4 Plates

JAMES ROWE.

PLATE. A.

Improvement in Telegraph Apparatus.

No. 120,000. Patented Oct. 17, 1871.

FIG. 1.

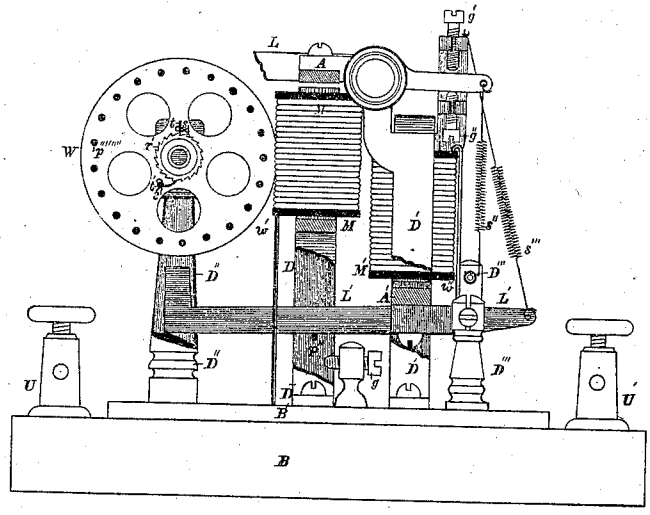
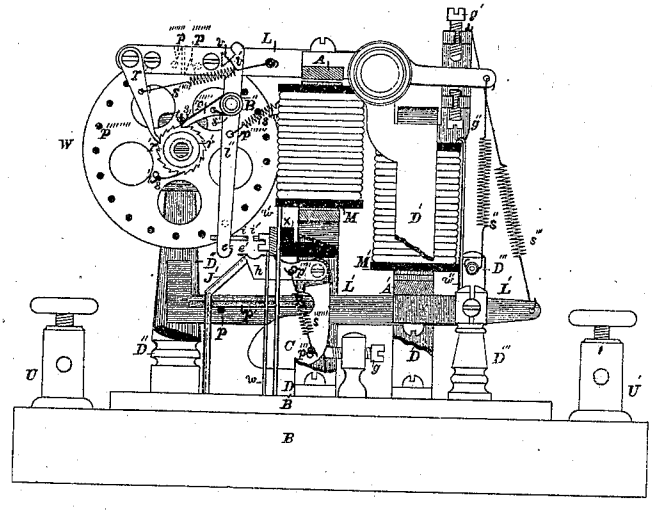


FIG. 2.



Witnesses,
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Charles A. Boyd.

Inventor
James Rowe.
By his attorney in fact
James R. Skilton

4 Plates

JAMES ROWE.

PLATE. B.

Improvement in Telegraph Apparatus.

No. 120,000.

FIG. 1.

Patented Oct. 17, 1871.

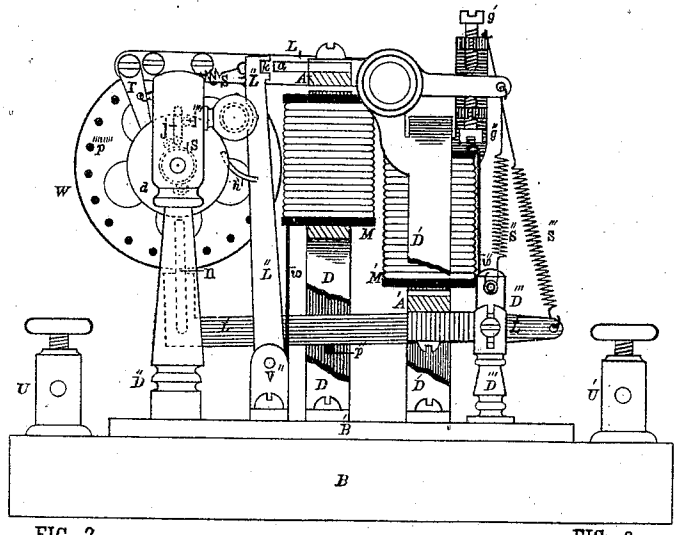


FIG. 2

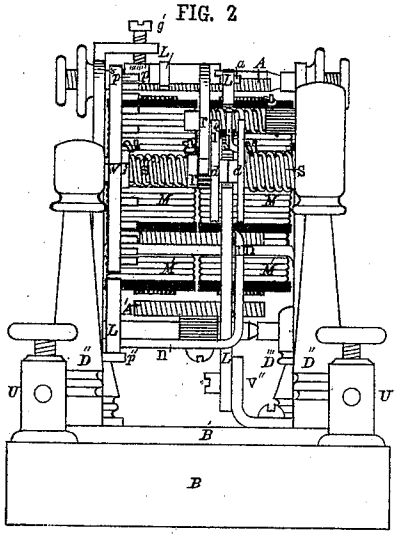
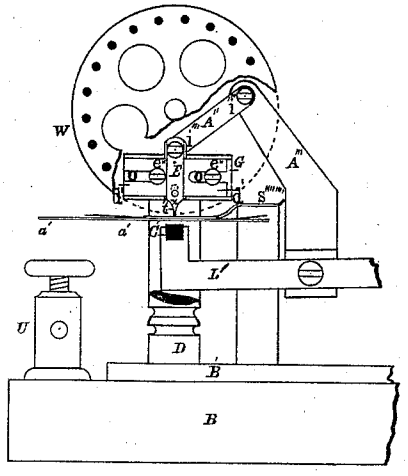


FIG. 3.



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4 Plates

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PLATE. C.

Improvement in Telegraph Apparatus.

No. 120,000. Patented Oct. 17, 1871.

FIG. 1.

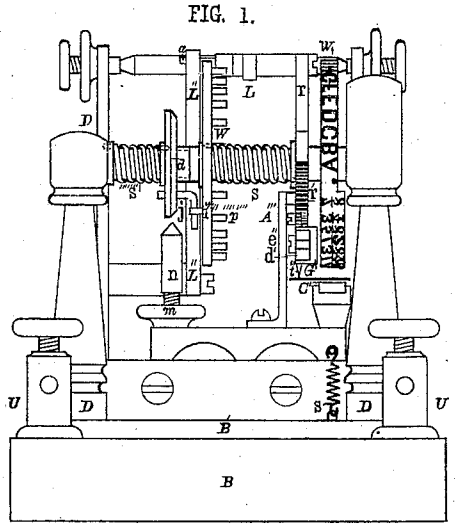


FIG. 2.

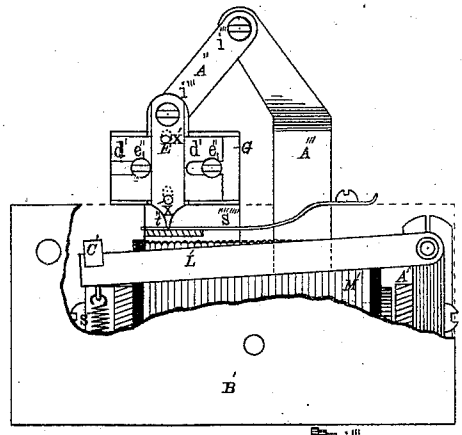
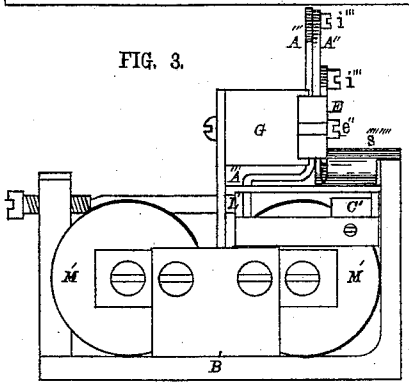


FIG. 3.



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4 Plates

JAMES ROWE.

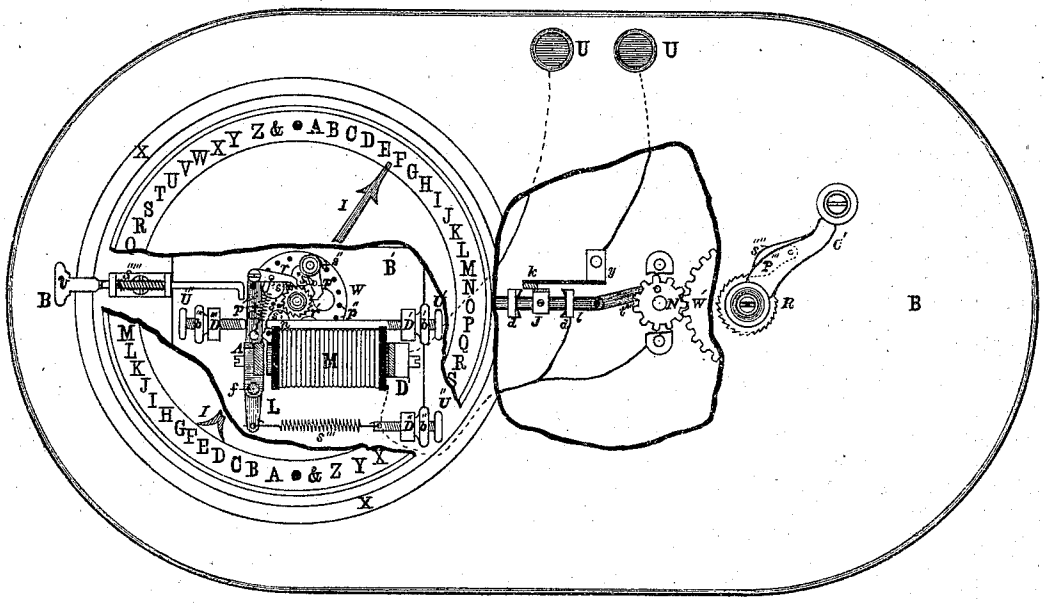
PLATE. D.

Improvement in Telegraph Apparatus.

No. 120,000.

FIG. 1.

Patented Oct. 17, 1871.



Witnessies:
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Charles A. Boyd.

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UNITED STATES PATENT OFFICE.

JAMES ROWE, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN TELEGRAPH APPARATUS.

Specification forming part of Letters Patent No. 120,000, dated October 17, 1871.

To all whom it may concern:

Be it known that I, JAMES ROWE, of Paterson, in the county of Passaic and State of New Jersey, have invented certain Improvements in Telegraph Instruments, of which the following is a specification:

The first part of my invention relates to an escapement so arranged and constructed that a regular and positive step-by-step motion of the printing or type-wheel and shaft may be secured and said type-wheel be constantly under such control that any desired letter may, by the making and breaking of electrical currents, be presented to the printing-lever at the proper time and an impression of the same be thereupon obtained. The parts employed are: a lever with pawl-and-dog attachments operating upon a ratchet-wheel secured to a sleeve on the type-wheel shaft and connected with an escapement-wheel fixed to the same shaft, and having its pins or detents projecting from one side of the periphery thereof, which engage wedge-shaped pallets fixed on the armature-lever with the edges of the said pallets standing in opposite directions and located far enough apart to just engage and clear the said pins or detents. The connection of the ratchet-wheel to the escapement-wheel is by a spiral spring coiled on the sleeve to which the ratchet-wheel is attached, which is so located as to be constantly in a state of compression between its two attachments. The pawl and dog of the ratchet-wheel are of ordinary construction for such purposes. The second part of my invention relates to telegraphic printing which is accomplished by the aid of a printing-magnet and lever operated by a switch-circuit which offers an alternative route for a part of the current of electricity whenever the escapement-lever is allowed to remain in contact with a pin provided for the purpose, which completes the switch-circuit for the necessary length of time to act upon the printing-magnet. At all other times, although intermittent contact occurs, time is not given to permit the completion or occupation of the circuit by the current. The third part of my invention relates to the devices for feeding the strip of paper to the type-wheel for its action, by co-ordinate step-by-step movements, for the proper spacing of the telegraphic letters or signs. The devices concerned are, first, an upright arm attached to the printing-lever; second, a connecting-rod or link suspended at an angle of about forty-five degrees; third, a vertical sliding-bar moving in a horizontal slide—of course, the two being at right angles with each other—the lower end of said vertical sliding-bar being sharpened so as to engage and carry forward the printing-slip when pressed upon and through the same into the slot provided in the plate in which the slip slides, and the upper end of said slide being secured loosely, by a pin, to the lower end of the link. The horizontal slide works in stationary guides and the vertical one in guides provided in the horizontal slide itself. The vertical slide has two pins secured therein, one above and one below the horizontal slide. These pins are so placed as to allow slight play in the vertical bar, and may take in recesses provided in the horizontal slide or on the plane edges thereof at will. The motion thus permitted allows the point of the vertical bar to engage and free itself from the printing-slip at the proper time. The fourth part of my invention consists in providing a printing-pad composed of cork. The object is to secure a substance which will absorb and not be injured by the oil of the printing-ink, as rubber, the material generally used, is injured, while absorption is small, but sufficient to cause softening thereof. This softening frequently causes the printing-slip to adhere to the rubber printing-pad, thereby deranging and hindering the operation of the machine. Cork is also much more elastic and durable than rubber cloth. The fifth part of my invention relates to devices for securing unison, either between the receiving-machine and the transmitter or between the transmitter and any number of machines on a given circuit, as the case may be. In other words, the object of this part of my invention is to place the means of regulating one or more machines about to be operated upon in the hands of the operator. The devices used are, first, a sliding sleeved collar placed on the type-wheel shaft, preferably, and a spiral spring, one end of which is attached to this collar and the other end to a stationary pin or fixture. This collar has an arm projecting from the side opposite the spiral spring, to one end of which it is attached, and bent at right angles or elbowed. This arm is beveled on both sides where it comes in contact with a carrier-pin on the back of the es-

capement-wheel, which pin is itself also beveled at the point on one side; or a transverse section of this arm may be described as wedge-shaped. The square edge on the side of the periphery of this collar which is toward the escapement-wheel is cut away so as to present a continuous bevel, against which a bevel-pointed adjustable post, located on the printing-lever, strikes whenever the said lever is called into action to disengage the parts. The second device is a vertical locking and unlocking-bar resting on a pin at the bottom so to overhang that its own overbalance may unlock the main escapement-lever, a fixed arm of which it engages. This locking-bar has projecting across the path or plane of motion of the elbowed arm above described a stop-pin or arm, the function of which is to engage said elbowed arm and receiving therefrom sufficient lifting or pushing force to push said locking-bar, to which it is fixed, over to and engaging the locking-arm of the main escapement-lever. The upper part of this locking-bar is hook-shaped for this purpose. The working of these devices will be more fully described hereafter. The sixth part of my invention relates to the transmitting machinery, and consists in a peculiar mode of opening and closing the circuit, as follows, viz.: By a sliding-bar having an adjustable connection-block operated by a link, itself connected to a system of cog-wheels operated by hand, weight, or spring, brought intermittently into contact with a corresponding connection-block attached to a spring and thence with the circuit. The link is attached to the operating mechanism at one end, and by a slot which is larger or longer than the pin which secures it. By this means I prevent any tremulous or involuntary motions—such as are likely to come from the hand of inexperienced operators—from returning the sliding-bar block into unintended connection with the spring-block after the connection has been once broken, thereby deranging the unison. This slot is made longer than the distance over which its connecting-pin can be moved before a spring-pawl attached to the crank-arm or handle takes in a tooth of a fixed wheel provided with teeth on its periphery, and prevents further back motion and, consequently, all danger of false connection.

Figure 1, Plate A, is a side elevation, showing the printing-lever, ratchet, and escapement-wheel, &c. Fig. 2, Plate A, is a side elevation, showing additional details in place. Fig. 1, Plate B, is a side elevation, showing modified devices for unison purposes. Fig. 2, Plate B, is an end view of the same. Fig. 3, Plate B, is a side view of the details concerned in feeding the printing-slip. Fig. 1, Plate C, is an enlarged end view of the unison devices. Figs. 2 and 3, Plate C, are a side and end elevation of the feeding devices. Fig. 1, Plate D, is a top view of the transmitter with wooden table or support cut away to show the transmitting devices.

A is the armature of the magnet M for actuating the lever L, which carries the escapement-pallets p^1 p^1, the pawl r, and the V-shaped cam v. A^1 is the armature of the magnet M^1 for operating the printing-lever L^1, which bears the pin p, the printing-pad C^1, the bevel-pointed post n, and its adjusting-screw m. A^2 is the connecting and actuating-link of the paper-feed provided with pins i^3 i^3. A^3 is the upright bar attached to the lever L^1 which operates the feeding devices. a is the locking-plate of the lever L. a^1 is the plate on which the printing-slip moves. B and B^1 are the wooden and metallic base-plates of the instrument. B^2 is a boss on one of the posts D^2, on an extended arm of which the lever l^2 is hung. C is the counter-weight separating the two pins i and i^1, which, connected, complete the printing-circuit, and is to withdraw the latch h promptly from the ledge e of the lever l^2, on which the lip e^1 of the latch h rests. C^1 is the printing-pad. C^2 is the crank of the transmitter. D, D^1, D^2, and D^3 are various posts and supports of the various devices, as shown. d is the beveled collar, to which the elbowed arm j is attached. d^1 is the horizontal slide perpendicular to the sliding feed-bar E. d^2 are the bearings of the slide-bar l in the transmitter. E is the sliding feed-bar, sharpened at the end t^2 to penetrate and carry along the printing-slip or strip. e is a ledge on the lever l^2. e^1 is a corresponding lip on the latch h. e^2 are guide-screws for holding the horizontal slide d in place. G is the stationary block or plate to which the two feed-slides, moving perpendicularly to each other, are attached. g is a gauge-screw regulating the position of the counter-weight C. g^1 and g^2 are gauge-screws regulating the movement of the lever L and furnishing the means of connecting the printing-circuit directly from the lever L instead of from the lever l^2, under some circumstances. L is a latch or stop to break the connections of the printing-circuit through the lever l^2. i and i^1 are connection-points for completing the printing-circuit. i^3 are securing-pins of the link A^2. i^4 is a pin on the escapement-wheel, or an independent wheel on the same shaft or sleeve, which engages the elbowed arm j, and is located so as to secure unison. J is the connecting-block of the transmitter, which serves to close and open the transmitting-circuit. j is an elbowed arm inserted in the bevel-edged collar d. J′ is the stop or rest of the latch h. k is the locking-lip of the locking-lever L^2. k^1 is the connecting-block of the transmitter. L is the escapement-lever. L^1 is the pointing-lever. L^2 is the locking-lever. l is the sliding-rod of the transmitter. l^2 is the pendent lever, used to complete the pointing-circuit. M is the actuating-magnet. M′ is the pointing-magnet. p is a pin in the lever L^1, on which the extended pin or arm p^1 of the counter-weight C rests. k^2 is a pin on which the lever rests. p^3 and p^4 are pins securing the spring S^6. p^5 is the dog or stop, which maintains the compression of the spring S by taking in the teeth of the ratchet r^1. p^6 is the attaching-pin of the spring S^4 for keeping the lever l^2 in place. p^7 p^7 are the two V-shaped pallets which engage the pins p^8 of the escapement-wheel W. R is the toothed wheel on the crank C^1 of the transmitter. r is the ratchet-pawl and r^1 the ratchet-wheel, the last secured

to a sleeve, and compressing the spring S between it and the escapement-wheel. S is the ratchet and escapement-spring. S^2 is the spring holding down the dog p^5. S^2 is the spring of the lever L. S^3 is the spring of the lever L^1. S^4 is the spring of the lever l^2. S^5 is the spring of the pawl r. S^6 is the spring of the counter-weight C and latch h. S^7 is the spring of the collar d. S^8 is the spring holding the printing-slip on the plate a^1. t and t^1 are the attaching-pins of the spring S. t^2 is the sharpened point of the feeding-bar E. t^4 is the link of the transmitting-rod l. U and U′ are the connection-posts. v and v^1 are opposing V-shaped cams on the levers L and l^2. v^2 is the support of the lever L^2. W is the escapement-wheel. w is the wire forming part of the printing-circuit, and insulated by insulator X. w^1 is the connecting-wire of magnet M. w^2, the same of the magnet M′. (S^4, Plate D, is the spring of the dog p^3 of the transmitter h^1, stop on the lever L^2.)

The indicator-dial and mechanism forming part of Fig. 1, Plate D, may be omitted as not intended to be described by the lettering shown.

The operation of the machine is as follows, viz: The wires of the circuit being connected with the posts U and U′, and this circuit being provided with a transmitter of either of the common forms, or constructed and operating like that set forth in this application, whenever the transmitting instrument is made to close the circuit the magnet M, armature A, and lever L and attachments are brought into action, thereby depressing the pawl r actuating the ratchet-wheel r^1, and thereafter, by permission of the escapement-detents p^7 and p^7, freeing a pin, p^8; also actuating the type-wheel W one step, letter, figure, or character, according as the type-wheel may be arranged. The sequent opening of the circuit by the transmitter releasing the armature A from the control of the magnet M permits the type-wheel W, which feels the pressure of the ratchet-spring S^5, (see Fig. 2, Plate B,) to take another step. The type-wheel W being secured to its shaft, and the ratchet-wheel r^1 being attached to a sleeve sliding or rotating on said shaft, and further, one end of the spring S being secured to each, viz., the type or escapement-wheel W and the said sleeve, and further, said spring S being in a state of compression and ready for action, the downward movement of the pawl r upon the ratchet-wheel r^1 is expected and arranged to give the spring S an amount of compression equal to the requirement of the type-wheel during both the downward and upward movements of the lever L. The type-wheel W makes use of only half of this compression upon the downward movement of said lever, because, although the pallet p^7, which has its edge presenting upward, clears the pins p^8 of the type-wheel, the opposite pallet, p^7, having its edge downward, engages said pin p^8 as freed, and prevents further movement of the type-wheel W until the circuit through the magnet M is broken and the spring on the outer end of the lever L is allowed to act, when the necessary freedom is given, and the spring S surrenders the remaining half of its compression or changes the same into motion of the type or escapement-wheel. Repeated closings and openings of the circuit, with suitable battery-power connected therewith, as above described, will cause the entire revolution and any number of revolutions of the type or escapement-wheel. The printing of the letter desired is accomplished as follows, viz.: The double-beveled pin v on the lever L, at each upward or downward movement of that lever, slides on the corresponding beveled projection upon the upper and adjacent part of the pendent lever l^2. This lever l^2 being free to move on its pin, is consequently vibrated at each motion of the lever L by the mutual action and reaction caused by these beveled surfaces in contact with the spring S^4. The lever l^2 has on its lower extremity a connecting-point, i, so placed as at each vibration of l^2 to come in contact with the pin i^1, which is insulated from the immediate or adjacent machine, but connected with the wire which leads through the printing-magnet M′. During sufficient rapid action of the transmitter, although the pins i and i' come in contact at each closing and opening of the circuit for want of sufficient time to set up a flow of the electric current through this additional or switch-route strong enough to operate the armature A^1 and the lever L^1, no action of the printing mechanism takes place; but whenever the beveled surfaces v and v^1 are allowed to fully lap on each other and rest in contact for a space of time, longer or shorter, according to the strength of the battery, perfection of contact, &c., the pins i and i' being in contact, a choice, as it were, of two routes is offered to the current, leading, one through the electro-magnet M, and the other through the electro-magnet M′. Under well-known laws of electrical dynamics, in such circumstances, part of the current will be diverted through the new and nearly-unoccupied route via magnet M′, and the printing-lever L^1 being actuated thereby, the letter presented to the printing-pad will be impressed upon the passing strip of paper provided for that purpose. Supposing the printing just described has taken place on a closed circuit, the succeeding opening of the circuit will permit the spring S^2 to take the lever L in charge, and thereby operating on the beveled surfaces v and v^1 of the lever l^2, break the connection of the switch-circuit at the pins i and i^1, provided the spring S^2 be sufficiently strong. But in practice the spring S^2 should be made as weak as the proper action of the lever L will permit, and therefore it becomes desirable, under the arrangement described, to break the switch-connections immediately after the printing has been accomplished by subordinate devices. This is done as follows, viz.: The pin p inserted in the lever L^1 takes under the lever p^1, which is inserted in the counter-weight C. The sudden action of the electro-magnet M′ on the armature A^1 and lever L^1 consequently gives a sudden upward impulse to these two pins p and lever p^1, and the counterweight C being hung with the

larger part of its weight in front of the perpendicular through the point of suspension, and, being aided by the action of the spring S^6, also receives an upward and forward motion, whereupon its shoulder takes on the under side of the latch-lever h, and lifting h from its rest J′, carries the lip thereof into contact with the rounded termination of the pendent lever l^2. The slipping of this lip e' on the rounded surface e, under the influence of the sudden blow delivered by the counter-weight C, tends to separate the pins i and i', and so break this switch-connection. The motion of the lip e^1 is intended to continue until it rests on the ledge at e, provided on the lever l^2, and remains there, insuring a gap in said e-connection. The succeeding action of the lever L necessarily moves l^2, releases the latch h, and permits rapid revolutions of the type-wheel W without printing any letter until the desired one is presented to the printing-pad, when the requisite delay, as before, brings the electro-magnet M′ or lever L^1 into action again, and printing follows. Following the impulse given to the counter-weight C by the printing-lever, that lever prints and then drops, allowing the counter-weight C also to drop and place the spring S^6 in a state of tension. The object of this is to so aid the weight of the latch h that it shall escape from the control of the ledge e on the lever l^2 instantly upon the subsequent motion of that lever. It may be deemed desirable under some circumstances to use a local battery and circuit to operate the printing mechanism above described. The local battery is connected with the screw-posts U and U′, and the closing of the local circuit is effected, both on the open and closed main circuit, by the mechanism that switches part of the main current, when that is used to do the printing, through the printing-magnet M′; consequently the type-wheel W takes two steps to every pin, and has a letter presented to the printing-pad at each step, and prints both upon the open and closed main circuit. Owing to the action of the double-beveled surfaces v and v^1 on each other, the pins i and i^1 are in contact only when these surfaces are in a state of rest—*i. e.*, at the beginning and end of each motion of the lever L, whether that motion be caused by the action of the magnet M on a closed circuit, or by the spring S^2 on the open circuit.

The second part of my invention may, however, be carried out in a more simple manner, as shown in Figs. 1 and 2, Plate B, the operation of which may be described as follows: Omitting the lever l^2 and its attachments—the operation of which has just been described—and for the purpose of this description abandoning the attempt to show how printing may be done on the open circuit, the printing mechanism otherwise being the same, an alternative connection is made with the printing-magnet M′ from one post, the other wire of which is connected with the screw-stop g^1, so that when the closing of the circuit of the magnet M occurs the back end of the lever L will come in contact with said screw and complete the printing-magnet circuit which leads from the printing-magnet M′ to the opposite binding-post through the frame-work and plate of the machine. The contact of the lever L with the screw g^1 being very brief while the type-wheel is being rotated by the rapid action of the magnet M, sufficient time is not given for the completion of the switch-circuit and the consequent action of the printing-lever. It may be stated in passing, however, that a local battery, being connected in circuit with the adjustable screw-pins g^1 and g^2 through the magnet M′, printing will take place on both the closed and the open circuit.

The operation of the third part of my invention is as follows, viz.: The strip of paper being placed in charge of the flat spring S^8, and the point t^2 of the vertical sliding bar E, which passes through a slot in the spring S^8 for that purpose, and through the paper strip and into a slot in the plate upon which the paper rests, the lever L^1 being about to rise for the purpose of bringing the printing-pad into action, the arm A^3 is also prepared to rise, and, when it does so, being rigid and rigidly attached to the lever L^1, in rising it lifts the link A^2. The lifting of the link A^2 slides the vertical bar E upward in the horizontal slide d^1, thus withdrawing the point t^2 from the paper strip preparatory to the next step. When the vertical slide E has proceeded until the pin X, secured in E, strikes the horizontal slide d^1 its further vertical motion ceases, and thereupon, the elevation of the arm A^3 and link A^2 continuing, the horizontal slide d^1 begins to move in its guides, and continues to move the necessary distance for the spacing of the letters. Next follows, of course, the drop of the printing-lever L^1 and of the series of parts attached to the slide E. When the slide E has dropped far enough to engage the paper strip and penetrate the slots, as before, the upper pin X′ strikes on the upper side of the slide d', and preventing further motion in that direction, causes the horizontal slide d' to return in its guides, carrying the paper forward for the required distance. In printing a message these operations are repeated as every letter is printed.

The operation or qualification of the fourth part of my invention consists in this, viz., that while rubber, the substance usually provided for the printing-pad, is liable to be softened by the contact and absorption of oil from the printing-ink, cork is not so, and, consequently, the adherence of the paper slip to the pad from such result is prevented. Cork seems rather to be benefited than injured by whatever contact may occur with printing ink.

The operation of the fifth part of my invention is as follows: It frequently occurs, when many receiving instruments are located on one circuit and operated by one transmitter, that they or some of them fall out of unison, and instead of printing the same letters each time, as the operator supposes he is doing by the indications of the transmitter, he is printing entirely different ones at those machines not in unison with the transmitter. The same thing occurs

between the transmitter and the receiving-machine on a circuit, and the object of the unison devices being to correct this evil, provision is made to bring the transmitter and all the instruments on the same circuit into harmony by indicating the same letter at one and the same time.

The escapement-wheel W, (see Fig. 1, Plate C,) has upon its outer side the pin i^4, which is beveled on one side. The sleeved collar d (same figure) is beveled on the edge next to the escapement-wheel, and is pressed toward the escapement-wheel by the spring S^7. The elbowed arm j projects from the collar d, and has the part which projects across the path of the pin i^4 also beveled, or so shaped that a transverse section thereof is wedge-formed. During the usual action of the machine the pin i^4 pushing against the arm j compresses the spring S^7, which is attached to the arm j at one end and is fixed to a stationary part at the other. When the escapement-wheel W has so far rotated that it has presented, say, a dot on the type-wheel nearly to the printing-pad, the arm j having been intentionally so located, is brought into contact with a projecting stop, h', (see Fig. 1, Plate B,) which extends from the vertical locking-lever L^2 toward and across the path of the same. The continual pressure of the actuating-lever L and the pawl r exerted through the mechanisms provided causes the slightly-overbalanced locking-lever L^2 to move slightly, and it does so at the proper time to cause the locking-hook k, (see Fig. 1, Plate B,) to engage the arm a, which is rigidly attached to the lever L. The lever L is thus held or locked so long as the transmitter continues to run and make and break circuit as rapidly as usual. Upon stopping to print the dot, however, the lever L^1 lifts, of course. In so doing the adjustable post n, which is attached to the printing-lever and has a beveled top, lifts and presents its beveled apex to the collar d, overcoming the pressure of the spring S^7, so as to cause the sleeve thereof to slide on the shaft until the arm j', (see Fig. 1, Plate B,) clears the pin i^4, when the compressed spring S^7 taking the collar in charge, it is rotated until the arm j strikes upon the opposite side of the stop h' of the lever L^2. The pressure which locked the lever L being thus removed, perhaps assisted by the blow of the arm j, the overbalance thereof takes effect and unlocks the lever L^2, thus permitting the receiving-machine or machines to start from the same point as the transmitter, the latter having been delayed to print at the proper common starting point, viz., a dot. The same revolution, or, according to the letter printed, part of a revolution, is described every time printing is allowed.

The operation of the sixth part of my invention, which is for the transmitting to the receiving instruments described or to any other, is as follows, viz.: As the pinion N revolves the rod l is caused to slide by the link t^4. Starting from the situation shown in Fig. 1, Plate D, the block J being in contact with its corresponding block k, is drawn from that contact, and the circuit is thereby broken. Continuing motion of the pinion N causes the link t^4 to return the slide l, and, consequently, the block J, into contact with the block k, thereby renewing the connection and completing the circuit. Repetitions of these motions constitute the means of control over the receiving instrument. Arrangements being made for lost motion in the slot of the link t^4 without effect upon the slide l and the spring S^4, Plate D, causing the dog p^3 to take in the toothed wheel R, the crank C^1 cannot move backward far enough to cause the pin in that slot to exceed the lost motion provided for. Consequently, no involuntary disarrangement of the instrument can result from the causes referred to in this connection.

I claim—

1. The lever L, provided with the two pallets p^7, engaging the pins of an escapement-wheel, such lever being operated by a magnet and armature.

2. The ratchet-wheel r^1 operating the escapement-wheel of a telegraph instrument by means of a spiral or a convolute spring in a state of compression between them.

3. The lever L, provided and operated as above and also provided with the pawl r, operating the escapement-wheel by means of a ratchet-wheel and compressed spring.

4. The dog p^5 operating to maintain the compression of the spring S between the ratchet r^1 and the escapement-wheel W.

5. The pendent lever l^2, provided with the V-shaped cam v', co-operating with the V-shaped cam v on the lever L, and also provided with the circuit-closing pin i or other equivalent device.

6. The sliding latch h, provided with the lip e^1, and the pendent lever l^2 provided with the ledge e, operating co-ordinately to close and open the circuit of the printing-magnet M'.

7. The counter-weight C and spring S^6 operating upon the latch h to permit or break the connection of the printing circuit, as described.

8. The counter-weight operated by an impulse derived from the printing-lever L^1, substantially as shown.

9. The lever L arranged and operating to complete the printing-circuit through the screw-stops g^1 and g^2 or their equivalents.

10. The pointed feed-bar E sliding in guides provided in the perpendicular slide d^1, operated by the link A^2 from the printing-lever L^1 to feed the slip of a printing-telegraph.

11. The cork printing-pad of a printing-telegraph.

12. The overbalanced locking-lever L^2, provided with locking-lip k and the stop h^1, and operating to lock the escapement-lever L.

13. The pin i^4 operating to carry the elbowed arm j of the collar d and to compress the spring S^7.

14. The elbowed arm j operating upon the stop h^1 of the lever L^2 for the purpose of locking the levers L and L^2.

15. The same operating in conjunction with the pin i^4 and stop h^1 to secure unison.

16. The bevel-pointed pin n located on the printing-lever and operating upon the bevel-edged collar d to cause the elbowed arm j to escape the pin i^4 by sliding the same on the type-wheel shaft.

17. The spring S^7 receiving compression during the revolution of the escapement-wheel, and operating to return the elbowed arm j to the stop h', and also to return the arm j into position to engage the pin i^4.

18. The slotted link t^4, block J, spring S^4, pawl p^3, and toothed wheel R in combination.

19. The adjustable block J on the slide l in combination with the spring-connection block k.

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Witnesses:
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