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KEY CUTTING MACHINE.

APPLICATION FILED JULY 21, 1917.

1,254,749.

Patented Jan. 29, 1918.

2 SHEETS—SHEET 1.

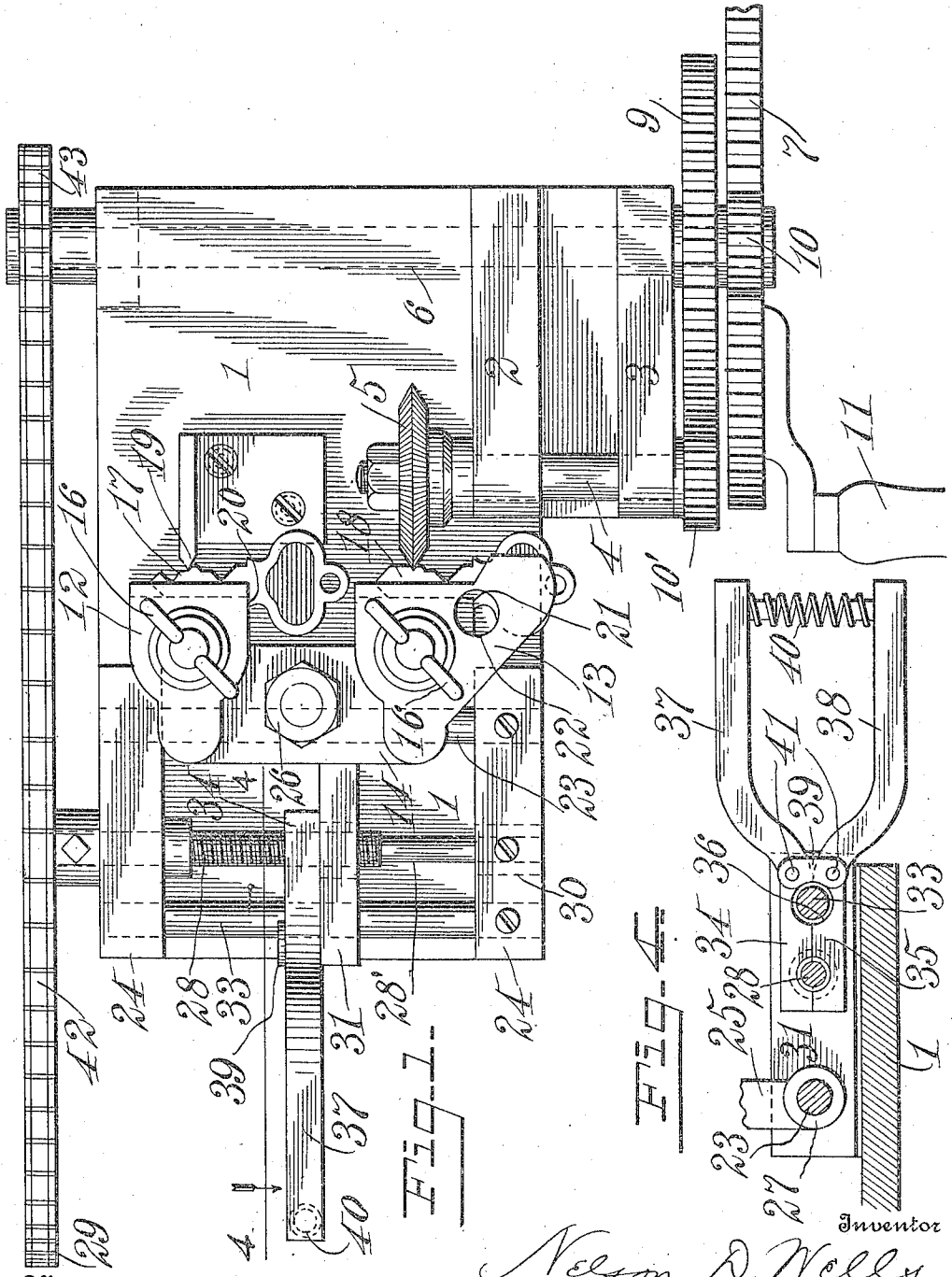


FIG. 1.



FIG. 4.

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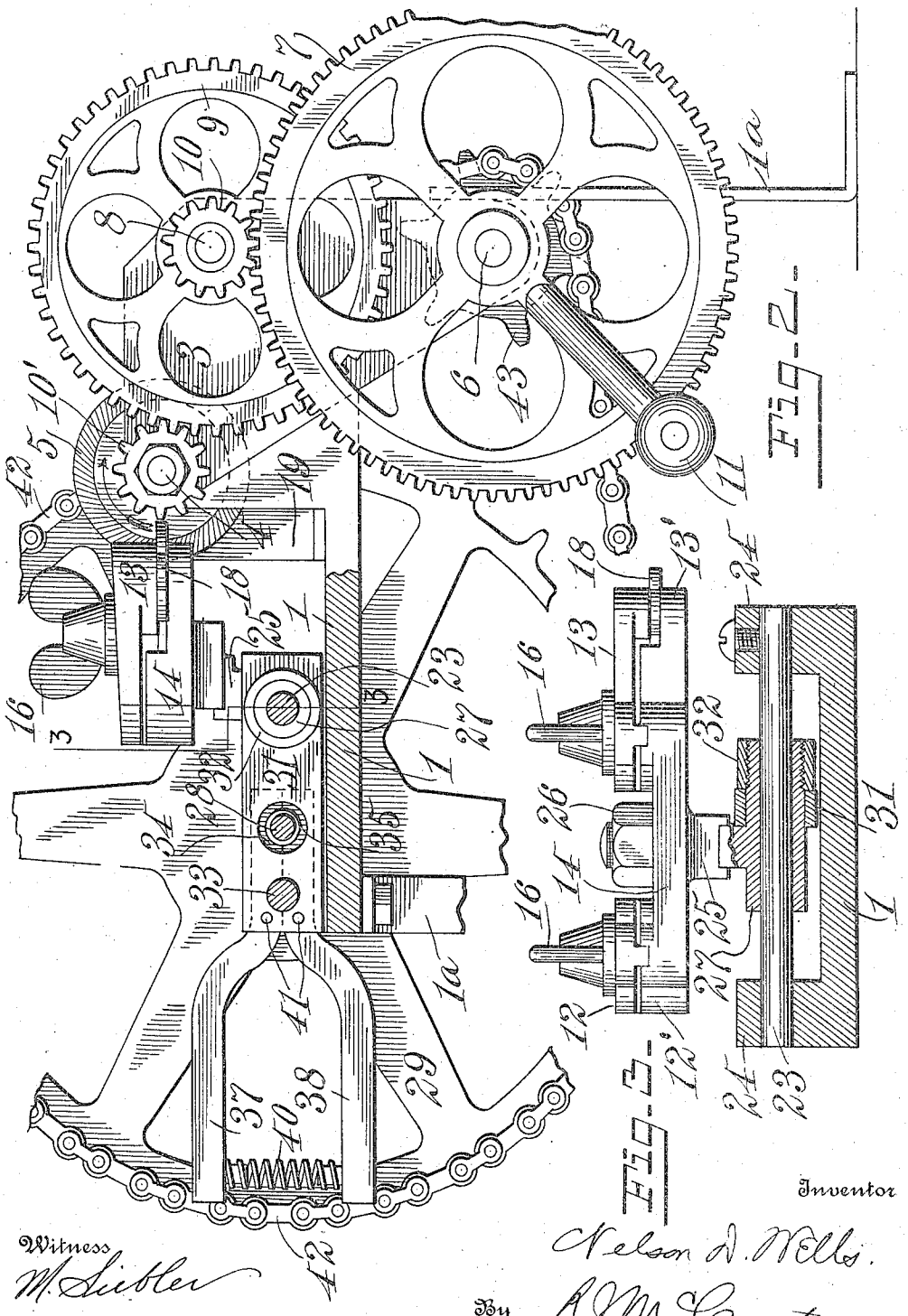
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# UNITED STATES PATENT OFFICE.

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## KEY-CUTTING MACHINE.

1,254,749. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed July 21, 1917. Serial No. 181,970.

*To all whom it may concern:*

Be it known that I, NELSON D. WELLS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Key-Cutting Machines, of which the following is a specification.

This invention relates to improvements in key cutting machines and comprises a machine of this character having means for automatically feeding the blank and the templet or pattern key during the operation of cutting the notches or recesses in said blank. The object of the invention is to provide a machine of this character in which the work of cutting keys is greatly facilitated and made more accurate. Among the special features may be mentioned the operation of the rotating cutter upon the blank. This is upward and imparts an undercut, thus avoiding any binding between the cutter and the blank. Other objects are attained which are incidental to the main object of constructing a machine having a high efficiency as will hereinafter more fully appear from the following description in connection with the accompanying drawings. Referring in general terms to the accompanying drawings, Figure 1 is a top plan view of my improved key cutting machine. Fig. 2 is a vertical longitudinal sectional elevation enlarged, with parts broken away. Fig. 3 is a sectional view of the holders or clamps on the line 3—3 of Fig. 2. Fig. 4 is a sectional view on the line 4—4 of Fig. 1, showing the automatic feeding mechanism for the carriage.

In a detail description of the invention similar reference characters indicate corresponding parts in both the description and the annexed drawings. The stationary part or frame-work of the machine may vary more or less in design. In the drawings it is shown to consist of a bed plate 1 with bearing parts 2 and 3 which support the cutter shaft 4 upon which the key cutter 5 is mounted, the shaft 6 of the main drive gear 7, and the shaft 8 of the intermediate gear 9 and pinion 10, the latter, to wit, pinion 10 meshing with the main drive gear 7 and the intermediate gear 9 meshing with the pinion 101 on the cutter shaft 4. The main drive gear 7 is operated from a suitable handle 11 and the operation of the train is apparent from Fig. 2. The bed plate 1 of the machine is supported upon suitable corner legs $1^a$. As shown more clearly in Fig. 1, 12 and 13 designate the loose or top members of two clamps which are mounted on a carriage 14, the lower or fixed members 12′ and 13′ of said clamps being preferably integral portions of the carriage 14. Binding screws and a suitable form of nut 16 operate these clamps to bind rigidly in position the pattern key 17 and the blank 18, the latter to be operated on by the cutter 5. The templet or pattern key 17 is held by the clamping members 12 and 12′ and is engaged by a guide 19 secured to the bed plate 1. The guide 19 is adjustable relative to the pattern key 17. The key blank 18 is held by the clamping members 13 and 13′ in position to be engaged by the cutter 5. In positioning the pattern key 17 and the key blank 18, the shoulders 20 and 21 thereof abut against the adjacent corners of the lower clamping members 12′ and 13′. The distance between the guide 19 and the cutting edge of the cutter 5 is equal to the distance between the two shoulders 20 and 21 when the pattern key and the blank are placed in position as in Fig. 1. This is necessary for accurate cutting. The upper clamping member 13 of the blank is provided with a sight opening 22 through which may be seen the shoulder 21 of the blank to determine when it is properly positioned. In order to properly hold the blank 18 the upper and lower clamping members 13 and 13′ are of increased area so as to clamp the entire length of the blank and properly hold it while being operated upon by the cutter 5. The carriage 14 is pivoted on a cross shaft 23 which is fixed in bearings 24 at each end. The said carriage 14 has a pivotal or oscillating as well as a longitudinal movement upon the shaft 23. The pivotal movement takes place when the guide 19 passes over the notches in the pattern key 17. The connection between the carriage 14 and the shaft 23 which permits of these movements consists of a post 25 which is secured to the carriage 14 by means of a nut 26. The lower portion of said post terminates in a sleeve 27 which receives the shaft 23 and slides thereon. This is a simple and preferred form of connection between the carriage 14 and the guide shaft 23, but it is obvious that other specific forms of connection may be adopted which permit the carriage to be automatically moved along the shaft 23 during the operation of the cutter, and to be moved backward upon the shaft

23 which acts as a pivot, as the guide 19 rides over the notches in the pattern key 17. It will be understood from Fig. 2 of the drawings that the weight of carriage 14 and clamps insures a proper contact between the guide 19 and the key 17, and the cutter 5 and the blank 18. The automatic feeding device by which the carriage is moved longitudinally of the shaft 23 consists of a screw shaft 28 which is journaled in the bearings 24 and is driven from a chain wheel 29 which is fixed thereto. One of the bearings 24 receives a bushing 30 in which said shaft 28 turns. As shown in Fig. 1, the screw threads are omitted from a portion 28′ of said shaft. A slide or guide 31 extends from the shaft 23 and is confined in its position on the shaft 23 by a nut 32 which has a screw-threaded engagement with the end of the sleeve 27 so that the said guide or slide 31 moves along the shaft 23 with the carriage 14. The said slide 31 has openings through which the screw shaft 28 and a guide shaft 33 pass, said guide shaft 33 being stationary in the bearings 24. The openings in the slide 31 through which the shafts 28 and 33 pass are sufficiently large to permit of the said slide moving freely with the carriage 14. The slide 31 is not in engagement with the shaft 28, the opening in said slide being sufficiently large to enable it to move freely with the feeding mechanism. The parts 34 and 35 are elements of the carriage feeding devices consisting of two jaws, the ends of which are provided with a combined opening with teeth therein which engage the threads of the screw shaft 28 and also said jaws have a combined opening 36 through which the guide shaft 33 passes. The jaws 34 and 35 have handle portions 37 and 38 extending therefrom and the two members are united by a plate 39 which is attached thereto so that the jaws may be operated together after the manner of a tongs. An expansion spring 40 is secured between the two handle portions 37 and 38 and is effective in maintaining the teeth of the jaws 34 and 35 in engagement with the threads on the shaft 28. The jaws 34 and 35 are connected to the guide or slide 31 by pins 41 which serve as pivots for the two jaws to move upon when the handle portions 37 and 38 are pressed together to release the jaws from the threads of the shaft 28. The shaft 28 is driven from the main drive shaft 6 through a sprocket chain 42 which engages a sprocket wheel 43 on said main drive shaft and extends over the larger sprocket wheel 29 which, as before stated, is fixed to the screw shaft 28. It will be readily understood that any appropriate form of gearing between the carriage feeding shaft 28 and the main drive shaft 6 may be employed. A sprocket chain and wheel drive is preferred for the reason that there is practically no back vibration of the same in the operation of the machine. It will be understood that the work to be done by the machine must be necessarily accurate. The key to be cut from the blank must be an exact duplicate of the key which is used for the pattern, therefore, a drive connection between the main drive shaft and the screw shaft must be one that permits of no back movement during the operations of the machine. As shown in Fig. 2 of the drawings the rotation of the cutter 5 is indicated by the arrow which shows that said cutter imparts an upper or under cut to the blank. This is important from the fact that there is no binding or stoppage of the cutter as there would be in the event that a downward cut were imparted through a reverse operation of the cutter. In the operation of the machine the pattern key and the blank are accurately placed in position in the manner hereinbefore specified by causing the shoulders 20 and 21 to abut against adjacent corners of the lower clamp members 12′ and 13′. The shoulder on 13′ being concealed below the upper member 13 of that clamp, the opening 22 permits the eye to see when the blank is in position. The carriage is then lowered to the positions shown in Figs. 1 and 2 and the main driving shaft 6 is operated from the handle 11. The cutter 5 is thereby rotated and concurrently therewith the screw shaft 28 is rotated to move the carriage along the guide shaft 23. As the notches or recesses are being cut in the blank the carriage is moved transversely, and pivotally through the engagement of the guide 19 with the recesses or notches of the pattern key. When the last notch or recess is cut in the blank the feed of the carriage stops by reason of the fact that the screw threaded engagement of the jaws 34 and 35 ceases, the said jaws being at that time driven off of the screw threads of the shaft 28 and onto the plain portion 28′ of said shaft. It will be understood that the weight of the carriage and the clamps supported thereon maintain a proper yielding contact between the guide 19 and the pattern key 17 and the cutter 5 and the blank 18. The carriage is returned to the proper initial position by opening the jaws 34 and 35 and shifting said carriage back to the starting point.

Having described my invention, I claim:

1. In a machine of the character specified, a carriage having clamps thereon for holding a key blank and a pattern key, a rotary cutter engaging said key blank, a slide fixed to said carriage, transverse shafts supporting said slide and serving as guides therefor in the movement thereof, one of said shafts forming a pivot upon which the carriage may be swung from or toward the cutter,

a screw-shaft, threaded jaws attached to said slide and engaging said screw-shaft whereby the carriage is actuated to feed the key blank to the cutter, said threaded jaws being provided with extensions forming handles for releasing the jaws from the screw-shaft.

2. In a machine of the character specified, a carriage having clamps for holding a key blank and a pattern key, a rotary cutter adapted to cut said key blank in accordance with the pattern key, a horizontal slide attached to said carriage for moving the same, transverse shafts supporting and guiding said slide in the movement thereof, one of said shafts serving as a pivot upon which the carriage may be swung, a screw-shaft, threaded jaws pivotally attached to said slide and engaging said screw-shafts, said jaws having extensions which form handles for spreading the jaws to disengage the screw-shaft.

3. A carriage, clamps carried by said carriage for holding a key blank and a key which serves as a pattern, the clamp for said pattern key having a sight opening for determining the accurate position of the pattern key, a transverse shaft, said carriage having a tubular extension which receives said shaft, said shaft and tubular extension forming a pivot for the carriage, a slide connected to the pivot of said carriage, a screw-shaft, a pair of toothed jaws pivotally connected to said slide and engaging said screw-shaft, said jaws being extended in handles by which said jaws are opened to release the screw-shaft.

In testimony whereof I affix my signature.

NELSON D. WELLS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."