Jan. 18, 1927. 1,615,020

L. K. LOEHR ET AL

KEY BITTING MACHINE

Filed April 2, 1925 3 Sheets-Sheet 1

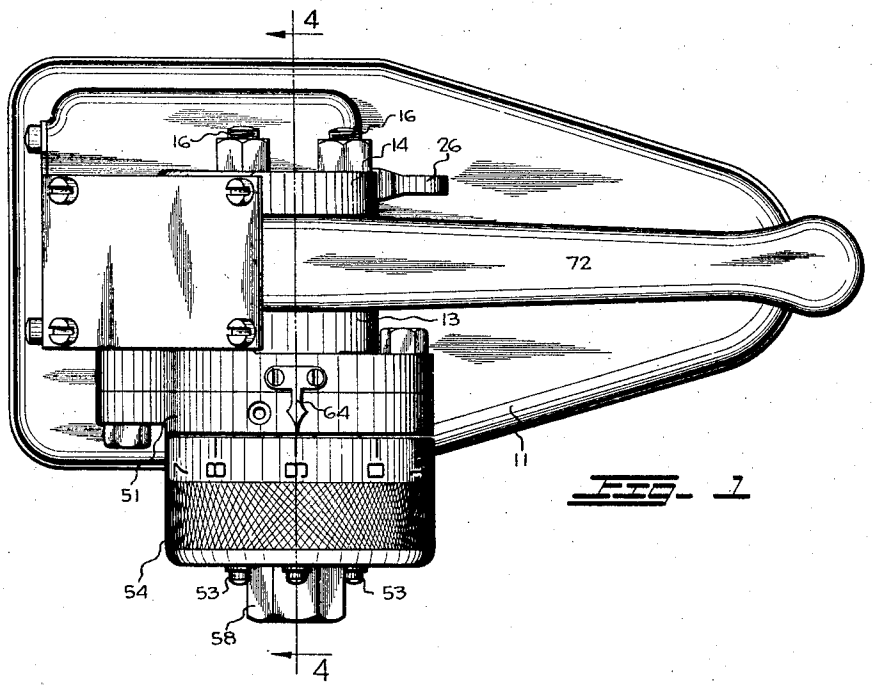
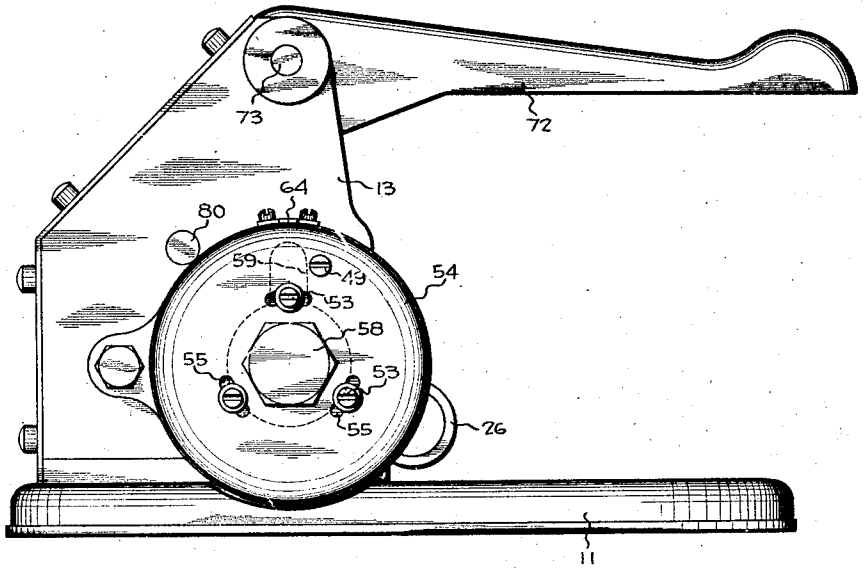


Fig. 1

Fig. 2



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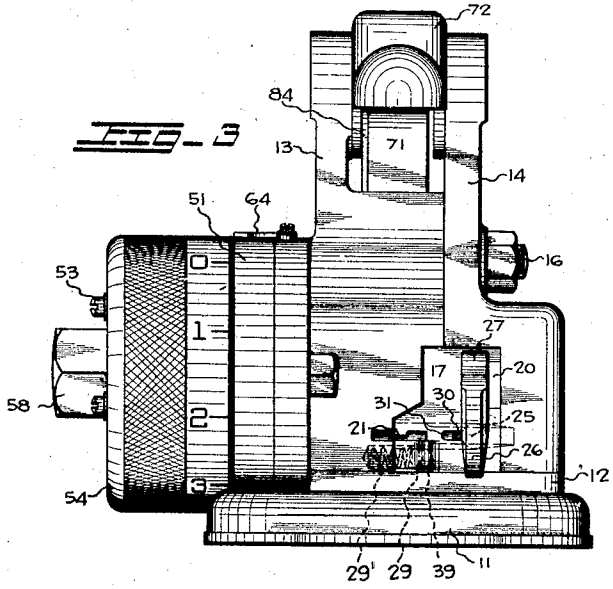


FIG. 3

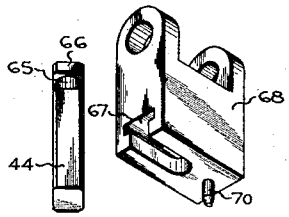


FIG. 7

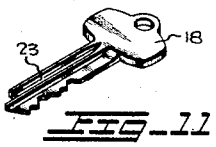


FIG. 11

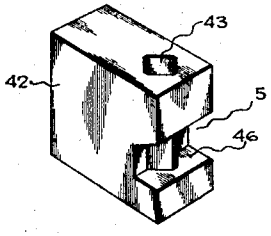


FIG. 8

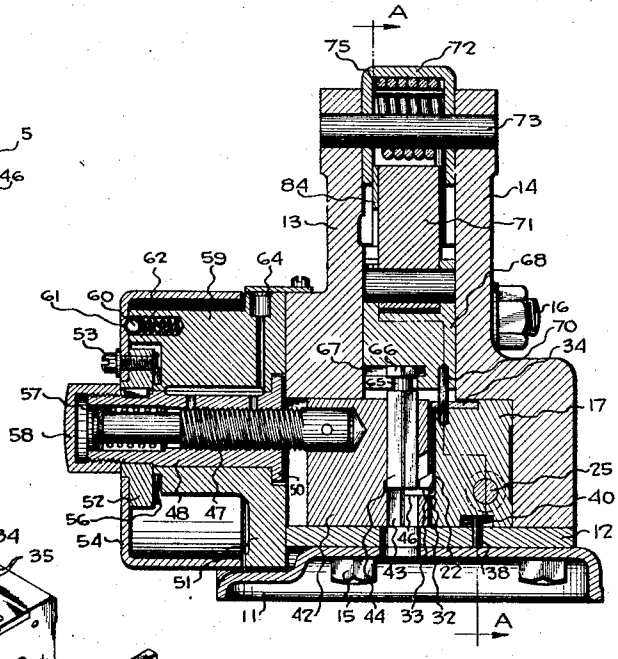


FIG. 4

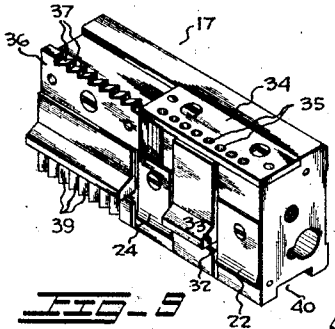
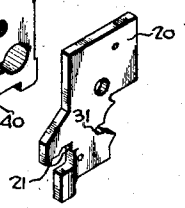


FIG. 9



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KEY BITTING MACHINE

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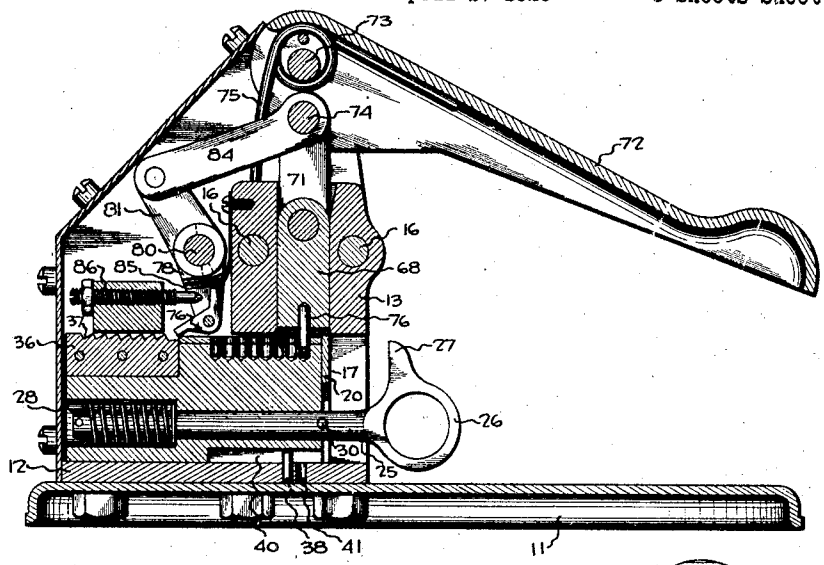

Fig. 5

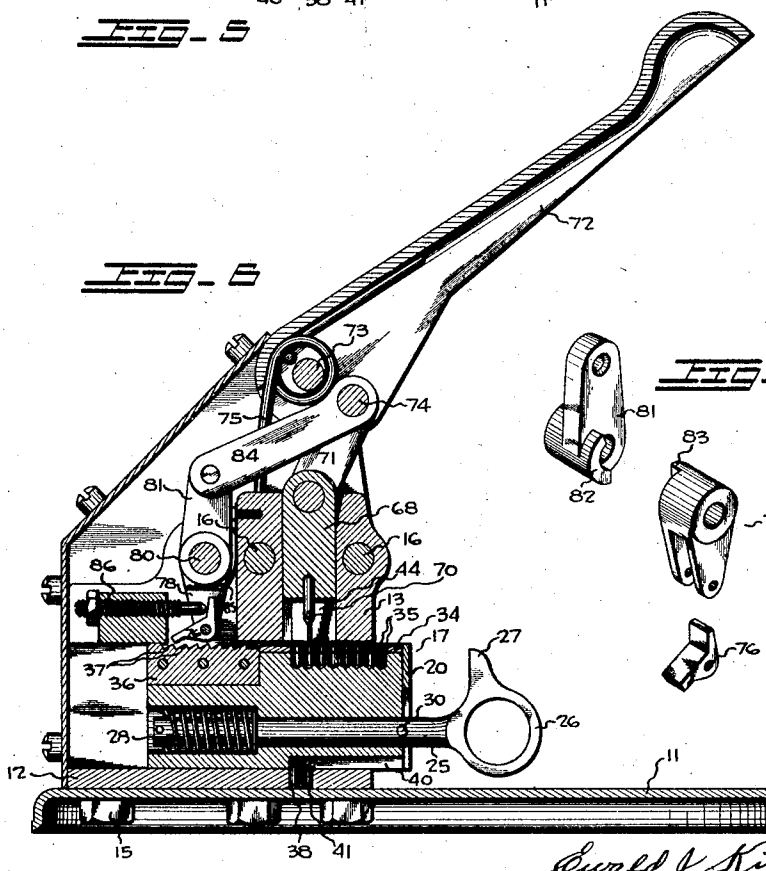

Fig. 6

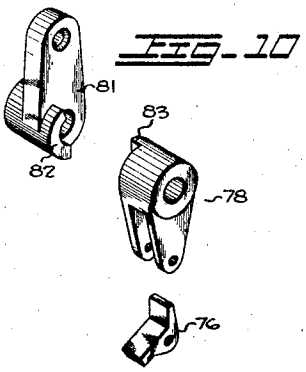

Fig. 10

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Patented Jan. 18, 1927. 1,615,020

UNITED STATES PATENT OFFICE.

LESLIE K. LOEHR AND EWALD J. KIND, JR., OF SEATTLE, WASHINGTON, ASSIGNORS TO FRANK E. BEST, INC., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

KEY-BITTING MACHINE.

Application filed April 2, 1925. Serial No. 20,281.

Our invention relates to improvements in key bitting machines and is in the nature of an improvement on the key bitting machine disclosed in the application of Ralph M. Mero and Franklin H. Harp of even date herewith.

The object of our invention is to provide a key bitting machine having rotatable dial means for selectively regulating the depth of the notches which the machine will cut in the edge of the key.

Further objects are to simplify and strengthen the construction of key bitting machines of this nature and to render the same more compact and more reliable and efficient in operation.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings Figure 1 is a plan view of a key bitting machine constructed in accordance with my invention showing the handle of the same in a partially depressed position.

Fig. 2 is a side elevation of the same.

Fig. 3 is a front elevation of the same.

Fig. 4 is a sectional view substantially on broken line 4—4 of Fig. 1.

Figs. 5 and 6 are sectional views substantially on broken line A—A of Fig. 4 showing the operating lever in the maximum lowered and raised positions respectively.

Fig. 7 is a detached isometric view of a cutting die and a die operating block.

Fig. 8 is a detached isometric view of a die block and guide for the die.

Fig. 9 is a detached isometric view of a key carriage and end plate therefor.

Fig. 10 is a detached isometric view of certain link and indexing devices embodied in the invention.

Fig. 11 is an isometric view of a key of the form that is adapted to be cut or bitted in this key bitting machine.

In each of Figs. 7, 9 and 10 several connected or closely related parts are shown as they might appear if moved a short distance apart thus affording an opportunity to better illustrate the same.

Referring to the drawings, throughout which like reference numerals designate like parts, 11 is a base on which is disposed an anvil plate 12, and 13 and 14 are two frame members secured in upright positions on said anvil plate and on said base by tap screws 15. The frame members 13 and 14 are also rigidly secured to each other as by screws or bolts 16 to form a rigid support for mechanism hereinafter described.

Guided for lengthwise movement on anvil plate 12 and in frame pieces 13 and 14 is a key carriage 17, Figs. 4, 5, 6 and 9 that is arranged to engage with and hold a key 18 of the form shown in Fig. 11. A plate 20, Figs. 3 and 9, is arranged to be secured to the forward end of key carriage 17 and is provided with a suitably shaped key slot 21, through which the key blank from which the key 18 is made may be inserted. A flat spring member 22 on the side of key carriage 17 is arranged to engage within a groove 23 in the key 18 to hold the back edge of said key securely against the key carriage. A plate 24 on the side of the key carriage serves as a stop against which the end of the key may abut when the same is fully inserted in the key carriage.

The key 18 is arranged to be held within the key carriage by a key lock bolt 25 having a finger ring 26 and lug 27 on the outer end, said lug being arranged to engage with the head of the key 18. The key lock bolt 25 is slidably disposed within a longitudinal bore in key carriage 17 and has a spring 28 on its inner end that urges it inwardly. When the device is not in use the key lock bolt 25 together with ring 26 and lug 27 on the end thereof will be in the position shown by full lines in the drawings. After a key blank is inserted the key lock bolt 25 is pulled outwardly and then turned through an angle of ninety degrees into the position shown by broken lines in Fig. 3, so that when it is released the lug 27 will press against the head of the key blank and hold the same in its innermost position. A pin 30 on the side of key lock bolt 25 operates in a groove 31 and prevents said key lock bolt from being turned until it has been pulled out.

When the key is inserted the back edge of the same is disposed between and supported by a lower more narrow ledge 32 and an upper wider ledge 33. Ledges 32 and 33 are preferably formed by milling the same on the side of key carriage 17 and may extend entirely to the rear end thereof although only those portions of said ledges near the forward end of the carriage are utilized for holding the key. For preventing the key

carriage 17 from stopping mid-way between two positions we provide a detent ball 29 urged toward carriage 17 by spring 29' see dotted lines Fig. 3 and arranged to seat in recesses 39 in the side of carriage 17 as shown in Fig. 9.

A plate 34 having a plurality of dowel holes 35 therein that register with corresponding holes in key carriage 17 is secured to the top of said key carriage 17 and an indexing plate 36 having ratchet notches 37 in its top edge is secured to the side of said key carriage 17.

A pin 38 extends upwardly through anvil plate 12 into a groove 40 in the bottom of the key carriage to limit the outward movement of the same. One or more extra holes 41 may be provided for adjustment of pin 38 to provide for the bitting of keys of more than ordinary length.

A die block 42 rests on anvil plate 12 and is guided in frame member 13 for movement toward and away from key carriage 17, said die block having a normally vertical substantially rectangular guide hole 43 within which a key bitting punch 44 may be operatively disposed and further having a notch 45 in its front end forming a shelf 46 on which the edge of the key that is being bitted may rest.

The die block 42 is arranged to be moved toward and away from the key carriage 17 to regulate the depth of cut of key bitting punch 44 by a screw 47 that is secured to die block 42 and is threaded into a long tubular nut 48. A flange 50 on the inner end of nut 48 takes the outward end thrust occasioned by the cutting operation of the key bitting punch. The nut 48 is rotatably mounted in a guide block or dial base 51 that is rigidly secured to frame member 13. The outer end of said nut 48 is secured to a disc 52 that is rigidly and adjustably connected by screws 53 to a cup-like dial 54 that fits over dial base 51. The screws 53 pass through slots 55, Fig. 2, in the end of the dial thus affording adjustment of the dial relative to nut 48. A spring 56 interposed between disc 52 and the end of dial base 51 urges nut 48 outwardly and prevents any play or slackness. In a similar manner a spring 57 on the end of screw 47 urges said screw outwardly and takes care of any wear or play in the threads of said screw, said two springs keeping the die block 42 always pulled over to the maximum position and preventing any sidewise movement when the key bitting punch 44 comes in contact with a key.

The graduated dial 54 together with the screw 47 and nut 48 constitute, in effect a micrometer device for adjusting and accurately positioning the die block.

A cap nut 58 covers the end of nut 48 and prevents removal of disc 52. A ball 60 operative in a hole in dial base 51 and urged outwardly by compression spring 62 is arranged to snap into a shallow recess 61 in the end of dial 54 to serve as a detent for positioning and holding said dial.

The dial 54 is graduated, preferably into ten equal spaces marked from 0 to 9 inclusive, and a pointer 64 is provided on frame member 13 to serve as a reference member to which the dial may be set.

A screw 49 in the end of the dial 54 engages with a stop wall on dial base 51 and limits the rotary movement of the dial 54 to slightly less than one complete revolution thereby making it possible to set the dial on any graduation from 0 to 9 inclusive.

The key bitting punch 44 has a smaller neck portion 65 that terminates in a head 66, said neck and head being arranged to fit slidably within a T shaped slot 67 in a punch operating block 68 that is reciprocably mounted in frame members 13 and 14, the T slot connection permitting the punch 44 to be moved toward and away from the key carriage 17.

The punch operating block 68 is provided with a dowel pin 70 that is arranged to enter one of the holes 35 in plate 34 and accurately position and hold the key carriage 17 while the key bitting punch is making a cutting stroke.

The punch operating block 68 is connected by a link 71 with an operating lever 72 that is fulcrumed on a pivot pin 75 in the upper portions of frame members 13 and 14. The pivot 74 connecting the upper end of link 71 with the lever 72 is arranged to move from the position shown in Fig. 6 to the position shown in Fig. 5 as the lever 72 is depressed thus producing a toggle action that gives a maximum leverage at the time the cut is being made.

A spring 75 normally holds the lever 72 in the raised position.

The key carriage block 17 is arranged to be indexed after each depression of lever 72 by a bell crank pawl 76 that is fulcrumed in the lower end of lever 78 that is mounted on transverse pivot 80. Another lever 81 also mounted on pivot 80 is provided with clutch element 82, Fig. 10, that engages with clutch element 83 on lever 78. A link 84 connects the upper end of lever arm 81 with the pivot 74 on operating lever 72. A flat spring 85 urges the pawl 76 into engagement with teeth 37 or ratchet plate 36 and an adjustable stop screw 86 is arranged in the path of said pawl to lift the same out of engagement with the teeth 37 at the end of the stroke.

The stop screw 86 makes it possible to release the pawl 76 at any desired point thus affording an accurate adjustment of the movement of the key carriage block. The final adjustment and holding of the key carriage 17 during the cutting operation is done

by the dowel pin 70 which descends into holes 35 while pawl 76 is released and is moving rearwardly and which is withdrawn from holes 35 just before pawl 76 begins the indexing movement of the key carriage, the clutch elements 82 and 83 on levers 81 and 78 respectively affording a limited amount of lost motion to permit the indexing and doweling movements to be carried out.

In the operation of this key bitting machine when a key is to be bitted the key blank is first inserted through key slot 21 and pushed into the carriage 17 until it strikes against the stop 24. The key carriage is then pulled out as far as possible into a position as shown in Fig. 6 and the key lock bolt 25 is pulled out relative to the carriage and turned through an angle of ninety degrees to cause the lug 27 on the head of said bolt to engage with the head of the key and hold the same in the carriage. When thus inserted the edge of the key that is to be bitted rests on the shelf 46 of die block 42 with the end of the same under the punch 44 and depression of operating lever 72 will move punch 44 downwardly and punch or cut a notch in the edge of the key. The depth of this notch will be determined by the setting of the dial 54. As the operating lever 72 is depressed on the cutting stroke the pawl 76 will be moved outwardly and will drop into engagement with a different one of the teeth 37. As soon as the operating lever 72 is released it will be raised by the spring 75 into the position shown in Fig. 6 and, as it moves upwardly will index or move the key carriage inwardly one notch thus moving the key blank in said key carriage into position for the cutting of the next successive notch. The dial 54 is reset after each notch is cut to gauge the depth of the next notch. By proceeding in this manner all of the notches may be cut in the key to depths that are determined by the settings of the dial.

The bitting punch 44 is preferably of rectangular cross sectional shape having four cutting corners so that if one corner becomes worn the punch may be turned in the block 42 and another corner used.

The use of the dial and screw for regulating the depth of the key notches makes possible a very compact and efficient construction and one by which very accurate adjustments and settings may be secured.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of our invention, but it will be understood that this disclosure is merely illustrative and that such changes in the same may be made as are within the scope and spirit of the following claims.

We claim:

1. In a key bitting machine, means for holding a key blank, means adjustable toward and away from said key blank for cutting notches of different depths therein and dial means controlling the adjustment of said cutting means.

2. In a key bitting machine, means for holding a key blank, a reciprocable punch adjustable toward and away from said key blank for cutting notches of different depths in the edge of said key blank and dial operated screw means controlling the adjustment of said punch.

3. In a key bitting machine a key carriage for holding a key, a punch adjustable toward and away from said key for cutting notches of different depths in the edge of said key, a screw for adjusting said punch toward and away from said key, a graduated dial for positioning said screw, and means for reciprocating said punch.

4. In a key bitting machine, a key carriage for holding a key, a punch, dial operated screw means for adjusting said punch toward and away from said key to vary the depth of the notches which said punch will cut in the edge of said key, means for reciprocating said punch and means for indexing said key carriage.

5. In a key bitting machine, a key carriage for holding a key, a punch, dial operated screw means for adjusting said punch toward and away from said key to vary the depth of the notches said punch will cut in the edge of said key, means for reciprocating said punch, means for indexing said key carriage each time said punch is reciprocated, and dowel means for positioning and locking said key carriage on the cutting stroke of said punch.

6. A key bitting machine, embodying a longitudinally movable key carriage arranged to receive and hold a key blank that is to have notches cut in one edge, a die block having a shelf on which the edge of said key is supported, a screw for moving said die block toward and away from said key, graduated dial and nut means for positioning said screw, a punch reciprocable in said die block for cutting notches in the edge of said key, a lever for reciprocating said punch, dowel means for positioning and holding said key carriage while said punch is making the cutting stroke and means for indexing said key carriage.

7. In a key bitting machine, the combination with a key cutting punch and operating mechanism therefor, of a carriage for holding a key blank, indexing means for the carriage to automatically space the notches cut in the key blank and dial operated screw means to selectively gauge the depth of said notches.

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