July 29, 1958 S. KAHN 2,844,869

SHEARING HEAD CLAMPING MEANS FOR ELECTRIC SHAVER

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Fig. 1.

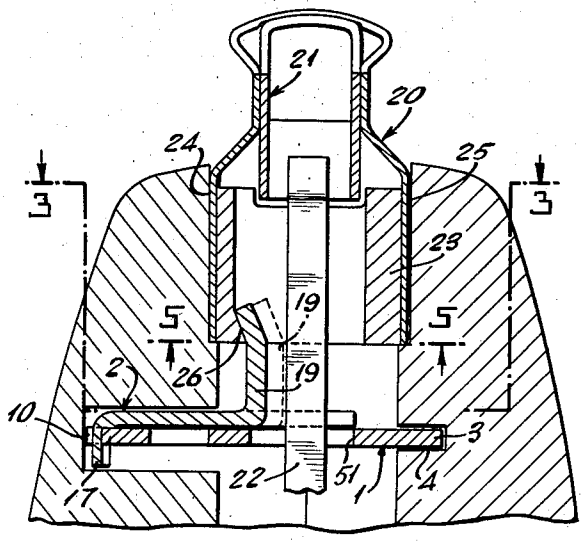


Fig. 7.

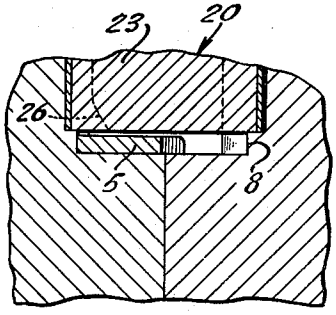


Fig. 2.

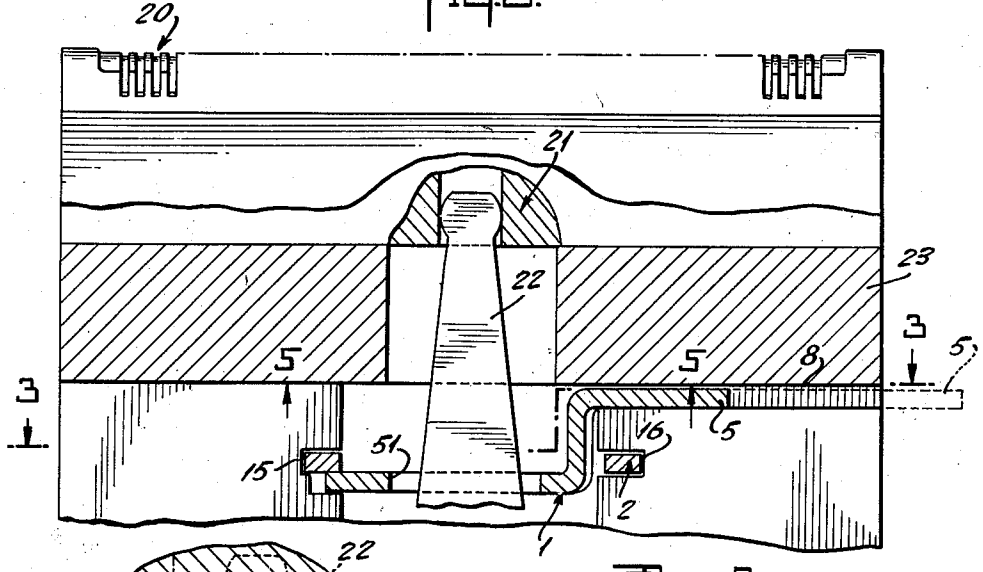
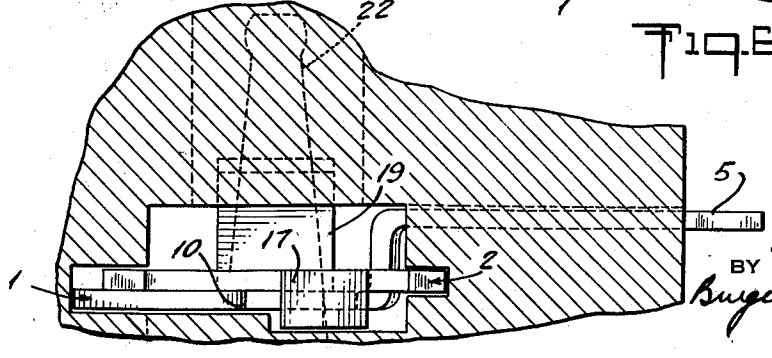


Fig. 6.



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Fig. 3.

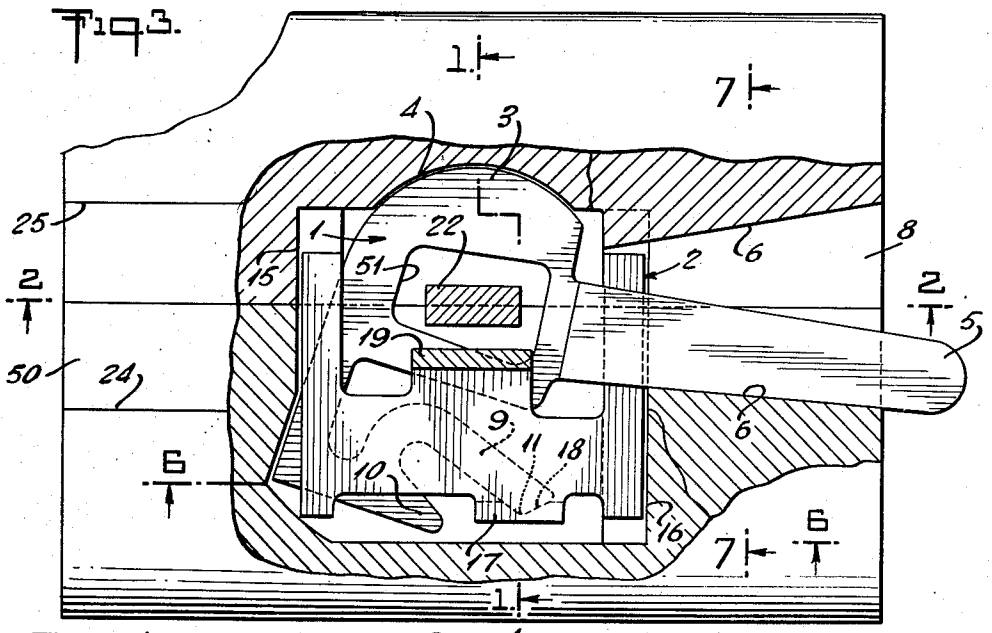
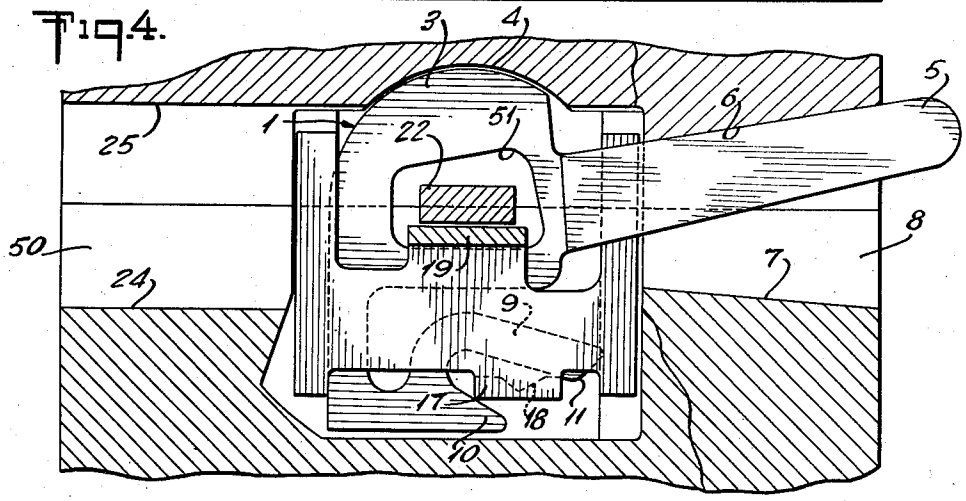


Fig. 4.



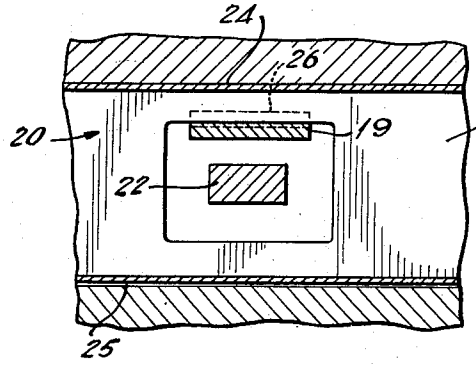


Fig. 5.

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Fig. 8.

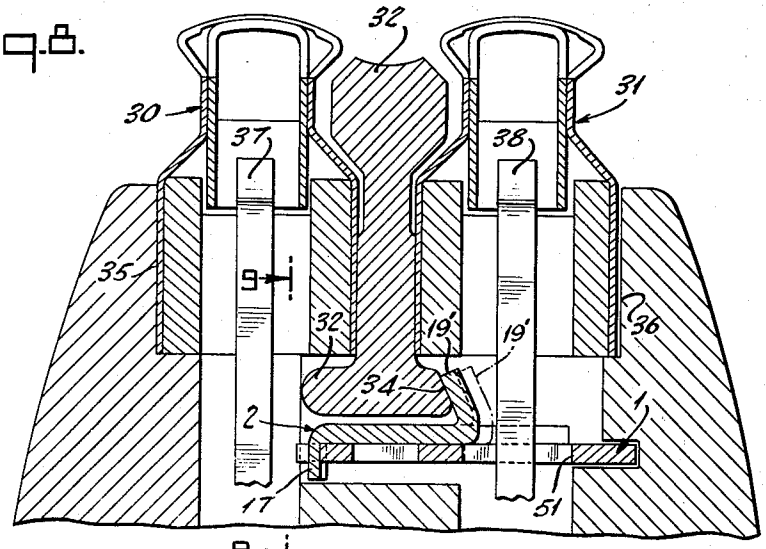
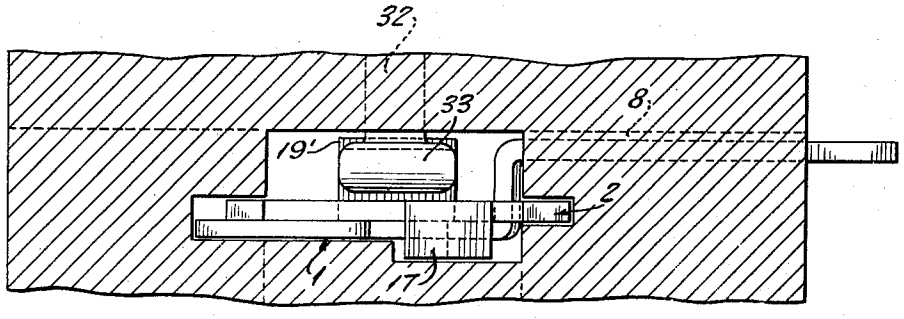


Fig. 9.



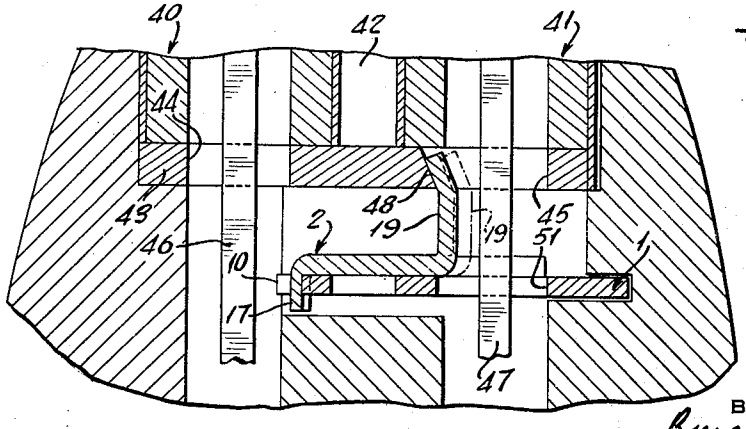


Fig. 10.

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2,844,869

SHEARING HEAD CLAMPING MEANS FOR ELECTRIC SHAVER

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Application January 26, 1954, Serial No. 406,179

4 Claims. (Cl. 30—43)

This invention has to do with electric shavers of the kind in which a shearing head unit, consisting of one or more pairs of outer and inner, relatively movable cutters, is removably secured to the case which houses the electric drive motor.

Heretofore, the common practice has been to mount the shearing head unit so that its underside abuts an end surface of the shaver case between locating case jaws, at least one of the jaws having a threaded opening to receive a thumb screw which, when tightened, engages one side of the head unit and clamps it to the case.

It has been proposed to dispense with the thumb screw and provide, instead, a type of concealed head securing means comprising locking means associated with the case and arranged to be operated to interlock with the lower portion or with the underside of the head unit, the latter being provided with suitable lug means for engagement by latch means forming part of the locking means. The present invention relates to head securing means of that type.

The general object and advantage of the invention centers in the provision of locking means arranged so to cooperate with the lug means as to effect a clamping action on the head unit, whereby it is not only held down against the case surface which its underside abuts but is also urged laterally and held in firm engagement with a stationary abutment, such as one of the head unit locking jaws.

In its preferred form, the present invention also provides locking means which comprise two separate elements, one manually manipulated and the other a thrust element operated by it, the arrangement being such that the manually manipulated element positively moves the thrust element both into and away from its clamping position and, in the clamping position of the parts, assumes a dead-center or over-dead-center position whereby movement of the thrust element away from its clamping position is positively blocked.

In the accompanying drawings:

Fig. 1 is a vertical section of the upper end of an electric shaver incorporating one form of the invention, the section being taken transversely of the head unit and on the line 1—1 of Fig. 3;

Fig. 2 is a view of the upper end of the shaver in partial vertical section, the section being taken longitudinally of the head unit and on the line 2—2 of Fig. 3;

Fig. 3 is a broken out horizontal section, as on the lines 3—3 of Figs. 1 and 2;

Fig. 4 is a view generally similar to Fig. 3 but with the locking means in its off or disengaged position;

Fig. 5 is an inverted view as on the line 5—5 of Fig. 2;

Fig. 6 is a vertical section on the line 6—6 of Fig. 3;

Fig. 7 is a vertical section on the line 7—7 of Fig. 3;

Fig. 8 is a vertical section similar to Fig. 1 but showing the locking means applied to a different type of shearing head unit;

Fig. 9 is a vertical section on the line 9—9 of Fig. 8; and

Fig. 10 is a broken out vertical section similar to Figs. 1 and 8 but showing the locking means applied to still another type of shearing head unit.

The locking means illustrated are the same in all three of the applications shown in the drawings and will be described first, the same reference characters being used throughout.

These locking means consist of two elements, generally designated 1 and 2, the former being in the nature of an actuator arranged for manual manipulation and the latter a clamp or thrust element operated by the actuator. Both parts may conveniently consist of sheet metal stampings.

In this illustrative form, the clamp actuator is adapted to partake of a rotary motion, having an arcuate portion 3, located in a similarly shaped guide recess 4 in the case, and a projecting lever or operating arm 5. The maximum travel of the latter is determined by walls 6, 7 of the case recess 8 through which the operating lever projects to the exterior of the case. Thus, movement of the operating lever rotates or rocks the clamp actuator as a whole between the positions indicated in Figs. 3 and 4.

The clamp actuator element in this form, and as is preferred, is designed to move the clamp or thrust element both into and out of its clamping positions and, accordingly, one of the elements is provided with an abutment and the other with what is, in effect, a shifter fork. In the arrangement illustrated, the abutment is formed on the thrust element and the actuator element incorporates the shifter fork. The latter consists of a detent arm 9, for moving the thrust element into clamping position and a toe 10 for moving the thrust element out of clamping position.

The thrust element lies on top of its actuator and is arranged to partake of a sliding motion in a direction transversely of the length of the shearing head unit (described later). Accordingly, the side edge portions of the thrust element are located and confined in case recesses 15, 16 (Figs. 2, 3 and 4).

Along part of its leading edge (the lower edge as viewed in Figs. 2 and 3) the thrust element has an abutment for engagement by the fork portion of the clamp actuator. As shown, this abutment may consist of a bent-down tab 17, the rear face of which is notched, as at 18 (Figs. 2, 3).

Along its trailing edge the thrust element has a second abutment, shown as consisting of an up-turned tab 19. This tab is the actual clamping portion of the thrust element which serves to engage and lock the head unit in place. In Figs. 8 and 9 the tab, marked 19', differs only that it is shorter than the tabs of Figs. 1 and 10.

Referring now to the different types of head unit illustrated:

In Fig. 1 the shearing head unit consists of an outer cutter 20 and an inner cutter 21 of a well-known type, the inner cutter being adapted to be reciprocated by an actuator 22 which is oscillated in the usual manner by a suitable motor (not shown). As usual, the base block 23 of the outer cutter is apertured to pass and accommodate the movement of the inner cutter actuator. Also, as usual, the head unit is located between case jaws 24, 25.

In accordance with the present invention, some part of the base of the shearing head unit is formed with suitable lug means for engagement by the clamp portion of the thrust element and, in this particular form, the function of the lug means is served by the sloping face 26 of one of the walls of the base block aperture (Fig. 1).

In Fig. 8 the shearing head unit consists of two pairs of cutters 30, 31 (each like the outer and inner cutters 20, 21) separated by a spacer member 32. The latter

has a depending portion 33 having a sloping face 34 corresponding to the sloping face 26 of the previous form. The depending portion of the spacer member and its sloping face 34 constitute the lug means in this instance. The head unit is located between case jaws 35, 36 and the inner cutters are reciprocated in the usual manner by actuators 37, 38.

In Fig. 10 the shearing head unit likewise consists of two pairs of cutters 40, 41 separated by spacer member 42 but seated on and suitably secured to a base plate 43. This base plate is apertured as at 44, 45 to pass the inner cutter actuators 46, 47 and, in this instance, the function of the lug means is served by the sloping plate face 48.

The operation of the locking means is the same in all forms. The head unit is inserted in the case jaws with the clamp actuator and thrust element in the Fig. 4 or unlocked position, the unit seating on the case surfaces at the base of the space between the jaws (as 50 in Figs. 3 and 4). The operating arm 5 is then moved toward its Fig. 3 position. The free end of detent arm 9 engages tab 17 and, functioning as a cam, causes the thrust element to slide in its case recesses and its clamping tab 19 to engage the sloping face of the head unit lug means (that is, the face 26 of Fig. 1, the face 34 of Fig. 8 or the face 48 of Fig. 10). The transverse linear movement of the clamping element serves to urge the head unit firmly against a suitable stop, in this instance the inner face of the opposing case jaw, so as to hold the head unit securely against twisting in the jaws; and due to the fact that the upper end of tabs 19 and 19' are bent over so as to overlie the engaged face of the lug means, the head unit is coincidently held down against removal from the jaws.

In the preferred form, the tabs 19, 19' are somewhat resilient and are engaged with the cooperating face of the head unit just before the operating arm 5 reaches the end of its movement toward its Fig. 3 position. The final movement of arm 5, slightly springing tab 19 (or 19') engages the corner 11 of detent arm 9 with notch 18 (Fig. 3). It will be recognized that with the end of detent arm 9 and the face of notch 18 appropriately sloped and/or appropriately positioned in relation to the center of rotation of the actuator element, the detent arm assumes what for convenience can be termed a dead-center position in which the clamp element and actuator are self-locked in the clamping position. In other words the clamp element and actuator cannot be moved out of clamping position either by the resilience of tab 19 or by side pressure applied to the shearing head unit. Preferably, of course, the parts are designed to assume a slightly over-dead-center position to ensure a more positive locking.

To free the head unit for removal, operating arm 5 is moved back towards its Fig. 4 position, the initial movement serving to release the detent arm from its notch and continued movement engaging the toe 10 with the corner of tab 17 and thereby sliding the thrust member back to its former position.

As will have been noted, the inner cutter actuator (22 of Fig. 1, 38 of Fig. 8 and 47 of Fig. 10) passes through and its movement is accommodated by the opening 51 in the actuator element.

It will be understood that the described form of locking means and the applications of it to three types of shearing head unit are illustrative only and that the invention is susceptible of embodiment in various forms within the scope of the following claims.

I claim:

1. In an electric shaver of the kind including a case incorporating jaws, a shearing head unit located in the jaws and lug means associated with the lower portion of the head unit, the improvement which comprises: head unit locking means associated with the case beneath the head unit, including a thrust element bodily slidable toward and from the plane of one of the jaws and, in the former movement, abutting the said lug means and urging the head unit laterally into clamping engagement with the said jaw, and an actuator for the thrust element projecting from beneath the head unit at one end thereof.

2. In an electric shaver of the kind including a case incorporating jaws, a shearing head unit located in the jaws and lug means associated with the lower portion of the head unit, the improvement which comprises: head unit locking means associated with the case beneath the head unit, including a thrust element bodily slidable toward and from the plane of one of the jaws and, in the former movement, abutting the said lug means and urging the head unit laterally into clamping engagement with the said jaw, the locking means also including an actuator element, one of said elements incorporating an abutment and the other a fork having portions disposed on opposite sides of the abutment, whereby the thrust element is movable by the actuator element both into and out of its clamping position.

3. In an electric shaver of the kind including a case incorporating jaws, a shearing head unit located in the jaws and lug means accessible from the underside of the head unit, the improvement which comprises: head unit locking means associated with the case beneath the head unit, including a thrust element bodily slidable toward and from the plane of one of the jaws and, in the former movement, abutting the said lug means and urging the head unit laterally into clamping engagement with the said jaw, the locking means also including a separate manually rotatable actuator element adapted in one direction of movement to urge the thrust member into and in the opposite direction of movement to withdraw the thrust member from its head unit clamping position, said actuator element projecting from beneath the head unit at one end thereof.

4. In an electric shaver of the kind including a case incorporating jaws, a shearing head unit located in the jaws and lug means accessible from the underside of the head unit, the improvement which comprises: head unit locking means associated with the case beneath the head unit, including an element slidably mounted in the case beneath and transversely of the jaws for linear movement into engagement with a side face of the said lug means to clamp the head unit laterally against a jaw face, and a separate actuator for said element projecting from beneath the head at one end thereof.

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