

May 5, 1959

J. M. McCUE

2,885,664

CODE TRANSMITTING APPARATUS

Filed April 4, 1958

2 Sheets-Sheet 1

FIG. 1

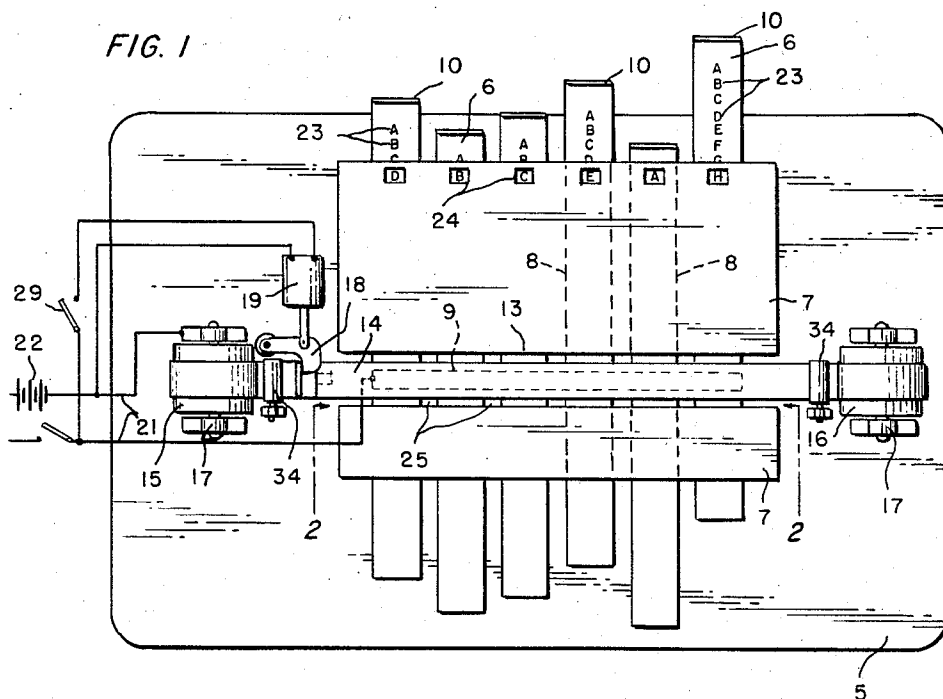
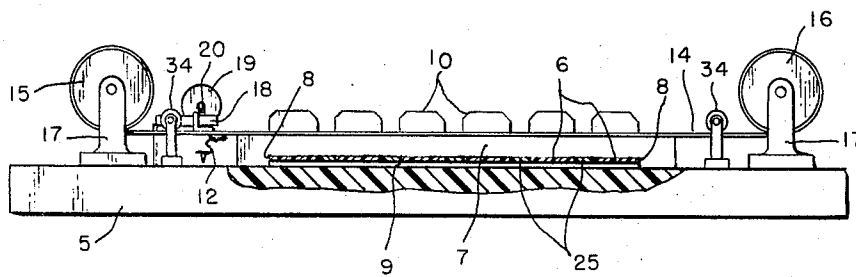


FIG. 2



INVENTOR,
JAMES M. McCUE.

BY

Harry M. Saragovitz

ATTORNEY.

May 5, 1959

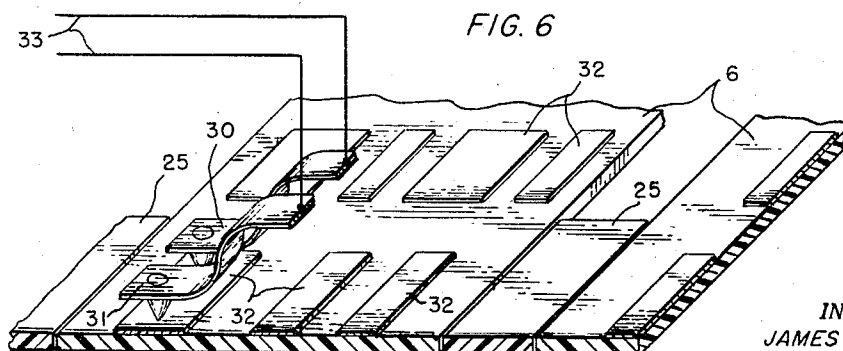
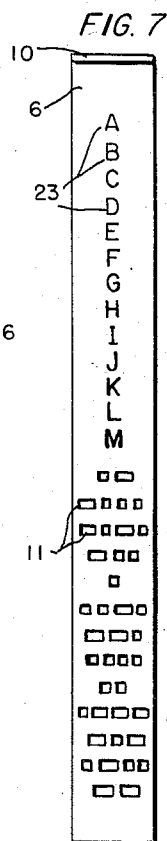
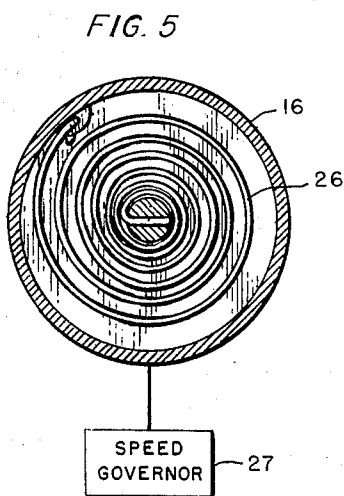
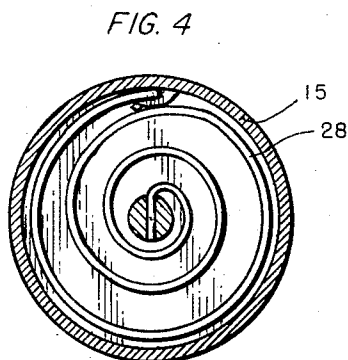
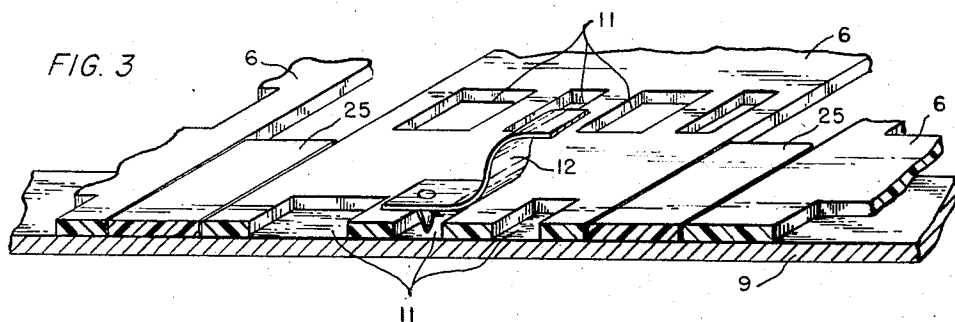
J. M. McCUE

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INVENTOR,
JAMES M. MC CUE.

BY

Harry M. Saragovitch
ATTORNEY.

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CODE TRANSMITTING APPARATUS

James M. McCue, Shrewsbury, N.J., assignor to the United States of America as represented by the Secretary of the Army

Application April 4, 1958, Serial No. 726,590

9 Claims. (Cl. 340—365)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to electric pulse code transmitting apparatus which is relatively compact, light and portable. Moreover, the structural and operating characteristics of the invention contribute to reliability, ruggedness and simplicity of operation.

The invention consists of a supporting structure upon which are independently slidably mounted a plurality of coding strips desirably of insulating material and arranged in side by side parallel relationship. Each of said strips is provided with a plurality of groups of circuit closing code elements arranged transversely thereof each group representing a different message character such as letters of the alphabet.

The strips are held and adjustably guided in a common plane and coact with suitable circuit elements and a contacting device movable transversely across the strips to successively close the circuit in a transmission line in accordance with a selected coding system to transmit a message.

The message is composed by adjusting the strips to transversely align groups of code elements representing the characters of the message. These groups are aligned along the path of the mobile contacting device, the movement of which successively closes the line circuit each time it engages the individual code elements of the message characters thus transmitting the message.

It is a primary object of the invention to provide a coding device which is structurally compact and light in weight.

A further object of the invention is to provide a code transmitter which is portable and highly desirable for service where the quantity of data transmitted is relatively small in which case it will supplant very costly and unnecessarily complex systems such as teletype equipment.

A further object of the invention is to provide a simplified error proof means for fast transmittal of coded signals wherein it is unnecessary for the operator to learn the code.

A further object is to provide a pulse code transmitter wherein a secret code may be maintained in operation and frequently changed by an operator with practically no previous experience or training.

Other objects and features of the invention will more fully appear from the following description and will be particularly pointed out in the claims.

To provide a better understanding of the invention a specific embodiment thereof will be described and illustrated in the accompanying drawing, wherein

Fig. 1 is a plan view of the device of the invention.

Fig. 2 is a side elevation of the device shown in Fig. 1.

Fig. 3 is an enlarged detail showing the construction and arrangement of the code elements within the coding strips.

Figs. 4 and 5 are respectively partially diagrammatic,

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cross-sectional views of rolls for supporting a metallic tape used for driving a wiping contact and showing the spring means for driving the rolls.

Fig. 6 illustrates a different construction for the electrical contact means wherein a pair of brushes coact with conductive areas upon the coding strips to produce coded output signals.

Fig. 7 is a detailed view of one of the coding strips. The principles of the invention may be embodied in various structural forms. A satisfactory form is illustrated in the drawings wherein the components of the apparatus are mounted upon a base 5 which desirably is made of rigid insulating material upon which are mounted a plurality of coding strips 6. The coding strips are arranged in side by side parallel relation and desirably are guided longitudinally and freely independently movable with respect to each other. The strips are held and guided in any suitable manner as by providing a hold-down plate 7 in the bottom face of which are formed grooves 8 to receive the strips. Extending transversely of the strips is a continuous electrode 9 which is positioned in contact with or in closely spaced relation to the bottom face of all of the strips 6.

Each strip is provided at one of its ends with a tab 10 or other suitable means to enable an operator to move the strips in their grooves for a purpose to be described. Each strip is provided with a plurality of groups of code elements 11 arranged sequentially transversely of the strip. These elements coact with circuit closing components including the electrode 9 and a mobile contactor 12, to be described in detail hereinafter, to transmit a series of pulses, representing a message character, along a transmission line.

The pulsing elements 11 may be of any suitable design. As illustrated and by way of example the strips 6 are made of insulating material and the pulsing elements are formed by punching apertures in the strip. The length and spacing of the apertures in each group determine the coding of an individual message character as illustrated clearly in Fig. 5. Each group of pulsing elements on the strips represents a different message character. To compose a message selected groups of pulsing elements on the respective strips are aligned end to end along the path of the mobile contactor. Thus when the contactor is traversed across the strips it successively penetrates the punched out pulsing elements and makes a series of contacts with the electrode 9 to complete the circuit through the transmission line thus sending the message in coded form.

The pulse coding groups may be composed of electrically conductive slugs set into apertures in the strips and arranged transversely thereof, the slugs extending completely through the strips 6 making contact from the electrode 9 to the mobile contact 12 during its transmitting cycle. In another form of the invention the strips 6 could be made of metal and each pulsing element could consist of holes over an insulating base or slugs of insulating material set into the metal strips. In the latter two constructions the strips would become a portion of the circuit. In each case the extent of the conducting and nonconducting portions of the strips are proportioned, spaced and sequentially arranged transversely across the strips to produce the required single pulse or coded series of pulses representing a particular message character.

The path of the mobile contact 12 is defined by the slot 13 in the hold-down plate and extends transversely of the strips 6. It is possible to operate the device manually in which case the contactor 12 would have a flexible connection to the transmission line and would be moved at uniform speed along the slot 13 to accomplish transmission of the message.

Since the coding strips 6 are spaced slightly edgewise for operational purposes, a narrow slot is formed between the edges of the strips where they extend across the slot 13. To prevent the brush 12 from making undesired contact with the electrode 9 at these points, sections of insulation 25 are inserted between the strips. While manual operation may be satisfactory it is more desirable to traverse the contactor 12 mechanically. This may be done in any suitable manner. As shown in the drawings the contact brush 12 is fastened to the bottom face of a flexible supporting and guiding tape 14 which extends across the strips 6 at the slot 13. The ends of the tape are wound upon actuating rolls 15 and 16 rotatably mounted in suitable bearing members 17 rigidly mounted on the base 5.

Desirably the roll 16 is driven by a spiral spring 26 anchored to a fixed shaft at one end and to the roll at its other end. Other type motors may also be used to drive the tap 14 to traverse the brush 12 from left to right across the strips 6. The tape winds up upon the roll 16 as the brush proceeds along its transmitting path. Desirably a speed governor 27 is coupled to the roll 16 to provide uniform travel of the brush.

The roll 15 is also provided with a spring 28 or other rotating means exerting a torque less than that developed by the spring 26, the spring 28 tending to rotate the roll 15 in the opposite direction. The tape is sufficiently flexible and its driving devices maintain it in a substantially straight line. If desired the edges of the tape may traverse shallow slots in the plate 7 to insure even pressure of the brush 12 upon the strips 6. A pair of guide rolls 34 may also be provided to assist in guiding the tape and to counteract the reactive upward thrust of the resilient contactor 12.

Prior to transmission the brush 12 is held in its left hand position by a latch 18. This latch may be electrically actuated by an electromagnetically operated trigger type relay 19. The latch 18 engages a holding lug 20 secured to the tape as shown in Fig. 1 thus latching the tape in its left hand position.

The invention is shown in connection with a communication line 21 one wire of which is connected to the electrode 9 and its other wire is connected to one of the rolls 15 or 16 which are electrically conductive. Such connection may be made to one of the supports 17 since they have electrical continuity to the rolls and the supports are mounted on the insulating base 5. Thus the electrical path proceeds from the line to the tape 14, through the brush 12 and when a pulse is being transmitted the path continues through the electrode 9 and thence back to the line which is supplied with an energy source such as the battery 22.

The remote end of the line is connected to a receiving device, not shown, which may transcribe the message visually as by dots and dashes to be decoded by the receiving operator or the receiving device may be an automatic or semi-automatic decoding system.

Desirably but not essentially the relay 19 is connected in parallel across the line 21 and is provided with an On-Off switch 29. If the operator is not in attendance he may leave the switch 29 closed and when the receiving operator wishes to determine whether a message has been set up at the transmitter he will close his end of the line which will act through the relay 19 to initiate such transmission. The transmitting operator may of course transmit his message by closing the switch 29 to actuate the relay.

The relay 19 desirably has sufficient impedance to avoid transmission of a signal to the receiving instruments when it is locally energized. For local actuation of the relay a separate power supply and switch therefor may be provided.

Each of the strips 6 in addition to its groups of code elements 11 has printed thereon message characters 23 corresponding to the respective groups of circuit closing

elements. Each of the message characters are spaced lengthwise along the strip an equal distance from their related code element groups and at a distance therefrom to cause them to appear in viewing windows 24 in the plate 7 when their respective contact element group is aligned with the path of the brush 12.

To compose a message it is merely necessary to adjust each code strip until the desired character appears in the window 24 and the coded message is ready for transmission.

In Fig. 6 of the drawings a modified circuit closing arrangement is shown wherein two resilient contactors 30 and 31 are mounted upon and insulated from the tape 14. Desirably the contactors are spaced a short distance apart and aligned transversely of the tape. Coacting with the contactors are groups of conducting code elements 32 fixed upon and arranged transversely of the strips 6. The elements 32 are of correct size to be contacted simultaneously by the contactors 30 and 31 as they are traversed during a transmitting cycle.

The contactors are provided with flexible leads 33 connected to the line 21. Only the contactors, the elements 32 and the leads 33 constitute the line closing circuit. Operation of the device shown in Fig. 7 is the same as in the structures previously described.

It should be noted that in the latter construction the elements 32 may be formed upon the strips 6 by any of the well-known printed circuit techniques thus reducing their cost.

The invention may be used in connection with any communication system but is especially valuable where secrecy is desired since a rapid change in the code may be made at any time by changing to a new set of coding strips. Further advantages accrue from the unlimited portability of the device and to its extreme simplicity of operation especially in military applications and moreover, due to the high speed of transmission, considerable saving in circuit occupancy is realized.

One of the important applications of the invention is its use for feeding information to a central facility. For example, several of these portable transmitters at widely dispersed points could feed information to the computer where it could be analyzed, classified and integrated to provide the immediate solution to a complicated problem.

While there has been described what is at present considered to be the preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. Signal code pulse transmitting apparatus comprising a plurality of longitudinally independently adjustable coding strips mounted in parallel side by side relation upon a support, each strip having a plurality of groups of code pulse elements, the elements of each group arranged in sequence transversely of the strips and representing an intelligence character, electric contacting means connected to a communication line, means to cause said contact to successively transversely traverse said strips along said code pulse elements, and coacting electric conducting means with which said contact member closes an electric circuit to said communication line each time it traverses a code pulse element whereby when the contactor traverses said strips a succession of coded message characters are transmitted to the line.

2. Signal pulse transmitting apparatus comprising, a plurality of coding strips arranged side by side, means to guide the strips lengthwise to provide relative movement therebetween, a plurality of groups of electric contact making code elements, the individual elements of each group arranged transversely thereon to provide a succession of electric pulses representing a coded message

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character, a resilient contactor connected to said line, means to traverse said contactor successively transversely along said strips to engage the code elements of successive transversely aligned code element groups, a plurality of message characters longitudinally disposed on said strips each character being equispaced thereon from its corresponding code element group.

3. Signal code transmitting apparatus comprising in combination with a transmission line having a power source, a plurality of movable elongated parallel message character coding strips arranged side by side, means to independently guide them lengthwise, a plurality of groups of circuit closing code elements, the elements of each group arranged transversely of the strip in a selected sequence to represent a message character, a movable contactor, means to guide it in a selected operating path transversely along said strips, a continuous contact electrode below said movable strips and in circuit closing relation to said strips at said operating path, said code elements acting to close an electric circuit to said line from said contactor to said electrode whereby the line current will be modulated according to a message set up by aligning selected contact element groups along the path of said movable contactor.

4. Code pulse transmitting apparatus according to claim 3 together with message characters arranged lengthwise on the strips equidistant from corresponding code element groups, masking means to cover said message characters and windows in said masks to observe the message transmitted.

5. A signal code transmitting apparatus comprising in combination with a transmission line having a power supply, a supporting frame, a fixed elongated continuous electrode connected to said line and insulated from said frame, a plurality of elongated parallel lengthwise movable coding strips in operative relation to said electrode, a plurality of groups of circuit closing elements the separate elements thereof being arranged transversely of said strips, each group representing a message character, a mobile contactor member connected in said line, a flexible tape-like carrier for supporting and traversing said contactor transversely along said strips, a pair of rolls at the ends of said tape upon which the tape is supported and winds as the contactor is traversed, driving means on one of said rolls acting to transport the tape and contactor whereby a series of circuit closings are made from the fixed electrode through the code elements on

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the strips to the contactor and thence to the communication line, said circuit closings producing pulses in the line in accordance with the coded message, said message being composed by aligning selected groups of code elements on said strips with the path of said contactor.

6. Code pulse transmitting apparatus according to claim 5 together with message characters arranged longitudinally of said strips equidistant from corresponding code element groups, masking means to cover said characters and windows in said masking means to observe the message transmitted.

7. In combination with a communication line having a source of energy a code transmitting apparatus comprising a plurality of groups of electrically conductive code elements mounted upon movable insulating supports each group representing a message character, means selectively to arrange said groups in end to end relation along an operating path, an electric contacting means having connection to said line, means to traverse said contactor means along said operating path to successively engage the code elements of said groups thereby to modulate the energy in said line in accordance with a message created by aligning selected groups of code elements.

8. A code transmitting apparatus according to claim 7 together with a tape-like carrier upon which said contactor means is mounted and speed regulated means to drive said carrier during a message transmitting cycle.

9. In combination with a communication line having a source of energy a code transmitting apparatus comprising a plurality of coding strips of electric insulating material disposed in side by side relation, means for guiding and moving said strips lengthwise with respect to each other, a plurality of groups of electrically conductive code elements the elements of each group being arranged sequentially transversely across said strips, a pair of electrically isolated contactors spaced a short distance apart, means to traverse said contactors transversely across said strips in a predetermined transmitting path corresponding to the position occupied by selected transversely aligned groups of code elements on successive coding strips and representing a message, both of said contactors engaging each of said code elements at the same time and electrical connections from said contactors to said line.

No references cited.