(No Model.) 2 Sheets—Sheet 1.

W. W. JACQUES.

COMBINED DOLL AND PHONOGRAPH.

No. 383,299. Patented May 22, 1888.

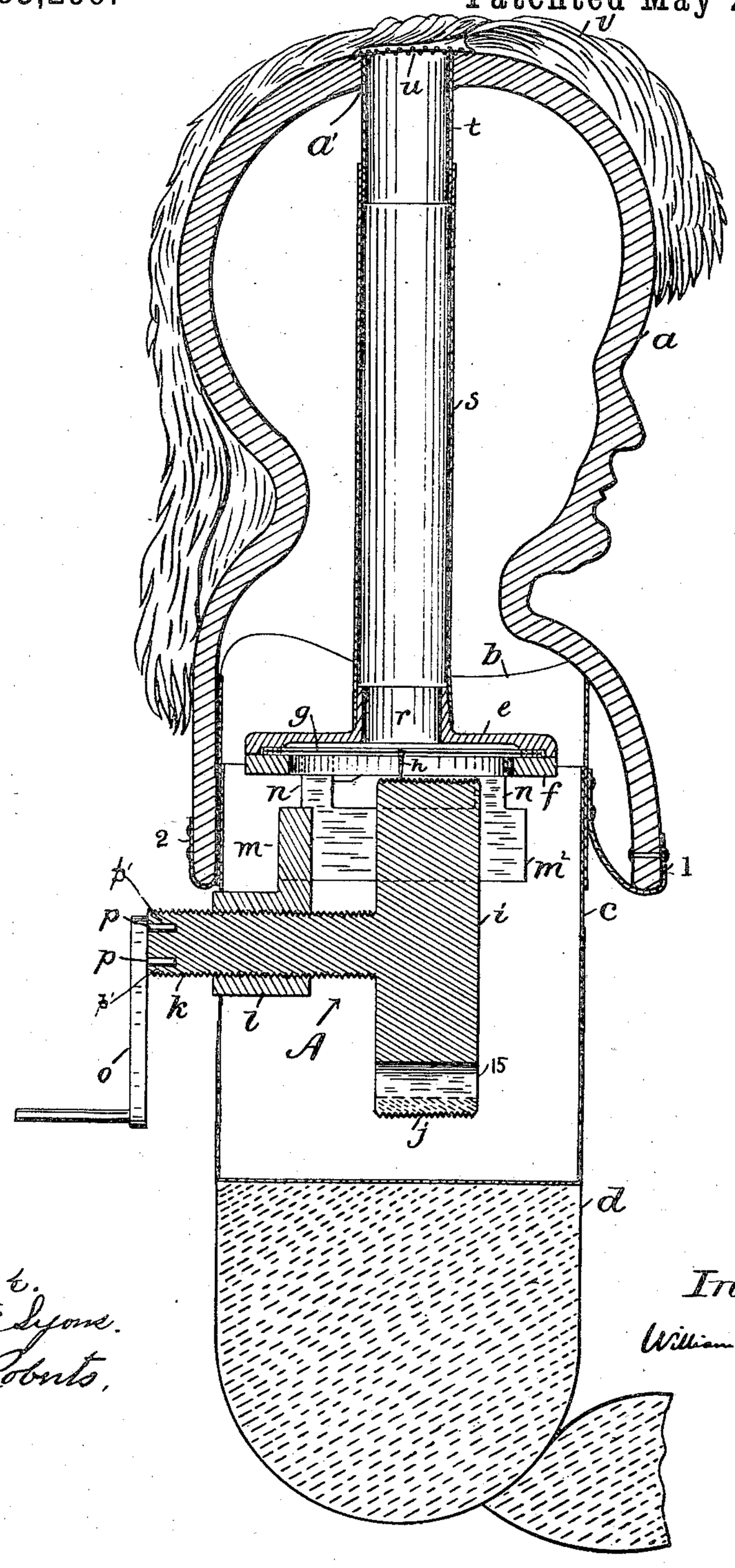

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

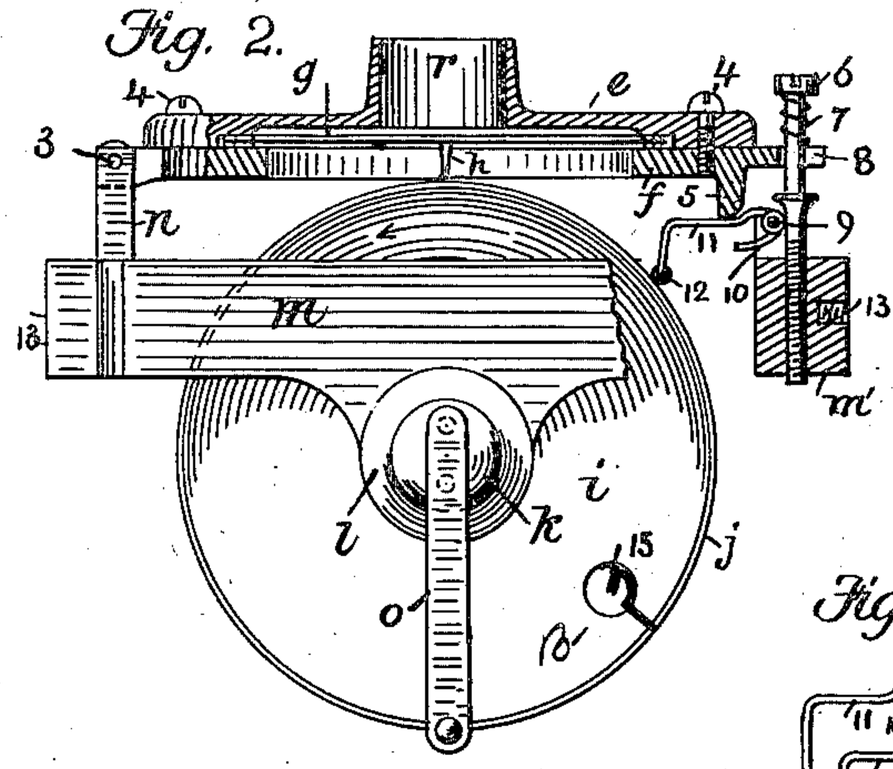


Fig. 3.

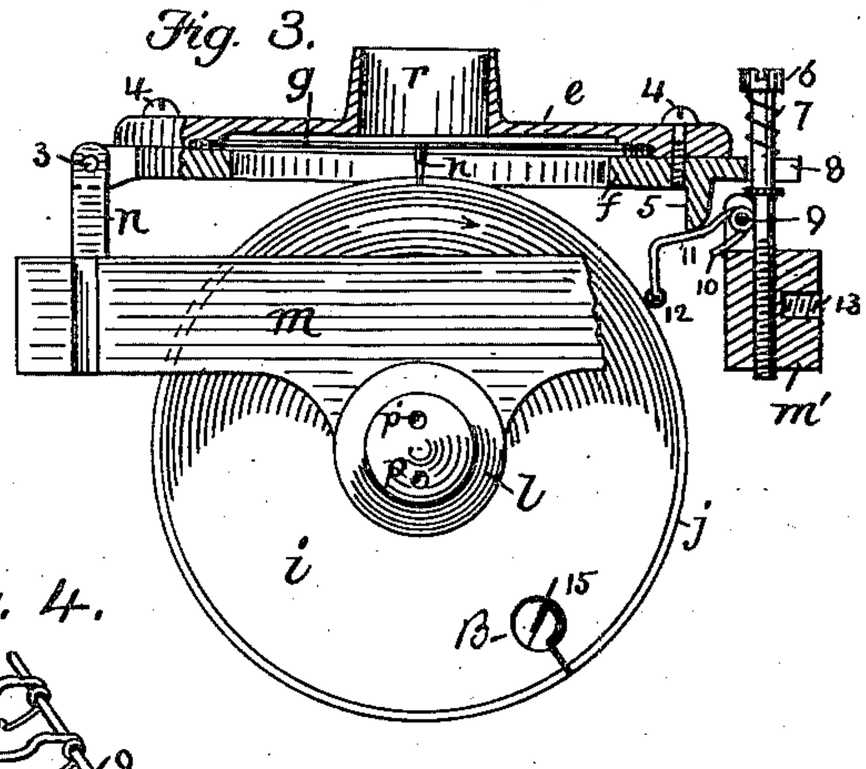


Fig. 4.

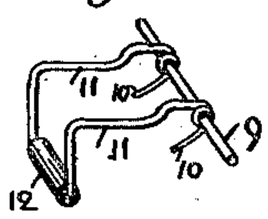


Fig. 5.

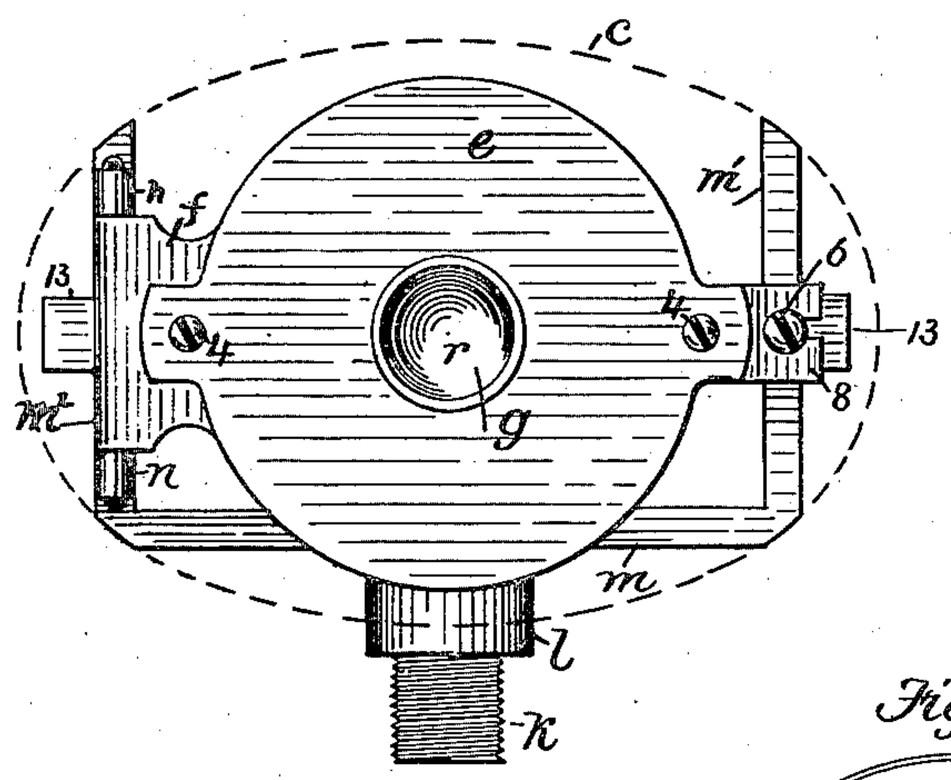


Fig. 6.

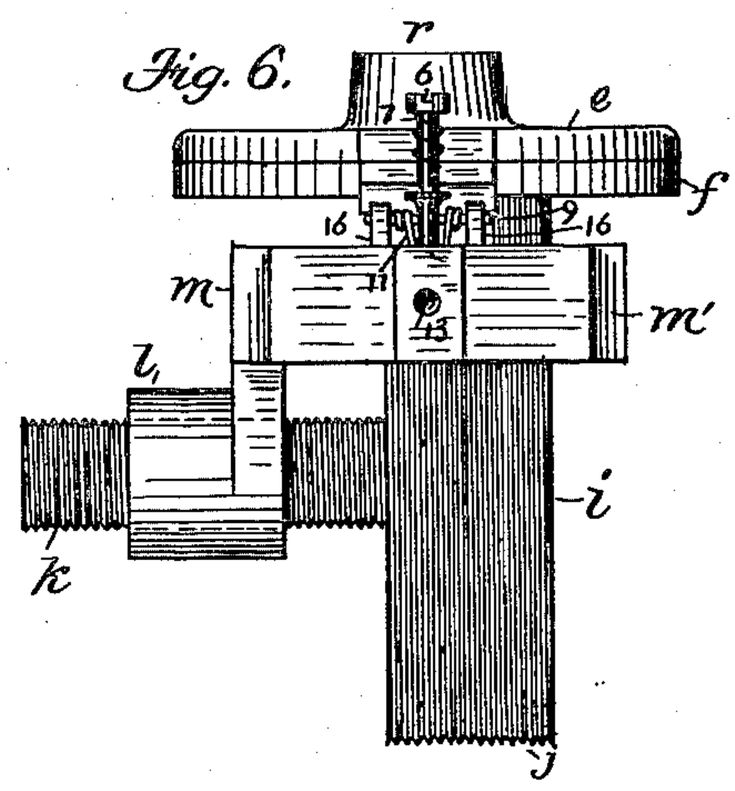


Fig. 7.

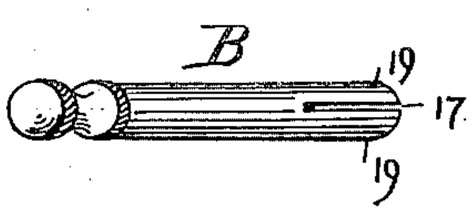


Fig. 8.

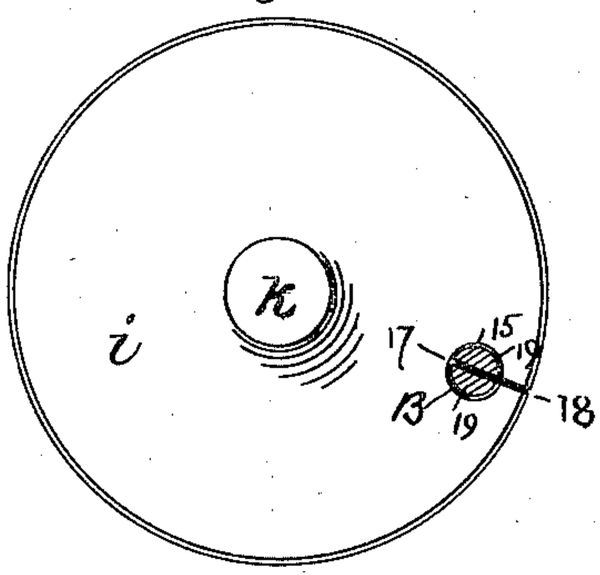
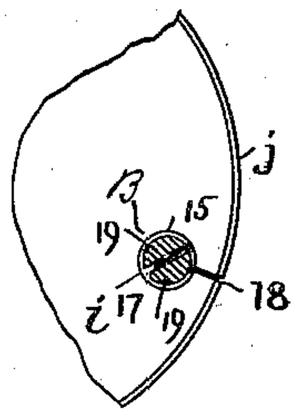


Fig. 9.



Attest.
Albert E. Lyons.
R. L. Roberts.

Inventor.
William W. Jacques.

UNITED STATES PATENT OFFICE.

WILLIAM W. JACQUES, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE EDISON PHONOGRAPH TOY MANUFACTURING COMPANY, OF MAINE.

COMBINED DOLL AND PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 383,299, dated May 22, 1888.

Application filed October 19, 1887. Serial No. 252,799. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. JACQUES, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Phonographs, of which the following is a specification.

My invention relates to certain improvements in the apparatus known as the "phonograph," substantially such as that described in the patent to Thos. A. Edison, dated February 19, 1878, whereby it can be constructed in a manner so simple and inexpensive as to be adapted to almost universal use in the reproduction of articulate sounds, and especially short sentences or phrases of every-day speech.

The particular object of my invention is to produce a talking doll or other image by placing therein a suitable phonograph which may be readily actuated, either by power applied from without or by automatic mechanism placed within the image.

It is obviously necessary that a talking doll or image suitable for a toy must be capable of repeating its phrases a great number of times and in whatever position the image may happen to be held by the child or other person inducing it to talk, and a phonograph used within such an image for the purpose of causing it to talk should possess the following characteristics, to wit:

First. The record or registration of the vibrations which represent the articulate sounds to be reproduced must be sufficiently permanent to be capable of withstanding the operation of effecting such reproduction a great number of times without material injury to the plate upon which the record is made, which plate I will designate as the "phonogram."

Second. The relative adjustment of the plate containing the record, the diaphragm with the style or tracer attached to its center, and the diaphragm holder or frame must be such as to maintain a comparatively light yet constant pressure between the record and the point of the style, while the edge of the diaphragm is so controlled as to resist quick vibratory movements and yet will readily yield to slow movements—such, for example as might be caused by changes of temperature or inaccuracies in the construction of an apparatus intended for a toy—and the several parts of the apparatus must be capable of maintaining the above-named conditions without regard to the position in which the toy may be held.

Third. In order to obviate unnecessary wear of the record and the disagreeable noise which would otherwise be produced in reversing the motion of the record-plate with relation to the tracer attached to the diaphragm, it is extremely desirable to provide means whereby the style will be automatically withdrawn from contact with the record-plate whenever it is moved in such reverse direction.

Fourth. To insure greater clearness and volume to the articulate sounds produced by the vibration of the diaphragm, it is essential to provide a resonating-chamber of such shape and dimensions that it shall operate in connection therewith to select and re-enforce the reproduced sounds due to the record, to the exclusion of accidental noises.

Fifth. That the sounds reproduced by the phonograph may be more distinctly heard, it is requisite to provide an aperture in the body of the image opposite to or coincident with the outlet of the resonating-chamber, through which the sounds may readily issue, and this aperture I preferably make in the head, where it may be easily obscured by a light covering of hair, and thus cause no detriment to the appearance of a doll.

Sixth. It is desirable that the external devices employed for imparting motion to the phonograph shall be capable of being readily attached or detached in order to remove them from the control of children, and also that the image be so constructed as to afford ready access to the phonograph within for the purposes of repair or renewal of the record-plate or phonogram.

In order to meet the requirements above set forth, I have found the construction hereinafter described in this specification and illustrated in the accompanying drawings to be satisfactory, although it will be readily understood that many variations in the specific form and construction of the several parts may be made without departing from the spirit of the invention.

Referring to the accompanying drawings, Figure 1 is a sectional view of the head and

trunk of a doll, showing the phonograph and its attachments therein. Fig. 2 is a view of the phonograph, looked at from the back of the doll, as arranged in Fig. 1, and with the diaphragm and its holder partly in section, showing its position when the motion of the phonograph-cylinder is reversed. Fig. 3 is the same view, showing the position of the parts when the cylinder is rotated in the direction to make the phonograph "talk." Fig. 4 is a detail drawing of the device by which the diaphragm, with its style or tracer, is automatically withdrawn from the record-plate when the motion of the cylinder is reversed. Fig. 5 is a top view of the phonograph. Fig. 6 is a side view of the phonograph from the same position that it is seen in Fig. 1. Figs. 7, 8, and 9 are detail drawings of the devices and construction of the parts by which the record-plate is tightened and held upon the cylinder.

Similar letters and figures in the several views indicate the same parts of the apparatus.

a is the head of the doll; *a'*, an aperture in the top covered by a wire-gauze, *u*, and hidden by the hair *v*.

c is a box, (preferably of tin,) within which is fixed the frame *l m m' m''*.

i is the phonograph-cylinder, having a spirally-grooved surface, as shown at *j*, and carried by a similarly-grooved journal, *k*, which runs in the nut *l*, constituting a part of the frame *m*.

o is a removable key or crank having studs *p p*, which fit into holes *p' p'*.

f and *e*, screwed together at 4 4, make the diaphragm frame or holder, which is pivoted on one side at *n n* by pivots 3 3. At the other side, S, it is free to move up and down the adjusting-screw 6 within the limits of its head and the shoulder upon its shank, although against the pressure of the spring 7 and the spring 10 11.

g is the diaphragm, held in a rubber ring between the plates *f e* and having a tracer or style, *h*, attached at its center.

r is an aperture through the plate *e* for the emission of the sounds produced by the diaphragm.

10 11 is a spring of bent wire hung on a rod, 9, and having a piece of rubber tube, 12, upon it, which rests lightly against the surface of the cylinder *i* when it is turned in the direction to make the phonograph talk. Its object is to raise the diaphragm-frame by contact with the projection 5 when the rotation of the cylinder *i* is reversed, and thus disengage the tracer *h* from the record upon the plate *j*.

j is a metallic foil wound around the cylinder *i* and having its ends pushed through the slot 18 therein and into the slot 17 in the end of the plug B, where it is held tightly in place by turning the said plug B from the position shown in Fig. 8 to that shown in Fig. 9. This foil is the phonogram or record-plate, on which at first is registered the vibrations of a diaphragm, caused by talking to it, and at the same time revolving a cylinder upon which the foil is wound, and which afterward, when placed upon the cylinder *i*, causes the same sounds to be reproduced by inducing similar vibrations in the diaphragm *g*.

S is a resonating tube or chamber connecting the aperture *r* with the opening *a* through the tube *t*, for the purpose of conducting the sound from the diaphragm out of the doll, and also for the purpose of selecting and re-enforcing the sounds due to the record, to the exclusion of accidental noise.

Resonating-chambers of other forms and dimensions adapted to different qualities of sound to be reproduced may be used and the tube *t* may be dispensed with; but in order to operate satisfactorily the outlet of the resonating-chamber should be opposite to or coincident with the aperture in the head of the image.

b is the upper portion of the phonograph-chamber, (preferably of tin,) attached to the head of the doll at 1 and 2, and serving as a cover fitting onto the box or lower part, *c*, of said chamber.

The parts may be of any suitable materials; but for the sake of economy, as well as rigidity of material, I make the parts *m i f e* of cast-iron, and the resonating-tubes I make of paper. The spring 7 should be sufficiently strong to hold the diaphragm-frame in place even when the phonograph is inverted.

In order to secure a substantially permanent record, I substitute for the tin, silver, or other foils heretofore used with the phonograph a foil which is inelastic and has been made hard upon its surface only, (preferably by the buffing process,) so that a record once impressed upon it by the style of the diaphragm will not be distorted by reason of elasticity, (in the sense that rubber is elastic,) and being made superficially hard is not easily worn away by the action of the style upon it. Specifically I prefer oroide foil composed of the following proportions: copper, eighty per cent.; zinc, thirteen per cent.; nickel, six per cent.; iron and tin, one per cent. A record upon such foil, prepared as above mentioned, will repeat a phrase distinctly several thousand times in a phonograph, and when thus prepared the foil becomes polished, which prevents undue vibrations caused by friction, and advantageously it may be oiled for the same purpose. A record upon foil such as above named gives far better results than that produced by electroplating or analogous methods.

It is desirable, in order further to insure permanency, that the foil upon the cylinder should present a continuous surface without seam, and that it should be held there under considerable tension. I effect this by inserting the ends of the foil through the narrow slit 18 in the cylinder and into the slit 17 in the plug B, and after turning the plug to the position shown in Fig. 9 soldering the seam at 18. If the foil is held in the manner usual in the phonograph, it very soon begins to wear

out at the seams and causes the diaphragm to produce a thumping sound, which is very disagreeable.

For the purpose of securing the relative adjustment of the record, diaphragm with its tracer, and diaphragm-holder, referred to in the second desideratum hereinbefore specified, and at the same time render the phonograph operative in any position in which it may be held, I make the diaphragm-holder of considerable weight—say about four ounces—so that its inertia may restrain the vibratory motions of the edge of the diaphragm, and I retain the diaphragm-holder in its normal position by two counteracting springs, 7 and 10 11, of sufficient strength to maintain the diaphragm and stylus with the supporting frame in operative relation to the record-cylinder even when the phonograph is inverted. The tensions of these springs are so proportioned that in whatever position the phonograph may be placed the stylus maintains a comparatively light but constant pressure upon the record. This method of holding the diaphragm in a holder which offers resistance to rapid vibrations by reason of its inertia instead of its rigidity may be said to be analogous to the method of holding the carbon electrode of a Blake transmitter or similar microphone as contradistinguished from the so-called "rigid contact" microphones.

The operation of the shipping device shown at Fig. 4, which I employ for automatically disengaging the tracer *h* from the record on the plate *j*, is as follows, to wit: The bent wire 11 11 being wound spirally about the rod 9, and having its ends 10 10 resting upon the portion *m* of the frame, constitutes a spring, which should be so adjusted as to cause the portion upon which the rubber tube 12 is placed to bear lightly against the phonograph-cylinder at all times. Thus when the cylinder is turned in the direction indicated in Fig. 3 to make the phonograph "talk" the portion 12 will merely rub lightly against the record-plate; but immediately that the rotation of the cylinder is reversed, as indicated in Fig. 2, the piece of india-rubber, 12, will stick to the face of the cylinder and be carried upward, and with it the diaphragm and its frame, until the resistance of the spring 7 becomes equal to the pressure exerted by the spring 11 11, when the rubber piece 12 will simply slip upon the surface of the cylinder. When the diaphragm and its frame are raised to the position shown at Fig. 2, the tracer will be withdrawn from contact with the record upon the plate *j* and no sound will be produced by the diaphragm. The phonograph may be operated by a key or crank, *o*; or a small clock mechanism may be placed within the box *c* and geared to the journal *k*.

It is of great benefit and very essential in order to give greater volume and clearness to the sounds caused by the vibrations of the diaphragm due to the record, to the exclusion of accidental noises, when the phonograph is operated, to use a resonating-chamber constructed, according to the laws of acoustics, of such form and dimensions as will adapt it to select and re-enforce sounds of the same pitch as the voice which produced the record. For example, with a record produced by a woman's soprano voice a tube four and one-half inches long and three-quarters of an inch in diameter, arranged as shown in Fig. 1 of the drawings, produces excellent results; or for the same record, if the tube *t* is omitted, the best results are obtained by making the tube *s* like an inverted frustum of a cone about three and one-half inches long, three-quarters of an inch in diameter at the small or lower end, and one and a half inch in diameter at the large or upper end, and over this upper end should be fixed, at a distance of about half an inch, a cup shaped cover—such, for instance, as is formed by the inside of a doll's head, with an opening through it opposite to the outlet of this flaring tube. For records produced by voices of lower pitch the dimensions of the resonating-tube should be relatively enlarged. I also find that by the use of different materials considerable variety in the quality of the sounds issuing from the resonating-chamber may be obtained.

It is obvious that the opening for the emission of the sounds from the phonograph may be made in various other parts of the image instead of the top of the head; but this is a convenient location in dolls having artificial hair.

The construction of the chamber for containing the phonograph shown in the drawings will be found convenient as affording facility in reaching the phonograph for repair or renewal of the record-plates, for, as heretofore shown, the head of the image may be removed and replaced as easily as the cover of a box, and for the sake of greater security a screw may be used to fasten the head and body together. An opening in the body of the image in juxtaposition to the phonograph, which can be closed by a suitable cover, will serve the purpose of gaining access to the operating mechanism of the apparatus, although it might not afford the same facility in adjusting the resonating-tubes.

The construction of phonograph described in this specification was devised for use with a doll or other image; but, as will be readily understood, the same apparatus may be used in a box or case of any form desired, and a record of a great variety of sounds may be impressed upon different record-plates for reproduction.

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

1. The combination of a phonograph and a doll provided with a body carrying said phonograph, and a head having an orifice therein for the emission of sounds from the phonograph, substantially as described.

2. The combination of a phonograph having its stylus or tracer supported by the oppos-

ing tension of two or more springs, and a doll serving as a receptacle and a support for said phonograph, substantially as described.

3. The combination of a phonograph and a doll having a body provided with a cavity for receiving and a support for holding the phonograph therein, and a resonator contained in a perforated head for conveying and emitting sounds produced by the phonograph within the body, substantially as described.

4. The combination, with a doll provided with a cavity and a support or supports for a phonograph, of a phonograph having a diaphragm held in a frame at one edge and controlled in its movements by a spring upon the upper and under sides of said frame, substantially as described.

5. In a phonograph, the combination of a traveling record-surface with a pivoted diaphragm provided with a stylus and maintained between two counteracting-springs under tension in operative relation with said record-surface, substantially as described.

6. The combination, with a phonograph, of an automatic shipping device actuated by the reversed motion of the record surface to withdraw the diaphragm-tracer from the contact with the record surface, substantially as described.

7. The combination, in a phonograph, of a diaphragm held in a hinged frame cushioned by a spring acting upon one side thereof, with a second spring acting upon the other side of the frame, and having an extension bearing upon the record-surface, so as to disengage the stylus from the record surface when the motion of the latter is reversed, substantially as described.

8. A record-plate for phonographs, consisting of a foil of metal which is superficially hard upon the side which is to receive the record and is normally soft upon the other side, substantially as described, and for the purpose specified.

9. In combination with a phonograph, a record-plate of oroide foil made superficially hard upon the side which is to receive the record, whereby while the record may be readily impressed thereon it becomes practically permanent, substantially as described.

WILLIAM W. JACQUES.

Witnesses:

ALBERT E. LYONS,

R. L. ROBERTS.