Dec. 19, 1950 F. W. TRUESDELL 2,535,001

TIME SWITCH RIDER

Filed Sept. 3, 1949

Fig. 1.

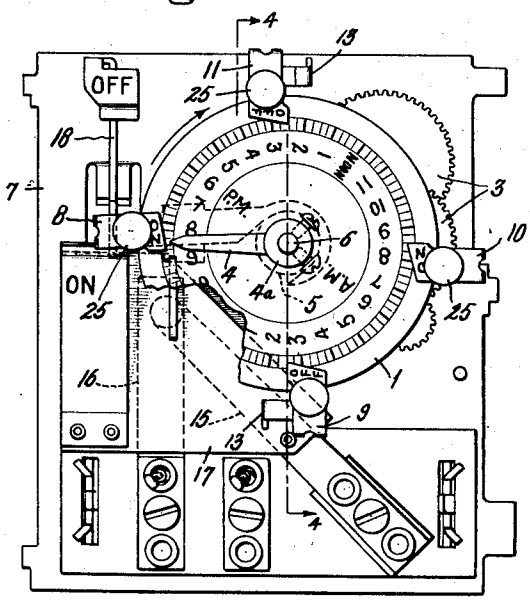


Fig. 2.

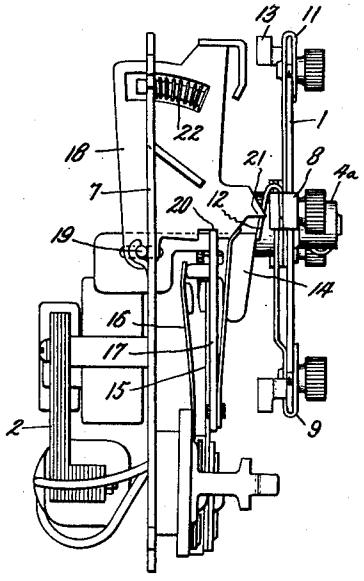


Fig. 3.

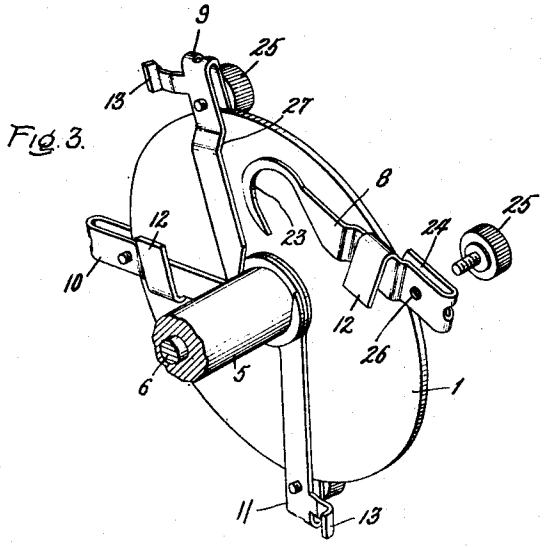
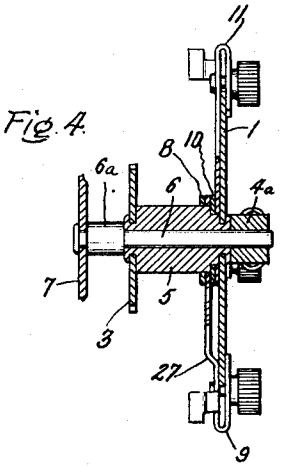


Fig. 4.



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TIME SWITCH RIDER

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2 Claims. (Cl. 74—568)

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My invention relates to time switch riders and its object is to provide a form of rider that may be added to or removed from a time switch without disassembly of any of the time switch parts and which, when on the time switch, may be adjusted for performing a time switch operation at different times and which, when loosened for adjustment purposes, will not fall off and become lost.

Riders are employed on time switches which have a dial or the like rotated by a timing motor one revolution in twelve or twenty-four hours. Riders are fastened to the peripheral portion of the dial for the purpose of performing switching operations at desired times. Generally, there is an "On" rider and an "Off" rider for turning a switch on and off once each revolution of the dial through mechanism which is engaged by the riders during their rotation. Such riders are adjustable about the dial so that the switching operations may be performed at the desired times. In many instances it becomes desirable to add additional "On" and "Off" riders to the dial so that the switch may be turned on and off more than once during each revolution of the dial, or so that a first switch may be turned on and off by one set of "On" and "Off" riders and a second switch may be turned on and off by a second set of "On" and "Off" riders.

The form of rider embodying my invention consists of a radial arm having an open hook at the outer end for hooking over the outer edge of the time dial, and an open hook at the inner end for hooking over the hub or shaft of the time dial. The hook at the outer end is provided with a removable thumb screw which is used both for fastening the rider in place on the time dial when the screw is tightened and for permitting adjustment of the rider about the time dial and preventing the rider from dropping off the time dial when the screw is loosened. When such thumb screw is removed, the rider may be taken off or put on the dial with ease and without disassembly or disturbance of any other part of the time switch mechanism. Such rider arms also carry a cam finger or the like for engagement with a switch operating mechanism for opening or closing a switch.

The features of my invention which are believed to be novel and patentable will be pointed out in the claims appended hereto. For a better understanding of my invention reference is made in the following description to the accompanying drawing in which Fig. 1 represents a

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face view of a time switch to which my invention is applied. Fig. 2 represents a side view of the time switch of Fig. 1. Fig. 3 is a perspective view of a time dial as viewed from the rear, illustrating the manner of adding my riders thereto, and Fig. 4 is a sectional side view of a time dial having permanent riders as well as the removable riders of my invention thereon and corresponds to a cross section through the time dial on line 4—4 of Fig. 1.

Referring now to Figs. 1 and 2, 1 represents a 24-hour time dial having corresponding time graduations thereon. Such dial is driven in a clockwise direction one revolution in twenty-four hours by a suitable timing motor represented at 2, through reduction gearing partially indicated at 3. Such gear train will usually include a clutch or the like to permit the time dial to be set relative to the motor. Time may be indicated on the time dial by reference to a stationary index 4. In the example given, the time dial 1 and its immediate driving gear are staked to a hub 5 which is rotatively mounted on a stationary post shaft 6 extending through the hub and rigidly secured in a rear supporting plate 7. The stationary time indicating index pointer 4 is secured to the forward end of post shaft 6, and its hub portion 4a serves as a collar to hold the time dial and hub assembly from endwise displacement towards the front. The post shaft 6 has an enlarged rear portion 6a which serves as a collar to prevent endwise displacement of the time dial hub assembly to the rear. It will thus be apparent that the time dial is arranged to rotate in a fixed plane about a fixed axis one revolution in twenty-four hours in a clockwise direction, and to be set so as to tell the time of day or night with close approximation by the time on such dial opposite stationary pointer index 4. Thus, in Fig. 1, the time as indicated is 8:35 p. m.

Mounted on the time dial 1 in Figs. 1 and 2 are four riders or rider arms 8, 9, 10, and 11. Riders 8 and 10 carry the designation "On" and have similar cam fingers 12 extending to the rear for turning a switch on. Riders 9 and 11 are designated "Off" and have similar fingers 13 extending to the rear for turning a switch off. The "On" and "Off" fingers 12 and 13 are positioned at different radial distances from the axis of rotation of the time dial so as to contact with different switch operating parts as the time dial and riders are rotated. In the example illustrated the on cam fingers 12 push back and then release a member 14 which is supported to slide forward

and back and which has a forward cam surface cooperating with cam fingers 12 when an on rider is moving past the index 4 position approximately. When the slider 14 is thus moved to the rear, it separately engages against and also moves to the rear resilient switch contact members 15 and 16 in open relation. When the on rider cam 12 moves off the cam surface of 14, the member 14 moves forward again under the tension of resilient contact member 16. However, contact member 15 is held in approximately the rear position to which moved by the previous rearward movement of slider 14 by a catch consisting of a triangular-shaped stiff insulating plate 17 fastened to the forward face of resilient contactor 15 and a latch member 18 pivoted at 19. The latching surfaces of these parts are shown at 20 in Fig. 2. Hence, when the on rider moves off from and releases slider 14, the switch contacts snap to a closed position. When the off riders 9 with their fingers 13 rotate past approximately the position of index 4, the fingers 13 are adapted to contact and raise a projection 21 on the pivoted latch plate 18 acting against the tension of a spring at 22 and thus release the latch parts at 20, which allows contactor 15 to snap forward and open the switch contacts. The upper edge of insulating plate 17 then holds the latch plate 18 raised until the next "On" operation.

The details of the switch operating mechanism are not important and may differ considerably from the example here described in so far as my invention is concerned.

It is assumed in Figs. 1 and 2 that the riders 10 and 11 are what may be termed permanent riders and are a permanent part of the switch construction as built at the factory, and that the riders 8 and 9 are riders embodying my invention and may or may not have been furnished with the original switch and may be readily added to or removed from the switch as desired. The essential difference between the permanent riders such as riders 10 and 11 and the removable riders such as 8 and 9, Fig. 3, is that the permanent riders have a closed eye at the inner ends for encircling the hub 5, while the removable riders have an open hook at their inner ends as shown in Fig. 3 at 23 on rider 8.

It is apparent that the permanent riders 10 and 11 cannot be removed or added to the switch except by removing index 4 from shaft 6 and removing dial 1 from its hub 5. This latter operation may spoil the hub and require a new hub. It also requires rather difficult and exacting mechanical operations that should not be attempted without removing the time switch to a shop having the necessary facilities for such operations. With my open hook inner end rider, no dismantling of the switch is necessary when a rider or riders are to be added to or removed from the switch. They may be quickly added or removed without tools and with the time switch installed. Such riders have an open hook 24 at their outer ends which is shaped to be hooked over and embrace the outer periphery of the time dial. Such hook is provided with a thumb head screw 25 which may be inserted in an unthreaded opening at the front of the hook 24 aligned with a threaded opening 26 in the back of hook 24. By inserting the screw through the hook and screwing it into the threaded opening 26, the open hook length may, in effect, be shortened by a corresponding amount. When in place with the inner hook 23 pulled close against the hub 5 as in the case of rider 9, Fig. 3, and with the screw 25 in place, the screw just clears the periphery of the time dial and the rider cannot now fall off or be removed.

The procedure for adding such a rider to the time dial is to slip the outer hook over the edge of the dial with the screw 25 removed as shown for rider 8, Fig. 3, and with the rider arm to the rear of the disk. The hook 24 is then long enough for the inner hook 23 to be hooked about hub 5. Then the rider arm is drawn radially outward with the inner hook 23 closely embracing hub 5 and the screw 25 inserted and threaded into opening 26. The rider now cannot drop off because it cannot move radially inwardly to unhook the part 23 about hub 5 so long as screw 25 is in place. It may, however, be adjusted about the dial and when in the desired adjusted position, the screw 25 is turned tight to clamp the periphery of the dial between the branches of hook 24 and secure the rider in a fixed position on the dial.

Each rider should, of course, be added at its proper relative position on the dial with respect to other riders already thereon, since after being added thereto, a rider cannot be moved past other riders already thereon. Also, it will be desirable to see that the operating fingers such as 12 and 13 of the added riders extend to the rear the proper distance to perform their intended operations. Some slight bending of their fingers towards or away from the rear side of the time dial may be found necessary or desirable after the riders are in place. The riders are made of one-piece lightweight sheet metal and their operating cam fingers can readily be bent to correct axial operating positions if not in such positions when first installed.

Another minor difference between the permanent riders and the removable riders in the example given is that the removable riders have the necessary offset as indicated at 27 in their arms, so that their hub hook parts are spaced the proper distance from the dial 1 to clear the hub parts of the premanent riders. It is evident that any reasonable number of such removable riders of the "On" or "Off" type, or both, may be added to existing time switches at small expense and with little trouble, to extend the usefulness of the switch. In Fig. 1 it was assumed that one removable "On" rider 8 and one removable "Off" rider 9 were added to the switch there represented, to enable the switch automatically to be turned on and off twice in each 24-hour period instead of only once. In the example given, where both types of riders operate on the same switch operating mechanisms, their corresponding "On" and "Off" cam fingers 12 and 13 will be similar and similarly radially positioned. However, it is apparent that the added riders of my invention might have their cam fingers designed and positioned to operate on a second switch mechanism without departing from the invention and its advantages.

While in the example described the removable rider arm is adapted to hook over a rotary hub shaft part 5 and at the rear of the time dial, these are not essential requirements of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A switch operating rider for use on the rotary time dials of time switches, said rider consisting of an arm having open hooks at opposite ends thereof identified as inner and outer ends, the hook at the inner end being formed remov-

ably to hook over a shaft member on the axis of rotation of the time dial, and the hook at the outer end being formed removably to hook over the periphery of such time dial, the latter hook being of sufficient length to embrace the periphery of the time dial both when the inner end hook is tightly hooked over such shaft member and during when being completely removed from such hooking relation, the hook at the outer end having aligned openings through its limbs parallel to the axis of rotation of the time dial at a radius such that when the inner end hook is tightly hooked over such shaft member and the arm of the rider is radial with respect to such time dial, such openings come just outside the periphery of such dial, and a head screw fitting freely through one of said aligned openings and removably threaded into the other opening, said screw serving, when the rider arm is in place on such shaft member and time dial and the screw is contained in said aligned openings, to prevent the removal of the rider from such shaft and dial and when said screw is removed, to permit the removal of the rider from such shaft and time dial, said screw further serving when tight and loose, respectively, to clamp and unclamp the periphery of such time dial between the limbs of said outer end hook to enable the rider to be held in place on the

time dial when the screw is tight or to permit of its free adjustment about the time dial when the screw is loose.

2. In combination, a time dial for use in rotary dial time switches, a hub member extending to the rear of said time dial concentric with its axis of rotation, and a removable switch operating rider for said dial, comprising a radial arm having a hook at its inner end formed to hook over and pivot about said hub member, and a hook at its outer end formed to hook over the peripheral outer edge of said time dial, the last-mentioned hook being of sufficient radial length as to embrace the periphery of said dial both when the inner end hook is tightly hooked about said hub member and during when being completely unhooked therefrom, aligned openings in the limbs of the outer end hook parallel to the axis of rotation of said disk, a removable head screw freely inserted through one of said openings and threaded into the other opening, said openings and screw being located just outside the periphery of the time dial when the rider arm is hooked in place on the hub and dial, is radial and its inner end hook is drawn tight against the hub.

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No references cited.