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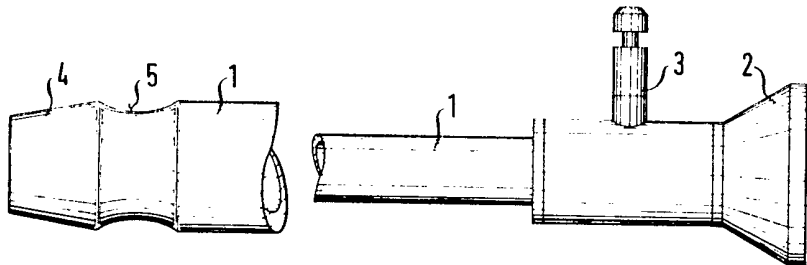
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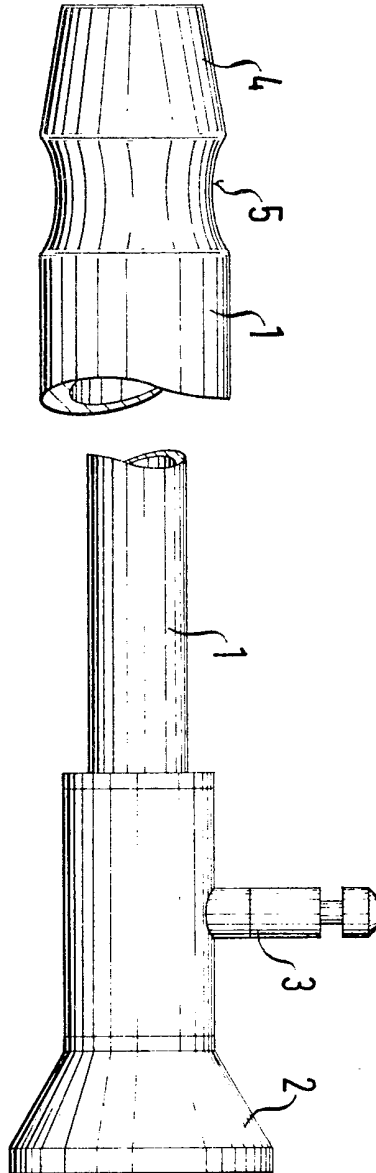
A61B

(54) **Shaped optical system shaft
for an endoscope**

(57) The shaft (1) of an endoscope optical system for passing through a trocar sleeve or a guiding shaft is tapered towards the distal extremity (shown on an enlarged scale), and this taper (4) is followed proximally by at least one shallowly concave peripheral constriction (5). The distal objective of the endoscope is thus spaced from the inner walls and distal edges of the trocar sleeve or guiding shaft, so that residues on these inner walls or edges do not contaminate or obscure objective but are instead scraped off by the peripheral constriction. An eyepiece (2) and light guide connector (3) are also shown.



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SPECIFICATION

Optical system for an endoscope

5 The invention relates to an optical system for an endoscope, comprising a shaft receiving the optical elements, which is insertible into a bodily cavity for examination via a trocar sleeve or a guiding shaft.

10 The case may arise upon passing endoscope optical systems through a trocar sleeve or a guiding shaft that contamination e.g. in the form of secretion or blood residues, is present in the distal extremity of the trocar sleeve or of the guiding shaft, which then obstructs the view of the optical system passed through the trocar sleeve, by being deposited on the distal objective of the optical system. The optical system then has to be withdrawn from the sleeve or shaft, cleaned and inserted through the sleeve again, which leads to considerable inconvenience to the patient and delays in endoscopic examination.

The present invention consists in an optical system for an endoscope, comprising a shaft receiving optical guide elements, which is insertible through a trocar sleeve or guide shaft into a bodily cavity for examination, wherein said optical system shaft tapers conically towards its distal extremity and wherein on the proximal side of the taper there is provided at least one peripheral constriction.

The constriction is preferably in the form of a shallow concavity such as an annular or helical peripheral channel.

Thanks to this particular uncomplicated solution when the distally tapered part of the endoscope optical system shaft is moved past secretion or blood residues or the like present in the distal extremity of the trocar sleeve or guiding shaft, its relatively narrow end portion will be clear of the inner wall and edges of the guiding shaft and of the residues so that soiling of the objective lens of the optical system can no longer occur. Any residue which is initially left behind in the trocar sleeve or guiding shaft upon passing the optical system through, is then scraped off, deposited and entrained at the proximal extremity of the taper and/or of the peripheral constriction. Residue adhering on this extremity of the optical system may be removed in a simple manner after completing the examination.

A preferred embodiment of the invention is described in the following with reference to the accompanying drawing, in which is illustrated a partial sideview of an endoscope optical system with the distal extremity shown on an enlarged scale.

The endoscope optical system comprises an optical system shaft 1 receiving the optical elements, having a proximal eyepiece 2 and a light guide connector 3 for light guides extending through the shaft.

The endoscope shaft 1 has a frusto-conical

end portion 4 tapering towards the distal extremity, and immediately behind it a peripheral constriction 5 of the shaft 1, which in this case has the form of a shallow concavity of substantially arcuate cross-section, to avoid sharp edges and acute transitions in shape. The concavity is annular, extending circumferentially around the shaft 1.

Instead of the annular constriction 5, it is also possible to provide the shaft 1 with at least one cross-sectionally rounded-off shallow helical groove or screw-thread. The depth of the constriction should generally be small in relation to the diameter of the shaft. Thanks to the distal frusto-conical end portion 4 and the constriction 5, the endoscope optical system may be inserted into a bodily cavity through a trocar sleeve or a guiding shaft without contaminations in the distal extremity of the sleeve or the like being liable to reach the objective area of the endoscope optical system, since the tapered distal extremity 4 is always spaced from the inner surface of a trocar sleeve or guiding sleeve, so that this extremity is led past the contaminations in the trocar sleeve and in the area of its distally open extremity. It is only by the extremities of the constriction 5 that residue particles are freed from the inner surface of the trocar sleeve or from its distally open extremity, and are deposited in the constriction 5 until they may be cleaned off in a simple manner after completion of the examination.

CLAIMS

1. An optical system for an endoscope, comprising a shaft receiving optical guide elements, which is insertible through a trocar sleeve or guide shaft into a bodily cavity for examination, wherein said optical system shaft tapers conically towards its distal extremity and wherein on the proximal side of the taper there is provided at least one peripheral constriction.

2. An optical system according to claim 1, wherein said constriction is in the form of an annular concavity extending circumferentially around the shaft.

3. An optical system according to claim 1, wherein said constriction is in the form of a helical groove around the shaft.

4. An optical system according to claim 1 or claim 2, wherein said constriction is shallow in relation to the diameter of the shaft.

5. An optical system according to any preceding claim wherein said constriction is of substantially arcuate cross-section.

6. An optical system for an endoscope substantially as herein described with reference to the accompanying drawing.