

No. 871,148.

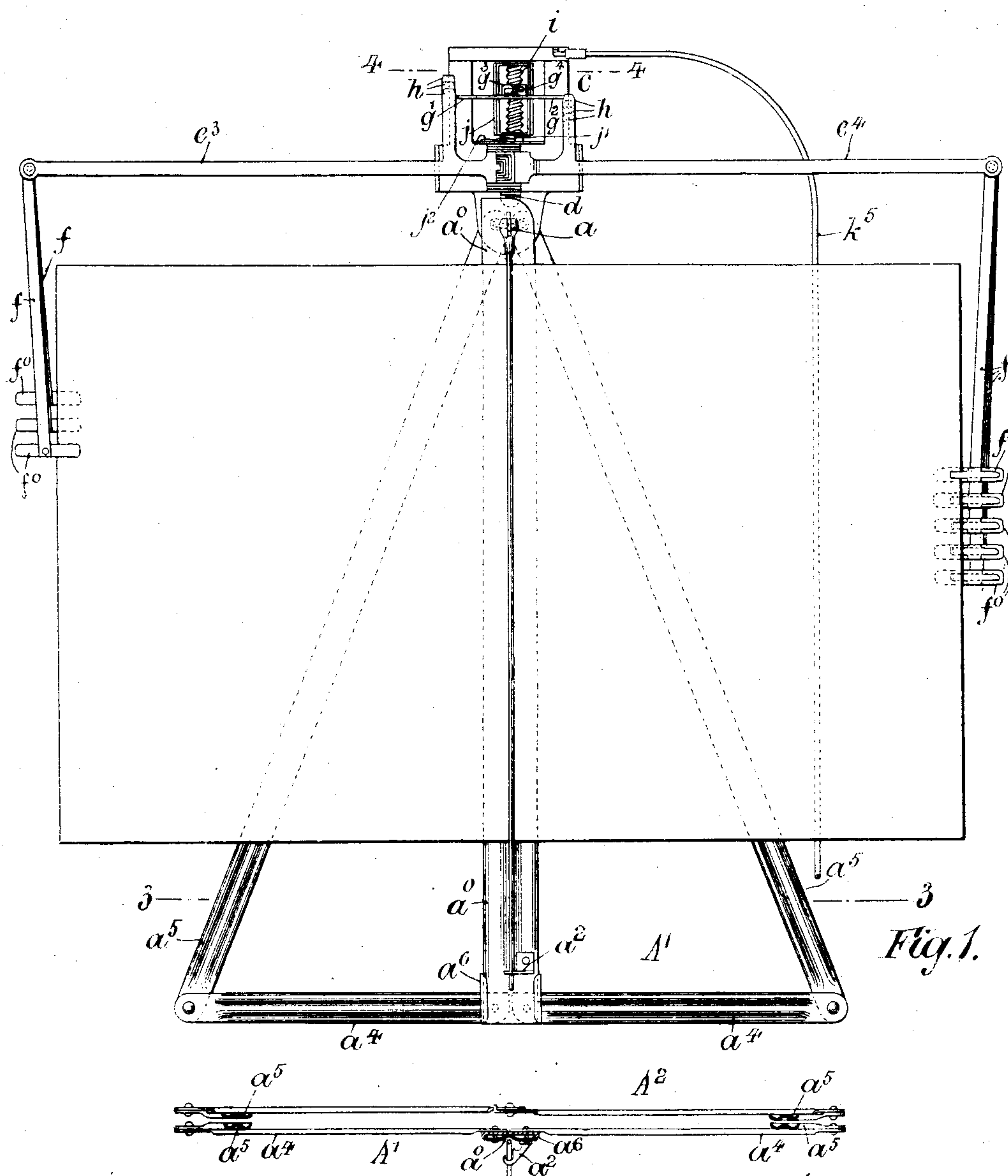
PATENTED NOV. 19, 1907.

B. SHARP.

CONTRIVANCE FOR TURNING THE LEAVES OF A PAMPHLET OR BOOK.

APPLICATION FILED APR. 14, 1905.

3 SHEETS—SHEET 1.



WITNESSES
J. M. Kuehn
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Fig. 3.

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3 SHEETS—SHEET 2.

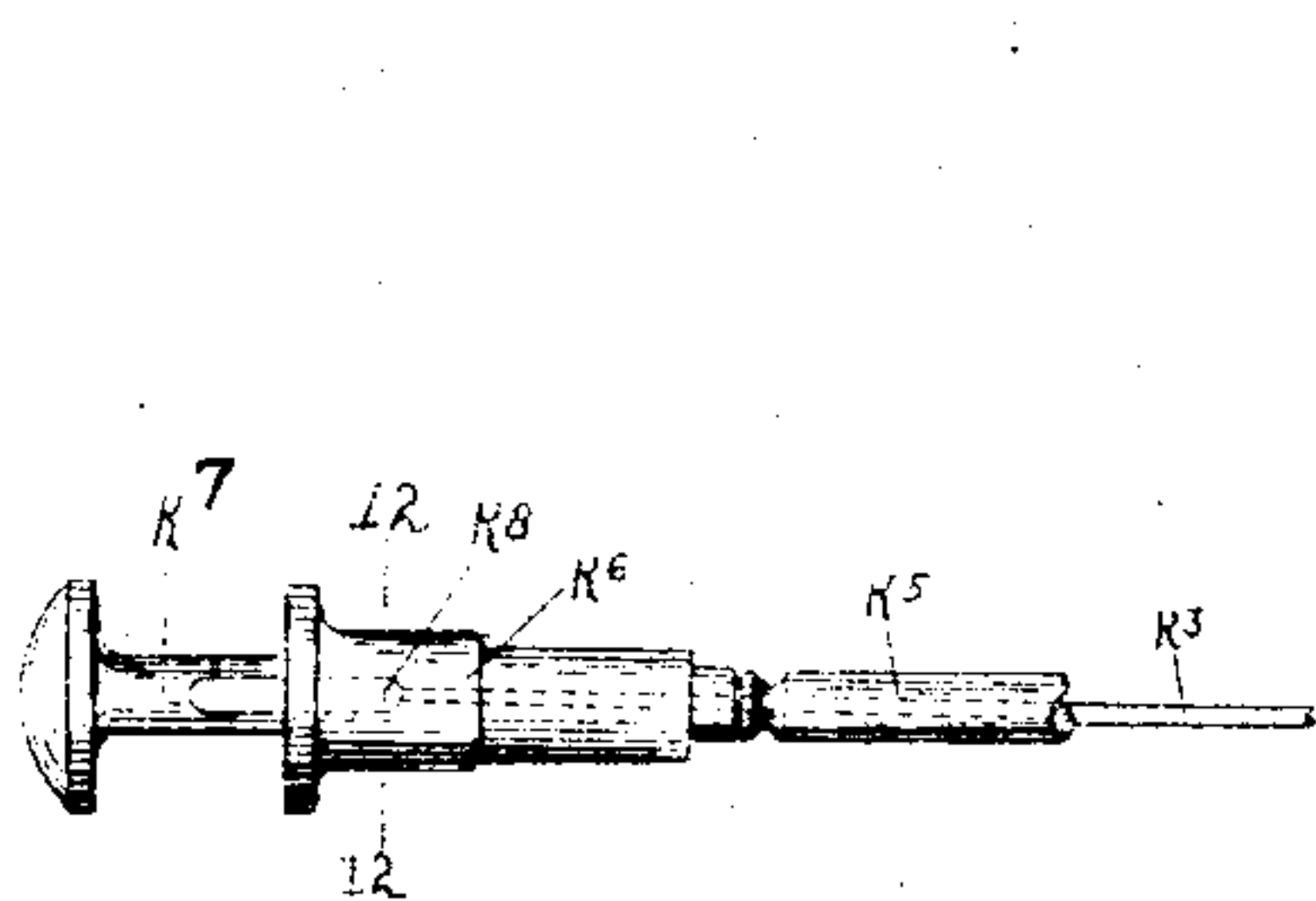


Fig. 11.

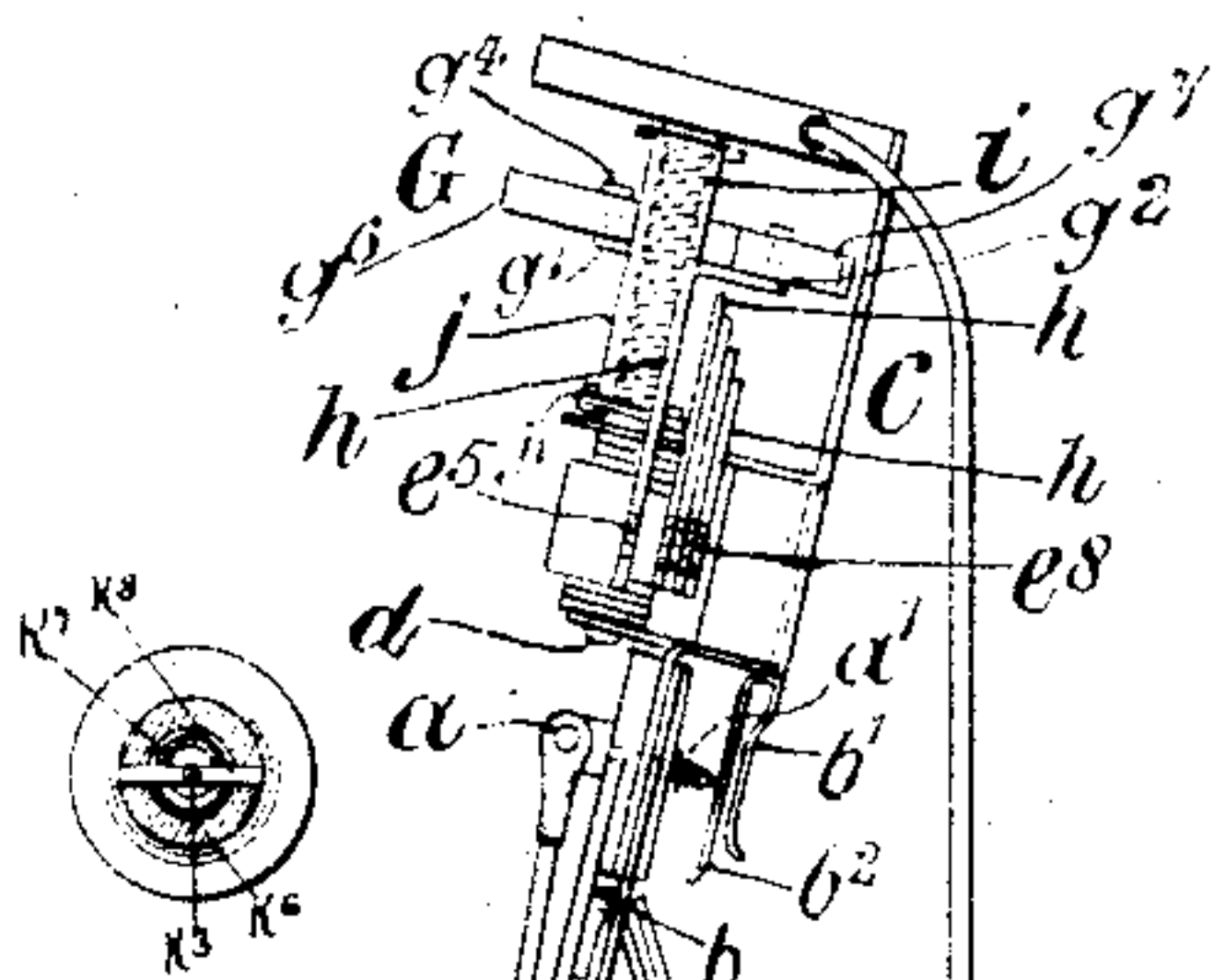


Fig. 12.

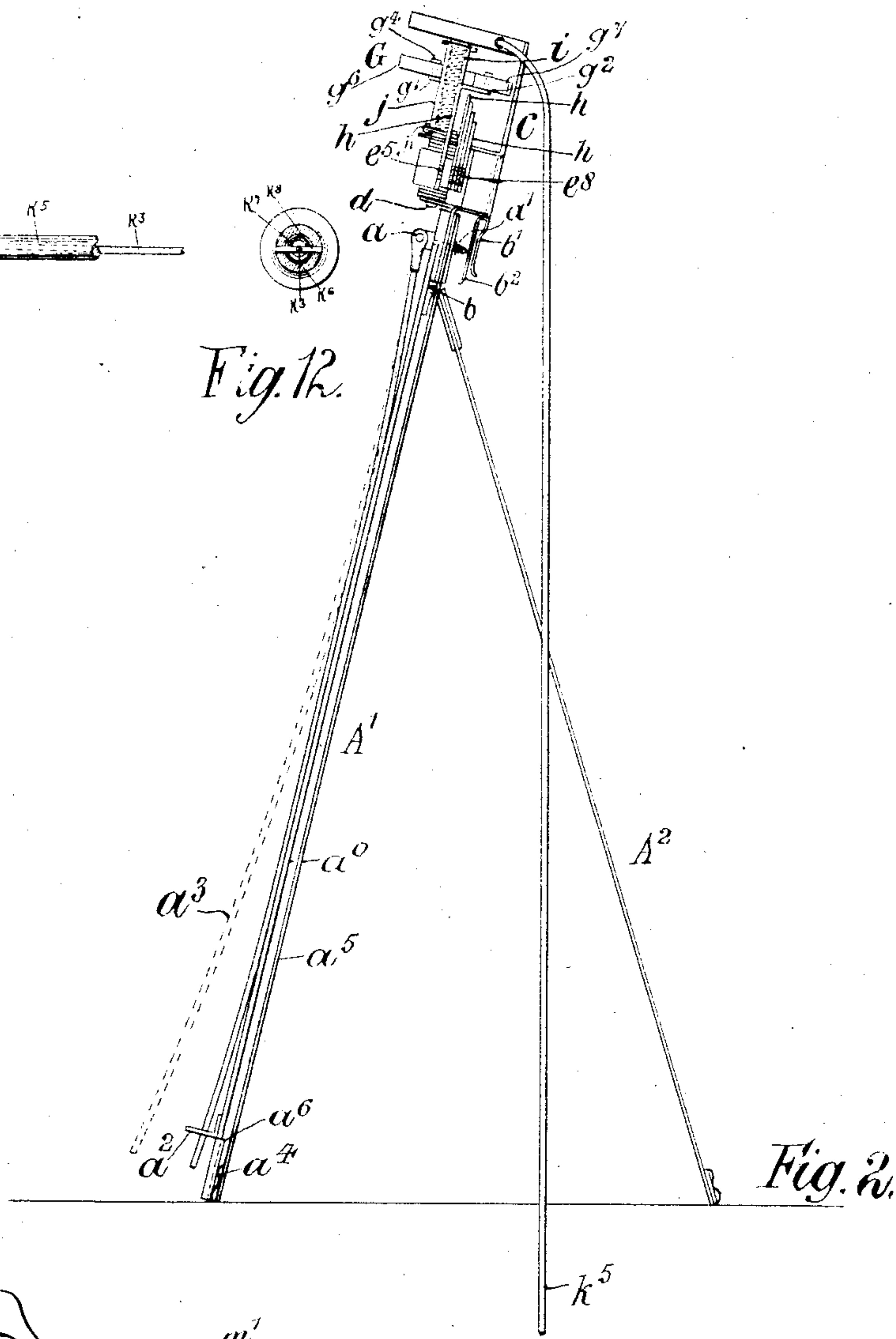


Fig. 2.

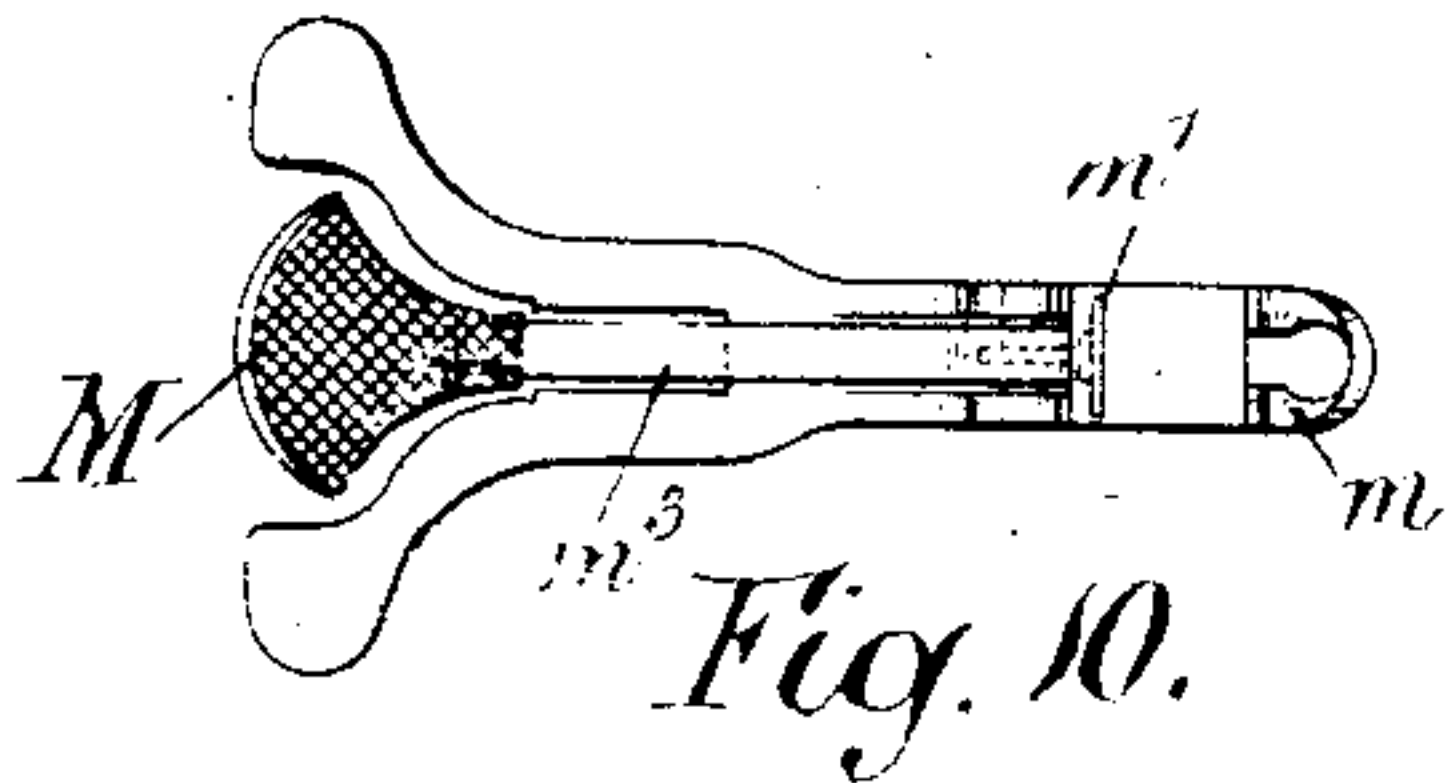


Fig. 10.

Witnesses
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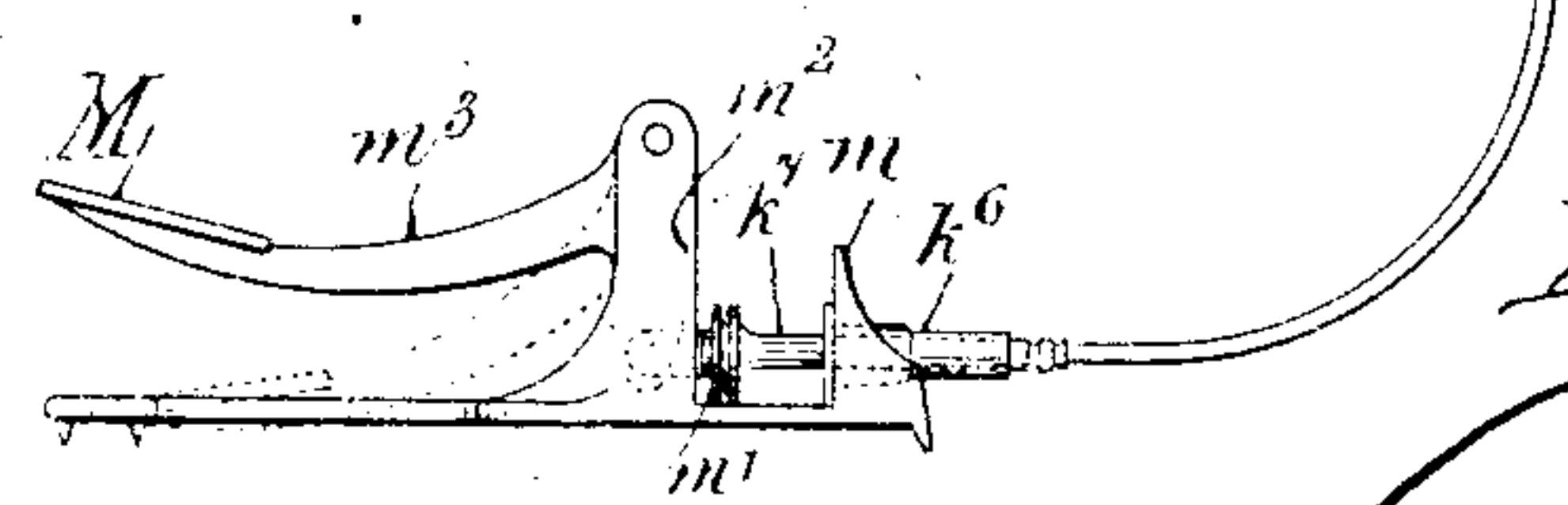


Fig. 9.

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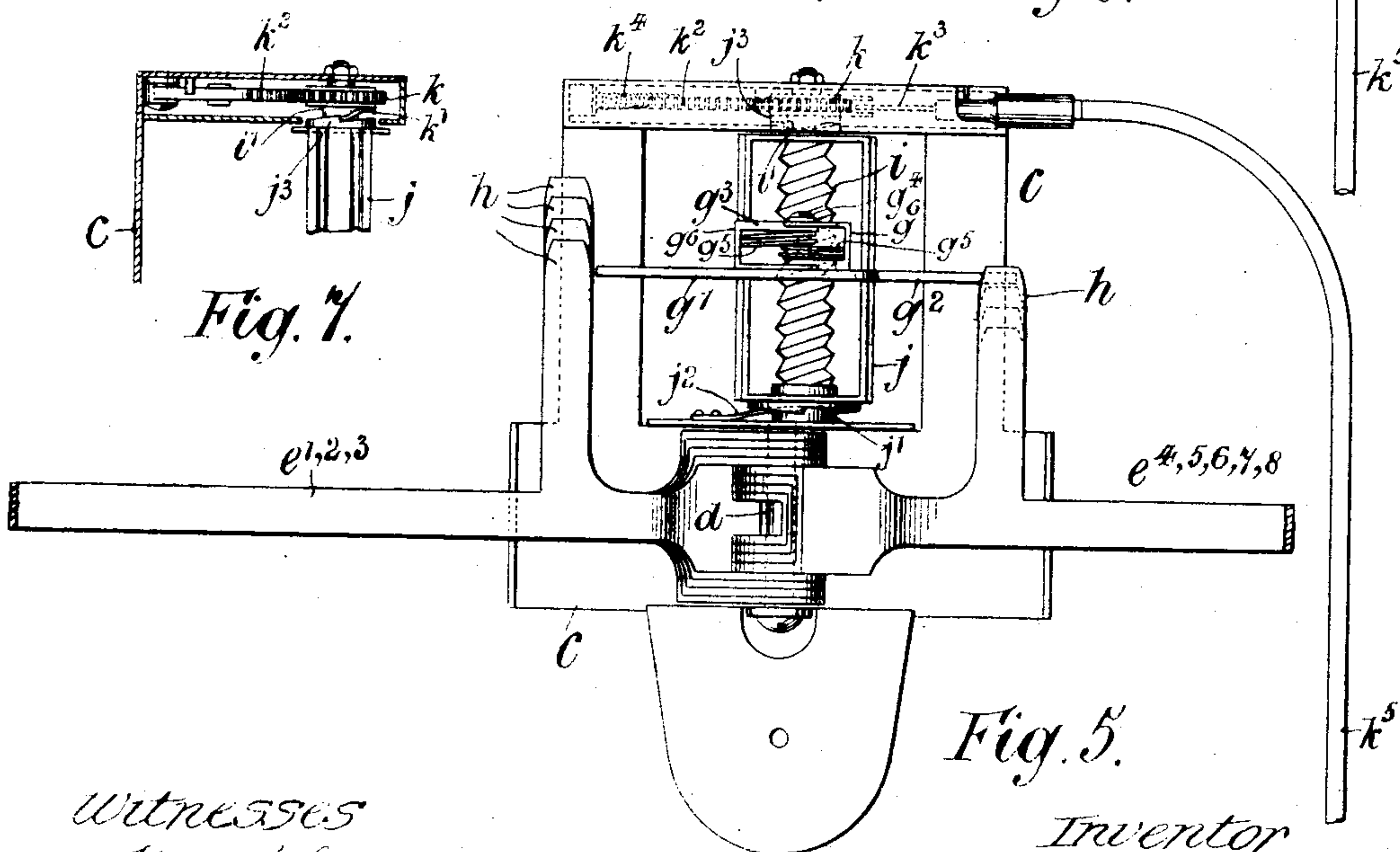
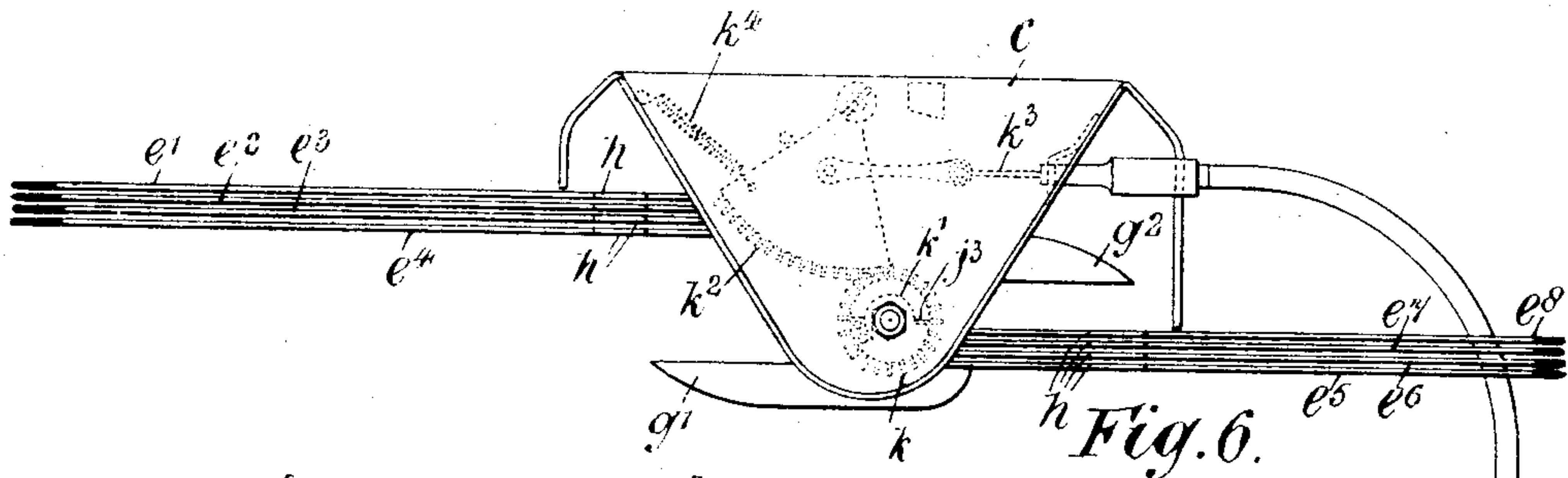
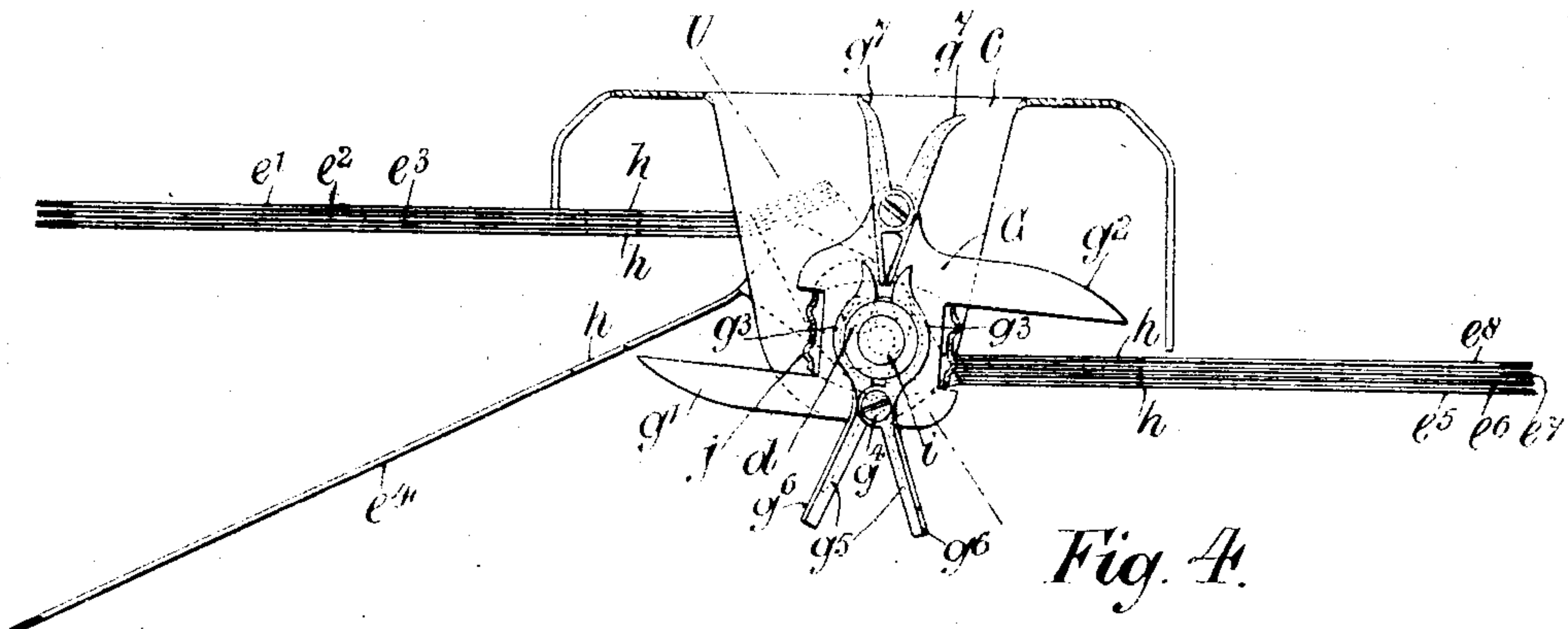
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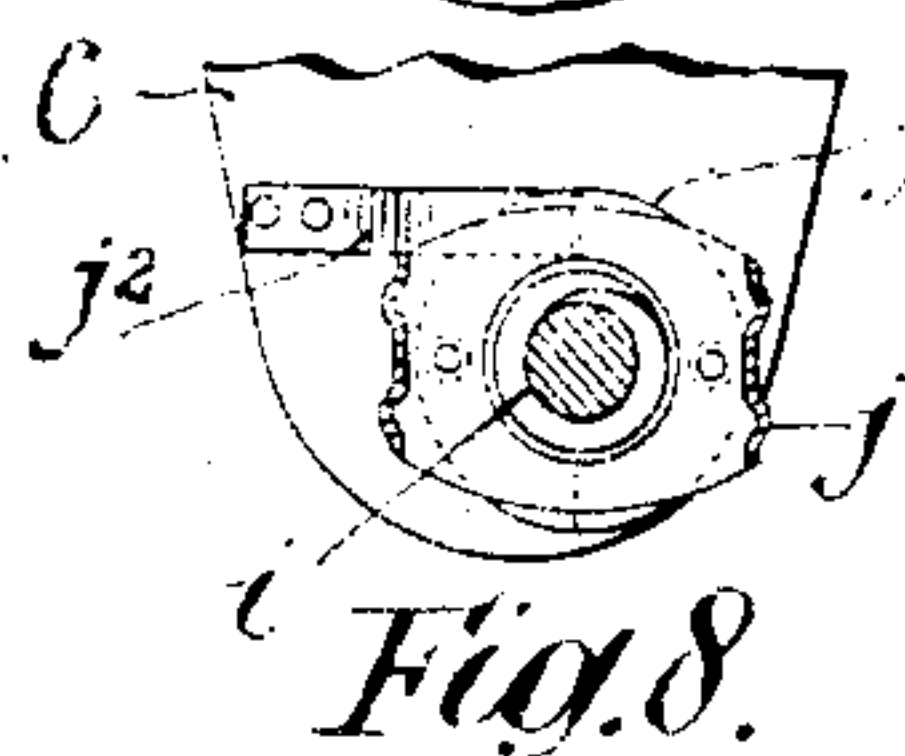
3 SHEETS—SHEET 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

BENSON SHARP, OF COUNTY OF MIDDLESEX, ENGLAND.

CONTRIVANCE FOR TURNING THE LEAVES OF A PAMPHLET OR BOOK.

No. 871,148.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed April 14, 1905. Serial No. 255,613.

To all whom it may concern:

Be it known that I, BENSON SHARP, a subject of the Emperor of Austria, residing at No. 3 Victoria Park road, in the county of Middlesex, England, have invented new and useful Improved Contrivance for Turning the Leaves of a Pamphlet or Book, of which the following is a specification.

This invention relates to an arrangement of mechanism whereby a succession of sheets can be turned so as to expose the under side of the upper sheet and the face of the sheet next thereto, as in the operation of turning over the leaves of a book.

The chief purpose which the invention is intended to serve is the turning of the leaves of a piece of music, without requiring the performer to finger the sheets, and the invention will be described with reference to a form of construction suitable for such purpose. Such a construction is illustrated in the accompanying drawings:—

In these:—Figure 1 is a front view of the apparatus arranged as in operation, three sheets having been turned, and five more being adapted to be turned. Fig. 2 is a side elevation showing the apparatus standing on a flat surface. Fig. 3 is a sectional plan of the stand taken along the line 3—3 of Fig. 1 as when in use with a piano of ordinary construction. Fig. 4 is a sectional plan, on a larger scale, of the principal portion of the apparatus, taken along the line 4—4 of Fig. 1. Fig. 5 is a front elevation corresponding to the view in Fig. 4. Fig. 6 is a plan corresponding to Fig. 4 showing the arrangement of the actuating mechanism. Fig. 7 is a side elevation of a part sufficient to show the actuating mechanism. Fig. 8 is a part sectional plan showing a detail. Figs. 9 & 10 are respectively a side elevation and a plan of a pedal for actuating the mechanism by the pressure of the foot. Figs. 11 and 12 are respectively on a larger scale side elevation and transverse section taken along the line 12—12 of Fig. 11 of the terminal portion of the pull and thrust mechanism.

The mechanism which effects the turning operation, is secured in a pivoted manner to the upper end of a stand which consists of a light frame of thin strips adapted to fold into a compact form, in which all the components can take positions which are parallel and in contact with one another.

The stand is formed in two portions A^1 and A^2 (Fig. 2) which are hinged together at b ,

and each portion is adapted to be opened into a triangular shape as shown in Fig. 1. The two portions may be spread at an angle with one another, as shown in Fig. 2, so as to be adapted to support a piece of music and the leaf-turning machine on a table or other horizontal surface. Alternatively, the two portions A^1 and A^2 can be brought into contact with one another, as shown in Fig. 3, in which condition the apparatus is adapted for use on a piano of ordinary construction by resting it on the music stand universally provided on such an instrument.

As a further alternative, the stand may be hung on an orchestra stand, a rail of a high backed chair or any suitable erection, the rail being interposed between the two sides b^1 and b^2 of a clip near the hinge b . To the central member a^0 , of the front portion A^1 of the stand, a bent rod is pivoted at a , the pivot mounting being adapted to yield elastically by the compression of a helical spring a^1 and thus the rod is adapted to be elastically engaged with either of two or more hooked recesses formed in a catch a^2 provided at the lower end of a^0 . When the rod is detached from a^2 it assumes a form and position a^3 , as shown in dotted lines in Fig. 2. If, with this construction, a piece of music is inserted with its central fold within the bent rod, and the latter is sprung into engagement of its lower end with the catch a^2 , the music will be securely held and the leaf turning apparatus will be adapted to efficiently carry out its operations in a manner which will be presently described.

It has been necessary to describe the construction of the stand in some detail because it is required to serve the purpose of bringing the music and the leaf-turning apparatus into working connection with one another.

To fold the stand completely for stowage or transport the bottom members a^4 a^4 turn upwards by pivoting, at one end, about the lower ends of the side members a^5 a^5 which, in the front portion A^1 are each pivoted to the upper end of the central member a^0 and, in the portion A^2 , the side members a^5 a^5 are pivoted together. The other ends of a^5 a^5 are, in the front portion A^1 , pivoted to a piece a^6 which is adapted to slide along the central member a^0 and, in the back portion A^2 , they are pivoted to one another.

Pivotally secured to the upper end of the stand is the frame c of the leaf-turning mechanism and to this frame is secured a short

spindle d . On the spindle d are mounted a number of arms $e^1 e^2 \dots e^8$ adapted to turn freely thereon. At its pivoted end, each arm is formed with two lugs which are bent into
 5 planes parallel to one another, the spindle d passing through both lugs. A section of the arm at this end, taken through the axis of the spindle d and along the line U indicated in Fig. 4, has a U shape, the dimensions being
 10 such that, of each arm which is intermediate between the first and the last, the U section closely embraces, and is embraced by, that of those next in sequence, each way respectively, (see Figs. 4 & 5). In this way, on a
 15 spindle of short length, a considerable number of arms can be pivoted in a manner so as to be free to turn, and at the same time the center lines of all the arms are rigidly restrained from deviation from one central
 20 plane of rotation.

At the further ends of the arms $e^1 \dots e^8$ links f are pivotally secured and each link carries a clip f^0 . The links f are each shorter or longer than that next in sequence, for the
 25 purpose of more completely separating the clips from one another.

Each arm $e^1 \dots e^8$ is formed with an upstanding finger h the length of which is shorter than that of the one preceding by a
 30 constant amount, (Figs. 1, 2 & 5). The extremities of these upstanding fingers are adapted to be engaged successively by the end of one of two fingers $g^1 g^2$ which project from an operative member G , which latter
 35 carries a nut g^3 which is adapted to traverse a screw i secured to the frame c and cause the operative member G to descend between the sides of a rectangular piece j which incloses it. The rectangular piece j the sides of which are
 40 corrugated to combine lightness with rigidity, is so mounted as to be able to turn freely on a spindle i^1 formed in one with the screw i at its upper end, the screw having at its lower end a collar on which also the piece j
 45 turns. To the piece j , at its lower end, is secured a two-toothed crown ratchet-wheel j^1 , shown in detail in Fig. 8, which, by means of a spring pawl j^2 , prevents the reversal of the movement of the piece j . Also to the upper
 50 end of the piece j another two-toothed crown ratchet-wheel j^3 is secured, and it is to the two teeth alternately of this wheel j^3 that the urging force is applied for the purpose of turning a leaf of the music in the following
 55 manner:—On the spindle i^1 , which forms a continuation of the screw i , a pinion k is freely mounted, and to the underneath face of the pinion a spring pawl k^1 is secured, the end of which is adapted to engage alternately
 60 with each of the two teeth of the ratchet-wheel j^3 . By means of this connection, when the pinion revolves in one direction, it will carry with it the ratchet-wheel j^3 and the rectangular piece j to which it is secured.
 65 When, after half a revolution has been com-

pleted, the pinion is caused to reverse its motion, the pawl k^1 will ride over the second tooth of j^3 and take such a position as to be adapted to urge the ratchet-wheel and piece
 70 j again in the forward direction through half a revolution, when the pinion k is once more rotated in the original direction, and so on successively.

The alternate forward and reversed rotations of the pinion k are effected by means of
 75 a toothed sector k^2 which is pulled by a wire k^3 to effect the purpose of turning the music and, on the release of the pull, the sector is returned to its initial position by the tension of a spring k^4 .
 80

The pull on the wire k^3 is effected from a distance through a medium, requiring no fixing except at its ends, by the employment of the well known Bowden transmission principle in which a tension element, preferably
 85 made of stranded wires, is threaded through a flexible tube capable of transmitting a thrust. The flexible tube may be a closely coiled helix, a string of beads, a composition pipe or otherwise.
 90

In Fig. 2 the transmission member is shown by k^5 and Figs. 9 & 10 show the construction of a pedal M whereby the required effort can be exerted. The construction of this latter member must be such as to be
 95 adapted to exert both a pull and a thrust. The transmission member terminates in a portion k^6 which is attached to the tension element k^3 by means of a transverse pin k^8 and a portion k^7 which is secured to the compression element or flexible tube k^5 (Figs. 11 and 12). These two elements are adapted to slide relatively to one another. k^6 is inserted within a fork m of the pedal in which it is retained by its flange, which flange and that
 105 of the portion k^7 are interposed between the fork m and a push piece m^1 pivotally secured to the short arm m^2 of the pedal lever, the long arm m^3 being adapted to be pressed on by the foot.
 110

By adopting a suitable amplitude of movement of the pedal and particularly by employing only two teeth on each of the ratchet-wheels, the operating member G will always be brought into the correct position, at the
 115 end of one movement, for effecting the turning of the next sheet when the actuating force is re-applied.

The method of operation is as follows:—The piece of music having been secured to
 120 the stand, as before described and as shown in Fig. 1, all the arms $e^1 \dots e^8$ are turned into the right-hand position, and the clip f^0 carried on the link f at the right end of the outside arm e^1 , which arm has the longest up-
 125 standing finger h , is attached to the edge of the first leaf to be turned, and the other clips are similarly attached to the other leaves, each in due order. If now the pedal lever m^3 is thrust downwards and a pull ex-
 130

5 erted on the wire k^3 the operative member G will, by means of the rectangular piece j , be carried around half a revolution and, by means of the nut g^3 , will descend a distance equal to half the pitch of the screw i . The axis of the screw i is situated somewhat eccentrically to that of the spindle d on which the arms $e^1 \dots e^8$ are mounted, and the length of the fingers $g^1 g^2$ of the operating member G is adapted to cause them to engage with the top end of the upstanding fingers h when the arms $e^1 \dots e^8$ occupy the right-hand position. Thus by the rotation of G the outside arm, which has the longest finger h , will be conveyed from the right-hand position into the position shown in Fig. 4 by the arm e^4 . In this position, on account of the eccentricity of the axes d and i , the two fingers will disengage themselves from one another. From this position the arms will complete their half revolution by the action of gravity, on account of the inclination of the sheets of music. After having accomplished the turning of one leaf, the opposite finger g^2 of the operating member, having descended a distance equal to half the pitch of the screw, will be ready to engage with the next arm when the mechanism is again actuated. By making the difference in lengths of the fingers h of consecutive arms equal to half the pitch of the screw i the fingers $g^1 g^2$ will successively engage with the extremities of the fingers h .

35 The nut g^3 is divided into two similar halves which are pivoted at g^4 to the operative member G forced into contact with the thread of the screw i by means of a spring g^5 inserted between the handles $g^6 g^6$. By pressing $g^6 g^6$ together, with the finger and thumb, the nut can be disengaged from the thread of the screw, and the member G can be raised into a suitable position on the screw to repeat the whole or any desired number of pages of music.

45 To facilitate the displacement of the nut, at the end of any half revolution, an alternative means of separating the two halves of the nut is provided in a second pair of handles $g^7 g^7$ which also are pivoted to the member G.

I claim:

1. A mechanism for turning the leaves of a book or pamphlet comprising arms pivotally mounted on a frame, such arms having

fingers which project each a small distance further than that of the arm which follows in sequence, links pivotally secured to the end of the arms, clips attached to the ends of the links, an operating member engaging successively with the projecting tips of the above mentioned fingers, a screw on which said operating member is mounted said screw being located above and parallel with the pivot of the arms, and means for rotating said operating member.

2. A mechanism for turning the leaves of a book or pamphlet comprising arms pivotally mounted on a frame, such arms having fingers which project each a small distance further than that of the arm which follows in sequence, a two fingered operating member adapted to engage successively with the projecting tips of the fingers on the arms, a screw in which said operating member is mounted, said screw being located above and parallel with the pivot of the arms, and means for rotating said operating member through an angle automatically limited to 180 degrees on each actuation.

3. In a mechanism for turning the leaves of a book or pamphlet, an operating member, arms engaged by said member, said arms being attached severally to the leaves, a screw, a divided nut attached to the said operating member and embracing said screw, and means for disengaging said nut from said screw.

4. In a mechanism for turning the leaves of a book or pamphlet, a series of arms pivotally mounted on a common vertical axis in a compact manner, and all lying in the same horizontal plane and links carrying clips for the attachment of the extremities of the arms to the several leaves, the pivoted ends of such arms having each a U shaped section, the surface of each section which is intermediate to the extreme members of the series, being embraced by and embracing, the ones next in sequence, the lengths of the clip-carrying links being each greater or less than the one next in sequence.

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

BENSON SHARP.

Witnesses:

THOMAS ALFRED HEARSON,
 WALTER J. SKERTEN.