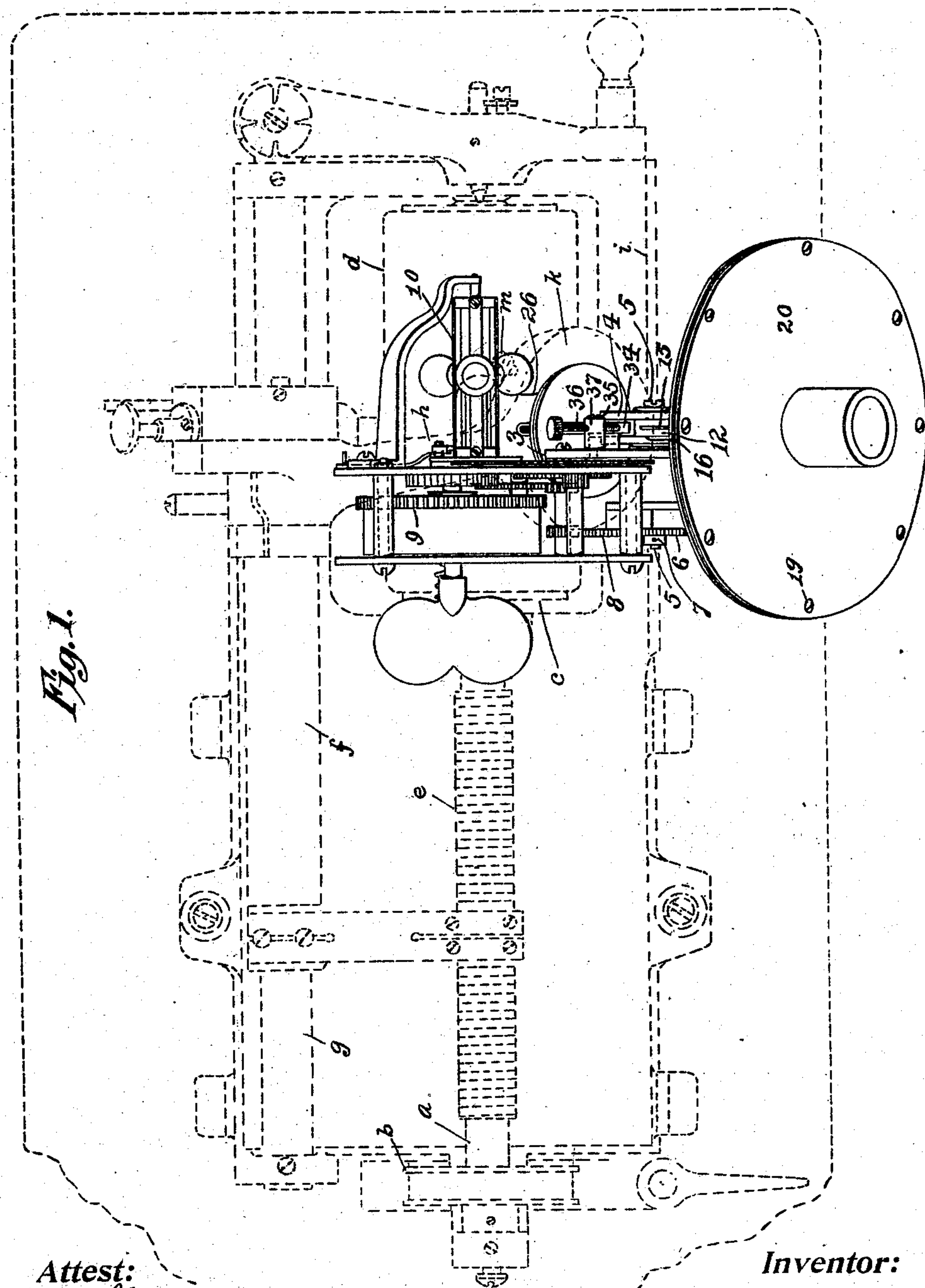


No. 847,687.

PATENTED MAR. 19, 1907.

A. N. PIERMAN.
PHONIC APPARATUS.
APPLICATION FILED OCT. 14, 1905.

3 SHEETS—SHEET 1.



Attest:
Edgeworth
Deputy Holder

Inventor:
Alexander N. Pierman
by *Frank L. Pierman* Atty.

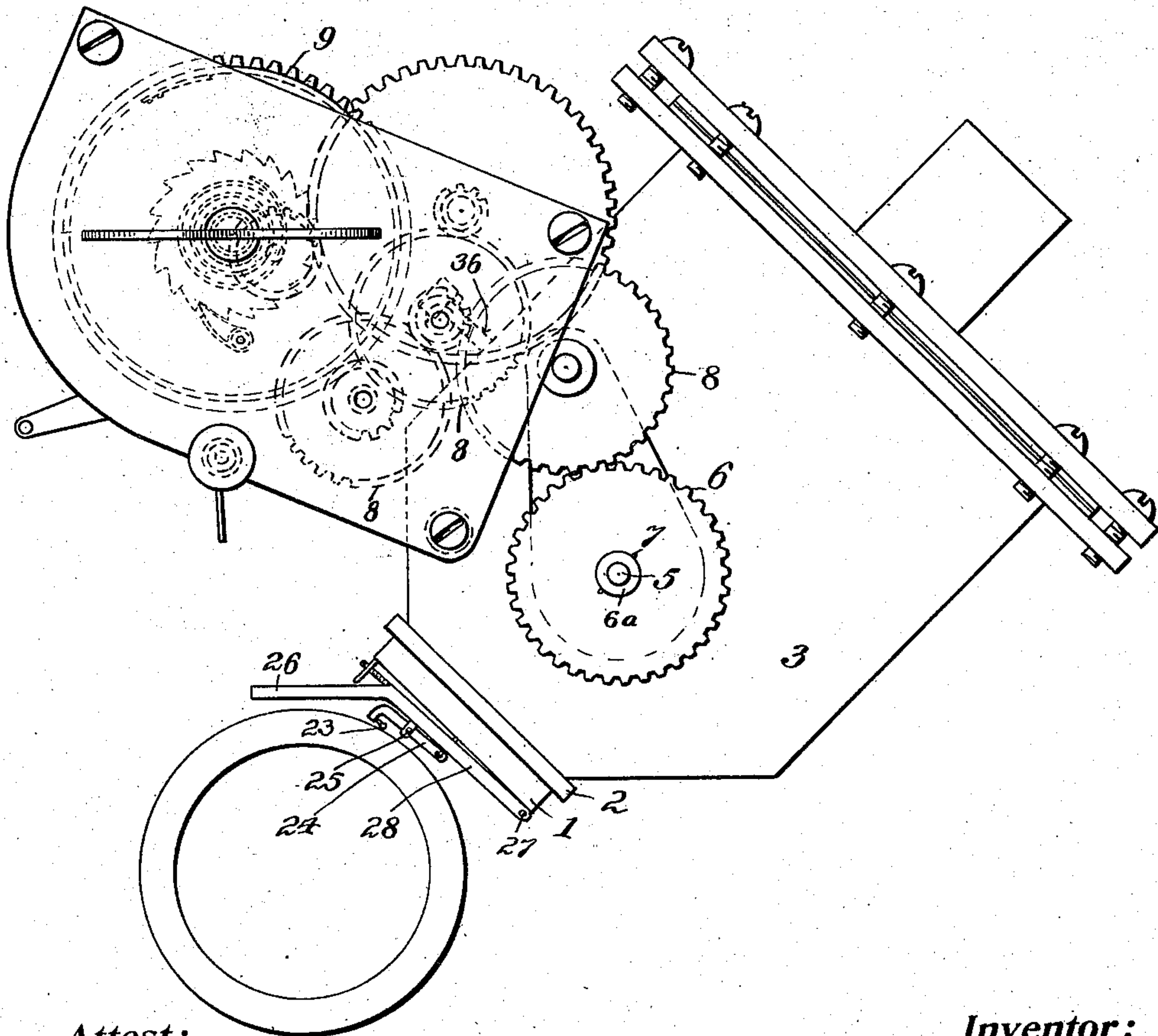
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3 SHEETS—SHEET 2.

Fig. 2.



Attest:
Edgeworth Burns
Delos Holden

Inventor:
Alexander N. Pierman
by *Frank L. Brown* Atty.

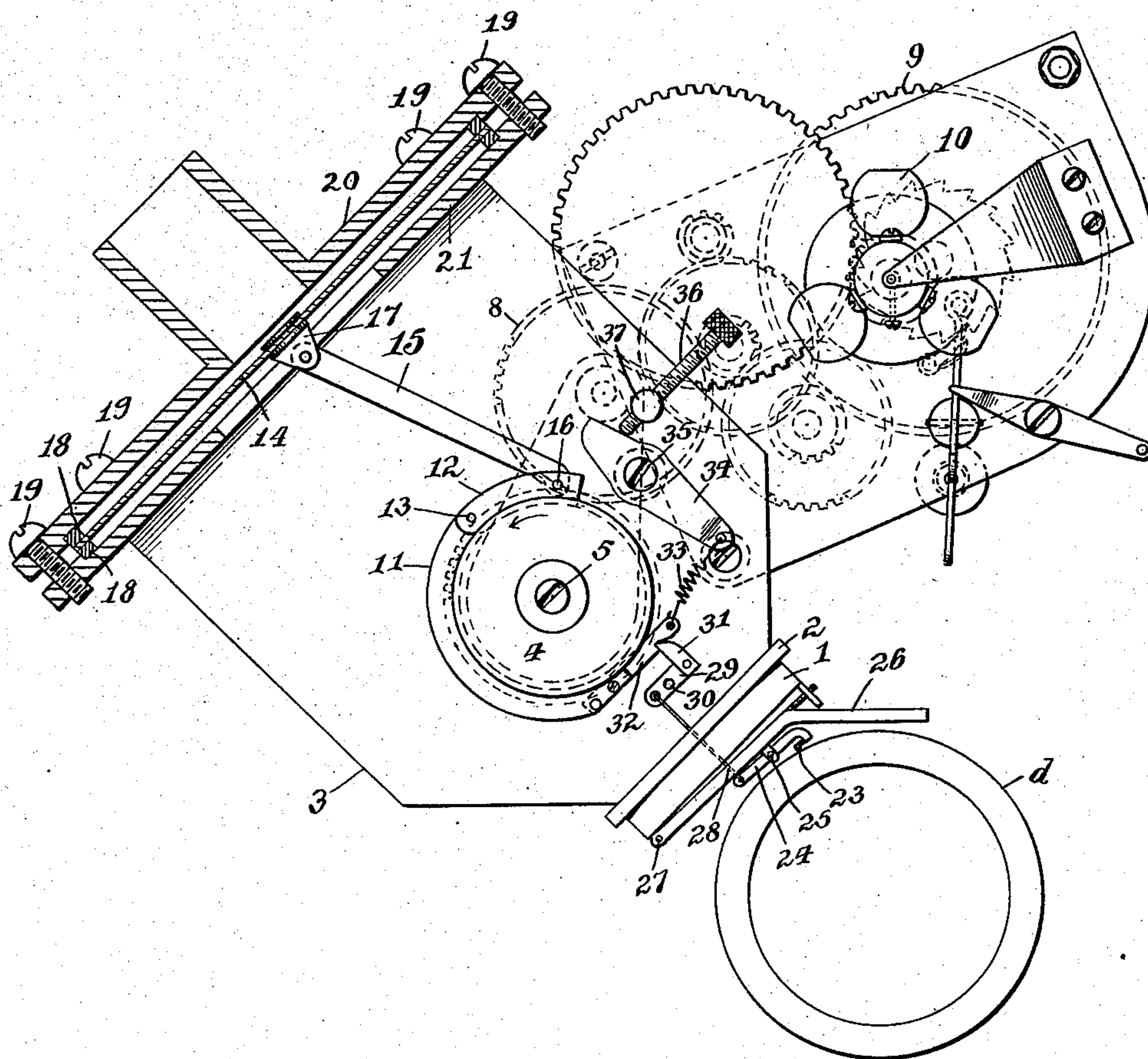
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APPLICATION FILED OCT. 14, 1905.

3 SHEETS—SHEET 3.

Fig. 3.



Attest:
Edgeworth Greene
Delos Holden

Inventor:
Alexander N. Pierman
by *Frank L. Piper* Att'y.

UNITED STATES PATENT OFFICE.

ALEXANDER N. PIERMAN, OF NEWARK, NEW JERSEY, ASSIGNOR TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PHONIC APPARATUS.

No. 847,687.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed October 14, 1905. Serial No. 282,710.

To all whom it may concern:

Be it known that I, ALEXANDER N. PIERMAN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Phonic Apparatus, of which the following is a description.

My invention relates to phonic apparatus of the type wherein a rotating friction-wheel is used in combination with a friction-shoe pressed against the same, power being applied for rotating the friction-wheel, and the pressure between the friction-shoe and friction-wheel being varied by suitable means representative of sound-vibrations, thus producing variations in the amount of friction, which by suitable mechanical connections may operate a diaphragm or other phonic apparatus.

My invention relates more particularly to devices for reproducing sounds through the instrumentality of a phonographic record, the phonographic stylus being connected with said friction-shoe and operating to vary the amount of friction.

Heretofore, as far as I am aware, the friction-wheel has always been driven from a stationary motor, and the said friction-wheel has either been mounted so as to have no progressive motion or in case it has been mounted on a traveling carrier the driving mechanism has been so arranged that the friction-wheel may receive its power from the said stationary motor during its movement with the carriage. These devices are objectionable, however, because they are not readily applicable to an ordinary phonograph and require special forms of instruments, which are expensive to construct and which in some cases cannot be used with an ordinary phonographic speaker.

My invention has for its general object the provision of a mechanism of the character referred to and more particularly its application to a phonograph of ordinary construction, so that the mechanism may be interchangeable with an ordinary phonographic reproducer without the addition of any parts whatsoever to the ordinary phonograph. This object has been carried out by the mounting of a complete frictional reproducing apparatus upon a base which is adapted to fit within the ordinary car-

rier-arm of a phonograph or other talking-machine, the friction-wheel being driven by a motor carried upon a suitable frame secured to or integral with the frame upon which the various operating parts of the reproducing mechanism are carried, whereby the friction-wheel may be continuously driven during the progressive movement of the carrier-arm without the disadvantages resulting from the use of a stationary motor, and without the necessity of increasing the strength or power of the usual phonograph-motor to enable it to drive the friction-wheel in addition to the work of driving the mandrel and feed-screw.

Reference is hereby made to the accompanying drawing, in which—

Figure 1 is a plan showing in dotted lines a phonograph of ordinary construction and in full lines an embodiment of my invention applied thereto. Fig. 2 is a side elevation of my improved reproducer looking from the left of Fig. 1; and Fig. 3 is a similar view, partly in section, looking from the right of Fig. 1.

Corresponding parts are designated by the same reference-numerals in the several views.

The phonograph shown in Fig. 1 is of the usual well-known construction and comprises a main shaft *a*, driven by means of any suitable stationary motor, (not shown,) such as a spring or electric motor, situated usually below the same and transmitting power thereto by means of a belt passing over the drive-pulley *b*. The shaft *a* carries at one end a mandrel *c*, upon which a cylindrical sound-record tablet *d* is held by frictional engagement. A feed-screw *e*, formed upon the shaft *a*, imparts a progressive forward movement to the carrier *f*, sleeved on the back rod *g*, the said carrier comprising an arm *h*, extending over the mandrel *c* and supported at its forward end upon a straight edge *i*, a circular eye *k* being formed in said arm to receive the recorder or reproducer. The parts thus described being well known form no part of my invention, except as combined with elements which I will now describe.

A circular base 1, having a flange 2, carries the frame 3, by which the friction-wheel 4 is carried. The base 1 is of a suitable size to fit within the eye *k* of the arm *h*, being held

herein by the usual set-screw *m*. The friction-wheel 4 is secured upon one end of a shaft 5 in any suitable manner, and the said shaft is journaled in a bearing carried by the frame 3. Upon the opposite end of the shaft 5 is a gear 6, secured in any suitable manner, as by a pin 7, passing through its hub 6^a. The gear 6 is driven by means of a gear-train 8, driven from a spring-barrel 9, the whole constituting a spring-motor provided with a governor 10 of any approved construction. Partially surrounding the friction-wheel 4 is a friction-shoe, comprising two parts 11 and 12, pivotally connected at 13. The part 12 is connected to a diaphragm 14 by a link 15, which is pivoted at 16 to the part 12 and at its opposite end to a lug or pivot-block 17, secured to the diaphragm. The diaphragm is clamped between gaskets 18 by means of screws 19, which pass through the plate 20 and are threaded in the plate 21, the latter plate being rigid with the frame 3. The reproducing-stylus 23 is carried at one end of a lever 24, which is pivoted at 25 to a lug depending from the compensating weight 26. This weight is pivoted at 27 to a pin or lug carried by the ring 1, whereby the stylus 23 may rise and fall to conform to inequalities or irregularities in the shape of the record-tablet. That end of the lever 24 opposite the stylus 23 is connected by a link 28 to a lever 29. This lever is pivoted at 30 to the frame 3 and has an arm 31, which engages a shoulder formed in the extension 32 of the friction-piece 11. A tension-spring 33 is connected at one end to the member 32 and at the other end to an adjusting-lever 34. The lever 34 is pivoted on a stud 35 and is adjusted by means of an adjusting-screw 36, threaded in a stud 37, carried by the frame 3, whereby any desired degree of tension of the spring 33 may be obtained.

It will be obvious that the rotation of the friction-wheel 4 in the direction indicated by the arrow will produce a thrust upon the diaphragm 14, which thrust will be diminished when the friction between the friction wheel and shoe is lessened and will be increased as the friction increases. The amount of friction between the friction-shoe and friction-wheel will be varied by the movements of the stylus 23 in accordance with the elevations and depressions of the sound-record groove of the tablet *d*. As the stylus rises the lever 24 draws the link 28 down, and the arm 31 of the lever 29 presses against the shoulder of the extension 32, thereby lessening the friction. The spring 33 operates to increase the friction when the arm 31 moves in the reverse direction, corresponding to a depression of the sound-record groove. The result is that the diaphragm 14 is thrown into vibrations corresponding to the elevations and depressions of the sound-record tablet and produces sounds corresponding to those recorded

upon the said tablet, the friction-wheel 4 being continuously driven by the spring-motor, which travels with it during the operation of the instrument. It will be obvious that other forms of motor may be mounted upon the frame 3 for driving the friction-wheel 4, if desired, such as an electric motor, water-motor, &c.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a phonic apparatus, the combination of a traveling carrier and means for progressively moving the same, a diaphragm, friction-wheel and motor carried by the carrier, a driving connection between said motor and friction-wheel, a friction member pressing against said friction-wheel, a connection between said friction member and diaphragm, and means representative of sound-vibrations for varying the amount of friction between the friction-wheel and friction member, substantially as set forth.

2. In a phonograph, the combination of a phonographic tablet, means for rotating the same, a carrier movable across said tablet, a stylus, diaphragm, friction-wheel and motor carried by said carrier, a driving connection between said motor and friction-wheel, a friction member pressing against said friction-wheel, and connections between said friction member and said stylus and diaphragm respectively, substantially as set forth.

3. In a phonograph, the combination with the mandrel, feed-screw, traveling carrier and means for driving the same, of a friction-wheel carried by said carrier and a motor traveling with and driving said friction-wheel, substantially as set forth.

4. In a phonograph, the combination of the mandrel, feed-screw, traveling carrier-arm extending over said mandrel and means for driving the same, of a friction reproducer attachment comprising a friction-wheel, friction member, diaphragm, reproducer-stylus, and a motor for driving said friction-wheel, said parts being mounted upon a base removably secured to said carrier-arm, substantially as set forth.

5. A friction reproducer attachment for phonographs and other talking-machines, comprising a frame or support adapted to be removably secured to the traveling carrier-arm of a talking-machine, said support carrying a friction-wheel, friction member, diaphragm, and motor for driving said friction-wheel, substantially as set forth.

This specification signed and witnessed this 12th day of October, 1905.

ALEXANDER N. PIERMAN.

Witnesses:

FRANK L. DYER,
DELOS HOLDEN.