Dec. 10, 1935. F. J. GRUSS ET AL 2,023,807

SURGICAL NEEDLE

Filed March 13, 1933

Fig. 1.

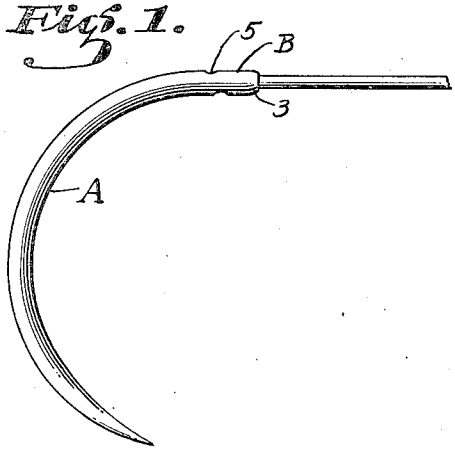


Fig. 2.

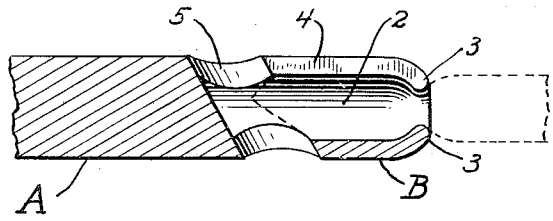


Fig. 3.

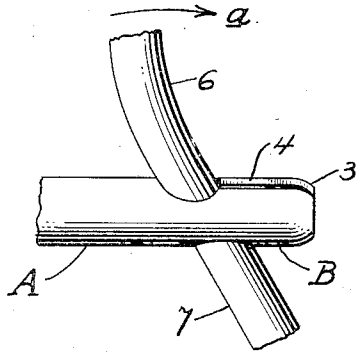


Fig. 4.

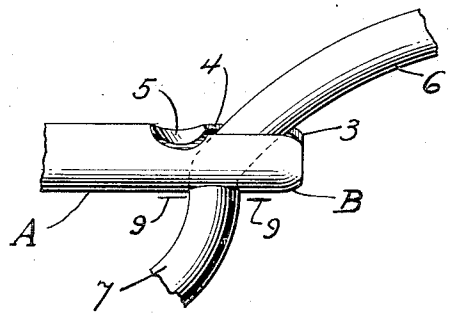


Fig. 5.

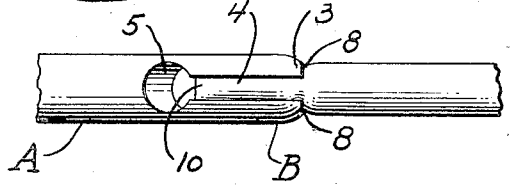
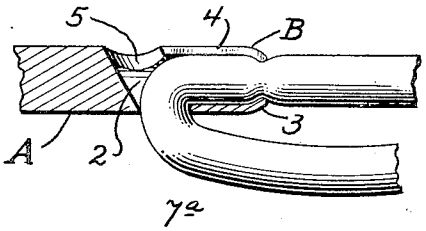


Fig. 6.



INVENTORS.
Francis J. Gruss,
Francis K. Gruss.
BY
Townsend and Loftus.
ATTORNEYS.

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SURGICAL NEEDLE

Francis J. Gruss and Francis K. Gruss,
San Francisco, Calif.

Application March 13, 1933, Serial No. 660,506

3 Claims. (Cl. 128—339)

This invention relates to a rethreadable surgical needle, and especially to improvements over the type of needle shown in our co-pending application entitled "Surgical needle and suture", filed September 23, 1932, Serial Number 634,460.

In our co-pending application a type of needle is disclosed which requires a special type of gut or suture; that is, a suture having a pre-formed head at one end so that when the needle is threaded the head at the end of the suture will function as a knot to prevent the suture from slipping through the eye, and while the suture is perfectly practical and feasible it limits the use of the needle to that type of suture. As the average surgeon, when performing an operation, will not have the time to knot or form heads on the sutures ordinarily supplied, a type of needle which may employ any suture is obviously more desirable.

The object of the present invention is to generally improve and simplify the construction and operation of needles of the character described; to provide a needle which will form a head at the end of an ordinary suture during the threading operation of the needle, thereby permitting the ordinary suture, or gut, to be employed; to provide a needle having a transverse eye and a longitudinal passage in communication therewith which opens through the end of the needle so that the needle may be employed both for single or double thread as desired; and further, to provide a needle which can be quickly threaded and in which the thread or suture is securely held when threaded.

The needle and the manner of threading the same is shown in the accompanying drawing, in which—

Fig. 1 is a side elevation of the needle.

Fig. 2 is an enlarged section of the head end of the needle showing the suture in position.

Figs. 3 and 4 are side elevations of the head of the needle, showing the manner in which it is threaded.

Fig. 5 is a plan view of the head end of the needle showing the thread or suture after threading.

Fig. 6 is a side elevation similar to Fig. 1, showing the manner in which the needle is threaded when a double thread or suture is required.

Referring to the drawing in detail, and particularly Figs. 1 to 5, A indicates a standard form of surgical needle, and B the thread or head end thereof. This end of the needle is tubular to form a longitudinal passage 2 which opens through the end of the needle, and the extreme open end is slightly swedged or bent inwardly to form retaining shoulders 3—3 on opposite sides of a slot 4 which extends from the eye 5 to the open end of the needle. The eye extends through the needle transversely thereof and is preferably disposed on an angle, as clearly shown in Figs. 3 and 4; that is, one end of the eye passage is closer to the open end of the needle than the opposite end so that when the suture is threaded through the eye it will not be disposed at right angles to the longitudinal axis of the needle but on an angle thereto, as shown at 6 in Fig. 3. This is important as will be later described.

The width of the slot in proportion to the diameter of the needle and the suture employed is clearly shown in Fig. 5; that is, its width is considerably less than the diameter of the suture, and this is essential as the thread or suture is pulled longitudinally through the slot during the threading operation and as the diameter of the suture is greater than the width of the slot the opposite sides of the suture will be pressed inwardly, thereby forming a pair of grooves or reduced portion which is gripped by the shoulders 3 on opposite sides of the slot for the purpose of retaining the thread against removal after the needle is threaded.

The threading operation is as follows: One end of a suture is threaded through the eye, as shown in Fig. 3. The distance the thread is run through the eye is just sufficient to leave short projecting ends 7. The long end of the thread, indicated at 6, is then grasped by the hand and pulled rearwardly through the slot 4 in the direction of arrow *a*. While the thread is being pulled in the direction of arrow *a*, and while it passes through the slot 4, the sides of the suture are pressed inwardly and a pair of grooves are thus formed as shown at 8—8, see Figs. 2 and 5. The pull is continued until the long end of the suture assumes the position parallel to the longitudinal axis of the needle and in that position the thread will extend through the open end of the head and the grooves 8—8 will be engaged or grasped by the shoulders 3—3. The short end 7 of the suture will then be cut off on the line 9—9 by a knife, or any other suitable cutting implement, and the threading operation is thereby completed. The formation of the grooves 8—8 on opposite sides of the suture is caused by pressing the sides of the suture inwardly when the suture is pulled through the narrow slot 4. This inward pressure on the suture material tends to expand the short end 7 of the suture and this expansion forms a head 10 which lies wholly within the longitudinal

passage 2 when the short end 7 is cut off. The head end of the suture is thus positioned within the needle while the main portion of the suture extends from the end of the needle, and when the needle is thus threaded and employed, laceration or tearing of the flesh by the thread during the operation of stitching a wound or the like is entirely prevented.

The operation of threading is quickly performed. Any suitable type of thread or suture may be employed, and while a single thread or suture is preferable, a double thread suture may be employed as shown in Fig. 6. When threading a needle to obtain a double thread, the suture is run through the transverse eye in the usual manner, but in place of leaving a short end, the end indicated at *7a* is run through the desired distance, or a distance equal to the length of the thread required, while the other end is pulled through the slot and through the open end of the needle in the usual manner.

To remove the thread from the eye, whether single threaded or double threaded, it is only necessary to reverse the pull; that is, to pull the thread upwardly through the slot and then back toward the eye, and when this position is reached the thread is pulled out of the transverse eye and the needle is unthreaded.

While certain features of the present invention are more or less specifically described, we wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A surgical needle having a head, a shank and a point, a transverse eye passage formed in the head of the needle, a longitudinal passage formed in the head and forming a tubular portion, said passage being open through the outer end of the head and also communicating with the transverse eye passage, retaining shoulders formed at the outer end of the tubular member, and a slot formed in the tubular member and extending from the transverse eye to the outer open end of the tubular member, said last-named slot forming a pair of substantially parallel shoulders between which a thread is pulled and whereby grooves are pressed in the sides of the thread to form a head on the thread and recess to be engaged by the shoulders at the open end of the head.

2. A needle having a tubular head at one end thereof, said head being slotted and the slot extending to the outer open end, the inner end of the slot being formed with an enlarged opening to receive the end of the suture, said slot forming a pair of substantially parallel shoulders between which the suture is pulled toward the open end of the head and whereby grooves are pressed in the sides of the suture to form a head on the suture, and retaining means on the open end to retain the head formed on the suture.

3. A surgical needle having a suture retaining head comprising a tubular portion constricted adjacent one end, an eye formed at the opposite end of said tubular portion to permit insertion of a suture, and means for forming a retaining head upon the inserted end of the suture comprising a slot connecting said eye and the constricted portion.

FRANCIS J. GRUSS.
FRANCIS K. GRUSS.