No. 780,664. PATENTED JAN. 24, 1905.

J. M. JOY.

PRINTING TELEGRAPH RECEIVER.

APPLICATION FILED AUG. 5, 1902.

8 SHEETS—SHEET 1.

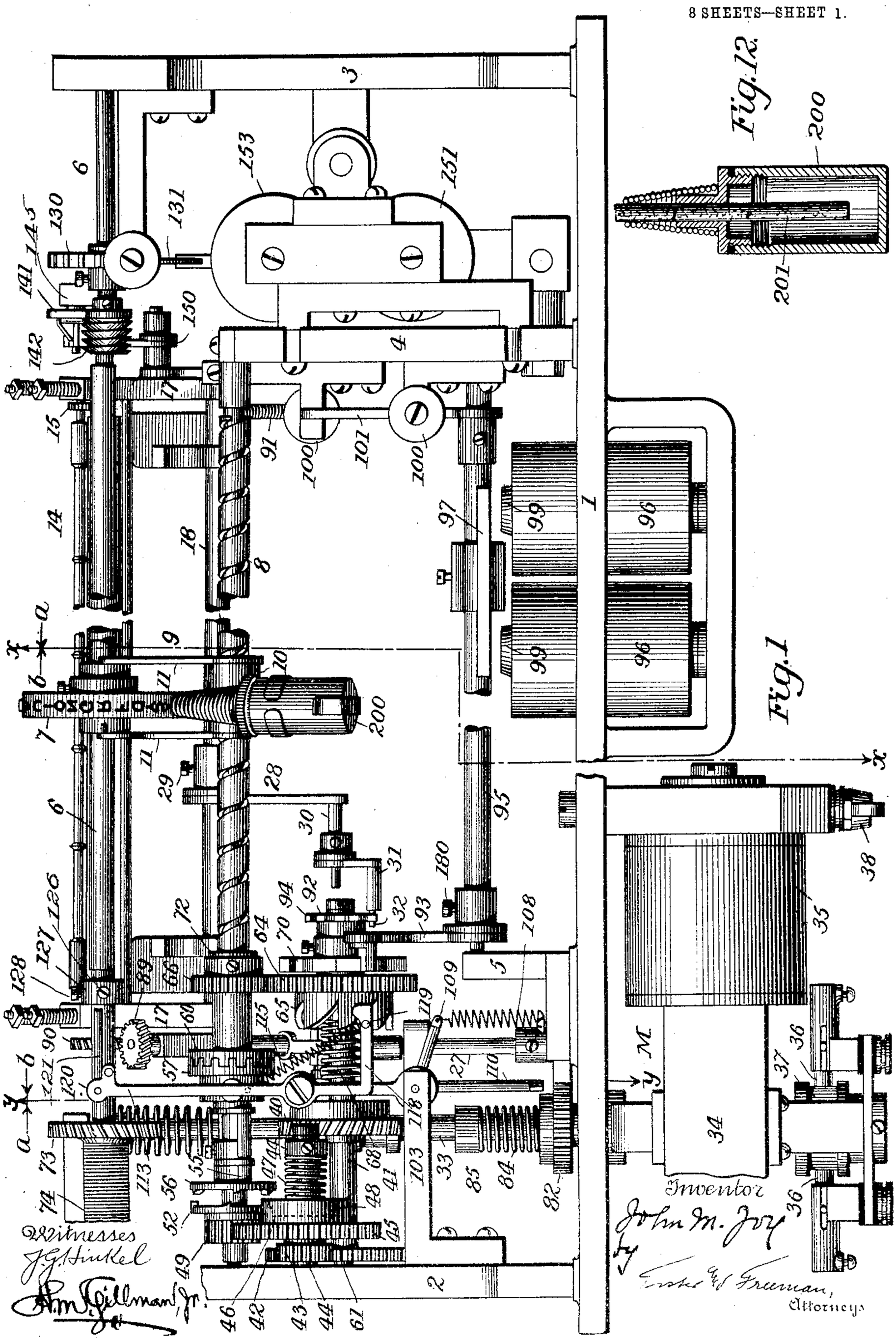

Fig. 1

Fig. 12

No. 780,664. PATENTED JAN. 24, 1905.

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8 SHEETS—SHEET 2.

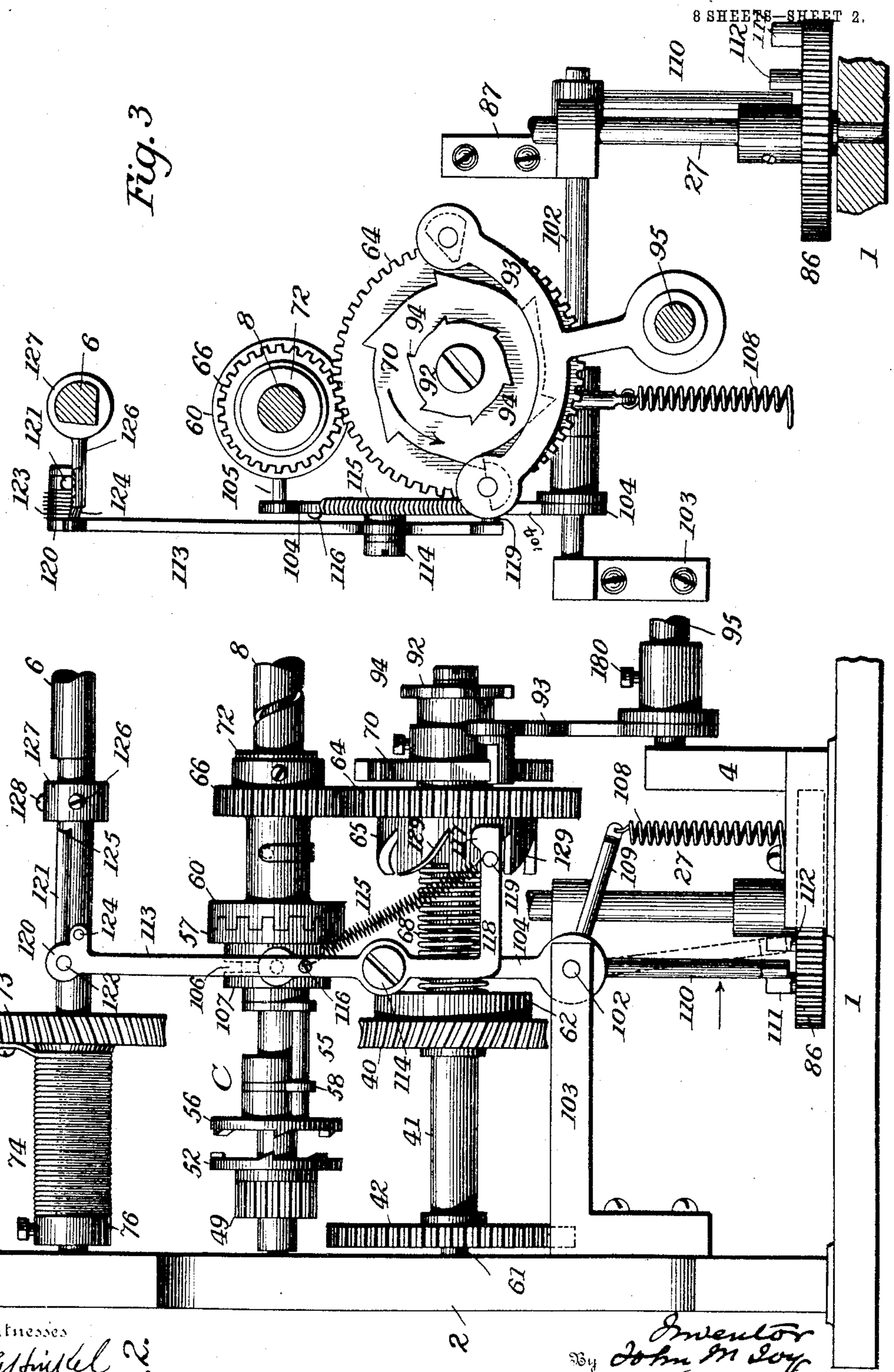

Fig. 2.

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Fig. 3

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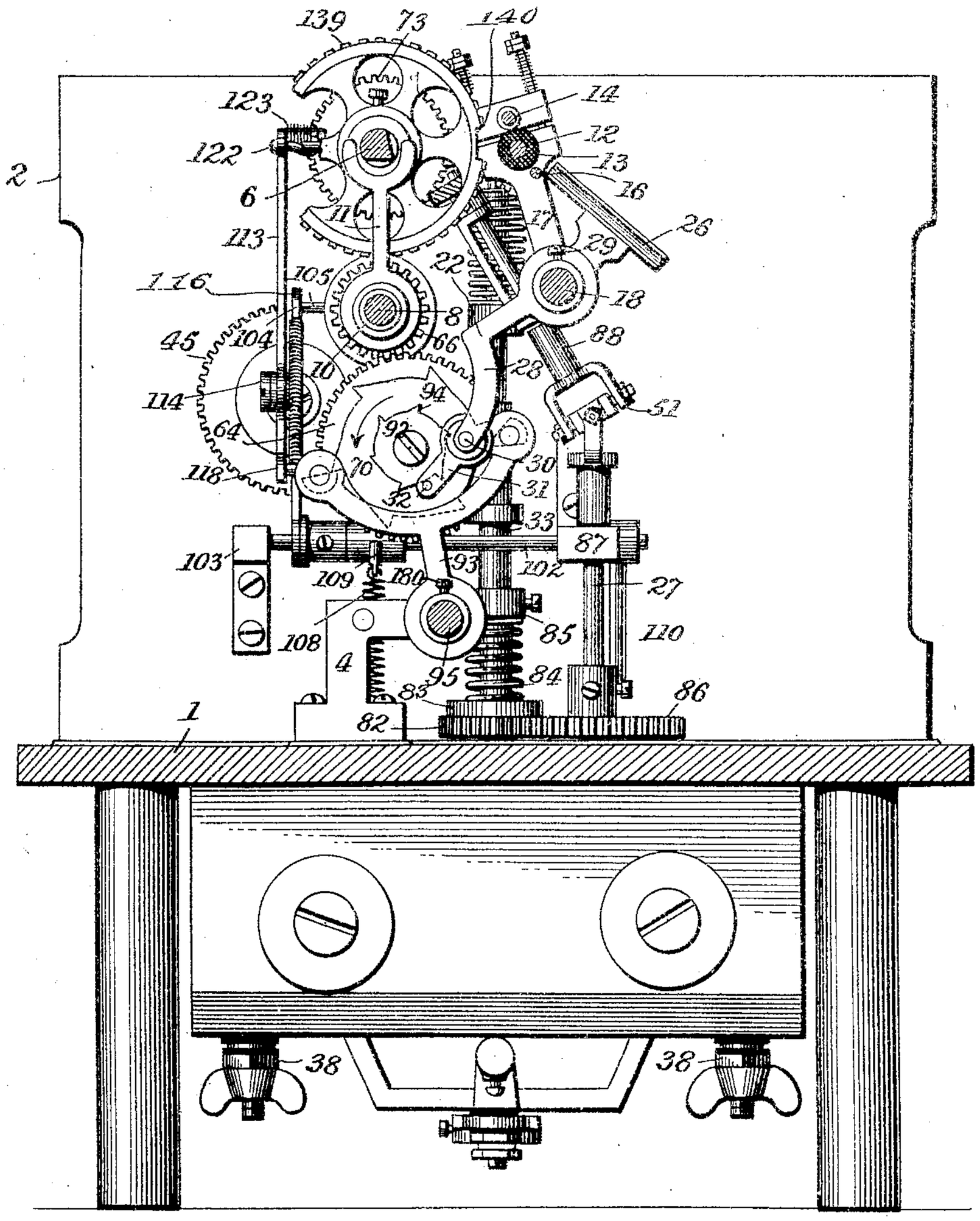
8 SHEETS—SHEET 3.

Fig. 4.



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8 SHEETS—SHEET 4.

Fig. 5.

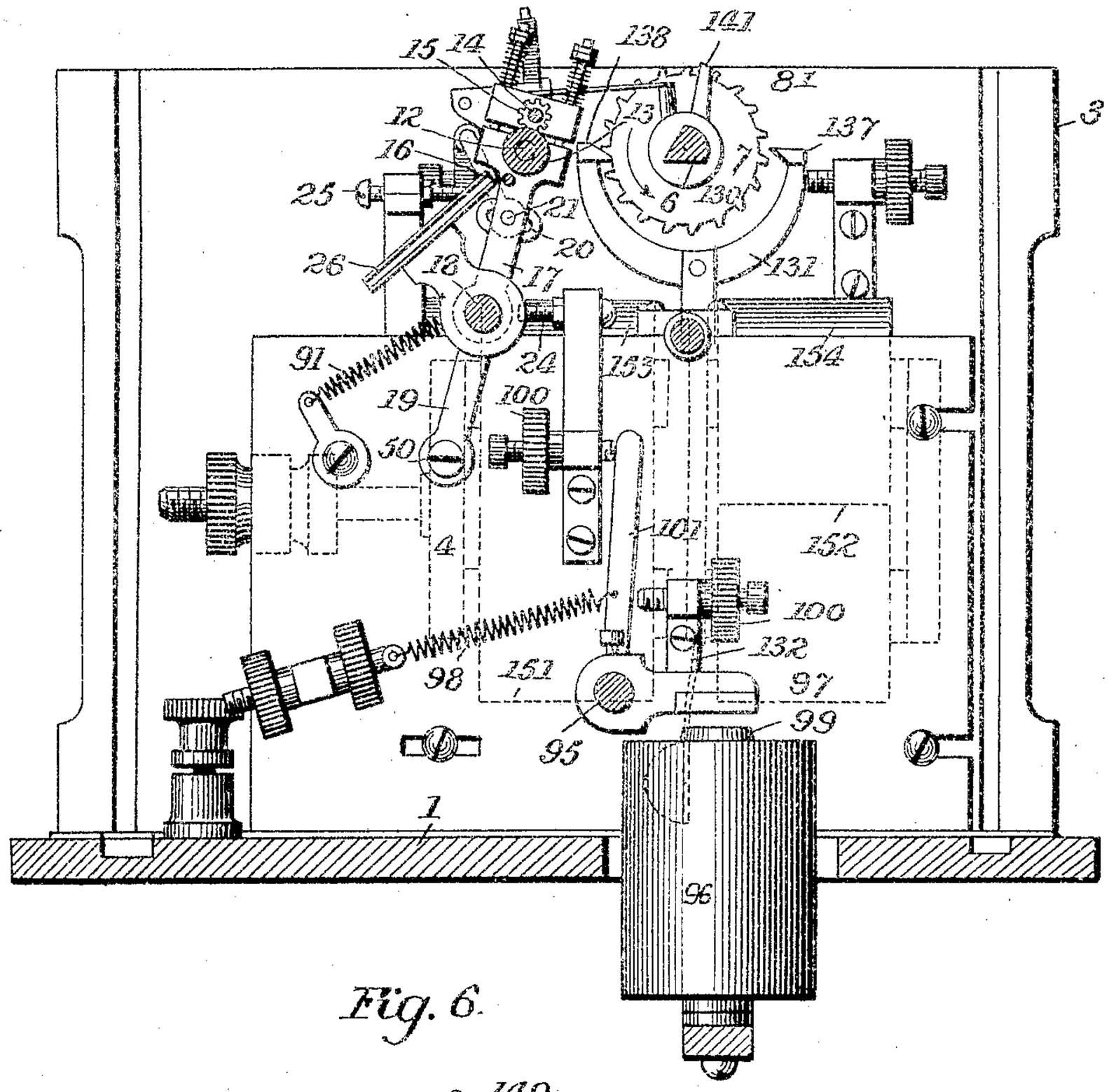
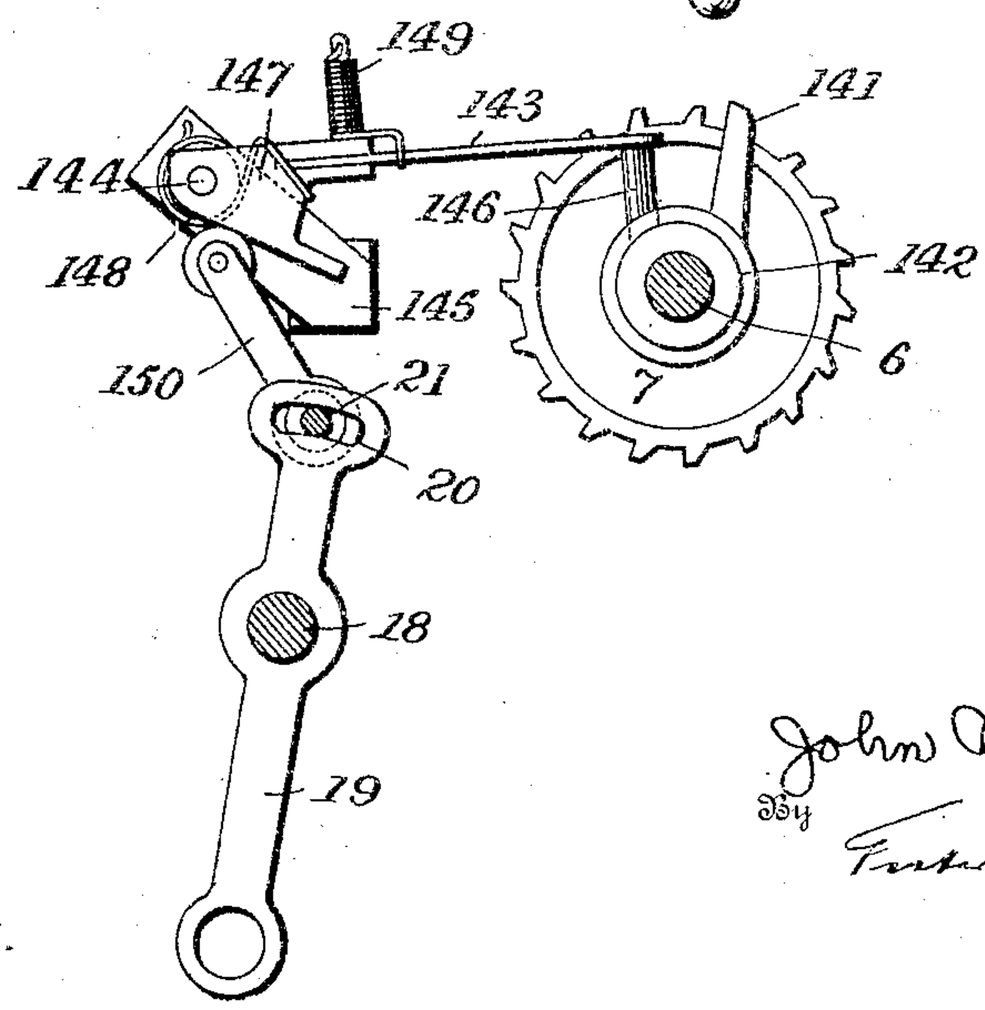


Fig. 6.



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8 SHEETS—SHEET 5.

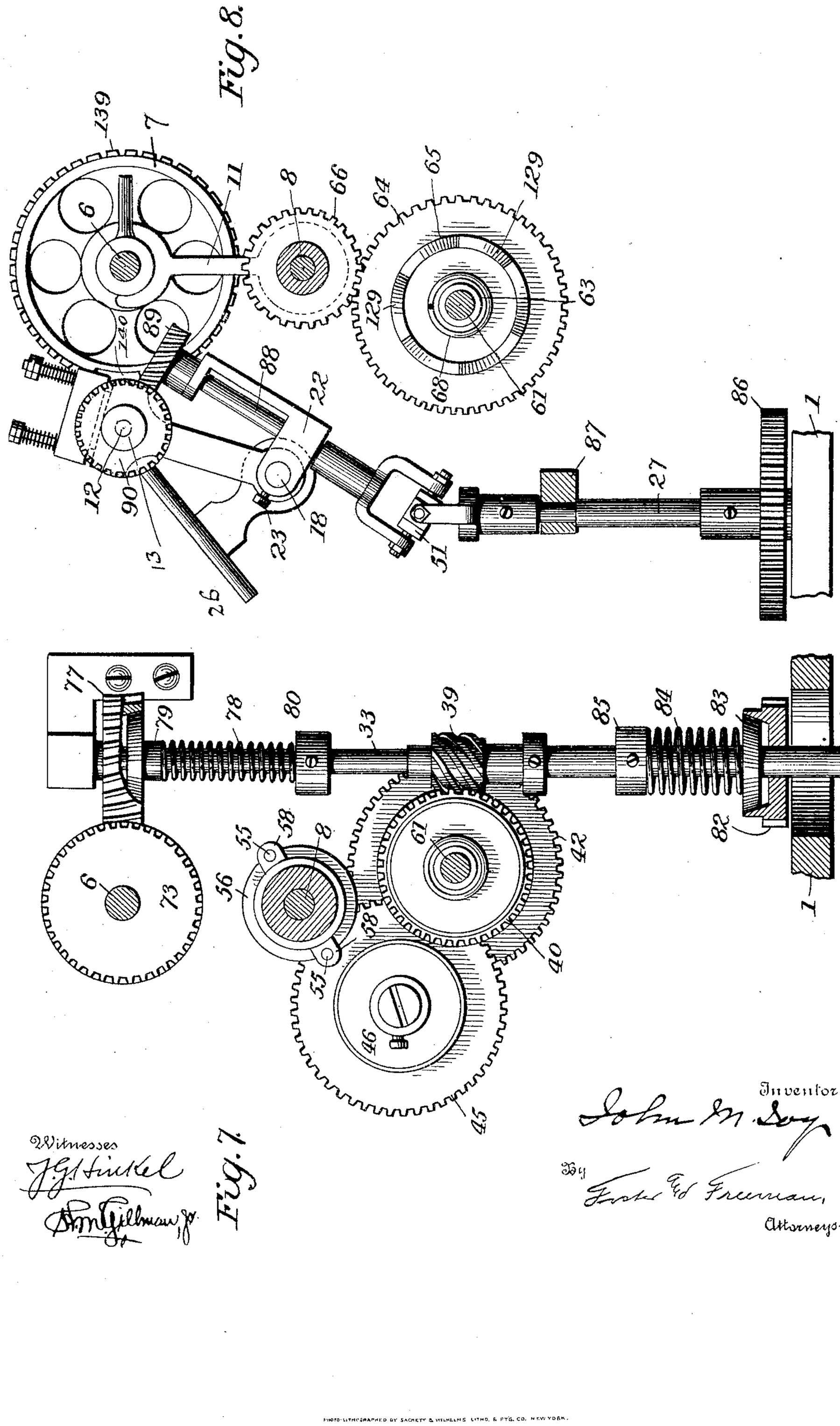

Fig. 8.

Fig. 7.

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8 SHEETS—SHEET 6.

Fig. 9.

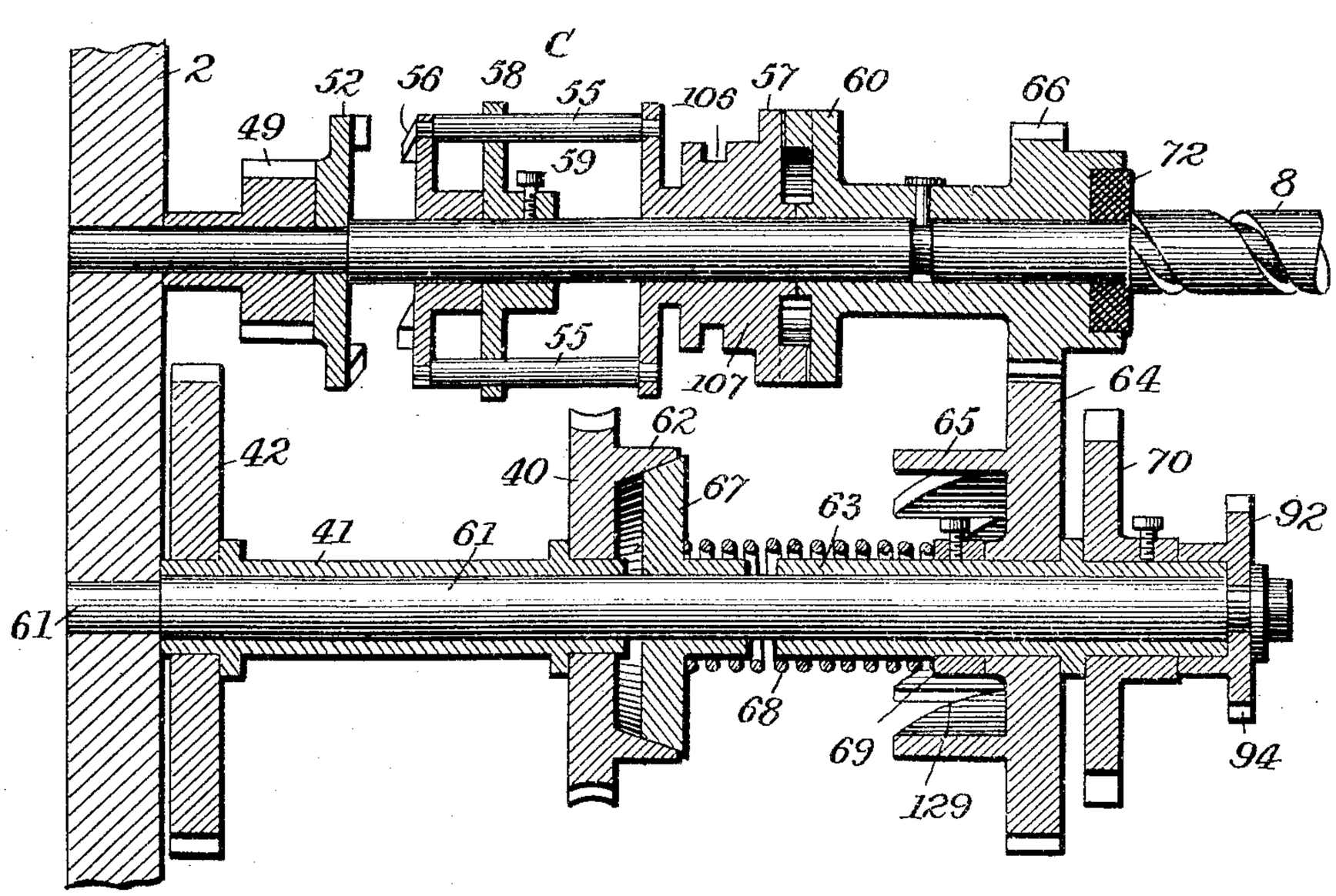
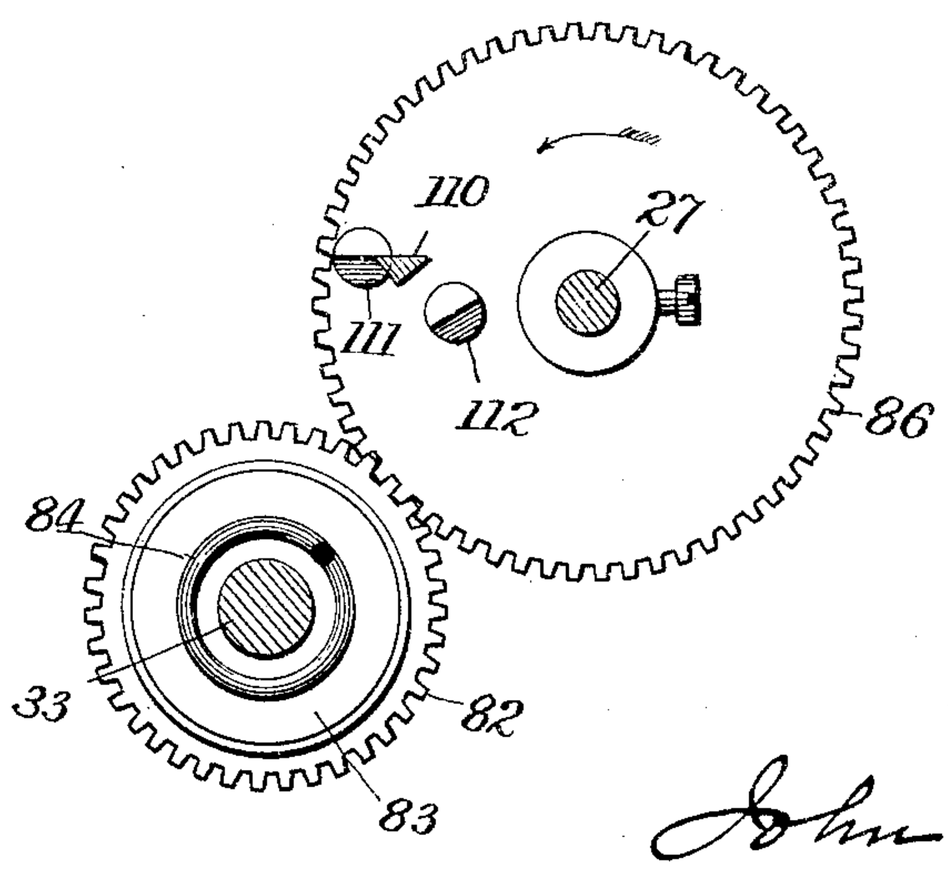


Fig. 10.



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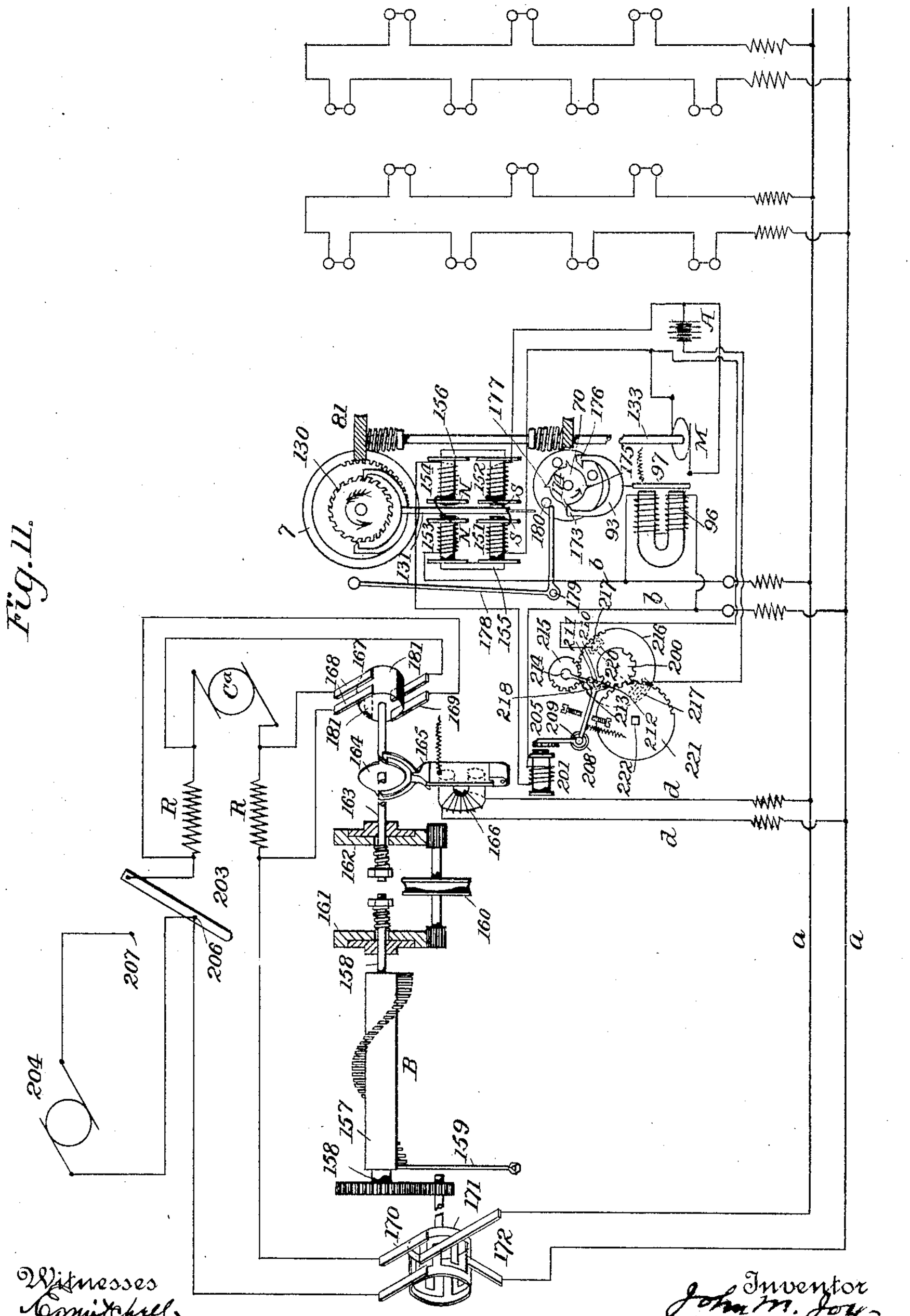
APPLICATION FILED AUG. 5, 1902.

8 SHEETS—SHEET 7.

Fig. 11.



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APPLICATION FILED AUG. 5, 1902.

8 SHEETS—SHEET 8.

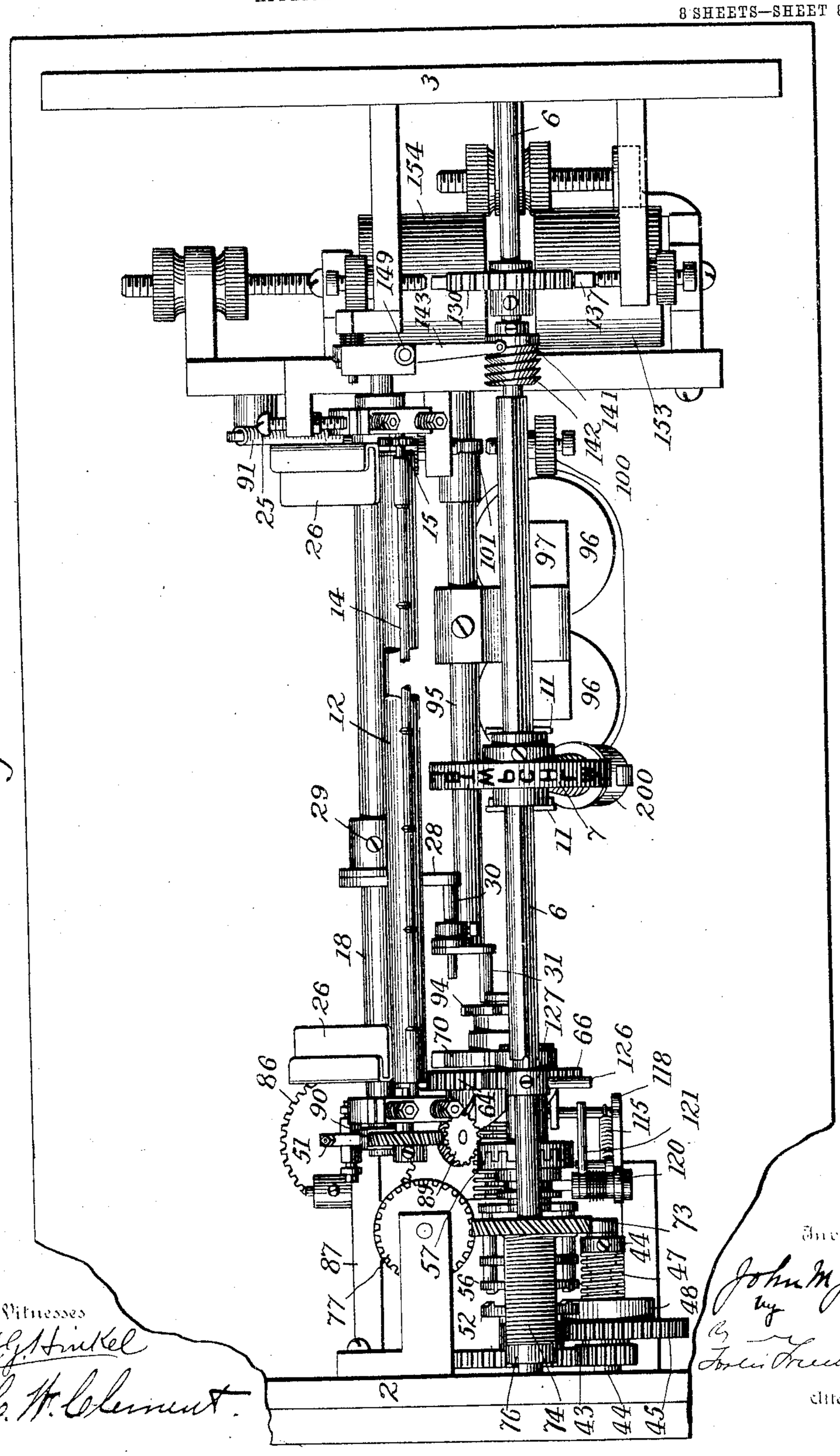

Fig. 13.

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No. 780,664. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

JOHN M. JOY, OF NEW YORK, N. Y., ASSIGNOR TO PAGE MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PRINTING-TELEGRAPH RECEIVER.

SPECIFICATION forming part of Letters Patent No. 780,664, dated January 24, 1905.

Application filed August 5, 1902. Serial No. 118,524.

To all whom it may concern:

Be it known that I, JOHN M. JOY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Printing-Telegraph Receivers, of which the following is a specification.

My invention relates to printing-telegraph receivers of the class known as "page-printers;" and the objects of my invention are to increase the rate of speed at which such a receiver may be worked with a minimum of power and to produce an improved compact and strong instrument of high efficiency which is not liable to get out of order.

Further objects of my invention are to improve the controlling devices of the receiver and render the application of the current for controlling them less wasteful and more certain and efficient in operation.

Further objects of my invention will hereinafter appear; and to these ends my invention consists in a printing-telegraph receiver for carrying out the above objects embodying the various features of construction and arrangement of parts, having the general mode of operation substantially as hereinafter fully set forth, and shown in this specification and drawings, in which—

Figure 1 is a side elevation of a printing-telegraph receiver embodying my invention viewed from the front. Fig. 2 is an enlarged side elevation, viewed from the front, of a portion of the receiver with some of the parts at front and rear removed. Fig. 3 is an end elevation of the parts shown in Fig. 2 viewed from the right. Fig. 4 is a transverse sectional elevation taken on the line *x x* of Fig. 1 looking in the direction of the arrow *a*. Fig. 5 is a transverse sectional elevation taken on line *x x* of Fig. 1 looking in the direction of the arrow *b*. Fig. 6 is a detail view showing the unison mechanism. Fig. 7 is an enlarged detail view of parts of the apparatus, partly in section, on the line *y y* of Fig. 1 looking in the direction of the arrow *b* and and showing the motor-shaft. Fig. 8 is an enlarged detail view of parts of the apparatus, partly in section, on the line *y y* of Fig. 1 looking in the direction of the arrow *a* and showing part of the paper-feeding mechanism. Fig. 9 is an enlarged detail view showing parts of the apparatus in longitudinal section. Fig. 10 is a detail plan view, partly in section, of gears connected to the motor-shaft and showing the stops on one of them; and Fig. 11 is a diagrammatic view of a transmitting and receiving station connected by suitable circuits for operating the apparatus. Fig. 12 is an enlarged vertical sectional view of the inking-receptacle and wick. Fig. 13 is a plan view of the apparatus.

In my Patent No. 676,137, granted June 11, 1901, I have shown, described, and broadly claimed some of the features embodied in my present invention, and while my present invention has the same general objects in view I accomplish those objects by different combinations and constructions arranged to operate in a different manner.

Referring to the drawings, upon a suitable base 1 are mounted standards 2 3 and intermediate standards 4 5, which support the main operative parts of the device. Mounted in the standards 2 3 is a type-wheel shaft 6, and mounted to slide longitudinally thereon and to be rotated thereby is a type-wheel 7, and means are provided for putting this type-wheel shaft under constant stress and also means for controlling the rotation of the shaft, as hereinafter set forth.

Mounted in the standards 2 and 4 is a type-wheel-mover shaft 8, which in the present instance is in the form of a worm or spirally-grooved shaft, and on this is mounted a type-wheel mover 9, comprising a hub 10, fitting the shaft 8 and having arms 11 11 adapted to engage the ends of the hub of the type-wheel 7 and move the type-wheel longitudinally on its shaft 6. Suitable means are provided for putting this type-wheel-mover shaft under constant stress tending to rotate the same, and means are also provided for controlling the rotation of this shaft, so that the type-wheel mover can be operated to move the type-wheel forward step by step in printing, and further means are provided for rotating the type-wheel-mover shaft in an opposite di-

rection at a high rate of speed to quickly restore the type-wheel and the type-wheel mover to their normal positions at the beginning of a line, and there are means whereby this movement of the type-wheel-mover shaft is controlled.

A paper-feeding mechanism, which in this instance also acts as a printing mechanism, is also mounted on the frame, and means are provided for putting said mechanism under a constant stress tending to operate the same, and means are provided for controlling said operation, as hereinafter set forth.

According to my invention the type-wheel and its shaft, the type-wheel-moving mechanism, and the paper-feeding mechanism are all under a constant stress tending to operate the same, and means are provided for controlling the operation of these devices from the same source of power. The power for actuating the mechanism of my receiver is derived primarily from any suitable source; but preferably there is a source of electric power, as a motor M,(see Fig. 1,) which may be arranged in any convenient position, as beneath the base 1, with a vertical armature-shaft 33. The motor M illustrated may be of any convenient character; but, as shown, it consists of field-yokes 34 and field-magnets 35 for providing a magnetic field in which the armature rotates, with brushes 36 bearing upon the commutator 37. The yokes 34 are suitably connected to the base 1, and the brushes 36 are supported in any convenient manner, as from the yokes 34. Current may be conveyed to the motor M through the binding-screws 38, the connections to the field and armature not being shown.

The armature-shaft 33 extends upwardly through the base 1 and supplies power for actuating the mechanism of the receiver through suitable devices about to be described. The shaft 33 has connected thereto a worm 39, (see Fig. 7,) providing means for imparting motion from the motor-shaft to a train of gearing. Meshing with this worm 39 is shown a wheel 40, connected to a sleeve 41, (see Figs. 1 and 9,) rotatably carried by a stud 61, suitably supported in the standard 2, and also connected to the sleeve 41 is a gear 42, meshing with a pinion 43, connected to a sleeve 44, rotatably supported from the standard 2. Loosely carried by said sleeve 44 is a gear 45, adapted to be connected to rotate with said sleeve 44 and gear 43 by any suitable means, as a friction-disk 46, loose upon the sleeve, but rotatable therewith by means of a spring 47, connected to the disk and the sleeve. The gear 45 is provided with a suitable hollow cup-shaped hub 48, within which the friction-disk 46 is pressed by the spring 47.

The type-wheel-mover shaft 8 is supported in the standard 2 and intermediate standard 4, and means are provided for rotating the shaft 8 in opposite directions. Any suitable operating-clutch C (see Figs. 2 and 9) may be provided for causing the shaft 8 to rotate in one direction or the other. As shown, the sliding portion of the operating-clutch C consists of bars 55, to which are connected the clutch members 56 57 and arranged to slide in a bracket 58, adjustably connected to the shaft 8, as by a set-screw 59, and adapted to rotate with the shaft. A clutch member 60, loose on shaft 8, is provided with a gear 66 and connected by suitable gearing to the motor-shaft 33, as is the clutch member 52, which is also loose on shaft 8; but the gearing is such that the direction of rotation of the members 52 and 60 is opposite to each other, so that according as the sliding members 56 57 are moved into engagement, respectively, with either of the clutch members 52 or 60 the shaft 8 will be rotated in one direction or the other.

The clutch member 52 is shown as connected to a pinion 49, meshing with the gear 45, so that rotation may be imparted to the clutch from the motor-shaft 33 through the train of gearing consisting of worm 39, wheel 40, gear 42 on sleeve 41 with wheel 40 and gear 45, as already described.

In order to impart motion to the clutch member 60 from the motor-shaft 33, suitable gearing is provided. Forming part of the wheel 40 and adapted to rotate therewith is a hollowed disk 62, (see Fig. 9,) while a sleeve 63 is loosely supported upon the stud 61 and is provided with a suitable gear 64, fast thereon, having a cam 65 connected thereto, the function of which will hereinafter appear. The gear 64 meshes with a gear 66, connected to the member 60 of the clutch C, and in order to impart motion from the worm-wheel 40 to the gear 64 a clutch-disk 67 is provided loose upon the stud 61 and adapted to be pressed into frictional engagement with the disk 62 by means of a spring 68, connected both to the clutch-disk 67 and to the sleeve 63, as by an adjustable collar 69. It will thus be seen that when rotation is imparted to the wheel 40 the disk 67 will be rotated, and, as hereinafter to be described, since the gear 64 is held from rotation, as desired, by means of an escapement-wheel 70, connected to the gear 64, and an escapement 93 the rotation of the disk 67 places the spring 68 under a stress constantly tending to rotate the gear 64 as soon as it shall be released from the escapement. Means are thus provided for causing rotation of the type-wheel-mover shaft in one direction or the other, the normal position of the operating-clutch C being that shown in Figs. 1 and 9, wherein the clutch members 57 and 60 are in engagement with each other, so that any rotation imparted to the gear 66 by gear 64 will cause a rotation of the shaft 8 in a direction to feed the type-wheel 7 forward to the right, while the shifting of the clutch in such manner that the clutch members 52 and 56

come into engagement will cause rotation of the shaft 8 to move the type-wheel mover and type-wheel 7 in direction opposite to that in which it was fed forward.

From the mechanism described it will be seen that the gear 45 on the sleeve 44 is constantly rotating, and with it gear 49 and the member 52 of the clutch C, so that the member 56 has only to be shifted into engagement with the member 52 in order to cause rotation of the shaft 8 in a direction to retract the type-wheel.

The utility of the clutch device, shown as a disk 46, connected to the gear 45, is here apparent, since if this were not provided the motor would be stopped whenever the shaft 8 was prevented from rotating with the clutch member 56 in engagement with the member 52 —that is to say, when the type-wheel 7 on its type-wheel mover 9 is retracted against the collar 72 (preferably of rubber to act as a buffer) to be in a position to commence the printing of a new line the type-wheel-mover shaft 8 is held from rotation, but the motor may continue to operate, in which case the clutch-disk 46 will rotate within the hollow hub 48 and the gear 45 will remain stationary.

The power for causing the rotation of the type-wheel shaft 6 is derived from the shaft 33 of the motor, and the type-wheel shaft 6, as before stated, is adapted to be placed under a constant stress, tending to rotate the same. In order to provide a constant stress tending to rotate this shaft 6, a gear 73 (see Figs. 2 and 7) is provided which is rotatable on the shaft 6, but connected thereto by means of a suitable spring, shown as a spiral spring 74. The spring is connected at one end to the gear 73, as by a screw 75, and at the other end it is connected to a collar 76, fast upon the shaft 6. Meshing with the gear 73 is a gear 77, loose upon the motor-shaft 33, but connected thereto by means of a clutch-disk within the gear and spring 78, (see Fig. 7,) connected to the hub 79 of the clutch-disk and to the shaft 33, as by a collar 80, fast thereon. There is normally sufficient friction between the gear 77 and the clutch-disk within the same to cause rotation of the gear 77 with the shaft 33, thereby causing rotation of the gear 73, loose upon the type-wheel shaft 6, and as long as the type-wheel shaft is held from rotation by means of the type-wheel escapement 81 (see Fig. 5) the spring 74 will be placed under a stress constantly tending to rotate the shaft 6 when the same is released. In other words, the gears 77 and 73 and the spring 74 are so connected and arranged that when the shaft 6 is held from rotation the spring 74 will be wound up by the operation of the parts; but when the shaft 6 is released the spring will tend to constantly rotate it. I am not to be understood as limiting myself to the precise means described for placing the type-wheel shaft 6 or the sleeve 63 on stud 61, carrying gear 64, under a constant stress tending to rotate them, for any suitable means may be provided for accomplishing this end; but I have illustrated a suitable and convenient means which have been found to operate satisfactorily.

Means must be provided for shifting the operating-clutch C at the desired moment to cause the type-wheel-mover shaft to retract the type-wheel, and while any suitable means may be provided to accomplish this end I have shown and will hereinafter describe a mechanism which has been found to operate efficiently and which may be nicely adjusted to accomplish this purpose.

As in my former patent referred to, No. 676,137, the mechanism for shifting the operating-clutch is connected between the type-wheel shaft 6 and suitable mechanism which operates in connection with the type-wheel-mover shaft 8; but before describing the present shifting mechanism and its operation I will state generally that according to my invention means are provided for continuously feeding the paper without feeding the type-wheel, and to be more particular the means for accomplishing this end are connected with the mechanism for shifting the operating-clutch C. In order to show how these ends may be accomplished, I will first describe the operation of the paper-feeding mechanism and the means for printing and then describe how the printing-wheel is fed letter by letter and how the paper may be fed line by line without feeding the printing-wheel.

As hereinbefore stated, not only the type-wheel shaft and the type-wheel-mover shaft are under a constant stress tending to rotate the same, but the paper-feeding mechanism is also placed under a constant stress tending to operate the same when released, and while any suitable means may be provided for doing this a convenient arrangement is that shown in the drawings, in which a gear 82 (see Fig. 4) is arranged loose upon the motor-shaft 33, but adapted to be rotated with said shaft by means of a clutch, shown as a friction-clutch, comprising a friction-disk 83, (see Fig. 10,) frictionally engaging the hollow portion of the gear 82. The disk 83 is connected, as shown, by a spring 84 to the shaft 33, as by a collar 85, fast upon the shaft. The gear 82 meshes with a gear 86, connected to the shaft 27, which is rotatably supported in the base 1 and in a bracket 87, connected to the standard 2 at the rear of the instrument. The shaft 27 carries pivotally secured to its upper end, as by a universal joint 51, another shaft 88, carried in a bracket 22. A spiral gear 89 is connected to shaft 88 and meshes with a gear 90 (see Fig. 8) on the shaft 12 of the platen 13. The rotation of the gear 86 will cause rotation of the shafts 27 and 88, thereby imparting motion through gears 89 and 90 to the shaft 12 of the platen 13. Since

the gear 86, as will hereinafter be described, is held from rotation except when it is desired to feed the paper, the gear 82 on the motor-shaft 33 is also held from rotation; but the constant rotation of the motor-shaft tends to cause rotation of the gears 82 and 86 as soon as gear 86 is released, and thereby cause a feeding of the paper through the paper-feeding mechanism.

The paper-feeding mechanism comprises a shaft 12, (see Fig. 4,) which in this instance is provided with an elastic covering forming the printing surface or platen 13, and there is a feed-roller 14, connected to rotate with the shaft 12 by any suitable means, as the gears 15 (see Fig. 5) on the roller 14 and shaft 12, respectively. There is also a guide-rod 16 for holding the paper or other material being printed. The paper-feeding shaft 12, roller 14, and rod 16 in the present instance are supported in arms 17 17, which are rigidly attached to a rod 18, which rod is loosely mounted at one end in a swinging arm 19, pivoted to the standard 4 at 50 (see Fig. 5) and having a slot 20 and an adjusting device 21, whereby the relation of the printing-platen 13 and shaft 12 can be adjusted to the path of the type-wheel 7. The end of the rod 18 in this instance is adjustably mounted in the pivoted bracket 22, being adjustable by a screw 23. The bracket 22, as shown, is pivotally supported upon the shaft 27 by means of the shaft 88, upon which it is loosely carried. The platen 13, supported in the arms 17, may thus have a slight backward and forward motion relative to the type-wheel 7, and the extent of the motion of the arms 17, carrying the platen, may be adjusted by adjusting-screws 24 and 25 in the standard 4.

Means are provided for rocking the platen 13 to make an impression from the type-wheel, it being understood that the paper is carried in the guides or supports 26 and is passed between the platen 13 and the type-wheel 7 over the platen. These guides 26 are adjustably supported upon the rod 18, so that the distance between them may be varied according to the width of the paper which it is desired to use, and they have the important function of keeping the paper straight as it is fed by the feeding mechanism, for it will be seen that without them the paper may be crowded to one side or the other, thereby producing crooked lines in the operation of the telegraph-receiver. The guides 26 may be of any suitable form; but the form shown has been found satisfactory, wherein the guides themselves are in the shape of clips, preferably bent from metal, thereby providing a smooth running surface for the paper.

The power for rocking the platen on its pivots 50 and 51 is in this instance derived from the motor M, which supplies power in the first instance for actuating the mechanism of the receiver, and in this way, since the means for rocking the platen 13 and printing are controlled electromagnetically instead of being operated directly by current from the receiving-line, current is saved, and this is one of the features of my invention. It requires a magnet of not inconsiderable strength to actuate the movable parts of a receiver of the character described, and where a great number of instruments are being operated from a common source it is obvious that instruments in which the magnets merely control the application of power to the actuating mechanism instead of doing all the work will require much less line-current then those in which electromagnets are depended upon for doing all of the work or the greater part of it.

Any suitable means may be provided for actuating the printing-platen; but as shown the rod 18 is provided with a suitable arm 28, (see Figs. 1 and 4,) preferably mounted thereon adjustably, as by set-screws 29. This arm may have an extension 30, as shown, upon which is adjustably mounted a follower in the form of a pin 31, with a projection 32 extending therefrom. Any suitable form of arm and follower may be provided, connected to the rod 18, I having simply shown a particular form which has been found desirable.

The platen 13 is normally held in a retracted position against an adjusting-screw 25, holding the paper away from the type-wheel by any suitable means, as a spring 91, (see Fig. 5,) connected to the intermediate standard 4 and to a part of the paper-feed.

As described hereinbefore, the sleeve 63 (see Fig. 9) on the stud 61 is provided with a suitable escapement-wheel 70 and a cam 92. An escapement-lever 93, operating in connection with the escapement-wheel 70 and the cam 92, are arranged to control the operation of the printing-platen 13 through the arm 28. The projection 32 of the follower 31 on the arm 28, which arm is rigidly connected to the rod 18, bears upon the cam 92, and it will be seen that as the cam rotates in the direction of the arrow (see Fig. 4) the projections 94 thereon serve to depress the projection 32 on the follower 31, thereby actuating the arm 28 and rocking the mechanism to which the platen 13 is connected. This mechanism to which the platen 13 is connected is rocked about the pivot 50 and the pivot at the universal joint 51, thereby causing the platen 13 to strike the type-wheel.

The operation of the cam 92, which serves to actuate the parts to cause the printing, as well as the operation of the gear 64, (see Fig. 1,) which actuates type-wheel-mover shaft 8 to cause a feeding of the type-wheel, is controlled in any suitable manner; but in this instance these operations are shown as controlled by the escapement-wheel 70 and escapement-lever 93. As shown, the escapement-lever 93 is adjustably connected to a rock-shaft 95, as by a set-screw 180, suitably supported in the

intermediate standards 4 and 5, this shaft being rocked by means of an armature 97, connected thereto, adapted to be attracted by controlling-electromagnets 96. The armature 97 is normally retracted in any suitable manner, as by means of a spring 98, the distance between the armature and cores 99 of the magnets being adjusted by adjusting-screws 100, against which the arm 101, connected to the rock-shaft 95, is adapted to bear.

The escapement-wheel 70 is normally held from rotation by means of the escapement-lever 93, connected to the rock-shaft 95, and it will be seen that when the shaft 95 is rocked by having the armature 97 attracted against the cores of the magnets 96 the escapement-wheel 70 will be released and will be rotated through a distance to feed the type-wheel the proper space, and the gear 64 will be rotated through the operation of the spring 68, thereby rotating the type-wheel-mover shaft 8 through the gear 66 and operating-clutch C, the clutch being in the position shown in the figures.

Since the cam 92 is connected to move with the escapement-wheel 70, it will be seen that rotation of the cam depresses the follower 31 and causes the platen 13 to strike the type-wheel 7, as described.

The parts are so arranged and adjusted that the rotation of the escapement-wheel 70 will cause the rotation of the type-wheel-mover shaft 8 and the feeding of the type-wheel the desired distance before the printing is done, and the cam 92, according to the adjustment shown, causes the printing to take place just at the end of the movement of the type-wheel. It is to be understood that the adjustment might be such that the printing would take place just as the type-wheel is moved forward.

The mechanism for actuating the operating-clutch C and for releasing the gear 86 on the shaft 27 meshing with gear 82 on the motor-shaft, and thereby allowing the feeding of the paper line by line, as desired, will now be described.

A rock-shaft 102 (see Figs. 3 and 4) is provided, supported in the brackets 87 and 103, and connected to this rock-shaft 102 is an arm 104, bearing at its upper end a pin 105, which bears in a groove 106 in a sleeve 107, forming part of the clutch member 57. Suitable retractile means, as a spring 108, connected to an arm 109, carried by the rock-shaft 102, tends to maintain the clutch members 57 and 60 in engagement, as shown, and it is evident that by rocking the shaft 102 and arm 104 against the tension of the spring 108 the sliding members of the operating-clutch C will be shifted. Also connected to the shaft 102 is a downwardly-extending arm 110, which is normally in such position that the flat side of a stop 111 on the gear 86 bears against said arm and prevents rotation of said gear except when feeding of the paper is to take place; but a rocking movement of the shaft 102 will cause the arm 110 to move to one side from engagement with the stop 111, thereby releasing gear 86, and thus also the paper-feeding mechanism. When the shaft 102, as will be described, is rocked in a direction to shift the operating-clutch C to cause the type-wheel to be retracted, the arm 110, connected to shaft 102, will at the same time be moved out of engagement with the stop 111, releasing the paper-feeding mechanism and causing the paper to be fed one line. The feeding of the paper one line takes place while the type-wheel 7 is being retracted to a position in readiness for the commencement of a new line. The paper is fed one line by one rotation of the gear 86, and in order to allow one complete rotation of the gear 86 another stop 112 is provided on said gear adjacent to stop 111 and so arranged thereon that when the arm 110 is moved to the position shown in dotted lines in Fig. 2 the gear 86 will be rotated under the action of the spring 84 (see Fig. 4) until the flat side of this stop 112 comes into engagement with the arm 110 when in its dotted position. Then upon allowing the arm 110 to resume its normal position, (shown in full lines in Fig. 2,) the stop 111 will again come into engagement with said arm 110 and the gear 86 will have been rotated one full revolution. In Fig. 3 the gear 86 is shown partially rotated from the position shown in Fig. 4 in order that the stops 111 and 112 may be more plainly seen. These stops are shown in plan in Fig. 10.

As shown in the drawings, there is an L-shaped lever 113, pivotally connected to the arm 104, as at the point 114, while a tension-spring 115 is connected to the arm 104, as at the point 116, and to the L-shaped lever 113, as at the point 117. This spring 115 normally tends to tilt the shorter end 118 of the lever 113 upward. A projecting pin 119, however, connected to the end 118 of the lever 113, is arranged to bear against the cam 65, thereby preventing the tilting of lever 113 more than a very slight degree from the vertical through the action of the spring 115. The upper end 120 of lever 113 is also provided with a finger 121, which may be flexibly secured to the lever, as on a stud 122, by a spring 123, tending to press the finger 121 downward, which movement is prevented by a suitable stop 124 on the lever 113. By this arrangement the finger 121 may be rocked about the stud 122, a slight rocking movement being necessary in the operation of the parts, as will hereinafter appear.

The end of the finger 121 is preferably slightly hollowed, as at 125, and is adapted to hit against a stop 126, adjustably secured to the type-wheel shaft 6, as by a collar 127 and set-screw 128, as shown, when said stop is in a certain position determined by the relative position of the type-wheel.

The cam 65 is provided with as many sepa-

rate cam-surfaces 129 of suitable conformation, as shown, as there are teeth on the escapement-wheel 70, it being remembered that the cam 65 and escapement-wheel 70 are connected to move together. The projecting pin 119 on the end 118 of the lever 113 engages in turn the cam-surfaces 129 of the cam 65, and during the printing when it is only desired to feed the type-wheel 7 letter by letter along a line the stop 126, connected to the type-wheel shaft 6, is in such position that the end of the finger 121 cannot strike against it as the cam 65 rotates and actuates the lower end 118 of the lever 113, and it will be seen that then the rotation of the cam 65 will simply cause a rocking of the lever 113 about its pivot 114 without actuating any of the operative parts of the mechanism. When, however, it is desired to feed the paper a line and at the same time retract the type-wheel, the type-wheel shaft is operated to bring the stop 126 to such a position that the finger 121 may strike against it when the lever 113 is rocked. When the parts are in this position—which would be that shown in the drawings—as the cam 65 is rotated under the action of the spring 68, the pin 119 is moved by cam 65 against the tension of the spring 115, and since the end of the finger 121 will find an abutment against the stop 126, the arm 104 on rock-shaft 102 will be rocked. In other words, the mechanism described acts as a toggle and breaks at the point 114 when an abutment is provided for the upper end of the lever 113 and the lower end is moved. Under these circumstances the pivot-point 114 is moved to the left, looking at Fig. 2, and consequently the clutch 57 will be shifted to the left by the pin 105 to bring the clutch portions 52 and 56 into engagement, thereby causing the rotation of the type-wheel-mover shaft 8 in a direction to retract the type-wheel, and at the same time the arm 110 will be rocked to the position shown in dotted lines (see Fig. 2) out of engagement with the stop 111, thereby releasing the gear 86 and allowing it to rotate through nearly one revolution, it being again arrested when stop 112 comes into engagement with the arm 110. This operation has taken place as the armature 97 is attracted by the controlling-magnets 96, thereby actuating the escapement-lever 93 and allowing the rotation of the escapement-wheel 70, thereby causing one of the cam-surfaces 129 to actuate pin 119 and the end 118 of the lever 113. As long as the armature 97 remains attracted the lever 113 and arms 104 and 110 will remain in the positions shown in dotted lines (see Fig. 2) with the pin 119 resting at the highest point of the cam-surface 129 and the escapement-wheel 70 held by the opposite pallet of the escapement-lever 93 from that which held the escapement-wheel from rotation with the parts in normal positions. In this position of the parts the gear 86 has not quite made one whole revolution, as described, to feed the paper; but as soon as the armature 97 is released by magnets 96 the parts take their normal positions, the arm 110 swinging away from stop 112, and the gear 86 rotates a slight distance farther in the same direction, bringing the stop 111 against the arm 110, thereby completing one whole revolution. It will now be seen that after the operating-clutch C has been shifted in such manner that the type-wheel-mover shaft 8 retracts the type-wheel 7 against the buffer 72 by continuing to successively actuate the armature 97, causing the rotation of the escapement-wheel 70 tooth by tooth, the paper may be fed line by line without feeding the type-wheel 7 forward, for with the type-wheel mover resting against buffer 72, as long as the stop 126 on shaft 6 is maintained in such position that finger 121 will hit against it whenever the lever 113 is actuated, rotation of the type-wheel-mover shaft in either direction cannot take place.

The rotation of the type-wheel shaft 6 is controlled by the escapement 81, (see Fig. 5,) comprising a letter-selecting escapement-wheel 130 and an escapement-lever 131 flexibly pivoted, as on a spring 132, between the actuating-magnets 151 152 153 154. The escapement-wheel 130 is adapted to rotate in the direction of the arrow, and the construction of the escapement wheel and lever is such that the rotation of the escapement-wheel aids in actuating the lever. The teeth or portions 137 and 138 of the escapement-lever 131 are the bearing portions against which the teeth on the escapement-wheel bear when the escapement-wheel is held from rotation, and it will be seen that the relative angles of the teeth and the bearing portions are such that the teeth will easily slide off of the bearing portions 137 and 138 when the escapement-lever is actuated, and the tendency will be to push the lever in the same direction in which it is actuated. When a tooth or bearing portion, as 138, of the escapement-lever is withdrawn from engagement with a tooth on the escapement-wheel, the shaft 6, upon which the escapement-wheel 130 is fixed, is under stress tending to rotate it, which tendency of the escapement-wheel to rotate will itself aid in pushing the bearing portion 138 out of engagement with a tooth, and in this way the actuation of the parts is made more rapid and there is not that disadvantageous sticking between the escapement-lever and the teeth of the escapement-wheel which takes place in the ordinary device where the teeth are locked against the pallets of the lever.

The escapement-wheel 130 is provided with any suitable number of teeth, in this instance nineteen being shown, while the type-wheel is provided with thirty-six characters (designated 139) and a blank space 140, which cor-

responds to two positions, and since in the operation of the letter-selecting escapement 81 the escapement-wheel 130 is allowed to advance each step into engagement with the opposite pallet of the lever 131 the escapement-wheel may be stopped thirty-eight times in one revolution, thus giving thirty-eight positions of the letter-selecting escapement-wheel 130, thirty-six of which correspond to the characters and two of which correspond to the blank space. When one portion of the blank space 140 is opposite the printing-platen 13, the parts are in the positions shown in the drawings, at which time the stop 126 is adapted to be hit by the finger 121 and cause the feeding of the paper and also cause the reverse rotation of the type-wheel-mover shaft 8. When the other portion of the blank space 140 is opposite the printing-platen 13, the stop 126 is in such position that it cannot be struck by the finger 121 and the parts are in position for printing character after character with continuous operation of the type-wheel.

A suitable unison device is provided for the telegraph-receiver, and, as shown, it is of a usual type and is adapted to be brought into operation as desired. In my former patent, before referred to, the unison device came into action after each operation of the type-wheel; but according to the present invention one letter may be selected after another as desired without bringing the parts to normal or zero position, and the unison device is only brought into play as may be necessary in the operation of printing a page. The unison device, as shown, is intended to bring the parts to such position that a blank space on the type-wheel is opposite the printing-platen, and, as shown, the device comprises a stop 141 (see Fig. 6) on the type-wheel shaft 6 and a screw-thread 142 adjacent thereto, while an arm 143, carried by a block 147, is pivotally supported on a pin 144 upon a bracket 145 on the standard 4, this arm 143 carrying a pin 146, the tip of which engages the screw-thread 142. A suitable spring 148, coiled about the pin 144, tends to press the tip of the pin 146 into the screw-threads 142, while another spring, 149, tends always to return the arm 143 to its normal position at the beginning of the threads 142, where it cannot be struck by the stop 141 in the rotation of the shaft 6. By allowing the shaft 6 to rotate continuously the pin 146 will be carried in the threads 142 to such position that the stop 141 will be brought into contact therewith, stopping the type-wheel with a blank space opposite the printing-platen 13; but the pin 146 will not have traveled far enough across the screw-threads 142 to be so struck by the stop 141 unless the type-wheel makes more than one complete revolution. At every actuation of the printing-platen 13 to print a letter an arm 150, connected to the arm 19, presses upwardly against the block 147, thereby raising the pin 146 out of engagement with the screw-thread 142 and allowing it to return to normal position under the action of spring 149 without having been struck by the stop 141.

Any suitable means may be provided for operating the telegraph-receiver from a distant station, and a common form of transmitter is shown in Fig. 11, which is a diagrammatic representation of circuits and apparatus illustrating means for carrying out my invention. Circuits are shown for a number of receivers connected to distributing bus-bars or mains *a a*. I prefer to actuate the escapement-lever 131 by means of a polarized relay comprising the magnets 151 152 153 154, the circuits of which are diagrammatically shown in Fig. 11. Means are provided for polarizing the cores of these magnets, as shown, the coils 151 and 152 being used for this purpose, while alternating currents or impulses of different signs are sent through the coils 153 154, alternately strengthening one core and weakening the other, and thereby vibrating the escapement-lever 131, thus allowing rotation of the escapement-wheel 130 for selecting the desired letters or space on the type-wheel 7. A magnet 201 is also included in the circuit of the coils 153 154 for a purpose hereinafter to appear.

In the diagram, M denotes the motor connected to the motor-shaft 133, from which the power for actuating the mechanism of the receiver is derived, and A a suitable source of electric energy for the motor, represented as a storage battery. A circuit including coils 151 and 152 and a switch 200, controlled by magnet 201, is also derived from the battery A, and said coils are so wound that the cores 155 156 are polarized with the oppositely-arranged poles of the same sign, as indicated by the letters S S and N N in the diagram. The coils 153 154 are then so wound that upon passing a positive impulse through them the magnetism of one of the cores, as 155, will be strengthened, while that of the other, as 156, will be neutralized, and then upon passing a negative impulse through these coils the magnetism of core 156 will be strengthened, while that of core 155 will be neutralized, and thus the escapement-lever 131 will be attracted to one side or the other, according to the character of the impulse transmitted over the line.

Each character being selected by impulses over the line, the letter-selecting escapement-wheel may be moved to any desired position and then the printing and feeding may take place, or the traverse position of the type-wheel may be changed as desired, or the paper may be fed continuously while the type-wheel remains fixed.

Suitable means are shown at B, as stated, of any ordinary or usual character for determining the number of alternations in current sent over the line. As shown, a common form

of pin-cylinder 157 is provided, with thirty-eight pins arranged thereon. This cylinder is arranged on a shaft 158, which by any suitable means tends to rotate, but is held therefrom by controlling-levers 159, corresponding to the characters on the type-wheel, (but one of which is shown.) A driving-pulley 160 may be connected with a suitable source of power for operating the pin-cylinder 157, and a friction-clutch 161 is shown between the gearing connected to the driving-pulley and the pin-cylinder shaft, so that the driving-pulley may at times rotate without driving the pin-cylinder. I also provide a shaft 163, which may be driven by any suitable power and, as shown, is connected to be driven from the driving-pulley 160, and I have shown it connected with a friction-clutch 162. Said shaft 163 carries an escapement-wheel 164, controlled by an escapement-lever 165, adapted to be actuated by a magnet 166, and also upon the shaft 163 is arranged a commutator 167, with brushes 168 169 bearing thereon, connected in circuit with a generator C^a, which generator is also connected with brushes 170, bearing upon a commutator 171. In this instance a switch 203 is shown included in the circuit of the generator C^a, while another generator, 204, is adapted to be connected in series with generator C^a or cut out of circuit. The generator C^a in this instance is a direct-current generator and supplies current for actuating the polarized magnets controlling the operation of the letter-selecting escapement 81, the direct current being commutated at the commutator 171 into alternating positive and negative impulses and passing from the commutator by brushes 172 to the distributing-line *a a*, from which connection is made, as by the leads *b b*, to coils 153 154 of the polarized relays.

Means are provided for rotating the commutator 171, as shown, connection being made through gearing to the pin-cylinder shaft 158, and any suitable form of commutator may be provided, it only being necessary that as the commutator rotates, with the brushes 170 and 172 bearing thereon, the direct current from the generator C^a shall be transformed into alternating impulses.

The number of impulses are controlled at will by means of levers 159, but one of which is shown, as stated, and means are provided, as hereinbefore described, for automatically printing and feeding the type-wheel after each letter has been selected, and this is accomplished by means of the printing-magnets or controlling-magnets 96 and the mechanism which they control. After the character desired to be printed has been selected and is in position to have an impression taken therefrom the circuits and apparatus are so arranged that the printing or controlling magnets 96 become operatively energized, thereby attracting the armature 97, actuating the escapement-lever 93, withdrawing the pawl 173 from engagement with the tooth 174 on the escapement-wheel 70, and allowing said escapement-wheel to rotate in the direction of the arrow until the tooth 175 comes into engagement with a pawl 176 on the other side of the escapement-lever. It will thus be seen that the tooth 177 on the escapement-wheel 70 is about in readiness to engage the pawl 173 when the magnets 96 become deënergized after the printing and feeding of the type-wheel has taken place.

Since Fig. 11 is but a diagrammatic representation of means for carrying out my invention, the construction of the parts does not correspond exactly to that shown in the previous figures, for the apparatus has been simplified for the sake of clearness, and in this connection any suitable means are shown for causing the printing-platen 13 to strike the type-wheel. As shown, a bell-crank lever 178, pivoted at 179, is adapted to be actuated by pins or stops 180, connected with the escapement-wheel 70.

As the alternating impulses traverse the circuits connected with the generator C^a, switch 203 being in the position shown in the drawings, and the magnets 153 and 154 actuating thereby the escapement-lever 131, the printing or controlling magnets 96 are not operatively energized by the current, since they are so connected in a shunt as to receive the alternations of the line. While the printing or controlling magnets 96 may be connected in the circuit in any desired manner, they are preferably connected in shunt to the line, as shown, since with this arrangement the controlling-magnets may be constructed to have a greater impedance than that of the coils 153 154 in the main circuit. This arrangement causes the greater portion of the alternating current to traverse the circuit of the magnets 153 154 rather than that of the controlling-magnets 96. Further advantages are gained by this arrangement of circuits, as will hereinafter be described. The magnet 166, controlling the escapement-lever 165, is also not operatively energized by alternating currents passing through its circuit *d d*, connected in shunt to the main line *a a*. As soon, however, as the pin-cylinder 157 comes to rest with the desired character on the type-wheel in position to be printed a constant current will momentarily flow from the generator C^a, through suitable resistances R R, through commutator 171, to the magnet 166, energizing the same, causing it to attract its armature, thereby releasing the escapement-wheel 164 and allowing it to rotate through half a revolution, allowing the conducting portions 181 on the commutator 167 to pass momentarily beneath the brushes 168 and 169, thereby short-circuiting the resistances R R for an instant and allowing more direct current to momentarily flow from the generator C^a to and through the commutator

171 to the line *a a*, energizing the printing or controlling magnets 96 sufficiently to cause them to attract the armature 97. This increase of current which caused the magnets 96 to attract the armature 97 was but momentary in order to provide sufficient magnetism to attract the armature 97 against its spring, and then the normal strength of current passing from generator C^a to resistances R R is sufficient to hold said armature 97 in a retracted position as long as desired.

By arranging the controlling-magnets 96 in a shunt to the line and in shunt to the escapement-magnets and making the controlling-magnets of less resistance than those controlling the escapement more direct current will flow through the controlling-magnets, which is to be desired.

Suitable means are provided for deënergizing the circuit of the battery A, and thus preventing the operation of the receiver as long as desired. The means thus provided are preferably controlled from a distance, as at the transmitting-station, and to these ends the magnet 201 and switch 200 are included in the operating-circuits at the receiver, while the generator 204 is arranged to be switched into circuit at the transmitting-station. The magnet 201 may be included in any suitable portion of the receiving-circuits; but, as shown, it is included in series with coils 153 and 154 and in the shunt to printing-magnet 96. Switch-magnet 201 is so designed and adjusted that it will not become sufficiently energized to actuate its armature 205 under the ordinary working conditions of the circuits, and means are provided for "boosting" the line when desired in order to actuate switch-magnet 201. For this purpose the additional generator 204 is provided at the transmitting-station, for by throwing switch 203 from contact 206 to contact 207 generator 204 is included in series with generator C^a, and thus raises the potential of the line sufficiently to cause magnet 201 to become energized and actuate its armature 205. This armature 205 is shown as one arm of a bell-crank lever 208, pivoted at 209 and having at its other end a cross-piece 210, provided with stops 211 and 212, while pivoted at 214 is a "flier" or arm 213, provided with a stop 218 and connected to move with a pinion 215, meshing with a gear 216, to which the switch 200 is connected. Contacts 217 coöperate with the switch 200, and to these contacts are connected the wires leading from the battery A, so that the switch 200 is in series with the battery.

From the above it will be seen that magnet 201 is energized so long as the main-line circuit has current; but it is adjusted above the normal working current and is not operated thereby. Its function is to control the mechanism which operates switch 200. It is made operative by introducing a higher potential to the line twice each day or when it is necessary to close switch 200 for a day's run and open it again at the end of the day's run. This switch 200 has no electrical connection with the main-line circuit, but simply opens and closes the circuit of the receiving instrument. For instance, in the morning the switch 203 is moved so as to send a high potential along the line which operates magnet 201, which releases the escapement and allows the switch 200 to close the circuit of the receiver. The switch 203 is then restored to its normal position, (shown in Fig. 11,) removing the higher potential from the line, and this potential is not again used until it is desired to again operate the switch, which of course may be any time or at the end of the day's run, and then the switch 203 is again operated to increase the potential in the line, and this in turn operates the magnet 201 and allows the switch 200 to open. The object of these mechanical and electrical connections is to enable the battery-circuit to be broken when desired, and other suitable means may be substituted for those illustrated without departing from the spirit of my invention.

The shaft to which the switch 200 is connected is provided with a pinion 220, meshing with a gear 221 upon a winding-stem 222, from which the switch mechanism is actuated when released by the arm or flier 213. Upon lever 208 being actuated to release stop 218 from stop 211 the arm 213 will make nearly one revolution under the influence of the spring-actuated gearing connected thereto, and it will be brought to a stop again against the stop 212. The gear 217 will have been rotated through nearly one whole revolution to break the circuit at switch 200. By deenergizing magnet 201 and releasing armature 205 the stop 218 will be released from stop 212 and brought against stop 211, thereby allowing the arm 213 to complete a full revolution and complete the circuit at the switch 200.

While any suitable means may be provided for inking the type-wheel, I have shown a traveling inker in the form of a bottle or receptacle 200, of which Fig. 12 is a detail sectional view. The bottle is shown suitably secured, as by means of clamps, to the type-wheel mover 9 and arranged adjacent the type-wheel in such manner that the wheel may be continually inked. As shown, the ink-bottle 200 is provided with a wick 201, the upper end of which bears against the type and serves to keep the type well inked. In order that the wick may be kept pressed against the type-wheel, a suitable spring is provided under compression and secured at one end to the wick, thus tending to stretch the wick.

Obviously some features of my invention may be used without others, and my invention may be embodied in widely-varying forms.

Therefore without enumerating equivalents nor limiting myself to the construction shown

and described, I claim, and desire to obtain by Letters Patent, the following:

1. In a printing-telegraph receiver, the combination of a shaft under constant stress tending to rotate the same, and a type-wheel carried thereby, a type-wheel-moving mechanism under constant stress tending to move the type-wheel forward, a paper-feeding mechanism under constant stress tending to actuate the same, and means for controlling the operation of the type-wheel, the type-wheel-moving mechanism, and the paper-feeding mechanism, for substantially the purposes set forth.

2. In a printing-telegraph receiver, the combination of a shaft under constant stress tending to actuate the same, and a type-wheel carried thereby, a type-wheel-moving mechanism under constant stress tending to move the type-wheel forward, an escapement controlling said type-wheel-moving mechanism, a paper-feeding mechanism under constant stress tending to actuate the same, an escapement controlling said paper-feeding mechanism, and means for controlling the operation of the type-wheel, for substantially the purposes set forth.

3. In a printing-telegraph receiver, the combination of a shaft under constant stress tending to rotate the same, and a type-wheel carried thereby, a type-wheel-mover shaft under constant stress tending to rotate the same, a paper-feeding mechanism under constant stress tending to actuate the same, and means for controlling the operation of the type-wheel, the type-wheel-mover shaft, and paper-feeding mechanism, substantially as and for the purposes set forth.

4. In a printing-telegraph receiver, the combination of a type-wheel shaft and means constantly tending to rotate the same, a type-wheel-mover shaft and means constantly tending to rotate the same, a paper-feeding mechanism and means constantly tending to actuate the same, and means for releasing the type-wheel shaft, the type-wheel-mover shaft and the paper-feeding mechanism, substantially as and for the purposes set forth.

5. In a printing-telegraph receiver, the combination of a source of power, trains of independent mechanisms directly connected to said source of power to be actuated thereby for feeding the paper, for presenting the character to be printed on the paper, and for spacing said characters, and means for controlling the operation of said mechanisms, substantially as and for the purposes set forth.

6. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereby, a type-wheel-mover shaft and a paper-feeding mechanism, independent mechanisms operatively connecting all of said devices with a common source of power for actuating said devices, and means for controlling the operation of the type-wheel shaft, type-wheel-mover shaft, and paper-feeding mechanism and their operative connections with a source of power, for substantially the purposes set forth.

7. In a printing-telegraph receiver, the combination of paper-feeding rolls under constant stress tending to actuate them, and means for releasing said rolls to feed the paper, said rolls being mounted for movement to and from the type-wheel, for substantially the purposes set forth.

8. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress tending to actuate it, a type-wheel and means for actuating the same, and means controlled by the position of the type-wheel for releasing said paper-feeding mechanism, substantially as and for the purposes set forth.

9. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress tending to actuate it, a type-wheel and means for actuating the same, and means controlled by the rotative position of the type-wheel for releasing said paper-feeding mechanism, substantially as and for the purposes set forth.

10. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress tending to actuate it, a type-wheel and means for actuating the same, type-wheel-feeding mechanism, and means controlled by the type-wheel-feeding mechanism and the rotative position of the type-wheel for releasing said paper-feeding mechanism, substantially as and for the purposes set forth.

11. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress tending to actuate it, a type-wheel and means for actuating the same, type-wheel-feeding mechanism, and means controlled by the rotative position of the type-wheel and adapted to be actuated by the type-wheel-feeding mechanism for controlling the paper-feeding, substantially as and for the purposes set forth.

12. In a printing-telegraph receiver, the combination of a type-wheel, paper-feeding mechanism, a constantly-acting source of power, and means for continuously feeding the paper without feeding the type-wheel as long as said source is supplying power, for substantially the purposes set forth.

13. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereby, a type-wheel-mover shaft for feeding and retracting the type-wheel, mechanism controlling the operation of the type-wheel-mover shaft, and means for continuously feeding the paper without feeding the type-wheel, said means being connected to the mechanism which controls the operation of the type-wheel-mover shaft, substantially as and for the purposes set forth.

14. In a printing-telegraph receiver, the combination of a shaft and a type-wheel car-

ried thereby, a type-wheel-mover shaft for feeding and retracting the type-wheel, a clutch connected to control the direction of rotation of said type-wheel-mover shaft, mechanism for shifting said clutch, and means for continuously feeding the paper without feeding the type-wheel, said means being connected to the mechanism for shifting the clutch which controls the operation of the type-wheel-mover shaft, substantially as and for the purposes set forth.

15. In a printing-telegraph receiver, the combination of a shaft and a type-wheel thereon, a stop projecting from said shaft, a rock-shaft, a bell-crank lever fast thereon, another bell-crank pivoted to said first-named lever and forming a toggle, a spring connecting said levers, a finger on said other pivoted lever, and means for actuating said other pivoted lever, whereby when an abutment is afforded for the finger by the stop, the levers are moved relatively to each other about their pivot-point to break toggle, substantially as and for the purposes set forth.

16. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereon, a type-wheel-mover shaft, a clutch controlling the operation of said type-wheel-mover shaft, a toggle-acting lever interposed between the two shafts, and means for controlling the operation of said lever, substantially as and for the purposes set forth.

17. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereby, a type-wheel-mover shaft, a clutch controlling the operation of the type-wheel-mover shaft, a toggle-acting lever interposed between said shafts and connected to the clutch, and provided with an abutment on the type-wheel, and means for actuating said lever, substantially as and for the purposes set forth.

18. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereby, a type-wheel-mover shaft, a clutch controlling the operation of the type-wheel-mover shaft, a toggle-acting lever connected to said clutch, an abutment for said lever on the type-wheel shaft and controlled by the movements of said shaft, and means for actuating the toggle-acting lever to operate the clutch, substantially as and for the purposes set forth.

19. In a printing-telegraph receiver, the combination of a shaft and a type-wheel carried thereby, a type-wheel-mover shaft, a clutch controlling the operation of the type-wheel-mover shaft, a toggle-acting lever connected to said clutch, an abutment for said lever on the type-wheel shaft and controlled by the movements of said shaft, and a cam controlled by an escapement for actuating said toggle-acting lever to operate the clutch, substantially as and for the purposes set forth.

20. In a printing-telegraph receiver, the combination of a type-wheel shaft, a type-wheel-mover shaft, mechanism for controlling the direction of rotation of the type-wheel-mover shaft, and a toggle-acting lever connected to control said mechanism, substantially as and for the purposes set forth.

21. In a printing-telegraph receiver, the combination of a type-wheel shaft, a type-wheel-mover shaft, mechanism for determining the direction of rotation of said type-wheel-mover shaft, a toggle-acting lever connected to control said mechanism, and itself controlled by the type-wheel shaft, and means for actuating said toggle-acting lever, substantially as and for the purposes set forth.

22. In a printing-telegraph receiver, the combination of a type-wheel shaft, a type-wheel-mover shaft, mechanism for determining the direction of rotation of the type-wheel-mover shaft, a toggle-acting lever connected to control said mechanism, and itself controlled by a stop on the type-wheel shaft, and means for actuating said lever, substantially as and for the purposes set forth.

23. In a printing-telegraph receiver, the combination of a paper-feeding mechanism controlled by a rock-shaft, a lever 104 connected to said shaft, a bell-crank lever 113 pivoted to said first lever, said levers being under constant stress, and means for actuating the bell-crank lever 113 to actuate the rock-shaft and operate the paper-feeding mechanism, substantially as and for the purposes set forth.

24. In a printing-telegraph receiver, the combination of a toggle-acting lever connected to a rock-shaft, a paper-feeding mechanism under constant stress tending to actuate the same and connected to be released by movement of said rock-shaft, and means for actuating said lever to release said paper-feeding mechanism, substantially as and for the purposes set forth.

25. In a printing-telegraph receiver, the combination of mechanism under constant stress tending to actuate the same and connected to be released by movement of a rock-shaft, a toggle-acting lever connected to said rock-shaft, and means for actuating said lever to release said mechanism, substantially as and for the purposes set forth.

26. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress controlled by a rock-shaft, said rock-shaft being connected to be actuated by movement of a toggle-acting lever, and means for actuating said lever to break toggle and release the paper-feeding mechanism, substantially as and for the purposes set forth.

27. In a printing-telegraph receiver, the combination of paper-feeding mechanism under constant stress controlled by a rock-shaft, said rock-shaft being connected to be actuated by movement of a toggle-acting lever, means for actuating said lever to break toggle and

release the paper-feeding mechanism, and means for returning said rock-shaft to normal position, substantially as and for the purposes set forth.

28. In a printing-telegraph receiver, the combination of paper-feeding mechanism, a type-wheel shaft and type-wheel-mover shaft, and a toggle-acting lever connected to control the direction of rotation of the type-wheel-mover shaft and the operation of the paper-feeding mechanism, substantially as and for the purposes set forth.

29. In a printing-telegraph receiver, the combination of a type-wheel shaft and a type-wheel carried thereby, a type-wheel-mover shaft, a paper-feeding mechanism, a stop on the type-wheel shaft, a toggle-acting lever connected to control the direction of rotation of the type-wheel-mover shaft and the operation of the paper-feeding mechanism, and means whereby when said stop on the type-wheel-mover shaft is in position to form an abutment for the toggle-acting lever, the paper-feeding mechanism will be actuated, substantially as and for the purposes set forth.

30. In a printing-telegraph receiver, the combination of a paper-feeding mechanism, a toggle-acting lever under constant stress tending to maintain the parts in a given position, connection between the lever and paper-feeding mechanism, and means for actuating said lever to break toggle and thereby operate the paper-feeding mechanism, substantially as and for the purposes set forth.

31. In a printing-telegraph system, the combination with the line-circuit, of a printing-telegraph receiver, transmitting mechanism for sending impulses over the line, a motor for actuating the mechanism of the receiver, electromagnetic means for controlling the operation of said motor, and means independent of the transmitting mechanism for preventing the operation of said motor and controlling means at will, for substantially the purposes set forth.

32. In a printing-telegraph system, the combination of a transmitting mechanism, mechanism for sending impulses to the receiving-station, a receiving-station, electrical connections between the two stations including a printing-telegraph receiver, a motor for actuating the mechanism of said receiver, electromagnetic means for controlling the operation of the motor, and means at the transmitting-station independent of the transmitting mechanism for preventing the operation of said motor, and controlling means as desired from the transmitting-station, for substantially the purposes set forth.

33. In a printing-telegraph system, the combination of a transmitting-station, a receiving-station, electrical connections between the two including a printing-telegraph receiver, and transmitting mechanism for sending impulses over the line, a motor for actuating the mechanism for said receiver, electromagnetic means for controlling the operation of the motor, and means at the transmitting-station independent of the transmitting mechanism for preventing the operation of said motor, and controlling means as desired from the transmitting-station, for substantially the purposes set forth.

34. The combination of a type-wheel, means for rotating the same, and a means for moving the same longitudinally, step by step, for letter-spacing, a receptacle for ink movable longitudinally with the type-wheel, and a means in addition to said receptacle for continually supplying ink to the type from the said receptacle for ink, substantially as set forth.

35. In a printing-telegraph system, the combination of a transmitting-station, a receiving-station, electrical connections between the two including a printing-telegraph receiver, a transmitting mechanism for sending impulses over the line, a motor for actuating the mechanism of said receiver, a local source of power for the motor at the receiving-station, electromagnetic means for controlling the operation of the motor, and circuits and apparatus for preventing the operation of said motor and controlling means as desired, said circuits and apparatus being controlled from the transmitting-station independently of the transmitting mechanism, for substantially the purposes set forth.

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

JOHN M. JOY.

Witnesses:
WM. L. VAIL,
HAMILTON MUSK.

Disclaimer in Letters Patent No. 780,664.

DISCLAIMER.

780,664.—*John M. Joy*, New York, N. Y. PRINTING-TELEGRAPH RECEIVER. Patent dated January 24, 1905. Disclaimer filed April 19, 1909, by the assignee, *Page Machine Company*

Enters its disclaimer—

"As to claim 12 of every constantly-acting source of power in the combination of elements therein contained excepting a constantly-rotating drive-shaft." [*Official Gazette, April 27, 1909.*]