July 7, 1931. R. E. THOMPSON 1,813,782

SURGICAL KNIFE

Filed Nov. 5, 1927

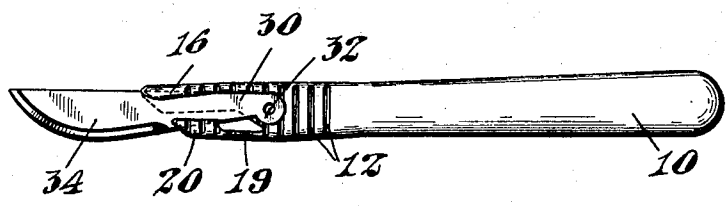


Fig.1.

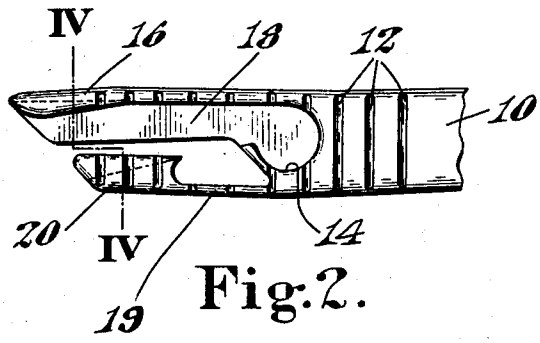


Fig.2.

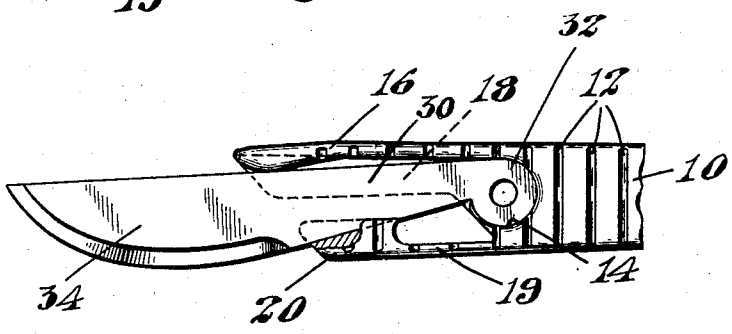


Fig.3.

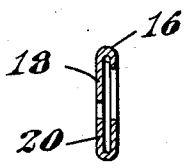


Fig.4.

INVENTOR: RALPH E. THOMPSON.

BY

ATTY.

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1,813,782

UNITED STATES PATENT OFFICE

RALPH E. THOMPSON, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO GILLETTE SAFETY RAZOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE

SURGICAL KNIFE

Application filed November 5, 1927. Serial No. 231,329.

This invention relates to knives having removable or replaceable blades, and more particularly to those used for surgical work. Its purpose is to provide an improved knife of this type comprising two separate parts only, the handle and the blade and, furthermore, so to design these parts that they may be accurately and rigidly interlocked easily by a surgeon whose hands are encased in rubber gloves with little or no danger of cutting, and as readily disengaged and separated. Consideration has also been given in the design of the handle to providing a one-piece or integral construction which may be quickly and thoroughly sterilized after using and, to this end, all deep, inaccessible grooves wherein foreign matter might accumulate have been avoided.

The invention as herein shown is embodied in a surgical knife comprising an elongated handle having a socket formed in one side of the body thereof and a replaceable blade having a shank with an enlargement adapted to fit the socket, thereby forming a defined fulcrum for relative movement of the handle and blade. This is prevented in the direction of cutting pressure by a rigid jaw but permitted in the opposite direction for purposes of disengaging the blade from the handle, as will appear. An advantage incident to this construction is that the blade may be entirely disengaged from the handle by oblique pressure on the back of its point without the necessity of touching the blade with the fingers. On the other hand, it may be temporarily maintained in engagement with the handle, if desired, by placing one finger over the socket, so that the blade may be carried to any desired point of disposal before being cast aside.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which—

Fig. 1 is a view in elevation of the complete knife;

Fig. 2 is a view in elevation, on a larger scale, of the blade holding portion of the handle;

Fig. 3 is a similar view, partially in section, showing the blade as displaced as in the process of disengaging it; and

Fig. 4 is a sectional view on the line 4—4 of Fig. 2.

The elongated handle 10 of the knife is formed of thin sheet stock, smooth except adjacent to its blade holding end where it is provided with scoring 12 to facilitate grasping. It is shaped at its forward end for interlocking engagement with the blade in the following manner. An elongated recess is provided which terminates in a shallow socket 14, circular in outline and formed in the rigid material of the handle. The upper wall of the elongated recess comprises a rigid jaw 16, grooved throughout its length and enlarged somewhat at its outer end so that the depth of the groove is greater at this point than throughout the rest of the jaw. The bottom of the recess comprises a web 18 integral with the handle 10 and the jaw 16, and of substantial width so that the jaw 16 is, to all intents and purposes, a rigid, integral part of the handle.

Oppositely disposed with respect to the rigid jaw 16 is a spring jaw, comprising an elongated flexible section 19 and a rigid, grooved blade engaging portion 20, the groove in this being substantially deeper than the groove in the rigid jaw.

The yielding jaw is substantially shorter than the rigid jaw 16. Its inner flexible section 19 is entirely out of contact with the blade and is subject to no strains in the normal use of the knife. The outer blade engaging portion 20 contacts with the blade only at a point spaced from its fulcrum in the socket 14 and there is accordingly no danger of the jaw being bent on a short radius and so broken.

The blade designed to be received by the handle above described is of thin flexible steel, having an elongated shank 30, terminating in a circular enlargement 32, and a blade portion with a sharpened cutting edge 34. The back of the blade and shank constitutes a straight, unbroken edge adapted to engage

and be supported by the bottom of the groove formed in the rigid jaw 16 of the handle. The circular enlargement 32 at the end of the shank is designed to fill the socket 14 in the handle and the sharpened cutting edge terminates just outside the point of engagement of the grooved portion 20 of the spring jaw.

It will be seen that the interlocking of the enlarged portion 32 of the blade with the circular socket 14 of the handle prevents longitudinal movement of the blade with respect to the handle and constitutes a defined fulcrum about which the only relative movement of the blade and handle is possible. Relative movement in the direction of cutting pressure is positively prevented by the rigid jaw 16 which overlies the back of the blade and extends to a position opposite its cutting edge. Movement in the other direction, however, is permitted in opposition to the yielding jaw for purposes of disengaging the blade and may be effected by exerting pressure on the back of the blade near the point thereof. This is suggested in Fig. 3, where the blade is shown as displaced away from the rigid jaw sufficiently to carry its back edge clear of the groove therein, to permit which the lower jaw is sprung downwardly. A very slight lateral pressure is sufficient to clear the back of the blade from the grooved jaw 16 and the blade may be completely disengaged from the handle unless the operator keeps one finger over the socket 14 so as to retain the enlargement 32 of the shank therein. If this is done, the blade may be carried to any point of disposal and then dropped out of the handle.

In inserting a new blade in the handle, the enlargement 32 is first placed in its socket 14 and the shank of the blade carried into the deep groove of the portion 20 of the spring jaw. Pressure now applied to the back edge of the blade will displace the spring jaw sufficiently to permit the back of the blade being slipped into the groove of the rigid jaw and the blade is maintained in engaged and interlocked position by the spring pressure of the lower jaw.

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

1. A surgical knife comprising an integral handle having a socket in the body thereof adjacent to one end, a replaceable blade having a shank formed with an enlargement to fit the socket, thereby anchoring the blade longitudinally and constituting a defined fulcrum point for the blade in the handle, a rigid jaw supporting the blade for more than half its entire length, and a spring jaw substantially shorter than the rigid jaw for maintaining the blade in engagement with the rigid jaw.

2. A surgical knife comprising an integral handle having a socket formed in the body thereof, a replaceable blade having a shank with an enlargement to fit the socket, a jaw supporting the blade rigidly against cutting pressure, and a substantially shorter spring jaw maintaining the blade in engagement therewith while permitting it to swing about the fixed axis of said socket.

3. A surgical knife comprising a flat handle having a circular socket formed in the body thereof, a replaceable blade having a shank with a circular enlargement at its end to fit the socket, thereby forming a defined fulcrum in the handle for relative movement of the handle and blade, a rigid jaw engaging the back edge of the blade opposite to its cutting edge and a spring jaw engaging the other edge at a point short of its cutting edge.

4. A surgical knife comprising a handle having at one end a jaw with a rigid supporting edge, a replaceable blade having a cooperating edge adapted to be engaged by the jaw and a pivotal connection with the handle, and an oppositely disposed spring jaw cut away so as to engage the blade only at a point remote from its inner end, and permit the blade to yield to a pressure exerted obliquely on the back thereof to effect disengagement of the blade and handle.

5. A knife comprising a handle having at one end a rigid grooved upper jaw and a socket independent of said jaw, a blade having an enlargement at its inner end to fit the socket thereby determining its fulcrum for movement away from the upper jaw, and a lower spring jaw cut away so as to engage the blade only at a point remote from such fulcrum and permit disengagement of the blade from the handle by pressure exerted obliquely on the back of the blade.

6. A knife comprising a handle having a shallow socket in its body portion and a rigid grooved upper jaw projecting outwardly beyond the socket, a removable blade having an enlargement shaped to turn in the socket in the body of the handle and prevent longitudinal displacement of the blade, and a lower spring jaw acting to hold the blade in the groove of the upper jaw but permitting it to be forcibly disengaged therefrom while maintaining its connection with the socket of the handle.

RALPH E. THOMPSON.