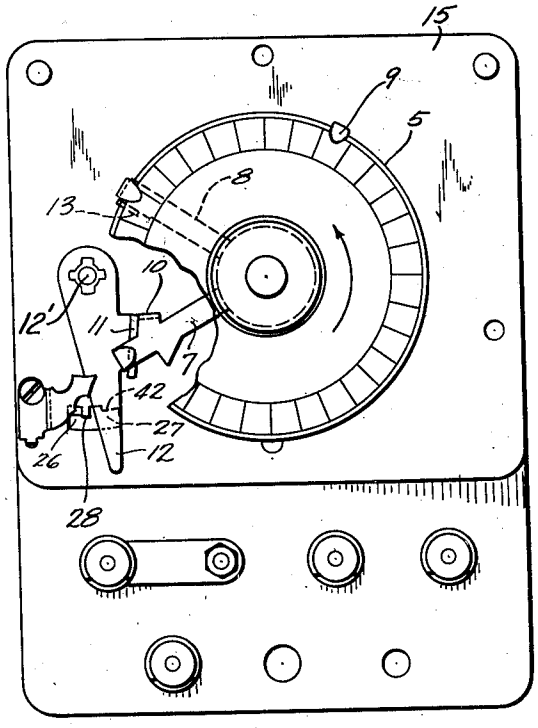
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TIME SWITCH

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Fig. 1



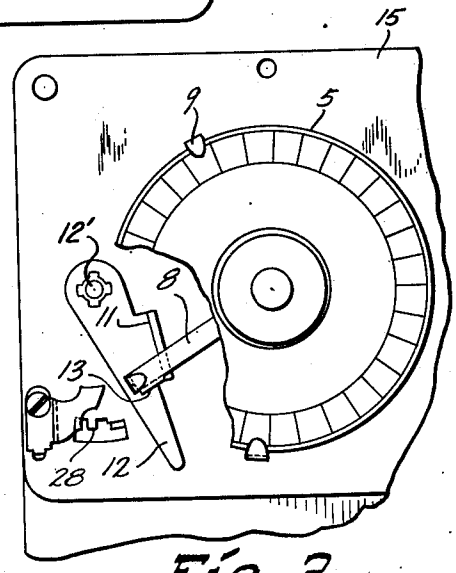


Fig. 2

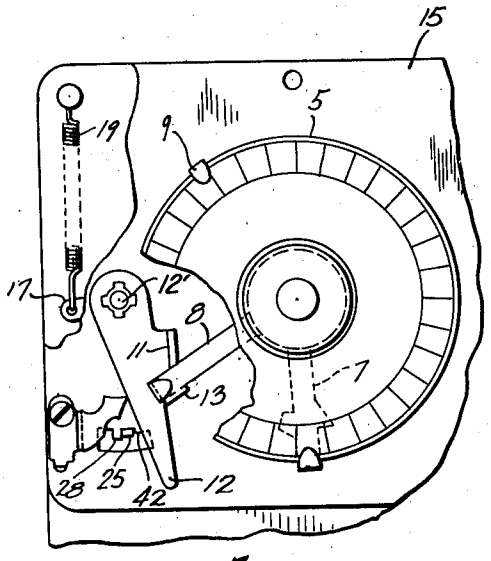


Fig. 3

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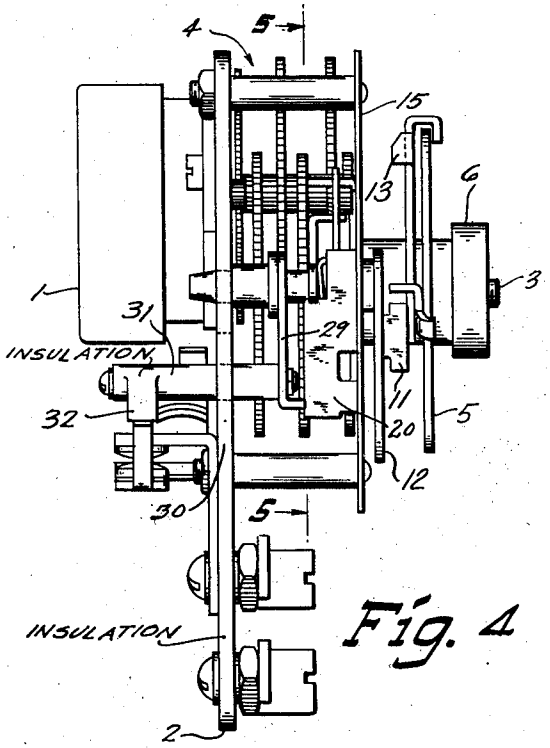


Fig. 4

Fig. 5

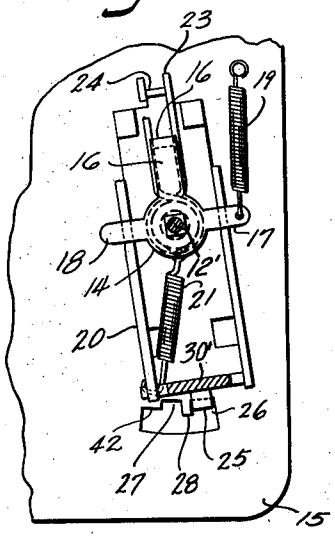


Fig. 6

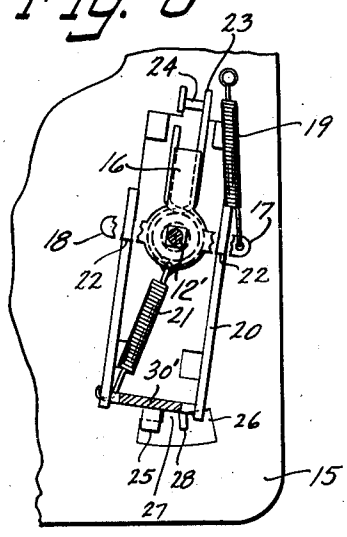
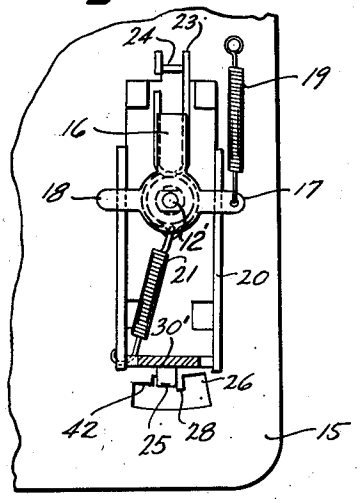


Fig. 7



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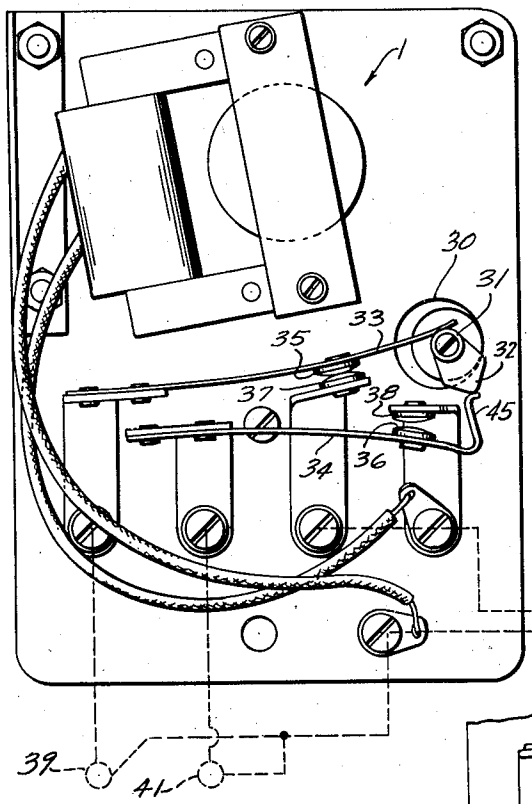
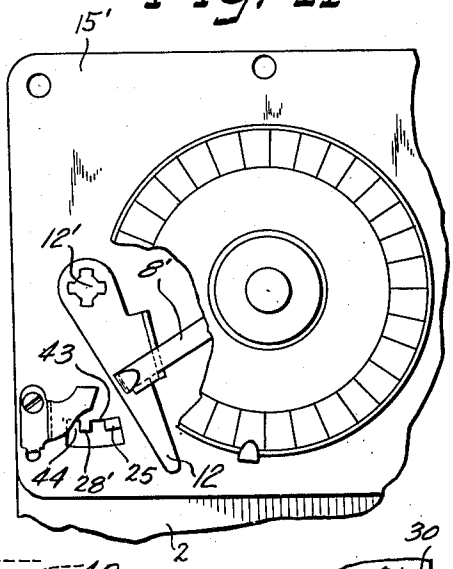


Fig. 8

Fig. 11



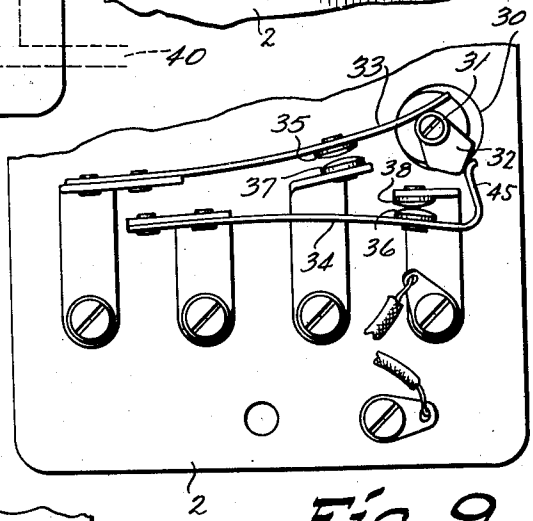
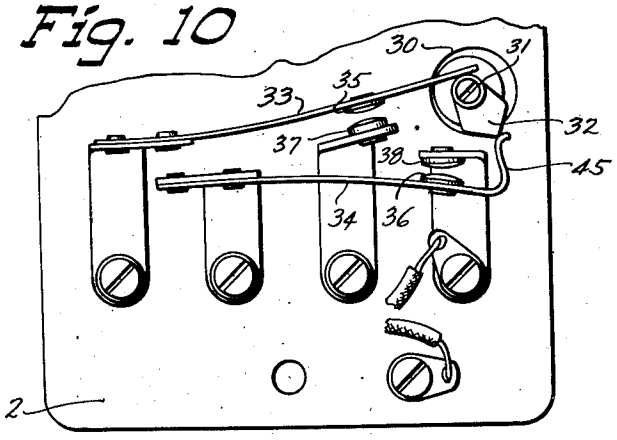


Fig. 9

Fig. 10



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2,474,494

TIME SWITCH

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Application October 6, 1947, Serial No. 778,071

3 Claims. (Cl. 200—39)

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This invention relates to time switches.

This invention is an improvement over that disclosed in United States Patent No. 2,251,429 issued August 5, 1941, to Emil F. Swensen, for Time switch, and assigned to the same assignee as the present application.

This invention has the same general objects as those set forth in the above noted patent, such as providing a timing dial with trippers provided with operating means located on the rear side of the timing dial which operating means respectively engages portions of a switch arm to sequentially operate the switch mechanism and to provide for a quick make and a quick break and to so arrange the operating arm that it is accessible exteriorly of the front plate or face plate and may be operated manually without interfering with its correct successive operation by the respective trippers of the timing dial.

A further primary object of this invention is to provide a time switch which is particularly useful in controlling the lighting of hen houses and to so organize the time switch that it will turn on bright lights for a predetermined period and will thereafter turn on dim lights for a very much shortened period to allow the chickens to go to roost, it having been found that if the bright light is turned off and a dim light is not turned on for a short period that the chickens cannot find their roosts.

In greater detail, further objects are to provide a time switch particularly useful for lighting hen houses, as stated hereinabove, which is so made that the tripper that cuts out the bright light causes the dim light to come on with a quick make and to so organize the parts that when the tripper has passed the operating arm, the dim lights are cut out with a quick break the invention providing, if desired, for another successive operation of the dim lights if it should be so wished.

It is to be understood, of course, that while this invention is primarily directed to the control of lighting of hen houses it nevertheless can be used in any other desired capacity.

Embodiments of the invention are shown in the accompanying drawings, in which:

Figure 1 is a face view of the device with a part broken away and with the device removed from the box or housing and showing the position of the parts for bright lighting.

Figure 2 is a fragmentary view with parts broken away showing the position of the parts for dim lighting.

Figure 3 is a view partly broken away showing

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the position of the parts for a complete open circuit for both the bright and dim lights.

Figure 4 is a side elevation of the structure shown in Figure 1, with the trippers in slightly different positions.

Figure 5 is a view of the cradle and the switch operating assembly, such view corresponding to a section on the line 5—5 of Figure 4 showing the parts in bright-light position.

Figure 6 is a view corresponding to Figure 5 showing the parts in dim-light position.

Figure 7 is a view corresponding to Figure 5 showing the position of the parts in the "off" position for both the bright and dim lights.

Figure 8 is a view from the rear side of the structure shown in Figure 1 showing in dotted lines the bright and dim light circuits and showing the position of the parts for the bright-light position.

Figure 9 is a fragmentary view corresponding to a portion of Figure 8 showing the position of the parts for the dim-light position.

Figure 10 is a view corresponding to Figure 9 showing the position of the parts for the "off" position for both the bright and dim lights.

Figure 11 is a fragmentary view partly broken away of a further form of the invention, such view showing the position of the parts for the dim-light position.

The general structure of the time switch is the same as that disclosed in the above noted patent and includes a self-starting synchronous motor 1 supported from the rear insulating plate 2 and connected with the timer dial shaft 3 by means of reduction gearing indicated generally at 4 so as to rotate the timer dial shaft 3 and the timer disk 5 carried thereby once every twenty-four hours. The timer dial shaft 3 is threaded and provided with a thumb nut 6 by means of which a series of trippers 7, 8, and 9 may be locked in any desired adjusted position to the timer dial 5. There are two types of trippers carried by the time dial. One tripper indicated at 7 is provided with operating means in the form of a downwardly turned shoulder 10, see Figure 1, which is adapted to engage the upper end of a cam member 11 of a switch operating lever 12 and rock it to the left as viewed in Figure 1. The other type of tripper, indicated by the reference characters 8 and 9, is provided with operating means 13 in the form of a downwardly turned flange which is arranged to ride on the left side of the cam 11 of the switch operating lever 12. The switch operating lever 12 is connected, by means of a shaft 12' to a three-armed spider 14, see Figure 5, located on

the rear side of the front plate 15. This three-armed spider has a rearwardly projecting arm 16 provided with a downwardly turned shoulder and has two laterally projecting arms 17 and 18. The arm 17 is connected to one end of a return spring 19 which constantly urges the spider in a counter-clockwise direction as viewed in Figure 5. A rocking and sliding cradle 20 is arranged to rock and slide and is biased upwardly as viewed in Figure 5 by means of the spring 21 and normally is in one or the other of the positions shown in Figures 5, 6, and 7. The springs 19 and 21 have been omitted in Figure 4 for clearness. The arms 17 and 18 bear against shoulders 22, see Figure 6, formed on the side flanges of the cradle 20. Thus when the switch operating lever 12 is rocked in either direction one or the other of the arms 17 or 18 bearing against the shoulder 22 moves the cradle downwardly as viewed in Figures 5, 6, and 7. The arm 16 of the spider tensions the hairpin spring 23 whose ends bear on opposite sides against a lug 24 formed integrally with the cradle 20 and thus biases the cradle 20 towards rocking motion. It is restrained against rocking motion by means of a lug 25 integral with the lower end of the cradle, as viewed in Figure 5, which normally fits within the notch 26 or the notch 27 formed in the face plate and separated by a barrier 28. Thus it will be seen that the trippers 7, 8, and 9 rock the switch operating lever 12 which through the medium of the shaft 12', the spider arms 16, 17, and 18, and the spring 23, causes sliding and rocking of the cradle 20.

The details of the construction thus far described, with the exception of the particular arrangement of the barrier 28 and notches 26 and 27, is identically the same as that set forth in the above noted patent. Suffice it to say at this point, that when the switch operating lever 12 is rocked in either direction that the cradle 20 is biased for rocking motion in the same direction and is also moved downwardly so as to release its latch or lug 25 and allow it to suddenly snap over to the other side.

The cradle 20 is operatively connected to a lever 29, see Figure 4, provided with a head 30', see Figures 5, 6, and 7, located between the side walls of the cradle 20 so that when the cradle rocks the lever 29 is also rocked. The lever 29 carries an insulating pin 31 provided with a cam portion 32, see Figures 4, 8, 9, and 10. Thus the switch operating arm may be considered to include the insulating pin 31 and its integral insulating cam portion 32. The insulating pin 31 passes through an enlarged opening 30 in the rear plate 2 as shown in Figures 8, 9, and 10. The insulating portions 31 and 32 of the switch operating arm are arranged to respectively control the action of the movable contact arms 33 and 34, such arms being provided with movable contacts 35 and 36 arranged to respectively engage or disengage the corresponding stationary contacts 37 and 38. The movable contact 35 is connected to one side of a bright light 39, the other side being connected to the alternating current power mains 40. The movable contact 36 is connected to one side of the dim light 41, the other side of such dim light being connected to one side of the mains 40. The other side of the mains 40 is connected to the stationary contacts 37 and 38.

Assume that the switch is in open position or, in other words, that both the dim and the bright lights are cut off. This position of the switch parts is shown in Figure 10 and the position of the cradle is shown in Figure 7.

The tripper 7 is set at the desired position on the timing dial for the bright lights to be turned on. When the dial 5 rotates the tripper 7 moves the switch operating lever 12 to the left as viewed in Figures 1, 2, and 3. This causes the lever 29 and the pin 31 and its cam portion 32 to suddenly move to the position shown in Figure 8, thus completing the bright-light circuit. The bright light is left on for the desired length of time. When it is desired to turn on the dim light, the tripper 8 comes into play. This tripper is set at the correct point when it is desired to extinguish the bright light and to turn on the dim light so as to allow the chickens to go to roost.

It is to be noted that the tripper 8 is provided with an operating portion 13, see Figure 2, and this operating portion rocks the switch operating arm or lever 12 to the right, as shown in Figure 2, and holds it in this position for a limited time depending on the width of the cam member 11 of the switch operating lever or arm 12. This dim light 41, therefore, remains on for a limited time. The position of the switch parts at this time is shown in Figure 9. This allows time for the chickens to find their roosts. Thereafter the operating portion 13 of the tripper 8 rides off the cam portion 11 of the switch operating lever or arm 12 and allows the cradle to be returned to its neutral position through the action of the spring 19. This is shown in Figure 7. When this occurs the cam portion 32 rides to the position shown in Figure 10 and opens the dim light circuit. At the same time the insulating pin 31 holds the bright circuit open.

Although it would not be useful for the control of lighting of hen houses it might be desirable for some other uses to provide a second tripper 9 for turning on the dim light for a short period a second time. This tripper would be constructed in identically the same manner as the tripper 8. It is to be noted that in each instance hereinabove described a quick make and a quick break was obtained. However, in view of the fact that that the tripper 9 moves the lever 12 towards the position shown in Figure 2 a second lug or shoulder 42 is provided on the front plate 15. The position of the parts before the tripper 9 again turns on the dim lights is shown in Figure 3. After the switch operating lever or arm 12 has been rocked a sufficient degree to the right as viewed in Figure 2, the latching lug 25 of the cradle snaps past the shoulder 42 and rides up on the shoulder to the position shown in Figure 2.

It is to be noted that all of the acts of the switch which either make or break are quick no matter whether there is a repetition of the turning on of the dim light or not. The first time the dim lights are turned on the lug 25 rode clear over the barrier 28 onto the top of the shoulder 42 at one stroke. On the second turning on of the dim light, as described hereinabove, the lug 25 suddenly snaps past and on top of the shoulder 42.

Usually it is not necessary to have the second turning on of the dim lights. If it is not desired to turn on the dim lights a second time, the tripper 9, see Figure 1, is omitted.

A further form of the invention is shown in Figure 11 and will now be described. This form of the invention is identical with that hereinabove described except that there is only a single barrier 28' corresponding to the barrier 28 hereinabove described. In other words, the front plate 15 of the time switch as shown in Figure 11 is not

provided with the shoulder **42** as shown in Figures 1, 2, 3, 5, 6, and 7.

It is to be noted that the width of the slot **43**, see Figure 11, is considerably greater than the width in slot **44**. This allows plenty of room for the travel of the lug **25** of the cradle to the right, as viewed in Figure 11, to turn on the dim lights as hereinabove described. After the switch operating lever or arm is released by the dim tripper **8'**, see Figure 11, the return spring **19**, see Figure 5, moves the lug **25** to the left as viewed in Figure 11 against the right side of the barrier **28'** and thus the switch is held in its open or neutral position for both the dim and bright lights.

It is to be noted that when the bright light is on that the switch operating cam means **31**, **32** is at its farthest position to the right as viewed in Figure 8. On the other hand, when the dim light circuit is on and the bright light circuit is open, the cam means **31**, **32** has moved to its farthest position to the left as viewed in Figure 9 and as will be seen from such figure the upturned end **45** of the movable contact arm **34** is free to move upwardly and allow the closing of the dim circuit contacts.

When the cradle is released and moves back to its neutral position the cam means **31**, **32** moves towards the right from the position shown in Figure 9 to that shown in Figure 10 and the cam portion **32** of the cam operating means rides up on the curved upper end of the upturned portion **45** of the movable contact arm **34**. However, this limited motion to the right of the cam means **31**, **32** does not allow the upper movable contact arm **33** to close the bright light contacts. It is to be noted also that there is a rocking or slight turning motion of the cam means **32** which aids in the above results.

It is to be noted that the slot in which the lug **25** operates is provided with end portions and that these end portions constitute stops which are located on opposite sides of the intermediate barrier or member **28** or **28'** and that they are located at different distances from this intermediate barrier.

It will be seen that a novel form of time switch has been provided which will turn on a bright light in a hen house, for instance during the late afternoon, which allows the bright light to remain on as long as desired and which will then turn on a dim light and cut off the bright light, thus allowing time for the chickens to find their roosts safely. Thereafter the dim light is cut off.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A time switch comprising motor driven timing means including a first tripper and a second tripper, a switch operating arm arranged to be moved in a first and a second direction by said first and second trippers, respectively, a sliding and rocking cradle, spring means between said cradle and said arm for storing up energy when said arm is rocked, latching means including a barrier and a lug carried by said cradle for latching said cradle, means operated by said arm for unlatching said cradle from said barrier by sliding said cradle, a first and a second switch operated by said cradle and arranged to alternately close and open when said arm is moved to said first and second positions, respectively, to correspondingly rock said cradle, a first stop located on one side of said barrier and spaced therefrom and a second stop located on the other side of said barrier and spaced therefrom a greater distance than said first stop, biasing means biasing said cradle towards said first stop for said first position of said arm, said second tripper being arranged to temporarily hold said arm against said second stop for said second position of said arm and arranged to subsequently release said arm for motion due to said biasing means, said barrier being effective to stop said cradle in a neutral position with both said switches open.

2. A time switch comprising motor driven timing means, a first and a second switch each biased towards closed position, switch operating means for alternately moving said switches to open position, said switch operating means having a neutral position arranged to hold both switches simultaneously in open position, said switch operating means including a cradle having sliding and rocking motion and having a latching lug, a plate having a slot provided with a relatively small notch at one end and an elonagted notch at the other end having a barrier between said notches coacting with said lug to form latching means for said cradle, a spider and a spring arranged to shift said cradle to release said latch from said barrier and store energy in said spring when said spider is rocked to move said cradle to either end of said slot and a plurality of tripping means carried by said timing means for actuating said spider, at least one of said tripping means being effective to hold said cradle with its latching lug in the outer end of said elongated notch, and spring biasing means biasing said cradle to move said lug towards said relatively small notch.

3. A time switch comprising motor driven timing means, a first and a second switch each biased towards closed position, switch operating means for alternately moving said switches to open position, said switch operating means having a neutral position arranged to hold both switches simultaneously in open position, said switch operating means including a cradle having sliding and rocking motion and having a latching lug, a plate having a slot provided with a relatively small notch at one end and an elongated notch at the other end having a barrier between said notches coacting with said lug to form latching means for said cradle, a spider and a spring arranged to shift said cradle to release said latch from said barrier and store energy in said spring when said spider is rocked to move said cradle to either end of said slot and a plurality of tripping means carried by said timing means for actuating said spider, at least two of said tripping means being effective to hold said cradle with its latching lug in the outer end of said elongated notch, and spring biasing means biasing said cradle to move said lug towards said relatively small notch, said elongated notch having a shouldered portion adjacent its outer end.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
2,251,429	Swensen	Aug. 5, 1941