

(No Model.)

2 Sheets—Sheet 1.

E. J. WHEELER.
KNIFE GRINDING MACHINE.

No. 463,017.

Patented Nov. 10, 1891.

Fig. 1.

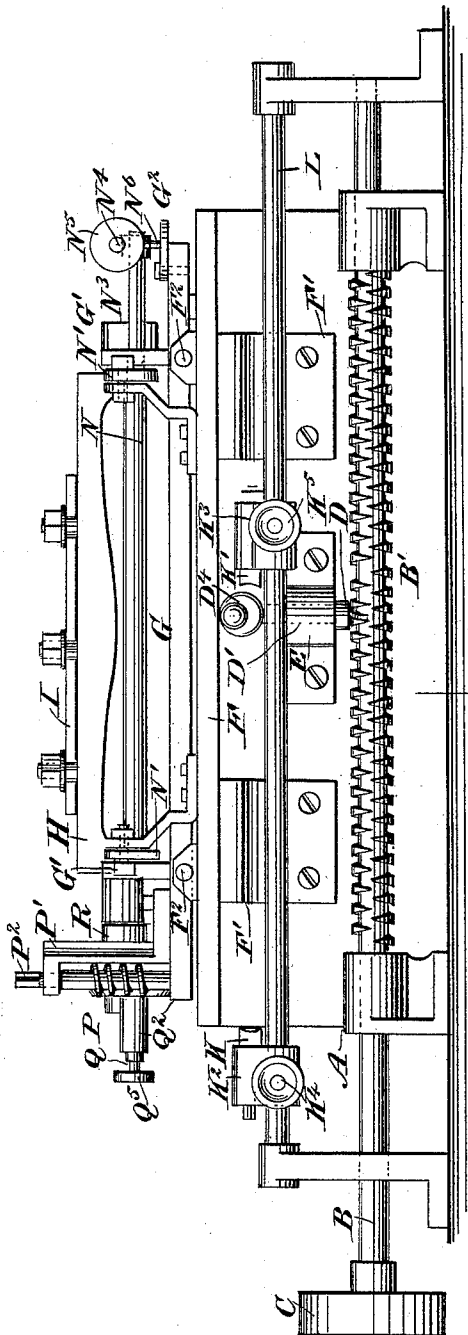
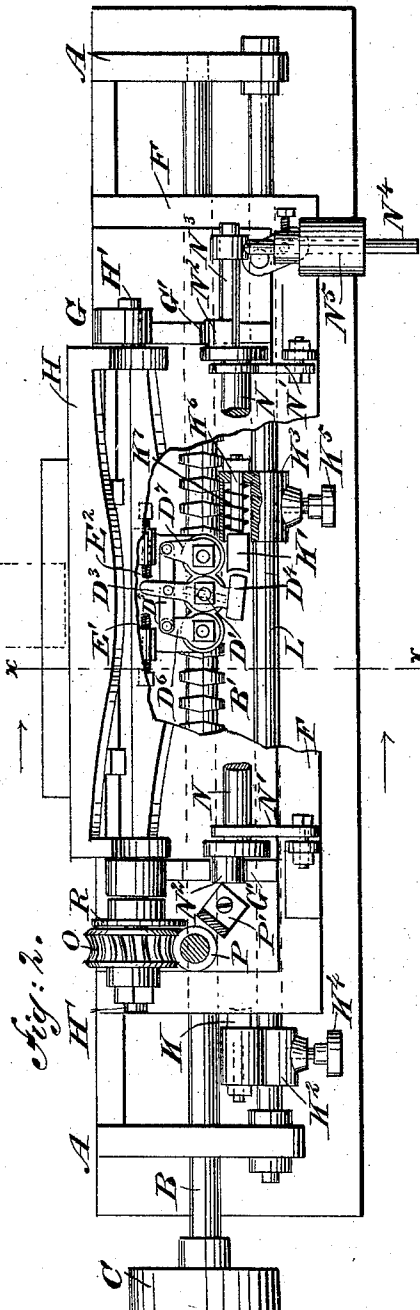


Fig. 2.



WITNESSES:

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EUGENE JEFFERSON WHEELER, OF MILLINGTON, TENNESSEE.

KNIFE-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,017, dated November 10, 1891.

Application filed May 28, 1891. Serial No. 394,382. (No model.)

To all whom it may concern:

Be it known that I, EUGENE JEFFERSON WHEELER, of Millington, in the county of Shelby and State of Tennessee, have invented a new and Improved Knife-Grinding Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved grinding-machine specially designed for grinding knives for cutters of various descriptions, and which is simple and durable in construction, very effective in operation, and permits of readily examining the work during the grinding operation without disturbing the adjustment.

The invention consists of certain parts and details and combinations of the same, as will be described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front view of the improvement. Fig. 2 is a plan view of the same, with parts broken out and parts in section. Fig. 3 is an enlarged transverse section of the same on the line *xx* of Fig. 2. Fig. 4 is an end elevation of the same, and Fig. 5 is an enlarged sectional side elevation of part of the improvement on the line *yy* of Fig. 4.

The improved knife-grinding machine is provided with a suitably-constructed frame A, on which is journaled in suitable bearings the main driving-shaft B, carrying on one end a pulley C, connected with other machinery for imparting a rotary motion to the said shaft B in one direction. On the shaft B, between its bearings, is arranged a right and left hand screw-thread B', one cut in the other, as is plainly shown, the said screw-threads being adapted to be engaged by a shoe D, held on the lower end of a shaft D', mounted to turn in suitable bearings in a bracket E, secured to a table F, mounted to slide longitudinally on the main frame A, the latter being provided for this purpose with a dovetail A', engaged by corresponding dovetail grooves formed in brackets F', secured to the under side of the said table F. On the table F is fitted to slide longitudinally in suitable

guideways a carriage G, in which is journaled the cutter-head H, carrying the knife I to be ground on a suitable grinding-wheel J.

When the shoe D stands in one direction, it travels in one of the screw-threads on the shaft B, so that the table F is moved toward one end of the frame A; and when the shaft D' is turned so that its shoe D points in an opposite direction from the one in which it pointed before, then the table F and its contents are moved in the opposite direction toward the other end of the frame A. By this longitudinal forward and backward swinging motion of the table F the knife I is carried over the grinding-wheel J, so as to be ground uniformly throughout its length.

In order to shift the shaft D' automatically, whenever the end of the knife passes over the grinding-wheel J the following device is provided: The shaft D' can be turned by hand by means of a handle D², secured to the upper end of the said shaft. Near the upper end of the shaft, directly below the handle D², is secured an arm D³, adapted to engage with its front end D⁴, alternately, the spring-pressed blocks K and K', held in collars K² and K³, respectively, mounted to slide on a longitudinally-extending rod L, secured on the main frame A. The collars K² and K³ are adapted to be secured in place at any desired point on the rod L by means of set-screws K⁴K⁵. Each of the blocks K and K' has coiled on its shank K⁶ a spring K⁷, which rests at one end in the recess for the block K or K' in the respective collar, the other end pressing against the respective block, as is plainly illustrated in Fig. 2. Thus when the front end D⁴ of the arm D³ moves in contact with one of the blocks K or K' the latter is pressed into its respective collar K² or K³ until the respective spring K⁷ is sufficiently compressed to cause the arm D³ to swing, so that the shaft D' is turned and the position of the shoe D is changed.

By mounting the respective block K or K' yieldingly in the adjustable collars K² and K³ the shoe D will readily change its position at the crossing of the two threads, so that no breakage whatever is likely to occur at the point of the reversing of the traveling motion of the table F.

- In order to hold the arm D³ in the proper position while traveling between the two spring-pressed blocks K or K', the rear end of the said arm is pivotally connected by a link 5 D⁵ with arms D⁶ and D⁷, secured by nuts on the bracket E, so that by adjusting the said nuts more or less friction is given to the said arms D⁶ and D⁷ to permit the arm D³ to swing more or less freely, as desired.
- 10 In order to move the carriage G transversely on the table F, so as to move the knife I toward or from the periphery of the grinding-wheel J, the following device is provided: A shaft N, arranged longitudinally on top of the carriage G, is mounted to turn in suitable bearings in links N', pivoted to the front 15 end of the table F. The shaft N is provided near its outer ends with eccentrics N², engaging vertical slots G', formed in offsets on top of the carriage G. From one of the eccentrics N² extends outward a reduced part N³ of the shaft N, as is plainly shown in Fig. 2, and on this reduced part is secured an arm N⁴, carrying a weight N⁵. In the arm N⁴ 25 screws the screw N⁶, arranged vertically and adapted to engage with its lower end the top of a bracket G², held on the carriage G, thus limiting the downward swinging motion of the arm N⁴ and consequently the turning motion of the shaft N. By swinging the arm 30 N⁴ upward the eccentrics N², engaging the slots G', cause the carriage G to slide forward, so that the knife I recedes from the grinding-wheel J. When the arm N⁴ is swung 35 downward to its normal position, regulated by the screw N⁶, then the carriage G slides transversely to bring the knife I in contact with the grinding-wheel. The sliding motion of the carriage G toward the front is limited by 40 set-screws P², screwing in the front end of the table F. The knife-head H carries a suitable number of bolts for securing the knife I to be ground in proper place on the said knife-head. The ends of the knife-head are formed 45 with trunnions H', mounted to turn in suitable bearings in the carriage G. The trunnions extend longitudinally parallel to the main driving-shaft B, the rod L, and the shaft N, as is plainly shown in the drawings.
- 50 On one of the trunnions H' is mounted to rotate loosely a worm-wheel O in mesh with a worm P, arranged vertically and having one end journaled in the carriage G and the other end in a bracket P', secured on the said carriage. The upper end of the shaft of the 55 worm-wheel is formed with a square offset P², adapted to be engaged by a suitable tool for conveniently turning the said worm to revolve the worm-wheel O. On the worm-wheel O is held a spring-pressed pin Q, adapted to engage one of a series of apertures arranged in a circle on a circular plate R, secured on the trunnion H' next to the worm-wheel O, as is 60 plainly shown in Fig. 5. The spring-pressed pin Q is fitted to slide in a suitable casing Q², secured on the outer face of the worm-wheel, the shank of the said pin carrying a coil- 65
- spring Q³, resting with one end in the casing Q² and with its other end on a collar Q⁴, secured on the pin Q. The inner end Q' of 70 the latter extends through the web of the worm-wheel and is adapted to pass into one of the apertures of the plate R, as previously described and fully shown in Fig. 5. On the 75 outer end of the pin Q is held a suitable knob Q⁵, adapted to be taken hold of by the operator to disengage the circular plate R.
- When the pin Q is in engagement with the circular plate R and the operator turns the worm P, then a rotary motion is given to the 80 worm-wheel O, which latter by being locked to the plate R causes a revolution of the knife-head, so that the knife I is swung toward or from the grinding-wheel J to enable the operator to adjust the knife relative to the grind- 85 ing-wheel, according to the bevel desired to be ground on the knife.
- It is understood that the shaft B is continually rotated in one direction, the table F, the carriage G, and knife-head H being carried 90 forward and backward the desired distance, according to the position of the collars K² and K³ on the fixed rod L. It will further be seen that the knife I may be given any desired inclination by revolving the knife-head, 95 as above described, so that any desired angle is given to the bevel of the cutting-edge. It will further be seen that the carriage G with the knife-head H can be readily moved transversely, so as to cause the knife to recede 100 from the grinding-wheel J to permit the operator to examine the work.
- Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—
1. The combination, with the frame and the main shaft journaled therein and having right and left threads, of the reciprocating table 105 mounted on the frame, a vertical shaft mounted on the under side of the table and having a shoe on its lower end engaging the threaded shaft, an arm projecting outward from the shaft, and lugs adjustable toward and from each other and in the opposite paths 110 of said arm to operate it and cause the reversal of the shoe, substantially as set forth.
 2. In a knife-grinding machine, the combination, with a revoluble shaft formed with a right and left hand thread, cut one over the other, of a shoe adapted to engage the said 115 threads and held on a shaft mounted to turn, an arm secured on the said shaft, and spring-pressed lugs adapted to be engaged alternately by the outer end of the said arm, substantially as shown and described. 120
 3. In a knife-grinding machine, the combination, with a revoluble shaft formed with a right and left hand thread, cut one over the other, of a shoe adapted to engage the said 125 threads and held on a shaft mounted to turn, an arm secured on the said shaft, spring-pressed lugs adapted to be engaged alternately by the outer end of the said arm, and collars carrying the said spring-pressed lugs and held 130

adjustably on a fixed rod, substantially as shown and described.

4. The combination, with the reversing-shaft D', its shoe, and operating-arm D³, of the links D⁶ D⁷ at opposite sides of the said arm and provided with friction-nuts, and a link D⁵, pivotally connecting the said arm with the said links D⁶ D⁷, substantially as set forth.

5. In a knife-grinding machine, the combination, with a table mounted to slide longitudinally, of a carriage fitted to slide transversely on the said table, a shaft mounted to turn in links held on the said table, and eccentrics held on the said shaft and engaging vertical slots in the said carriage, substantially as shown and described.

6. In a knife-grinding machine, the combination, with a table mounted to slide longitudinally, of a carriage fitted to slide transversely on the said table, a shaft mounted to turn in links held on the said table, eccentrics held on the said shaft and engaging vertical slots in the said carriage, and a weighted arm connected with the said shaft, substantially as shown and described.

7. In a knife-grinding machine, the combination, with a table mounted to slide longitudinally, of a carriage fitted to slide transversely on the said table, a shaft mounted to turn in links held on the said table, eccentrics held on the said shaft and engaging vertical slots in the said carriage, a weighted arm con-

nected with the said shaft, and a set-screw engaging the said weighted arm for regulating the position of the said arm, and consequently the position of the said eccentrics in the slots of the carriage, substantially as shown and described.

8. In a knife-grinding machine, the combination, with a carriage, of a knife-head formed with trunnions traveling in the said carriage, a worm-wheel held loosely on one of the trunnions of the said knife-head, a worm engaging the said worm-wheel and mounted to turn in bearings in the said carriage, and a plate secured on the said trunnions and adapted to be locked to the said worm-wheel, substantially as shown and described.

9. In a knife-grinding machine, the combination, with a carriage, of a knife-head formed with trunnions traveling in the said carriage, a worm-wheel held loosely on one of the trunnions of the said knife-head, a worm engaging the said worm-wheel and mounted to turn in bearings in the said carriage, a plate secured on the said trunnions and adapted to be locked to the said worm-wheel, and a spring-pressed pin held on the said worm-wheel and adapted to engage one of a series of apertures in the said frame, substantially as shown and described.

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Witnesses:

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