

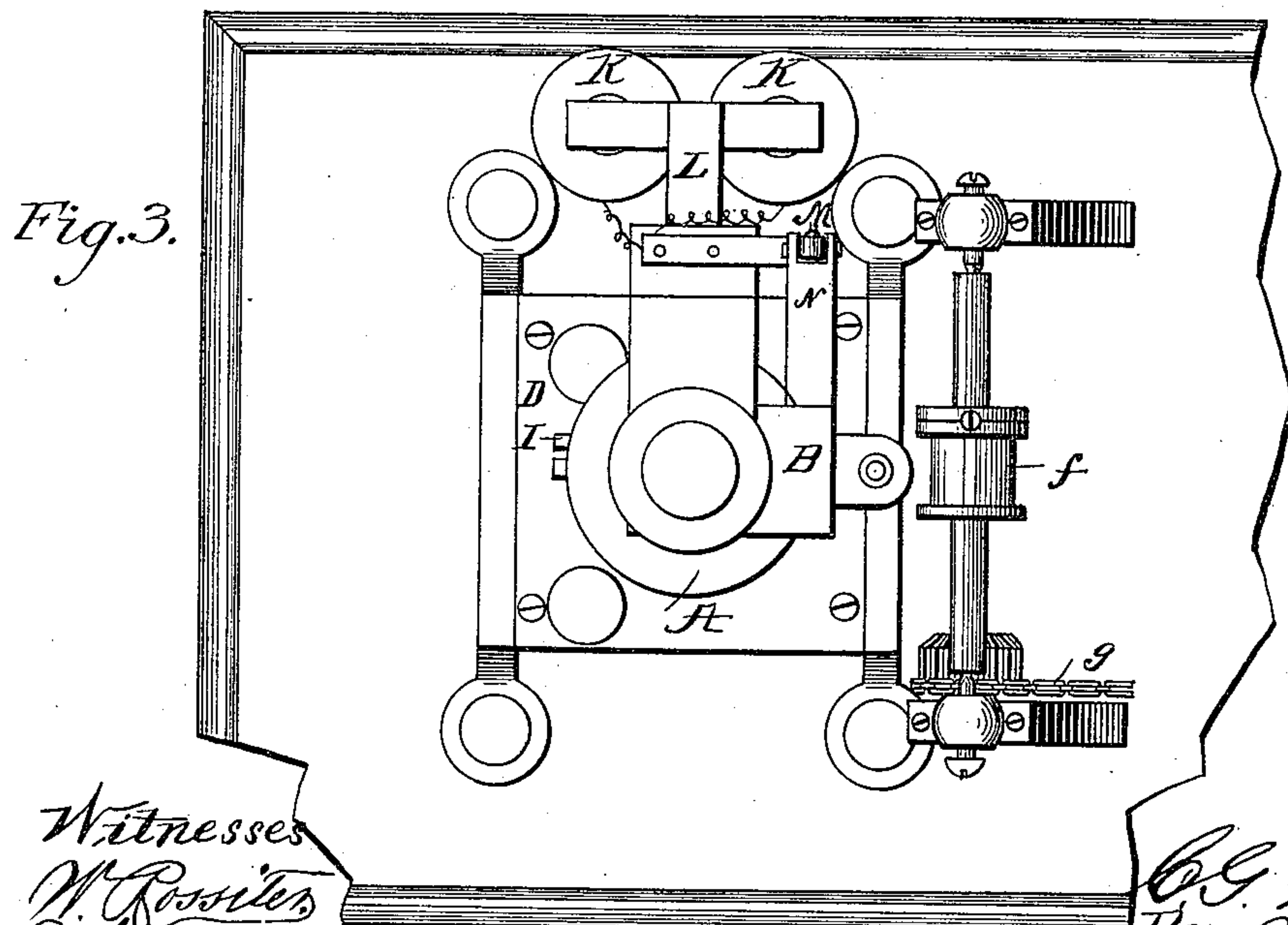
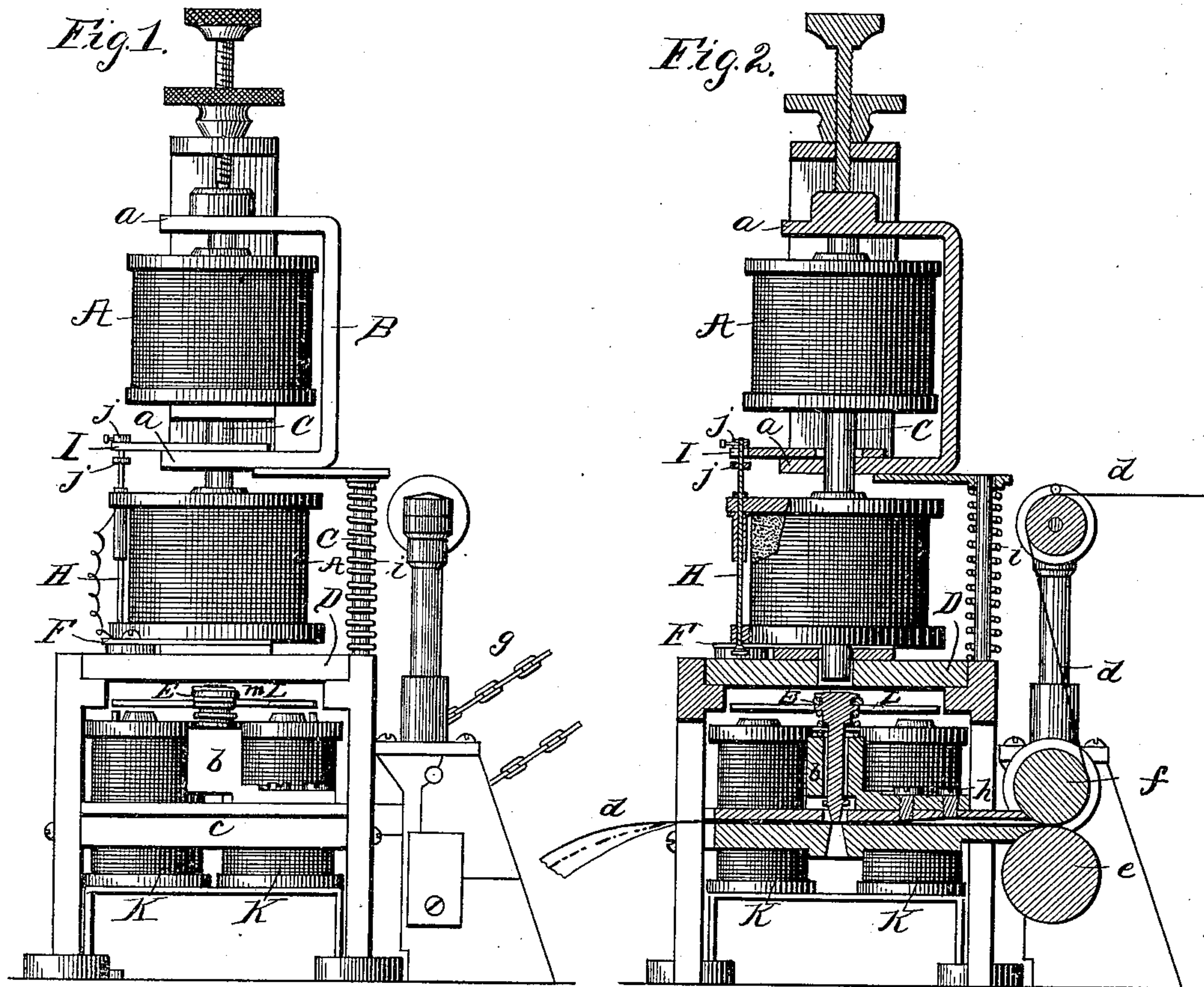
(No Model.)

2 Sheets—Sheet 1.

C. G. WRIGHT.  
TELEGRAPH INSTRUMENT.

No. 352,600.

Patented Nov. 16, 1886.



Witnesses  
W. Rossiter  
Will R. Quohundred.

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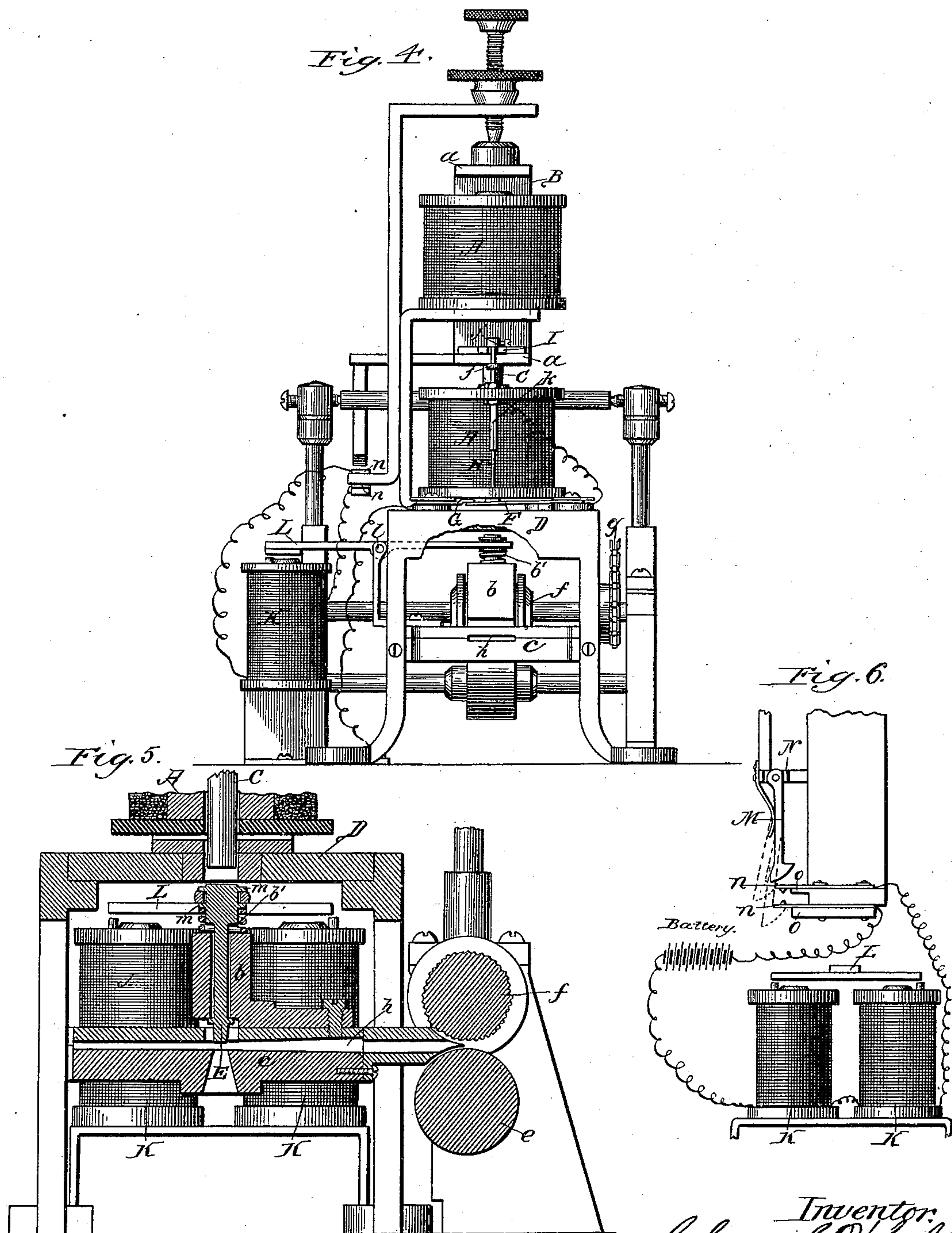
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# UNITED STATES PATENT OFFICE.

CHANCY G. WRIGHT, OF CHICAGO, ILLINOIS.

## TELEGRAPH-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 352,600, dated November 16, 1886.

Application filed January 26, 1886. Serial No. 189,793. (No model.)

*To all whom it may concern:*

Be it known that I, CHANCY G. WRIGHT, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Telegraph-Instruments, of which the following is a specification.

This invention relates to improvements in telegraph-instruments for receiving and perforating Morse characters in a paper or other ribbon.

The prime object of this invention is to produce a single instrument adapted to receive and register a telegraphic message by perforating a paper or other ribbon with what is known and commonly designated as the "Morse characters."

Further objects are to provide such an instrument with a punch automatically and electrically operated, whereby levers and cams heretofore employed for operating the punch may be dispensed with; to provide an actuating mechanism for said punch independent of and disconnected therefrom, whereby the power applied in operating the punch shall be in the nature of a blow; to provide means for withdrawing the punch from contact with the paper independent of the means for actuating said punch; to provide means for actuating the punch in a line with its movement, whereby power so applied will be employed to the utmost advantage; finally, to provide an automatic receiver for effecting other important results in connection with the foregoing, and involving certain details of construction hereinafter fully described, and illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of a receiver embodying my invention; Fig. 2, a central vertical section thereof; Fig. 3, a plan view of the same; Fig. 4, an end elevation; Fig. 5, a detail central vertical section through the punch and tape-passage; Fig. 6, a detail rear side elevation, showing the magnets for withdrawing the punch from the tape, and the means for making and breaking the circuit through these magnets.

Referring by letter to the accompanying drawings, A A indicate a pair of coiled magnets for electrically actuating an armature, B, and supported upon a suitable frame, on end, in an axial line with and one above the other,

for the purpose of exerting a force in a direction axially through both of the magnets; and to this end the armature B is bent in the form of a bail, or is U shaped, so as to partly encompass the upper magnet, with the ends *a a* thereof arranged and adapted to come simultaneously in contact with the poles of the magnets A A, respectively.

The centers of the magnets are formed hollow, to permit the passage through them of a small guide rod or shaft, C, rigidly secured in the ends of the armature B and reciprocating therewith. This rod, passing vertically and freely through the magnets, projects through a corresponding hole or orifice formed in a frame or table, D, for supporting the said magnets, and is normally supported above the upper end of the punch E in such a position that when actuated by the magnets will strike the punch and then be lifted from contact therewith until a second blow is struck, against the end of which punch and longitudinally or axially therethrough is exerted the striking or hammering force of the said rod during its vertical reciprocation, produced by the constant contact and withdrawal from contact of the armature B with the poles of the magnet, owing to the making and breaking of the electric circuit through the magnets, as is common to instruments of this character, and for the purpose hereinafter described.

For convenience of description, and in contradistinction to the pivoted armatures heretofore employed, I shall hereinafter designate my armature as a "rectilinear reciprocal armature," meaning by this term to convey the idea of the bodily reciprocations of the armature in a straight or right line, which, so far as I know, is new in devices of this class, in which it is common to have pivoted armatures necessarily moving on the arc of a circle.

The punch E works loosely and vertically in a suitable guide, *b*, in a line with the guide-rod C, as before described, and is maintained suspended in an elevated position above the line of travel of the tape by means of a small spiral spring, *b'*, or any other suitable cushion having just sufficient tension to support the weight of the punch, but which tension is designed to offer little or no resistance to the force of the blow from the rod. The lower end of the punch is preferably formed circu-



lar in cross-section, and is designed, when depressed and projecting partially through an orifice in a bed-plate, *c*, to come in contact with the sharpened edges of the said orifice, which at that point it tightly fits, and thereby produce a smoothly-cut perforation in a tape, *d*, which passes through a horizontal groove or passage formed in the bed-plate *c*, and projects across the path of the punch, between it and the bed-plate.

The paper or other tape employed in connection with my device is designed to be fed or pushed through the instrument, and not drawn through, as is common to devices of this character; and to this end I have employed a loose friction-roller, *e*, located immediately beneath and operated by a feed-roller, *f*, in turn actuated by means of any suitable power, preferably through the medium of a sprocket-wheel and chain-gear, *g*, as shown.

The point of contact between these friction and feed rolls is coincident with the receiving end of the slot or passage *h*, formed in the bed-plate *c*, for reception of the tape, which end of the said passage is slightly enlarged, as clearly shown in Figs. 2 and 5, in order to permit a buckling of the paper, if required, during the operation of producing the perforations therein; for while the feed of the tape is continuous, it is liable to be checked by the passage of the punch through the paper, which, however quickly withdrawn, might retard the passage of the tape, and hence the necessity of this provision for the buckling thereof.

As usual in devices of this class, the armature is actuated in identically the same vibrations as those of the transmitting-instrument at the point from whence they are electrically transmitted to the magnets of my receiver, and the characters generally used are those of the Morse alphabet, consisting of dots and dashes.

In producing a single dot or perforation in the tape the circuit is closed and instantly reopened, so that the punch will pass through the paper but once, which result is accomplished by reason of the depression of the rectilinear reciprocal armature carrying with it the rod, which former, although held suspended and free from contact with the magnet by means of a spiral spring, *i*, encircling a guide-rod, *i'*, and bearing against a projection, *i''*, on said armature, is always forcibly and instantaneously brought in contact with the poles of the magnets whenever the circuit is closed, for the tension of its supporting-spring, although sufficient to instantly return the armature to its elevated, and therefore normal, position when the circuit is open, is designed to be easily overcome by the power of the magnets.

With this understanding of so much of the operation as has been described, it will be readily understood that the armature, and consequently the punch, will remain depressed throughout the time the circuit is closed, and were no means provided for elevating the armature and withdrawing the punch from the paper while the circuit is closed—for instance,

during the registering of a dash—the tape, by reason of its constant feed, would be torn and broken if drawn through or the feed stopped, and the tape buckled beyond usefulness if fed or pushed through, and the instrument thereby rendered useless and inoperative; but even should the tape be fed through the instrument at suitable intervals, the punch could only produce single perforations or dots, and would therefore be useless. To overcome these objections and produce a rapid rectilinear reciprocation of the armature, resulting in a corresponding reciprocating motion of the punch while the circuit is closed, I have provided two contact-points, *F* and *G*, the one, *F*, of which connects with the magnets *A A*, and the other, *G*, with the end of the return-wire. The point *F* preferably consists of a small flat spring, the tension of which serves to hold the points normally in contact with each other, and working through the two end plates of the lower magnet, *A*, is a rod, *H*, its lower end having an endwise bearing upon the spring contact-point *F*, and its upper end beyond the top cap of the magnet, having formed thereon or rigidly secured thereto two collars forming shoulders *j j*, between which and encompassing the rod works the bifurcated end of an arm or yoke, *J*, rigidly secured to the lower end of the armature. The shoulders *j j* are sufficiently far apart to permit a slight loss of motion between the armature and the rod, in order that the reciprocating movement of the armature may act upon this rod in the same manner that it does upon the punch—that is to say, with a hammering or striking force—so that the contact may be instantaneously made or broken, whereby the circuit through the magnet operating the punch may be opened and closed in a similar manner.

To maintain the rod in either its elevated or depressed position against the force of gravity, or the tension of the spring contact-point, the split spring-jaw *k* is provided, which maintains at all times a sufficient grip upon the rod to support it in either its elevated or depressed position, except when actuated by the yoke secured to the armature, the force of which is amply sufficient to overcome the tension of the said spring-jaw.

The operation of these parts is as follows: When the circuit is closed and the rectilinear reciprocal armature is depressed thereby just before completing its downward stroke, the yoke thereon coming in contact with the lower shoulder on the rod *H* carries with it the said rod, the end of which bears upon the spring contact-point *F*, depressing said point and thereby breaking the circuit, whereupon the spiral spring *i* causes the armature to resume its normal or elevated position, and during its upward travel, the yoke thereon coming in contact with the upper shoulder on the rod *h*, carries with it the said rod, thereby releasing the spring contact-point *F* and permitting it to come in contact with the point *G*, which again closes the circuit. Immediately this latter



closing of the circuit occurs the armature will be again depressed or drawn down in contact with the magnets, when the foregoing operation will be repeated; and all of these operations will be continuously repeated so long as the circuit of the main line remains closed—that is to say, as long as the operator depresses the operating-key in the act of registering a dash.

It will be observed from the foregoing that the movement of my armature is rectilinear reciprocal—that is to say, it reciprocates or vibrates bodily to and fro in a right or straight line—which movement, so far as I am aware, is broadly new, for in the prior constructions the armature has been pivoted at some point and necessarily swings on the arc of a circle, while in mine the armature is not pivoted at all, but, on the contrary, has a bodily movement in a straight line, the guide-rod secured thereto passing freely through the magnets, and serving to maintain the armature in its normal relative position during the rapid reciprocations thereof.

In order to withdraw the punch from contact with the paper immediately after the rectilinear reciprocal armature is elevated, so that it may reciprocate with the rectilinear reciprocal armature, but not exactly in unison therewith, I have provided another pair of magnets, K K, the armature L of which is pivoted, as shown at l, to form a lever of the first class, and the forward end of which is bifurcated to project and work between two shoulders, m m, formed on the upper end of the punch; hence it will be seen that any vibration of the armature, which is disposed in an approximately-horizontal plane, will produce a corresponding movement of the punch, and in such manner as to cause it to have a vertical movement.

To obtain the best result, this mechanism for elevating the punch should be actuated by the rectilinear reciprocal armature which depresses the punch connected with the magnets A A; and to this end I have provided means for making and breaking the circuit through the punch-operating magnets K K, by means of the said armature, for it will be understood that although the punch must be elevated immediately the rectilinear reciprocal armature, or rather the rod connected therewith, releases it, it must also be released before the said rod descends again to depress it. To accomplish this end, I have provided the contact points n n, for making and breaking the circuit through the magnets K K, disposed one above the other, and flexible, when bent upward out of their normal position, by reason of their spring action, but which are rigid as against any force which tends to depress them downwardly from their normal or horizontal position, owing to the fact that when in this latter position they lie or rest upon rigid lips or projections o o, secured to the supporting-frame. These contact-points are normally held out of contact with each other, and when thus held the lever-armature L is

also out of contact with the magnets K K, and the punch consequently free to be depressed by the action of the main armature B. To bring these points in contact, a spring-actuated hook, M, is pivoted to an arm or extension, N, projecting from the rectilinear reciprocal armature B, which hook is preferably composed of gutta-percha or other non-conducting substance, and depends from the said arm or extension in a line with the said contact-points n n, with the hook end thereof turned upward and toward the said points. The lower end of this hook just below the point is inclined or beveled in such manner that as the hook descends and comes in contact with the said points, which are rigid from this direction, the hook, by reason of the said incline or bevel, will be forced backward by the contact-points; but immediately the hook passes these points it will be again thrown forward to its normal position by the action of its keeping-spring. The hook carried downward by the rectilinear reciprocal armature B passes a little beyond or below the contact-points; but as the armature rises on its upstroke the hook engages the end of the lower contact-point and carries it up with it, by reason of its flexibility, thereby causing it to come in contact with the other point, about which time the lower points will be released by the hook, for while the hook travels upwardly in a vertical line the flexible point bends upon the arc of a circle. When the two points are thus brought in contact, the circuit through the magnets K K is instantly closed and the lever-armature as quickly brought in contact with the said magnets, thereby elevating the punch which has just been released by the guide-rod C of the rectilinear reciprocal armature. This operation, it will be observed, must necessarily take place almost in unison with the action of the rectilinear reciprocal armature, and at each stroke thereof, and the entire operation of depressing and elevating the punch, as heretofore described, occurs so rapidly that during the closing of the circuit on the main line in registering a dash the punch will be elevated and depressed a number of times; but although the tape travels constantly and somewhat rapidly through the instrument, the action of the punch is so rapid as not to produce any perceptible retarding effect upon the travel of the paper, and as a consequence the perforation in the tape has the appearance of an elongated slot, the side edges of which are perfectly straight.

While I have shown and described means for automatically and electrically withdrawing the punch from contact with the paper, I do not confine myself to these particular means, for various others might be employed and effect the same result—such, for instance, as utilizing a spiral spring sufficiently strong to instantly return the punch to its normal position; but as this device would obviously require considerable more power in the magnets A A for depressing the punch in order to



overcome the tension of the spring, it will therefore be objectionable.

In conclusion, I may add that the magnets A A and K K may have a separate battery for each pair, and this is advisable to produce the most satisfactory results; but the smaller magnets K K may be connected with and operated by the main magnets A A, for they require a very small expenditure of power in their operation.

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

1. The magnet, the armature, the guide-rod thereof extending axially through said magnet, and the punch disconnected from and intermittently actuated by said guide-rod, in combination with a tape-guide having a passage therein for the punch, and a separate passage for the tape, extending across the punch-passage, whereby the tape in its forward movement will be prevented from a vertical movement, substantially as described.

2. The punch and a guide for the tape, said punch being actuated by an armature for depressing it, in combination with the lever I, magnets K K, contact-points *m m*, and means for automatically making and breaking the circuit through the magnets K K alternately

with that of the magnets A A, substantially as described.

3. The punch and a guide for the tape, said punch being actuated by an armature for depressing it, in combination with lever I, magnets K K, contact-points *m m*, spring-actuated hook, the armature B, and the battery, substantially as described.

4. The magnets A A, located one above the other, a sliding guide-rod extending axially through said magnets, and the armatures rigidly secured to said guide rod, in combination with the perforating-punch located in the path of travel of said guide-rod, the tape-passage, the contact-points F and G, rod H, guide-rod *i*, spiral spring *i'*, and projection *i''*, substantially as and for the purpose set forth.

5. The punch, an electro-magnet, and circuit-breaking devices for operating said punch and the feed-rollers, in combination with a tape-passage having an enlarged portion intermediate said punch and rollers, whereby a buckling of the tape is permitted, substantially as described.

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