

Aug. 1, 1933.

A. C. WRIGHT

1,920,229

PERIODIC SWITCH

Filed Feb. 4, 1931

3 Sheets-Sheet 1

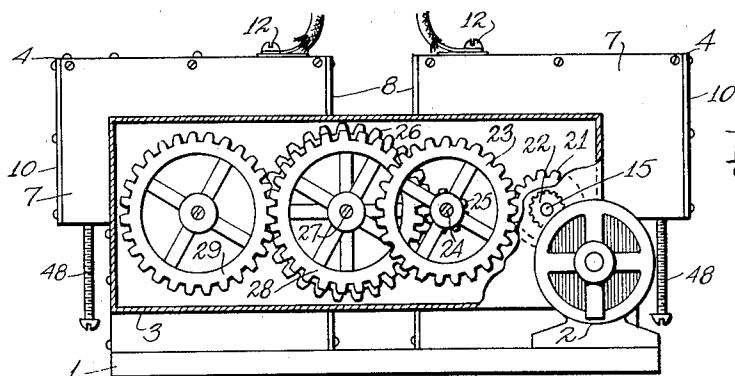


Fig. 1

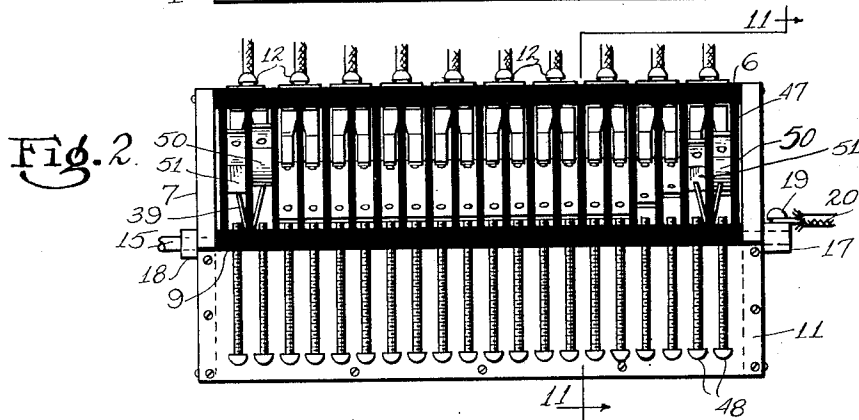


Fig. 2

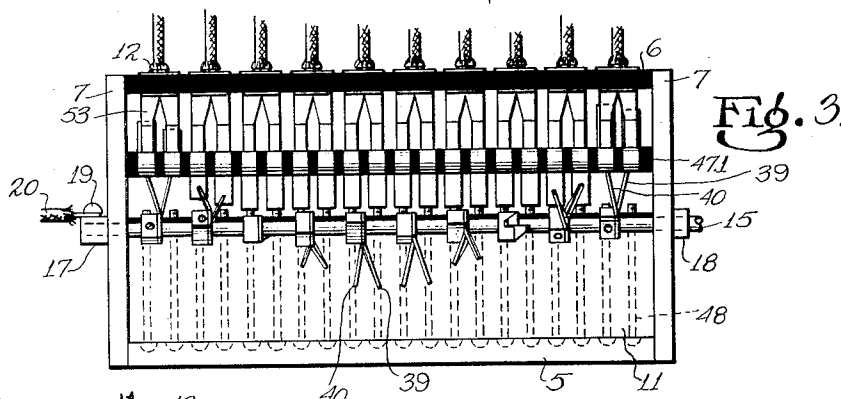


Fig. 3

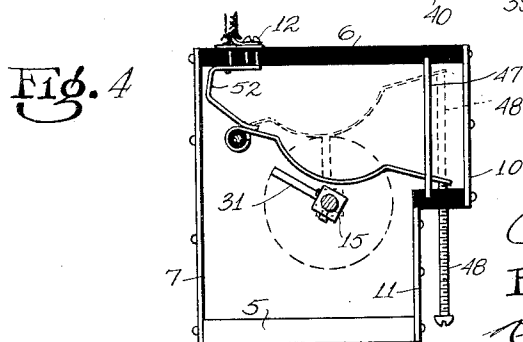


Fig. 4

Inventor

Arthur C. Wright,

By

Rumrill, Rumrill, & Woodworth

Att'y.s.

Aug. 1, 1933.

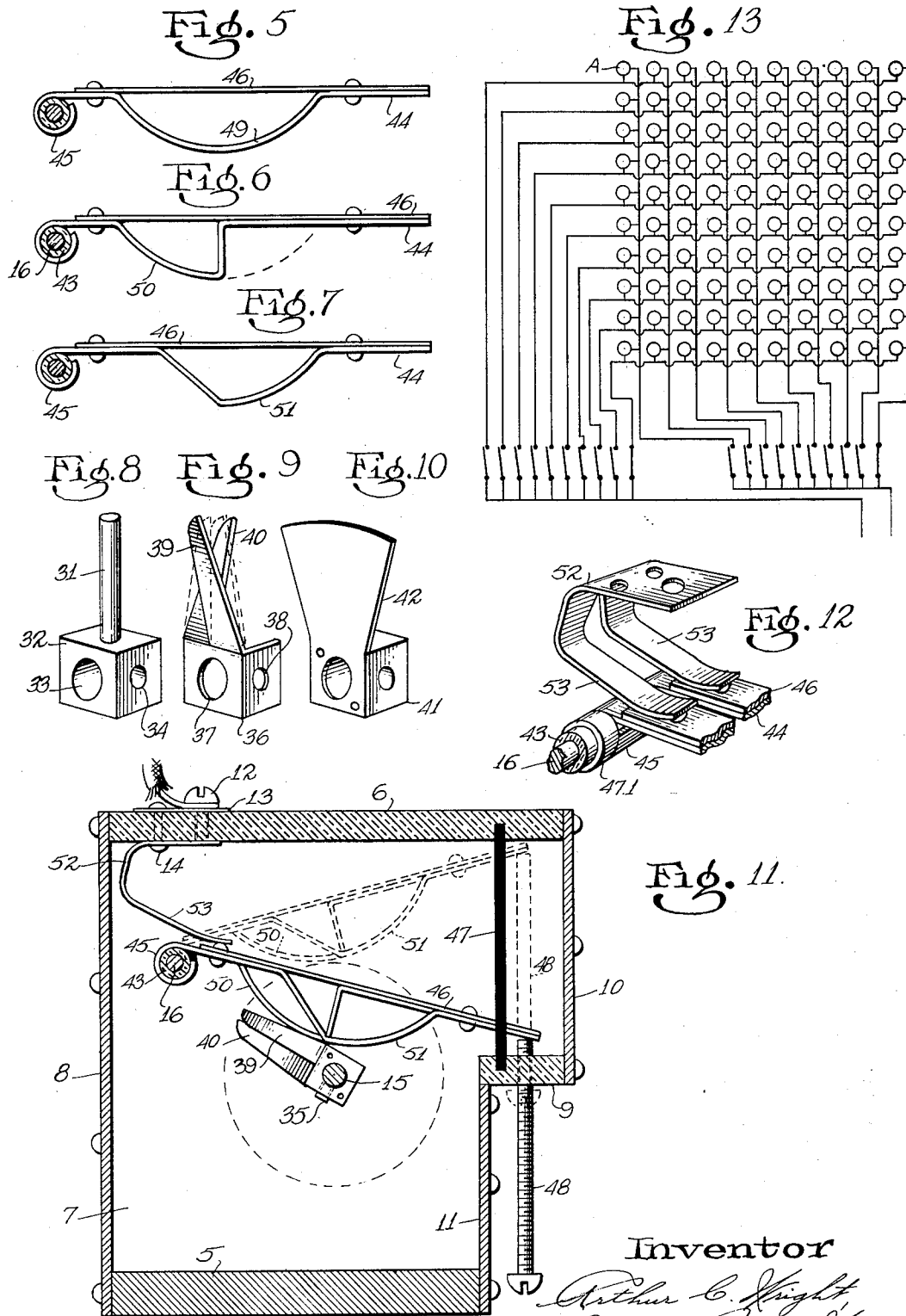
A. C. WRIGHT

1,920,229

PERIODIC SWITCH

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Inventor

Arthur C. Knight

By Kummer, Kummer & Goodworth,
Att'ys.

Aug. 1, 1933.

A. C. WRIGHT

1,920,229

PERIODIC SWITCH

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Fig. 14

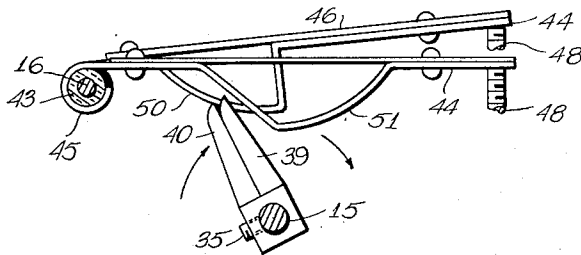


Fig. 15

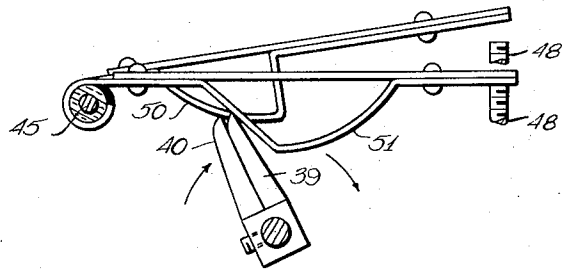


Fig. 16

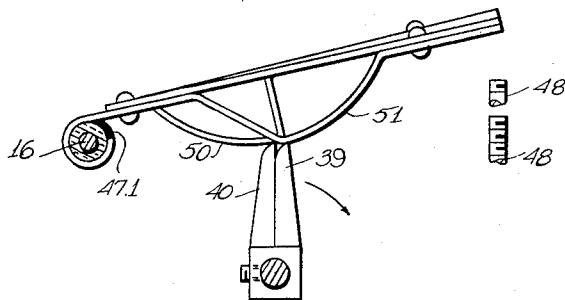


Fig. 17

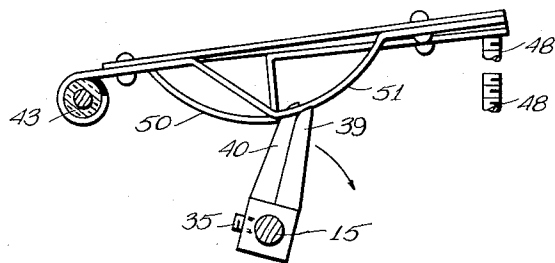
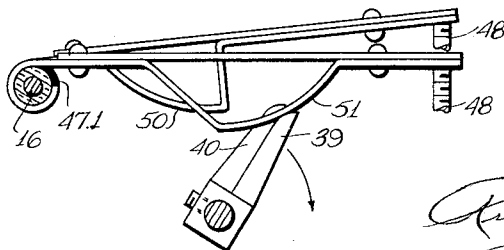


Fig. 18



Inventor

Arthur C. Wright

By *Hummer, Hummer, & Woodworth*
Attys.

UNITED STATES PATENT OFFICE

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PERIODIC SWITCH

Arthur C. Wright, Chicago, Ill.

Application February 4, 1931. Serial No. 513,511

5 Claims. (Cl. 200—24.)

This invention relates to electric switches.

The main objects of this invention are to provide an improved periodic switch adapted to control a large number of electric circuits; to provide a periodic switch having improved means for controlling the time at which each circuit is opened and closed; and to provide a periodic electric switch of this kind which is compact and which is particularly adapted for use in connection with advertising display devices for controlling a bank of electric lamps.

Illustrative embodiments of this invention are shown in the accompanying drawings, wherein:

Figure 1 is an end elevation of an improved switch comprising two similar units connected together.

Fig. 2 is a front elevation of one of the units with the front plate of the casing removed; the view being taken from the right of Fig. 1.

Fig. 3 is a rear elevation of the same, with the rear plate removed.

Fig. 4 is an end elevation showing a simplified form of the switch, taken from the left of Fig. 2, the end plate of the casing being removed.

Figs. 5 to 10 inclusive are enlarged views showing various forms of contact members adapted to be used in the switch.

Fig. 11 is an enlarged vertical section of one of the units, taken on the line 11—11 of Fig. 2.

Fig. 12 is an enlarged detail in perspective showing one of the conductors and certain other portions.

Fig. 13 is a diagram of the electric circuit employed in connecting two units together for controlling a bank of one hundred lamps.

Figs. 14 to 18 inclusive are fragmentary side elevations showing successive steps in the movements of the contact members.

In the form herein shown, the improved switch comprises a rotatable actuator in combination with a plurality of hinged members adapted to be moved a predetermined distance by the actuator for closing the circuit. The actuator and hinged members are preferably contacts in the electric circuit. In order to accurately control the closing and opening of the circuit, adjustable means are provided for limiting the strokes of the hinged members.

The contact members are preferably arranged in units and, if desired, the switch may include several units for controlling a large number of circuits. In the construction illustrated, the switch includes two substantially identical units connected together for controlling one hundred lamps A, as illustrated diagrammatically in Fig.

13. Each of the units illustrated comprises ten independent switches, but it is understood that any desired number may be employed.

The improved periodic switch herein shown comprises a base 1, on which is supported a motor 2, gear housing 3, and a pair of unit housings 4.

Each of the unit housings 4 includes a bottom plate 5, top plate 6, end walls 7, a rear plate 8, horizontal shelf 9, and front plates 10 and 11. The top plate 6 is made of suitable insulating material because it supports binding posts 12 mounted on metal conductors 13, which are secured to the top 6 by rivets 14. The plates 10 and 11 are removable to permit access to the contacts.

Located in each of the housings 4, is a pair of substantially parallel horizontal shafts 15 and 16, which are supported by the end walls 7. Each of the shafts 15 forms a terminal of the electric circuit. The ends of the shafts 15 project through the walls 7 and are rotatably mounted in bearings 17 and 18. The bearings 17 support binding posts 19 for attachment to conductors 20.

The two shafts 15 of the two units are geared together by a train of gears as illustrated in Fig. 1. One of the shafts 15 has a gear 21 and a pinion 22. The pinion 22 is driven by the motor 2 and the gear 21 drives a gear 23 mounted on a stud 24, which also carries a pinion 25 meshing with a gear 26 on a stud 27. Also mounted on the stud 27, is a gear 28 which drives a gear 29 mounted on the second shaft 15. At least one of the gears should be made of suitable insulating material.

Supported on the terminal bars 15, is a plurality of actuators which are rotatable into and out of engagement with contact members which are hinged on the bars 16. The actuators control respectively different circuits, as illustrated in Fig. 13, and these actuators are adjustable angularly relative to one another so as to permit the different circuits to be closed in succession.

Various forms of actuators may be employed, as shown in Figs. 8, 9 and 10, and various forms of hinged contacts may be used, as shown in Figs. 5, 6 and 7.

In the form shown in Fig. 8, the actuator comprises a contact arm 31 mounted on a block 32 having an opening 33 for receiving the terminal bar 15 and a threaded aperture 34 for receiving a set screw 35 by which the actuator may be secured in its adjusted position on the bar 15.

In the form shown in Fig. 9, the actuator com-

prises a sheet metal stamping which is provided with a base part 36 having openings 37 and 38, for the terminal bar and set screw, respectively. Formed on the base part 36, is a pair of contact arms 39 and 40, which are offset axially of the bar 15 for the purpose hereinafter described.

In the form shown in Fig. 10, the actuator comprises a block 41 and a sector-shaped contact arm 42.

- 10 Embracing the shaft 16, is an insulator sleeve 43 which forms the pivot of the hinged contact members. In the forms shown in Figs. 5, 6 and 7, the hinged contact comprises a metal bar 44, which is bent to form a collar 45 loosely embracing the sleeve 43, and a shoe which is adapted to ride on the rotatable actuator of the bar 15 during a portion of the latter's cycle. A reinforcing bar 46, is riveted to the upper face of the bar 44. The inner ends 45 of the hinged contacts are insulated from one another by insulator collars 47.1.

- The outer ends of the hinged contacts ride between vertically disposed insulator guide bars 47, which are secured to the shelf 9 and top 6. Movement of the hinged contacts toward the rotatable actuators are limited by vertically disposed adjusting screws 48 extending upwardly through the shelf 9. By means of the screws 48 the strokes of the hinged contacts may be varied for varying the period of contact between each hinged contact and its corresponding actuator.

- The contact members shown in Figs. 5, 8 and 10, may be used for heavy-duty switches and in cases where accurate timing of the switches is not essential. Where accurate timing is necessary, the contacts shown in Figs. 6, 7 and 9 are employed.

- In the form shown in Fig. 5, the contact shoe is segmental, as illustrated at 49.

- 40 In the forms shown in Figs. 6 and 7, the shoes are sector-shaped, as illustrated at 50 and 51. The shoes 50 and 51 are complementary, so as to be adapted to be used together in connection with the actuator shown in Fig. 9 to permit accurate timing. For instance, the shoe 50 is adapted to engage the arm 40 of the actuator and the shoe 51 is adapted to engage the arm 39 of the actuator. With this improved construction, there are two adjusting screws 48 for each independent circuit. One of the adjusting screws 48 of each circuit limits the downward movement of the shoe 50 for controlling the time at which the circuit is closed. The other adjusting screw of each circuit limits the downward movement of the shoe 51 for accurately controlling the time at which the circuit is opened.

- The hinged contacts are normally urged downwardly into the paths of the rotatable actuators by means of resilient conductors 52, which are connected to the rivets 14 and binding posts 12.

- In the form shown, each of the conductors 52 has a pair of resilient fingers 53, which bear against two adjacent complementary hinged contacts, as shown in Figs. 11 and 12.

- 65 In operation, the shafts 15 are rotated continuously for rotating the actuators in the direction indicated by the arrows in Figs. 14 to 18 inclusive. The actuators are positioned so as to close the circuits successively. The hinged contacts are normally urged downwardly into the paths of the rotatable actuators by means of the conductors 52.

- 75 At a predetermined time in the cycle of each actuator, its contact arm 40 engages the corresponding shoe 50 for closing the respective circuit,

as illustrated in Fig. 14. The time at which the arm 40 engages the shoe 50 is controlled by one of the adjusting screws 48.

At a predetermined time after the circuit has been closed by the members 40 and 50, the arm 39 of the same circuit engages the corresponding shoe 51, as illustrated in Fig. 15. During the next interval in the cycle of the actuator, the arms 40 and 39 are in contact with the shoes 50 and 51, respectively, as shown in Fig. 16.

When the arm 40 moves away from its corresponding shoe 50, the shoe 50 drops until it is stopped by the respective screw 48, and the arm 39 continues in contact with the corresponding shoe 51, as shown in Fig. 17. The time at which the arm 39 becomes disengaged from its corresponding shoe 51 depends upon the height of the respective adjusting screw 48. When the arm 44 of the shoe 51 engages the respective screw 48, it becomes disengaged from the corresponding arm 39 and the circuit is again opened.

It will thus be apparent that with this improved construction, the switch may be accurately timed as to the closing and opening of each circuit, independently of other circuits.

Although but certain specific embodiments of this invention have been herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A periodic switch comprising a bar forming an electric terminal, a plurality of contact arms mounted on said bar, a plurality of independently movable contact members respectively urged into the paths of said arms so as to be moved thereby, separate means for clamping each of said contact members to said bar independently of the other contact members, said clamping means being operable independently of one another so as to permit each of said contact members to be turned on said rod without disturbing the clamping means of said other contact members, and a plurality of separate adjustable means for independently limiting the strokes of said members.

2. A periodic switch comprising a bar forming an electric terminal, a plurality of contact arms having hubs mounted on said bar, a plurality of independently movable contact members respectively urged into the paths of said arms so as to be moved thereby, and separate set screws mounted on said hubs for clamping said contact members to said bar, said set screws being operable independently of one another so as to permit each of said hubs to be turned on said rod without disturbing the adjustment of the other hubs, each of said hubs having a bearing edge substantially normal to the longitudinal axis of its contact member.

3. A periodic electric switch comprising a rotatable actuator, a pair of movable members adapted to engage said actuator so as to be thereby moved between predetermined limits, said actuator and pair of movable members being electrically connected in a single circuit, one of said movable members being arranged to engage said actuator in advance of the other movable member so as to control the closing of the circuit, said other movable member being disengaged from said actuator after the disengagement of said one member so as to control the opening of the circuit, and adjustable means for limiting the strokes of said members independently

ently of each other whereby the time of closing and opening the circuit may be controlled.

4. A periodic switch comprising a rotatable actuator, a pair of contact members hinged so as to be movable into the path of said actuator, said actuator being adapted to move said members between predetermined limits, said actuator and pair of movable members being electrically connected in a single circuit, one of said movable members being arranged to engage said actuator in advance of the other movable member so as to control the closing of the circuit, said other movable member being disengaged from said actuator after the disengagement of said one member so as to control the opening of the circuit, and adjustable means adapted to independently limit the strokes of said hinged members for controlling the period during which each of said members engages said actuator whereby the time of closing and opening the circuit may be controlled.

5. A periodic switch comprising a rotatable

terminal, a pair of contact arms on said terminal, a pair of contact members hinged on an axis disposed substantially parallel to said terminal, said members being independently movable and being normally urged into the paths of said arms respectively, said arms being adapted to engage said members during a portion of said terminal's cycle, said pair of arms and pair of members being electrically connected together in a single circuit, one of said members being arranged to engage one of said arms in advance of the engagement of the other arm by the other member so as to control the closing of the circuit, said other member and arm being adapted to be disengaged after the disengagement of said first-mentioned member and arm so as to control the opening of the circuit, and adjustable stops for independently limiting the movements of said members toward said arms whereby the time of opening and closing the circuit may be varied.

ARTHUR C. WRIGHT.

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