E. G. MISSBACH.

ELECTRIC SIGNALING APPARATUS.

APPLICATION FILED JUNE 28, 1912.

1,135,040. Patented Apr. 13, 1915.

Fig. 1

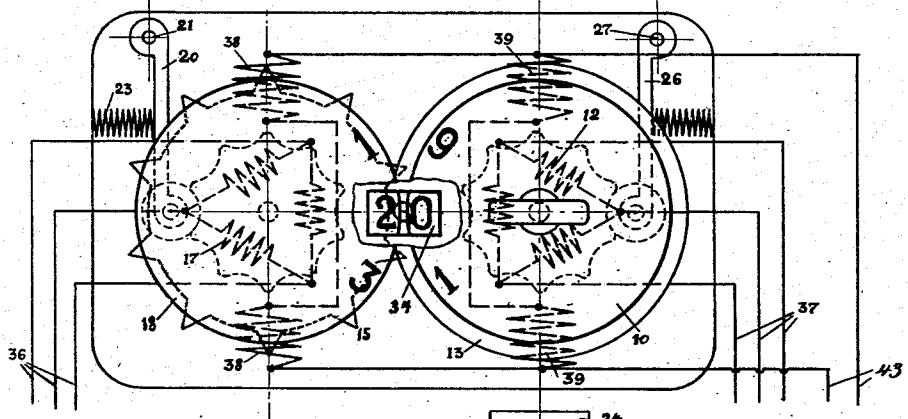


Fig. 2

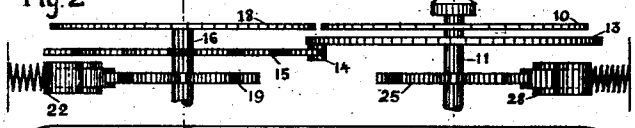


Fig. 3

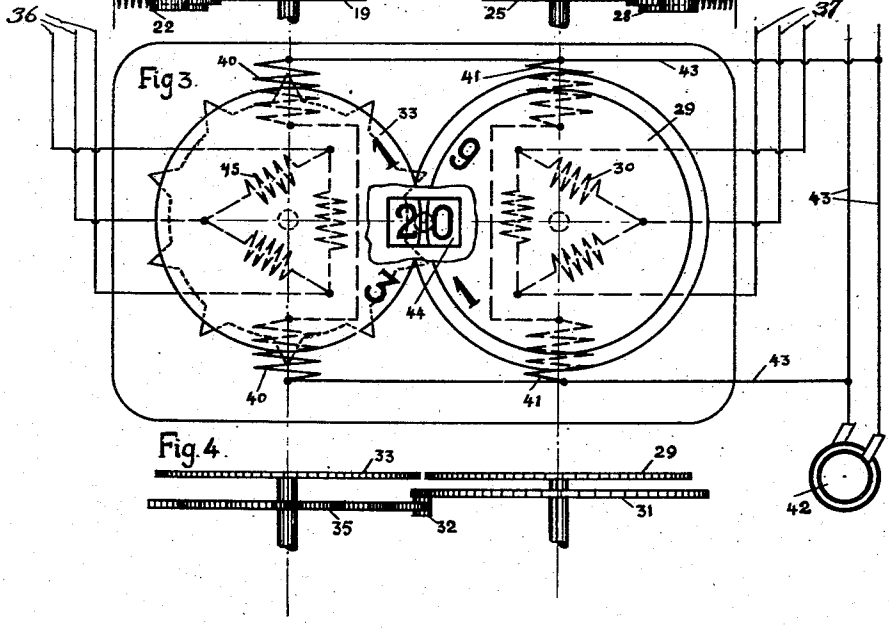


Fig. 4

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ELECTRIC SIGNALING APPARATUS.

1,135,040. Specification of Letters Patent. Patented Apr. 13, 1915.

Application filed June 28, 1912. Serial No. 706,368.

To all whom it may concern:

Be it known that I, ERNST GEORG MISSBACH, a subject of the German Emperor, and residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Electric Signaling Apparatus, of which the following is a full and clear specification, illustrated in the accompanying drawing, the particular novel features being pointed out in the annexed claims.

This invention refers to an electric signaling system having a plurality of dials at the sending station, and a like plurality of dials at the receiving station for transmitting combination signals such as for instance numbers composed of a plurality of ciphers. More particularly, my present invention is an improvement of the general system of electrically transmitting signals which consists of a plurality of sending and receiving armatures closed upon each other and rotating each in a field which is excited from an alternating current source. In such a signaling system the armature at the receiving station will accurately follow the angular position of the armature at the sending station by action of alternating currents which flow between these two armatures.

The primary object of this invention is to provide additional means for more safely securing the proper relative angular position between the dials at the sending station and those at the receiving station. An arrangement of this kind is desirable in view of the fact that the electrical effect, taking place between an armature of the sending station and the corresponding armature of the receiving station is not always sufficient to safely transmit the signal to the receiving armature. For this purpose I employ besides the above electrical connections between the sending and receiving elements, a further mechanical connection between said plurality of sending armatures and likewise between said plurality of receiving armatures. This mechanical connection, moreover, is so arranged as to permit the operation of only one of the sending elements and to cause at intervals, a predetermined motion of the second sending element relatively to the motion of the first.

In this specification I show my present invention as being applied to a signaling device for transmitting two ciphered figures; accordingly I have shown two armatures which are properly connected with each other, each of which is connected with a dial bearing the ciphers from 0 to 9 equally spaced around their circumferences. For operating the device, therefore, it is only necessary to move the dial containing the figures representing the units, the proper relative motion of the second dial with the ciphers for the tens being operated by the unit dial when passing through the zero-value.

A further object of my invention is to provide facilities between the several sending elements, to enable the operator to handle only one of these elements without paying attention to the other, and to automatically secure proper motion of the second element at the instant when said first element is passing through its zero position. In other words, I desire to employ a mechanical connection between the several elements of the sending station, which will come automatically into operation at the instant when the element for the smaller units has completed a full revolution thus forcing the element for the greater units to positively move into the next position.

My invention will be more fully understood by reference to the accompanying drawing, in which—

Figure 1 represents a diagrammatic view of the arrangement of the sending station, Fig. 2 an elevation of the apparatus of the sending station, Fig. 3 a diagrammatic view of the arrangement of the apparatus at the receiving station, and Fig. 4 an elevation of the latter.

Referring now more particularly to the drawings, 10 represents the unit dial which is mounted upon the shaft 11 together with the armature 12. Upon the same shaft 11 there is mounted a further disk 13, which carries a pin 14 at a certain point of its circumference. This pin coöperates with a toothed wheel 15 mounted upon the shaft 16 of the second armature 17 of the sending station. The second dial 18, similar to the dial 10, contains the digits for the tens and is mounted upon said shaft 16 together with said armature 17. The wheel 15 is provided with ten teeth and is set at a proper distance from the disk 13 to become

engaged by said pin 14 immediately before entering into the position shown in the drawing. Furthermore, there is provided upon each of the shafts 16 and 11, a locking device which is so arranged that the dials 18 and 10 will have a tendency to lock at positions which show a cipher of one disk in line with a cipher of the other disk. This locking device is represented in Fig. 1 of the drawing by a toothed wheel 19 having ten teeth the same as wheel 15 and by a lever 20 which is pivoted at 21 at its upper end; it carries a roller 22 at its lower end, said roller engaging the spaces between the teeth of this wheel. The spring 23 is acting upon said roller to press it against the wheel 19 thus to lock same and therewith the armature 17 and dial 18 in such a position that the cipher appearing in the opening 24 of the cover of the apparatus is in line with the centers of the shafts of the two sending elements. It will now be apparent that any number from 0 to 99 will be able to appear in said opening 24 upon rotation of the armature 12 in one or the other direction by causing the dial 18 to rotate one tenth of a revolution upon a complete revolution of the dial 10; in other words it will be possible to have all numbers from 0 to 99 successively appear in said opening 24 by merely rotating the armature 12 by means of the handle 24. A similar locking device is provided upon the shaft 11 which carries the armature 12, the disk 13 and the dial 10. This is represented by the toothed wheel 25, the lever 26 pivoted at 27 at its upper end and bearing a roller 28 at its lower end, said roller 28 engaging the space between neighboring teeth of the wheel 25, said device being identical to those forming part of the locking mechanism of the ten-element of the sending station.

The receiving station comprises an apparatus which is essentially the same as that of the sending station and consists of the following devices: A dial 29 for the units, which is mounted upon the armature 30, a further disk 31 which is also mounted upon the shaft of the armature 30, a pin 32 mounted upon the circumference of the disk 31 in proximity to the zero, and a dial 33 containing the tens, which is mounted upon the same shaft with the armature 45 and toothed wheel 35, said toothed wheel 35 meshing with the pin 32 in the position shown in the drawing. The armature 17 and 12 of the sending station are electrically connected with the armatures 45 and 30 of the receiving station by the conductors 36 and 37 respectively. The armatures 17 and 12 are rotatably mounted in a field represented by the coils 38 and 39 respectively at the sending station and the coils 40 and 41 respectively at the receiving station. These coils 38, 39, 40 and 41 are commonly excited by alternating currents from the alternating current generator 42 by means of the conductors 43. The operation of my present apparatus in brief, will therefore be as follows: If a certain number, in the present case any number between zero and 99, shall be transmitted from the sending station to the receiving station, the operator will have to move the unit-dial 10 by means of the handle 24 until the desired number appears underneath the opening 34 at the sending station. The alternating currents flowing between the armatures 17 and 45 and the armatures 12 and 30 will now have the effect to rotate the armatures 45 and 30 at the receiving station in exact synchronism with the corresponding armatures at the sending station. Consequently the numbers appearing at every instant at the opening 34 of the sending station, will be reproduced contemporaneously at the opening 44 at the receiving station. Apparently the armatures 12 and 30 which contain the units are rotated at least at ten times more revolutions than the armatures 17 and 45 containing the tens. By reason of this, and in view of the fact that the ten-disks are often kept at rest for a considerable time, the resistance due to friction and poor lubrication may become so considerable as to prevent the proper transmission of the motion from the ten-disk at the sending station to the ten disk at the receiving station. To avoid this an auxiliary mechanical device comes thus into action at the moment when the unit-disk is rotated so as to pass from 9 to zero at the opening 34. At this instant the motion of the ten-disk in the apparatus of my present invention is caused by two means, first by the electrical inter-connections 36 between the armatures 17 and 45 of the ten-disk and second by the pins 14 and 32 which transmit proper positive motion of the armatures 12 and 30 upon the armatures 17 and 45 at the desired instant. It will therefore be seen that the reliability of my present apparatus is considerably enhanced by the application of this auxiliary means.

Having thus described my invention and particularly set forth the advantage thereof, I do not wish to confine myself to the precise arrangements as shown and described herein, since modifications may be made thereon without departing from the spirit of this invention.

What I claim is:

1. An electrical signaling system of the character described, comprising a plurality of sending elements, a like plurality of receiving elements, electrical connections between each of said sending elements and its corresponding receiving element and auxiliary mechanical means for fixing the rela-

tive movements of said sending elements and the relative movements of said receiving elements in a desired ratio.

2. An electrical signaling system of the character described, comprising a sending and a receiving element for smaller units, a sending and a receiving element for greater units, and mechanical devices for operating said elements for the greater units from said elements for the smaller units, electrical connections between said element for the greater units at the sending station and said element for the greater units at the receiving station, and electrical connections between said element for the smaller units at the sending station and said element for the smaller units at the receiving station.

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