Oct. 4, 1938. F. C. WAPPLER 2,131,924

ENDOSCOPIC TUBE AND OBTURATOR THEREFOR

Filed April 13, 1935

Fig. 1

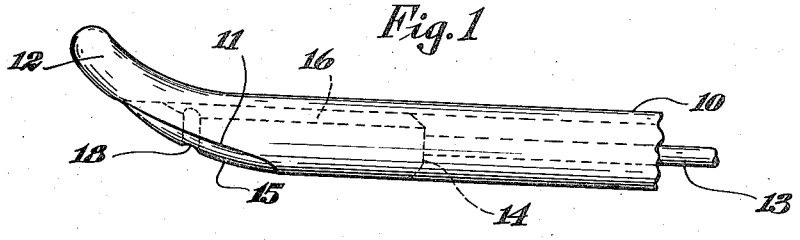


Fig. 2

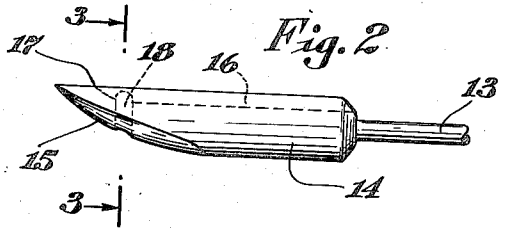


Fig. 3

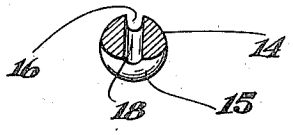


Fig. 4

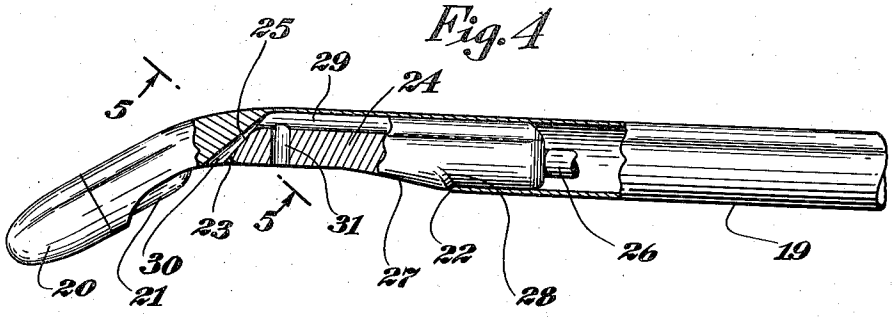


Fig. 5

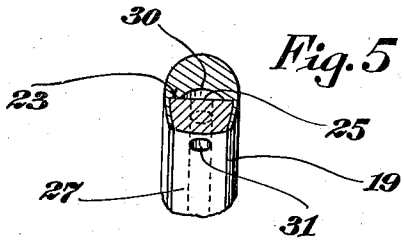


Fig. 7

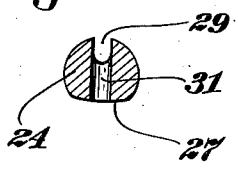
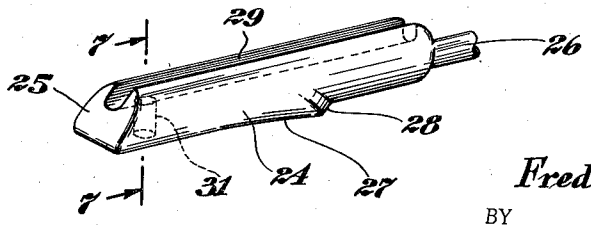


Fig. 6



INVENTOR,
Frederick Charles Wappler,
BY
Frederick Breitenfeld
ATTORNEY.

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ENDOSCOPIC TUBE AND OBTURATOR THEREFOR

Frederick Charles Wappler, New York, N. Y.

Application April 13, 1935, Serial No. 16,112

8 Claims. (Cl. 128—6)

My present invention relates generally to surgical instruments, and has particular reference to the obturating of endoscopic tubes.

The primary function of an obturator is to plug the fenestra of a tube in such a manner that the tube may be safely inserted into a body cavity without likelihood of injury. This requires that the fenestra be plugged by an obturator head having a unique configuration accurately fitting the fenestra and tube and presenting an exposed surface which forms a smooth continuation of the walls of the tube.

This accurate fit of the obturator, however, gives rise to a disadvantage which manifests itself after the instrument is in position and when the obturator is ready to be removed. It has been found that the withdrawal of the obturator produces an effect akin to that which a plunger of a pump produces. Regardless of the care with which the obturator is withdrawn, a suction effect is produced which is extremely painful to the patient.

It is a general object of my present invention to provide a fenestrated endoscopic tube, together with an obturator therefor, which avoids this disadvantage, while at the same time permitting the fenestra to be just as adequately plugged, from the standpoint of safety of insertion, as heretofore.

Briefly, it is a feature of my invention to provide an arrangement whereby the obturated instrument is vented, and whereby the withdrawal of the obturator is unaccompanied by the painful, and sometimes harmful, suction effect hereinbefore alluded to.

More particularly, my present invention provides an obturator head which has a longitudinal venting channel therein. This channel is preferably provided in the rear surface of the obturator head, and communicates at its rear end with the interior of the endoscopic tube, which may be maintained in communication with the outside atmosphere through the rear thereof, either through the petcocks, or otherwise.

In a preferred embodiment, the obturator head is provided, further, with a transverse bore which communicates with the venting channel, the open or outer end of the bore being disposed on the outer surface of the obturator head in a manner which does not impair the obturating function.

Another method of carrying out the present purpose permits the transverse bore to be dispensed with, if desired, and provides a venting communication with the venting channel by a predetermined structural cooperation between the forward end wall of the obturator head and an oblique abutment wall provided on the tube itself. More specifically, one of these abutment walls is provided with a longitudinal concavity which communicates at the rear end with the venting channel in the obturator head, thereby establishing a condition which avoids the undesirable plunger effect.

I achieve the foregoing objects, and such other objects as may hereinafter appear or be pointed out, in the manner illustratively exemplified in the accompanying drawing, wherein—

Figure 1 is a side view of the forward end of an endoscopic tube obturated in accordance with the present invention;

Figure 2 is a side view of the obturator head of Figure 1;

Figure 3 is a cross-sectional view taken substantially along the line 3—3 of Figure 2;

Figure 4 is a side view, partly in section, showing a modified method of carrying out the present invention;

Figure 5 is a cross-sectional view taken substantially along the line 5—5 of Figure 4;

Figure 6 is a perspective view of the obturator head of Figure 4; and

Figure 7 is a cross-sectional view taken substantially along the line 7—7 of Figure 6.

In Figure 1, I have shown by way of illustration an endoscopic tube 10 provided with the oblique, elongated fenestra 11, and with the upturned, rounded beak 12. The obturator for this tube consists of the shank 13 and the substantially cylindrical head 14, the latter fitting snugly into the forward portion of the tube 10 and having an outer smoothly contoured surface 15 which effectively plugs and obturates the fenestra 11.

In accordance with my present invention, the rear surface of the head 14 (i. e., the surface remote from the exposed surface 15) is provided with a longitudinal venting channel 16. In the embodiment of Figures 1–3, this channel terminates, as at 17, short of the forward end or tip of the obturator head.

Provided in a transverse direction is the additional bore 18 which extends through the head and which communicates with the forward portion of the channel 16.

The tube of Figure 1, when obturated, as shown, by means of an obturator of the character described and illustrated, may be safely introduced into the body, as heretofore. However, when the operator is ready to remove the obturator, he may do so without inflicting any pain upon the patient, because the plunger effect has

been destroyed by the venting arrangement. In other words, no vacuum is produced, nor is there any such tendency, when the obturator head is withdrawn.

The exposed or outer opening of the bore 18 is too small to deprive the obturator of its primary ability to plug the fenestra 11.

In Figure 4, I have shown a tube 19 with a beak 20 at its forward end, the latter, in this case, carrying the electric lamp 21. The fenestra is disposed laterally behind the beak 20 and the lamp 21, and the rear edge is indicated by the reference numeral 22.

In this instrument, an oblique abutment wall 23 is provided across the tube behind the beak 20, and the obturator head 24 has an end wall 25 which is adapted to abut against the wall 23 when the obturator is in position. The head 24 is mounted upon a shank 26 and has an outer exposed surface 27 which is properly contoured to form a continuation of the wall of the tube. A shoulder 28 is usually provided which seats itself in front of the rear edge 22 of the fenestra.

In accordance with my invention, the head 24 is provided with the longitudinal venting channel 29 in its rear surface, but in this case this channel extends all the way to the end wall 25. One of the abutment walls (23 or 25) is provided with a longitudinal concavity. In the illustrated embodiment, I have shown the wall 23 provided with the concavity 30. This passageway communicates at the rear with the forward end of the channel 29, and thus provides a venting aperture which is effective for the purposes hereinbefore mentioned.

It is preferable to enhance the venting action by the provision of a transverse bore 31 which is similar to the bore 18 of Figure 2 and which communicates with the channel 29 rearwardly of its forward end.

The obturator head, by itself, is shown most clearly in Figure 6; and Figure 7 shows the transverse bore 31 and the manner in which it communicates with the channel 29.

In certain instances, the beak at the forward end of the tube may be angularly disposed in the opposite direction. It will be understood that my invention is applicable to such a construction in exactly the same manner as shown in Figure 4.

In general, it will be understood that changes in the details, herein described and illustrated for the purpose of explaining the nature of my invention, may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims. It is, therefore, intended that these details be interpreted as illustrative, and not in a limiting sense.

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

1. In an instrument of the character described, an endoscopic tube having a lateral fenestra, an oblique abutment wall extending transversely across the tube at the forward end of the fenestra, an obturator having a substantially cylindrical head adapted to plug the forward portion of said tube, said head having an end wall adapted to abut against said oblique wall, a longitudinal venting channel in the rear surface of the obturator head, and a longitudinal concavity in one of said abutment walls defining a vent in communication with said channel when the obturator is in position.

2. In an instrument of the character described, an endoscopic tube having a lateral fenestra, an oblique abutment wall extending transversely across the tube at the forward end of the fenestra, an obturator having a substantially cylindrical head adapted to plug the forward portion of said tube, said head having an end wall adapted to abut against said oblique wall, a longitudinal venting channel in the rear surface of the obturator head, and a longitudinal concavity in said first-named oblique abutment wall defining a vent in communication with said channel when the obturator is in position.

3. In an instrument of the character described, an endoscopic tube having a lateral fenestra, an oblique abutment wall extending transversely across the tube at the forward end of the fenestra, an obturator having a substantially cylindrical head adapted to plug the forward portion of said tube, said head having an end wall adapted to abut against said oblique wall, a longitudinal venting channel in the rear surface of the obturator head, and a longitudinal concavity in one of said abutment walls defining a vent in communication with said channel when the obturator is in position, said obturator head having a transverse bore communicating with said channel and serving as an additional vent opening.

4. An obturator for a fenestrated endoscopic tube, said obturator having a substantially cylindrical head adapted to plug the fenestrated portion of said tube, said head having a longitudinal venting channel in its rear surface.

5. An obturator for a fenestrated endoscopic tube, said obturator having a substantially cylindrical head adapted to plug the fenestrated portion of said tube, said head having a longitudinal venting channel and a transverse bore communicating therewith.

6. An obturator for a fenestrated endoscopic tube, said obturator having a substantially cylindrical head adapted to plug the fenestrated portion of said tube, said head having a longitudinal venting channel in its rear surface, and a transverse bore communicating therewith.

7. An obturator for a fenestrated endoscopic tube, said obturator having a substantially cylindrical head adapted to plug the fenestrated portion of said tube, said head having a longitudinal venting channel in its rear surface, said channel terminating short of the forward end of the obturator head, and a transverse bore through said head communicating with the forward portion of said channel.

8. An obturator for a fenestrated endoscopic tube, said obturator having a substantially cylindrical head adapted to plug the fenestrated portion of said tube, said head having a forward abutment wall and a longitudinal venting channel in its rear surface, said channel extending forwardly all the way to said wall, and a transverse bore through said head communicating with said channel behind its forward end.

FREDERICK CHARLES WAPPLER.