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SHAVER HEAD RELEASE

Filed Jan. 26, 1967

Fig. 1.

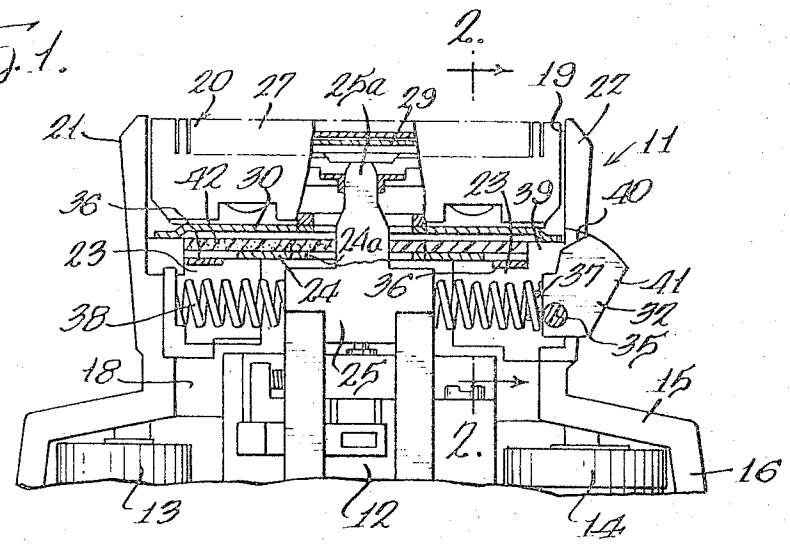


Fig. 2.

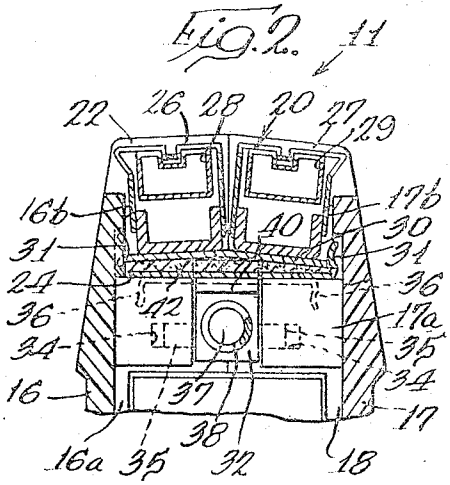
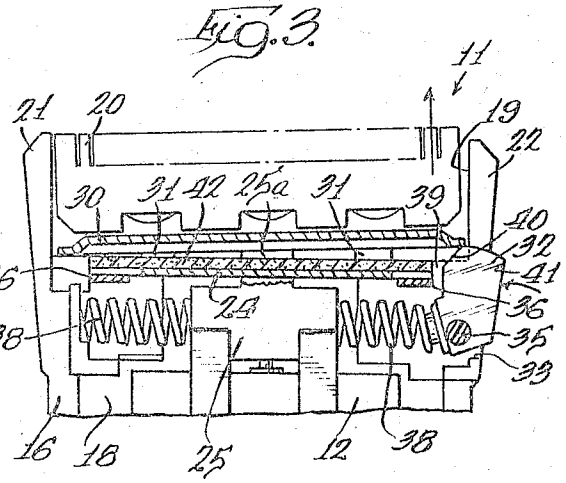


Fig. 3.



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SHAVER HEAD RELEASE

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ABSTRACT OF THE DISCLOSURE

A dry shaver having a motor housing enclosing a motor and detachably supporting a shaving head in a recess in said housing with a pivotally mounted head ejection means operative to detach said head from the housing.

Background of the invention

It has been conventional in the field of electric dry shavers to provide a shaving head which is detachable from the housing for the electric motor. The reason for constructing the shaver so that the head may be detached is both for replacement of the head in case of damage as well as to provide a means for cleaning the hair clippings which are normally deposited within the shaving head. In some instances, alternative means are provided for cleaning the head and the detachability of the head need not be as easy and convenient as is required when necessary for cleaning purposes.

This easy detachment of the shaving head has presented problems with respect to cost and styling of the shaver. From a styling standpoint the shaving head should be integrated with the housing in such a way that the shaver as a whole presents a smooth, well-contoured, unitary appearance. This objective normally demands that the head be somewhat recessed within the housing. As a result of this recessing of the head in the housing, it is frequently difficult to withdraw the head and thereby detach it from the housing.

In devising a means for detachably retaining the head on the housing, cost is one of the primary considerations since the electric shaver field is highly competitive. Thus, in providing a practical solution to the retention and release of the shaving head from the housing, the structure employed must be extremely simple.

Another problem encountered in integrating the detachable head retaining means and a head ejection means with a shaver is one of space. A dry shaver is conventionally designed to be as small and as attractive as possible. Any additional mechanism which will add to the size or change the shape of the shaver is generally considered undesirable. This space problem is particularly apparent in the present day battery operated shavers which must not only accommodate the electric motor but also batteries for operating the motor. Because of the power limitations and the desire for efficiency in such battery operated shavers, it has been known to use resilient spring systems associated with the motor or drive mechanism to provide more efficient operation of the oscillating parts. An example of a shaver having a motor with such a spring system is disclosed and claimed in Jepson et al. application Ser. No. 515,915, filed Dec. 23, 1965. Similarly, many shavers are equipped with vibrator-

type motors having springs associated with their vibrating armatures. These spring systems occupy space within the shaver housing and further complicate the problem of fitting a head ejection mechanism into the housing.

Summary of the invention

The invention relates to a shaver having the shaving head detachably mounted in a recess in the wall of the shaver housing. Within the recess there are detent means provided to retain the head when the head is completely seated with the recess. In the wall of the housing adjacent the head, a small pivoted member is arranged so that it may be manually actuated, pivoting it into engagement with the head of the shaver to cause the head to be released by the detent means as it is forced upwardly. The member is biased to a disengaged position with respect to the shaver head by means of a spring associated with the motor within the housing. The pivoted member forms the seat for the spring and, therefore, occupies little or no space within the shaver housing.

Brief description of the drawing

For a better understanding of the present invention, reference may be had to the accompanying drawings wherein:

FIG. 1 is a fragmentary vertical section taken through the center of a shaver embodying our invention;

FIG. 2 is a vertical section taken on line 2—2 of FIG. 1; and

FIG. 3 is a fragmentary view of the release mechanism of FIG. 1 shown in the head release position.

Description of the preferred embodiment

Referring to the drawings, there is shown an electric dry shaver designated generally by reference numeral **11**. The shaver includes an electric motor **12** and batteries **13** and **14** which are enclosed within a housing **15**. The housing **15** is formed by a pair of cup-shaped housing members **16** and **17** which have peripheral side walls **16***a* and **17***a* abutting along a common plane to form a housing enclosure **18**.

The upper end of the housing **15** is formed with an upwardly facing recess **19** within which a shaving head **20** is adapted to be received. The head receiving recess **19** is formed by side walls **16***b* and **17***b* and end walls **21** and **22**. The bottom of the recess **19** is defined by horizontally extending wall portions **23**, housing assembly clips **36**, and the latch bracket **24**. The central portion of the recess **19** opens directly into the motor enclosure **18** and permits drive arm **25** to extend upwardly into driving engagement with the shaving head **20**. The latch bracket **24** is provided with apertures **24***a* through which the bifurcated ends **25***a* of the drive arm **25** extend. The housing assembly clips **36** extend horizontally between the housing members **16** and **17** and are in hooked engagement therewith to retain the housing members in assembled relation. The assembly clips **36** and the latch bracket **24** form a supporting floor for a hair seal **42** which is made of rubber or flexible plastic.

The shaving head **20** is made up of a pair of comb members **26** and **27** which receive in operative engagement therewith cutter members **28** and **29** respectively. The two comb and cutter seats are assembled together as a unit on a mounting plate **30** so that the head may

be assembled and removed from the recess 19 as a single unit.

For the purpose of retaining the shaving head 20 in assembled position seated at the bottom of the recess 19, the latch bracket 24 is formed with four upwardly and inwardly extending latch tabs or fingers 31 as are best shown in FIGS. 2 and 3. The tabs 31 are curved so that upon insertion of the shaving head 20 into the recess 19 the tabs will be deflected outwardly allowing the mounting plate 30 to move into seated engagement with the bottom of the recess 19. In this seated position, the latch tabs 31 resiliently grip the mounting plate 30 and retain the head 20 in assembled position on the shaver 11.

For the purpose of unlatching the shaver head from the latch bracket 24, there is provided a head ejection means or lever 32. The lever 32 is mounted for pivotal movement in an opening 33 formed in the side of the housing 15. The wall portions of the housing forming the opening 3 have bearing holes 34 arranged in aligned position to receive support projections 35 extending from opposite sides of the lever 32. On the side of the lever 32 positioned within the motor enclosure 18, there is provided an inwardly extending projection 37 which forms a spring seat. Positioned in engagement with opposite sides of the drive arm 25 are coil springs 38. The motor 12 drives the drive arm 25 in oscillating movement about its pivot point which is not shown in the drawings. As the drive arm 25 moves through this oscillating movement, the coil springs 38 are alternatively compressed and allowed to expand. This compression and expansion of the springs increases the efficiency of the electro-mechanical system which reciprocates the cutter members 26 and 27. One of the springs absorbs power as the drive arm 25 and the cutters 26, 27 move in the direction of that spring to the end of their stroke. As the drive arm 25 and the cutter members 26, 27 return in the opposite direction, the power absorbed by the spring is returned to the system. The improved efficiency is a result of the spring absorbing unnecessary power which would be used in slowing down and reversing the direction of the drive arm and cutters and using this power to start the drive arm and cutters moving in the opposite direction.

As was indicated above, the outer end of one of the springs 38 is received on spring seat 37 formed on the inner side of the lever 32. The spring seat 37 is positioned so that the force delivered by the spring 38 against the lever 32 is along a line displaced upwardly from the supporting projections 35. Thus as seen in FIGS. 1 and 3, the lever 32 will be pivoted in a clockwise direction as a consequence of the force exerted by the spring 38. The lower edge of the opening 33 serves as a stop to limit the amount of pivotal movement in the clockwise direction as is best shown in FIG. 1 where the lever 32 is shown positioned against the edge of the opening 33.

In order that the head ejection lever 32 may operate against the shaving head 20, the opening 33 which receives the lever 32 extends upwardly into the bottom of the head receiving recess 19. Thus, there is formed a second opening 39 which extends through the horizontal wall portions 23 which form part of the bottom of the head receiving recess 19.

The lever 32 is formed at its upper end with a sloping cam surface 40 which serves as the head ejection portion of the lever 32. The lever 32 is also formed with an outwardly projecting portion 41 which serves as the manual actuator to eject the shaving head 20. The lever 32 is shown in FIG. 1 in the position it assumes during normal operation of the shaver. When rotated counterclockwise by virtue of manual actuation of the portion 41, the cam surface 40 engages the mounting plate 30 of the shaving head 20 thereby causing the end of the mounting plate adjacent the lever 32 to be urged upwardly. This upward movement of the shaving head 20 causes the mounting plate 30 to be disengaged from the pair of latch tabs positioned closest to the head ejection lever 32. The disengagement of the one pair of latch tabs or latch fingers is immediately followed by disengagement of the other pair as the head is rotated upwardly to the maximum extent possible as shown in FIG. 3. At this point, the slope on the upper portions of the tabs or fingers 31 causes the shaving head 20 to be urged completely out of latched engagement therewith. The gradual slope of the cam surface 40 as well as the necessity to unlatch only one pair of latch tabs at a time reduces to a minimum the force necessary to complete the ejection of the shaving head 20 by the lever 32.

It should be appreciated that the head ejection lever 32 must be biased to a retracted position as shown in FIG. 1 in order to prevent interference between the lever 32 and the mounting plate 30 when the shaving head is reinserted into the head recess 19. By utilizing one of the springs 38 to accomplish this biasing function, the head ejection mechanism is reduced to the ultimate in simplicity. The head ejection feature is added to the shaver 11 simply by providing the opening 33 in the shaving housing 15 and providing the simple plastic lever 32. In the retracted position of the lever 32, as shown in FIG. 1, the lever 32 supports one of the springs 38 in the normal manner. Only when the shaver motor 12 is de-energized and the lever 32 is actuated is there any change in the location or position of the spring 38. Since the head 20 would not be ejected while the motor is being operated, this change in the spring position during head ejection is not objectionable. Accordingly, the head ejection mechanism has been made as simple as possible and has occupied little or no space within the housing 15. The lever 32 is positioned substantially within the wall area and not in the enclosure portion 18 where it might occupy space needed by the motor and drive mechanism. As a result, the ejection mechanism of the instant invention provides the advantages of simplicity and compactness which are important requisites for any mechanism added to an electric dry shaver.

While there has been illustrated and described a single embodiment of the present invention, it will be apparent to those skilled in the art that numerous changes and modifications will occur, and it is contemplated by the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a dry shaver of the type having a motor enclosed in a housing, resilient means associated with said motor to deliver power to an oscillating system, a shaver head detachably secured to said housing within a recess in the walls of said housing, a head ejection mechanism comprising a head ejection lever pivotally mounted on said housing, a spring seat formed on said lever, a coil spring forming part of said resilient means and having one end thereof seated on said spring seat, manually actuable means on said lever accessible from the exterior of said housing to pivot said lever against the force exerted by said spring, latch means for retaining said shaving head in said recess, head ejection portion on said lever engageable with said shaving head on rotation of said lever to urge said head upwardly out of engagement with said latch means.

2. The combination of claim 1 wherein said head ejection lever is pivoted at one end to said housing, said head ejection portion of said lever being a sloping cam surface at the other end of said lever, said spring exerting a biasing force on said lever along a line between the pivot for said lever and said head ejection portion to bias said lever to a retracted position out of engagement with said head.

3. The combination of claim 1 wherein said lever is pivotally mounted on said housing in an opening formed in the wall thereof, said opening extending into said recess and into the motor enclosing portion of said housing.

4. The combination of claim 1 wherein said resilient means comprises a pair of coil springs mounted to engage opposite sides of a drive lever, said motor oscillating said drive lever in engagement with said head to reciprocate the cutter means included therein.

5. The combination of claim 1 wherein said latch means comprise two pairs of resilient fingers gripping said head at either end along the lengthwise extending edges, and said head ejection portion of said lever engageable with one end of said shaving head between the fingers of one pair of said resilient fingers.

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