

No. 714,681.

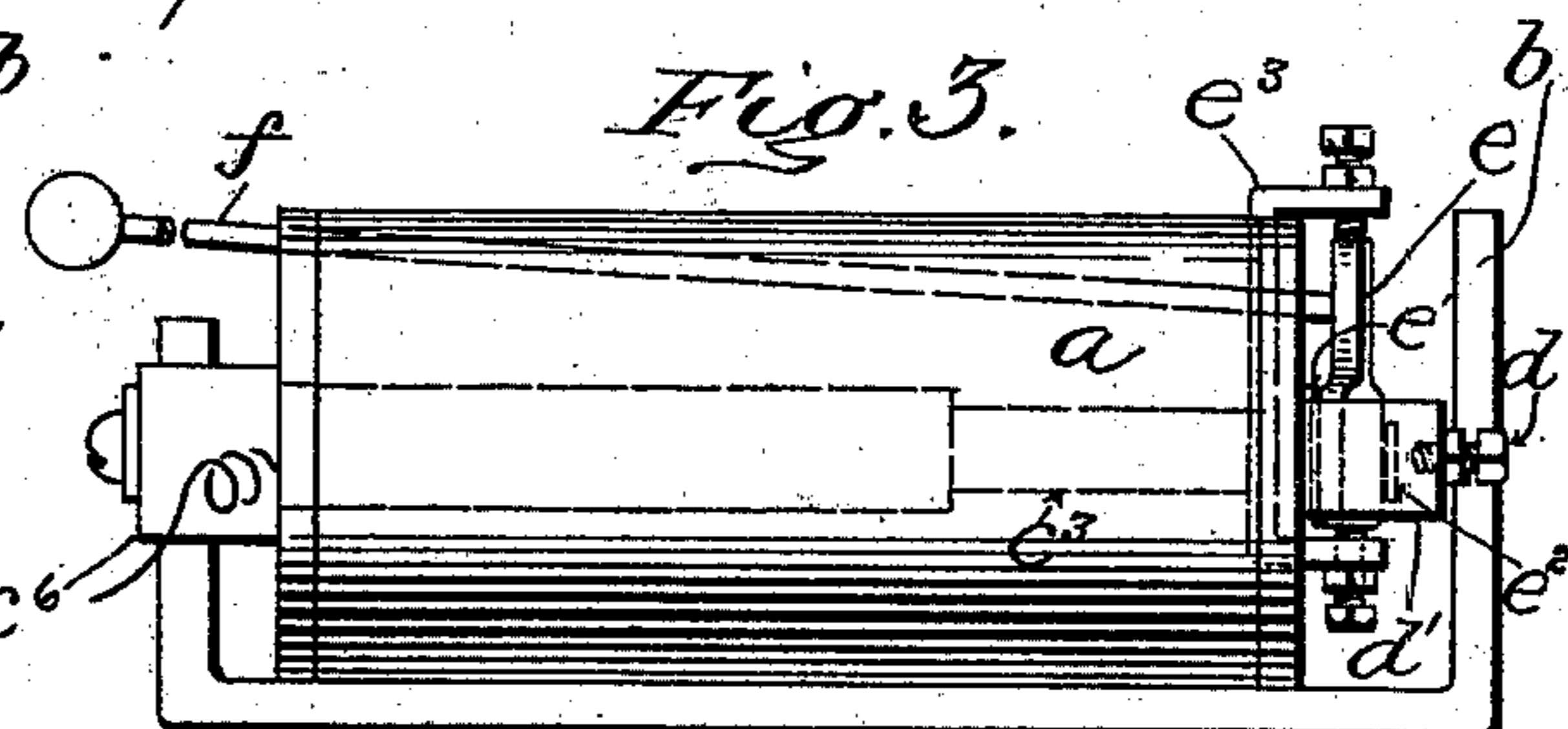
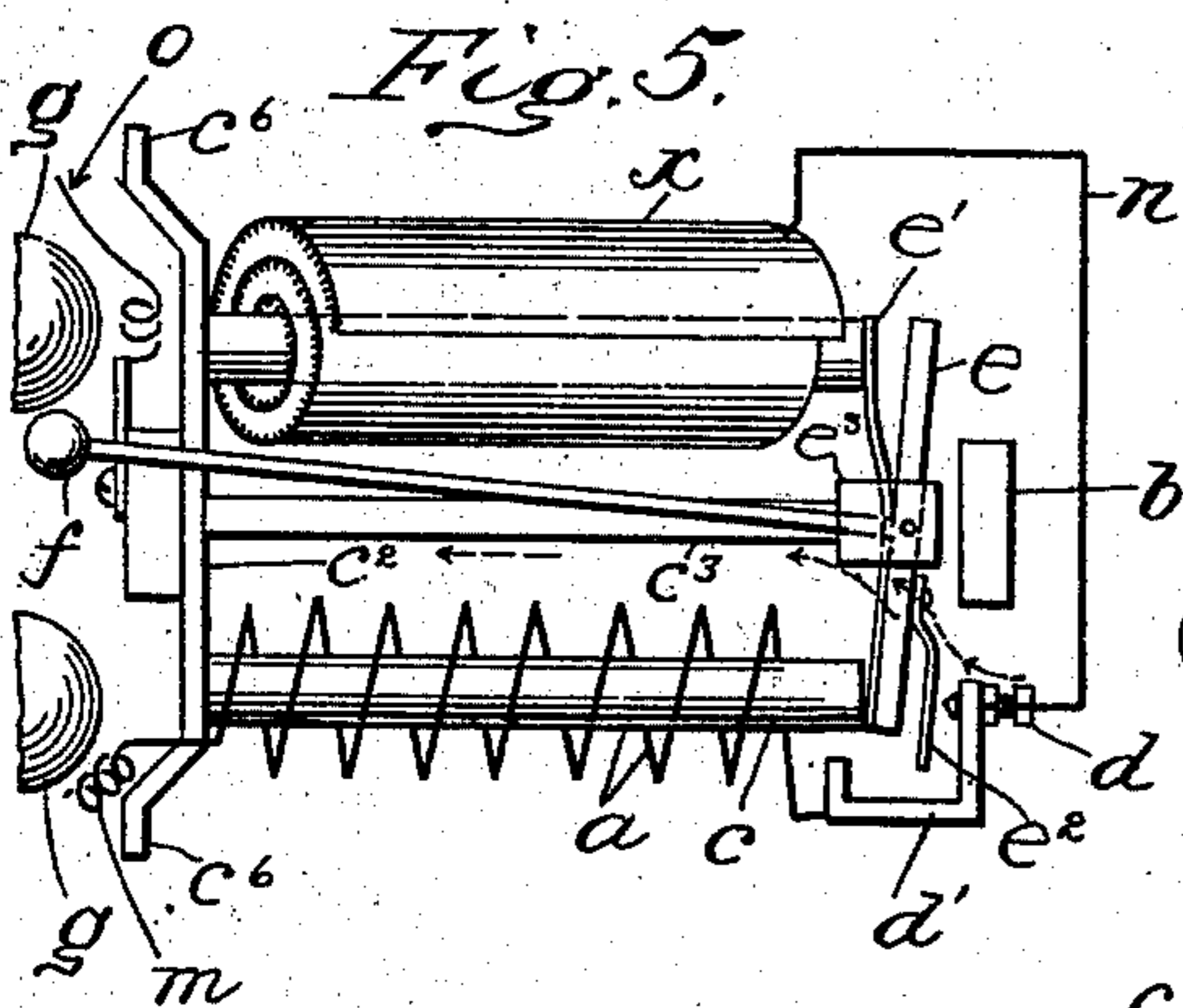
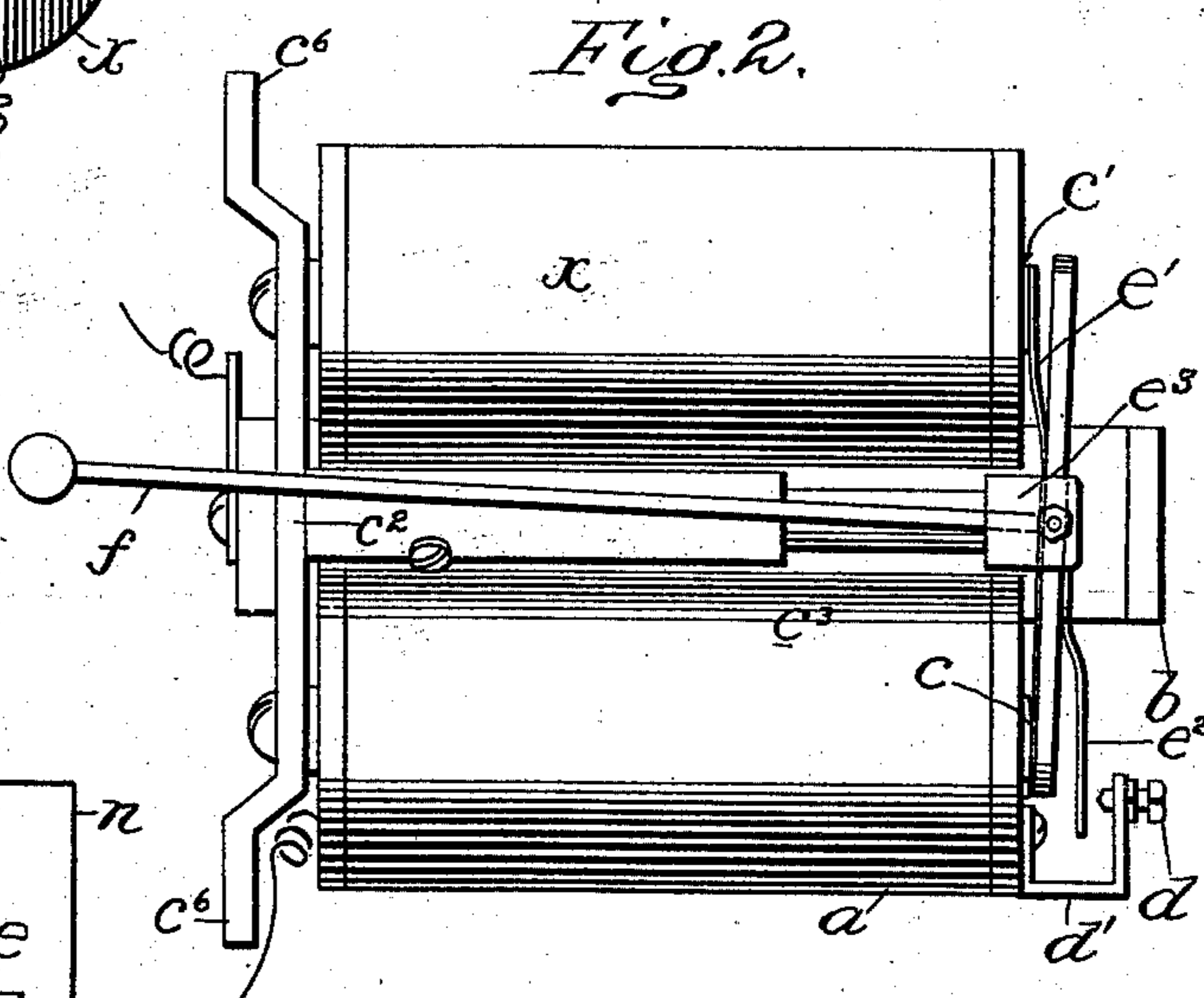
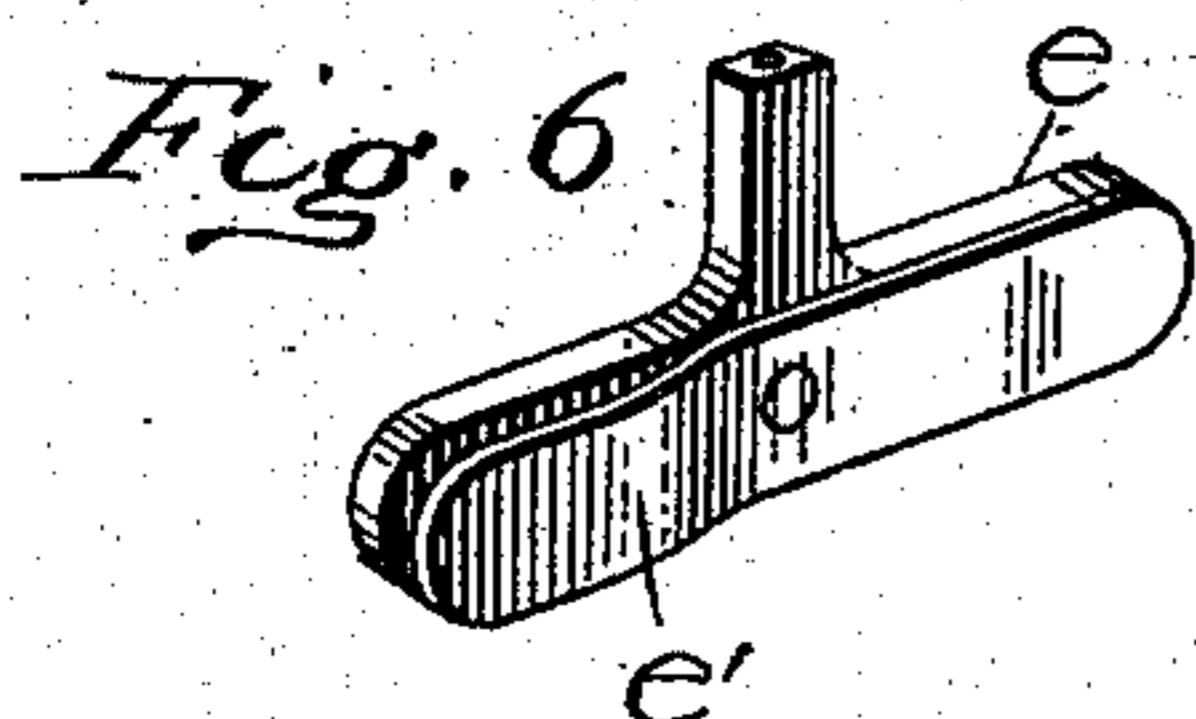
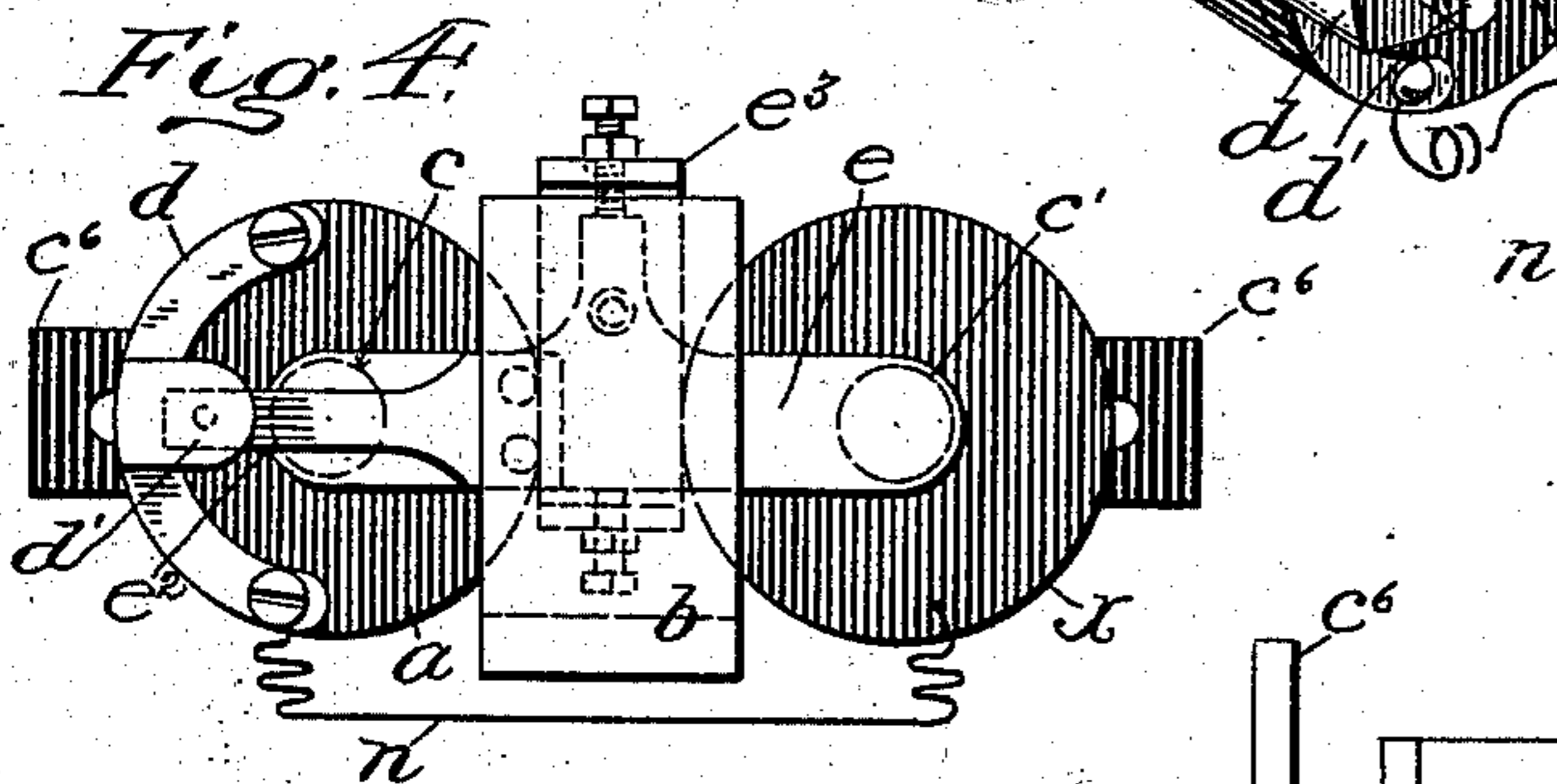
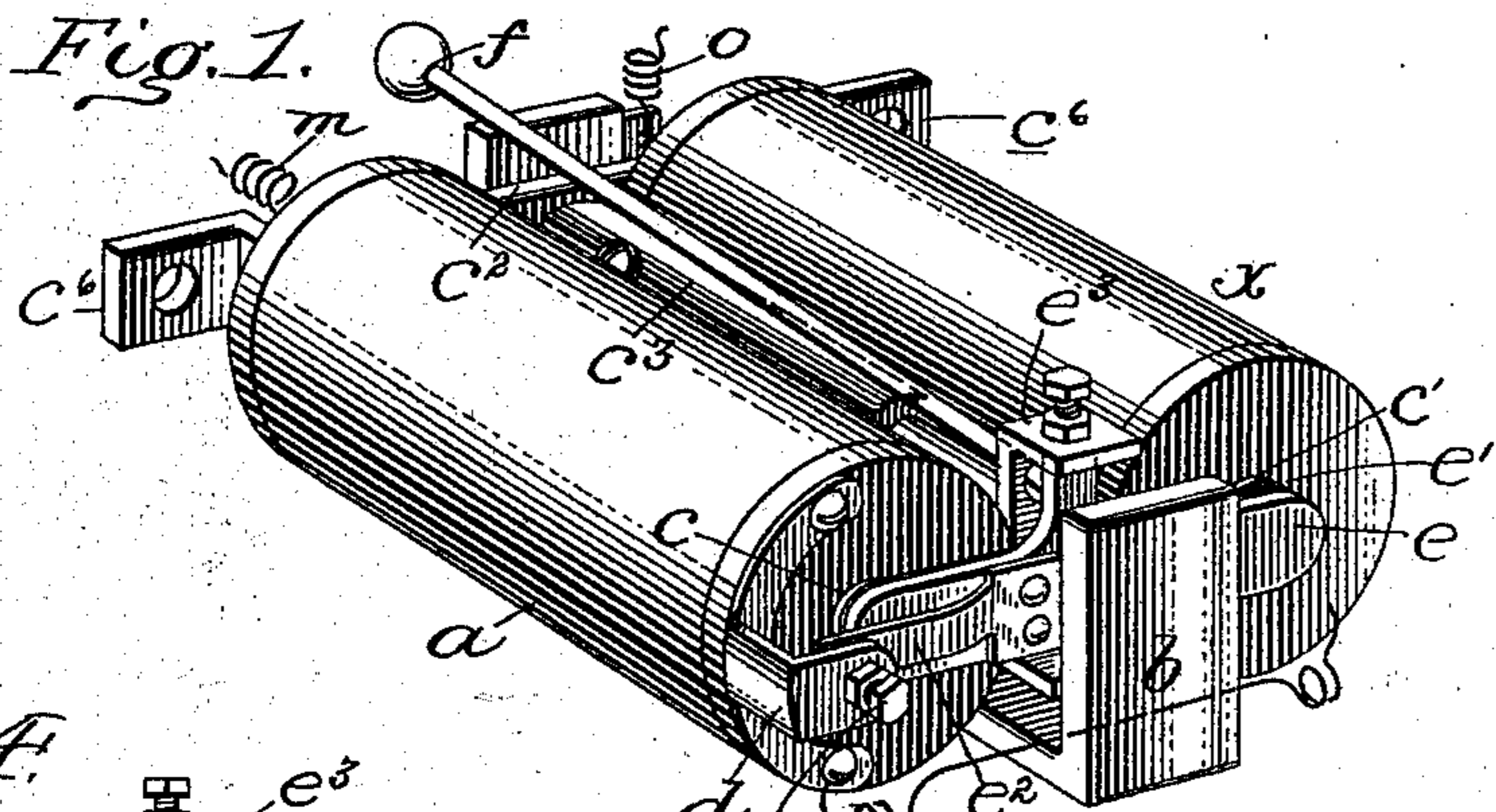
Patented Dec. 2, 1902.

C. E. EGAN.

SIGNAL BELL FOR TELEPHONE SYSTEMS.

Application filed Sept. 17, 1902.)

(No Model.)



Witnesses
 L. E. Burdine,
 D. E. Burdine.

Inventor:
Charles E. Egan,
by Dodge and Sons,
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. EGAN, OF DURHAM, NORTH CAROLINA.

SIGNAL-BELL FOR TELEPHONE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 714,681, dated December 2, 1902.

Application filed September 17, 1902. Serial No. 123,748. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. EGAN, a citizen of the United States, residing at Durham, in the county of Durham and State of North Carolina, have invented certain new and useful Improvements in Signal-Bells for Telephone Systems, of which the following is a specification.

My invention relates to call or signal bells for telephone systems and the like, and has for its object to provide a combined ringer and condenser for use on signal and telephone lines employing alternating and direct currents.

To this end the invention comprises a call or signal bell provided with a polarized ringer, with a magnet-coil on one leg thereof and a condenser on the other, so related that the ringing-circuit passes through said coil to the condenser, thereby attracting the armature upon the discharge of the condenser and establishing an alternative path for the current through the magnet-frame, cutting out or partially cutting out the condenser, causing the armature to be again attracted by the pole carrying the coil and reestablishing the initial condition.

In systems of telephony wherein alternating currents are employed for signaling purposes and direct or battery currents are used upon the line it is necessary to employ a condenser of relatively large size and capacity in series with each ringer-magnet to close the ringer-circuit by direct currents for obvious purposes of economy and successful operation. By means of my invention I provide a condenser that is simple, efficient, and cheap, that is applied to its intended use without providing any other connections and housing than those required for the ordinary ringer-circuit, and that affords a unitary instrument performing the functions of the two corresponding separate instruments in a more efficient manner and with a less expenditure of energy.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the ringer magnet and condenser with their circuit attachments. Fig. 2 is a plan view thereof. Figs. 3 and 4 are a side elevation and an end view, respectively, of the apparatus. Fig. 5

is a diagrammatic view showing the relation of the various parts, including the circuits; and Fig. 6, a detail perspective view of the armature.

Referring to the drawings, a indicates an electromagnet-coil, which is mounted upon one leg c of the usual type of horseshoe-core, which latter comprises a similar parallel leg c' , joined to the leg c by a back bar or supporting member c^2 , which in turn is adapted to be attached within the bell-box by perforated lugs c^6 . Midway between legs c and c' there is a metallic bar c^3 , adjustably attached to the back bar c^2 and carrying at its outer end a bracket e^3 , in which the armature e is pivoted, so that the latter may vibrate toward and from the respective poles. Attached to the back bar and embracing the ends and one side of the core is the usual permanent or polarizing magnet b .

Armature e is provided with a flat spring e' on one side, which bears against the end of leg or pole-piece c' and tilts the armature, so that the opposite end is held normally in juxtaposition to the end of leg or pole-piece c . Upon the other side of said armature and on the end adjacent to pole c is a contact-spring e^2 . Attached to the outer end of the spool or bobbin of the magnet a is a U-shaped bracket d' , said bracket being connected to the outer terminal of the magnet-winding. The bracket carries an adjustable contact-screw d , which is normally out of engagement with spring e^2 . A hammer f , attached to the armature, coöperates with the usual double arrangement of gongs or bells g .

Upon the leg or pole-piece c' is mounted a condenser x , which is formed as a roll or spiral embracing said pole-piece. Said condenser may be formed of a layer of metal foil coated with paper, shellac, or any other suitable dielectric of sufficient resistance to properly insulate the successive convolutions of metal foil from each other and from the pole-piece c' .

A conducting-wire n connects bracket d' , and consequently contact-screw d , with the metal coating of the condenser, and the line-terminals of the ringer-circuit m o are connected to coil a and the metallic frame of the ringer, respectively.

The magnet-coil and the condenser are enclosed in a suitable protective covering to exclude dust and moisture, so that when assembled the apparatus does not differ in size, form, or general appearance from the conventional bipolar ringer.

The operation of the above-described apparatus is as follows: An alternating or magnet current sent over the line enters coil *a* of the electromagnet by way of lead *m* and passes through bracket *d'*, contact-screw *d*, and cross-connector *n* to the condenser, charging the latter. Upon discharge of the condenser and reversal of the current in the circuit armature *e* is attracted by pole-piece *c'* by reason of the current reversal and the fact that the pole-pieces are polarized and connected together through the frame, causing contact-spring *e*² to engage screw *d* and opening a direct circuit from coil *a* by way of bracket *d'*, contact-spring *e*², armature *e*, bar *c*³ to lead *o*, thereby practically cutting the condenser out of the circuit. The next impulse over the line, assisted by spring *e*¹, moves armature *e* into contact with pole-piece *c*, thereby breaking the short circuit through the frame-work and reestablishing a single circuit through the condenser, as before. This cycle of operations is repeated for each complete alternating impulse on the line, causing the armature to vibrate and actuate the hammer or clapper *f*.

It is to be observed that the condenser not only breaks the ringer-circuit for direct currents on the line, but as the condenser is practically cut out of circuit with the ringer-magnet during at least one-half of the time the calling-circuit is operated it follows that a normally low current will ring the bell much louder than could be done with a condenser of correspondingly small capacity, which is always maintained in series with the ringer-magnet, as in all systems heretofore employed.

Having thus described my invention, what I claim is—

1. A signaling apparatus for telephone systems and the like, comprising an electromagnetic actuator; a condenser combined therewith in a unitary structure; and circuit connections between the actuator and condenser, substantially as described, whereby the condenser will be alternately placed in the line in series with the actuator and cut out therefrom

upon the passage of current through said connections and operation of the actuator.

2. A signaling apparatus for telephone systems and the like, comprising a bipolar core; an electromagnet-coil on one pole; a condenser on the other pole; and circuit connections, substantially as described, whereby the magnet-coil is first connected to the line in series with the condenser, and then directly to the line with the condenser cut out.

3. A signaling apparatus for telephone systems and the like, comprising a bipolar core; an electromagnet-coil on one pole; a spirally-disposed condenser on the other pole; and circuit connections for cutting the condenser out of line with the coil as the apparatus is actuated.

4. A signaling apparatus for telephone systems and the like, comprising a bipolar core; an electromagnet-coil on one pole; a condenser on the other pole; an armature pivoted to the magnet-frame; a line connection to the coil; a line connection to the frame; a series connection between the coil and the condenser; and cooperating contacts on the armature and in said series connection to complete the circuit between the coil and the line and short-circuit the condenser when the armature moves said contacts into engagement.

5. A signaling apparatus for telephone systems and the like, comprising a bipolar core; an electromagnet-coil on one pole; a condenser on the other pole; a polarized armature pivoted to the magnet-frame; a spring on said armature normally holding said armature away from one of said poles; a series connector between the coil and the condenser; a contact in said connector; a contact on said armature; and line-terminals connected to the coil and the magnet-frame, respectively, all so arranged that the coil and the condenser are connected in series with the line when the armature is attracted by one pole and the condenser is cut out of the line when the armature is attracted by the other pole.

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

CHARLES E. EGAN.

Witnesses:

A. L. CRANDALL,
E. CLEVE WILCOX.