

No. 671,625.

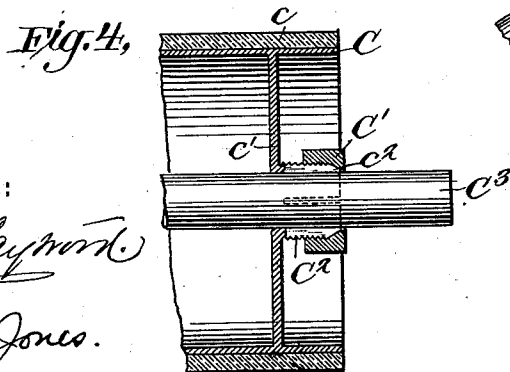
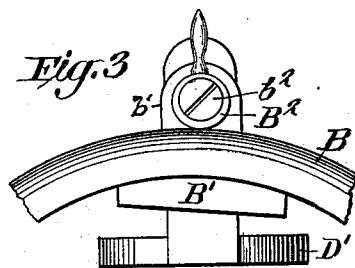
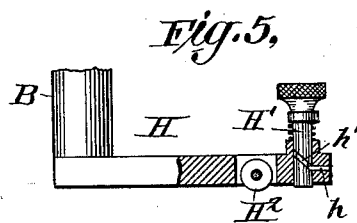
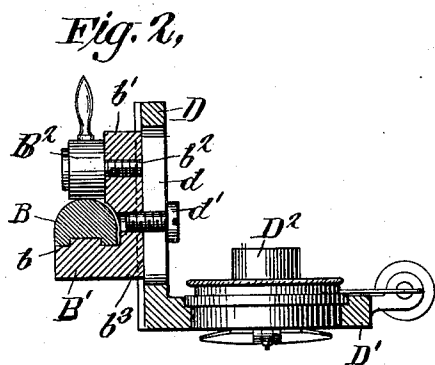
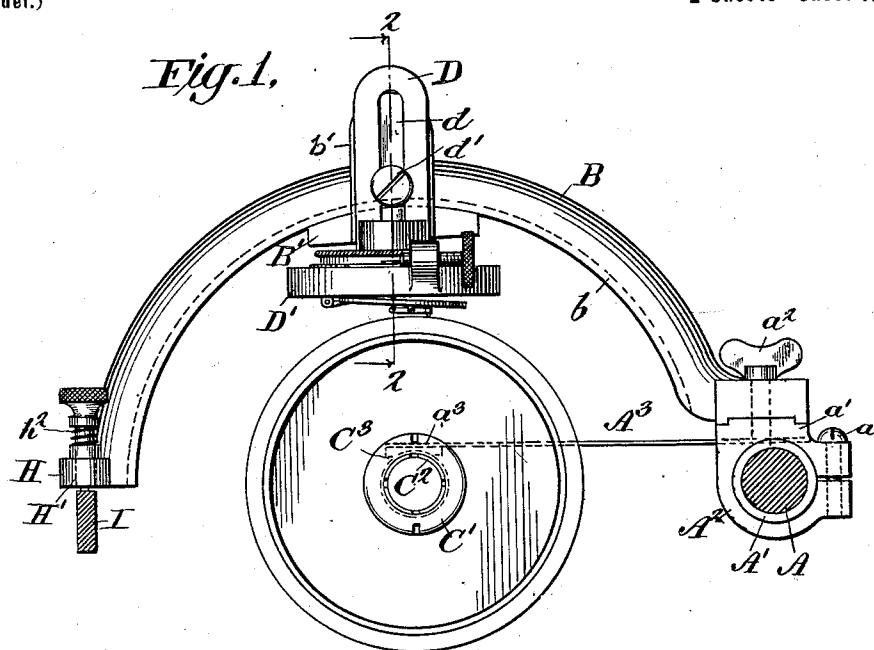
Patented Apr. 9, 1901.

E. A. HAWTHORNE.
PHONOGRAPH.

(Application filed Jan. 18, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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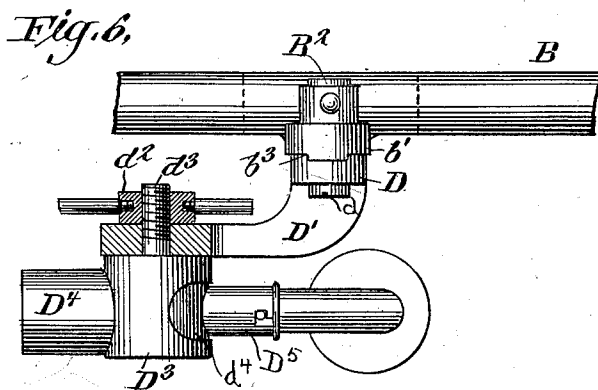
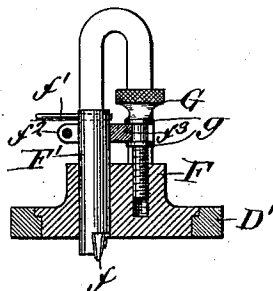


Fig. 7,



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UNITED STATES PATENT OFFICE.

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PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 671,625, dated April 9, 1901.

Application filed January 18, 1900. Serial No. 1,857. (No model.)

To all whom it may concern:

Be it known that I, ELLSWORTH A. HAWTHORNE, a citizen of the United States of America, residing in Montclair, Essex county, New Jersey, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates to phonographs, graphophones, and similar machines, the object being to secure certain adjustments of the recorder, reproducer, and shaving-knife relatively to the phonogram-blank or the sound-record cylinder.

I will describe a machine embodying my improvements and point out the novel features thereof in the claims.

To carry out the object of my invention, I have devised the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a diaphragm-supporting arm and its adjuncts. Fig. 2 is a vertical section on the plane of the line 2 2 of Fig. 1, certain of the parts being shown in elevation. Fig. 3 is a view in elevation of a portion of the diaphragm-supporting arm on the side opposite that shown in Fig. 1. Fig. 4 is a sectional view of the mandrel that carries the sound-record. Fig. 5 is a view, part in section and part in elevation, of a bracket on the diaphragm-supporting arm and a stud for raising and lowering the latter. Fig. 6 is a plan view of the diaphragm-supporting arm and bracket. Fig. 7 is a view of my improved knife adapted to be used in connection with the diaphragm-supporting arm.

In the drawings, in which similar letters of reference indicate similar parts, A designates the back rod, and A' the back-rod sleeve, movable along said rod, as found in well-known machines, to which my improvement relates. A² designates a split collar or ring clamped to the said sleeve by means of a screw *a*. The upper face of the collar A² is provided with a seat *a'* to receive the end of the diaphragm-supporting arm B, the contacting faces being dovetailed to provide a fixed seat. The sleeve A' and its attached parts are caused to travel along the rod A by means of the twin nut *a*³, traveling upon the screw-threaded drive-shaft C³, and the arm A³, connected to said nut and also to the sleeve A', this construction being one commonly used in machines of this class.

The arm B, which carries a bracket adapted to support a recorder, reproducer, or shaving-knife, is curved on the arc of a circle, so as to be concentric with the sound-record cylinder. This arm is clamped at its rear end to the collar A² by means of a screw *a*², and at its forward end is formed into a bracket H, to be hereinafter described. This arm B is provided upon its under face with a grooved way or track *b*, adapted to receive a slide-block B', which block has an upwardly-extending portion *b'*, in which is seated a stud *b*². On this stud is mounted a cam-lever B², which bears upon the upper face of the arm B and firmly locks the slide-block B' to said arm. By adjusting the cam-lever the slide-block B' may be moved to any part of the arm B and then clamped securely in position thereon. The inner face of the upwardly-extending part *b'* will preferably be formed with a suitable guideway *b*³, and mounted so as to be adjustable along said way is a block D, which forms an integral part or has secured to it a bracket D', which bracket is adapted to receive a recorder D² or a reproducer or a shaving-knife of any approved construction. The block D is slotted, as shown at *d*, so that it may be adjusted to any position along the part *b'* of the slide-block B' by means of a clamp-screw *d'*, having a seat in the block B'.

It is evident from the construction that whatever may be the diameter of the sound-record cylinder the recorder, reproducer, or shaving-knife carried by the bracket D' may be adjusted radially of said cylinder to accommodate any one of said devices to a cylinder of greater or less diameter. Thus if the machine has been in use with a phonogram or cylinder of small diameter and it is desired to use one of greater diameter or one that is commonly known as "concert size" the recorder, reproducer, or shaving-knife may be adjusted radially outward to accommodate said device to the larger phonogram or cylinder. Of course a reverse adjustment may be used when changing from a large to a smaller phonogram or cylinder. It will also be seen that according to the construction above described the recorder, reproducer, or shaving-knife may be adjusted lengthwise of the arm B, according to the character of the record to be made or reproduced. For ex-

ample, if a light engraving of the sound-recorder is required a better result is obtained by placing the recorder substantially in the position shown in Fig. 1, and the reproducer should occupy the same position when it is in use. If a heavy engraving is required, such as a record of a band, it is better to place the recorder at the right-hand end of arm B or at the back of the phonogram-blank, as in such position the limiting-weight or the weight of the diaphragm bears heavier on the recording-stylus, and hence a deeper cut will be made.

With the heavy engraving the reproducer may be thrown to the back of the phonogram, and thus the angle best suited to a proper reproduction secured. Again, it may be found desirable to place the recorder or reproducer at the front of the cylinder for certain records. With the present form of adjustment it is possible by moving the recorder or reproducer along the arm B to ascertain precisely the position of the said devices or either of them best suited to the work required.

In Figs. 1 and 4 I have shown a form of mandrel that permits of a ready change in the size required or desired for use. In this form C designates a mandrel adapted to receive the sound record or cylinder *c*. The mandrel is provided near one end with a diaphragm *c'*, having a central opening in which is seated the base or flange of a split collar *C*². The sections of the collar *C*² are screw-threaded and tapered at their outer ends. When placed upon the main driving-shaft *C*³, the collar, and consequently the mandrel, may be secured to said shaft by means of a clamp-nut *C'*, having an inclined shoulder *c*², engaging the tapered ends of the collar-sections, and thus drawing the collar firmly down upon the shaft. Of course any other means, such as any well-known clutch mechanism, may be employed to secure the mandrel to the shaft, the only consideration being that whatever means shall be employed shall permit of easy and ready adjustment, so that a mandrel of any given size may be placed upon the main driving-shaft without difficulty.

In Fig. 6 the adjustable bracket *D'* is shown as supporting, by means of a stud *d*³, a tubular body *D*³. This tubular body has attached thereto the horn connection *D*⁴, and also carries the diaphragm connection-tube *D*⁵, to which is attached a form of recorder commonly employed on graphophone-machines. This connection *D*⁵ has its inner end in the form of a plate curved to fit and bear against the inner wall of the body *D*³, forming a socket connection. The outer end of the stud *d*³ is screw-threaded, and a clamp-nut *d*² mounted thereon permits the adjustment at any desired angle of elevation of the horn connection independently of the recorder or reproducer, even while the record is being made or reproduced. The wall of the tubular body is cut away, as shown at

*d*⁴, so as to permit free movement of the horn connection independently of the diaphragm to the extent of the portion cut away. With this form of attachment, in connection with the radially-adjustable devices heretofore described, it is possible to adjust the position of the recording-stylus at any given point on the phonogram-blank to bring the recording-point into operation to make cuts of different degrees. This may be done by first adjusting the diaphragm connection by means of the nut *d*² and screw *d*³, so as to throw the recorder off the blank and then bring the recording-point into a different angular position at the same point on the phonogram-blank by means of the adjustable block or bracket *D*. In this manner the recording-point may be given any angular position with relation to the phonogram-blank, so that a cut of any desired character may be made.

The means just described for adjusting the horn connection and recorder are secured to the adjustable bracket *D'*, and the sound-box adjustment (shown in Fig. 6) is capable of the adjustments heretofore described lengthwise of the arm B and radially of the sound-record cylinder.

In Fig. 7 I have shown a novel form of shaving-knife. It consists, essentially, of a body portion *F*, adapted to be seated in the bracket *D'*. Passing vertically through an opening in the body *F* is a post *F'*, which carries at its lower end a knife or cutter *f* and at its upper end a suitable handle *f'*, by means of which the post may be rotated, and thus the knife-edge adjusted so as to cut a narrow or wide strip from the periphery of the sound-record cylinder. The body *F* is also provided with a screw-threaded recess to receive a screw *G*, which is provided near its upper end with collars or rings *g*. Between these rings are the arms *f*³, forming part of a collar *f*², clamped to the post *F'*. By these means the post *F'* and the knife carried by it may be adjusted radially of the sound-record cylinder to give a light or heavy cut.

The front portion of the arm B is formed into a bracket *H*, which carries the roller *H*², adapted to travel upon the edge *I*, forming part of the frame or body of the machine. This construction materially reduces the friction of the arm B on the traveling way *I*. In order to lift the arm B, and consequently the recorder, reproducer, or shaving-knife, from the periphery of the sound-record cylinder, I provide a very simple means in the pin *h*, seated in the bracket *H* and projecting into a slot *h'* on the stud *H'*, set into an opening in said bracket. A spring *h*³, surrounding said stud and bearing against the bracket *H*, tends normally to hold the roller in contact with the edge *I*⁴. By turning the stud *H'* the arm B will be lifted, and the part held by the bracket *D* will be clear of the cylinder.

Having now particularly described and ascertained the nature of my invention and in

what manner the same is to be performed, I declare that what I claim is—

1. An attachment for use on phonographs and graphophones, comprising a bracket to support a recorder, reproducer or shaving-knife, an arm to which said bracket is adjustably secured, and means to adjust said bracket, together with the recorder, reproducer or shaving-knife when attached to the machine, relatively to said arm in a straight line in the direction of the radius of the sound-record cylinder, whereby said devices may be adjusted to accommodate cylinders of different diameters on the same machine, substantially as described.

2. In a phonograph or graphophone, comprising a sound-record cylinder, an arm resting on the frame of the machine, a bracket to support a recorder, reproducer or shaving-knife, means to adjust said bracket with the recorder, reproducer or shaving-knife relatively to said arm in a straight line in the direction of the radius of the cylinder, whereby said devices may be adjusted to accommodate cylinders of different diameters on the same machine, substantially as described.

3. In a phonograph or graphophone comprising a sound-record cylinder the combination of a curved arm mounted concentrically of the sound-record cylinder, a bracket on said arm adapted to support a recorder, reproducer or shaving-knife, means to adjust said bracket lengthwise of said arm and means to adjust said bracket radially of said arm, substantially as and for the purpose described.

4. In a phonograph or graphophone, comprising a sound-record cylinder, the combination of a curved arm attached to the back-rod sleeve of the machine concentrically of said cylinder, a block mounted on and adjustable lengthwise of said arm, a bracket, to support a recorder, reproducer or shaving-knife, adjustably secured to said block, and means to adjust said bracket together with the recorder, reproducer or shaving-knife in a straight line in the direction of the radius of the cylinder, substantially as described.

5. In a phonograph or graphophone com-

prising a sound-record cylinder, an arm supported on the frame of the machine and embracing the sound-record cylinder, a recording, reproducing or shaving device supported on said arm, and means to adjust said devices lengthwise of said arm, substantially as described.

6. In a phonograph or graphophone, comprising a sound-record cylinder the combination of a curved arm, mounted on the frame of the machine concentric with the sound-record cylinder, a bracket mounted on said arm and adjustable lengthwise thereof, a recorder, reproducer or shaving-knife supported by said bracket, and a cam-lever secured to said bracket and bearing upon the said arm, to lock the said bracket to the said arm in any desired position.

7. A shaving-knife adapted to be used with phonographs or graphophones, consisting of a body portion, a knife-carrying arm, and means to adjust said arm and knife at any desired angle, to change the width of the cut.

8. In a phonograph or graphophone, comprising a sound-record cylinder and a recorder or reproducer, an arm attached to the back-rod sleeve of the machine, a bracket to support said recorder or reproducer adjustably mounted on said arm, a horn connection for the recorder or reproducer also mounted on said bracket and means to adjust said horn connection independently of the recorder or reproducer.

9. In a phonograph or graphophone, comprising a sound-record cylinder, an arm secured to the back-rod sleeve, a bracket mounted on said arm and adjustable thereon radially of the sound-record cylinder, a recorder supported by said bracket and means to adjust said recorder to any desired angular position relatively to the sound-record cylinder, to make any desired character of cut.

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

ELLSWORTH A. HAWTHORNE.

Witnesses:

GEO. E. CRUSE,

CHARLES S. JONES.