

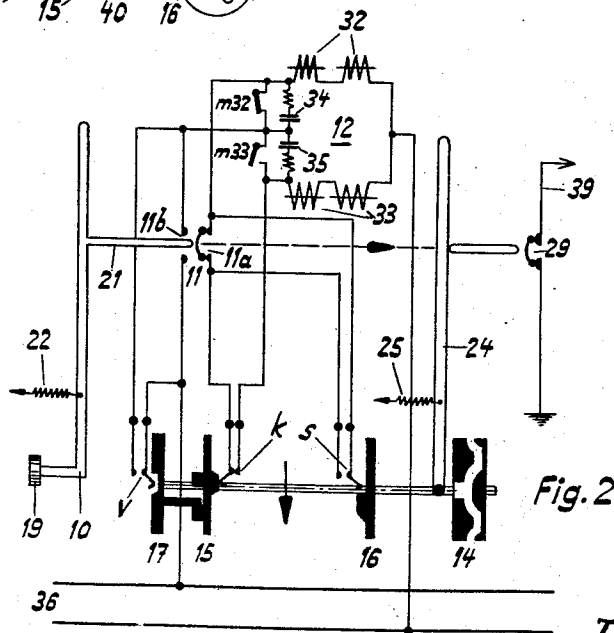
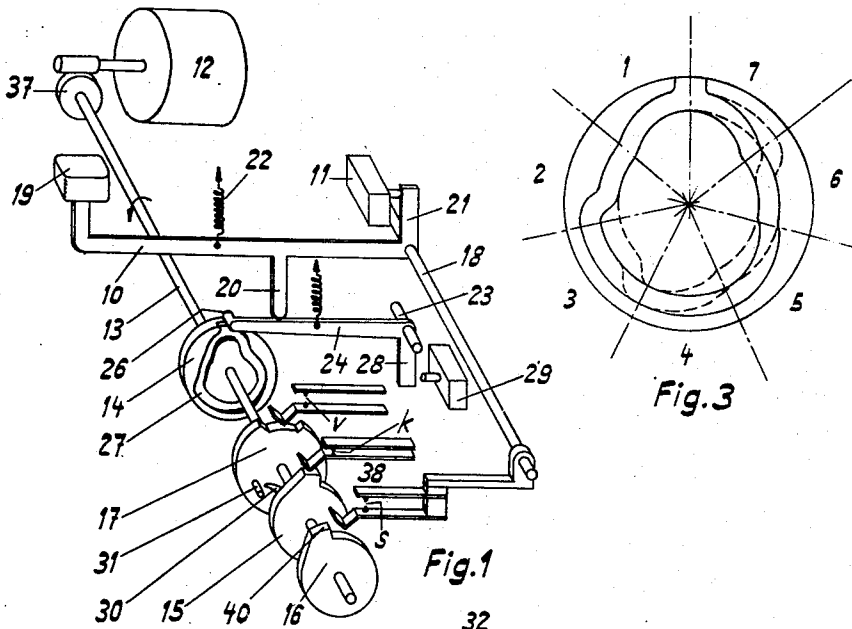
Sept. 8, 1953

O. MOSER

2,651,676

ELECTRIC CURRENT IMPULSE TRANSMITTER

Filed Aug. 14, 1951



INVENTOR
OTTO MOSER
BY *c. m. [signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

2,651,676

ELECTRIC CURRENT IMPULSE
TRANSMITTER

Otto Moser, Bern, Switzerland

Application August 14, 1951, Serial No. 241,758
In Switzerland August 24, 1950

6 Claims. (Cl. 178—17)

1

This invention relates to the transmitting of electric current impulses and more especially of combinations of such current impulses as are used in the operation of telegraph apparatus, telautographs, telewriters and the like.

The invention is especially concerned with transmitting devices which convert the signal or the like into current impulse combinations.

Devices of the kind aforesaid as hitherto known comprise a setting mechanism, i. e. a keyboard with a number of individual keys or a dial for the combinations of current impulses to be transmitted, further certain controlling elements operatively connected with the setting device, for instance impulse discs keyed on a common shaft or on different shafts, means for driving this shaft or shafts and a contact device controlled by the control elements for transmitting the combinations of current impulses.

In the known devices of this kind, in which impulse discs are used as controlling elements, these discs are formed with projecting cams. In contrast to these devices, the impulse discs forming part of the transmitting devices according to the present invention have on one of their disc surfaces a cam groove which extends around the disc axis and is characteristic of one particular combination of current impulses. When the setting mechanism is operated, a pin, finger or other feeler cooperating with the disc enters the cam groove and is thereafter moved according to the configuration of the groove to control the contact device and provide for transmission of the combination of current impulses corresponding to the adjustment of the setting device such as for instance the individual key which had been depressed.

In the drawings affixed to this specification and forming part thereof, an embodiment of the invention is illustrated diagrammatically by way of example.

In the drawings:

Fig. 1 is a schematic showing, in perspective, of the mechanical part of the device, while

Fig. 2 is a schematic showing of the electrical part and wiring diagram.

Fig. 3 is a plan view, drawn to a larger scale, of an impulse disc.

Referring to the drawings, 10 in Figs. 1 and 2 denotes one of the selectively operable key bars of the keyboard mechanism. For the sake of simplicity only one such bar and key are shown. A snap switch 11 capable of assuming two different positions controls the starting of a driving device 12 serving to drive a shaft 13. Keyed on

2

the shaft are pulse control discs 14, one for each key bar. Each disc 14 has a cam groove 27. Firmly mounted on shaft 13 are further a rest-cam disc 15 and a working cam disc 16. A delaying disc 17 is mounted loosely on the shaft 13.

The key bars 10 have the form of double-armed levers fixed on an axle 18 supported for rocking motion. One arm of these levers carries the key head 19 and a vertical arm 20, while the other arm 21 of the lever serves for actuating the start switch 11. A tension spring 22 tends to maintain the key 10 in its position of rest. A bar 24 having a pin or feeler 26 to be controlled by the cam groove 27. Bar 24 has the form of a double-armed lever and is mounted for rocking movement on an axle 23 and forced by a coil spring 25 with one of its arms against the arm 20 of the key bar 10. Arm 24 also carries the pin 26 which, when key 10 is being depressed, enters through an opening at the periphery of disc 14 into the cam groove 27 of disc 14.

A contact device 29 serving for transmitting the current impulse combinations is actuated by arm 28 of bar 24 in accordance with the configuration of the cam groove 27. The cam disc 15 carries a finger 30, and a disc 17 loose on shaft 13 carries a pin 31. In the position of rest of the mechanism, pin 31 is angularly spaced from finger 30 so that finger 30 comes into contact with pin 31 only after the disc 15 has gone through a predetermined angular movement, to then carry along the disc 17.

The disc 15, by means of its cam 38, can operate a rest contact *k*. The discs 16 and 17 are coupled with respective working contacts *s* and *v* (Fig. 2.)

The driving device 12 as here provided is of an electromagnetic kind comprising fixed electromagnets 32 and 33 which are excited in pairwise alternation through self-controlled contacts *m*32 and *m*33, respectively. The driving device further comprises a rotor (not shown) with definite poles. The driving devices as here described are particularly well adapted for the purpose here in view for the reason that they can be brought to a standstill instantaneously in a simple manner by magnetic action as will be explained more in detail hereinafter. Spark extinguishing circuits 34 and 35 are connected across respective contacts *m*32 and *m*33. The driving device 12 is supplied with current from a line 36 which may supply a 60-volt direct current.

The transmitter here above described operates as follows:

On a key 10 being depressed, the vertical arm 20 of the key bar exerts pressure on one arm of the pin carrier 24, whereby the pin 26 is caused to enter the cam groove 27 of the pertaining impulse disc 17. Simultaneously the arm 21 of the key 10 actuates the switch 11 whereby the circuit for the driving device 12 is closed. The current flows from line 36 by way of the closed switch contacts 11b, contact m32, through the windings of the electromagnets 32 back to the line. Owing to the excitation of the electromagnets 32 the rotor (not shown) is started rotating and by means of the gearing 37 sets the shaft 13 revolving. Now the contacts m32 and m33 are opened and closed alternately, whereby the electromagnets 32 and 33 are excited alternately. In accordance with the configuration of the cam groove 27 of the impulse disc 14 the arm 28 will now actuate the switch 29 which transmits the current impulses into the wire 39. On the key 10 being released, the contacts 11b are opened and the contacts 11a are closed again. In the meantime the loosely seated disc 17 has turned through an angle such that the pertaining holding contact v is closed and the driving device 12 is now supplied with current through the contact v. Shortly before the end of a full revolution the cam of the disc 16 closes the contact s. Apart from this, directly after the shaft 33 has started revolving, the contact k is opened. After a complete revolution the cam 38 of disc 15 closes again the contact k. This leads to a bridging of the contacts m32 and m33 whereby both pairs of electromagnets 32 and 33 are excited simultaneously and the driving device 12 is instantly brought to a standstill.

In order to prevent the braking period from being too short, the interruption of the current supply to the driving device 12 by contact v is delayed a short period of time after the shaft 13 is arrested. This delay is due to the fact that, when shaft 13 is suddenly arrested, the disc 17 which is loose on this shaft continues revolving under its own momentum. Only after the disc 17 has returned into its position of rest is contact v opened so that now the entire device is in its initial position.

The working cam disc 15 guarantees the stopping of the driving device 12 after completion of one revolution independently of the position of the key 10 and regardless of whether key 10 remains in its depressed position or is released at once. Directly before the shaft 13 has completed its revolution, the contact s is closed by the cam 14 of the disc 16 whereby any contacts 11a which may still be open are bridged also.

The pulse control disc 14 illustrated by way of example in Fig. 3 is designed for use in connection with a device operating as a transmitter for a telegraph system working in accordance with the 5-current step alphabet. To this end the impulse disc is subdivided into seven sections, namely a section 1 which may be called the blocking step, a section 2 representing the starting step for the transmitter and five further sections which represent the current impulse combination proper corresponding to the signals to be transmitted. The particular shape of the cam slot is chosen in accordance with the one signal to be transmitted by each cam disc 14. The slot sections corresponding to the blocking and starting steps are of uniform configuration in all impulse discs belonging to the device.

As compared with known devices of similar

type comprising discs with projecting cams as control elements for the transmission of the impulses, the cam slot discs offer the advantage of guaranteeing, by the positive steering of the pin or finger in the individually formed cam slots of the impulse discs, a far safer working of the device, because it does away with the bouncing and wear of contacts which frequently occur in devices operating with projecting cam discs. Impulse distortions are practically rendered impossible, so that the transmitter cannot transmit any faulty combinations of current impulses and consequently any wrong signals.

A further advantage offered by the mechanism hereabove described as compared with transmitters comprising setting members common to different impulse combinations consists in that any setting element, for instance an impulse disc which might become defective during the operation, will disturb only a single combination of current impulses, while in the old devices all combinations controlled by a common setting member are disturbed.

I wish it to be understood that I do not desire to be limited to the exact details described in the foregoing specification and shown in the drawings for obvious modifications will occur to a person skilled in the art.

This invention is related to that of my copending application Serial No. 260,522, filed December 1, 1951, now Patent No. 2,612,556.

I claim:

1. Apparatus for transmitting electric pulse combinations, comprising a mechanism for selecting a pulse combination to be transmitted, a shaft, a drive joined with said shaft, a pulse control disc for each of the available pulse combinations mounted on said shaft to revolve together therewith, a start switch controlled by said mechanism and connected with said drive for starting said drive when said mechanism is actuated, pulse contact means for transmitting said pulse combination having a movable contact control member with a feeler, said pulse control disc having a cam groove extending around said shaft and having a composite curve shape corresponding to one of said pulse combinations, said movable control member and feeler having a bias away from said groove, and said mechanism, when being actuated to control said start switch, being engageable with said control member to move said feeler against said bias into said groove, and said groove having a cross sectional shape straddling said feeler and forming a double-sided guiding contour for oscillating said feeler.

2. Apparatus for transmitting electric pulse combinations, comprising a pulse control disc for each of the respective pulse combinations, a shaft having a one-revolution drive joined therewith, said disc being firmly mounted on said shaft to revolve together therewith, said disc having a lateral cam groove closed upon itself around said shaft and having a composite curve shape corresponding to one of the pulse combinations, and said disc having a passage extending from said groove to the disc periphery and located at a given place when said drive is at rest, pulse contact means for transmitting said pulse combination having a movable contact control member with a feeler disposed near said disc at said place and biased away from said disc, a pulse-combination selector mechanism, a start switch controlled by said mechanism and connected with said drive for starting said drive

5

when said mechanism is actuated, said mechanism when actuated being in engagement with said contact control member to move said feeler through said passage into said groove, and said groove having a cross sectional shape straddling said feeler to hold it oscillatorily engaged in said groove during revolution of said disc.

3. In pulse transmitting apparatus according to claim 2, said groove having a first curve section for issuing a receiver-releasing pulse ahead of the pulse combination, said first curve section beginning a given angular amount from the rest position of said feeler so that the releasing pulse is issued only after said pulse control disc has gone through a given part of its revolution, said first curve section being followed by said composite curve shape corresponding to the pulse combination proper.

4. Apparatus for transmitting electric pulse combinations, comprising a mechanism for selecting a pulse combination to be transmitted, a shaft, a drive motor joined with said shaft and having a motor control circuit, said circuit comprising a normally open start switch and a normally open holding contact parallel connected to said start switch, a pulse control member firmly mounted on said shaft to revolve together therewith, electric pulse contact means disposed for transmitting said pulse combination and engageable with said member to be actuated by revolution of said member, said start switch being engageable by said mechanism for closing said circuit to start said drive motor when said mechanism is actuated, a cam disc loosely seated on said shaft and engageable with said holding contact to close said holding contact only when moved out of a given rest position, stop means firmly secured to said shaft and engageable with said cam disc after a given angle of revolution of said shaft to then entrain said cam disc, whereby said cam disc closes said holding contact to maintain said motor running independently of said start switch.

5. Apparatus for transmitting electric pulse combinations, comprising a mechanism for selecting a pulse combination to be transmitted, a shaft, a drive motor joined with said shaft and having a motor energizing said circuit and a braking circuit, said energizing circuit comprising a normally open start switch and a normally open

6

holding contact parallel to said start switch, and said braking circuit comprising a stop control contact, a pulse control member firmly mounted on said shaft to revolve together therewith, electric pulse contact means disposed for transmitting said pulse combination and engageable with said member to be actuated by revolution of said member, said start switch being engageable by said mechanism for closing said energizing circuit to start said motor when said mechanism is actuated, a first cam disc loosely seated on said shaft and engageable with said holding contact to close said holding contact only when moved out of a given rest position, a second cam disc firmly mounted on said shaft and having a part abutable against said first cam disc but angularly spaced therefrom so as to entrain said first cam disc for revolution from said rest position when said second cam disc has passed through a given portion of its revolution, said second cam disc being engageable with said stop control contact at the end of said revolution to arrest said motor.

6. In pulse transmitting apparatus according to claim 5, said second cam disc having a continuous cam contour in contact-closing engagement with said holding contact over the entire cam periphery with the exception of a peripheral cam portion located at said holding contact when said second cam disc is in said rest position, and said second cam disc having a mass sufficient for said second cam disc to continue moving under its own momentum after said first cam disc has completed its revolution, whereby said second cam disc opens said holding contact to reset the apparatus for renewed operation of said mechanism a given period of time after completion of the pulse transmission.

OTTO MOSER.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,100,413	Wotton	June 16, 1914
1,737,024	Roe	Nov. 26, 1929
1,913,905	Servanton	June 13, 1933
1,954,170	Gibbs	Apr. 10, 1934

FOREIGN PATENTS

Number	Country	Date
579,660	Germany	June 30, 1933