Sept. 23, 1930. M. B. BEHRMAN 1,776,248

SURGEON'S KNIFE

Filed Dec. 11, 1926

Fig. 1.

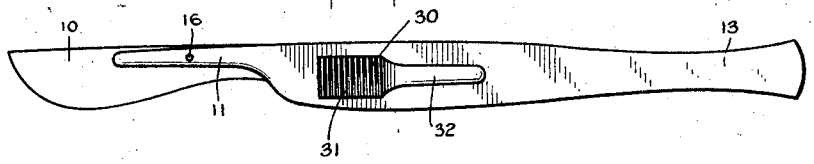


Fig. 2.

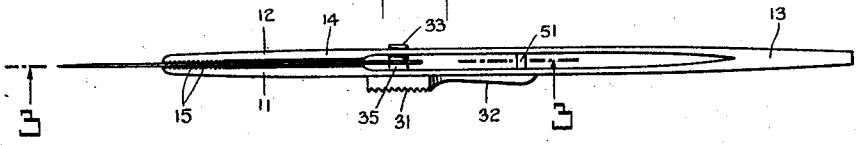


Fig. 3.

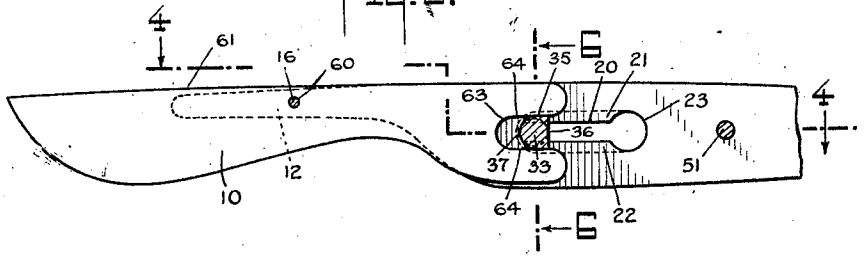


Fig. 4.

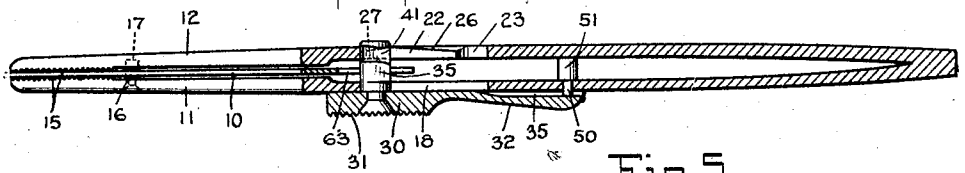


Fig. 5.

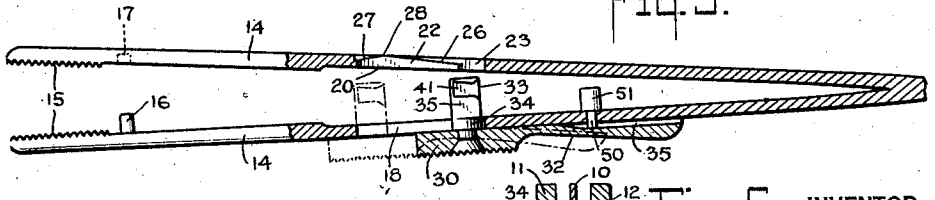


Fig. 7.

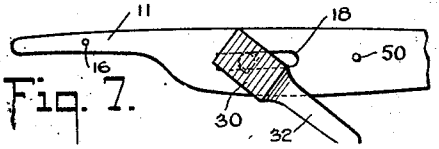
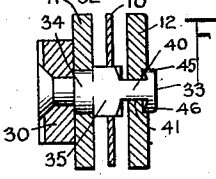


Fig. 6.



INVENTOR

Marcus B. Behrman

BY William S. Glenn

ATTORNEY

Patented Sept. 23, 1930

1,776,248

UNITED STATES PATENT OFFICE

MARCUS B. BEHRMAN, OF NEW YORK, N. Y., ASSIGNOR TO THE LOX SEAL CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK

SURGEON'S KNIFE

Application filed December 11, 1926. Serial No. 154,051.

My present invention relates generally to a surgeon's knife and more particularly to a detachable association between a blade and a holder particularly adapted for such purpose.

I have found that in instruments of this character, it is desirable not only that the knife blade be readily disassociated from the handle or holder for purposes of sharpening, replacement and sterilizing, but that the manner of associating of the blade with the handle shall be such that the knife and the blade shall be firmly secured, one to the other, so that in use, the possibility of accidental movement of the knife with reference to the handle shall be reduced to an absolute minimum.

One of the objects of my invention therefore is an arrangement whereby the means for securing the blade to the handle shall be of such character as to eliminate any possibility of any accidental movement of the blade with reference to the handle or any possibility of any accidental operation of the locking parts which will render the holding means ineffective.

The Patent No. 990,882 granted May 2, 1911, to one Ernest Kratz, discloses a type of surgeon's knife which I have found, possesses some of the advantages which I am seeking, and my present invention is an improvement upon the surgeon's knife therein disclosed.

My invention over this knife, is directed to a simplification of the construction whereby on the one hand, the cost of manufacture is materially reduced and on the other hand, the efficiency of the instrument materially increased.

While I have herein illustrated all my improvements as embodied in the construction of this patent to Ernest Kratz, yet it will be understood that as to certain phases of my invention, they need not be embodied in exactly this type of instrument, all as will be more fully set forth in the specification and claims hereto appended.

For the attainment of these objects and such other objects as may hereinafter appear or be pointed out, I have illustrated an embodiment of my invention in the drawings, wherein:

Fig. 1 is a side elevational view of the knife and holder assembly;

Fig. 2 is a top elevational view;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a view partly in top elevation and partly in horizontal section taken on line 4—4 of Fig. 3, with a portion of the knife broken away;

Fig. 5 is a view similar to Fig. 4 showing the gripping arms in inoperative or released position;

Fig. 6 is a vertical, transverse section taken on line 6—6 of Fig. 3; and

Fig. 7 is a fragmentary view on a reduced scale of the locking member moved angularly to its position of removal.

Upon viewing the figures of the drawing, it will be observed that the knife 10 is detachably held between the two members 11 and 12 of the handle, in a manner which I will now describe.

In the illustrated embodiment I show the members 11 and 12 as spring arms joined together at 13 and so arranged and constructed as to normally assume the spaced or separated position as shown more fully in Fig. 5 of the drawing.

These spring arms are illustrated for purposes of convenience as symmetrical in all respects, although it is not necessary that they be so. Adjacent their free ends, the arms are thickened as shown at 14 and are provided with roughened or serrated inner surfaces 15 at their extreme free ends. The purposes of this construction will be more fully understood as the operation of the device is explained hereinafter. The thickened portions 14 and the roughened portions 15 serve their purposes not only in connection with the employment of this instrument as a handle for a surgeon's knife, but also for the employment thereof as pincers or forceps as already fully described in the aforementioned Patent 990,882.

I will now describe my improved construction for detachably and fixedly holding a blade in its proper association with this type

of holder. One of the arms 14 is provided at its free end and preferably inwardly of the serrated portion 15 with the pin 16 extending inwardly from its inner face and the other arm 14 is provided with an opening 17 to register with and receive this pin when the two arms 14 are forced together into gripping engagement.

Inwardly of this thickened free end, the arm 11 is provided with a longitudinally extending slot 18 of a size and dimension that will be more fully understood or pointed out hereinafter. The opposite arm 12 is provided with a longitudinally extending slot 20 which differs from the slot 18 provided in the arm 11 in that there are provided the opposite extending depressed or countersunk flanges 21 and 22 which narrow a portion of this slot so as to have the slot form a key hole slot with a narrowed elongated portion and the relatively enlarged opening 23.

The upper surface of these flanges 21 and 22 are shown more in detail in Fig. 4 of the drawing in which as will be observed, they are formed with an outer cam surface made up of the opposite inclines 26 and 27, the apex or the highest point 28 being intermediate the ends of the flange, all for purposes that will shortly be pointed out.

For forcing and holding the arms 11 and 12 locked together so as to maintain them in gripping engagement with the blade 10, I provide a locking slide to which I have applied the reference character 30 in Fig. 1 of the drawing. This locking slide is made up of a thickened knurled portion 31 which is to be engaged by the finger for convenient manipulation, and the narrowed finger 32 extending rearwardly therefrom, the thickened portion being provided with the pin 33 extending downwardly from its inner face and the narrowed longitudinal portion 34 being provided with the longitudinal groove 35 also formed on its inner face.

Upon viewing Fig. 6 of the drawing, it will be observed that the pin 33 is made up of a number of sections of which the innermost section 34 is substantially cylindrical and of a diameter to be freely received through the slot 18 and is of a thickness equal to or in excess of the thickness of the portion of the arm 11 in which the slot 18 is provided. As a result of this, when the section 34 is brought into the plane of the arm 11, the locking member can rotate freely. Beyond this section 34, is a section 35 which is irregularly formed and has an extended flat face 36, (see Fig. 3), and a rounded face 37. The thickness of this member 35 from the flat face 36 to the opposite extreme portion of the curved surface 37, is such that when the locking member 30 is positioned angularly transversely of the slot 18, the member 35 will pass through the slot 18 so as to permit of the cylindrical portion 34 being moved into registry with the slot.

The outermost portion 40 of the pin 33 is cut down and narrowed on its opposite faces as shown at 41 to a thickness between these faces, less than the narrowed portion of the slot 20 between the flanges 21 and 22 in the opposite arm, and is provided with the oppositely positioned lugs 45 and 46 of a size to permit these lugs to pass through the widened portion 23 of the slot 20 and when the slide is moved along in engagement with the slot 20, to cause these lugs 45 and 46 to seat on the flanges 21 and 22.

When it is desired to assemble the locking lug with the knife handle, the locking lug is held so as to be substantially at right angles to the slot 18 of the arm 11 in which position the pin 33 can be fully inserted through the slot 18 so as to bring the cylindrical portion 34 of the pin into the plane of the arm 11. The locking member is then turned angularly so as to position it longitudinally of and into parallelism with the arm 18 in which position, it is held against removal and in this position, the groove 35 in the finger 32 is caused to engage with the outwardly extending reduced portion 50 of a pin widened at 51 as shown, and extending inwardly from the arm or finger 11 and which serves as a spacing member for the purposes that will be pointed out. The arm 32 is bowed outwardly intermediate its ends so as to hold the groove 35 in engagement with the pin extension 50 so that this arrangement will serve the purposes of normally preventing any accidental angular movement of the slide and will also guide the slide in its movement longitudinally of the handle. In this manner the locking member 30 is held associated with the arm 11 at all times for longitudinal movement, except when it is desired to remove the locking member for repair, replacement or sterilization.

I have illustrated in the drawings and particularly in Fig. 3 a conventionally shaped blade, which however has the following characteristics in order to enable it to cooperate with the handle member thus far described in order to serve the purposes which I intend. This blade is provided with an opening 60 so positioned that when the blade is received between the portions 14 of the arms 11 and 12, with the pin 16 in registry with the opening 60, the outermost edge 61 of the blade 10 will be substantially aligned with the corresponding outer edges of the two arms 11 and 12. The blade is further provided with a slot 63 which is illustrated as a longitudinally extending one and which when the pin 16 is received in the opening 60 of the blade, will register with the openings 18 and 20 in the arms 11 and 12. This slot 63 is preferably made up of two flat faces 64 which snugly receives the portion 35

of the pin as shown in Fig. 3 so as to permit a relative longitudinal movement of the locking slide 30, but to prevent a relative rotation between the two, and for this reason, the coacting faces of the portion 35 of the pin 30 are made substantially flat.

The gripping engagement between the handle and the knife is accomplished as follows:

Assuming the locking member is in its retracted position on the arm 11 and capable of longitudinal sliding forward movement, as already above described and as shown in Fig. 5 of the drawing, it will be understood that the arms 11 and 12 will be in their normal separated position as shown in Fig. 5. The blade is now positioned on one of the arms, for instance, the arm 11 in Fig. 5 with the pin 16 passed through the opening 60 in the blade. The two arms 11 and 12 are then forced together and the pin 16 on the arm 11 will pass through the opening 60 in the blade and into the opening 17 in the opposite arm 12. In this position, it will be found that the extreme end 40 of the pin 33 is in registry with and will be forced through the key-hole enlarged opening 23 of the key-hole slot 20 in the arm 12 and that the flanges 45 and 46 are positioned immediately above the adjacent portion of the incline 26. The locking slide 30 is now pushed forward. In this movement, the flanges 45 and 46 of the pin 33 will engage over the flanges 21 and 22 of the slot 20, and as the movement is continued, an increasing pressure will be applied to the two locking arms so as to force them further together until the apex 28 of the arms are reached which will be the point of maximum compression. Upon a continued longitudinal movement of the locking slide 30 beyond this point, the flanges 45 and 46 will move downwardly on the opposite inclined surface 27 and this arrangement will tend to prevent a retrograde movement of the locking slide 30. It will of course be understood that the parts are so arranged and constructed that the jaws 15 are at their maximum point of engagement before the flanges 45 and 46 reach the apex 28 of the cam surfaces so that the continued compression is taken up by the inner thinner portions of the arms 11 and 12. In this manner, the only effect of the decrease in compression of the locking jaws incident to the riding movement of the flanges 45 and 46 on the reverse inclined surfaces 27 will be to permit the thin parts of the arms 11 and 12 to separate slightly without, however, in any way affecting the action of the clamping jaws 15.

In this forward movement of the locking slide 30, the part 35 of the pin 33 will enter the slot 63 of the blade. This action along with the engagement of the pin 16 all supplemented by the action of the jaws 15 will hold the blade securely in position.

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

1. The herein described surgical instrument comprising resilient arms fixedly associated together at one end, one of said arms having on its inner face a pin adapted to extend into engagement with the other arm when the arms are in closed position, a removable blade between said arms having openings, one of which is to receive said pin, and means for holding the arms in their closed position and for engaging in another opening through said blade.

2. The herein described surgical instrument comprising a handle, including two arms fixedly associated together at one end and having their other ends normally separated to receive a blade between them and provided with a plurality of means for engaging the blade at a plurality of longitudinally separate points, one of said means being in the form of a slide arranged and constructed to engage the blade and the arms and lock the handle in engagement with the blade.

3. The herein described surgical instrument comprising, a blade holding handle including two arms and a slotted blade adapted to be received between said arms, said arms having registering slots and said blade having a slot adapted to be brought in registry with the first aforementioned slots and sliding means receivable in said slots in the arms and in the slot in the blade for locking the arms and the blade together as a unit.

4. A surgeon's knife, comprising a handle member having two arms capable of spreading, a pin carried by one of said arms and receivable through the other adjacent the front end of said arms, a slotted blade adapted to be received between said arms and to receive the aforementioned pin through a perforation therethrough, registering slots in said arms and a sliding lock engageable in said slots and in the slot in the blade to lock said blade in position.

5. A handle, adapted to detachably carry a surgeon's knife, said handle comprising superposed members, a slide in slidable engagement with said members for locking them together, said slide being mounted upon one of the members for rotation with reference thereto, so that in one position of sliding adjustment, the locking member upon angular movement can be released from the member and in other positions of sliding adjustment, the slide is locked to said member and permitted only a sliding adjustment.

6. A handle, adapted to detachably carry a surgeon's knife, said handle comprising superposed members, a slide in slidable engagement with said members for locking them together, said slide being mounted upon one of the members for rotation with refer-

ence thereto, so that in one position of sliding adjustment, the locking member upon angular movement can be released from the member and in other positions of sliding adjustment, the slide is locked to said member and permitted only a sliding adjustment, and means normally resisting such angular movement.

7. A handle for a surgeon's knife adapted to detachably receive a blade, said handle comprising superposed members and means for locking said members together so as to cause them to grip a blade therebetween, said means comprising registering longitudinally extended slots in said members, a locking slide moveable in said slots and means associated with one of the slots for holding the locking slide in its locking position, said last mentioned means comprising a double incline engageable by the slide with the highest part of the incline positioned short of the locking position of the slide.

8. The herein described surgical instrument comprising resilient arms, one of said arms having on its inner face a member adapted to extend into engagement with the other arm when the arms are in closed position, a removable blade between the narrow end portions of said arms and having an opening to receive said member, the arms and the blade having registering slots and a locking slide slidable in the slots of the arms and engageable with the slot in the blade for locking the arms and the blade together as a unit.

9. In a surgical knife, a pair of elongated clamping jaws having longitudinally arranged slots adapted to register with each other, a removable blade between said jaws and having an open-end slot in its rear portion, said last-named slot being adapted to register with the slots in said jaws, and a locking device for holding said blade in clamped relationship between the jaws and against a pivoting movement, said device comprising a pin adapted to pass through all three slots, and means for sliding said pin forwardly and rearwardly in said slots.

10. In a surgical knife, a pair of elongated clamping jaws having longitudinally arranged slots adapted to register with each other, a removable blade between said jaws and having an open-end slot in its rear portion, said last-named slot being adapted to register with the slots in said jaws, and a locking device for holding said blade in clamped relationship between the jaws, said device comprising a pin adapted to pass through all three slots and having a non-circular medial portion adapted to engage snugly within the slot of said blade.

11. In a surgical knife, a pair of elongated clamping jaws having longitudinally arranged slots adapted to register with each other, the walls adjacent to one of said slots being shaped to provide a cam surface, a removable blade between said jaws and having an open-end slot in its rear portion, said last-named slot being adapted to register with the first-named slots, and a locking device for holding said jaws and blade in clamped relationship and the blade against a pivoting movement, said device comprising a pin adapted to pass through all three slots, said pin having a portion adapted to engage with said cam surface, and means for sliding said pin forwardly and rearwardly in said slots, one of said movements thereby wedging the jaws toward each other.

In witness whereof I have signed this specification this 4th day of December, 1926.

MARCUS B. BEHRMAN.