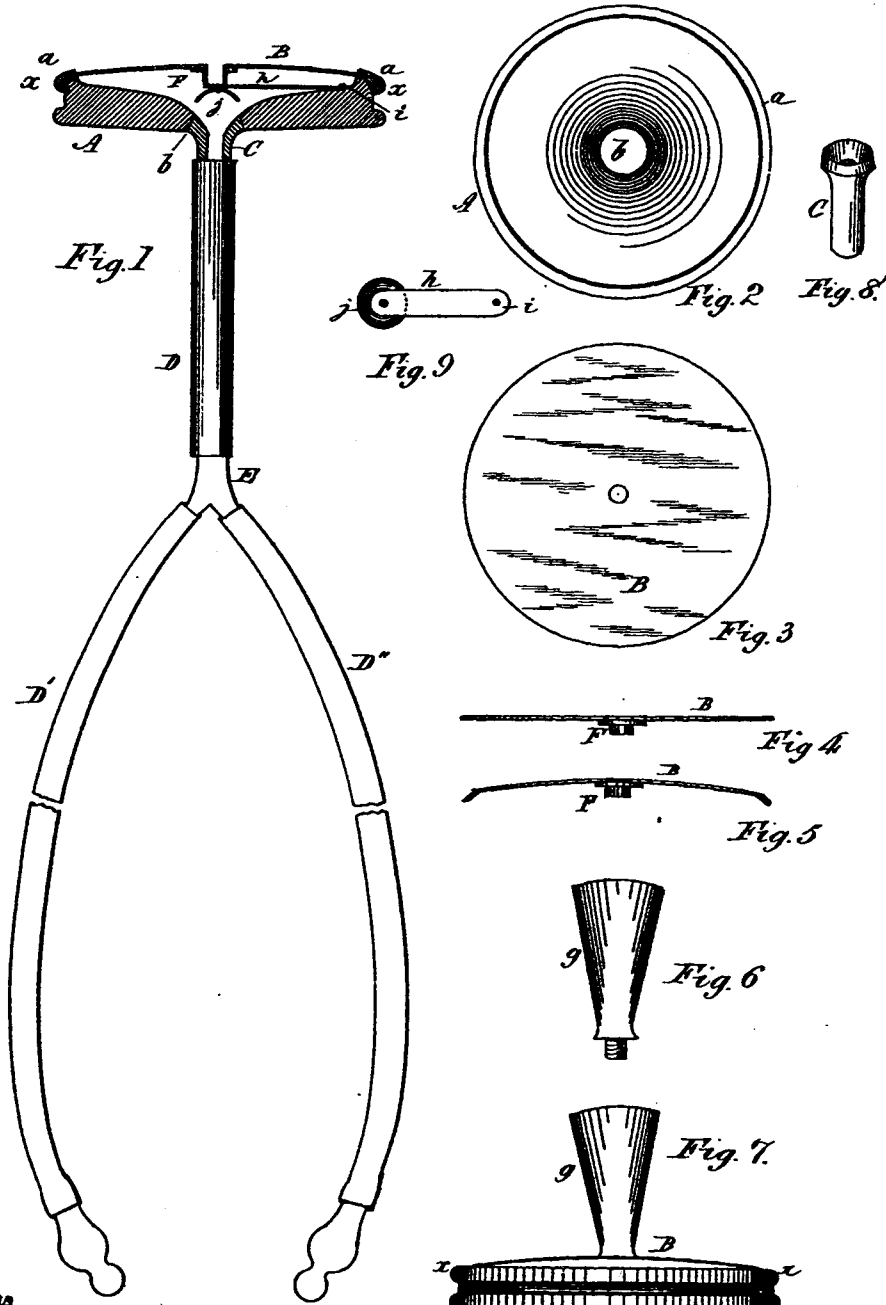


(No Model.)

D. B. MARSH.
APPARATUS FOR EXAMINING HEARTS, LUNGS, &c.
No. 592,154. Patented Oct. 19, 1897.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR EXAMINING HEARTS, LUNGS, &c.

SPECIFICATION forming part of Letters Patent No. 592,154, dated October 19, 1897.

Application filed September 14, 1896. Serial No. 605,703. (No model.)

To all whom it may concern:

Be known that I, DANIEL BRAND MARSH, clerkman, a citizen of the Dominion of Canada, residing at Blackheath, in the county of Werorth, in the Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Apparatus for Examining the Condition of the Heart, Lungs, &c.; and I do hereby declare that the following is full, clear, and exact description of the construction and operations of the same.

The invention relates to a very useful, hand-effective, and sensitive instrument for testing the condition of the lungs, heart, &c., which can be done conveniently and correctly without removing the clothing of the person operated upon.

The invention consists in a circular metallic disk in on the outside and the interior saucer-shaped on the bottom, and provided with a beaded margin. A diaphragm of thin sheet gutta-percha, mica, or equivalent material cut to the shape of the disk and laid thereon and fastened thereto by a screw-bezel. A hole made through the center of the disk to receive a small pendant, which is hollowed out in its inner side to complete the saucer shape on the disk. To the under side of the disk is sewed a thin steel plate which serves as a vibrator, also to hold a small saucer-shaped plate corresponding to the saucer completely by the pendant when applied to the disk. The purpose of the plate is to receive vibrations from the diaphragm, the said saucer-plate being fastened to the vibrator, and through the vibrations from the inside of the saucer plate toward the inside of the corresponding one on the disk, and being conveyed by rubber tube to a branch to which two rubber tubes are attached, terminating in ear gutta-percha tips for inserting in the ears of the operator.

By reference to the drawings forming part of this specification it will be seen that Figure 1 represents a side view of the instrument. Fig. 2 represents a plan or top view of the disk with diaphragm removed. Fig. 3 represents a plan view of the diaphragm detached. Fig. 4 represents an edge view of the diaphragm detached from the disk. Fig. 5 represents a similar view of the diaphragm, showing its position in cross-section when secured

on the disk. Fig. 6 represents a side view of the localizer, detached. Fig. 7 represents the localizer attached to the diaphragm on the disk. Fig. 8 represents a side elevation of the pendant detached from the under side of the disk. Fig. 9 represents a plan or top view of the vibrator and small saucer-shaped plate attached thereto.

A represents a metallic disk, which may be of brass or other metal, having an opening *b* in its central portion, and its interior bottom hollowed out or slightly concaved toward the central opening *b*, as shown in Fig. 1. The outer top edge of the disk *A* is beveled outward at *a*, so that when the diaphragm *B*, which is laid level upon it, becomes slightly raised toward the center the circular-threaded bezel-ring *x* is screwed down upon it.

C is a small tube pendant enlarged at its upper end, concaved to complete the concavity of the disk and made to be inserted and fit into the bottom opening *b* of the said disk, and, when in that position, a rubber tube *D* is attached to it, and a branch *E* inserted in the said tube *D*, into the arms of which two rubber tubes *D'* *D''* are secured, the bottoms of the tubes having ear-tips *e e* attached. I employ a diaphragm, as at *B*, Fig. 4, having a central circular projection *F* for holding a projecting localizer *g*, (shown detached at Fig. 6,) which is made of solid gutta-percha or ebony, is threaded at its small end, and screwed into the said diaphragm prepared for it, and is for the purpose of making more specific examinations.

h is a thin vibrating plate secured to the interior of the disk by a small pin or screw *i*. On the outer end of the said vibrator is attached a small convex plate *j*, which is made to hang over the concave opening in the pendant *C*. The vibrator *h* receives the vibrations from the diaphragm *B* and the convex-shaped plate *j* throws the vibrations to a focus in the center of the pendant *C*, and thence are transmitted to the ears of the operator by the tubes *D* *D'* *D''*.

The operation of the apparatus in practice is as follows: In examining a patient for a general examination the first thing the operator does is to place the ear-tips *e e* of the rubber tubes in his ears, the instrument provided with diaphragm *B*, Fig. 5, is placed over the

supposed affected portion of the body without removing the clothing, then the pendant C is placed in the opening *b* of the disk A, the rubber tubes being attached thereto, when
5 the action of the heart and lungs or stomach can be distinctly heard by the operator. The loudness of the beats of the heart and respiration of the lungs can be easily heard, affording a physician the opportunity of learning
10 the condition of the heart, lungs, and stomach to some extent, or any inflamed portion of the body. For a more specific examination, say of the lungs or the heart, and to localize any particular diseased portion, the localizer *g* is
15 attached to the diaphragm, and the large end of said localizer is placed over the supposed seat of trouble or derangement and is moved from place to place until the diseased portion is found, which is determined by the sounds
20 indicated through the ear-tubes.

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

1. In combination with the disk A the vibrating plate *h*, attached to the inner surface of the disk, and to its outer end is secured a convex-shaped plate *j*, to transmit and focus vibrations from the diaphragm B to the pendant and ear-tips, substantially as specified.

2. In an apparatus for examining the heart and lungs, a metallic disk, having a central opening, and a vibrating diaphragm detachably fastened to said disk, in combination with a plate-spring fastened at one end to said disk and at the other end in contact with the center of the inner side of the diaphragm, a convex plate attached to the said spring at this central point and presenting its concavity inward and a tube leading from the opening of the said disk and provided with brahes which are adapted to be applied to the ears substantially as set forth.

3. In a stethoscope a convex plate *j*, in combination with a vibrating diaphragm to which it moves, a concave disk to which the said diaphragm is attached, and a tube extending from said disk, the concave side of the said plate *j* being arranged over the outlet-opening of the said disk and serving to transmit sound more perfectly through the said tube substantially as set forth.

Dated at Hamilton, Ontario, Canada, this 15th day of August, A. D. 1896.

DANIEL BRAND MASH.

In presence of—

W. G. THOMPSON,
WM. BRUCE.