

No. 707,548.

W. H. CAMPBELL.
TYPE WRITER.

Patented Aug. 26, 1902.

(Application filed Mar. 31, 1902.)

(No Model.)

4 Sheets—Sheet 1.

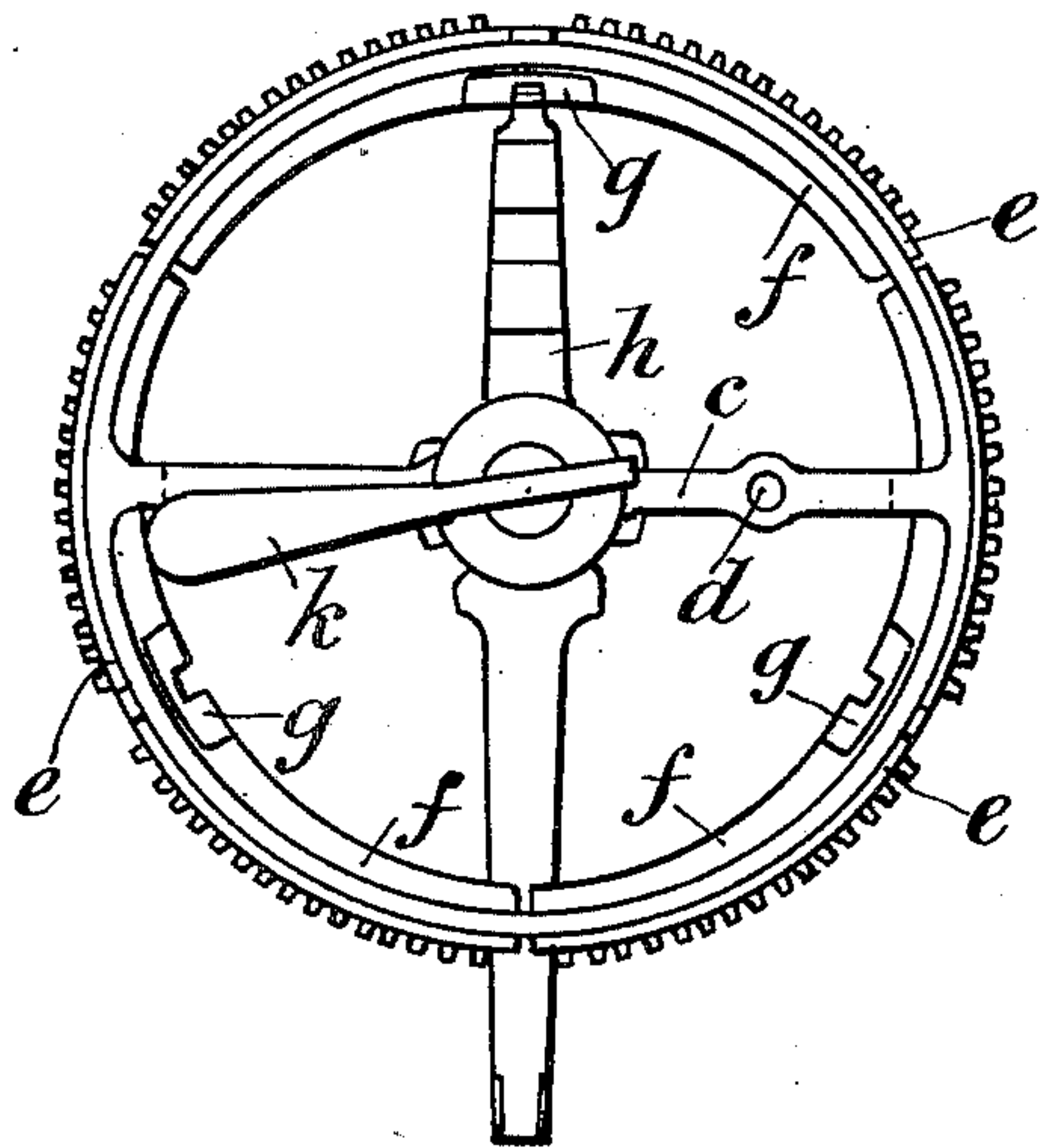


Fig:1.

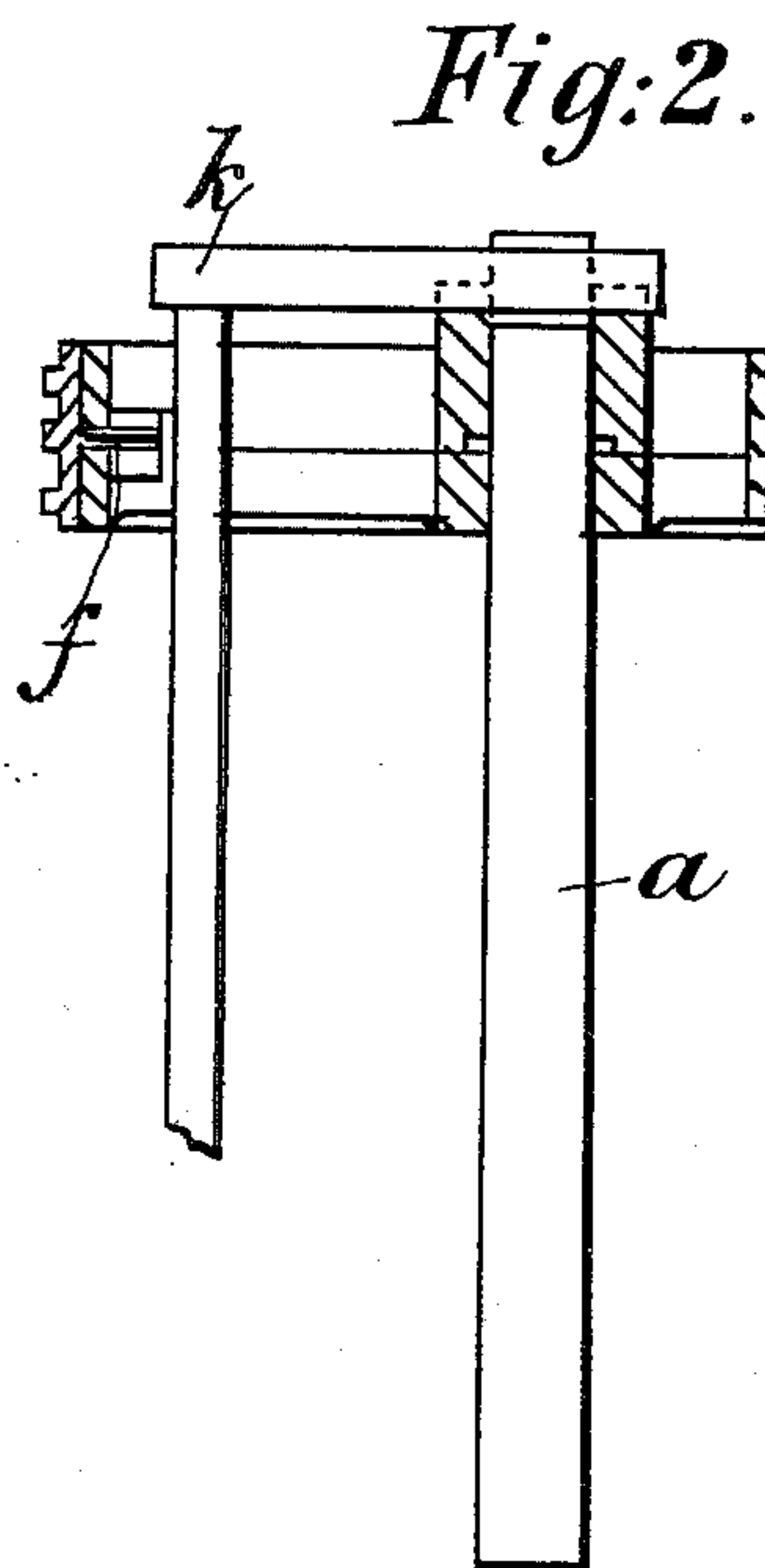


Fig:2.

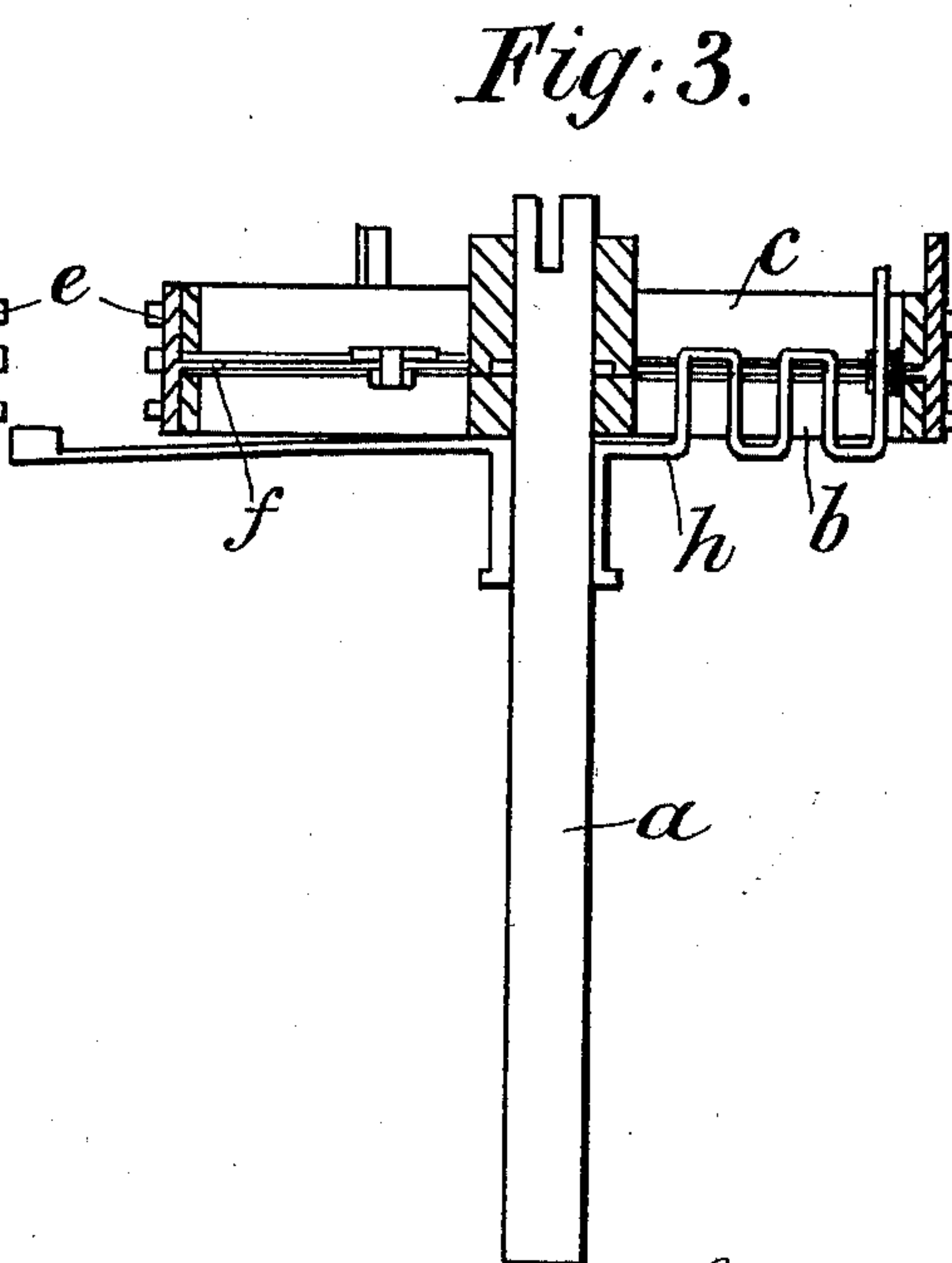


Fig:3.

Witnesses:
E. A. Finckel.
Ada C. Briggs.

Inventor:
Walter Hope Campbell.
by W. H. Finckel
Atty.

No. 707,548.

Patented Aug. 26, 1902.

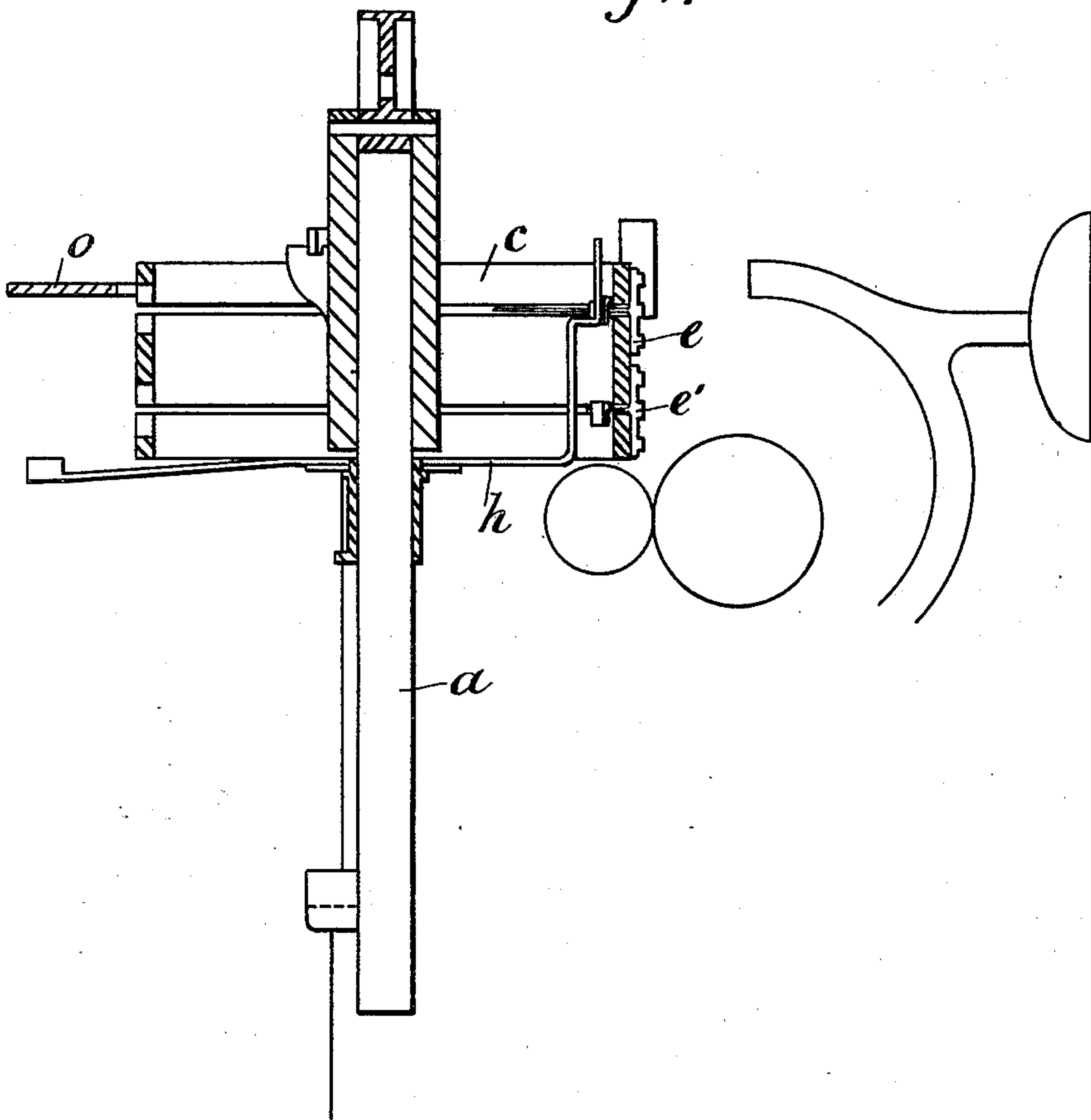
W. H. CAMPBELL.
TYPE WRITER.

(Application filed Mar. 31, 1902.)

(No Model.)

4 Sheets—Sheet 2.

Fig: 4



Witnesses:
Ed. Finckel.
Ada C. Briggs.

Inventor:
Walter Hope Campbell.
by *Wm. H. Finckel* Atty.

No. 707,548.

Patented Aug. 26, 1902.

W. H. CAMPBELL.
TYPE WRITER.

(Application filed Mar. 31, 1902.)

(No Model.)

4 Sheets—Sheet 3.

Fig. 6.

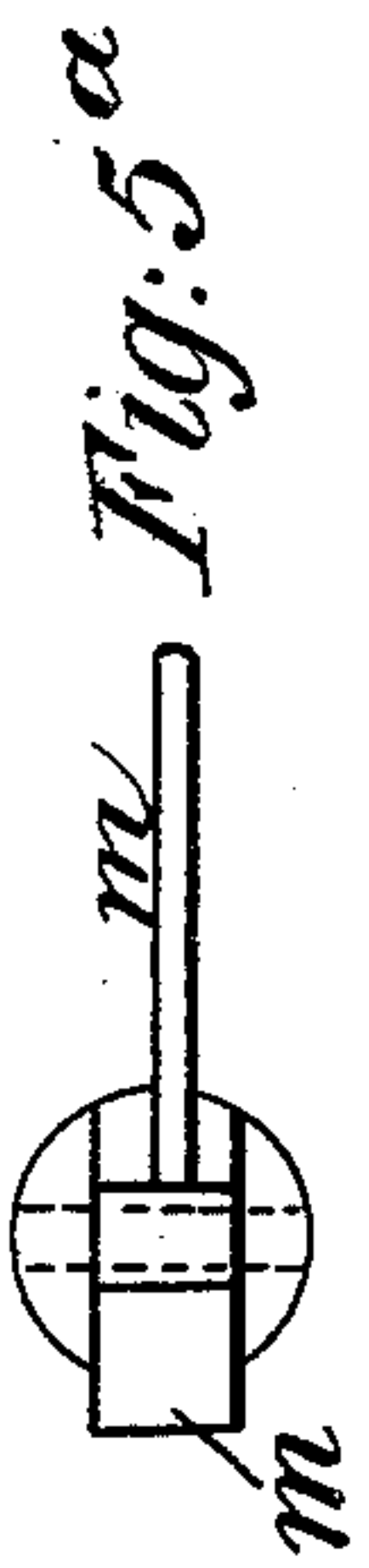
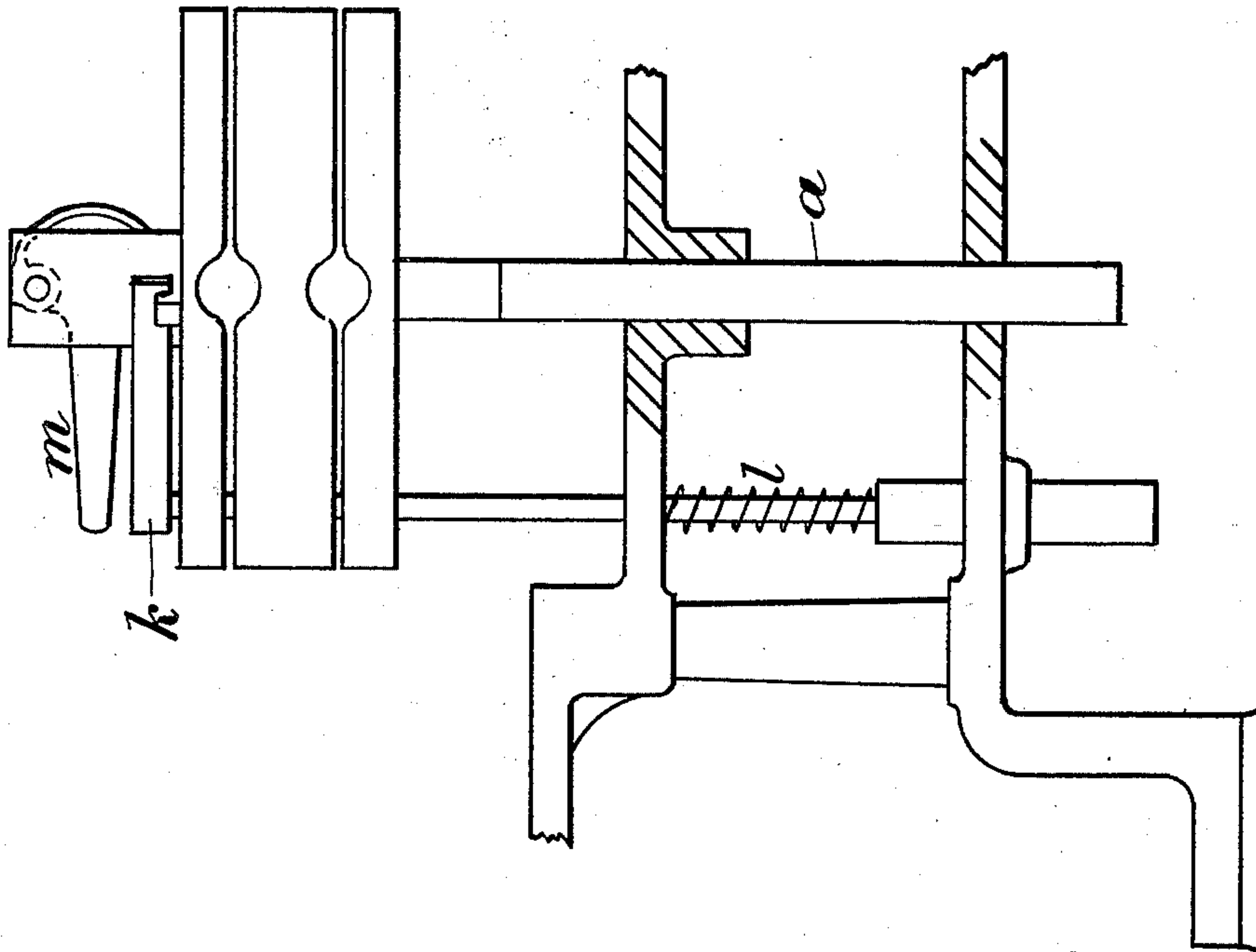
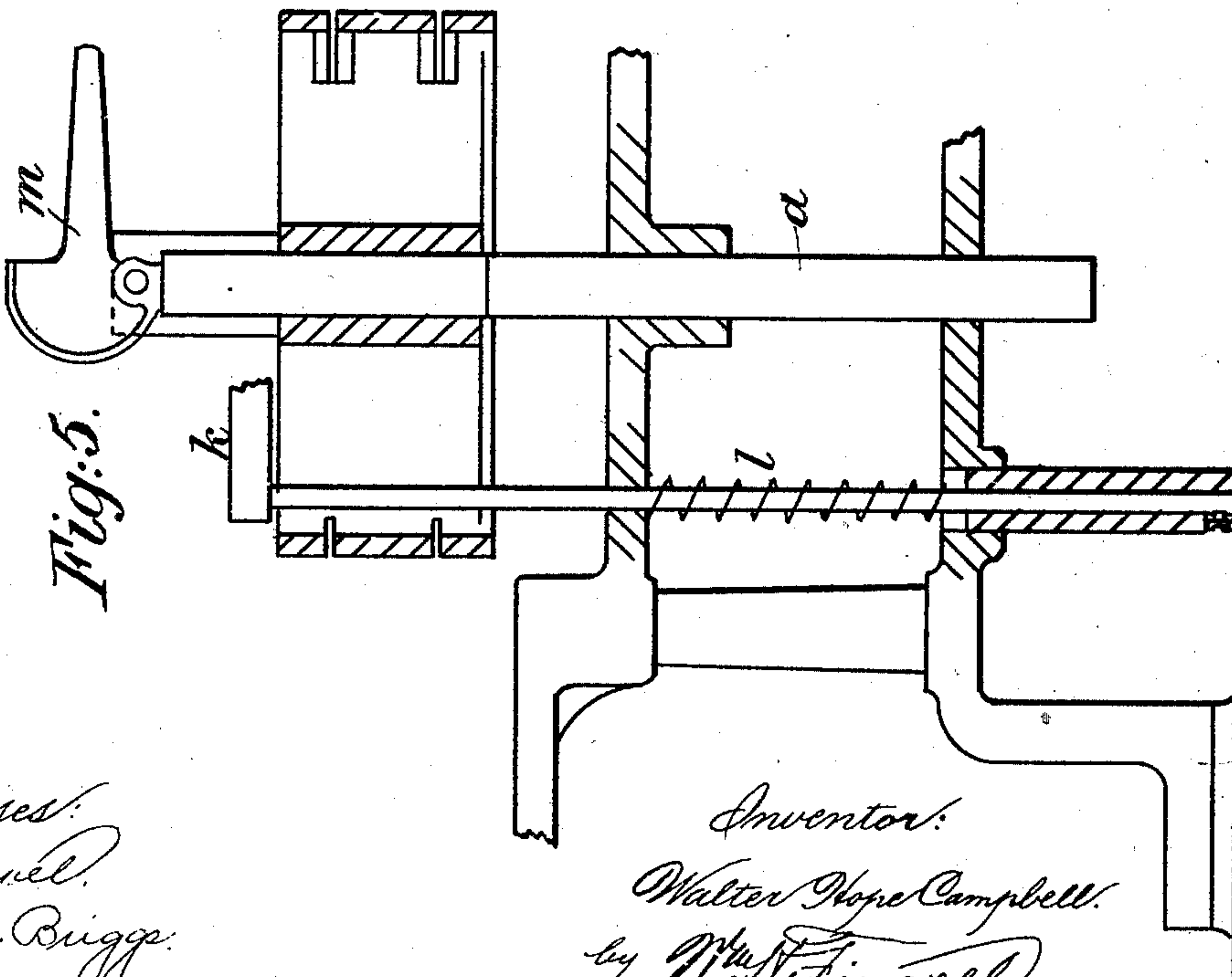


Fig. 5.



Witnesses:
E. H. Finckel.
Ada C. Briggs.

Inventor:
Walter Hope Campbell.
by W. H. Finckel Atty.

No. 707,548.

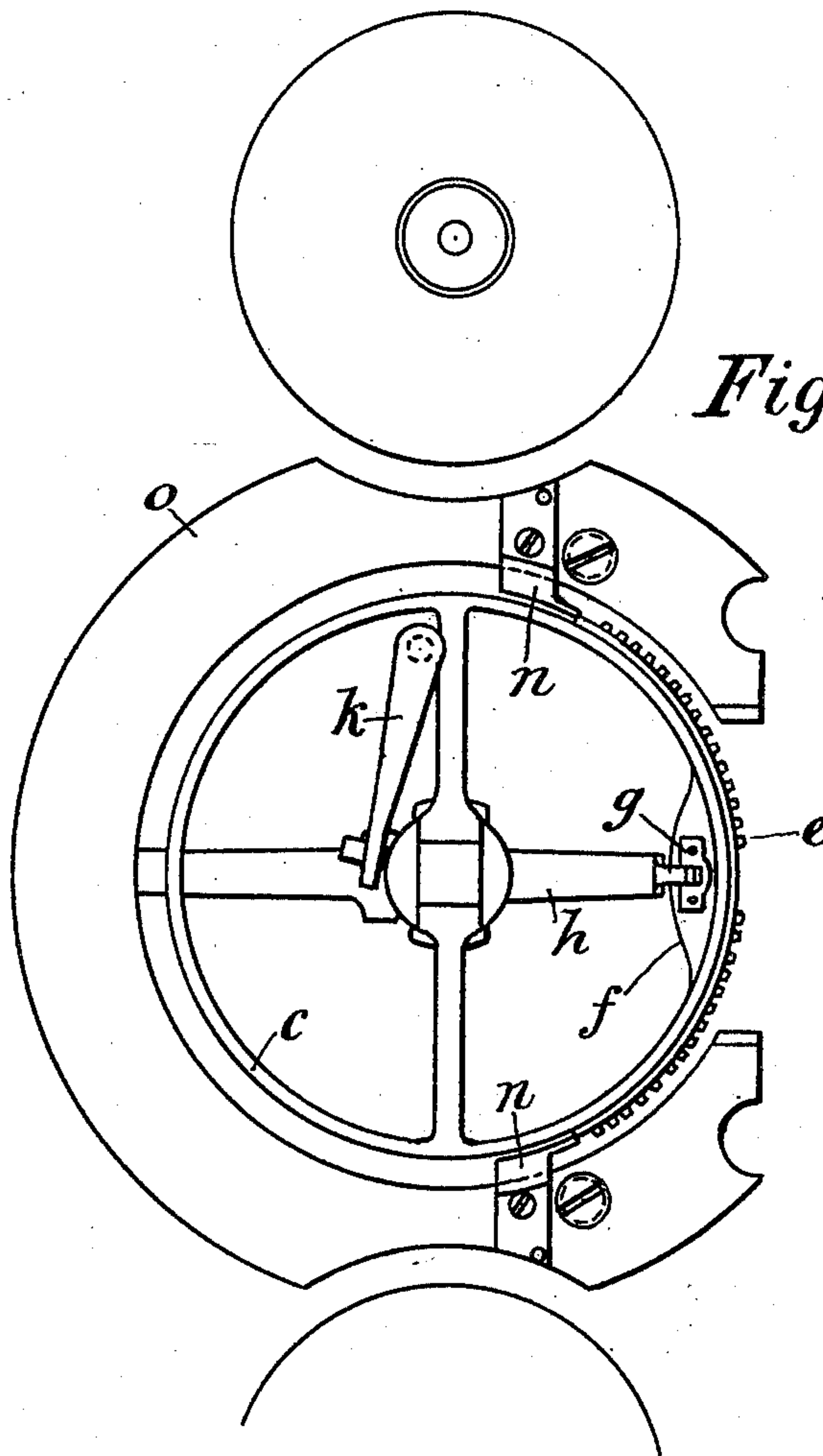
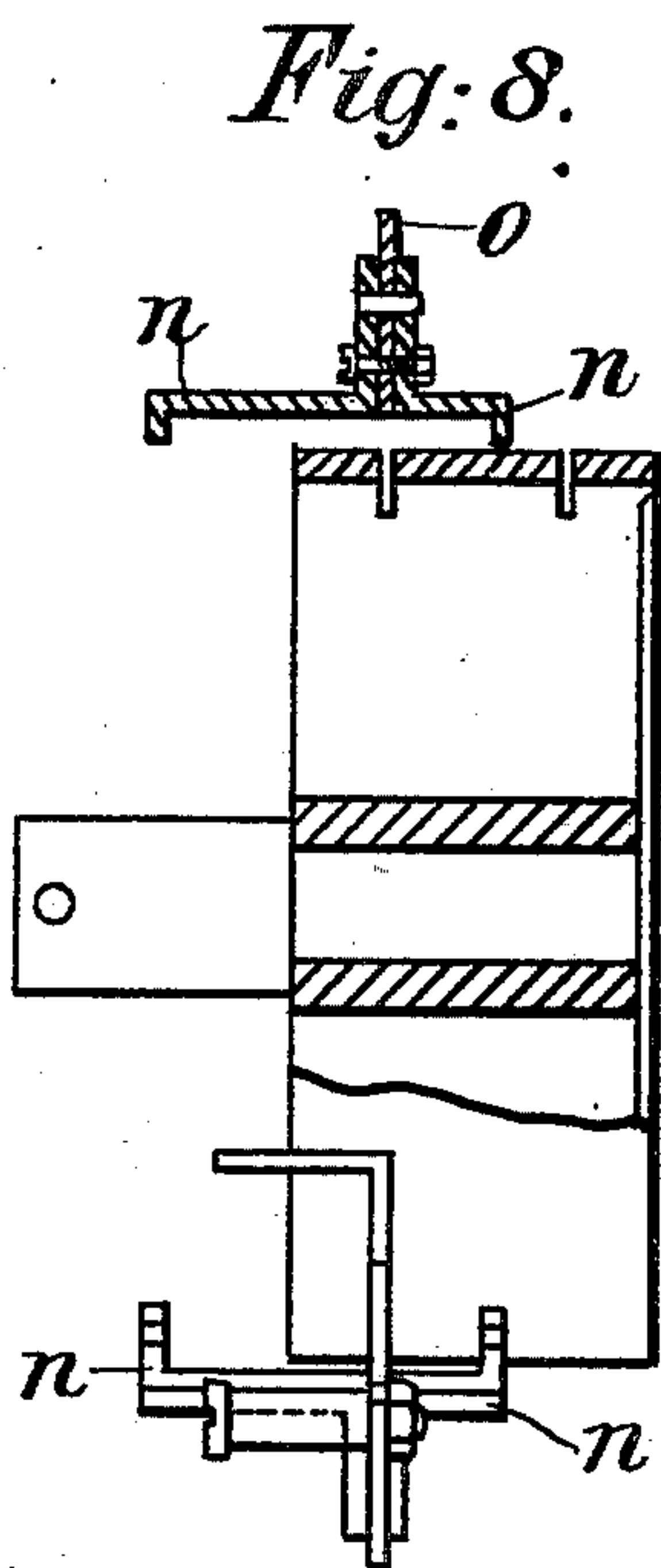
Patented Aug. 26, 1902.

W. H. CAMPBELL.
TYPE WRITER.

(Application filed Mar. 31, 1902.)

(No Model.)

4 Sheets—Sheet 4.



Witnesses:
E. H. Finckel
Ada B. Briggs

Inventor:
Walter Hope Campbell.
by W. H. Finckel
Atty.

UNITED STATES PATENT OFFICE.

WALTER HOPE CAMPBELL, OF KIEV, RUSSIA.

TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 707,548, dated August 26, 1902.

Application filed March 31, 1902. Serial No. 100,796. (No model.)

To all whom it may concern:

Be it known that I, WALTER HOPE CAMPBELL, a subject of the King of Great Britain, residing at Kiev, Russia, have invented certain new and useful Improvements in Type-Writers, of which the following is a full, clear, and exact description, and for which I have made applications for patents in Russia, dated October 21, 1901, and in Great Britain, dated February 22, 1902.

The object of these improvements is to facilitate the writing of more than one language or set of characters at the same time—for instance, when it is desired to write foreign words in an English letter, or words in Italics among ordinary type, or mathematical or chemical symbols, or generally to increase the number of characters available without entirely removing the one set of characters and substituting others.

The improvements relate to that class of machines in which the letters are contained on a shuttle in the form of a portion of a cylindrical surface, which shuttle is rotated about its axis by a driving-arm, so as to bring the required letter to the point of impression. The Hammond type-writer is a good example of this kind of machine.

In this specification I will describe the method of throwing the working shuttle out of action and introducing another. This is effected by arranging the various shuttles at the same position as regards the length of the cylinder of which they all form part, but occupying different positions on the circumference, and they are moved around circumferentially to bring the required one into action in the manner described in the specification of my British Patent No. 3,268 of the year 1895, but with new and improved details. In a modified form of my invention the shuttles are arranged at different positions along the axis of the cylinder, and they are moved axially to bring the required one into action.

I will describe the invention as applied to the Hammond machine, it being understood that it is equally applicable to others of the same class.

According to my invention a complete circle of metal is employed as an anvil, and the various shuttles are disposed around the circumference, one of them being in gear with

the driving-arm. Each shuttle has, as in the Hammond machine, a thin fin which runs in a groove in the anvil, and on the fin, inside the rim of the anvil, is a boss with a square hole in it, which prevents the shuttle from escaping from the anvil and serves also to engage the driving-arm. Whereas, however, the square hole in the Hammond machine is surrounded by metal on all four sides, I make the hole open on the side toward the center of the cylinder, and the shuttle is disengaged from the driving-arm not by lifting it over the top of the arm, but by springing the vertical member of the arm in toward the center, the arm being either made sufficiently flexible to allow of this or being made with a hinge or sliding contrivance which provides for this deflection, the vertical member being returned to its normal position by a spring. When it is desired to change the working shuttle for another, the operator springs the driving-arm out of the square gap in the shuttle with his left forefinger and then with his right hand pushes all the shuttles around until the one required comes opposite the arm. The fins of the shuttles should curve gradually outward from the corners of the square gaps, so that when the required shuttle approaches the arm it will wedge the arm back without assistance from the left hand of the operator, and the arm will when opposite the gap snap automatically into it. It is well to have a projection on each shuttle on its upper edge, by which the shuttle can be moved without soiling the fingers with the ink on the shuttle. In the Hammond machine the shuttles are introduced into place radially, there being a gap or hole at one point of the groove for allowing the boss on the fin to pass; but this is inadmissible in this variety of the machine, as one of the idle shuttles might fly out when its boss passed the gap. The anvil is therefore made in two pieces divided by a horizontal plane through the groove in which the shuttles run. The upper half of the anvil is removed for removing or inserting the shuttles.

Referring now to the modification, an anvil is used with two or more grooves, one above the other, in each of which shuttles run. The anvil is not fixed to its shaft, as in the Hammond machine, but can be moved up and

down on it without turning around on it by a cam or equivalent contrivance, so as to bring either shuttle into gear with the driving-arm. The square hole in the boss of the shuttle is
 5 open toward the center of the cylinder, so that the boss of the shuttle which is being thrown out of gear may pass clear of the driving-arm. Suitable stops are provided for holding the idle shuttle in its central position, so that
 10 when it is again required it may truly engage the driving-arm.

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

Figures 1, 2, and 3 refer to the first method, and Figs. 4, 5, 6, 7, and 8 to the modification. Fig. 1 is a plan of parts of a type-writer, illustrating one method of carrying my invention into effect. Figs. 2 and 3 are sectional elevations, drawn at right angles to each other, of
 20 the parts shown in Fig. 1. Figs. 4 and 5 are sectional elevations, drawn at right angles to each other, of a modification of my invention. Fig. 5^a is a plan of part of Fig. 5. Fig. 6 is a sectional elevation showing the parts in different positions. Fig. 7 is a plan of Fig. 4, and Fig. 8 is a sectional elevation of parts as seen when looking from the back of the machine toward the operator.

In Figs. 1, 2, and 3, *a* is the vertical shaft
 30 of the anvil, which latter is in two superposed pieces *b* and *c*. *d* is a pin fast in the upper part *c* and an easy fit in the lower of such pieces *b* for insuring that the halves come together in the right position. *eee* are
 35 the shuttles, having fins *fff* running in the groove between the pieces of the anvil *b* and *c*. Each fin has a boss or enlargement *g*, which prevents its escape from the anvil, and a square gap which engages the driving-arm
 40 *h* when that particular shuttle is being printed from. The driving-arm *h* is bent up and down several times, as shown, so as to make it weak or flexible radially for the purpose of drawing it out of the gap in the boss or
 45 enlargement *g*, while it is abundantly stiff circumferentially for the purpose of driving the shuttle around. The necessary flexibility of the driving-arm *h* may be produced by a hinged joint and a spring. *k* is an arm fixed
 50 on a vertical rod, which is always pulled down by a spring for keeping the upper part of the anvil *c* pressed down on the lower part *b*.

In Figs. 4 to 8, which represent the modification, *a* is the shaft of the anvil, and *c* is
 55 the anvil in one piece, being double the height of the usual Hammond anvil and having two grooves to receive the two shuttles *e* and *e'*, one only of which is in gear with the driving-arm *h* at any time. A cam *m* is mounted
 60 and works in an extension of the boss of the anvil and is always pressed down upon the top of the anvil-shaft *a* by the arm *k* and its spring *l*. When this cam is in the position (turned over to the right) shown in Figs. 4
 65 and 5, the upper shuttle is in use. When, however, the arm of the cam is turned over to the left, as in Fig. 6, the anvil is raised

and the lower shuttle comes into use. Suppose there are three lines of type on each shuttle, the top one for small letters, the next
 70 for capitals, and the bottom one for figures and symbols, the anvil-shaft *a* being raised, and with it the anvil, by two keys at the left of the keyboard for the purpose of bringing
 75 the second and third lines of type to the impressing-level, just as in the Hammond machine, and suppose it is required to write principally in English, with occasional Russian words introduced, then the upper shuttle
 80 should be the English one and the lower the Russian. In Figs. 4 and 5 the anvil-shaft *a* is in its lowest position—that is, when neither of the special keys at the left of the keyboard is depressed and the anvil is in its
 85 lowest position on the shaft. The machine is therefore printing English small letters. The anvil is raised for printing English capitals or English figures not by the cam *m*, but by the special keys on the left. When, however, the shaft *a* is in its lowest position,
 90 as shown in Fig. 6, but the anvil has been raised on the shaft *a* by the cam *m*, the machine prints Russian small letters. Russian capitals and Russian figures are got as above without altering the cam *m*, but by the left-
 95 hand keys.

In the arrangement shown at Fig. 4 it will be seen that the driving-arm *h* consists of, first, starting from the anvil-shaft *a*, a horizontal part, then a vertical part, which does
 100 not touch the shuttle, then another short horizontal part, and, lastly, a vertical part, which engages the gap in the boss *g* of one or other of the shuttles. The length and vertical position of this last part must be such
 105 that it is in gear with the top shuttle and clear of the bottom one for all three positions of the anvil-shaft *a* while the arm of the cam *m* is toward the right and in gear with the bottom shuttle and clear of the top one for all
 110 three positions of the shaft *a* while the arm of the cam *m* is toward the left.

Figs. 7 and 8 show the contrivance for keeping the idle shuttle in correct position, so that when again required it shall truly engage the
 115 driving-arm. Four pieces of metal *nnnn* are fixed to the stationary plate *o*. Each has a vertical part, which is just clear of the shuttle, and a small projection or horn, which just clears the anvil. The height of the two
 120 upper horns is such that the upper shuttle is between them, and so restrained from circumferential movement, while the lower shuttle is in gear with the driving-arm *h*, and, similarly, the lower horns keep the lower shuttle
 125 central while the upper shuttle is in action. Each pair of horns just allows its shuttle to enter between them and no more. In operating the cam *m* for changing shuttles none of the printing-keys should be depressed,
 130 and therefore the driving-arm will be in the central position, and the shuttle which has been idle and is now about to be used being also central, owing to the horns, it will bring

its gap in the boss *g* accurately over the driving-arm. In the same way the shuttle which is now to be idle will come accurately between its horns.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In type-writing machines, the combination of a fixed circular anvil, two or more shuttles around the circumference thereof, 10 fins on such shuttles, gaps in such fins, and a spring driving-arm engaging the said gaps, substantially as herein set forth.

2. In type-writing machines, the combination of two or more shuttles one above the 15 other in a circular anvil, a driving-arm for

said shuttles, means for bringing into gear with the driving-arm the one required at the level of impression by altering the position axially of the anvil on its shaft and causing the other to remain idle, and stops for holding the idle shuttle centrally so that it shall come truly into gear with the driving-arm when brought into action, substantially as herein set forth.

In testimony whereof I affix my signature 25 in presence of two witnesses.

W. HOPE CAMPBELL.

Witnesses:

JOHN JOSEPH PITTS,

GREGORY S. FOARITSKY.