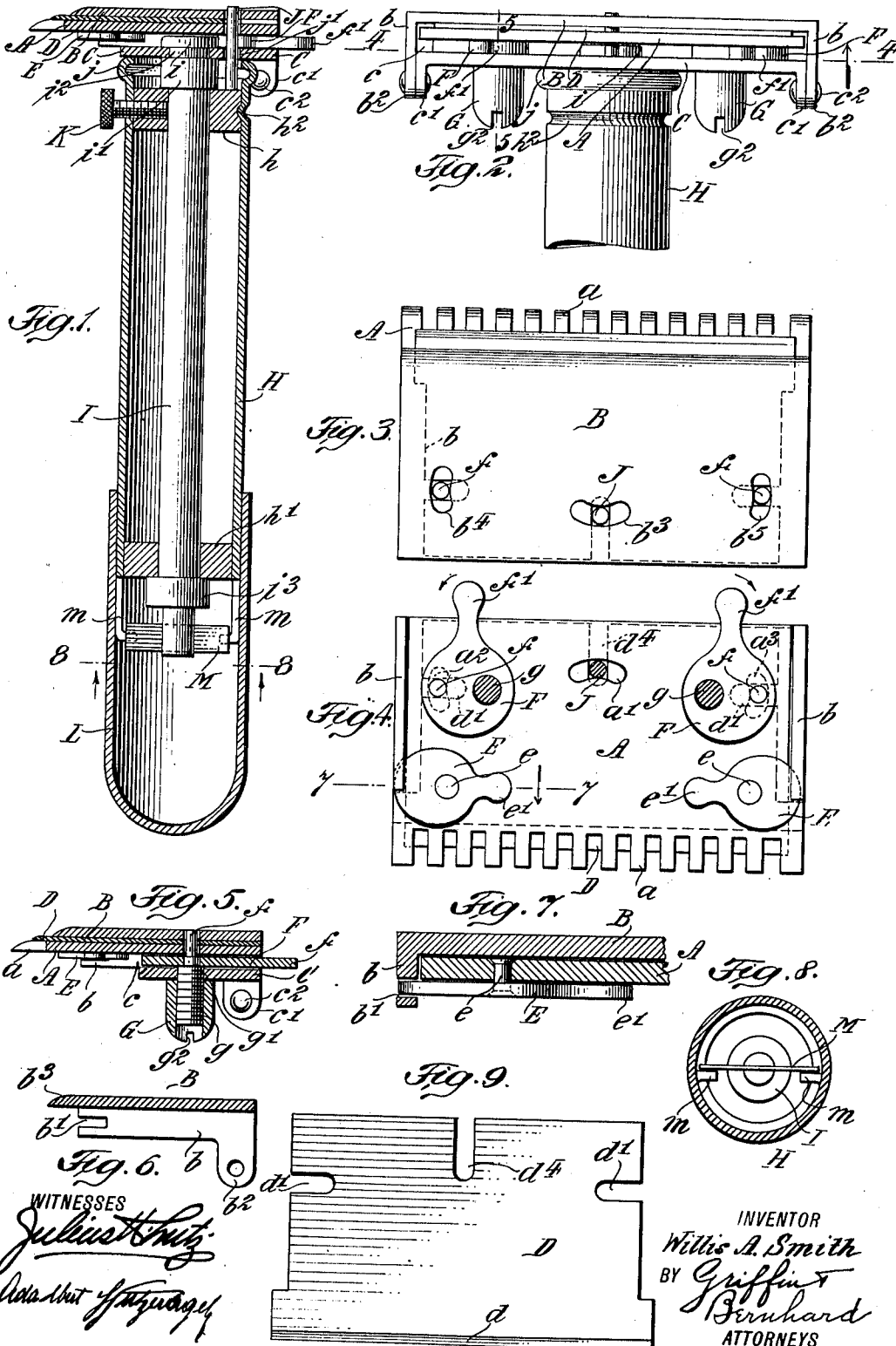


W. A. SMITH.
SAFETY RAZOR.

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WITNESSES
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Adm. Att. of Invention

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SAFETY-RAZOR.

978,230.

Specification of Letters Patent. . Patented Dec. 13, 1910.

Application filed April 22, 1909. Serial No. 491,572.

To all whom it may concern:

Be it known that I, WILLIS A. SMITH, a citizen of the United States, residing in the city of New York, borough of Manhattan, county and State of New York, have invented certain new and useful Safety-Razors, of which the following is a specification.

This invention is a safety razor embodying in its construction a blade movable during the shaving operation with respect to the holder which supports it.

Prior to my invention, safety razors of the ordinary type to be found on the market employ a separable holder of one type or another, and a blade held rigidly in the holder, a common form of construction involving means for rigidly clamping the blade relatively to a comb or guard plate.

One object of this invention is to secure a draw or shear cut by the blade during the operation of moving the razor over the face, for the purpose of increasing the ease and facility of shaving, and thereby obviate in a great measure the "pull" of the razor on the beard.

A further object is to facilitate the adjustment of the blade with respect to the teeth of the comb or guard plate, such adjustment being effected without interfering with the movement of the blade relative to the holder; and a further object is to simplify the construction and render easy and quick the operations of inserting a blade into, or removing it from, the holder.

According to the present invention, a holder of suitable construction is employed as a means for supporting a blade in such a manner that said blade is movable bodily within said holder. In one practical form of construction, the blade is reciprocatory, and it is operated by turning or rocking the handle, suitable mechanical connections being employed intermediate said blade and the handle whereby the blade is operated. The razor is thus capable of operation to secure a compound movement, to wit: the razor as an entirety is adapted to be drawn by hand over the flesh, carrying the blade with it, and the blade is given a reciprocating movement within the holder of said razor, said reciprocation of the blade being simultaneous with the movement of the razor.

The invention consists, also, in the em-

ployment of means for adjusting the blade edgewise relative to the comb or guard blade for the purpose of bringing the sharp edge of said blade closer to the teeth of said comb or guard plate.

Other features and advantages of the invention will be set forth hereinafter in connection with the following detailed description.

In the accompanying drawings I have illustrated one practical embodiment of the invention, but the construction shown therein is to be understood as illustrative, only, and not as defining the limits of the invention, the several views being shown enlarged for clearness of illustration.

Figure 1 is a vertical section, partly in elevation, of a safety razor embodying my invention. Fig. 2 is an elevation looking toward the back end of the razor and toward the right-hand side of Fig. 1. Fig. 3 is a plan view of the razor. Fig. 4 is a sectional plan view, the plane of the section being indicated by the dotted line 4—4 of Fig. 2 looking in the direction of the arrow. Fig. 5 is a vertical cross section on the line 5—5 of Fig. 2. Fig. 6 is a detail view through the retaining plate illustrating one of the side flanges thereof. Fig. 7 is a detail cross section on the line 7—7 of Fig. 4. Fig. 8 is a cross section through the handle on the line 8—8 of Fig. 1 looking in the direction of the arrow in order to show the spring which acts to normally position the blade mid-way between the limits of its stroke. Fig. 9 is a plan view of the blade.

A designates the comb or guard plate, B the retaining plate, C a stay plate, the said plates forming what may be generically termed the holder for blade, D. Plates, A, B, C, are flat and positioned parallel to each other. Said retaining plate is provided at its end edges with flanges, *b*, each flange being formed with a groove, *b'*, and with a perforated lug or ear, *b*², see Fig. 6, the front edge of said retaining plate being beveled or curved, as at *b*³. Said retaining plate is so related to the comb or guard plate, A, that the flanges, *b*, will embrace the end edges of the guard plate, and the corresponding edges of the stay plate, C, as shown in Fig. 2. Said stay plate is in spaced relation to the guard plate in order to provide an intervening space or chamber, *c*, for the reception of

devices which will presently be described, and the stay plate is provided with lugs, c' , adapted to register with lugs, b^2 , of the retaining plate, whereby pivots, c^2 , may be passed through the registering lugs, c' , b^2 , as shown in Fig. 2, for the purpose of pivotally connecting retaining plate, B, to stay plate, C. This construction permits a relative movement of retaining plate, B, to comb or guard plate, A, and when said retaining plate is in an opened position, blade, D, may be inserted or removed as desired.

Comb or guard plate, A, is provided at its front edge with a series of teeth, a , forming the comb or guard, said teeth being beveled as shown in Figs. 1 and 5. Said guard plate is parallel to the retaining plate in order that blade, D, may fit snugly between the two plates and have free movement with respect to them. It will be recalled that the retaining plate is pivotally connected to the stay plate, and as shown in the drawings, the comb plate is intermediate said retaining and stay plates. For the purpose of securely fastening the retaining plate in parallel relation to the guard plate, I employ suitable latches, one form of which is shown in Fig. 4 as consisting of the latch disks, E. Two of said latch disks are positioned on comb or guard plate, A, near the respective end edges thereof, each latch being pivoted eccentrically to the guard plate by a pin, e , so that the edge portion of said latch will engage with a notch, b' , in an end flange, b , of the retaining plate. While various forms of latches may be used to detachably fasten plates, A, B, in fixed relation to each other, the eccentrically pivoted disks, E, afford simple, effective and convenient means for securing the end sought, particularly as each latch is provided with a suitable knob or handle, e' , for its easy manipulation. It will be understood that latches, E, are adjusted into engagement with the notches, b' , and occupy the position shown in Fig. 4 for fastening plates, A, B, firmly together, whereby blade, D, is confined laterally between said guard and retaining plates, but when the latches are turned on pivot, e , to disengage the edges of said latches from the notches, plate, B, may be swung away from plate, A, and the blade, thus exposing the blade to easy access for the purpose of inserting or removing it as desired.

Guard plate, A, is provided with a segmental slot, a' , which registers with the corresponding slot, b^3 , in retaining plate, B, and, furthermore, said guard plate is provided with other segmental slots, a^2 , a^3 , shown in dotted lines in Fig. 4, said slots, a^2 , a^3 , being in register with slots, b^4 , b^5 , respectively, in the retaining plate.

For the purpose of adjusting blade, D, so that its sharpened edge, d , will be in proper relation to the teeth, a , of comb plate, A,

and for guiding or directing said blade in its movement with respect to the holder, I employ suitable devices which are positioned between stay plate, C, and comb plate, A. Said adjusting and guiding devices are shown more clearly in Fig. 4 as eccentrics, F, each having a pin or stud, f . The pin or stud of one eccentric passes through the coincident slots, a^2 , b^4 , of the guard and retaining plates, whereas the stud or pin of the other eccentric passes through coincident slots, a^3 , b^5 , of said guard and retaining plates. Blade, D, is provided with slots, d' , at or near its respective end edges, said slots being parallel to the cutting edge, d . The blade is positioned between plates, A, B, for its parallel slots, d' , to aline or register with slots, a^2 , b^4 , and a^3 , b^5 , whereby studs or pins, f , will engage with the edges of said slots, d' , of the blade.

Each eccentric, F, is provided with an operating knob or handle, f' , and said eccentrics are so positioned between guard plate, A, and stay plate, C, that said knobs or handles, f' , extend beyond the rear edges of the holder, whereby the eccentrics may be adjusted easily, although said eccentrics are housed or contained between the guard plate and the stay plate.

Each eccentric, F, is held in fixed relation to the stay plate and the guard plate by a screw, g . The screw is fastened rigidly to the guard plate, and said screw passes loosely through an opening, g' , in stay plate, C, so that the screw projects beyond the exposed face of the stay plate. The eccentric has an opening produced eccentrically to the axis thereof, and this hole receives the screw, g , so that the eccentric may be turned or adjusted by hand on the screw. The eccentrics and their pivot screws are positioned near the end edges of guard and stay plates, A, C, and said screws are engaged by nuts, G, which are shown as having a notch, g^2 , for the reception of a suitable implement whereby each nut may be turned on its screw for the purpose of clamping the eccentric firmly between the guard plate and the stay plate. It is evident that the nuts may be slackened in order to release the eccentrics from clamping engagement with said plates, and when so released said eccentrics may be adjusted by manipulating their knobs, f' , in order to turn the studs or pins, f , in the curved slots of the guard and retaining plates. By reference to Fig. 4 it will be understood that when they are turned in the direction indicated by the arrows, the pins, f , will be moved toward the teeth, a , of guard plate, A, thereby adjusting blade, D, toward the free ends of said teeth, but an adjustment of the eccentrics in an opposite direction will move blade, D, edgewise toward the heel of the holder, thus withdrawing the sharpened edge of the blade rearwardly from the points

of the teeth on the comb plate. After the blade shall have been adjusted to the required position relatively to the teeth of the comb plate, nuts, G, are tightened and
 5 eccentrics, F, are clamped fixedly in position against comb plate, and as the eccentrics are held from movement the pins or studs, f, remain in stationary positions so that the pins will serve as the means for guiding
 10 blade, D, in its reciprocating movements.

As a proper means for imparting movement to blade, D, I employ a handle, H, which is movable with respect to the holder and is operatively connected with said blade,
 15 D. In the embodiment of the invention shown in the drawings handle, H, is hollow, preferably tubular, and it is provided near its respective ends and interiorly thereof with the disks or heads, h, h'. Said disks
 20 may be fastened rigidly to the hollow handle by any suitable means, but as shown in Fig. 1, one or both of the disks may be provided with an annular groove, h², into which is forced an inwardly extending rib of the
 25 handle for the purpose of locking the disks within said hollow handle.

The hollow handle is connected operatively with the holder by a stem, I, which extends lengthwise within said handle and through aligned openings in the disks or
 30 heads, h, h', see Fig. 1. Said stem is attached firmly to stay plate, C, and for this purpose the stem is provided with a head, i, and a collar, i', said head and collar being
 35 spaced in order to provide a groove, i², adapted to receive the stay plate, as shown in Fig. 1. Collar, i, of the stem is adapted to engage with the stay plate when an end portion of the stem is inserted through an
 40 opening in the stay plate, after which said end part of the stem is upset in any suitable way or by any suitable means so as to produce the head, i, whereby the stem is fastened securely to the stay plate, the headed
 45 end, i, of the stem being received in the chamber, c, between guard plate, A, and stay plate, C. Collar, i', of the stem engages, also, with head or disk, h, and near its other end the stem is provided with another collar,
 50 i³, adapted for engagement with the other disk or head, h', whereby the collars, i', i³, of the stem cooperate with the heads or disks, h, h', in order to preclude endwise movement of the handle on the stem, and at the same
 55 time, permit said handle to turn freely on said stem. If desired, collar, i³, may be fastened or clamped removably to the stem to facilitate the assemblage or removal of the parts. That part of the handle which lies
 60 next to the stay plate may be finished by providing a ribbed part, j, and beyond this ribbed part of the handle extends an operating pin, J, the latter being eccentric to the axis of motion of the handle. Said plate, C,
 65 is provided with a segmental slot, j', which

registers with slots, a', b³, of the guard and retaining plates, and pin, J, extends from the handle so as to operate in the slots, j', a', b³, of the stay, guard, and retaining
 70 plates, respectively. Said eccentric pin works in a slot, d⁴, provided in blade, D, said slot opening through the rear edge of the blade and being at an angle, preferably a right angle, to the beveled edge, d, and slots, d',
 75 of said blade. The eccentric pin moves with the handle when it is rocked or turned on the stem, I, and said pin engages with the slotted part, d⁴, of the blade so as to serve as the operative connection between the pivoted handle and the reciprocating blade.
 80 When the handle is turned in one direction, eccentric pin, J, rides against one edge of slot, d⁴, and moves blade, D, in one direction, but a reverse turn of the handle, H, moves
 85 pin, J, in an opposite direction and causes it to engage with the other edge of slot, d⁴, thereby moving said blade, D, in an opposite direction, whereby as the handle is turned back and forth in drawing the razor over the face said blade, D, is given a reciprocating
 90 motion for the purpose of securing a draw or shear cut on the beard.

It is desirable at times to retain blade, D, in a fixed position, and to this end, I provide means for clamping the handle firmly
 95 to stem, I. One means for securing this result is a binding screw, K, which is supported in the handle and its head, h, whereby the screw may impinge stem, I, and lock the handle firmly against the stem, thus precluding the handle from turning and the
 100 blade from reciprocating.

A finish is given to the handle by employing a cap, L, adapted to fit friction tight upon the outer end of the hollow handle, but
 105 this cap is removable should it be desired to secure access to the stem, I.

For assisting the blade, D, in its reciprocating movements it will be found desirable to employ a spring which will tend to return
 110 said blade to a normal position. One embodiment of this part of the invention is shown in Figs. 1 and 8, wherein the outer free end of stem, I, is provided with a spring, M, the same being a leaf spring, extending transversely through the outer
 115 extremity of stem, I. The end portions of said spring, M, engage with fingers, m, of handle, H, and when said handle is turned in one direction, one end of the spring engages with one finger, m, so that when pressure on the handle is relaxed the spring will
 120 tend to return the handle and blade to a central position. Should the handle be turned in an opposite direction, the other end of the spring will press against the other finger, m, and thus the handle and the blade will be again returned to their normal
 125 positions by decreasing the pressure on said handle. Spring, M, thus acts to retain
 130

blade, D, in a position mid-way between the limits of its movement in either direction. Of course, the spring may be variously placed and various constructions of the spring may be employed, but the example shown and described affords a simple and effective means for retaining the blade in its operative position.

The operation of the invention will be readily understood from the foregoing description, but it may be summarized briefly as follows: To place a blade, such as D shown in Fig. 9, in position, latches, E, are released from notches, b' , and retaining plate, B, is turned on the pivots, c^2 . Blade, D, may now be placed against the comb plate, for its slots, d' , to receive guide pins, f , and its slots, d^2 , to receive eccentric pin, J. The retaining plate may now be closed against the blade, and latches, E, adjusted to the position of Fig. 4 and into engagement with notches, b' , to lock plates, A and B, in parallel relation. Screw, K, being free from engagement with stem, I, handle, H, may be turned on said stem. When the razor is drawn across the face, the edge, d , of the blade will act to cut the beard, but the efficiency of the cutting operation is increased by rocking or turning handle, H, on stem, I, so that pin, J, will impart reciprocating motion to blade, D, the spring, M, assisting in the operation of imparting reciprocating movement to said blade. The razor is thus capable of a compound movement, first, a movement across the surface to be shaved, and second, a reciprocating movement of blade, D, due to the operator turning handle, H, so as to swing eccentric pin, J, back and forth, said reciprocating movement of the blade taking place simultaneously with the movement of the razor across the face.

The razor may be washed or cleansed in any usual or convenient way, but after the shaving operation is completed, latches, E, are released, plate, B, swung outwardly and blade, D, removed, thus permitting of the parts to be thoroughly cleaned and dried, and the razor blade to be sharpened.

It is preferred to employ a thin flat blade having parallel faces and a sharpened edge. The blade may be rigid or elastic as most desired. The plates, A, B, C, are flat so that they may be stamped rapidly and economically to their required form and from pieces of sheet metal, thus securing economy in the manufacture of the device. Latches, E, and eccentrics, F, are, also, flat plates which may be conveniently stamped from suitable material, and obviously, the blade, D, may be stamped in the required form, tempered and sharpened in any usual way. The entire device is quite simple in construction, and the parts of said device may be rapidly manufactured by suitable machinery, and assembled

in an expeditious manner, with or without skilled labor, so that the cost of manufacture is minimized.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. In a safety razor, a blade-holder, a stem projecting from said blade-holder, a handle on the stem and movable relatively to the blade-holder, a blade having a reciprocating movement relatively to the blade-holder, and means operatively connecting said blade and the handle whereby the blade is reciprocated by the movement of the handle relatively to the holder.

2. In a safety razor, a blade-holder comprising a plurality of plates two of which are hinged for movement sidewise with relation to each other and another of said plates being intermediate said hinged plates, a blade positioned between the intermediate plate and one of the hinged plates, a movable handle, means for connecting said handle to the blade-holder, and means for operatively connecting said handle and the blade whereby the blade is operated by the movement of the handle relatively to the holder.

3. A safety razor comprising a holder, a movable handle, means connecting said handle and the blade holder whereby the handle may be turned on its axis, a blade movable with respect to said holder, and means operatively connecting the blade and the handle, whereby the blade may be operated within the holder by the movement of said handle relative to said holder.

4. A safety razor comprising a holder, a handle connected to said holder for movement relatively thereto, a reciprocatory blade, and means operatively connecting said blade and the handle whereby the blade is reciprocated by the movement of the handle relatively to the blade holder.

5. A safety razor comprising a holder, a movable handle, means connecting the handle to said blade holder, said handle being rotatable on the axis of said connecting means, a movable blade supported within the holder, and means operatively connecting said movable handle and the blade for imparting movement to the latter relative to said holder.

6. A safety razor comprising a holder, a reciprocatory blade supported on said holder, means for guiding said blade, a handle, means connecting the handle to said holder for movement relative thereto, and means operatively connecting the blade and the handle whereby said blade is reciprocated relative to the holder by the relative movement of said handle to the holder.

7. A safety razor comprising a holder, a stem connected to said holder, a reciprocating

tory blade supported on said holder, a handle fitted to said stem for axial movement with respect to the holder, and means operatively connecting the blade and the handle whereby the blade is reciprocated by the movement of the handle.

8. A safety razor comprising a holder, a reciprocatory blade thereon, means for directing the movement of said blade, a stem, a handle supported on said stem for axial movement thereon, and an operating pin in eccentric relation to the handle and operatively connected to said blade, whereby the movement of said pin by the operation of the handle imparts reciprocating movement to the blade.

9. A safety razor comprising a holder, a blade movable with respect thereto, a handle, means connecting the handle to said holder, whereby the handle is movable relative to the holder, means connecting the blade and the handle for operating the blade by movement of the handle, and a spring cooperating with said blade for retaining it in a position intermediate the limits of its movement.

10. A safety razor comprising a holder, a reciprocatory blade, a handle, means connecting the handle to the holder whereby the handle is movable relatively to the holder, means operatively connecting said handle and the blade for reciprocating said blade by the movement of the handle relative to the holder, and a spring cooperating with said handle, whereby the blade is retained in a position intermediate the limits of its movement.

11. In a safety razor, a holder provided with a toothed guard plate, a reciprocating blade supported in said holder, a handle, means operated by the handle for imparting reciprocating movement to said blade, and means cooperating with the blade for bodily adjusting said blade in a direction parallel with the guard plate, whereby the operative position of the edge of the blade relative to the toothed edge of the plate may be varied.

12. In a safety razor, a holder provided with a toothed guard plate, a reciprocating blade supported in said holder, a handle, means operated by the handle for imparting reciprocating movement to said blade, and pivoted members supported by the holder and cooperating with the blade for adjusting said blade in a direction parallel to the guard plate, whereby the edge of the blade may be adjusted toward or from an edge of the guard plate.

13. In a safety razor, a holder comprising a guard plate, a retaining plate hinged thereto, a stay plate, and means for clamping the guard plate in fixed relation to the retaining plate and the stay plate, combined

with a movable blade confined between the guard and retaining plates, a handle, means for connecting the handle to the stay plate, whereby the handle is movable relative to the holder, and means intermediate the handle and the blade for operating the latter by the movement of the handle.

14. In a safety razor, a holder comprising a stay plate, a guard plate, and a retaining plate, said guard plate and retaining plate being pivotally connected, whereby the retaining plate may be adjusted relative to the guard plate, a blade positioned intermediate the guard plate and the retaining plate, means intermediate the stay and guard plates and operatively connected with said plate for guiding the latter, a handle connected to the stay plate, and means operated by the handle for imparting reciprocating movement to said blade.

15. In a safety razor, a guard plate, a retaining plate hinged thereto, means for locking the guard and retaining plates, a stay plate, eccentrics intermediate the stay and guard plates, guide pins on said eccentrics, a reciprocating blade cooperating with the guide pins, and means for operating said blade, said eccentrics being shiftable relatively to said plates whereby the guide pins are operated to move the blade edgewise and toward or from an edge of the guard plate.

16. In a safety razor, a holder having a guard plate, a retaining plate and a stay plate, a reciprocating blade, a stem fixed to the stay plate, a handle rotatable on said stem, and an eccentric pin projecting from the handle into engagement with the blade, said pin operating to impart reciprocating movement to the blade when the handle is rotated.

17. In a safety razor, a holder having a guard plate, a retaining plate and a stay plate, a reciprocating blade, a stem fixed to the stay plate, a handle rotatable on said stem, an eccentric pin projecting from the handle into engagement with the blade and adapted to impart reciprocating movement to the blade when the handle is rotated, and means for locking the handle firmly on the stem.

18. In a safety razor, a blade-holder, a reciprocating blade therein, said blade having guide slots and an additional slot, means engaging said guide slots for directing the movement of the blade, a handle, means connecting said handle to the blade holder, whereby the handle is adapted for rotation on its axis, and blade operating means cooperating with the handle and engaging directly with the additional slot of the blade whereby the blade is operated by the movement of the handle.

19. In a safety razor, a blade holder, a

blade carried thereby and adapted to be reciprocated thereon, a handle, and means co-operating with said blade and handle whereby turning of the handle causes said blade
5 to be reciprocated on the blade holder.

20. In a safety razor, a blade-holder, a blade supported on the blade-holder and adapted to be reciprocated thereon, a handle, means connecting the handle to the
10 blade holder, whereby said handle is rotatable relative to the blade holder, and means

connecting the blade and the handle for reciprocating said blade when the handle is turned about the axis thereof.

In testimony whereof I have signed my name to this specification in the presence of
15 two subscribing witnesses.

WILLIS A. SMITH.

Witnesses:

H. I. BERNHARD,
M. C. POWELL.