(No Model.)

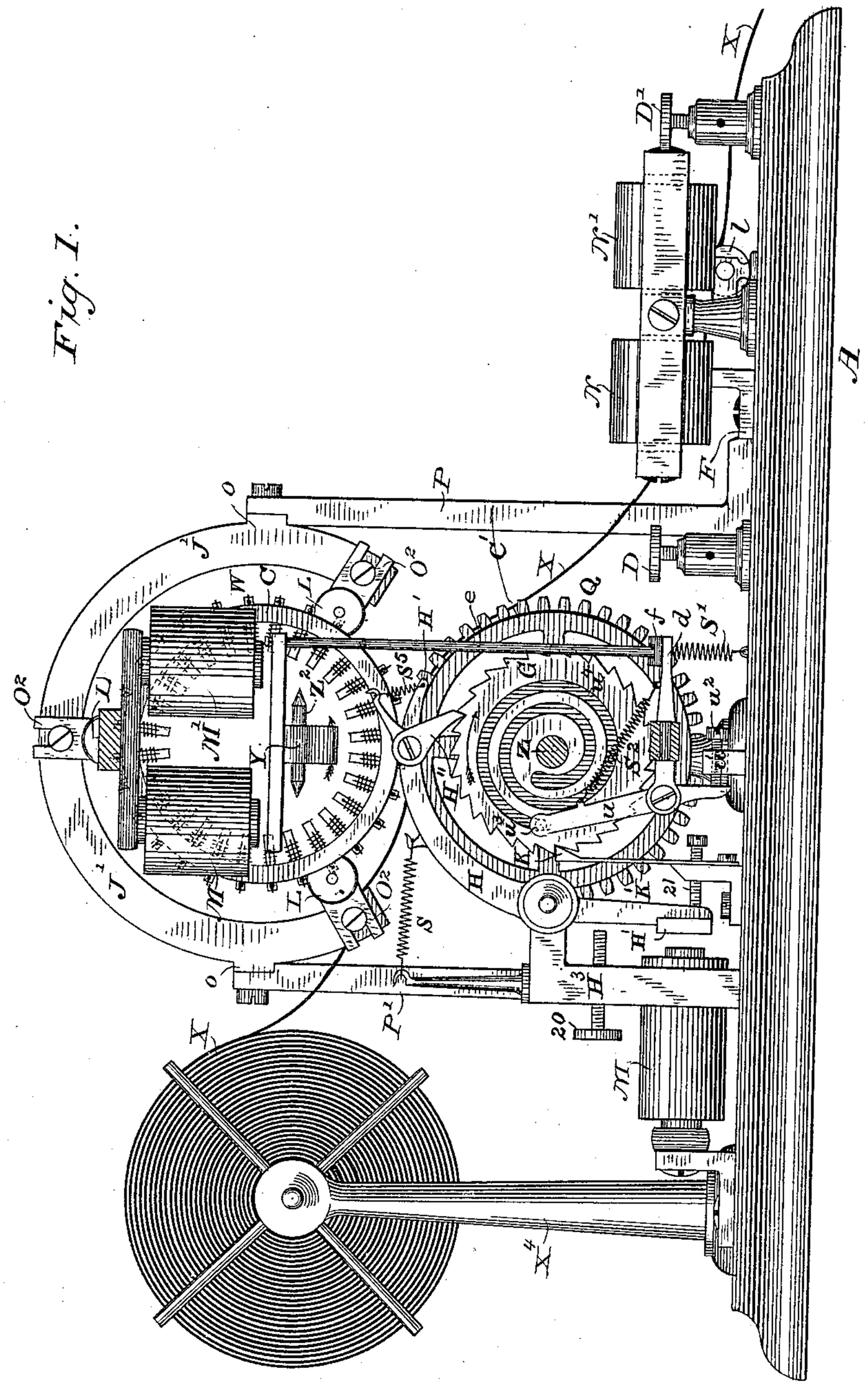
5 Sheets—Sheet 1.

A. C. ROBBINS.

PRINTING TELEGRAPH.

No. 335,482. Patented Feb. 2, 1886.

Fig. 1.



WITNESSES

Wm A. Skinkle

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INVENTOR

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(No Model.)

5 Sheets—Sheet 2.

A. C. ROBBINS.

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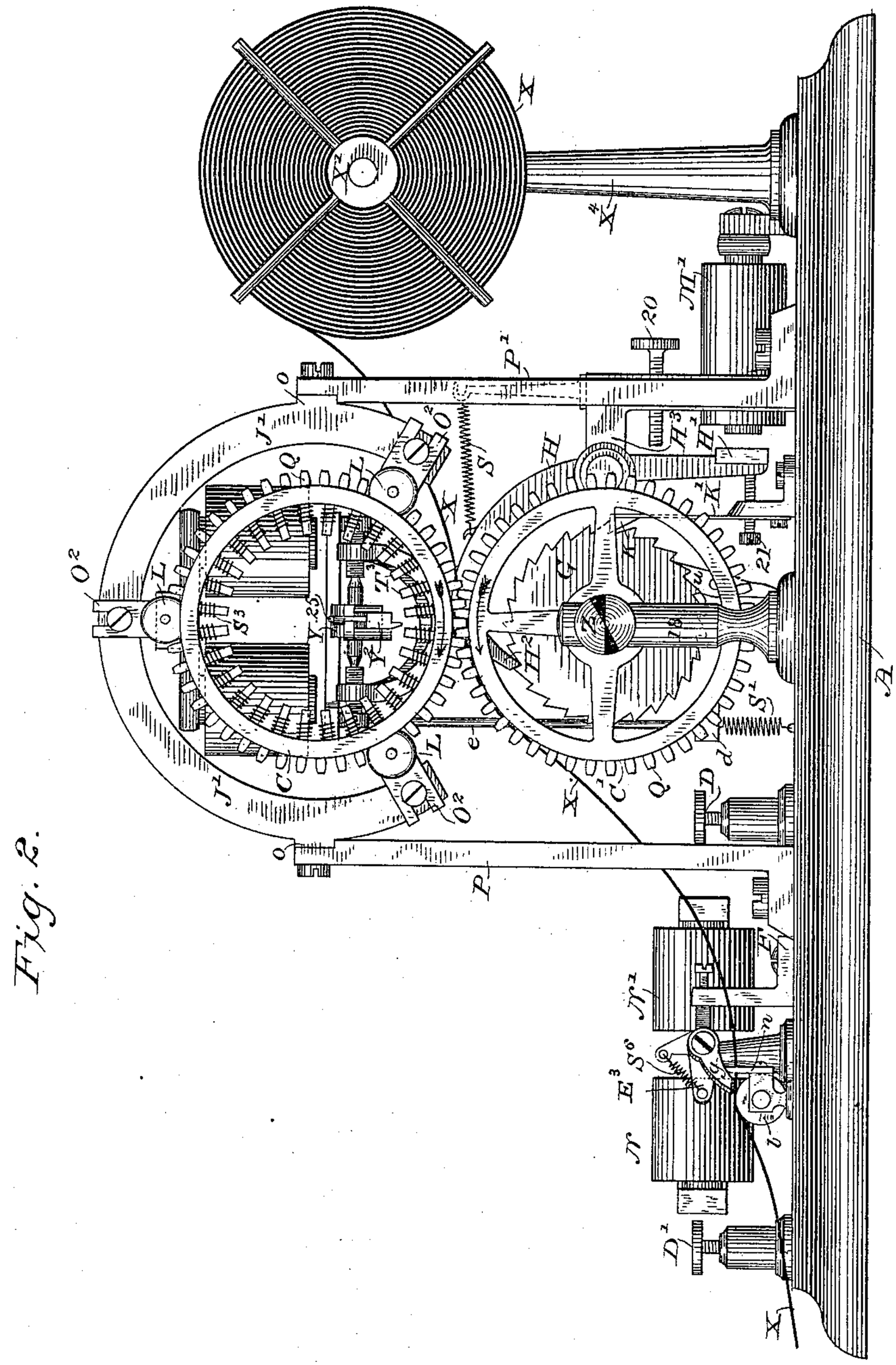

Fig. 2.

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(No Model.)

5 Sheets—Sheet 3.

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Fig. 5.

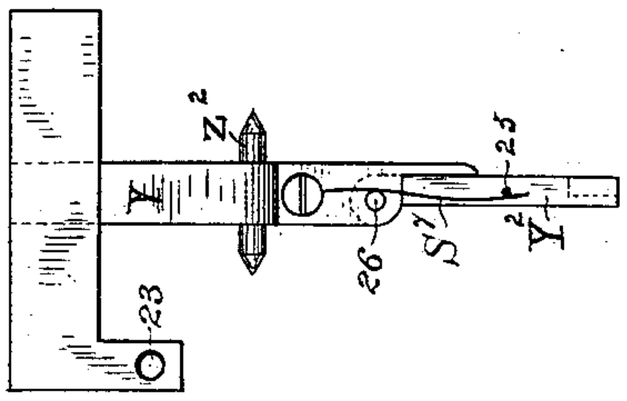


Fig. 6.

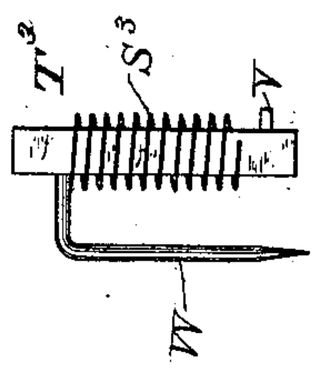
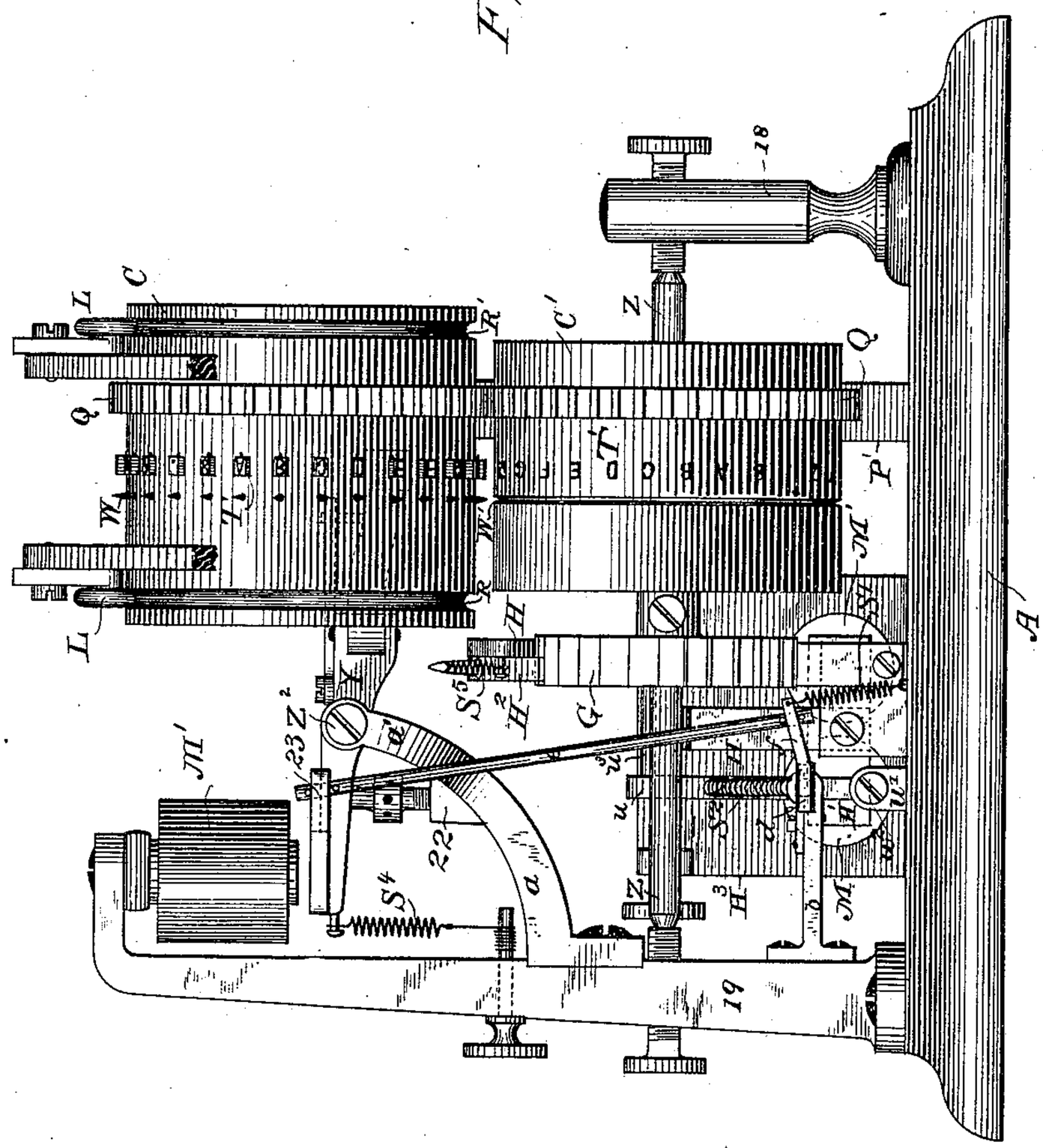


Fig. 3.



WITNESSES

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(No Model.)

5 Sheets—Sheet 4.

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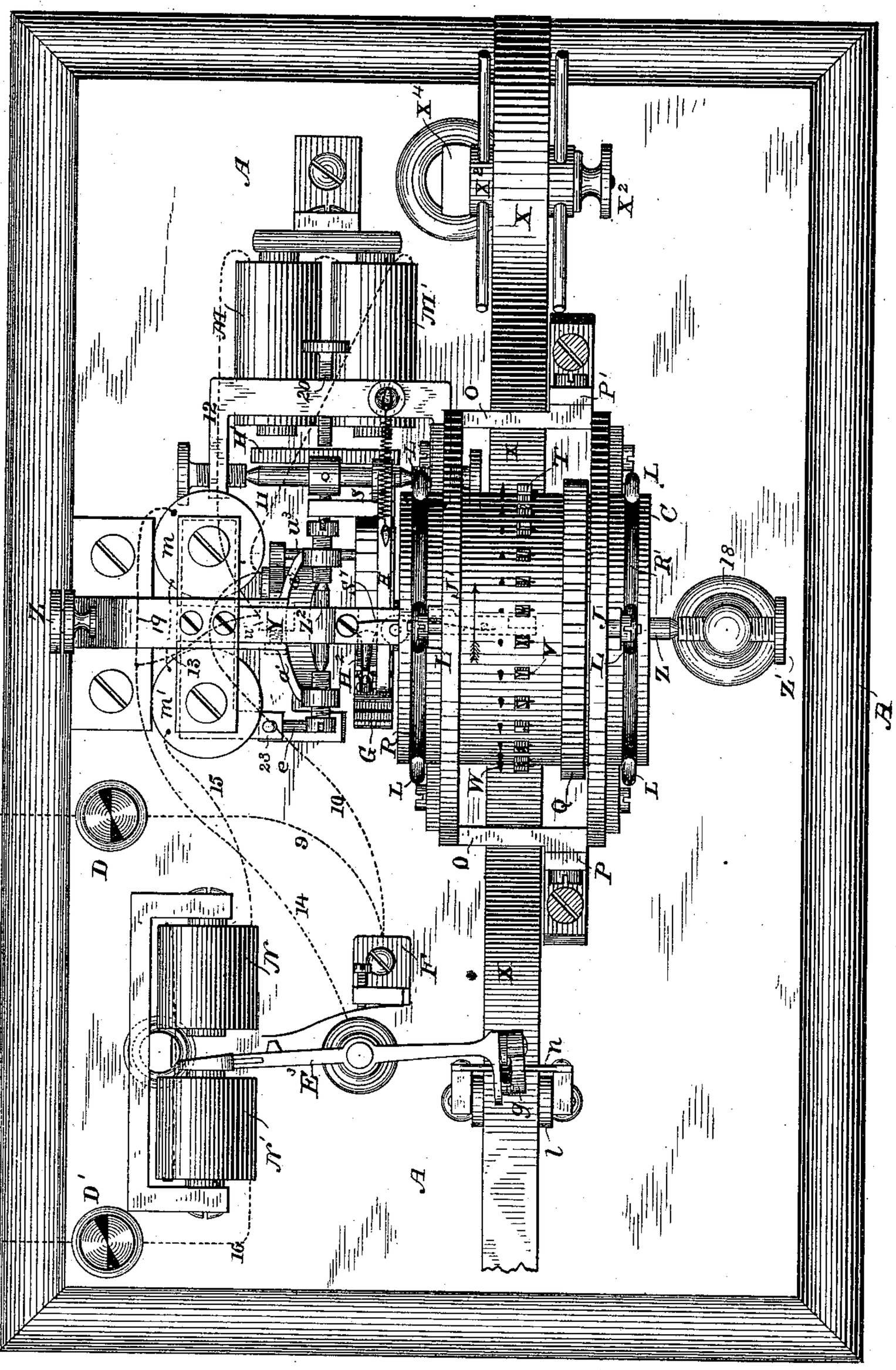
PRINTING TELEGRAPH.

No. 335,482. Patented Feb. 2, 1886.

Fig. 4.



WITNESSES

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5 Sheets—Sheet 5.

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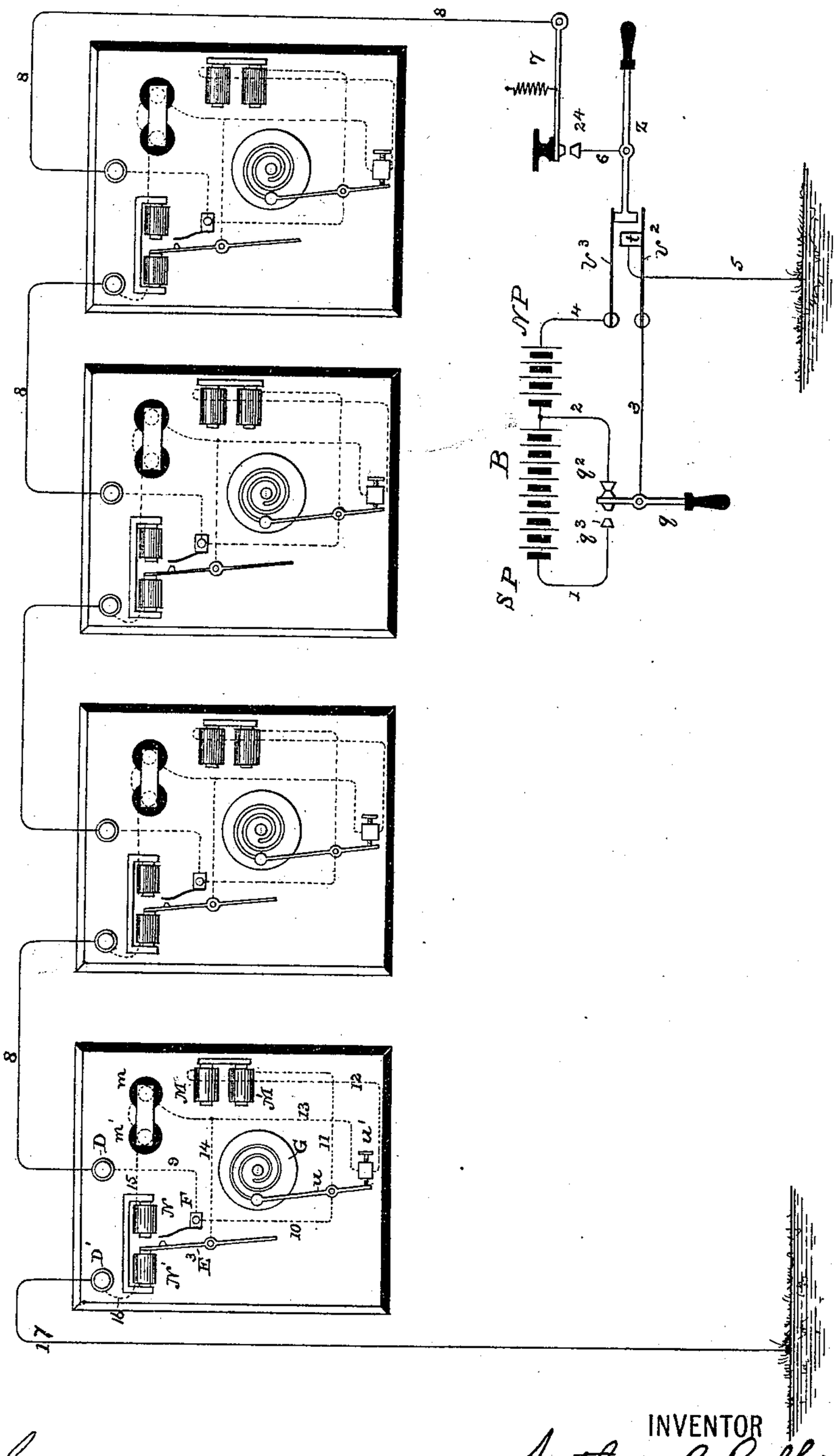

Fig. 7.

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UNITED STATES PATENT OFFICE.

ARTHUR C. ROBBINS, OF BUFFALO, ASSIGNOR OF ONE-HALF TO EDWARD C. COLE, OF ALBION, AND JOHN D. LARKIN, OF BUFFALO, NEW YORK.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 335,482, dated February 2, 1886.

Application filed October 8, 1884. Serial No. 144,988. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. ROBBINS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Recording-Telegraphs; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in instruments for recording messages upon a strip or ribbon of paper by means of suitable characters or type manipulated by electric impulse transmitted and controlled by apparatus at distant points or stations.

The object of this invention is to furnish an automatic instrument that will receive a message of any description, either singly or arranged in circuit, with a number and record the same on a strip or strips of paper with certainty, speed, and accuracy.

My device being especially designed and adapted to impress its characters into the material of the message strip, it is particularly adapted for use where skilled operators are not desired—as, for instance, on private lines, for reporting stock quotations, and for police and fire department service, there being nothing to renew, but to replenish the exhausted paper strip.

The device consists, generally, of two parallel metallic cylinders moved in unison and in opposite directions by means of suitable gearing, one cylinder bearing a set of type or suitable characters mounted upon suitable pins, which move radially through apertures in the periphery in said cylinders and force the type into similarly-shaped depressions in the surface of the cylinder, pressing the interposed strip of paper into said depression, thereby impressing its particular shape or form into the surface of said strip, and said pins are provided with a paper-holder upon each, which, when the type moves outward, enters the paper, carrying the same forward until the impression is completed and a new and unbroken surface is presented for the next succeeding impression. A ratchet-wheel and pawl attached to the armature of an electro-magnet is provided for rotating the cylinders. A lever of peculiar construction operating from the inside of the type-carrying cylinder forces the characters outward and into the depressions of the other, without interfering with the rotation of either of the cylinders. I further provide an electro-magnetic paper-feeding device that operates independent of the cylinders, which is to move the paper forward for spacing.

In order to obtain the synchronism of action essential to the operation of a number of instruments from one transmitter, I include a portion of the unison mechanism in a shunt-circuit in such a manner that upon reaching the unison or zero point the electro-magnet operating the cylinder-rotating mechanism will be cut out and the rotation of all the cylinders will cease—in other words, all the cylinders will be brought to a standstill at a predetermined point after a given number of revolutions, during which the impression-lever is left in a state of rest, and for succeeding revolutions all the cylinders start from this same predetermined zero-point.

The arrangement of the various elements hereinafter to be more fully described will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the working parts, the main support being removed to better show the construction and arrangement. Fig. 2 is a side elevation from the opposite side of the instrument. Fig. 3 is an end view with the paper-feeding devices and the mechanism for supporting the upper cylinder removed. Fig. 4 is a plan view. Fig. 5 is a detail view of the impression-lever. Fig. 6 is a view of one of the type-pins with the paper-feeding pin thereto attached. Fig. 7 is a diagrammatic view showing the electrical connections of the instrument and the manner of connecting a number of instruments in series.

Similar letters denote like parts.

A is the base, preferably of wood.

18 and 19 represent standards—one at each side of the base. Upon these standards, sup-

ported on suitable bearing-screws, is an axis or shaft, Z, upon which is mounted a metallic cylinder, C'. Upon each side of the cylinder C', secured in the base A, are vertical standards P P', that support a circular frame-work, J J', joined together and secured to said standards by end pieces, *o o*. Upon this frame-work, preferably at three points equidistant from one another, are adjustably secured short arms O^2, in the inner ends of which are mounted anti-friction rollers L. Within the triangular space thus formed is placed a second metallic cylinder, C, which is provided with two circumferential grooves, R and R', adapted to receive the rolls L. Being in this manner supported within the frame-work J J', the cylinder is capable of rotating freely, while at the same time its interior is entirely unobstructed by supporting devices. Both cylinders being provided with gearing Q, unison of movement is at all times insured. The cylinder C carries the type used in recording messages, and it is provided with radial apertures, through which the type are projected from the interior.

In close proximity to the type is a row of perforations, through which project small sharp pins for the purpose of holding the paper while being impressed. The type are mounted upon short pins T^3, which pass through the radial apertures and into the interior of the cylinder C. Each one is provided at its extremity with a stop, V, which, resting against the outside of the cylinder, holds the type in their normal position. From the inner ends of the pins T^3 extend the paper-feeding pins W, which normally extend to the surface of the cylinder, and no farther. A spring, s^3, coiled on each type-pin, holds it in position and returns it after having been struck.

The cylinder C' is provided with a series of depressions, T', corresponding to the type T, and preferably shaped to receive them and assist in perfecting their impression upon the interposed strip. A groove, W', is located parallel to these type-dies T', into which the paper-feed pins extend through the paper, thereby insuring its proper forward movement.

The cylinders are placed at such distance apart that C does not touch or hold the paper, except when the feed-pins W are projected, and in order to produce the movements necessary to form space. I provide separate and independent paper-feeding mechanism which is located at any convenient point in front of the cylinders, and consists of the electro-magnet N N', of well-known construction, which is provided with a polarized armature, E^3, extending horizontally therefrom. The outer end of this armature is fitted with a pivoted claw, *g*, that is normally held down by an arm and spring suitably fastened to the end of said armature. A roller, *l*, is located under the end of the armature E^3, and a stop or support, *n*, is attached to its frame and projects upward into the path of the claw *g*, so that in the normal position of the armature, which is against the pole of the magnet N', the claw *g* will be sufficiently elevated to allow the strip to move freely on the roller. Upon a change of polarity in the magnets N and N', the armature E^3 will be attracted by the opposite pole, and the claw *g* in moving forward will leave its support *n*, engage the paper strip, and move it forward one space. By continued reversing of the polarity of the magnets N N' the strip can be carried forward to any desired extent for spacing, repetition, or any desired effect.

Near one side of the pivoted polarized armature-lever E^3 is placed a cut-out or switch, F, consisting of a contact-spring projecting into the path of said armature, and an adjusting-screw for regulating the tension thereof. The line-current is carried direct to this switch from binding-post D, and by means of suitable connections leading from the switch to the armature and from the armature to the printing-magnet said armature operates, when in contact with said spring, to send a current direct to the printing-magnet, and by cutting out the cylinder-rotating magnet to feed the paper forward and cause the printing-magnet to strike the type already in position. In this manner a character may be repeated any desired number of times.

Upon the axis Z is mounted a toothed wheel, G, and motion is imparted to the cylinders by means of a pivoted arm, H, which is supported upon suitable standard, H^3, and provided at its outer end with the spring-pawl H^2. At the lower end of this arm H is attached an armature, H', behind which is located the magnet M M', which is wound with coils of comparatively high resistance, so as to respond to smaller electric currents than the printing-magnet. This magnet imparts oscillatory motion to the said arm H in the known manner, thereby securely engaging the teeth of and thereby rotating the wheel G and the cylinders. The lower end of the arm H normally rests against an adjustable stop, 21, from the support of which projects a spring catch, stop, or brake, K', the upper end, K, of which is formed to fit the teeth of and retard the motion of the wheel G. In this way rotation of said wheel and cylinders is prevented, except when actuated by the arm H and electro-magnet M M'.

The standard H^3 is of any convenient form. It supports and furnishes a bearing for the arm H, and also carries a spring, S, for retracting the same. At any suitable point near the bearing of said arm is inserted an adjustable stop, 20, which limits its movement to correspond with the size of the teeth in the wheel G, which said teeth are arranged coincident with the characters upon the cylinders, thereby insuring harmony of action between the rotating and printing mechanism.

It will be readily understood that I can dispense entirely with the ratchet-wheel G by simply forming the desired number of teeth upon the body or edge of the cylinder C'. In like manner I may form the spiral groove w^4, hereinafter more fully described, in the end of

said cylinder; but for convenience of arrangement I prefer the present plan.

From the standard 19, extending to a point near the inner end of the cylinder C, is a bracket, *a*, provided at the upper portion with branching arms *a'*, the ends of which are provided with adjustable bearing-screws, between which, upon the axis Z^2, is supported the printing-lever Y, which extends forward into the said cylinder C and rearward toward the support 19. To the end of this lever is secured an iron armature, which is provided in one corner with a slotted aperture.

S^4 is a tension-spring attached to the rear end of the lever, and rendered adjustable in any convenient manner.

22 represents an adjustable back-stop extending upward from the bracket *a*, underneath the rear portion of said lever. A magnet, *m m'*, of comparatively low resistance, is mounted upon the said standard 19, so as to present its poles vertically over the armature of the printing-lever Y. The impression upon the paper being formed while the cylinders are both in motion, the lever Y is provided at its outer end with a flexible portion, Y^2, which is undercut or recessed at its extremity, so that it will catch against the side of the type it is intended to depress and move laterally with the rotary motion of the cylinder; and it is so connected by hinge 26 to the body of the lever that it may move laterally, as well as vertically, with the type it is pressing. A spring, S^7, attached to the lever proper and engaging a pin, 25, upon the hinged portion, serves to return the extension Y^2 to its position when raised from the type-pin.

Owing to variations in the adjustment of the several instruments where more than one are upon the same circuit, and to the mechanical exigencies of the case at other times, it is necessary to provide a fixed zero or starting point, to which all the cylinders can be returned, and where they will be automatically brought to a standstill. The means with which I accomplish this end are substantially as follows: In one face of the driving-wheel G, I form a spiral groove, u^4, in which moves a rider, w^3, that is carried by the lever *u*, which is pivoted to a rock-shaft, *d*, which is journaled in a bracket, *b*, extending from the standard 19. From the free end of the rock-shaft *d*, and substantially at right angles thereto, extends a short lever, *f*, from the outer end of which a rod, *e*, extends to and is fastened within a slot, 23, in the armature of the printing-magnet. The lever *u* is continued a short distance beyond its pivotal point, and its extremity rests against an adjustable contact, u^2, that is suitably supported in a stud or offset, *u'*, projecting from the base, the lever *u* and stud *u'* forming a shunt-circuit around the rotation-magnet when such contact is made. To the outer end of the lever *f* is attached a retracting-spring.

From the foregoing it will be understood that when the rider w^3 has traversed its groove, which operation may take any desired number of turns, but is in this instance fixed at two revolutions of the cylinders, they (the cylinders) will be brought to a full stop, the rider resting in the termination of the groove, and the cylinder-rotating magnet cut out by the contact at u^2.

The next movement of the printing-lever will strike the blank or zero type-pin, the lever *f* will be raised, and will turn the rock-shaft *d* and move the upper portion of the lever *u* away from the wheel G, lifting the rider out of its groove. Said lever *u* being provided with retracting-spring s^2, the said lever will be instantly thrown back to first position against the axle Z, where the rider enters the commencement of its groove. The connection at u^2 now being broken, the rotation-magnet is again placed in the electrical circuit. Thus, at every revolution of the cylinders they may be brought to a full stop before released by an impulse sent through the printing-magnet.

I remark this, as the rotation-magnet is cut out of circuit, and its mechanism thereby stopped, when the rider w^3 has reached the termination of the groove u^4 by means of the shunt-circuit formed through the lever *u*, contact u^2, and stud *u'*, and there is consequently no strain upon the unison mechanism, as it at all times operates in conjunction with the rotating mechanism referred to.

In the drawings is shown a simple form of transmitter, which will answer the present purpose, and is easily understood.

B is a battery, and a hand lever or key is represented at 7. 24 is an anvil for the key. A two-point contact-lever, *z*, ground-block *t*, and springs v^2 v^3, connected to opposite poles of the battery, represent a pole-changer by which either pole of the battery may be put to line. Blocks q^2 q^3 represent the same polarity, but lead from different points in the battery, and by means of the switch *q* and suitable connection, 3, leading to the spring v^2, all or only a portion of the battery can be sent to line. NP is the north and SP the south pole of the battery. The entire apparatus is shown at rest.

The operation of the device will be substantially as follows: On depressing the key 7 and switch *q* an electric circuit is closed through the earth at E, wire 5, block *t*, wire 3, switch *q*, contact q^3, wire I, and the battery, wire 4, spring v^3, pole-changer *z*, key 7, and line-wire 8, to binding-post D, thence by wire 9, switch F, wire 10, and unison-lever U, which normally rests against its contact U^2, thereby directing the initial impulse around the high-resistance rotation-magnet M M', through said contact U^2 and wire 13 to the printing-magnet *m m'*, thence by wire 15, through magnets N N' and wire 16 to post D' and to ground, or to the next instrument in circuit and then to ground. The magnet N N', having a polarized armature, is somewhat more sensitive to a change of polarity than are the other magnets

to an electric impulse, as said armature is repelled by one pole of its magnet and attracted by the other in a manner well understood. In this instance the current passing through its coils is of a polarity to still attract its armature against the pole of N′, where it rests normally, consequently the armature E^3 will not be operated by this polarity; but the current is of sufficient strength to energize the printing-magnet, which may be operated by either polarity, and said printing-magnet immediately depresses the blank or zero type, at the same time tripping and releasing the unison mechanism and bringing the rotation-magnet M M′ into circuit by moving away from contact U^2, after which the current follows wire 10 through lever U, wire 11, magnet M M′, wire 12, support U′, thence by wire 13 to printing-magnet and by wire 15 to magnet N N′. If, now, a smaller current—such, for instance, as that portion of the battery that comes through the block q^2—be sent to line, a succession of impulses of the same polarity will by successively energizing the magnet M M′, produce two revolutions of the cylinders, after which the unison mechanism will cut it out, as before. By shifting the switch *q* and sending the entire current to line at any time during the rotation of the cylinders, the character which is under the lever Y will be impressed upon the message-strip without checking or in any way interfering with the continued operation of the rotation-magnet. Owing to the flexible or hinged portion Y^2 of the printing-lever yielding in the direction of rotation of the type-carrying cylinder, upon the release of which from the type will resume its normal position by reason of the spring S^7, above referred to, when the lever will be in readiness for further action.

The method of operating the independent feed when spacing is to switch in the lesser portion of the battery and to then reverse the poles by moving the lever *z* to contact with spring v^2, when spring v^3 comes in contact with the ground-block *t*. This will move the armature E^3 into contact with the switch F, forming a shunt-circuit through D, wire 9, F, E^3, wire 14, *m m′*, wire 15, N N′, and wire 16 to D, thereby cutting out the rotation-magnet and prevent any movement of the cylinders, and at the same time the claw *g* will move forward and downward from its support *n* onto the paper, which will thereby be pushed forward a distance equal to the desired space between letters.

As already referred to, the pins W, attached to and moving with the type, are used to feed the paper only for successive letters, during which operation the independent feed mechanism just described is not brought into operation, and remains thus inoperative until brought into requisition, when it is desired to produce a space or blank between any of the letters or characters, or to feed the strip for a repetition of the same character, or to space between the words, or for any desired spacing, during which latter operation the rotation-magnet is cut out of circuit, as heretofore described, consequently the type cylinders are inert, and the pins W can effect no feed of paper. Thus it will be observed that the two paper-feeding devices operate independently of each other, and for a special purpose.

To repeat a character after it has been brought round and recorded once in the usual manner by reversing the polarity of the current to line, and consequently that of the magnet N N′, but using the entire battery instead of the lesser portion, as before described, the armature E^3 will make the necessary movement to feed the paper forward one space, and at the same time it will cut out the cylinder-rotating magnet M M′, and therefore, having used a substantially strong current, the printer-magnet will be fully energized and the lever Y a second time depress the same character.

Throughout this description characters to be recorded by leaving their impression on the paper have been exclusively mentioned, and the instrumentalities referred to are designed to operate with sufficient force and precision to accomplish such a result; but it will be evident that by simply interposing an ink-ribbon between the cylinders, together with the message-strip, a printed message may be produced and any of the well-known forms of inking device applicable to my mechanism may be used in connection therewith.

Various minor changes in the position and shape of parts may also be made without departing from the spirit of my invention. The cylinder C may also be constructed with a head or hub and spokes beyond the type and lever Y at the gearing end of the cylinder and revolved upon an axis in a manner similar to C′.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a pair of geared cylinders provided with movable and fixed type, respectively, an axis passing through and supporting one of said cylinders, and a frame provided with inwardly-projecting friction-rollers, between which the other cylinder is supported, substantially as described.

2. In a recording-telegraph, the combination, with a pair of geared cylinders carrying movable and fixed type, respectively, of an axis passing through and supporting the cylinder having the fixed type, and a frame carrying adjustably-mounted frictional rollers, between which the other cylinder is mounted, substantially as described.

3. The combination, with a pair of geared cylinders provided with movable and fixed type, respectively, of an axis upon which one of the pair is mounted, a ratchet, also on said axis, a pivoted lever and pawl adapted to engage the teeth of the ratchet, an armature attached to said lever, and a magnet for imparting a to-and-fro movement to said lever, and thereby rotating the cylinders, and a spring pawl or brake, also engaging said ratchet and

adapted to prevent the cylinders acquiring any momentum sufficient to move them independently of their driving mechanism, substantially as set forth.

4. In a recording-telegraph, the combination, with an exteriorly-supported type-cylinder provided with a series of type, the pins of which extend toward the center, of a printing-lever extending into said cylinder and resting normally in position to depress said type, and a magnet for operating said lever, substantially as described.

5. In a recording-telegraph, the cylinder C, having radial type-apertures, and the adjustable supporting-rollers L, in combination with the cylinder C′, formed with groove W′, the depressions or type-dies T′, the gearing Q, a suitable axis or bearing, Z, and means, substantially as described, for rotating said cylinders.

6. In a recording-telegraph, the cylinder C, provided with adjustable supporting-rollers, radial type and paper-feed apertures, type T, mounted on inwardly-extending type-pins, T^3, paper-feeding pins W, suitable stop, V, and retracting-spring S^3, in combination with the cylinder C′, formed with depressions or type-dies T′, adapted to receive the type T, a groove, W′, adapted to receive the pins W, and gearing intermeshing with that on cylinder C, substantially as described.

7. The combination, with a pair of geared cylinders provided with movable and fixed type, respectively, of an axis upon which one of the pair is mounted, a ratchet, also on said axis, a pivoted lever and pawl engaging the teeth of said ratchet, an armature attached to said lever, and a magnet for imparting a to-and-fro movement to said lever, thereby rotating the cylinders, substantially as described.

8. The printing-lever Y, provided with the laterally-movable end-piece, Y^2, suitable retracting-spring, and an armature and magnet, substantially as described.

9. The combination, with a type-cylinder, C, and impression-cylinder C′, of the printing-lever Y, provided with laterally-moving end piece, Y^2, suitably recessed at its lower side, a retracting-spring, S^7, and an armature and magnet, substantially as described.

10. The combination, with an electro-magnet having a polarized armature, of a stationary paper-carrying roller, a pivoted claw carried on the armature and adapted to be moved over said roller, and a stop for raising said claw on its rearward movement, substantially as described.

11. The combination, with an electro-magnet having a polarized armature, of a paper-carrying roller, a pivoted claw carried on the armature and adapted to be moved over said roller, a stop for raising said claw on its rearward movement, and a switch and shunt circuit including a portion of said armature and operating by the movement thereof to cut out the type-feeding devices, whereby the paper is moved forward and the type remains stationary and in position to repeat the previous character, substantially as described.

12. The combination of magnet N N′, polarized armature E^3, pivoted claw *g*, having an arm, *a*, suitable retracting-spring connecting said arm and armature with the roller *l*, and stop *n*, attached to the roller-supporting frame, substantially as described.

13. The combination, with magnet N N′, polarized armature, and independent spacing mechanism, of the switch F, type-feeding or cylinder-rotating magnet M M′, of comparatively high resistance, and connections between said switch and magnet, whereby the magnet M M′ is cut out of circuit when the spacing mechanism is operated, substantially as described.

14. The combination, with a pair of cylinders, an electro-magnet, its armature, and a pivoted lever and pawl for rotating the same, of an electro-magnet having a polarized armature, a switch in the path of said armature, and connections whereby the cylinder-rotating magnet is cut out of circuit by reversing the polarity of and thereby operating the switching-magnet, substantially as described.

15. The combination, with a pair of cylinders carrying movable and fixed type, respectively, an electro-magnet, its armature, a pivoted lever and pawl, and connections operating to transmit its oscillations to the cylinders, of an electro-magnet having a polarized armature provided with means for feeding a message-strip forward, step by step, at each reversal of its magnet, a switch in the path of said armature, and connections between said switch and the rotation-magnet M M′, whereby the latter will be cut out and motion of the cylinders prevented at each movement of said armature, substantially as described.

16. In a recording-telegraph, the combination, with a pair of positively-rotated geared cylinders carrying fixed and movable type, respectively, of a unison-stop for automatically arresting the motion thereof at a predetermined point, a printing-magnet, its armature, a lever actuated by said magnet to depress the type, and a connecting-rod and system of levers extending from said armature to the unison-stop and actuated by the printing movement of said armature to withdraw the unison-stop and liberate the cylinders, substantially as set forth.

17. The combination, with the axis Z and cylinder or ratchet wheel formed with the spiral groove u^4, of the lever *u*, provided with rider u^3, adapted to travel in said groove, a spring for returning said lever to the source of said groove, a rock-shaft, to one end of which said lever is pivoted, an arm projecting from said shaft, and a rod connecting said arm with the armature of the printing-magnet, by the movement of which the rock-shaft will be turned, the lever *u* moved outwardly, and the rider withdrawn from the groove,

thereby releasing the axis Z and mechanism mounted thereon, substantially as described.

18. In a recording-telegraph, the combination, with a pair of geared cylinders, a magnet, and mechanism operated thereby to rotate said cylinders, a printing-magnet, and electrical connections between said printing-magnet and the cylinder-rotating magnet, substantially as described, of a unison-stop provided with a switch and contacts, whereby when the instrument is at zero the rotating-magnet is cut out and the printing-magnet is in circuit, and when the unison-stop is removed from its stopping-place both magnets are continuously in circuit, substantially as described.

19. In an automatic telegraph, the combination of a cylinder, a series of type provided with feed-pins and supported by and movable beyond the periphery of said cylinder, a hammer or lever adapted to engage and actuate said type and pins, and a magnet whereby to operate said hammer or lever, substantially as set forth.

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

ARTHUR C. ROBBINS.

Witnesses:
WILLIAM FINN,
ASTLEY C. TERRY.