No. 867,597. PATENTED OCT. 8, 1907.

A. N. PIERMAN.

FRICTION REPRODUCING ATTACHMENT FOR PHONOGRAPHS.

APPLICATION FILED MAR. 13, 1905.

6 SHEETS—SHEET 1.

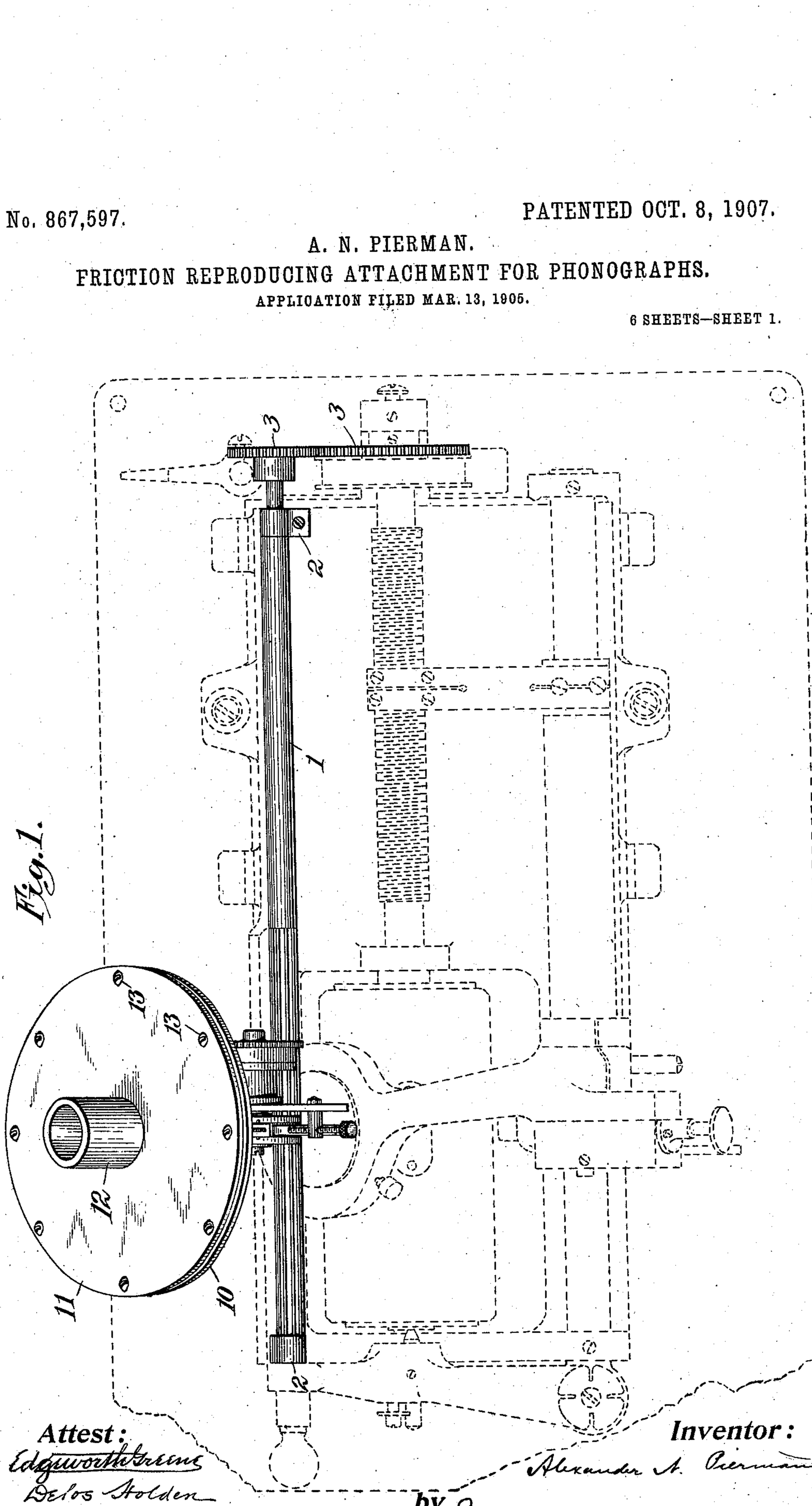

Fig. 1.

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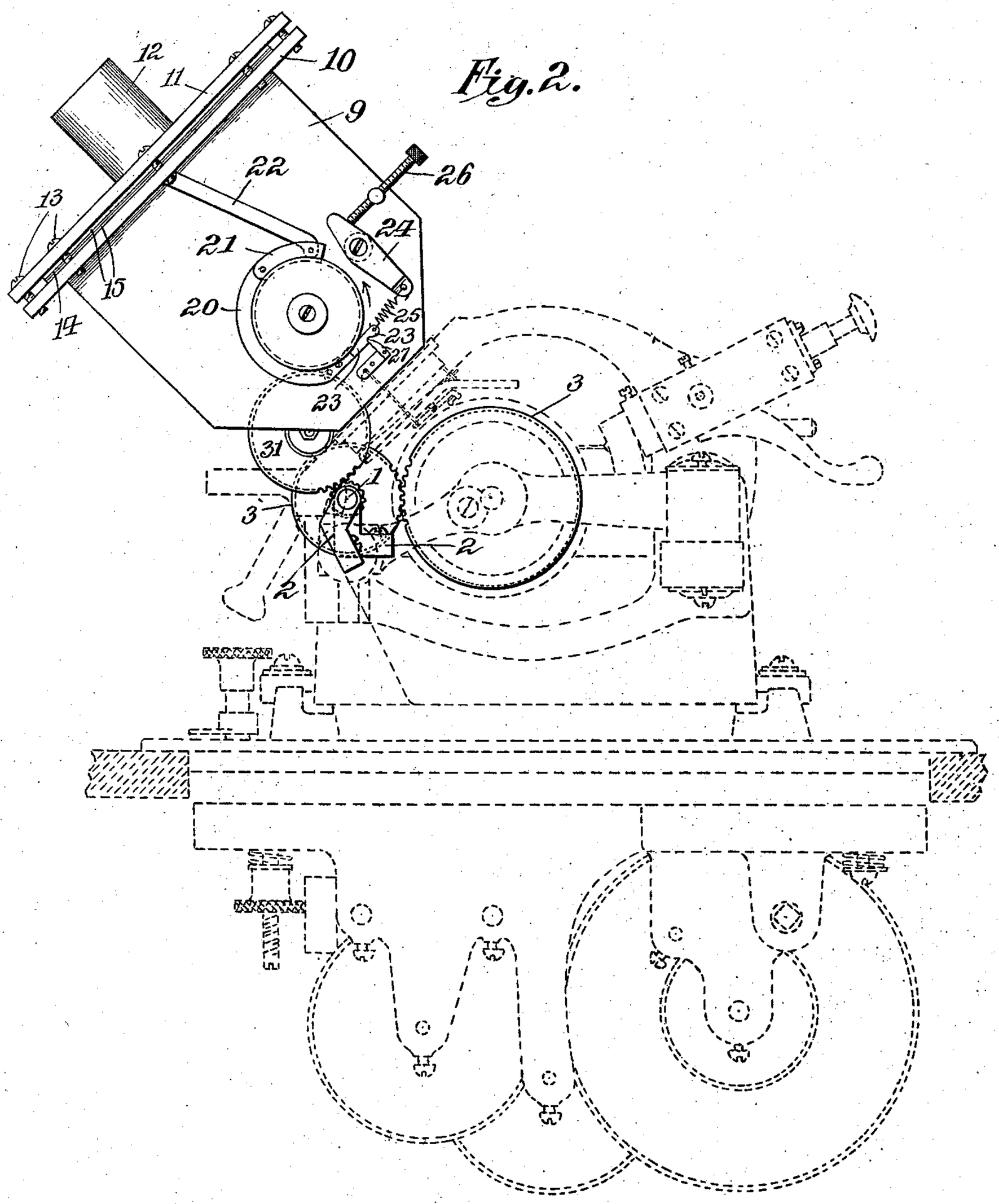
6 SHEETS—SHEET 2.

Fig. 2.



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6 SHEETS—SHEET 3.

Fig. 3.

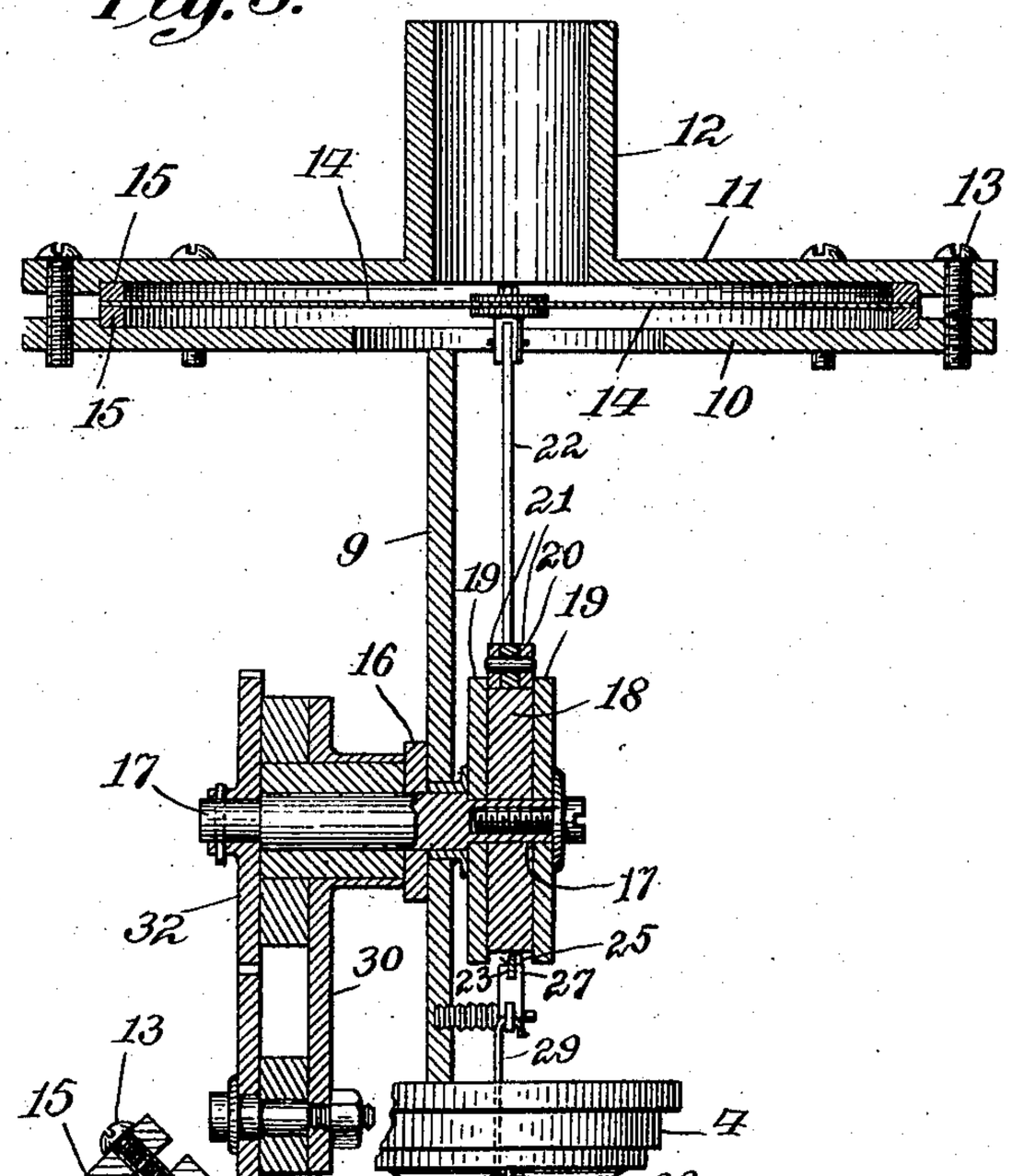

Fig. 4.

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6 SHEETS—SHEET 4.

Fig. 5.

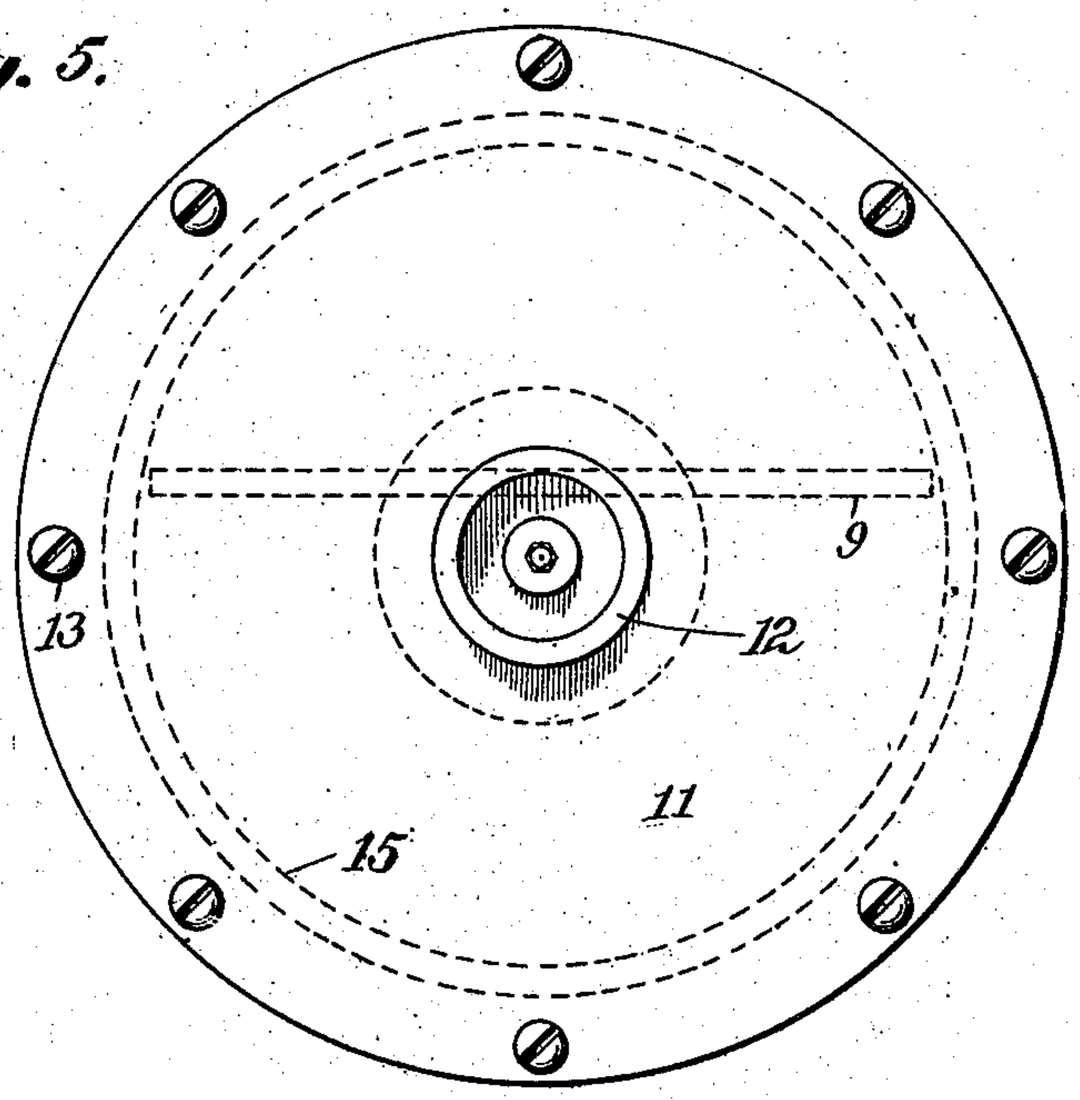
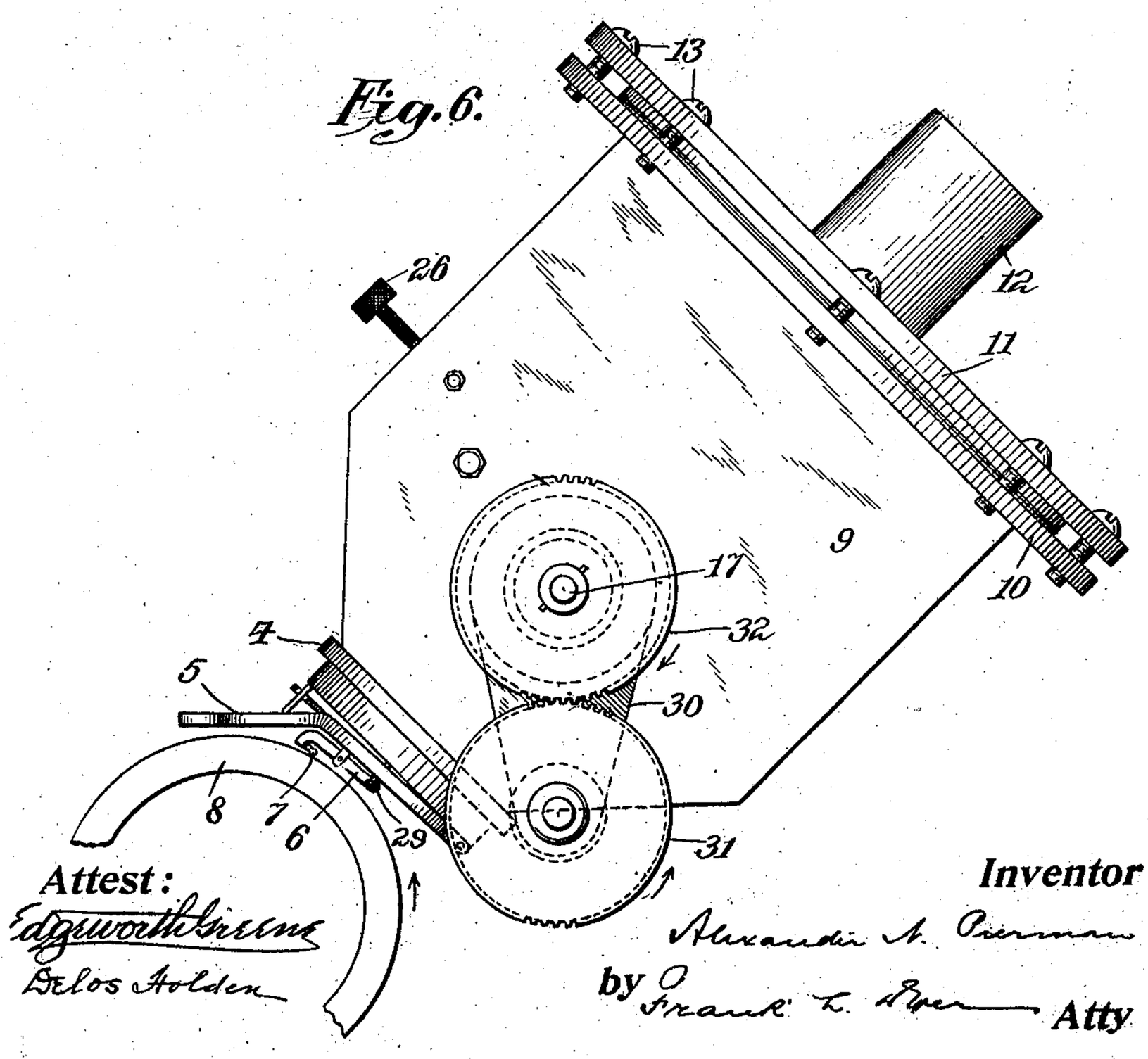


Fig. 6.



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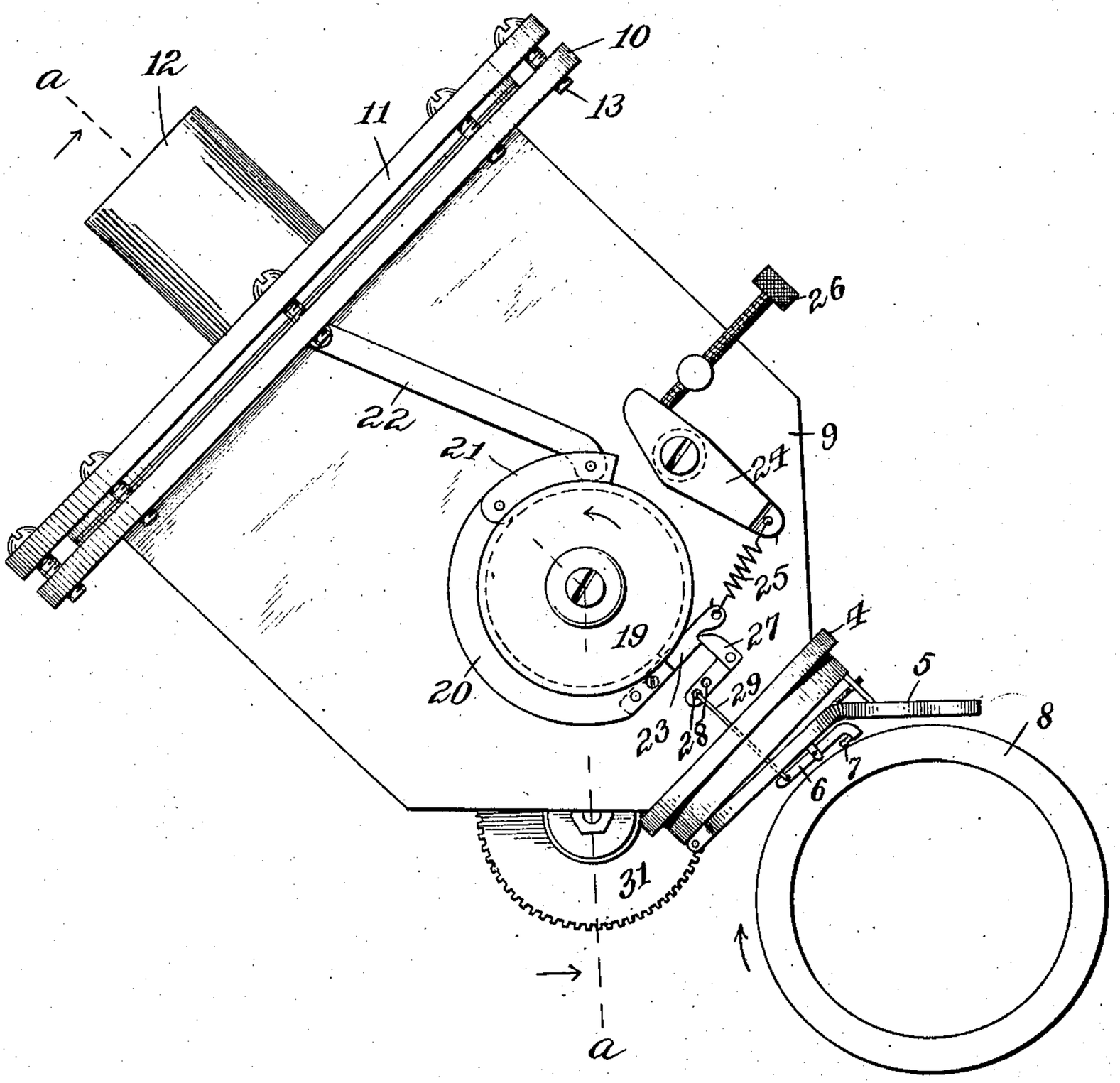
APPLICATION FILED MAR. 13, 1905.

6 SHEETS—SHEET 5.

Fig. 7.



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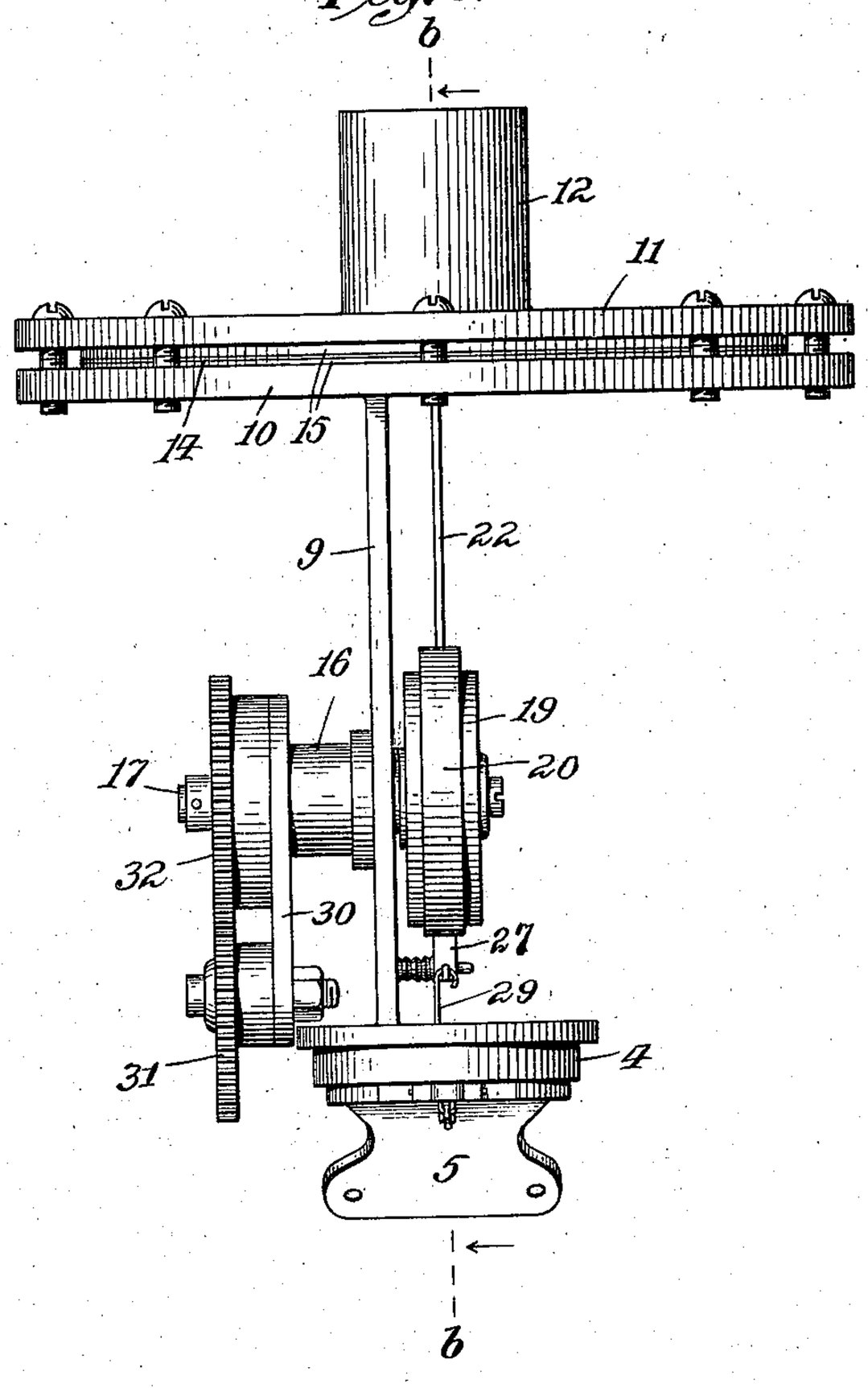
6 SHEETS—SHEET 6.

Fig. 8.



Attest:
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Inventor:
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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.

FRICTION REPRODUCING ATTACHMENT FOR PHONOGRAPHS.

No. 867,597. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed March 13, 1905. Serial No. 249,687.

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 Friction Reproducing Attachments for Phonographs, of which the following is a specification.

My invention relates to sound reproducing devices of the type wherein the diaphragm is vibrated by means of a friction shoe engaging a continuously rotating friction wheel, the friction between the friction shoe and friction wheel being varied by varying the pressure of the friction shoe on the friction wheel, such variation in pressure being effected either directly or indirectly by the sounds to be reproduced. Devices of this type are well known and have been suggested for effecting the reproduction of ordinary sounds either directly as in the case of megaphones or indirectly as in the case of telephones or phonographs. The suggestion has also been made of actuating the friction block by means of levers, in order that the friction may be increased and thereby permit the reproduced sounds to be augmented. Examples of these suggestions are found in British patents to Hope-Jones No. 15,245 of 1890 and to St George No. 3473 of 1880.

My invention relates to improvements in apparatus of this type in its application to phonographs and allied talking machines, and my object is to provide an attachment for the purpose which can be readily applied to a phonograph at small cost and without interfering with the effective operation of the same.

The invention has particular reference to the means whereby the friction wheel may be continuously rotated while at the same time the friction wheel and parts coöperating therewith may be progressed longitudinally with respect to the record; also to the means for varying the leverage between the reproducing stylus and the friction shoe and further details of construction and operation, as will be more fully hereinafter described and claimed.

In order that the invention may be better understood, attention is directed to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a plan view, showing in full lines my improved attachment applied to a well known type of Edison phonograph, the latter being illustrated in dotted lines, Fig. 2 an end elevation of the same, Fig. 3 a sectional view on the line *a*—*a* of Fig. 7, Fig. 4 a section on the line *b*—*b* of Fig. 8, Fig. 5 a plan view of the diaphragm box, Fig. 6 a side elevation of the attachment showing the reproducer stylus in engagement with the record, Fig. 7 a side elevation similar to Fig. 6, viewing the attachment from the opposite side, and, Fig. 8 a front elevation of the attachment.

In all the above views corresponding parts are represented by the same numerals of reference.

Broadly speaking, the invention consists of two parts, first, operating mechanism permanently applied to the talking machine but in no way interfering with the ordinary operation thereof when desired; and second, friction reproducing mechanism removably carried by the arm which sustains the ordinary reproducer, so as to be readily taken off when the ordinary reproducer is to be used, said friction reproducing mechanism coöperating with the operating mechanism, so as to continuously rotate the friction wheel as the reproducer progresses longitudinally with respect to the record.

The phonograph illustrated in Figs. 1 and 2 is of such common construction and the parts thereof are so well known to persons skilled in the art, that a description thereof is unnecessary. I arrange at the front of the instrument a fluted or pinion shaft 1 mounted in suitable bearings 2—2 and driven from the main shaft of the phonograph in any suitable way, as by gears 3—3. Removably carried in the usual supporting arm like the ordinary reproducer, is a cylindrical casing 4, to the underside of which is pivoted the usual floating weight 5. Pivoted on this floating weight is a small lever 6 carrying the reproducer stylus 7 engaging the record 8. A support 9 extends up from the casing 4 and carries a disk 10, opposing which is a corresponding disk 11 formed with a neck 12, to which the usual horn is applied. The disks 10 and 11 are clamped together by screws 13 to hold the large diaphragm 14 in place between the washers 15, as will be understood. The support 9 carries a bearing 16, in which is mounted a shaft 17 carrying the friction wheel 18, the latter being made of some very smooth substance, having a high coefficient of friction, preferably amber or a composition in which amber is employed. Said friction wheel is preferably provided with metallic rings 19 for the purpose of guiding the friction shoe and maintaining the same always in its proper relation to the friction wheel. The friction shoe 20 partly encircles the friction wheel and is provided with a pivoted extension 21 also engaging the friction wheel. The friction shoe is made as light as possible to minimize inertia and momentum, and it may be lined with cloth, leather or similar material to increase the friction with the friction wheel. A pivoted link 22 connects the extension 21 of the friction shoe with the diaphragm 14. The friction shoe 20 is provided with a finger 23 connected to the pivoted adjusting lever 24 by means of a spring 25. The lever 24 is mounted on the support 9 and is adjusted by a screw 26, whereby the tension of the spring 25 may be varied to regulate the initial pressure of the friction shoe on the friction wheel. Engaging the

finger 23 is a small bell crank lever 27, whose other member is formed with a series of holes 28 from any one of which extends a link or wire 29 to the stylus lever 6 whereby the leverage between the reproducer stylus and the friction shoe may be varied as will be evident.

The bearing 16 carries a support 30 on which is mounted a spur gear 31 adapted to mesh with the pinion shaft 1, so as to be rotated by the latter. At the same time, the spur gear may move longitudinally of the pinion shaft as the reproducer stylus tracks the record. The friction wheel 18 is rotated from the gear 31 in any suitable way, as for example, by a gear 32 on the shaft 17, meshing with said gear wheel 31. It will be evident that in applying my attachment to a phonograph or other talking machine, the only permanent attachment to the talking machine is the pinion shaft 1 and its driving mechanism, but this does not in any way interfere with the operation of the talking machine or detract from the appearance thereof. The rest of the device is applied to the usual holding arm in the same way as the ordinary reproducer, and can be removed as readily. Furthermore, in raising or lowering the holding arm to lift the reproducer stylus from or engage it with the record, the spur gear 31 will be simultaneously raised from or lowered into engagement with the pinion shaft 1. In other words, the friction wheel is not rotated except when the reproducer is in engagement with the record, thereby reducing wear on the parts and preventing the transmission of noises, resulting from the rotation of the friction wheel. In operation the screw 26 will be adjusted so as to secure the desired initial pressure between the friction shoe 20 and the friction wheel, and a record having been placed on the usual mandrel of the phonograph, the holding arm will be lowered so as to engage the reproducing stylus with the record, and simultaneously engage the spur gear 31 with the rotating pinion shaft 1. The friction wheel rotating at a constant speed in the direction of the arrow will obviously exert stress on the diaphragm 14. Consequently as the reproducer sapphire vibrates, the friction between the friction shoe and wheel will be correspondingly varied, to thereby vibrate the diaphragm 14 with the desired amplification but in accordance with the record.

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

1. In a friction reproducing attachment for phonographs and allied talking machines, the combination with a pinion shaft mounted in fixed bearings, of friction reproducing means movable longitudinally of the record to be reproduced and a gear coöperating with the friction reproducing means and meshing continuously with said shaft, as and for the purposes set forth.

2. In a friction reproducing attachment for phonographs and allied talking machines, the combination with a pinion shaft mounted in fixed bearings, of a support movable longitudinally of the record, a friction wheel carried by said support, friction reproducing devices operated by said wheel and a gear for driving said wheel and meshing with said shaft, substantially as set forth.

3. In a phonograph or allied talking machine, the combination with the feed screw, feed nut, guide rod and traveling carriage sleeved thereon, of reproducing means comprising a friction wheel carried by said carriage, means carried by the frame for driving said friction wheel, the arrangement of parts being such that the raising of the carriage disconnects the friction wheel from its said driving means, substantially as set forth.

4. The combination with a talking-machine and a relay-device therefor comprising a reproducer and the relatively stationary part of the relay-device proper, the relatively movable part of said relay device, and a detachable bracket carrying means for rotating said movable part.

This specification signed and witnessed this 10th day of March 1905.

ALEXANDER N. PIERMAN.

Witnesses:
DELOS HOLDEN,
ANNA R. KLEHM.