

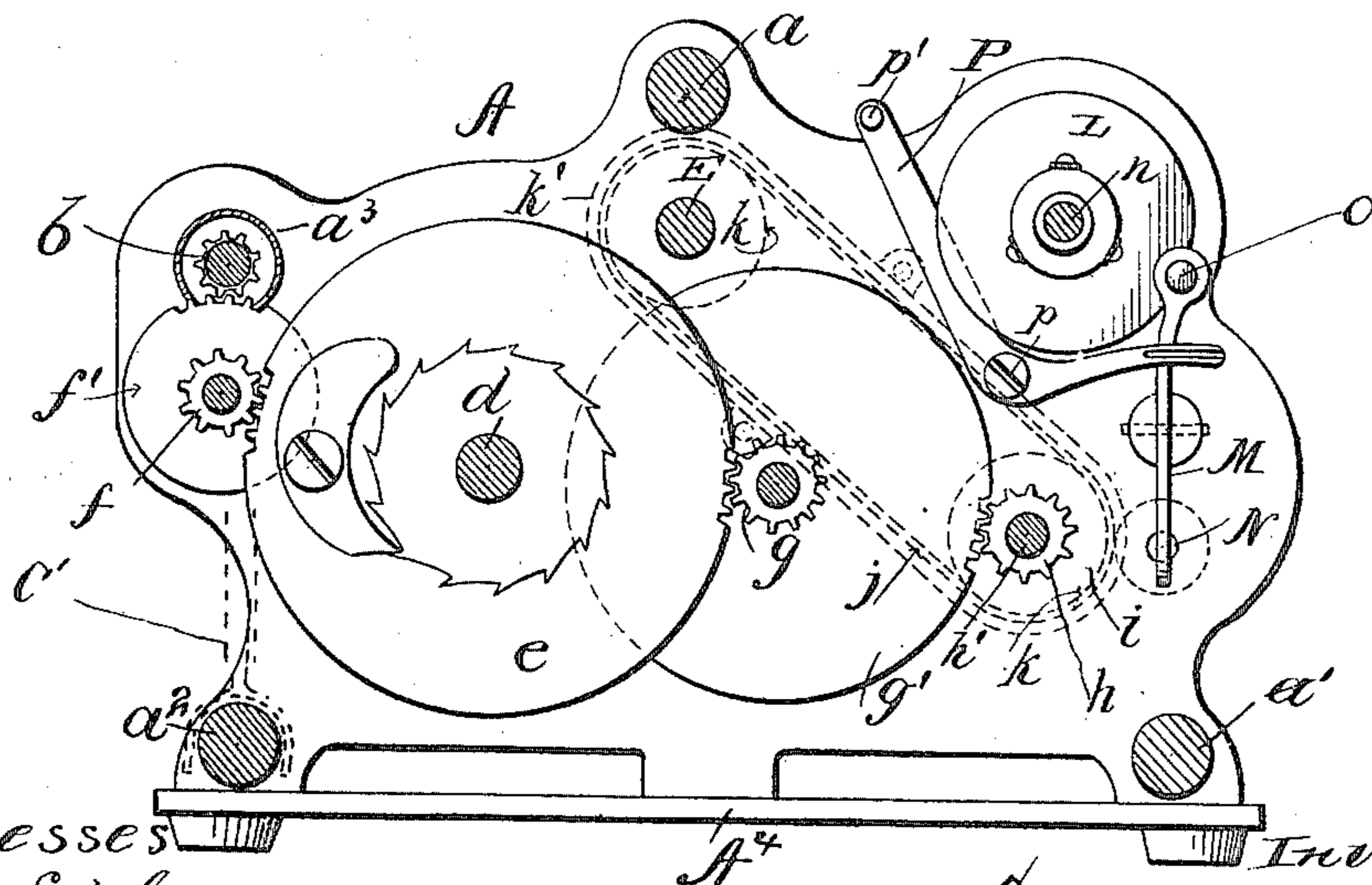
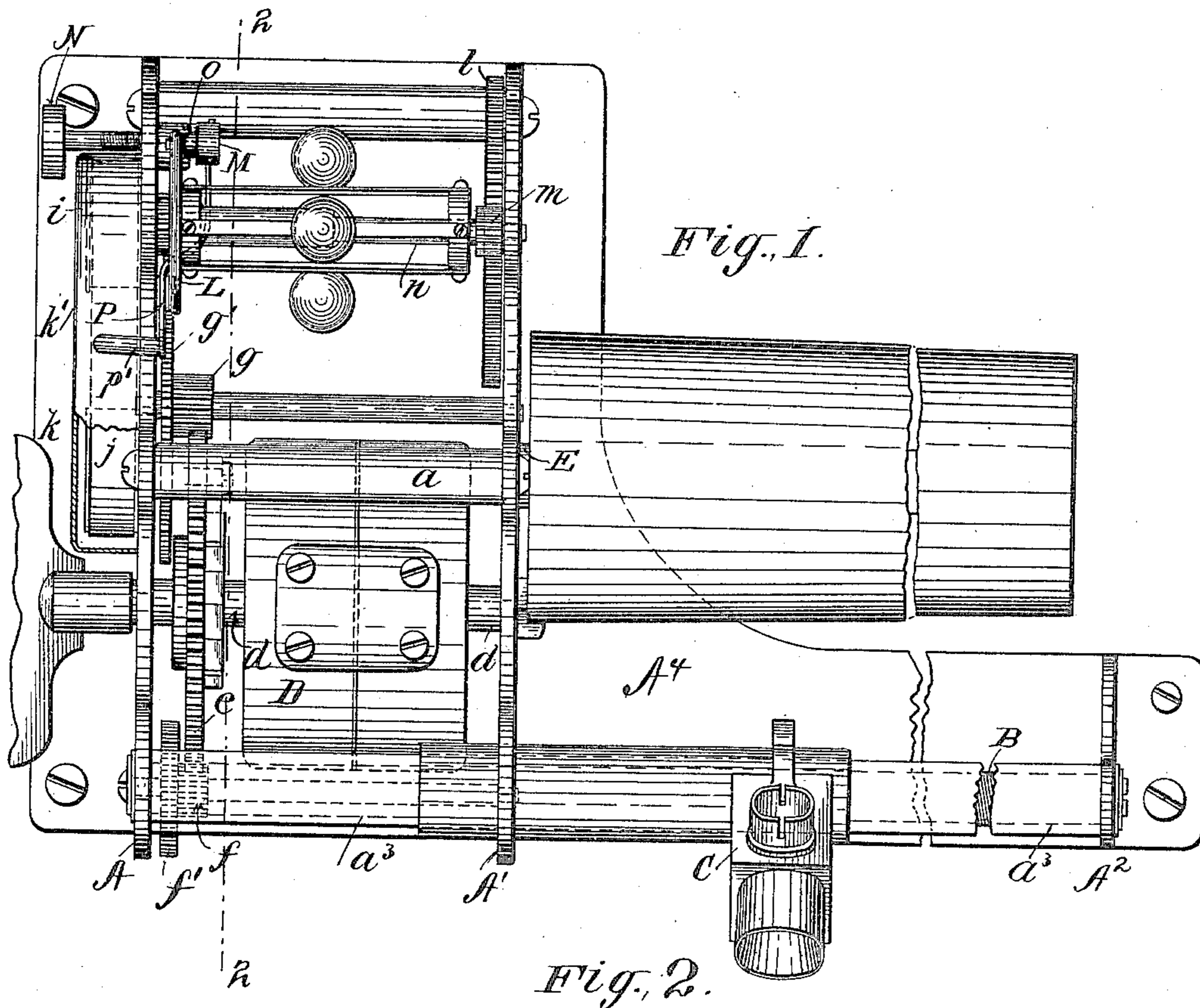
No. 680,794.

Patented Aug. 20, 1901.

T. H. MACDONALD.
COMBINED GRAPHOPHONE AND MOTOR.

(Application filed Sept. 16, 1897.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS H. MACDONALD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO
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COMBINED GRAPHOPHONE AND MOTOR.

SPECIFICATION forming part of Letters Patent No. 680,794, dated August 20, 1901.

Application filed September 16, 1897. Serial No. 651,912. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. MACDONALD, of Bridgeport, Connecticut, have invented new and useful Improvements in a Combined Graphophone and Motor, which improvements are fully set forth in the following specification.

This invention has reference to the construction of sound recording and reproducing apparatus generally known as "graphophones;" and its object is to simplify the construction of the mechanism (decreasing the cost, complexity, and liability to derangement) without sacrificing but, on the contrary, improving the quality of the acoustical results.

To this end I have designed new arrangements of the spring-motor mechanism and the parts of the graphophone (the mandrel and feed-screw) driven thereby, whereby greater compactness and rigidity are secured, the graphophone and motor in the improved construction constituting a single complete mechanism. I have also made improvements in the driving mechanism, as will be hereinafter explained.

In the accompanying drawings, which form part of this specification, Figure 1 is a plan view of a combined graphophone and motor constructed in accordance with the invention. Fig. 2 is a vertical cross-section on line 2 2, Fig. 1.

The frame of the mechanism consists of three upright plates A A' A². The first two are of the same shape and extend the full width of the machine, the motor mechanism being supported between them. Plates A A' are rigidly connected together by a tie-rod *a* at the top of the plates and about the middle thereof, and tie-rods *a'* *a*² at opposite sides of the plates near the bottom thereof. Rod *a*² is prolonged and attached at its farther end to the bottom of plate A². The latter is also connected to plate A by a sleeve *a*³, which contains the feed-screw B and passes loosely through a hole in plate A'. Sleeve *a*³ constitutes the sliding way for the carriage C of the recorder or reproducer, and rod *a*² serves as a guide for the tailpiece C', which depends from the under side of the carriage, as in previous constructions. The lower ex-

trinity of said tailpiece is shown in dotted lines in Fig. 2. The whole frame thus constituted may be set on a bed-plate A⁴ or on any other suitable support. The mandrel-shaft E has its bearings in plates A A' and is located about midway between the ends of said plates or just beneath rod *a*. The arbors of the motor mechanism also have their bearings in plates A A'.

D represents the barrel of the mainspring, (preferably a tandem or duplex spring,) mounted on arbor *d*, on which is also mounted a spur-gear *e*. This gear through a pinion *f* and gear *f'* on the same arbor therewith drives pinion *b* on the shaft of the feed-screw. Through a separate train of gears comprising pinion *g*, spur-gear *g'* on the same arbor, and pinion *h* motion is communicated to arbor *h'*, which extends through plate A and has on its end a driving-pulley *i*. The latter through a belt *j* drives pulley *k* on the mandrel-shaft E. The belt and pulleys are preferably covered by a casing *k'*. Arbor *h'* also carries a spur-gear 1, Fig. 1, which drives a pinion *m* on the governor-shaft *n*. The governor is of the type described in my Patent No. 587,265, dated July 27, 1897.

Heretofore the mandrel-shaft has usually been connected by gearing to the feed-screw, so as to drive the latter, or the feed-screw and mandrel have been on the same shaft. The object of the improved construction is to make the mandrel independent of the feed-screw. By this construction, the feed-screw being driven by a train of gears and the mandrel by a belt from an independent train of gears, I am able to a large extent to prevent vibrations from the gearing and from the feed-screw being communicated to the mandrel and impairing the recording or reproduction of sounds.

For operating the centrifugal governor as a brake and also as a speed-regulator for varying speeds a lever M is pivoted on a projection of plate A and carries at one end a leather stud *o*, adapted to make contact with the rotatory friction-disk L of the governor. An adjusting-screw N determines the normal position of the lever, which in turn determines the speed of rotation of the motor. A bent arm P, pivoted at *p* to plate A, has its rear

end extending over and pressing upon lever M. Arm P can be turned on its pivot by means of a handle *p'*, so that the pressure of its rear end upon lever M will be shifted from one side of the pivot-point of said lever to the other, thereby tilting the lever in either direction to start the motor or to stop it by causing stud *o* to bear forcibly against disk L.

The carriage C for the recorder and reproducer is or may be similar in construction and operation to that heretofore used and requires no description.

Heretofore the graphophone and its motor (whether electric, spring, or treadle) were separate and distinct mechanisms, the former being simply connected with and driven from the latter by means of a belt. The principal departure in construction effected by the present invention is the consolidation of the two into one concrete mechanism or structure.

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

1. In a graphophone the combination of a frame having two upright plates secured to a suitable base, a motor-spring having its shaft journaled in said plates, a mandrel-shaft having bearing at one end only where it is journaled in said plates said shaft projecting from and lying outside of the plates at its outer end, a feed-screw shaft separate from the mandrel-shaft journaled in the frame, and gearing connecting the spring-shaft with the mandrel-shaft and with the feed-screw shaft.

2. In a graphophone the combination of a frame consisting of upright plates rigidly secured together, of a motor-spring mounted on a shaft journaled in said plates, a mandrel-shaft journaled at one end only in said plates and at its other end projecting bodily therefrom, a mandrel on the projecting end of said shaft, a feed-screw shaft separate from the mandrel-shaft journaled in said plates, driving connections between the spring-shaft and the mandrel-shaft, and other driving connections between the spring-shaft and the feed-screw shaft.

3. The combination with the mandrel-shaft

and screw-shaft of a graphophone, of a motor, one line of connections from said motor for driving said mandrel, and separate connections for driving said feed-screw, substantially as described.

4. The combination with the mandrel-shaft and screw-shaft of a graphophone, of a spring-motor, connections between the main shaft of said motor and the mandrel, and separate connections from said main shaft to said screw-shaft, substantially as described.

5. The combination with the mandrel-shaft and screw-shaft journaled in suitable bearings, of a spring-motor, a belt and pulleys for driving said mandrel-shaft from one of the arbors of said motor, and separate driving connections between the main shaft of the motor and said screw-shaft, substantially as described.

6. The combination of a base with frame-plates secured thereto, a motor-spring between two of said plates and having its shaft journaled therein, a mandrel-shaft lying outside of said plates but having one end journaled therein, a screw-shaft journaled in said frame-plates, one line of connections from the spring-shaft to the mandrel-shaft and separate connections from the spring-shaft to the screw-shaft, substantially as described.

7. The combination with frame-plates secured to a suitable base, of a motor-spring between two of said plates and having its shaft journaled therein, a mandrel-shaft journaled in said plates but projecting bodily therefrom, a belt and pulleys through which motion is communicated from the spring-shaft to the mandrel-shaft, a screw-shaft also journaled in said frame-plates and separate driving connections between the spring-shaft and the screw-shaft, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS H. MACDONALD.

Witnesses:

M. A. FOGO,

A. B. KEOUGH.