May 14, 1946. L. E. HAYSLETT ET AL 2,400,088

REMOTE CONTROL APPARATUS

Original Filed Aug. 5, 1941

FIG. 1

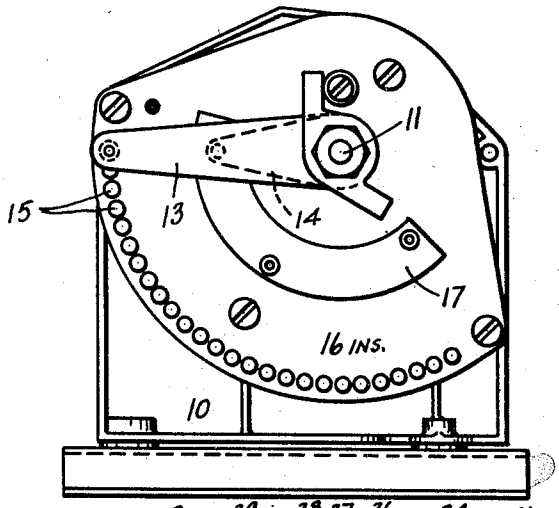


FIG. 2

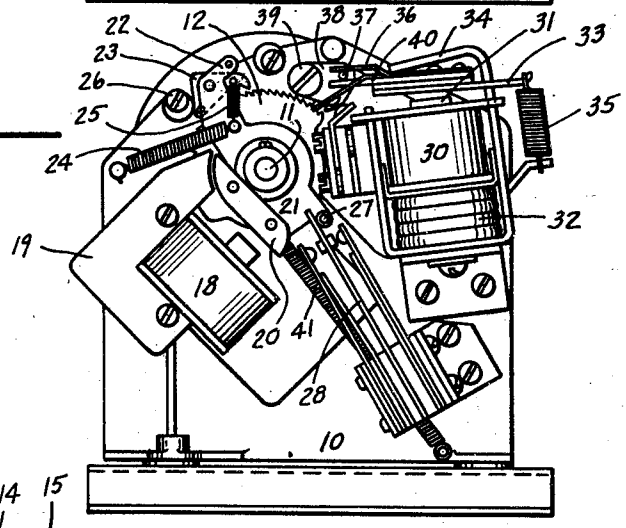
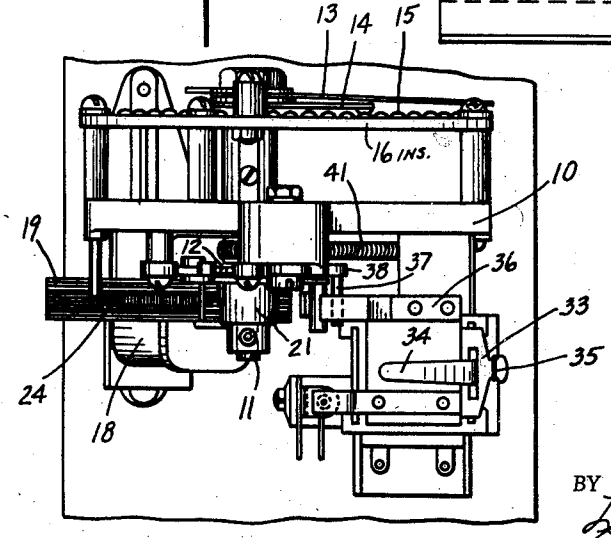


FIG. 3



INVENTORS.
LAMAR E. HAYSLETT.
FRED H. OSBORNE.

BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

Patented May 14, 1946

2,400,088

UNITED STATES PATENT OFFICE

2,400,088

REMOTE-CONTROL APPARATUS

Lamar E. Hayslett, Kenmore, and Fred H. Osborne, Snyder, N. Y., assignors to The Rudolph Wurlitzer Company, Cincinnati, Ohio, a corporation

Original application August 5, 1941, Serial No. 405,522. Divided and this application March 22, 1943, Serial No. 480,008

3 Claims. (Cl. 74—142)

This invention relates to an electric impulse actuated device, particularly applicable for registering impulses in electric signal transmission, or for various other purposes and uses including remote control system, and is a division of our Letters Patent No. 2,387,444, issued October 23, 1945, entitled "Remote control apparatus," and particularly as disclosed in Figs. 4, 5 and 6 of said application.

One object of the invention is to provide an electric impulse actuated device operative for selective circuit control whereby the speed and accuracy with which operating signals may be transmitted, received and acted upon, are increased and improved.

Whereas the invention may be applied to various uses and purposes, one example of its application is made known by reference to a remote control system and operates as set forth and described in the above-entitled letters patent of which this application is a division, whereby the ability of a receiver to reject spurious signals received from outside sources is improved upon through employment of this device, such receiver being adapted to receive electrically generated signals from a remote control.

A further advantage residing in the use of this invention lies in the fact that its operation is positive and accurate even though exceedingly low power or electrical energy may be employed, which is essential in some applications.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:

Fig. 1 is an elevational view of the device. Fig. 2 is a similar view showing the opposite side thereof. Fig. 3 is a plan view thereof.

In the drawing there is illustrated an electric impulse actuated device adapted to be electrically connected in an impulse sending circuit, such as that shown and illustrated more in detail in Fig. 1 of the above-mentioned Letters Patent, and operable for selectively controlling one of a plurality of circuits according to impulses received.

Said device comprises a stationary frame 10 in which there is mounted a rotatable shaft 11. Said shaft has secured thereto a ratchet wheel 12 and a pair of contact fingers 13 and 14. The contact finger 13 is adapted to engage contact points 15 mounted on an insulation plate 16 and the finger 14 is adapted to engage a contact segment 17 mounted on said plate. The fingers 13 and 14 are electrically connected to each other but suitably insulated from the shaft 11 and other parts of the device.

A magnet 18 is mounted on a core 19 suitably supported on the frame 10 and is provided with an armature 20 mounted on a rocking collar 21 which is freely carried on the shaft 11. The rocking collar 21 is provided with an arm 22 carrying a pawl 23 adapted to engage the teeth of the ratchet wheel 12. The rocking collar 21 is normally held in the position shown in the drawing by a tension spring 24 and the pawl 23 is urged toward engagement with the ratchet 12 by a tension spring 25. In the idle position however, the spring 24 holds the pawl 23 against a stop pin 26 and retains said pawl out of engagement with the ratchet. The rocking collar 21 is provided with an insulated pin 27 adapted to engage and actuate the switch 28.

In the operation of this portion of the device, each actuation of the magnet 18 draws the armature 20 toward said magnet and rocks the collar 21 on the shaft 11. At each such operation the pawl 23 engages the ratchet 12 and advances the same a distance corresponding to one tooth of the ratchet. Each such advance also corresponds to the spacing of the contact points 15 so that the finger 13 is brought successively into engagement with said contact points.

A control magnet 30 is provided with a core 31 mounted on the frame 10 having a number of copper slugs 32 to provide a slow drop action. Said magnet has an armature 33 normally held against a stop 34 by a tension spring 35. Said armature carries a resilient finger 36 engaging a pin 37 carried by a pawl 38 which is pivotally mounted on the frame 10 by means of a pivot screw 39. The armature 33 also carries a rigid finger 40 adapted to engage the undersurface of the pin 27.

In the operation of the magnet 30 the finger 36 resiliently presses the pawl 38 against the ratchet 12 and prevents counterclockwise movement of said ratchet, referring to Fig. 2, while permitting clockwise movement of said ratchet by operation of the magnet 18. When the magnet 30 is deenergized at the end of a series of signal impulses, the finger 40 positively lifts the pawl 38 clear of the ratchet wheel 12 and permits said ratchet wheel to be returned to normal position by a tension spring 41 anchored at one end to the frame 10 and at the other end anchored to the shaft 11.

One application of the invention and its embodiment in an electric impulse generating selective circuit is described and illustrated in the above mentioned Letters Patent. However, it is to be understood that such embodiment is only by way of illustration, and that the device may be

employed in other circuits and for other purposes.

By means of said device, the time of transmission of a series of signal impulses may be greatly reduced. The shorter signal impulses may be transmitted at the rate of 20 per second and the longer initial impulse may be as short as a sixth of a second. When a selection of 24 operations is provided, the entire cycle of transmission may be run through in less than two seconds. This speed of operation is of particular importance where a number of remote stations are used to control a single machine since it reduces to a negligible factor the chance of simultaneous operation of a plurality of transmitters.

From the foregoing it may be noted that one of the novel features of this invention resides in the arrangement whereby the rocking collar assembly 21 effects the operation of the switch 28 through the medium of an engaging element carried thereby such as the pin 27.

Furthermore, the device will operate positively and accurately on relatively low energy as applied to the coil or magnet 18. This in some measure is aided by the magnetic circuit "hinge design" between the armature 20 and the magnetic core 19 wherein their adjacent slightly spaced edges are arcuate and concentric with the shaft, having the same center of radius. This permits of relative motion with slight clearance, but no possibility of binding.

Whereas the invention has been herein described for illustration purposes, and wherein one application thereof may embody a control magnet 30 having a slow drop action which retains the pawl 38 in its ratchet wheel engaging position while energized, in other applications of the device the control magnet 30 need not have a slow drop action, and in a reverse manner, is adapted to cause the release of the pawl 38 from the ratchet wheel to permit the selector finger 13 to return to its initial position.

The invention claimed is:

1. An electric impulse actuated device including a rotative shaft, a fixed frame having a bearing for said shaft, a rocker arm supported by said shaft for free oscillation about the axial center thereof, a ratchet wheel connected with said shaft for rotative movement therewith, a pawl pivotally mounted on said rocker arm movable into and out of engagement with the teeth of said ratchet wheel for step by step rotation thereof in one direction, resilient means connected with said wheel tending to rotate it in the opposite direction to initial position, a magnet mounted on said frame, and an armature operably associated with said magnet and secured to said rocker arm for actuation thereof upon said magnet receiving an impulse, said armature and rocker arm being movable about the axial center of said ratchet wheel and shaft for rapid oscillation in moving said pawl about said axial center to engage and rotate said wheel.

2. An electric impulse actuated device including a rotative shaft, a fixed frame having a bearing for said shaft, a rocker arm supported by said shaft for free oscillation about the axial center thereof, a ratchet wheel connected with said shaft for rotative movement therewith, a pawl pivotally mounted on said rocker arm movable into and out of engagement with the teeth of said ratchet wheel for step by step rotation thereof in one direction, resilient means connected with said wheel tending to rotate it in the opposite direction to initial position, a magnet mounted on said frame, an armature operably associated with said magnet and secured to said rocker arm for actuation thereof upon said magnet receiving an impulse, said armature and rocker arm being movable about the axial center of said ratchet wheel and shaft for rapid oscillation in moving said pawl about said axial center to engage and rotate said wheel, a latching pawl pivotally mounted on said frame movable into engagement with said ratchet wheel for preventing reverse movement thereof by said resilient means, a projection on said pawl, and a magnet carried by said frame having an armature extending into engagement with said projection for moving said pawl into locking engagement with said ratchet wheel when said last-mentioned magnet is energized and disengaging said pawl from said ratchet wheel to permit reverse movement thereof upon being deenergized.

3. An electric impulse actuated device including a rotative shaft, a fixed frame having a bearing for said shaft, a rocker arm supported by said shaft for free oscillation about the axial center thereof, a ratchet wheel connected with said shaft for rotative movement therewith, a pawl pivotally mounted on said rocker arm movable into and out of engagement with the teeth of said ratchet wheel for step by step rotation thereof in one direction, resilient means connected with said wheel tending to rotate it in the opposite direction to initial position, a magnet mounted on said frame, an armature operably associated with said magnet and secured to said rocker arm for actuation thereof upon said magnet receiving an impulse, said armature and rocker arm being movable about the axial center of said ratchet wheel and shaft for rapid oscillation in moving said pawl about said axial center to engage and rotate said wheel, a latching pawl pivotally mounted on said frame movable into engagement with said ratchet wheel for preventing reverse movement thereof by said resilient means, a projection on said pawl, a magnet carried by said frame having an armature extending into engagement with said projection for moving said pawl into locking engagement with said ratchet wheel when said last-mentioned magnet is energized and disengaging said pawl from said ratchet wheel to permit reverse movement thereof upon being deenergized, a switch carried by said frame, and a pin mounted on said rocker arm movable therewith to engage and actuate said switch for controlling the circuit to said last-mentioned magnet.

LAMAR E. HAYSLETT.
FRED H. OSBORNE.