

No. 761,369.

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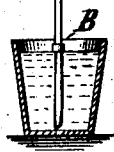
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APPARATUS FOR DIAGNOSIS.
APPLICATION FILED APR. 20, 1903.

NO MODEL.



Fig. 1,

Fig. 2,



Witnesses
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DIAGNOSIS.

SPECIFICATION forming part of Letters Patent No. 761,369, dated May 31, 1904.

Application filed April 20, 1903. Serial No. 153,457. (No model.)

To all whom it may concern:

Be it known that I, BARBARA J. FRANCIS, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have invented a certain new and useful Apparatus for Diagnosis, of which the following is a specification.

The object of the present invention is to provide a method and apparatus for quickly and accurately diagnosing disease of the lungs, bronchial tubes, and nasal passages. It is founded upon the concept that the healthful condition of the lungs and pulmonary tubes is dependent upon the free ingress of a sufficient quantity of air and the consequent relief or decrease of the partial vacuum in the lungs prior to inspiration. Where such ingress is opposed by an obstruction of any sort, the lungs are subjected to undue partial vacuum and consequent strain, and frequently but a portion thereof properly expanded. In either case there is a harmful tendency toward congestion and resultant inflammation.

A further object of the invention is to provide means whereby an unskilled person may correctly diagnose an affliction of the character herein referred to, and thereby intelligently determine the probabilities as to success or failure of any operation resorted to for the removal of such affliction.

In carrying out my invention under the concept above stated I employ a tube, preferably of glass or other transparent material, one end whereof is adapted to be placed in a vessel containing water, the other end being placed in the mouth of the patient. Intermediate of its ends this tube is preferably provided with a scale whereby the height to which water is raised therein may be determined and recorded. I prefer to employ also a sliding collar held in frictional contact with said tube and which may be readily moved to various points to indicate the height of the water within the tube. Either or both of these means may be employed for the purpose stated.

In operation the lower end of the tube being immersed in a receptacle containing water and the upper end being placed in the mouth of the patient, the latter takes a forcible

nasal inspiration. Should there be no nasal deformity, the suction created at the mouth by this inspiration—that is, by the expansion of the lungs through the air admitted at the nostrils and not by sucking at the tube—will in a normal individual raise the water within the tube to a certain height, indicating the vacuum force at the lungs. If, on the other hand, there be a nasal deformity of any sort, the increased suction will cause the water to rise to a higher level. By alternately stopping the nostrils with the fingers and under each condition taking a forcible nasal inspiration it will readily be found in which, if either, of the nostrils the obstruction is present—i. e., if one nostril through which the air is taken in be free of deformity the water will be raised by the suction at the mouth to a certain level, whereas if on stopping that nostril and testing the other nostril the water be raised to a much higher level the presence of an obstruction will be at once indicated. There is thus obtained, first, a determination as to whether the nostrils be free for the ingress of air to the lungs or obstructed, and, second, a determination, if obstruction exists, which of the nostrils requires treatment for the removal of such obstruction. Again, if the obstruction to nasal breathing be due to an adenoid located in the naso-pharynx the presence of said adenoid will be indicated by the fact that due to the increased suction the water will be raised higher within the tube than it would be in the absence of such adenoid or other obstruction; but such height will not be varied upon alternate tests with the nostrils, these tests indicating that the obstruction is not within but beyond the nostrils.

A further important use for which the apparatus is adapted is to determine from time to time the pressure to which the lungs are subjected, or rather the force which they must exert in breathing. Thus I have found that a person having no nasal deformity will when using said apparatus in a preferred form raise the water approximately thirty inches at each nasal inspiration. The exertion of force necessary to accomplish this is frequently productive of a damaging congestion of the lungs,

particularly in the case of patients afflicted with tubercle bacilli. I have found that the tendency in this direction may be removed, or, more conservatively stated, minimized, by enlarging the nostrils sufficiently to relieve the lungs of this suction strain. Where such an operation has been performed, the patient thereafter upon using the apparatus herein described will upon each nasal inspiration raise the water to a level much below that to which it was possible to raise it before the operation, indicating thereby a decrease of lung strain with its resultant suction at the mouth by means whereof the water is raised in the tube. The health of the patient in the respect under consideration is, however, dependent upon a continuance of this condition—*i. e.*, the maintenance of freedom of ingress of air to the lungs. This can be quickly and correctly determined by the patient himself by the use of the apparatus herein described, as can also the necessity, if any there be, for a further operation to maintain this condition.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an elevation showing the apparatus in use, and Fig. 2 an enlarged detail showing a portion of the tube.

As here shown, I employ a tube A, preferably of glass. I prefer to employ such a tube having a length of about four feet and an opening of about three-sixteenths of an inch. The lower end of this tube is preferably so constructed as that when the tube is upright water may be freely admitted thereto. This may be accomplished by grinding off such end *a* at an angle of about forty-five degrees, by providing it with suitable separated projections, or by any other suitable means. This tube in use is placed in a glass containing clean water to the depth of about two and one-half inches. The tube is provided, preferably upon its exterior and at a point coincident with the depth of the water in the receptacle, with a mark or other indication showing the height to which the tube is to be immersed. If desired, this mark or indication may be a collar, as B, in frictional contact with the tube.

The tube is also provided with a movable mark or other indicating medium for the purpose of indicating the level to which water is raised within such tube in operation. For this purpose I prefer to employ a sliding collar C, held in frictional contact with the tube and, as just stated, readily movable thereon. Preferably the tube is provided with an inch-scale extending from the collar or other indicating means B to or near the top of the tube and by means of which at a glance the height of the water raised within the tube may be readily determined. It is not absolutely essential that the tube be provided with both the collars B and C and the scale D. It is obvious that, if desired, one or the other may be dispensed with or both may be used conjointly. Should the scale D be dispensed with, the water-level would be ascertained by moving the collar C to the point reached by the water and then upon removing the tube from the receptacle measuring the distance between the collars or other indicating means B and C. Where the scale is used alone, the same result can be effected by marking with the finger the point upon the scale reached by the water. Where both are used, this point may be indicated by moving the collar C thereto in order that upon removal of the tube from the water the proper reading may be had.

What I claim, and desire to secure by Letters Patent, is—

Apparatus for diagnosis, comprising a tube, a receptacle containing a fluid and into which one end of said tube is placed, the other end being placed in the mouth of the patient, an indicator for determining the proper degree of immersion of the lower end of said tube, and a movable indicator carried by said tube above the indicator first named, substantially as described.

This specification signed and witnessed this 16th day of April, 1903.

BARBARA J. FRANCIS.

Witnesses:

S. O. EDMONDS,
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