

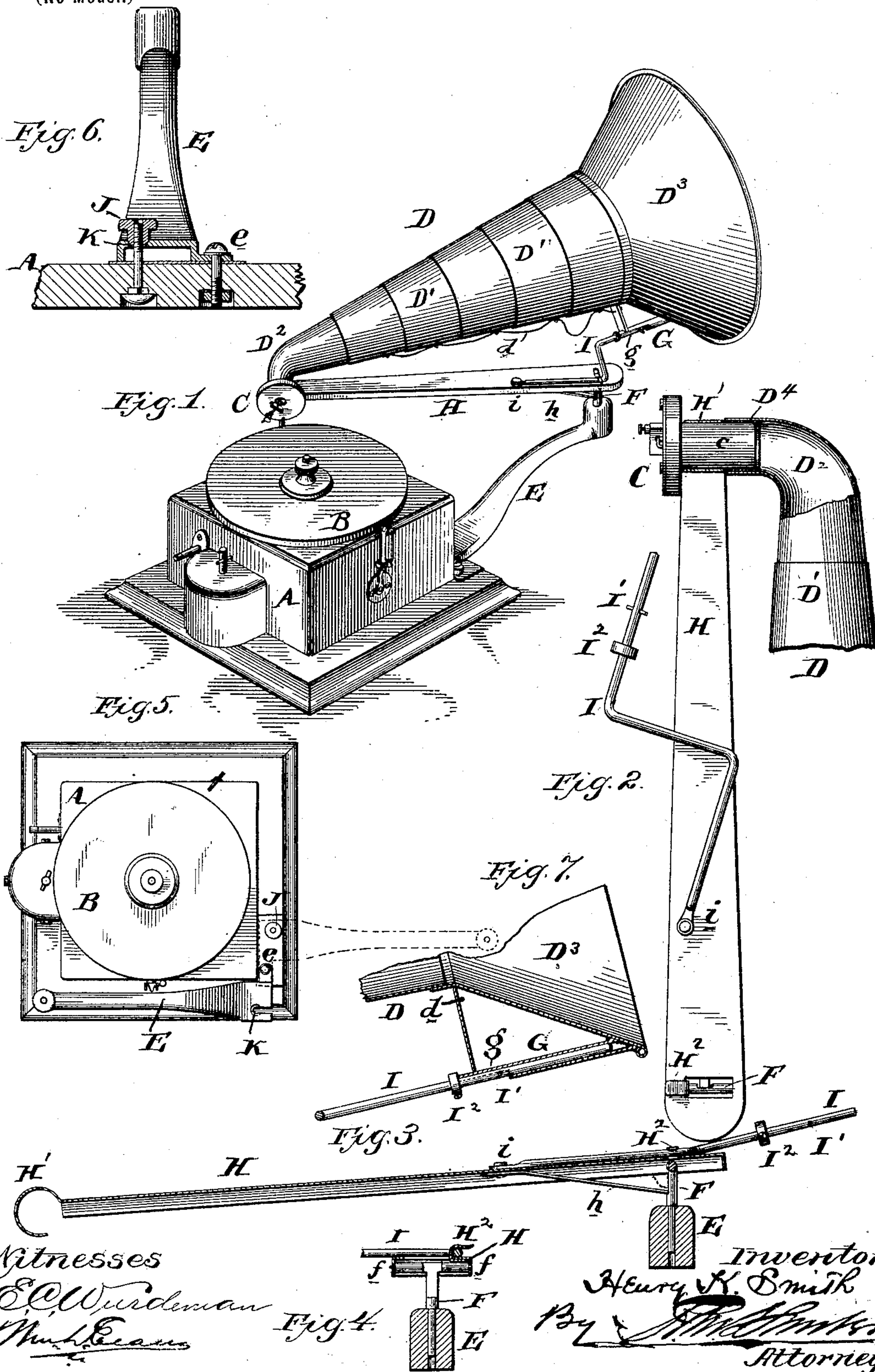
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Patented Mar. 6, 1900.

H. K. SMITH.  
GRAMOPHONE.

(Application filed July 10, 1899.)

(No Model.)



Witnesses  
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Fig. 4.

Inventor  
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# UNITED STATES PATENT OFFICE.

HENRY K. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

## GRAMOPHONE.

SPECIFICATION forming part of Letters Patent No. 644,834, dated March 6, 1900.

Application filed July 10, 1899. Serial No. 723,277. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY K. SMITH, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Gramophones, of which the following is a specification.

My invention has reference to gramophones; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my improvements is to so construct and adapt the sound horn or amplifier and its supporting devices to the sound-producing means that it may be condensed when not in use, so as to take up much less room than when in operation, to facilitate shipping and storage, and at the same time retain all of the advantages heretofore existing.

Furthermore, my object is to so support the horn and reproducer that when not in use in connection with the rotating plate or disk it shall be supported in a manner to prevent contact of the stylus or needle point with the table or support for the instrument.

My object is, moreover, to improve the connection of the horn with the reproducer in such manner as to secure increased and more clear sound transmission.

In carrying out my invention I support the horn upon a pivoted arm sustained by a bracket from the main body of the machine and provided with means for limiting the downward movement of its free end, to which the reproducer carrying the needle-point is secured. The horn or amplifier is made of a collapsible construction having its ends made of metal and combined with the supporting pivoted arm in such a manner as to be retained in a stretched or extended condition when adapted for use, but capable of being disconnected and condensed for shipment or storage. In connection with this part of my apparatus I form the elbow of the horn of sheet metal or other hard substance and connect it with the tubular end of the reproducer through a sleeve or lining of fibrous or hard but practically non-resonant material, whereby all metallic, foreign, or rattling sounds of the machine are eliminated from the amplifier. The bracket for supporting the pivoted arm of the amplifier and reproducer is piv-

oted or hinged, so as to turn about its connection to the main frame, and combined with suitable clamping means for holding it in an extended or operating position. In addition to these features there are others of minor importance, but all of which are hereinafter fully disclosed.

My improvements will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a gramophone embodying my improvements. Fig. 2 is a plan view of the pivoted arm for supporting the horn or amplifier, showing parts in section. Fig. 3 is a longitudinal section of same. Fig. 4 is a cross-section of same across its pivotal point. Fig. 5 is a plan view of the gramophone in a partly-dismantled condition, ready for shipping or storage. Fig. 6 is a cross-section showing the jointed connection of the bracket with the main frame, and Fig. 7 is a sectional elevation showing connection of the large end of the horn with its support.

A is the main frame of the gramophone and incloses the motor.

B is the rotating table upon which the disks containing the spiral tracings are clamped.

C is the reproducer and consists of the usual head inclosing a diaphragm against which the needle or stylus or its holder rests. The rear end of the sound-box of the reproducer C is made tubular, as at c.

D is the horn or amplifier and is connected to the reproducer and sustained by the pivoted arm H, which latter is pivoted by a universal joint upon the end of a bracket E, secured to and projecting from the frame A.

The horn or amplifier D consists of a series of tapering tubular sections D', fitting one within the other, so as to make tight joints when extended, but having capacity for collapsing. The inner end section D<sup>2</sup> is made like an elbow and adapted to fit over the end of the tubular extension c of the reproducer. I prefer to form the sections D' of fiber and the elbow D<sup>2</sup> of metal or hard resonant material. The large end section or mouth of the horn may be also of metal. In case metal is used I prefer to interpose a tubular lining D<sup>4</sup> between the elbow and the extension c to prevent rattling and buzzing and movement.



I is a bent-wire rod pivoted to the arm H at *i*, having a free end adapted to the socket G of the horn. It is further provided with a transverse pin I' to work against the fastened surface *g* of the socket to hold the horn in an upright position. A collar I<sup>2</sup>, preferably adjustable on the rod, acts as an abutment against which the socket G rests and by which the tension put upon the horn in the direction of its length is secured. This wire I, when in position to support the horn, is snapped under a spring-catch H<sup>2</sup>, but is capable of being turned around on its pivot *i*, as indicated in Fig. 2, for condensing it for shipment. When in use for holding the horn distended, it will be seen that the wire is pivoted to the arm to one side of the line of tension put upon the horn. To prevent the arm H falling down under the weight of the horn and reproducer C, I provide a stop *h*, connected at one end to the arm and having the other end adapted to press against the pivot-post F. In practice I prefer to make this stop *h* of spring metal, so that it may be pressed toward the arm and permit the pivot-post to be turned down to condense it for shipment. It is evident, however, that any suitable stop may be employed between the arm H and post F to limit this downward movement of the free end of the arm. It is also evident that the parts *h* and H<sup>2</sup> might be formed integral with the arm. When the horn is condensed, the several portions telescope into each other and are prevented from accidental separation by the employment of the flexible connection or cord *d*, which is connected at intervals with the several sections.

The bracket E is permanently pivoted to the main frame at *e*, near one corner thereof, so that it may be turned around, as indicated at Fig. 5, and lie close to the side of the said main frame. The base part of the bracket is furthermore provided with a slot terminating in a depression, as at K, and adapted to receive a clamping-nut J of a fixed bolt *j*, as shown in Fig. 6. When the bracket is turned from the solid-line position into the dotted-line position in Fig. 5, the clamping-nut J firmly holds it in position.

It is evident that by my improvements I not only secure better and more satisfactory constructions for the parts enumerated than heretofore used, but I am enabled to greatly condense the entire apparatus for storage or shipment.

It is evident that while I have set out the details of construction more particularly preferred the minor details may be modified without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a pivoted arm having at its free end a sound-reproducing device, with a horn or sound-amplifier carried by the arm and consisting of a series of sections so as to be collapsible, and means car-

ried by the arm for holding said horn in an extended condition.

2. The combination of a pivoted arm having at its free end a sound-reproducing device, with a horn or sound-amplifier carried by the arm and consisting of a series of sections so as to be collapsible and provided with a socket on the bell-mouth of the horn, and means carried by the arm consisting of a wire or rod having a free end adapted to receive the socket for holding said horn in an extended condition.

3. The combination of a pivoted arm having at its free end a sound-reproducing device, with a horn or sound-amplifier carried by the arm and consisting of a series of sections so as to be collapsible and provided with a socket on the bell-mouth of the horn, and means carried by the arm consisting of a wire or rod having a free end adapted to receive the socket for holding said horn in an extended condition and pivoted to the arm to one side of the line of tension put upon it by the horn, and means to limit the movement of the wire or rod in one direction but permit its adjustment about its pivot in the other direction for packing.

4. In a sound-producing instrument a horn or sound-amplifier consisting of a series of sections telescoping into each other, the smaller end being formed with an elbow of hard material the intermediate sections of non-metallic material and the large end being formed of metal, in combination with means acting upon the two end parts to stretch or hold the parts in an extended condition.

5. In a sound-producing instrument a horn or sound-amplifier consisting of a series of sections telescoping into each other, the smaller end being formed with an elbow of hard material and the large end being formed of metal, in combination with means to stretch or hold the parts in an extended condition, and a flexible connection between several of the sections to connect them with the largest section and prevent relative displacement when collapsed.

6. In a speaking instrument, the combination of a sound-reproducing device having a rigid tubular end, a horn or sound-amplifier having an elbow at the small end of metal or other hard resonant material receiving the tubular end of the reproducing device, and an interposed washer or packing of non-resonant material fitting tightly and forming a practically-rigid joint between the tubular end of the reproducing device and the end of the amplifier.

7. In a speaking instrument, a sound-amplifier or horn, consisting of a series of sections telescoping into each other and tapering so as to form when extended a horn-shaped structure the intermediate section being formed of fiber, or non-metallic resonant material and the small end and bell-mouth or larger end section being formed of metal, in



combination with suitable means connecting with the end sections for holding the horn or sound-amplifier in an extended condition.

8. In a speaking instrument, the combination of a moving record, a supporting-bracket located to one side of the moving record, a vertical pivot-pin supported in the end of the bracket and free to revolve about a vertical axis, a freely-movable arm jointed to the vertical pin on a transverse axis, a suitable stop connected to the movable arm and directed backward and downward so as to strike against the vertical pin above the bracket and limit the downward motion of the movable arm without obstructing in any manner its lateral motions upon the bracket, and a sound-reproducing device carried upon the free end of the arm and having a needle-point acting upon the moving record.

9. In a speaking instrument, the combination of an arm pivoted so as to have universal movement, a sound-reproducing device carried at the free end of the arm, a bracket extending close to the pivoted end of the pivoted arm, an upright pin pivoted on a vertical axis in the end of the bracket and connected to the pivoted-arm on a transverse axis whereby the arm is universally jointed close to its outer end, and a stop wholly connected to the arm and having its lower end arranged in alinement with the vertical pin whereby when the arm is free the stop is caused to abut against the pin to limit the downward motion of the free end about the transverse axis but which when the instrument is in operation is out of contact with the vertical pin.

10. In a gramophone instrument, the combination of a pivoted arm carrying at its free end a sound-reproducing device, a support for the arm at its pivoted end consisting of the bracket E extending outward and upwardly close to the arm, a hinge device F pivoted to the end of the bracket on a vertical

axis and connected with the arm on a transverse axis, and a stop-finger *h* secured to the under side of the arm and projecting backward and downward so as to abut against the vertical pin only when the outer end of the arm is unsupported, the construction being such that when the arm is in its normal position during the operation of the instrument the stop-finger *h* has no connection with the vertical pin.

11. In a speaking instrument of the character described, the combination of the rotating table, a box-like structure inclosing the power devices for moving the table, a sound-reproducer adapted to be moved over the table, a pivoted arm carrying the sound-reproducer, and a bracket E to which the arm is pivoted said bracket being pivoted at *e* to the box-like structure adjacent to one corner thereof so that the arm may be swung around parallel to the box to condense the machine for shipment, and a suitable clamping device for clamping the base of the bracket to the box-like structure whereby the arm is held in a rigid extended condition when the machine is in operative adjustment.

12. In a gramophone instrument of the character described the universal pivoted arm H formed of sheet metal with top horizontal and sides bent at an angle to the top surface so as to project vertically downward for strengthening purposes and further having the free end of the horizontal top curved to form a tubular socket for receiving the sound-reproducer, in combination with a vertical pivot-pin jointed to the arm on a transverse axis extending through the sides at its end most distant from the tubular socket.

In testimony of which invention I hereunto set my hand.

HENRY K. SMITH.

Witnesses:

R. M. HUNTER,  
R. M. KELLY.