June 14, 1927. E. E. KLEINSCHMIDT 1,632,298

SIGNALING TRANSMITTER

Original Filed Dec. 22, 1920 4 Sheets-Sheet 1

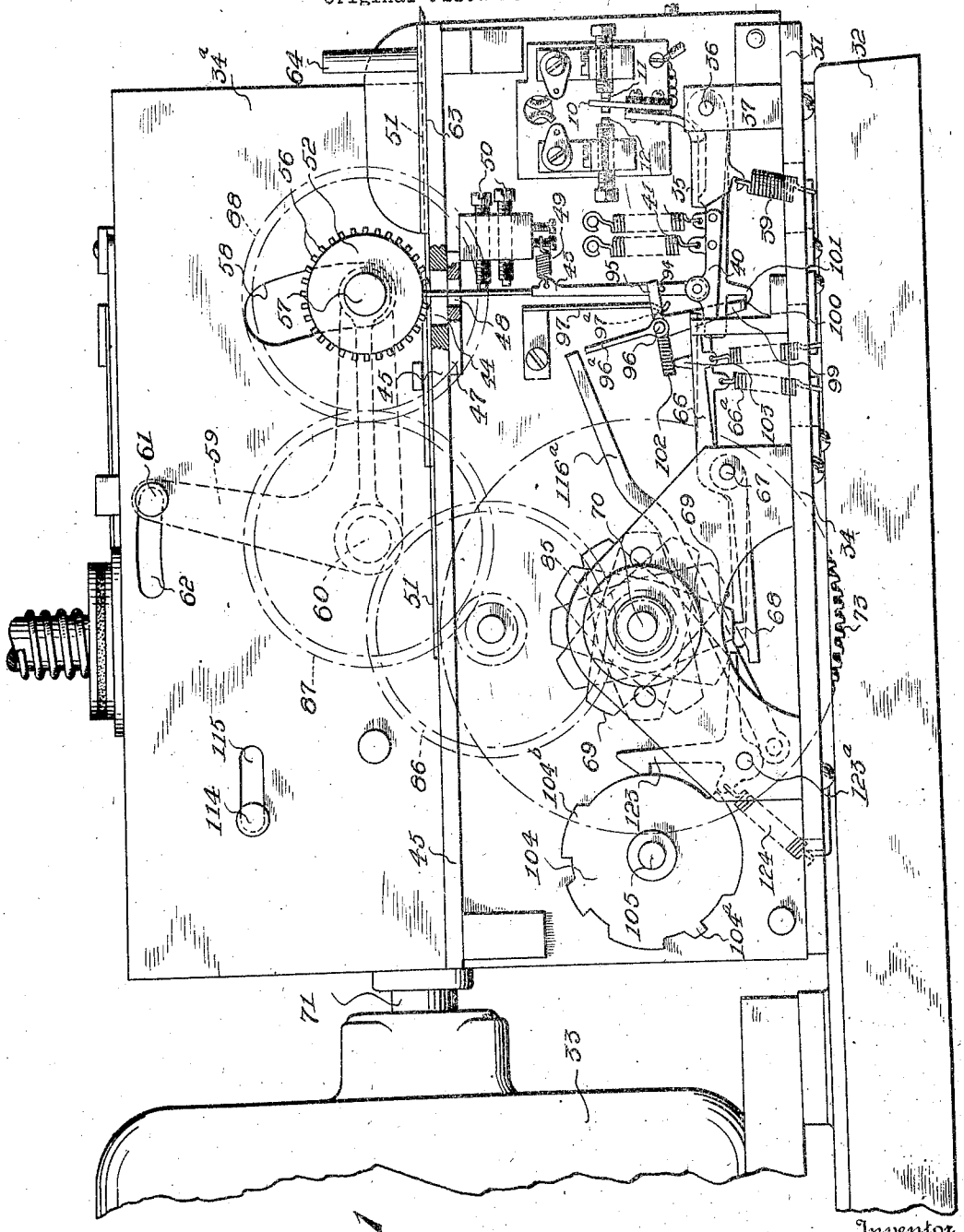


Fig. 1

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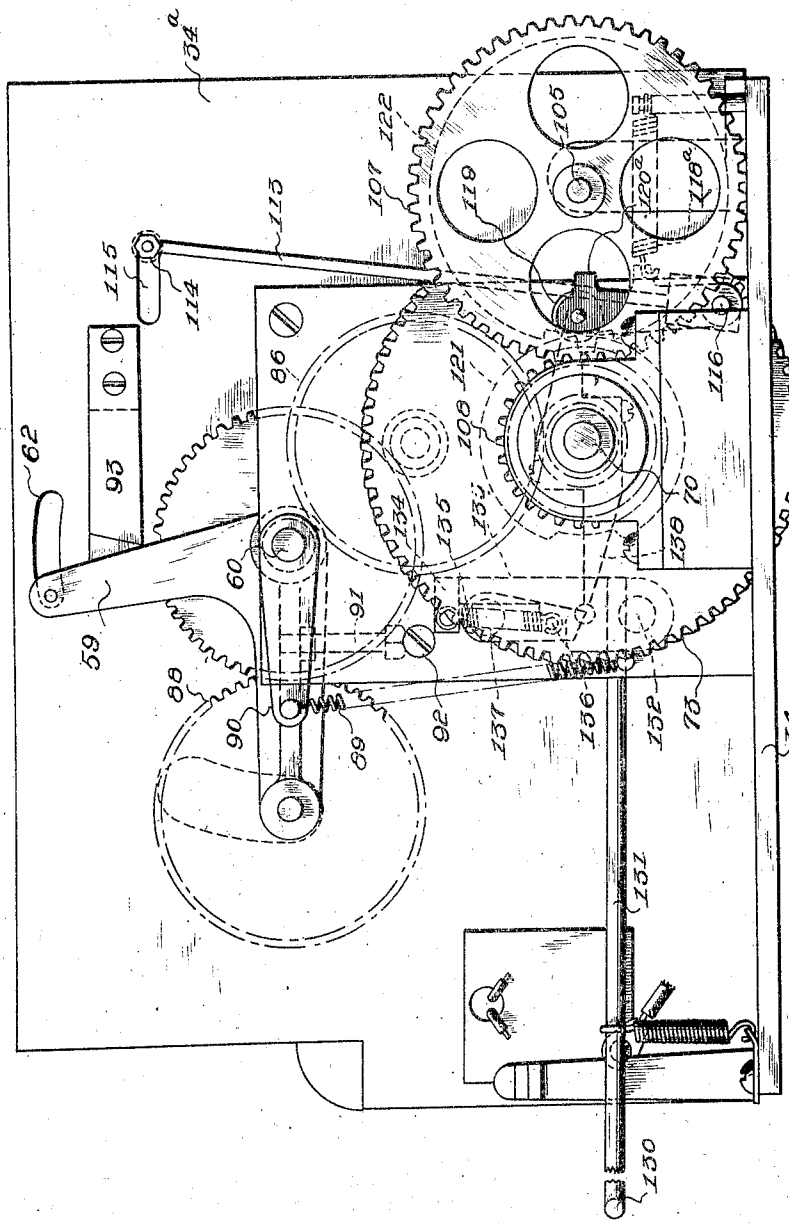


Fig. 2

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SIGNALING TRANSMITTER

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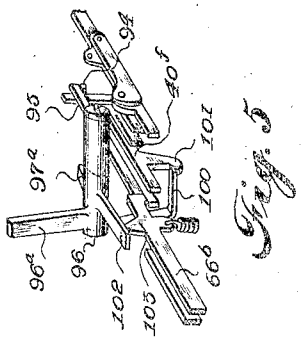


Fig. 4

Fig. 5

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SIGNALING TRANSMITTER

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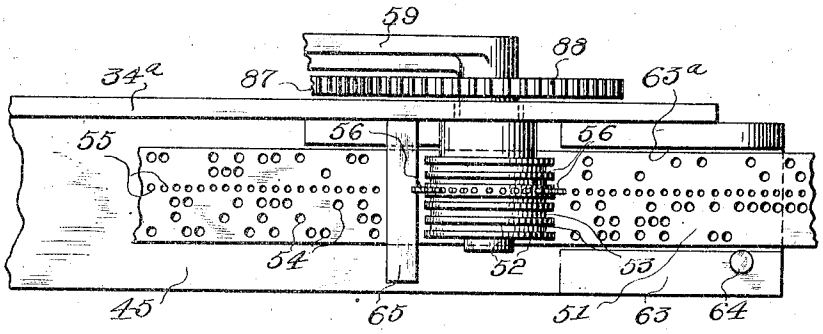


Fig. 4

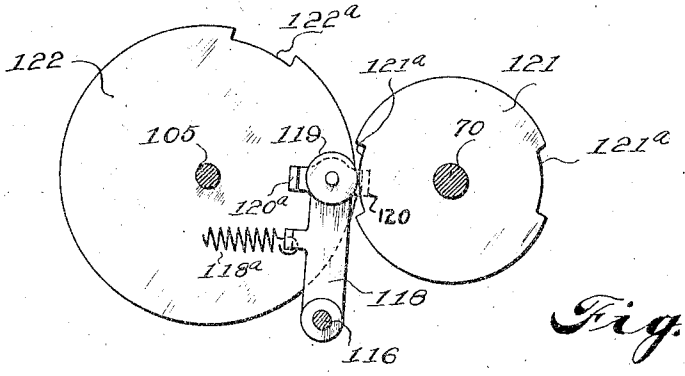


Fig. 6

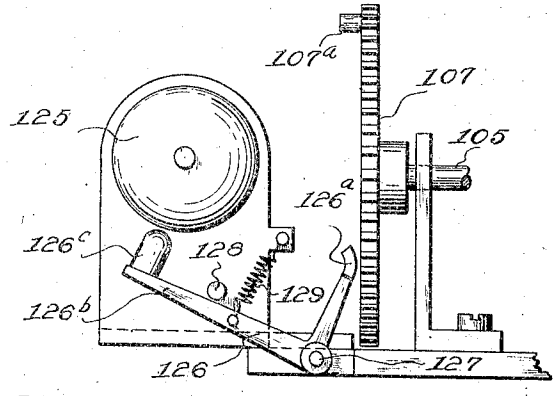


Fig. 7

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UNITED STATES PATENT OFFICE.

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SIGNALING TRANSMITTER.

Original application filed December 22, 1920, Serial No. 432,564. Divided and this application filed November 18, 1924. Serial No. 750,626.

The present invention relates to signal transmitters.

More particularly the invention relates to automatic transmitters, such as are disclosed in Patent No. 1,564,421, Dec. 8, 1925, of which the present application is a division.

The objects of the invention are to provide a simplified and more reliable transmitting apparatus than has been heretofore produced; to provide novel means for advancing a control tape continuously; to provide novel tape stop arrangements; to provide a novel auxiliary signaling mechanism; to provide novel means for preceding each code combination by an impulse different in character from the last selecting impulse of the preceding code combination; and such other objects as may be attained by utilization of the various combinations and subcombinations of mechanisms hereinafter set forth and defined by the terms of the appended claims. Although the apparatus is especially useful in the so-called six unit telegraph systems, it is to be understood that numerous features of the invention are applicable to different systems.

Referring to the drawings—

Fig. 1 is a side elevation, partially in section of a preferred form of transmitter.

Fig. 2 is a side elevation showing the drive mechanism.

Fig. 3 is a sectional plan view of the transmitting apparatus.

Fig. 4 is a fragmental plan view showing the tape and tape feed arrangement.

Fig. 5 is a fragmental detail view showing the means for controlling the first impulse of a code combination.

Fig. 6 is a fragmental sectional view showing the transmitting and auxiliary signaling means interlock.

Fig. 7 is a view showing the mechanical means for actuating the signal bell.

Referring now to Figures 1 and 2, 31 indicates, in general, the frame of the machine comprising a bed plate 32, on which is mounted its operating motor 33, a base plate 34 being secured to the bed plate 32 and carrying the upright plate 34^a, on which most of the parts of the transmitting mechanism have their bearings. The vibrating arm 10, is mounted on an elbow lever 35, pivoted at 36 in a bracket 37, mounted on the base plate 34. A spring 39 is connected to the lever 35 and to a stationary part of the device and tends to move the arm 10 against the contact point 12 which, in the specific embodiment of my invention here shown, is the negative contact, contact point 11 being the positive contact. Beneath the lever 35 is disposed a plurality of arms indicated, in general, at 40, (see Figs. 1 and 3) and which are individually represented by the reference characters 40^a, 40^b, 40^c, 40^d, 40^e and 40^f. The horizontal portion of the elbow lever 35 extends across all six of the arms, so that the elevation of any one of the arms will rock the elbow lever 35 and move the contact arm 10 against the contact at the right, as viewed in Fig. 1. A spring 41 is provided for each of the arms 40, one end of the spring being attached to the upper side of the arm, and the other end to a stationary part, so that the spring tends to elevate the arms against the action of the spring 39, and the springs 41 are sufficiently powerful to overcome the springs 39 and move the arms when the latter are unrestrained. To each of the arms 40^a, 40^b, 40^c, 40^d and 40^e are pivoted, when used in the Baudot system, five upwardly extending plungers 43, the upper ends of which are preferably cylindrical and pass through slots 44 in a plate 45, secured to the upright plate 34^a, the upper ends of the plunger cooperating with a perforated tape, in a well understood manner. An additional guide plate 47 is preferably secured to the underside of the plate 45 and is provided with slots 48, through which the five plungers also pass. The plungers 43 are moved to the right, as viewed in Fig. 1, by springs 49 which bring the plungers into engagement with set screws 50 or other stops, by means of which the positions of the plungers may be adjusted to register properly with the perforations in the continuously moving tape 51. No plunger is connected to the sixth arm 40^f which is actuated by its spring 41 each time the arm is released, in the manner hereinafter described.

The tape 51 in which a message has been

perforated, by means of a separate instrument of any suitable character, passes beneath a roll 52, provided with peripheral grooves 53 (Fig. 4), which register with the upper cylindrical ends of the plungers 43. Plungers 43 are so adjusted by means of screws 50 that when a perforation in the tape comes above the plunger, the plunger passes through the perforation into the registering groove 53. The perforations 54, Fig. 4, produce the group of five impulses of the Baudot code, and 55 are a series of feed holes which are engaged by teeth 56 on the roll 52. The roll 52 is rotatably mounted on a pintle 57 which passes through an arcuate slot 58 in the plate 34^a and is secured to one arm of a bell crank 59, pivoted at 60, the other arm of the bell-crank being provided with an operating handle 61, passing through an arcuate slot 62 in the plate 34^a. A guide plate 63 for the tape is mounted on the plate 45 in front of the roll 52, a post 64 preferably being provided to keep the tape in the groove 63^a, formed in the guide plate. A stripping plate 65, secured to the plate 34^a, preferably extends across and above the tape to disengage the latter from the feed wheel.

Levers, indicated in general at 66, and individually by the reference characters 66^a, 66^b, 66^c, 66^d, 66^e and 66^f, are pivoted at 67 and engage the free ends of the arms 40^a, 40^b, 40^c, 40^d, 40^e and 40^f, respectively. The opposite ends of the levers 66 are provided with projections 68 which are engaged by cams 69, secured to and angularly displaced with reference to each other on a shaft 70, having its bearings at 70^a in the frame of the machine (see Fig. 2), so that the cams successively engage the ends of the operating levers 66^a, 66^b, 66^c, 66^d, 66^e and 66^f. Each cam arm is preferably extended to the diametrically opposite sides of the shaft, so that each of the arms 66 is twice operated during each revolution of the shaft 70 on which the cams are mounted.

The connections by which the operating cams, just referred to, are actuated by the motor include the shaft 71 of the motor and has its bearings in brackets secured to the frame. On this shaft is mounted a worm 72, (not shown) engaging worm wheel 73, which is rotatably mounted on the shaft 70, suitable ballbearings 74 preferably being interposed between the worm wheel 73 and the shaft. A slip friction, indicated in general at 75, is interposed between the worm wheel 73 and the shaft 70, so that the motor may continue to rotate while the transmitting device is inactive. A friction plate 76 engages the face of the worm wheel 73 and is attached to, or integral with, a hub 77 surrounding the shaft 70. A collar 78 is mounted adjacent to the hub 77 and is provided with lugs 79, engaging in corresponding recesses in the hub 77, so that the two parts rotate together. The end of the collar 78 is preferably enlarged, as at 80, and secured to the shaft by a set screw 81, a coiled spring 82 being interposed between the enlarged end 80 of the collar and the friction plate 76, to produce the desired friction between the plate and the gear.

The roll 52 is driven by means of a pinion 85, secured on the shaft 70 acting through gears 86, 87, and 88 (see Figures 1, 2 and 3), the latter being secured to rotate with the roll 52, it being understood that the gear wheel 88 rotates when the roll 52 is elevated by the handle 61. The elbow lever 59, on which the roll 52 is mounted, is normally held in the position, shown in Figures 1 and 2, by a spring 89, (see Fig. 2), attached to an arm 90, secured on the rock shaft on which the elbow lever 59 is mounted, an adjustable set screw 91 preferably being attached to the elbow lever and engaging a stop, such as a screw 92 (see Fig. 2). The elbow lever 59, when moved clockwise, as viewed in Fig. 2, is held in position by a friction spring 93, secured on one side of the vertical plate 34.

In the embodiment of the invention here illustrated, the different characteristics of the impulses are produced by varying the polarity of the group impulses, and an additional impulse is provided having a different polarity from that of the fifth or last group impulse. The plunger 43, which is pivoted to the arm 40, producing the last of the group impulses, is provided with a pin 94 which engages an arm 95, secured on a shaft 96 (see Fig. 5), when this particular plunger is elevated. The rock shaft 96 is held in one or the other of its positions by a spring finger 97, (Fig. 1) the bent end of the spring engaging on one side or the other of a triangular lug 97^a. A downwardly extending arm 99 is also secured to the shaft 96 and is provided at its lower end with a horizontal extension 100, which is adapted to engage a hook 101, secured to the lower side of the start impulse lever 40^f. When, therefore, the last of the group impulses is a positive impulse, the end of the plunger 43 passes upwardly through the tape, the pin 94 engages the arm 95, rocks the shaft 96 and brings extension 100 on the lower end of the arm 99 over the hook 101, so that when the last cam arm 69 engages the corresponding lever 66^f and releases the corresponding arm 40^f, the latter cannot be elevated because of the lock engagement, and the contact 10 is locked against the contact 12, so that a negative impulse is sent, having a polarity diverse from that of the last of the group impulses. When, on the other hand, the last group impulse is a negative impulse, the plunger 43, corresponding to the last group impulse, is not raised, the pin 94

does not engage the arm 95 to rock the shaft, and the extension 100 does not come into engagement with the hook 101, so that when the lever 66ᶠ is rocked by the corresponding cam arm, the corresponding arm 40ᶠ is elevated, contact arm 10 is brought into engagement with contact 11, and a positive impulse is sent over the line. It will be seen, therefore, that the additional sixth impulse always has a polarity the reverse of the last group impulse. A second arm 102 is secured to the shaft 96 and is engaged by a lug 103, on one of the lever arms 66, here shown as the second lever arm 66ᵇ, which, when the lever is elevated, engages the arm 102, rocks the shaft 96 and causes the arm 95 to be depressed, thereby returning the extension 100 to its normal position.

The auxiliary signaling mechanism comprises a code wheel 104, secured on a shaft 105, having its bearings at 106 in the plate 34ᵃ, and in a bracket secured to the bed plate, respectively. On the end of the shaft 105 opposite to the cam wheel, is secured a gear wheel 107, meshing with a gear 108, formed on a collar 109, secured on a hub 110, surrounding the shaft 70, the hub preferably being integral with a friction disc 111, engaging the gear wheel 73 on the opposite face from the friction disc 76, the parts, associated with the collar 109, engaging a collar 112, secured to the shaft, so that the friction disc 111 is held in engagement with the face of the gear wheel by the same spring 32 which holds the friction disc 76 in engagement with the same gear wheel. It will thus be seen that a transmitting and signaling mechanism is provided in which the movement of the transmitting mechanism is stopped when the signaling mechanism is put into operation, and vice versa. A spring arm 113 (see Fig. 2) is provided at its upper end with an operating handle 114, passing through a slot 115 in the plate 34ᵃ. The spring arm 113 is secured at its lower end on a shaft 116, having its bearings at 117 in plates 34ᵉ and 34ᵇ, secured to the base plate. Secured on shaft 116 is another arm 118 (see Fig. 6), to the upper end of which is secured a roller 119 (see Fig. 6) and laterally extending projections 120ᵃ and 120ᵇ (see Fig. 3) forming detents, the roller and the detents cooperating with discs 121 and 122, secured on shafts 70 and 105, respectively. The disc 121 is provided, on diametrically opposite sides, with notches 121ᵃ which cooperate with roller 119, while disc 122 is provided with a single notch 122ᵃ within which detent 120 is received. Discs 121 and 122, together with the notches and the cooperating roller and dent, are so arranged that, when the roller is received in one of notches 121ᵃ, detent 120 is withdrawn from notch 122ᵃ in disc 122, and detent 120ᵃ is simultaneously brought into the path of movement of an arm 138, secured to a collar 70ᵇ, which is, in turn, secured to shaft 70, thereby arresting the transmitting mechanism. On the other hand, when notch 122ᵃ in disc 122 is presented to detent 120, the detent is drawn into the notch by a spring 118ᵃ, attached to arm 118, which normally maintains the detent in position. When the operator desires to send a signal over the line, he throws the handle 114 to the right, as viewed in Fig. 1. This movement of the handle flexes spring arm 113 and tends to rock shaft 116 clockwise, and as soon as one of the notches 121ᵃ in disc 121 is brought opposite roller 119, and at the same time arm 96ᵃ is out of the way of arm 116ᵃ, the roller will be moved to the right, as viewed in Fig. 6, and the movement of the transmitting mechanism will thereby be stopped. The signaling mechanism, which has hitherto been inactive, because of the friction disc 111, slipping on the gear wheel 73, now begins to operate and code wheel 104 transmits a desired signal over the line. This is done by operating the same contacts that are used during transmission, cam wheel 104 engaging one arm of a bell-crank 123, pivoted at 123ᵃ, which is kept in engagement with the code wheel by a tension spring 124, the opposite arm of bell crank 123 engaging the end on one of the levers 66, here shown as the sixth impulse lever 66ᶠ. Code wheel 104 is provided with any desired number of teeth 104ᵃ, suitably formed, and a complete revolution of the code wheel produces a desired signal at the receiving station. In actuating the signaling mechanism with the code wheel illustrated, a plurality of impulses forming signals, the precise nature of which it is unnecessary to describe, are sent over the line. When the code wheel is started from the position shown in Fig. 1, arm 123 is brought into engagement with the first tooth 104ᵇ and a starting or sixth impulse is sent over the line.

It is necessary for the operation of the system that this impulse should have a characteristic different from that of the last group impulse of the transmitting mechanism. It is convenient, however, to arrange the code wheel so that the sixth impulse is of a fixed characteristic, here shown as a positive characteristic. This means that the transmitting mechanism must be stopped only when the last group impulse is of a different characteristic from that of the starting impulse of the signaling mechanism—in this case a negative impulse. Mechanical locking means are therefore provided which permit the signal mechanism to start only when the last group impulse is a negative impulse. An arm 96ᵃ is secured to shaft 96, which coacts with an arm 116ᵃ attached to shaft 116, to which spring arm 113 is secured, and the parts are so arranged

that when the last group impulse is negative, the arm 96ª engages the arm 116ª, thereby preventing the rotation of the shaft 116, necessary to the starting of the signaling mechanism, and the transmitting mechanism will continue to operate until the last group impulse is negative. In the embodiment here illustrated, three different signals which may be "carriage shift," the letter "J" and "carriage release," are sent by the code wheel. It may be remarked, however, that the successive starting impulses of the code wheel are of different characteristics from those of the immediately preceding group impulses, the same as in the transmitting mechanism, and at the end of a given signal, the cam on the arm 123 drops off from the cam 104ª, on the wheel immediately below the cam on the arm 123, (Fig. 1) and sends a negative starting impulse, which starts the receiver. The extended notch in which the cam on the arm 123 is shown positioned in Fig. 1, permits the continued rotation of the code wheel 104, after the cam has dropped into its notch, and this permits the movement of the receiver to be arrested, before the transmitting mechanism begins operation. The signal at the receiving station may be a single stroke of a bell which is likewise produced at the transmitting station by a mechanical arrangement, reference being had particularly to Figs. 3 and 7. The bell is indicated at 125. A bell-crank 126 pivoted at 127 is provided with one arm 126ª, adjacent to the gear wheel 107. The other arm 126ᵇ is normally held against a stop 128 by a spring 129. A lug 107ª is secured on the face of the gear wheel 107 which engages the arm 126ª from below and rocks the bell-crank, and when the lug 107ª is disengaged from the arm 126ª, the bell-crank is returned to its normal position by spring 129 with sufficient force to cause the hammer 126ᶜ to engage the bell and give the operator an audible indication that the signaling member has completed one revolution and that a corresponding signal has been given at the receiving station. The operator will hold the handle 114 in the position at the right, as viewed in Fig. 6, until the desired number of signals have been transmitted and when released, the rock shaft 116, to which the spring arm is secured, is returned to its normal position by a spring 118ª, (see Fig. 6) when the notch 121ª in the disc 121 is brought opposite the detent 120.

Mechanism is preferably provided for stopping the operation of the transmitting mechanism, in case the slack in the tape is taken up to such an extent that the tape is likely to break. The tape, as it is fed to the machine, passes beneath a lateral extension 130 (see Fig. 2), on an arm 131 which is secured to a shaft 132. To the shaft is secured an upwardly extending arm 133, having at its upper end a lateral projection 134, to which is attached the upper end of an over-centering spring 135, the lower end of which is attached to stop arm 136, pivoted at its upper end 137, so that, when the lower end of the arm is moved to the right, as viewed in Fig. 2, it comes in the path of movement of the arm 138, secured on the shaft 70 of the transmitting mechanism, to stop the operation thereof between completed code combinations only and in position to maintain a receiver stop condition on the line. When the arm 131 is raised, by the slack being taken up in the tape, the upper end of the arm 133 is moved to the right, which moves the spring 135 past the center of the pivot 137 of the arm 136 and causes the lower end of the arm to snap to the right into the path of movement of the arm 138 on the shaft 70, and thereby stops the operation of the transmitting mechanism. When there is again sufficient slack in the tape, the arm 131 drops and moves the arm 133 out of engagement with the arm 138.

In operation with the transmitter at rest, arm 138 will engage stop arm, contact tongue 10 will remain in a position to continue the line condition of the last selecting condition in the preceding code combination, and as disclosed in the copending application, the receiver will remain at rest. To start transmission, arm 131 is lowered either manually or by slacking of the tape due to perforation and stop 136 is removed from the path of arm 138 permitting shaft 70 to start into rotation. Lever 66ᶠ will first be actuated by its cam 69 and will permit lever 40ᶠ to operate under influence of its spring 41 to transmit a receiver start condition, the nature of which will be determined by the position of extension 100. Thereafter, levers 66ª to 66ᵉ permit arms 40ª to 40ᵉ to move upward in succession and to position tongue 10 against contact 11 or 12 in accordance with the perforations in tape 51. As lever 66ᵇ moves upward projection 103 thereof shifts extension 100 out of the path member 101 and conditions arm 95 to be reset in accordance with the movement of arm 40ᵉ to predetermine the nature of the start impulse to be transmitted by 40ᶠ for the succeeding code combination.

In case the operator desires to transmit an auxiliary signal to another station, he moves operating handle 114 of spring arm 113 to the right and holds it in this position until one of the notches 121ª in disc 121 comes opposite roller 119, and until 96ª is positioned out of the path of 116ª when roller 119 will engage the notch 121ª thereby freeing disc 122, thus stopping the movement of the signaling mechanism. The cams 104ª on the code wheel 104 are formed to send through the levers 123, 66ᶠ and 40ᶠ, the con-

tact tongue 10, and contact points 11 and 12, the desired signal to the receiving station. When the code wheel of the signaling mechanism has completed its movement, a signal, such as the ringing of a bell, is given at the receiving station and a corresponding signal, given at the transmitting station through lug 107^a, engaging arm 126^a, as heretofore described. The operator continues to hold handle 114 to the right until the desired number of signals, conveying the desired information, have been given. Since the signaling mechanism is driven by the same motor that drives the transmitting mechanism, it will be apparent that signals are sent without loss of time, and since they are transmitted through the same mechanism by which the regular transmitter operates, the signals will be given with the same certainty as that of the message sent by the transmitter.

Having described a preferred embodiment of the invention, what is desired to be secured by Letters Patent and is claimed as new is:

1. A transmitter comprising contact carrying means; means for actuating said contact carrying means to transmit code combinations of electrical selecting conditions; and means for actuating said contact carrying means to precede each code combination with an electrical condition differing in character from the last electrical condition of the preceding code combination.

2. The combination as set forth in claim 1 in which said second mentioned means comprises a control tape perforated in accordance with the code combinations to be transmitted.

3. The combination as set forth in claim 1 in which said contact carrying means comprises a single contact.

4. A transmitter comprising contact carrying means, a plurality of tape controlled members operable to actuate said contact carrying means to transmit code combinations of electrical conditions, and means mechanically controlled by one of said members to actuate said contact carrying means to precede each code combination of conditions with an electrical condition differing in character from the last condition of the preceding code combination.

5. The combination as set forth in claim 4 in which said contact carrying means comprises a single contact.

6. In an apparatus for transmitting code combinations each made up of a uniform number of electrical selecting conditions; control means; a member individual to and controlling the transmission of each of said selecting conditions under the control of said control means; actuating means for said members; contact carrying means under the control of said members; means for preceding each code combination with an electrical condition; and means controlled by the member controlling the last selecting condition of any combination to determine the nature of the impulse preceding the succeeding code combination.

7. The combination as set forth in claim 6 in which said last mentioned means is solely mechanical.

8. The combination as set forth in claim 6 in which control means comprises a perforated tape and said contact carrying means comprises a single transmitting tongue.

9. An apparatus for transmitting code combinations each made up of a uniform number of electrical selecting conditions comprising control means; a member individual to and controlling the transmission of each of said selecting conditions under the control of said control means; a member under the control of the member controlling the last selecting condition of each combination to precede the succeeding code combination with an electrical condition differing in character from the last selecting condition of the preceding code combination, and actuating means for said members.

10. The subcombination as set forth in claim 9 together with a single transmitting contact common to said members.

11. The subcombination as set forth in claim 9 in which said control means comprises a perforated tape.

12. A tape transmitter adapted to transmit code combinations each made up of five selecting conditions comprising a tape controlled finger individual to and controlling the transmission of each condition of a combination; and means for preceding each combination with a receiver start condition differing in character from the fifth selecting condition mechanically controlled by the finger controlling the fifth selecting condition.

13. Apparatus for transmitting code combinations each made up of a uniform number of electrical selecting conditions comprising a control tape means for continuously advancing said tape; perforations across said tape in lines perpendicular to the movement of said tape and arranged in accordance with the code combinations to be transmitted; a set of tape fingers normally out of engagement with said tape; one individual to each selecting condition of said combinations; and arranged in a line at an angle with respect to the lines of said perforations; and means for moving said fingers to successively engage said tape in a manner to register with the respective continuously moving perforations.

14. The combinations as set forth in claim 13 in which said tape fingers are pivotally mounted, and guided in elongated slots.

15. The combinations as set forth in claim 13 in which said tape fingers are pivotally mounted, and guided in elongated slots, together with means for adjusting the normal position of said tape fingers with relation to said slots.

16. A tape transmitter comprising a tape feed wheel; means for moving said tape feed wheel into and out of feeding relation with respect to said tape; and means for driving said feed wheel in any position thereof.

17. Transmitting apparatus comprising main signaling means for transmitting varying code combinations of electrical selecting conditions each preceded by a receiver start condition differing in character from the last selecting condition of the preceding code combination; and an auxiliary signaling means for transmitting predetermined code combinations of selecting conditions each preceded by a receiver start condition differing in character from the last selecting condition of the preceding code combination; said auxiliary signaling means being operable only when said main signaling means is at rest.

18. The combination as set forth in claim 17 together with a local signaling means operated by said auxiliary signaling means.

19. A transmitter comprising contact carrying means, means including a perforated tape for actuating said contact carrying means to transmit a code combination of impulses of differing electrical conditions and means in said transmitter whereby the last impulse of said code controls the electrical condition of the succeeding impulse.

20. A transmitter comprising contact carrying means, a perforated tape, means controlled by said tape for actuating said contact carrying means to transmit code combinations of electrical conditions, a latching member controlled by the last impulse of the code for latching the first mentioned means to transmit a succeeding impulse of a predetermined character.

21. In a telegraph transmitter, contact carrying means, means including a perforated tape for controlling said contact carrying means in said transmitter to transmit code combinations of impulses and means controlled by the code combination of impulses for transmitting an impulse between said codes independently of control by said tape.

22. In a telegraph transmitter, a perforated tape, contact carrying means, means controlled by said perforated tape for operating said contact carrying means to transmit code combinations of impulses and means in said transmitter controlled by said last mentioned means and operated independently of said tape for transmitting an extra impulse between said code combination of impulses.

23. In a telegraph transmitter, a perforated tape, means controlled by said perforated tape for transmitting code combinations of impulses and means in said transmitter controlled by said last mentioned means for transmitting impulses of a predetermined character between said code combination of impulses.

24. In a telegraph transmitter, a tape comprising perforations arranged transversely with respect to said tape, a finger individual to each of said perforations in a row, said fingers being arranged angularly with respect to said row of perforations and means for continually moving said tape whereby said fingers are brought in relation with their individual perforations successively.

25. In a telegraph transmitter, a tape comprising perforations arranged transversely with respect to said tape, and a single contact transmitter arranged to be operated sequentially by the perforations in a row while said tape is being moved continually.

26. In a telegraph transmitter, a tape comprising a plurality of perforations arranged transversely with respect to said tape, means for moving said tape continuously and a single contact transmitter operated by the perforations in said tape to transmit code combinations of impulses.

27. In a telegraph transmitter, a perforated tape comprising rows of code perforations arranged transversely with respect to said tape and a single contact transmitter operated by the perforations in a row for transmitting code combinations of impulses while said tape is being moved.

28. In a telegraph transmitter, a tape comprising rows of code perforations, said rows being arranged transversely with respect to said tape, means for continuously moving said tape, a single contact transmitter and means for operating said contact sequentially by the perforations in a single row while said tape is being moved.

29. In a telegraph transmitter, a perforated tape, a feeder device for moving said tape continuously and means for disengaging said feeder device from said tape to stop the movement of said tape.

30. In a telegraph transmitter, a perforated tape, a roller in engagement with said tape for moving said tape and manually operated means for disengaging said roller from said tape.

In testimony whereof, I affix my signature.

EDWARD E. KLEINSCHMIDT.