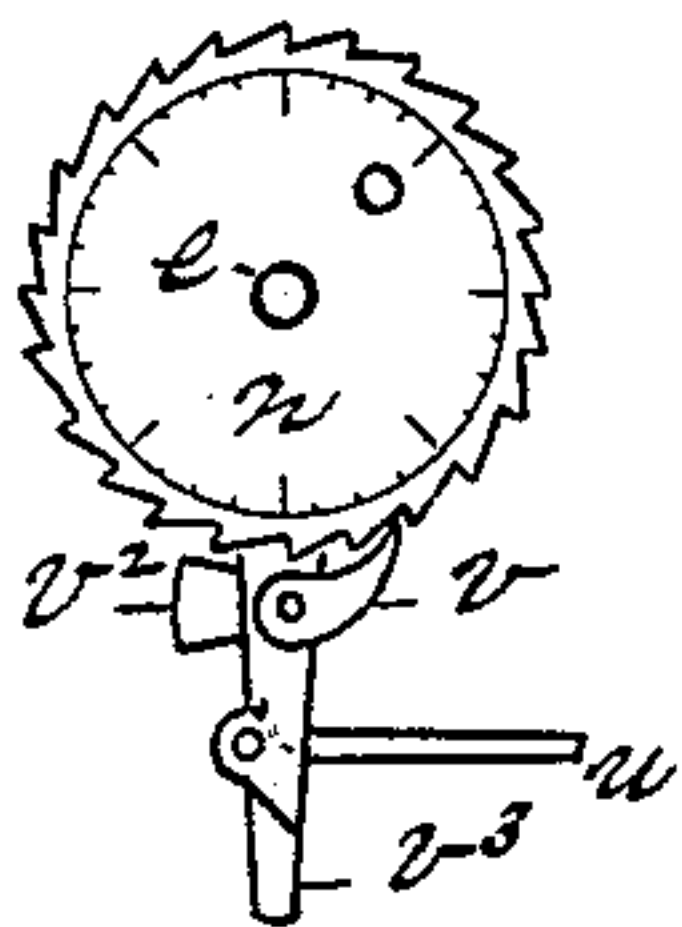


Fig 5



Witness
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Fig 6

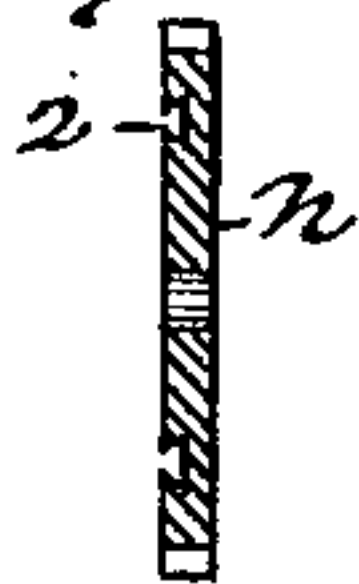
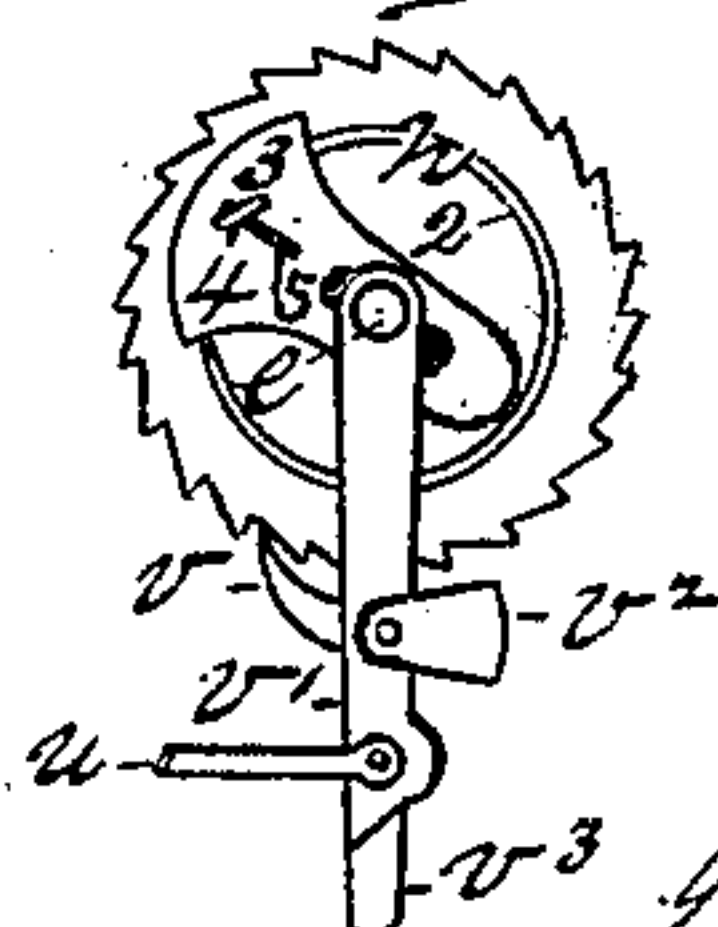


Fig 7



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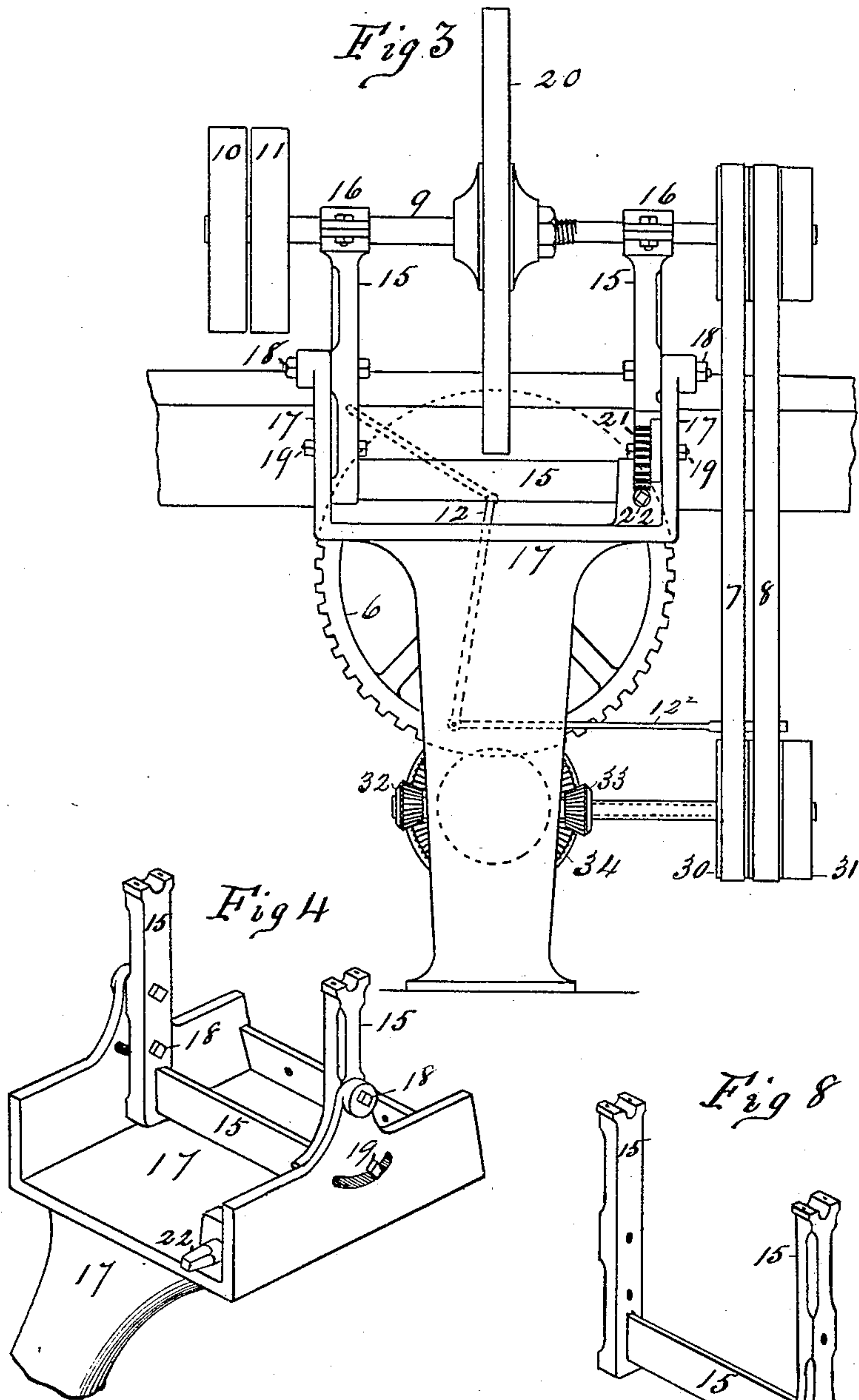
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UNITED STATES PATENT OFFICE.

ELWIN R. HYDE, OF SPRINGFIELD, MASSACHUSETTS.

KNIFE-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 250,665, dated December 13, 1881.

Application filed March 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, ELWIN R. HYDE, a citizen of the United States, residing at Springfield, Hampden county, and State of Massachusetts, have invented new and useful Improvements in Knife-Grinders, of which the following is a specification.

This invention relates to improvements in the details of the construction of grinding-machines for grinding long straight knives—such as paper-cutting knives, &c.—the object being to provide an improved grinding-wheel frame and devices for holding and adjusting it to or from its work, and to provide improved devices and means for feeding the knife-carriage toward the grinding-wheel.

In the drawings, forming part of this specification, Figure 1 is a front elevation of a knife-grinding machine embodying my improvements, in which a portion of the bed of the machine is broken away to show operative parts. Fig. 2 is an end elevation, partly in section. Fig. 3 is a rear elevation of the central portion of the machine, the knife-carriage being removed. Fig. 4 is a view of the grinding-wheel yoke and its supporting-frame detached from the bed of the machine. Fig. 5 is a front view of a part of the cross-feed devices of the knife-carriage detached therefrom. Fig. 6 is a transverse section of the ratchet-wheel shown in Fig. 5. Fig. 7 is a rear view of the parts shown in Fig. 5. Fig. 8 is a view of the grinding-wheel yoke and its actuating worm-shaft detached from the machine.

In the drawings, A is the bed of the machine. B is the knife-carriage bed. *c c* are knife-bar supports on carriage B. *e e* are screw-feed shafts carrying supports *cc*. *d* is a transversely-slotted guide-head, one of which is located on each end of the carriage-bed B. *f* are adjusting-bolts pivoted to the base of supports *c* and connected with the rear edge of the knife-bar *i*. *o* is the knife. *n n* are ratchet-wheels secured to the ends of feed-shafts *e*. *v v* are pawls engaging with ratchet-wheels *n*, and are pivoted on bars *v' v'*, which swing on shafts *e*. One of said bars *v'* is provided with hinged end *v³*, which, when carriage B slides to the right on bed A, swings and passes over the arm *x'* on the feed-block *x*; but when said carriage moves to the left said end *v³* comes in contact with

said arm *x'*, causing the end *v³* and the bar *v'* to swing to the right, the latter, through the connecting-rod *w*, moving the second bar *v'* at the opposite end of bed B in the same direction and causing both of the pawls *v v* to be simultaneously operated against the teeth of the ratchet-wheels *n*. *v² v²* are counter-weight arms attached to the opposite ends of the pivots upon which pawls *v* swing in bars *v'*. Said arms *v²* cause pawls *v* to swing up into engagement with the ratchet-wheels *n*, and when it is desired to swing said pawls away from wheels *n* said arms *v²* swing over back of bars *v'* and hold the pawls away.

u is a connecting-rod whose ends are pivoted to bars *v' v'*.

x is a movable feed-block, adapted to be moved and secured at different points on the front side of the bed A, and having a projecting arm, *x'*, which screws through block *x* and against the face of the rib on the front side of bed A, thus holding said block as aforesaid.

2 is a circular groove in the rear face of ratchet-wheel *n*. 3 is a plate, slotted, as shown, to let shaft *e* pass through it, and adjustable in the rear of wheel *n*. 4 is a thumb-screw bolt, whose head engages with groove 2 in wheel *n*, and which passes through a slot, 5, in plate 3, and by which said plate is secured in place. The object of said adjustable plate 3 on the back of the ratchet-wheels *n* is to provide means for automatically stopping the action of pawls *v* upon said ratchet-wheels, and consequently the rotation of the feed-shafts *e*, through which the knife is fed toward the grinding-wheel. Therefore, when something less than one entire revolution of said feed-shafts will suffice to feed said knife far enough, plate 3 is moved out so that its outer edge projects beyond the points of the teeth on said ratchet-wheels, and consequently, when said wheels are carried around far enough to bring the edge of said plates 3 against the points of the pawls, the latter will operate only upon the edge of said plates not catching in the teeth of the ratchet-wheels, and thus the forward feed of the knife will cease.

It will be seen that the faces of the wheels *n* are divided by graduating marks, the purpose of which is to enable the operator to set said plate 3 at such a point as will allow of

such an amount of forward feed of the knife as will be the result of some certain fractional part of one revolution of the feed-shafts *e*.

The knife-carriage bed B is provided with a rack, T, upon its under side, like a planer-bed, in which the teeth of gear 6 under the machine engage, and said gear is made to rotate in opposite directions alternately by the operation of the belts 7 and 8 upon the devices, as shown, which are substantially those usually employed to produce the reciprocating motion of a planer-bed, and they consist of a shaft within a shaft, on each of which is a pulley, 30 31, driven by belts 7 and 8, and on each of said shafts is a bevel-gear, 32 33, which engage with a gear-wheel, 34, fixed on the end of a horizontal shaft, 35. On the opposite end of said shaft 35 is fixed a gear-wheel, 36, which engages with the gear-wheel 6 under the bed A of the machine. The pulley between pulleys 30 and 31 is a loose one. A belt-shipper, 12², is adjusted to slide in proper guides, as shown, through proper links, in which belts 7 and 8 pass in the usual manner, and said shipper 12² is pivoted to the end of the bent shipper-lever 12. This lever 12 is pivoted in frame A, running from the front side thereof, where the arm 13 is secured to it, up over wheel 6, as shown in dotted lines in Figs. 3 and 2; thence through the rear side of said frame, partly supported on frame 17, and thence downward to the point of its connection with the said shipper 12². By means of said shipping devices the movement of one of arms 14 on bed B against said arm 13 causes rod 12 to be oscillated and to slide the shipper-rod 12² and ship belts 7 and 8, so that either pulley, 30 or 31, will be driven, causing gears 32 or 33 to act upon gear 34 and revolve it in either direction, and through the above-described connecting devices to slide bed B back and forth on bed A.

The machine is operated through the shaft 9, which is at the same time the grinding-wheel shaft, by applying a belt to pulleys 10 and 11, one of which is tight and the other is loose on said shaft.

Secured to and adjustable longitudinally on the carriage B are two downwardly-projecting arms, 14 14, which are set at any required point on said carriage, according to the length of the knife being ground, to engage with the upper end of arm 13 as the carriage B moves to and fro, and thus by turning the shipper-rod 12 cause the belts 7 and 8 to be shipped, as afore-said, and reverse the movement of said carriage each time that the knife has passed before the grinding-wheel.

The grinding-wheel yoke 15 is provided with proper boxes, 16, for the support of shaft 9, and consists of a single piece, as shown. Said yoke is supported in the frame 17, to which it is pivoted by the bolts 18. Two other bolts, 19, pass through the sides of frame 17 through curved slots therein, one of which slots is shown in dotted lines in Fig. 2, and one end is fixed in the lower part of the yoke 15. Said bolts 19 are provided with nuts, as shown, which may

be screwed against the sides of frame 17, and thus hold yoke 15 and the grinding-wheel 20, so that they cannot swing out of position when once set.

To enable the operator to adjust the grinding-wheel 20 very closely relative to the edge of the knife it may be operating upon, one end of yoke 15 is provided with a segment of a gear, 21, at one end, and a worm-shaft, 22, set in frame 17, engages with the teeth of said segment, so that by turning shaft 22 yoke 15, when bolts 19 are freed, may be swung in frame 17 with great nicety, and fine adjustments be obtained for the proper action of the grinding-wheel upon the knife.

By the above-described construction it will be seen that the grinding-wheel shaft 9 operates always in a line parallel to the knife to carry the wheel 20 toward and from said knife, and that both ends of said shaft are moved simultaneously when the wheel is adjusted. The bolts 19 may be used solely to hold the yoke 15 and to adjust it by, but not with the same convenience and advantage that appertain to the use of the worm-shaft and segment. When the yoke 15 is once set the knife-bar *i* and its supports *c* may be solely employed for some time for bringing the knife *o* and wheel 20 into proper operative relations; but when the diameter of the wheel is so reduced by wear that the knife-bar cannot be moved toward the wheel far enough to cause the latter to act upon the knife the yoke 15 is swung over, as above described, and when a new grinding-wheel is put upon shaft 9 the yoke is adjusted accordingly.

The general operation of the improved grinding-wheel yoke 15 and the manner of its adjustment and retention in place will be clearly understood by the foregoing description. The knife *o* to be ground is bolted to the knife-bar *i* in the usual manner, and pawls *v* being swung out of contact with the ratchet-wheels *n* the latter are turned to operate through the feed-screws *e* to move the knife-bar supports *c c*, so as to carry the edge of the knife properly toward the wheel 20, and the nuts upon the upper ends of the adjusting-bolts *f* are turned to swing said knife-bar on its bearings in supports *c* until the knife *o* stands with its edge at a proper angle before the wheel 20. The carriage B is now caused to be moved along until one end of the knife *o* is opposite the wheel, when the knife is fed into contact with the wheel, the ratchets *v* are turned to engage with the ratchet-wheel teeth, and the machine is set in motion, when the bed B will traverse to and fro on the machine, automatically shipping the belts 7 and 8, and causing the knife-feeding devices to be operated, as above described.

What I claim as my invention is—

1. In a knife-grinding machine, the combination, with the frame 17, of the yoke 15, pivoted in said frame, and provided with the bolts 19, substantially as and for the purpose set forth.

2. In combination, the frame 17, the worm-

shaft 22, and the yoke 15, having thereon the gear-segment 21, to engage with said worm-shaft, substantially as and for the purpose set forth.

5 3. In combination with the carriage-bed B, adapted to be moved reciprocatingly on bed A, and with the knife-bar supports *c c*, the screw feed-shafts *e e*, the bars *v' v'*, one of which has the hinged end *v³* hung on said shafts, the
10 pawls *v*, the arms *v²*, the connecting-rod *u*, the

ratchet-wheels *n n*, and the feed-block *x*, provided with the arm *x'*, substantially as and for the purpose set forth.

4. In combination, the ratchet-wheel *n*, provided with the groove 2, the bolt 4, and the
15 plate 3, substantially as and for the purpose set forth.

Witnesses: ELWIN R. HYDE.
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