

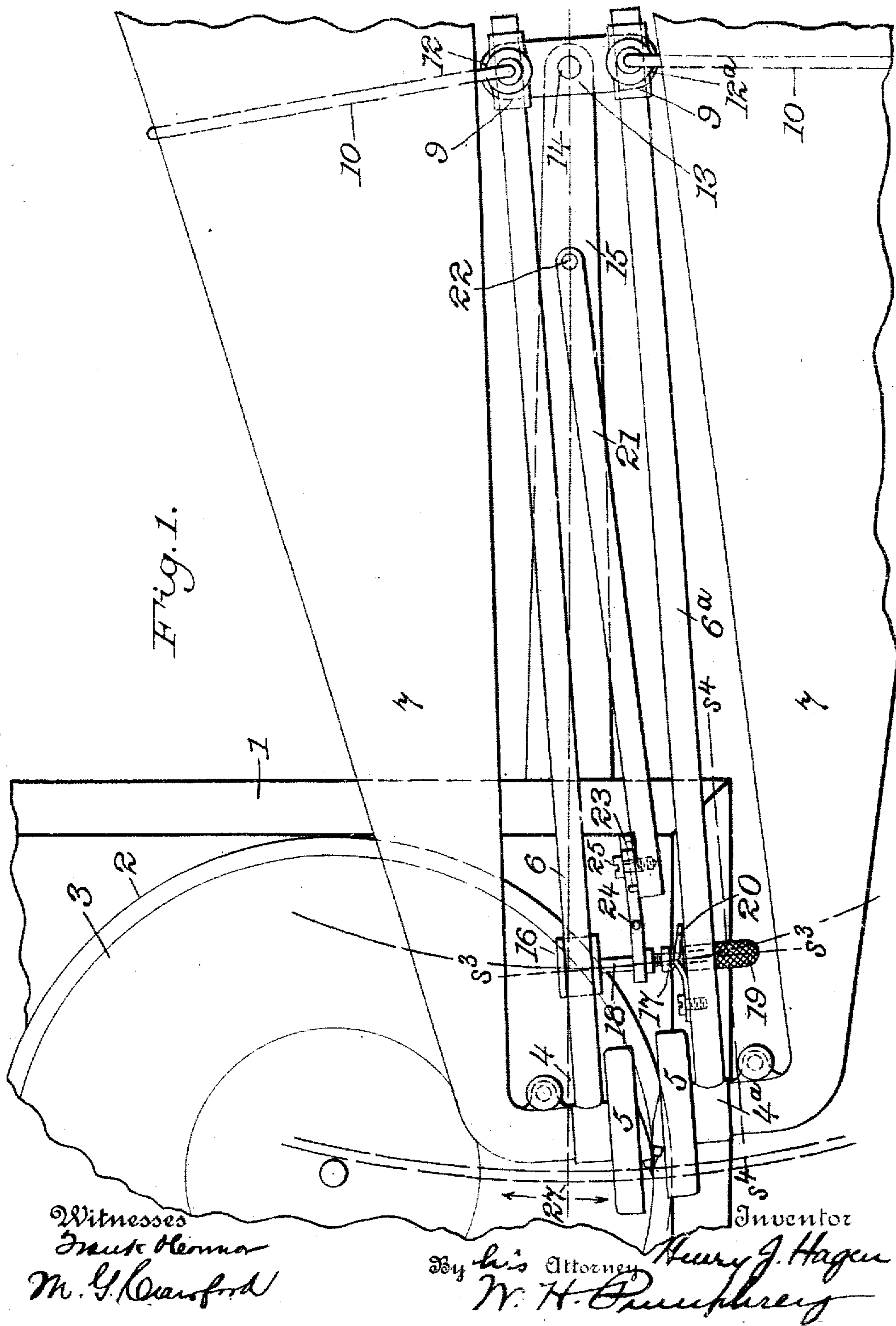
No. 816,978.

PATENTED APR. 3, 1906.

H. J. HAGEN.  
TALKING MACHINE.

APPLICATION FILED MAR. 28, 1905.

3 SHEETS--SHEET 1.



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3 SHEETS--SHEET 2.

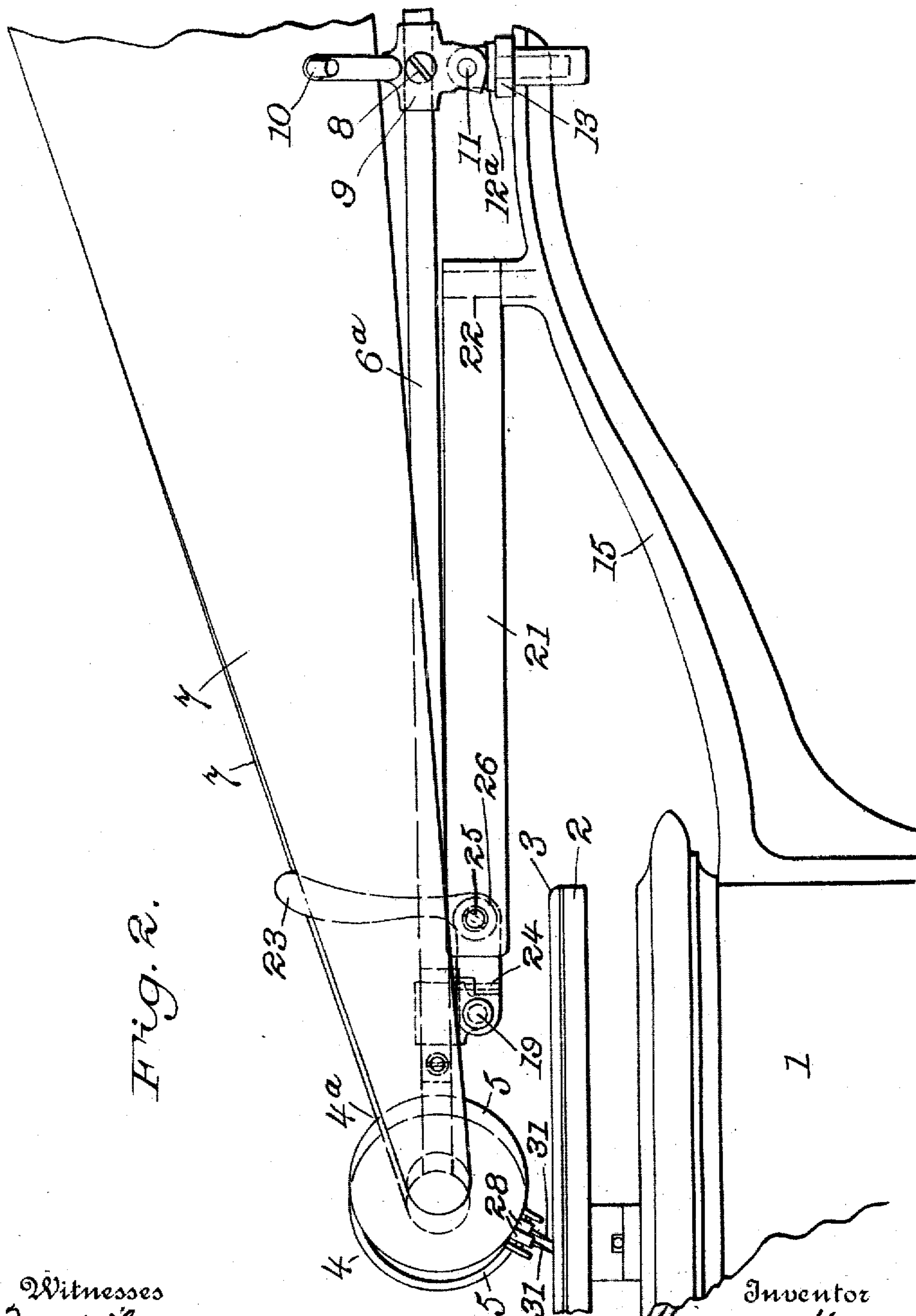


Fig. 2.

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3 SHEETS-SHEET 3

Fig. 3.

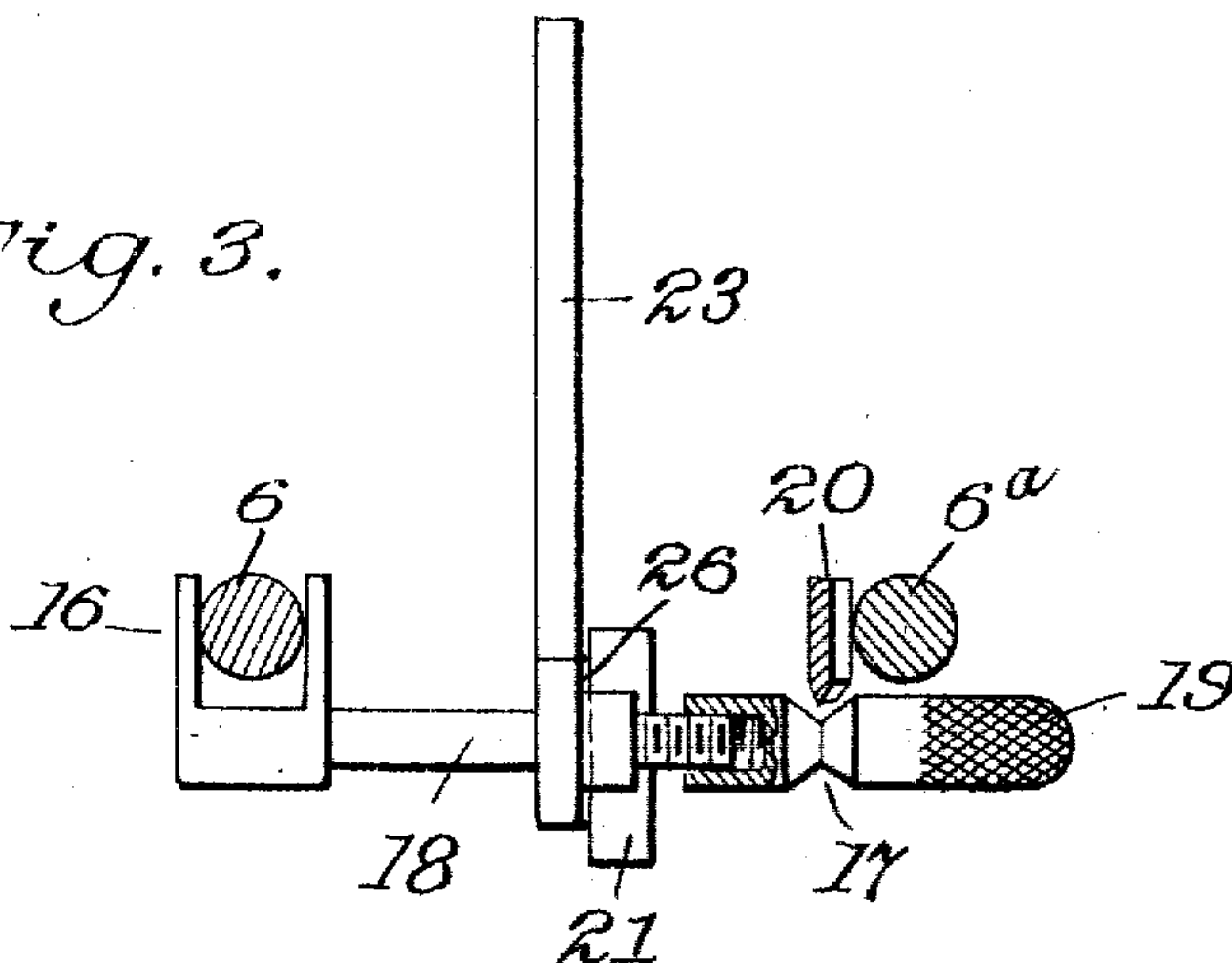
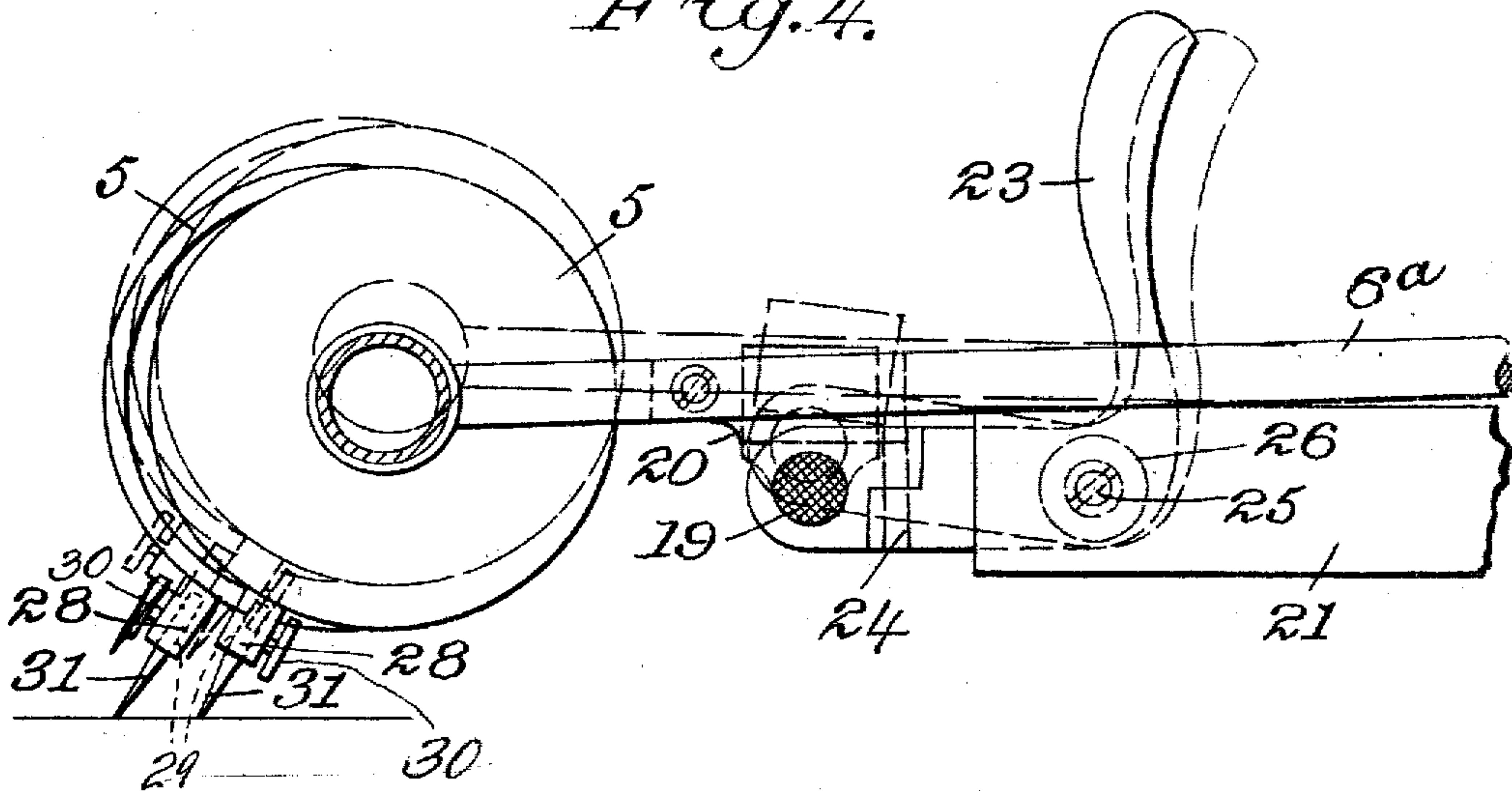


Fig. 4.



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# UNITED STATES PATENT OFFICE.

HENRY J. HAGEN, OF ORANGE, NEW JERSEY, ASSIGNOR TO UNIVERSAL TALKING MACHINE MANUFACTURING COMPANY, A CORPORATION OF NEW YORK.

## TALKING-MACHINE.

No. 816,978.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed March 28, 1905. Serial No. 252,542.

*To all whom it may concern:*

Be it known that I, HENRY J. HAGEN, a citizen of the United States of America, residing at Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

My invention relates to talking-machines or sound-reproducing apparatus in general, and as herein embodied is designed to produce a polyphone or multiple reproducer-machine employing, preferably, the disk-type of record. Such machines are ordinarily used in concert-halls or for exhibition or like purposes where the volume of sound must be greatly increased in order to be distinctly heard in all parts of an auditorium.

The present invention relates particularly to the mounting and arrangement of the several reproducers relatively to the record, the object being to obtain exact alinement and freedom of movement thereof in order to insure, first, proper engagement of the reproducers with the groove in the record, and, second, the requisite yielding action of the reproducers in following the undulations of the groove.

The accompanying drawings will serve to illustrate mechanism suitable for carrying my invention into effect.

In the drawings, Figure 1 is a view in plan, illustrating the application of my invention to a well-known form of disk machine. Fig. 2 is a view in elevation thereof. Fig. 3 is a cross-sectional view taken on the line  $s^3 s^3$  of Fig. 1; and Fig. 4 is a detail sectional view taken on the line  $s^4 s^4$  of Fig. 1, showing in dotted lines the guides adjusted and the reproducers elevated thereby above and clear of the record.

Referring now to the drawings, 1 represents the casing of the machine, and 2 the rotating table thereof, upon which the disk record 3 is supported in the usual manner. Mounted to cooperate with the record I have shown two reproducers 4 4'; but this number may be increased, if desired, or I may employ other forms of such devices. As shown, each reproducer consists of a sound-box 5, carried by a rod or other support, such as 6 or 6', and having a horn 7 connected therewith in the usual manner. Secured upon each of the rods 6 6' by a set-screw 8 there is

a sleeve 9, from which a bent wire 10 projects as a support for the horn. The sleeves are pivoted at 11 to posts 12 12' to permit limited vertical movement of the reproducers, as in machines of this class now in general use. The horizontal movement of the reproducers is provided for by mounting the posts 12 12' upon an arm 13, which is pivoted at 14 to a bracket 15, projecting from the casing of the machine. The post 12 is secured fast upon the arm 13, and the reproducer 4, connected therewith through the rod 6, is movable about the pivot 14 as a center. The post 12' is rotatably mounted upon the opposite end of the arm and serves as the pivotal center about which the reproducer 4' swings. As the arcs described by the reproducers in their movement across the record are substantially parallel, the rods 6 6' may, if desired, be mounted to turn about the same vertical axis, this dispensing with the arm 13. Being free to swing vertically and horizontally, the reproducers when properly adjusted, as shown, for example, in Fig. 1, will follow the undulating groove in the record as the latter is rotated and feed across the same in perfect alinement without requiring further adjustment or attention on the part of the operator. In order now to continue the reproducers in alinement when raised clear of the record, so that they may be caused to reengage therewith at the will of the operator without the necessity of adjusting them separately to the record-groove, I employ a device which will now be described.

At a point adjacent to the sound-boxes the rods 6 6' rest in guides 16 and 17, which are spaced a definite distance apart by an interposed pin 18, forming an extensible connection between the same. The guide 16 is preferably U-shaped, as shown in Fig. 3, and while movable vertically and lengthwise of the rod is of such depth as to always engage the same. The guide 17 is shown as an annular groove of V-shaped cross-section, formed either in the pin 18 or an adjustable extension 19 thereof to receive a knife-edged cam or projection 20 of the rod 6', which engages therewith only when the reproducers are clear of the record, as will be later on explained. The guides are supported and given longitudinal motion relatively to the rods by an arm 21, which is pivoted at 22 upon the bracket 15 and may be connected directly



with the pin 18 or indirectly therewith through an interposed L-shaped lever 23. I preferably employ the lever 23 as a convenient means of raising and lowering the reproducers. As shown, it is formed in two parts 5 hinged together at 24, one part thereof being rigidly secured to the pin 18 and the other part pivoted to the arm at 25. A friction-disk 26, of leather or other material, serves to 10 hold the lever 23 in any position to which it may be adjusted—as, for example, when thrown over, as indicated by dotted lines in Fig. 4, to elevate the reproducers above and clear of the record. Other devices may ob- 15 viously be substituted for the lever 23 as a means of yieldingly supporting the reproducers.

As above stated, the arcs described by the engaging points of the reproducers in moving 20 across the record are substantially concentric, and the alinement of these points relatively to the record-groove when out of engagement therewith is effected by causing the reproducer 4<sup>a</sup> when moving in either di- 25 rection from the high point 27 of the arc, as indicated by the arrows in Fig. 1, to advance at a slightly-increased speed over that of the reproducer 4. This movement is obtained automatically through the action of the cam 30 20 in coöperating with the guide 17, the difference in the arcs of travel of the cam and guide being such as to cause the guide to move lengthwise of the rod 6<sup>a</sup>, and thereby traverse the knife-edged cam, which is given 35 suitable shape or curvature to advance the reproducer 4<sup>a</sup> as required.

It will be observed that the arrangement of parts is such that either reproducer may be lifted out of its guide without disturbing 40 the other and replaced with equal readiness.

The guides serve to hold the reproducers in definite relation and automatically adjust the same to maintain them operatively 45 alined relatively to the record-groove from the moment they are lifted clear of the record until they are again lowered into engagement therewith, and thereupon the guide 17 becomes disengaged and the reproducers are free to move independent of each other in fol- 50 lowing the undulations of the record-groove. When thus adjusted, the reproducers are supported by the record; but the side lugs upon the guide 16 remain in engagement with the rod of reproducer 4, and through this 55 connection the guides are given a follow-up motion relatively to the reproducers and are therefore always in position to reengage when the lever 23 is thrown over. While the guides may be so arranged as to allow the 60 reproducers to enter or leave the record-groove simultaneously, I preferably provide for giving the reproducer 4 a slight advance over the reproducer 4<sup>a</sup>, as the former is steadier, owing to the form of guide employed in connection therewith.

The stylus-arm 28 is socketed at 29 in the usual manner and provided with a set-screw 30 for securing the needle 31 therein.

The operation, advantages, &c., of my invention will be apparent from the foregoing 70 description.

Having thus described my invention, I claim—

1. A polyphone comprising a sound-record, a plurality of reproducers coöperating there- 75 with, and means connecting the reproducers and operating substantially parallel with the face of the record to adjust and maintain the reproducers in such position that their styluses track in the same record-groove. 80

2. A polyphone comprising a sound-record, a plurality of reproducers movable independently of each other and means for transmitting requisite motion from one reproducer to the other to maintain them in operative aline- 85 ment.

3. A polyphone comprising a disk sound-record, a plurality of reproducers, and requisite guides movable with the reproducers for maintaining them in alinement relatively 90 to the record when out of engagement therewith.

4. A polyphone comprising a sound-record, a plurality of reproducers, and means for effecting an automatic adjustment of the re- 95 producers toward and from each other.

5. A polyphone comprising a sound-record, a plurality of reproducers coöperating therewith, a support common to the several reproducers for moving them in and out of engage- 100 ment with the record, and means carried by the reproducers for automatically adjusting them toward and from each other.

6. A polyphone comprising a sound-record, a plurality of reproducers coöperating there- 105 with, a cam and a cam-engaging device mounted respectively upon adjoining reproducers and arranged to cause said reproducers to move in such direction as to maintain them in operative alinement. 110

7. A polyphone comprising a sound-record, a plurality of reproducers coöperating therewith, requisite guides for the reproducers, and a cam coacting with the guides to effect an automatic adjustment of the reproducers. 115

8. A polyphone comprising a sound-record, a plurality of reproducers, requisite guides movable with the reproducers, and a cam co- operating with the guides to effect an auto- 120 matic adjustment of one of the reproducers.

9. A polyphone comprising a sound-record, two reproducers normally disconnected during their reproducing movement, means for raising and lowering the reproducer, and means for positively connecting the repro- 125 ducers when raised clear of the record.

10. A polyphone comprising a disk sound-record, a plurality of reproducers coöperating therewith, an arm movable with the reproducers, requisite guides carried by the arm, 130



and means for adjusting the guides to raise and lower the several reproducers relatively to the record.

11. A polyphone comprising a disk sound-  
5 record, two reproducers coöperating there-  
with, a movable arm operatively connected  
with one of the reproducers, guides carried  
by the arm, and a cam coacting with the  
guides to effect an automatic adjustment of  
10 the other reproducer.

12. A polyphone comprising a rotatable  
sound-record, two reproducers coöperating  
therewith, said reproducers being movable  
horizontally in substantially concentric arcs,  
15 a pivoted arm operatively connected at its  
free end to one of the reproducers, guides for  
retaining the reproducers in definite relation,  
and means carried by the arm for moving  
the guides to raise or lower the several repro-  
20 ducers.

13. A polyphone comprising a rotatable  
sound-record, two reproducers coöperating

therewith, requisite guides for the reproduc-  
ers, a support for the guides, an adjustable  
connection interposed between the guides 25  
and the support, and a cam coacting with  
the guides to effect an automatic adjustment  
of the reproducers relatively to each other.

14. A polyphone comprising a sound-rec-  
ord, two reproducers normally disconnected 30  
during their reproducing movement, means  
for raising and lowering the reproducers,  
means for positively connecting the repro-  
ducers, and a device coacting with said con-  
necting means to give the reproducers mo- 35  
tion toward and from each other.

In testimony whereof I have signed my  
name to this specification, in the presence of  
two subscribing witnesses, this 17th day of  
March, 1905.

HENRY J. HAGEN.

Witnesses:

M. TURNER,

W. H. PUMPHREY.