No. 744,165. PATENTED NOV. 17, 1903.

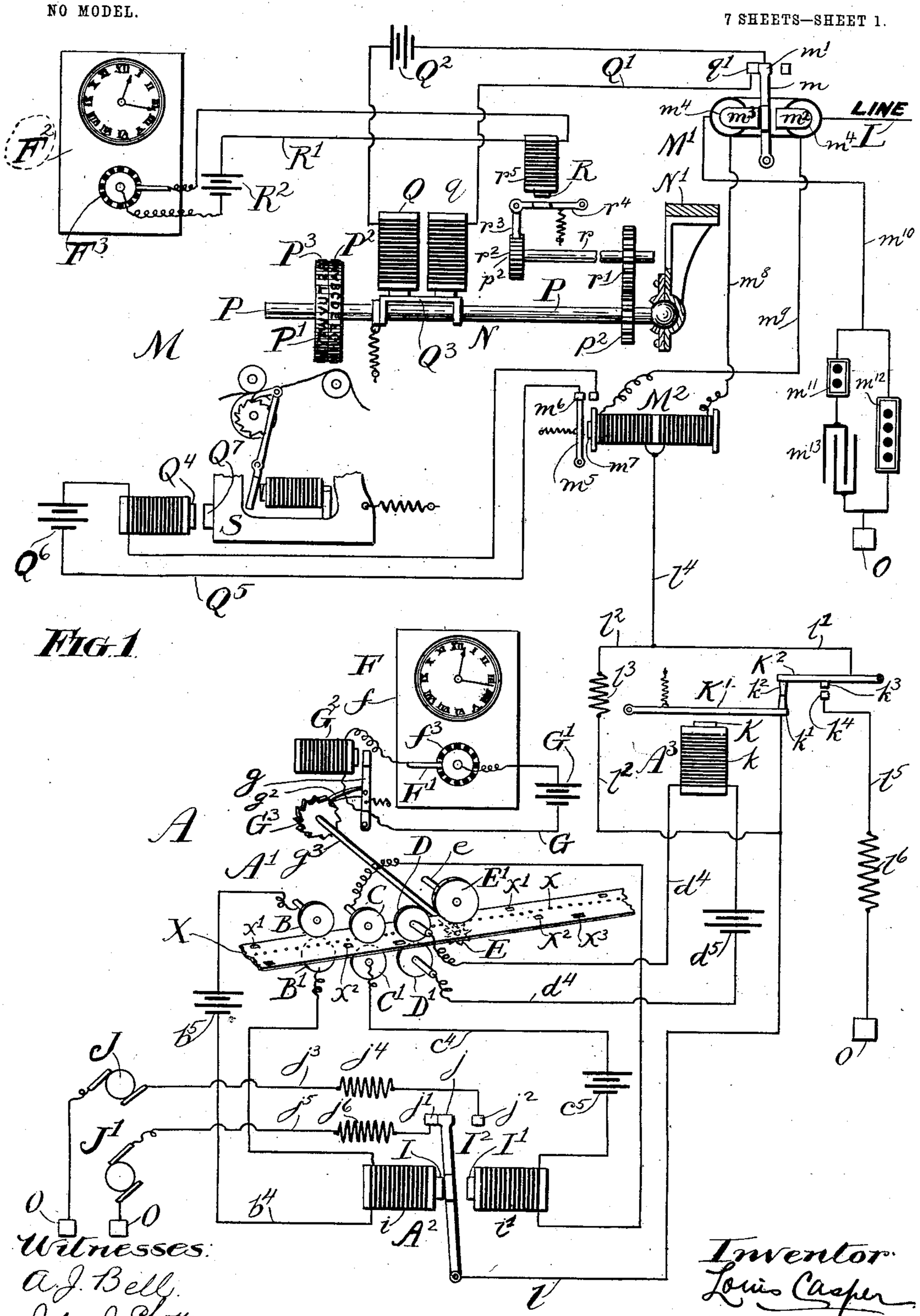
L. CASPER.

AUTOMATIC PRINTING TELEGRAPH SYSTEM.

APPLICATION FILED MAR. 10, 1898.

NO MODEL. 7 SHEETS—SHEET 1.

FIG. 1



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NO MODEL. 7 SHEETS—SHEET 2.

FIG. 2.

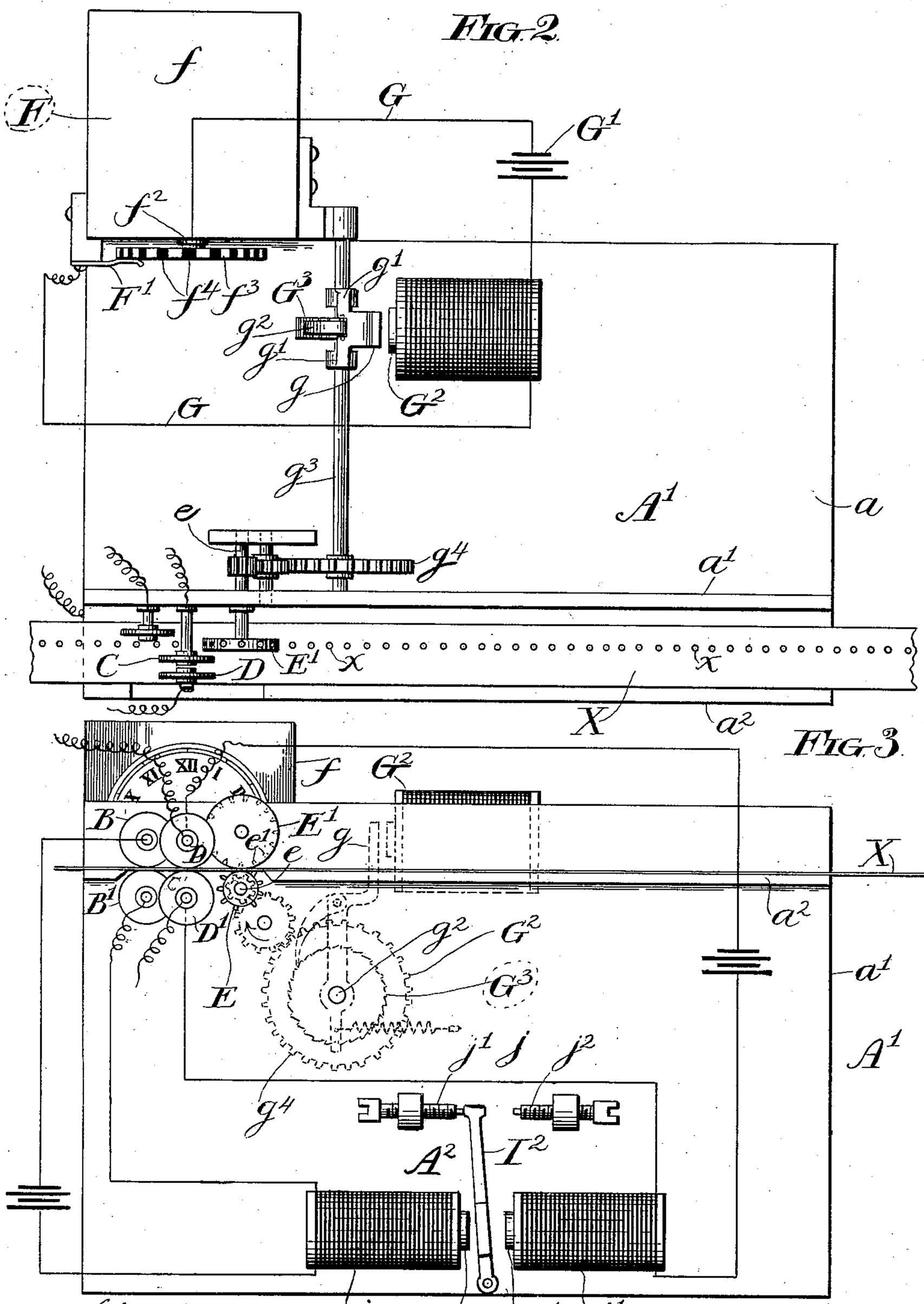

FIG. 3.

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Fred. D. Curtiss.

Inventor:
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FIG. 4

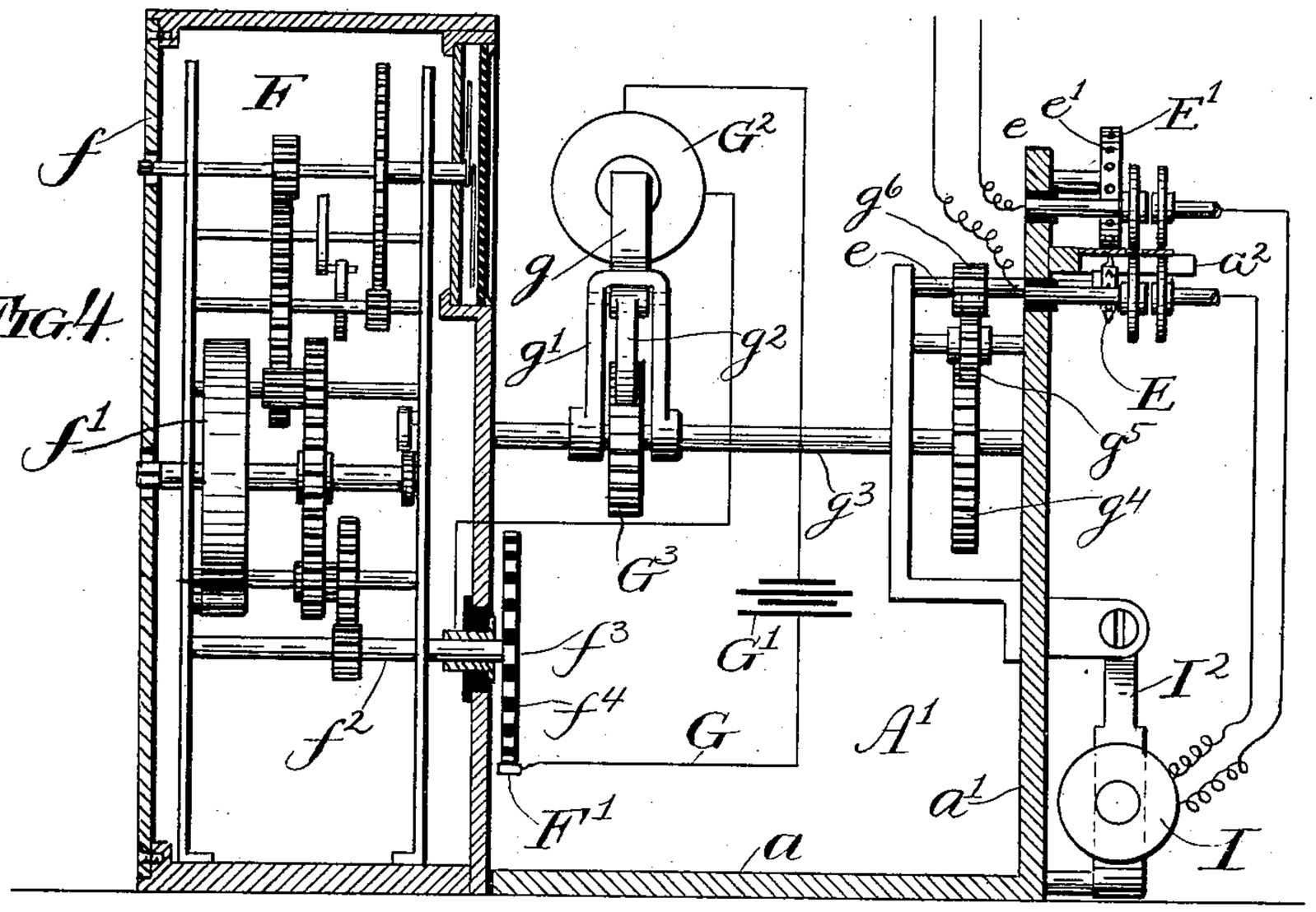


FIG. 5

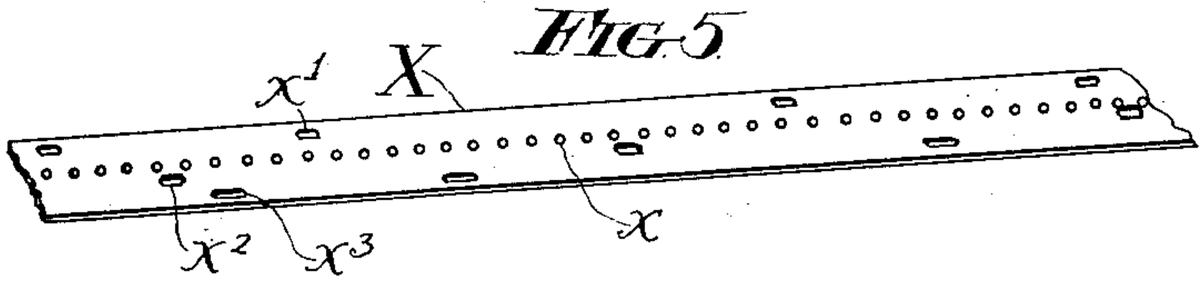
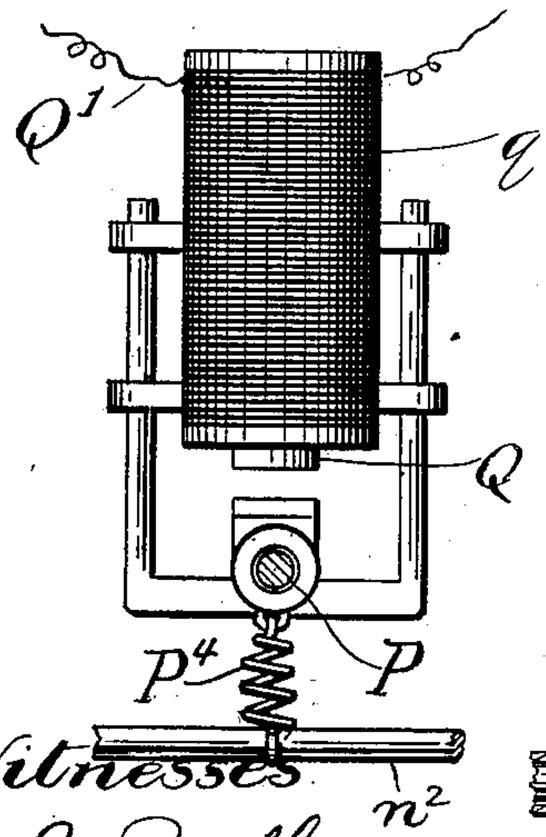


FIG. 9



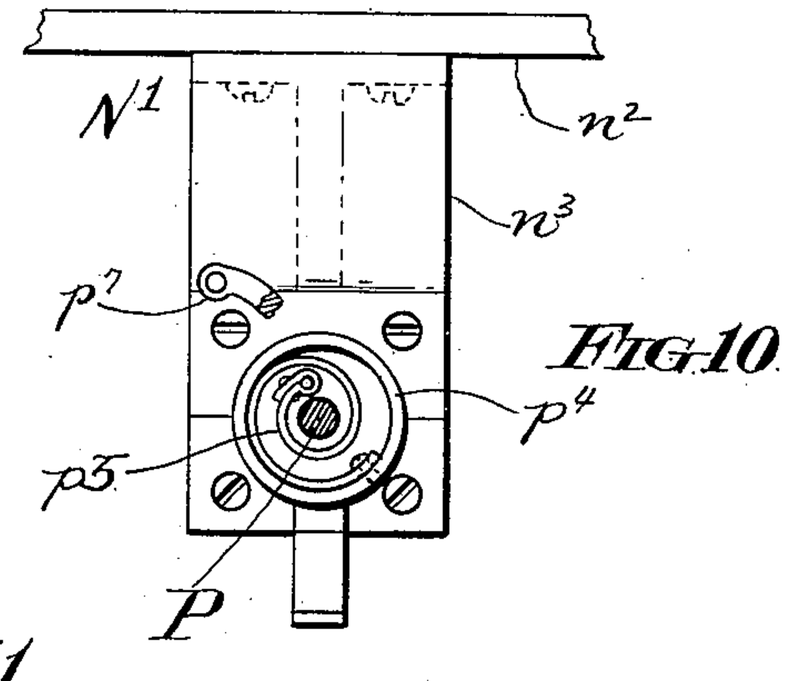
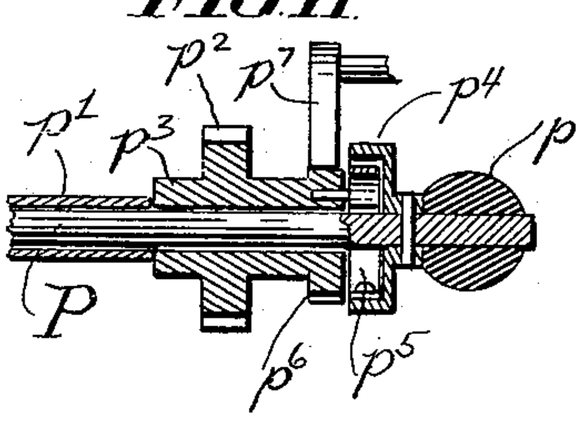


FIG. 10

FIG. 11



Witnesses
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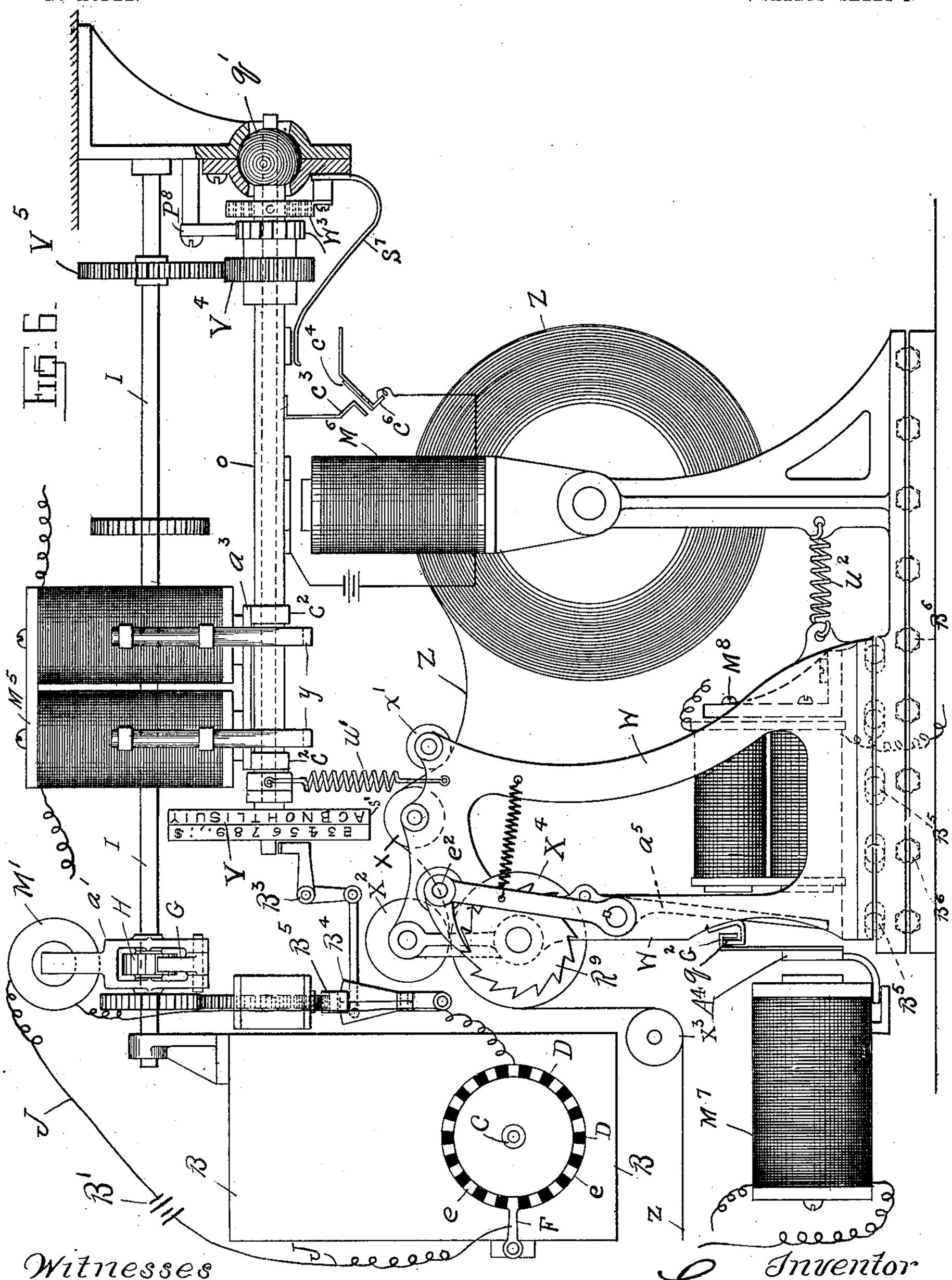
NO MODEL. 7 SHEETS—SHEET 4.

FIG. 6.



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AUTOMATIC PRINTING TELEGRAPH SYSTEM.

APPLICATION FILED MAR. 10, 1898.

NO MODEL. 7 SHEETS—SHEET 5.

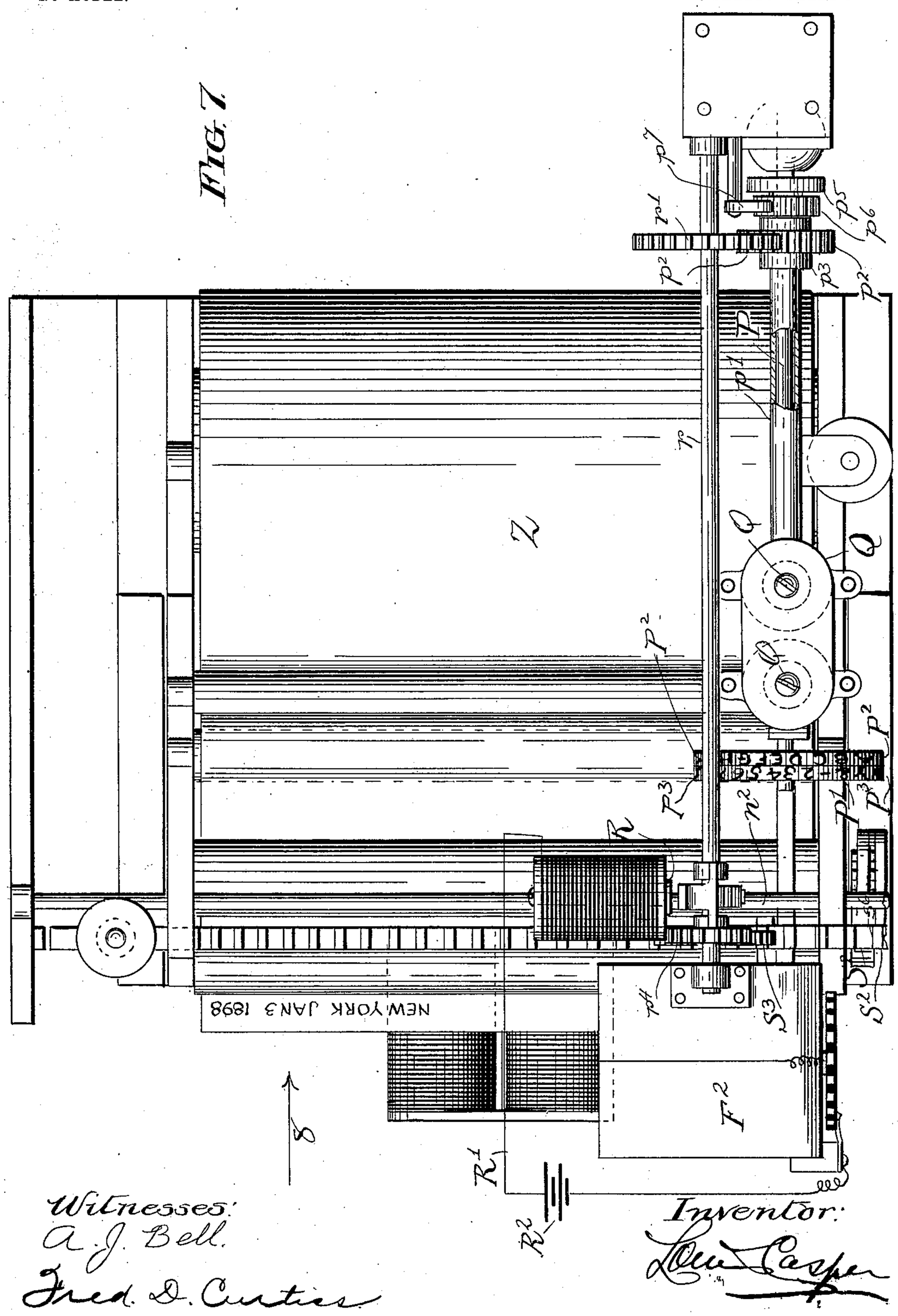

Fig. 7.

Witnesses:
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APPLICATION FILED MAR. 10, 1898.

NO MODEL. 7 SHEETS—SHEET 6.

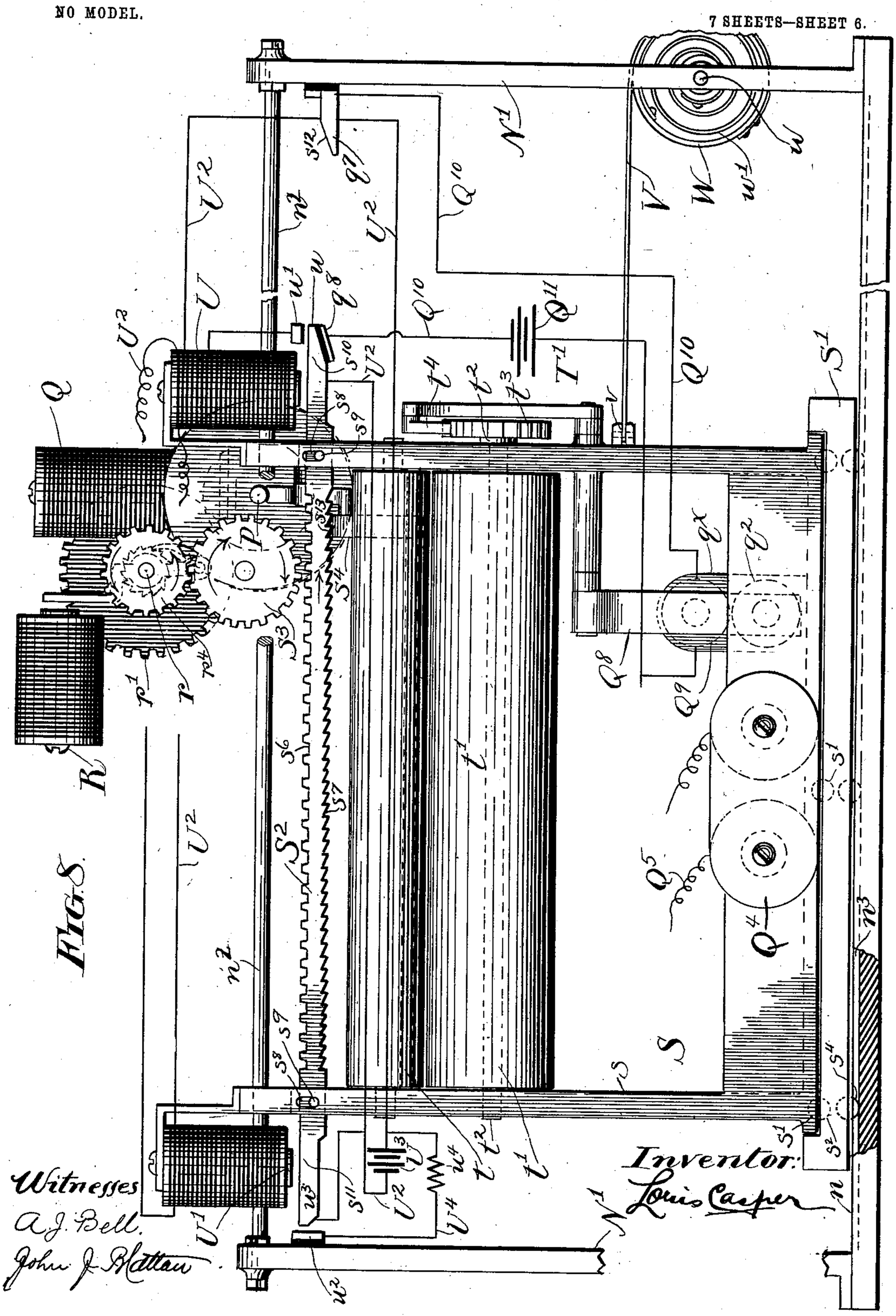

FIG. 8.

No. 744,165. PATENTED NOV. 17, 1903.

L. CASPER.

AUTOMATIC PRINTING TELEGRAPH SYSTEM.

APPLICATION FILED MAR. 10, 1898.

NO MODEL. 7 SHEETS—SHEET 7.

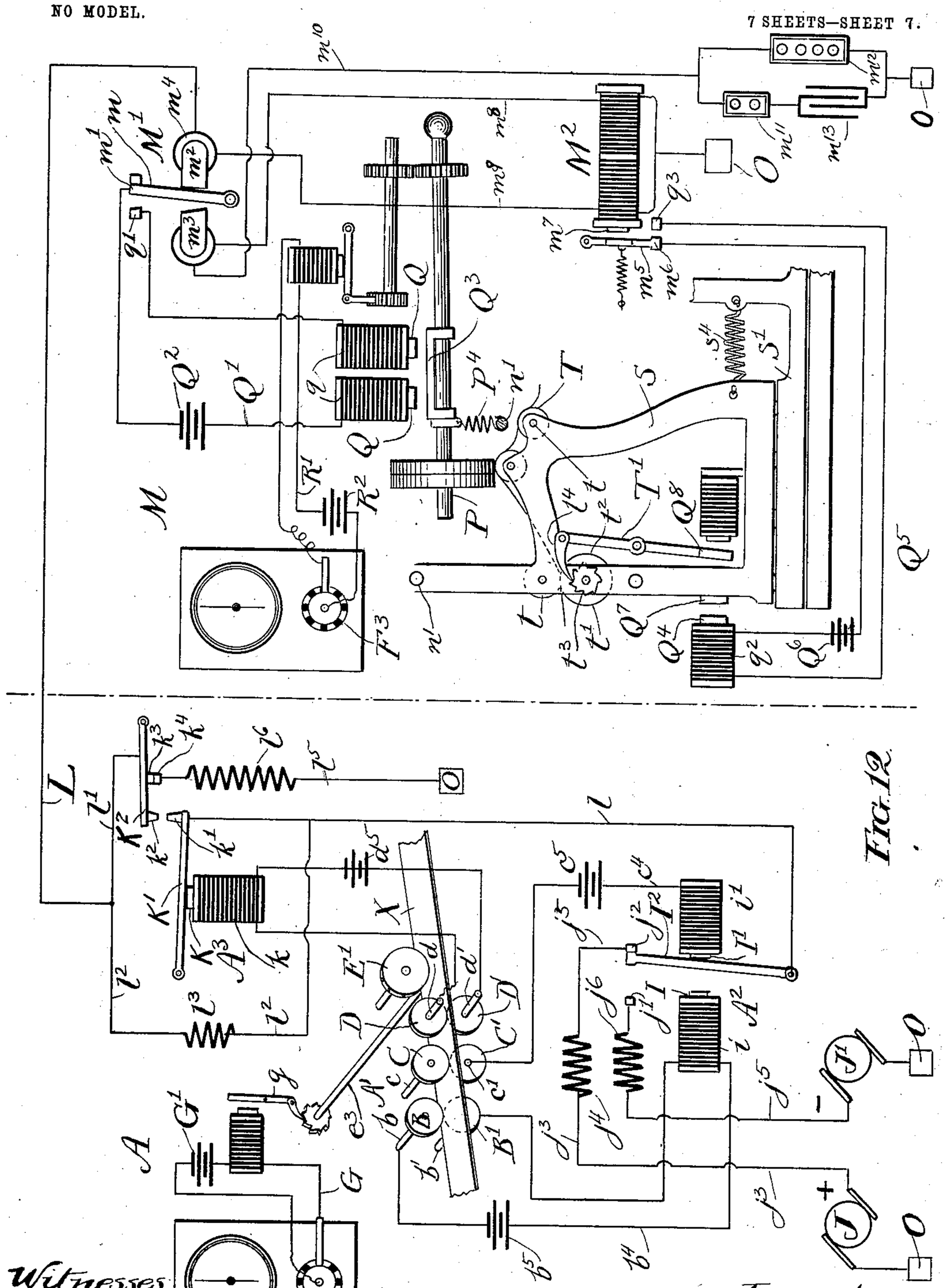

FIG. 12.

Witnesses:
A. J. Bell.
Fred. D. Curtiss Jr.

Inventor:
Louis Casper

No. 744,165. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

LOUIS CASPER, OF CHICAGO, ILLINOIS.

AUTOMATIC PRINTING-TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 744,165, dated November 17, 1903.

Application filed March 10, 1898. Serial No. 673,347. (No model.)

To all whom it may concern:

Be it known that I, LOUIS CASPER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Printing-Telegraphs, of which the following is a specification.

The present invention relates to improvements in apparatus or appliances in the above class, the purpose of the invention being to transmit messages by means of multiple signals, of sending the same over a single wire, and at a receiving-station to automatically print the message in page form instead of on a tape, as has heretofore to some extent been done. This I accomplish by apparatus having a transmitter and receiver which embody some novel features in their construction and operation, some of the principal features being as follows: a transmitter capable of sending multiple signals or impulses which vary in polarity and current intensity, the devices in the transmitter for effecting this purpose are actuated by a tape having different series of perforations, and this tape is fed or controlled by a motor which is synchronous in action to a similar motor operating the printing-wheel of the receiver.

The receiver has a movable paper-holder or platen, a type-wheel, and devices for receiving the multiple signals from transmitter, so as to operate the type-wheel and print the message in page form. The printing-wheel of the receiver has two circumferential rows of type and means for shifting the cylindrical platen, so as to print from one or the other of these rows of type. By doing this I am enabled to use a small printing-wheel, and as the tape in transmitter has two rows of perforations spaced according to the circumferential positions of type or printing wheel and another row for shifting the platen it will be seen that by this compact arrangement of perforations I can place a message on the transmitting-tape, so as to occupy about one-half the space it would occupy if placed in one continuous line. As I employ a minimum number of signals for each letter, the time required for preparing the tape, for sending the message, and for printing it is comparatively brief. The receiver has also some novel features in the means employed for automatically operating the paper-carriage and spacing the lines. These and other features embody a telegraphic system that is practically automatic, requiring but small attention and permitting messages to be transmitted and printed in less time than has heretofore been done.

I have illustrated the above and other features in the accompanying drawings and will hereinafter fully describe the same.

In the drawings, Figure 1 is a diagrammatic view of a station having apparatus embodying features of my invention, local circuits and transmitting and receiving apparatus being shown as arranged for working over a single line-wire. Fig. 2 is a top view of the main transmitting appliance, which I will ordinarily designate as the "transmitter," supports for some of the contact-disks not being shown. Fig. 3 is a side view of same. Fig. 4 is a vertical section of Fig. 2, taken on line 4 4. Fig. 5 is a perspective view of the transmitting-tape. Fig. 6 is a side elevation of the printing-machine in receiving apparatus and which I will usually briefly designate as the "receiver." In this view a portion of the stationary framework of the machine is broken away. Fig. 7 is a plan view of the receiver. Fig. 8 is an end view of same viewed in direction of the arrow 8 in Fig. 7, the clockwork being removed. Fig. 9 is a sectional detail of magnets for shifting type-wheel shaft. Fig. 10 is sectional detail of shaft, showing a take-up device which allows a portion of the connections to shaft to turn while the type-wheel is making an impression. Fig. 11 is a detail showing a longitudinal section of take-up device and shaft; and Fig. 12 is a diagrammatic view of two stations, showing transmitting apparatus at one station and receiving apparatus at the other.

The apparatus employed in this invention is usually equipped or arranged for actual work, as shown in Fig. 1, so that a single wire may be used to transmit and receive messages; but for the purposes of illustrating the relationship of the transmitting apparatus to the receiving I have shown in Fig. 12 the two kinds of apparatus connected between individual stations and will first describe the apparatus so arranged.

The transmitting apparatus at a station is referred to as a whole by A, and where so designated the group of local and line appliances there is meant. This group comprises in reality a principal transmitter or signaling-machine A′, with local circuits and two line-transmitters A^2 and A^3, respectively. Briefly described, the transmitting apparatus will also be found to have the following features: a main transmitter or signaling-machine A′, having tape-feeding mechanism operated by a motor having a time-movement synchronous with a similar motor which operates the printing-wheel of the receiver; three contact devices in the signaling-machine operated by a tape which has a row or series of perforations for each device; a pole-changing transmitter A^2, having two local circuits in which two of the above contact devices are placed, this transmitter belng capable of sending two line-signals, positive and negative impulses, and in the receiver a polar relay responds to them; a transmitter or circuit-shifter A^3, its local circuit having the third contact device, this transmitter being capable of sending signals of either high or low current intensity. A differential relay in receiver responds to the transmitter A^3.

In addition to the above suitable sources of electricity are provided for working the local and line circuits.

It will be seen from the brief enumeration given of the devices embodied in the transmitting apparatus that it is capable of producing multiple electromagnetic signals varying according to their polarity and in the intensity of the current transmitted.

The following is a detailed description of the transmitting apparatus, the tape being first described.

X is the tape for actuating the contact devices in the signaling-machine. This is of any suitable material, preferably strong paper which has been rendered non-conducting by having been paraffinized. The tape has a series of equidistant small perforations x running centrally and longitudinally. These perforations are engaged by a feed-wheel, hereinafter referred to, and cause the tape to run uniformly and regularly. The tape is provided with three rows or different series of perforations x', x^2, and x^3. Two rows of these perforations, x' and x^2, represent the positions of the letters in the two rows of type in the printing-wheel. In other words, the perforations x' x^2 represent according to their position the letters or characters, spaces, &c., of a message and are placed on the tape so that their position or distance apart is coincident to the circumferential positions that the various letters occupy on the printing-wheel in the receiver. This printing-wheel has two rows or series of type. The alphabet, punctuation-marks, figures, and suitable characters comprise about thirty-six type, and these are divided into two rows, each consisting of eighteen type and one space-mark. Normally one of these rows is centrally over the cylindrical platen of the receiver. The perforations x^3 on tape are for actuating a contact device which sends a signal which causes the paper-holder to shift and bring the platen under the second row of type on printing-wheel. The perforations x^3 are elongated or of a length which produces a signal of longer duration than one of the printing-signals, the object being to move the paper-holder or platen first and hold it in proper position during the operation of printing. The transmitting-type is first prepared with the perforations for a message in a perforating-machine, and as any machine commonly employed for this purpose may be used I will not give a description of one.

In the transmitting apparatus A′ refers to the signaling-machine, which has a base a, a framework a', and a shelf or table a^2, which serves as a support for the tape X.

B B′, C C′, and D D′ are the metal disks of three contact devices. These disks are in pairs mounted, respectively, on short shafts $b\,b'$, $c\,c'$, and $d\,d'$, and these shafts have bearings in parts of the framework a', so as to be insulated from each other. Wires b^4, c^4, and d^4 are the lines of three local circuits in which the contact-pieces referred to interpose. Normally each pair of contact-pieces are separated by an unperforated part of the tape X intervening. Batteries b^5 c^5 d^5 or other suitable sources of electricity are indicated for working the circuits b^4 c^4 d^4.

A^2 is a pole-changing transmitter. It has electromagnets I I′. The helices i and i' of said magnets are respectively in the local circuits b^4 and c^4. I^2 is a polarized armature or lever, which is normally pulled to one or the other of the magnets I and I′, according to which circuit is closed. Thus when a perforation x' on tape permits the contact-pieces B B^2 to some together the circuit b^4 is closed and the polarized armature I^2 is pulled over to the magnet I and a negative current, for instance, is sent to transmitting-line z. A perforation x^2 on tape permits the contact-pieces C C′ to close the circuit c^4, which causes the magnet I′ to pull over the armature I^2 and change the polarity of the current, and thus transmit a different signal.

The polarized armature or bar I^2 has a contact-point j, which engages either of the contact-points j' and j^2, so as to throw one of the current-wires j^3 j^5 into line l and send a positive or negative current, these current-wires being provided with dynamos J J′, respectively, or other suitable means for providing electric currents. Resistance-coils j^4 j^6 are placed in the lines j^3 j^5.

A^3 is a transmitter or circuit-shifter. This transmitter has an electromagnet K with a helix k in a local circuit d^4. A perforation x^3 will allow the contact-pieces D D′ to close the circuit d^4 and operate the bar or armature K′, which breaks the local line $l\,l'$ and causes the current from one of the primary lines j^3

or j^5 to pass through the line $l\ l^2$ and resistance-coil l^3. The interposition of the resistance-coil l^3 causes a current of lighter intensity to pass through the wires $l\ l^2$ than that which goes over wires $l\ l'$. The bar K′ has a contact-point k'.

K^2 is a bar with points k^2 and k^3, the point k^2 engaging the point k' on bar K′ when the line $l\ l'$ is closed. When this local line is closed, there is no circuit through the bar K′, the point k^3 at that time engaging the point k^4 of an artificial line l^5, having a resistance-coil l^6.

L is the line-wire between two stations.

O refers to ground or earth plates in both the transmitting and receiving apparatus.

The tape-feeding mechanism in the signaling-machine A′ consists of the following: E is a star-wheel placed below where the tape X runs. The teeth of this wheel engage the equidistant perforations x of tape. Above the star-wheel is a roller or wheel E′, which may have perforations e', into which the star-wheel meshes. The upper wheel E′ acts as a presser on the tape, thus making its engagement with star-wheel positive.

The star-wheel E has a shaft e, which is driven by any suitable motor and which consists, preferably, of the following means which are intended to feed the tape at a speed that will be synchronous with the circumferential speed of the type-wheel in receiver.

F refers as a whole to clock mechanism inclosed in a case f. This clock is driven by a spring f' and is controlled by any suitable time-movement. Projecting from the clock is a small shaft f^2, having a commutator or circuit-breaker f^3. A contact-spring F′ engages the commutator, which has insulated parts f^4.

G is a short local line having a battery G′ and an electromagnet G^2. The armature g of magnet is connected with an arm g' to a pawl g^2. This pawl engages a ratchet-wheel G^3, which has suitable gearing for driving the star-wheel E. As shown, the ratchet-wheel is mounted on a shaft g^3, which has a gear-wheel g^4, which engages a smaller gear g^5, which meshes into a pinion g^6 on the shaft e of the star-wheel.

M refers as a whole to the receiving apparatus at a station and, briefly described, has the following features: a polar relay M′, responding to changes in polarity of current caused by the pole-changing transmitter A^2 at transmitting-station; a differential relay M^2, which is actuated by low or high changes in intensity of current caused by the action of transmitter A^3 at transmitting-station; a printing-receiver N. The polar relay M′ operates a local circuit in receiver which will cause the printing-wheel to be depressed and cause it to make an impression. The printing-wheel revolves at a speed that is synchronous with the movement of the signaling-tape in transmitter, and the speed of type-wheel is so regulated by a motor having a time-movement similar to the one employed in the transmitter. The speed of the two motors is first made synchronous by tests made by ordinary line instruments by which the time-movements are adjusted and set until the motors at both stations are made to run synchronously. The receiver has a double-faced printing-wheel, with the type for alphabet, figures, &c., arranged to occupy the two rows. Below the type-wheel is a paper-carriage having a cylindrical platen, which normally keeps it below one of the type-faces.

The differential relay already referred to actuates mechanism which will cause the paper-carriage to shift and bring the platen centrally under second row of type on wheel. The paper-carriage has also a movement somewhat similar to carriage of ordinary typewriter, so that after each type impression it moves itself into position for the next impression. This movement is transversely to the shaft of printing-wheel. At the end of a line the carriage automatically shifts itself back into a position to begin a new line, the paper also being moved suitably. The automatic movements of the paper-carriage are effected by suitable electromagnetic mechanism in local circuits.

The following is a more specific description of the receiving apparatus.

N refers as a whole to the printing appliance of receiver.

N′ is a stationary frame having a bed n, vertical sides n', and longitudinal cross pieces or rods n^2. A bracket n^3 is provided with a socket-bearing n^4, in which an oscillating shaft P is mounted, a ball-like enlargement p engaging the socket n^4. The shaft P is provided near its outer end with a printing-wheel P′, which has two series of circumferential type or printing characters P^2 P^3. These characters consist of an alphabet, numerals, punctuation-marks, and such signs as are commonly used in writing, such as "&," "$," and so forth. Any number of type may be employed; but I prefer to use about thirty-six, placing in one of the rows eighteen of the letters of alphabet most commonly used and placing in the other row the remaining letters and characters. Mounted on the shaft P is a gear-wheel p^2, which engages a gear-wheel r' on a shaft r. This shaft has bearings in the stationary frame N′. On the shaft r is a ratchet-wheel r^2. r^3 is a pawl which engages said wheel and is attached to the pivoted arm r^4, which is provided with an armature r^5.

R is an electromagnet for actuating the armature r^5. This magnet has a helix r^6 in a local circuit R′, which has a battery R^2. Placed in the circuit R′ is a circuit-breaker or commutator F^3, which is mounted on a shaft f^5, the said shaft being actuated by clockwork $F^\times$, similar in all respects to the clockwork F, which revolves the commutator F^3 for actuating the main transmitting appliance A′.

The gear-wheel p^2 is connected to the shaft P, so that the gear-wheel may turn while the type-wheel is stationary during operation of printing, and means are also provided so that the printing-wheel will take up or recover its lost motion, as follows: p^4 is a collar fixed on shaft P. p^5 is a spiral spring, one end of which is attached to collar p^4 and the other end to hub or stem p^3 of wheel p^2. A ratchet-wheel p^6 on stem p^3 and a pawl p^7 may be employed, but are not absolutely essential.

When the type-wheel makes an impression, the gear-wheel p^2 does not become disengaged from the gear p', but the type-wheel becomes stationary, but the gear-wheel p^2 turns on, the spring connection p^5, as shown in Fig. 11, permitting it to do so. On the wheel leaving the paper the tension of the spring causes the wheel to take up its lost motion and resume its proper position.

Above the hollow shaft p' are placed electromagnets Q, having helices q in a circuit Q'. Q^2 is a battery in said circuit.

m is a pivoted armature provided at its top with a contact-point m', which when it engages the contact-piece q' will close the circuit Q' and energize the magnets Q. The armature m is placed between poles m^2 and m^3 of the magnet m^4 of the polar relay M'. Below the magnets Q is an armature Q^3, which is mounted on the shaft p'.

P^4 is a spring for pulling the printing-wheel downward when the armature Q^3 is released from magnets Q. The said spring is attached to the shaft p' and to a cross-rod n'. It will be observed that the shaft P oscillates in a vertical plane, the spring P^4 causing the printing-wheel to quickly strike the paper underneath, and when the magnets Q are energized the shaft is drawn up.

S is the paper-carriage, which is movable longitudinally with respect to itself or transversely to the axis of printing-wheel. This carriage is also provided with means for effecting a slight movement, so as to change the position of paper under the type-wheel and bring the platen centrally under the second series of type on printing-wheel when so desired. The carriage is provided with a frame s. This is mounted on balls or rollers s' which run in grooves s^2 on a table S', which is also provided with ways s^3 to prevent the displacement of the sliding frame s from table. The table S has ball or roller bearings s^4, which run in longitudinal grooves n^3 in the bed n of the stationary frame of receiver.

Q^4 represents magnets having helices q^2 in a circuit Q^5. Q^6 is a battery in same.

m^5 is a pivoted armature having a contact-point m^6, and q^3 is a contact-piece which is engaged by said point, so as to close circuit when the armature m^5 is drawn by the magnet m^7 of the differential relay M^2. When the circuit is closed, the magnets Q^4 are energized, so as to effect an armature Q^7 on the carriage S and pull same into a secondary position, so as to place the paper under second series of type on printing-wheel. A spring s^5 draws the carriage back into its first position when the armature is released.

T is a roller or cylindrical platen having bearings at t on the carriage S. T^2 is a supply-roller mounted on stationary part of frame. Z is the paper. $t\ t$ are feed-rollers. All of said rollers are arranged longitudinally in paper-carriage or transversely to axis of type-wheel.

t^3 is a ratchet-wheel mounted on shaft t^2 of roller T^2.

T' is a pivoted arm provided at one end with a pawl t^4, which engages the wheel t^3, and at its other end with an armature Q^8.

Q^9 is a magnet for actuating the armature Q^8. The helix $q^\times$ of the magnet Q^9 is in a circuit Q^{10}, having a battery Q^{11}. q^7 and q^8 are contact-pieces in said circuit. The contact-piece q^7 is placed on the stationary frame N' and the contact-piece q^8 on a part of the movable carriage S. When the end of a line is reached, the carriage reaches its extreme movement and the contact-pieces q^7 and q^8 engage each other. This closes the circuit Q^{10} and causes the magnet Q^9 to actuate the lever or arm T', and the pawl on same moves the ratchet-wheel one notch forward, thus moving the paper into position for a new line to be printed.

The mechanism for moving the carriage longitudinally after each letter or space and also back into position to begin a new line is as follows: S^2 is a horizontal bar placed longitudinally near top of carriage S and mounted so as to be capable of moving slightly in a vertical plane. The bar S^2 is provided on the upper side with a rack s^6 and on its lower side with serrations or teeth s^7. The bar S^2 is mounted in slots s^8 in frame N', s^9 being retaining-pins, but which permit the bar to move up or down. S^3 is a gear-wheel, which engages the rack s^6 when the bar is in its upper position. The wheel S^3 is actuated by a wheel r^4 on the shaft r. The bar S^2 projects beyond the carriage S at s^{10} and s^{11}, the said projection forming armatures above which are placed magnets U U', having a circuit U^2 and a battery U^3. u^2 is a contact-point insulated on frame N', and u^3 is a contact-point on the bar S'. U^4 is a short circuit tapping the wires of circuit U^2 near battery and running to contact-points u^2 and u^3. u^4 is a resistance-coil.

When the carriage S has traveled so as to be at the end of a line, the said carriage will be toward the right hand in the frame N', as viewed in Fig. 8. On reaching its extreme position there the beveled contact-point q^8 on the bar S^2 engages the contact-point q^7, closing circuit Q^{10}. This energizes the magnet Q^9, causing the armature Q^8 to actuate the arm T', pawl t^4, and roller t', thus moving the paper ahead one notch. The beveled end of bar S^2 at the same time rides up the part s^{12} and contact is made between the points u

and u'. This closes the circuit of the line U^2 and the magnets U and U′ pull up the bar S^2, so as to place the wheel S^3 in engagement with the rack S^6 on the bar S^2. The wheel S^3 will then move the carriage S to the left until the points u^2 and u^3 engage, when a short circuit will be formed through the line U^4, thus causing the bar S^2 to drop out of engagement with the wheel S^3, when the operation of printing a new line may proceed. The tape at the transmitting-station may be left blank at regular intermissions, so that the rack of carriage S will not interrupt transmitted signals for printing.

V is a cable or flexible strip attached to the carriage S at v and to a drum W, pivoted to stationary frame N′ at w. w' is a coiled spring within the drum, which provides means for pulling the carriage back after the cog-wheel S^3 has brought same into position for beginning a line.

The operation of the carriage S, just described, is as follows: When the end of a line is reached, the carriage will be in a position opposite to that shown in Fig. 8, and the bar S^2 will have its contact-point q^8 engaging the point q^7. Where these two points first touch, the circuit Q^{10} will close and operate magnets Q^9, the armature Q^8 being drawn so as to operate the arm T, pawl t^4, and thus move the ratchet-wheel t^3 forward one notch, and thus carry the paper into position for a new line. The point q^8 by this time will have moved up the slope s^{12} of the contact-point q^7, which will bring the point u on the bar S^2 against the point u', thus closing the circuit U^2. This will energize the magnets U and U′, thus pulling the bar S^2 up, so that the rack s^6 on same will engage the cog-wheel S^3. This wheel will then drive the carriage to the position shown in Fig. 8. The points u^2 and u^3 will touch and short-circuit the battery by means of the lead U^4, and bar S^2 will drop, as shown in Fig. 8. The carriage will then be in a position for printing a new line. When a letter is impressed on the paper, the outer end of shaft P strikes a lever S^4, so as to move a catch S^5, having a grooved or toothed head s^{13}, which engages the teeth s^7 of the bar S^2. The movement of this catch permits the carriage to move forward one space, the carriage being pulled by the strip V, attached to the drum W. This movement is continued until the line is printed, when the operation of reversing carriage, &c., will be repeated until the desired matter or telegram has been received and printed. In preparing the tape X an allowance for reversing of carriage is made in perforating the tape. For instance, seventy-five letter-spaces are used, then an equivalent blank space is inserted, so as to allow for the reversal of carriage.

The foregoing description relates principally to where transmitting apparatus only and receiving apparatus are placed at opposite ends of one wire, as shown in Fig. 12; but in carrying out my invention in actual practice I preferably arrange the apparatus as shown in Fig. 1, where the transmission of signals is carried out by means of one wire or on a quadruplex system. Thus the transmitter A and receiver M send and receive over one wire. In so arranging the apparatus the local line from transmitter A over connections $l\ l'$ on $l\ l^2$ passes over a wire l^4 through the differential relay M^2 to the polar relay M′ by means of wires m^8 and m^9 and to the line L. To equipoise transmission from opposite direction, I employ an artificial line m^{10}, having rheostats m^{11} and m^{12} and a condenser m^{13} and a terminal or ground plate O.

The action of the transmitting apparatus and operation of the receiver are as follows: The tape X, with a prepared message, is inserted between the contact-rollers and the star-wheel E and the wheel E′. The star-wheel will then pull the tape along. The apparatus at both ends are placed in synchronism by test-signals. A perforation x' will cause disks B and B′ to close the circuit b^4 and energize the magnet I, which causes a current of higher pressure from J′ to pass through line $l\ l'\ l^4$ to the differential relay M^2 of the receiver and onto the polar relay M′, where a positive or negative current will open or break the local circuit Q′, according to the desired arrangement. On the circuit Q′ being closed the magnet Q^2 will keep the printing-wheel P′ out of contact with paper. On being open the wheel will drop. When the contact-disks C and C′ close the circuit c^4 a current of higher pressure from the dynamo J passes to the line, and will, for instance, pass through relay M^2 and to polar relay M′, where, if so arranged, it will operate relay so as to close the circuit Q′ and cause printing-wheel to make an impression. When the disks D and D′ close the circuit d^4, the magnet K drops the bar K′ and causes the current to pass through the resistance-coil l^3, thus causing a current of lower pressure to pass to line and to differential relay M^2. This current will operate the relay so as to close the local circuit Q^5, which will excite the magnet Q^4, thus attracting the armature Q^7 on the carriage S, which will pull the carriage forward, so as to place the platen T under a different or second row of type. On the circuit U^2 being broken the carriage shifts back into its former position.

In Fig. 6 I have shown a magnet w^3, having a circuit w^4 and a contact-point arranged on shaft p' and in said circuit. This is for the purpose of preventing the shaft from springing back during operation of printing. It may be dispensed with and is only used to meet an emergency.

While I have described a machine employing a perforated tape for transmitting multiplex signals, any other appliance which will transmit the same class of signals may be employed in connection with the printing-receiver mentioned, a specific feature being that the transmitting and receiving appara-

tus should be governed by synchronous mechanism or motors. In the details of the transmitting and receiving appliances many of the features may be modified without departing from the spirit of the invention.

What I claim is—

1. In a printing-telegraph, a transmitter having mechanism for feeding a perforated tape, the said mechanism being controlled by a motor having a movement synchronous with a motor which operates the printing-wheel of receiver, in combination with contact devices each of which consists of a pair of disks arranged one above and below the transmitting-tape so as to close the circuit when a perforated part of tape passes between the disks and actuate a transmitting device, as set forth.

2. In a printing-telegraph, receiving apparatus having a printer provided with a type-wheel mounted on an oscillatory shaft means for holding the type-wheel away from platen, a cylindrical platen mounted on a paper-carriage which travels transversely to the shaft of type-wheel means for moving paper-carriage and means for releasing or impressing printing-wheel on the paper, as set forth.

3. In a printing-telegraph, receiving apparatus having a printer provided with a wheel having two rows of type, a motor for rotating said wheel and having a movement synchronous with a similar motor which controls the transmitting apparatus, a paper-carriage, means for moving same longitudinally, means for moving the carriage transversely so as to place the platen under one or the other of the rows of type on printing-wheel and means for impressing said wheel, as set forth.

4. In a telegraph of class described, a printing-receiver having a type-wheel, a motor for rotating same, the said motor having a movement in synchronism with a motor controlling the transmitting apparatus, a paper-carriage, means for moving same longitudinally, means for moving the carriage transversely so as to place the platen under different rows of type on a printing-wheel and means for impressing said wheel, as set forth.

5. In a printing-telegraph, receiving apparatus having a printing-wheel, means for rotating same, a paper-carriage, means for moving same longitudinally, means for shifting the carriage transversely so as to place the platen under different rows of type on printing-wheel, a polar relay controlling the printing movements of wheel, and a differential relay controlling the shifting movements of paper-carriage, the said relays being operated by transmitting apparatus having means for changing polarity and intensity of currents over line, as set forth.

6. In a telegraph of class described, a printing appliance having a type-wheel, mounted on an oscillatory shaft provided with a spring connection to a gear-wheel, mechanism for driving same, a paper-carriage, means for moving same, and means for impressing the type-wheel, as set forth.

7. In a telegraph of class described, a printing appliance, comprising a stationary frame, a type-wheel mounted on an oscillatory shaft, electromagnets, means for controlling position of type-wheel with regard to platen, a paper-carriage having a cylindrical platen, means for moving the carriage longitudinally and means for moving the paper after each type-impression, in combination with a relay which controls the magnetic means effecting position of type-wheel, as set forth.

8. In a telegraph of class described, a printing appliance having a paper-carriage provided with a cylindrical platen, a supporting-frame, means for moving the carriage longitudinally and electromagnetic means for moving the carriage transversely, the said means being under control of a relay effected by signals from line, as set forth.

9. In a telegraph of class described, a printing appliance provided with a type-wheel, electromagnets means for controlling the printing position, of wheel, a relay for controlling said means, the relay being effected by signals which vary as to polarity, a paper-carriage means for moving same longitudinally, means for shifting the carriage transversely, the said means being controlled by a differential relay effected by signals from line which vary in intensity, as set forth.

10. In a telegraph of class described, a printing appliance provided with a type device, electromagnets, means for controlling printing position of same, a relay controlling said means, a paper-carriage, means for moving same longitudinally, means for shifting the carriage transversely so as to bring the carriage under different rows of type on printing-wheel, and a relay which controls means for shifting carriage, as set forth.

11. A printing-telegraph having transmitting apparatus provided with means for sending signals which vary as to polarity and to intensity of currents in combination with receiving apparatus having a printing appliance, a relay controlling means for regulating the position of the type device and a relay controlling means for regulating the position of the platen, the said transmitting and receiving apparatus being provided with motors adapted to keep their respective apparatus in synchronism, as set forth.

LOUIS CASPER.

Witnesses:
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