

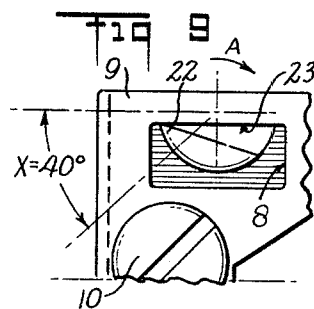
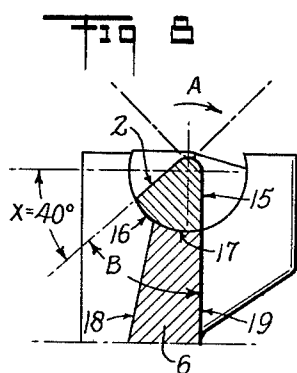
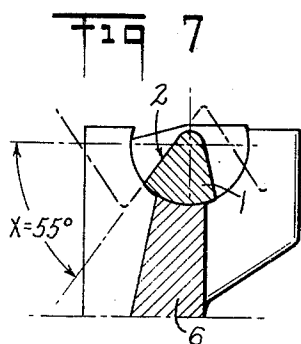
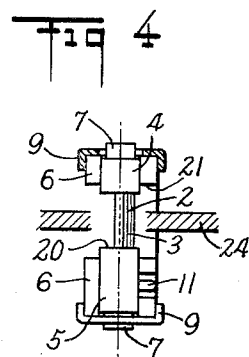
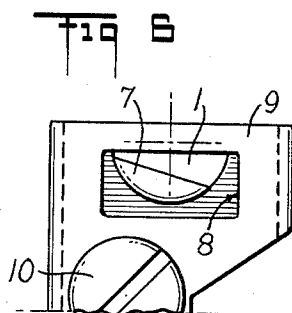
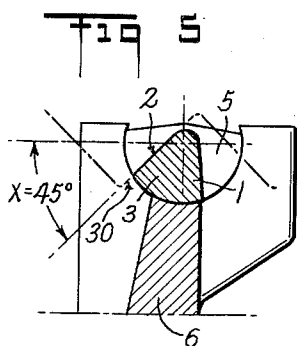
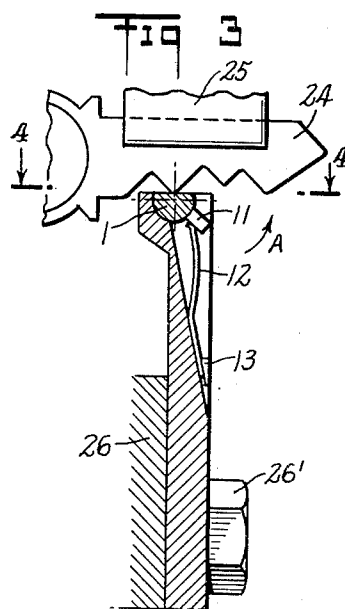
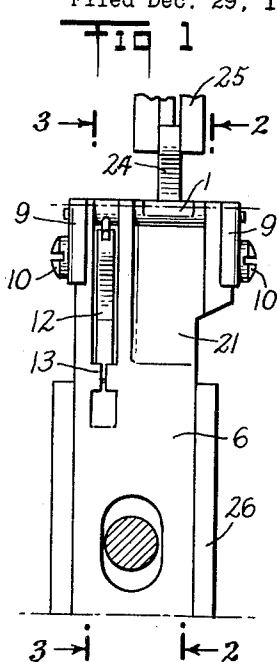
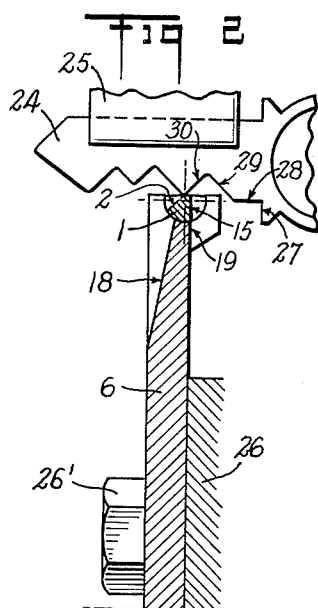
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FEELER FOR KEY COPYING MACHINE

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FEELER FOR KEY COPYING MACHINE

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3 Claims. (Cl. 90—62)

Various known key copying machines employ a feeler which is caused to follow the profile of a key which is to be reproduced. Although this feeler generally has a beveled end, the resistance encountered upon the passage of the feeler over the rising parts of the profile of the key results in a high degree of wear of the feeler and sometimes even in its deformation.

The object of the present invention is to provide a feeler which slides easily over the profile of the key to be reproduced.

The feeler which is the subject matter of the invention, and has an inclined bearing face intended to slide along the rising parts of the profile of a key to be reproduced, is characterized by the fact that said face is formed on a tiltably mounted shoe so that the said face can assume an inclination corresponding to the inclinations of the rising parts of the profile followed.

The accompanying drawing shows, by way of example, one embodiment of the feeler which forms the subject matter of the invention.

FIG. 1 is a face view thereof.

FIGS. 2 and 3 are sections along the line 2—2 and 3—3 of FIG. 1.

FIG. 4 is a top view along the line 4—4 of FIG. 3.

FIGS. 5, 6, 7, 8 and 9 are detail views on a larger scale.

The feeler shown, forming part of a key copying machine, comprises a shoe 1 having a bearing face 2 intended to slide on rising parts of the profile of a key to be reproduced upon relative displacement of said key and the feeler.

The shoe 1 comprises a central part 3, having the bearing face 2, and two pivot pins 4 and 5 located on opposite sides of said central part and pivoted in a support 6 (see FIG. 4). These pivot pins, the cross-section of which has approximately the shape of a circular sector slightly larger than half a circle (see FIG. 5) with a radius for instance of 2 mm., are extended on the two ends of the shoe by end parts 7 having a cross-section in the form of a circular sector smaller than half a circle (see FIGS. 4 and 6).

These parts 7 are engaged in openings of rectangular shape 8 cut in caps 9 arranged to each side of the support 6 and fastened to the latter by screws 10 (FIGS. 1, 4 and 9).

The shoe 1 bears a pin 11 on which there rests the free end of an elastic blade 12, the other end of which is fastened to the support 6 at 13 (FIGS. 1 and 3). The blade 12 urges the shoe to turn in the direction indicated by the arrow A in the various figures.

The central portion 3 of the shoe comprises a cylindrical nose 14 included between the bearing face 2 and a stop face 15 which is inclined with respect to said face 2 (FIG. 8). The angle B inscribed between these two faces is 60°. The cylindrical surface of the nose 14, as well as a rear surface 16, also of cylindrical shape, of the central portion 3 of the shoe are both coaxial to the pivot pins 4 and 5. This rear surface 16 has the same radius as the pivot pins and the support 6 has a hollow, cylindrical seat 17 which constitutes a support for the surface 16 of the shoe (FIG. 8). This seat 17 extends between surfaces 18 and 19 constituting the bottoms of two grooves 20 and 21 cut in the support 6 (see FIGS. 2 and 4).

The elastic blade 12 tends to maintain the shoe 1 in an end angular position of rest shown in FIGS. 8 and 9. In this end position, determined by the fact that a corner 22 of the part 7 of the shoe strikes against the upper edge 23 of the corresponding opening 8, the stop face 15 is vertical and is aligned with the face 19 of the support 6 (FIG. 8).

The feeler shown operates in the following manner:

The key to be copied, such as that shown at 24 for instance, placed in a clamp of the machine shown schematically at 25, is caused to rest via its profile to be reproduced against the central portion 3 of the shoe 1 (FIG. 2). The feeler is itself fastened on a support 26 of the machine by means of a screw 26' and the clamp 25 is brought, by machine means not shown, to move longitudinally with respect to the support 26. The vertical position of the clamp is determined by the profile of the key, resting against the feeler, so that the clamp rises and descends according to the shape of the profile followed upon the displacement of the key with respect to the feeler.

At the start, before closing the clamp on the key, the key is pushed all the way towards the left (FIG. 2), so that its axial starting position is determined precisely by the fact that a reference face 27 provided on a shoulder of the head of the key strikes against the stop face 15 of the shoe.

The key resting on the shoe 1 is then moved longitudinally from left to right in FIG. 2 during the operating stroke of the machine. At the beginning of this movement, the shoe 1 first of all follows a flat portion 28 of the profile of the key and then a first downward portion 29 of said profile. During this first phase, during which the clamp at first remains at the same level and then drops in the direction of the feeler, the shoe 1 remains in its angular position of rest, shown in FIGS. 8 and 9, the key resting against the cylindrical nose 14 of the shoe.

On the other hand, when the shoe 1 arrives at a rising part of the profile, for instance, the part 30, it rests against the key via its inclined bearing face 2 (see FIG. 5).

In the position of rest of the shoe, said face 2 is inclined by an angle $X=40^\circ$ with respect to the horizontal (FIG. 8) and as a result of a slight rotation of the shoe, this face 2 assumes an inclination corresponding to that of the profile of the key.

FIGS. 5 and 6 show the position assumed by the shoe 1 when it cooperates with a key such as that shown, having a 45° profile. FIG. 7 shows the position which it assumes when it cooperates with a key having a 55° profile, which latter inclination can be considered a maximum for ordinary keys.

When the shoe 1 arrives at the apex of a rising part of the profile, it resumes its angular position of rest which it retains during the passage of the tooth.

The shoe shown can withstand a very high load without appreciable deformation. As a matter of fact, it is not only supported by its end pivot pins 4 and 5, but its central portion 3 is also supported by the seat 17 of the support 6.

The bearing face automatically assumes an inclination which corresponds so that of the rising portions of the profile of the key so that the contact effected between the shoe and the key remains a surface contact for any key having notches the inclination of which is between 40 and 55°.

Due to this surface contact, the key and the shoe slide more easily on each other. There is thus avoided any hooking of the feeler on the rising portions of the profile and in this way the wear and the risks of deformation of the feeler are reduced.

It should be noted that all the high and low points of

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the profile of the key are felt in last analysis by the rounded nose 14 of the shoe which has a relatively small radius of curvature (0.5 mm. for instance) while the rising sides of the profile of the key are felt by the orientable surface 2 of the shoe which has a relatively large length 5 (2 mm. for example).

It has been found that a feeler designed in this manner makes it possible to permit a relatively high pressure of the feeler on the key without the occurrence of catching, even with grooved keys. High precision contributes in 10 general to the obtaining of better faithfulness of reproduction of the high and low portions of the profile of the key, which are determinative.

Having thus described the invention and illustrated its use, what is claimed as new and desired to be secured by 15 Letters Patent is:

1. A cutter guide for a key duplicating machine arranged slidably to scan the profile of the bitted edge of a pattern key to be duplicated, comprising a supporting body portion having mounted thereon a tiltably supported 20 shoe, said shoe being provided with a bearing face arranged to contact a portion of the said profile of the bitted edge of said pattern key whereby said bearing face can assume an inclination conforming to the portion of the profile of the bitted edge of said pattern key in the rela- 25

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tive sliding movement of said bearing face of the shoe and the bitted edge of the pattern key, said bearing face of said shoe being disposed substantially medially of said shoe between pivot pins providing the tiltable mounting for said shoe in said supporting body, said medial portion having a cylindrical nose coaxial to the pivot pins and constituting the apex of the cutter guide.

2. A cutter guide in accordance with claim 1 wherein said nose is included between two faces inclined to each other, one of the two said faces being arranged to provide the bearing face for contacting the rising surface of the bitted edge of the pattern key, the other of the two said faces being arranged to provide a stop face with a portion of the pattern key.

3. A cutter guide in accordance with claim 1 wherein the two faces are inclined to each other at no more than 60°.

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