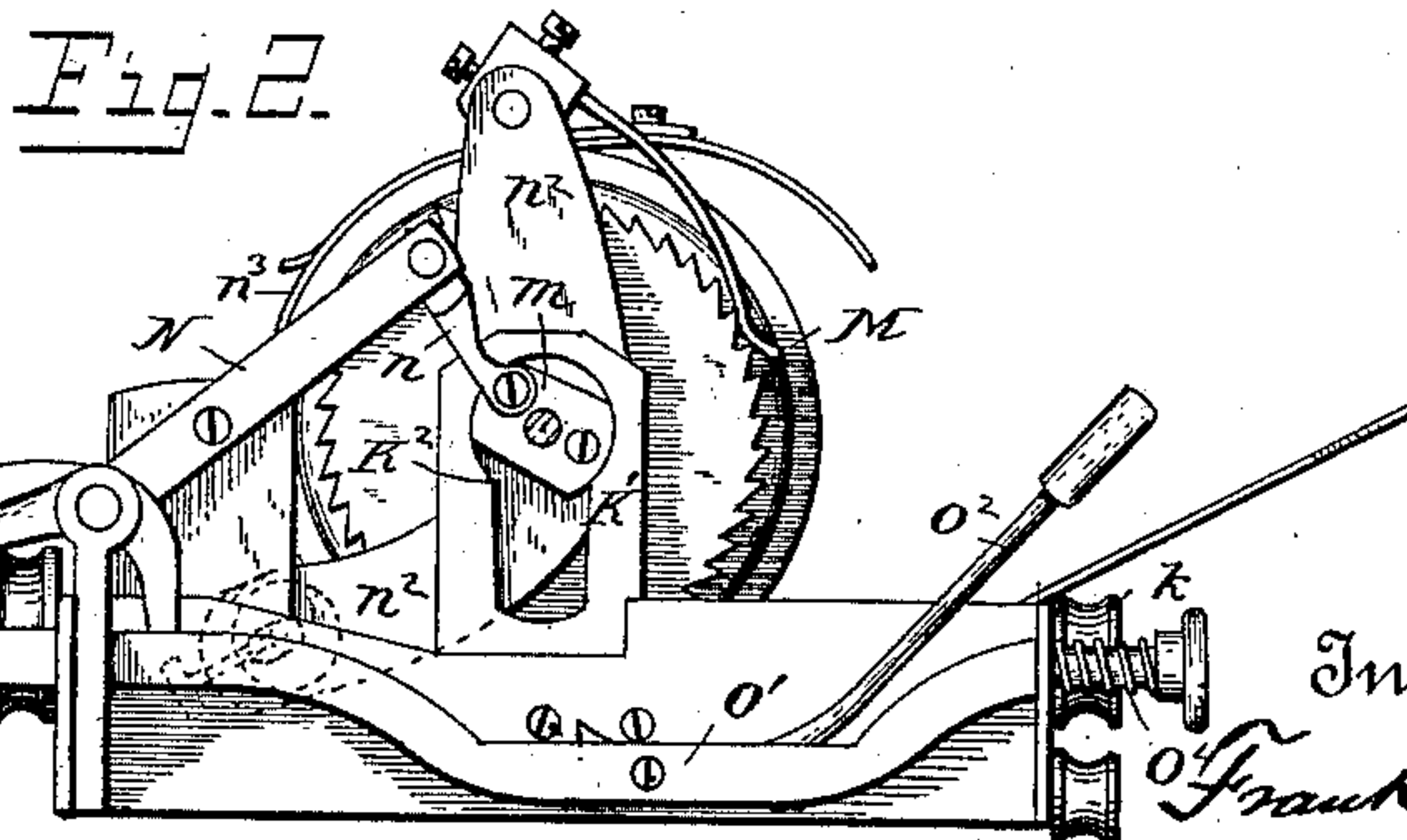
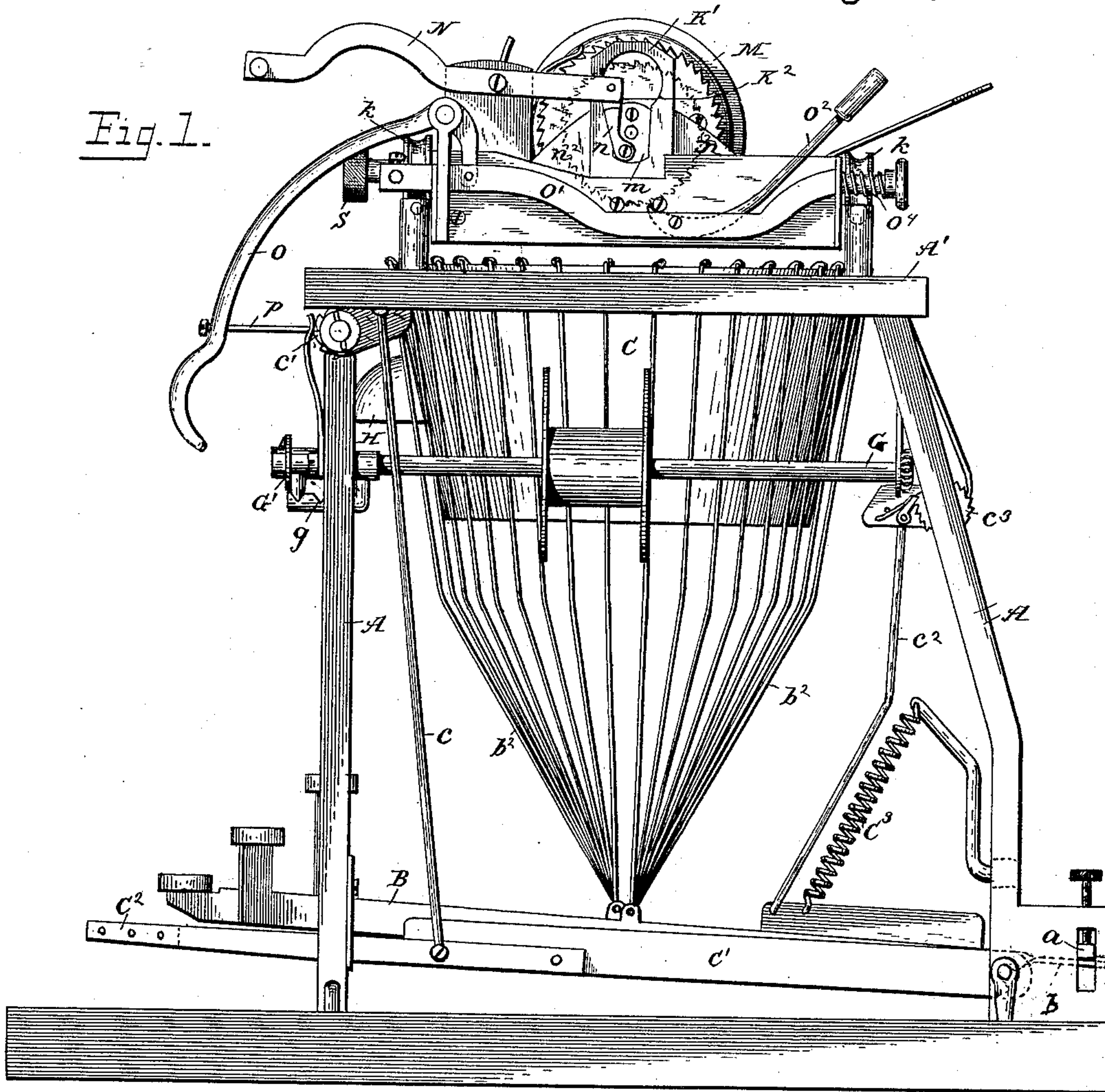


4 Sheets—Sheet 1.

No. 409,914.

Patented Aug. 27, 1889.



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By *his* Attorneys

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(No Model.)

4 Sheets—Sheet 2.

F. BURNS.
TYPE WRITING MACHINE.

No. 409,914.

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Fig. 3.

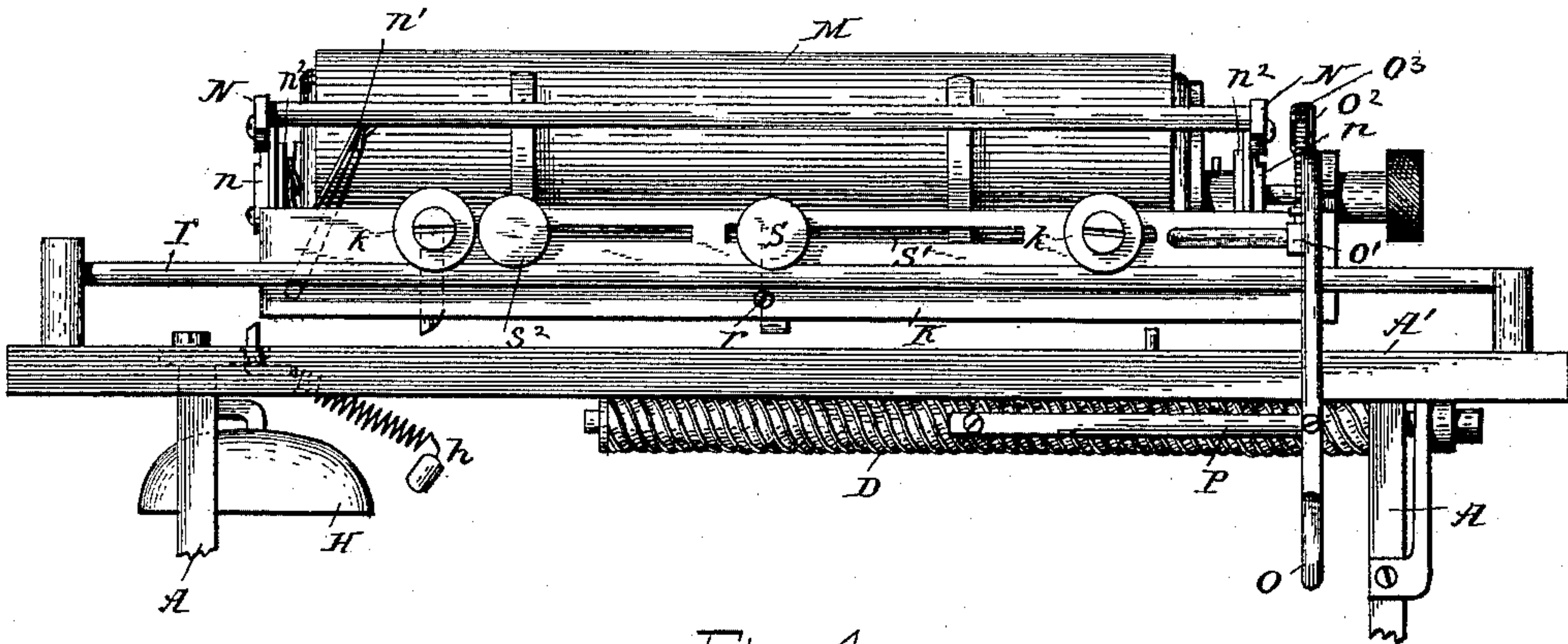
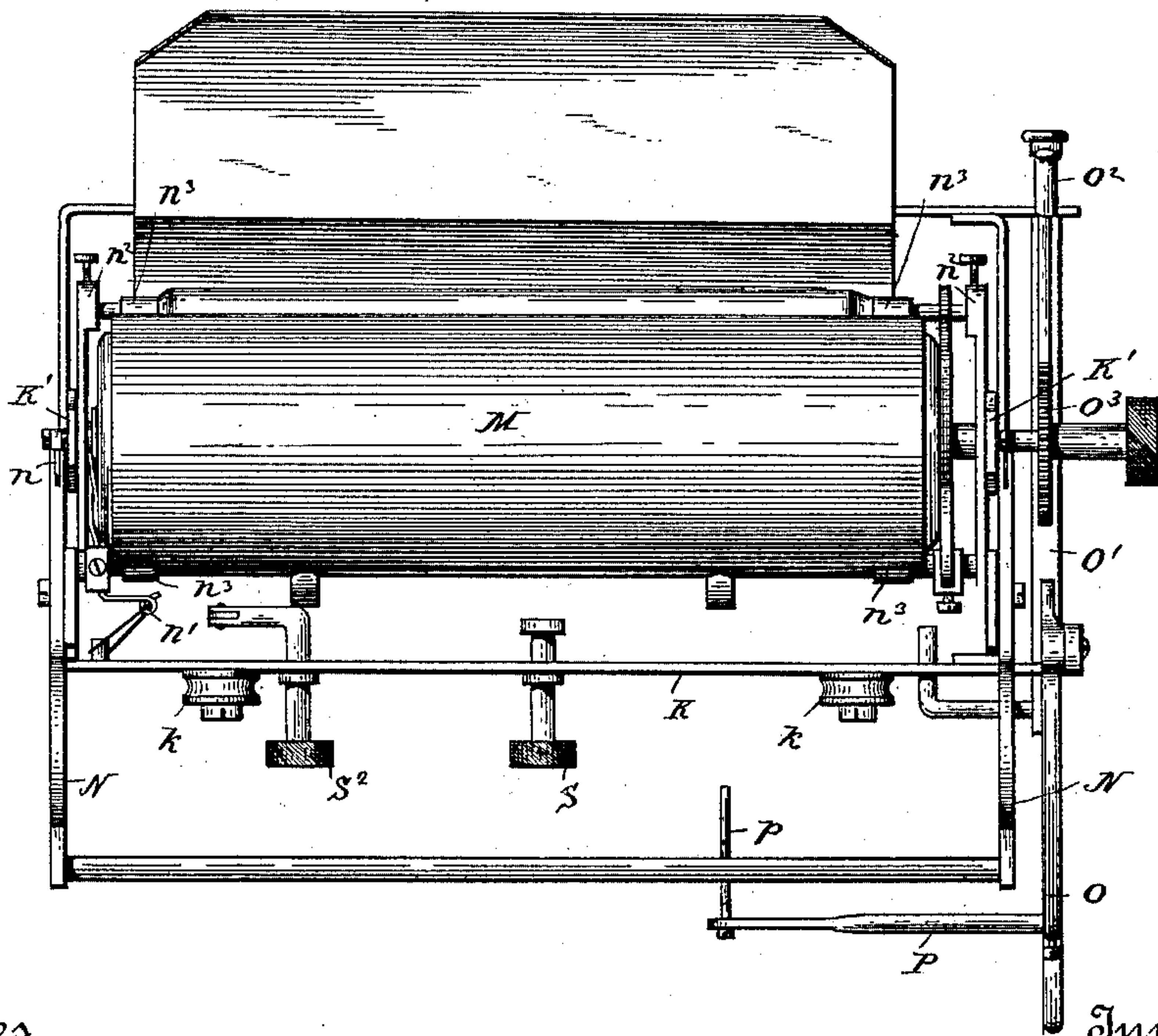


Fig. 4.



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Fig-5.

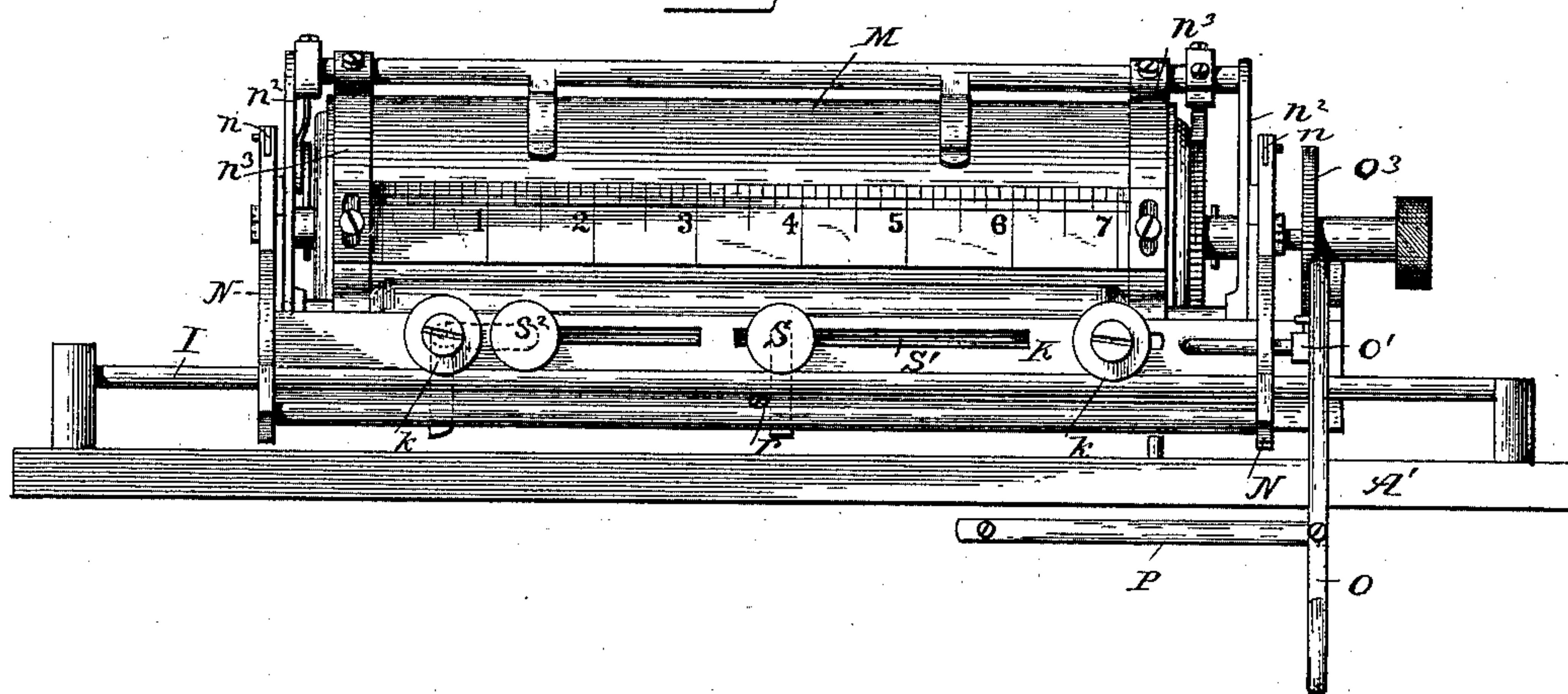


Fig. 6.

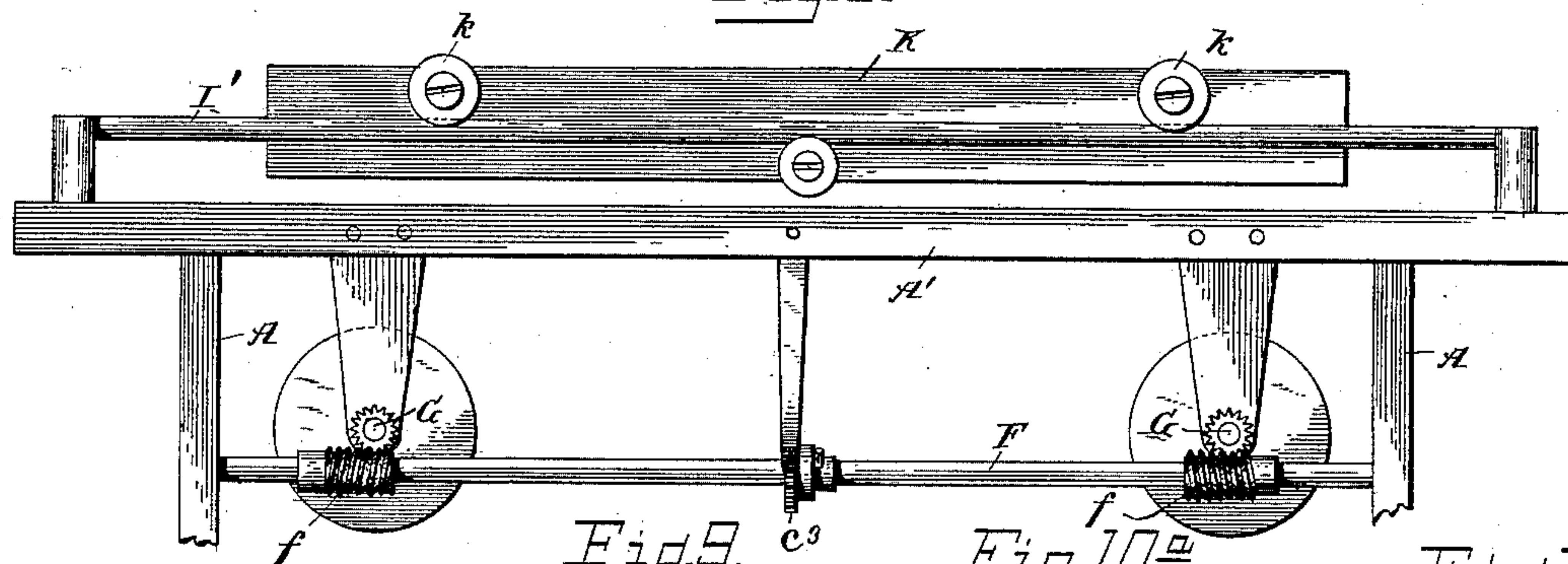


Fig. 9.

Fig. 10^a

Fig. 10.

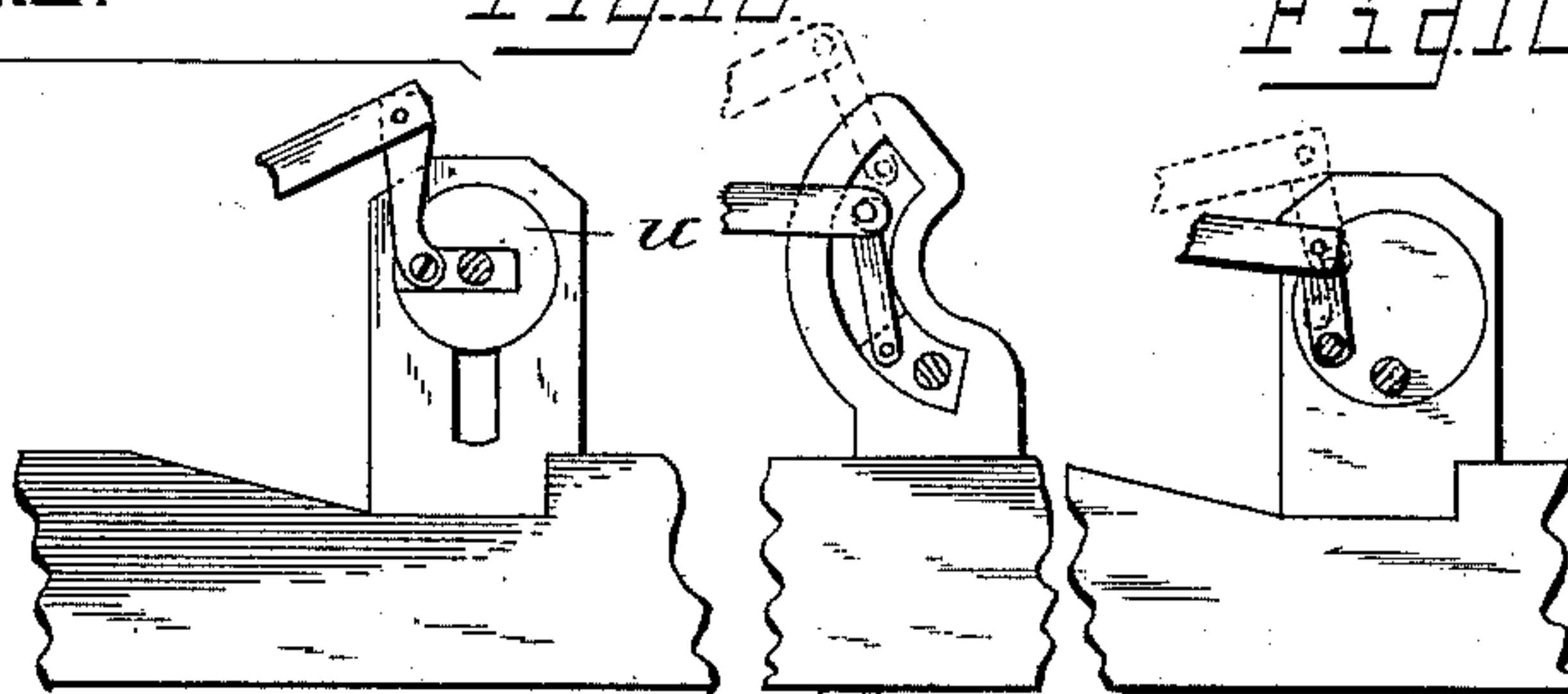
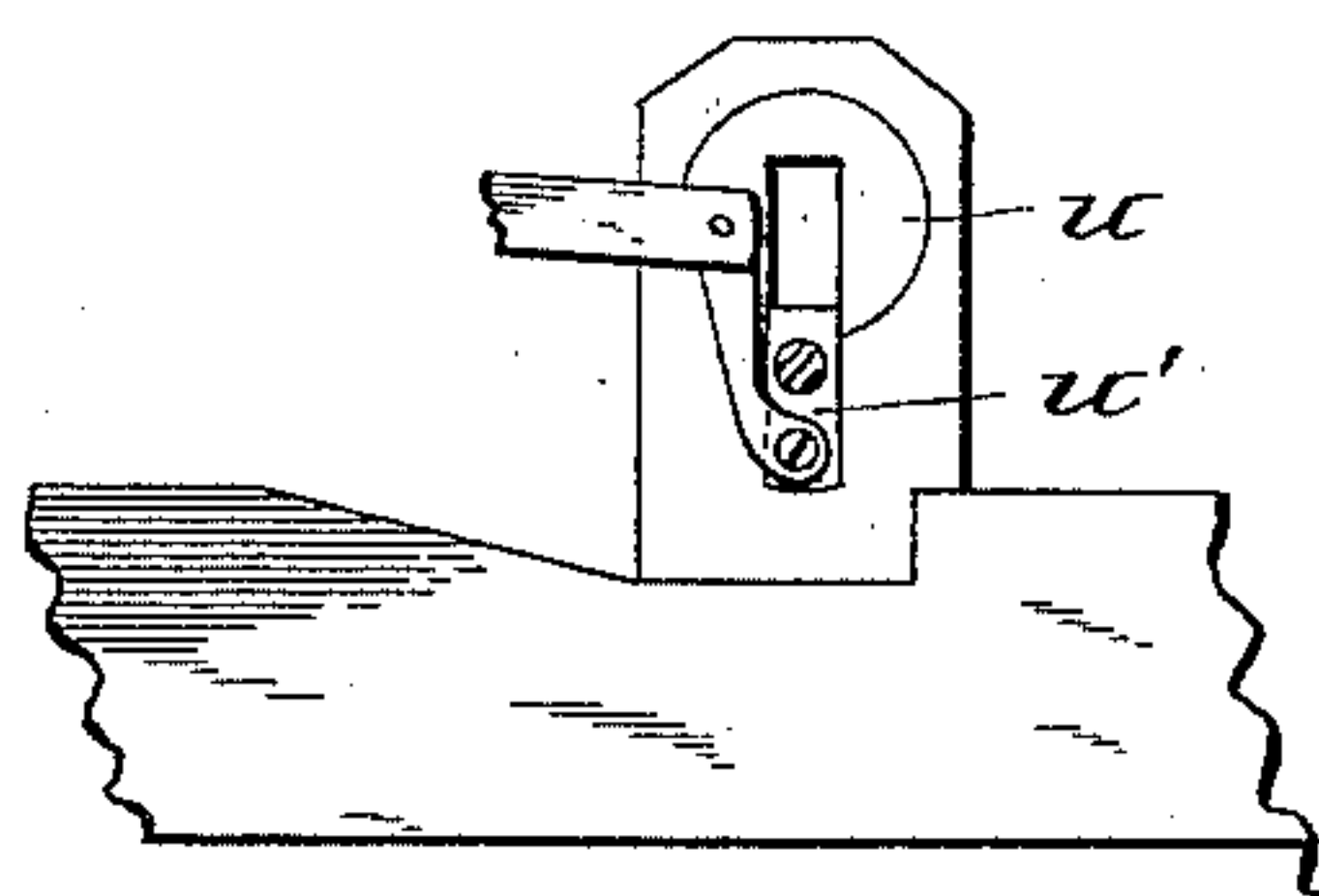


Fig. 11.

Fig. 12.

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A diagram showing a horizontal beam. The left portion is a thick rectangular section labeled B . The right portion is a thin circular section labeled b . The two sections are joined at a curved transition point.

b' E *Inventor*

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(No Model.)

4 Sheets—Sheet 4.

F. BURNS.
TYPE WRITING MACHINE.

No. 409,914.

Patented Aug. 27, 1889.

Fig. 7.

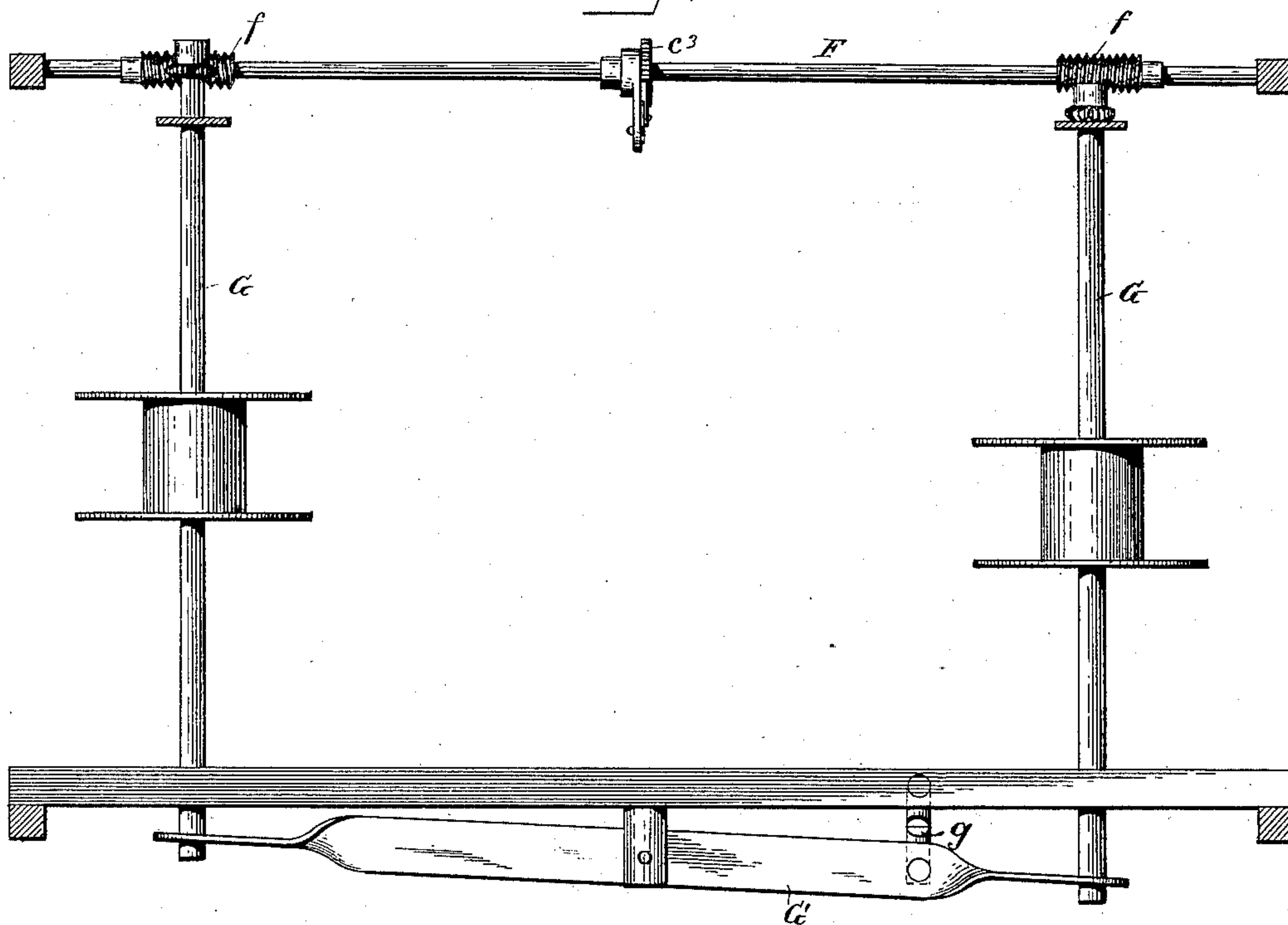
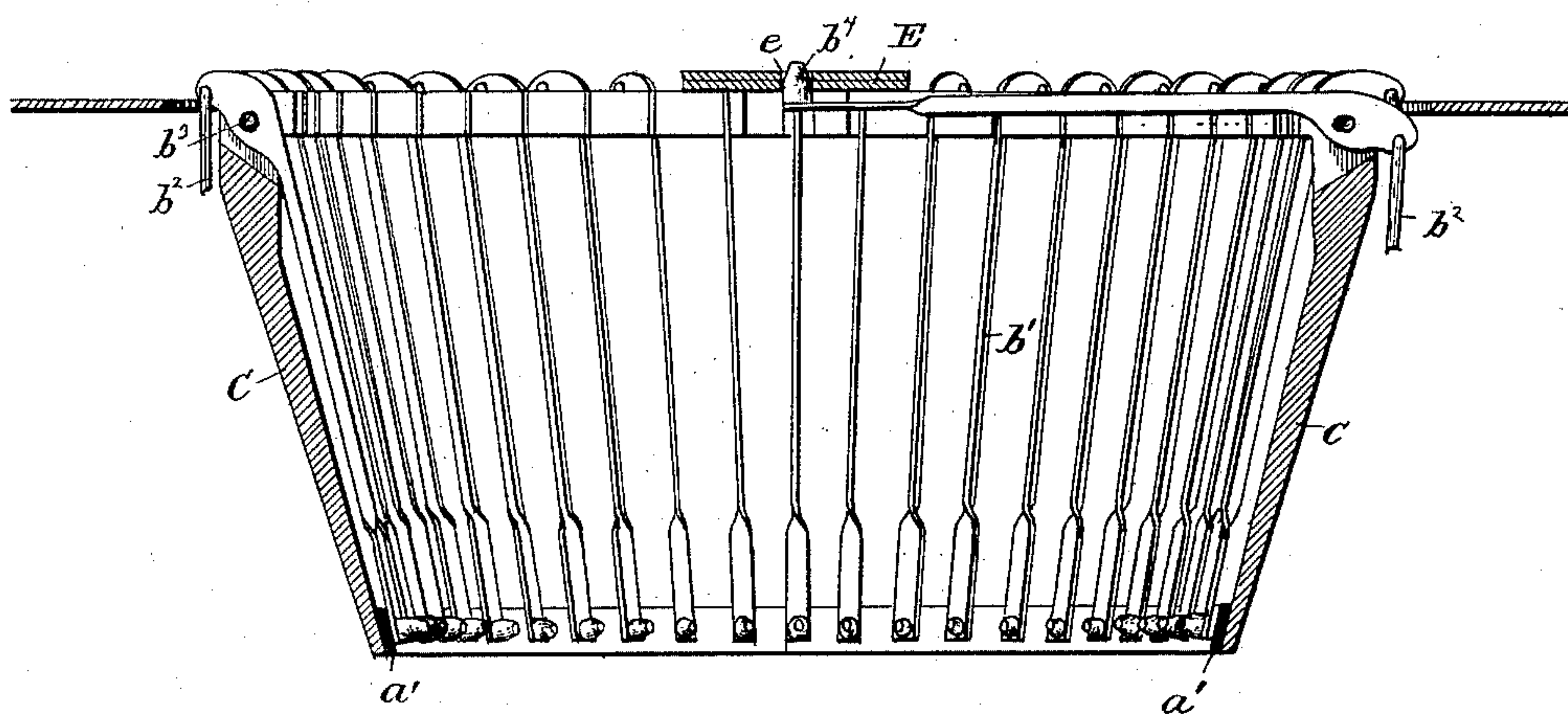


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANK BURNS, OF WESTFIELD, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 409,914, dated August 27, 1889.

Application filed April 9, 1889. Serial No. 306,512. (No model.)

To all whom it may concern:

Be it known that I, FRANK BURNS, a citizen of the United States, residing at Westfield, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in type-writers; and it consists in certain novel elements and combinations, hereinafter described and claimed.

In the drawings, Figure 1 is an end elevation of a machine made according to my invention, showing the impression-cylinder in its normal position. Fig. 2 is also an end elevation of the cylinder-carriage with the impression-cylinder in a raised and turned position to bring the writing into view. Fig. 3 is a front elevation showing the upper part of the machine with the impression-cylinder in normal position. Fig. 4 is a plan or top view of the cylinder-carriage and cylinder. Fig. 5 is a front elevation of the same, the impression-cylinder being raised and turned to show the writing. Fig. 6 is a rear elevation of the upper part of the machine, showing the means of securing and swiveling the carriage to the rear track or rail. Fig. 7 is a plan of the inking-ribbon carrier and the mechanism for operating and reversing the movement of the same. Fig. 8 is a section through the type-bar ring and centering-plate, showing also the type-bars in elevation. Figs. 9, 10, and 10^a are views showing modified forms of the mechanism for raising and turning the impression-cylinder. Fig. 11 is an elevation of a segment of a key-bar and its spring; and Fig. 12 is an elevation, plan, and section of the type shank or socket and type, respectively.

A is the frame-work of the machine, upon which the principal operating parts are mounted, and A' is the top plate of the machine, above which the impression-cylinder or platen and its connections are mounted.

B B are key-bars pivoted in the rear of the frame in the usual way, as shown. These key-bars are made of thin plates or bars of steel and have formed integral with them the key-bar springs *b b*. The bars are preferably

punched from plate steel of the width desired for the bars, the rear ends being reduced in width and under heat given a quarter-turn to produce the spring parts. By reason of this construction a uniform character of spring is economically produced and the necessity of separate attachments for said spring to the frame is avoided. These springs bear against a horizontal bar *a*, adjustable by means of set-screws to regulate the tension on said springs. The bar *a* is by preference notched to receive the springs, and thus keep the key-bars properly spaced. The key-bars are coupled with the type-bars *b'* by the usual pitmen *b²*.

The type-bars are provided with slots or with pivot-holes *b³*, somewhat larger than their pivots, to prevent binding and permit of perfectly free movement under all circumstances of warping of the type-bar ring C or from the slight variations incident to the manufacture of large numbers of parts by machinery. Obviously the same function would be secured by having enlarged bearing-sockets in the ring or support for trunnions or journals connected to the type-bars. These type-bars are made of thin steel plate or bars, which are given a quarter-twist near their extremities to provide a flat or relatively-broad surface for the attachment of the type. The type or printing surfaces are provided with cylindro-conoidal shanks or sockets *b⁴*, or shanks of other equivalent form, which taper from parallel sides toward the printing-surface.

C is the type-bar ring, in this instance shown of considerable depth and of conoidal form, so that the interior walls may serve as a stop and rest or support for the outer extremity of the type-bars when they come to a state of rest. The inside of the ring is cushioned with a band of suitable material to prevent the type-bars from hammering and rebounding, as shown at *a'*.

C' is the spacing-yoke, having a forwardly-projecting plate or bar C² for operating it independently, and having a transverse bar across the path of movement of the key-bars. This spacing-yoke C' is operated in one direction by hand through a key-bar or the plate C², and in the reverse direction by a spring C³. The yoke is connected by pitman *c* with ratchet *c'*, connected with the shaft of the letter-spacing cylinder; also, by pitman *c²* with

ratchet c^3 for intermittently rotating a rear driving-shaft.

D is a spirally-grooved spacing-cylinder, mounted in the frame below the top plate for driving the impression-cylinder forward step by step for spacing letters and words.

E is a plate provided with a hole or perforation e for centering and bringing the type to exactly the same point opposite the impression-surface.

Each type-bar has connected to its extremity a type provided with cylindro-pyramidal, cylindro-conoidal, or other formed shank or socket tapering on all sides and merging into parallel sides, and the base of the shank or a cross-section at the beginning of the untapered portion corresponds in shape and dimensions with and closely fits in the guide-hole e . In operation the tapering shank or socket passes freely into the perforation e in the plate E, and guides the type to the same point at all times, notwithstanding the pivot-joints of the bars may be free and loose, and this operation is performed with greater ease and freedom from the fact that such joints are provided with some play.

It is observed that there is no tendency to upset or bruise the printing-surface of the type when its shank is tapered and used in connection with either a tapering or cylindrical centering hole, whereas there is some tendency to do so when the upper outer edge of the type is permitted to hammer against the inclined sides of a tapering centering hole. It is further observed that the cylindrical part of the shank reaches the sides of the cylindrical hole just as the surface of the type reaches the plane of the upper face of the centering-plate, and thus insures perfect registry before the type can reach the surface of the paper.

F is a rotary shaft intermittently operated by the spacing-yoke through ratchet c^3 . This shaft is provided with devices for intergearing with transverse shafts G G. The transverse shafts are mounted in the frame so as to have a slight reciprocating motion in their bearings and they carry spools for reeling on and off, step by step, an inking-ribbon. (Not shown.)

G' is a spring-lever pivoted in the frame and provided with a detent and spring-stop to engage in suitable notches g g , and connected with the shafts, as shown, to throw one or the other of the shafts G into gear with the shaft F. By shifting the connection between shafts G G and F the movement of the inking-ribbon is reversed.

H is the signal-bell, and h is the bell-hammer, both mounted in the top plate, as shown. The bell-hammer is hung on a flexible arm or spiral spring, so that when it is tripped it will strike the bell and then come to rest just out of contact with the bell.

Above the top plate are supported on suitable studs or pillars the tracks or ways I I',

upon which the cylinder-carriage is mounted and traversed.

K is the cylinder-carriage, mounted on trucks or grooved rollers k k , adapted to the rods or round tracks II'. The rollers are arranged to grasp the rear track, as shown in Figs. 1, 2, and 6, so as to hold the carriage in position on the track and permit it to be traversed and swiveled without further connections. The carriage is provided with risers K' K', provided with ordinary key-hole slots K² K², one part being circular and the lower part having straight sides, as shown in Figs. 1 and 2.

M is the impression-cylinder or platen, having its journals or arbors hung in movable boxes m m , which normally fit and rest in the neck of the slots K² K². The ends of these boxes are in segments of circles which fit in the circular part of the slots.

A yoke N is pivoted to risers from the carriage, and is connected by links n n with the lower edge of the boxes m m . By this combination of devices the depression of the yoke first raises the cylinder or platen from its normal plane, as shown in Fig. 1, and then swings or turns it, together with the attached paper-holder, to the position shown in Figs. 2 and 5, so that the operator may inspect the writing. The paper-pressure roller of the paper-holder being at the rear lower side of the cylinder makes it necessary to elevate the cylinder before it can be rotated to expose the writing. Furthermore, the elevation and rotation brings the work to a better position for inspection than it would be if the cylinder or platen were merely rotated enough to bring the writing in front of it.

To give an impulse or start the return movement of the cylinder after it has been raised and rotated, I employ a light spring n' between a fixed part of the frame or machine and the movable cylinder. The paper-holder and its pressure-roller may be of any ordinary or approved construction. I have, however, in the present instance shown the finger-holder and pressure-roller supported by bent or angular arms or bars n^2 , attached to the movable boxes m m , the pressure-roller being held under tension against the cylinder by the springs n^3 n^3 .

To make the feeding of the paper positive and to avoid possible backward movement of the pressure-roller upon the return of the cylinder from its raised to its normal position, I prefer to gear the cylinder and roller together, as shown in Fig. 4.

The feeding forward step by step of the cylinder for line-spacing is accomplished by a hand-lever O, pivoted to the carriage and to the reciprocating bar O'. The bar O' carries a detent or pawl O², which intergears with the usual ratchet O³ upon the shaft of the cylinder. The bar is normally held in its rearward position by means of a spring O⁴. By raising the operating hand-lever O the recip-

roccating bar and its pawl are driven forward, thereby turning the cylinder and moving the paper forward. The hand-lever also carries an arm P, having a backwardly-projecting stud *p*, which meshes with the spiral grooves of letter-spacing cylinder D, thus causing the cylinder-carriage, with its mountings, to move step by step from right to left as the keys or the spacing-yoke are operated. Normally the carriage is locked down to its tracks by means of a catch or screw-stop *r*, the provision for raising and swinging the impression-cylinder on its carriage serving the usual purpose of raising the carriage and all its attachments; but for cleaning the type and other purposes requiring the exposure of the type-bar ring the stop *r* is removed, when the carriage is swiveled or swung back out of the way.

Attached to the front rail of the carriage is a stop S, adjustable to the right or left in slot S'. This stop moves in the path of an upward projection from the top plate, and serves to limit the movement of the carriage to the right. S² is an attachment of the carriage, also adjustable in a slot. This attachment carries a pendant free to swing in one direction, as shown in Figs. 3, 4, and 5, and being in the path of the upper arm of the bell-hammer serves to trip the bell in its movement toward the left, while it rides freely over said arm when moving to the right.

In Figs. 9 and 10 I have shown mechanical movements which permit of raising and swinging the impression-cylinder, which for the purposes of my invention in type-writers are the equivalent of that shown in Figs. 1 and 2, and hereinbefore described.

In Fig. 9, *u* is a cylindrical part provided with a notch or slot in one side, and *u'* is a vertically-reciprocating box adapted to fit in the slot of *u*. The arbor of the cylinder is mounted in the part *u'*, and in operation is first raised with the box into the slot and then turned around.

In Fig. 10 the shaft or arbor of the cylinder is mounted in the bottom of a circular box, and in Fig. 10^a it is mounted in a box adjusted in a curved slot. In these forms the link and yoke are so connected that in operation the axis of the cylinder is moved from its lowest plane in the arc of a circle upward to the position shown in dotted lines in said figure.

Obviously, other mechanical movements may be devised or adopted and used in connection with a platen to raise and swing the same without departing from my invention, and this may be done simultaneously or successively.

In Fig. 12 I have shown in side elevation, in plan, and in section a type socket or shank of the form best adapted to operate in combination with a centering-plate having a guide-hole.

I am aware that type-shanks have been proposed having converging faces on two sides,

and that a perforated plate for bringing the type to a given point opposite an impression-cylinder has also been proposed. I do not, therefore, claim either of these devices, broadly. I am not aware, however, that there has been combined with a perforated guide-plate of the character shown a type shank or socket tapering all the way around the same, such as I have described.

Having now described my invention, what I claim is—

1. The combination, in a type-writer, of a tapering type socket or shank and a member provided with a guide-hole corresponding in shape and dimensions with the base of the type-shank, substantially as described.

2. The combination of a type for type-writers, having a cylindro-conoidal shank or socket, and a centering-plate having a cylindrical guide-hole, substantially as described.

3. The combination, in a type-writer, of a loosely-mounted type-bar, a type having a tapering shank, as described, and a perforated centering-plate, substantially as described.

4. A key-lever and key-lever spring formed integral with each other of thin spring-metal plate, having the flat surface of the spring part at right angles with the flat surface of the lever part, substantially as described.

5. In a type-writer, the combination of a round rear track, a cylinder-carriage, and grooved rollers connected with the carriage and embracing the round track, substantially as described.

6. The combination, in a type-writer, of an intermittently-driven shaft carrying intergearing devices, a pair of spool-carrying shafts mounted to reciprocate in the direction of their length, a vibrating lever connected with the spool-carrying shafts, and a spring-stop whereby the inking-ribbon is mounted and operated step by step and reversed, substantially as described.

7. The combination, in a type-writer, of a carriage, a platen mounted in movable boxes, and a yoke or lever pivoted to the carriage, flexibly connected with the platen, and extending to the front of the machine to a point for conveniently raising and turning said platen, and thereby bringing the work to view, substantially as described.

8. The combination, in a type-writer, of a carriage having risers provided with "key-hole" slots, movable boxes fitted to reciprocate and rotate in said slots, an impression-cylinder mounted in the boxes, and a yoke connected with said boxes for raising and swinging the cylinder to bring the writing into view, substantially as described.

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

FRANK BURNS.

Witnesses:

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ARTHUR CRANSTON.