ABSTRACT

A unitary disposable surgical scalpel is disclosed which has a sheath for the blade and means for permanently sheathing the blade so that at the option of the operator the blade may be permanently covered for safe disposal.

4 Claims, 9 Drawing Figures
DISPOSABLE SURGICAL SCALPEL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention concerns medical-surgical instruments and more particularly concerns a disposable surgical scalpel.

2. Description of the Prior Art

Although surgical scalpels have been used for centuries, there has been little in the way of advancing their basic design. In recent years, the commercially important surgical scalpels have been those having disposable blade portions. Illustrative of this type of surgical scalpel is that disclosed in U.S. Pat. No. 3,412,467. In this type of scalpel the blade component is detachable from the handle component and disposed of by deposit in a special container which may thereafter be handled without hazard. It will be appreciated, however, that such disposable surgical scalpels still present a hazard to the individual who must detach and transfer the blade component.

U.S. Pat. No. 2,735,176 discloses a veterinary surgical knife which comprises a hollow handle component having a slidably extensible blade. A similar cutting instrument is disclosed in U.S. Pat. No. 2,512,237. In effect, the latter instruments employ the handle component as a sheath for the blade component when not in use. Such sheathable blades are not contemplated for disposal after a single use. Furthermore, such cutting instruments do not provide a positive means for preventing an unseathing of the blade portion by a careless handler should disposal be desired.

The demand on the part of hospital administrators and liability insurance carriers for a disposable scalpel has increased considerably in recent years. The ultimate desirability is a surgical scalpel which may be disposed of safely with the least potential for using the scalpel.

The surgical scalpel of this invention obviates many of the prior art problems. First, the surgical scalpel of this invention includes a means of sheathing the blade component without risking the hazards of blade removal. Second, once sheathed, access to the blade component is permanently denied thereby assuring that the scalpel will never be reused and will never offer a hazard to individuals charged with ultimate disposal of the scalpel.

SUMMARY OF THE INVENTION

The invention comprises a surgical scalpel which comprises; a handle, a cutting blade attached to said handle, a sheath for said blade and means for permanently sheathing said blade with said sheath.

The term "permanently sheathing the blade" as used herein means sheathing the blade component of the surgical scalpel in such a manner that it cannot be unseathed without destroying the sheath component.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric drawing of a preferred embodiment of the invention showing a surgical scalpel with sheath assembly. The sheath is shown in the position employed prior to use.

FIG. 2 is an isometric view of the scalpel shown in FIG. 1 but with the sheath in a retracted or operating position exposing the cutting blade.

FIG. 3 is an isometric view showing the scalpel of FIG. 1 with the sheath locked in a permanent blade protecting position after use.

FIG. 4 is a schematic view showing the scalpel assembly of FIG. 1 in disassembly.

FIG. 5 is a cross-sectional view taken along lines 5--5 of FIG. 1.

FIG. 6 is a cross-sectional view taken along lines 6--6 of FIG. 2.

FIG. 7 is a cross-sectional view taken along lines 7--7 of FIG. 3.

FIG. 8 is a cross-sectional view taken along lines 8--8 of FIG. 2.

FIG. 9 is a cross-sectional view taken along lines 9--9 of FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

The apparatus of the invention is conveniently fabricated by conventional and standard methods for preparing surgical scalpels using conventional and standard materials. For example, the blade component of the surgical scalpel may be the standard surgical steel blades conventionally employed. The handle and sheath components of the scalpel may be fabricated from conventional polymer materials such as, for example, polystyrene, polycarbonate, polyurethane, polyethylene, phenol-formaldehyde resins, polybutylene and the like.

The means employed for permanently sheathing the blade component of the scalpel of the invention may be any means whereby the sheath component is firmly affixed in a position covering the blade component. In general, this is conveniently accomplished by any locking means obtained by the cooperation of sheath and handle components. For example, a deadbolt can be recessed in the handle and spring loaded. The sheath can then have a recess formed on its interior surface for receiving and engaging the deadbolt when aligned with that deadbolt. In operation then, the deadbolt is depressed and the sheath slid over it to a position wherein the sheath covers the blade component and engages the deadbolt so as to become firmly and permanently fixed in that position.

A preferred embodiment of the scalpel of the invention is one wherein the handle, blade and sheath comprise a unitary assembly. The term "unitary" as used herein means a single, one-part assembly. Thus, handle, blade and sheath are all attached in such a manner that they are inseparable, one from the other. The advantage of such a unitary construction resides in its convenience and the fact that the sheath cannot become separated from the blade and lost. In a particularly preferred embodiment within the scope of the invention the sheath forms a gripping surface for the handle when the blade is unsealed. The term "gripping surface" as used herein means a surface which by its design enhances and facilitates holding the scalpel with one's fingers.

The apparatus of the invention will now be further described and exemplified by reference to the various specific embodiments set forth in the drawings.

FIG. 1 is an overall view of a disposable unitary assembly embodiment of the invention. As shown in the illustration of FIG. 1, the surgical scalpel comprises a handle 10 which comprises a butt 12 and a shank 14 which is reduced in thickness and over which sheath 16 may slide. Sheath 16 is shown in a position covering the
blade component of the surgical scalpel. The sheath position illustrated in FIG. 1 is for covering and protecting the blade component prior to use. It will be seen from FIG. 1 that the sheath has a resilient detent 26 which is forced out by the underlying shank 14 to a position where it blocks forward movement of the sheath by meeting with cam 28. Cam 28 is an integral part of shank 14. Details of this position locking mechanism are seen with greater clarity by referring now to FIG. 5. FIG. 5 is a cross-sectional view taken along lines 5—5 of FIG. 1. FIG. 5 further shows the construction of the sheath 16 and the underlying portions of shank 14. Thus, sheath 16 is seen to be hollow having an opening 18 proximal to butt 12 and opening 20 proximal to the blade component. Sheath 16 fits over and encloses shank 14 and blade 24. Shank 14 is attached to blade 24 by its blade supporting end 30. Shank 14 also has a resilient spring member 32 which is preferably integral with shank 14. Spring 32 imposes a frictional force upon the inner surface 52 of sheath 16. This frictional force serves to hold sheath 16 in a given position. FIG. 5 also shows with greater clarity the blocking of sheath 16 movement forward by detent 26 meeting with cam 28.

FIG. 2 is an overall view of the surgical scalpel apparatus of FIG. 1 showing the sheath 16 in a retracted position exposing blade 24 and blade supporting segment 30. As seen in FIG. 2, sheath 16 has raised surfaces 22 to facilitate gripping and in this rearward position forms a gripping surface for handle 10.

The features hidden from view in FIG. 2 are seen with greater clarity by reference to FIG. 6, a cross section along lines 6—6 of FIG. 2. As shown in FIG. 6, with the sheath in a rearward position blade 24 is exposed together with the blade supporting end 30 of shank 14. Spring 32 and resilient cam 28 both exert a frictional force upon the inner surface 52 of sheath 16 (see FIG. 9, a cross-sectional view along lines 9—9 of FIG. 2). These frictional forces plus a frictional force from detent 26 exerted against shank 14 all serve to hold sheath 16 in the operating position. In addition, shank 14 can be tapered so that it is thicker near the butt end 12. In this manner a tight frictional fit into sheath 16 opening 18 holds the sheath in position. Shoulders 13 of butt 12 also serve as a stop to prevent removal of the sheath over the butt end of the handle 10.

Referred to now in FIG. 3, the surgical scalpel of the invention is observed with the sheath in a permanently fixed blade sheathed position. Following use, the sheath is moved forward to cover the blade 24. As shown in FIG. 3, when the sheath 16 is moved to an extreme position away from butt 12, cam 28 forces resilient detent 26 down underneath the surface of shank 14. Referring now to FIG. 7, a cross-sectional view of lines 7—7 of FIG. 3, the locking mechanism, is readily observed which locks sheath 16 permanently into a blade sheathing position. As observed in FIG. 7, detent 26 has been guided by cam 28 down and over the locking lug 50 which is an integral part of shank 14 so that hook 27 at the end of detent 16 is in firm engagement. In this position, sheath 16 can neither be moved forward nor rearward but is in a firmly locked position covering blade 24. It will also be observed from FIG. 7 that there is no way of releasing detent 26 without physical destruction of the sheath 16.

Referred now to FIG. 4, the various components making up the surgical scalpel assembly of FIG. 1 are readily observed in their disassembled position. Thus, sheath 16 comprises an elongate sheath open at both ends 18, 20 and having frictional surfaces 22. Integral with sheath 16 is detent 26 having a hook 27 at the unattached end thereof. The handle 10 comprises a butt end 12 and a shank 14. The shank 14 preferably has a narrowed center portion 15, a spring 32, cam 28 and a locking bar 50 which engages hook 27 of detent 26 as previously described. An aperture 48 through shank 14 not only provides for access of the detent 26 when the sheath is moved into a blade protecting position but also provides for a weakened area of shank 14. This weakened area having rai lings 14a and 14b are easily fractured when the sheath 16 is in a permanently locked blade protecting position. This provides an easy method of breaking the handle prior to disposal of the surgical scalpel. FIG. 4 also shows the mounting of blade 24 on blade support 31 where it is held in place by bayonet lock 42 and covered by blade mounting piece 33. As shown in FIG. 4, the blade 24 is fixedly attached by a bolt 46. However, in a preferred embodiment, blade 24 is permanently attached by ultrasonic welding of blade support 31 to blade mounting piece 33 with the blade 24 interposed.

FIG. 8 is a cross-sectional view taken along lines 8—8 of FIG. 2 and more clearly shows the relationship of blade 24 in position between blade support 31 and blade mounting piece 33.

What is claimed is:
1. A surgical scalpel which comprises,
a handle;
a cutting blade attached to said handle;
a sheath for said blade. said sheath forming a gripping surface for said handle when said blade is un-sheathed; and
means for permanently sheathing said blade with said sheath.
2. A scalp el of claim 1 wherein said handle, said blade and said sheath comprise a unitary assembly.
3. A unitary surgical scalpel with sheath assembly which comprises:
a handle;
a cutting blade affixed to one end of said handle;
a sheath movably attached to said handle;
means for releasably locking said sheath to said handle when said sheath is moved to a first blade sheathing position;
means for releasably locking said sheath to said handle when moved in a blade exposed position; and
means for permanently locking said sheath to said handle when said sheath is moved to a second blade sheathing position.
4. A scalpel of claim 3 wherein said sheath forms a gripping surface for said handle when in the blade exposed position.

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