

(No Model.)

2 Sheets—Sheet 1.

J. H. WHITE.  
GRAPHOPHONE.

No. 432,462.

Patented July 15, 1890.

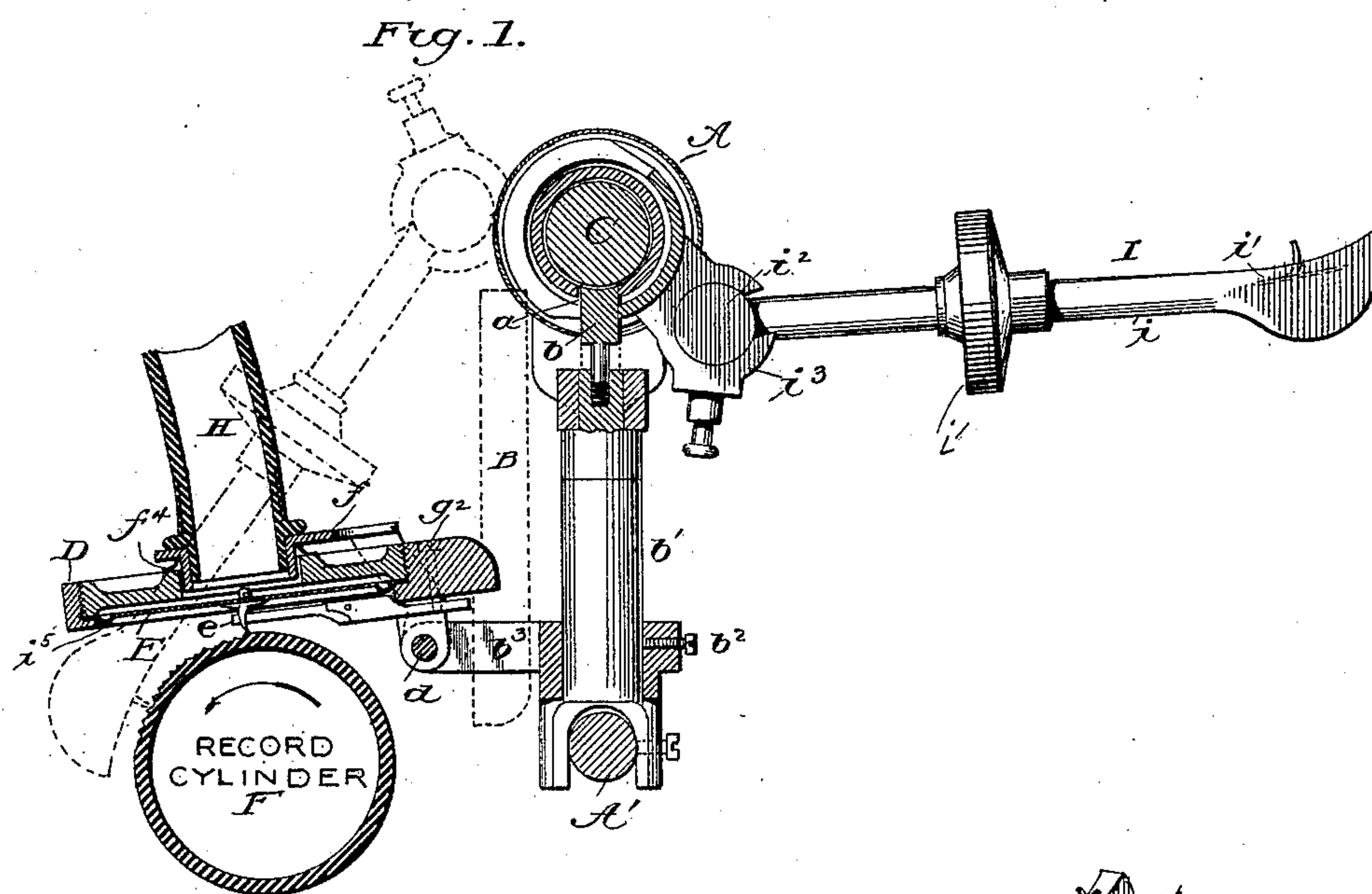
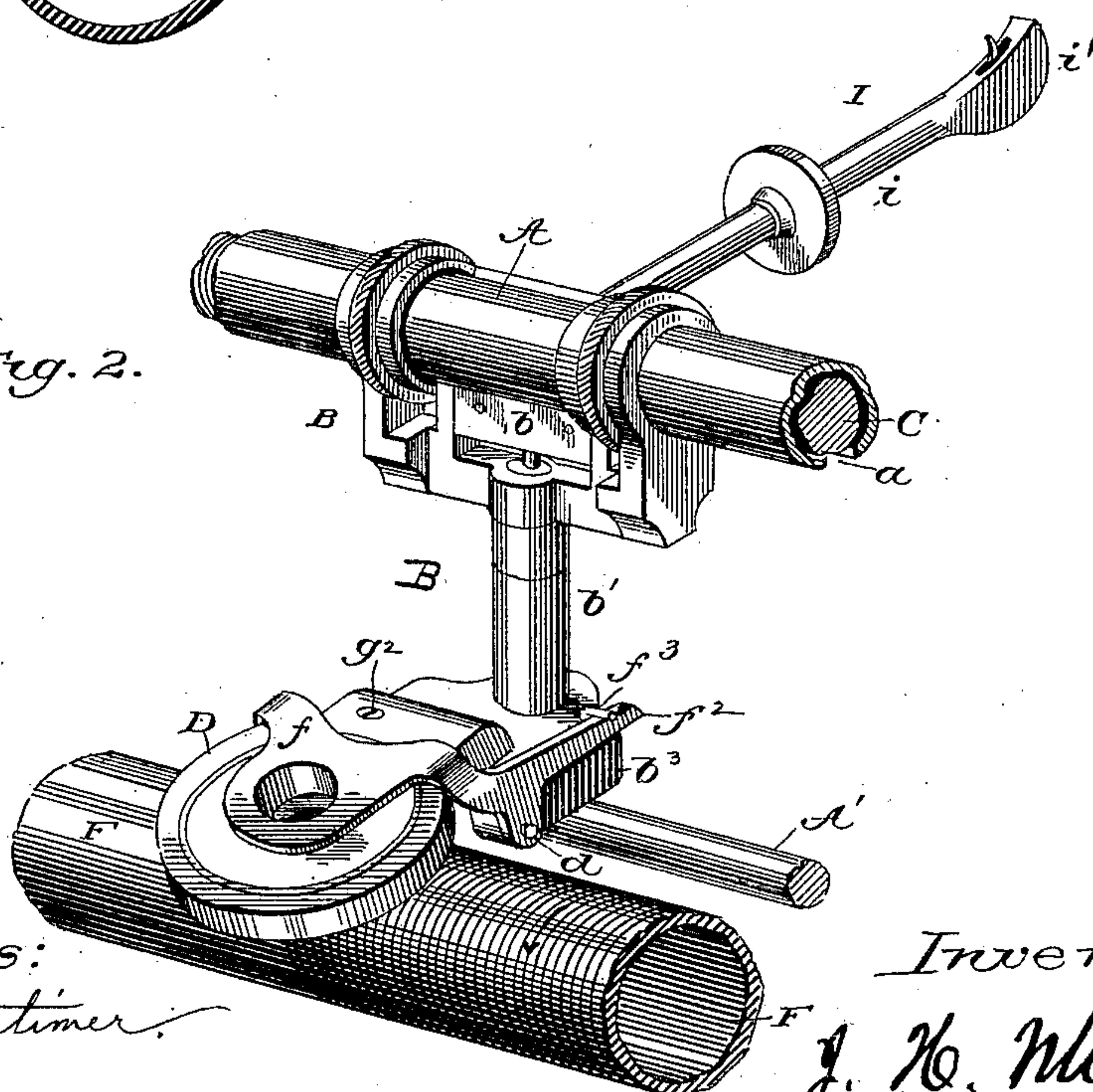


Fig. 2.



Witnesses:

M. N. Mortimer.

A. R. Kennedy.

Inventor:

J. H. White  
By his atty  
Philip T. Dodge

J. H. WHITE.  
GRAPHOPHONE.

No. 432,462.

Patented July 15, 1890.

Fig. 3.

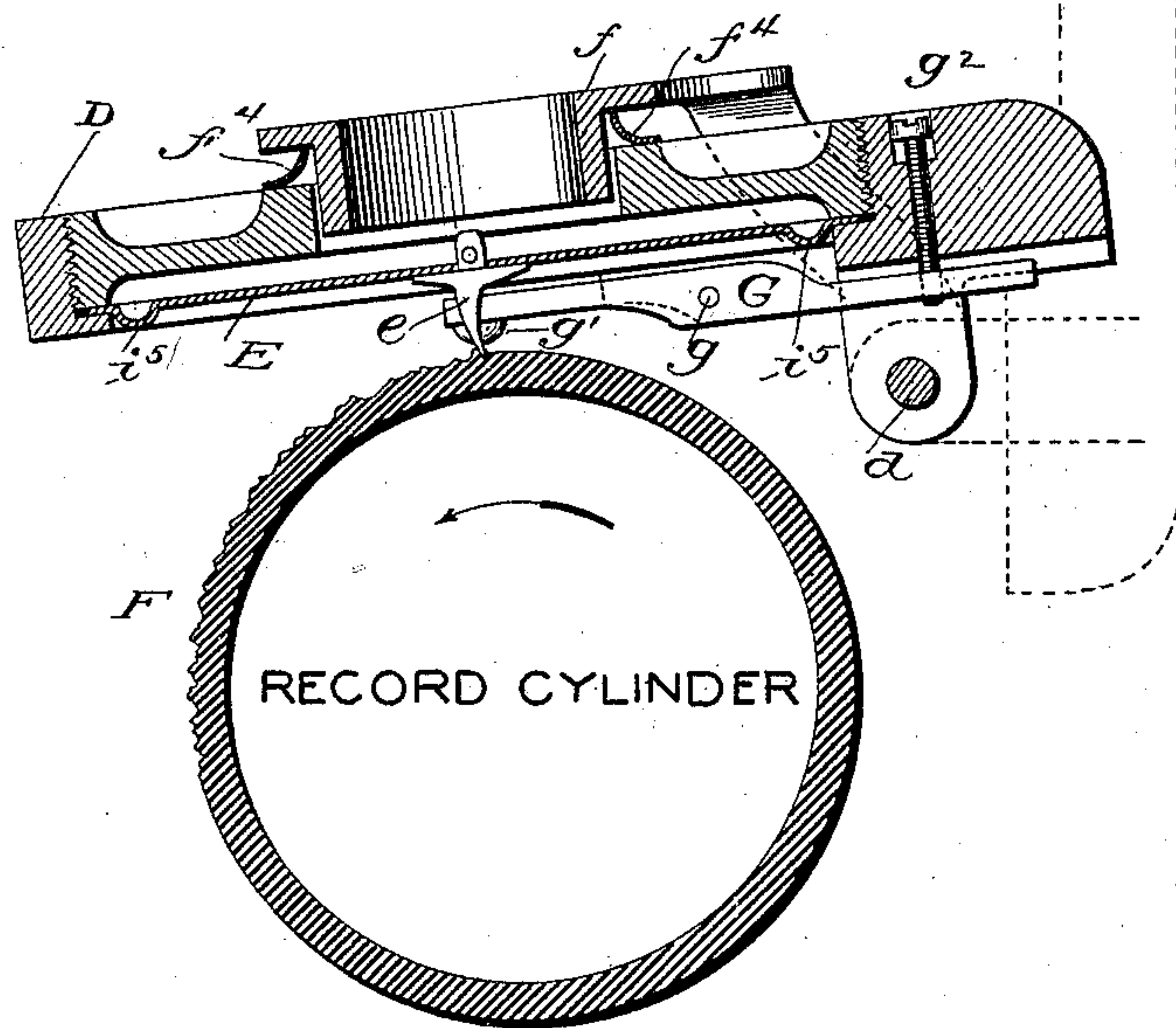


Fig. 4.

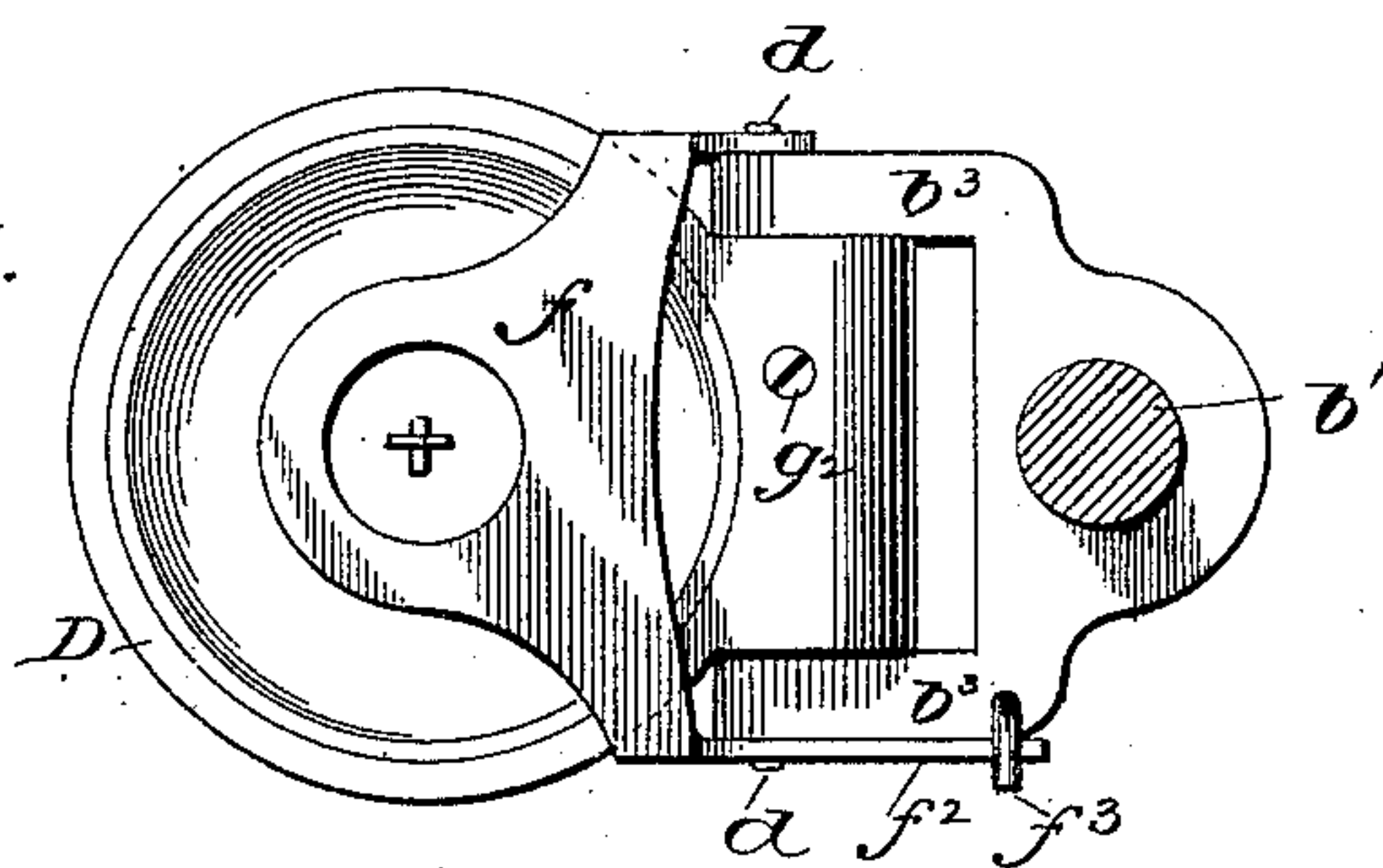
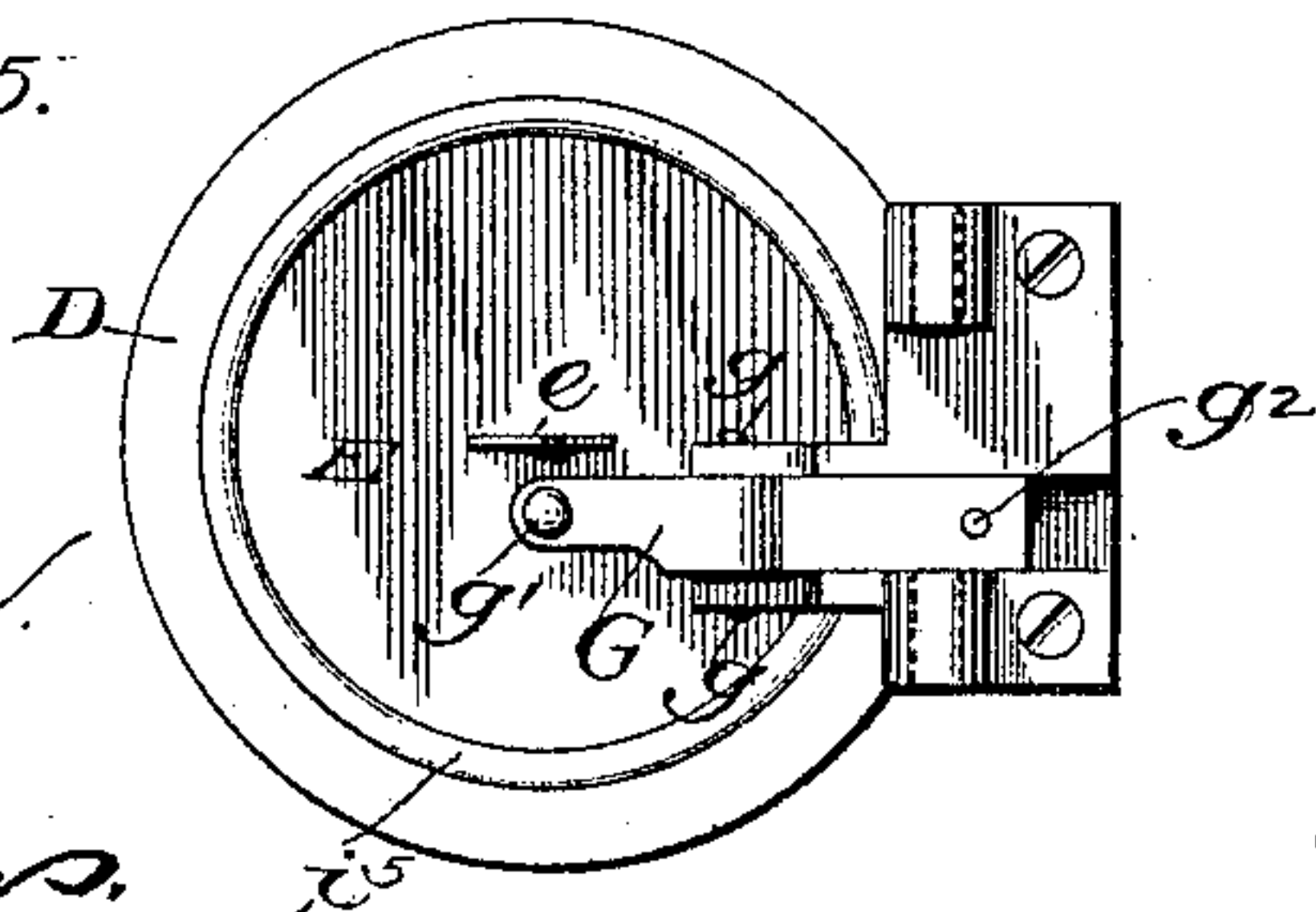


Fig. 5.



Witnesses:  
W. M. Northmer.  
A. R. Kennedy.

Inventor:  
J. H. White  
By *Wittig*  
Phil. T. Dodge



# UNITED STATES PATENT OFFICE.

JOHN H. WHITE, OF WASHINGTON, DISTRICT OF COLUMBIA.

## GRAPHOPHONE.

SPECIFICATION forming part of Letters Patent No. 432,462, dated July 15, 1890.

Application filed December 23, 1889. Serial No. 334,705. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. WHITE, of Washington, in the District of Columbia, have invented certain Improvements in Graphophones, of which the following is a specification.

My invention has reference to those instruments in which a vibratory peripherally-sustained diaphragm is provided with or connected to a style operating in connection with a record-cylinder or equivalent record.

One improvement consists in sustaining the speaking-tube commonly attached to the diaphragm-frame by an independent support, as hereinafter described, in order to relieve the diaphragm from the weight, vibration, and strains of the tube.

Another improvement consists in so bringing the recorder and the reproducer to the sustaining-carriage that either may be turned up at will to an inactive position, at the same time allowing the other to swing down into action.

With the exception of the parts to which said improvements relate the instrument may be of ordinary construction, and I have therefore confined the drawings to such features as are necessary to an understanding of my invention.

In the accompanying drawings, Figure 1 is a vertical cross-section through the record-cylinder and the recording and reproducing devices of a graphophone, an instrument now well known in the art, with my improvements incorporated therein. Fig. 2 is a perspective view of the parts shown in the preceding figure. Fig. 3 is a vertical central section, on a larger scale, through the recording devices. Fig. 4 is a top plan view of the same. Fig. 5 is a bottom plan view of the same.

Referring to the drawings, A A' represent two horizontal guides fixed rigidly in and forming part of the main frame, and B a carriage to sustain the diaphragm mounted to slide to and fro on said guides. The upper guide is of tubular form, with a longitudinal slot *a* in the under side, and contains a feed-screw C, which engages a nut *b* on the carriage to cause the movement of the latter. The carriage is formed with a vertical neck *b'*, to which there is fixed by screw *b<sup>2</sup>* a plate

*b<sup>3</sup>*. To this plate is connected by a horizontal hinge-pin *d* the frame D, having an opening in which the recording-diaphragm E is peripherally secured. The diaphragm is provided at the center with the fixed style or cutter *e*, which acts upon and produces a record-groove in the surface of the rotary record-cylinder F in the usual manner. The diaphragm-frame is free to rise and fall around the hinge-pin, so that its weight holds the diaphragm and style down to their operative positions; but their descent is limited by an arm G, pivoted at *g* to the diaphragm-frame and provided at one end with a smooth hemispheric knob *g'* to ride on the surface of the record-cylinder and acted upon at the other end by a vertical adjusting-screw *g<sup>2</sup>* passing down through the frame.

H represents the speaking-tube, by which the sound-waves are directed upon the recording-diaphragm. This tube instead of being attached to and sustained by the diaphragm-frame, as heretofore, is now connected to an independent sustaining arm or plate *f*, having arms mounted on the hinge-pin of the diaphragm-frame, so that the two are free to rise and fall independently around a common center. In order to limit the descent of the tube-sustaining plate, it is provided with an arm *f<sup>2</sup>*, which acts beneath a stop *f<sup>3</sup>* in the carriage. This prevents the weight of the plate and tube from being transmitted to the diaphragm or style. The tube-sustaining plate is provided with a short neck or tube extending down loosely into an opening in the top plate of the frame and surrounded by a thin elastic collar *f<sup>4</sup>*, of soft rubber or like material, to prevent the leakage of air. When the recorder is not in use, it may be folded upward against the carriage, as indicated in broken lines, the tube being first detached.

The essence of my invention lies in sustaining the rising and falling diaphragm-frame and the tube leading thereto on independent supports, and it is obvious that the details may be modified at will without passing beyond the scope of my invention, provided these essential characteristics are retained. The elastic collar, although advantageous, is not necessary, and the same may be said as to the pivoted support of the tube-sustaining



plate. If preferred, this plate may be fixed to the carriage when it is not required to fold the parts.

In the drawings I have shown the reproducing device I in the usual form of a tubular arm  $i$ , containing the reproducing-style and actuating-diaphragm. The arm is hinged at  $i^2$  to a collar  $i^3$ , mounted in the carriage around the guide A and adapted to rotate in order to carry the recorder from the inoperative position shown in full lines in Fig. 1 to the operative position shown in dotted lines. It will be observed that in this manner the reproducer is brought into action without removing the recorder, which will stand in its upright position beneath and out of contact with the recorder, as shown.

The rotary collar, the recorder hinged thereto, and the locking-nut are not claimed as part of the present invention, being shown and claimed in my application for Letters Patent filed on the 9th day of April, 1889, Serial No. 306,497.

The recording-diaphragm is made of sheet metal, preferably aluminium, and instead of being made flat throughout its surface, as usual, is provided near the outer edge with an annular corrugation or rib  $i^5$ , formed by pressing or spinning the metal up from one side, so that there is a groove in one face and a corresponding rib on the other.

It is to be observed that the corrugation is at the extreme edge or margin of the exposed or operative portion, and that it is raised wholly above one face of the diaphragm, the object being to have the entire active portion of the sheet perfectly flat without break or interruption of any kind therein.

Having thus described my invention, what I claim is—

1. In a graphophone, a frame sustaining the recording-diaphragm and a plate sustaining a speaking-tube, the two mounted to rise and fall independently.

2. In a graphophone, a record-cylinder, a diaphragm, a style connected therewith and acting on the cylinder, a diaphragm-sustaining frame mounted to rise and fall freely when in action, a tube terminating in proximity to the diaphragm, and a tube-support sustained independently of the diaphragm-frame, whereby the diaphragm-frame is permitted to play up and down independently of the other parts.

3. In a graphophone, a speaking-tube and a support therefor, and a diaphragm-supporting frame having a telescopic connection with the tube-support and hinged to rise and fall independently.

4. In combination with the tube-support and the independently-vibrating diaphragm-support, the intermediate yielding collar.

5. In combination with the record-cylinder, the carriage, the hinged gravitating diaphragm-frame, its rest or support riding on the cylinder, and the independently-hinged tube-support.

6. In combination with the carriage, the recorder hinged thereto to fold upward out of action, the rotary collar, and the reproducer hinged to the rotary collar, substantially as shown, whereby the recorder and reproducer are adapted to be thrown into and out of action without detaching any of the parts.

7. In a graphophone, a carriage, in combination with a recorder and a reproducer, each hinged to the carriage independently of the other to swing vertically from an operative position to an inoperative position of rest.

In testimony whereof I hereunto set my hand, this 12th day of December, 1889, in the presence of two attesting witnesses.

JNO. H. WHITE.

Witnesses:

W. R. KENNEDY,

F. STANLY ELMORE.