

C. S. DU BELLE.
ELECTRICALLY OPERATED TYPE WRITER.
APPLICATION FILED JUNE 8, 1909.

956,798.

Patented May 3, 1910.

6 SHEETS—SHEET 1.

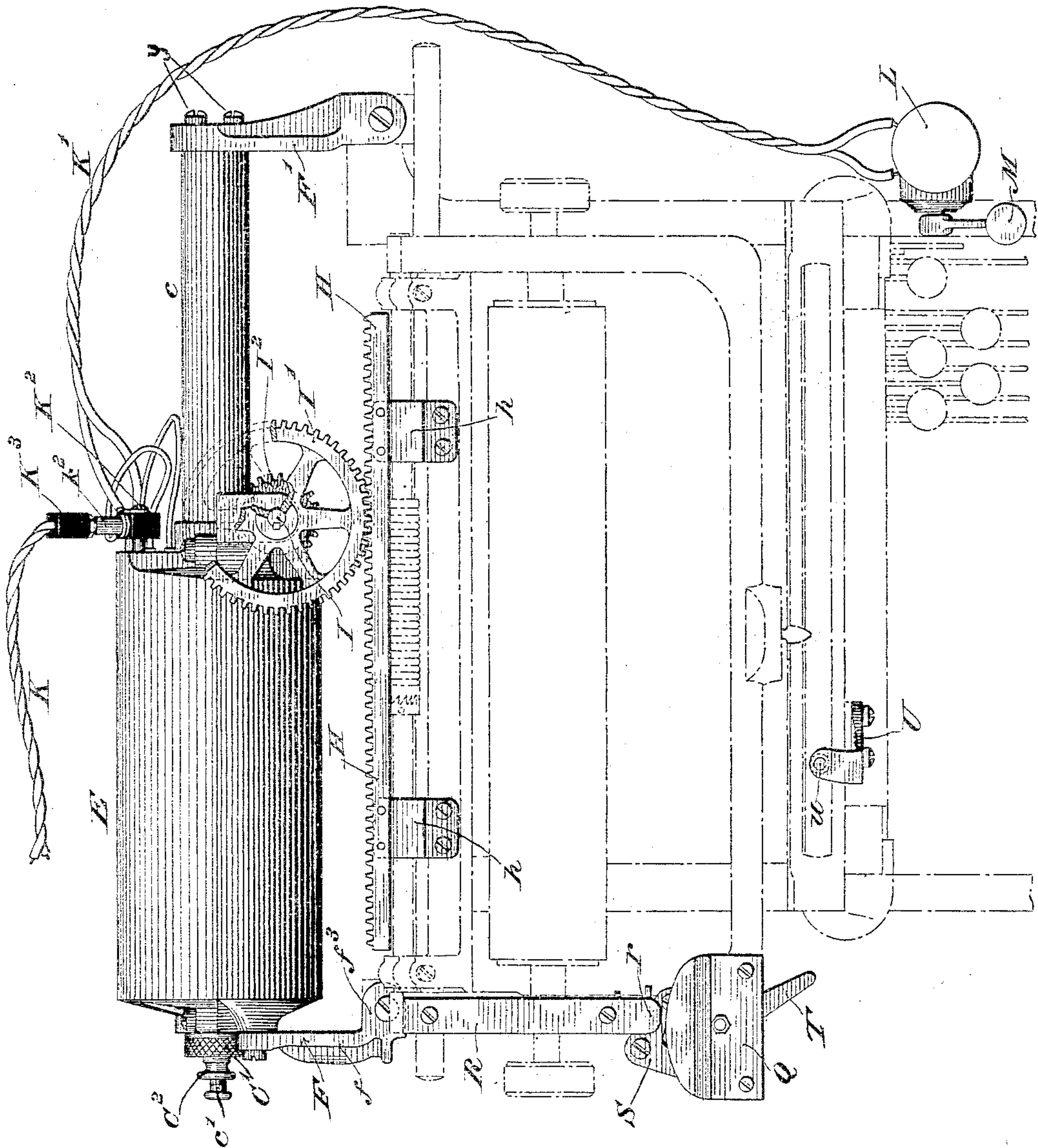


FIG. 1

WITNESSES

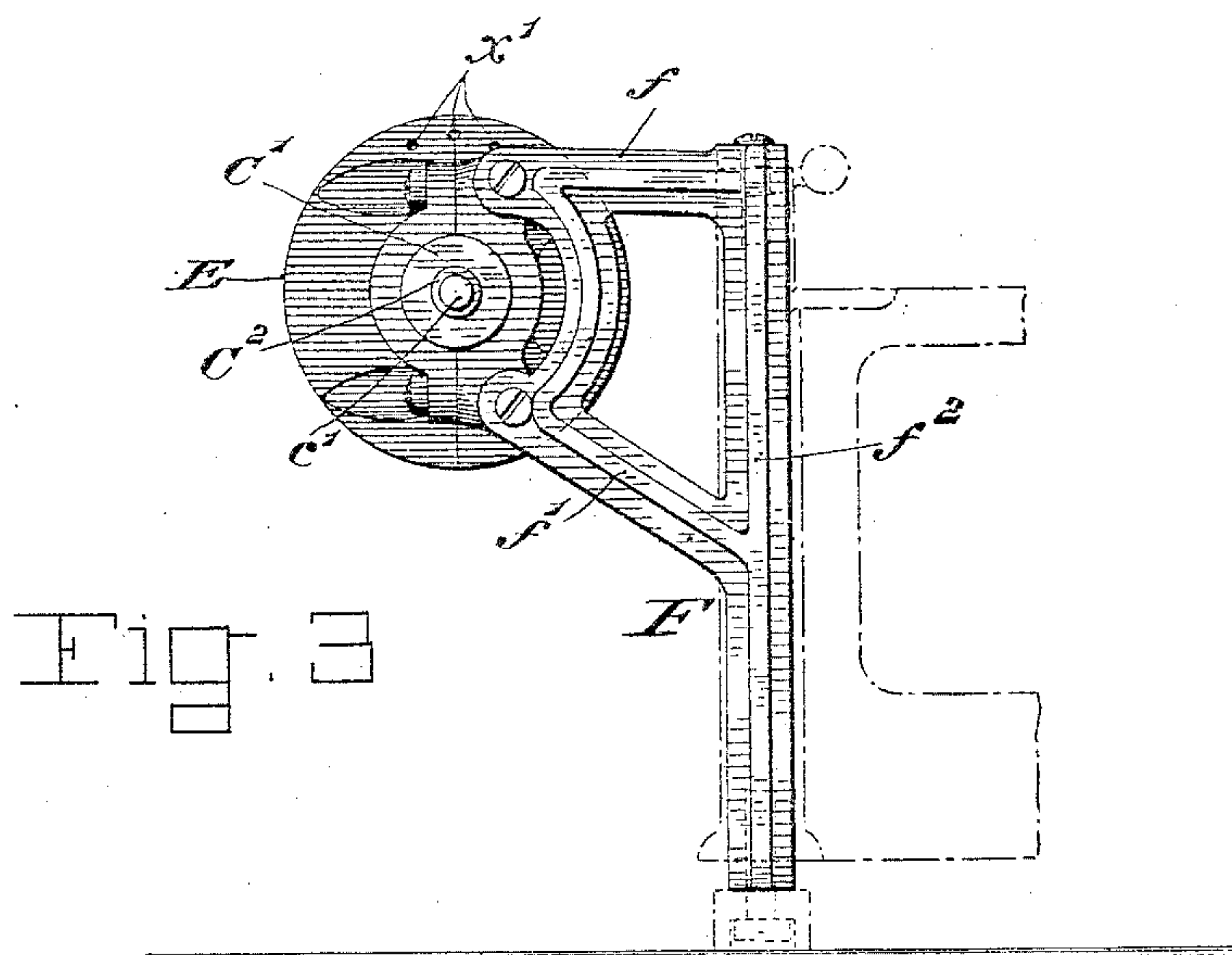
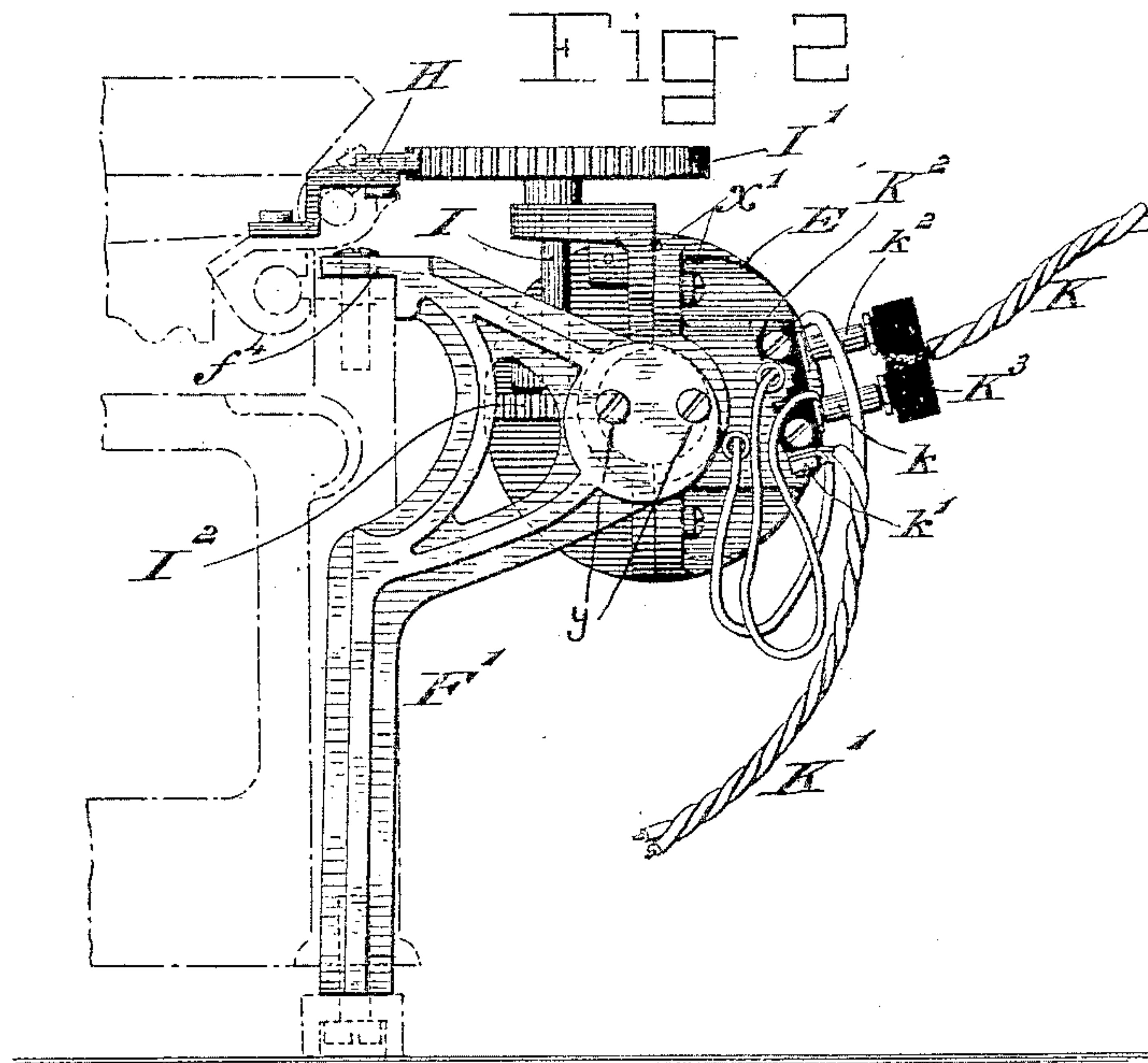
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6 SHEETS—SHEET 2.



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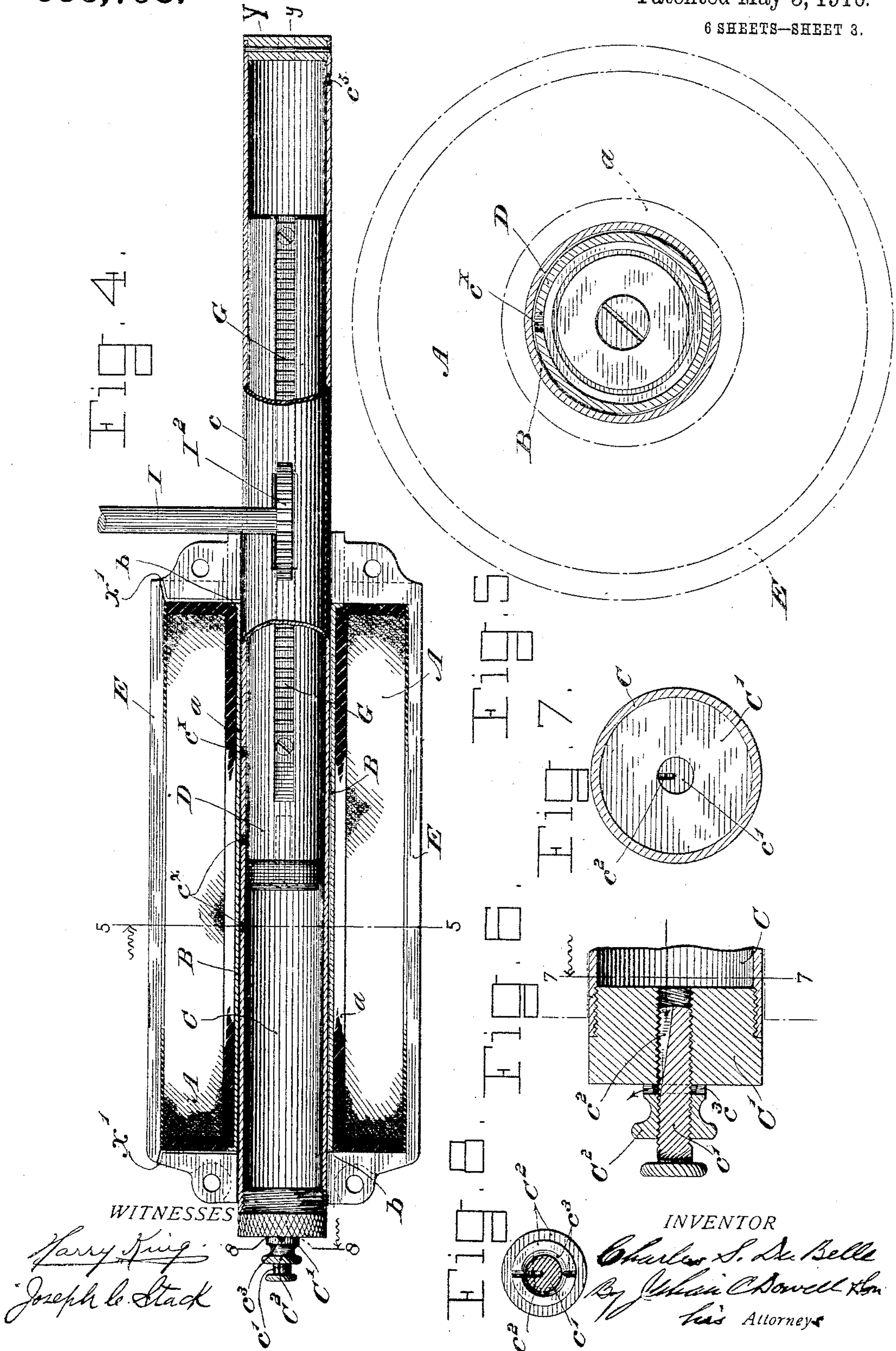
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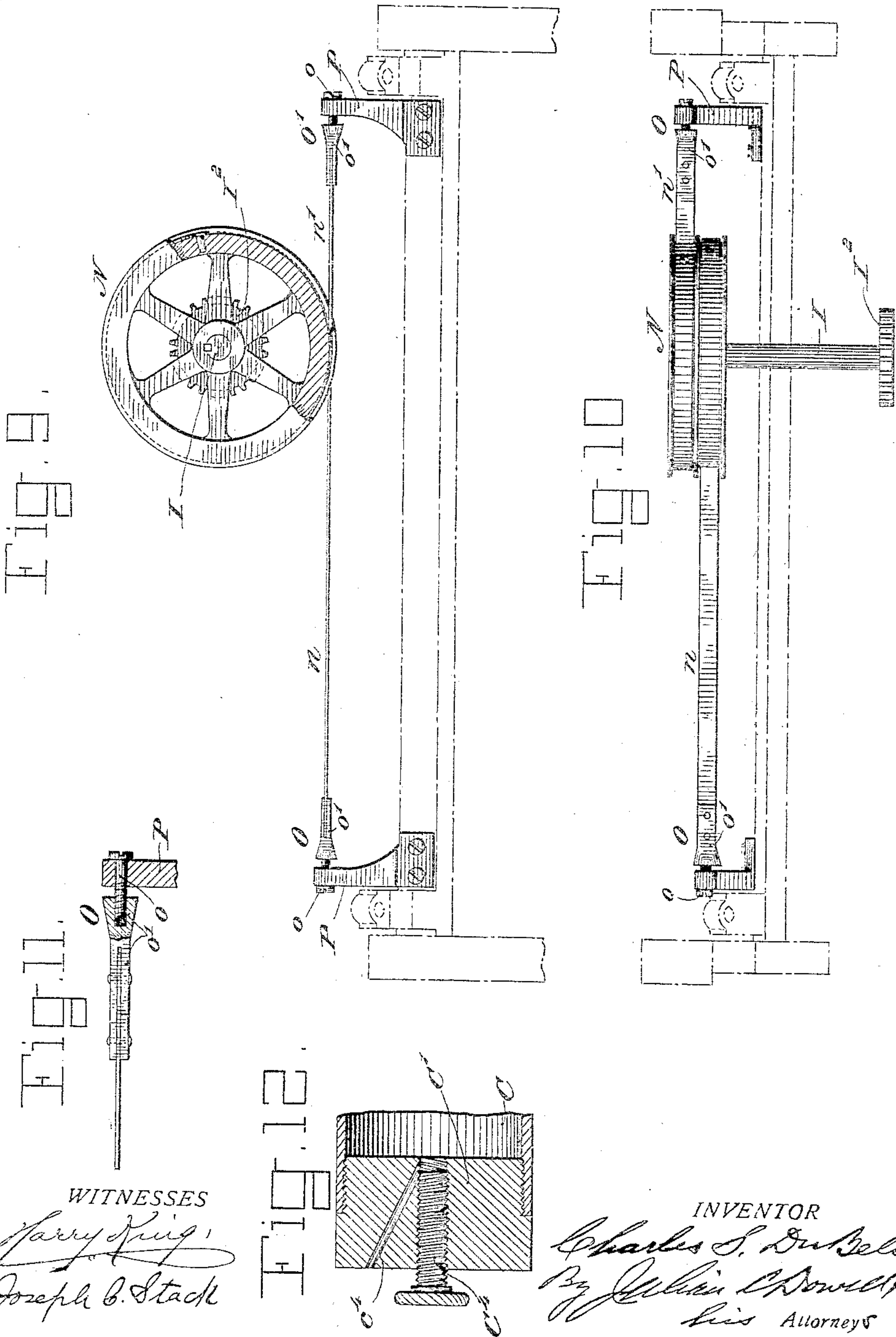
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6 SHEETS—SHEET 5.

Fig. 13.

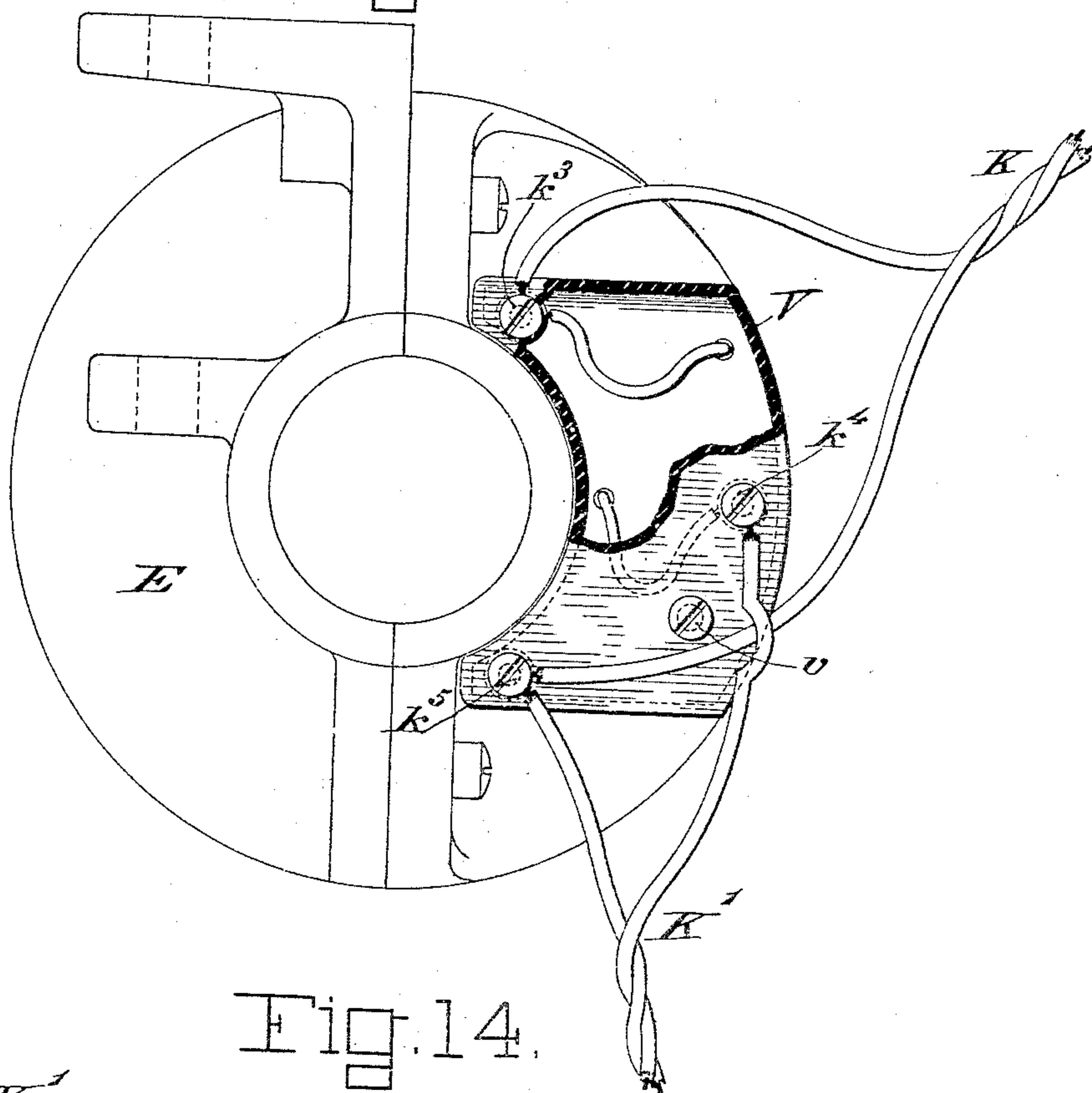
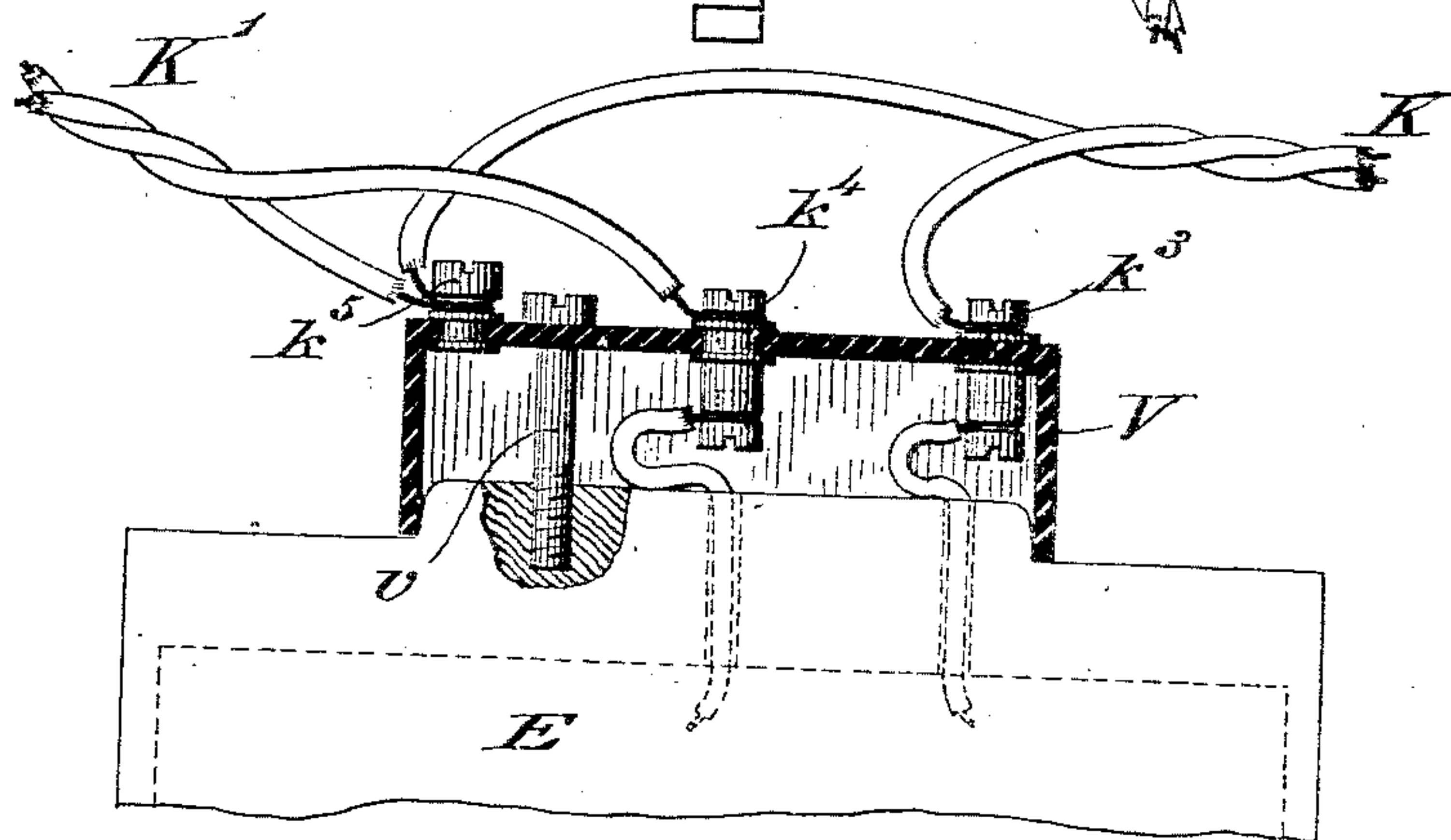


Fig. 14.



WITNESSES

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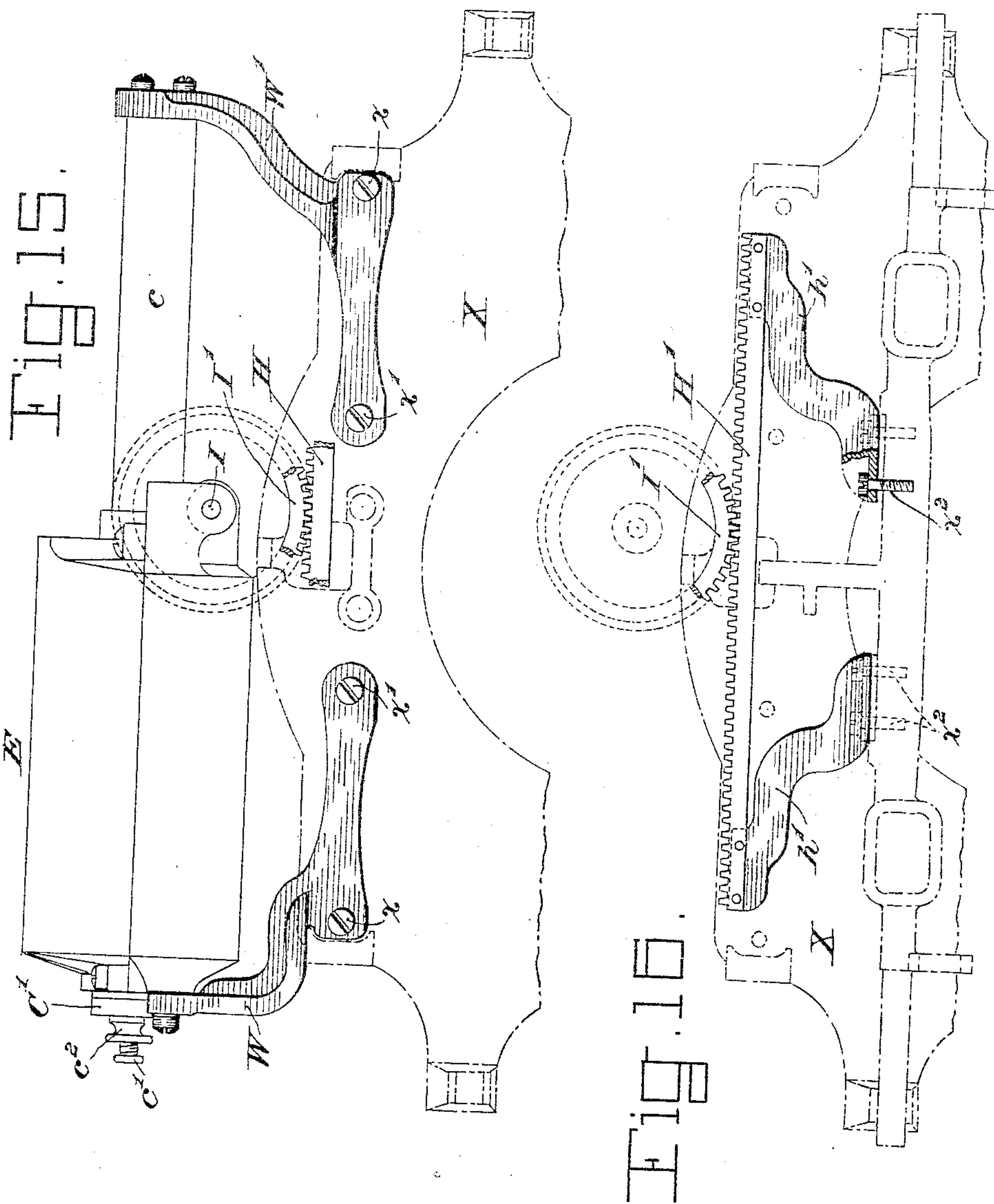
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6 SHEETS—SHEET 6.



WITNESSES
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UNITED STATES PATENT OFFICE.

CHARLES S. DU BELLE, OF WILLIAMSPORT, PENNSYLVANIA.

ELECTRICALLY-OPERATED TYPE-WRITER.

956,798.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed June 8, 1909. Serial No. 500,317.

To all whom it may concern:

Be it known that I, CHARLES S. DU BELLE, a citizen of the United States, residing at Williamsport, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Electrically-Operated Type-Writers; and I do hereby declare the following to be 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.

This invention relates to electrically actuated devices for operating typewriters and other similar machines, and more particularly to electrically operated carriage-return mechanism for typewriters and means for automatically line spacing the platen on the return movement of the carriage.

A great deal of time is lost in operating a typewriter, by reason of the extra motions required, such as reaching for the spacing lever, returning or reversing the carriage, and turning the platen, preparatory to typewriting a new line, and since the typewriting machine has become an important and almost indispensable factor in the business world, there is a demand for some means for easily, quickly and with accuracy returning the carriage to initial position and stopping it at the desired point to commence typewriting a new line, after the completion of a line, or part of a line, without shock, jar or noise, and at the same time to automatically turn the platen so as to feed the paper forward the desired space for a new line, thereby not only increasing the speed and capacity of the machine, but relieving the operator of all physical strain incident to reversing the carriage and spacing the platen.

In order to accomplish the desired results, various electrical contrivances have been devised and patented, but as heretofore constructed such devices are usually very complicated and costly, inconvenient and otherwise objectionable, on account of the amount of space they occupy, their lack of adaptation for use upon different types of machines, and their unreliability in operation, as the carriage is liable to stop short of the mark, or to forcibly strike the marginal stop and rebound, with consequent shock, jar, noise and injury to the machine and the nerves of the operator, and necessitating frequent use of the hand to properly position the carriage at a predetermined point on the

scale, thus rendering such devices unsatisfactory and impracticable in commercial use.

The objects of my invention are to provide a simple and efficient electrically operated carriage-return mechanism adapted for connection with or attachment to existing typewriters and similar machines of ordinary construction now in common use, and which shall possess the advantages of noiselessness, rapidity, and reliability in operation, having an easy running movement and being under perfect control of the operator, who, by merely touching a key at or on the key-board may effect the return of the carriage to its original or starting position, quickly yet silently, and without shock or jar, and with the same accuracy that the carriage may be manipulated by hand; also to provide simple and efficient cooperating means for automatically spacing the platen for typewriting a new line; the carriage-return mechanism being adapted for connection with any ordinary electric light fixture or other suitable source of electric supply, by simply attaching a cord and plug for connection with a fixture in the well known manner of attaching a bulb in an electric lighting system such as now in common use.

The invention will first be hereinafter more particularly described in connection with the accompanying drawings, which are to be taken as a part of this specification, and then pointed out in the claims at the end of the description.

In said drawings, which illustrate the application to a standard make of typewriting machine, known as the Underwood, of a preferred form of electrically operated carriage-return mechanism, and means for automatically line spacing the platen, Figure 1 represents a plan view of my improvements applied to the typewriter, which is represented or outlined diagrammatically in broken lines; Fig. 2 is a side elevation illustrating in full and broken lines my improved electrically operated carriage-return mechanism mounted at the rear of the typewriter; Fig. 3 is a side elevation of the same looking at the opposite side of the machine; Fig. 4 is a longitudinal, vertical, sectional elevation of the solenoid, its core and a part of the case in which it is housed being shown in full lines, and the tube in which the core slides being partly broken away; Fig. 5 is a transverse diagrammatic section taken on

the line 5—5 of Fig. 4 on an enlarged scale, looking in the direction of the arrow; Fig. 6 is a detail sectional view of the plug closing one end of the tube containing the core
 5 of the solenoid, showing the air inlet screw and lock-nut for regulating the admission and ejection of air; Fig. 7 is a transverse section taken on the line 7—7 of Fig. 6; Fig. 8 is a detail sectional view of the air-screw
 10 and lock-nut thereon; the section being taken on the line 8—8 of Fig. 4, looking in the direction of the arrow; Fig. 9 is a plan view of a band-wheel and bands connecting it with opposite ends of the typewriter carriage, and designed to take the place of the
 15 gear wheel and rack, shown in Fig. 1; Fig. 10 is a side elevation of the device shown in Fig. 9; Fig. 11 is a detail sectional view of an adjusting device for securing the ends
 20 of the bands shown in Figs. 9 and 10 to the typewriter carriage; Fig. 12 is a detail sectional view of a modified form of air controlling device; Fig. 13 is an enlarged end view of the casing and attached electrical
 25 connections, illustrating a modification of the connections shown in Figs. 1 and 2; Fig. 14 is a sectional view also on an enlarged scale of the parts shown in Fig. 13, and Figs. 15 and 16 are plan views, partly dia-
 30 grammatic and partly in full and sectional lines, illustrating the application of the carriage-return mechanism to a Remington typewriter.

In said drawings the letter A may denote
 35 an electro-magnetic helix or solenoid suitably insulated and wound of wire of suitable gage adapted for connection with a source of electric supply, either a battery or power circuit. The coil may be wound upon
 40 a spool a of insulating material, in the usual manner, said spool being placed on a sleeve B, preferably of non-magnetic metal and having annular end-flanges between which the spool is confined. Within the
 45 sleeve B is placed a sleeve or tube C, also preferably of non-magnetic metal, extending through and beyond one end of the solenoid to provide a support and guide for the core D as the latter is drawn out in the
 50 ordinary course of typewriting by its gear-connection with the carriage.

The tube C is imperforate a portion of its length to provide an air-cushion at the end thereof toward which the core moves in re-
 55 turning the carriage to initial position, said end being preferably closed by means of a detachable plug C^1 , screwed into the end of the tube, and longitudinally bored and threaded to receive an air-inlet screw c^1 hav-
 60 ing a slit or channel c^2 therein for the admission and ejection of air. A lock nut C^2 , having a slit or channel c^3 in communication with the air passage through the screw c^1 may be screwed upon the latter to
 65 adapt it to be adjusted and locked in dif-

ferent positions so as to vary and control the volume of air admitted as the core is drawn out, in order to secure the best results under varying conditions in practical use.

The tube C is fitted somewhat loosely 70 within the sleeve B to provide an air space around its circumference and provided with a series of perforations c^4 leading from said air-space into the interior of the tube, and located a suitable distance from the closed 75 end thereof and also properly spaced to render the air cushion inactive or ineffective during a portion of the travel of the core, and active the remainder of the travel there-
 80 of, so that when the core is drawn out by the step by step movement of the carriage, in the ordinary course of typewriting, air will be admitted through the air-screw and ejected on the return movement through
 85 both the air-screw and the several perforations until the core reaches the aperture nearest the air-screw, whereupon the air within the tube is prevented from escaping fast enough to avoid compression and brings the core and thereby the carriage 90 silently and easily to a full stop, without shock or jar, the carriage having reached the marginal stop ready to start typewriting a new line. The head of the core may be in
 95 the form of any ordinary piston-head or air-packed in the same manner that pistons of pumps are water-packed.

As shown, the solenoid is mounted on the typewriter frame, being preferably placed between or within semi-cylindrical portions 100 of a casing E and insulated therefrom as shown; the two parts of the casing being bolted together and secured at one end by bolts or screws to apertured lugs on rearwardly projecting arms f , f^1 of a bracket F 105 having an upright f^2 which is provided with inwardly projecting apertured lugs or ears f^3 at opposite ends for securing it to the machine frame by the same set screws that are used on the ends or corner-posts for attach- 110 ing a foot-piece at the base and at the top one of the plates which support a transverse rod or guide-bar for the carriage at the rear of the machine. At the other side of the machine the extension c of the tube C is at- 115 tached to a rearwardly extending arm or arms of a bracket F^1 similar to the bracket F, and secured at that side of the machine in the same manner that the bracket F is se-
 120 cured at the other side, though the apertured lugs f^3 on the upright for attachment to the corner-post both extend inwardly in the same direction from the upright f^2 of the bracket F, whereas the corresponding lugs f^4 on the upright of the bracket F^1 extend at 125 right angles to each other, as shown more clearly in Figs. 1 and 2 of the drawings.

The letter G denotes a toothed bar or rack which is preferably let into a recess extend- 130 ing longitudinally of the iron core of the

solenoid and secured therein by set screws, and said rack-bar is geared to another rack-bar H, which extends transversely of the carriage and may be conveniently secured thereto by means of plates h, h , perforated to receive the same screws that are used on the machine for securing upon a cross-bar of the carriage the pendent guides or bearings in which the above mentioned guide-rod at the rear of the machine is fitted.

As shown in Figs. 1 and 2, a direct gear-connection is provided between the carriage and core of the solenoid by means of a short shaft or arbor I carrying a gear-wheel I^1 in mesh with the rack H and a pinion I^2 in mesh with the rack G on the core D. Bearings for the arbor or shaft I may be formed integrally with or secured to one end of the solenoid inclosing casing E as shown.

Any suitable electrical connections may be employed for establishing a circuit through the coil of the solenoid, such, for instance, as a cord K having a plug for attachment to an electric light fixture, and suitable electrical connections K^1 may lead from the solenoid terminals or binding-posts on the casing E to a switch L adapted to close an electric circuit through the solenoid when a key M is depressed, said key being at or on the key-board so that the typewriter operator may easily depress it in the usual manner of manipulating the keys on the key-board in typewriting.

While I preferably employ a rack and gear connection between the carriage and core of the solenoid, I may substitute for the rack on the carriage and the gear in mesh therewith a band-wheel and band connections, such as illustrated in Figs. 9 to 11 of the drawings, wherein the letter N denotes a band-wheel which may take the place of the gear-wheel I^1 , and to which are secured steel bands n, n^1 , each having one end attached to the band-wheel and extending therefrom in opposite directions, the free end of one being secured at one end of the carriage and the free end of the other at the other end of the carriage, so that it will be drawn back and forth in the same manner that it is impelled by the rack and gear connection, the bands being of sufficient length to allow the carriage to run the usual or required distance in each direction. To compensate for variations in temperature, tending to lengthen or shorten the steel bands, and to provide for any desired adjustment that may be necessary, the ends thereof are preferably secured to the typewriter carriage by means of take-up devices O, O^1 , which may consist simply of a screw o protruding through an aperture in a bracket or arm P on the typewriter carriage and screwed into a socket-piece o^1 secured by rivets or otherwise to the end of the band. The form of air-screw may also be varied,

and instead of providing a passage in the screw itself and a lock-nut thereon, as shown in Fig. 6 of the drawings, the plug may be provided with an air inlet c^4 extending at an angle to and communicating with the threaded opening through the plug in which a plain screw C^4 may be inserted for regulating the admission and ejection of air, as shown in Fig. 12.

To adapt the line spacing mechanism of the machine to which my improvements are applied for automatically line spacing the platen upon the return movement of the carriage, the line space lever at the left of the carriage is removed, together with its retaining plate and the angular cover-plate overlying the slide which moves the platen when the line space lever is operated, and instead thereof, and by the same screws that are used on the machine for securing said retaining and cover-plate and line spacing lever, I may secure a retaining plate Q, a cover-plate R and bell-crank lever S, the latter carrying at the end of one arm a friction roller which engages the beforementioned slide for turning the platen, the other arm of said bell-crank lever being connected by a link with the short arm of a line space lever T which is pivotally supported underneath the plate Q. Said line space lever rests upon the front cross-bar of the carriage with its longer arm projecting into the path of movement of a pin or stud fixed on the machine frame so as to contact with the line space lever and turn the platen near the completion of the return movement of the carriage.

The angular side or cover-plate R, is substantially identical with and secured by the same screws that are used for securing the corresponding plate used on the machine, except that the end r thereof is straight instead of being bent downwardly and recessed as in the case of the original plate. The fixed stud or pin for actuating the line space lever on the return movement of the carriage may be supported on a bracket U having a clamp and set screw at its lower end adapted for attachment to a transverse rod arranged below the scale support of the particular type of typewriter illustrated in connection with my improvements, and which may be conveniently utilized for securing said bracket thereto.

The bracket U extends upwardly in front of the scale bar and carries at its free end, overhanging the scale-bar, a downwardly projecting stud or pin on which may be placed a friction roller u lying in the path of movement of the projecting end of the line space lever T, so as to engage said lever and turn the platen near the end of the return movement of the carriage.

To permit the line space lever to yield in passing the friction roller u when moving toward the left and resume its normal posi-

tion for engagement with said friction roller to actuate the platen on the return movement, a light coiled or other suitable spring may be used having one end secured to said line space lever and the other end secured underneath the retaining plate Q, thereby gently drawing the lever toward its inactive position but adapted to yield sufficiently to permit the fixed stud or pin to pass in one direction without affecting the platen spacing mechanism.

I make no claim herein to the specific line spacing mechanism illustrated and described, as the same is made the subject of a separate application, filed November 21, 1908, Serial No. 458,825.

As shown in Figs. 1 and 2 of the drawings, the binding-posts with which the ends of the wires of the cords K and K¹ are connected are exposed outside of the casing, being secured upon an insulating block K² at one end of the casing. The two binding-posts k, k² have sockets therein to receive split spring-retained projections or plugs upon an insulating block K³ each in electrical connection with one of the wires of the cord K to permit said cord to be easily disconnected when desired for detaching the electrical connections.

Figs. 13 and 14 of the drawings illustrate a modification of the electrical connections, wherein, instead of leaving the wires exposed as in Figs. 1 and 2 the two binding-posts k³, k⁴, with which the terminals of the coil are connected, extend within a box or cap V, preferably of rubber, detachably secured upon the casing E by means of a screw v. Said box also carries the binding-post k⁵ with which the ends of one of each of the wires of the cords K and K¹ are connected, the leading-in wire of the cord K being attached to the binding-post k³ and the outgoing wire of the cord K¹ attached to the binding-post k⁴, whereby on depressing the key M controlling the switch L an electric circuit will be closed through the solenoid, so as to energize the latter and thereby return the carriage to its initial position.

It will be observed that I utilize such holes as are already provided on the machine for attaching my improved carriage-return mechanism and means for automatically line spacing the platen, and by merely changing the form of the supporting brackets said mechanism may be applied to known machines of different makes by the same bolts that are used thereon for securing other parts of the machine together, or by merely substituting longer bolts or screws for shorter ones already on the machine, and the only thing needful in applying the mechanism to different machines is a slight change in the form of the supporting brackets, to adapt them to be secured by bolts or screws applied to screw-holes already made in the

machine frame, but differently arranged in different machines. For instance, to apply the carriage-return mechanism shown to a Remington machine I use another form of supporting bracket, such as illustrated in Figs. 15 and 16 of the drawings, wherein the letters W, W¹, Fig. 15, denote supporting brackets corresponding with the brackets F and F¹ for securing the solenoid in the same manner that it is secured between the last mentioned brackets on the Underwood machine. In the Remington machine a top-plate or frame-piece, denoted by the letter X in Fig. 15, is secured upon the corner-posts by screws x, x, and certain parts are secured underneath said top-plate by screws x¹, x¹, and these screws may be utilized for securing the brackets W, W¹, thus rendering it unnecessary to bore any holes or provide other means for attaching the mechanism to this particular type of machine. There are also used on the Remington machine, at the rear, downwardly curved plates or guides for one of the transverse guide-rods on which the carriage is mounted, each of which curved plates is secured by two screws, and I utilize these same screws, which are denoted by the letters x², x², in Fig. 16, for securing the plates h¹, h¹, which support the rack H¹ having a direct gear-connection with the rack on the core of the solenoid as hereinbefore described.

The operation of the carriage-return and line spacing mechanisms will be readily understood from the foregoing description when taken in connection with the accompanying drawings. Assuming that the solenoid is connected up to a typewriter substantially in the manner described, and in electrical connection with a suitable source of electric supply, for instance, by simply attaching a cord and plug to any electric light fixture, and assuming that the core of the solenoid has been drawn out by the rack and gear connection in the ordinary course of typewriting a line, the carriage may be returned by depressing the key M, thus closing the electric circuit through the solenoid, and as the core is drawn back the air in front will escape partly through the perforations in the tube C and partly through the air-screw until the head of the core passes the last of the series of perforations in the tube, after which only a small portion of the confined air may escape in regulated quantity through the air-screw, thus cushioning the core and at the same time regulating the air pressure so as to bring the core and thereby the carriage quickly, gently and accurately to a full stop, at a predetermined point on the scale. The air holes in the tube and the air slit in the adjusting screw are so proportioned as to permit a rapid inrush of the sliding core until within the last second of its travel, insuring a quick return and

a quick stoppage of the carriage at the desired point, with an easy running movement, and without shock, jar or rebound. In typewriting a new line the core will be drawn
 5 out as before under the action of the typewriter springs as released by the typewriter keys, and no air resistance is encountered on the outward movement of the core, since sufficient air may freely enter behind the core,
 10 first through the passage in the air-screw and then through the perforations in the tube, and any air in the tube extension may escape through the slot through which the pinion I^2 engages the rack, and also through
 15 a vent hole e^5 at the end of the tube.

The described carriage-return and line-spacing mechanisms are applied to the machine shown by simply lengthening a few screws, or removing some of the short screws
 20 used on the machine and substituting longer screws therefor, without changing the construction or arrangement of parts, save only the substitution of a different line space lever and coöperating devices for connection
 25 with and automatic action upon the slide that turns the paper roll or platen, and the carriage-return mechanism is designed and adapted for attachment to any ordinary typewriter or other similar machine by simply
 30 changing the form of the brackets holding the solenoid and the plates holding the rack on the machine so as to properly position them for connection with the gear-wheel on the shaft to which motion is im-
 35 parted by the reciprocatory movements of the core. There are also but few parts, which are simple in construction and combined with the typewriter in compact form, so as to occupy but little space and be out
 40 of the way of the operator or other persons in the same room, and at the same time a perfect balance is secured adapting the carriage to be reversed in a smooth, easy running manner, yet with great rapidity and
 45 under perfect control of the operator, enabling instantaneous return from any point along the scale-bar, and a quick, accurate stoppage at any predetermined point, thus saving both time and labor as well as re-
 50 lieving the operator of much physical strain.

If desired, the electrically operated carriage-return and automatic line-spacing mechanisms may be actually built into the typewriting machine while in course of construction as in effect said mechanisms are
 55 compactly built into the machine as shown and described, by merely utilizing suitable bolts or screws and screw-holes already provided on the machine for attaching said
 60 mechanisms thereto, without necessitating any alteration or change of structure in the commercial machine.

It should also be noted that the construction of the solenoid and its housing provides
 65 for automatic air-cooling or ventilation of

the solenoid by causing a circulation of fresh air around the coil with every inward movement of the core, this being accomplished by the air being taken in through the several perforations e^x in the tube C and
 70 the air-passage in the air-screw and forced out through the perforations e^x into the annular space between the tube and sleeve B, and passing thence into the space between the coil and the casing E, circulating around
 75 the outside of the coil between it and the inside of the casing E, and passing out through holes x^1 in the casing, thus causing all the hot and foul air to escape and preventing the coil from being unduly heated
 80 and thereby damaged. While the perforations e^x as shown in Fig. 4 of the drawings are located at the top or upper side of tube C, coincident with the dividing line between the two parts of the casing E, in practice
 85 such perforations are preferably formed in one side of said tube, and the air escaping therethrough will circulate around the tube inside of the tube B and finding its way
 90 toward both ends will escape through the air-space between the inner sides of the ends of the casing and the adjoining ends of the coil and thence out at the top of the casing through the hole x^1 and also through the
 95 crevice between the two parts of the casing, in case a ground joint is not used, and in the latter case additional holes may be provided if desired along the line of separation by forming confronting grooves in the faces
 100 of the two halves of the casing, so as to permit the air to escape freely at the top of the casing while fresh air is being forced in at every stroke of the piston-like core.

The end of the tube C which is attached to the bracket F^1 may be closed by a plug Y
 105 of non-metallic or insulating material having screw-holes therein to receive screws y entered through holes in the bracket registering with holes in the plug.

Various changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of my invention, and hence I do not desire to be restricted to the specific construction and arrangement of parts shown
 110 and described. 115

I make no claim herein specifically for the herein-described improvements in the solenoid *per se*, which forms the subject-matter of a division of this application filed March
 120 29, 1910, Ser. No. 552,280.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In combination with a typewriting machine having a reciprocating carriage, an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine and rigidly secured thereto and provided with a reciprocating core having a
 125 130

direct gear-connection with said carriage, for returning the latter to initial position, and suitable electrical connections including a carriage-return key for closing an electric circuit through the solenoid.

2. In combination with a typewriting machine having a reciprocating carriage, an electrically operated carriage-return mechanism mounted on the machine and comprising a solenoid provided with a reciprocating core air-cushioned at one end and having a direct gear-connection with said carriage, for returning the latter to initial position, said air-cushion being active against the inrush of the core near the completion of its inward movement, and suitable electrical connections including a switch with a key at the keyboard for closing an electric circuit through the solenoid.

3. In combination with a typewriting machine, an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine and provided with a reciprocating core and an air-cushion at one end active against the inrush of said core near the completion of its inward movement only; said core having a direct gear-connection with said carriage, for returning the latter to initial position, means for automatically line-spacing the platen on the return movement of the carriage, and suitable electrical connections including a key-controlled switch for closing an electric circuit through the solenoid.

4. In combination with a typewriting machine having a reciprocating carriage, an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine and rigidly secured thereto and provided with a reciprocating core having a direct gear-connection with said carriage, for returning the latter to initial position, and suitable electrical connections including a carriage-return key for closing an electric circuit through the solenoid, together with means for automatically line spacing the platen on the return movement of the carriage.

5. A typewriter or similar machine having a reciprocating carriage and a platen, and means for automatically line spacing the platen upon the return movement of the carriage, in combination with an electrically operated carriage-return mechanism comprising a solenoid provided with a reciprocating core and an air-cushion active against the inrush of the core near the end of its inward movement only; said core having a direct gear-connection with said carriage for returning the latter to initial position after movement in the opposite direction, and suitable electrical connections including a key at the keyboard for closing an electric circuit through the solenoid.

6. In combination with a typewriter or

similar machine, an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine frame and provided with a reciprocating core air-cushioned at one end and having a direct gear-connection with said carriage, for returning the latter to initial position; said air-cushion being active against the inrush of the core near the completion of its inward movement only, and means for regulating the admission of air to said air-cushion.

7. A typewriter or similar machine having a reciprocating carriage and a platen, and means for automatically line spacing the platen upon the return movement of the carriage, in combination with an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine-frame and suitable electrical connections for closing an electric circuit through the coil of the solenoid, the latter being provided with a piston-like core working in a tube within the coil of the solenoid and having a direct gear-connection through said tube with said carriage, for returning the latter to initial position, together with means for controlling the admission and escape of air from said tube so as to permit a rapid inrush of the core and cushion it near the completion of its inward movement.

8. In combination with a typewriter or similar machine, a carriage-return mechanism comprising a solenoid mounted on the machine frame surrounding a tube of non-magnetic material extending parallel with the line of movement of the carriage and having a core working in said tube and geared to said carriage, said tube fitting loosely within a sleeve to provide a surrounding air-space and having a series of perforations therein communicating with said air-space and a closure at one end spaced from said perforations so as to provide an air-cushion at said end, together with means for regulating the admission of air through said closure, and suitable electrical connections for closing an electric circuit through the solenoid.

9. In combination with a typewriter or similar machine having a reciprocating carriage, a solenoid and suitable electrical connections for closing an electric circuit through the same, said solenoid being mounted on the machine and having a reciprocating core, and said core fitting within a tube which extends parallel with the line of movement of the carriage, the latter being geared to said core for returning it to initial position, said tube having spaced perforations therein, and a closure at one end with an air-screw to provide an air-cushion which becomes effective near the end of the return movement of the carriage.

10. In combination with a typewriter or similar machine having a reciprocating car-

riage, a solenoid mounted on the machine frame and having a reciprocating core, a tube in which said core is fitted extending parallel with the line of movement of the carriage to which said core is geared for returning it to initial position, said tube having spaced perforations therein and a surrounding air-space, and a closure at the end thereof toward which the core moves inwardly with an air-screw therein for regulating the admission of air.

11. An electrically operated carriage-return mechanism for typewriting and similar machines, comprising a solenoid mounted on the machine and having a reciprocating core carrying a rack, said core being fitted in a non-magnetic tube extending from side to side of the machine and rigidly secured thereto at opposite ends, a rack on the carriage, a gear-wheel engaging the latter rack, a pinion on the shaft of said gear-wheel engaging the rack on said core, and suitable electrical connections including a key-controlled switch for closing an electric circuit through the solenoid.

12. In combination with a typewriter having a reciprocating carriage, a solenoid hav-

ing a core slidably fitted in a non-magnetic tube secured on the machine frame parallel with the line of movement of the carriage, a gear-connection between said core and carriage, and suitable electrical connections including a key-controlled switch at the keyboard for closing an electric circuit through the solenoid to effect the return movement of the carriage.

13. In combination with a typewriter or similar machine having a reciprocating carriage, an electrically operated carriage-return mechanism comprising a solenoid mounted on the machine and provided with a reciprocating core having a direct gear-connection intermediate its ends with said carriage adapting the core and carriage to travel together side by side, and means for establishing an electric circuit through said solenoid.

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

CHARLES S. DU BELLE.

Witnesses:

F. E. BRADLEY,
ROSSER THOMAS.