

No. 782,310.

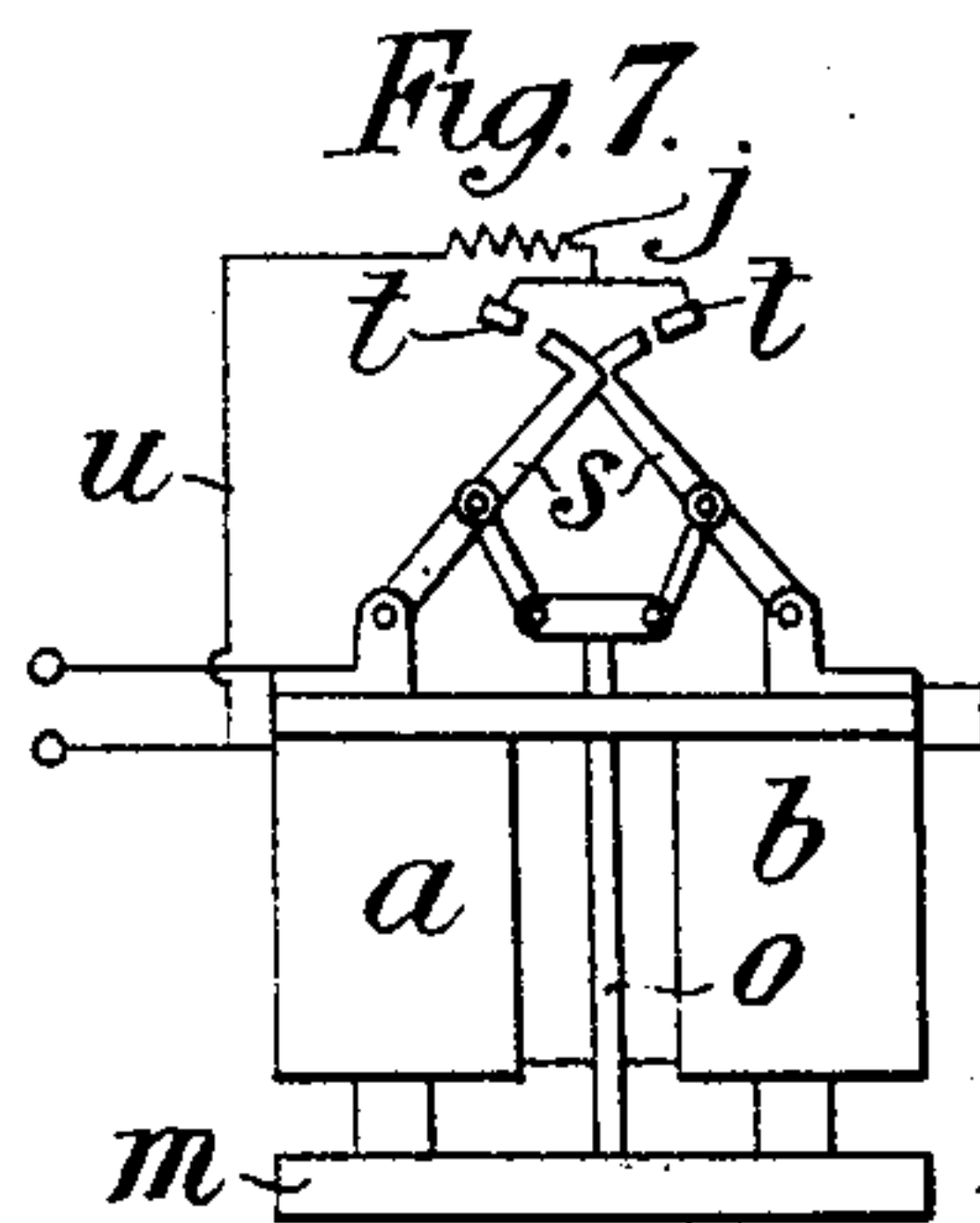
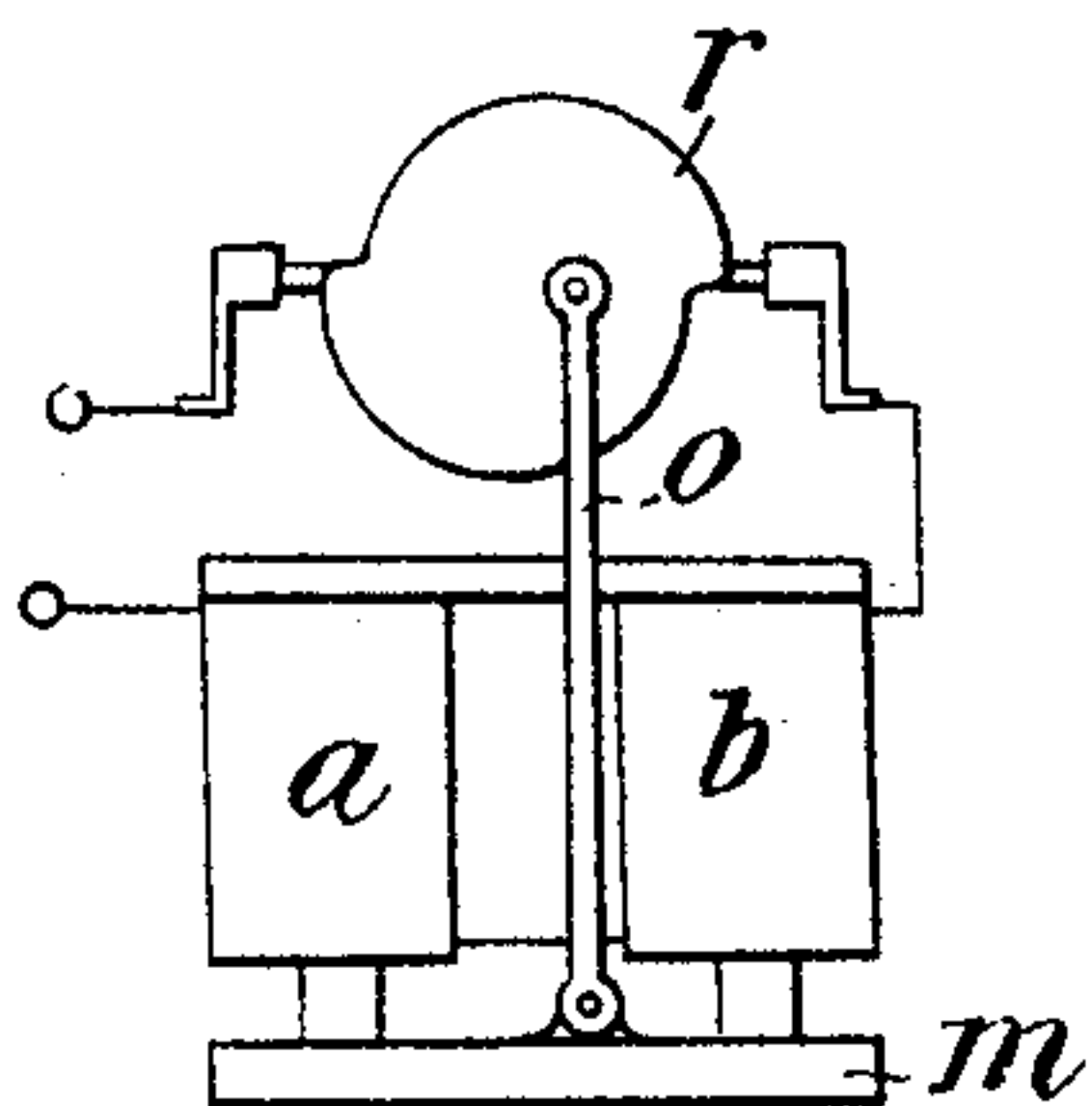
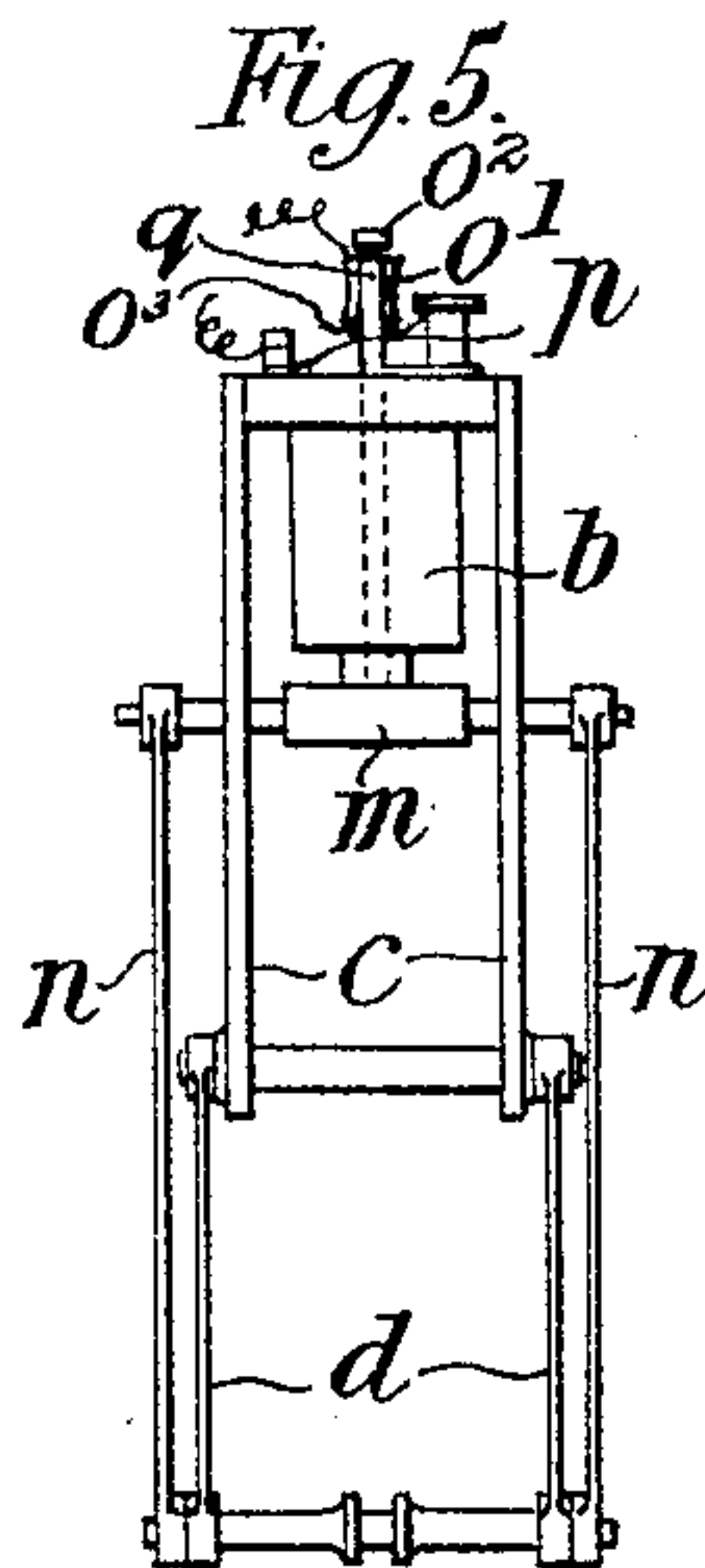
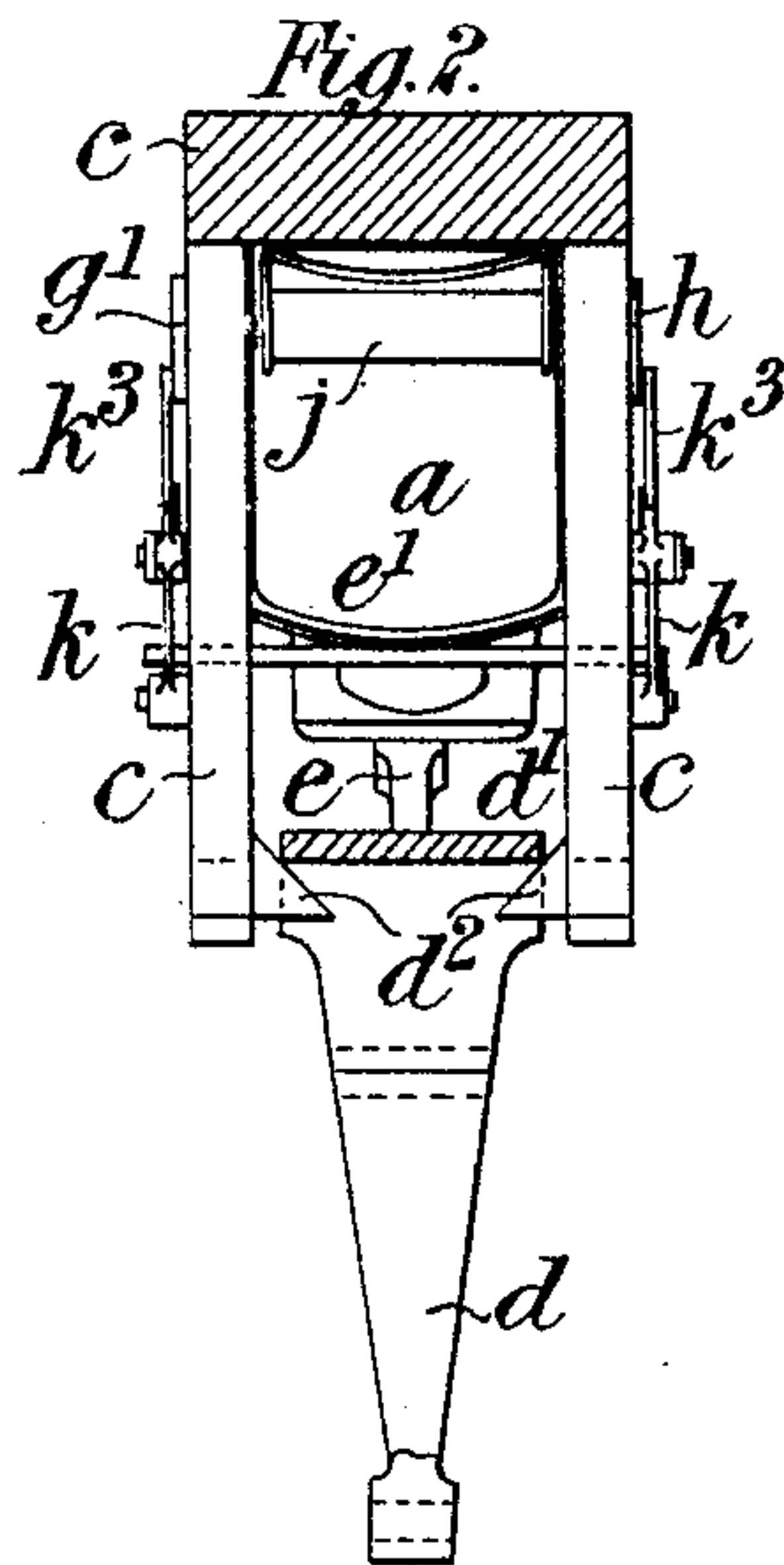
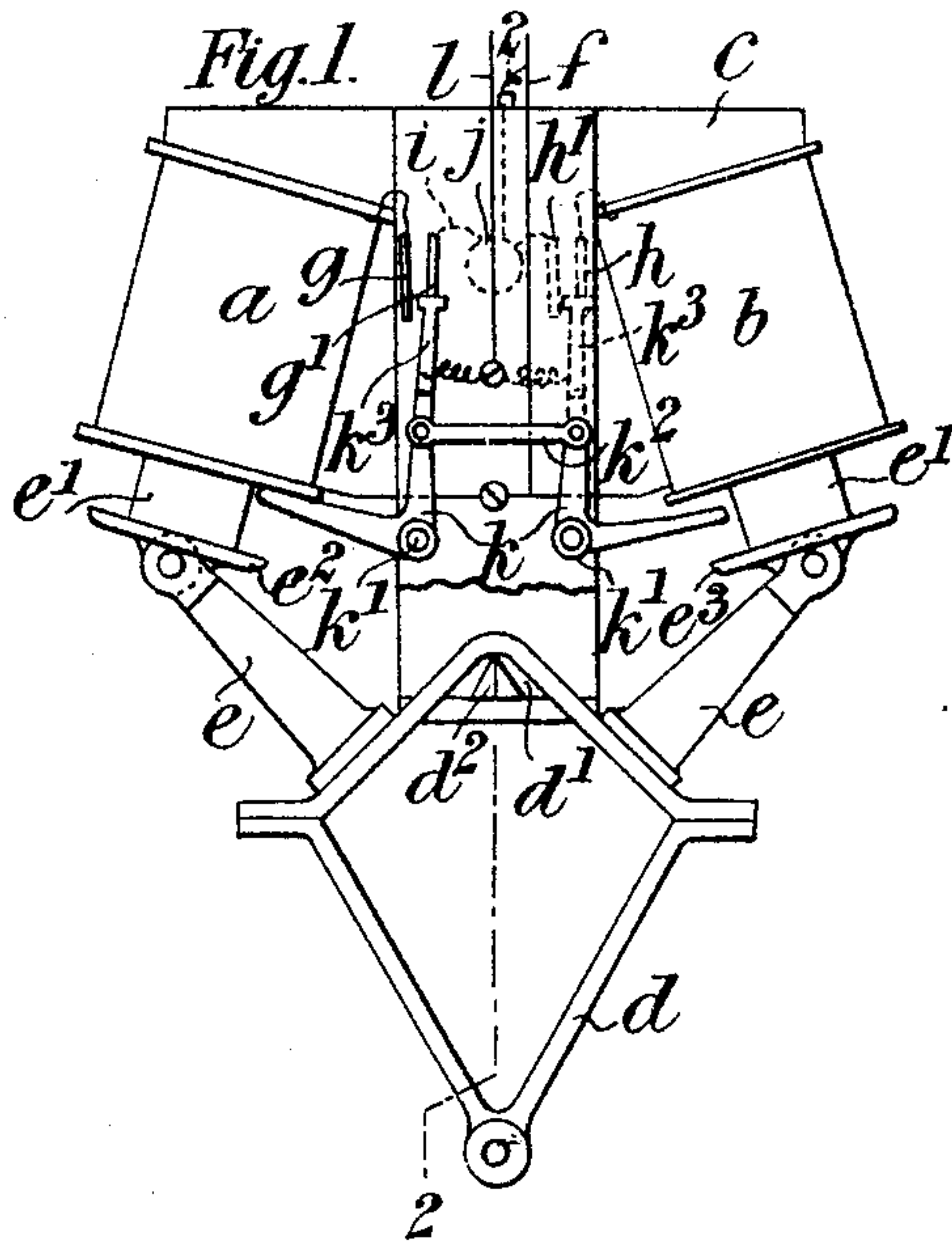
PATENTED FEB. 14, 1905.

H. H. YOUNG.

OBTAINING OSCILLATORY OR RECIPROCATORY MOTION.

APPLICATION FILED DEC. 12, 1902.

2 SHEETS—SHEET 1.



Witnesses :

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Inventor:

Reforming

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APPLICATION FILED DEC. 12, 1902.

2 SHEETS—SHEET 2.

Fig. 4.

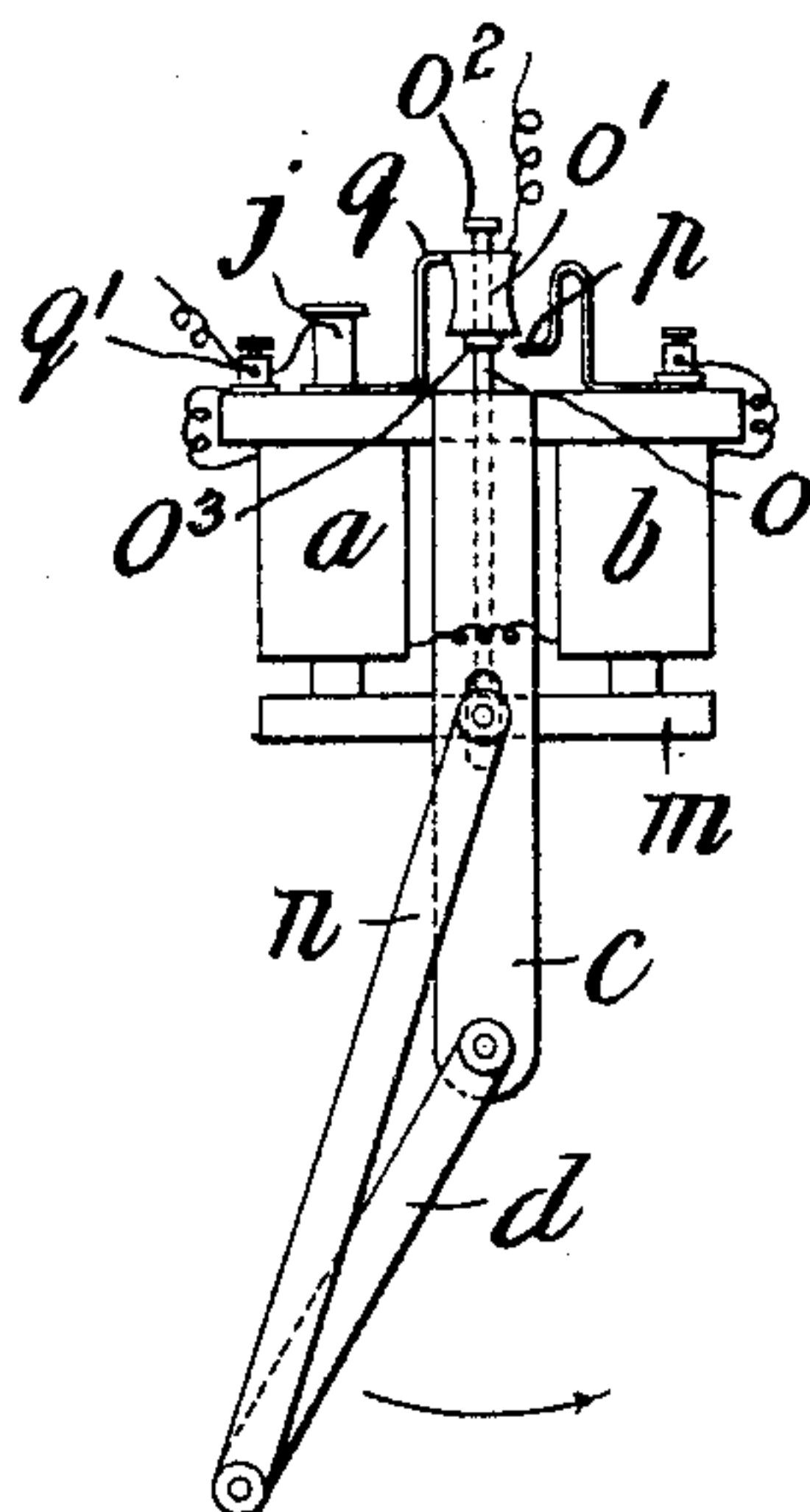


Fig. 4^a

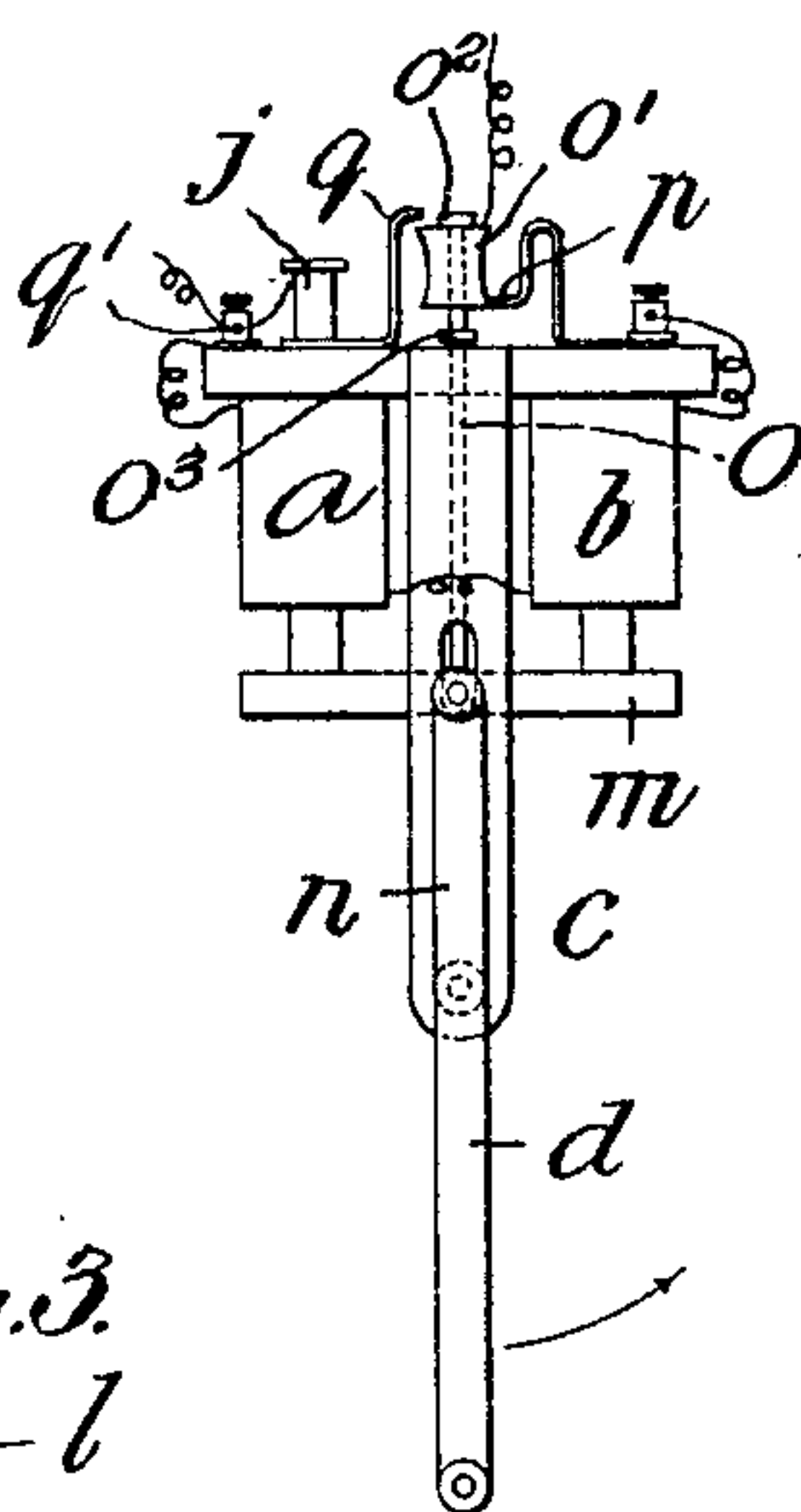
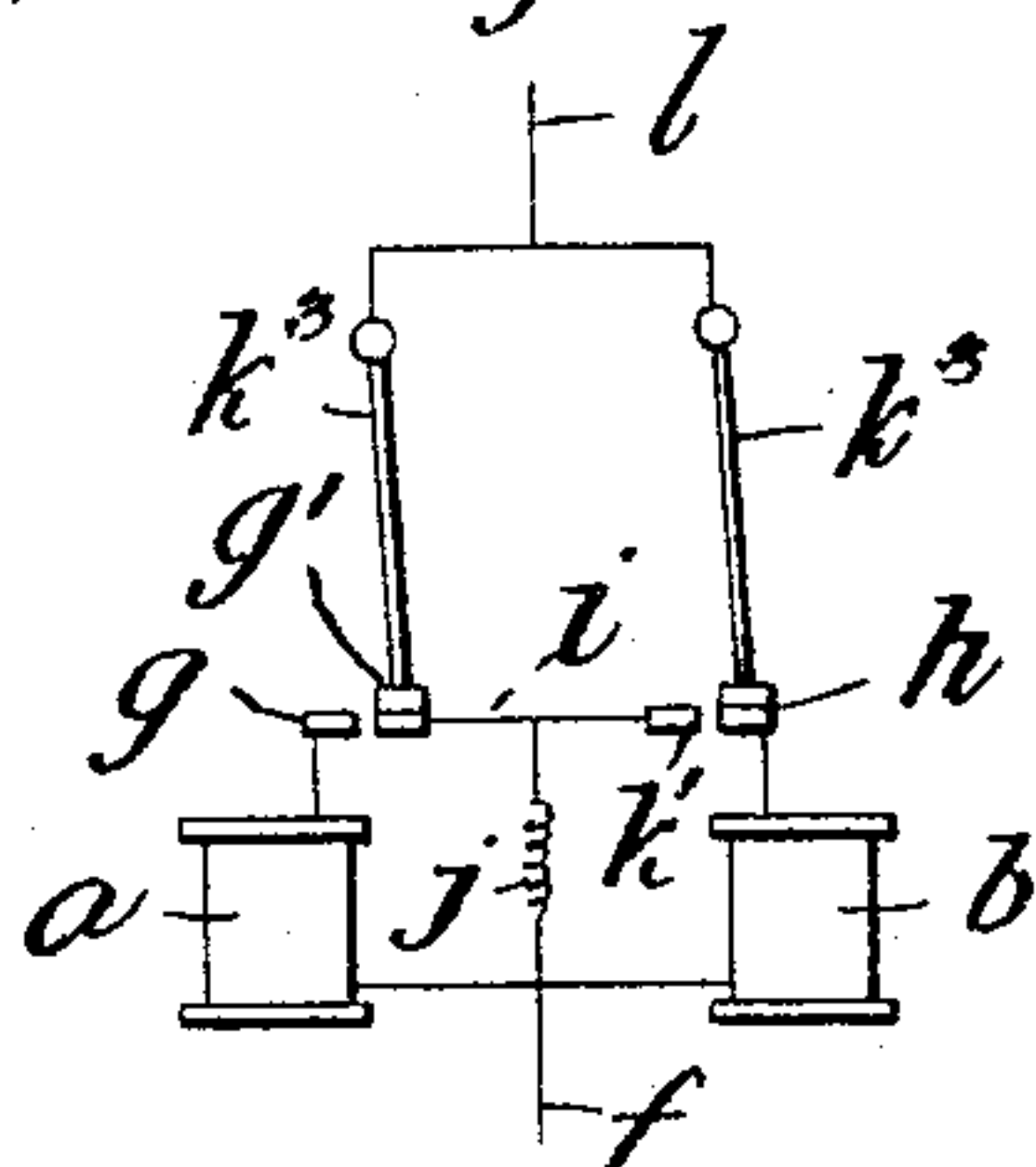


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRY HOWLETT YOUNG, OF COLCHESTER, ENGLAND.

OBTAINING OSCILLATORY OR RECIPROCATORY MOTION.

SPECIFICATION forming part of Letters Patent No. 782,310, dated February 14, 1905.

Application filed December 12, 1902. Serial No. 134,940.

To all whom it may concern:

Be it known that I, HARRY HOWLETT YOUNG, a subject of the King of Great Britain, residing at 10 Inglis road, Colchester, in the county of Essex, England, have invented new and useful Improvements in Obtaining Oscillatory or Reciprocatory Motion, of which the following is a specification.

This invention relates to improvements in obtaining oscillatory or reciprocatory motion—for example, for operating punkas or other bodies requiring similar propulsion.

According to the invention I make use of a pair or pairs of magnetic solenoids acted upon and obtaining their power from the passage of an electric current which flows through each or all of the said solenoids which actuate a movable arm or the like so as to cause it to oscillate or to transmit an oscillating or reciprocatory motion, the said arm or the like in its movement operating a contact device which controls the flow of current to the solenoids.

To enable the invention to be fully understood, I will describe it by reference to the accompanying drawings, in which—

Figure 1 is a sectional side elevation of a device made according to the invention. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a diagrammatic view drawn to a smaller scale and illustrating the connection of the electric circuits. Figs. 4 and 5 are a side and end elevation, respectively, of a modified construction of the motor device; and Fig. 4^a is a similar view to Fig. 4, but showing the parts in a different position. Figs. 6 and 7 are two side elevations illustrating further modifications.

Referring first to the arrangement illustrated in Figs. 1, 2, and 3, *a* *b* are the two solenoids, which are mounted on a frame or support *c* of any suitable construction. *d* is the swinging arm, which is adapted to be oscillated by the solenoids, as hereinafter described, and which may itself form the part to be oscillated or reciprocated or may be in connection with such part. To reduce friction as far as possible, the oscillating part *d* is provided with a curved bearing-surface *d'*, which rests upon two knife-edge projections

*d*² *d*², fixed to the support or bracket *c*. The part *d* is provided with two arms *e* *e*, which carry at their outer ends rods or cores *e'* *e'*, the said cores *e'* extending into the solenoids *a* and *b*, as clearly shown in Fig. 1. One terminal of each of the solenoids is connected to the inflow-wire *f* from the source of current, the other end of the coil *a* being connected to the contact *g* upon the bracket *c* and the other end of the coil *b* being connected to the contact *h*, also upon the said bracket. *g'* and *h'* are contacts which are connected together by the wire *i* and to the inflow-wire *f* through the resistance *j*. (See Fig. 3.) *k* *k* are angular swinging frames which are pivoted at *k'* *k'* to the bracket or support *c* and are connected together by links *k*², so that they are caused to move together, as hereinafter described. Each of them carries a movable contact *k*³, which is in electrical connection with the return-wire *l*. These pivoted frames *k* are adapted to be operated so as to move the movable contact *k*³ alternately against the contacts *g* and *g'* and *h* and *h'*, respectively, through the medium of the tappet-pieces *e*² *e*³, in connection with the cores *e'*, as hereinafter described. With this arrangement when the arm *d* is swung over to one side one of the swinging contacts *k*³ is brought against the fixed contact *h*, (see Fig. 1,) so that current flows through the wire *f*, solenoid *b*, contact *h*, contact *k*³ to the return-wire *l*. The rod or core *e'* is then drawn into the solenoid *b*, so that the arm *d* continues its swing beyond the central point and in its movement upward brings the tappet *e*³ against its frame *k*, so as to shift the contacts *k*³ *k*³ and cause current to flow through the solenoid *a*, whereby on the arm *d* dropping by its own weight past the median plane it is raised by the said solenoid *a* and the operation begins *de novo*.

Where mere power is required, I advantageously connect the two solenoids *a* and *b* in series, as shown in Figs. 4 and 5, and in this case the oscillating movement is preferably effected by the armature *m* of the same magnet, which is drawn toward and allowed to move away from the magnet when the latter is energized and deenergized in the manner hereinafter described. The arm *d* is suspended from the

bracket *c*, as shown, and the reciprocating armature *m* is attached to the said arm by means of lateral connecting-links *n n*, the upper ends of which move with the armature, and so cause the lower end of the arm *d* to oscillate. The armature *m* is provided with a rod *o*, having mounted upon its upper end a sliding contact-piece *o'*, designed to be reciprocated up and down by collars *o² o³*, fixed to the rod *o*. When the said contact-piece *o'* is in its lowermost position, as shown in Fig. 5^a, it makes contact with the spring contact-piece *p* in connection with the windings of the magnets *a b*, and when in its uppermost position, as shown in Fig. 4, it makes contact with the spring contact-piece *q* in connection with the terminal *q'*, connected to the return-wire, each of the said contacts being maintained by the pressure of the respective spring contact-piece against the contact-piece *o'* until moved up or down by one of the collars *o² o³*. The contact *o'* is itself in connection with the inflow-wire. With this arrangement it will be seen that when the arm *d* is moved to its highest position on one side of its center of oscillation, as shown in Fig. 4, and is allowed to swing in the direction of the arrow by its own weight the rod *o* will be moved down, and just before the said arm *d* arrives at its lowest point the collar *o²* will impinge against the upper side of the contact-piece *o'* and move it out of contact with the contact-spring *q* and into contact with the contact-spring *p*, as shown in Fig. 5^a, thereby causing the current to flow through the magnets *a b*, which attract the armature *m*, and consequently lift the arm *d* after it passes the median plane, which it does under the influence of momentum. Just before the arm *d* reaches its highest point on the opposite side of the center to that from which it started the collar *o³* will impinge against the under side of the contact-piece *o'*, thereby diverting the current.

The arrangement shown in Fig. 6 is similar to that described with reference to Figs. 4 and 5, with the exception that the current to the magnets is controlled by a cam contact device *r*, oscillated by the rod *o*, this rotating cam device merely making and breaking the circuit, but not diverting it through a shunt, as is the case with the arrangements described.

Fig. 7 illustrates a construction which is similar to that described with reference to Figs. 4 and 5; the rod *o* in this case being connected to two pivoted arms *s s*, which are adapted when in their lowermost position, as

shown, to make contact with one another, so as to complete the circuit through themselves and the magnet. When the rod *o* is raised on the armature being attracted, the two arms *s s* separate and strike two fixed contacts *t t*, in which case the current is diverted through the resistance *j* and the shunt-line *u*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a device for obtaining oscillating and reciprocating motion, the combination with a pair of solenoids or magnets, of a swinging or oscillating frame carrying the armatures of the solenoids or magnets and of means whereby, on the said armatures being attracted by the magnets, a complete magnetic circuit is formed so as to provide a powerful attractive pull upon the armatures at the moment of contact with the magnets or solenoids, substantially as described.

2. The combination with a swinging arm, of a vertically-movable armature, a magnet for raising said armature, a link connecting said armature with said arm below the center of oscillation of said arm and a circuit-breaker for the magnet-circuit operated by said armature, substantially as described.

3. The combination with a swinging arm, of a pair of vertical solenoids, vertically-movable cores within said solenoids, connections from said cores to said arm, engaging the arm below its point of suspension and a circuit-breaker for said solenoids operated by the vertical movement of said cores, substantially as described.

4. The combination with a swinging arm, of a pair of vertical solenoids, vertically-movable cores within said solenoids, connections from said cores to said arm, engaging the arm below its point of suspension, an electric current for said solenoids, provided with two contacts, a vertically-reciprocating rod operated by said cores, a sliding contact-piece loosely mounted on said rod, and adapted to be forced into engagement with one or other of said contacts, and held in relation therewith, and projecting devices on said rod, for engaging and operating said sliding contact-piece, substantially as described.

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Witnesses:

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