

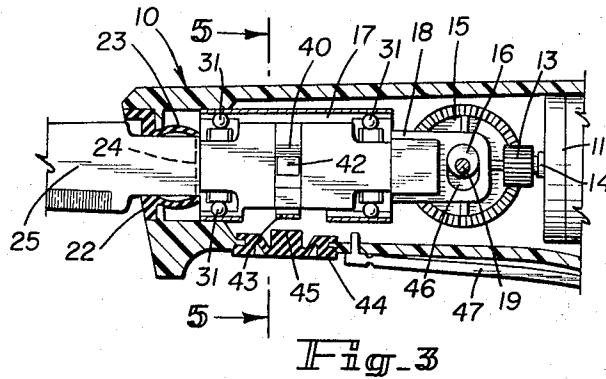
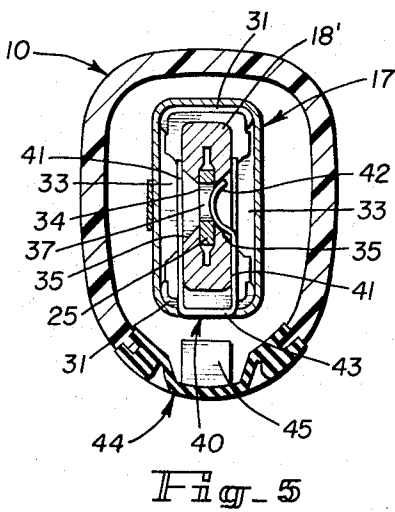
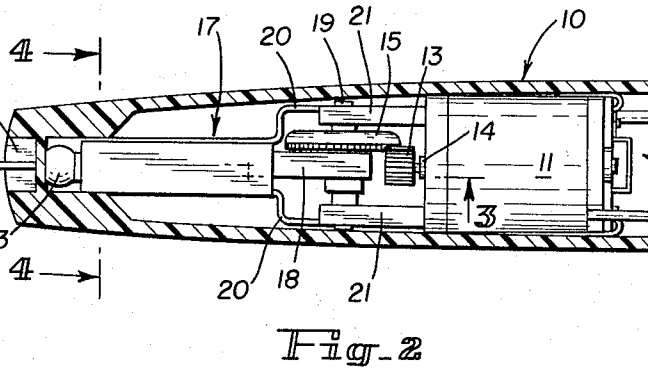
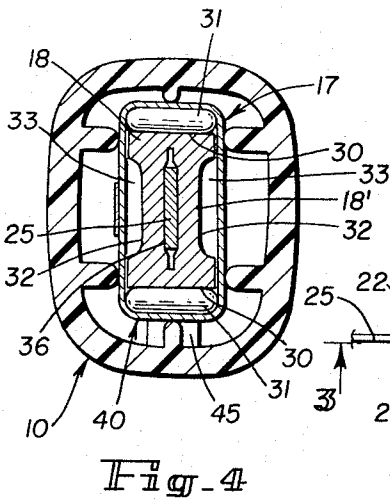
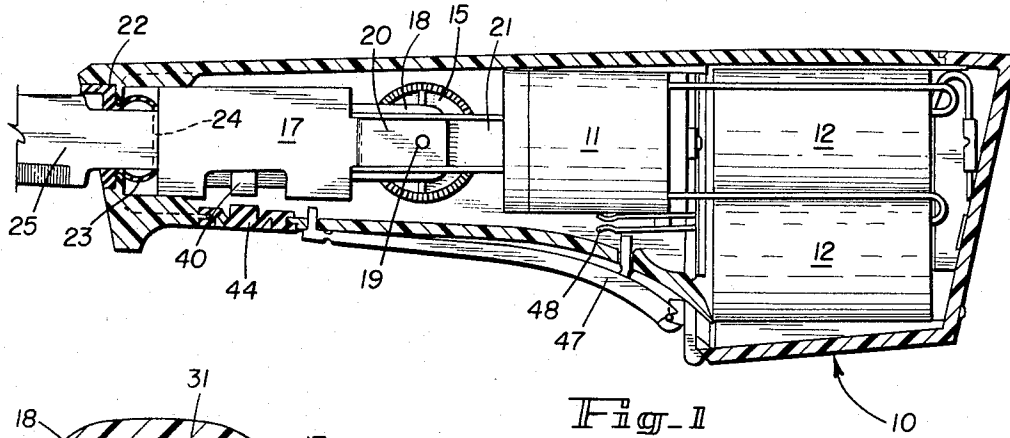
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POWER OPERATED SINGLE BLADE KNIFE

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3,359,637

POWER OPERATED SINGLE BLADE KNIFE

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8 Claims. (Cl. 30-272)

This invention relates to a power operated knife in which a single blade has reciprocating motion imparted thereto by a motor driven pinion which drives a spur gear provided with an integrally molded single cam on the face of the spur gear.

One object of the invention is to provide simple and efficient means for mounting the blade tang in a reciprocated carrier, whereby the blade is locked in the carrier by insertion of the tang in the carrier into engagement with a spring steel blade retainer, releasable by a release button mounted in the knife housing.

Another object of the invention is to mount the reciprocated parts including the carrier and the blade tang in a cage stationarily mounted in the housing adjacent the forward end of the housing. The cage is formed to enclose the carrier and antifriction means between the carrier and cage which greatly prolong the life and performance of the battery power source used in the knife to drive the motor, with minimum of current drain. The forward end of the cage bears against a boot made of thermolastic material which provides a yielding end bearing for the cage and contents. Antifriction means between the carrier and cage are "Nylatron" rollers located in longitudinally spaced apart pairs above and below the carrier top and bottom surfaces.

In the drawings:

FIG. 1 is an elevational side view of the knife mechanism with the outer housing shown in longitudinal vertical section.

FIG. 2 is a top plan view of part of the knife mechanism, with the outer housing shown in horizontal section.

FIG. 3 is a longitudinal vertical sectional view in the plane of the line 3-3 of FIG. 2.

FIG. 4 is a transverse vertical sectional view in the plane of the line 4-4 of FIG. 2, on an enlarged scale.

FIG. 5 is a transverse vertical sectional view in the plane of the line 5-5 of FIGS. 1 and 3, on an enlarged scale.

In the embodiment of the invention shown in the drawings, a housing 10 encloses a motor 11, battery pack 12, pinion 13 on motor shaft 14, spur gear 15 with cam 16 on one of its faces, and cage 17 in which a blade carrier 18 is reciprocably contained. The spur gear 15 with cam 16 is loosely mounted on the transverse shaft 19. The cage 17 is generally rectangular steel casing having top, bottom and side walls, with strap members 20 at opposite sides riveted to the side walls of the cage, and offset for attachment to support brackets 21 attached to the motor 11. The brackets 21 also support the transverse shaft 19. The forward end of the cage contacts a boot 22 made of thermolastic material which is yielding and provides a resilient end bearing for the cage 17. The boot 22 has an inner concavo-convex portion 23 which has a vertical slit 24 therein for passage of the knife tang 25 therethrough.

The carrier or driver 18 imparts reciprocated movement to the blade 25. The carrier has two pairs of roller engaging surfaces 30 extending, transversely of the carrier on the upper and lower faces thereof, one pair of said surfaces 30 being spaced longitudinally of the carrier from the other as shown in FIGS. 3 and 4. Rollers 31 rest on the surfaces 30 between said surfaces and the upper and lower walls of the cage 17. The outer surfaces of the carrier between the upper and lower roller bearing sur-

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faces 30 are recessed as indicated at 32 in FIG. 4 to provide lateral spaces 33 between the carrier sides and the side walls of the cage 17.

Midway between the two pairs of roller bearing surfaces 30, the carrier 18 is cut away to form a portion 18' (FIG. 5) which is narrower transversely than the rest of the carrier (FIG. 4). The portion 18' is cut away to provide an opening 34 extending transversely therethrough, the surfaces 35 adjacent the opening being inclined as shown in FIG. 5. The carrier 18 has a longitudinally extending centrally located space 36 for reception of the tang 25 of a blade. The tang 25 has a hole 37 extending transversely therethrough which registers with the opening 34 in the carrier 18 when the tang has been inserted in the carrier a predetermined distance. A blade retainer 40 made of spring steel is as wide as the portion 18' of the carrier 18 as shown in FIG. 3, and is formed with side arms 41 to fit the sides of the carrier, one of said side arms 41 terminating in an inwardly curved blade retainer 42 as shown in FIG. 5. The retainer 42 partially enters the hole 37 in the blade tang 25 when the tang has been inserted sufficiently to bring the openings 37 and 34 into register with each other. The blade retainer arms 41 extend downwardly beyond the carrier 18 and are joined by a cross piece 43 spaced from the bottom of the carrier in position to be contacted by a blade release member 44 mounted in the housing 10 and provided with a button 45 for engaging the cross piece 43 of the retainer 40. The release member 44 is made of resilient thermolastic material.

Rearwardly of the carrier parts herein described, the carrier is provided with an opening 46 for receiving the cam 16 on spur gear 15.

Motor control switch lever 47 actuates contact 48 for opening or closing the switch between the batteries and motor.

To use the knife, the blade tang 25 is inserted through the slit 24 in the boot 22, into the passage 36 of the carrier 18, until the hole 37 in the tang registers with the opening 34 in the carrier and the blade retainer part 42, bearing against the inclined surfaces 35, snaps into the hole 37 and firmly holds the blade in its intended position in the carrier 18. The carrier is slidably held within the cage 17, with the rollers 31 bearing on the upper and lower surfaces of the carrier in longitudinally spaced apart locations. Closing of the switch contacts 48 actuates the motor, driving the pinion 13, spur gear 15 and cam 16, to reciprocate the carrier 18 and the blade held therein.

To release the blade tang 25 from carrier 18, the blade release member 44 is manually pressed inwardly to move the button 45 into contact with the cross piece 43 of the retainer 40. This movement causes the arms 41 of the retainer to move upwardly, forcing the retainer member 42 to slide out of engagement with the blade tang and permitting the blade to be removed. Retainer 40 automatically returns to normal position after manual release of button 45.

In describing the invention, reference has been made to a particular example embodying the same, but I wish it to be understood that the invention is not limited to the construction shown in the drawing and that various changes may be made in the construction and general arrangement of parts without departing from the invention.

I claim:

1. A power operated knife comprising

- (a) a housing,
- (b) an electrically powered motor in the housing,
- (c) a cage adjacent the forward end of the housing,
- (d) a blade carrier reciprocably mounted in the cage, the carrier having a blade tang receiving space ex-

tending longitudinally of the carrier and a laterally extending aperture,

(e) a blade having a tang provided with a laterally extending aperture in register with the carrier aperture when the tang has been inserted in the carrier a predetermined distance,

(f) a spring metal blade retainer having a pair of arms adapted to engage opposite sides of the carrier, a cross piece connecting the arms spaced from the carrier, and inwardly directed tang engaging member on one of said arms for entering the apertures in the carrier and blade tang and retaining the tang in the carrier,

(g) blade release means in the housing movable into contact with said retainer cross piece for moving said blade retainer relatively to the carrier and disengaging the inwardly directed member from the apertures in the carrier and tang to release the blade and

(h) means between the motor and carrier imparting reciprocatory movement to the carrier.

2. The power operated knife defined by claim 1, in which the blade carrier is spaced from the cage, and which includes two pairs of rollers spaced apart longitudinally of the housing, the rollers of each pair being located between upper and lower surfaces of the carrier and the cage.

3. The power operated knife defined by claim 1, in which the carrier is provided with a groove extending around the carrier between its ends for reception of the spring metal blade retainer arms.

4. The power operated knife defined by claim 1, in which the carrier is provided with inclined surfaces surrounding the carrier aperture, said surfaces being inclined inwardly toward said aperture.

5. The power operated knife defined by claim 1, which includes a boot made of resilient material located between the blade carrier and the forward end of the housing, said boot having a vertical slit therein through which the blade tang is inserted into the carrier.

6. The power operated knife defined by claim 1, in which the means for imparting reciprocatory movement to the carrier comprises a motor shaft, a pinion on the shaft, a spur gear driven by the pinion, and a cam on the gear in engagement with the carrier.

7. The power operated knife defined by claim 1, in which the carrier has side walls spaced from the cage, and the blade retainer arms are slidable on said side walls in one direction when contacted by said blade release means and automatically slidable in the opposite direction when the blade release means is out of contact with the blade retainer.

8. A power operated knife comprising

(a) a housing,

(b) an electrically powered motor in the housing,

(c) a blade carrier reciprocably mounted in the housing, the carrier having a blade tang receiving space extending longitudinally of the carrier and a laterally extending aperture,

(d) a blade having a tang provided with a laterally extending aperture in register with the carrier aperture when the tang has been inserted in the carrier a predetermined distance,

(e) a spring metal blade retainer having a pair of arms adapted to engage opposite sides of the carrier, a cross piece connecting the arms spaced from the carrier, and an inwardly directed tang engaging member on one of said arms for entering the apertures in the carrier and blade tang and retaining the tang in the carrier,

(f) blade release means in the housing movable into contact with said retainer cross piece for moving said blade retainer relatively to the carrier and disengaging the inwardly directed member from the apertures in the carrier and tang to release the blade and

(g) means between the motor and carrier imparting reciprocatory movement to the carrier.

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