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ENDOSCOPIC APPARATUS

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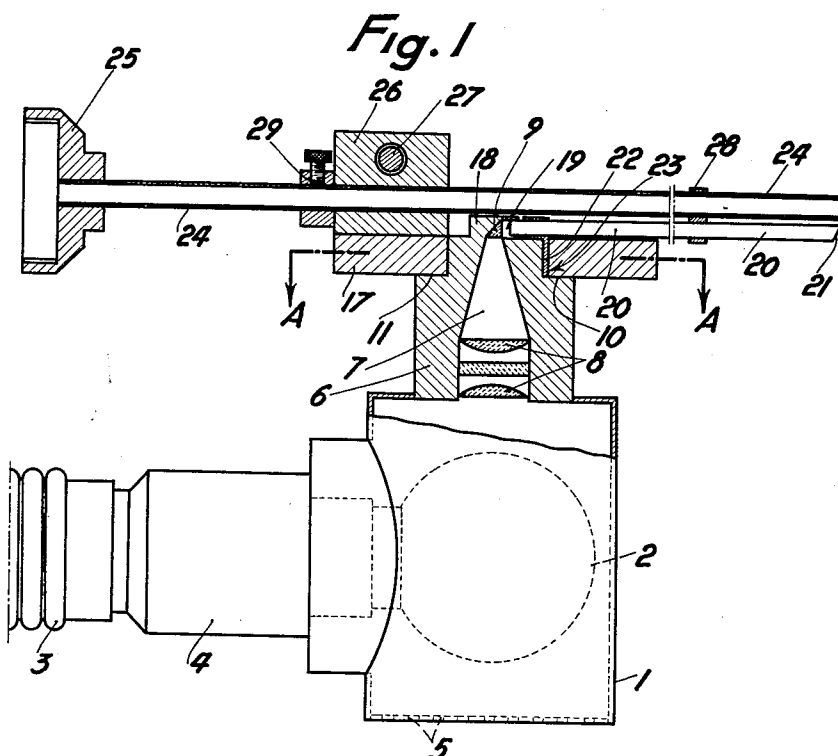
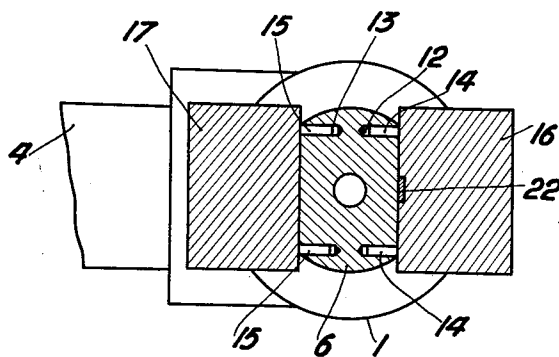


Fig. 2



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The progress made during the last few years in medical endoscopy and especially in bronchoscopy has greatly increased the possibilities of exploration and working and has made it easy to produce photographic and cinematographic documents of great value.

The application of light-guides to endoscopic devices has already been suggested. The United States Patent No. 2,699,770, issued January 18, 1955, and patent application Serial No. 539,632, now Patent No. 2,932,294, filed in the name of Fourestier, Gladu and Vulmiere have proposed improvements in lighting devices intended for endoscopes. These devices enable very satisfactory images to be obtained which represent real progress as compared with those obtained up to that time.

The present invention relates to a special device of the same type as those described in the patents referred to, which is capable of being associated with the usual exploring instruments used in endoscopy, while enabling their ease of handling to be retained and all the samples and all the necessary treatments to be made.

The present invention is concerned with a form of embodiment of an endoscopic system, the essential feature of which resides in the fact that the system which illuminates the cavity is independent of the endoscopic tube. Thus a standard endoscope can be used, and the illuminating system need only be introduced for the taking of photographic and cinematographic pictures. This system comprises a light-guide rod co-operating with a source of light, the radiation of which, duly concentrated and directed, falls on one extremity of the said rod, the whole unit being capable of association with a movable tube displaceable along the light-guide-rod and permitting either direct endoscopic observation or the taking of photographic or cinematographic views. The illuminating system forms a complete unit, and in order to facilitate a better understanding of the device in accordance with the invention reference will be made to the accompanying drawings which show one particular form of embodiment of the present invention.

FIG. 1 shows a partial axial cross-section of a device which is applicable in endoscopy for taking photographic or cinematographic views;

FIG. 2 shows a view in cross-section taken along the plane A—A of FIG. 1.

Referring now to the drawings, there has been shown at 1 a metal casing, of light metal for example, which forms the support of the whole unit of the device. This casing which is preferably given a cylindrical form, constitutes the housing of an illuminating lamp shown diagrammatically at 2. A flexible sheath 3 is fixed on the casing 1 through the intermediary of a coupling section 4. This flexible sheath, in which pass the supply wires for the lamp 2, is coupled to a compressor (not shown) which drives air into the casing 1 in order to cool the lamp 2. This air is evacuated through a series of orifices 5 provided in the lower part of the casing 1. If so desired, a handle (not shown) may be provided and this would be fixed on the casing 1 in a plane perpendicular to the plane of FIG. 1.

At its upper extremity, the casing 1 is extended by a cylindrical portion 6 of smaller diameter but having the same axis as the said casing. This cylindrical portion 6

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comprises an internal cavity 7 in which is provided a light-condensing device 8, this device being known per se and belonging for example to the type of condenser described in Patent No. 2,699,770 referred to above.

This device 8 concentrates the light emitted by the lamp 2 on a total-reflection prism 9 arranged at the upper part of the cavity 7 and suitably centered.

At the upper portion of the cylinder 6, and symmetrically with respect to its axis, are provided two shoulders 10 and 11. On the vertical wall of these shoulders are formed two pairs of bored holes 12 and 13 (see FIG. 2) respectively intended to receive two pairs of plugs 14 and 15 carried by two blocks 16 and 17 which play the parts of supports, and the thickness of which corresponds approximately to the height of the shoulders 10 and 11. The cylinder 6 is terminated by a portion 18 of smaller diameter, on the lateral wall of which is provided a circular orifice 19 which permits the outlet of the light reflected by the prism 9.

There has been shown at 20 a rod of quartz which belongs for example to one of the types described in the patents referred to above. This rod passes into the orifice 19 and enables a flux of light sufficient to take photographic or cinematographic images to be conveyed from that orifice to the extremity 21 of the rod. The length of the rod 20 depends on the particular endoscopic observation which it is desired to make, but it has generally a length of the order of forty centimetres. The rod 20 is held in position by a stirrup 22 which is blocked against the shoulder 10 by the block 16 in which it is enclosed and fixed by a nipple 23.

The optical device for observation and photography comprises a tube 24 of small diameter carrying at one of its extremities an enlarged end member 25 on which is placed the lens of the photographic or cinematographic camera. The tube 24 is passed into a member 26 in the form of a clamp, provided with a clamping screw 27. The clamp 26 which is fixed by any appropriate means on the block 17 holds the tube 24 parallel to the rod 20. To this end there is also provided a double ring 28. An adjustable positioning stop 29 provides an exact location of the position of the tube suitable for any particular application. The best results are obtained when the proximal extremity of the tube 24 reaches the same level as the extremity 21 of the quartz rod.

The arrangement of the device forming the object of the invention facilitates the use of the said device in the various operations of endoscopic exploration (bronchoscopy, oesophagoscopy, etc.), by reason of the fact that it permits of the changing of the quartz tube 21 and also the changing of the tube 24 of the adjustment of its position.

It will be understood that a certain number of modifications can be made to the form of embodiment which has just been described, without thereby departing from the scope of the present invention.

What I claim is:

1. In combination with an end scope tube, a separable and independent illuminating and observation unit enabling photographic or cinematographic views to be made of cavities of the body, said unit comprising: a source of light constituted by an electric lamp; a forced-ventilated cylindrical casing housing said lamp; a tubular coaxial extension of said casing; an optical condenser system and a total reflection prism housed in said extension; a straight cylindrical light-guide rod detachably mounted transversely in the extremity of said extension, the near extremity of said light-guide receiving the light rays directed by said prism; a clamping device for slidably mounting said complete unit on said endoscope tube, with said light-guide rod in

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parallel juxtaposition with regard to the endoscope tube; a first block fixed to the longitudinal outer face of said clamping device; a second block in juxtaposition with and serving to support said light-guide; diametrically-opposite shoulders formed in the wall of said tubular extension; and means for detachably fixing said blocks on said shoulders. 5

2. A separable illuminating unit as claimed in claim 1, and further comprising screw means on said clamping device for fixing said unit in the desired position longitudinally of said endoscope tube. 10

3. A combination as claimed in claim 1, in which the viewing extremity of said endoscope tube is provided with an end member adapted to receive the lens of a photographic or cinematographic camera. 15

4. A combination as claimed in claim 1, wherein each

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of said first and second blocks is provided with plug elements and each of said diametrically opposite shoulders is provided with socket elements whereby said plugs may be fixed detachably on the respective shoulders.

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