

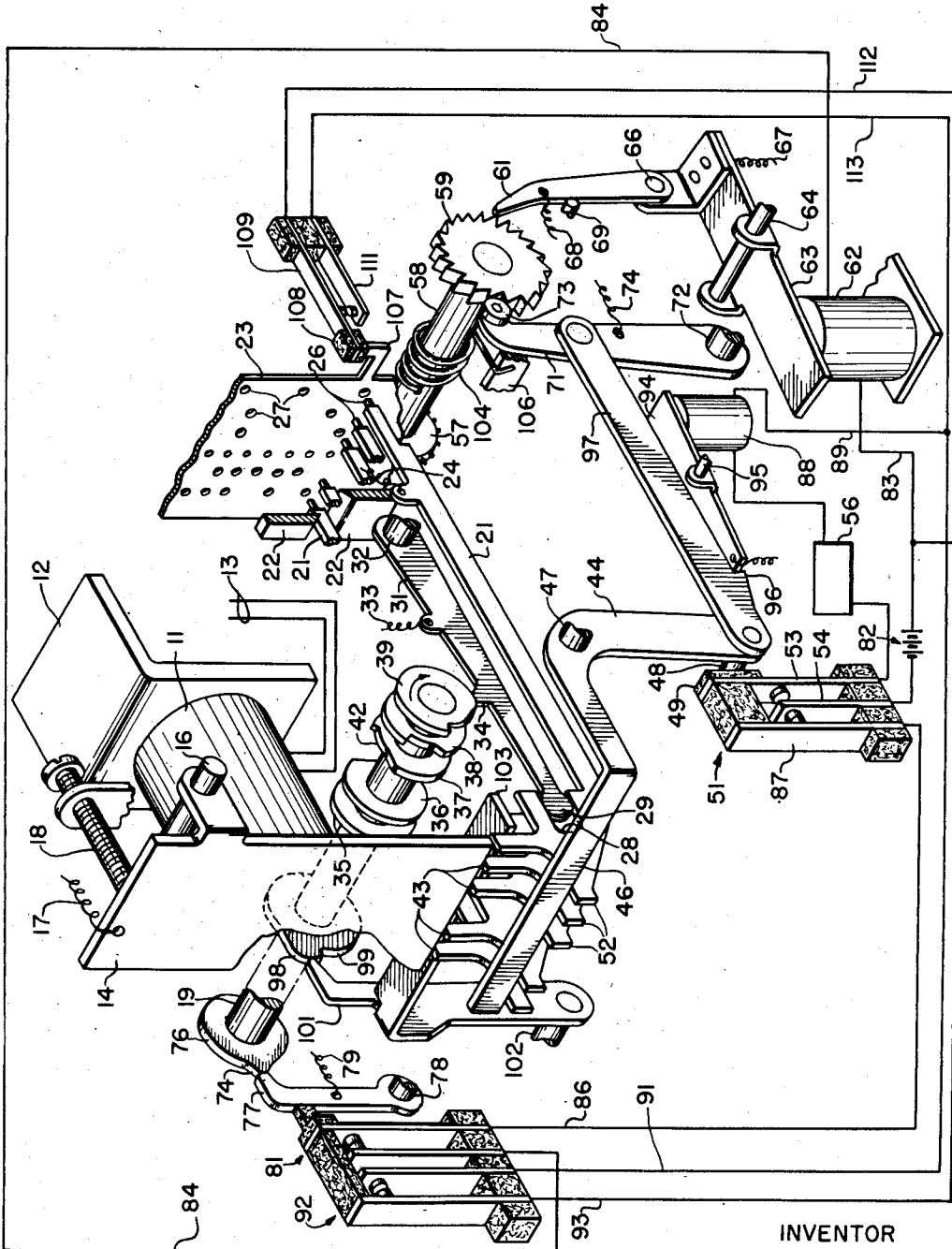
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SIGNAL COMPARING APPARATUS

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SIGNAL COMPARING APPARATUS

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This invention relates to printing telegraph apparatus and more particularly to apparatus for checking signals against a master control form.

The principal object of the present invention is to provide a mechanical apparatus for receiving incoming telegraph signals and comparing such signals with a master control form.

By the invention as illustrated in the drawing an armature is actuated in response to incoming signals and a plurality of sensing levers sense the perforations in a master control form. If the signals from both sources fail to agree a bail pivots to close a pair of contacts in an alarm circuit to bring the fact of signal disagreement to the attention of an attendant. Simultaneously with the closure of the alarm circuit a detent is actuated to enable a feed wheel to return the master control form to its zero position.

Quite often it becomes necessary to check received signals with a master control form or else to check a pair of control forms. By the present invention a very effective apparatus is provided for automatically performing this operation.

For a more complete understanding of the invention the following detailed description should be read in conjunction with the attached drawing showing a perspective view of the preferred embodiment of the invention.

In the drawing a receiving selector magnet 11 is mounted suitably on a supporting bracket 12 and is energized in accordance with signals received over a signal line 13. The selector magnet 11 has a cooperating armature 14 mounted suitably for pivotal movement about a shaft 16. The armature 14 is urged clockwise continuously about the shaft 16 by a spring 17 and is restrained in its pivotal movement by a set screw 18. When the magnet 11 receives a spacing or no current impulse the spring 17 is effective to retain the armature 14 against the set screw 18; however, upon the receipt of a marking or current impulse by the magnet 11 it pulls up the armature 14.

A cam shaft 19, associated with the receiver mechanism is released for rotation in a well known manner in a clockwise direction by the start impulse of each signal received by the receiving selector magnet 11. It is contemplated that any well known means be utilized for releasing the shaft 19 for rotation, there being a number of such means in common use at the present time in the printing telegraph field.

A plurality of sensing levers 21 are mounted

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suitably for longitudinal movement between a pair of guides 22 and are urged continuously toward a master control form 23 by springs 24 individual to each sensing lever 21. The sensing levers 21 have round end portions 26 for entering perforations 27 in the master control form 23. Each of the sensing levers 21 has a slot 28 within which a rounded end 29 of a mixer lever 31 is positioned. A separate mixer lever 31 is provided for each sensing lever 21 and all are mounted pivotally on a shaft 32, being urged clockwise thereabout by individual springs 33. Each of the mixer levers 31 has a follower 34 which rides one of the cams 35 through 39 mounted on the shaft 19. Each of the cams 35 through 39 have low portions 42, the low portion 42 on the cam 35 being positioned opposite the corresponding follower 34 when the magnet 11 receives the No. 1 impulse of an incoming signal, the low portion on the cam 36 being opposite the corresponding follower 34 when the magnet 11 receives the No. 2 impulse, etc.

The sensing levers 21 are each provided with an upward extending projection 43 which is adapted to cooperate with the armature 14. If the sensing lever 21 senses a perforation, or marking indicia in the master control form 23, it moves to the right under the urging of its spring 24. If, when the low portion 42 of the corresponding cam 35 through 39 is opposite its follower 34, and when the sensing lever 21 has sensed a perforation in the control form 23, the armature is pivoted counterclockwise in response to a marking impulse, then the armature 14 will engage the upward projection 43 to prevent any pivotal movement of the mixer lever 31 and sensing lever 21. This condition occurs when marking impulses are sensed in both the incoming signal and in the master control form. If the sensing lever 21 senses a spacing or non-perforated spot in the master control form 23 at a time when the armature 14 senses a marking impulse, then the lower end of the armature 14 will move to the right of the projection 43 on the sensing lever 21. This permits the follower 34 on the mixer lever 31 to follow the lower portion 42 on the corresponding cam and thereby permits the spring 33 to pivot the mixer lever 31 and sensing lever 21 clockwise slightly. If the armature 14 and sensing lever 21 respond to spacing impulses simultaneously then neither the armature nor the sensing lever will move and therefore pivotal movement of the sensing lever 21 and mixer lever 31 will be prevented. When the armature 14 responds to a spacing impulse

at a time when the sensing lever 21 responds to a marking impulse, then the projection 43 will move to the right to thereby enable the spring 33 to pivot the mixer lever 31 and sensing lever 21 clockwise.

A bell crank 44 having an extension in the form of a bail 46 is mounted pivotally on a suitable shaft 47. The bell crank 44 carries a stud 48 which cooperates with an insulated portion 49 of a contact assembly 51. When any of the sensing levers 21 move upwards in response to a disagreement between the impulses in an incoming signal and in the master control form 23, a projection 52 on such sensing lever 21 engages the bail 46 thereby pivoting the bell crank 44 clockwise and causing the stud 48 to engage the contact insulation portion 49. This causes a contact 53 of the assembly 51 to close against a contact 54 which completes a circuit to any kind of an alarm device 56, which will be described hereinafter.

A feed wheel 57 for advancing the master control form 23 is mounted on a suitable shaft 58. The shaft 58 has a ratchet 59 affixed thereto which enables a pawl 61 to advance the ratchet 59 and shaft 58 in a stepped manner. A stepping magnet 62 has a cooperating armature 63 secured pivotally on a shaft 64. The armature 63 is connected pivotally to the pawl 61 by a bolt 66 and a spring 67 normally retains the armature 63 in its clockwise position whereby the pawl 61 is disengaged from the ratchet 59. The pawl 61 is provided with a spring 68 which retains the pawl 61 against a stop lug 69. Upon energization of the magnet 62, the armature 63 is pivoted counterclockwise about the shaft 64 and the pawl 61 is, in turn, moved upward whereby it engages and moves a tooth on the ratchet 59 to advance the ratchet 59 a step. A detent lever 71 is mounted pivotally on a suitable shaft 72 and carries a roller 73 which is held in continuous engagement with the ratchet 59 by a spring 74. The detent roller 73 prevents rotation of the ratchet normally; however, the spring 74 is sufficiently weak so that the pawl 61 is able to overcome the detent, when the pawl 61 is moved upwards upon energization of the stepping magnet 62.

During normal operation of the apparatus, that is, when identical signals are sensed by both the armature 14 and sensing levers 21, a circuit is established to the magnet 62 upon the completion of each incoming signal, to enable the stepping of the master control form 23 at this time. This circuit is completed just after the fifth impulse of each incoming signal is received when a high portion 74 on a cam 76 is positioned so as to engage a follower 77 mounted pivotally on a suitable shaft 78. Normally, while the follower 77 is opposite the low portion of the cam 76, a spring 79 retains the follower 77 in a clockwise position whereby a contact pair 81 is open, but as the follower 77 is pivoted counterclockwise by the high portion 74 on the cam 76 a circuit is established momentarily to the magnet 62, from battery 82, over a lead 83, through the magnet 62, over a lead 84, through the contact pair 81, over a lead 86, through a contact 87 which is normally closed with the contact 54, to the battery 82.

When a discrepancy exists between an incoming signal, as received by the selector magnet 11, and the signal in the master control form 23 sensed by the sensing levers 21, the bell crank 44 is pivoted clockwise to move the contacts 53 and

87 of the contact assembly 51 to the left, to thereby complete a circuit from the battery 82, through closed contacts 54 and 53, through the alarm 56, through a magnet 88, over a lead 89, over a lead 91 through a closed contact pair 92 (closed because the follower 77 is on a low part of the cam 76 at this time), over a lead 93, to the battery 82. When the magnet 88 is energized in this manner it attracts its armature 94, which is suitably mounted for pivotal movement on a shaft 95. The armature 94, when attracted, engages a projection 96 on a link 97 which connects the bell crank 44 and the detent 71, and retains the bell crank 44 and detent 71 in a leftward position. The magnet 88 remains energized until slightly later than the receipt of the fifth signal impulse by the selector magnet 11, that is until the high portion 74 on the cam 76 engages the follower 77 and opens the contacts 92. It will be recalled that at this time the circuit to the control form stepping magnet 62 is normally completed through the contacts 87 and 54; however, this circuit is not established at this time as the stud 48 retains the contacts 87 and 54 open. The lag of the magnet 88 in releasing its armature 94 is just sufficient to insure that the contacts 87 and 54 will not close to cause the stepping of the ratchet 59 when there has been a discrepancy between the incoming signal and a signal in the master control form 23.

After the fifth impulse of the incoming signal is received, a high portion 98 on a cam 99 secured to the shaft 19 is rotated to a position opposite a follower 101 mounted pivotally on a suitable shaft 102. The follower 101 has a projecting arm 103 which is adapted to engage the projections 43 on each sensing lever 21 to withdraw the sensing levers 21 from engagement with the control form 23 upon the completion of reception of each signal. It is after this withdrawal of the sensing levers 21 from the control form 23 that the stepping magnet 62 is normally energized to step the master control form 23.

When the control form 23 is stepped in the normal manner a helical spring 104, which is secured at one end to the shaft 58 and at its other end to a suitable stop 106, is wound up. Therefore, if a discrepancy occurs between incoming signals and those in the master control form 23, when the sensing levers 21 are withdrawn from the control form 23, the spring 104 unwinds and returns the master control form to its zero position, as shown.

The master control form 23 is shown as having a projecting arm 107 which is adapted to cooperate with an insulator 108 on a spring contact 109. It is contemplated that in practicing the invention that the master control form 23 could be mounted in a carriage and that in such case the arm 107 would be mounted on the carriage. When the control form 23 is in its uppermost or zero position the arm 107 engages the insulator 108 to retain the contact 109 disengaged from a contact 111; however, the contacts 109 and 111 are closed when the control form 23 occupies any other position.

It is to be noted that when contacts 109 and 111 are closed, the leads 112 and 113 therefrom short circuit the contact pair 92 and if the contacts 53 and 54 are closed, the magnet 88 is retained energized independently of the condition of the contact pair 92. Since the magnet 88 is thus energized for so long as the contacts 109 and 111 are closed, the link 97 is retained in its leftward position to retain the detent 71 disengaged

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from the ratchet 59 and to prevent any possible energization of the magnet 62 until the control form 23 returns to zero position to cause the opening of the contacts 109 and 111.

The contact assembly 92 is necessary for the condition when a discrepancy occurs between an incoming signal and the first signal in the control form. Under this condition the arm 107 on the control form 23 holds the contact 109 disengaged from the contact 111, and to prevent stepping of the ratchet 59 at this time the circuit to the stepping magnet 62 is retained broken, due to the energization of magnet 88 over the circuit including the contact 92 until after the normal time for closure of the contacts 53 and 54 in the circuit of the stepping magnet 62.

From the above description of the present invention it will be apparent that numerous changes and modifications may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. In a signal comparing apparatus, means for comparing incoming signals with signals in a master control form including a selector mechanism having an armature movable in accordance with said incoming signals, a plurality of sensing levers positioned by said signals in said master control form, a mechanical actuator controlled by the position of said armature and said sensing levers and moved upon a variation between said incoming signals and said master control form signals, an alarm, and a circuit operable when said actuator is moved for actuating said alarm to indicate said variation between said incoming and said master control form signals.

2. In a signal comparing apparatus, means for comparing incoming signals with signals stored in a master control form including a selector mechanism for receiving said incoming signals, said stored signals being in the form of code combinations corresponding in order to the incoming signals, a plurality of sensing levers operable simultaneously with said selector mechanism for sensing said signals in said master control form, means for stepping said master control form from a zero position in unison with said incoming signals, means normally ineffective for returning said master control form to said zero position, and means controlled by a dual effect of said selector mechanism and said sensing levers and effective upon a variation between said incoming signals and said signals in said master control form for rendering said last-mentioned means effective to return said master control form to said zero position.

3. In a signal comparing apparatus, a selector magnet for receiving incoming signals, an armature controlled by said magnet in accordance with said incoming signals, a plurality of sensing levers operable simultaneously with said selector magnet for sensing signals stored in a master control form, said signals stored on the master control form being a sequence of code combinations corresponding in order to the incoming signals, means for stepping said master control form from a zero position in unison with said incoming signals, means normally ineffective for returning said master control form to said zero position, an alarm, a detent for retaining said control form in a stepped position upon being stepped by said control form stepping means, and a lever controlled by a dual effect of said armature and said sensing levers and effective upon a variation between said incoming signals and said sig-

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nals in said master control form for actuating said alarm and rendering said detent ineffective, said detent upon being rendered ineffective enabling said control form returning means to return said control form to said zero position.

4. In combination with a signal receiving mechanism, means for sensing predetermined signals on a master control form, an actuator maintained in position by said sensing means, a member positioned in accordance with signals received by said signal receiving mechanism to prevent movement of said sensing means when said received signal and sensed signal are identical, means controlled by said signal receiving mechanism for moving said sensing means and said actuator when the signals received are not identical with the sent signals, and an indicator operated by the movement of said actuator.

5. In a signal verifying apparatus, a solenoid adapted to be energized by incoming signal impulses, an armature adapted to be moved in accordance with the energization of said solenoid, a plurality of sensing arms adapted to be positioned in accordance with a predetermined code designation on a master control form, means on said sensing arms for engaging said armature when the solenoid is deenergized and the particular sensing arm senses a no current code designation in the control form, said armature adapted to be moved into position to engage said means on the sensing arm upon reception of an incoming current impulse whenever said particular sensing arm senses a current designation in the master control form, a control arm engaging each of said sensing arms, a cam for controlling the position of each of said control arms, each of said cams being provided with a cutout portion, means controlled by the incoming signal for rotating the cams to sequentially present the cutout portions to the control arms in unison with the reception of signal impulses, means to move the control arm into said cutout portion whenever said armature is not in position to engage said means on said sensing arms to indicate a variance between the incoming signal and the signal designation on the master control form, an actuator arm adapted to be engaged and moved by the movement of any of said sensing arms, and means operated by the movement of said actuator arm for indicating a variance between the incoming signal and the signals sensed on the master control form.

6. In a signal comparing apparatus, a selector magnet energized in accordance with incoming signal impulses, an armature adapted to be moved by the energization of said magnet, a plurality of sensing arms positioned in accordance with signal code combinations on a master control form, stepping means for advancing said master control form in unison with the reception of signals by the selector magnet, an actuator maintained in an unoperative position when said armature and sensing arms are positioned by identical signals, and means controlled by the incoming signals for moving said actuator when the armature and the sensing arms are positioned by different signals to move the actuator to render the stepping means ineffective.

7. In a signal comparing apparatus, a selector magnet energized by incoming signal impulses, an armature positioned in accordance with the energization of the selector magnet, a plurality of sensing levers positioned by a signal code in a master control form, means for stepping the master control form in unison with the reception of

incoming signals, means for urging the master control form to the initial position, means for retaining said master control form in the stepped positions, actuator means maintained in position by the position of the sensing levers and the armature when the incoming signals are verified by the signal code in the master control form, and means controlled by the incoming signals to move the actuator to remove the retaining means to return the master control form to the initial position when said incoming signals are not verified by the signal code in the master control form.

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