May 17, 1955 W. E. STEELE 2,708,313

DETACHABLE BLADE SCALPELS

Filed May 12, 1952

Fig. 1.

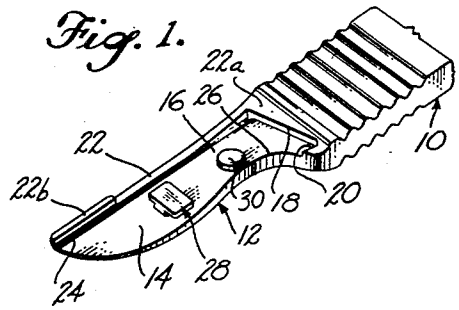


Fig. 3.

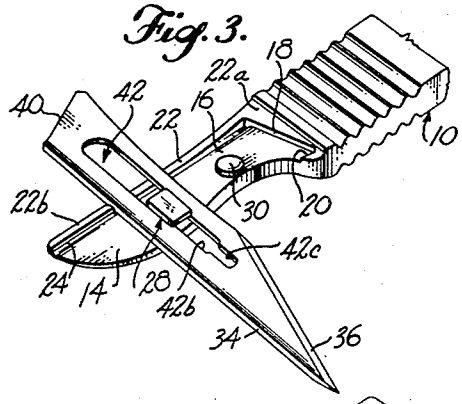
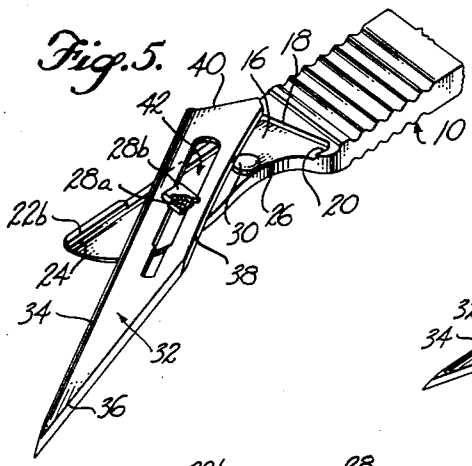


Fig. 5.



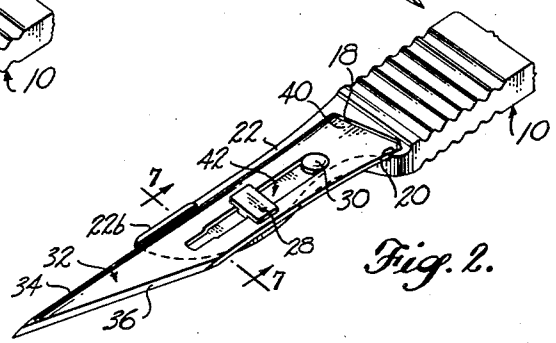


Fig. 2.

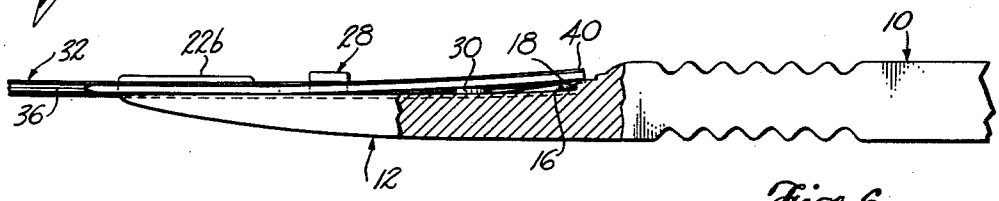


Fig. 6.

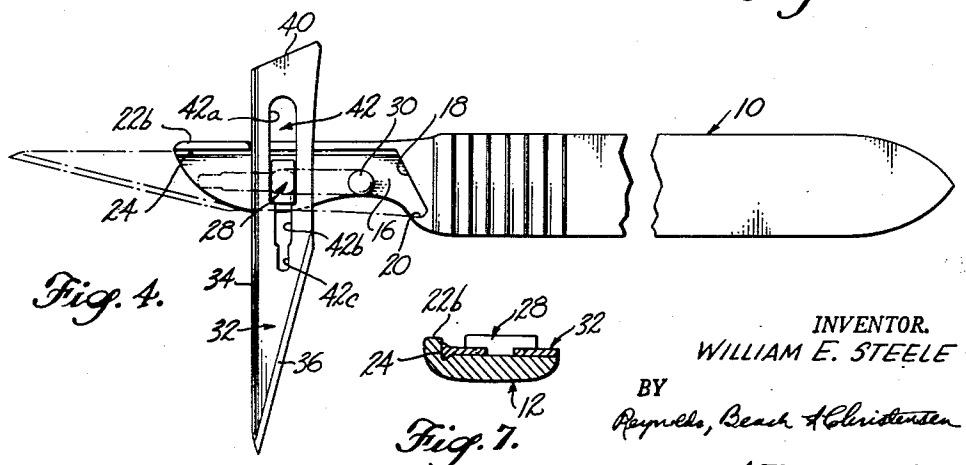


Fig. 4.

Fig. 7.

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DETACHABLE BLADE SCALPELS

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7 Claims. (Cl. 30—339)

This invention relates to improvements in detachable blade scalpels generally of the type disclosed in my United States Patent No. 2,454,353 of November 23, 1948 entitled Detachable Blade Scalpel. More particularly, the present invention concerns a scalpel handle arrangement which is adapted to receive and to retain more securely and rigidly than heretofore certain types of commercially available scalpel blades and blades of equivalent construction. A related object is a detachable blade scalpel also constructed and arranged to facilitate and expedite the installation and removal of blades from the handle. The invention is herein illustratively described by reference to the presently preferred form thereof as applied to a particular commercially available type of scalpel blade, but it will be understood that the invention extends to equivalent forms within the principles disclosed herein and obviously is not confined to the illustrative details.

In addition to the requirement of rigid full support for the scalpel blade, it is important that the handle elements releasably engaged by the blade prevent any appreciable or noticeable displacement between blade and handle in any direction during all types of cutting operations performed with the scalpel. In addition it is essential that blades be quickly exchangeable if one of different shape is desired for the operation, and that there be no tendency for the blade to bind on the handle or be dangerous to remove or install with rubber gloves worn by the surgical assistant. Certain commercially available surgical scalpel blades for detachable blade scalpels have experienced widespread use and are of the highest quality suitable for numerous applications in the various shapes and sizes in which they are produced. However, the available handle arrangements for mounting these blades when measured against the above-mentioned requirements and others for a perfected detachable blade scalpel have fallen short of their full purpose, and it is the general object of the present invention to provide an improved handle arrangement.

The particular commercial type of blade upon which the disclosure of this invention is based herein comprises a flat steel body with or without a reinforcing rib along the back edge and with an elongated aperture or slot extending lengthwise of the blade generally intermediate its ends and opposite side edges, such aperture or slot being widest at its end nearest the butt of the blade and undergoing one or more successive reductions in width toward the cutting end thereof. Such stepped portions, at least beyond the first step, are inconsequential.

Described in brief terms, the improved detachable blade scapel handle having the advantages mentioned for a blade of the foregoing type, comprises a shank and a tongue projecting beyond one end thereof. The tongue has a blade-supporting side face comprising a substantially flat blade-engaging outer portion and a raised blade-engaging root portion. A headed pin projects laterally from the outer portion of the tongue face and a second pin projects laterally adjacent to the raised root portion thereof. The apertured blade slips over the headed pin

with the blade disposed transversely to the tongue and is then rotated about the pin's axis into general alignment with the handle. A rib extending along one side edge of the tongue and of a height, perpendicular to the tongue face, which progressively increases towards the tongue root, deflects the butt end of the blade up and over the second pin during swinging of the blade toward alignment with the handle. Upon reaching such alignment, the butt end of the blade snaps resiliently against the raised root portion of the tongue and the second pin enters the registering blade aperture to lock the blade in position. The blade is then held under stress by pressure of the underside of the first pin's head causing the blade to bend as a result of its contact with the non-coplanar portions of the tongue face.

These and other features, objects and advantages of the present invention will become more fully evident from the following description of the preferred form thereof as illustrated in the accompanying drawings.

Figure 1 is a perspective view of the scapel handle with its major shank portion broken away for convenience of illustration.

Figure 2 is a similar perspective view with the scalpel blade secured in place on the handle.

Figure 3 is a similar perspective view with the scalpel blade laid transversely across the handle's tongue and the headed pin on the tongue passed through the blade aperture in the initial step of the procedure for mounting the blade.

Figure 4 is a side view of the scalpel blade and handle combination in which the blade's position as shown by solid lines corresponds to that in Figure 3 and by broken lines corresponds to the installed position illustrated in Figure 2.

Figure 5 is a perspective view similar to Figure 3 but in which the blade is swung about the headed pin part way toward alignment with the handle as required for securement thereto.

Figure 6 is an edge view of the handle, at enlarged scale, parts being broken away, showing the blade postioned relative to the handle as in Figure 5, the sloped rib deflecting the swinging blade automatically for clearance over the second pin.

Figure 7 is a cross section of the scalpel taken on line 7—7 in Figure 2.

As illustrated in the various figures, the scalpel handle comprises the shank **10** and the tongue **12** projecting beyond one end thereof. The tongue has a blade-engaging side face made up of a generally flat outer portion **14** and a raised or offset root portion **16** progressively curved outwardly of the general plane of such outer portion. The specific curvature in longitudinal cross section, for instance, of this blade-stressing face of the tongue is not critical, as will become evident. It may in fact be formed by an abrupt rise in the face of the tongue or by a more gentle curve as indicated in the example. The root end of this tongue face is met by a perpendicular shoulder **18** on the adjoining end of shank **10**, which shoulder in the illustrated case is inclined diagonally to the handle's longitudinal axis in substantial conformity to the angularity of the butt end of the particular blade chosen for purposes of illustration. This shoulder actually has some setback from the very end of the shank **10** and extends across the width thereof from locations near its opposite edges so as to form the end wall of a three-sided blade-receiving pocket which opens both laterally and endwise of the handle. The opposite sides of this pocket comprise the shoulder **20** extending a short distance along one edge of the tongue, and the root end portion of the rib **22** which extends along the opposite side edge of the tongue over substantially its full length.

The upper side of the rib **22** curves upwardly in progressive manner toward the root end thereof and continues into a similarly sloped shank surface **22***a* adjoining the shoulder **18** for a purpose which will later become evident. A heightening in this rib near its outer end provides a relatively wide finger rest **22***b* for cutting pressure application by the surgeon's index finger and affords transverse support to the back edge of the installed blade during cutting. A groove 24 (Figure 7) extending lengthwise along the base of the rib 22 over its full length is provided to receive one flange of a reinforcing rib **34** on the back edge of the type of blade herein illustrated. The tongue is indented or narrowed at **26** near its root to enable grasping the blade's shank for lifting of the blade shank in the course of removing it from the handle.

A headed pin **28** projecting laterally from a generally intermediate location on the outer portion **14** of tongue **12** has a round shank **28***a* (Figure 5) flattened on opposite sides which face endwise of the tongue. The pin head **28***b*, of elongated form, extends transversely of the tongue. A second pin **30**, preferably unheaded, and of the same diameter as the shank **28***a* of pin **28** in the illustrated case projects laterally from a generally intermediate location on the upwardly curving root portion **16** of tongue **12**. Preferably the two pins occupy positions of approximate alignment lengthwise of the tongue. Pin **30** and the shank of pin **28** are both preferably of a projecting height very slightly in excess of the blade's thickness.

As illustrated, the scalpel blade **32** has a double reinforcing rib **34** along its back edge, a cutting edge **36**, shown extending diagonally to a point, an unsharpened shank edge **38** located opposite the back edge **34**, and an inclined butt edge **40** previously mentioned. Generally intermediate its several edges the body of blade **32** has an elongated aperture or slot **42** extending lengthwise therein. This slot comprises a root section **42***a*, an intermediate section **42***b* and a tip section **42***c*, each being of uniform width and, in the order named, being somewhat wider than its successor. The presence of aperture sections **42***b* and **42***c*, of significance in previous usages of this particular commercial type of blade, is unessential for present illustrative purposes, however, wherein the root section **42***a* alone of the blade aperture comes into play, and the length of even this portion is not critical.

The width of this aperture root section **42***a* is very slightly in excess of the diameter of pins **28** and **30**. Its length is such that it slips over the two pins with slight but inappreciable clearance at its remote ends and sides, so that in the blade's installed position (Figure 2, Figure 4—dotted) one end edge of the aperture bears against the side of one pin to prevent appreciable endwise shifting or free play of the blade in one direction relative to the handle, whereas the same is true of the opposite end edge of such aperture and the other pin, with respect to relative shifting of the blade in the opposite direction, and both pins alike prevent transverse shifting of the blade. Being of crucible steel or comparable tool metal the blade is of course inherently resilient.

In order to install the blade it is first slipped over pin **28** as shown in Figure 3, with its back edge **34**, transverse to the tongue, facing toward the tip of such tongue. The blade is then swung clockwise about pin **28** through the position of Figure **5**, toward that of Figure 2. As the blade swings in this manner its butt portion slides on the upwardly curved face of rib **22** and contiguous shank surface **22***a*. The leading edge of the progressively deflected blade is thereby automatically raised above the top of pin **30** (Figure 6) so that it clears the pin as its swinging movement progresses through the position of Figures 5 and 6. While the butt edge of the blade is being deflected progressively upward by the cam action of rib **22** and surface **22***a*, the head **28***b* of pin **28** holds down the body of the blade in face-to-face freely sliding contact with the tongue. Thus very little effort is required to swing the progressively bent blade into alignment with the handle.

When the blade is swung into such alignment its butt end finally drops off the rim of shoulder **18** and snaps down resiliently to a seat in the pocket previously described. This it does at a position of the blade in which the pin **30** automatically slips quite snugly, though freely, into the root end of aperture **42** of the descending blade, assuming, of course, that the shank **28***a* of the other pin is then being pressed by the opposite end edge of aperture section **42***a*. The blade is then secured firmly in place on the handle. Of course, if the pin **28** lies in an intermediate position lengthwise of aperture section **42***a* as the blade is swung into alignment with the handle, pin **30** will prevent the blade butt from snapping to its seat. In that event it is an easy matter to complete the mounting operation by sliding the blade endwise of the handle until it does snap down over the pin **30**.

The blade's snug engagement with the face of tongue **12** and with pins **28** and **30**, together with the augmented support afforded to it by adjoining rib and shoulder surfaces insures a minimum of free play or looseness in the connection and also a maximum of support to the thin blade against undue bending under operating pressure. Moreover, the continued bending stress residing in the resilient blade caused by the underside of pin head **28***b* holding the blade down against the curved face of the tongue **12** further adds to the tightness of the securement and reduces the possibilities of accidental dislodgement of the blade's aperture from retaining pin **30**. A very important feature of the simple and readily manufactured arrangement is the combination of the two pins, one a pivot and stop and the other a stop or locating element, engaging blade aperture edges to prevent shifting of the blade in any sense in its own plane.

In order to remove the blade, its shank is simply grasped at the location of the tongue indentation **26**, lifted clear of pin **30**, and then swung counterclockwise to the position of Figure 3 or 4. The blade is then simply slipped off pin **28** free of the handle.

In the structure described above, it has been assumed that the shoulders formed by the step from slot portion **42***a* to slot portion **42***b* engaging the shank **28***a* of the headed pin **28** would hold the blade against rearward movement and the engagement of the rearward end of slot portion **42***a* with pin **30** would hold the blade against forward movement. While the latter engagement is principally relied upon to prevent forward movement of the blade, engagement of the toe of the blade's butt end with shoulder **20** would assist somewhat in thus holding the blade.

Various alternatives for restraining rearward movement of the blade are possible in addition to or instead of the engagement of the shoulders between slot portions **42***a* and **42***b* with the shank **28***a* of pin **28**. Thus the engagement of the blade's root end with the shoulder **18** of the handle, as shown in Fig. 2, will prevent rearward blade movement. For that reason it is not necessary that the blade shoulders between such blade slot portions actually engage the pin shank, although it is desirable to have pins **28** and **30** separated a considerable distance.

Also, while engagement of the edges of slot portion **42***a* with the sides of pin shank **28***a* and pin **30** hold the blade against lateral and swinging movement, it is not necessary that the sides of pin **30** engage the sides of such slot portion with the handle socket for the blade butt shown in Fig. 2. Rotation of the blade in a clockwise direction about pin **28** from the position shown in Figure 2 is prevented by engagement of the back of the blade with flange **22***b*, and also by engagement of the toe of the blade root end with shoulder **20**. Rotation of the blade in a counterclockwise direction about pin **28** is prevented by engagement of the back of the blade at its root end with rib **22**. As long as the rearward face of pin **30** engages the rearward end of blade slot **42**, therefore,

the blade will be held satisfactorily in place against swinging by engagement of the blade edge with shoulders on the handle as discussed. If the blade aperture or slot does fit the pin **30** snugly, however, laterally as well as lengthwise of the handle, provision of such blade edge engaging shoulders is not necessary.

I claim as my invention:

1. A detachable blade scalpel comprising an elongated blade having therein an elongated slot extending lengthwise of the blade, and a handle including a shank, a tongue projecting from one end of said shank and having a blade-supporting side, a first pin projecting laterally from said tongue's blade-supporting side at a location spaced from said shank, having a head of an extent transversely of said tongue greater than its extent lengthwise of said tongue and greater than the width of said blade slot but less than the length of such blade slot, the extent of said head lengthwise of the tongue not exceeding the maximum width of said blade slot, for passage of said head through said blade slot only when the length of said blade extends transversely of said tongue, and said first pin having a stem of an extent both lengthwise of said tongue and transversely of said tongue not exceeding the maximum width of said blade slot, to enable said blade, after passing over said pin head, to be swung beneath said pin head into substantial alignment with said tongue, and an unheaded pin projecting laterally from said tongue's blade-supporting side at a location between said first pin and said shank, said unheaded pin being of a size to fit in said elongated blade slot when the blade has been swung to dispose its length in alignment with said tongue, said handle having a rib extending along one edge of the blade-supporting side of the tongue, the height of said rib above such tongue side tapering away from the shank for engagement by the blade engaged beneath the head of the first pin to bend the blade progressively as it is swung toward alignment with the tongue, for passage of the blade over the top of the unheaded pin.

2. A detachable blade scalpel handle comprising a shank, a tongue projecting lengthwise of the handle from one end of said shank, said tongue having a blade-supporting side and a blade-backing rib projecting from said side and extending lengthwise of said tongue substantially from said shank to the projecting end of said tongue, a first pin projecting laterally from said tongue's blade-supporting side at a location spaced from said shank, having a head of an extent transversely of said tongue greater than its extent lengthwise of said tongue and a stem of an extent lengthwise of said tongue not exceeding its extent transversely of said tongue, and an unheaded pin projecting laterally from said tongue's blade-supporting side adjacent to said rib, said pins being engageable with a scalpel blade for holding the same to the handle with the back edge of the blade abutted to said rib.

3. A detachable blade scalpel handle comprising a shank, a tongue projecting from one end of said shank and having a blade-supporting side, a first pin projecting laterally from said tongue's blade-supporting side at a location spaced from said shank, having a head of an extent transversely of said tongue greater than its extent lengthwise of said tongue and a stem of an extent lengthwise of said tongue not exceeding its extent transversely of said tongue, an unheaded pin projecting laterally from said tongue's blade-supporting side at a location between said first pin and said shank, and a rib between said headed pin and said shank, extending lengthwise of said tongue, spaced laterally of said tongue from said unheaded pin, its height above such tongue side tapering away from shank, and having a maximum height at least substantially as great as the height of said unheaded pin.

4. The detachable blade scalpel handle defined in claim 2, wherein the tongue projects lengthwise from the shank materially beyond the first pin, and wherein the rib is heightened between such pin and the projecting end of the tongue, such heightened rib portion constituting a finger rest in addition to a backing for a scalpel blade secured to the handle.

5. A detachable blade scalpel handle comprising a shank, a tongue projecting lengthwise from one end of said shank and having a blade-supporting side, a headed pin projecting from said tongue side at a longitudinally intermediate location thereon engageable with an apertured scalpel blade to hold such blade in contact with said tongue side, a blade-backing rib at least substantially as high as the length of said pin between its head and said tongue, projecting laterally from said tongue side and extending lengthwise of said tongue along one longitudinal edge thereof between said headed pin and the projecting end of said tongue to afford a blade stop and finger rest, and means projecting laterally from said tongue side between said shank and said headed pin, said latter means being engageable with a root end portion of a scalpel blade held by said pin in contact with said tongue side to prevent swinging of the blade's root end about said pin.

6. A detachable blade scalpel comprising, in combination, a scalpel handle including a shank, a tongue projecting lengthwise from one end of said shank and having a blade supporting side, a rib projecting laterally from said side and extending lengthwise of said tongue along one longitudinal edge thereof, the projecting height of said rib above said tongue side being gradually and progressively increased towards said shank from a location generally intermediate the ends of said rib, and the height of said rib being materially increased substantially throughout that portion of the length thereof extending between said location and the projecting end of said tongue to afford a blade stop and finger rest, a headed pin projecting from said tongue side at a longitudinally intermediate location thereon, the head of said pin having an extent transversely of said tongue greater than its exent lengthwise of said tongue, an elongated scalpel blade having an elongated aperture therein extending lengthwise of said blade and having a length greater than the length of said pin's head and a width less than the length of said pin's head, but slightly greater than the width of such head, whereby said blade may be passed over said pin's head and pressed into contact with said tongue side with said blade extending generally transversely to said tongue, and an unheaded pin projecting from the tongue side at a location thereon between the headed pin and the shank, said blade, pressed against said tongue side with its aperture engaged with said headed pin, being swingable about the axis of such pin, held by and beneath the head thereof, toward alignment with said tongue accompanied by progressive deflection of the butt end portion of said blade away from said tongue side by riding up the gradually increased height of said rib until such alignment is reached, permitting such blade butt portion to snap down into contact with said tongue side and engage its aperture with said unheaded pin to prevent further swinging of said blade.

7. A detachable blade scalpel comprising a blade including a sharp cutting edge and a blunt longitudinal opposite edge, said blade having an elongated aperture therein extending lengthwise thereof intermediate the ends of such blade, and a scalpel handle cooperable with said blade comprising a shank, a tongue projecting lengthwise of the handle from one end of said shank, said tongue having a blade-supporting side and a blade-backing rib projecting laterally from said side and extending lengthwise of said tongue substantially from said shank to the projecting end of said tongue, a pin projecting laterally from said tongue's blade-supporting side at a location spaced from said shank, said pin having a head of an extent transversely of said tongue greater than its extent lengthwise of said tongue and a stem of an extent lengthwise of said tongue not exceeding its extent transversely

of said tongue, the transverse extent of said pin head being less than the length of said blade aperture and the lengthwise extent of said pin head being slightly less than the width of said blade aperture, whereby said apertured blade may be slipped over said headed pin when the blade is disposed transversely to the tongue and may thereby be pressed into contact with said tongue, and stop means projecting laterally from said tongue's blade-supporting side at a location thereon between said headed pin and said shank, said stop means being engageable with a cooperable portion of said blade to arrest swinging of said blade about said headed pin when said blade is swung from its transverse position toward and into alignment with said tongue, said blade-backing rib being spaced from said stop means transversely of said tongue to contact the blunt edge of said blade substantially continuously along the length of said rib with said blade thus positioned in alignment with said tongue.

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