No. 749,031. PATENTED JAN. 5, 1904.

F. G. CREED.

TELEGRAPH APPARATUS.

APPLICATION FILED SEPT. 3, 1901.

NO MODEL.

Fig. 1.

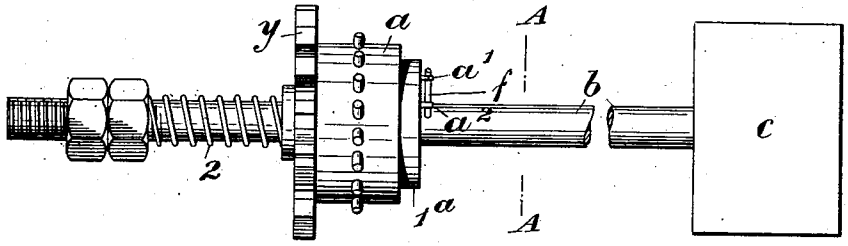
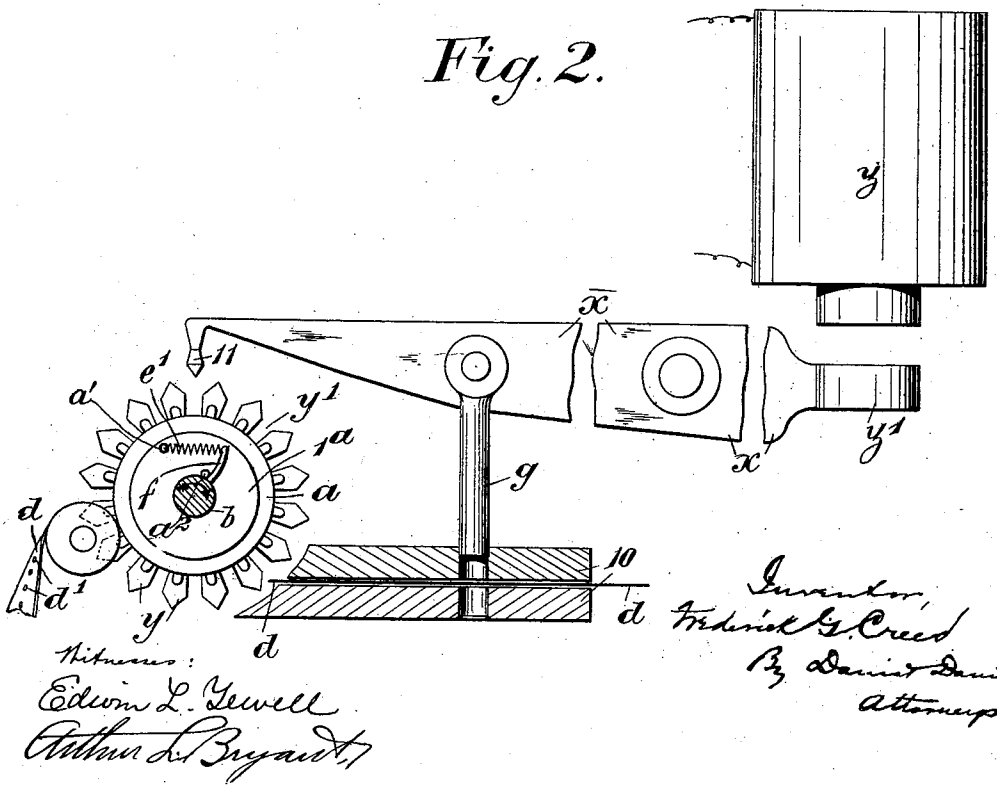


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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UNITED STATES PATENT OFFICE.

FREDERICK GEORGE CREED, OF LENZIE, SCOTLAND, ASSIGNOR TO HIMSELF, AND WILLIAM ARTHUR COULSON, OF GLASGOW, SCOTLAND.

TELEGRAPH APPARATUS.

SPECIFICATION forming part of Letters Patent No. 749,031, dated January 5, 1904.

Application filed September 3, 1901. Serial No. 74,205. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK GEORGE CREED, a subject of the King of Great Britain and Ireland, residing at Lenzie, in the county of Dumbarton, Scotland, have invented Improvements in or Relating to Telegraph Apparatus, of which the following is a specification.

In automatic telegraphy it is sometimes important that the receiving instrument shall work synchronously, or approximately so, with the transmitting instrument in order that the perforations or other indications representing letters, figures, or other characters formed in or on the tape, or strip of paper, or like material (hereinafter called the "receiving-tape") fed through the receiving instrument shall accurately correspond in position to the corresponding perforations in the tape or strip (hereinafter called the "transmitting-tape") fed through the transmitting instrument. Various means have been employed for maintaining the desired synchronism between the two instruments; but all of them, so far as I am aware, are either very complicated in construction or are defective in working.

Now this invention has reference to improvements in receiving instruments of the kind referred to whereby the desired synchronism of working between the receiving and transmitting instruments (hereinafter respectively called the "receiver" and "transmitter") can be maintained or, in effect, maintained in a simple and effective manner, so that the perforations produced in the receiving-tape shall practically correspond in position to the corresponding perforations in the transmitting-tape.

In the accompanying illustrative drawings, Figure 1 is a side elevation, and Fig. 2 a sectional end elevation on the line A A of Fig. 1, showing diagrammatically one arrangement of telegraphic receiving apparatus according to this invention.

a is a feed-wheel mounted upon a driving-shaft b, that is continuously rotated from a suitable clock-train or motor c, the pins or teeth of such feed-wheel engaging in the longitudinal row of feed-holes d' in the receiving-tape d, which is to be formed with perforations that shall practically correspond in position to the corresponding perforations in the transmitting-tape.

y is a toothed wheel fast on the feed-wheel a. The teeth of this wheel may correspond in number and position to the pins or teeth on the feed-wheel, as in the example shown, and the ends of the said teeth may be made V shape, the spaces y' between the teeth at their roots being parallel. The form and number of the teeth may, however, be varied.

g is the punch of the perforating portion of the receiver, arranged to work through a pair of die-plates 10, between which the tape d passes, and which are preferably arranged to terminate as close to the feed-wheel a as possible in order to guide the tape in an advantageous manner.

x is the punch-operating lever, which is operated or caused to operate by the action of or under the control of the current sent over the line from the transmitting instrument, the said current acting, for example, in the ordinary way through an electromagnetic device z, whose armature z' is connected to the said lever x. The feed-wheel a, with toothed wheel y, is pressed by a spring 2 against one side of a disk or wheel 1^a, (hereinafter called the "driving-wheel,") that is yieldingly connected to the driving-shaft b by a coiled spring e', that is connected at one end to a pin a' on the driving-wheel 1^a and at the other end to a pin or stop f on the shaft b and tends to keep a pin a^2 on the driving-wheel against the pin or stop f. As will be seen, the arrangement is such that the feed-wheel a, with toothed wheel y, will be driven by friction from the driving-wheel 1^a, to which it is therefore yieldingly connected, and the spring or yielding connection e' will allow of the driving-wheel 1^a being detained during the perforation of the tape by the punch without interfering with the rotation of the driving-shaft b and the action of the motor c, the said spring acting when the tape, feed-wheel, and driving-wheel are released to suddenly move these parts forward to overtake the shaft b and then move them forward with the shaft until they are again arrested by the action of the punch.

The friction between the feed-wheel a and

the driving-wheel 1^a is such as will permit of the feed-wheel being moved forward against and independently of the driving-wheel when necessary, but is nevertheless sufficiently great to hold the said driving-wheel in opposition to the pull of the yielding connection or spring e' when the tape d is arrested by the punch g. Above the toothed wheel y, carried by the feed-wheel a, extends the free end of the punch-carrying lever x, which is provided with a tooth or projection 11, that is adapted on the said end of the lever being depressed to enter the space y' between two teeth of the toothed wheel y and register therewith just before the punch g touches the tape d. The tooth or projection 11 by thus engaging with the toothed wheel y will overcome the friction between the feed-wheel a and the driving-wheel 1^a, should this be necessary to correct the position of the feed-wheel in a forward direction, and will thereafter hold the said feed-wheel a, driving-wheel 1^a, and the tape d in the correct position, so that the punch will perforate the tape in the correct place. During the further descent of the punch after it touches the paper the tooth or projection 11 will merely enter a little deeper into the space y' between the teeth of the toothed wheel y. When the punch-operating lever is raised and the punch g withdrawn from the tape d and the tooth or projection 11 from between the teeth of the wheel y, the feed-wheel a, with toothed wheel y and driving-wheel 1^a, will be suddenly moved forward by the yielding or spring connection e', so as to overtake the driving-shaft. In the arrangement of apparatus now being described it will be obvious that the receiver should be set to work at a slower speed than the transmitter, so that the tooth or projection 11 will tend to always set the feed-wheel a a little forward.

The advantages of the type of apparatus just above described are that it requires no electromagnetic speed-controlling device, being purely mechanical and automatic, and it is more independent of the relative speed of the transmitter and receiver than the electromagnetic arrangements above referred to. Again, in the arrangement shown as the tooth or projection 11 will enter the space y' between two teeth of the wheel y just before the punch strikes the tape it will immediately act to correct any difference in pitch that would otherwise exist between the perforation about to be made in the tape and the feed-hole in the tape opposite which it ought to be made, and thus insure the perforation being made in the correct position in relation to the corresponding feed-hole in the tape.

In some cases—as, for example, when the punch g is rapidly reciprocated—the arrangement shown in Figs. 1 and 2 may be modified by the omission of the spring e', stop f, and pin a^2, so that the position of the feed-wheel a will when necessary be merely adjusted in a forward or backward direction relatively to the frictional driving-wheel 1^a by the tooth or projection 11 of the punch-lever. In this case the driving-wheel 1^a is so connected to the driving-shaft as to always rotate therewith.

If the receiving instrument be constructed with two punches g and two punch-operating levers x, either or both of such levers may be used for actuating the toothed wheel y.

The invention hereinbefore described can be applied in connection with automatic telegraph apparatus of various types.

It will be obvious that various changes can be made in the details of construction of my apparatus without departing from the spirit and scope of the invention so long as the relative arrangement of the parts shown in the drawings or the mode of operation described in the specification is preserved.

What I claim is—

1. In a telegraphic receiver for use in automatic telegraphy, the combination with a tape-perforating punch, means for operating the same when a signal is received, a feed-wheel for causing the receiving-tape to pass through the instrument, and means for rotating said feed-wheel, of means adapted on the reception of a signal to adjust said feed-wheel in a rotary direction relatively to the means used for rotating it and cause the tape to successively assume positions in which the relative positions of the perforations made therein by said punch will practically correspond with the relative positions of the perforations in the transmitting-tape.

2. In a telegraphic receiver for use in automatic telegraphy, the combination of a tape-perforating punch, means for operating the same when a signal is received, a feed-wheel for drawing the receiving-tape through said receiver, a driving-shaft for rotating said feed-wheel, and means adapted on the reception of a signal to adjust the position of said feed-wheel in a rotary direction relatively to said driving-shaft before said punch engages the tape and correct any want of synchronism in the movements of the transmitting and receiving tapes.

3. In a telegraphic receiver for use in automatic telegraphy, the combination of a tape-perforating punch, means for operating the same when a signal is received, a rotary driving-shaft and means for rotating it in a continuous manner, a feed-wheel adapted to draw the receiving-tape through said receiver, said feed-wheel being mounted upon and driven by said shaft but capable of adjustment thereon in a rotary direction and of being held and released in an intermittent manner while said shaft rotates, and means adapted on the reception of a signal to engage said feed-wheel and, if necessary, correct the position thereof relatively to the driving means.

4. In a telegraphic receiver for use in automatic telegraphy, the combination of a tape-perforating punch, means for operating the same when a signal is received, a rotary driv-

ing-shaft and means for rotating it in a continuous manner, a feed-wheel mounted upon said shaft and adapted to draw the receiving-tape through said receiver, frictional driving means between said shaft and feed-wheel, and means adapted on the reception of a signal to adjust the position of said feed-wheel in a circular direction relatively to the frictional driving means previous to the punch perforating said tape, substantially as described for the purpose specified.

5. In a telegraphic receiver for use in automatic telegraphy, the combination of a tape-perforating punch, means for operating the same when a signal is received, a feed-wheel for drawing the receiving-tape through said receiver, a toothed wheel connected to said feed-wheel, a shaft for rotating said feed-wheel and toothed wheel, driving means between said feed-wheel and shaft, driving mechanism for continuously rotating said shaft, and means adapted on the reception of a signal to coact with said toothed wheel to hold said feed-wheel stationary during the operation of said punch and to control the position of the tape in the receiver and correct any want of synchronism in the movements of the transmitting and receiving tapes.

6. In a telegraphic receiver for use in automatic telegraphy, the combination of a tape-perforating punch, means for operating the same when a signal is received, a feed-wheel for drawing the receiving-tape through said receiver, a toothed wheel connected to said feed-wheel, a shaft for rotating said feed-wheel and toothed wheel, a yielding connection between said feed-wheel and shaft, driving mechanism for continuously rotating said shaft, and means connected to said punch-operating means and adapted on the operation of said punch to engage said toothed wheel and hold the same and said feed-wheel stationary during the punching operation.

7. In a telegraphic receiver for use in automatic telegraphy, the combination of a punch, a lever for operating the same, a feed-wheel for moving said tape past said punch, a toothed wheel connected to said feed-wheel, a driving-shaft whereon said feed-wheel and toothed wheel are mounted to turn, means for continuously rotating said shaft, driving means between said shaft and feed-wheel, and a synchronizing or correcting device carried by said punch-operating lever and adapted, when the same is operated in one direction, to engage said toothed wheel and hold the same and said feed-wheel stationary during the punching operation and also to correct the position of said feed-wheel if it be not moving in synchronism with the feed-wheel of the transmitter.

8. In a telegraphic receiver for use in automatic telegraphy, the combination of a punch, a lever for operating the same, a driving-shaft, means for continuously rotating said shaft, a feed-wheel adapted to engage and move said tape and provided with teeth, said feed-wheel being mounted to turn on said shaft, a driving-wheel connected to said shaft and in frictional driving connection with said feed-wheel, and a tooth or projection carried by said punch-operating lever and adapted, on the operation of said lever, to enter between two of the teeth on said feed-wheel and insure the centering of said feed-wheel previous to said punch perforating said tape, substantially as described for the purpose specified.

9. In a telegraphic receiver, the combination of a punch for perforating the receiving-tape, a lever carrying said punch and adapted to make its operative stroke on the reception of a signal, a driving-shaft, means for continuously rotating said shaft, a driving-wheel mounted to turn on said shaft, a coiled spring connecting said driving-wheel to said shaft, a feed-wheel in frictional driving contact with said driving-wheel, a toothed wheel connected to said feed-wheel, and a tooth or projection carried by said punch-carrying lever and adapted on the operative stroke of said lever to first center said feed-wheel and to then hold this wheel and said driving-wheel stationary while the punch is engaged with said tape and to then release said feed and driving wheels, and allow them to be moved forward on said shaft by said spring, substantially as described for the purpose set forth.

10. In a telegraphic receiver, the combination of the tape-guide 10, the punch-operating lever x with punch g, the rotary driving-shaft b, the driving-wheel 1^a mounted on said shaft and connected thereto, the feed-wheel a with toothed wheel y, an adjustable spring for forcing said feed-wheel into frictional driving contact with said driving-wheel, and the tooth or projection 11 carried by said punch-operating lever and adapted to engage said toothed wheel before said punch engages the tape, substantially as described for the purpose specified.

11. In a telegraphic receiver, the combination of the tape-guide 10, the punch-operating lever x with punch g, the rotary driving-shaft b, the driving-wheel 1^a mounted on said shaft and connected thereto through a retractile spring e', a pin a^2 fixed to said driving-wheel and adapted to abut against a stop f on said shaft, the feed-wheel a with toothed wheel y, an adjustable spring for forcing said feed-wheel into frictional driving contact with said driving-wheel, and the tooth or projection 11 carried by said punch-operating lever and adapted to engage said toothed wheel before said punch engages the tape, substantially as described for the purpose specified.

Signed at Glasgow this 22d day of August, 1901.

FREDERICK GEORGE CREED.

Witnesses:
J. WARNER RONALD,
JOHN D. MCKAY.