

No. 628,810.

Patented July 11, 1899.

H. JONES.

SOUND RECORDING AND REPRODUCING MACHINE.

(Application filed June 11, 1898.)

(No Model.)

Fig. 1.

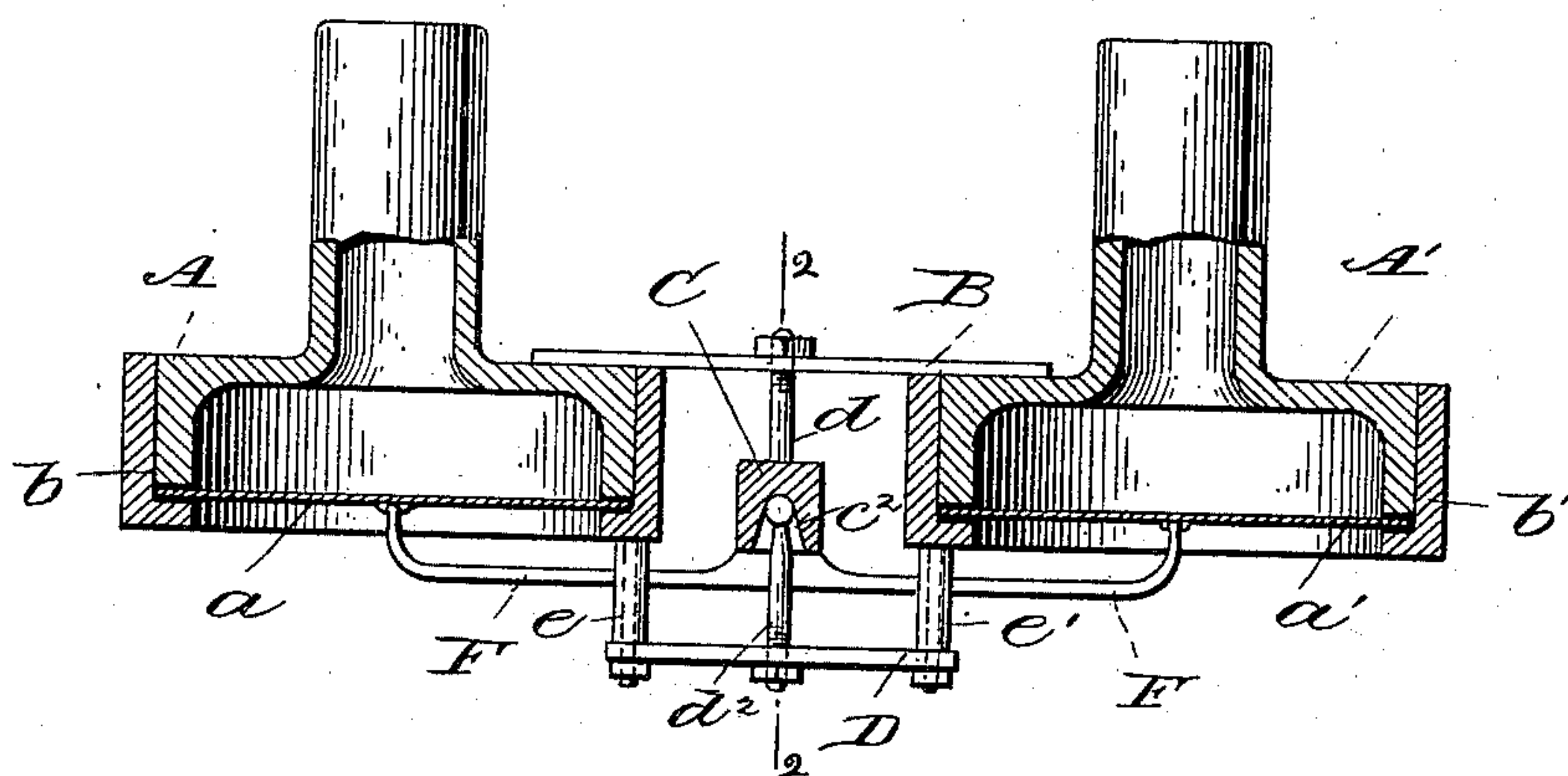


Fig. 2.

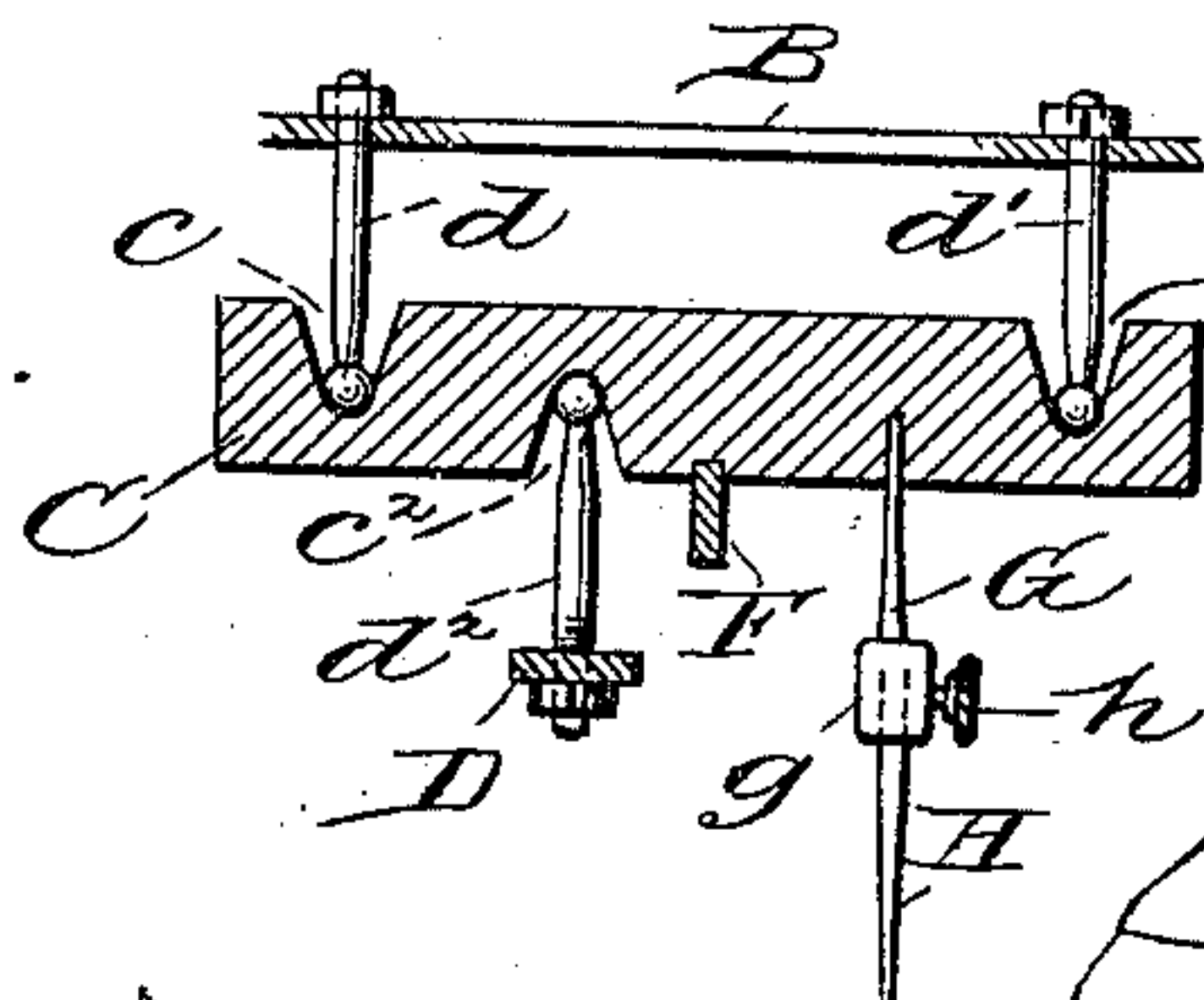


Fig. 3.

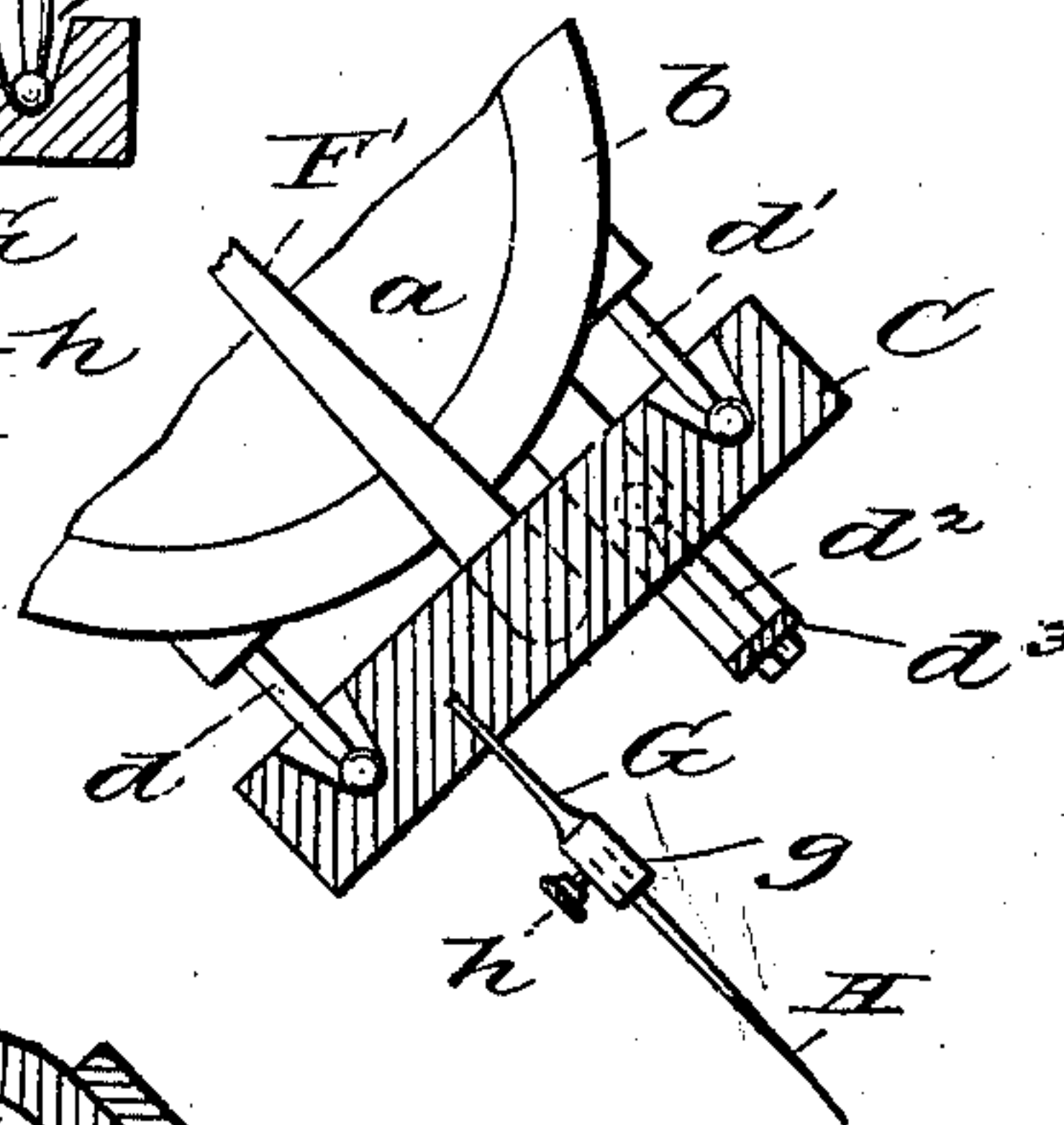


Fig. 5.

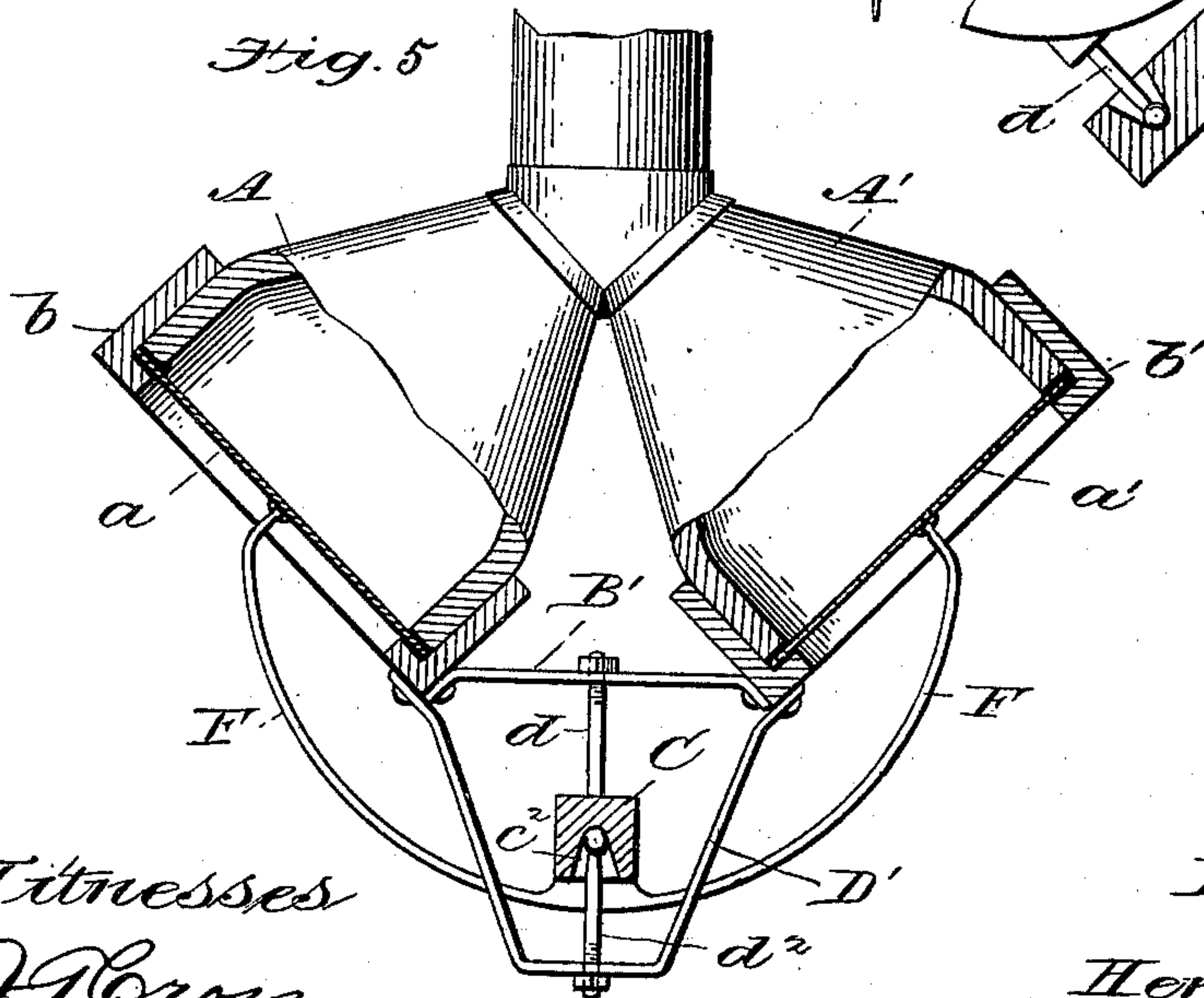
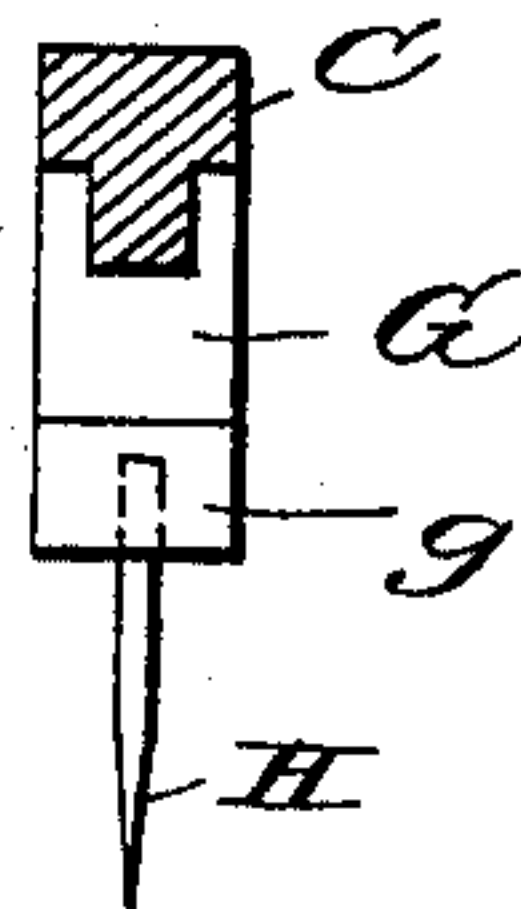


Fig. 4.



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SOUND RECORDING AND REPRODUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 628,810, dated July 11, 1899.

Application filed June 11, 1898. Serial No. 683,182. (No model.)

To all whom it may concern:

Be it known that I, HENRY JONES, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Sound Recording and Reproducing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to certain improvements in sound recording and reproducing machines, and has for its object to provide an improved construction by means of which the sound delivered from the trumpet or other receiver is greatly improved both in tone and in volume, the harsh and grating effect which has heretofore been experienced in all machines of this class being completely eliminated and a clear and distinct articulation obtained and the sound softened and otherwise improved.

With this object in view my invention consists in providing twin sound-boxes rigidly secured together in diaphragms which are connected by a single arm pivotally secured in the said rigid frame and connected to and operated by a single stylus.

My invention further consists in providing the stylus-supporting bar with ball-bearing studs both on its top and bottom, said construction permitting the easy lateral movement of said supporting-bar, at the same time preventing longitudinal or endwise movement.

A further object of my invention is to provide with the twin sound-boxes an arm pivotally mounted between the two diaphragms of said sound-boxes, said mounting being substantially on a line with the lines of the diaphragm and adapted to oscillate upon the pivot of such mounting, the said arm extending in opposite directions on each side of its pivotal point, its outer ends being connected in the center of one of the diaphragms.

A still further object of my invention is to provide the stylus-holders with a thin resilient end to be secured to the supporting-bar, which is pivotally mounted in the supporting-frame, said plate being broadened for rigidity in a crosswise direction.

My invention further consists in the con-

struction, combination, and arrangement of parts, such as will be hereinafter fully described, and particularly pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification and in which similar letters of reference are used to indicate similar parts, Figure 1 is a sectional elevation of a portion of a gramophone having my improvements applied thereto. Fig. 2 is a transverse section taken about on the line 2 2 of Fig. 1, parts of the supporting-frame being broken away and the sound-boxes omitted. Fig. 3 is a detail, partly in section, showing the application of my pivoted stylus-supporting bar to a single sound-box. Fig. 4 is a detail plan view of the stylus-securing plate attached to the bar C, which is shown in section. Fig. 5 is a side elevation, partly in section, showing the sound-boxes inclined and terminating in a single trumpet.

In carrying out my invention I provide two sound-boxes A A' of the usual construction, each provided with a diaphragm *a* and *a'*, secured to and adjusted upon the said sound-boxes by means of the caps *b b'*. On the upper outside surface of the sound-boxes A A' is rigidly secured a supporting-plate B, which holds the two sound-boxes rigidly together and forms a part of the supporting-frame. Located centrally between the two sound-boxes A A' and on a line with the horizontal plane of the diaphragms is a supporting-bar C, having in its upper surface sockets *c c'* for the reception of the lower ends of the ball-bearing studs *d d'*, the upper ends of said studs being rigidly secured in the frame-plate B by means of suitable screw-threads and nuts, as illustrated, or in any other well-known manner. On the under side of the said supporting-bar C is a socket *c²*, located to one side of its longitudinal center and adapted to receive the upper end of the ball-bearing stud *d²*. The lower end of this stud *d²* is secured by means of screw-threads and nuts or otherwise in a transversely-arranged bar D, secured at its ends to the sound-boxes A A' by means of the standards *e e'*.

Rigidly secured to the under side of the supporting-bar C is a transversely-arranged arm F, extending on each side of the said supporting-bar C and having its respective

ends connected to the center of the diaphragms $a a'$, as clearly illustrated in Fig. 1 of the drawings. To the under side of the supporting-bar C and slightly to one side of the transverse arm F is secured the stylus-holder G, which may be soldered to the said bar C or secured thereto in any other well-known manner. This stylus-holder G consists of a thin resilient flat metal bar, increasing in thickness as it reaches the lower end and terminating in an enlarged socket or sleeve g for the reception of the stylus-point H. A suitable set-screw h is provided in said sleeve g for securely holding the stylus-point in the stylus-holder.

The sound-boxes A A' are preferably connected, as in the construction shown in Fig. 1, each to an independent horn. The construction shown in Fig. 5 is especially adapted to connection with a single horn.

From the foregoing description it will be readily seen that the supporting-bar C, which carries the arms F, which are connected to the diaphragms $a a'$ at their respective centers, is capable of oscillating on its ball-bearing studs under the action of the vibrations produced through the stylus by the sound-waves of the record-disk. This oscillatory movement of the said supporting-bar C and its connecting-arms F causes a pulling movement on one of the diaphragms and a simultaneous pushing on the other, thus doing away with the necessity of any springs to return the said diaphragms to a normal position, as has heretofore been the practice.

In Fig. 3 I have illustrated a single sound-box, showing the supporting-bar C provided with the ball-bearing studs $d d'$ on its upper surface, the rigid ends of which are secured directly to the frame or cap b of the sound-box, while the stud d^2 on the lower side is secured in a bracket d^3 , also rigidly connected to the supporting-frame of the sound-box. A single arm F' is rigidly secured at one end to the supporting-bar C and at its other end to the center of the diaphragm a . The stylus-support G is constructed and secured to the supporting-bar C in substantially the same manner as heretofore described.

In Fig. 5 I have illustrated my sound-boxes in inclined positions, so as to economize in space and having the ends of the said sound-boxes terminating in a single tube to be connected to the trumpet or other receiving device. In this construction the supporting-bar C is located centrally between the two sound-boxes A A' and is provided with the ball-studs on its top and bottom, the pivotal bearing-points of which are on a line at the intersection of the longitudinal plane of said diaphragms, as clearly illustrated. A supporting-frame B' is secured at each end to the caps $b b'$ of the sound-boxes for supporting the upper ends of the studs $d d'$. A depending U-shaped rod D', secured at each end of the caps B B' of the sound-box, is provided for the support of the lower end of the stud

d^2 . The arm F, rigidly secured to the supporting-bar C, extends on each side, and its respective ends are loosely connected to the center of the diaphragms $a a'$, and the operation of this construction is substantially the same as that described with reference to Figs. 1 and 2.

I have referred to the studs $d d'$ as "ball-bearing" studs. It is clear, however, that it is not essential that the point of these studs should be shaped in a ball form, as they are antifrictional bearings and might therefore be pointed or tapered and answer the requirements.

By my above-described construction of pivoted or ball-bearing stylus-supporting bar located centrally on a line with the diaphragms I do away with friction and provide an easy bearing, which permits of easy oscillation of the said bar and also prevents the transmission of an unnatural grating sound, which would be caused by undue friction at such point. By providing the twin sound-boxes and a single arm connected at its free ends to the diaphragm and rigidly connected to the stylus-supporting bar I am enabled to do away with springs for returning the said diaphragms to normal positions, as by the oscillatory movement imparted to the said arms through the medium of this pivot-supporting bar and connecting-stylus heretofore described I obtain a pushing and pulling movement alternately on the diaphragms.

In the construction of stylus-support shown in Fig. 4 the plate G is made of reduced thickness, tensioned to slightly yield under the weight of the sound-box—as, for instance, in use in machines known as the "gramophone"—and broadened, so as to be unyielding in the direction of the sound-waves. In the construction shown the plate G is mortised or set into the bar C in slots provided for the purpose and rigidly secured therein.

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

1. In a sound recording and reproducing machine, multiple diaphragms and sound-boxes having their diaphragms connected through the medium of rigid arms with a single stylus-bar and adapted to pulsate at the same time in opposite directions, substantially as described.

2. In a sound recording and reproducing machine, twin sound-boxes set in a rigid frame, a pivoted stylus-bar, a rigid arm connecting said stylus-bar with each diaphragm, said diaphragms adapted to vibrate at the same time in opposite directions, substantially as described.

3. In a sound-reproducing machine, a stylus loosely mounted between two diaphragms, adapted to oscillate from the pivot of such mounting, arms rigidly connected to said stylus, the outer ends of which are connected to the center of the diaphragms, substantially as described.

4. In a sound-reproducing machine, the combination of twin sound-boxes, diaphragms carried thereby, a stylus loosely mounted between the same, and on a line with the plane of the diaphragms, said stylus adapted to oscillate from the pivot of its mounting, arms rigidly connected to said stylus the outer ends of which are connected to the center of the diaphragms, substantially as described.

5. In sound-reproducing machines, the combination of twin sound-boxes, a supporting-frame rigidly connecting them together, diaphragms carried by said sound-boxes, a stylus-supporting bar carried by said supporting-frame, pivotal bearings for said stylus-bar located on a line with the plane of the diaphragm, an arm rigidly connected to said stylus-bar its free ends extending in opposite directions and connecting at each end with one of the diaphragms, substantially as described.

6. The combination of the twin sound-boxes, diaphragms carried thereby, a supporting-frame rigidly connecting the sound-boxes, a stylus-supporting bar located between the sound-boxes, studs carried by the supporting-frame adapted to bear in sockets formed on the upper and lower sides of the stylus-sup-

porting bar, an arm rigidly connected to the said stylus-supporting bar having its free ends extending in opposite directions and connected to one of the diaphragms, and a stylus secured in said supporting-bar, substantially as described.

7. The combination of the twin sound-boxes provided with diaphragms, a frame rigidly connecting them together, a stylus-supporting bar located centrally between the said sound-boxes, sockets formed at each end on the upper side of said supporting-bar, studs rigidly secured in the supporting-frame having balls on their lower ends adapted to the said sockets, a socket formed on the lower side of said stylus-supporting bar, a stud carried by the supporting-frame having a ball on its upper end adapted to said socket, the said ball-bearings being on a line with the diametrical center of the diaphragms, and a stylus carried by the stylus-supporting bar, substantially as described.

In witness whereof I have hereunto set my hand this 8th day of June, A. D. 1898.

HENRY JONES.

Witnesses:

J. HENDERSON,
HORACE PETTIT.