

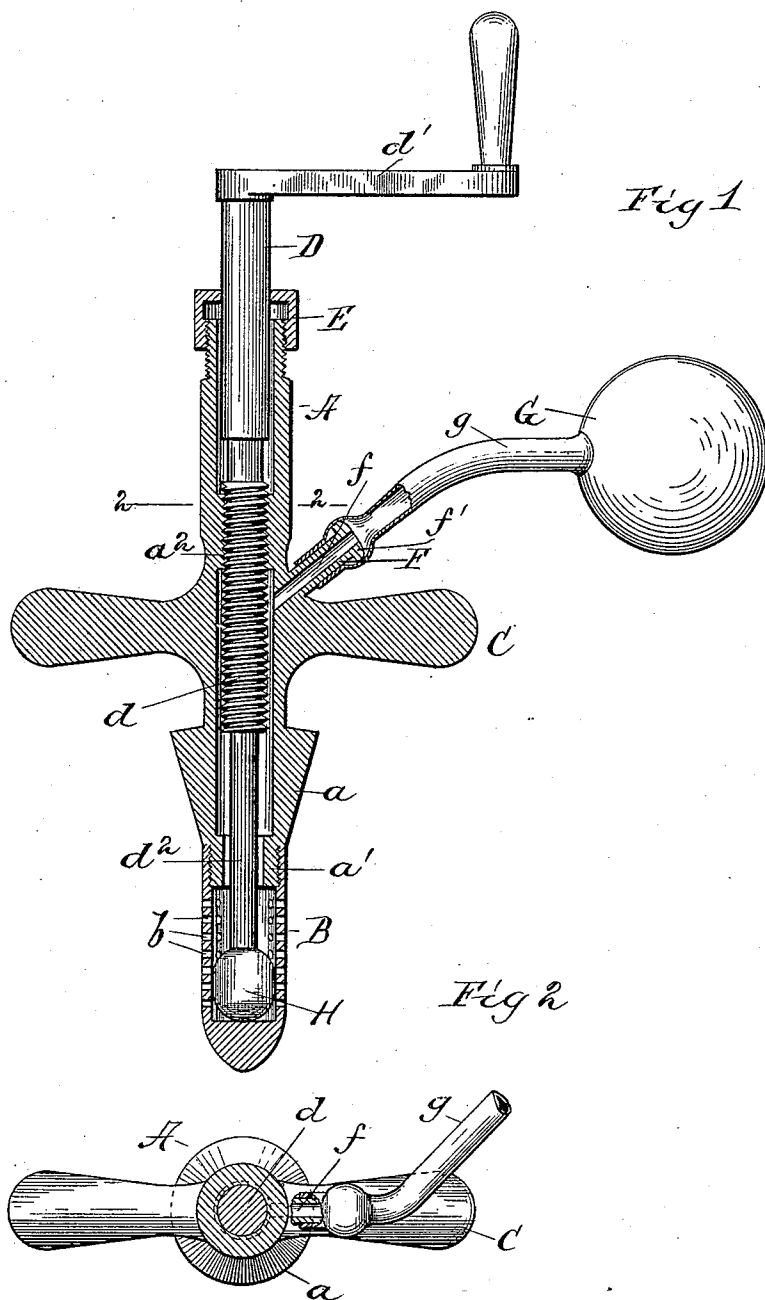
(No Model.)

R. T. CRANE.

DEVICE FOR DETECTING INTESTINAL PERFORATIONS.

No. 464,692.

Patented Dec. 8, 1891.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR DETECTING INTESTINAL PERFORATIONS.

SPECIFICATION forming part of Letters Patent No. 464,692, dated December 8, 1891.

Application filed June 14, 1890. Serial No. 355,448. (No model.)

To all whom it may concern:

Be it known that I, RICHARD T. CRANE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Devices for Detecting Intestinal Perforations in Abdominal Wounds, which are fully set forth in the following specification.

It is well known that at the present time there is very great difficulty in determining at once and with certainty whether or not the intestines have been perforated in case of gunshot or other wounds in the abdomen. At the same time the importance of determining this question speedily when such wounds have been inflicted is fully recognized by the medical profession. Heretofore the surgeon has been compelled to wait for developments, and the existence of such perforations is determined only after the lapse of some time. My invention relates to means for determining this question at once, so that the surgeon will be able to decide with certainty at the outset and regulate his treatment accordingly.

The invention consists in devices adapted to release within the rectum a small quantity of some harmless but very volatile fluid having a very pungent odor—such, for instance, as peppermint—the fluid being introduced by a suitable instrument, released from the outside, and then air forced in through the instrument. If the intestines are perforated, the air, carrying with it the pungent vapor, will escape through the perforations and out through the exterior of the wound, where its presence will be at once detected by the sense of smell; but if the intestines have not been punctured there will of course be no such indication. I have devised an instrument suitable for this purpose, which is illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal section of the instrument; and Fig. 2, a plan section of the same, taken on the line 2 2 of Fig. 1.

I will describe in detail the construction and mode of using this device in practically carrying out my plan, and will then point out more definitely in the claims the improvements which I believe to be new and wish to secure by Letters Patent.

In the drawings, A represents the main body

of the instrument, and is in the form of a hollow spindle. Near one end of this spindle there is a slight conical enlargement *a*, as seen in Fig. 1 of the drawings, the enlargement of the cone being backward from the end of the spindle. Below or outside of this conical enlargement the spindle has a short terminal section *a'*, which is threaded externally, and the bore within this threaded section is somewhat contracted, as seen in Fig. 1. A hollow tip B is internally threaded at one end, whereby it is adapted to be secured upon the threaded extremity of the spindle just described. This tip is closed at the other end, is of a rounded or conical exterior form, and is provided with a series of small perforations *b* all along its side. The spindle is also provided with suitable handles C, which project about midway of its length and furnish means for firmly holding and easily manipulating the instrument. Within the bore of the spindle there is also a threaded section *a*². A rod or plunger D is constructed to fit the bore of this spindle, being provided with a threaded section *d*, adapted to be turned into the internally-threaded section *a*² of the spindle. The outer end of the plunger fits loosely the bore of the spindle and passes out at the upper end thereof, and upon its outer end is provided with a handle *d'*, whereby it may be turned. The extreme inner end of the rod is somewhat reduced in size, so as to provide a small section *d*², which is adapted to pass down through the small bore at the inner end of the spindle and into the perforated hollow tip. A cap E is applied to the outer end of the spindle, being internally threaded, while the outer extremity of the spindle is externally threaded for the purpose of securing the cap, as seen in Fig. 1. Packing is applied within the cap, so that the latter serves as a kind of stuffing-box for the plunger. At one side of the spindle is a small short stud or nipple F, located at some convenient point between the tip end of the spindle and the internally-threaded section *a*². This stud is bored, the passage *f* extending the length of the stud and opening into the interior of the spindle, as seen in Fig. 1. It is also provided with an annular groove *f'*, which facilitates the application and securing thereto of the end of the flexible tube of an elastic air-bulb

G, the tube *g* of which is shown applied to the perforated stud in Fig. 1. This air-bulb provides means for driving air into the bore of the spindle, and as there is some space between the inner wall of the spindle and the plunger beyond their threaded connection, as seen in Fig. 1, the air will obviously be driven toward the tip end of the instrument.

For use with this instrument the peppermint or other odoriferous fluid employed is put up in capsules *H*, which are of a size adapted to the tip *B* and such that when the plunger is turned down into the tip it will press upon the capsule and break it, thereby liberating its contents.

In the practical application of my invention the instrument is prepared for operation by unscrewing the perforated tip, placing therein one of the capsules *H*, and replacing the tip on the spindle. The plunger should be adjusted so that its lower end just touches the capsule, but with sufficient movement left to press upon the latter and burst it at the proper time. The elastic air-bulb is connected to the nipple *F*, and the tip end of the instrument is then inserted in the rectum of the wounded person and firmly held by the handles. The operator then turns the plunger in a direction to force it inward, thereby bursting the capsule, and then immediately operates the air-bulb, so as to force air into the spindle and out through the perforated tip. The air will of course be highly charged

with the vapor of the fluid, and if the intestines are punctured it will escape therefrom and out through the exterior wound, where the fact of such perforation will be indicated by the pungent odor of the fluid at that point. If no odor of the fluid is perceptible, it will be known, of course, that there has been no perforation of the intestines.

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

1. An instrument for detecting intestinal perforations in cases of abdominal wounds, the same consisting of a hollow spindle, a perforated tip at one end thereof adapted to enter the rectum and to receive a capsule of volatile odoriferous fluid, a device for breaking said capsule from the outside of the spindle, and a device for forcing air through the spindle and perforated tip, substantially as described.

2. In an instrument for carrying out the herein-described process, the hollow spindle *A*, in combination with the perforated tip *B*, adapted to hold a capsule of volatile odoriferous fluid, the plunger *D*, the perforated nipple *F*, communicating with the interior of the spindle, and the elastic air-bulb *G*, substantially as and for the purposes specified.

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