Oct. 13, 1959 O. BAHLMANN 2,908,077

VIBRATORY KNIFE

Filed Sept. 9, 1957

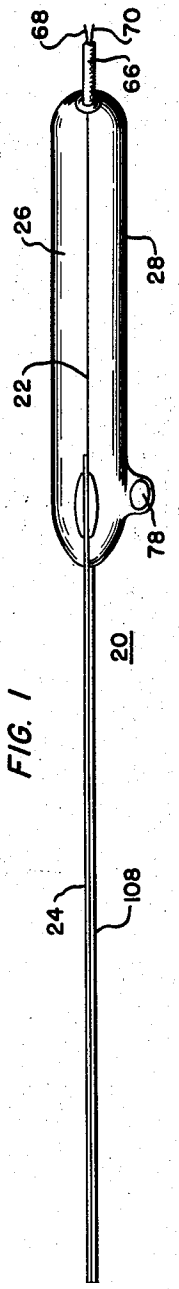


FIG. 1

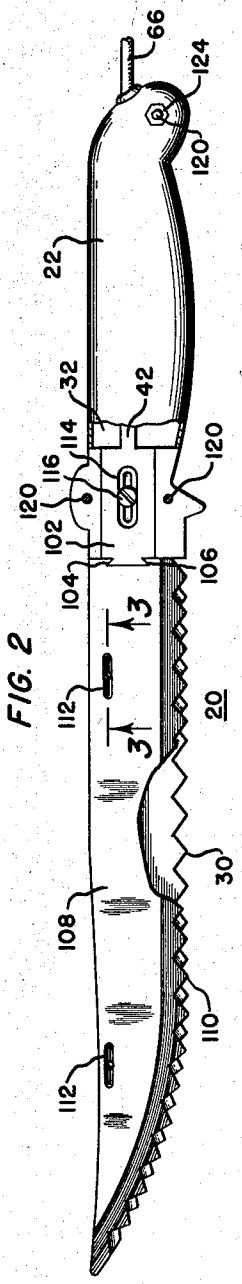


FIG. 2

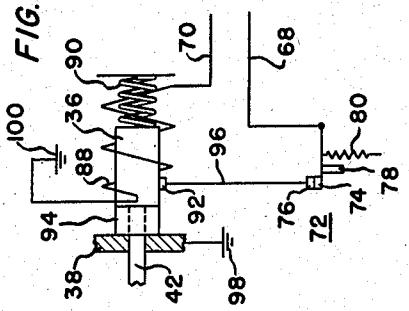


FIG. 5

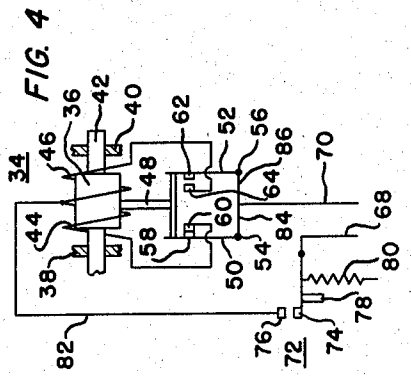


FIG. 4

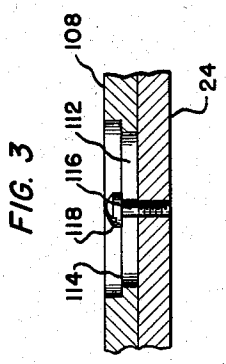


FIG. 3

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United States Patent Office 2,908,077
Patented Oct. 13, 1959

2,908,077

VIBRATORY KNIFE

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Application September 9, 1957, Serial No. 682,698

3 Claims. (Cl. 30—272)

The present invention relates to a cutting tool such as a knife.

The cutting tool of the present invention includes a handle member and an elongated blade member carried by the handle member. The blade member is provided with a longitudinally extending cutting edge. A second elongated blade is arranged parallelly of the first blade member and is provided with a cutting edge arranged alongside the first mentioned cutting edge. One of the aforementioned members, and as herein shown specifically, namely the blade member, forms a guide for supporting the second mentioned blade for longitudinal reciprocation. The handle member carries an electrically actuated motor for imparting reciprocating movement to the blade.

Further objects and advantages will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the invention are illustrated.

In the drawings:

Fig. 1 is a top plan view of the improved cutting tool;

Fig. 2 is a side view of the tool, parts thereof being shown in section;

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 2 but on a somewhat larger scale;

Fig. 4 is a diagrammatic view of the electrically actuated motor and the circuit therefor; and

Fig. 5 is another diagrammatic view of the motor and circuit therefor showing another aspect of the invention.

Referring more in detail to the drawings the cutting tool 20, for the purpose of illustration, comprises a knife including a handle member 22 and a blade member 24. Both of these members 22 and 24 are elongated and the handle member 22 includes two complementing sections 26 and 28. The blade member 24 may be secured to the handle member 22 in any suitable manner. This blade member 24 extends longitudinally of the handle member 22, and the lower edge thereof forms a cutting edge and may be serrated as is shown at 30.

The handle member 22 is hollow, as is more clearly shown in Fig. 2, to provide a motor chamber 32. This motor is of the reciprocating type and may be like that shown in Fig. 4 or like that shown in Fig. 5. In the embodiment shown in Fig. 4 the motor 34 includes a solenoid core 36 which is carried in two bearings 38 and 40 for reciprocating movement. That is, the solenoid is carried by a shaft 42 which is journaled in the bearings 38 and 40. The motor also includes two electromagnetic coils 44 and 46 which are arranged to be alternately and intermittently energized for imparting reciprocating movement to the solenoid core 36 and the shaft 42. The solenoid core 36 carries an inverted T-shaped switch actuator 48. The actuator 48 is connected to two switch arms 50 and 52 which are pivotally mounted at 54 and 56. Switch arm 50 carries a contact 58 which is arranged to engage a stationary contact 60, and switch arm 52 carries a contact 62 which is arranged to engage a stationary contact 64. Current is delivered to the motor through a cord 66 containing wires 68 and 70. The circuit also includes a push button type of switch 72 including a movable contact 74 and a stationary contact 76. The movable contact 74 is actuated by a push button 78 which extends to the exterior of the handle section 28 and the contact 74 is normally biased to open position by a spring 80.

When the circuit is closed through the push button 78, the solenoid 36 and the shaft 42 carried thereby will be moved either to the right or left, depending upon the position at which the solenoid stopped on the previous operation thereof. As shown in Fig. 4, contact 58 is in engagement with contact 60. Therefore upon closing switch 72 a circuit will be complete as follows: Wire 68, contacts 74 and 76, wire 82, solenoid coil 44, contacts 60 and 58, switch arm 50 and wires 84 and 70. Energization of coil 44 will cause the solenoid core 36 to move to the left, and in so doing, will interrupt the circuit at contacts 58 and 60 and close the circuit between contacts 62 and 64 and thereby establish the following circuit: Wire 68, switch 72, wire 82, coil 46, contacts 64 and 62, switch arm 52, wires 86 and 70. The solenoid core 36 will then move to the right to break the circuit between 62 and 64 and re-close the circuit between 58 and 60 to again cause the core 36 to move to the left. This reciprocation of the core and shaft 42 will continue until the switch 72 is opened.

In the embodiment shown in Fig. 5, one coil 88 only is provided. It is adapted to move the solenoid 36 and the shaft 42 to the right, and a spring 90 is utilized to move the core and shaft to the left. A contact in the form of a brush 92 is in contact with the solenoid core 36 and the assembly of the metallic shaft 42, and metallic core 36 carries a block of insulation 94. When the switch 72 is closed a circuit is completed as follows: Wire 68, switch 72, wire 96, brush 92, solenoid core 36, shaft 42, bearing 38 to ground shown at 98, and from the ground shown at 100, through the coil 88, to wire 70. The energization of coil 88 causes the core 36 to move to the right, and in so doing the circuit is interrupted between the brush 92 and the core. When the circuit is thus interrupted, the spring 90 forces the core 36 and shaft 42 to the left. Thus reciprocating movement is imparted to the shaft 42.

The shaft 42 is suitably connected with a crosshead 102. This crosshead is suitably guided by the handle sections 26 and 28. The end of the crosshead, opposite the shaft 42, is provided with a dovetail forming shoulders 104. These shoulders are arranged to engage shoulders 106 of a blade 108 to thereby cause reciprocating movement to be imparted to the blade 108. The blade 108 lies parallelly of blade member 24, and the cutting edge lies alongside the cutting edge 30 of blade member 24 and may be serrated as at 110. The blade 108 is provided with a plurality of longitudinally extending slots 112 which slots are longitudinally countersunk to provide shoulders or longitudinally extending tracks 114. The blade member 24 is provided with guide members in the form of screws 116 whose heads 118 ride upon the tracks 114. In this manner the blade member 24 provides a guide for the reciprocating blade 108.

The crosshead 102 is guided in the same manner as previously described with respect to the blade 108, namely by the track 114 and the screws 116.

To remove the blade 108, it is necessary merely to remove the two screws 116 and the blade can be moved sidewise, the dovetail connection providing for the ready disconnection of the blade from the crosshead 102.

Access to the motor can be had when desired by removing the screws 120 which are held in place by nuts

124. These screws 120 extend transversely through the handle sections 26 and 28 and clamp the same in position.

In the event that the solenoid should stop in a neutral position, that is contact 58 is spaced from contact 60, and contact 62 is spaced from contact 64, a slight jerking movement in either longitudinal direction of the knife will cause one or the other pair of contacts to be made. This jerking can take place while the push button 78 is held in circuit making position.

By virtue of the present invention, a rapid double cutting action takes place by merely moving the composite knife 20 either forwardly or rearwardly, and, by closing the switch 72, rapid reciprocation is imparted to the blade 108 to augment the cutting by the cutting edge of the blade member 24.

While the forms of embodiments herein shown and described constitute preferred forms, it is to be understood that other forms may be adopted falling within the scope of the claims that follow.

I claim:

1. A cutting tool comprising a handle; an elongated stationary blade carried by the handle and having a longitudinally extending cutting edge; a second elongated blade arranged parallelly of the first blade and having a longitudinally extending cutting edge alongside the cutting edge of the first blade, one of said blades having an elongated slot arranged longitudinally thereof forming an elongated track, said slot having an elongated countersink providing an elongated shoulder, and the other of said blades having a guide member riding on said track and having a shoulder confronting the shoulder on the said one blade, said guide member lying wholly within the confines of the countersink; and means including an electrically actuated motor carried by the handle for imparting reciprocating movement to the second mentioned blade.

2. A cutting tool as defined in claim 1, characterized by the inclusion of connecting means between the second mentioned blade and the last mentioned means said connecting means including complementary and abutting shoulders on the said second mentioned blade and said last mentioned means, said shoulders being disposed at an angle with respect to the direction of reciprocation of the second mentioned blade.

3. A cutting tool as defined in claim 1, characterized by the inclusion of connecting means between the second mentioned blade and the last mentioned means including complementary dovetailed shoulders on the second mentioned blade and the last mentioned means.

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