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[72] Inventors **W. Allen C. Moore**  
**Skaneateles;**  
**William S. Pilgrim, Port Byron, both of,**  
**N.Y.**

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[73] Assignee **Welch Allyn, Inc.**  
**Skaneateles Falls, N.Y.**

**SUBSTITUTE FOR MISSING XR [56]**

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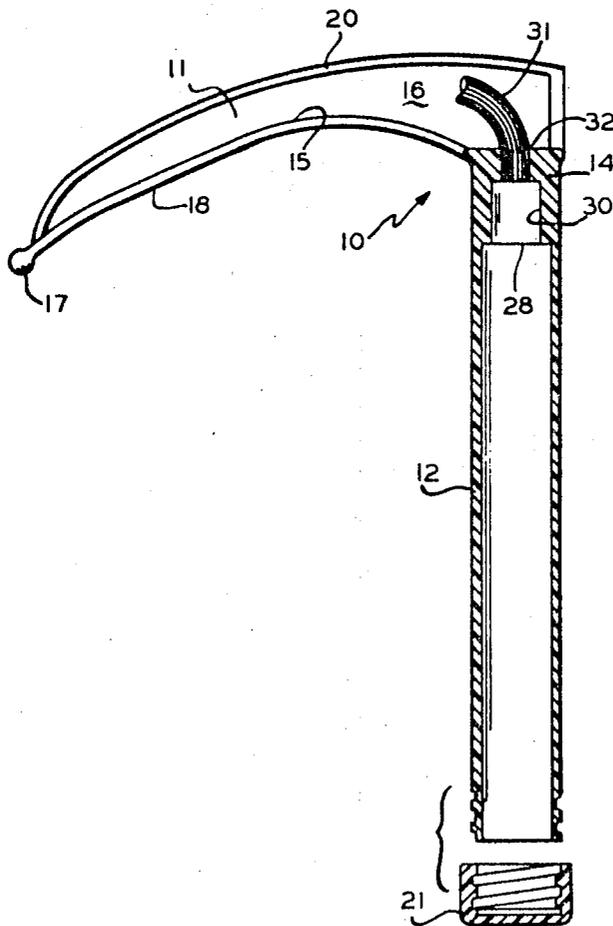
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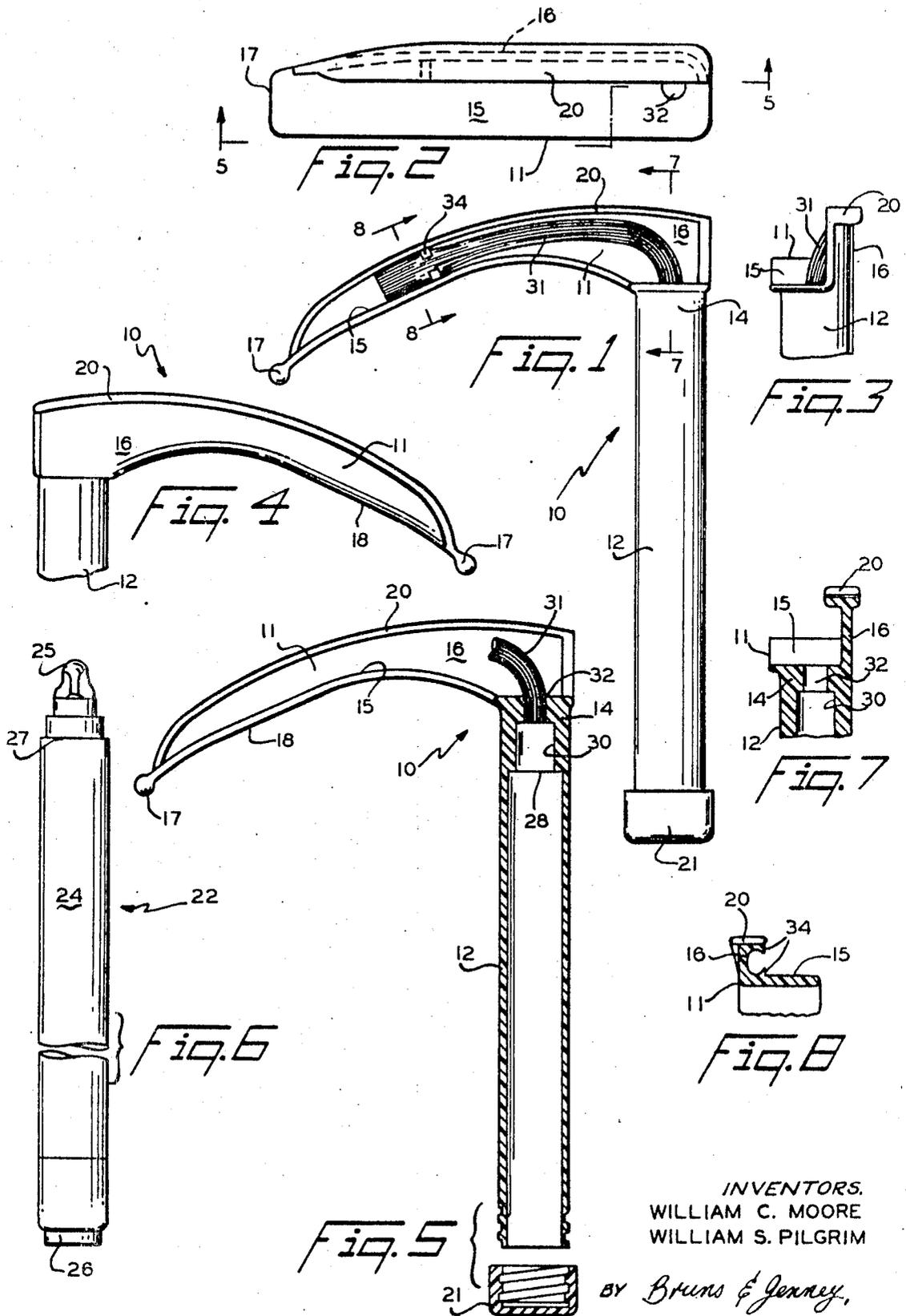
*Primary Examiner*—Richard A. Gaudet  
*Assistant Examiner*—Channing L. Pace  
*Attorney*—Burns & Jenny

[54] **DISPOSABLE LARYNGOSCOPE CONSTRUCTION**  
**2 Claims, 10 Drawing Figs.**

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128/397
- [51] Int. CL..... A61b 1/26,  
A61b 1/06, A61b 1/24
- [50] Field of Search..... 128/6, 10,  
11, 16, 23, 9, 13, 18, 22, 7, 8, 395, 396, 397, 398;  
240/1 EL 2.18, 2 M

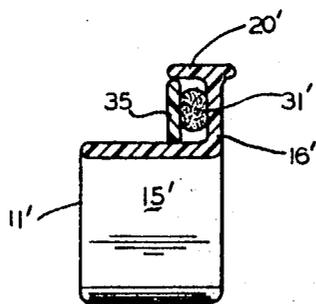
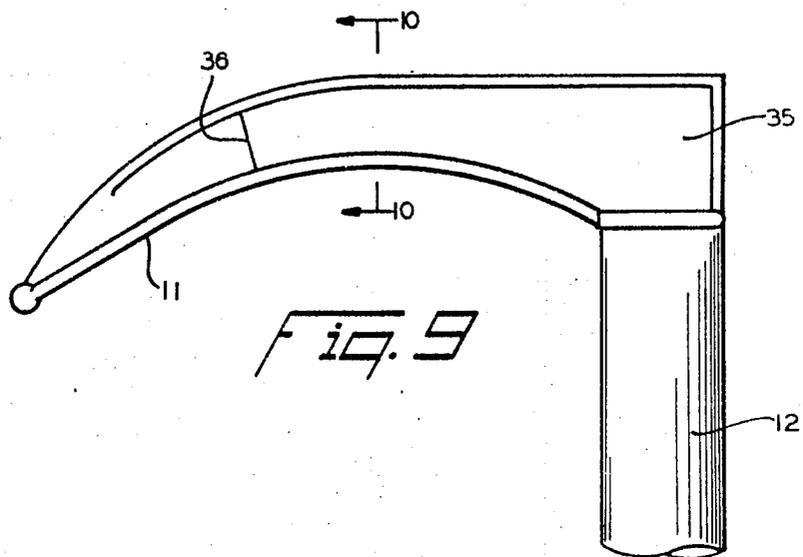
**ABSTRACT:** A disposable laryngoscope having a unitary plastic blade and handle. The handle is hollow and in use contains a light unit having batteries, a lamp and an operating switch. The light unit is not disposable and is removed for reuse before the blade and handle assembly is thrown away. The disposable part of the instrument includes a fiber optic bundle which carries light from the lamp within the handle to a point near the distal end of the blade.





INVENTORS.  
WILLIAM C. MOORE  
WILLIAM S. PILGRIM

BY *Bruns & Jenney,*  
*Attorneys*



## DISPOSABLE LARYNGOSCOPE CONSTRUCTION

## BACKGROUND OF THE INVENTION

This invention relates generally to medical instruments, and has particular reference to a disposable laryngoscope having a novel construction.

A laryngoscope, like any other instrument that enters a body cavity, must be sterilized after each use. This is usually accomplished by autoclaving and this operation has become increasingly expensive due to ever-increasing labor costs. Thus, autoclaving requires that a nurse, technician or other attendant pick up the instrument after use by the doctor, take it to the autoclave, perhaps give it a preliminary cleaning or washing, place the instrument in the autoclave and then after an interval take it out again, etc. Obviously, if the autoclave itself must be started up and turned off after each use, the operation takes even more time. In short, sterilizing an instrument has become so expensive that whenever an instrument can be produced cheaply enough it is more economical to use a new one each time than to sterilize to permit reuse.

In addition to the expense and bother of having to continually autoclave the relatively costly, permanent type of laryngoscope, most of these instruments in common use employ as a light source a lamp that is located near the distal end of the blade. This has the advantage of placing the light source close to the area being examined or treated, but is disadvantageous in that having a lamp in the patients mouth is undesirable because of heat and the possibility of breakage. Also, locating the lamp at or near the distal end of the laryngoscope blade limits the size of the lamp that can be used and thus the amount of light output.

## SUMMARY OF THE INVENTION

The laryngoscope of the present invention is comprised of two principal parts: a blade and handle unit that is disposable and a light unit that is not. The blade and handle are preferably made of plastic. The handle is hollow and is adapted to receive with a free sliding fit the light unit which is not unlike a penlight and comprises a lamp, batteries and an operating switch in a cylindrical case.

The light unit is releasably held in the laryngoscope handle by a screwcap that engages the handle open end and can be turned to operate the light unit switch. A preformed bundle of light transmitting optical fibers is carried by the blade and handle unit to conduct light from the light unit lamp within the handle to a point near the distal end of the blade.

Because of its molded plastic construction, the blade and handle unit of the laryngoscope can be manufactured quite inexpensively and, therefore, after use the light unit is removed and the remainder of the instrument is simply thrown away obviating the expense and inconvenience of autoclaving. In addition to being relatively inexpensive, the plastic blade is less likely to be injurious to the patient's teeth than a metal blade. The fiber bundle eliminates the heat problem caused by a lamp at the distal end of a blade and is, of course, far safer. The fiber bundle also permits a larger lamp to be used since the lamp is in the handle rather than on the blade, and the available light can be used more efficiently.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation of a disposable laryngoscope embodying the invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is a fragmentary right side elevation thereof;

FIG. 4 is a fragmentary rear elevation thereof;

FIG. 5 is a partial longitudinal sectional view of the laryngoscope taken on line 5-5 of FIG. 2;

FIG. 6 is an enlarged elevation of the light unit for the laryngoscope;

FIG. 7 is a transverse sectional view taken on line 7-7 of FIG. 1;

FIG. 8 is a transverse sectional view taken on line 8-8 of FIG. 1;

FIG. 9 is a fragmentary front elevation of a modified form of the disposable laryngoscope; and

FIG. 10 is a transverse sectional view taken on line 10-10 of FIG. 9.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numbers designate the same part in each of the views, 10 generally indicates the blade and handle unit of the laryngoscope of the invention. This unit comprises a blade 11 and a tubular handle 12 that are integrally connected to provide a one piece or unitary structure. In the embodiment disclosed, the blade and handle are molded of a suitable plastic material.

The blade 11 is connected to the closed end 14 of the handle and includes a spatula portion 15, a flange portion 16 and a rounded tip 17. The longitudinal axis of the spatula is curved adjacent the handle and then has a substantially straight portion 18 extending to the tip. The flange 16 is connected to one side edge of the spatula and is disposed at right angles to the transverse axis thereof. A subflange 20 is formed on the outer edge of the flange 16, the transverse axis of the subflange being substantially perpendicular to the plane of flange 16 and parallel to the transverse axis of the spatula.

The end of handle 12 opposite the blade is open, and a closure is provided in the form of a cap 21 that is adapted to be threaded onto the handle. A battery pack—lamp unit, generally indicated at 22 in FIG. 6, is insertable with a sliding fit in the hollow handle, the unit being maintained in the handle by the cap 21. The battery pack—lamp unit, also referred to herein as simply the light unit, comprises a cylindrical metal casing 24, a lamp 25, a pushbutton switch 26 and batteries (not shown) that are contained within the housing.

The light unit 22 is constructed and operates essentially like a flashlight or penlight and is not considered to be novel per se. The operating switch 26 is normally spring biased outwardly into an open circuit position. When the switch is pushed inwardly, a circuit is completed through the batteries, lamp, casing, switch and back to the batteries. When the light unit is mounted in the instrument handle, the switch 26 can be actuated to turn the lamp on or off by turning the cap 21 a few degrees in either direction.

When the light unit is inserted in the handle 12, a shoulder 27 on the unit abuts against a shoulder 28 in the handle interior and the lamp 25 is received in a reduced diameter portion 30 of the interior. Light from the lamp is conducted from within the handle to a point near the distal or tip end of the blade by means of a bundle 31 of optical fibers or filaments, the fibers being of a known clad glass or plastic type. Fiber bundle 31 may be preformed by securing the fibers together in the configuration shown in FIG. 1, and the opposite ends of the bundles may be optically ground and polished.

One end of the fiber bundle is substantially cylindrical and is received in a cylindrical opening 32 in the closed end of the instrument handle, the opening communicating with the portion 30 of the handle interior so that the bundle receives substantially all of the light that emanates from the light unit lamp 25. The opposite end of the bundle has an oval or rectangular cross section so that it offers a minimum amount of interference to viewing or instrumentation. This end of the bundle terminates at a point between the midlength point of the blade and its distal end and is held in position by small lugs 34, FIGS. 1 and 8, integral with the blade. As indicated in FIG. 3, above the opening 32 at the closed end of the handle the bundle bends toward the blade flange 16 so that from that point to its distal end substantially all of the bundle is positioned beneath and protected by the subflange 20.

To use the laryngoscope, the light unit 22 is inserted in the handle and cap 21 is engaged with the open end and turned far enough to depress the switch 26 and light the lamp 25. The light from the lamp is transmitted by the fiber bundle 31 with

negligible light loss to its distal end from which the light emerges and illuminates the field being examined and/or treated. After use, the light unit is removed from the handle and put aside and the blade and handle unit, including its fiber bundle, is thrown away.

The light unit, which is not disposable, need not be sterilized because it has been completely enclosed by the handle and has had no contact with the patient. Thus, the need for sterilization of any kind has been eliminated. Moreover, since the blade and handle unit is used but once, its sterile condition can be assured by shipping it from the manufacturer in such condition wrapped in a sealed package. The plastic blade of the disposable laryngoscope of the invention is less likely to be injurious to the patient's teeth than a metal blade and, as noted above, the fiber bundle arrangement eliminates the need to locate the lamp at the distal end of the blade which is dangerous and produces heat. It was also pointed out that the fiber bundle permits the use of a larger lamp than can be used by most conventional laryngoscopes. While only one blade shape has been disclosed, it will be apparent that the blade and handle unit can be produced with a variety of blade shapes and sizes for different specific uses of the instrument.

FIGS. 9 and 10 illustrate a slightly modified form of the invention wherein the blade includes a wall 35 that is parallel to the flange 16' and spaced therefrom to provide an enclosure for the fiber bundle 31'. With this arrangement, the only part of the bundle that is exposed is the light emitting distal end indicated at 36 in FIG. 9.

From the foregoing description it will be apparent that the invention provides a novel and highly useful laryngoscope

construction which ensures maximum cleanliness and is economical and convenient to use. As will be understood by those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiments disclosed are, therefore, to be considered in all respects as illustrative rather than restrictive, the scope of the invention being indicated by the appended claims.

What we claim is:

1. In combination with a nondisposable light unit having a power source, lamp and operating switch: a disposable laryngoscope comprising a hollow elongated handle, a blade integrally connected to one end of the handle, and extending therefrom in substantially right angular relationship and of such length as to extend into a larynx being examined, said handle being open at its opposite end, the handle and blade being of a unitary plastic construction, the light unit being fully enclosed with a free sliding fit in the handle, a closure member threaded on the open end of the handle to releasably hold the light unit therein, the closure member coacting with the light unit switch whereby rotation of the former actuates the latter, and a bundle of light transmitting clad optical fibers extending from a point inside the handle adjacent the light unit lamp to a point spaced therefrom near the distal end of the blade.

2. An instrument as defined in claim 1 wherein said blade includes a flange a portion of which overlies the optical fiber bundle.

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