

No. 685,024.

Patented Oct. 22, 1901.

J. E. ALEXANDER.  
TALKING MACHINE.

(Application filed Dec. 10, 1900.)

(No Model.)

3 Sheets—Sheet 1.

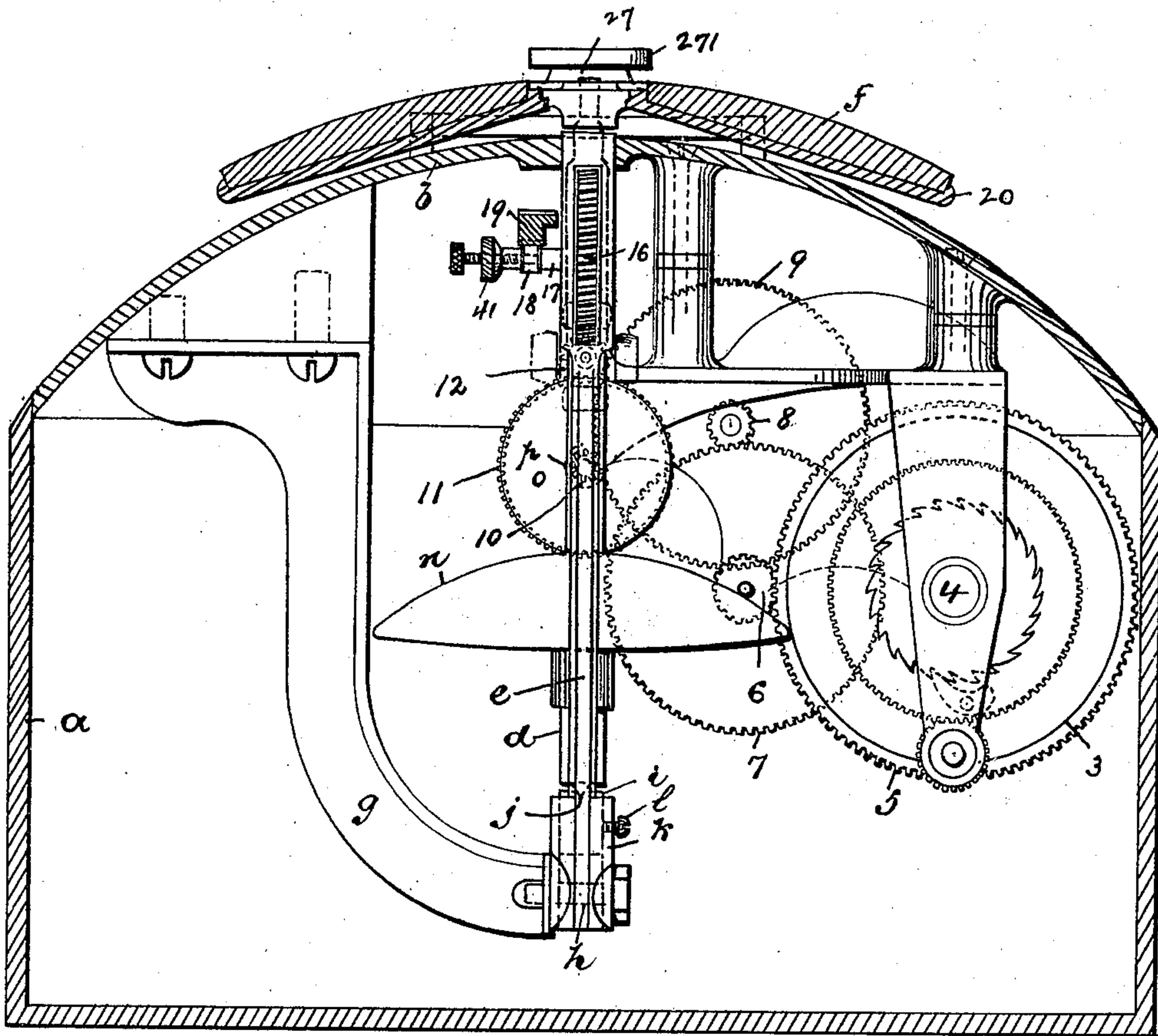


Fig. 1.

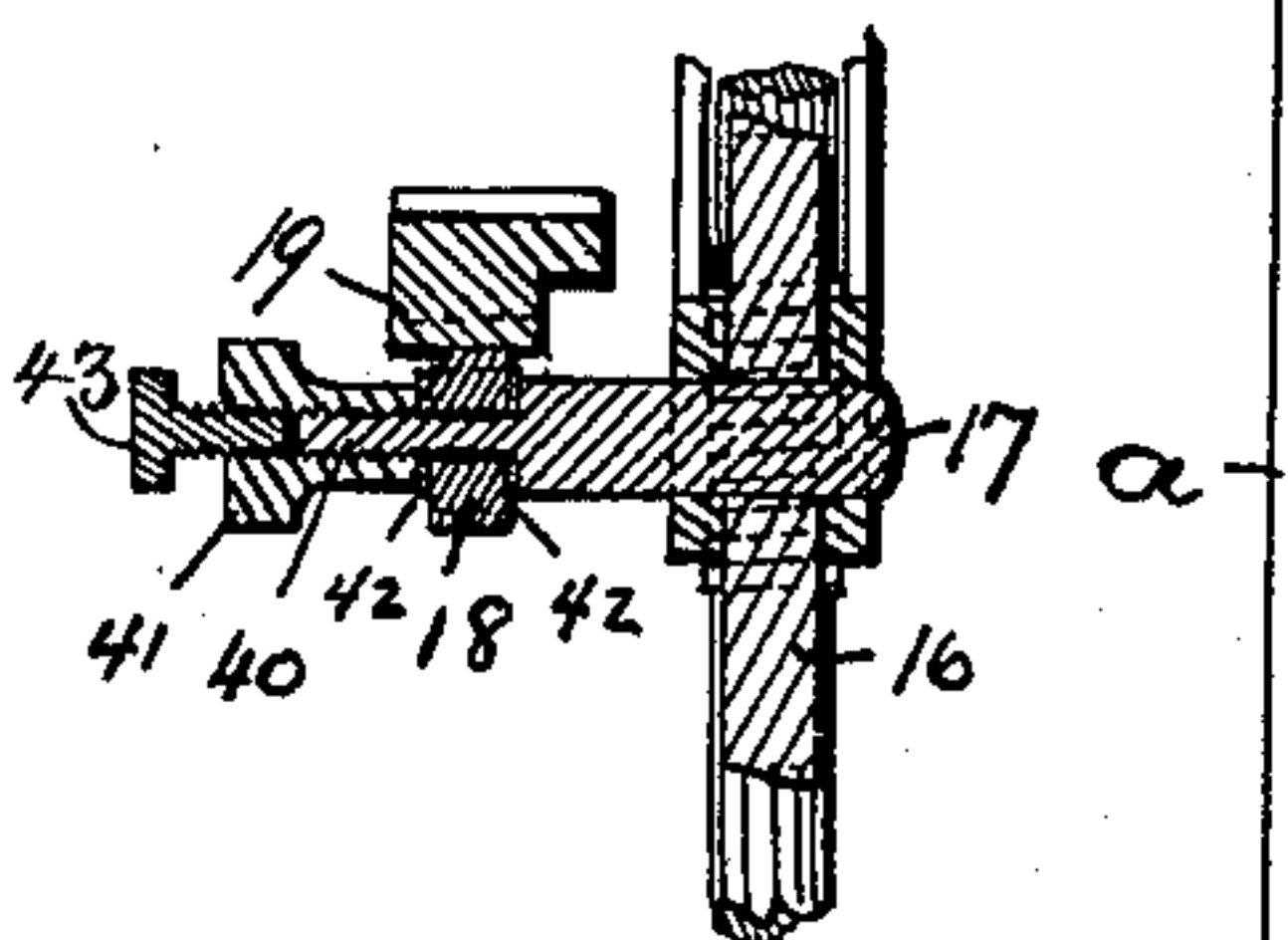


Fig. 2 1/2.

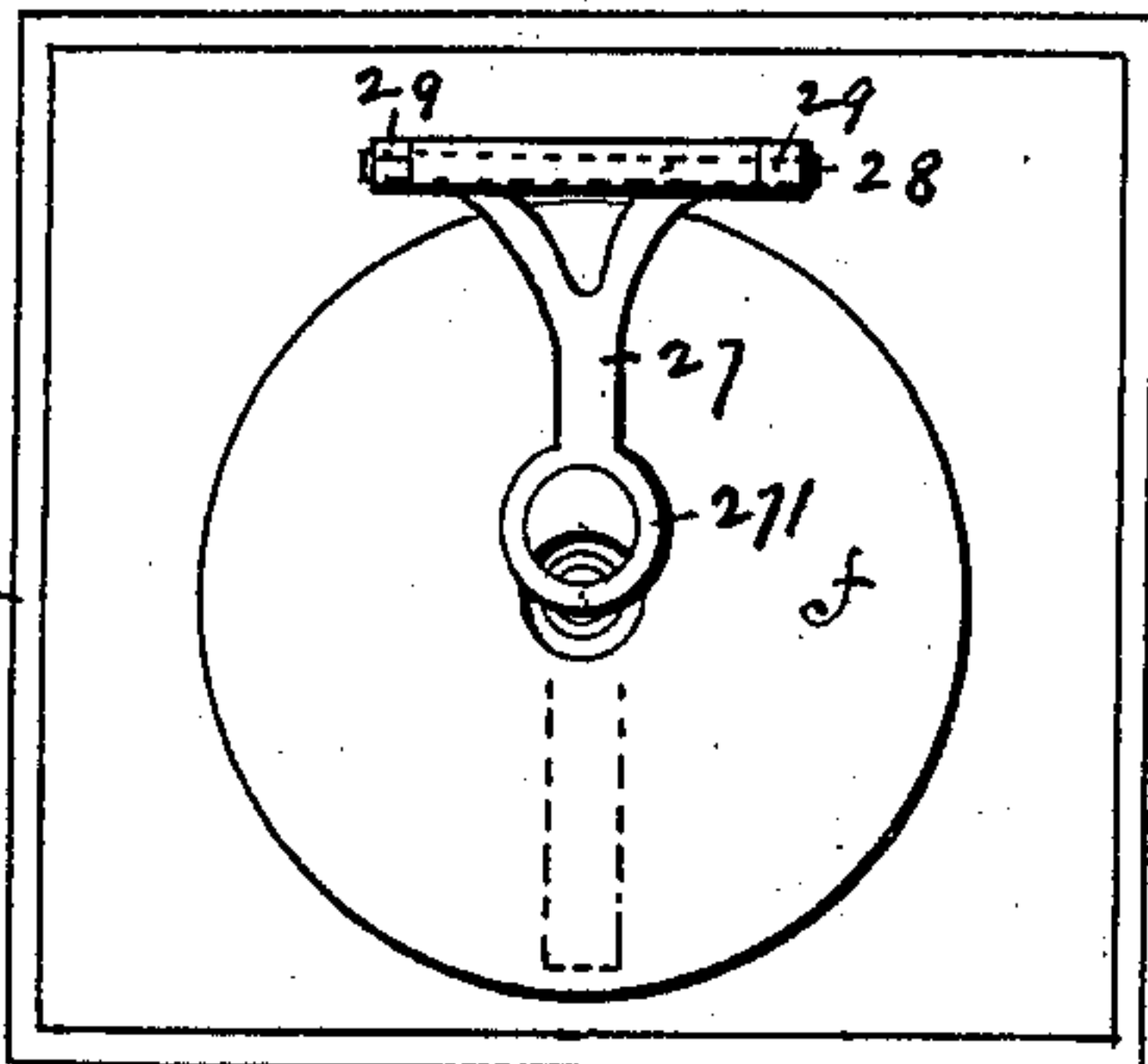


Fig. 2.

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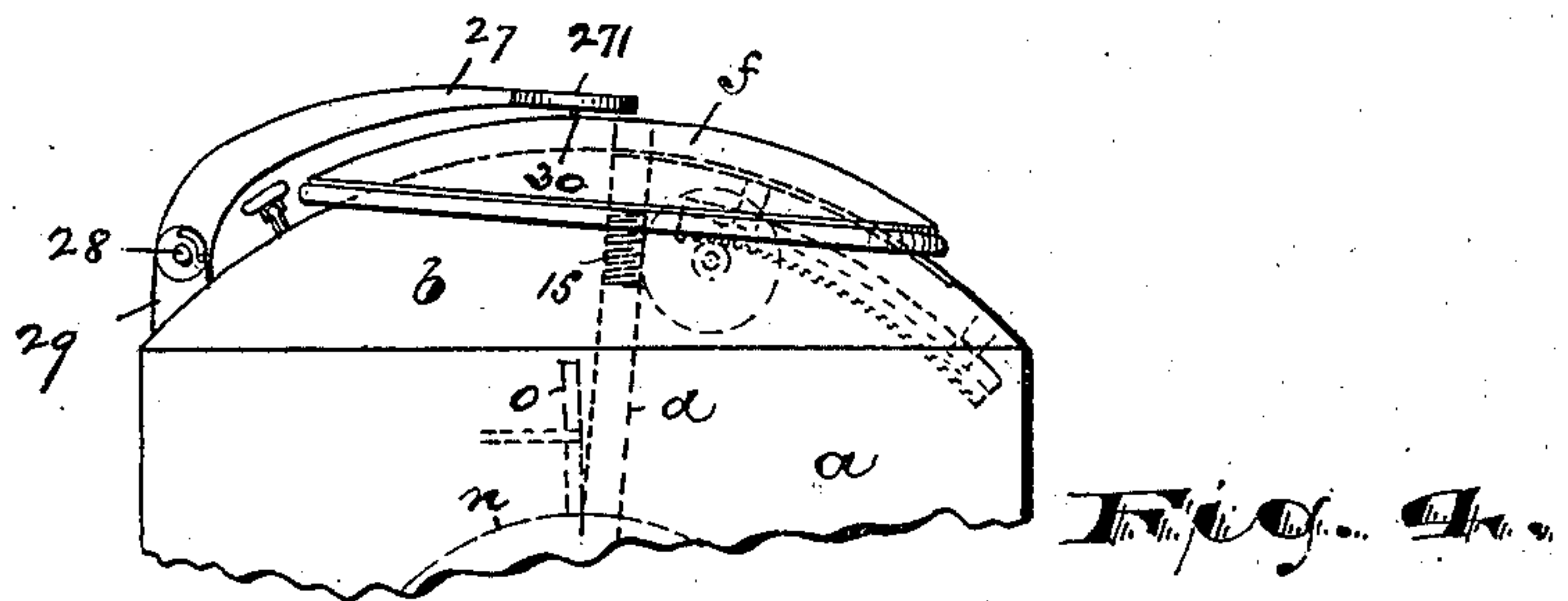
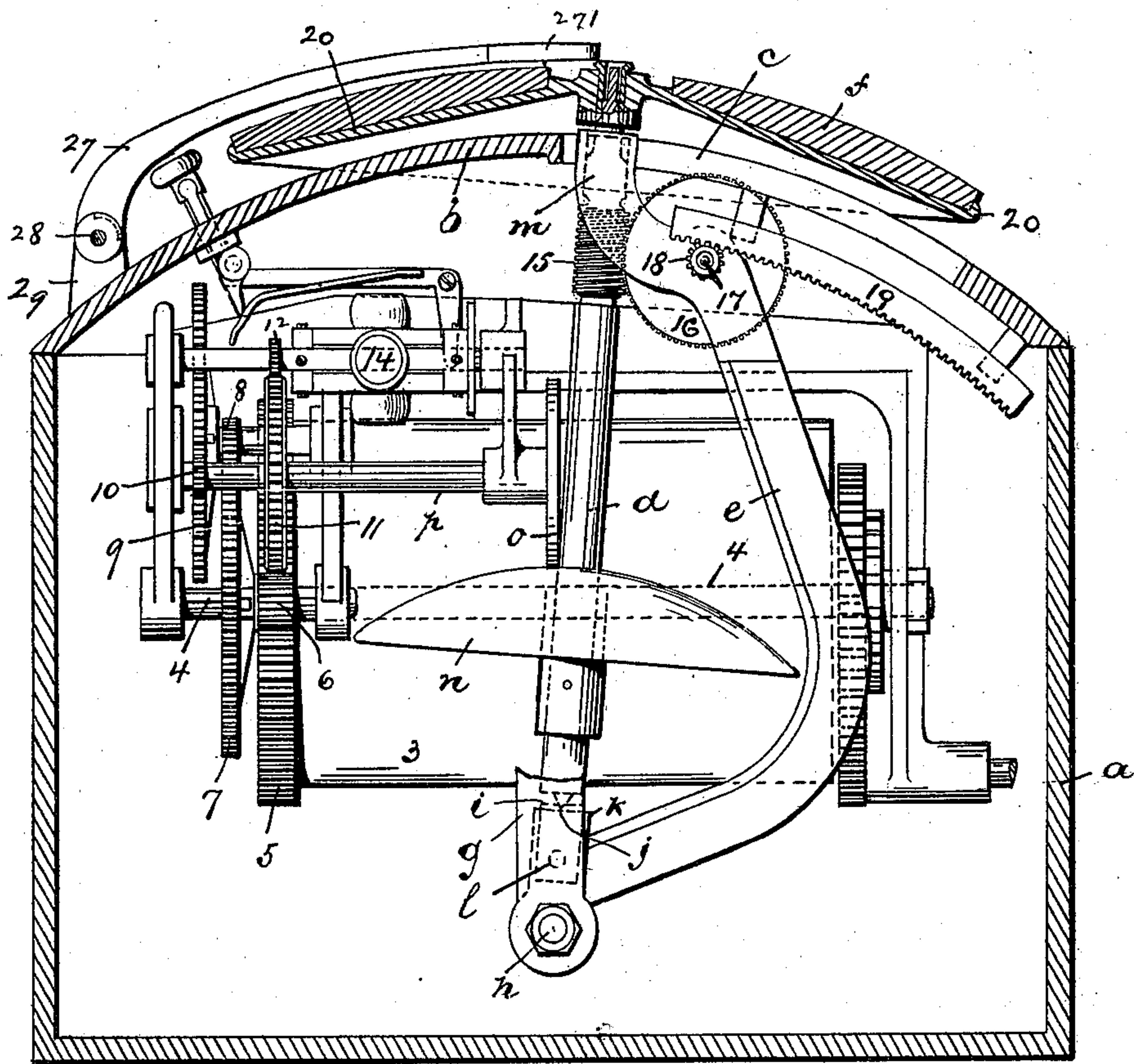
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**3 Sheets—Sheet 2.**



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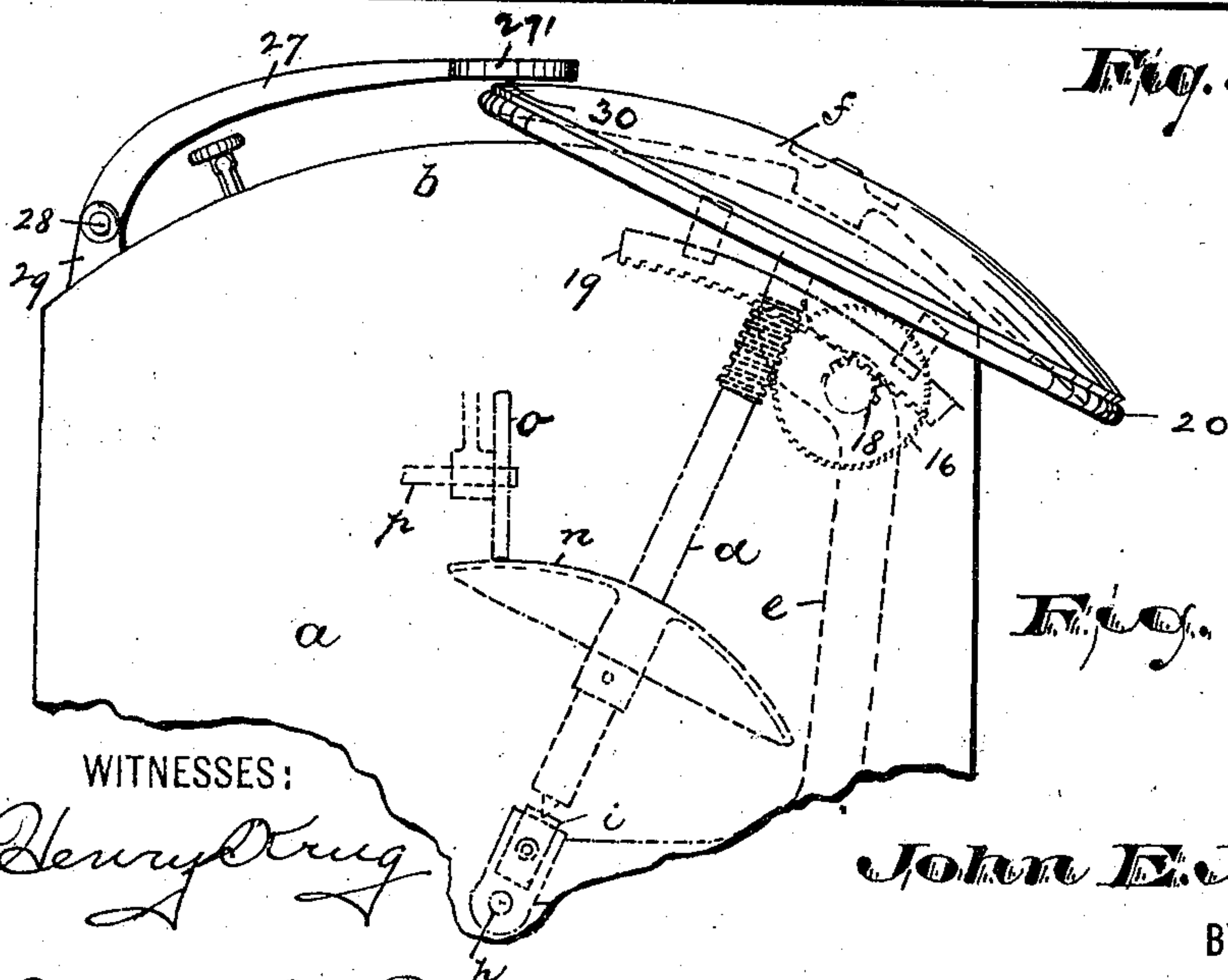
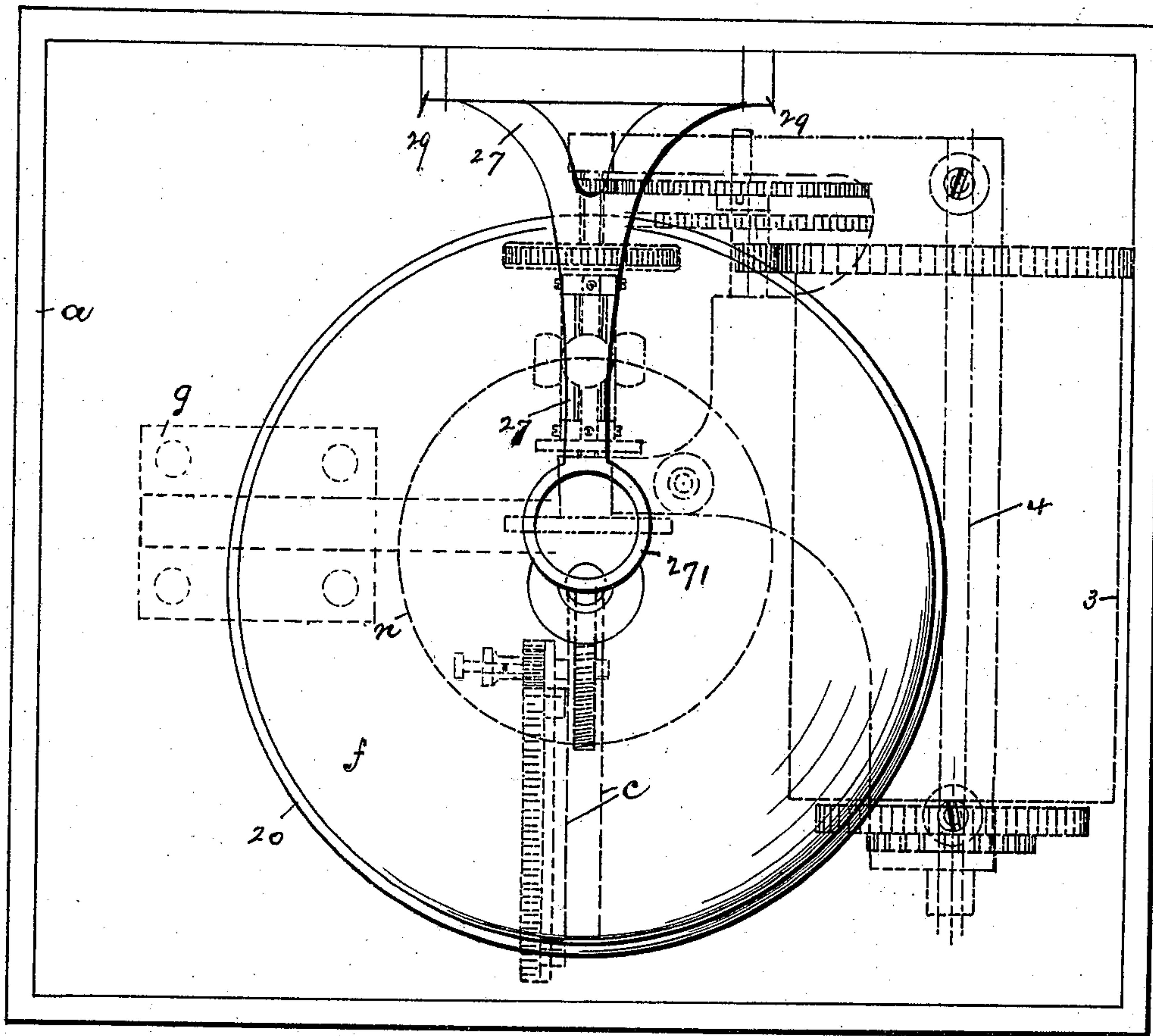
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**3 Sheets—Sheet 3.**



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# UNITED STATES PATENT OFFICE.

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## TALKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,024, dated October 22, 1901.

Application filed December 10, 1900. Serial No. 39,347. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. ALEXANDER, 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 Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in that class of sound recording and reproducing or talking machines adapted to serve in connection with a record or record-blank having a spherical surface or a surface convexed in concentric relation to a given center after the fashion of the surface of a globe, of which class the machine shown in my prior application, filed September 28, 1900, Serial No. 31,357, is the only prior representative.

The object of the present construction is to secure greater compactness of structure in a machine of said class whereby greater convenience is obtained in operating in connection with said spherical or concentrically-curved records or record-blanks, to render the operation of said spherical recording device more simple and inexpensive, and to obtain other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved sound recording and reproducing or talking machine and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a side view of the improved machine, the box or case containing the working parts, the record-holder and record being shown in vertical section. Fig. 2 is a plan view, on a reduced scale, showing a speaker-

holder overlying the record. Fig. 2½ is a detail section showing a certain frictional pinion-clamp. Fig. 3 is a side view of the said machine, the box, the record, and its holder being again shown in section. Fig. 4 is a side view showing the machine in part on a reduced scale. Fig. 5 is a plan of the said machine, and Fig. 6 is a side elevation showing the record and holder in different positions from what are shown in Fig. 4.

In said drawings, *a* indicates the body of a suitable box or case within which the working parts of the machine are inclosed and by which the said working parts are protected from injury by mechanical interference, dust, or otherwise. The top of the body of said box or case is preferably a dome-shaped casting or plate *b*, providing bearings from which the working parts are suspended and held in operating relation and removable together from the body of the case. Said dome-shaped plate or casting *b* is slotted from at or near the center of the dome radially or laterally outward, as at *c*, to permit a sidewise movement of the record-holder shaft *d* and frame *e*, which have bearings within the box or case and extend out through said slot to receive the record-holder, so that it will lie near to the dome as it moves in a path concentric to the curvature of the dome. The said frame *e* has its lower bearing upon a bracket *g*, Fig. 1, secured within the box or case, preferably upon the dome-shaped casting or plate *b*, said frame being pivoted upon said bracket, as at *h*, so as to turn thereon, and near its pivot *h* said frame *e* preferably provides an adjustable bearing *i* for the lower or inner end of the shaft. Said adjustable bearing may be a short cylindrical piece of metal recessed at its upper end to receive a pivotal lug or center *j* at the lower end of the shaft, and it may fit within a tubular part *k* of the frame *e*, where it may be adjustably held by means of a set-screw *l* or other means. At its upper end said shaft *d* is arranged in a box or bearing *m*, prepared for it in the frame *e*, said bearing permitting a free rotation of said shaft as it turns with said frame, but holding it steadily and positively to prevent irregularity of rotary movement. Said shaft *d* is preferably provided at a suit-



able point in its length with a friction-surface  $n$ , which is preferably globular or convexly curved, after the fashion of the surface of a sphere, the convexity being concentric with the center of movement of the shaft and with the curved surface of the record. Said friction-surface is preferably formed upon a flange the general shape of which is that of a segment of a globe and is fastened upon the shaft  $d$  at a distance below the record-holder, and thus there is no necessity for a contact of the cooperating friction motive device bearing upon the record-holder, and thereby deadening the sound therefrom. The friction-surface is engaged by a friction-wheel  $o$  upon the shaft  $p$ , in train with the cog-wheels and cooperating mechanisms of a suitable motor, preferably a spring-motor. The convex friction-surface being concentric with the center of movement of the shaft  $d$ , the said friction-wheel  $o$  maintains its operative contact with said friction-surface as the said shaft moves with the frame on the pivot  $h$ . Said friction-wheel  $o$  may be of leather or other material having a measure of elasticity. The convex friction-surface in the preferred construction being concentric or approximately concentric with the surface of the record, as the shaft moves laterally in the plane of its longitudinal axis the distance between the friction-wheel and the axis of the shaft  $d$  gradually increased, so that the spirals described by the said friction-wheel  $o$  on the surface  $n$  gradually enlarge, as will be apparent, and the rate of speed of rotation of shaft  $d$  will be correspondingly reduced. This reduction of speed of the shaft  $d$  effects the speed of the record-holder and record, and thus this last-mentioned part rotates more slowly as the stylus enters into engagement with the parts of the globular or spherical record more distant from the center of rotation thereof, and thereby there is no hastening in the time or measures of sound production as the reproduction of the music or sound advances, but, on the contrary, the time is uniform throughout the reproduction.

The advantages due to the use of the improved record employed in this machine have already been detailed in my prior applications.

When a spring-motor is employed to effect the desired movements of the shaft and frame, the spring (not shown) may be contained within the barrel 3, being fastened at opposite ends upon said barrel and its shaft 4 in any suitable manner, and power may be transmitted through the cogs and pinions 5, 6, 7, 8, 9, and 10 to the friction-wheel. In train with the said motor-cogs I may employ a suitable governor 14 for regulating the speed, power being transmitted thereto by means of the cog-wheels 11 12 or by any other suitable means. The said shaft  $d$  near its free end is preferably threaded, as at 15, and engages a worm-wheel 16 on a shaft 17, having bearings upon the frame at a point adjacent to the threads

15, so that the threads of the shaft and worm-wheel intermesh, as indicated in Fig. 3. On the shaft 17, with the worm-wheel, is a pinion 18, which engages a curved or segmental rack 19, stationed beneath the dome and approximately concentric with the pivot  $h$ , so that the pinion will travel over the toothed surface of the rack as the frame  $e$  and shaft  $d$  move upon the pivot  $h$ , and thus as the shaft  $d$  rotates under the action of the friction-wheel  $o$  and the spherical or globular surface  $n$  the worm-wheel 16 slowly turns and causes the pinion 18 to travel over the rack 19 laterally and draw the frame  $e$  with it, so that said frame and the shaft  $d$ , the record-holder 20, and the record  $f$  on said holder are caused to move slowly, the shaft  $d$  moving in the slot  $c$  in one direction under the power of the spring of the motor or other motive means as the shaft  $d$  and the said parts connected therewith rotate.

Stationed at the top of the device and projecting over the record-holder and when the record is in place is an arm 27, arranged, preferably, on a pivotal pin 28 of a suitable bracket or bearing-plate 29, fastened to or formed on the case or plate  $b$ . At the projecting end of said arm 27 is formed a ring or other device 271 to receive and hold a speaker or sound-box having a stylus 30. (Indicated in Figs. 4 and 6.) Said arm 27 is free at its projecting end to gravitate, so that when the said speaker is disposed over the record its stylus 30 will engage the said record and contribute to the production of sound. After the shaft  $d$  and its connections have made a complete operative movement under the power of the spring-motor, so that the stationary stylus traversed the face of the record as said record is rotated and moved in a plane of its axis in a direction coincident with the longitudinal axis of the slot  $c$  to the end of said movements, the said record may be returned to its initial position by hand, and to permit this to be quickly accomplished I prefer to hold the pinion 18, which engages the rack 19, in operative position upon the shaft 17 by frictional clamping means, which are illustrated in Figs. 1 and 2 $\frac{1}{2}$ , where the shaft 17 is shown to be reduced in diameter at one end, as at 40, and the reduced end is threaded to receive a clamping-screw 41. The pinion is arranged between friction-washers 42 42 on said reduced end of the shaft, so that when the clamp-screw is screwed up the pinion is clamped with sufficient firmness to secure the operations described, and yet permit a loose turning independent of its shaft when the frame  $e$ , shaft  $d$ , and connections are turned to their initial positions, as described. A lock screw or nut 43 may be employed to lock the clamping-screw 41, when properly adjusted, to secure the desired frictional contact.

Having thus described the invention, what I claim as new is—

1. In a sound recording and reproducing ma-



chine, the combination with a motor, of a rotary record - carrying shaft, and a frame carrying said shaft and movable about a center *h*, in the axis of rotation of said shaft, and means for transmitting motion from the motor to said frame and shaft, substantially as set forth.

2. In a sound recording and reproducing machine, the combination with a frame pivoted upon a suitable bearing in said machine, of a record-carrying shaft having its bearings on said frame, the pivotal center of movement of the frame being in the longitudinal axial line of said shaft and movable with said frame, means for rotating said shaft and means for moving said frame on its pivot, substantially as set forth.

3. In a sound recording and reproducing machine, the combination with a frame pivoted upon a suitable bearing in said machine, of a record-carrying shaft having its bearings on said frame near the opposite ends of the latter and having, intermediate of said ends, a screw-thread, a worm-wheel centered on said frame and engaging the threads of the record-carrying shaft, a pinion in connection with said worm-wheel and a curved rack engaged by said pinion, said curved rack being fixed in the machine adjacent to the free end of the shaft and the curvature of the rack being concentric with the center of movement of the frame, whereby, when the said pinion is turned with the worm-wheel, the said pinion will travel over said rack and will effect a turning of the frame on its pivot, substantially as set forth.

4. In a sound recording and reproducing machine, the combination with a frame movable on a center, of a rotary shaft journaled on said frame and adapted to turn therewith, and means in connection with the free end of the frame and receiving power from the said shaft for turning said frame, and a friction-surface on said rotary shaft, distant from the free end thereof, and independent of the record-holder, said record-holder secured to said rotary shaft at its free end, and a friction-wheel pressing on said friction-surface but not on the holder, and means for rotating the said friction-wheel, substantially as set forth.

5. In a sound recording and reproducing machine, the combination with a pivoted frame carrying a worm-wheel and pinions and a threaded shaft carrying a record with a spherical surface and a spherical friction-surface distant from said record, of a rack engaged by said pinion, the power from the shaft being transmitted to the pinion through said worm-wheel, and a friction-wheel for engaging said spherical friction-surface and rotating said shaft, substantially as set forth.

6. In a sound recording and reproducing machine, the combination with a pivoted frame carrying a rotary shaft arranged with its longitudinal axis in line with the pivotal center on which the said shaft turns and having screw-threads and movable in one direction

of turning under the power of a motor, of said motor and means for transmitting the power to said shaft and means for transmitting the power of the rotary shaft to the frame to effect a turning thereof on its pivot, substantially as set forth.

7. In a sound recording and reproducing machine, the combination with a dome-shaped box or case having a slot *c*, to permit the record-holder shaft to move with its record-holder, as said shaft turns about its pivotal center, said rotary shaft, means for rotating said shaft, means for turning said shaft and causing it to move a distance in a given plane and a record-holder arranged on said shaft distant from its center of turning, substantially as set forth.

8. In a sound recording and reproducing machine, the combination with the fixed speaker-holder, of a rotary record-holder and spherical record, together movable in a curved path adjacent to said speaker-holder, substantially as set forth.

9. In a sound recording and reproducing machine, the combination with a speaker having a suitable stylus, of a rotary record-holder on a movable axis and means for rotating said holder and changing the position of the axis and a spherical record arranged on said holder, substantially as set forth.

10. In a sound recording and reproducing machine, the combination with a speaker having a stylus, of a rotary record-holder movable in the plane of its axis, a flange arranged at a distance from but connected to rotate with said record-holder and a friction-wheel, and means for operating the same, said flange being engaged and rotated by said friction-wheel and thereby operating said holder, substantially as set forth.

11. In a sound recording and reproducing machine, the combination with a speaker having a stylus, of a rotary record-holder movable in the plane of its axis, in a curvilinear path, and a globular or spherical flange and friction-wheel for operating said holder, substantially as set forth.

12. In a sound recording and reproducing machine, the combination with the record-holder, of a shaft arranged at the axis of said holder, the longitudinal axis of the shaft, coinciding with the axis of said holder, a frame pivoted upon a suitable fixture and provided with journal-bearings for the shaft, one of said journal-bearings being arranged near the pivot of the frame, and the other of said bearings being near the free end of said frame, and means for rotating said shaft and means for turning the frame on its pivot, substantially as set forth.

13. In a sound recording and reproducing machine, the combination with the record-holder, of a rotary shaft arranged at the axis of said holder and supporting the same, the longitudinal axis of the shaft coinciding with the axis of the holder, a frame pivoted at a point in line with said longitudinal axis of



the shaft, and providing journal-bearings for said shaft, one of said bearings being near the frame-pivot and the other at a distance therefrom, said shaft having a friction-flange  
5 interposed between the said bearings, a friction-wheel engaging said flange and transmitting rotary motion thereto, and means for transmitting motion from the frame and turning said frame on its pivot, substantially as  
10 set forth.

14. In a sound recording and reproducing machine, the combination with a speaker-holder, of a rotary and laterally-movable record-holder, and a friction-flange arranged on  
15 the same axis with the holder at a distance from said holder, a friction-wheel engaging said flange, and a motor, substantially as set forth.

15. In a sound recording and reproducing  
20 machine, the combination with a stationed speaker or sound-box holder, of a rotary and laterally-movable record-holder having a spherical friction-surface, connected therewith, and on the same axis, a friction-wheel  
25 engaging the said spherical surface and a motor, substantially as set forth.

16. The combination with the box or case of a frame pivoted in said case and movable at its free end in a straight course on its  
30 pivot, of a rotary shaft having bearings on said frame near said pivot, and at its free end being adapted to carry a record, a speaker-carrying arm, attached to said box or case, and a motor for rotating said shaft and turning  
35 the frame on its pivot in one direction, the motive means and connections permitting a return of the record, its shaft and frame to an initial position by hand-power, substantially as set forth.

17. In a machine for recording and repro- 40  
ducing sounds, the combination with a curved rack fixed in said machine, a frame *e*, pivoted at a distance from said rack and having a free end adjacent to said rack and movable  
45 in a path concentric with the curvature of said rack, and carrying a shaft 17, carrying said pinion, a worm-wheel on said shaft 17, clamping means for said pinion, said frame  
50 *e*, having bearings for a threaded record-holding shaft, and said shaft adapted to receive said record, substantially as set forth.

18. In a machine for recording and reproducing sound, the combination with the curved rack fixed immovably in said machine, of a frame pivoted concentric with said curved  
55 rack and carrying a record-holding shaft having a screw-thread, a pinion and worm-wheel joined together, one engaging said rack and the other threads of the record-carrying shaft, substantially as set forth. 60

19. In a machine for recording and reproducing sound, the combination with the curved rack, of a pivotal frame carrying a record-holding shaft, said shaft having a  
65 screw-thread, a pinion and worm-wheel movable together when clamped and independent of one another when not clamped, and a friction-clamp for normally holding said pinion and worm-wheel in operative relation, substantially as set forth. 70

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of November, 1900.

JOHN E. ALEXANDER.

Witnesses:

CHARLES H. PELL,  
LOUIS A. GREENLEAF.