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SAFETY RAZOR

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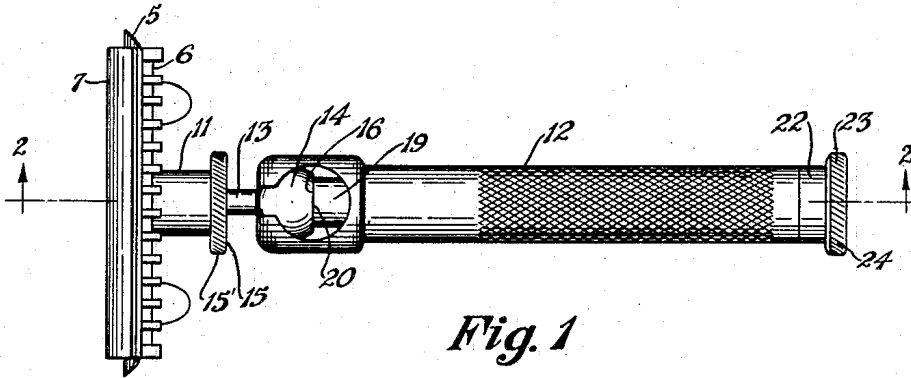


Fig. 1

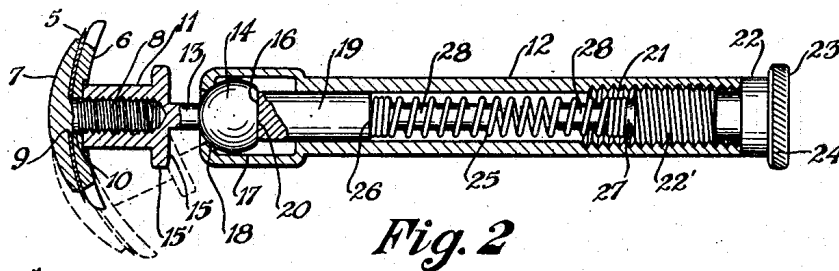


Fig. 2

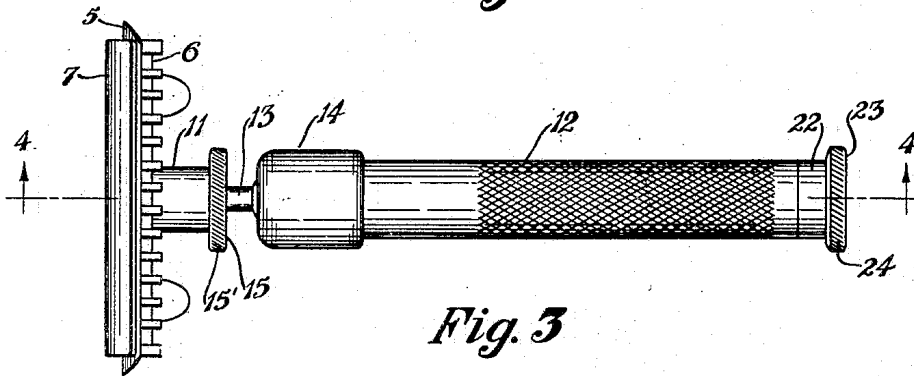


Fig. 3

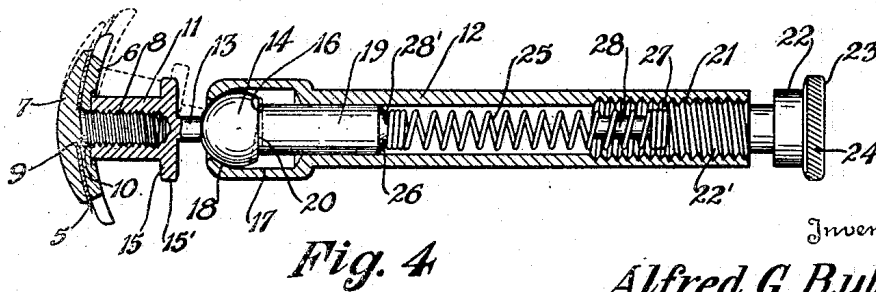


Fig. 4

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# UNITED STATES PATENT OFFICE

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## SAFETY RAZOR

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9 Claims. (Cl. 30—12)

The invention relates to the type of razors in which the blade is carried by a cross head on the end of the handle; and the object of the present improvement is to provide a yielding resilient connection between the head and the handle to permit an easier, closer, and cleaner cutting action of the blade, with less injury to or impairment of the surface of the skin, and with less wearing or dulling of the cutting edge of the blade, than can be done with a razor in which the head is rigidly or inflexibly connected with the handle.

Some inventors who have sought to improve razors of this type, have believed that the cutting action of a razor blade is facilitated by moving the edge of the blade over the skin at a slight inclination from normal to the direction of movement, and other inventors have believed that the work of the razor is facilitated by tilting the head laterally at an angle to the axis of the handle; and various kinds of pivotal joints or connections between the head and the handle have been proposed, to adjust the edge and the plane of the blade to either one or the other of such inclinations, but in all cases it has been proposed to secure the blade carrying head inflexibly or fixedly in its adjusted position during the shaving operation.

I have discovered that the cutting action of the blade is so facilitated by providing a rotatively resilient flexible pivotal joint in the handle adjacent to the head of the razor, as to render it undesirable, or at least unnecessary to normally incline the plane or edge of the blade from a rectangular relation to the axis of the handle.

To that end the object and purpose of the present invention may be attained by providing a stem or shank on the inner side of the razor head upon an axis which may be normal or perpendicular to the plane of the head, with a neck and a round journal having a flat face on its free side; in combination with a tubular handle having a bearing socket on its end for receiving the round journal, with a spring actuated plunger therein having a flat end pressed against the flat face of the journal: the parts being so proportioned and arranged, and the spring pressure being of such strength, that the head may yield or flex by resistance of the beard to the cutting action of the blade, but will always return to normal position by the spring pressure of the end of the plunger against the flat face of the round journal.

A preferred embodiment of the invention is

illustrated in the accompanying drawing, in which—

Figure 1 is a side view of the improved razor having a spherical journal, with an opening in the side of the bearing socket for entering the spherical journal therein;

Fig. 2, a longitudinal section on line 2—2, through the axis of Fig. 1;

Fig. 3, a side view of a similar razor without the opening in the side of the bearing socket; and

Fig. 4, a longitudinal section on line 4—4, through the axis of Fig. 3.

Similar numerals refer to similar parts throughout the drawing.

An ordinary form of cross head in well known safety razors, includes a blade 5, secured between an inner base plate 6 and an outer clamp plate 7; and the clamp plate is provided with a central screw shank 8, extending inward through central apertures 9 in the blade and 10 in the base plate, and the parts of the razor head thus formed are clamped together by means of a screw, preferably a screw socket 11 on the end of the handle, turned preferably upon the screw shank 8.

For the purpose of the present invention, the screw socket 11 is pivotally connected with the end of the handle 12 by means of an axial neck 13 extending from the closed end of the screw socket 11, which end is preferably provided with a disk flange 15 having a knurled periphery 15', by means of which the screw socket may be turned to clamp the parts of the head together.

The round journal 14 is preferably in the form of a truncated ball with a flat face 16 on its free side opposite the neck, the flat face 16 being preferably normal to the axis of the razor head, as shown by full lines in the drawing.

The bearing socket 17 is provided on the end of the tubular handle 12, and the same may be formed as a cylinder having its free end flanged inward to form a spherical zone bearing 18 for the outer spherical side of the truncated ball, the rim of the flanged end being spaced at a substantial distance from the periphery of the neck 13, to permit a limited rotative movement in all directions upon the fixed center of the universal pivotal joint formed by the ball bearing.

The bore of the hollow handle 12, which is preferably less in diameter than the bore of the bearing socket 17, forms a guide for the plunger pin 19, which is long enough to have a substantial length of bearing in the bore of the handle

and to extend into the bearing socket with its free end in contact with the flat face 16 on the truncated ball journal; and the contacting end 20 of the plunger is preferably formed flat, or so that its peripheral edge is in a plane normal to its axis and will contact with the flat face of the ball journal.

The free end of the handle is provided with the screw socket 21, into which is turned the screw shank 22' of the closing cap 22, which is preferably provided with a disk flange 23 having a knurled periphery 24 for turning and adjusting the screw shank in the screw socket of the handle.

A compression coil spring 25 is located in the bore of the handle, and when the spring is in compression its opposite ends bear and press against the opposing ends 26 of the plunger pin and 27 of the screw shank; and centering pins 28 and 28' may be provided on the pin and shank respectively, for centering the spring in the bore of the handle, or the end 26 of the pin may be coned to accomplish the same purpose.

The parts are so proportioned and arranged that when the screw cap 22 is screwed into the handle to be in contact with the end thereof, as shown in Figs. 1, 2 and 3, the coil spring 25 will be in its maximum compression, and the length and strength of the coil spring is such that it will press the end of the plunger pin against the flat face of the ball journal with sufficient force to hold the razor head in what may be called normal position, which is preferably coaxial with the handle; and that when the razor blade encounters resistance in the work of shaving, the head will rotatively yield somewhat to that resistance, on the fixed center of the pivotal joint formed by the ball and socket bearing, but will always be forced back into normal position by the pressure of the plunger pin against the flat face of the ball when that resistance is relieved or removed, such a rotatively resilient yielding of the blade-head being shown in somewhat exaggerated manner by dotted lines in Fig. 4.

It has been found that a closer shave can be made by a greater pressure of the plunger pin against the flat face of the ball journal, and it is preferred to provide the maximum pressure required for the closest shave on a face and beard giving the greatest resistance, when the screw cap is turned inward against the end of the handle, as shown in Figs. 1, 2 and 3; but it will be understood that the force of the pressure of the spring and the plunger pin against the flat face of the ball journal may be adjusted, as may be desired, to accommodate different skin and beard resistances, and to vary the closeness of a shave, by turning the screw cap away from the end of the handle, to a greater or lesser extent, as shown in Fig. 4.

Although the coaxial alignment of the razor head and the handle is preferred, the axis of the head may be normally inclined to the axis of the handle in any direction, by merely forming the flat face of the ball journal at such an angle to the axis of the head as to give the desired inclination, as shown by dashed lines for the inclined position of the head in Fig. 2.

It will also be understood that the flat faced round journal 14 is not necessarily in the form of a ball journal, as shown; but the ball form of journal is preferred because it provides a universal ball and socket joint, which permits the razor head to resiliently yield in any desired di-

rection, and in all positions of angularity with respect to the axis of the handle, depending upon the manner in which the razor is manipulated.

It will also be understood that the diameter of the flat face 16 of the ball journal is preferably larger than the diameter of the contacting end of the pin plunger, and in any event, the parts are so proportioned and arranged and the diameter of the opening formed by the rim of the inwardly flanged end 18 of the bearing socket, is made of such a size as to form a stop which prevents the razor head from being deflected far enough from its normal position so as to cause the spherical face of the ball journal to ride far enough upon the end of the pin plunger as to prevent the pressure of the plunger from automatically causing the blade-head to return to its normal position, when the resistance or force which moves it from that position has been released or relieved.

In the operation of the razor, the rotatively resilient action derived from the long and flexible compression spring, bearing on the plunger in the handle, and the pressure of the plunger bearing on the flat face of the ball journal, causes the blade head, when shaving, to bound back to its normal position with each stroke of the razor, when the resistance on the face or beard is released; the rotatively resilient yielding of the razor head, as pressure is exerted on the face and beard, causes the blade to cut the beard instead of pulling or scraping the same; and the yielding resistance obtained in the manner described, has the effect, also of saving or preserving the edge of the blade, thereby increasing its longevity, and also preventing abrasions of the skin, and leaves the face, after a close shaving, without irritation or discomfort, such as results from a rigidly fixed razor, whether it is operated in an angular or other position, without the yielding effect attained by the resilient action described herein.

And the freedom of action of the spherical portion of the truncated ball, enables the user of the razor to shave at any angle desired, and at the same time to obtain the full benefit of the resilient action, as when shaving with the razor with its head and handle in coaxial relation, and the razor part automatically adjusts itself to any angle the user may desire.

The improved razor having a yielding, resilient pivotal joint in the handle adjacent the blade-head, as described herein, is fundamentally, radically and designedly different from any other known form of razor; and from all other known forms of razors which provide for adjusting the axis of the razor head at an angle one way or another from the axis of the handle; such an adjustment has always included means for fixing and rigidly holding the head in its adjusted position without any yielding resistance or freedom of action during the work of shaving.

In its practical and important accomplishments, the present improvement differs from razors designed for maintaining fixed or rigid angular or other positions, because the rotatively resilient flexible pivotal joint in the handle, permits the user to shave in angular and other positions of the razor, and to change therefrom at will by the automatic self-adjusting of the razor, instead of adjustments requiring a handling of the razor awkwardly, messily, and with danger of cutting the fingers in making such changes.

And finally, the present improvement is expressly designed and constructed so as to practically give an unrestricted, yielding, resilient shaving action, in all positions and movements of the razor; and the degree of yielding resiliency may be regulated by the user, as desired, by the turning of the cap screw on the end of the handle; to the end that a safety razor is given a yielding resilient action substantially the same as the delicate, sensitive and yielding pressure of the fingers which results from the use of an ordinary razor wherein the blade and the handle are grasped in the hand of the user.

I claim:—

- 15 1. A razor including a blade-head and a handle with a rotatively resilient flexible pivotal joint in the handle adjacent the head.
- 20 2. A razor including a blade-head and a handle with a rotatively resilient flexible universal pivotal joint in the handle adjacent the head.
- 25 3. A razor including a blade-head and a handle with a rotatively resilient flexible ball and socket joint in the handle adjacent the head.
- 30 4. A razor including a blade-head and a handle with a rotatively resilient flexible pivotal joint in the handle adjacent the head, and means for adjusting the resilience of the flexible joint.
- 5. A razor including a blade-head and a handle with a round journal joint in the handle adjacent the head, the journal being flattened on one

side and a spring actuated plunger in the handle pressing against the flat side of the journal.

6. A razor including a blade-head and a handle with a ball and socket joint in the handle adjacent the head, the ball being flattened on one side and a spring actuated plunger in the handle pressing against the flat side of the ball. 80

7. A razor including a blade-head and a handle with a ball and socket joint in the handle adjacent the head, the ball being flattened on one side and a spring actuated plunger in the handle pressing against the flat side of the ball, with means for adjusting the pressure of the plunger. 85

8. A razor including a blade-head and a handle with a ball and socket joint in the handle adjacent the head, the ball being flattened on one side and a spring actuated plunger in the handle pressing against the flat side of the ball, the diameter of the plunger being less than the diameter of the flat face of the ball. 90 95

9. A razor including a blade-head and a handle with a resilient flexible ball and socket joint in the handle adjacent the head, the ball being flattened on one side and a spring actuated plunger in the handle pressing against the flat side of the ball, and means stopping a flexing of the joint before the edge of the flat face rides upon the end of the plunger. 100 105

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