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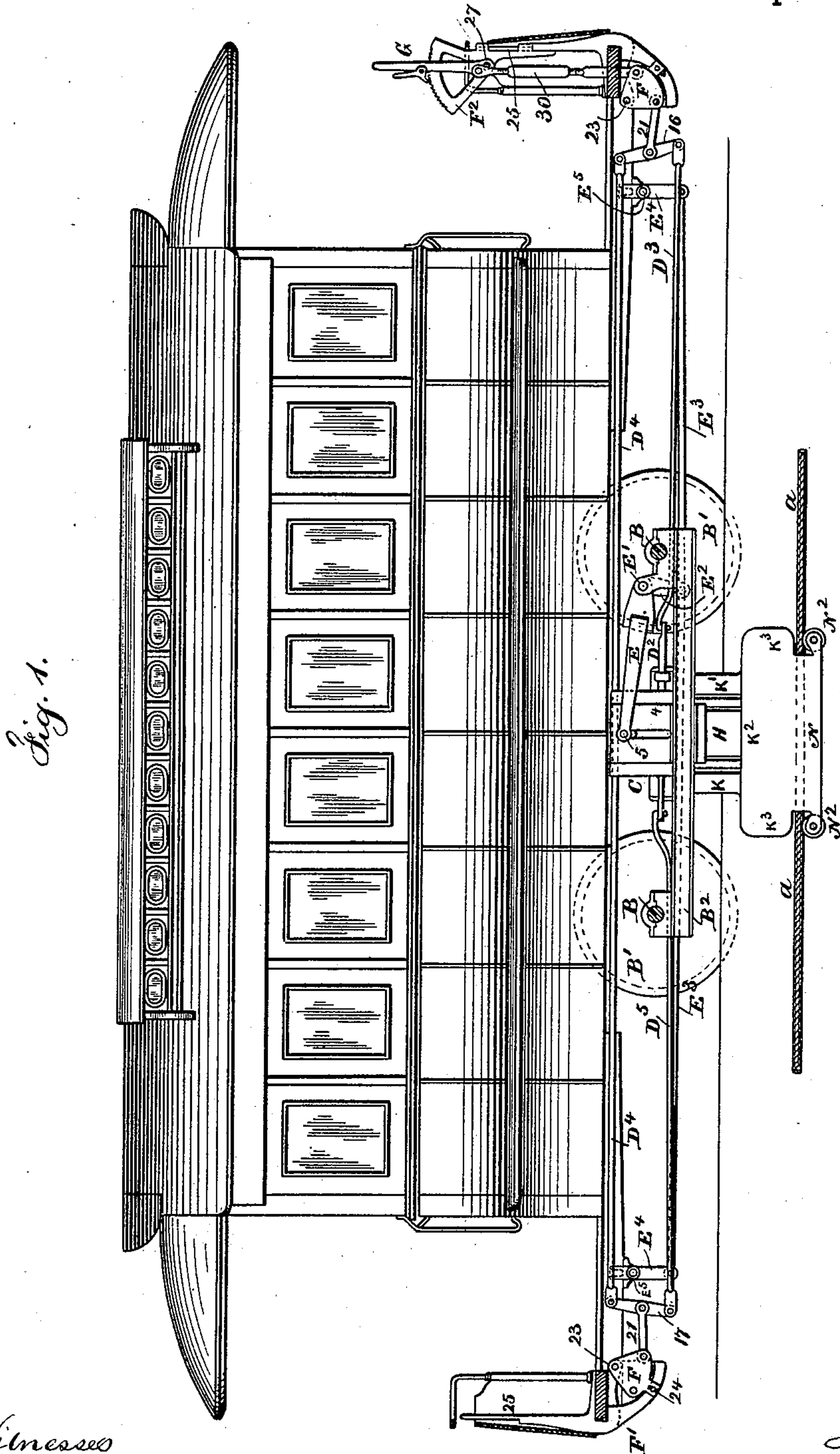
4 Sheets—Sheet 1.

J. H. PENDLETON.

GRIP MECHANISM FOR CABLE RAILWAYS.

No. 436,105.

Patented Sept. 9, 1890.



Witnesses

Chas H. Smith
J. Staib

J. Staib

Inventor

John H. Pendleton
per Lemuel W. Serrell
att'y

For Lemuel W. Serrell

Dally

(No Model.)

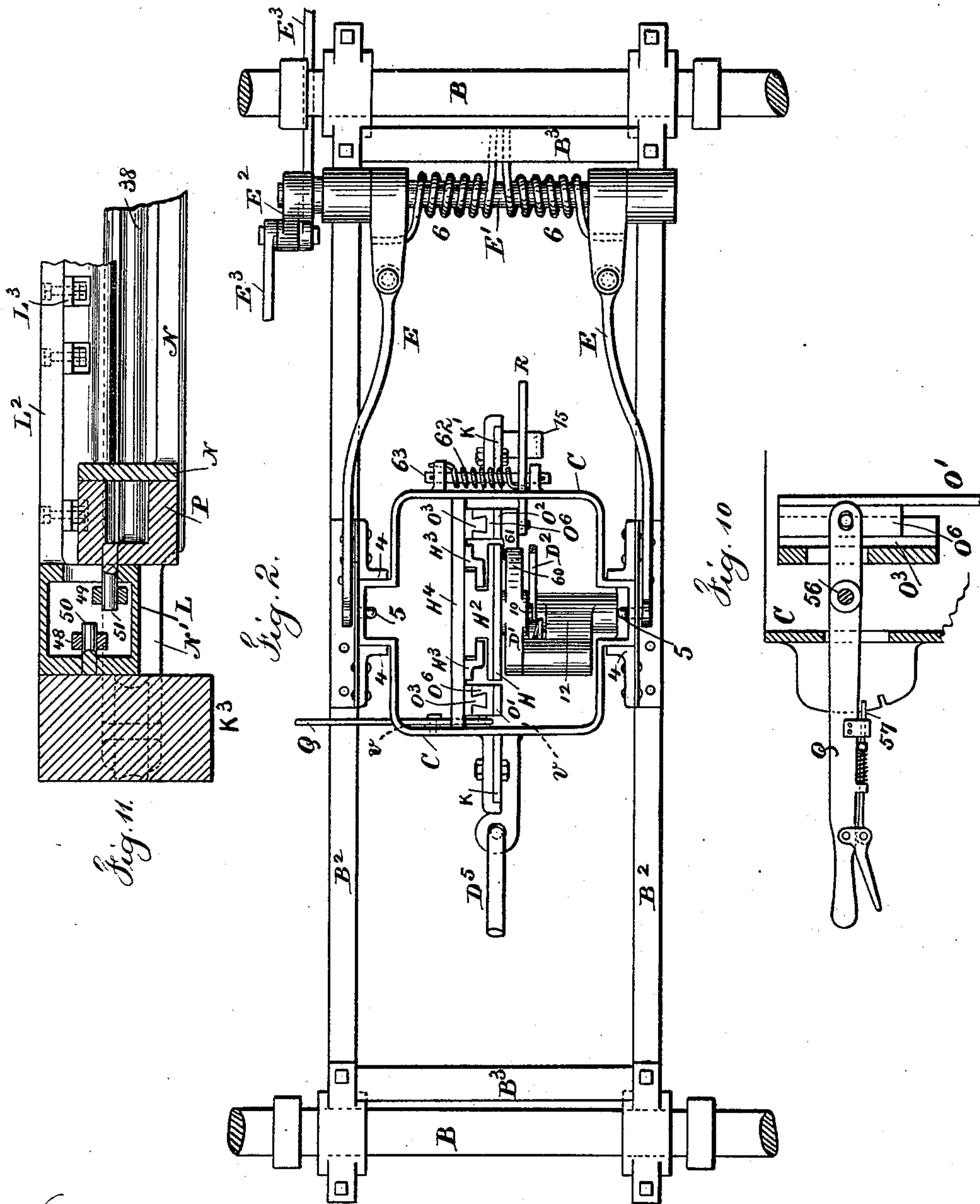
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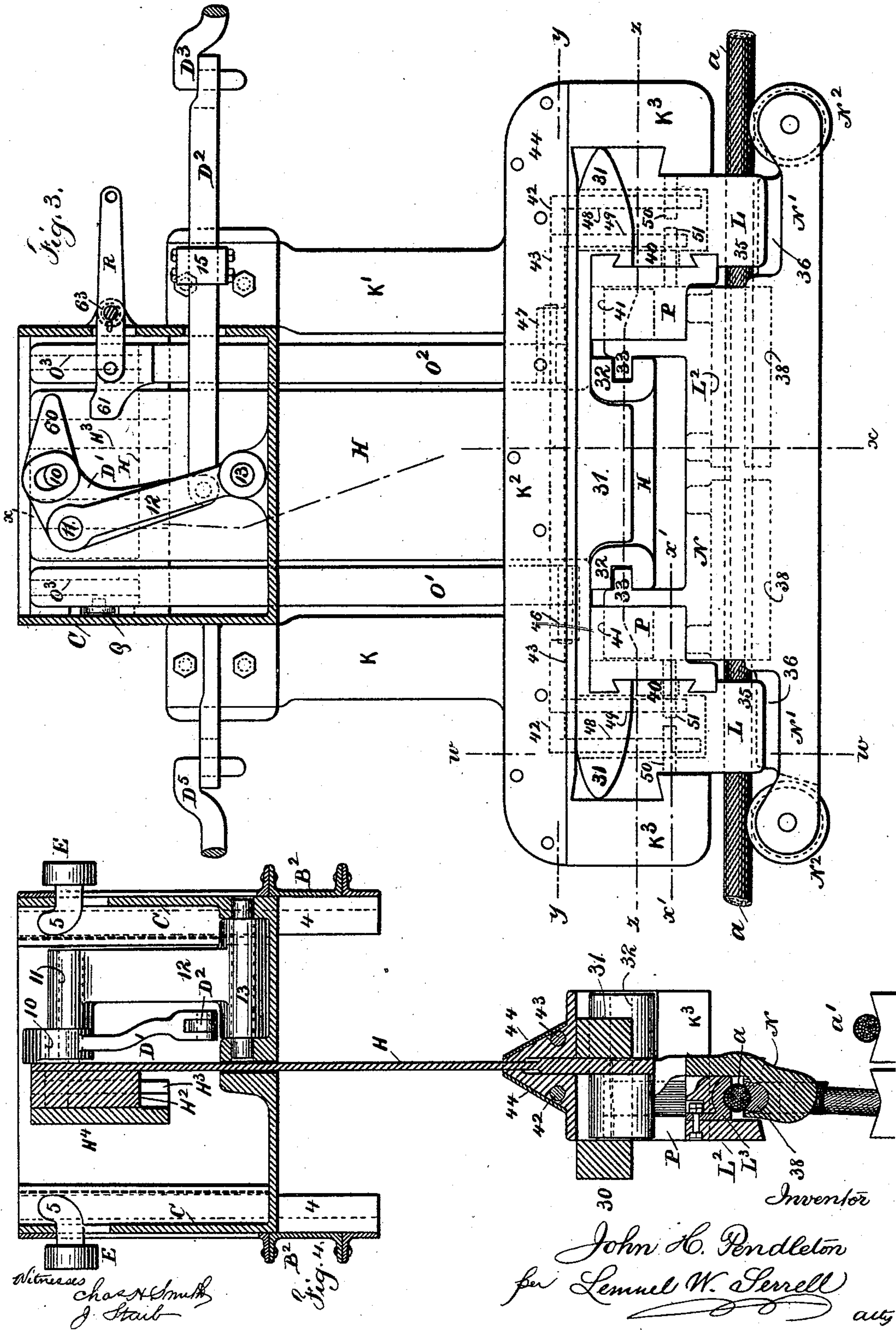
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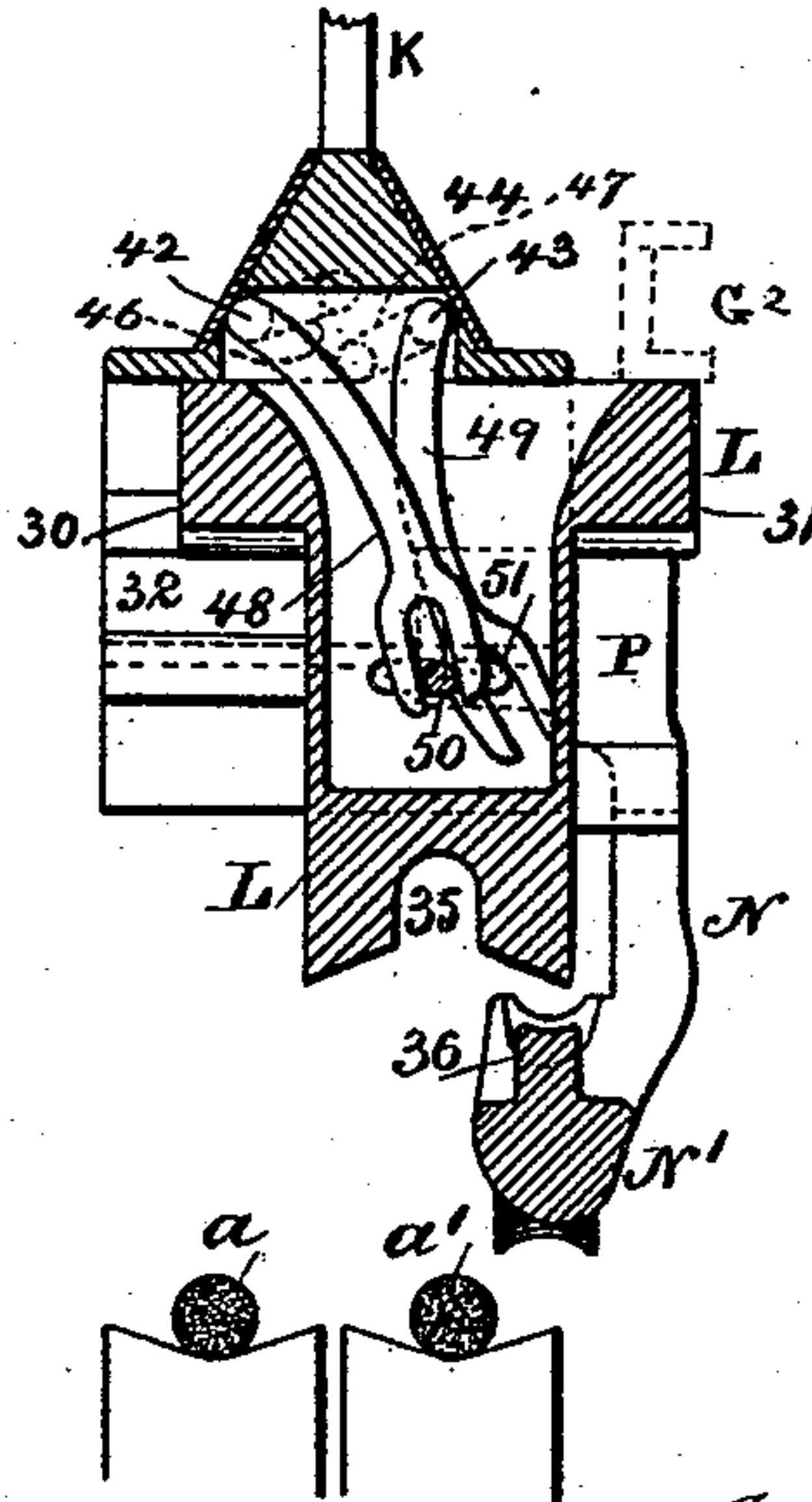
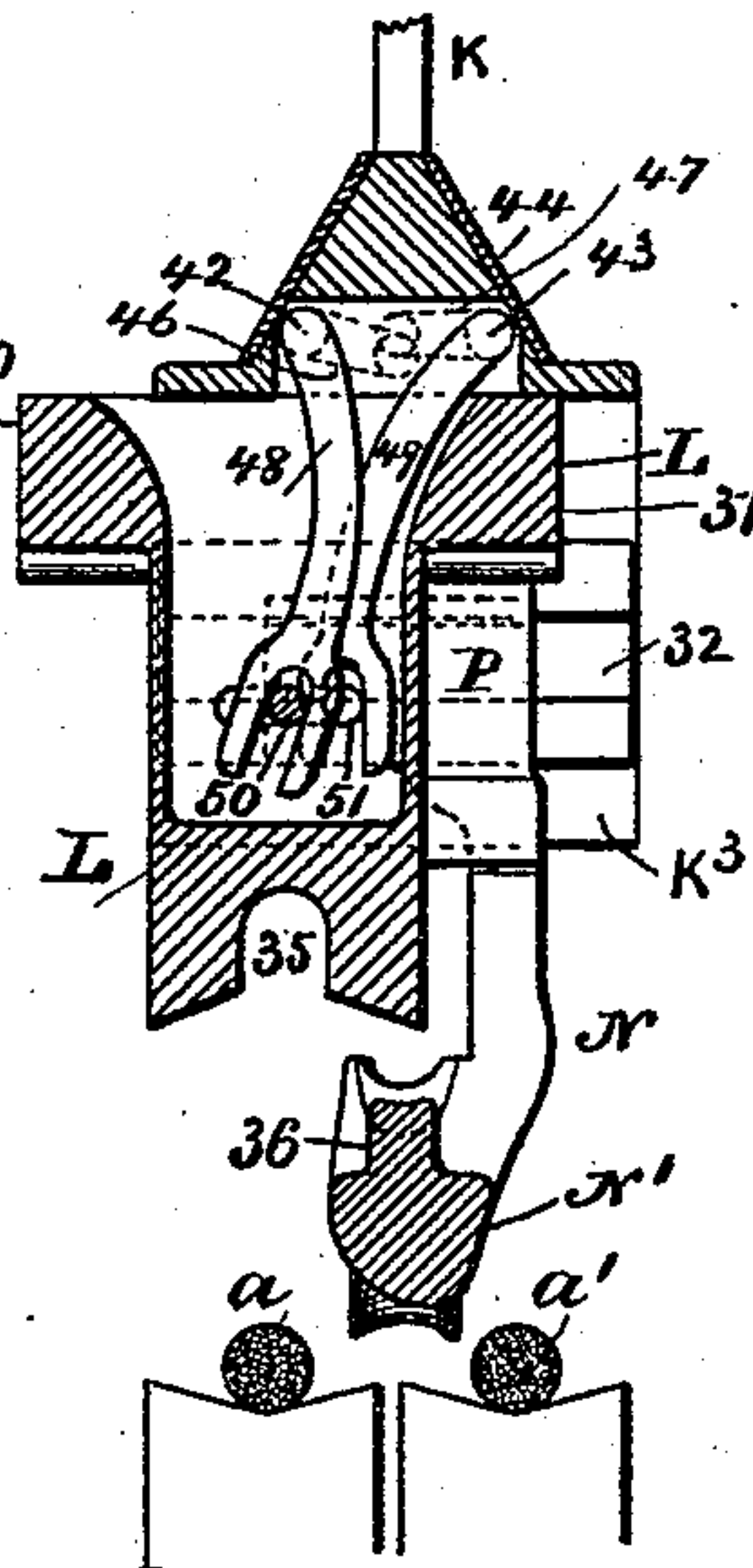
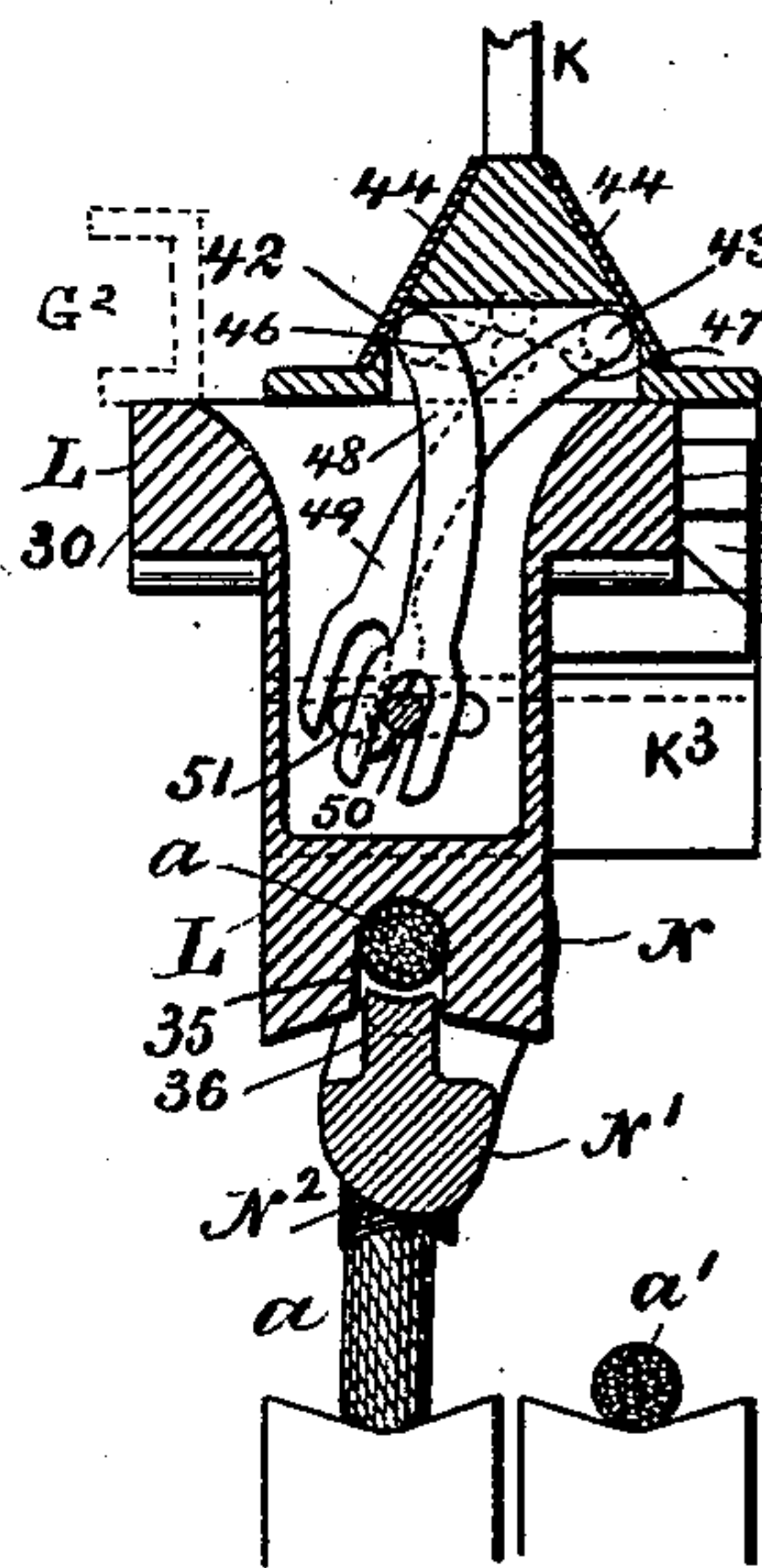
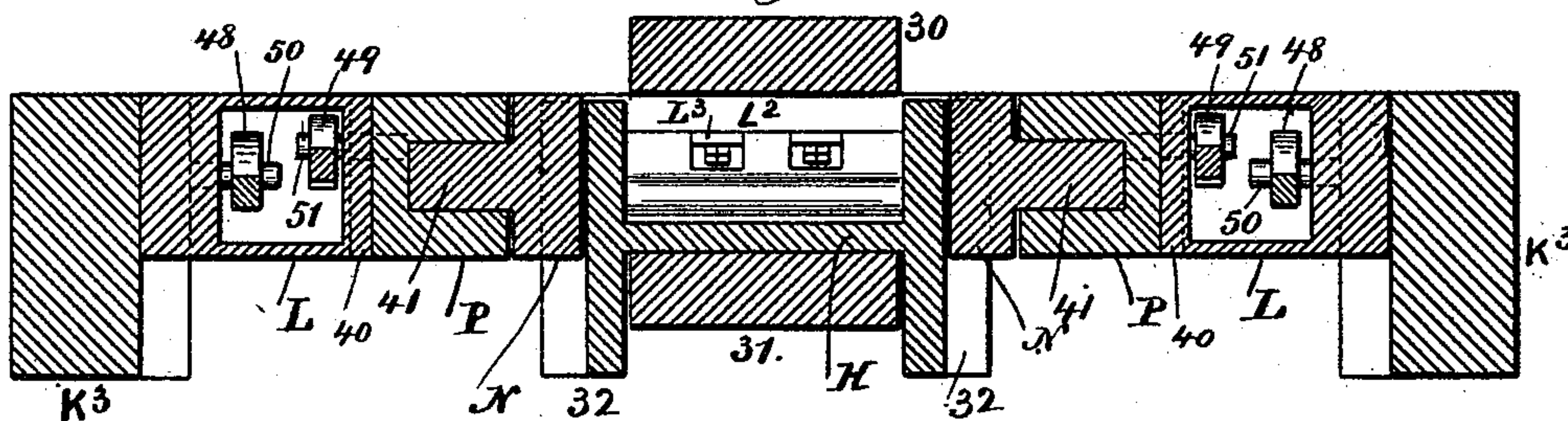
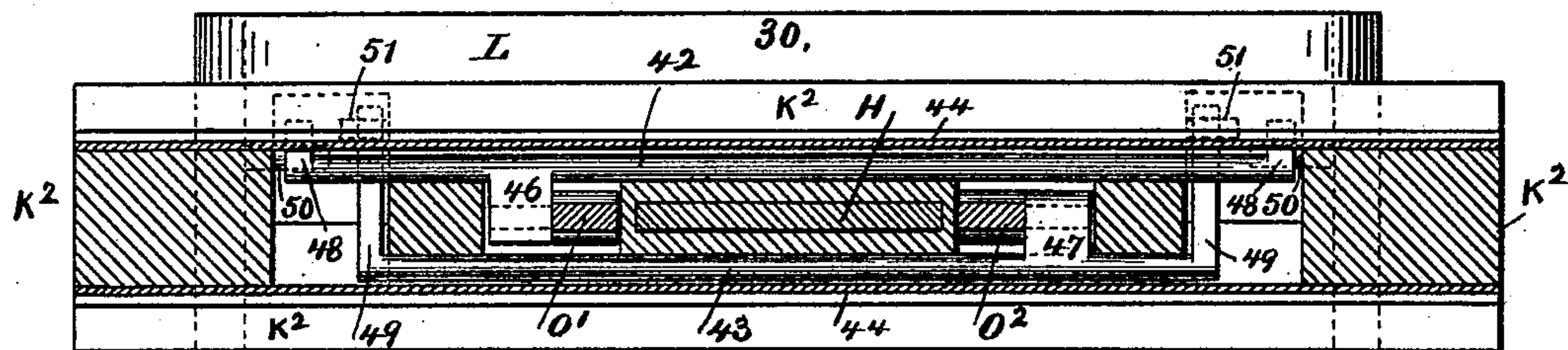
Patented Sept. 9, 1890.



4 Sheets—Sheet 4.

GRIP MECHANISM FOR CABLE RAILWAYS.

Patented Sept. 9, 1890.



Chas. H. Smith
J. Staib

John H. Pendleton
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UNITED STATES PATENT OFFICE.

JOHN H. PENDLETON, OF BROOKLYN, ASSIGNOR TO THE RAPID TRANSIT
CABLE COMPANY, OF NEW YORK, N. Y.

GRIP MECHANISM FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 436,105, dated September 9, 1890.

Application filed March 27, 1890. Serial No. 345,468. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. PENDLETON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Grip Mechanism for Cable Railways, of which the following is a specification.

This invention is a modification of the device shown in my application, Serial No. 344,325, filed March 18, 1890, and the present improvements are for simplifying the construction of the mechanism that is within the trench and acts upon the cable, and also for simplifying the construction of the parts that are above the roadway and are supported by the axles of the car. The lever mechanism, however, which is under the control of the driver or conductor, is the same as set forth in the said application except in the particulars hereinafter noted.

In the drawings, Figure 1 is an elevation of the car, showing a portion of the trench, the wheels at one side and portions of the platform being removed. Fig. 2 is a plan view in larger size of the frame-work and parts carried by the same and supported by the axles. Fig. 3 is an elevation of the grip mechanism and a section of the box supporting the mechanism under the car. Fig. 4 is a cross-section at the line $x x$ of Fig. 3. Fig. 5 is a sectional plan at the line y , Fig. 3. Fig. 6 is a sectional plan at the line z , Fig. 3. Figs. 7, 8, and 9 are cross-sections at the line w , Fig. 3, the parts being in the various positions assumed by them under different circumstances. Fig. 10 is a partial elevation, the box being in section at the line v , Fig. 2. Fig. 11 is a section at the line $x' x'$, Fig. 3.

Upon the platforms of the cars, at the ends thereof, are stationary rods 25, upon the upper ends of which are received the movable frames F^2 , which frames and the parts that are connected with them can be changed from one end of the car to the other. The frame F^2 carries the lever-handle G , pivoted at 27 and having a turn-buckle and rod 30, to the rocker F , pivoted at 23 below the platform, and the lower end of the turn-buckle rod 30 is connected by a movable pin to either of the rockers F according to which end of the

car may be the front, and the movable frame F^2 and the parts therewith connected should always be employed at the front end of the car. I have shown this frame and the parts as connected to one rocker F , and the rocker at the other end is held stationary by a pin 24, inserted through the rocker into a hole in the frame F' , and the pin is withdrawn from the rocker at the end where the frame F^2 is applied. The rockers are connected by the links 21 to the levers 16 and 17, respectively, and there is a rod D^4 extending from the upper end of the lever 16 to the upper end of the lever 17, and there is a rod D^3 extending from the lower end of the lever 16 to the bar D^2 , that is made use of in actuating the grip mechanism, as hereinafter described, and a rod D^5 extends from the lower end of the lever 17 to a projection upon the box C , the ends of the rods D^3 and D^5 being made as hooks, so that they can be disconnected from the parts that are attached to the box C . The rod D^5 does not move endwise, and by the arrangement of parts shown the rod D^3 receives an endwise movement by the action of either rocker F , when the handle G is moved in either one direction or the other, and, by the mechanism hereinafter described, the grip is operated by the movements received from this rod D^3 .

The box C is supported in the slideways 4 upon the side frame B^2 , which side frames are connected by the cross-frames B^3 , and the axles B of the wheels B' pass through bearings or journal-boxes upon the ends of the side frames B^2 , and this box C can be moved vertically in the slideways 4, and there are levers E , with hook ends 5 passing into slots or mortises in the sides of the box C , between the slideways 4, and these levers E extend to and are fastened upon the cross-shaft E' , and there are springs 6 of any suitable character, that tend to lift the levers E and counterpoise the weight of the box C and the parts connected therewith. I have shown these springs 6 as coiled around the shaft E' , with their ends connected with the levers E and the cross-frame B^3 , respectively, and at the end of the cross-shaft E is a crank E^2 , to which are connected the rods E^3 , extending to the levers

E^4 , that are pivoted at E^5 below the platforms at the respective ends of the car, and these levers E^4 are preferably provided with sockets at their upper ends for the reception of a movable hand-spike lever that is passed through a mortise or slot in the platform into the socket, and by this hand-spike lever and one of the levers E^4 the cross-shaft E' can be rocked to raise or lower the box C and the parts connected therewith through the intervening levers E. As this box C only requires to be raised or lowered occasionally in shifting the grip from one cable to the other, it is only necessary to provide a hand-spike lever that can be inserted into such socket-lever E^4 when required.

At the front and back surfaces of the box C are flanges, to which are connected the vertical end plates K K', extending down to the top piece K^2 of the grip mechanism, and there is within the box C a plate H, that is in line with the plates K K' and slides vertically and centrally through the bottom of the box C, and this plate H passes through the top piece K^2 of the gripping device and gives motion to the parts thereof, as hereinafter described, and there is at the upper end of this plate H a head-piece H^2 , sliding within vertical guides H^3 upon a plate H^4 , the ends of which are fastened to or cast with the front and back end portions of the box C, and the vertical rods O' and O^2 are in the same plane as the plates H and K K', and they pass through the bottom of the box C and are provided with sliding blocks O^6 upon the slides O^3 , that are secured to the cross-plate H^4 .

In order to support and give motion vertically to the plate H, I provide a pin 10, that projects from one side of the plate H and passes into the bent lever or crank D' , the pivot 11 of which is at the upper end of the radius-bar 12, and at the bottom the radius-bar is supported by the joint 13 upon the upper surface of the bottom of the box C, and the bar D^2 , to which the rod D^3 is hooked, passes through a guide 15, and it is united by the joint to the lower end of the bent lever D' , so that when the rod D^3 is moved endwise the bar D^2 is slid and the lever D' is swung upon its pivot 11, the radius-bar 12 swinging at the same time and forming with the lever D' a toggle, and the pin 10 and plate H are moved vertically either in one direction or the other, according to the direction in which the bar D^2 is moved.

The top piece K^2 , which is supported by the vertical end plates K K', extends fore and aft or longitudinally of the cable-trench, and terminates with the downwardly-projecting ends K^3 , forming cross-slides that support the grip-frame L, the upper portions of which project in the form of taper-ended bars 30 31, and these pass at opposite sides of the plate H, such plate H passing down through an opening between said bars and terminating as an H-shaped frame having slides 32 upon its edges transversely that receive and support

the grip-block N, at the lower portion of which is the grip-bar N' , and the ribs 33 upon the upper part of the grip-block N slide in the transverse slides 32 on H. It is to be borne in mind that the grip-frame L and grip-block N and the parts carried by them are to be slid transversely within the downward ends K^3 of the frame K^2 K^3 when the grip is to be changed from one cable to the other, and that the grip-block N is to be raised and lowered by the action of the plate H to release or grip the cable, and that the grip-block N also receives a motion transversely of the trench for dropping and picking up the cable, all as hereinafter more fully described.

The grip-frame L is hollow at the ends, as seen in Figs. 7, 8, and 9, and it is also notched at 35 upon its under edges for the reception of the cable as such cable is lifted up into such notches by the grip-block N, and there are pulleys N^2 at the end portions of the grip-bar N' , which pulleys act beneath the cable to support the same, and there are grip-ribs 36 upon the grip-bar N' , which ribs pass up into the lower portions of the notches 35 to steady the end portions of the grip-bar N' , and keep it in position at the lower edges of the grip-frame L, and these grip-ribs 36 pass into the notches 35 a sufficient depth to allow the pressure upon the cable to be released by a slight downward movement of the plate H, block N, and bar N' , in which condition the cable is free to run upon and be sustained by the pulley N^2 with little or no friction or wear by contact with the grip mechanism, or when the grip-block N, bar N' , and pulleys N^2 are raised, and the ribs 36 aid in clamping the cable, and the pulleys N^2 also lift the cable sufficiently to bend the same slightly, or the cable is allowed to run freely at the option of the attendant, who raises or lowers the plate H by means of the toggle D' 12 and bars D^2 D^3 and connections to the handle G.

There is a plate L^2 extending from one end of the grip-frame L to the other, and at one side of the cable, and upon this frame L^2 is fastened one or more removable grip-shoes L^3 , which may be replaced when worn out, and upon the middle part of the grip-bar N' , between the ribs 36, there is a recess containing a suitable filling material, as at 38, which is immediately below the grip-shoe L^3 and forms one portion of the grip, and these parts can be replaced from time to time as worn out. Upon the grip-frame L there are transverse slides 40 supporting the guide-blocks P, and in these guide-blocks P are vertical guides for the blocks 41 upon the grip-block N, and these blocks 41 slide in the guide-blocks P as the grip is raised and lowered bodily by the action of the plate H and slides 32 upon the ribs 33 of such grip-block N.

There are in the top-piece K^2 of the frame K^2 K^3 longitudinal grooves with openings downwardly at the ends above the openings in the hollow portions L of the grip-frame, and in these longitudinal grooves there are

shafts 42 43, and movable cover-plates 44 retain these shafts in place, but allow them to be turned, and there are projecting from the lower ends of the vertical rods O^1 O^2 crank-pins passing into crank-arms 46 47 upon the respective shafts 42 43, and there are at the ends of the shaft 42 crank-arms 48, and at the ends of the shaft 43 crank-arms 49 and these pairs of crank-arms 48 49 pass down into the hollow portions of the grip-frame L, and such pairs of crank-arms are slotted at their lower ends, as shown in Figs. 7, 8, and 9, and the crank-arms 48 act upon pins 50 in said hollow portions of the grip-frame L, and the crank-arms 49 act on pins 51, projecting from the guide-blocks P through slots in the walls of the hollow portions of the grip-frame L, so that when the vertical rod O^1 is acted upon the shaft 42 is rocked or partially turned, and the crank-arms 48 acting upon the pins 50 in the grip-frame L will slide the said grip-frame L bodily and transversely in the end pieces K^3 of the frame, so that the whole of the parts of the grip can be changed from one cable to the other, and it will be observed that the operation only can take place when the grip has been disconnected from the cable, and during this operation the ribs 33 on the grip-block N will slide in the grooves at 32 upon the H-shaped lower end or head-piece of the plate H, and as this operation only has to be performed occasionally and when the car is standing still, I make use of the lever Q, (see Figs. 2, 3, and 10,) which lever is pivoted at 56 upon the box C, and passes through the box, and is provided with a spring-latch or holding-pawl 57, so that after the rod O^1 has been raised or lowered to shift the grip bodily, the parts will be held by the spring-pawl 57 and be in position for either one cable or the other.

In Figs. 7 and 8 the gripping mechanism is shown in a position adapted to use with the cable a , and in Fig. 9 the parts are represented in the position they assume after the lever Q has been acted upon to change the gripping mechanism bodily for acting in connection with the cable a' .

The bar O^2 is connected, as aforesaid, through the crank 47, rock-shaft 43, arms 49, and pins 51 with the guide-blocks P, and these guide-blocks P receive the slide-blocks 41 upon the grip-block N—hence, when the vertical rod O^2 is pressed downwardly the rock-shaft 43 is moved, and by the crank-arms 49 the guide-blocks P are moved laterally upon the transverse slides 40, and in so doing the grip-block N can be made to assume the position represented in Figs. 8 and 9 to the other parts of the grip, and the position shown in Figs. 4 and 7—that is to say, in Figs. 8 and 9 the grip-block N is in the position for picking up the cable, and in Figs. 4 and 7 it is in the position for gripping the cable, and upon reference to Figs. 8 and 9 it will be seen that the grip-block N can be moved aside from beneath the gripping mech-

anism when the parts are in position for acting upon either one cable or the other.

Referring now to Fig. 3, it will be apparent that through the agency of the bar D^2 and toggle-levers D' and 12 the plate H can be raised or lowered, and when the bar D^2 is pressed inwardly the lever D' acting upon the stud 10 forces the plate H downwardly and carries the grip-block N also downwardly, and this operation as performed relieves the cable from the action of the grip, but the plate H is not forced downwardly enough to disconnect the rib 36 from the groove 35 unless it is desired to drop the cable and by a continuation of the end movement of the bar D^2 the plate H is forced down carrying with it the grip-block N until there is room for the cable to pass out laterally and at this moment the end 60 of the lever D' comes into contact with the projection 61 upon the vertical rod O^2 , and forcing this downwardly brings into action the rock-shaft 43 and crank-arms 47 and 49 that give motion to the pins 51 and the guide-blocks P, which guide-blocks are moved laterally upon the transverse slides 40 and carry with them the blocks 41 upon the grip-block N, and by this means the parts of the grip-block N are moved bodily from beneath the cable, and these parts assume the position shown in Fig. 8.

The end movement given to the bar D^2 and the movement of the toggle-levers D' 12 insure the proper downward movement of the plate H and the grip-block N, and these parts cannot move farther downwardly after the lower edge of the plate H rests upon the part L^2 of the grip-frame, and thereafter the end 60 of the lever D' , acting upon the projection 61 of the vertical rod O^2 , will compel the movement of this rod O^2 and slide the grip-block N laterally, because the slot in the lever D' for the pin 10 is sufficiently long to allow the lever D' to be moved in giving to the projection 61 and rod O^2 the necessary movement to slide the grip-block N laterally, as aforesaid, and in order to move the grip laterally to hook it in beneath the cable that is to be picked up I make use of the lever R, Figs. 2 and 3, having a spring 62 around its axis, one end of which spring is attached to the lever and the other is fixed to the bearing for the shaft 63, so that as the rod O^2 is forced downwardly this spring 62 is wound up. Hence as soon as the pressure upon the bar D^2 is relieved so that the lever D' moves upwardly toward the stud 10 this spring 62, through the lever R, lifts the rod O^2 , and through the rock-shaft 43, crank-arms 47 and 49, the grip N is slipped laterally in beneath the cable, so as to catch the same upon its clamping-surface 38, and this operation is promoted by the pulleys N^2 coming into contact with the moving cable, so that the moving cable rides over such pulleys and into position, and then the further movement of the bar D^2 and toggle-levers D' and 12 raises the plate H and lifts the grip-block N bodily up into position,

as indicated in Fig. 7, and the further movement grips the cable so that the movement thereof is communicated to the car.

In this improvement the entire gripping mechanism may tend to rise in consequence of the springs 6 being sufficiently powerful to lift the box C and parts therewith connected. In this instance the bar 30 or 31 that projects at one side or the other of the grip device will come beneath stationary tracks in the trench, either level or inclined, to regulate the position vertically of the gripping-mechanism, as illustrated by dotted lines G², Figs. 7 and 9. If the springs 6 are not sufficient to lift the box C and parts carried by it the projection or bars 30 or 31 will ride upon the stationary track or incline to regulate the position of the grip mechanism vertically. The bars 30 31 are rounding at the ends, to facilitate the sliding upon the stationary tracks. If the cable and the gripping devices are lifted by the springs 6 the levers E⁴ will be used to depress the box C and gripping mechanism, and if the springs 6 are not sufficiently strong to constantly lift the cable and its mechanism the levers E⁴ will be used for raising the mechanism and cable, and these devices are applicable to use as the circumstances of the road or the construction of the devices in the trench may require, and by this device for raising and lowering the gripping mechanism the cable may be raised or lowered by hand to the proper place for laying the cable in wheels upon curves or for dropping or picking up the cable, or for depressing or elevating the cable at crossings.

The raising or lowering of the grip mechanism as a whole is advantageous in connection with two cables passing around curves, and I have invented devices connected with the trench and curved track that are adapted to use with two cables, as shown in my applications, Serial Nos. 344,324 and 345,486, filed March 18, 1890; and March 27, 1890, respectively.

Upon reference to Figs. 1 and 4, it will be seen that the box C can be depressed to any desired extent in lowering the apparatus to pick up the cable, as the hooking ends of the levers E pass through the vertical slots in the slides that hold such box C, and the levers E being made in two parts the ends can be swung horizontally sufficiently to unhook the ends from the box C, should it be necessary to do so, to entirely disconnect the grip mechanism, and the counterpoise is sufficient to raise the cable, the grip, the box, and the parts therewith connected, the limit of movement being the slots through which the hook ends of the levers pass.

I claim as my invention—

1. The combination, with the box C and means for supporting the same, of the end plates K K' and the frame K² K³, supported thereby, the grip-frame L, sliding transversely in the end frames K³, the grip mechanism and the plate H, for acting upon the same, and

the toggle-levers D' 12, and bar D², for giving motion to the plate H, substantially as set forth.

2. The combination, in the grip mechanism, of a frame within the trench and connections to the car for supporting the parts, a grip-frame sliding transversely in the supporting-frame and carrying one member of the grip, a grip-block adapted to move vertically for clamping or releasing the cable, and mechanism for sliding the grip-block transversely to drop or pick up the cable, and the actuating mechanism, substantially as specified, for giving motion to the respective parts, substantially as set forth.

3. The combination, with the box C and the supports for the same, of the plate H, adapted to slide vertically within the box, the bar D², toggle-levers D' 12, for giving motion to the plate H, the plates K K', frames K² K³, through which the plate H passes, there being a head-piece at the lower end of the plate H, the grip-block N, connected to the head-piece of the plate H by horizontal grooves and ribs, the grip-frame L L² within the frame K² K³ and adapted to slide horizontally, the rod O², rock-shaft and connections for moving the grip-block transversely, and the mechanism, substantially as specified, for moving the rod O² vertically in communicating the motion to the grip-block, substantially as set forth.

4. The grip-block N, having the grip-bar N', and rollers N², acting beneath the cable, the grip-frame L L², grooved at 35 for the cable, the upper member of the grip being connected to the frame L², and the lower member of the grip being provided with suitable material at 38, the plate H and its head-piece connected with the grip-block by ribs and grooves, and mechanism, substantially as specified, for raising and lowering the plate H in applying or releasing the grip, substantially as set forth.

5. The combination, with the frame K² K³, of a grip-frame sliding transversely in the frame K² K³, the vertical rod O', rock-shaft 42, and crank-arms acting upon the grip-frame to move the same transversely, and a lever for giving motion to the rod O', substantially as set forth.

6. The combination, in a grip mechanism, of a grip-frame, slides for supporting the grip-frame, and mechanism for moving such grip mechanism bodily upon the slides into position for grasping one of two cables, a grip-hook and means for raising and lowering the same to grip or release the cable, and slides upon which the grip-hook can be moved laterally to hook under the cable or to move from under and disconnect such cable, substantially as specified.

7. The combination, in a grip mechanism, of a grip-frame recessed longitudinally on its under side for the reception of the cable, slides for supporting the grip-frame, and mechanism for moving such grip-frame bodily

upon the slides into position for grasping one of two cables, a grip-hook, and means for raising and lowering the same to grip or release the cable, and slides upon which the
5 grip-hook can be moved laterally to hook under the cable or to move from under and disconnect such cable, and means for raising and lowering the grip mechanism and the frame holding the same bodily, according to
10 the level of the cable, substantially as specified.

8. The combination, with the gripping mechanism for the trench, of the bars or plates passing between the slot-rails, a box with the
15 grip-actuating devices, wheels, axles, and a frame supported by such axles, and a coun-

terpoise sufficient to lift the cable, the grip mechanism, and the box to the maximum height, substantially as specified.

9. The combination, with the cable-grip- 20 ping mechanism, of a box fitted to move vertically, a counterpoise for the box and its connected mechanism, a lever and connections for raising or lowering the box, and the parts therewith connected, substantially as 25 specified.

Signed by me this 24th day of March, 1890.

J. H. PENDLETON.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.