

Dec. 23, 1930.

S. ENNES

1,785,940

RAILROAD CODE TRANSMITTING DEVICE

Filed Dec. 22, 1924

4 Sheets-Sheet 1

Fig. 1.

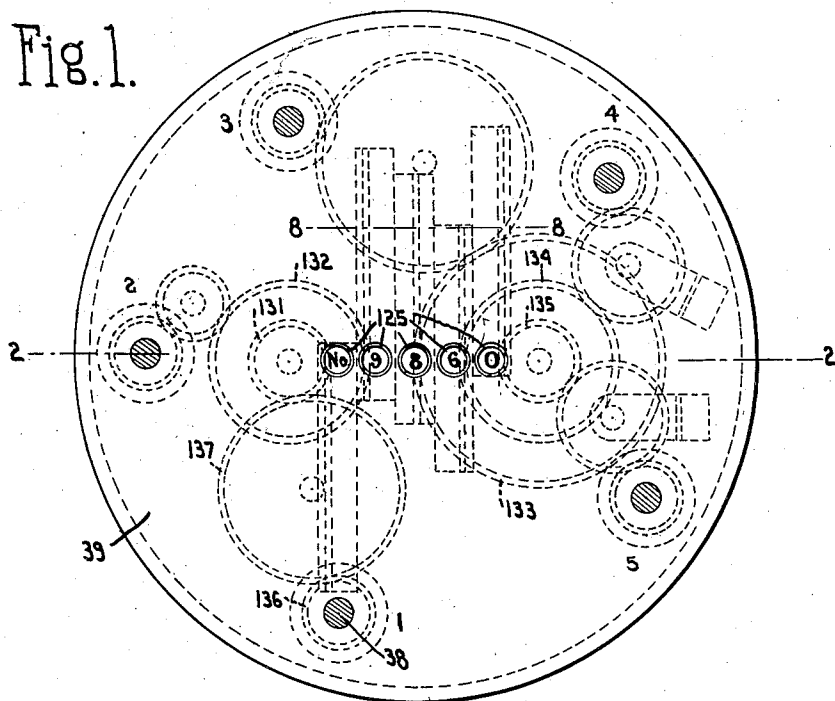


Fig. 2.

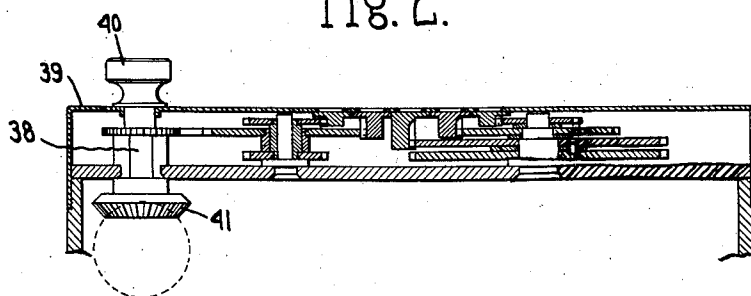
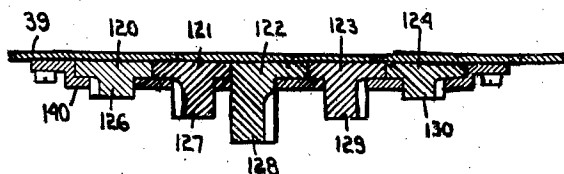


Fig. 8.



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4 Sheets-Sheet 2

Fig. 4.

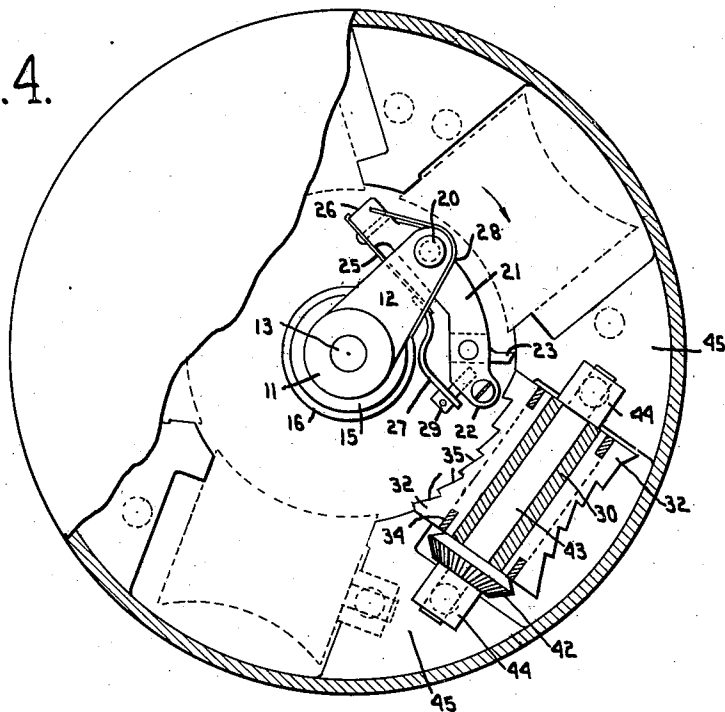
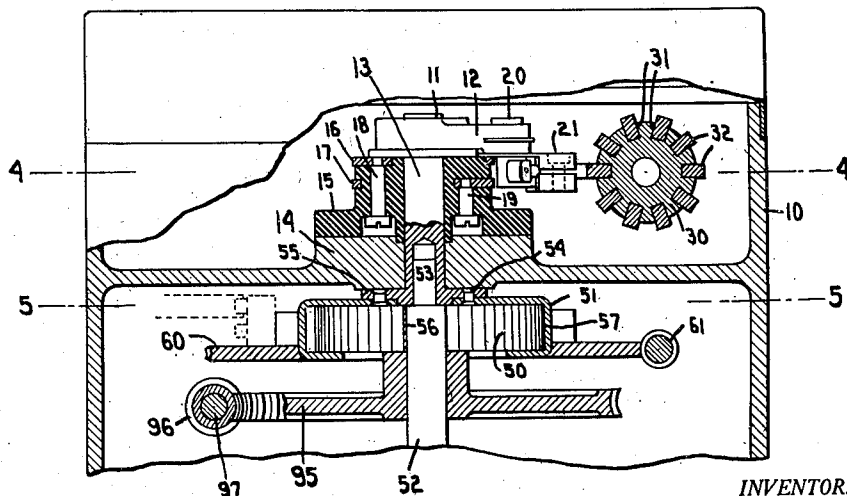


Fig. 3.



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4 Sheets-Sheet 3

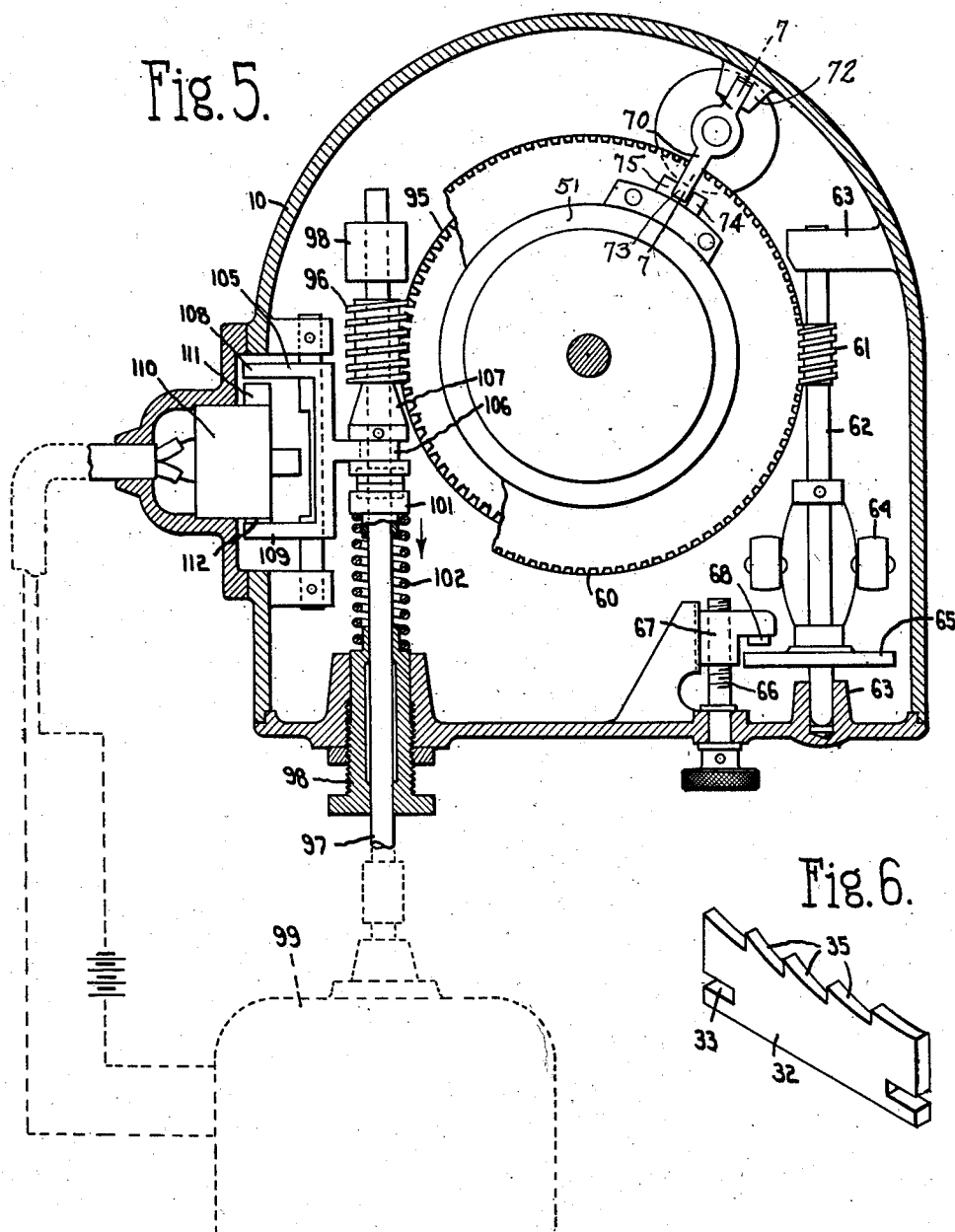


Fig. 6.

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4 Sheets-Sheet 4

Fig. 7.

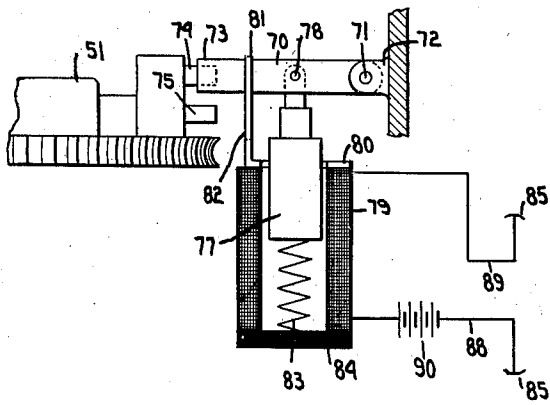


Fig. 10.

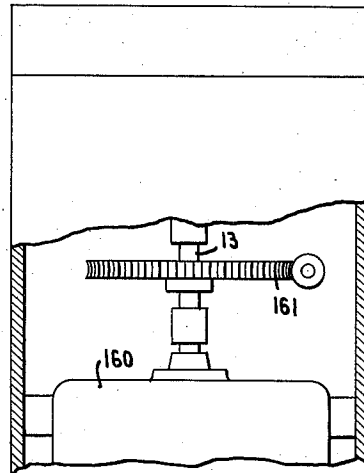


Fig. 9.

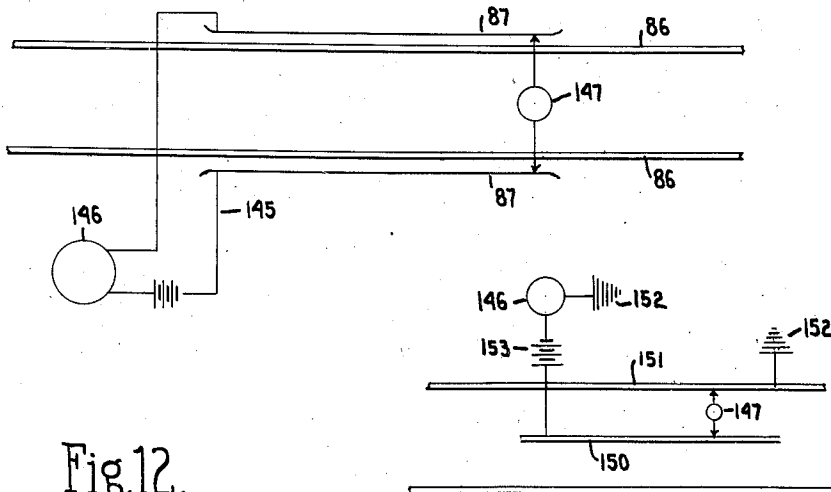


Fig. 12.

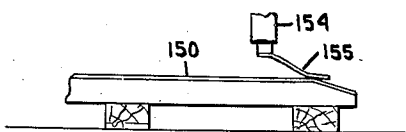


Fig. 11.

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UNITED STATES PATENT OFFICE

STANTON ENNES, OF CLEVELAND, OHIO

RAILROAD CODE-TRANSMITTING DEVICE

Application filed December 22, 1924. Serial No. 757,364.

This invention relating, as indicated, to a code transmitting device is more particularly directed to a new and improved code transmitting device which may be used on railroads in connection with the train dispatching and reporting division. As is well known, the operation of a railroad system is very complicated and the greatest care must be exercised in the control or direction of the various trains; otherwise it would be impossible to run several trains, both passenger and freight, in the same direction on a single track without considerable danger. Most commonly, to aid in the operation of the system, a number of telegraph or telephone stations are located at various points along the railroad line from which places information as to the time and number of a passing train may be reported direct to the train dispatcher's office. Obviously the practice of manually reporting trains is expensive, requiring men, machinery, shelter and other equipment, and as the necessity for the information is constant, the service calls for men at each station for each 24 hour period. I am aware that several attempts have been made to provide mechanical means to take the place of these operators, but these previous devices have operated only to automatically report that a train is passing a certain point, and no means have heretofore been provided to automatically report the individuality, as the number and direction of movement, of a train as it passes several points on the railroad line.

The primary object of this invention is to provide a new and improved device, to be carried on a train, which is adapted to automatically report to a central station the number or identity of trains as they pass certain points on the railroad line. A further object hereof is to provide a device having the above characteristics which is simple in construction, efficient in operation and which may be readily adjusted to report any desired number or message.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following de-

scription set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a plan view partly in section of a preferred embodiment of the present novel indicating device; Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1; Fig. 3 is another cross-sectional view taken in the same plane as Fig. 2 but showing the operating elements mounted in the casing below those shown in Fig. 2; Fig. 4 is a cross-sectional view as taken on the line 4—4 of Fig. 3 showing the transmitting mechanism of the present device; Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 3; Fig. 6 is a detailed perspective view of one of the indicating segments carried by the transmitting cylinders; Fig. 7 is a detailed sectional view taken on line 7—7 of Fig. 5; Fig. 8 is a detailed cross-sectional view taken on line 8—8 of Fig. 1 illustrating the means of support for the indicating slides; Fig. 9 is a diagrammatic view of a railroad track showing one method by which this invention may be operated to report the passage of a train at any point along such track; Fig. 10 is a view similar to Fig. 3 showing a modification of the invention; Fig. 11 is a view similar to Fig. 9 showing a different form of electrically connecting the present indicating device, and Fig. 12 is a detailed view of a ramp and contact shoe.

The embodiment of the invention illustrated in the accompanying drawings and described hereinafter consists of a transmitting device which is adapted to be carried by a train and of operating means mounted at the desired places along the railroad line by which the indicating device is actuated to report to a central station the number of and direction of travel of the train when it passes each of said places. Further, the specific device here shown comprises means for sending or transmitting predetermined signals, illustrated in Fig. 1 as "No. 9860", and means for adjusting mechanisms thereof so that the signals may be easily changed to include any

other series of numbers. The possible combination of numbers in the present embodiment is from 1 to 9999 but as will appear hereinafter, this number may be increased without materially affecting the construction of the device.

The transmitting device proper consists of a casing or housing 10 adapted to carry the various transmitting mechanisms and which may be attached at any suitable place on the train. The preferable place of mounting is in the engine cab where it is at all times accessible to the engineer and also within a short distance from the locomotive power plant from which electrical energy may be taken to operate the several driven elements, as will more fully appear hereinafter. Carried within the casing 10 is a rotatable contact maker and a plurality of adjustable cylinders adapted to cooperate therewith to automatically transmit predetermined signals. Means are also provided within the casing 10 which are adapted to automatically move said contact maker across the face of the cylinder, said means of course being actuated at the time when the train is passing the reporting station on the line.

Referring more specifically to the construction illustrated in the drawings, the contact maker is indicated generally at 11 and comprises a radial arm 12 mounted at the upper end of a rotatable shaft 13 which is carried centrally of the casing in the flanged portion 14. Mounted between the contact maker 11 and the flange 14 is a collar 15 of insulating material and carried at different elevations in said collar are contacts in the form of annular metallic bands 16 and 17 which are intended to be connected in the electrical circuit between the transmitting device and the circuit leading to the main receiving station. These bands are secured in place by screws 18 and 19 and project a slight distance beyond the circumference of the collar 15. Pivotaly mounted about a pin 20 at the outer end of arm 12 is a second arm 21 having its ends extending to either side of arm 12. In the end 22 of arm 21 is secured a projecting finger 23 which is adapted to engage the cylinders as the contact maker 11 is rotated about its axis and to cause the arm 21 to be intermittently oscillated about its pivot 20. Mounted on a spring leaf 25 secured to the other end 26 of arm 21 is a metallic contact plate or finger 27 which is constructed of a sufficient width to engage both the bands 16 and 17 when the arm 21 is moved inwardly toward the collar 15. A spring 28 is provided to keep the end 22 of arm 21 normally pressed outwardly in which position the plate 27 is not in engagement with the bands 16 and 17. An adjustable screw 29 is provided at the outer end of plate 27 so that said plate may be adjusted relatively of the arm 21.

The cylinders referred to above are here shown as five in number and as they are all similarly constructed, only one of them will now be described. Each of these cylinders comprises a hub portion 30 having its outer circumferential portion provided with a series of slots or recesses 31 in which are received code segments 32. To hold these segments in place, the outer ends thereof are slotted at 33 and rings 34 are slipped over the ends of hub 30 to engage in these recesses 33. The outer face of each segment is arcuate in form and is provided with a series of code indentations or notches 35 which notches correspond to certain timed intervals as provided in the ordinary Morse telegraph code and it will be seen that as the contact member through the engagement of finger 23 is moved across this outer surface of the segment, the arm 21 will be intermittently moved inwardly to engage the plate 27 with the bands 16 and 17. This contact will therefore establish a closed circuit and the proper message or signals may be transmitted therefrom to the circuit leading to the main receiving station as described above. The serrated surface of each of these segments is so formed that they comprise a single complete message such as No. N, —E, —S, —W, or any single numeral. As stated above, each cylinder has a plurality of these segments carried at its circumference, which construction affords a considerable change in the range of the possible signals. Means for adjusting the cylinders to present the proper segment in the path of the contact member consists of suitable thumb screws 38 which project upwardly through the top of a cover 39 for casing 10 and have handles or buttons 40 secured to their upper ends. To the lower ends of these screws 38 are secured beveled gears 41 which engage other beveled gears 42 secured on the cylinder shafts 43. The ends of these shafts 43 are suitably journaled in blocks 44 mounted in lateral projecting flanges 45 of casing 10.

It will be obvious from the foregoing that in order to transmit the desired message by the present indicating device, it is necessary to provide means which will operate to effect one complete revolution of the contact member 11. The same may be accomplished in various ways as by an electrical motor or as shown by a mechanically driven mechanism. This mechanism comprises a coil spring 50, such as a clock spring, carried in a casing 51 mounted about a shaft 52 co-axially arranged with shaft 13. These shafts may be journaled one within the other as shown at 53. The casing 51 is secured by rivets 54 to an annular flanged portion 55 provided on the lower end of shaft 13. The spring 50 has its inner end 56 secured to the shaft 52 and its outer end 57 secured to the casing 51. Therefore, if the shaft 52 is held stationary,

the natural tendency of spring 50 is to rotate the casing 51 and the shaft 13 which rotation carries the contact member 11 past the various transmitting cylinders. To the outer periphery of casing 51 is secured a worm gear 60 having engagement with a worm 61 mounted on a governor shaft 62. The shaft 62 is suitably journaled in bosses 63 on the casing 10 and carries a revoluble governor 64 provided with the usual friction brake disk 65. Operating through the casing 10 is a thumb screw 66 adapted to actuate an adjustable member 67 carrying suitable friction means 68 which engages the surface of disk 65 to retard the rotation of shaft 62, the purpose thereof being to control the rotation of the contact member 11.

Means for automatically releasing the contact member 11 so that it may make a complete revolution within the casing is herein shown as a pivot latch member 70 mounted at one end about a pin 71 in the boss 72 on the inner side of the casing and having its other end 73 extending into a path adjacent the outer surface of casing 51. Mounted on casing 51 is a pair of laterally projecting pins 74 and 75, the pin 74 being arranged slightly in advance of the other. Referring now to Fig. 7 which illustrates the mechanism in its initial position, it will be seen that the end 73 of latch 70 is positioned in the path of pin 74 and consequently the spring casing and shaft 13 are restricted from rotary movement. Means for actuating this latch 70 to retract from the path of pin 74 consists of a plunger member 77 having its upper end 78 suitably attached to the latch member 70. This plunger 77 is arranged within a solenoid coil 79 which when energized is adapted to pull the plunger 77 downwardly and thus release the spring casing 51. A plate 80 is secured to the top of coil 79 and has an upstanding portion 81 having a slot 82 therein in which may be guided the latch 70. This slot 82 serves a double purpose, i. e., it prevents lateral strain of the latch member 70 and also limits its upward movement. A spring 83 is positioned between the lower end of plunger 73 and the mounting 84 of the coil 79 which serves to keep the latch 70 normally pressed upwardly into the path of pin 74. Any suitable mechanism for energizing the solenoid coil may be provided, the same being here shown as a pair of contact shoes 85 adapted to project laterally beyond the railroad tracks 86 and engage suitable ramps 87 provided at the sides of said track at the places where it is desired to report the identification of a passing train. To these shoes are attached suitable leads 88 and 89 connected in the circuit of the solenoid 79 and having a source of power such as a battery 90.

Thus it will be apparent that as a train is passing a certain designated point, the present novel transmitting device will be set in mo-

tion as soon as the pin 74 carried on the exterior of the spring casing is released. To provide against more than one complete rotation of the contact member, the second stop pin 75 is so arranged that it will engage the latch 70 as the casing 51 completes its revolution. This pin 75 will hold the casing 51 against any further movement until the train passes beyond the ramps 87 at which time the coil 79 will be de-energized and the latch 70 returned to normal position in the path of pin 74. As seen in Fig. 5, these pins 74 and 75 are arranged one in advance of the other to permit freedom in the movement of latch 70.

This invention also contemplates the provision of means whereby the spring 50 may be kept at the desired tension at all times. As seen in Figs. 3 and 5, the shaft 52 has secured thereto a worm gear 95 engaging a worm 96 mounted on a shaft 97. The shaft 96 is suitably journaled in bearings 98 provided on the casing 10 and has connected to its outer end an electrical motor 99. Rotation of the motor 99 will cause the worm 96 to revolve the gear 95 and shaft 52 and consequently will wind the spring 50 within its casing. The connection between the motor 99 and shaft 97 is intended to permit certain longitudinal movement of the shaft 97 while maintaining the driving relation therebetween. Mounted on shaft 97 between the worm 96 and one of the bosses 98 is a collar 101 and surrounding the shaft between such collar 101 and the boss 98 is a compression spring 102 which normally tends to keep the collar and worm pressed upwardly or against the torque action of spring 50. It will be obvious that when the spring 50 is completely wound, the torque action thereof will be sufficient to overcome the action of the spring 102 and therefore the worm and collar member 101 will be moved in the direction of the arrow shown in Fig. 5. The arrangement shown in such figure is illustrative of the unwound condition of the spring 50 at which time the motor 99 is automatically controlled to re-wind the spring 50 through the worm 96 and gear 95. This is accomplished by providing in connection with the shaft 97 a yoke member 105 mounted to move parallel of shaft 97 and having a projecting portion 106 engaged between collar 101 and a second collar 107 on such shaft. Said yoke member 105 is also provided with a pair of projecting fingers 108 and 109 which are adapted to lie adjacent the sides of a switch member 110. This switch is of usual construction and comprises a pair of push buttons 111 and 112 projecting through the sides thereof adjacent the fingers 108 and 109. The switch 110 is connected in the circuit of the motor 99, it being obvious that movement of the yoke member 105 will actuate the push buttons 111 and 112 to turn such motor either on or off. In the construction described immediately above, as the spring 50 is wound to a suitable degree,

the torque action thereof will move the shaft 97 together with the yoke member 105 in a direction to engage the push button 111 and shut off the electrical current to the motor 99 which condition will prevail until the spring 50 has been weakened so that the compression spring 102 will again move the yoke 105 to engage the button 112. The pitch of worm 96 is sufficiently acute to prevent unwinding of the spring 50.

Thus far the description has related to the transmitting mechanisms of my improved indicating device and to their means of control. It is also within the purview of this invention to combine with such mechanisms means visible from the exterior of the casing by which may be determined the adjusted position of the code segments 32 carried by the transmitting cylinders, i. e., means are provided corresponding to each of the cylinders which carry certain indicia conforming to the code of each segment on each of the cylinders. In Figs. 1, 2 and 8 is illustrated a plurality of slides 120, 121, 122, 123 and 124 mounted beneath a corresponding number of apertures 125 in the top of cover 39 through which may be seen the characters inscribed on the upper surface of said slides. I have provided a slide for each of the transmitting cylinders and have inscribed on the surface thereof characters to represent each of the code segments carried by the corresponding cylinder such as from 0 to 9.

There is also provided mechanism whereby the buttons 40 for adjusting the cylinders 30 are also utilized for adjusting the relative position of the slides beneath the apertures 125. To the lower side of each such slides 120 to 124 inclusive, are secured rack members 126, 127, 128, 129 and 130 respectively which in turn are engaged by pinion gears 131, 132, 133, 134 and 135. On the face of cover 39, the buttons 40 are numbered as from 1 to 5 which respectively control the slides in their order from left to right, i. e. button No. 1 controls slide No. 120, etc. One the shaft 38 of button 1 is mounted a gear 136 engaging with an intermediate gear 137 by which the pinion 131 is driven. It will be seen therefore that movement of the button 1 will adjust both the slide 120 and its corresponding transmitting cylinder. Likewise are each of the other various sets of slides and cylinders interconnected by gearing so that the characters displayed through the apertures 125 are indicative of the adjusted position of the code segments of the several cylinders. As seen in Fig. 8, the slides are supported by a suitable slotted member 140 secured to the cover 39.

In one form of connecting the present indicating device for operation, the contact bands 16 and 17 are intended to be connected to a pair of contact shoes adapted to engage pairs of ramps mounted adjacent the railroad track at the points where it is desired to report the

passage of trains. These ramps are connected in the circuit 145 leading to the central dispatcher's office as shown diagrammatically in Fig. 9 wherein 146 designates a receiving instrument, and 147 the transmitting mechanism carried on the train.

Fig. 11 illustrates a form of connection wherein a single ramp 150 is utilized together with one of the rails 151 for connecting my indicating device to the receiving instrument 146. In this form, the instrument 146 and the rail 151 are grounded as at 152 and a suitable source of power 153 is interposed between the instrument and the ramp 150. It will be obvious therefore that to transmit signals from a moving train to a receiving instrument, it is merely necessary to connect the ramp 150 to the rail 151. The same may be accomplished by providing on the train a depending shoe 154 from which extends a resilient contact finger 155 adapted to engage the ramp 150, said finger 155 being connected to one of the bands 16 or 17 and the other thereof being grounded through the engine to the rail 151.

In the foregoing description, the indicating device as illustrated in Figs. 3 and 5 comprises certain mechanism which is intermittently actuated to move the contact maker one complete revolution at a time. As illustrated in Fig. 10, this invention also contemplates the provision of a mechanism wherein the shaft 13 carrying the contact maker is connected for continuous rotation to a motor 160, there being interposed between such shaft a motor and governor arrangement 161 similar to the worm gear 60 and worm 61. In this construction, the contact maker is continuously rotated and it is not necessary to provide the additional means as the solenoid 79 to release such contact member for operation.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a device of the character described, the combination with a casing of a rotatable contact maker, a plurality of cylinders mounted in the circuitous path thereof, each said cylinders being adjustable and having a plurality of code indented segments adapted to engage said contact maker to transmit signals, indicating means corresponding to each said cylinders and having indicia thereon relating to the several code indentations of the segments, a series of contiguous sight apertures in said casing through which said indicia are visible and individual adjusting means for each cylinder, said last named means being externally accessible and having

means adapted to adjust the relation of said indicating means with respect to its corresponding cylinder.

2. In a device of the character described,
5 the combination with a casing having a series of contiguous sight openings in the top thereof, of a vertical shaft, a contact maker mounted on said shaft, means for rotating the shaft, a plurality of cylinders mounted in the
10 circuitous path of said contact maker, each of said cylinders being adjustable and having a plurality of code indented segments, indicating means corresponding in number to said cylinders and mounted to slide beneath
15 said apertures, said indicating means having indicia thereon relating to the several code indentations of the segments, and individual adjusting means for each said sets of cylinders and indicating means.

20 Signed by me this 8th day of December, 1924.

STANTON ENNES.

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