Aug. 18, 1936. R. W. GRIFFITH 2,051,139

KEY CUTTING TOOL

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Fig. 1.

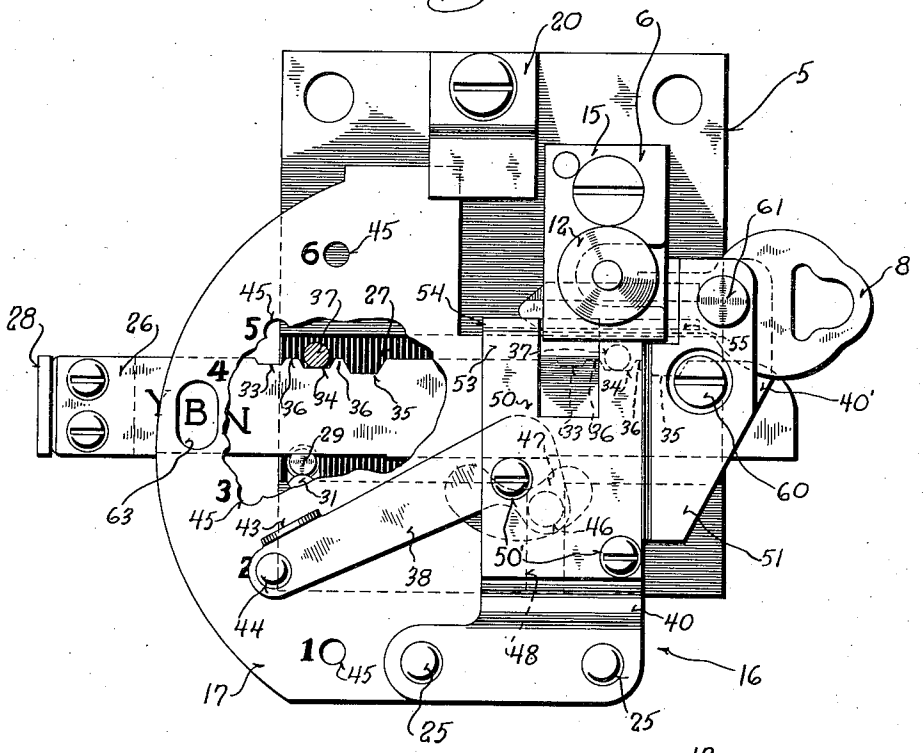
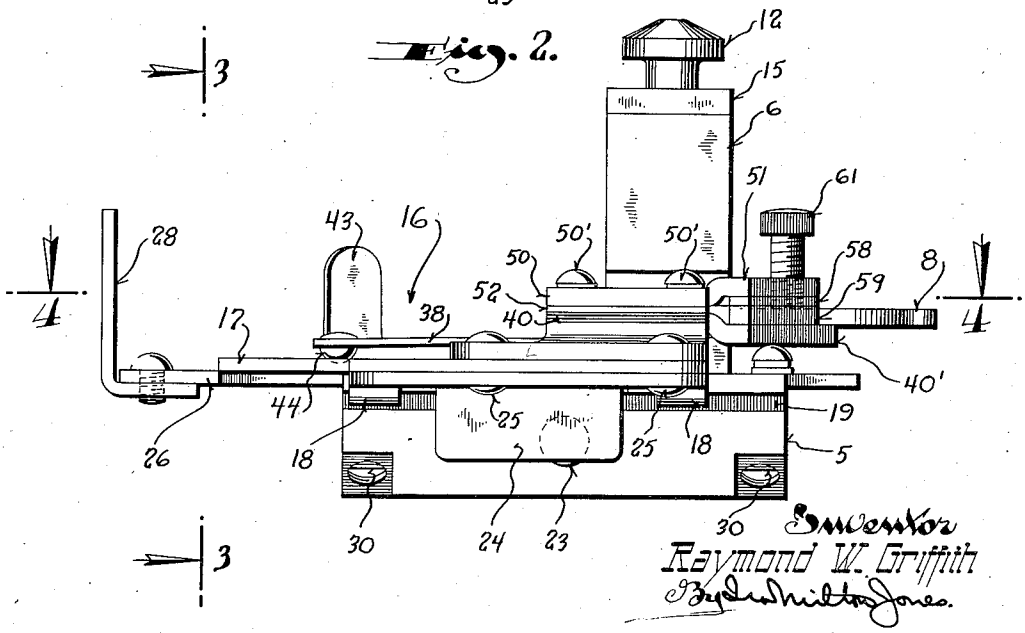


Fig. 2.



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Fig. 3.

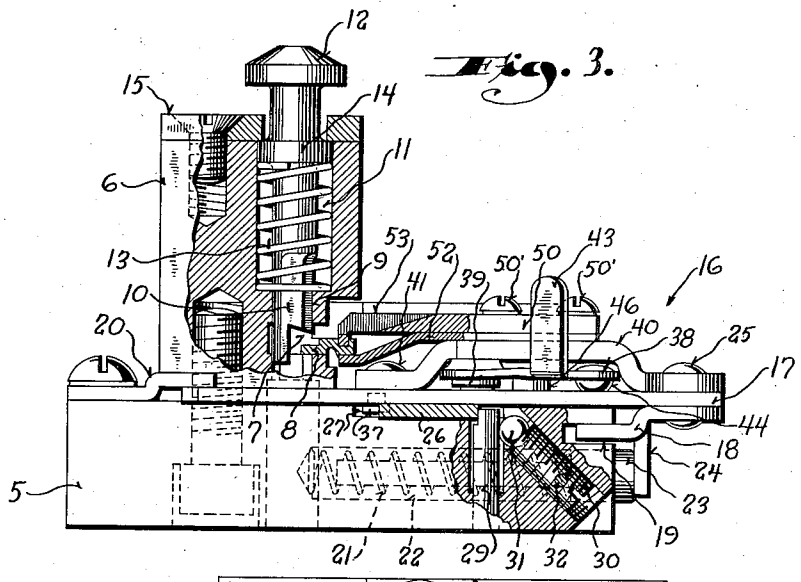
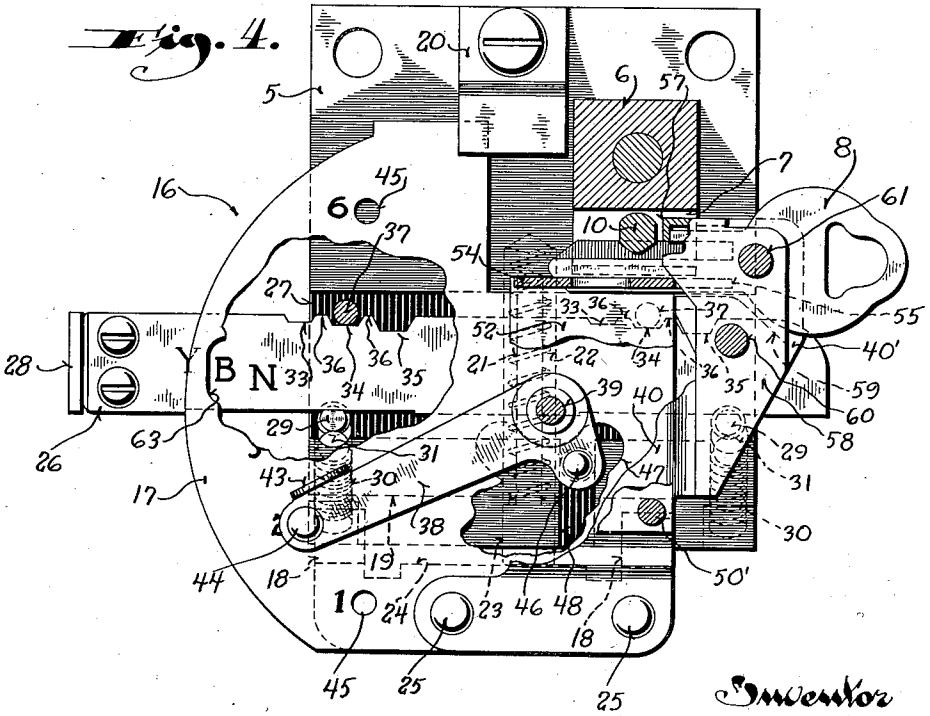


Fig. 4.



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2,051,139

KEY CUTTING TOOL

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Application April 8, 1935, Serial No. 15,269

7 Claims. (Cl. 164—50)

This invention relates to improvements in key cutting devices and has as an object to provide a simple fixture for cutting keys to fit any plate tumbler lock.

Another object of this invention is to provide a key cutting fixture of the character described wherein the cutting is done by means of a punch actuated by a percussive force, such as a hammer blow.

Another object of this invention is to provide a key cutting fixture of the character described which will securely hold the key accurately located with respect to the punch so as to insure accuracy in the cut key.

A further object of this invention is to provide a key cutting fixture of the character described which is so designed that the key blank to be cut is rigidly held in and quickly moved to the various settings to produce the desired contour.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a top plan view of a key cutting fixture constructed in accordance with this invention, parts thereof broken away to illustrate details of construction;

Figure 2 is a side view of the fixture;

Figure 3 is a section view taken through Figure 2 on the plane of the line 3—3; and

Figure 4 is a horizontal section view taken through Figure 2 on the plane of the line 4—4.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 designates the base of the fixture. Fixed to and extending up from the top face of the base is a punch 6.

The punch 6 comprises a substantially rectangular standard formed of hardened metal and having a recess 7 in one edge to provide a space into which the blade of a key blank 8 is positionable. A vertical bore 9 intersects the recess 7 so that a cutter 10 reciprocable in the bore 9 has its lower cutting end movable through the bottom wall of the recess which acts as an anvil to support the key blank during the cutting action of the punch.

The lower cutting end of the cutter 10 is substantially V-shaped in cross section so that the notches cut thereby into the key blank are V-shaped. The upper end portion of the cutter projects up through a counterbore 11 forming an extension of the bore 10 to have its extreme end projecting therefrom to provide a percussion head 12.

A coil spring 13 encircling the upper end portion of the cutter is confined between the bottom of the counterbore 11 and a collar 14 on the cutter to yieldingly maintain the cutter in an elevated position permitting ready disposition of a key blank under its cutting end. The upward projection of the cutter by the spring 13 is limited by the engagement of the collar 14 with a plate 15 secured to the top of the punch standard.

Obviously, with a key blank in position under the lower cutting end of the cutter, a percussive force applied to the head 12, as by a hammer blow, shears off the key blank to form a V-shaped notch to a depth determined by the position of the blank on the anvil provided by the lower wall of the recess 7. The longitudinal position of the V-shaped notch on the key blank is also determined by the relative position of the blank with respect to the punch.

It is, of course, understood that the bore 9 in which the cutter reciprocates extends on through the lower portion of the punch standard and communicates with a hole through the base so that the chips cut from the key blank are carried away from the field of operation.

To properly position the key blank with respect to the punch, a carriage indicated generally by the numeral 16 is mounted on the base. To this carriage the key blank is secured in a manner to be hereinafter described so that by controlling the position of the carriage on the base, and consequently its position with respect to the punch, the key blank may be properly located to have the notches cut therein at the proper longitudinal positions and to the proper depth.

The carriage 16 comprises a plate 17 stamped from relatively heavy sheet metal and disposed flatwise over the top of the base where it is held by a pair of hooks 18 slidably received in a groove 19 in the front of the base, and a clip 20 fixed to the rear portion of the base and overlying the adjacent marginal edge portion of the plate. The relative dimensions of the hoods 18 and the groove 19 in which they are received and the amount of overhang of the clip 20, is such that the plate 17 is permitted a degree of sliding movement on the base forwardly and backwardly as well as from side to side.

The plate is yieldingly urged toward the front edge of the base by a coil spring 21 disposed within a well 22 drilled into the base from the front face thereof. The outer end of the spring 21 engages a shoulder on a push pin 23 slidable in the well 22 and engaging a spring stop 24 fixed to the adjacent portion of the plate 17. As

a matter of convenience, the hooks **18** and the spring stop **24** are formed as a single stamping secured to the underside of the plate **17** by rivets **25**.

The spring actuated movement of the plate **17** is determined by the setting of a depth bar **26**. This depth bar is merely a flat metal strip longer than the width of the base and slidably received in a channel **27** cut down into the top face of the base to a depth substantially equal to the thickness of the depth bar. The bar is slidable longitudinally within the channel **27** and to facilitate such sliding movement thereof one end has a handle **28** fixed to it by which the bar may be readily grasped to slide the same from one position to another.

The forward edge of the depth bar slidably engages hardened pins **29** set in the base and adjustable by set screws **30** so that the depth bar may be properly located with respect to the punch. The upper extremities of the pins **29** are flattened to have a flat surface to surface engagement with the adjacent forward edge of the depth bar, and as best shown in Figure 3, the bores in the base in which these pins are seated are counter-bored so that the pins may be sprung slightly toward the depth bar by means of the set screws **30**.

To preclude binding between the set screws **30** and the pins **29** and insure proper adjustment of the pins through the medium of the set screws, the inner ends of the set screws have balls **31** through which the set screws press against the upper ends of the pins. After being properly adjusted, the set screws are locked against accidental displacement by pins **32**.

The marginal edge portions of the depth bar opposite the pins **29** have notches **33** and **34** and **35** which are progressively deeper and spaced from each other by tooth portions **36**. There are two such sets of notches **33**, **34** and **35**, one opposite each of the pins **29**.

Engageable with the bottoms of the notches **33**, **34** and **35** are lugs or pins **37** fixed to the plate **17**. Consequently, the force of the spring acting upon the plate **17** is reacted upon by the stop pins **29** and **37** with the depth bar **26** interposed therebetween and in view of the different depths of the notches **33**, **34** and **35**, it is readily apparent that by shifting the depth bar **36** longitudinally to align different notches with the pins **37**, the spring actuated movement of the plate **17** and consequently the relative position of the plate **17** with respect to the punch may be readily determined.

It also follows that through adjustment of the depth bar the depth of the notch cut in a key blank by the punch is determinable inasmuch as the key is securely mounted on the carriage during the cutting thereof, as will be hereinafter more fully described.

To shift the carriage **17** from side to side on the base so as to locate different longitudinal portions of the key blank in position to be cut, a spacer lever **38** is provided. The spacer lever **38** is pivoted as at **39** between the top of the plate **17** and a stirrup **40** extending across the top face of the plate **17** on one side thereof. The stirrup **40** is fixed to the top of the plate **17** by the rivets **25** and a third rivet **41**.

The lever **38** is a bell crank lever and at the extremity of its long arm it has an upturned handle **43** and a button **44** engageable in any one of six holes **45** arranged in an arc about the pivot **39**. These six holes represent the six positions of the notches on the key blank designated by the numerals **1** to **6**, inclusive, stamped on the plate **17** alongside their respective openings **45**.

The small arm of the bell crank lever **38** has a pin **46** which projects through an arcuate slot **47** in the plate **17** to engage in an open groove **48** in the face of the base plate, the groove **48** being parallel with the sides of the base. Hence, the pin **46** by being disposed in the groove **48** is held against movement from side to side on the base so that when the lever **38** is swung about its pivot **39**, the entire carriage structure is moved from side to side on the base a distance corresponding to the angular motion of the lever **38**.

It is thus seen that through the medium of the depth bar **26** and the spacer lever **38**, the position of the carriage **16** and the key blank carried thereby may be readily adjusted and set at predetermined definite positions with respect to the punch.

The means for clamping the key blank to the carriage comprises an arm **40'** formed as an integral part of the stirrup **40** and a plate **50** overlying and fixed to the stirrup by screws **50'**, with an extension **51** shaped to overhang the arm **40'**. Between the stirrup **40** and the plate **50** is a flat plate-like spring **52**, one end portion of which recedes from the rear edge portion **53** of the plate **50**.

This rear edge portion **53** is bent downwardly and reduced in thickness to form a sharply defined rib or fin **54** engageable in the usual longitudinal groove **55** formed in one side of the blade of the key blank to hold the key blank in a predetermined fixed position on the carriage. The spring **52** holds the key blank properly engaged with the guide fin **54**. Longitudinally, the position of the key blank **8** on the fin **54** is defined by the engagement of the usual shoulder on the edge of the key blank to be cut, with a stop **57** formed as a shoulder on a stamping **58**. The stamping **58** is confined between the arm **40'** and the extension **51**. A spacer **59** is also positioned between the arm **40'** and the stamping **58**, and a screw **60** holds these parts securely clamped together.

To detachably secure the key blank in position, a thumb screw **61** is threaded in the arm **51** to bear down on the blank and clamp the same against the arm **40'**. Insertion and removal of the key is thus a simple matter.

Operation

The lock for which keys are cut by means of this fixture has six tumblers cut to four different depths. The depths are indicated by the letters C, N, B and Y. The depth C requires no cutting of the key as it takes the full width of the blank.

The position of the cuts on the key are indicated by the numbers **1**, **2**, **3**, **4**, **5** and **6**, starting from the head of the key. Assuming that the code combination to which the key is to be cut is as follows:

1—2—3—4—5—6
N—B—C—N—Y—B

to cut a blank to this combination, the blank is first inserted into its holder or clamp in the manner hereinbefore noted. Care should be taken that the blank is pushed all the way in until the stop **57** engages the shoulder on the edge of the blank to be cut. With the key blank in position, the thumb screw is then tightened.

The spacer lever is next moved to position "1" for the first cutting. Then the depth bar is moved longitudinally until the letter "N" appears in the indicator opening 63 cut through the plate 17. In view of the tooth portions 36 on the depth bar, it is necessary to push the carriage toward the punch against the action of the spring 21 before the bar can be shifted longitudinally. This is conveniently done by pressing the carriage with the thumb of the right hand rearwardly toward the punch, about which the fingers of the right hand engage.

With the depth bar properly located, the punch is hit a quick sharp blow with a light hammer.

To make the second cut, the spacer lever is moved to position "2", when the carriage is again compressed to allow the depth bar to be shifted so that the letter "B" appears in the indicator window 63. This procedure is repeated until the entire combination has been completed, it being remembered that the depth "C" requires no cutting as the full width of the blank is used for this depth.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains, that this invention provides a simple easily operated key cutting fixture wherein keys may be quickly and accurately cut to any desired combination.

What I claim as my invention is:

1. In a key cutting fixture, a base, a cutter mounted on the base and adapted to cut notches into a key blank presented to it, a carriage to hold and present a key blank to the cutter, means mounting the carriage on the base for movement toward and from the cutter to present more or less of the key blank to the cutter, a spring to yieldingly urge the carriage in one of said directions, and adjustable means to limit the motion of the carriage induced by the spring to definite selected distances, said last named means comprising abutments on the carriage and the base and a spacing member between the abutments having portions of different widths so that by shifting the spacing member the limits of movement of the carriage by the spring are determined.

2. In a key cutting fixture, a base, a cutter mounted on the base and adapted to cut notches into a key blank presented to it, a carriage to hold and present a key blank to the cutter, means mounting the carriage on the base for movement toward and from the cutter to present more or less of the key blank to the cutter, a spring to yieldingly urge the carriage in one of said directions, an abutment on the base, an abutment on the carriage in line with the first mentioned abutment and movable towards it in response to the action of the spring, and a depth bar positioned between the abutments, said depth bar having notches of different depths with which one of the abutments is engageable so that the limit of motion defined by the abutments and the depth bar is adjustable.

3. In a key cutting fixture, a base, a cutter mounted on the base and adapted to cut notches into a key blank presented to it, a carriage to hold and present a key blank to the cutter, means mounting the carriage on the base for movement toward and from the cutter to present more or less of the key blank to the cutter, a spring to yieldingly urge the carriage in one of said directions, aligned abutments on the carriage and base movable toward each other in response to the spring actuated movement of the carriage, and a depth bar disposed between the abutments and slidable longitudinally to dispose different portions thereof between the abutments and said different portions being of different widths so as to afford adjustment for the limit of motion of the carriage induced by the spring.

4. A key cutting fixture of the character described comprising a base having a flat top, a cutting unit so mounted as to have a cutting stroke substantially perpendicular to the flat top of the base, a carriage adapted to hold a key blank in position to be acted upon by said cutting unit, means mounting said carriage for movement flatwise across the top of the base, said means including a plate upon which said carriage is mounted constrained to move flatwise across the top of the base back and forth in two directions, and means for moving the plate flatwise across the base in a direction to carry the key blank longitudinally past the cutting unit comprising a bell crank lever overlying the top of the plate, means pivotally mounting the bell crank lever on the plate, and means carried by one arm of the bell crank lever and passing through the plate and engaging the base, whereby swinging movement of the other arm of the bell crank lever moves the plate and the carriage in said designated direction.

5. In a key cutting fixture of the character described, a base having a flat top, a plate constrained to move flatwise across the top of the base back and forth in either of two directions, means on said plate to hold a key blank, a bell crank lever overlying the top of the plate and pivoted at its apex to the plate, said bell crank lever having a long and a short arm, a pin carried by the short arm of the lever and passing through the plate for engagement with the base whereby swinging movement of the long arm of the lever moves said plate across the base in a direction to carry the key blank longitudinally of itself, and a cutter fixed on the base for cutting notches into portions of the key blank as they are presented thereto.

6. In a key cutting fixture of the character described, a base having a flat top, a plate constrained to move flatwise across the top of the base back and forth in either of two directions, means on said plate to grip and hold a key blank to be cut, a cutter fixed on the base for cutting notches of different depths and at different portions of the key blank depending upon the position of the plate on the base, an adjusting member movable between the plate and the base for defining different locations of the plate to determine the depth of the notches to be cut, and an adjusting member overlying the flat top of the plate and operable to shift the plate in a direction to carry the key blank longitudinally of itself past the cutter so as to present different longitudinally spaced portions of the blank to the cutter.

7. In a key cutting machine, a base having a flat top, a cutter mounted on the base and adapted to cut notches into a key blank presented to it, a carriage to hold and present a key blank to the cutter including a flat plate constrained to move flatwise across the top of the base back and forth in either of two directions, movement in one of said directions presenting more or less of the key blank to the cutter to determine the depth of the notches and movement in the other direction carrying the key blank longitudinally of itself past the cutter to present different longitudinally

spaced portions of the blank to the cutter, a spring to yieldingly urge the carriage forward in said first direction toward the cutter, a depth bar slidable between the plate and the base and operable to selectively determine the position to which the carriage is so moved by the spring to govern the depth of the notches to be cut, and an adjusting lever pivoted to the top of the plate and connected to the base for sliding the carriage back and forth in the second designated direction to present longitudinally spaced different portions of the blank to the cutter.

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