Sept. 16, 1924. 1,508,442

C. O. BURTON

DOUBLE POLE DOUBLE THROW SWITCH

Filed March 17. 1921 3 Sheets-Sheet 1

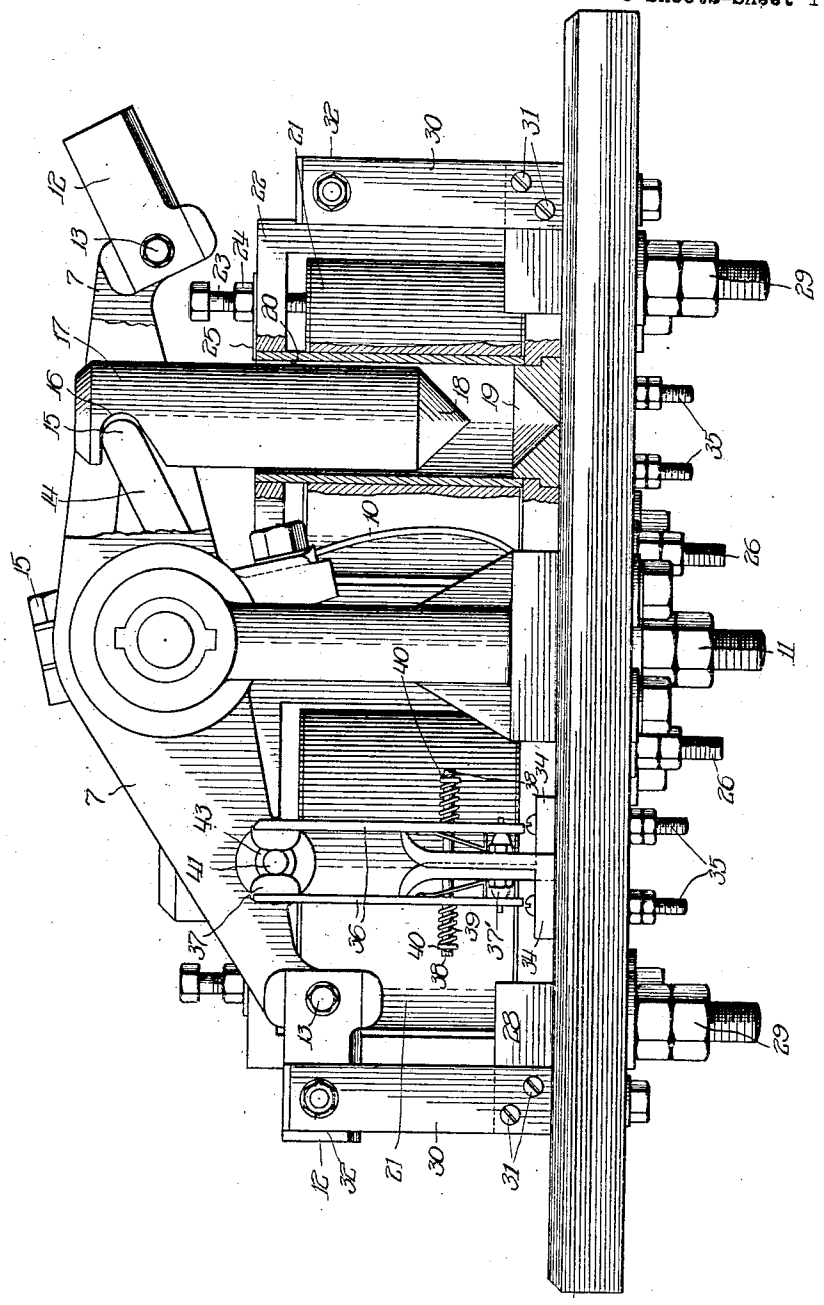


Fig. 1.

Witness:
A. Burkhardt

Inventor
Carl O. Burton,
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DOUBLE POLE DOUBLE THROW SWITCH

Filed March 17, 1921 3 Sheets-Sheet 2

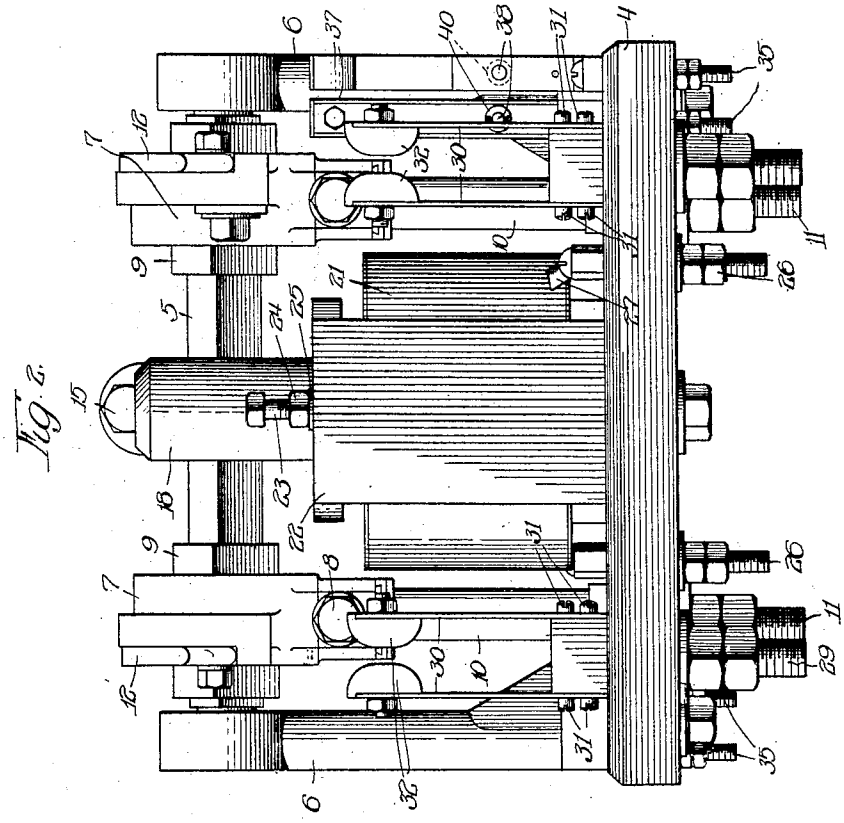


Fig. 2.

Witness:
R. Burkhardt.

Inventor:
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Sept. 16, 1924. 1,508,442

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DOUBLE POLE DOUBLE THROW SWITCH

Filed March 17, 1921 3 Sheets-Sheet 3

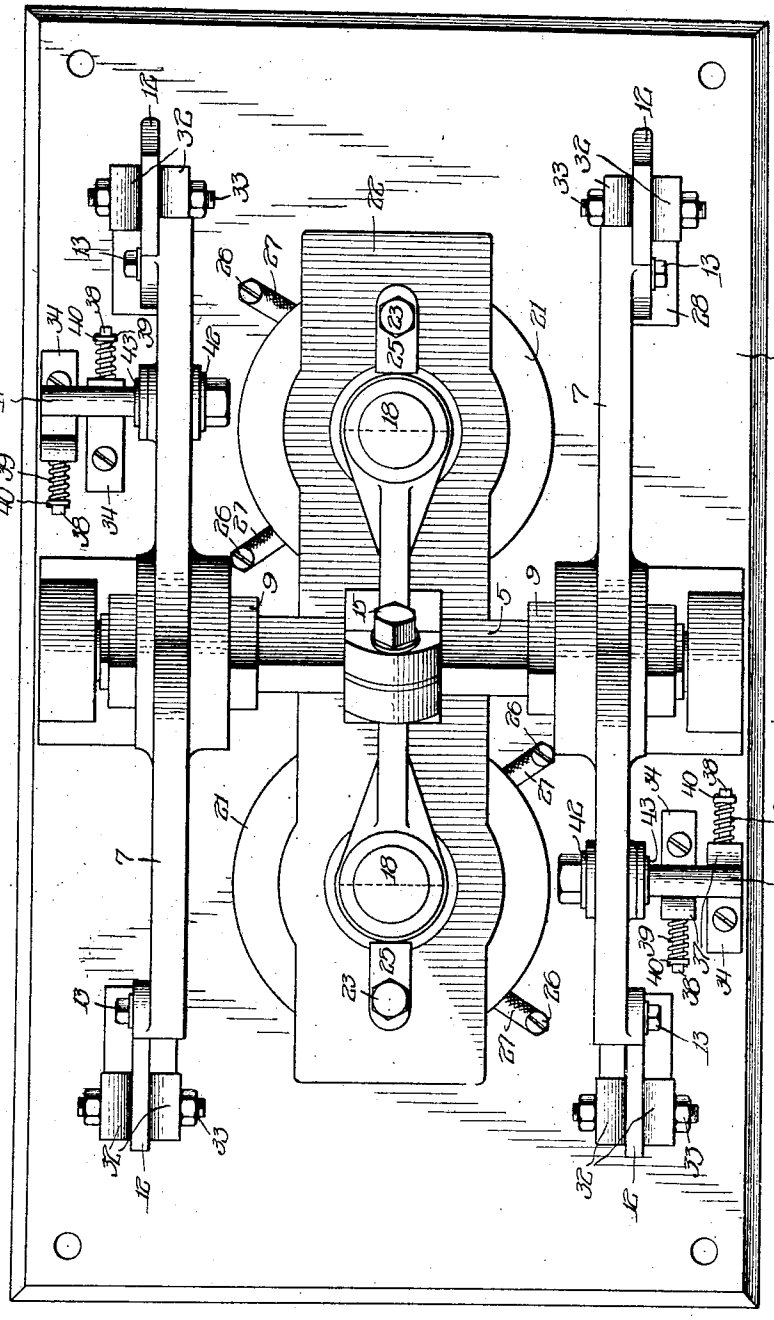


Fig. 3

Witness:
R. Burkhardt

Inventor:
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Patented Sept. 16, 1924. 1,508,442

# UNITED STATES PATENT OFFICE.

CARL O. BURTON, OF DULUTH, MINNESOTA.

## DOUBLE-POLE DOUBLE-THROW SWITCH.

Application filed March 17, 1921. Serial No. 453,074.

*To all whom it may concern:*

Be it known that I, CARL O. BURTON, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in a Double-Pole Double-Throw Switch, of which the following is a specification.

This invention relates to a new and improved electric switch, and more particularly to a double-pole double-throw switch of the electrically operated, distant control type. The switch is particularly adapted for use in reversing the direction of rotation of any type of direct current motor, although broadly useful wherever a switch of like characteristics may be desired.

It is an object of the present invention to provide a switch of this character which is so constructed as to have a minimum of wear of all moving parts and to consist of a relatively small number of rugged elements.

It is a further object to provide a switch in which the contact surfaces have sliding action therebetween and in which the contact elements are readily renewable.

It is also an object to provide a switch having auxiliary contacts for interlocking with various other control systems.

It is an additional object to provide an electrically actuated switch which is mechanically held closed after the actuating coils are de-energized.

Other and further objects will appear as the description proceeds.

My invention comprises broadly an apparatus in which the main switch arms and an operating arm are rigidly connected to a rocking shaft, the switch arms being provided with contacts at their extremities. The operating arm has its end engaging solenoid operated plungers. The switch arms are provided with means insulated from the main circuit and adapted to engage secondary contacts to operate auxiliary circuits.

I have illustrated a preferred embodiment of my invention in the accompanying drawings, in which—

Figure 1 is a side elevation of the switch;

Figure 2 is an end elevation; and

Figure 3 is a plan view.

The switch is mounted upon the base 4 of slate or equivalent insulating material. The shaft 5, the central portion of which is square in cross section, has its opposite ends journaled in the bearing standards 6. The main switch arms 7 are located adjacent the standards 6 and are provided with a split bearing clamped to the shaft 5 by means of the bolts 8. The insulating sleeves 9 are interfitted between the arms 7 and shaft 5. The braided connectors 10 are connected to the arms 7 by the bolts 8 and their lower ends are connected electrically to the bolts 11. The switch knife plates 12 are clamped to the opposite ends of the arms 7 by the bolts 13. The main operating arm or walking-beam arm 14 is clamped to the central portion of the shaft 5 by means of the bolt 15. The outer ends of this arm 14 are rounded at 15 and engage the rounded sockets 16 in the plungers 17. These plungers 17 are provided with lower ends 18 conical in form and adapted to interfit with similar plunger seats 19. The sleeve 20 surrounds the plunger 17 and is in turn surrounded by the coil 21. The coil yokes 22 are secured to the base 4 and the coils are retained therein by the adjustable screws 23. These screws 23 are provided with the lock nuts 24 which also serve to retain in place the detents 25 which maintain the sleeve or bushing 20 in proper relation to the coil yokes. The coil circuits are connected to the terminal studs 26 by connectors 27.

The jaw blocks 28 are secured to the base by means of the bolts 29. The contact fingers 30 are attached to the blocks 28 by screws 31 and are provided with the removable finger tips 32 secured to their upper ends by the bolts 33. The auxiliary contact finger holders 34 are secured to the base by the bolts 35. The auxiliary contact fingers 36 carry the removable finger tips 37. The lower ends of these fingers are perforated to receive the ends of the adjusting screws 37′. The spring studs 38 are secured to the holders 34 and extend outwardly through the fingers 36 carrying the springs 39 between the outer surfaces of the members 36 and the bushings 40. The auxiliary contact studs 41 are carried by the main switch arms 7 and extend laterally therefrom. They are insulated from the switch arms by the washers 42 and sleeves 43.

In the operation of the switch the circuit of one of the coils 21 is closed by a control switch located at any convenient point. The coil being energized draws the steel plunger 17 downwardly until it en-

gages its socket 19. The socket 16 of the plunger, coacting with the curved end 15 of the operating walking beam arm 14, rocks that end of the switch assembly downwardly, the shaft 5 turning about its bearings in the bearing standard 6. As this switch moves down, the plates 12 pass between the finger tips 32, making contact therewith, and being yieldingly retained therebetween. Simultaneously the auxiliary contact stud 41 passes between its contacts 37, closing the auxiliary circuit. Each main circuit closed by the switch passes from the bolts 29 through the blocks 28, fingers 30, finger tips 31, switch plate 12, and switch arm 7, to the braided connector 10, and thence to the bolt 11. The auxiliary circuit is closed by means of the stud 41 and the circuit passes through one bolt 35, support 34, finger 36 and finger tip 37 through the stud 41 and thence down the opposite assembly to the adjacent bolt 35. The auxiliary circuit fingers may be adjusted by means of the screws 37′ so as to make any desired contact pressure with the stud 41, the total pressure being limited by the spring 39.

In dismantling or assembling the structure, the shaft with its assembled switch and operating arms may be readily removed by first removing one of the bearing supports 6. The plungers 17 are readily disengaged from the arm 14, there being no fastened connection therebetween. Removal of the screw 23 and detent 25 serves to permit the bushings 20 to be lifted upwardly from the coil cases 22 and the coils 21 may then be slipped laterally from the yokes.

While I have shown but one auxiliary circuit operating means associated with either end of the switch, yet it is obvious that a plurality of such means may be provided if desired. The switch is composed of comparatively few and rugged elements. The main circuit is positively insulated from the auxiliary circuit and from the solenoid circuits, and the walking beam arm is also insulated from these circuits and in case of accident may be manually operated without danger.

I claim:

1. In an electric switch, a rocking shaft, switch arms and an operating arm extending transversely of the shaft and having their median portions connected thereto, contacts adapted to engage the ends of the switch arms, secondary contacts adjacent each end of the main switch arms, and means carried by the switch arms insulated from the main circuit and adapted to engage the secondary contacts when the switch arms engage the first-named contacts.

2. In an electric switch, a rocking shaft, switch arms and an operating arm extending transversely of the shaft and having their median portions connected thereto, contacts adapted to engage the ends of the switch arms, secondary contacts adjacent each end of the main switch arms, means carried by the switch arms insulated from the main circuit and adapted to engage the secondary contacts when the switch arms engage the first-named contacts, the operating arm being insulated from the main circuit, and solenoid controlled plungers associated with each end of the operating arm.

Signed at Duluth, Minnesota, this 11th day of January, 1921.

CARL O. BURTON.