Dec. 30, 1969 S. REISNER 3,486,226

PORTABLE KEY CUTTER AND KEY CODER

Filed July 31, 1968

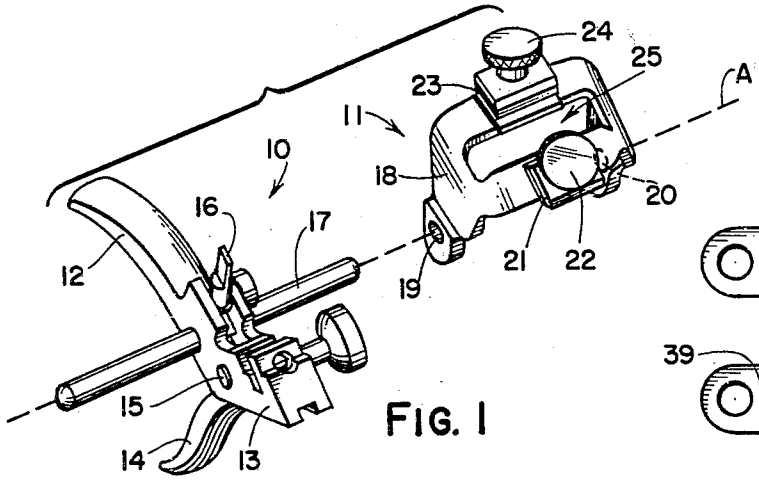


FIG. 1

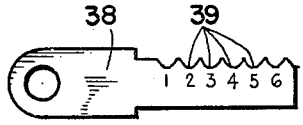


FIG. 4



FIG. 5

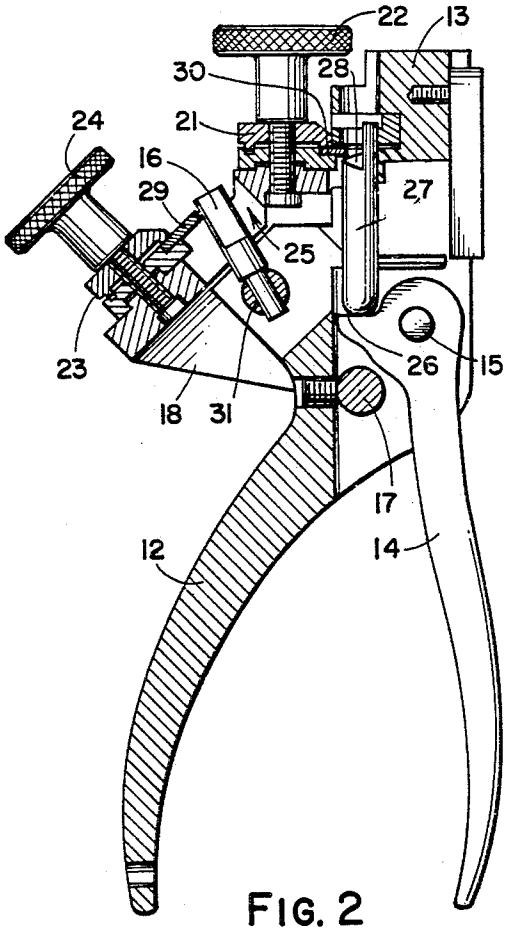


FIG. 2

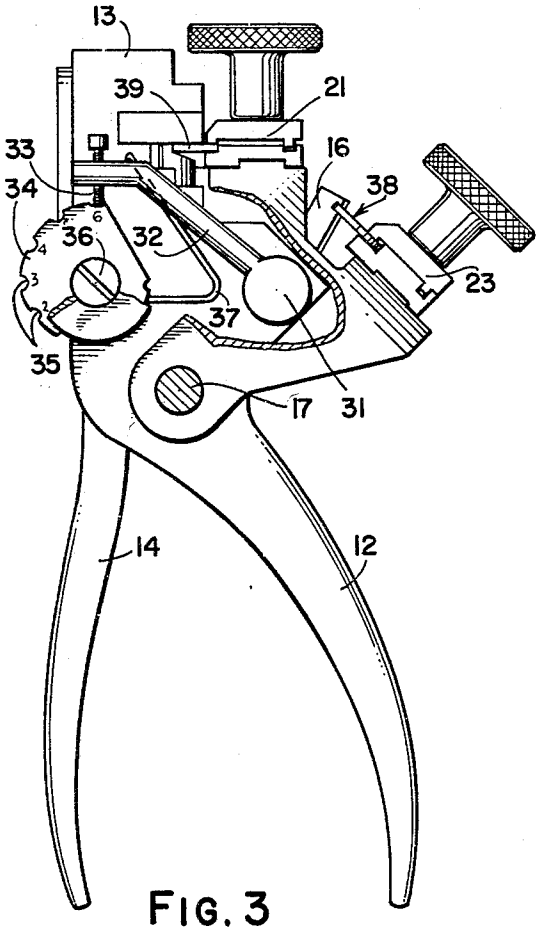


FIG. 3

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PORTABLE KEY CUTTER AND KEY CODER

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ABSTRACT OF THE DISCLOSURE

A portable, hand-operated key cutter or duplicator is provided with improved blank and master key locking jaws and a novel coding mechanism enabling keys having specific indentations formed in accord with a desired code to be readily cut. The key cutter itself includes a hand grip cutter having a handle portion and a lever portion together with a suitable stylus. A key carriage structure in turn is coupled for rotative and guiding movement to the hand grip cutter and includes blank key locking jaws and master key locking jaws for holding blank and master keys respectively. The arrangement is such that the carriage can rotate and transversely move along the guide for the hand grip cutter by causing the stylus to follow indentations in the master key and corresponding individual indentations may be cut by the cutter in the blank key. A code wheel and stop mechanism is provided for enabling the stylus to be adjusted at a series of different given spacings from the cutter portion of the hand grip cutter to control the depth of a cut in cutting a code key. In this instance, the spacer code key is substituted for the master key to enable a desired spacing of the indentations of desired depth to be effected along the code key to be manufactured.

This invention relates generally to key duplicating devices and more particularly to an improved portable hand-operated key cutter or duplicator incorporating novel means for manufacturing coded keys.

BACKGROUND OF THE INVENTION

Portable hand-operated key cutters or duplicators are well known in the art. Generally these devices comprise two principal elements. First, there is provided a hand grip cutter having a cutter head and a suitable pivoted lever for closing clipping jaws or cutter blades in the head upon pivoted movement of the lever. The hand grip cutter also includes a stylus held at a fixed position from the cutter head and a suitable guide means in the form of a transverse rod rigidly fixed to the hand grip structure. Second, there is provided a key carriage device received on the guide rod for rocking and transverse movement. This key carriage includes blank key and master key locking jaws for holding a blank key and a master key in positions adjacent to the cutter head and stylus respectively. The arrangement is such that by causing the stylus to follow indentations in the master key, the resulting rocking and transverse movement of the key carriage will result in proper positioning of the blank key with respect to the cutter head to enable corresponding indentations to be cut in the blank key by operation of the lever.

Key cutters of the foregoing type can only receive certain types of keys wherein indentations are to be cut along only a single edge of the key shaft. Further, the keys themselves can usually only be received from one side of the locking jaws. Finally, there must always be provided some type of master key in order to form a duplicate key; that is, the versitility of the key cutter is somewhat limited in that only duplicate keys can be made and cutting of original key indentations in accord with a desired code is not possible.

BRIEF DESCRIPTION OF THE PRESENT INVENTION

With the foregoing in mind, the present invention comprehends the provision of an improved portable type hand-operated key cutter or duplicator incorporating improved locking jaws for the blank and master keys such that symmetrical type keys may be received in either side of the jaws and indentations may be cut on either or both sides of the key shaft. In addition, the structure includes a novel code wheel arrangement permitting the given spacing between the stylus and cutter head itself to be adjusted to a number of different positions so that a depth control of the cutting of a blank key is provided. In conjunction with this depth control, there is provided, in accord with a preferred embodiment of the invention, a spacer code key to be substituted in the master key locking jaws and including evenly spaced indentations identified by successive numerals such that a desired indentation depth and spacing can be effected on a blank key to thereby provide a code key. The particular code for the key is determined by the setting of the code wheel to control the depth of the indentation and the particular indentation in the code spacer key as designated by the corresponding numeral assigned thereto which determines the spacing between the indentations cut on the blank key.

As a consequence of the foregoing features, the portable key cutter of this invention provides a greatly improved device of far greater versitility than has characterized prior art devices.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention will be had by now referring to a preferred embodiment thereof as illustrated in the accompanying drawings, in which:

FIGURE 1 is an exploded perspective view illustrating some of the basic elements making up the key cutter of this invention;

FIGURE 2 is a side elevational view partly broken away and partly in cross section illustrating the elements of FIGURE 1 is assembled relationship;

FIGURE 3 is a view similar to FIGURE 2 illustrating the opposite side of the key cutter of FIGURE 2;

FIGURE 4 is an elevational view of a code spacer key which may be used in combination with the cutter of FIGURES 2 and 3; and,

FIGURE 5 is an elevational view of a code key manufactured in accord with the coding feature of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGURE 1 there is shown at **10** and **11** a hand grip cutter and a key carriage respectively constituting the two basic structural elements making up the portable key cutter. For convenience in illustrating the invention, the key carriage **11** is shown separated or exploded from the hand grip cutter **10**.

Considering first the hand grip cutter **10**, this element includes a handle portion **12** terminating at one end in a cutter head **13**. A lever **14** forming a complementary handle for the handle portion **12** is pivoted to the handle portion at **15** in a position spaced below the cutter head **13**. The hand grip cutter also includes a stylus member **16** which is held at a given spacing from the cutter head by a suitable coupling means which will be described in greater detail subsequently. A guide rod **17** extends transversely through the handle portion **12** below the cutter head and stylus means **16** and is rigidly secured to the handle portion to maintain a fixed spacing from the cutter head.

Referring now to the key carriage element **11**, this structure includes a yoke **18** having aligned openings **19**

and **20** arranged to receive the guide rod **17**, the yoke structure straddling the handle portion through which the guide rod passes. The yoke structure includes blank key locking jaws **21** for holding a blank key in a position adjacent to the cutter head when the key carriage is assembled on the hand grip cutter **10**. A tightening knob **22** permits ready insertion and locking of the blank key in the key jaws **21**. The yoke also supports master key locking jaws **23** in fixed spaced relationship to the locking jaws **21**. A tightening knob **24** is provided for enabling ready insertion and locking of a master key in the jaws **23**. An open space **25** is defined between the respective locking jaws through which the stylus **16** extends when the yoke of the key carriage is assembled on the guide rod **17** of the hand grip cutter **10**. The arrangement is such that the master key locking jaws **23** are positioned adjacent to the stylus when the blank key locking jaws **21** are positioned adjacent to the cutter head **13**.

It will be evident from the foregoing arrangement that the key carriage **18** may rock on the guide rod **17** and may also move transversely along the rod **17** such as to effect relative movement between the stylus **16** and the master key locking jaws **23**. The blank key locking jaws **21** will follow all movements of the master key locking jows **23** in view of their rigid structural relationship on the yoke **18**.

Further details of the portable key cutter will be evident from FIGURES 2 and 3. Referring first to FIGURE 2, it will be noted in the broken-away portion that the upper end of the lever **14** terminates in a cam surface **26** arranged to engage the lower end of a cam follower plunger **27** terminating in a cutter **28**. With this arrangement, it will be clear that clockwise pivoting movement of the lever **14** about the pivot **15** will urge the cam follower plunger **27** upwardly to effect a cutting operation.

In FIGURE 2, the key carriage is shown assembled on the guide rod **17**. A master key **29** in turn is shown locked into the master key locking jaws **23** after tightening of the knob **24**. These jaws are symmetrical about a center line normal to the axis of the guide rod **17** so that the key **29** may be inserted from either side of the jaws. With the master key **29** secured within the jaws **23** and the key carriage structure rocked in a clockwise direction about the guide rod **17**, the various indentations in the master key shaft will bear against the stylus **16**. This rocking movement of the key carriage will also result in a blank key such as indicated at **30** held within the blank key locking jaws **21** being positioned adjacent to the cutter **28** in the cutter head **13**. Since the master key locking jaws and blank key locking jaws are in rigid fixed relation to each other in view of their support on the common yoke **18**, it will be clear that slight rocking movements and also transverse movements along the rod **17** of the key carriage will result in simultaneous identical movements of the master key **29** and blank key **30**. With the stylus **16** at a fixed given spacing from the cutter head, a blank key **30** may have indentations cut therein by simply causing the stylus **16** to follow the indentations in the master key **29** and at each indentation, pivoting the lever **14** to operate the cutter and clip out a corresponding indentation in the blank key.

An important feature of the present invention relates to the provision of a coding means on the portable key cutter enabling the manufacture of coded keys. This feature takes the form of a novel coupling means for holding the stylus **16** at adjustable given spacings from the cutter head **13** and can best be understood by reference to FIGURE 3 which shows the side of the cutter opposite to that shown in FIGURE 2.

This coupling means includes a pivot shaft **31** secured to the stylus and pivotally mounted to the handle portion **12** as shown in both FIGURES 2 and 3. The end portion of the shaft **31** in FIGURE 3 includes a radially extending stop arm **32** terminating at its free end in a stop pawl **33**. A code wheel **34** in turn is provided with a spiral periphery having indexing indents **35**. The rotative position of the code wheel **34** may be set as by suitable knob shaft **36** to position one of the indexing indents **35** in engagement with the stop pawl **33**. Because of the spiral configuration of the code wheel **34**, it will be clear that each index indent **35** will effect a different radial position of the stop arm **32** and thus rotative position of the pivot shaft **31**. This action in turn will vary the spacing of the stylus **16** relative to the cutter head **13**. For example, in the code wheel position illustrated in FIGURE 3, maximum given spacing between the stylus **16** and cutter **13** is provided. If the code wheel **34** were rotated to position the radially inwardly-most indent **35** against the stop pawl **33**, the stylus would be swung in a counterclockwise direction about the axis of the pivot shaft **31** to position it at a minimum spacing from the cutter head **13**. Any set position of the stop arm **32** and pawl **33** is maintained by a bias spring **37**.

The foregoing stylus spacing arrangement and code wheel is utilized in conjunction with the manufacture of code keys and towards this end, there is provided a code spacer key indicated at **38** in FIGURE 3 which is substituted in the master key locking jaws **23** for a normal master key. The code key to be manufactured is formed from a code key blank indicated at **39** in the key blank locking jaws **21**.

FIGURE 4 illustrates the code spacer key **38** wherein it will be noted that there are provided a succession of evenly spaced indentations or notches **39** with an associated successive numeral.

FIGURE 5 illustrates the coded key made from the code spacer key and use of the code wheel described in FIGURE 3. As shown, the coded key **39** includes two notches spaced at the numeral indications **3** and **6** which correspond to the spacing between the notches **3** and **6** on the code spacer key **38** and each has a depth *d* which depth is determined by the setting of the code wheel **34**.

OPERATION OF THE INVENTION

The operation of the portable key cutter and key coder described in conjunction with the drawings will now be set forth.

Initially, the key carriage **11** of FIGURE 1 is positioned on the guide rod **17** during the assembly of the portable key cutter so that the two elements are always coupled together.

Assuming first that it is desired merely to duplicate a known master key, the tightening knob **24** for the master key locking jaws **23** is first loosened and a master key such as indicated at **29** is inserted in the jaws. As mentioned, the jaws are symmetrical about a midline normal to the axis of the guide rod **17** so that the key **29** may be easily inserted from either end. The shoulder of the key shaft abuts against the edge of the locking jaws so that consistent positioning is realized.

Next a key blank **30** is secured by the tightening knob **22** in the key blank securing jaws **21**. Again, the key blank may be inserted from either side of these jaws as they are similarly symmetrical about a midline. However, it is important that the orientation of the key blank be the same as the orientation of the master key.

With the master key and blank key properly secured, an operator may hold the handle **12** and lever **14** in his right hand in a normal gripping position. Assuming that the heads of the master key and blank key are facing away from the view of FIGURE 2, the key carriage will be slid along the guide rod **17** in a direction out of the plane of the drawing of FIGURE 2 until the stylus **16** abuts against the first notch closest to the key head on the shaft of the master key **29**. The stylus **16** is caused to enter the first notch by effecting simple rocking movement of the key carriage **18**. This movement will then position a corresponding portion of the blank key shaft adjacent to the cutter **28** in the cutter head **13**. With the elements held in this manner, the operator will then squeeze the lever **14** and handle **12** to rotate the lever

and thereby cam the plunger **27** upwardly to effect a clipping of an indentation in the blank key **30**. The key carriage is then rocked to the left as viewed in FIGURE 2 to free the stylus **16** from the first notch and the key carriage is slid into the plane of the drawing along the guide rod **17** until the stylus **16** is juxtaposed the next notch. The key carriage is then rocked in a clockwise direction to cause the stylus **16** to be completely received in the next notch. If this notch is of greater depth, the degree of rocking movement in a clockwise direction will be greater so that the blank key **30** will be positioned further into the cutter head **13**. The operator will then again clip or cause an indentation to be formed in the blank key **30**. This operation is continued until the blank key has been cut with indentations corresponding to those on the master key. The respective keys may then be removed.

When the device is to be employed in manufacturing a coded key, the code spacer key **38** described in FIGURE 4 is substituted for the master key **29**. With particular reference to FIGURE 3, assume that the desired code key to be manufactured is to have notches appearing only at the number **3** and number **6** positions as described in FIGURE 5 and also assume that these notches are to have a given depth *d*. In this event, the proper depth *d* is effected by the code wheel **34**, the same being rotated to a position to receive the stop pawl **33** and thus position the stylus **16** from the cutter head **13**. This particular positioning of the stylus **16** with respect to the cutter head **13** will determine the extent that the shaft of the blank key **39** is received in the cutter head when the stylus **16** is received in one of the indentations **39** of the code spacer key **38**. As shown in FIGURE 3, with the code wheel set in the position illustrated a maximum depth cut will result in the blank key **39**. If the code wheel were rotated to position the spiral peripheral surface at a minimum radial spacing, the entire key carriage would have to be rotated in a slightly further clockwise direction before the stylus **16** would be received in one of the notches **39** of the code spacer key. As a result, the blank key **39** would be withdrawn slightly from the cutter head **13** so that a much shallower cut would result.

To effect the desired cuts at the numerical positions designated **3** and **6**, the operator will first position the stylus **16** in the number **3** notch of the code spacer key **38**. The blank key **39** will then be in a position to be cut and by operating the clipper in the manner as already described, the cut of depth *d* and designated by the numeral **3** will result as shown in FIGURE 5. Next, the operator will move the stylus to the notch **6** in the code spacer key **38** and again effect a clipping operation on the blank key **39** to produce the indentation designated **6** in FIGURE 5.

The code of the resulting key is thus determined by both the longitudinal position of the notch or indentation along the key shaft and the depth of such indentation. While the depth *d* is the same for both the slots or indentations **3** and **6**, the code wheel could have been changed after the slot or indentation **3** had been cut and a new depth provided for the code slot or indentation **6**.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved portable key cutter and key coder wherein a far more versatile device results.

What is claimed is:

1. A portable key cutter comprising, in combination:

(a) a hand grip cutter including:

(1) a handle portion terminating at one end in a cutter head;

(2) a lever pivoted to said handle for operating said cutter head;

(3) a stylus means;

(4) coupling means holding said stylus means at a given spacing from said cutter head, said coupling means being adjustable; and

(5) a guide rod extending transversely through and secured to said handle portion at a point spaced below said cutter head and stylus means; and

(b) a key carriage in the form of a yoke having aligned openings receiving said guide rod and including:

(1) blank key locking jaws for holding a blank key in a position adjacent to said cutter head; and

(2) master key locking jaws for holding a master key in a position adjacent to said stylus,

whereby relative rocking movement of said carriage about said guide rod and relative transverse movement of said carriage along said guide rod can take place by causing said stylus to follow the pattern of said master key thereby causing said blank key jaws to position said blank key relative to said cutter head to permit a duplicate indentation pattern to be cut in said blank key by pivoting said lever at each indentation to operate said cutter head.

2. A portable key cutter according to claim **1**, in which said coupling means includes a pivot shaft secured to said stylus and pivotally mounted to said handle portion; a stop arm secured to said shaft, extending radially therefrom, and terminating at its free end in a stop pawl; and a code wheel rotatably mounted to said arm and having a spiral periphery adjacent to said stop pawl, whereby rotative positioning of said code wheel causes a portion of said periphery to engage said pawl and thereby adjust the value of said given spacing of said stylus from said cutter head so that a desired depth of a cut in said blank key is determined by the setting of said code wheel and the position of said cut along the key blank may be determined by positioning of said stylus in a desired indentation in a code spacer key substituted for said master key.

3. A portable key cutter according to claim **2**, including, in combination, said code spacer key, the code on said key comprising a series of equally spaced indentations along the edge of the shaft of said key of equal depth identified by successive numerals, respectively.

4. A portable key cutter according to claim **1**, in which said blank key locking jaws and said master key locking jaws are symmetrical about a center line normal to said guide rod such that symmetrical type keys may be received from either side of said jaws and either side edge of the shafts of such symmetrical keys received in said jaws may be exposed in effecting a key duplicating operation.

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GIL WEIDENFELD, Primary Examiner

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83—917; 90—13.05