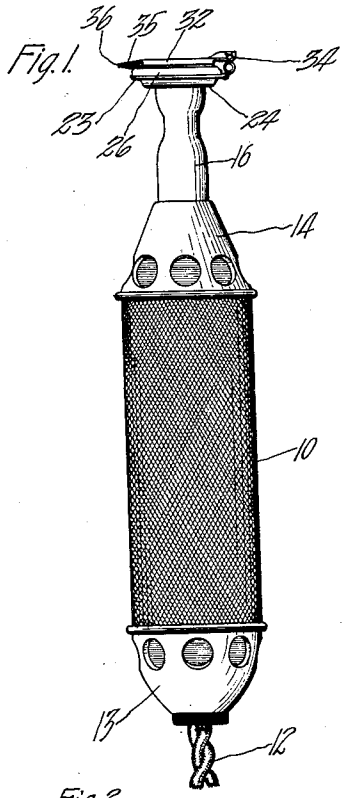
M. B. & L. B. STEARNS.

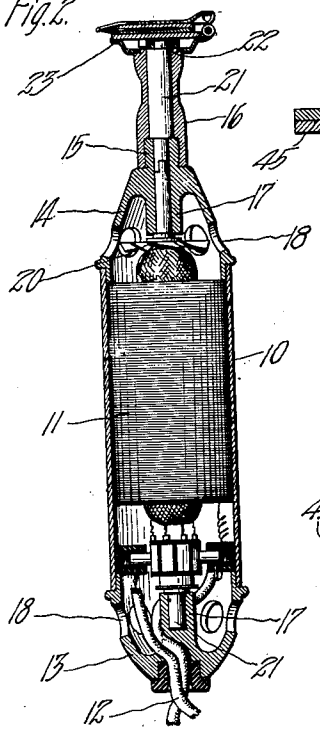
SAFETY RAZOR.

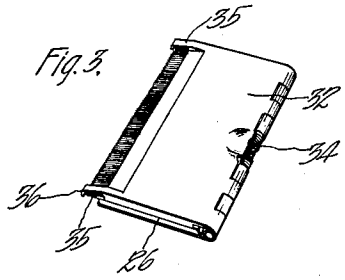
APPLICATION FILED APR. 20, 1916.

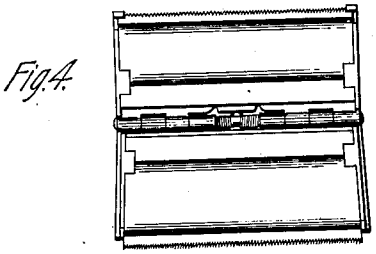
1,205,576.

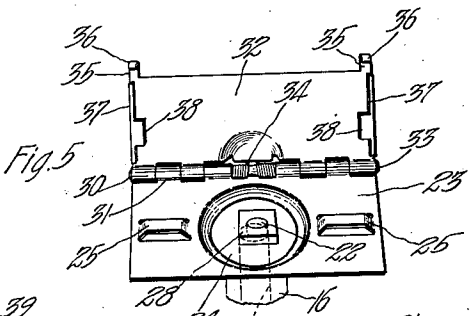
Patented Nov. 21, 1916.

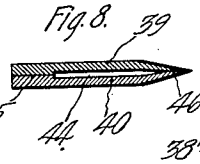


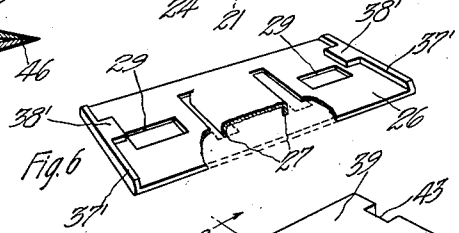


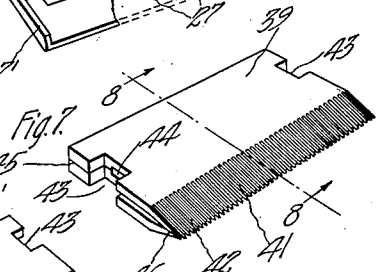


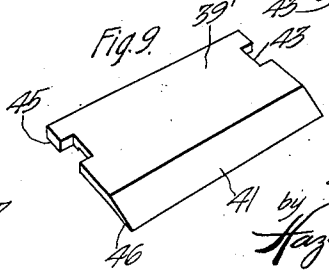












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and Leo B. Stearns
by Hazard Brug & Miller
their Attorneys.

UNITED STATES PATENT OFFICE.

MARCO B. STEARNS, OF HUNTINGTON BEACH, CALIFORNIA, AND LEO B. STEARNS, OF YUMA, ARIZONA.

SAFETY-RAZOR.

1,205,576. Specification of Letters Patent. Patented Nov. 21, 1916.

Application filed April 20, 1916. Serial No. 92,550.

To all whom it may concern:

Be it known that we, MARCO B. STEARNS and LEO B. STEARNS, citizens of the United States, residing at Huntington Beach, county of Orange, and State of California, and Yuma, county of Yuma, State of Arizona, respectively, have invented new and useful Improvements in Safety-Razors, of which the following is a specification.

Our invention relates to a safety razor, and in particular to a safety razor in which a reciprocating blade coacts with a stationary blade in cutting the hair.

It is an object of this invention to construct a safety razor in which a pair of coacting blades provided with cutting teeth are removably mounted. Suitable means such as an electric motor are operatively connected to the reciprocating blade for imparting motion thereto. The movable blade is mounted on a blade carriage and the latter is slidably supported on a fixed carriage guideway provided with guides, whereby the movement of the carriage is maintained in straight lines. Means are also provided for yieldingly pressing the blades together, whereby the blades are automatically sharpened and kept in perfect cutting condition.

It is another object of our invention to provide a safety razor simple of construction, positive in operation, in which the blades may be easily and quickly inserted and removed, and which may be manufactured at a low cost.

With the above and other objects in view which will appear as the description proceeds, our invention consists in the construction, combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings which form a part of this specification, we have illustrated a convenient and practical embodiment of our invention and in which:

Figure 1 is a side elevation of the razor constructed in accordance with our invention. Fig. 2 is a vertical central section of the razor, some parts being shown in elevation for fullness of illustration. Fig. 3 is a perspective view from above of the razor head in closed position. Fig. 4 is a plan view of the razor head in its open position showing the razor blades in place. Fig. 5 is a perspective view of the razor head in open position with the razor blades and the blade carriage removed. Fig. 6 is a perspective view, with parts broken away, of the blade carriage. Fig. 7 is a perspective view of the razor blades in operative position. Fig. 8 is a vertical section taken on line 8—8 of Fig. 7. Fig. 9 is a perspective view of a blade of slightly different construction.

Referring to the drawings, 10 designates a hollow handle in which an electric motor 11 of any suitable or preferred construction is mounted. 12 designates the wire connections for said motor passing through the lower cap 13 of the handle. The wire connections are provided with a connecting plug and lead to any suitable source of electric energy such as a light socket (not shown). At the upper end of the hollow handle, a cap 14 is mounted, provided with an externally threaded boss 15 on which the lower end of the handle extension 16 is screwed. The upper and lower caps are provided with bearings 17, 17, for the motor shaft 21. A series of openings 18, 18 in said caps, provide for the circulation of air for keeping the motor cool. The circulation of air is assisted by a fan 20 mounted on the motor shaft 21 in the upper cap 14. The motor shaft 21 extends through the handle extension 16 and is provided at its upper extremity with an eccentric pin 22.

Rigidly mounted at the upper end of the handle extension 16 is a rectangular carriage guideway 23. The same is provided with a central circular recess 24 through which upper end of the motor shaft 21 and the eccentric pin 22 project. A pair of guide lugs 25 are arranged at opposite sides of said recess. These guide lugs are preferably formed by cutting a pair of parallel slits in the metal plate of which the carriage guideway 23 is composed, and pressing the metal vertically upward to assume the position as shown in Fig. 5. A reciprocating blade carriage 26, rectangular in shape is slidably mounted on the guideway 23. The same consists of a metal plate provided with a pair of parallel and downwardly extending operating flanges 27 preferably formed by cutting elongated U-shaped slits in the metal and bending down the metal therebetween. The flanges 27 engage opposite sides of an apertured square block 28 which is loosely mounted on the eccentric pin 22. As the motor shaft 16 rotates, the eccentric pin 22 will impart a reciprocating motion, through the mechanism of the square block

28 engaging the operating flanges 27 of the blade carriage 26. A pair of longitudinal slots 29 arranged on opposite sides of the operating flanges 27 are provided in the blade carriage which fit over the guide lugs 25 of the carriage guideway 23. The guide lugs 25 and the guide slots 29 converting the rotary movement of the eccentric pin 22 into a rectilinear movement as will be understood.

The rear end of the carriage slide is provided with a plurality of apertured ears 30 between which similar apertured ears 31 of a hinged blade holder 32 are inserted. A pintlet 33 passing through the ears 30 and 31 forms therewith a hinge. A coiled spring 34 encircling said pintlet and having its ends engaging the outer face of the blade holder 32, tends to move the same toward the carriage slide 23 with yielding pressure. The width of the blade holder 32 is slightly less than the width of the carriage slide 23. The blade holder is provided at opposite corners of the forward edge with a pair of blade retaining clips 35 which project in a slightly downward direction from the plane of said holder and which have their extreme ends 36 bent at an angle thereto. The lateral ends of the inner face of the blade holder 32 are provided with a pair of blade retaining ribs or flanges 37, said flanges having a rectangular blade retaining lug 38 projecting inwardly along the face of the blade holder. The blade carriage 26 is provided on its upper face with similar blade retaining ribs 37′ and retaining lugs 38′.

The stationary and movable blades 39 and 40 are exactly alike in construction, and therefore interchangeable. Each blade consists of a flat rectangular piece of metal preferably steel, provided with a tapered cutting edge 41 which may be a straight edge as shown in Fig. 9, or of the preferred form with a serrated edge comprising a great number of fine cutting teeth formed by providing the cutting edge with a number of parallel grooves 42. The sides of the blades are cut away to form a pair of rectangular recesses 43 adapted to engage the retaining lugs 38 and 38′ of the blade holder 32 and the blade carriage 26, respectively. In order to reduce the friction to a minimum, and to automatically maintain a sharp cutting edge on the razor blades, the latter are provided with a shallow longitudinal channel or groove 44 at their adjacent faces, which when the blades are lying flat and parallel in their operative position as shown in Figs. 7 and 8, form a narrow longitudinal slot or channel. It will be understood from the construction of the blades just described that their bearing surfaces are formed by two narrow longitudinal bearing faces 45 at the rear and 46 at the front. As the bearing surfaces 46 are worn down, the extreme cutting edges will be correspondingly worn away, but owing to the taper thereof, a sharp cutting edge will be maintained.

From the foregoing description, the operation of our improved safety razor will be easily understood.

The razor head is assembled by swinging the blade holder 32 on its hinges against the tension of the spring 34 and placing the blade carriage 26 so that the operating flanges 27 will be engaged by opposite sides of the square block 28 loosely mounted on the eccentric pin 22. The guide lugs 25 of the carriage line will project through the guide slots 29 in the carriage 26 and produce the rectilinear motion of the carriage. The razor blade 40 is next inserted by placing the same upon the blade carriage 26 so that the rectangular recesses 43 will engage the retaining lugs 38′, the shallow groove 44 of the blade being on its upper face. The second blade 39 is similarly inserted and placed on the blade holder 32 with the retaining lugs 38 engaging the recesses 43 of said blade and the shallow groove 44 of said blade on its lower face. The extreme ends of the cutting edge of the stationary upper blade 39 are engaged by the retaining clips 35 at the extreme ends of the forward edge of the blade holder. The blade holder with its blade 39 is now allowed to close upon the lower blade 40 so that the blades will lie flat and parallel as shown in Figs. 7 and 8, forming a shallow channel between them. The electric connections 12 are attached to a suitable source of electric energy provided with a switch. When the switch is turned on and the motor is actuated, rotation of the motor shaft 21 will, through the eccentric pin 22 and operating block 28, impart a rapid reciprocating motion to the blade carrier 26 and the blade 40 carried thereby. The safety razor is used for shaving with the beard preferably left dry, that is without the application of soap and water to produce a lather to soften the beard. Our safety razor will shave rapidly and closely. It is sanitary, as lather and moisture cannot get into the razor head between the blades. Furthermore, the blades are automatically maintained in perfect cutting condition due to the fact that the blade holder 32 presses the upper blade against the lower blade with yielding pressure, and as the adjacent contacting faces of the cutting edges are worn away, they are simultaneously sharpened. Another advantage of our invention is the ease of assembling the razor head and removing old blades and inserting new ones. Furthermore, the blades are exactly alike and interchangeable, which is another advantage in assembling the head.

While we have shown the preferred con-

struction of our apparatus as now known to us, it will be obvious to those skilled in the art that various changes in the combination, construction and arrangement of parts may be made without departing from the spirit of our invention as defined by the appended claims.

We claim:

1. A safety razor comprising a hollow handle, an electric motor therein, a handle extension, a fixed carriage guideway mounted on the outer end thereof, said guideway having a central recess in the upper face thereof, a pair of vertically projecting guide lugs integral with said slide arranged on opposite sides of said recess, a blade carriage reciprocably mounted on said slide, said carriage being provided with a pair of downwardly extending transverse flanges and a pair of guide slots arranged on opposite sides of said flanges, said slots being adapted for the reception of said guide lugs of said guideway, a blade holder, a spring hinge connecting said blade holder and said guideway, and yieldingly pressing said holder against said guideway, the lateral ends of the adjacent faces of said blade holder and said carriage being provided with blade holding flanges and lugs, a stationary blade mounted in said blade holder, a blade mounted for reciprocatory movement in said carriage, said blades lying flat and parallel against each other and being provided at their cutting edges with cutting teeth, the adjacent faces of said blades being each provided with a central longitudinal shallow recess forming when the blades are in engagement with each other a longitudinal slot, a motor shaft extending through said guideway, an eccentric pin extending from the outer end of said shaft and a carriage operating apertured block loosely mounted on said pin, said block engaging the guide flanges of said carriage.

2. A safety razor comprising a hollow handle, a motor therein, a fixed carriage guideway mounted at one end of said handle, a pair of outwardly projecting guide lugs formed integral with said guideway, a reciprocating blade carriage provided with a pair of guide slots adapted for the reception of said guide lugs, a holder for the stationary blade, means for pressing said holder against said guideway with yielding pressure, the lateral ends of the adjacent faces of said blade holder and said carriage being each provided with blade holding means, a stationary blade mounted in said holder, a blade mounted in said carriage, said blades lying flat and parallel against each other, the adjacent faces of said blades being each provided with a longitudinal recess forming when the blades are in engagement with each other a longitudinal slot, and means connected to said motor for reciprocating said carriage.

3. A safety razor comprising a handle, a fixed carriage guideway connected to one end thereof, a reciprocating blade carriage mounted thereon, means for reciprocating said carriage, a fixed blade holder hinged to said guideway, a spring moving said holder against said guideway with yielding pressure, means on said blade holder and said carriage for holding the blades in fixed relation thereto, a stationary blade mounted in said holder, and a reciprocatory blade mounted in said carriage, said blades being provided with coacting cutting edges.

4. A safety razor comprising a handle, a reciprocating blade carriage supported thereby, means for reciprocating said carriage, a fixed blade holder, means for yieldingly pressing said holder against said carriage, a fixed flat blade in said holder, a reciprocatory flat blade in said carriage, and separate means for holding said blades in fixed relation to said carriage and to said holder, respectively.

5. A safety razor comprising a handle, a reciprocating blade carriage supported thereby, a flat blade mounted in said carriage, means for holding said blade in fixed relation to said carriage, a fixed blade holder, a flat blade supported thereby, means for holding said blade in fixed relation to said holder, the cutting edges of said blades contacting with each other, and resilient means for pressing said blades together.

6. A safety razor comprising a handle, a pair of like interchangeable flat blades, one of said blades being stationary and the other reciprocatory, the cutting edges of said blades contacting and coöperating with each other, means for reciprocating said reciprocatory blade, and resilient means for pressing the cutting edges of said blades against each other.

7. A safety razor comprising a handle, a pair of like interchangeable flat blades, one of said blades being stationary and the other reciprocatory, means for reciprocating said reciprocatory blade, the cutting edges of said blades coöperating with each other and means for pressing the cutting edges of said blades against each other.

8. A safety razor comprising a pair of like interchangeable flat blades having longitudinal grooves along their adjacent faces, means for reciprocating one of said blades and resilient means for holding said blades in coöperating engagement.

9. A safety razor comprising a handle, a carriage guideway mounted thereon, a blade carriage reciprocably mounted on said guide-way, a flat blade mounted on said carriage, means on said carriage for preventing lateral movement of said blade in

relation to said carriage, a flat stationary blade coöperating with said reciprocating blade, a combined blade holder and guard for said stationary blade, and means for yieldingly pressing said blade holder against said guideway.

10. A safety razor comprising a pair of interchangeable flat blades coöperating with each other and having a longitudinal channel between their adjacent faces, means for reciprocating one of said blades, a combined blade holder and guard for the other blade, said blade holder having blade protecting portions bent over the ends of the cutting edge of said other blade, means for preventing lateral movement of said other blade in relation to said blade holder and guard, and a spring pressing the cutting edges of said blades together.

11. A safety razor comprising a handle, a reciprocating blade carriage supported thereby, means for reciprocating said carriage, a fixed blade holder, said holder constituting a guard for the cutting edges of the blades, means for yieldingly pressing said holder against said carriage, a flat blade in said holder, a reciprocating flat blade in said carriage and separate means for holding said blades in fixed relation to said carriage and to said holder.

12. A safety razor comprising a handle, a carriage guideway mounted thereon, a blade carriage reciprocably mounted on said guideway, a blade removably mounted on said carriage, means on said carriage for preventing lateral movement of said blade in relation to said carriage, a combined blade holder and guard pivotally secured to said guideway, a stationary blade removably mounted therein, means for preventing lateral movement of said blade in relation to said holder and means for yieldingly pressing said holder against said guideway.

13. A safety razor comprising a pair of like interchangeable flat blades coöperating with each other and having a longitudinal channel between their adjacent faces, means for reciprocating one of said blades, a blade holder for the other blade, and means for yieldingly pressing the cutting edges of said blades together.

14. A safety razor comprising a pair of flat like interchangeable blades, means for reciprocating one of said blades, a blade holder in which the other blade is removably mounted, means on said blade holder for preventing lateral movement of said other blade in relation to said holder, and means for reciprocating one of said blades.

15. A safety razor comprising a handle, a reciprocating blade carriage supported thereby, means for reciprocating said carriage, a flat blade removably mounted in said carriage, means for preventing lateral movement of said blade in relation to said carriage, a blade holder, a blade removably mounted thereon, and in coöperative relation to said reciprocating blade, and means for yieldingly pressing said blades together.

In testimony whereof, we have signed our names to this specification.

MARCO B. STEARNS.
LEO B. STEARNS.