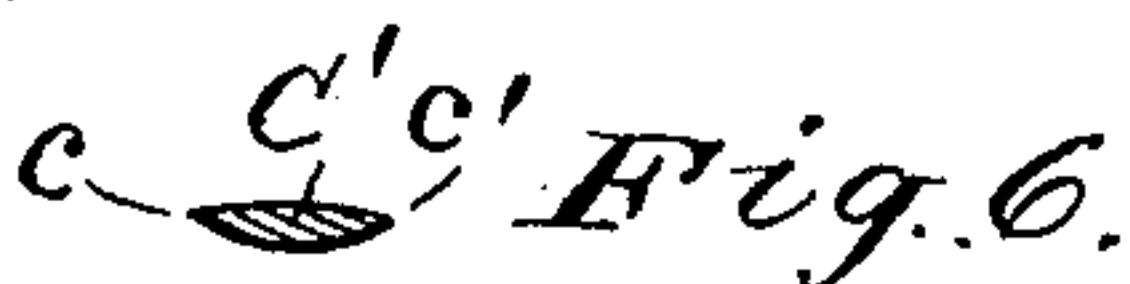
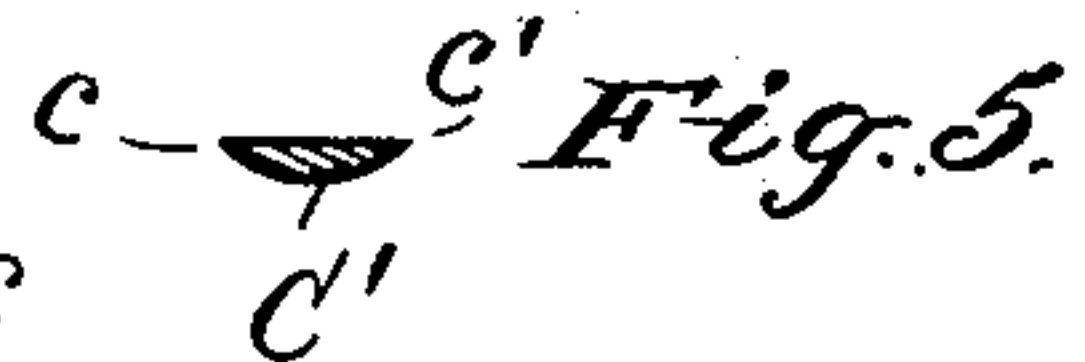
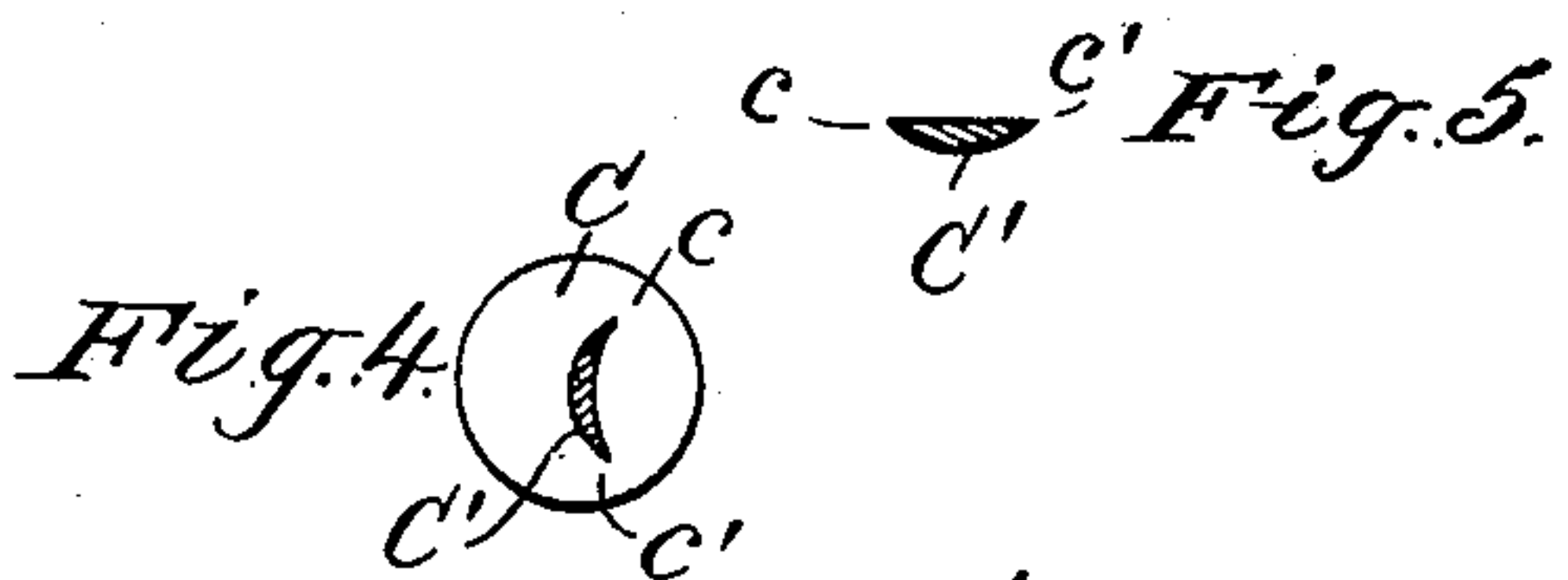
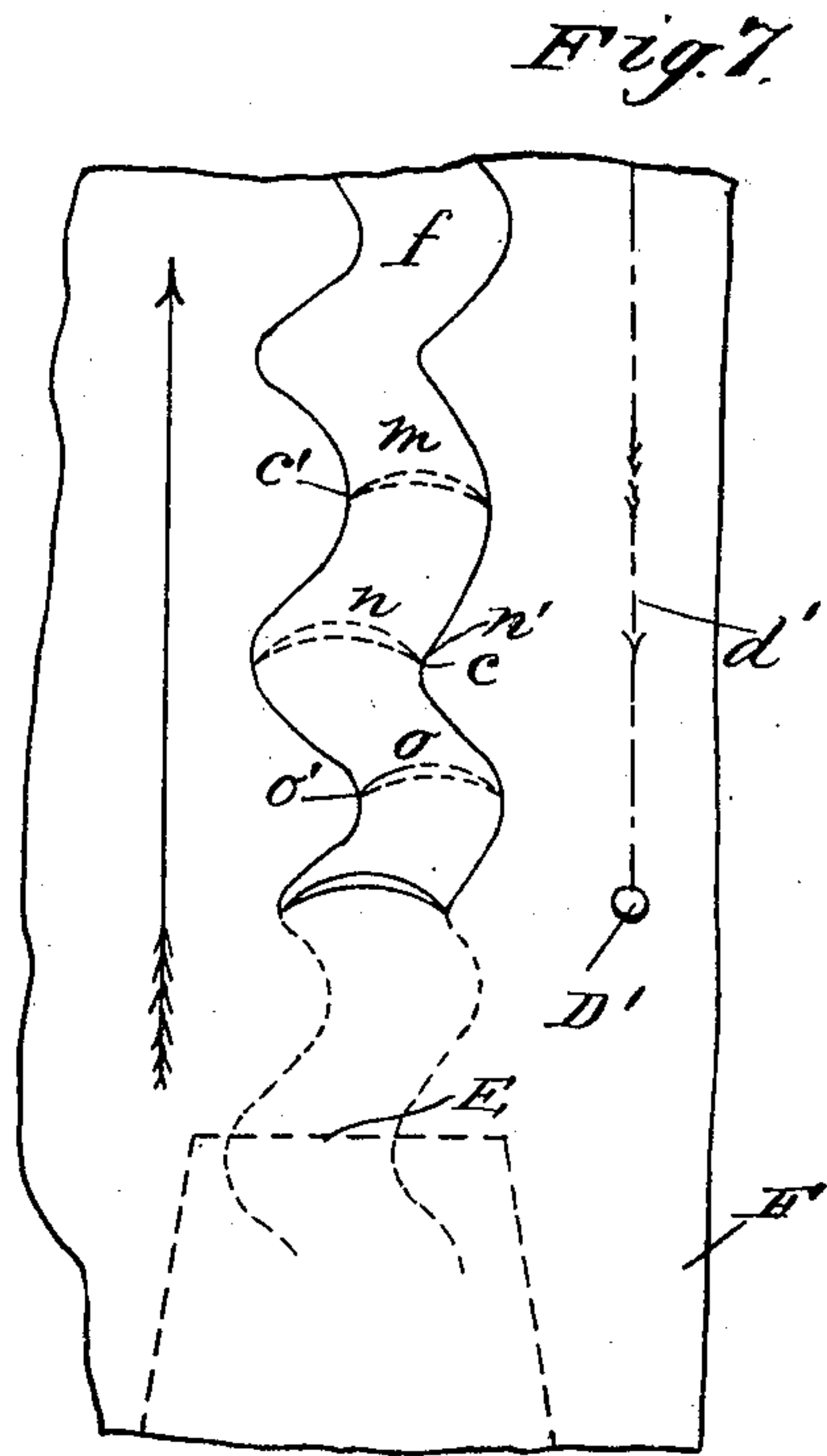
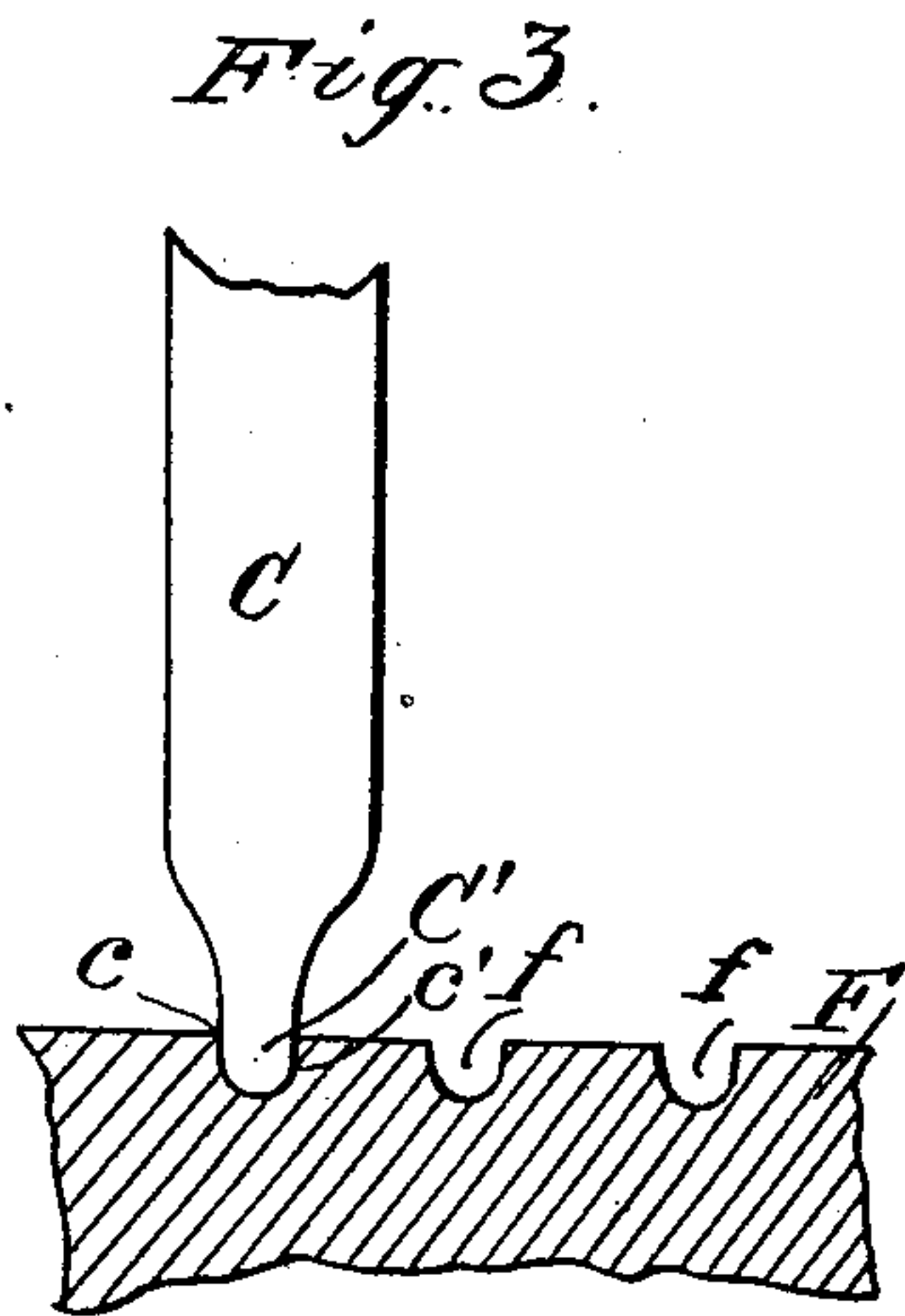
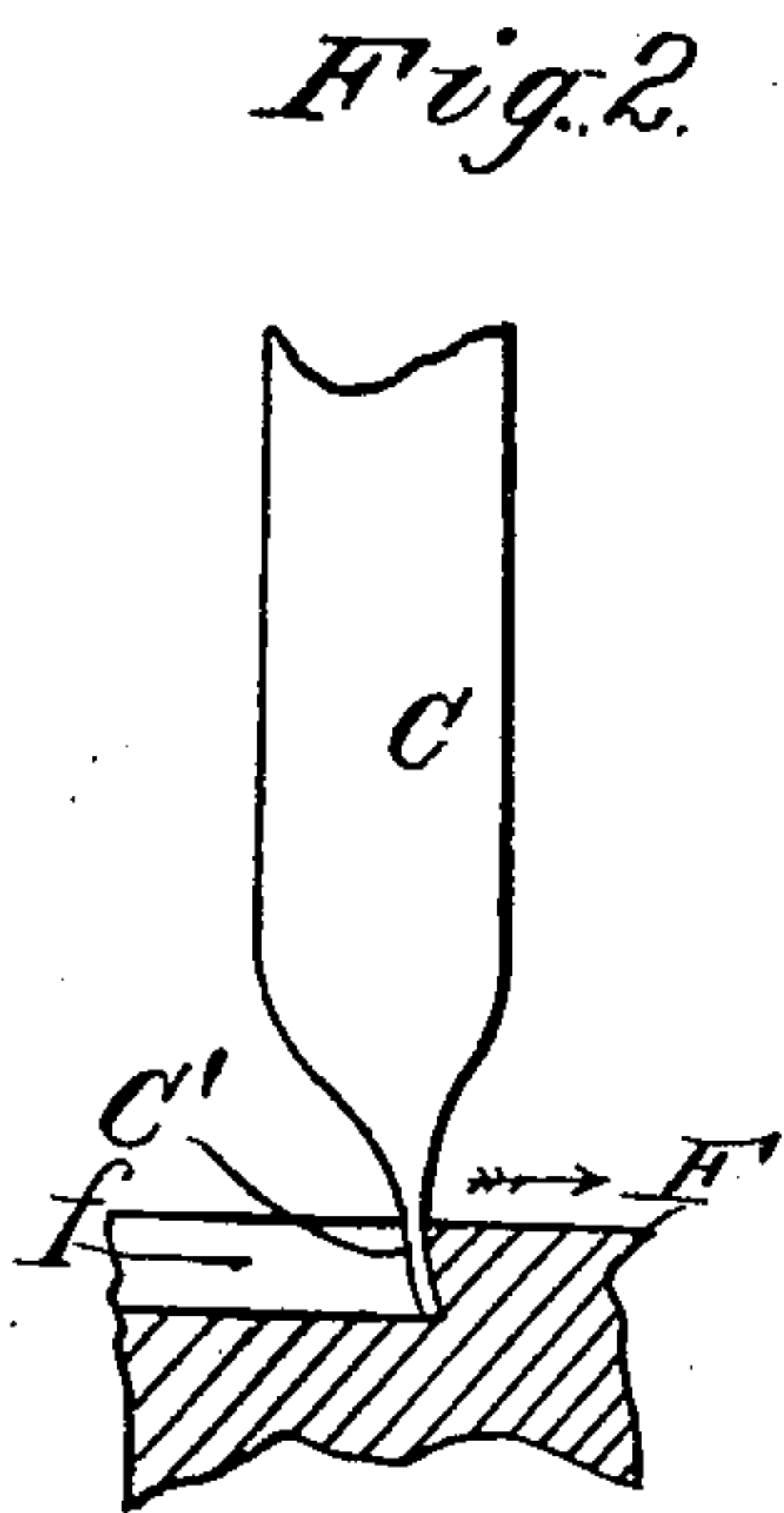
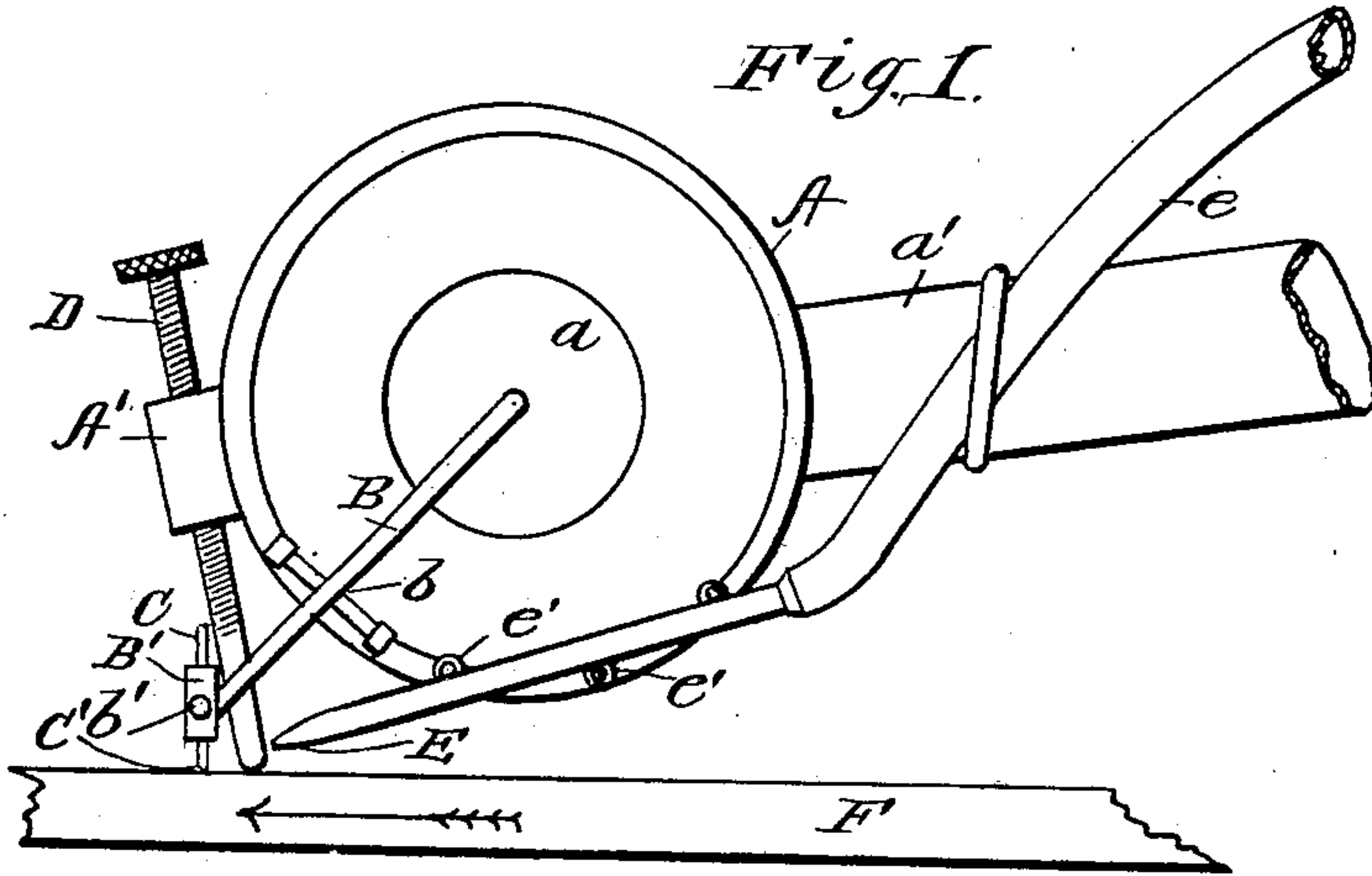


No. 763,903.

PATENTED JUNE 28, 1904.

J. W. JONES.  
SOUND RECORDING APPARATUS.  
APPLICATION FILED MAY 1, 1900.

NO MODEL.



Witnesses.

W. R. Edelen.  
[Signature]

Inventor  
Joseph W. Jones  
by [Signature]  
his atty.

# UNITED STATES PATENT OFFICE.

JOSEPH W. JONES, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF WEST VIRGINIA.

## SOUND-RECORDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 763,903, dated June 28, 1904.

Application filed May 1, 1900. Serial No. 15,056. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH W. JONES, of the city and State of New York, have invented a new and useful Sound-Recording Apparatus, which is fully set forth in the following specification.

This invention relates to a sound-recording apparatus for producing in a suitable recording material grooves of uniform depth containing lateral undulations made by and in accordance with sound-waves, such sound-records being fully set forth in certain pending applications of my own, Serial No. 659,170, filed November 19, 1897, and Serial No. 10,367, filed March 27, 1900.

The invention relates particularly to the novel form of cutting-tool employed.

The original phonograph employed a point to indent the tin-foil, the point acting at right angles to the foil or vertically. The graphophone and the modern phonograph employ as a cutting-tool a small cylindrical stylus whose recording end is cut off square and may be either plane or cupped. In either case the cutting edge is circular, while (since the stylus lies at an angle to the recording-tablet) that portion of this edge which actually does the cutting is a semicircle or less. The gramophone employs a fine point to trace an almost imperceptible line in an acid-resisting film; but in cutting records of the kind described in my pending applications none of these cutting-tools will serve. A fine point would not cut at all, but would merely scratch, and the lines scratched by it (not being cleanly cut) would have jagged edges and would be too narrow for practical reproduction of sound, while if a cylindrical stylus were employed not only would it meet greater resistance and have to tear or plow a furrow instead of cutting it cleanly, with the result of rough jagged edges, but the rearmost part of the cylindrical cutting-tool would not clear the more abrupt of the projections constituting the outline of the record-groove. For this reason it is necessary in making original sound-records of the desired character, consisting of lateral undulations, (to right and left of the normal,) 50

that the recording-tool cut readily both to right and to left—that is, the recording-tool must be two-edged. Further, it is necessary that the body of the recording-tool be cut away as much as possible immediately behind its cutting edges, so as to leave no shoulder that would fail to clear the projections forming the outline of the groove already cut—that is to say, the most advantageous form of cutting-tool for the purpose in hand may be described as “spoon-shaped” and having two cutting edges. 55

In the drawings illustrating my invention, Figure 1 is a side elevation showing the complete recording apparatus in operative connection with a recording-tablet, only a portion of the latter being shown. Fig. 2 is a side elevation, on an enlarged scale, of the recording-tool. Fig. 3 is a rear elevation of the same. Fig. 4 is an inverted transverse section through the same, taken on the plane of the recording-surface. Fig. 5 is a sectional view of a modified form of recording-tool. Fig. 6 is a similar view of another modification, and Fig. 7 is a plan view illustrating the mode of operation of the cutting-tool. 60

A is a suitable head or “sound-box” having a diaphragm *a* and a neck or tube *a'*, that leads to the mouthpiece. (Not shown.) Attached to the center of the diaphragm is an arm B, secured to the frame of the sound-box A, as at *b*, preferably by a pivot, and carrying a substantially vertical tubular head B'. 65

My new recording-tool C is carried in the head B', as by a set-screw *b'*. On the frame A is a lug A', that provides a bearing for a screw-threaded pin D, which is thus vertically adjustable in its bearing. 70

E represents the nozzle of a pipe *e* for carrying an air-blast, the pipe *e* being supported in any convenient manner, as by securing it to the neck *a'*, and the nozzle E may be secured to the frame A, as at *e' e'*. 75

F represents a portion of a suitable recording-tablet, such as described in my said pending applications, the same being mounted to progress in the direction indicated by the arrow in Fig. 1. 80



The recording apparatus is mounted in any approved manner so as to be in operative contact with the recording-tablet, as indicated in Fig. 1. The rounded foot of the screw-threaded pin D rests upon the uncut surface of the tablet to regulate the depth to which the cutting-tool C enters the recording material—that is, by raising or lowering pin D, I regulate the depth of the sound-groove *f*.  
 10 The purpose of the air-blast is to blow away all the cuttings in order to prevent any clogging or interference with the cutting-tool, the nozzle E being directed to deliver its blast around the cutting portions of the tool. I  
 15 will now describe this cutting-tool C. The main portion of this tool is substantially cylindrical, though this is immaterial. The lower portion C' is reduced, as shown by Figs. 2 and 3, to produce a two-edged cutting-tool,  
 20 preferably spoon-shaped, the cutting edges being indicated at *c c'*. (See Fig. 4.) Fig. 5 shows a modified form, plano-convex in cross-section, and Fig. 6 still another modification; but Fig. 4 shows the preferred form,  
 25 crescent-shaped in cross-section.

Fig. 7 illustrates the mode of operation of my improved apparatus, the arrow indicating the direction in which the tablet progresses, so that relatively the cutting-tool advances  
 30 in the opposite direction. In cutting from the position indicated at *m* to the position *n* the cutting edge *c'* has done most of the work, though the other edge *c* does its part in making a clean cut on that side of the groove, the  
 35 air-blast (from nozzle E) simultaneously removing the loosened material. In passing from the position *n* to that indicated at *o* the edge *c* does most of the work, and so on, the flatness or spoon shape of the tool enabling it  
 40 to clear projections *n' o'*, &c., readily. D' indicates the position of the rounded foot of regulating-pin D, which slides smoothly over the uncut portion of the polished surface of tablet F to one side of cutting-tool C, its path  
 45 being indicated by the dotted line *d'*.

While the air-blast coöperates with the cutting-tool in producing the best results, it is not absolutely necessary and may be dispensed with, and the same is true with regard to the  
 50 regulating-pin.

Having thus described my invention, I claim—

1. A sound-recording tool, of a flattened crescent shape in cross-section, and presenting two cutting edges. 55

2. A sound-recording tool provided with two separate cutting edges one on either side, said edges being separated by a blunt or rounded bottom.

3. In a sound-recording apparatus comprising a revoluble table carrying a suitable recording-tablet and having a sound-box mounted to travel radially across said tablet, and a sound-diaphragm in said box and disposed at right angles to said tablet, a recording-tool  
 60 in combination therewith, the latter consisting of a flattened piece of metal presenting two separate and distinct cutting edges on opposite sides thereof and facing respectively in the same directions as the two faces of said  
 65 diaphragm, the said tool being embedded to a slight yet appreciable distance into the material of said tablet, whereby upon the vibration of said diaphragm the edges will cut alternately in opposite directions, as and for  
 70 the purpose specified. 75

4. A sound-recording apparatus comprising a revoluble table carrying a recording-tablet, and a sound-box mounted to travel across said tablet and containing a diaphragm, and in combination with the foregoing a recording-tool  
 80 connected with said diaphragm, the said tool consisting of a flattened piece of metal presenting two separate and distinct cutting edges on opposite sides thereof, and the said tool  
 85 being embedded to a slight yet appreciable distance into the material of said tablet, whereby upon the vibration of said diaphragm the edges will cut alternately in opposite directions, as and for the purpose specified. 90

5. A laterally-vibrating cutting-style for sound-records provided with lateral cutting edges in line with its path of vibration.

6. A laterally-vibrating cutting-style for sound-records provided with lateral cutting  
 95 edges in line with its path of vibration and provided with a concave face.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOSEPH W. JONES.

Witnesses:

C. A. L. MASSIE,  
 WILLIAM E. HILLS.