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Willis

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[54] **EMERGENCY SIGNALLING TRANSMITTER WITH IMPROVED LATCH AND LOCK**

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[52] **U.S. Cl.** ..... **325/185,** 290/1 E, 322/100, 325/119, 325/161, 340/293, 340/309, 340/333

[51] **Int. Cl.** **H04b 1/04**

[58] **Field of Search** ..... 325/53–55, 119, 325/155, 161, 169, 185, 186; 290/1 E; 340/293, 333, 309; 322/100

[56] **References Cited**

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Primary Examiner—Albert J. Mayer

[57] **ABSTRACT**

Remote electrical signalling system featuring a storage unit which receives mechanical energy from a manually operable member and delivers it to an electromechanical generator for the transmitter, a lock assembly for preventing delivery of the stored energy to the generator until the manual operation is complete, and a latch for securing the manually operable member in a position covering the transmitter switches while the storage unit is delivering energy to the generator.

10 Claims, 5 Drawing Figures

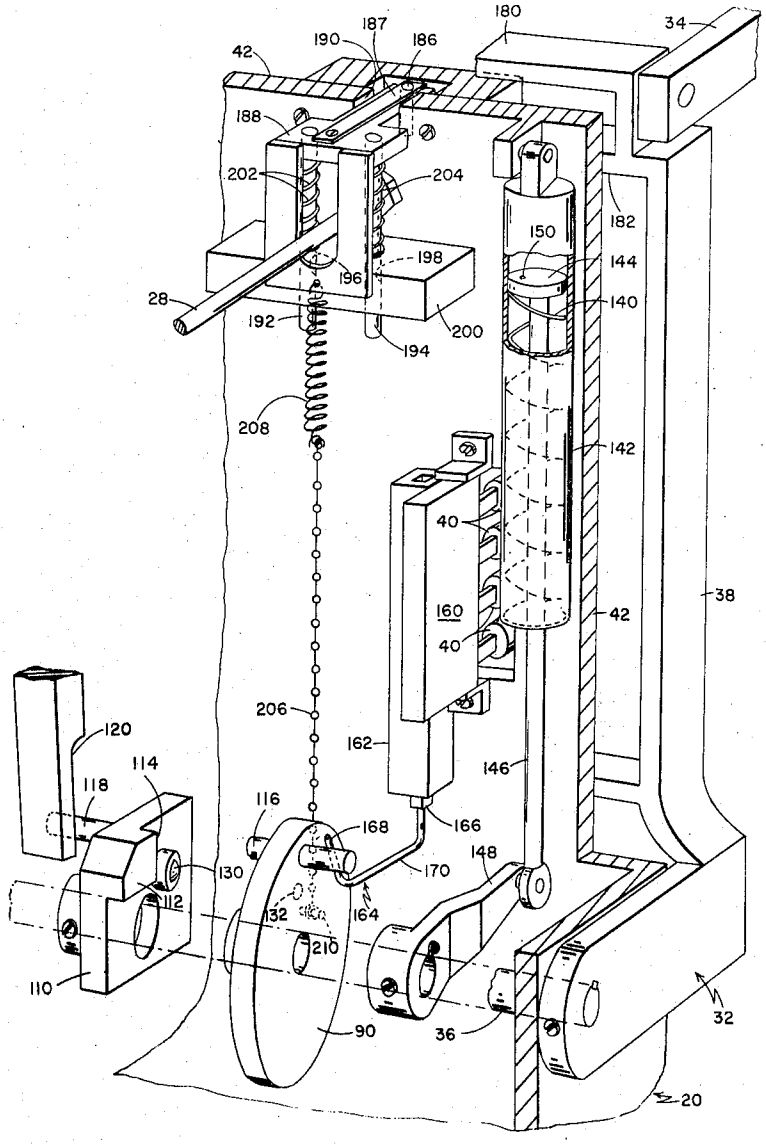


FIG 1

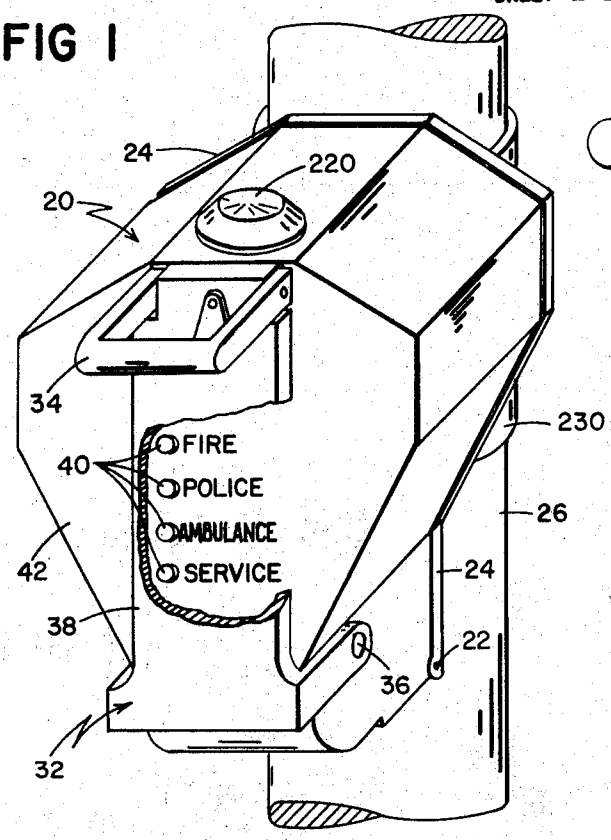


FIG 2

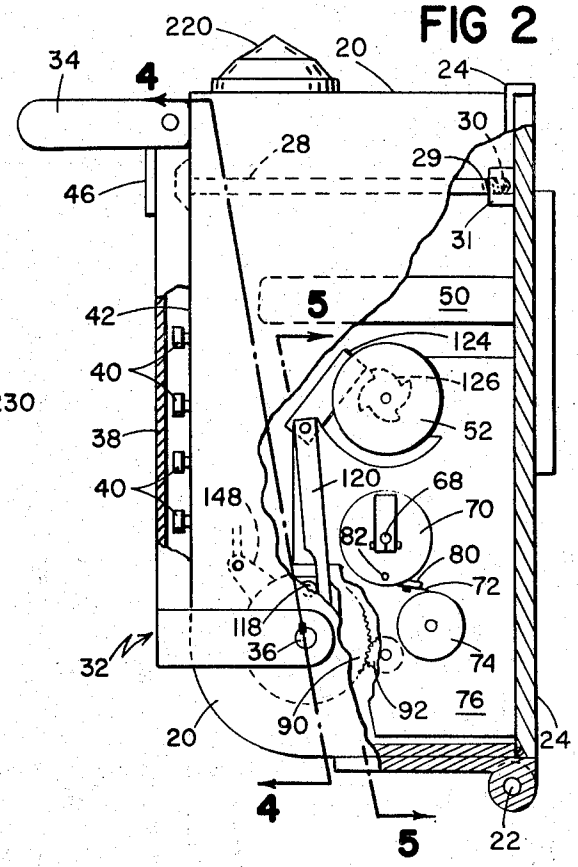


FIG 5

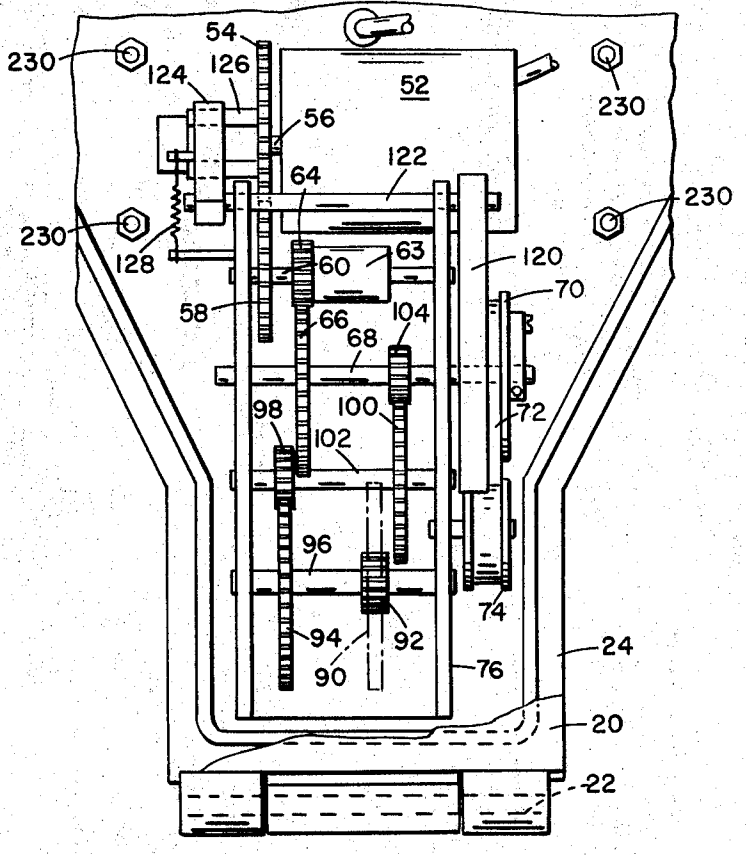


FIG 3

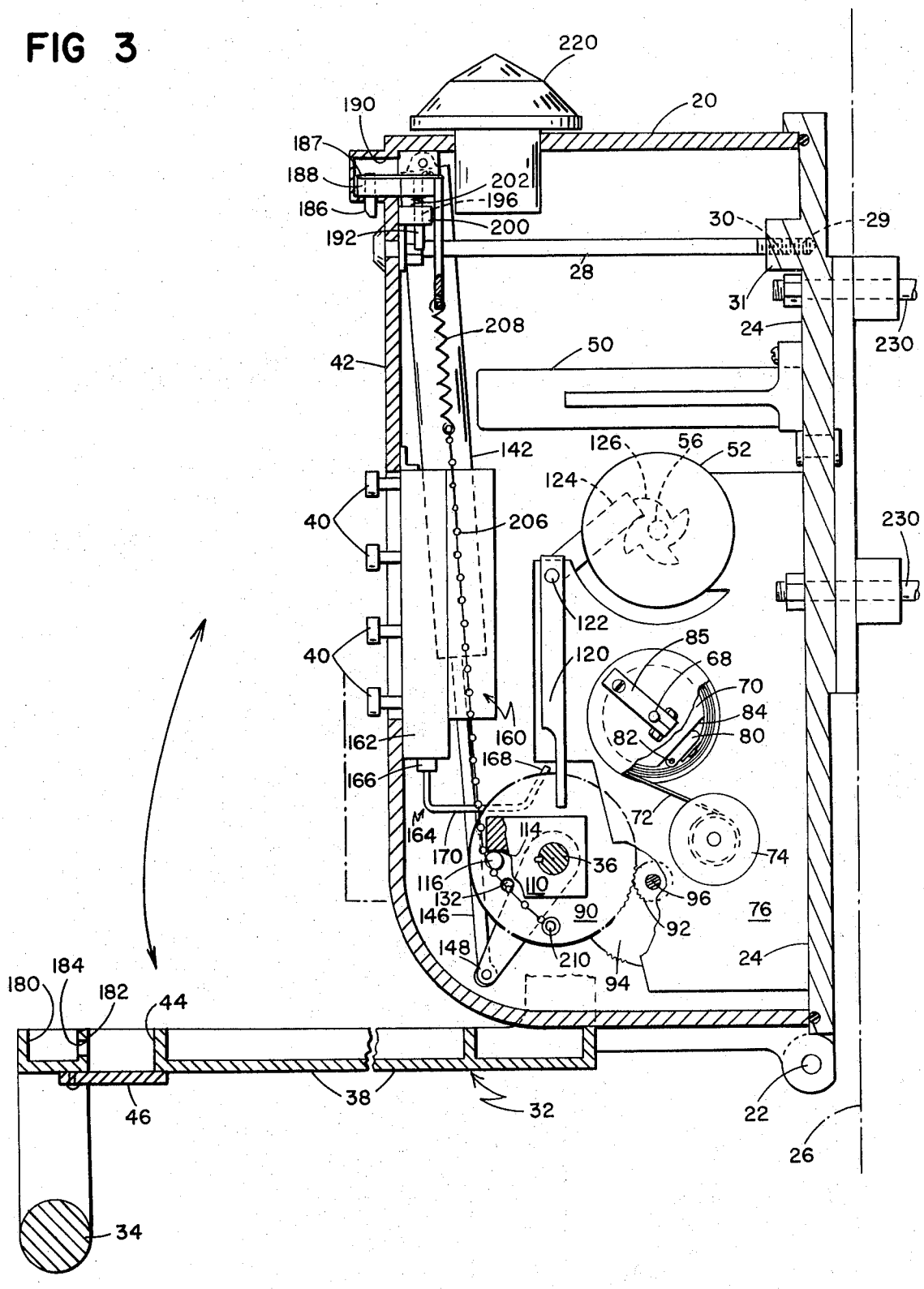
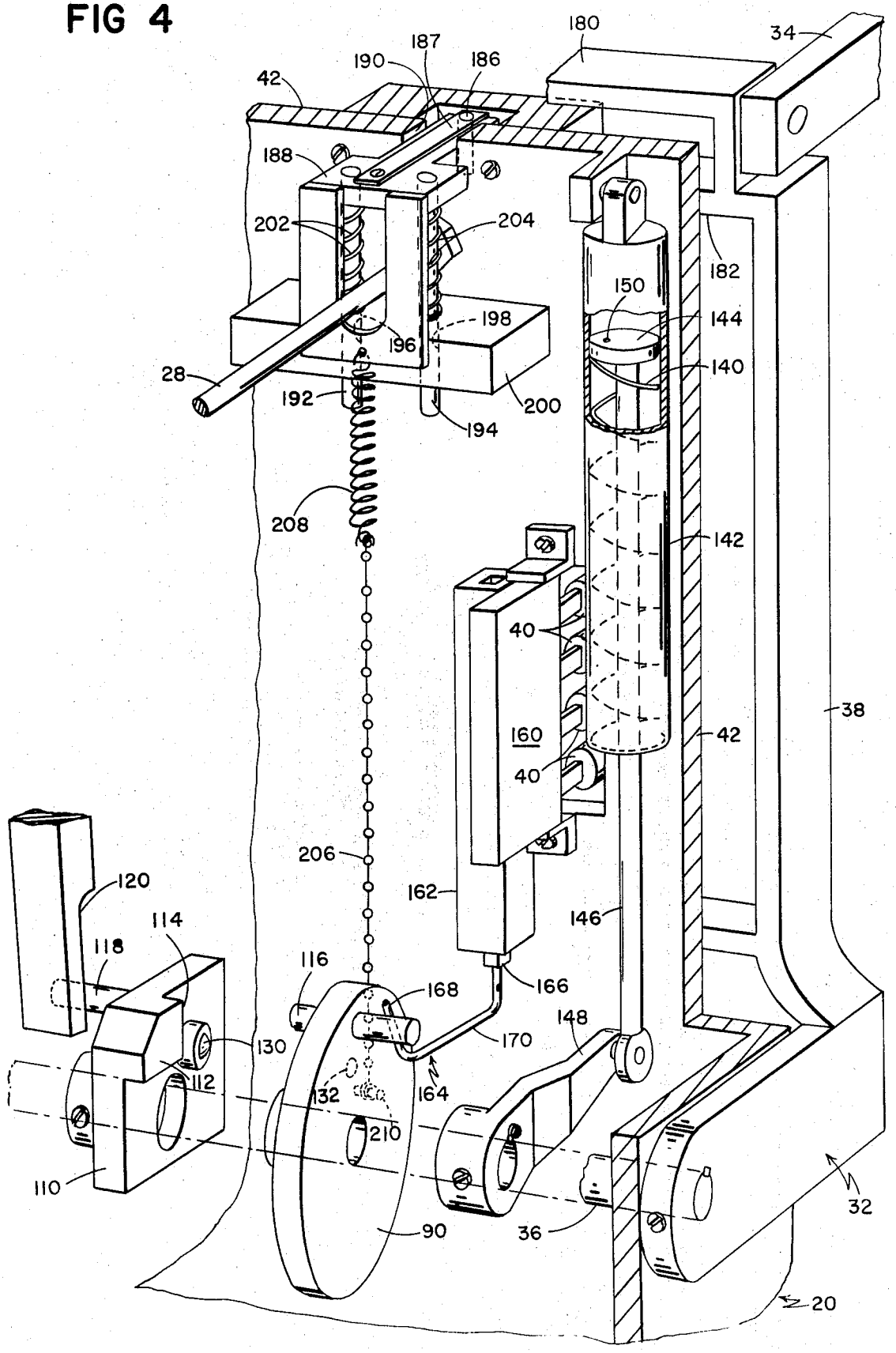

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FIG 4


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EMERGENCY SIGNALLING TRANSMITTER WITH IMPROVED LATCH AND LOCK

BACKGROUND OF THE INVENTION

This invention relates to remote electrical signalling systems, e.g., emergency signal boxes located on highways for calling police, ambulances, or the like.

SUMMARY OF THE INVENTION

The invention provides a signalling system improved with respect to foolproof operation, simplicity, reliability, and cost. The signal box is not easily tampered with. Once a signal is selected and the transmission cycle initiated, transmission will always run to completion, thus avoiding imcomplete signals. Signal selection can be changed prior to final initiation of the transmission.

In general the invention features, in one aspect, a storage unit which receives mechanical energy from a manually operable member and delivers it to an electro-mechanical generator for the transmitter, and a lock assembly for preventing delivery of the stored energy to the generator until the manual operation is complete. In another aspect the invention features a latch for securing the manually operable member in a position covering the transmitter switches while the storage unit is delivering energy to the generator. In preferred embodiments a reset mechanism for the transmitter switches has an actuating member with a resilient, pin actuated extension having an oblique leg past which the pin can slide; and the storage unit includes a coiled strip spring wound on a reel with an end of the spring connected to a take-up reel through a pivot pin having an axis parallel to that of the take-up reel.

Other advantages and features of the invention will be apparent from the description and drawings herein of a preferred embodiment thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view, partially broken away, of a signal box embodying the invention;

FIG. 2 is a side elevational view partly broken away;

FIG. 3 is an enlarged sectional view similar to FIG. 2, showing additional elements, with the lever in its lower position;

FIG. 4 is a fragmentary, enlarged perspective view taken from inside the alarm box looking toward the lever; and

FIG. 5 is a front view in section showing the gear train.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, a weatherproof enclosure **20** is pivoted at pins **22** to back plate **24** in turn fixed to, e.g., a post **26** along a highway. Key operated latch rod **28** is journaled in enclosure **20** is threaded at end **29** to screw into threaded bore **30** of latch receptacle **31** fixed to plate **24** to hold the enclosure against the back plate. At the front of the enclosure manually operated lever **32**, with handle **34**, is keyed to shaft **36** pivotally mounted in the enclosure and extending between its side walls.

When lever **32** is in its upright position (FIG. **1**) its main wall **38** covers four pushbuttons **40** which extend through the front wall **42** of enclosure **20** and are used,

after the lever is pivoted to its horizontal position (FIG. **3**), for selection of the emergency signal to be transmitted. An aperture **44** in wall **38**, normally covered by pivotally mounted cap **46**, provides access to rod **28**.

Buttons **40** select the transmission mode for conventional multi-mode radio transmitter **50** mounted on plate **24** and powered by electro-mechanical spring driven generator **52**.

Referring in more detail to the mechanism for driving generator **52**, a drive gear **54** (FIG. **5**) is fixed to the generator shaft **56**, and is in turn driven through gear **58** carried on shaft **60** which also carries one-way clutch **63** with pinion **64** (the clutch effectively keys this pinion to shaft **60** for one direction of rotation, but allows the pinion to rotate on the shaft in the other direction), and gear **66** carried on shaft **68** meshing with pinion **64**. Also mounted on shaft **68** is a reel **70** (see also FIGS. **2** and **3**) to which is attached an end of a spring metal strip **72** most of which is coiled on a drum **74** freely pivoted to frame **76**. Spring **72** is biased to wind itself on drum **74**. The spring is attached to reel **70** through a small block **80** screwed to the spring end and pivoted to the reel by pin **82** parallel to shaft **68**, an arrangement which avoids sharp bends in the spring when it is wound and unwound. Pin **82** is located adjacent a flat **84** on the reel hub, which provides a space for block **80** when the spring is wound onto the reel. Reel **70** is held on shaft **68** by a split clamp **85**, which allows for adjustment to produce smooth meshing of the gear train. Shafts **68** and **36** are geared together by a train comprising gear **90** on shaft **36**, pinion **92** and gear **94** on shaft **96**, pinion **98** and gear **100** on shaft **102**, and pinion **104** on shaft **68**. Gear **90** is rotatable on shaft **36**. Block **110** (FIG. **4**) is fixed to shaft **36** and has a lateral extension **112** providing a shoulder **114**. Pin **116** extends laterally from both sides of gear **90**, one end of the pin being in the path of shoulder **114** as shaft **36** rotates. Pin **118** extends laterally from block **110** and overlaps a rod **120** (see also FIGS. **2** and **3**) which is pivoted to one end of frame-supported axle **122**. The axle carries at its other end an upwardly angled pawl **124** which coacts with ratchet wheel **126** mounted on shaft **56** (see especially FIG. **3**). Spring **128** (FIG. **5**) extends between pawl **124** and frame **76** to bias the pawl toward the ratchet wheel. All of this generator drive mechanism works as follows.

When lever **32** is pulled down to its horizontal position shoulder **114** acts against pin **116** to rotate gear **90** and hence, through the gear train described, shaft **58**, winding some of spring **72** onto reel **70**. Clutch **62** allows pinion **64** to rotate without turning shaft **60**. Pawl **124** is engaged with ratchet **126**. As lever **32** is returned to its vertical position the entire gear train is held stationary by the pawl and ratchet, and shaft **36** turns in gear **90**, until pin **118** strikes rod **120**, pivoting pawl **124** out of engagement with wheel **126**. When the ratchet is released spring **72** rewinds itself on drum **74** and in doing so reverses the original rotation of shaft **68**. That reverse rotation not only returns gear **90** to its original position, but also rotates shaft **60**, driving the generator through gears **58** and **54**. As gear **90** returns, spring biased knob **130** (FIG. **4**) on block **110** snaps into rounded recess **132** in the gear.

The force for returning lever **32** is provided by spring **140** (FIG. **4**) mounted in damper cylinder **142** between the bottom of cylinder and piston **144** connected to

shaft **146.** Shaft **146** is pivoted to crank **148** fixed to shaft **36.** Piston **144** has a bleed hole **150.**

Pushbuttons **40** operate electric switches **160** with which is associated a conventional reset mechanism **162.** According to one aspect of the invention, a resilient, generally U-shaped extension **164** is attached to the operating rod **166** of mechanism **162.** Free leg **168** of extension **164** extends at about a 45° angle in front of pin **116** when gear **90** is in its rest position before the alarm is operated. As lever **32** is pulled down, pin **116** slides easily past leg **168,** flexing it somewhat. Upon the return of gear **90,** pin **116** strikes the middle section **70** of extension **164,** lifting the entire extension and rod **166** to reset the switches. As gear **90** completes its return it slides past section **170** and returns to its position adjacent leg **168,** allowing rod **166** to drop.

Extending inwardly from lever wall **38** above aperture **44** are a pair of spaced shelves **180** and **182** (FIG. **3**). Shelf **180,** when the lever is in its upright position, contacts enclosure **20** to prevent access to between the lever and the enclosure. Shelf **182** has a latch opening **184** to receive a latch tongue **186** depending from leaf spring **187** (FIG. **4**) attached to plate **188** which extends through aperture **190** in the front wall **42** of the enclosure. The pins **192** and **194** depend from plate **188** inside enclosure **20** and are slideable in bores **196** and **198** of frame portion **200.** Springs **202** and **204** respectively surround the pins to provide an upward force against the plate. Chain **206** is connected to the plate through spring **208** at one end, passes around pin **116,** and is connected at its other end to pin **210** on gear **90.** When the alarm is at rest, with lever **32** upright, pin **210** is above shaft **36,** so that spring **208** is relaxed and springs **202** and **204** hold plate **188** up with tongue **186** out of aperture **184.** When lever **32** is pulled down to its horizontal position, rotating gear **90,** pin **110** moves below shaft **36,** drawing on chain **206** and extending spring **208** sufficiently to overcome springs **202** and **204.** Plate **188** is thus lowered so that when lever **32** returns to its upright position latch **186** will snap into aperture **184.** Lever **32** will thus be locked in place until gear **90** completes its reverse rotation, thereby ensuring that buttons **40** cannot be pressed again until the already selected signal has been sent, and that the signalling cycle cannot be interrupted.

Horn **220** (FIG. **3**) is mounted on enclosure **20** and wired to the generator to provide a local audible signal whenever a radio signal is sent, thus giving psychological assurance to the user.

Plate **24** is fixed to post **26** by straps **230** the ends of each of which are adjustably connected together inside enclosure **20,** preventing tampering.

In overall operation, lever **32** is pulled down to expose buttons **40** for selection of the signal. At any time before the lever has returned to move rod **120** the selection may be changed, since the generator drive action is stationary prior to lever return. Once the lever is latched in its upright position, however, no further change in or interruption of the selection signal is possible.

Other embodiments are within the following claims.

What is claimed is:

1. A remote electrical signalling system comprising
an enclosure,
a transmitter mounted within said enclosure,
an electro-mechanical generator mounted within said enclosure and connected for energizing said transmitter,
a unit for storing mechanical energy, said unit being mounted to deliver energy stored therein to drive said generator,
a manually operable member movable from a first to a second position to deliver mechanical energy to said unit, and
a lock assembly for preventing delivery of stored energy from said unit to said generator until said manually operable member is returned to its first position.

2. The system of claim **1** wherein said first position is the rest position of said member.

3. The system of claim **1** wherein said transmitter has a manually operable switch associated therewith and said member includes a wall which prevents access to said switch when said member is in its first position, and a latch assembly is mounted to latch said member to said enclosure in said first position while said storage unit is delivering energy to said generator.

4. The system of claim **3** further comprising a reset assembly for resetting said switch after its actuation, said reset assembly including an actuating member movable along an axis and a resulient extension having a main portion connected to said actuating member and a leg remote from said actuating member and oblique to said main portion, and a pin linked to said manually operable member and arranged to slide past said leg in contact therewith as said manually operable member is moved from its first to its second position, said main portion being in the path of movement of said pin whereby upon return of said member from its second to its first position said pin moves said main portion and with it said actuating member to reset said switch.

5. The system of claim **1** wherein said unit includes a coiled strip spring wound on a reel, an end of said spring being connected to a take-up reel through a pivot pin having an axis parallel to that of said take-up reel.

6. The system of claim **1** wherein
said member is linked to said generator and said storage unit through a gear train,
said lock assembly includes a stop member connected to rotate in at least one direction with said gear train, and a link assembly having a first position engaged with said stop member to prevent said rotatiomn in said one direction to thereby immobilize said gear train, and a second position disengaged from said stop, and
an element is linked to said manually operable member in position to move said link assembly from its first to its second position as said manually operable member is returned to its own first position, thereby allowing transfer of energy from said unit to said generator through a portion of said gear train.

7. A remote electrical signalling system comprising
an enclosure,
a transmitter mounted within said enclosure,
an electro-mechanical generator mounted within said enclosure and connected for energizing said transmitter,
a unit for storing mechanical energy, said unit being mounted to deliver energy stored therein to drive said generator,

a manually operable member movable from a first to a second position to deliver mechanical energy to said unit,

a manually operable switch associated with said transmitter,

a wall forming a part of said member and preventing access to said switch when said member is in its first position, and

a latch assembly mounted to latch said member to said enclosure in said first position while said storage unit is delivering energy to said generator.

8. The system of claim **7** wherein said latch assembly comprises

a latch movable between open and closed positions with respect to said manually operable member,

first spring means biasing said latch in its open position,

a chain linked to said latch and said member and arranged to draw said latch to its closed position when said member moves to its second position, and

means to prevent movement of said chain until said unit has discharged its energy to said generator.

9. The system of claim **8** wherein a gear train is provided for discharge of energy from said unit to said generator, and said chain is connected to a gear in said train operable by said member for rotation in one direction to draw said chain in the direction away from said latch.

10. The system of claim **9** wherein said manually operable member is mounted on a rotatable shaft, said gear is freely carried on said shaft, a block is fixed to said shaft, and a pin extends from said gear to overlap said block so that said gear will rotate with said shaft in said one direction only.

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