

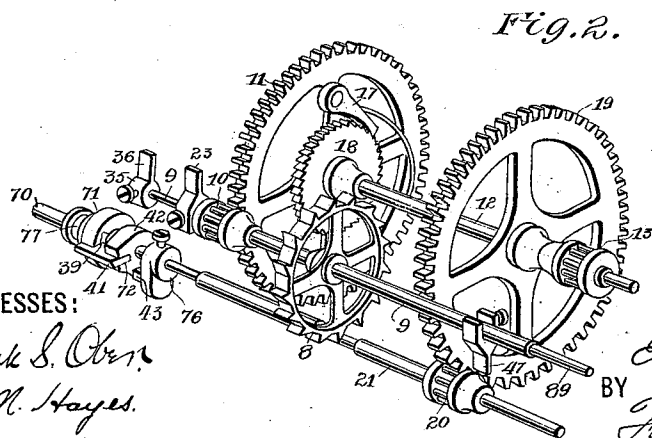
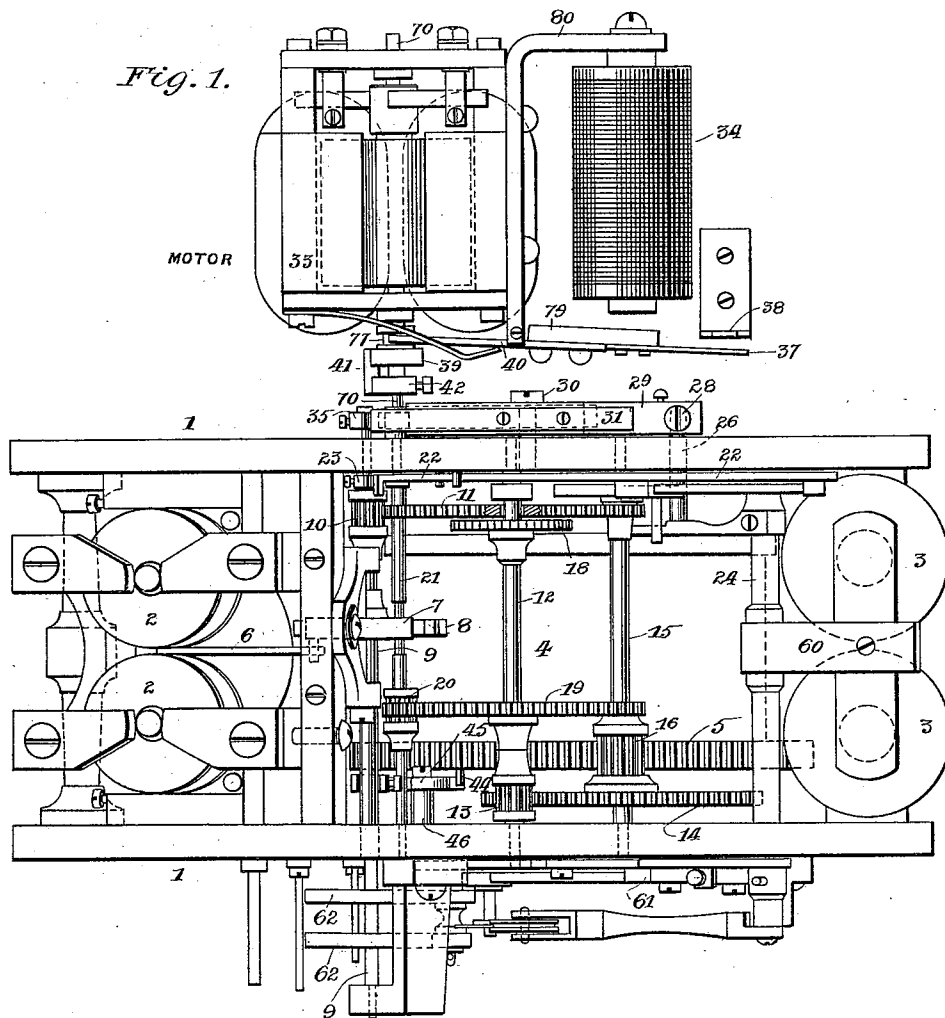
(No Model.)

3 Sheets—Sheet 1.

E. A. WIRSCHING.
PRINTING TELEGRAPH.

No. 512,422.

Patented Jan. 9, 1894.



WITNESSES:

Frank S. Ober.
A. M. Hayes.

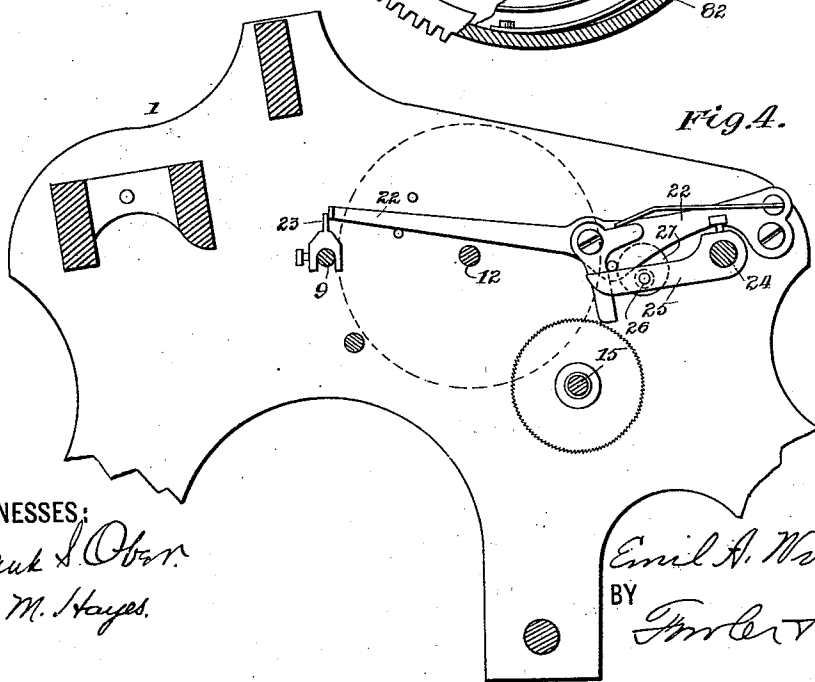
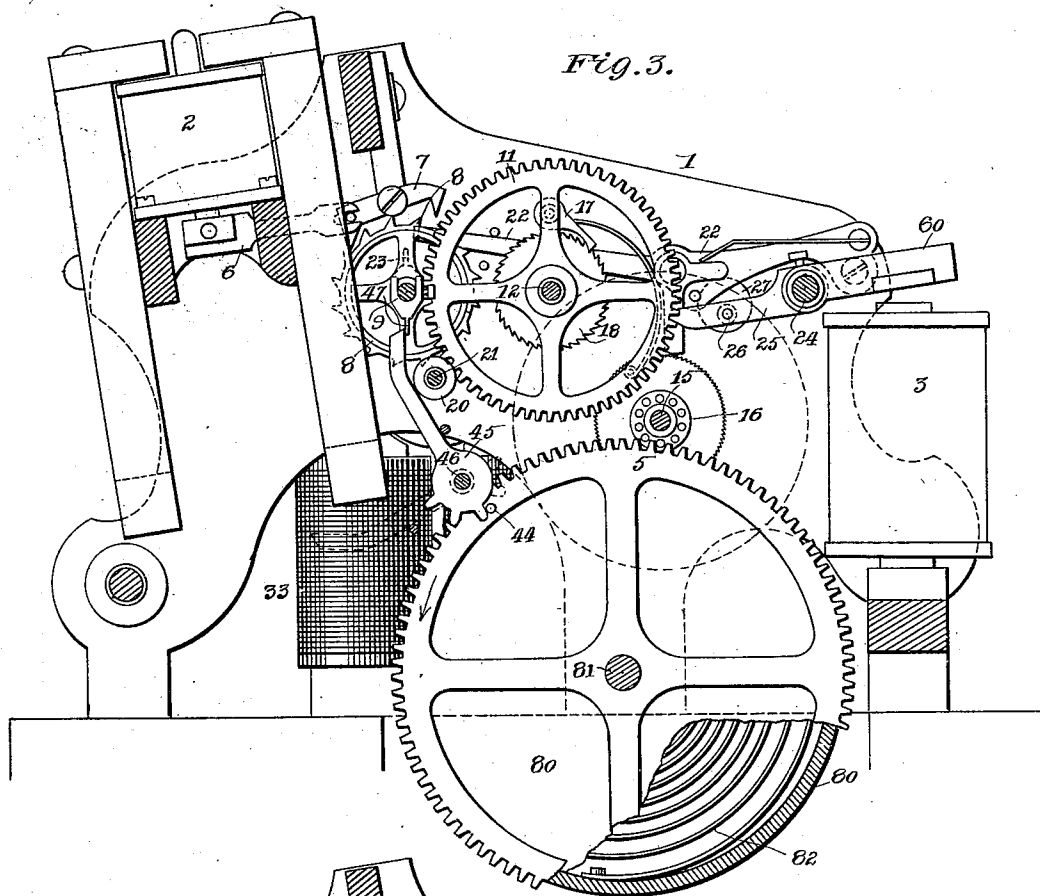
INVENTOR

Emil A. Wirsching
BY *Forster & Forster*
ATTORNEYS.

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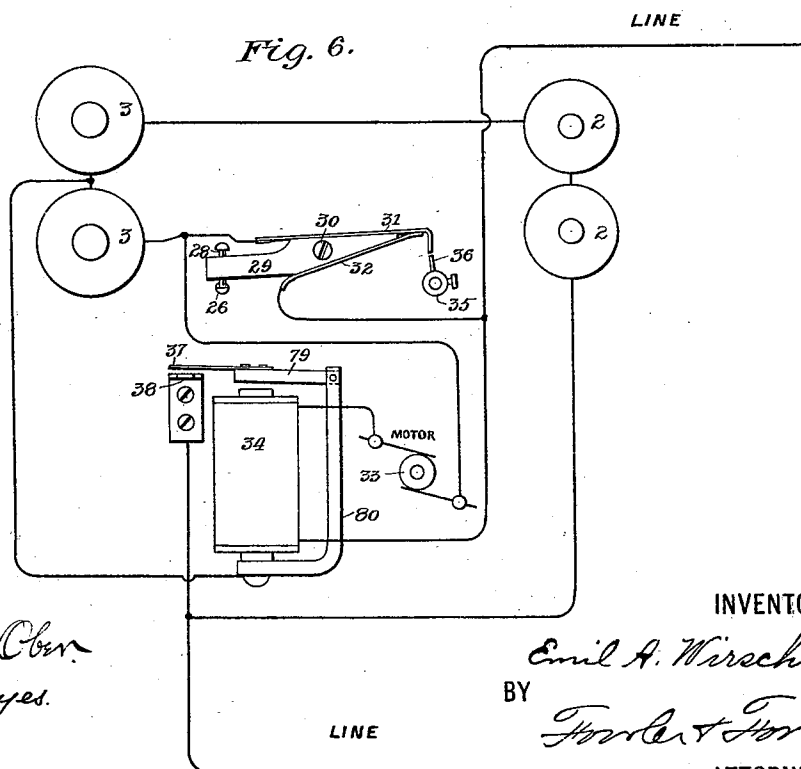
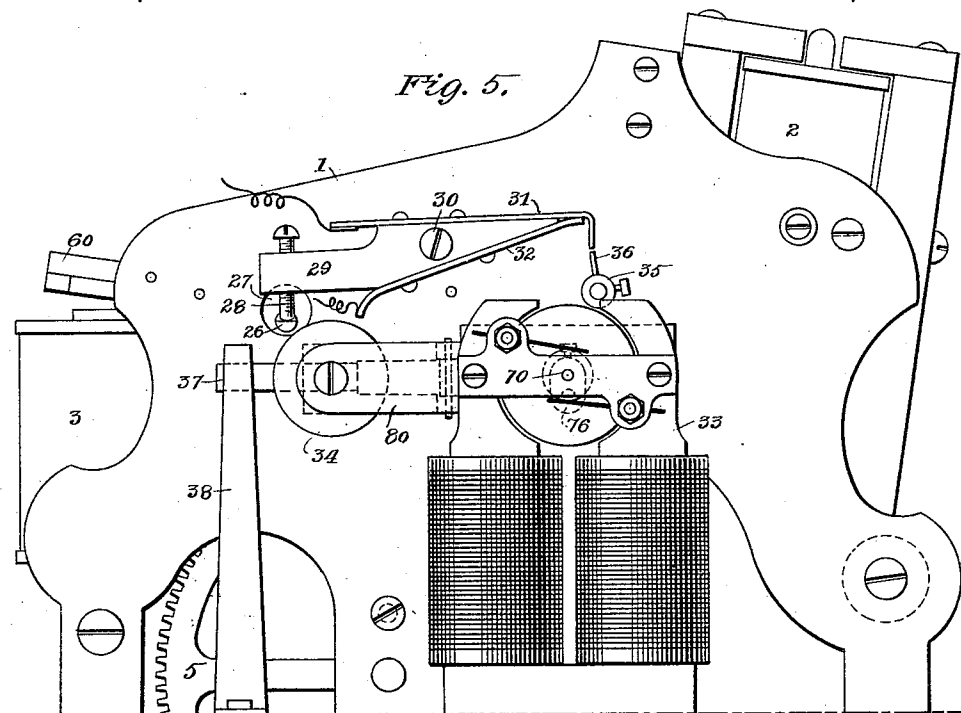
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3 Sheets—Sheet 3.

E. A. WIRSCHING.
PRINTING TELEGRAPH.

No. 512,422.

Patented Jan. 9, 1894.



UNITED STATES PATENT OFFICE.

EMIL A. WIRSCHING, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
ALOYS WIRSCHING, OF SAME PLACE.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 512,422, dated January 9, 1894.

Application filed May 12, 1893. Serial No. 473,942. (No model.)

To all whom it may concern:

Be it known that I, EMIL A. WIRSCHING, a citizen of the United States, residing at New York city, county and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

It is well known that the receivers or local instruments in printing telegraph systems are generally impelled or driven by weights or springs acting through suitable clock mechanism and that the escapements of the said clock mechanism are governed by electromagnets in the main line. The successive operations of the escapement-magnet in any given local instrument, or "ticker" release its clock-work and thus throw the type-wheel or wheels on one of the shafts of the clock-work successively into the power of the said weight or spring, whereby the said type-wheel shaft is rotated step by step until the proper letter is in position for printing. A printing-magnet, also in the main line, is then brought into operation and the desired letter is recorded upon a suitable strip or tape. The local apparatus or receiver being once wound up, all the other needful operations for printing are performed by the central office operator, who, by manipulating the proper keys of a transmitter, both affects the escapement-magnet in such a manner as to bring the right letter into position, and also causes the printing-magnet to act for making the record.

I have devised means whereby the work of winding all the instruments can be accomplished automatically from the central station, or at the will of the central operator, through the use of the ordinary current used in the telegraphic service. To this end, I provide a small rotary electric motor to be added to each "ticker" or receiver and so combined therewith as to be capable under certain conditions of winding up the actuating weight or spring, the action of the motor being in the reverse direction to that which the spring or weight exerts in the normal opera-

tion of the apparatus. I have also provided means whereby the apparatus is prevented from running down so far as to interfere with the proper operation of my winding devices; all of which will be fully described in the specification which follows, and more particularly set forth in the claims forming a part thereof.

My invention will be more clearly understood by reference to the accompanying drawings, which illustrate a type of my invention, and wherein—

Figure 1, is a plan of a ticker having my attachments. Fig. 2, is a perspective of the chief significant parts of the clock mechanism. Fig. 3, is a rear elevation of the "ticker" with one of its rear plates removed, and with a portion thereof broken away to show the actuating-spring. Fig. 4, is a detail view. Fig. 5, is a rear elevation of the complete apparatus. Fig. 6, is a diagram of the circuits.

The same designating characters indicate the same parts throughout the drawings.

Referring more particularly to the several parts, 1 is a ticker of any suitable type, the same being provided with the usual escapement-magnets 2, and the usual printing-magnet 3. The escapement-magnet controls the action of a clock-work 4, which is operated by a driving-wheel 5. The said wheel 5, may be driven either by a spring or a weight, both sources of power being well known in the art for this purpose.

In the construction shown a spring 82, is used for impelling or actuating the type-wheels through means of the intermediate train. This spring is coiled within the rotating drum 80, which is mounted on the arbor 81, the ends of the spring being secured fast to said arbor and drum respectively in the usual way.

The escapement-magnet 2, is the usual polarized magnet whose armature 6, is connected with the escapement-lever 7, of an escapement-wheel 8, on the shaft 9. From the said shaft 9, to the driving-wheel 5, the connection is made by means of a pinion 10, on the shaft 9, a gear-wheel 11, engaging therewith, the said gear-wheel being loosely mounted, as shown in Fig. 1, upon a shaft 12, a pinion 13, upon the last named shaft, a gear-wheel 14,

on a shaft 15, and a pinion 16, on the said shaft 15. This train of gearing forms the main portion of the clock-work by which the action of the apparatus is controlled. The loose gear-wheel 11, has a connection with its shaft by means of a pawl 17, and ratchet 18, so that it moves with the said shaft when the latter is rotated in one direction but is free to remain at rest when the shaft is rotated in the opposite direction.

The gearing described is substantially that which appears in the ordinary ticker, save that usually the gear-wheel which I have designated as 11, is rigid with its shaft. I have, however, arranged the said gear-wheel to be loose upon its shaft and independent of it during its rotation in one direction and I have added another gear-wheel 19, on the same shaft 12, gearing with a pinion 20, on an additional shaft 21, all for the purpose of permitting the winding of the driving spring or weight by a simple reversal of the operation of the various gears in their normal action. The operation of this part of the apparatus will be fully explained hereinafter. Meanwhile, I may say that the escapement-magnet acts in my apparatus in the ordinary manner and that the printing-magnet also has its usual action, for which reason the details of this part of the description will be dispensed with. I need only call attention to the unison apparatus clearly shown in Fig. 4, as consisting of the usual unison-lever 22, and the unison-detent 23, mounted on the escapement-shaft 9. The rock-shaft 24, which is actuated by the armature of the printing-magnet, carries an ordinary form of printing-lever or platen 61, which co-operates in the usual well known manner with the type-wheels 62, 62, to effect the printing of characters on an intermittently-moving paper strip or tape, which is not shown.

For the purpose of my invention I have secured to the shaft 24, of the armature 60, of the printing-magnet 3, a lever 25, carrying a pin 26, which extends out through an opening 27, in the frame of the ticker 1, and rests normally under the end of a screw 28, which passes through a pivoted switch-arm 29, as clearly shown in Fig. 5. The said switch-arm 29, is of insulating material and is loosely pivoted at 30, to the frame or side wall of the ticker and carries upon its upper face a metallic strip 31, and upon its lower face a metallic strip 32. These two strips come together at the end of the switch-arm 29, and form there the spring terminals of a normally-closed electric circuit. As will appear hereinafter, the spring 31, is connected to the printing-magnet 3, and also to one pole of an electric motor 33, having a rotary armature while the other spring 32, is connected directly to line on one side of the apparatus and through a switch-magnet 34, to the opposite pole of the said motor 33.

On the escapement-shaft 9, outside the frame of the ticker I mount a hub 35, from

which extends a detent 36, the said detent being so arranged that at a certain point in the rotation of the shaft 9, it stands directly beneath and close to the bent-down end of the spring or strip 31. It being borne in mind that the pin 26, lifts the rear end of the switch-bar 29, every time the printing-magnet 3, acts, one will see that if this described lifting takes place at a time when the detent 36, is just under the end of the spring 31, the said spring-end will be lifted and so break contact between the spring 31, and the spring 32. It will also be seen that the armature 79, of the magnet 34, carries a contact-spring 37, which is adapted to make contact with a corresponding terminal 38, every time the circuit of the switch-magnet 34, is closed. The object of this arrangement will be fully described hereinafter.

Normally, the motor is disconnected from the winding-shaft 21, but it may be temporarily coupled with the shaft through means of a clutch 39, which is opened and closed by the action of the armature of the switch-magnet 34. This clutch comprises a sleeve or clutch-box 71, mounted loosely upon the armature-shaft 70, of the motor. The free end of the extension 40, of the armature of magnet 34, takes into a groove 77, formed circumferentially around the clutch-box 71, so that the vibration of the armature may serve to slide the sleeve lengthwise on the armature-shaft in opening and closing the clutch. The clutch sleeve 71, is provided with a clutch-arm 41, which is shown as projecting from the outer face thereof parallel with the shaft 70. This arm is adapted to slide endwise through a notch or forked-projection 72, of a yoke or ring-piece 42, which is secured fast upon the outer end of the armature-shaft 70. When the clutch is open the outer end of the clutch-arm 41, is about flush with the outer face of the guide or yoke 42, but when the clutch is closed the arm projects beyond the outer face of the yoke in order to interlock with a suitable projection 43, extending outwardly from the outer face of a hub or bracket 76, which is mounted fast upon the outer end of the winding-shaft 21. During the printing operation of the receiver the winding-shaft 21, rotates in the usual way, and the clutch-arm or projection 43, carried at its outer end cannot collide and couple with the clutch-arm 41, of the motor-shaft as the clutch at such time is open. When the armature of the magnet 34, is drawn down, the clutch-arm 41, is thereby projected into the path of the projection 43, so as to interlock therewith. As the motor at this time is put in operation, the winding-shaft is thus rotated in reverse direction from that in which it normally turns and this serves to wind up the driving mechanism through means of the gearing hereinbefore described. When the armature falls away from magnet 34, the clutch is open and the winding-shaft is free to turn in its normal direction. While I have shown

but one form of clutch for temporarily connecting the motor with the driving mechanism of the receiver, it is to be understood that any ordinary form of clutch may be used for
 5 such purpose. Furthermore, I do not limit myself to a construction in which the winding-motor is temporarily thrown into engagement with the driving mechanism of the receiver in order to wind it, since it is evident
 10 that a construction in which the motor is permanently connected or geared with the winding mechanism would be within the broad scope of my invention.

I may now describe the operation of the
 15 parts in combination, their construction and operation having been already described separately.

Referring especially to Fig. 6, it will be seen that the circuit coming from line passes
 20 through the apparatus by way of the escapement-magnet 2, the printing-magnet 3, springs 31, 32, and on to line again. This is the normal circuit and in operating it the attendant at the central office uses the ordinary key of the transmitting instrument for
 25 causing as many pulsations of the polarized armature of the escapement-magnet as may be necessary to bring the desired letter into place for printing, and then by means of a longer closure of the circuit affects the printing-magnet 3, in such a manner as to cause
 30 the operation of printing to be accomplished. This goes on until the central office operator concludes that the local instruments are nearly run down, whereupon he manipulates
 35 the transmitter until the various instruments have been brought to a position where the detents 36, are located just below the ends of the springs 31, in the various instruments.
 40 In the present apparatus I have shown the said detent as adapted to be so placed at the moment when the instrument is at unison. This, however, is a non-essential feature, as
 45 I may select any key such as that for the letter "Z" or "Q" or any other letter of the alphabet, or I may even use a blank key to bring the instrument to the point where the detent is in the position shown Figs. 5 and 6.
 50 Having brought the parts to the position indicated, the central office operator closes the circuit and holds it closed until such time as he thinks necessary for winding the ticker or
 55 tickers, whereupon he releases his key leaving the apparatus ready for further use in the same way as before the winding. Now the winding is accomplished in the following manner: When the circuit is closed, the parts
 60 having been brought to the position shown in Figs. 5 and 6, the printing-magnet 3, is energized thereby lifting the lever 25, the pin 26, and the switch-arm 29. This causes the depression of the forward end of the said switch-arm and causes the spring 31, to be
 65 brought into contact with the end of the detent 36, and lifted away from the spring 32. Accordingly, the main line circuit through the apparatus, already described, is broken

and a new circuit is formed by way of escapement-magnet 2, printing-magnet 3, motor 33, switch-magnet 34, and line. However, the
 70 closing of the circuit of magnet 34, has for its effect the making of contact between the terminal 37, and the terminal 38, whereupon a new path for the main line current is formed
 75 by way of the said terminals and the frame 80, of the magnet 34, through one bobbin of the printing-magnet 3, and thence through the motor 33, and the magnet 34, to line. Thus the escapement-magnet 2, and one-half
 80 of the printing-magnet 3, are cut out and the greater portion of the main line current is accordingly utilized for operating the motor 33. The reason why the current is permitted
 85 to pass through one-half of the printing-magnet is because if that were not the case the switch-arm 29, would be allowed to drop and restore the circuit to 31 and 32. The circuit
 90 is maintained through the switch-magnet 34, in order to cut out the resistance of the escapement-magnet, and at the same time to hold the clutch 41, in such a position as to be
 95 in range with the arm 43, on the shaft 21. I come now to the action of the motor 33, in winding the driving weight or spring. The circuit through the motor having been made
 100 in the manner already described, and being held closed by the operator at the central office, the motor is first set in operation and then continues to operate in such a manner as to turn its armature-shaft 70, and at the
 105 same time turn with it the shaft 21, the projection 43, and the arm 41, acting as a clutch to unite the two shafts into one. Now the direction of rotation of the shaft 21, is such as to cause a rotation of the gearing forming
 110 the clock-work of the apparatus in a direction just opposite that which it has when the ticker is going through its normal operation. This can be traced step by step from the pinion 20, gear-wheel 19, pinion 13, gear-wheel
 115 14, and pinion 16, to the gear-wheel 15, with which the driving spring or weight is connected. In this reverse operation of the parts, the gear-wheel 11, and the escapement-wheel and shaft remain stationary, the pawl 17,
 120 slipping over the backs of the teeth of the ratchet 18, as the latter moves with its shaft.

It is obvious that the apparatus described in the foregoing will accomplish the winding of the driving-weight or spring and that its
 125 action is subject to control by the operators at the central office. In this way, the expense of sending boys to wind the tickers in the various sub-offices is entirely dispensed with.

It is, of course, necessary to provide some means for guarding against a practical nullification of the advantages of this invention by reason of the danger which exists of having the spring or weight run down so far as
 130 not to admit of the detent 36, being moved far enough to come into line with the end of the spring 31. The apparatus which I have devised for overcoming this difficulty is shown

more particularly in Fig. 3, where the driving-wheel 5, is illustrated as having a pin 44, upon its rim, the said pin being adapted to co-operate with a segmental lever 45, which is toothed along a portion of its hub and is frictionally mounted upon a shaft 46, or secured by a screw, to a support, in such manner as to retain its position after being moved. The said lever 45, co-operates at its outer free end with a detent 47, secured to the shaft 9. It is found in practice that with a spring-drum for driving the ticker, about four revolutions of the said drum are sufficient for unwinding the spring. The wheel 5, in the present instance rotates in the direction of the arrow and when it begins to rotate the lever 45, is in the position indicated by the dotted lines in Fig. 3. As the wheel 5, comes around the first time, however, the pin 44, catches the tooth on the hub of the lever 45, which is farthest to the left in the drawings. In passing by, the said pin, acting upon the said tooth, moves the lever out of its original position and toward but not to the position indicated in the full line in Fig. 3. The second rotation of the wheel moves the lever a little farther, the third rotation a little farther and so on. When the spring or the weight is nearly run down, the parts come to occupy the position illustrated in Fig. 3, where the outer end of the lever 45, is brought to rest against the detent 47, and can go no farther. At this point the ticker is seen to be at unison and the detent 36, is in line with the end of the spring 31. Accordingly, although the apparatus is out of position to be further operated in printing (the spring being almost completely run down) yet the central office operator can at any time rewind the apparatus by holding the circuit closed, as already set forth. The fact that the ticker shown is so arranged that the lever 45, contacts with the detent 47, at the moment of unison, is a mere matter of detail, which may be varied as indicated above.

If preferred, the transmitting apparatus, which controls the action of the winding-motors of the receivers, may be equipped with an automatic device which will cause the transmitter to throw the current on the motors and revolve them sufficiently to wind the driving mechanisms of the receivers, every few hours or so. For instance, the transmitter may be provided with an electric self-winding clock which is so connected with the winding key of the transmitter as to depress it about every two hours or so and keep it depressed a sufficient length of time to effect the requisite winding of the motors of the receivers. This self-winding clock may also be provided with an alarm which will operate when the clock is about to depress the winding-key of the transmitter and thereby warn the central operator that the automatic winding is about to take place.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In a printing telegraph, the combination of a printing-telegraph receiver or ticker and driving mechanism therefor, and an electric motor having a rotating armature adapted to wind the said mechanism, substantially as and for the purpose set forth.

2. In a printing telegraph, the combination of a printing-instrument or ticker at a local station, and driving mechanism therefor, an electric motor having a rotating armature controlled at the central office for winding the said mechanism automatically, substantially as and for the purpose set forth.

3. In a printing telegraph, the combination of a printing-instrument or ticker having a driving weight or spring and provided with the usual escapement-magnet and printing-magnet through which the main circuit passes, an electric motor having a rotating armature for actuating said driving spring or weight, the said motor being in a normally short-circuited branch, and a switch for breaking the short-circuit, substantially as and for the purpose set forth.

4. The combination of a printing-instrument or ticker and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling one or more magnets, of an electric motor having a rotating armature for actuating said driving spring or weight, the said motor being in a normally short-circuited branch, a switch for breaking the said short-circuit, means controlled by the ordinary apparatus of the said printing-instrument or ticker, for operating the said switch, substantially as and for the purpose set forth.

5. In a printing telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement-magnet and a printing-magnet, an electric motor for actuating said driving weight or spring, the said motor being in a normally short-circuited branch, a switch controlling the said short-circuit, a second short-circuit, normally open, but including the said motor, and an electro-magnet switch for closing the said second short-circuit, substantially as and for the purpose set forth.

6. In a printing telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement-magnet and a printing-magnet, an electric motor having a rotating armature for actuating the said driving weight or spring, the said motor being in a short-circuit, normally open, and an electro-magnetic switch for closing the said short-circuit, substantially as and for the purpose set forth.

7. In a printing telegraph, the combination

of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement and a printing magnet, an electric motor for actuating the said driving weight or spring, the said motor being in a normally short-circuited branch, an electro-magnetic switch governed by the printing-magnet and controlling the said short-circuit, a second short-circuit, normally open, including the said electric motor but cutting out the said escapement-magnet and one leg of the printing-magnet, and whose electro-magnet is in the same normally short-circuited branch with the said motor, an electro-magnetic switch for closing the said short-circuit, substantially as and for the purpose set forth.

8. In a printing telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement and a printing-magnet, an electric motor adapted to be operatively connected with the said driving weight or spring, the said motor being in a normally short-circuited branch, an electro-magnetic switch governed by the printing-magnet and controlling the said short-circuit, a second short-circuit, normally open, including the said electric motor but cutting out the said escapement-magnet and one leg of the printing-magnet, and an electro-magnetic switch for closing the said short-circuit, substantially as and for the purpose set forth.

9. The combination with a driving-gear, of an electric motor having a rotating armature connected with and adapted to operate the gear in a direction reverse to the normal, as and for the purpose set forth.

10. The combination with a driving-gear, and an electric motor having a rotating armature connected with and adapted to operate the said gear in a direction reverse to the normal, of a switch governing the circuit of the said motor and a switch-controlling device adapted to be brought into position by the said driving-gear for affecting the said switch, as and for the purpose set forth.

11. The combination with a driving mechanism, and an electric motor adapted to operate the said mechanism in a direction reverse to the normal, of a switch governing the circuit of the said motor and a switch-controlling device adapted to be brought into position by the said driving mechanism for affecting the said switch, all in combination with means for stopping the said mechanism at the proper position for affecting the said switch, as and for the purpose set forth.

12. The combination with a driving mechanism, and an electric motor adapted to operate the said mechanism in a direction reverse to the normal, of a switch governing the circuit of the said motor and a switch-controlling device adapted to be brought into po-

sition by the said driving mechanism for affecting the said switch, all in combination with a detent on the driving mechanism adapted to be brought into operation when the said mechanism is nearly run down and to stop the said mechanism when the switch-controlling device is in the proper position for affecting the said switch, as and for the purpose set forth.

13. The combination of a printing-instrument or ticker and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling one or more magnets, of an electric motor for actuating said driving spring or weight, the said motor being in a normally short-circuited branch, a switch for breaking the said short-circuit, means controlled by the ordinary apparatus of the said printing-instrument or ticker for operating the said switch, and an automatic clutch for connecting the said motor to the said driving spring or weight, as and for the purpose set forth.

14. In a printing-telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement-magnet and a printing-magnet, an electric motor for actuating said driving weight or spring, the said motor being in a normally short-circuited branch, a switch controlling the said short-circuit, a second short-circuit normally open, but including the said motor, and an electro-magnetic switch for closing the said second short-circuit, and an automatic clutch for connecting the said motor to the said driving spring or weight, as and for the purpose set forth.

15. In a printing telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement-magnet and a printing-magnet, an electric motor for actuating the said driving weight or spring, the said motor being in a short-circuit, normally open, and an electro-magnetic switch for closing the said short-circuit, and an automatic clutch for connecting the said motor to the said driving spring or weight, as and for the purpose set forth.

16. In a printing-telegraph, the combination of a printing-instrument or ticker, and a driving weight or spring therefor, the said printing-instrument or ticker being traversed by a main electric circuit controlling an escapement and a printing-magnet, an electric motor for actuating the said driving weight or spring, the said motor being in a normally short-circuited branch, an electro-magnetic switch governed by the printing-magnet and controlling the said short-circuit, a second short-circuit, normally open, including the said electric motor but cutting out the said

escapement-magnet and one leg of the printing-magnet, and whose electro-magnet is in the same normally short-circuited branch with the said motor, an electro-magnetic switch for closing the said short-circuit, and
5 an automatic clutch for connecting the said motor to the said driving spring or weight, as and for the purpose set forth.

17. The combination with a driving-gear,
10 and an electric motor adapted to operate the said gear in a direction reverse to the normal, of a switch governing the circuit of the

said motor and a switch-controlling device adapted to be brought into position by the said driving-gear for affecting the said switch, 15 and an automatic clutch for connecting the said motor to the said driving-gear.

In testimony whereof I have hereunto set my hand, this 9th day of May, 1893, in the presence of the two subscribing witnesses.

EMIL A. WIRSCHING.

Witnesses:

A. M. HAYES,

WILLIS FOWLER.