Sept. 11, 1962 F. GRASSAU 3,052,979

SAFETY RAZOR

Filed April 15, 1959 2 Sheets-Sheet 1

FIG.1

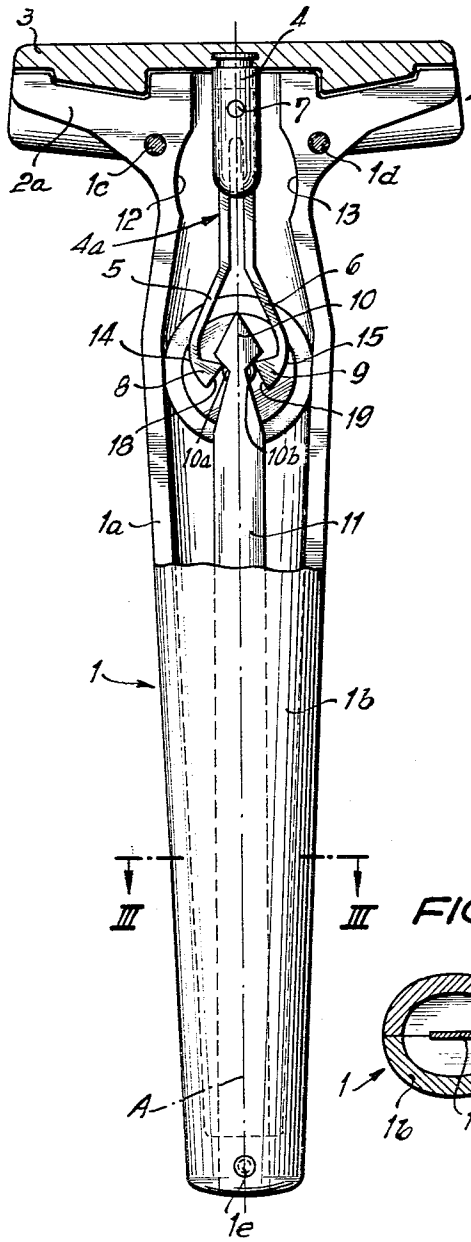


FIG.2

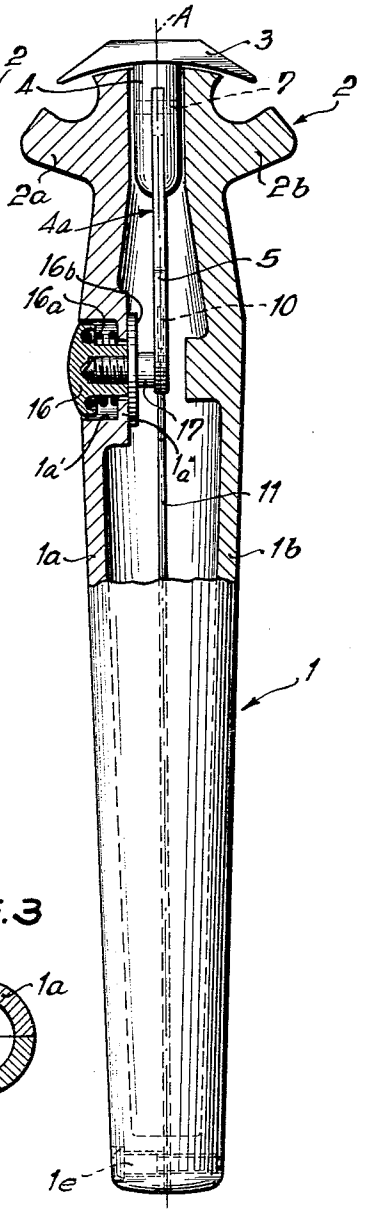


FIG.3

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FIG. 4

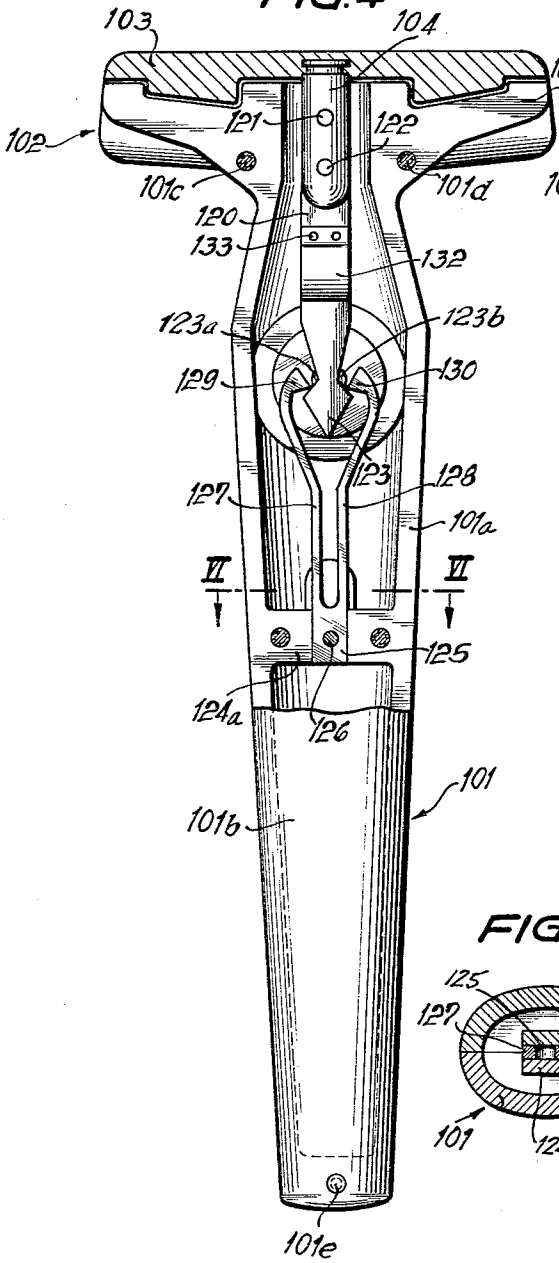


FIG. 5

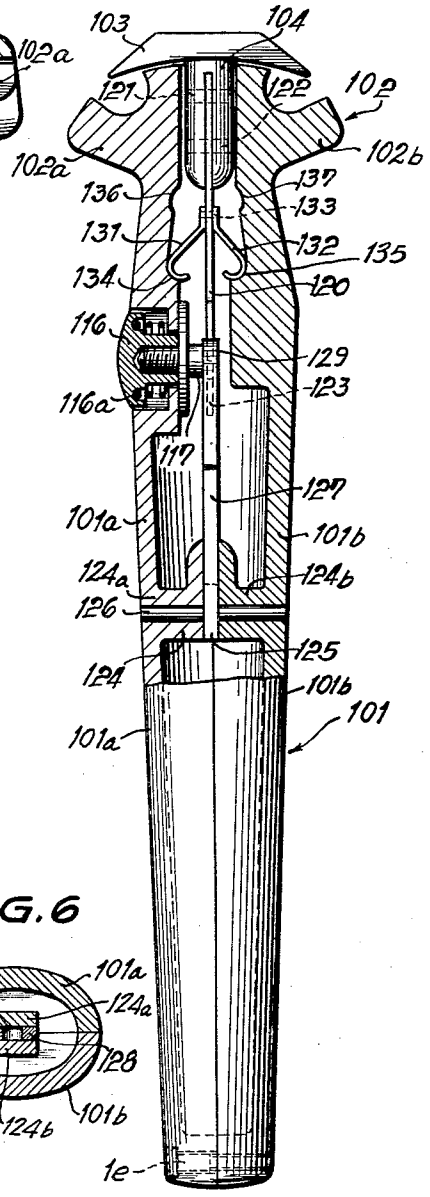


FIG. 6

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3,052,979

SAFETY RAZOR

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Claims priority, application Germany May 17, 1958
3 Claims. (Cl. 30—67)

The present invention relates to razors in general, and more particularly to a safety razor which is formed with a fully detachable clamping plate.

Certain previously proposed safety razors of this general character comprise a handle which is either threadedly connectable with the one or both blade holders or is releasably fixed thereto by a bayonet lock or the like. The separation and reassembly of so connected component parts of known razors frequently require rather lengthy manipulation by the user and do not always insure proper retention of a blade between the holders.

According to another prior proposal, the clamping plate of the safety razor is formed with a shaft which is insertable into the handle to be engaged and releasably retained by one or more hooks pivotably or otherwise installed in the hollow body of the handle. A serious drawback of such razors is in that the shaft is subjected to lateral forces tending to incline it with respect to the longitudinal axis of the handle and to thus prevent proper retention of a razor blade. In addition, such prior razors always require that the clamping plate and its shaft be bodily separated from the handle and that the blade be removed wherever the razor is to be cleaned regardless of whether or not the razor blade requires replacement.

An important object of the present invention is to provide an improved safety razor whose clamping plate is releasably held in the handle by two flat springs which subject the clamping plate to symmetrically distributed forces and thus maintain the blade in proper position with respect to its back support and the clamping plate.

Another object of the invention is to provide a safety razor of the above outlined characteristics which is so constructed that the clamping or blade retaining plate is instantaneously separable from the handle.

A further object of the invention is to provide a safety razor which is so constructed that a blade held therein need not be bodily removed if a mere rinsing or cleaning but no replacement thereof is desired.

A still further object of the invention is to provide an improved safety razor which is so constructed that the clamping plate is automatically movable away from the back support to expose both sides of the razor blade.

A yet further object of the invention is to provide a safety razor which embodies resilient means for automatically moving the clamping plate a given distance away from the back support and thus facilitates rinsing of the blade without requiring complete separation of the clamping plate from the handle.

Still another object of the invention is to provide a safety razor of the type as above set forth which is so constructed as to prevent rotation of the blade when the razor is in position ready for cleaning of the blade.

A concomitant object of the present invention is to provide a safety razor which may be conveniently manufactured of readily available metallic or plastic materials, which is reliable in use in that it can hold the blade in a single fixed position in which it is ready for application to the skin, which is of very simple construction, which can accommodate different types of razor blades, and which may be assembled or separated into its component parts within extremely short periods of time.

The above and certain other objects of the invention are attained by the provision of a safety razor which comprises essentially a handle preferably consisting of two releasably joined shells which define an elongated bore therebetween and each of which is formed with a lather bar, these bars constituting a back support for the razor blade and the bore in the handle having an open forward end; a clamping plate for the blade preferably formed with a shaft extendable through the blade and into the open end of the bore to be longitudinally slidably received in the handle; two flat springs the first of which is connected to and is mounted in the handle, and the second of which is connected to the shaft or directly to the clamping plate and is adapted to be releasably engaged by the first spring to maintain the clamping plate in such position with respect to the back support that a razor blade is properly retained therebetween; and means for separating the springs to permit complete or only partial withdrawal of the second spring whereby the razor blade can be replaced if the second spring member is fully withdrawn, or rinsed if the second spring is only partially withdrawn from the handle. One spring is formed with a pair of symmetrically arranged prongs whose claw-like extensions are movable toward and away from each other, and the other spring is formed with a preferably lance head shaped end which constitutes retaining means receivable between the extensions of aforementioned prongs to in such manner maintain the clamping plate in blade retaining position. Both springs are deformable from a neutral position in which they are preferably coplanar in directions substantially at right angles to each other, i.e. the spring which is formed with the lance head shaped end can be deflected in directions at right angles to the plane of aforementioned prongs, and the releasing or separating means preferably comprises an actuating element in the form of a spring biased push-button whose stem is movable into the interior of the hollow handle substantially at right angles to the latter's longitudinal axis to deform the one or the other spring and to thus separate the lance head shaped end from the extensions of prongs on the other spring. When the pronged spring is connected to the shaft of or directly to the clamping plate, the distant end of the other spring may but need not extend all the way to the rear end of the handle. On the other hand, when the pronged spring is permanently held in the handle, the handle may be formed with a bridge-like retaining portion at a point intermediate its ends to hold the pronged spring in requisite position in which the extensions of its prongs engage in tong-like fashion with the lance head shaped end of the other spring which is then fixed to the shaft of or directly to the clamping plate and thus maintains the clamping plate in blade retaining position adjacent to the back support.

That spring which is connected to the shaft of, or directly to the clamping plate may be automatically at least partially ejected from the hollow handle by so forming the extensions of both prongs that, while disengaged by the push-button from the lance head shaped end of the other spring and while moving toward each other owing to their innate resiliency, they slide along the stem of the push-button to impart an outwardly directed impetus to the spring connected with the clamping plate which impetus is sufficient to move the clamping plate away from the back support and to permit rinsing of both sides but no actual removal of the razor blade. The handle may be formed with suitable internal stops engaging with that spring which is connected to the shaft of or directly to the clamping plate in order to prevent complete automatic ejection of the clamping plate. Full withdrawal of the shaft of the clamping plate and/or of the spring connected thereto from the handle is possible by simply overcoming the frictional retaining force

of the last mentioned spring whereupon a dull blade may be replaced by a new one.

If the flat spring which is formed with the lance head shaped end is connected to the shaft of or directly to the clamping plate, a resilient member, e.g. a small leaf spring, may be riveted or otherwise connected at least to one major surface of the flat spring and so disposed as to operate between a pair of stops and a pair of shoulders provided in the bore of the handle, the shoulders deforming and thus storing energy in the resilient members when the safety razor is fully assembled, and the stops engaging with the resilient members upon depression of the push-button and subsequent movement of the clamping plate in a direction away from the handle due to the release of energy stored in the deformed resilient members.

If the clamping plate comprises a distinct shaft, the shaft is preferably of such configuration as to prevent rotation of the razor blade thereon and also to be non-rotatably but longitudinally slidably receivable in the open end of the bore formed in the hollow handle in order to move the flat spring connected thereto into proper engagement with the other flat spring.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of two specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a part front elevational and part sectional view of a safety razor constructed in accordance with one embodiment of the invention, the razor being shown in fully assembled position ready for use;

FIG. 2 is a side elevational view of the safety razor with the upper half shown in longitudinal section taken substantially at right angles to the section of FIG. 1;

FIG. 3 is a transverse section taken on line III—III of FIG. 1, as seen in the direction of arrows;

FIG. 4 illustrates a modified safety razor in part front elevational and part sectional view similar to that of FIG. 1;

FIG. 5 is a side elevational view of the modified safety razor with the upper part thereof in longitudinal section taken substantially at right angles to the section of FIG. 4; and

FIG. 6 is a transverse section taken on line VI—VI of FIG. 4, as seen in the direction of arrows.

Referring now in greater detail to the illustrated embodiments, and first to that shown in FIGS. 1 and 2, there is illustrated a safety razor which comprises a hollow handle or handgrip means **1** consisting of two halves or shells **1***a*, **1***b* assembled in mirror reverse and releasably joined by threaded bolts **1***c*, **1***d* and **1***e*.

Each of shells **1***a*, **1***b* is connected to or integrally formed with a guard member or lather bar **2***a*, **2***b*, respectively, the lather bars **2***a*, **2***b* constituting a composite back support **2** for the non-represented razor blade and being held together by aforementioned bolts **1***c*, **1***d*. This back support is located at the open forward end of the handle **1**. The third bolt **1***e* releasably joins the rear ends of shells **1***a* and **1***b*. A conventional razor blade may be pressed against the exposed surface of composite back support **2** by a cover or clamping plate **3** of customary design which is integrally formed with or rigidly connected to a comparatively short shaft **4**, preferably of non-circular cross-sectional contour, which projects into the hollow handle **1**. Shaft **4** is adapted to be passed through a razor blade and supports a forked flat spring **4***a* which is formed with two arms or prongs **5** and **6**. These prongs are symmetrically arranged with respect to the longitudinal axis A of the composite handle **1**. Of course, the spring **4***a* may be connected directly to the clamping plate **3** and the shaft **4** omitted. Also, shaft **4** may be formed integrally with prongs **5**, **6**, if desired. The spring **4***a* is received in a longitudinal slot formed in the free end of shaft **4** and is retained therein by a pin **7**. Prongs **5**, **6** extend from the shaft **4** in a direction away from the clamping plate **3** and are movable toward and away from each other when subjected to deforming forces substantially at right angles to the axis A.

The free ends of prongs **5**, **6** are formed with inwardly oriented hook- or claw-like extensions **8**, **9** respectively, which latter normally engage with suitably inclined surfaces **10***a*, **10***b* of a retaining means **10**. This retaining means preferably assumes the shape of a lance head and constitutes the free end of a second flat spring **11** which is located in the bore formed between shells **1***a*, **1***b* of the handle **1** and is retained therein by the aforementioned bolt **1***e*. Flat spring **11** is coplanar with the spring **4***a* and hence with the prongs **5**, **6** so that its lance head shaped end **10** automatically enters between and its inclined surfaces **10***a*, **10***b* are engaged by the extensions **8**, **9** when the clamping plate **3** is adjacent to back support **2**.

Adjacent to the lather bars **2***a*, **2***b*, the shells **1***a*, **1***b* are formed with aligned internal concave recesses **12**, **13** whose configuration is complementary to that of convex outer surfaces **14**, **15**, respectively on resilient prongs **5**, **6**. The walls surrounding the recesses **12**, **13** constitute two stops and are in the path of the prongs **5**, **6** and, by coming into frictional engagement with the latter's outer surfaces **14**, **15**, the walls of recesses **12**, **13** normally prevent complete withdrawal of the clamping plate **3** and of its shaft **4** from the handle **1**, though such complete withdrawal is possible if the expanding force of prongs **5**, **6** is overcome by pulling the clamping plate **3** in the direction of axis A and away from handle **1**, i.e. if the prongs **5**, **6** are caused to move toward each other sufficiently to permit their withdrawal from the recesses **12**, **13** and through the open end of the bore formed between shells **1***a*, **1***b*.

The resilient connection between prongs **5**, **6** and the lance head shaped end **10** may be released by a push-button like actuating element **16** which is constantly biased by a coil spring **16***a* received in an external recess **1***a'* formed in shell **1***a* and bearing against the inner side of push-button **16** on the one hand, and against an annular flange **1***a''* of shell **1***a* on the other hand. The extent to which the push-button **16** may be displaced in outward direction by the coil spring **16***a* is controlled by a disk **16***b* which is fixed to the stem **17** of the push-button **16**. The free end of stem **17** is adjacent to the lance head shaped end **10** or to that portion of the flat spring **11** which is adjacent to the lance head shaped end **10**. Though the flat spring **11** is normally located in a plane passing through the axis A of the handle **1**, it can be displaced by stem **17** to move the lance head shaped end **10** out of engagement with the extensions **8**, **9** of prongs **5**, **6** respectively. The extensions **8**, **9** are formed with inclined cam surfaces **18**, **19**, respectively, which latter, by sliding along the preferably circular periphery of stem **17**, impart an outwardly directed impetus to the shaft **4** and to the clamping plate **3** to remove the clamping plate from contact with the razor blade. Thus, the prongs **5**, **6**, whose resilient force normally urges their extensions **8**, **9** toward each other, bring about retention of the clamping plate **3** in the position of FIGS. 1 and 2 when the push-button **16** is held in one extreme position by its spring **16***a* and the claws **8**, **9** engage with the lance head shaped end **10**, and the prongs also cause movements of the clamping plate **3** outwardly and away from composite back support **2** when the push-button **16** is depressed into another extreme position against the force of spring **16***a* and the inclined cam surfaces **18**, **19** slide along the periphery of the stem **17**. As before mentioned, the extent to which the clamping plate **3** is movable away from composite back support **2** is normally limited by the stops constituted by the walls of the concave recesses **12**, **13** which receive the convex outer surfaces **14**, **15** of prongs **5**, **6**, respectively.

In such position of the safety razor, the blade and parts **2**, **3** may be conveniently rinsed or otherwise cleaned after each use of the razor. It is preferred to impart to shaft **4** a configuration which prevents a blade from rotating thereabout when the razor is about to be rinsed.

When it is desired to exchange the blade, a user simply extracts the shaft **4** against the retaining force of prongs **5** and **6** whose outer surfaces **14**, **15** are thus withdrawn from their respective recesses **12**, **13** in a direction away from the lance head shaped end **10** and through the open forward end of the bore in the handle **1**. After a new blade has been placed against the inner side of the clamping plate **3** or onto the outer side of the back support **2**, the shaft **4** and the resilient prongs **5**, **6** are reinserted into the hollow handle **1** and are moved in the latter until the extensions **8**, **9** again engage with the inclined cam surfaces **10***a*, **10***b* of the lance head shaped end **10**.

The embodiment shown in FIGS. 4 and 5 differs from that of FIGS. 1 and 2 in that the mounting of the flat spring which is formed with the lance head shaped end and of the other spring which is formed with clawed resilient prongs is reversed. As in the first described embodiment, the modified safety razor comprises a hollow handle **101** consisting of two shells **101***a*, **101***b*, these shells forming a bore and comprising lather bars **102***a*, **102***b*, respectively, these lather bars constituting the back support **102** for the razor blade when the shells **101***a*, **101***b* are joined by threaded bolts **101***c*, **101***d* and **101***e*. The back support **102** is adapted to cooperate with a clamping plate **103** for retention of a non-represented razor blade therebetween.

A flat spring **120**, corresponding in function to the flat spring **11** of FIGS. 1 and 2, is connected to the shaft **104** of the clamping plate **103** by retaining pins **121** and **122**, and extends into the hollow handle **101** when the safety razor is in assembled position and ready for use. The free end of the spring **120** constitutes a retaining means and is formed as a lance head **123** similar to the end **10** of the spring **11** shown in FIGS. 1 and 2.

Intermediate their forward and rear ends, shells **101***a*, **101***b* are formed with internal webs **124***a*, **124***b*, respectively, these webs forming a bridge for one end of a pronged flat spring **125** which is received between the adjacent faces of webs **124***a*, **124***b* and is fixed thereto by a transversely inserted screw or pin **126**. The spring **125** is formed with a pair of prongs **127**, **128** which extend toward the back support **102** and comprise claw- or hook-like extensions **129**, **130**, respectively. The extensions **129**, **130** normally cooperate in tong fashion with one set of oppositely inclined cam surfaces **123***a*, **123***b* on the lance head shaped end **123** to retain the clamping plate **103** in the position of FIGS. 4 and 5 when the safety razor is in actual use.

The construction and function of push-button like actuating element **116**, of its stem **117**, and of the coil spring **116***a* is identical with that of the parts **16**, **17** and **16***a* described in connection with FIGS. 1 and 2. When the push-button **116** is depressed substantially at right angles to the longitudinal axis of the handle **101** (corresponding to the axis A of the handle **1** shown in FIG. 1) and against the force of constantly acting spring **116***a*, the free end of its stem **117** engages the lance head shaped end **123** or the adjacent reduced neck portion of the flat spring **120** and disconnects the latter from extensions **129**, **130** to permit withdrawal of the clamping plate **103** in a direction away from the back support **102**. Such withdrawal of the clamping plate **103** and of its shaft **104** is assisted to a certain extent by prongs **127**, **128** whose extensions **129**, **130** then slide along the periphery of stem **117** and bring about a certain upward movement of flat spring **120** due to the tendency of prongs **127**, **128** to move further toward each other when in fully unstressed condition. Thus, the function of stem **117** is to deform the flat spring **120** by moving it out of the plane of prongs **127**, **128** which latter are movable toward and away from each other in directions at right angles to those in which the spring **120** is deformable.

An additional impetus in upward direction may be imparted to the assembly of parts **103**, **104**, **120** and **123** by a pair of comparatively small resilient members here shown as leaf springs **131**, **132** (shown in FIG. 5) which are fixed to the flat spring **120** by a rivet **133** or the like. The inner surfaces of shells **101***a*, **101***b* in the bore of handle **101** are formed with symmetrically disposed shoulders **134**, **135**, respectively, which subject the resilient members **131**, **132** to a certain tension and thus store energy therein when the shaft **104** is fully inserted into the handle **101** and the lance head shaped end **123** is retained by extensions **129**, **130** of respective resilient prongs **127**, **128**. As soon as the stem **117** releases the lance head shaped end **123**, the energy stored in the resilient members **131**, **132** causes movement of the clamping plate **103** away from the back support **102**. The extent of outward movement of shaft **104** and of the flat spring **120** is preferably limited by the conave walls of two aligned recesses **136**, **137** formed in shells **101***a*, **101***b*, respectively, these walls constituting two stops against which the resilient members **131**, **132** abut when the razor blade is freely accessible for rinsing, i.e. when clamping plate **103** has been moved a requisite distance away from the back support **102**. The exchange of a razor blade can occur upon complete withdrawal of shaft **104** and of flat spring **120** from the bore of handle **101**, such withdrawal being possible by merely overcoming the force with which the resilient members **131**, **132** bear against the stops represented by the walls of recesses **136**, **137**, respectively.

The shells **1***a*, **1***b* or **101***a*, **101***b* of handle **1** or **101**, as well as the back support **2** or **102** may be manufactured of any of a great variety of metallic or synthetic plastic materials, while the clamping plate **3** or **103** preferably, but not necessarily, consists of a metallic material. It will be understood that the resilient retention of the clamping plate **3** or **103** in razor blade holding position with respect to the back support **2** or **102** can be effected by an assembly utilizing cam-shaped means somewhat different from the lance head shaped end **10** or **123**, and also that the safety razor may be manufactured in many different colors, sizes and in many different configurations to enhance its appearance and to thus increase its sales appeal. Moreover, it is also possible to install the push-button **16** or **116** in a position to act against the prongs **5**, **6** or **127**, **128** instead of deforming that spring which carries the lance head shaped end.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic and specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A safety razor comprising an elongated hollow handle having an open end and a back support at said open end; a clamping plate; a first flat spring connected to said clamping plate and insertable into said handle; a second flat spring mounted in, fixed to, and extending toward the open end of said handle, one of said springs comprising a pair of resilient prongs tending to move toward each other, each prong having an inclined cam surface, said springs coplanar when the first spring is inserted into said handle, the other spring comprising a substantially lance head shaped end bounded by a pair of inclined surfaces engageable by said prongs and adapted to hold said first spring in the handle when the clamping plate is adjacent to said support to retain a razor blade therebetween, said other spring deformable in a direction substantially at

right angles to the plane of said prongs; and a spring biased push button carried by and comprising a rounded stem adjacent to said lance head shaped end and extendable into the interior of said handle for deforming said other spring sufficiently to disengage said lance head shaped end from said prongs whereupon the cam surfaces of said prongs slide along said stem while the prongs move toward each other to automatically displace the clamping plate in a direction away from said back support.

2. A safety razor comprising an elongated handle having a bore with an open end, a back support for a razor blade adjacent to said open end, and at least one stop provided in said bore adjacent to said open end; a clamping plate having a shaft longitudinally slidably insertable into the open end of said handle; a first flat spring connected to and having a pair of symmetrically disposed prongs extending from said shaft in a direction away from said clamping plate, said spring received in said bore when the shaft is inserted into said open end and each prong having an inwardly facing extension and an outer surface, said prongs being deformable in directions to move said extensions toward and away from each other; a flat spring mounted in, fixed to, and having a lance head shaped end, said springs coplanar and said lance head shaped end having a pair of oppositely inclined surfaces engaging with said extensions to hold the first spring in the handle when the clamping plate is adjacent to said support for retaining with the latter a razor blade therebetween, said second spring deformable in directions at right angles to those in which said prongs are deformable; means comprising a spring biased push-button carried by and extendable into the bore of said handle for deflecting the second spring sufficiently to disengage said lance head shaped end from said extensions whereupon the shaft is freely slidable in said bore in a direction away from said lance head shaped end until the outer surface of one of said

prongs comes into abutment with said stop, the shaft being adapted to be fully withdrawn from said bore by deforming said one prong sufficiently to move the same along and beyond said stop; and means provided on said pushbutton for automatically moving the first spring into abutment with said stop.

3. A safety razor comprising in combination, a hollow handle having an open end, a back support for a razor blade at said open end, and an internal bridge spaced from said back support; a clamping plate; a first flat spring connected to and extending from said clamping plate and insertable through the open end of and into said handle; a second flat spring mounted in said handle and fixed to said internal bridge thereof, said second spring extending toward said open end and both said springs having means for releasably engaging each other to hold the first spring in the handle when the clamping plate is adjacent to said back support; means including an actuating element carried by and extendable into the interior of said handle for deflecting one of said springs sufficiently to disengage said springs, whereupon the first spring may be withdrawn from said handle to move the clamping plate away from said back support; and means for automatically moving the clamping plate away from the back support when the springs are disengaged from each other.

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