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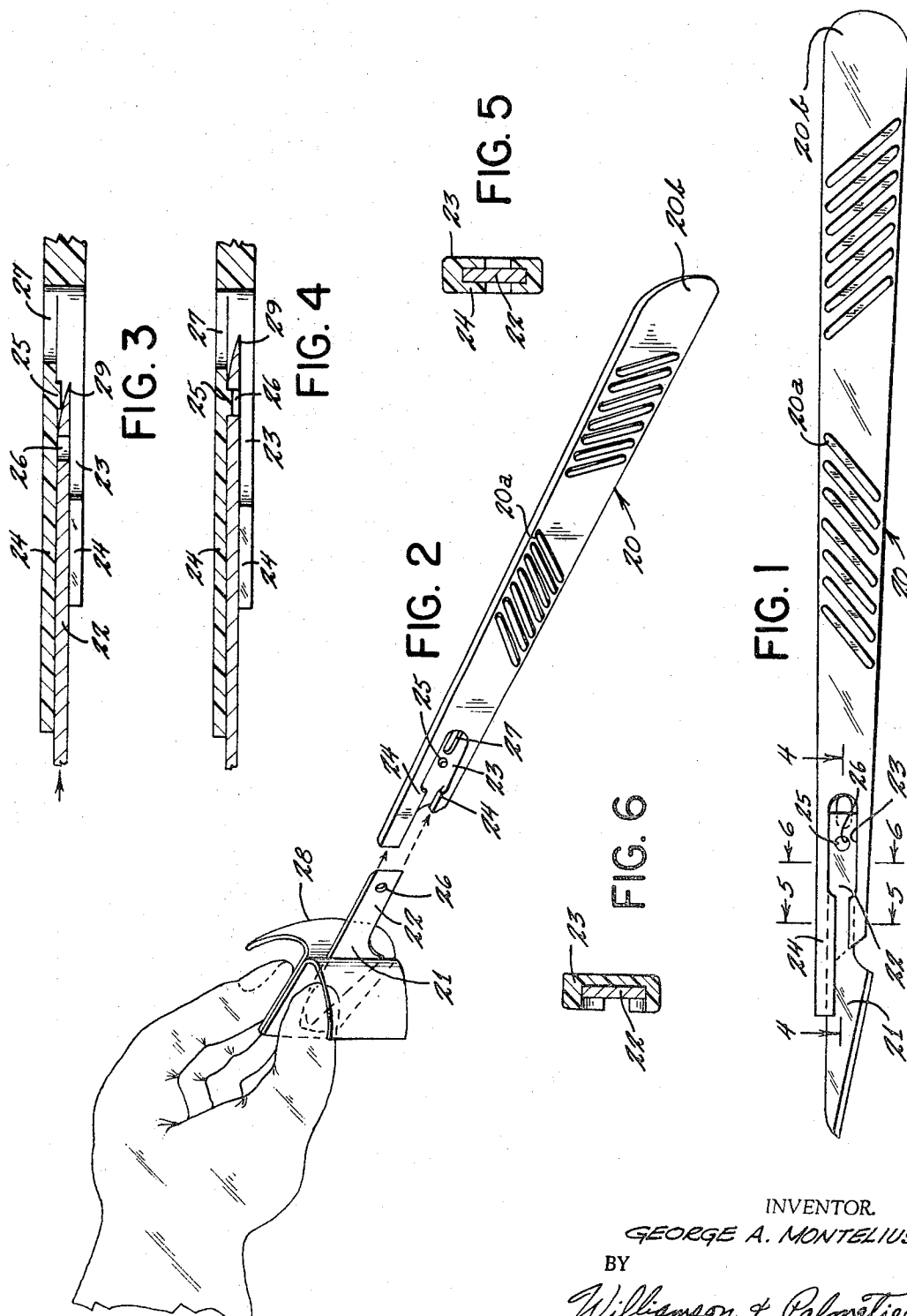
G. A. MONTELIUS

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SURGICAL KNIFE AND BLADE EXPELLING TOOL

Filed Feb. 9, 1966 .

2 Sheets-Sheet 1



INVENTOR.
GEORGE A. MONTELIUS
BY
Williamson & Palmatier
ATTORNEYS

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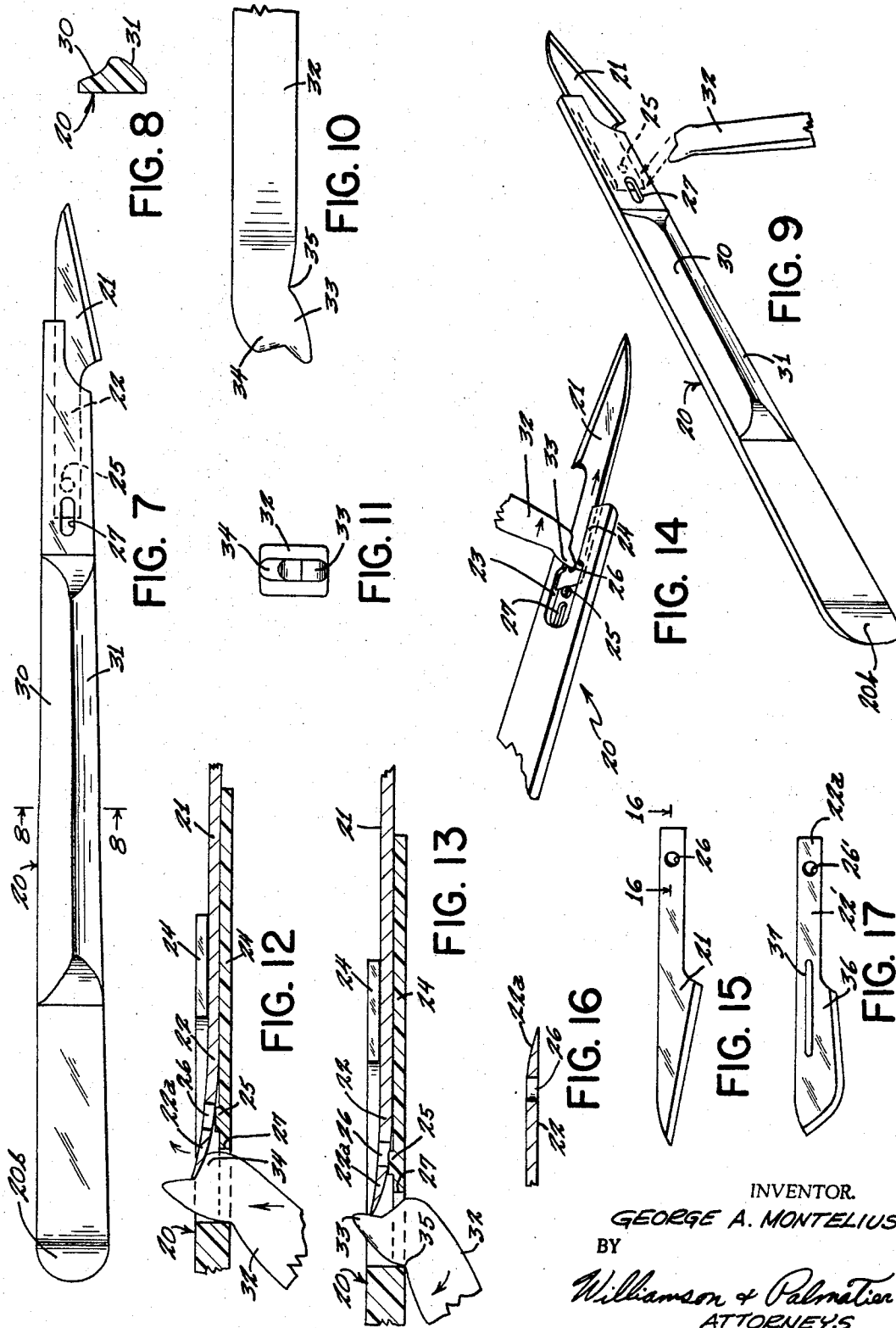
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ATTORNEYS

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SURGICAL KNIFE AND BLADE EXPELLING TOOL

George A. Montelius, Box 53, Rte. 1,

Braham, Minn. 55006

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This invention relates to a surgical instrument and more particularly relates to a scalpel blade holder and blade expeller for controlled release and removal of the blade.

Among the tasks performed by operating room personnel is that of providing a sterile scalpel blade holder and blade. The blade should not be touched when assembling the blade to the holder, nor should the blade touch any another object prior to use or between uses. The holder should be equipped for providing for easy mounting of a sterile blade to a holder, as well as controlled release and removal of the blade. After use, the blade is typically contaminated and, for the safety of the operating room personnel should not be touched when removed. It is therefore desirable to provide a blade holder which provides for removal of the blade without contacting the blade. This prevents cutting the rubber gloves worn by the operating room personnel and the incidence cutting through the rubber glove to the hand of the operator with a contaminated blade.

During surgery several holders may be used, each holder having several changes of blades during the course of the operation. Consequently, the problem of disposing of the used blade quickly, as well as inserting a new, sterile blade presents a problem, the solving of which would afford operating room personnel considerably greater time in conducting the operation.

The blade must be removed carefully, providing against uncontrolled "ejecting" the blade into the incision area or into a sterile area. If a blade is lost or ejected into an undesirable area considerable time is lost in performing the operation. It is therefore important to provide a holder which allows for removal of the blade without uncontrolled ejection of the blade, thereby allowing the operating room personnel to keep track of the equipment in use so that an inventory may be readily made prior to closing the incision.

With these comments in mind it is to the elimination of these and other disadvantages to which the present invention is directed, along with the inclusion therein of other novel and desirable features.

An object of my invention is the provision of a new and improved scalpel blade holder and scalpel blade of simple and inexpensive construction and operation.

Another object of my invention is the provision of a scalpel blade holder which provides for easy attachment of a sterile scalpel blade.

A further object of my invention is the provision of a scalpel blade holder which provides for controlled release and controlled removal of the scalpel blade from the holder.

A further object of my invention is the provision of an expeller which cooperates with the blade and holder to effect the release and removal of the blade with a high degree of control.

A further object of my invention is the provision of a holder which will securely accept a variety of blade shapes and provide maximum visibility of the area in which the scalpel blade is to be used.

Another object of my invention is the provision of a holder which provides a secure grip and affords ease and freedom of movement to the surgeon.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

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FIG. 1 is an enlarged front view showing my scalpel blade holder with a scalpel blade attached therein.

FIG. 2 is a perspective view showing my scalpel blade holder with a scalpel blade about to be inserted.

FIG. 3 is an enlarged sectional view of my scalpel blade holder showing the scalpel blade being inserted in the holder.

FIG. 4 is an enlarged sectional view taken along the line 4-4 of FIG. 1.

FIG. 5 is an enlarged sectional view taken along the section line 5-5 of FIG. 1.

FIG. 6 is an enlarged sectional view taken along the section line 6-6 of FIG. 1.

FIG. 7 is a rear view of my scalpel blade holder showing a scalpel blade in place.

FIG. 8 is a sectional view taken along the section line 8-8 of FIG. 7.

FIG. 9 is a perspective view showing my scalpel blade holder, complete with blade and showing the expeller being inserted for controlled release and removal of the blade.

FIG. 10 is an enlarged partial front view of the expeller.

FIG. 11 is an end view of the expeller.

FIG. 12 is an enlarged longitudinal sectional view showing the expeller about to release a blade.

FIG. 13 is an enlarged longitudinal sectional view showing the expeller in a subsequent position in the release of a blade.

FIG. 14 is a partial perspective view showing the expeller engaged in the blade for controlled removal of the blade.

FIG. 15 shows a side elevation of a blade embodiment.

FIG. 16 is an enlarged sectional view taken along the section lines 16-16 of FIG. 15.

FIG. 17 shows a side elevation of an alternate blade embodiment.

One form of the present invention is shown in the drawings and is described herein.

The scalpel blade holder of my invention is shown in FIG. 1 and is indicated in general by numeral 20. The holder includes gripping surface 20a and a periosteal pushing portion 20b. The scalpel blade 21 includes a shank portion 22 adapted to be inserted into the shank receiving portion 23 of holder 20. The shank includes a beveled end 22a. The holder 20 is typically manufactured from moulded high tensile strength plastic material which may be subjected to the high temperatures experienced in a sterilization process. Further, the shank receiving portion 23 of the holder is adapted to receive blade 21 and secure the blade snugly in the holder 20 so that longitudinal, vertical and lateral movement is not experienced between the blade and the holder. The holder may also be made of tool steel with a machined, rather than moulded shank receiving portion. The blade is made of tempered surgical steel for cutting and so that the shank portion has sufficient flexibility to be properly mounted in the shank receiving portion of the holder.

FIG. 2 shows a blade being inserted in the holder, the shank 22 being moved toward the shank receiving portion 23. The shank receiving portion includes opposed parallel slots 24 to receive and retain the shank 22. The shank receiving portion 23 also includes a shank receiving peg 25 adapted to receive a mating aperture 26 on the shank 22. An expeller receiving slot 27 provides for controlled release of the blade.

As shown in FIG. 2 the blade 21 is wrapped so that the shank portion may be exposed without exposing the blade portion. Therefore the operator removes the outer covering of the shank when inserting the blade into the holder and grips the covered blade portion. The blade

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may be packaged in an envelope 28 which provides for easy exposure of the shank 22.

The sectional view of FIG. 3 shows a scalpel blade shank 22 partially inserted in the shank receiving portion 23. Aperture 26 is shown about to engage and mate with shank mounting means 25. Slots 24 are shown snugly holding shank 22 in position, preventing vertical and transverse movement. The expeller receiving slot 27 is shown and it should be noted that the shank is free to move transversely in this area so that the expeller may free the aperture 26 from the mounting peg 25, without distorting or injuring the shank. A bevel 29 is shown on shank 22 to provide for easy clearance over peg 25, thereby allowing aperture 26 to engage peg 25 for securely holding the scalpel blade within the holder and preventing longitudinal movement.

FIG. 4 shows the scalpel blade in position in the scalpel blade holder. The aperture 26 is shown mating with mounting peg 25. This positive engagement of peg and aperture together with the slots 24 prevents transverse, vertical or longitudinal movement of the blade within the holder. The bevel portion 29 of the shank 22 is shown aligned with the expeller receiving slot 27 so that the expeller may engage this portion of the shank and remove it from the peg.

FIG. 5 shows the slots 24 which snugly engage the shank 22 securing it in the holder thereby preventing vertical and transverse movement of the blade. FIG. 6 shows the shank clearance necessary for shank 22 to be removed from peg 25 by the expeller which disengages the shank from the mounting peg. This clearance allows the blade to flex in this area of the holder and clear the mounting peg whether inserting the blade or in the controlled removal of the blade.

FIG. 7 shows a rear view of my holder with a scalpel blade secured therein. The rear portion of blade holder 20 includes a receiving portion 30 for the bulbous portion of the index finger. The rear portion also includes a surface adapted to receive the middle finger of a right hand person or the thumb of a left hand person, which surface is indicated at 31. It should be noted that the surface 30 is substantially concave while the surface 31 is substantially convex. It has been determined through anatomical research that this configuration, for gripping by either a right or left handed operator, gives the operator optimum control of the instrument. FIG. 8 shows the relative positions and configuration of the surfaces.

FIG. 9 shows the expeller 32 about to be placed into the expeller receiving slot 27 of holder 20. The expeller is shown in detail in FIG. 10 and includes a toe portion 33, a heel portion 34 and a pivot point 35 which is adapted to engage the rear portion of the receiving slot 27. The expeller has the dual and successive uses of controlled release of the scalpel blade from the mounting peg 25 and the further purpose of controlled removal of the scalpel blade from the holder. The expeller may be made of the same plastic as the holder and, of course, may be moulded. In some instances it may be desirable to make the expeller as well as the holder from tool steel. FIG. 11 shows an end view of the expeller showing the configuration of the toe portion 33 and the heel portion 34.

FIG. 12 shows the expeller inserted in the expeller receiving slot 27, the heel portion 34 engaging the shank portion 22a to remove the shank aperture 26 from the mounting peg 25. Slots 24 are shown retaining the scalpel blade in the holder preventing the scalpel blade from springing or any other uncontrolled movement of the blade which may be dangerous in operating room procedure. Next, as shown in FIG. 13, the expeller is pivoted against the slot 27 about pivot 35 with the toe 33 engaging the end of the beveled portion 22a of the shank, thereby moving the shank 22 away from the mounting peg 25 and releasing the blade 21 from the

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holder 20. Slot 24 retains the blade in the holder, preventing uncontrolled movement of the blade during the controlled releasing operation.

FIG. 14 shows the expeller toe 33 placed in the blade aperture 26 on the front side of the holder 20. This is done, of course, after the above mentioned steps which release the blade from the mounting peg. The blade is then guided in slots 24 providing controlled removal of the blade. A new blade may then be inserted as above and the old blade inventoried for reference when completing the operation.

FIG. 15 shows the scalpel blade 21 with an aperture 26 located therein. FIG. 16 shows the beveled portion 22a of the shank 22 as well as the location of the aperture 26.

FIG. 17 shows an alternate blade which may be used for different operations. It has a different cutting edge configuration 36 yet maintains the same shank 22', shank beveled portion 22a' and a receiving aperture 26'. Further, the modified form of the blade may include a raised portion 37 which gives additional stability to the blade cutting portion 36.

Operation

My surgical instrument is prepared for use by first unwrapping the shank of the scalpel blade and gripping the blade portion which is covered by the wrapper. This maintains the blade in a sterile condition and prevents the operator from cutting either his hand or his protective glove. The shank is inserted into the slots 24 with the bevel 22a on the side adjacent the mounting peg 25. The shank 22 is slid through slots 24 and the bevel provides for clearance over mounting peg 25. Aperture 26 mates with mounting peg 25, securing the blade in the holder. The blade is now secure in slots 24 providing against vertical and transverse movement and in aperture 25 providing against longitudinal movement. Any blade configuration may be used, provided that the shank 22, aperture 26 and bevel 22a are maintained in the same relation to the blade configuration.

When using the instrument, the operator grips the holder in pencil fashion with the bulbous portion of the index finger on concave surface 30. The middle finger of a right handed person or the thumb of a left handed person is placed on convex surface 31. The thumb of a right handed person or middle finger of a left handed person is then placed on grooves 20a. This gives a firm grip with ease and freedom of movement available to the operator. Further, the operator has complete vision with respect to the area in which the blade is utilized. The blade and holder may be placed on the instrument table in such a way that the blade does not contact the table. This is so because the protruding surfaces 30 and 31 provide a holder with a triangular cross-section, thereby maintaining the blade in a position away from the instrument table when the holder is resting on surface 30 or 31. This also provides for easier grasping of the instrument as it is taken from the table for use. This feature also aids in keeping the blade sharp since blades do not touch anything between uses.

When removing the blade from the holder in order to place a different blade in the holder, the old blade must be removed with ease and without contaminating the operator. Since the instrument is used close to the site of the surgery, the removal of the blade must be done with an extremely high degree of control. A contaminated blade must be carefully handled and inventoried during surgery to prevent contamination to the personnel as well as for the safety of the patient. For controlled release and removal of the blade, expeller 32 is inserted in expeller receiving slot 27. The heel of the expeller engages the beveled portion 22a of shank 22 forcing it from mounting peg 25. Next, the expeller is pivoted about expeller pivot point 35 in slot 27, engaging toe 33 with the shank and urging shank 22

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away from mounting peg 25, effecting controlled release of the shank from the peg. Slots 24 retain the blade in the holder preventing vertical or transverse movement of the blade and further preventing, since they snugly engage the blade, longitudinal movement of the blade. Next, the expeller is removed from slot 27 and placed in the longitudinal slot 23 on the front of the holder. The toe 33 engages the aperture 26 on the blade. The expeller may then be moved forwardly providing controlled removal of the blade by sliding it in slots 24 slowly and carefully removing it from the holder 20. During this operation, the blade need not be touched and may be easily disposed for inventory at the end of the operation. Further, the contaminated blade need not be touched during any part of its removal, thereby preventing the possibility of contaminating an operator or cutting the glove and even the hand of an operator. The expeller provides the dual and successive function of controlled release of the shank from the mounting peg and the subsequent controlled removal of the blade from the holder.

Since the holder and expeller, as well as the blades, may be packaged sterile, in which sterility is not lost until the package is opened, my blade and holder should find a high acceptance in areas where field operations are conducted, such as in battle zone hospitals. The operator need only unwrap a blade and a holder to have a sterile instrument, thereby saving a great deal of time and utilizing a minimum of equipment to conduct an operation under considerably better circumstances than with instruments which are inadequately sterilized.

During surgery the periosteal pushing portion 20b may be used for blunt dissection and for pushing tissue from adjacent parts. This provides the operator with additional utility in the instrument providing for faster surgery and therefore more safety to the patient.

The holder may be provided in any of several sizes with a corresponding assortment of blades with shank sizes to fit the given size holder. It is anticipated that a holder and group of blade shapes would be most advantageous for delicate surgery such as eye, ear, nose and throat surgery. A medium size holder with a corresponding group of blade shapes may be used for more common surgery such as appendectomies. A large holder and corresponding assortment of blades may be utilized for particularly deep surgery such as thoracic surgery.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

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1. In combination, a surgical instrument comprising a scalpel blade holder having a scalpel blade mounted therein, the scalpel blade having a blade portion and shank portion, said scalpel blade holder comprising an elongate holder portion, a blade retaining portion affixed to one end of said holder portion, said blade retaining portion including securing means that accommodates the shank portion of the blade and prevents transverse motion of said blade, said blade retaining portion further including interengaging means received in an aperture in said shank portion of the blade to prevent longitudinal movement of said blade, the improvement comprising, an expeller tool receiving slot located in said blade retaining portion, and expeller tool having a work engaging end including blade release means, blade removal means and pivot means, said work engaging end being receivable in said expeller tool slot, said release means being engageable with the shank of the blade to release said interengaging means, said pivot means being pivotally engageable with the wall of said expeller tool slot and said removal means being engageable with the shank of said blade to cooperatively move the blade in the longitudinal direction when said expeller tool is being pivoted about said wall, whereby said blade has controlled removal from the blade retaining holder portion of said blade holder.

2. The surgical instrument as defined in claim 1 and a periosteal pushing portion affixed to the other end of said elongate holder portion,

an upper elongate concave gripping surface affixed to said elongate holder portion, and

a lower elongate convex gripping surface affixed to said elongate holder portion and joined with said upper concave surface forming a holder portion having a substantially triangular cross-section whereby a positive grip on said holder may be maintained by a user.

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OTHELL M. SIMPSON, *Primary Examiner*.

G. WEIDENFELD, *Assistant Examiner*.