E. ROGERS.

PHONOGRAPH.

APPLICATION FILED DEC. 21, 1917.

1,316,187.

Patented Sept. 16, 1919.

Fig. 1.

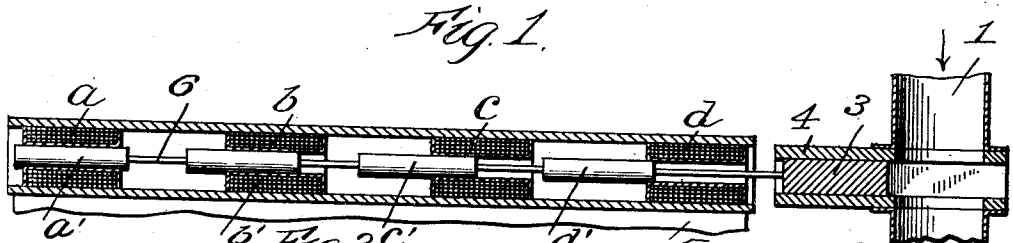


Fig. 2.

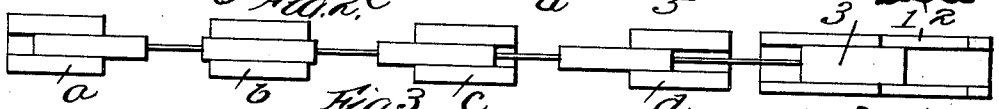


Fig 3

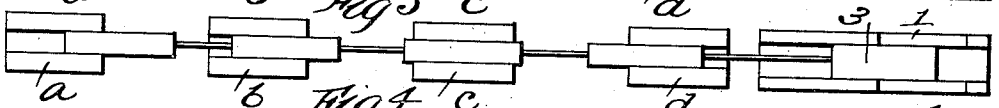


Fig. 4.

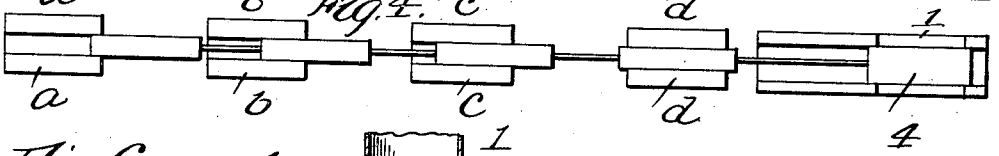


Fig. 6.

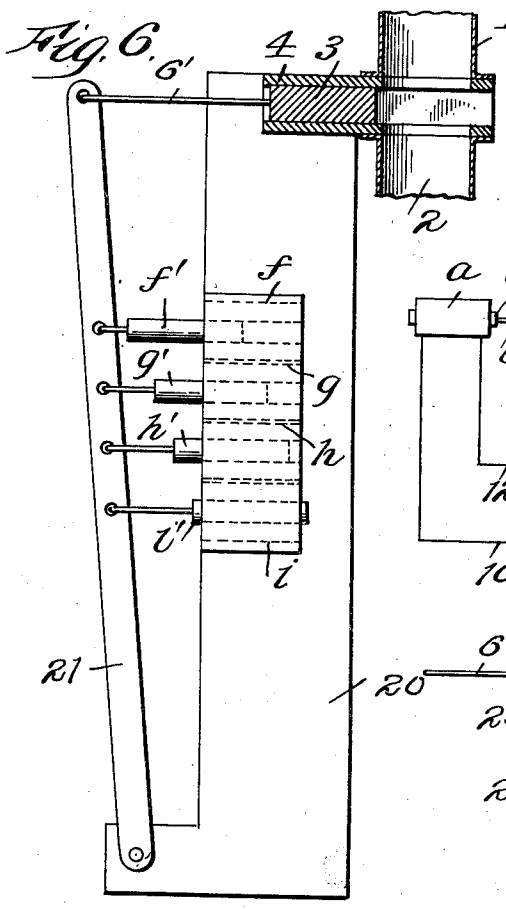


Fig. 5.

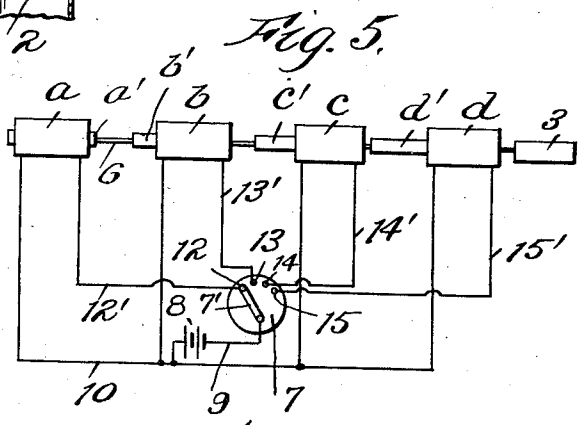


Fig. 7.

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PHONOGRAPH.

1,316,187. Specification of Letters Patent. Patented Sept. 16, 1919.

Application filed December 21, 1917. Serial No. 208,298.

To all whom it may concern:

Be it known that I, EDWARD ROGERS, a citizen of the United States, residing at Rosedale, borough of Queens, and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates in general to phonographs and specifically to means for graduating and controlling the tone or sound volume of the same.

The primary object of this invention is to provide a device for controlling the tone or volume of sound produced by a phonograph, and providing means for operating said device to place the sound controlling element in desired position.

A further object of this invention is to provide means capable of being operated to select, modulate and maintain the tone of a phonograph from any desired distance, at the will of the operator.

A further object of this invention is to operate the sound controlling element step by step to decrease the volume of sound, and retracing the operation and movement of the sound controlling element step by step to increase the volume of sound.

Other and further objects, including certain features of construction, will appear in the specification and be pointed out in the annexed claims, reference being had to the accompanying drawings which show the preferred embodiment of this invention and in which—

Figure 1 is a sectional view showing the sound channel or outlet open, the damper having been withdrawn by the controlling means therefor.

Figs. 2, 3 and 4 diagrammatically show how the damper is advanced to the extreme opposite position to that shown in Fig. 1.

Fig. 5 is a diagrammatic view showing how the magnets are controlled.

Figs. 6 and 7 are modified arrangements of the damper controlling parts.

In the embodiment of my invention shown in the drawings, 1 is a phonograph sound conducting outlet above the damper, 2 the sound outlet below the damper and 3 the damper placed within the sound outlet and adapted to move freely within guides 4 attached to or forming part of the sound outlet. 5 is a base or holding member upon which is mounted in any suitable manner a series of electromagnets, here shown as four in number and marked *a*, *b*, *c* and *d*. These magnets are preferably made in the form of solenoids having cores *a'* *b'* *c'* and *d'*. These cores are mounted on a suitable non-magnetic rod 6 which extends from the outermost solenoid to the damper, to which it is attached. By referring to Fig. 1 it will be noted that the cores are equally spaced on the rod 6, but in such manner that core *a'* is inoperative within solenoid *a* while core *b'* is in position in solenoid *b* to be made active when the solenoid *b* is energized. Core *c'* extends out of solenoid *c* a greater distance than does the core *b'* extend out of solenoid *b*, while core *d'* extends out of solenoid *d* a still greater distance than core *c'* extends out of solenoid *c*.

In Fig. 5, 7 is the switch, 7' the switch arm and 8 the battery. One pole of said battery is connected to the switch arm by line 9, the other pole to the common return line 10. Contacts 12, 13, 14 and 15 are connected respectively to solenoids *a*, *b*, *c* and *d* by lines 12', 13', 14' and 15', thus establishing a circuit successively through the solenoids as desired. When the switch arm is in the position shown in Fig. 5 the solenoids will have their respective cores in the position shown in this figure and Fig. 1, that is, core *a'* will be balanced within solenoid *a*. By moving switch arm 7' to contact 13 solenoid *b* will be energized and core *b'* will be drawn to balanced position, as shown in Fig. 2, core *a'* being withdrawn from solenoid *a* a distance equal to the movement of core *b*. This movement of rod 6 advances the damper 3 to the position shown in Fig. 2. By moving the switch arm to contact 14 solenoid *c* will be energized and core *c'* will be drawn to balanced position, thereby advancing the cores *a'* and *b'* and the damper 3 to the position shown in Fig. 3. When the switch arm is moved to contact 15 solenoid *d* is energized and core *d'* will be drawn to balanced position, thereby advancing the cores *a'*, *b'* and *c'* and the damper 3 to the position shown in Fig. 4. It will be noted that the solenoids have been successively energized to move the damper to its extreme position, that is closed, and that when solenoid *d* was energized and its core balanced therein, core *c'* was placed in position to be acted upon by solenoid *c* when energized, and in a like manner cores *b'* and

a' will be positioned and acted upon when their respective solenoids are energized. By arranging the solenoids, the carrying rod 6 and the cores thereon in said solenoids in the manner shown, I am enabled to successively energize the solenoids and move the damper to one extreme, and retracing the movement successively energize the solenoids to move the damper to the other extreme.

Of course it should be understood that any number of solenoids can be used whereby the damper can be moved step by step any desired distance.

In Fig. 6 a modified form is shown wherein the solenoids act in the same manner as those shown in Fig. 1, but with the connecting parts differently arranged. In this form 20 is a frame having pivotally mounted near the bottom thereof an upright arm 21. The upper end of this arm is pivotally attached to the rod 22 said rod in turn being freely fastened to and controlling the movement of the damper. f, g, h and i are solenoids carried by the frame 20 and provided respectively with cores f', g', h' and i'. These cores are freely connected to the arm 21 and are arranged within their respective solenoids in the same relation as those shown in Fig. 1, so that when said solenoids are successively energized in either direction they will move the damper to the extreme of its positions.

Fig. 7 is another modification wherein the sound conducting outlet 1 carries therein an oscillating damper 26, pivoted at 27 and oscillated by the arm 25, said rod being controlled by the rod 6′ which in turn is controlled by the solenoids a, b, c and d in the manner hereinbefore explained.

Of course it should be understood, that the lead wires between the damper operating means and the switch may be of any desired length, so that the tone control of the phonograph may be effected from any desired distance at the will of the operator.

While I have shown and described the preferred embodiment of my invention, obviously modifications may be made within the spirit of the appended claims.

I claim:

1. A phonograph having a sound outlet, a damper therefor, a plurality of electromagnets, cores within said magnets arranged in staggered relation in their respective magnets, and a member attached to each of said cores whereby each of said magnets can be successively energized to give said damper a step by step closing movement in said outlet, and reversely energized to give said damper a step by step opening movement in said outlet.

2. A phonograph having a sound outlet, a damper, a member attached to said damper and movable to control the action of the damper across the outlet, a plurality of electromagnets having their cores connected to said member in staggered relation in their respective magnets, whereby successive energization of said magnets will move said member in the desired relation to said outlet.

3. A phonograph having a sound outlet, a damper, a member attached to said damper and movable to control the action of said damper, and a plurality of electromagnets having their cores connected to said member in such manner that the core of each magnet will be successively moved to a position to limit its movement when its magnet is energized.

4. A phonograph having a sound outlet, a damper, a member attached to said damper and movable to control the action of said damper, a plurality of electromagnets, and cores in said magnets connected to said member and placed in staggered relation in said magnets so that the energization of one magnet, will through the medium of the damper controlling member, move within said successive magnet to give a predetermined movement to said core within the succeeding magnet when same is energized.

EDWARD ROGERS.