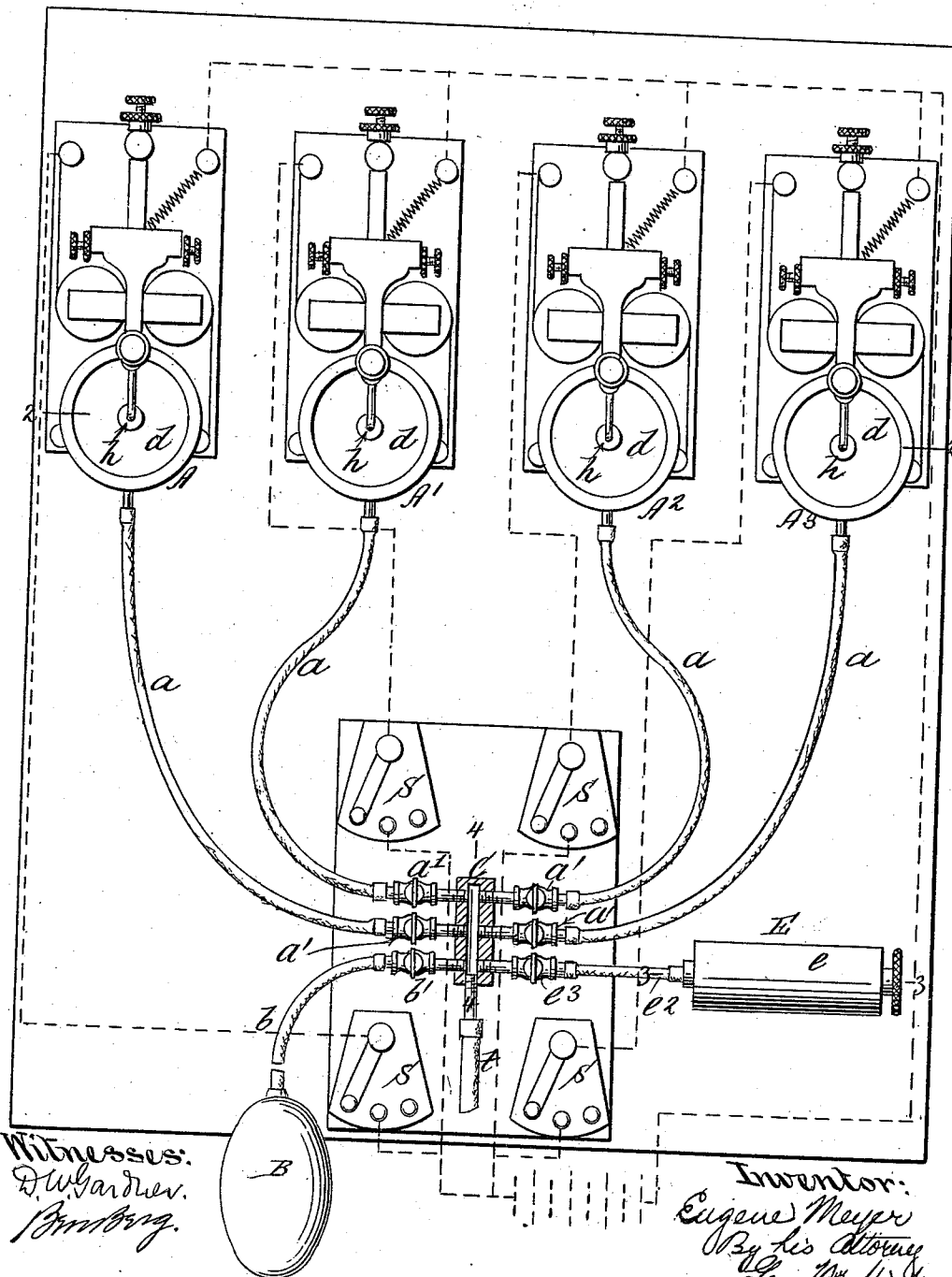


E. MEYER.  
VIBRATORY APPARATUS FOR EAR TREATMENT.  
APPLICATION FILED NOV. 15, 1909.

976,200.

Patented Nov. 22, 1910.  
2 SHEETS—SHEET 1.

Fig. 1.



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J. B. M. B. B.

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2 SHEETS—SHEET 2.

Fig. 2.

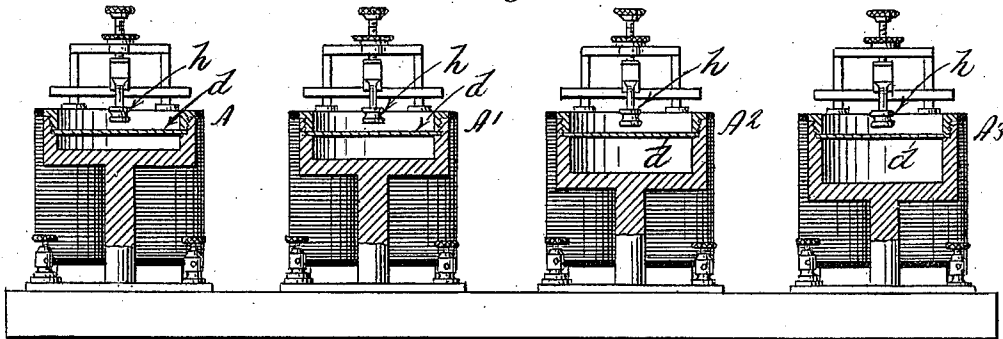


Fig. 3.

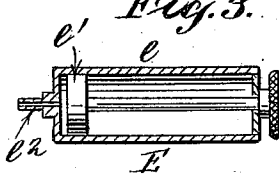


Fig. 4.

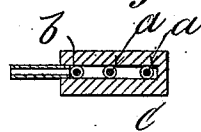
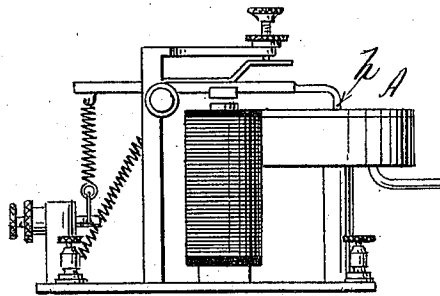


Fig. 5.



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# UNITED STATES PATENT OFFICE.

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## VIBRATORY APPARATUS FOR EAR TREATMENT.

976,200.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed November 15, 1909. Serial No. 528,140.

*To all whom it may concern:*

Be it known that I, EUGENE MEYER, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Vibratory Apparatus for Ear Treatment, of which the following is a specification.

My improvements relate to apparatus for treating the ear for remedial purposes to pulsations or vibrations of air substantially as set forth in Letters Patent No. 853,645 dated May 14th. 1907 and No. 904,632 dated November 24th. 1908, and are the result of practical experience and experimentation in adapting the apparatus to the individual requirements of numerous patients.

The invention consists in the specific construction and arrangement of parts described and claimed, distinguishing features being the use of a plurality of vibratory diaphragms and air chambers and connected with a common intermediate variable tension chest in such manner that one or more vibratory diaphragms may be used in conjunction therewith; in making the diaphragm chambers of different capacities so as to afford a difference in fundamental tone or volume between the several chambers as compared with each other; and in connecting the intermediate variable tension chest with a pressure device and a low tension device substantially as hereinafter set forth.

In the accompanying drawings, Figure 1, is a plan of apparatus grouped and arranged according to my invention; Fig. 2, is a sectional elevation on plane of line 2—2— Fig. 1; Fig. 3, is a sectional elevation on plane of line 3—3— Fig. 1; Fig. 4, is a sectional elevation on plane of line 4—4— Fig. 1; Fig. 5, a side elevation of one of the vibratory devices.

In carrying out my invention practically, any desired plural number of vibratory air chambers A, A', A<sup>2</sup>, A<sup>3</sup>, may be used in conjunction with the intermediate variable tension chest C, being connected therewith through ducts *a*, *a*, in which are interposed individual valves *a'*, *a'*. Each vibratory air chamber A, is provided with a diaphragm *d*, of mica or other appropriate material which is capable of vibration by suitable means, as by the hammer *h*, actuated by electromagnets as in the patents hereinbefore cited, and which for that reason it will

not be necessary to describe in detail herein, although in this connection it is to be understood that I do not limit myself to any specific means of vibrating the diaphragms *d*. Each vibratory air chamber A, is preferably made of a different depth or capacity as shown in Fig. 2, so that the volume of air contained in each is not the same as in any other of the series. Thus by way of illustration the air chamber A, is of less capacity than the others, and the vibration of its diaphragm *d* will produce a relatively high fundamental pitch or tone as compared with the others, the capacity of each succeeding air chamber A', A<sup>2</sup>, A<sup>3</sup>, being relatively increased so that the fundamental tones or pitches produced by the vibrations of their respective diaphragms will be relatively and successively lower and deeper in quality.

The intermediate chest C, is connected with the tube *t*, by which the air pulsations are conducted to the ears or nostrils of the patient in the usual manner. The ducts *a*, open directly into said chest. This chest C not only acts as a common receiver for one and all of the vibratory air chambers, A, A', A<sup>2</sup>, A<sup>3</sup>, but it also performs the important function of a tension variator in which the air pressure may be increased above or reduced below that of the atmosphere. The excess of pressure above the normal is afforded by means of a compressible rubber bulb B, or equivalent device, the rubber bulb being convenient of manipulation. It is connected with the variable tension chest C, by a flexible tube *b*, a valve *b'*, being provided for controlling communication between the parts. The decrease of pressure below that of the atmosphere is effected by an exhaust device E of any suitable character, that shown in the drawings consisting of a cylinder *e*, provided with a reciprocating piston *e'*, and the inner end of the cylinder *e* being connected with the chest C, by a duct *e<sup>2</sup>*, in which is interposed the valve *e<sup>3</sup>*.

S, S, are individual switches by which the several electro-magnets may be thrown in or out of circuit.

Thus equipped I am enabled to vary the treatment of patients in accordance with individual requirements and conditions,—the scope of variation and the number of changes and combinations being quite extensive and under full control. Any desired number of vibratory chambers may be pro-

vided to be used individually, collectively or in various combinations, of tone or pitch, and the air pulsations delivered to the affected parts may be either above or below normal or atmospheric pressure, enabling me to either press or draw upon the parts under treatment.

What I claim as my invention and desire to secure by Letters Patent is,

- 10 1. In apparatus of the character described, the combination of a plurality of vibratory air chambers, each containing a diaphragm, said diaphragms, electro-magnetic means for vibrating each of said diaphragms, either  
15 individually and independently, or simultaneously in plural numbers, an intermediate air chest, independent conduits connecting each of said vibratory air chambers individually with said intermediate air chest,  
20 and a conduit connected with said intermediate air chest and adapted to transmit air pulsations therefrom to a patient, substantially in the manner and for the purpose described.
- 25 2. In apparatus of the character described, the combination of a plurality of vibratory air chambers each containing a diaphragm, said diaphragms, electro-magnetic means for vibrating each of said diaphragms, either  
30 individually and independently, or simultaneously in plural numbers, an intermediate air chest, independent conduits connecting each of said vibratory air chambers individually with said intermediate air chest,  
35 an air compressing device connected with said intermediate air chest for increasing the air pressure therein above that of the atmosphere, and a conduit connected with said intermediate air chest and adapted to transmit  
40 air pulsations therefrom to a patient, substantially in the manner and for the purpose described.

3. In apparatus of the character described,

the combination of a plurality of vibratory air chambers each containing a diaphragm, 45 said diaphragms, electro-magnetic means for vibrating each of said diaphragms, either individually and independently, or simultaneously in plural numbers, an intermediate air chest, independent conduits connecting each 50 of said vibratory air chambers individually with said intermediate air chest, an air tension device connected with said intermediate air chest and adapted to decrease the air pressure therein below that of the atmosphere, 55 and a conduit connected with said intermediate air chest and adapted to transmit air pulsations therefrom to a patient, substantially in the manner and for the purpose described. 60

4. In apparatus of the character described, the combination of a plurality of vibratory air chambers each containing a diaphragm, 65 said diaphragms, electro-magnetic means for vibrating each of said diaphragms, either individually and independently, or simultaneously in plural numbers, an intermediate air chest, independent conduits connecting each of said vibratory air chambers 70 individually with said intermediate air chest, an air compressing device connected with said intermediate air chest for increasing the air pressure therein above that of the atmosphere, an air tension device connected with said intermediate air chest and adapted 75 to decrease the air pressure therein below that of the atmosphere, and a conduit connected with said intermediate air chest and adapted to transmit air pulsations therefrom to a patient, substantially in the manner and for the purpose described. 80

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