ABSTRACT: An enclosed batteryless remote wireless electrical signalling system with a radio transmitter having a plurality of selectable transmission modes and an electromechanical generator driven by a spring mounted within the enclosure. Manually operable means are provided for operating the generator to energize the transmitter means for a substantial period of time for transmission of the selected mode. Such means includes a manual winding lever overlying a portion of the front wall of the enclosure with its lower end pivoted adjacent the bottom of the front wall and with its free upper end having a handle. The lever is manually swingable downwardly and away from said front wall throughout an arcuate path of about 90° generally perpendicular to said front wall to wind the spring. Selecting means are provided having a plurality of push buttons contained in an electrical switch mounted on the enclosure front wall behind and normally concealed by the overlying winding lever for exposure by the downward arcuate movement of the lever, each button being connected to the transmitter to select one of the transmission modes as indicated by indicia provided adjacent said buttons. Further included in the manually operated means is a cam operated linkage for initiating driving of the generator upon return of the manual winding lever to the normal vertical position adjacent said front wall to transmit the selected transmission mode.
EMERGENCY SIGNALLING TRANSMITTER

This invention relates to signalling systems and more particularly to manually powered electrical signalling systems especially useful for use in emergencies and in remote locations.

For years, there has existed an unsatisfied need for a simple, batteryless wireless signalling system for use in locations where electrical power is either not available or is subject to failure under conditions in which the signalling system is most needed. The former situation is present in modern superhighway systems, which at present must be constantly patrolled by radio-equipped vehicles for the motorists' protection. The latter situation arises in newly developed residential areas remote from urban centers, where fire protection must be provided in the form of fire alarm boxes which at present require an expensive independent underground wiring system for protection from the elements. Such a signalling device was disclosed in my prior U.S. Pat. application, Ser. No. 827,574, filed Oct. 30, 1969. (The disclosure of said application hereby being incorporated by reference).

It has more recently been recognized that the intended operator of such a signalling system may be emotionally upset by a just-experienced crisis and as a consequence be error prone in the selection of the desired emergency service as well as in the operation of the device. Furthermore, in the event of a serious emergency such as an automobile collision, the operator may well be in urgent need of multiple services and attempt to transmit two or three signals simultaneously or in rapid succession. As the signalling system is limited to the transmission of one signal at a time, it is possible that the device would only result in partial emission of either signal, thereby reducing the opportunity of reception by the proper party. To avoid defective operation of the signalling device in such situations, it would be advantageous to permit the operator to change his selection of the desired emergency service and to ensure that, once the selection has been correctly made, a complete transmission cycle will be emitted. Accordingly, it is an object of the present invention to provide such a signalling system.

It is another object of the present invention to provide a signalling system in which selection of a desired signal may be readily altered prior to energizing said system.

It is still another object of the present invention to ensure complete transmission of a selected emergency signal.

Yet another object is to prevent multiple simultaneous selection of available emergency services, especially during transmission of a given signal.

The above objects are accomplished by providing in a remote electrical signalling system comprising an enclosure having a vertical wall containing a transmitter having a plurality of selectable transmitter modes and an electromechanical generator for energizing it, manually operable means for operating said generator and selecting means for selectively connecting a predetermined transmission mode with said generator for operating said transmission mode for a substantial time. Preferably, the manually operable means includes locking means, actuating means for controlling the generator and a manual winding lever normally overlying the portion of said enclosure wall including the selecting means and extending vertically thereacross with its lower end pivoted adjacent the bottom of said front wall and with its free upper end having a handle. Preferably, the manual winding lever is normally urged by spring means into its upright position overlying said front wall. The actuating means is connected to the generator for initiating driving of said generator to transmit the selected transmission mode only after return of said lever to its normal position by said spring means.

The selecting means comprises a plurality of push buttons mounted in an electric switch secured on the enclosure wall behind and normally concealed by the overlying winding lever for selectively operating one of said transmission modes indicated by indicia provided adjacent said buttons.

Conventional interlocking means are provided in said switch for controlling actuation of said buttons such that only one button may be depressed at a time for selecting a predetermined transmission mode. However, the selection of said transmission mode may be altered by depressing a second button, but only prior to actuation of said generator at which time said buttons are concealed by said overlying winding lever, locked in an upright position.

For the purpose of more fully explaining the above and still further objects and features of the invention, reference is now made to the following detailed description of a preferred embodiment of the invention, together with the accompanying drawings, wherein:

FIG. 1 is an isometric view of a signalling system according to the invention with its operating lever partially broken away;

FIG. 2 is a vertical sectional view of the signalling system of FIG. 1;

FIG. 3 is an exploded isometric view of drive shaft subassembly portion of FIG. 2;

FIG. 4 is a vertical section of the signalling system of FIG. 1;

FIG. 5 is a partial sectional view of the signalling system of FIG. 1 showing the reset linkage assembly, the push buttons and the drive shaft assembly; and

FIGS. 6, 7 and 8 are enlarged fragmentary schematic views of the reset linkage assembly showing progressive steps in its operation.

Referring to the drawings, and especially to FIG. 1 thereof, the remote signalling system of the invention includes a weatherproof enclosure 10, preferably red in color, having vertical sidewalls 11, a vertical front wall 12 and a rectangular operating lever 14 normally overlying front wall 12 of the enclosure 10 and having at its lower end two arms 16 extending perpendicularly inward to receive opposite ends of drive shaft 18. A control disc 20 is mounted on drive shaft 18 for alternatively driving a gear drive train, activating transmission of a signal and locking the operating lever, all as hereinafter described.

Lever 14 has, at its upper free end, a prominent handle 22 projecting perpendicularly outward from said front wall for use in an emergency by pulling it down, much in the same manner as the conventional fire alarm box to which people have long been accustomed.

In FIG. 2, lever 14 is shown in its lowered position to which it has been pulled down through an arcuate path of preferably about 90 degrees from its normal position to the horizontal plane of the axis of drive shaft 18. The operating lever is pivoted to a support 24 attached to an insulating plate 23 and to an insulated terminal 25. Spring 26 is disposed between the end of support 24 and a portion of an insulated terminal 28. Terminals 25, 23 and 28 are provided in a terminal housing 30. Spring 26 is disposed between insulated terminal 25 and the housing.

FIG. 3 illustrates in more detail the operating lever 14 and control disc 20 as well as the drive shaft 18. A control disc 20 is mounted on drive shaft 18 and is free to rotate about an axis 32 which is substantially parallel to said drive shaft 18. The control disc 20 is provided with a curved sector having a curved circumferential edge 38 and an arcuate recess 40 for receiving clutch pin 41.
extending transversely from drive gear 36 rotatably mounted on drive shaft 18. Responsive to arcuate movement of lever 14, control disc 20 rotates relative to drive gear 36 when pin 41 rides in recess 40. However, upon the striking of shoulders 43 provided at one end of said recess by said pin, gear 36 is held in fixed relation with said control plate during continued rotation thereof. Circumferential portion 38 provides a cam surface for slideably contacting a tip 45 of pivotally mounted, spring loaded locking bar 46. Control plate 20 also is provided with post 48 projecting transversely from the side opposite drive gear 36 and a notch 50 for engaging tip 45 of locking bar 46 when lever 14 is in the upright position. Surrounding drive shaft 18 and adjacent drive gear 36, an annular recess 52 is provided in control disc 20 for receiving sleeve 54 extending transversely from said drive gear to align said control plate with said drive gear.

A second pin 56 parallel with and spaced outwardly from drive shaft 18 is provided in drive gear 36 on the same side as clutch pin 41, spaced therefrom by an arc of approximately 170°, and extending transversely for contacting locking bar 46 during counterclockwise rotation of said drive gear as viewed in FIG. 8. Projecting from the opposite side of drive gear 36, reset post 58 is positioned radially outward from drive shaft 18 for supporting cam surface 59 provided on the free end of reset arm 60 (see FIGS. 6, 7, and 8).

Disposed intermediate drive gear 36 and sidewall 11, reset crank 62 is fixedly mounted on drive shaft 18 by keying and extends toward front wall 12 for connection by means of cable 63 to spring loaded piston 64 contained within with dash pot 65.

As seen in FIG. 4, drive gear 36 is included in an input gear train for winding coil spring 34 which is included in an input gear train for in turn is connected to an output gear train for driving generator 32.

The input gear train, as best shown in FIG. 4, consists of drive gear 36, pinion 70, gear 71, pinion 72, gear 73 and pinion 74. Mounted on shaft 76 coil spring 34, formed of multturns resilient metal strips coiled around drums of known construction, such as the Negator spring manufactured by Hunter Spring Co., for storing energy supplied through the input gear train by winding lever 14 and for furnishing constant force to the output gear train for rotation of the generator 32.

The output gear train, as also shown in FIG. 4, consists of gear 78, pinion 80, gear 82 and generator drive gear 83. Pinion 80 is affixed to sleeve 85 slideably received by shaft 86, the sleeve inner diameter being greater than the shaft outer diameter. Sleeve 85 is attached to shaft 86 by clutch 87 constructed to impart rotational movement to shaft 86 in one direction only.

Drive shaft 90 of generator 32 projects horizontally outward slideably to receive generator drive gear 83 and ratchet stop 92 (see FIG. 4). Slip clutch 94 is attached to the distal end of shaft 90 frictionally to maintain ratchet stop 92 and generator drive gear 83 in engagement with drive shaft 90. The compressive force exerted by slip clutch 94 is designed to permit rotation of shaft 90 and generator 32 relative to gear 83 only when tongue 118 engages ratchet stop 92 while generator 32 is rotating.

The stop and reset linkage seen in FIGS. 6, 7, and 8 is comprised of a series of pivotally mounted interconnected links 97, 98 and 99 for rotating lock 100. Reset arm 60, pivotally connected at one end to a shaft, extends toward front wall 12 in a plane parallel to and adjacent drive gear 36 with the free end formed to provide a cam surface 89 for engaging reset post 58 through an approximately 90° of rotation of gear drive 36 (see FIGS. 7 and 8). One end of link 97 is pivotally secured to reset arm 60 adjacent cam surface 59, the other end being pivotally fastened to one end link 98. The opposite end of link 98 is securely fastened to horizontal shaft 102 at a point equidistant from vertically arranged support frames 104 and 106 (see FIG. 4). Link 99, being securely fastened at one end to the end of shaft 102 projecting outwardly through frame 104 (see FIG. 4), extends upwardly in a vertical plane spaced from the plane of link 98 to engage the lower edge of lock 100 with roller 108. Spring 109, connected at the midpoint of link 99, is attached to a shaft to urge roller 108 toward lock 100. Lock 100, pivotally mounted on a shaft, is provided with a catch 110 extending horizontally to engage sloping surface 112 of stop lever 114.

Stop lever 114, pivotally mounted at one end and disposed between lock 100 and push rod 116 has a tongue 118 at the distal free end for engagement with ratchet stop 92. Spring 119 attached to the midpoint of stop lever 114, is connected to a shaft for normally urging tongue 118 into engagement with ratchet stop 92.

Push rod 116 extends perpendicularly from vertical arm 111 mounted on one end of rotatable shaft 113 horizontally mounted between frames 104 and 106. The opposite end of said shaft is provided with rigidly attached lever arm 115 having a free end projecting vertically downward to a position adjacent post 48 extending horizontally from control plate 20 (see FIG. 3).

As seen in FIGS. 1 and 2, the four rectangular vertically arranged push buttons 26 extend from the within-mounted electrical switch 28 through respective openings in front wall 12 and project outwardly a short distance, being accessible only when lever 114 is pulled down. Electrical switch 28, being of known construction, contains internal interlocking mechanisms permitting only one button 26 to be depressed at a time for connecting a given transmission mode with generator 32. Depression of a second button results in return of the first button to its normal extended, open position. Included in electrical switch 28 is a rack 121 connected to each button 26 and to return cam 122, said rack being slideably supported by eight pins 124 respectively received in vertical extending slots 125 provided in the wall of said electrical switch. Return cam 122 is pivotally mounted on bracket 126 projecting downwardly from electrical switch 28 and extends rearwardly and inwardly from front wall 12 to engage clutch pin 41. Rotary movement of clutch pin 41 is translated by return cam 122 into vertical movement of rack 121, and upward movement of said rack displaces an inwardly depressed button 26 outwardly.

Enclosure 10 is pivotally mounted on pins 128 extending from the bottom of rear wall 129 (see FIG. 2) and is secured by stud 130 to the upper portion of the rear wall 129. Lock 131 is provided on the front end of stud 130 to lock enclosure 10 in fixed relation with rear wall 129 and prevent tampering with the components contained within said enclosure.

To operate the signalling system of the invention, handle 22 is manually grasped and lever 14 is manually swung downward through an arc of 90° against lever stop 24 to rotate drive shaft 18, reset crank 62 and control plate 20 in a clockwise direction as viewed in FIGS. 3, 6, 7, and 8. As control plate 20 rotates, clutch pin 41, riding in recess 40 is engaged by shoulder 43 causing drive gear 36 to rotate in a clockwise direction (see FIG. 6). Rotation of drive gear 36 drives the input gear train (consisting of pinion 70, gear 71, pinion 72, gear 73 and pinion 74) to wind coil spring 34 and moves reset post 58 downwardly, causing the free end of reset arm 60 to rotate in a clockwise direction, thereby displacing links 97, 98 and 99 (see in FIGS. 6, 7, and 8). Roller 108, being urged by link 99 into engagement with the lower edge of lock 100, causes catch 110 to be raised along sloping surface 112 (see especially FIG. 6).

As coil spring 34 is wound by the input gear train, generator 32 is held stationary by the engagement of ratchet stop 92 by tongue 118, ratchet stop 92 being firmly pressed against shaft 86 by slip clutch 94. Reverse rotation of generator 32 is prevented by clutch 87 which engages shaft 86 only when driven in a clockwise direction by coil spring 34. The output gear train (consisting of gear 78, pinion 80, clutch 87, shaft 86, gear 82 and generator drive gear 83), being locked by ratchet stop 92, prevents coil spring 34 from unwinding.
As lever 14 is pulled down, the internal piston 64 of dash pot 65, being connected by cable 63 to reset crank 62, is displaced downward to compress spring 66. While lever 14 is held against stop 19, one of the pushbuttons 26 may be selectively depressed to close a contact (not shown) in electric switch 28 connecting a predetermined transmission mode (e.g., “Train”) with generator 32 held immobile by stop lever 114. If desired, the selected transmission mode may be changed while lever 14 is held down and away from front wall 12 by depressing a second button 26 to connect a second transmission mode (e.g., “Police”) with generator 32 and at the same time disconnecting the first selected mode by displacing said first button outwardly by interlocking means not shown. Upon manual release, lever 14 is automatically returned to the normally upright position due to the force of spring 66, being damped by dash pot 65, acting on reset crank 62 to rotate shaft 18 in a counterclockwise direction.

As control plate 20 is rotated by shaft 18, drive gear 36 remains stationary being connected to the input gear train, locking bar 46 rides along circumferential edge 38 until tip 45 is received by notch 50 and post 48 rotates lever arm 115.

Displacement of lever arm 115 causes push rod 116 to strike stop lever 114 urging tongue 118 out of engagement with ratchet stop 92, permitting catch 110 to drop over the edge of sloping surface 112, thereby locking stop lever out of engagement with ratchet stop 92. Engagement of locking bar 46 by notch 50 prevents clockwise rotation of shaft 18 and thus locks lever 14 in the upright position overlying pushbuttons 26 preventing access thereto. Upon the release of ratchet stop 92, coil spring 34 is free to drive the output gear train (gear 78, pinion 80, clutch 87, shaft 86, gear 82 and generator drive gear 83) causing generator 32 to spin for a period of three to twenty seconds to energize the mode of transmitter 30 connected to the electric switch 128 closed by the selected button 26. Drive gear 36 is now free to rotate about shaft 18 in a counterclockwise direction through an arc of 90° responsive to operation of the output gear train because shoulder 43 is accurately spaced from clutch pin 41 by approximately 90° due to relative displacement of control plate 20.

As drive gear 36 is driven in a counterclockwise direction by coil spring 34 during the unwinding driving cycle, reset post 58 is accurately moved to the position shown in FIG. 8 to displace link 97 downward, rotating links 98, 99, driving roller 108 in engagement with lock 100 to raise catch 110. As catch 110 is released, stop lever 114 is released, being urged by spring 119 to move tongue 118 into engagement with stop ratchet 92, even as generator 32 continues to turn, with slip clutch 94 permitting some rotation of shaft 90 relative to stop ratchet 92. At the completion of the unwinding cycle, drive gear 36 urges pin 56 against locking bar 46 to disengage tip 45 from notch 50, thereby unlocking lever 14, permitting repeated operation of the signalling system (see FIG. 8). Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. In a remote electrical signalling system comprising an enclosure having a vertical wall, a transmitter having a plurality of selectable transmission modes mounted within said enclosure, and an electromechanical generator for energizing the transmitter also mounted within said enclosure, that improvement which consists of:

   manually operable means for operating said generator to energize said transmitter for transmission of a signal, including

   manual operating lever means normally in a first position overlying a portion of said enclosure wall with its lower end pivoted adjacent the bottom of said wall with its lower end pivoted adjacent the bottom of said wall; and with its free upper end having a handle, said lever means being manually swingable downwardly and away from said front wall throughout an arcuate path to a second position exposing said wall,

   lever operated actuating means connected between said lever means and said generator actuating operation of said generator only upon return of said lever means from said second position to said normal first overlying position, and

   selecting means having a plurality of push buttons mounted on said wall behind said lever means for exposure by said downward arcuate movement of said lever means,

   each button being connected by said selecting means to said transmitter to select one of said transmission modes, indicated by indicia provided adjacent said buttons, upon actuation of one of said buttons, and said selecting means being changeable to select a different one of said transmission modes by actuation of a second one of said buttons, but only prior to return of said lever means to said first overlying position, and the consequent actuation of the operation of said generator by said actuating means and the energization of said transmitter for transmission of a signal according to the transmission modes selected upon actuation of one of said buttons.

2. A signalling system as claimed in claim 1 wherein locking means are provided for cooperation with said manually operable means to prevent, after return of said lever means to said first position and actuation of the operation of said generator by said actuating means, operation of said manual winding lever and selection of a second transmission mode until a first selected signal has been completely transmitted.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION


Inventor(s): John George Willis

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Heading, "Wilmington, Del." should be --Wilmington, Mass.--;

Column 3, lines 33 and 34, delete "is included in an input gear train for";

Column 3, line 71, after "end" insert --of--;

Column 6, claim 1, lines 17 and 18, delete "with its lower end pivoted adjacent the bottom of said wall".

Signed and sealed this 8th day of August 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. ROBERT GOTTSCHALK
Attesting Officer Commissioner of Patents
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,633,106
Dated January 4, 1972

Inventor(s) John George Willis

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