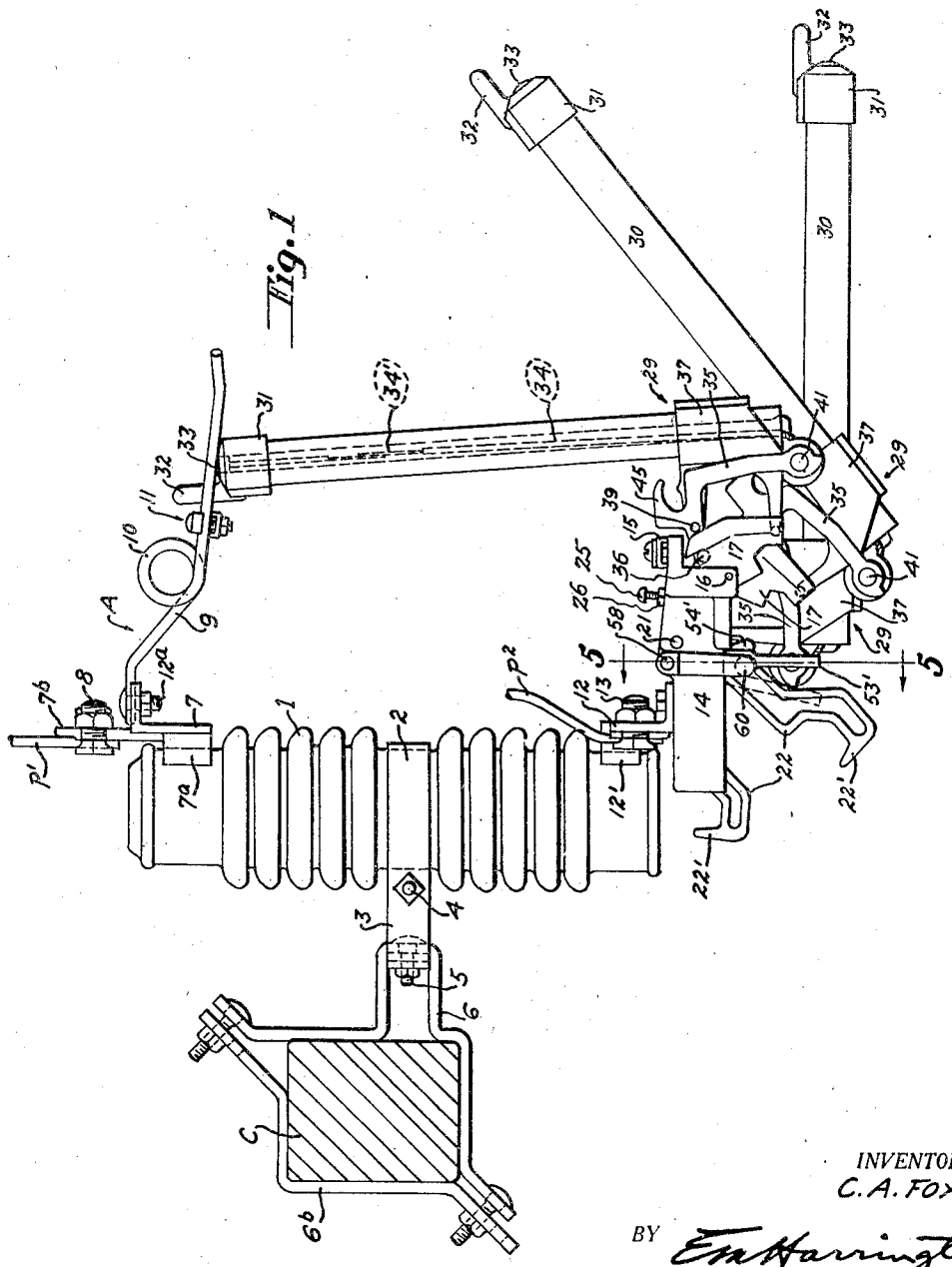
May 25, 1937. C. A. FOX 2,081,623

FUSE SWITCH

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Fig. 1



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FUSE SWITCH

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Fig. 2

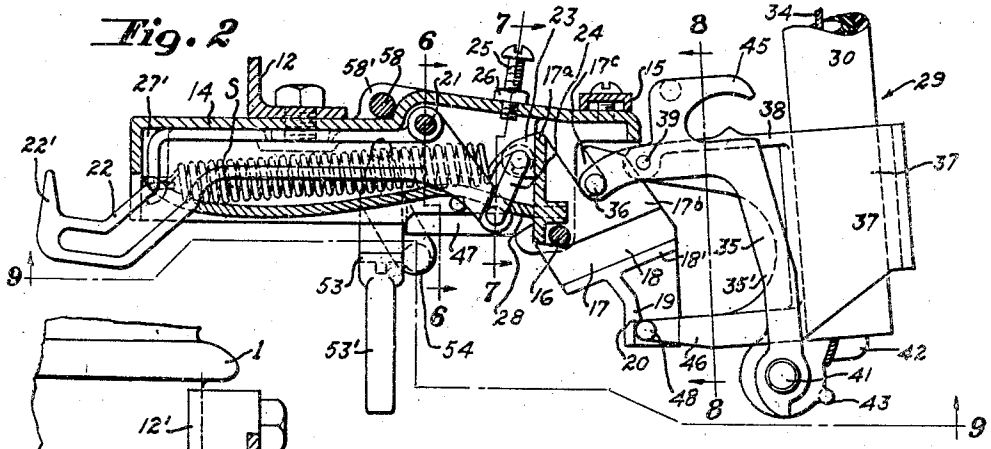


Fig. 3

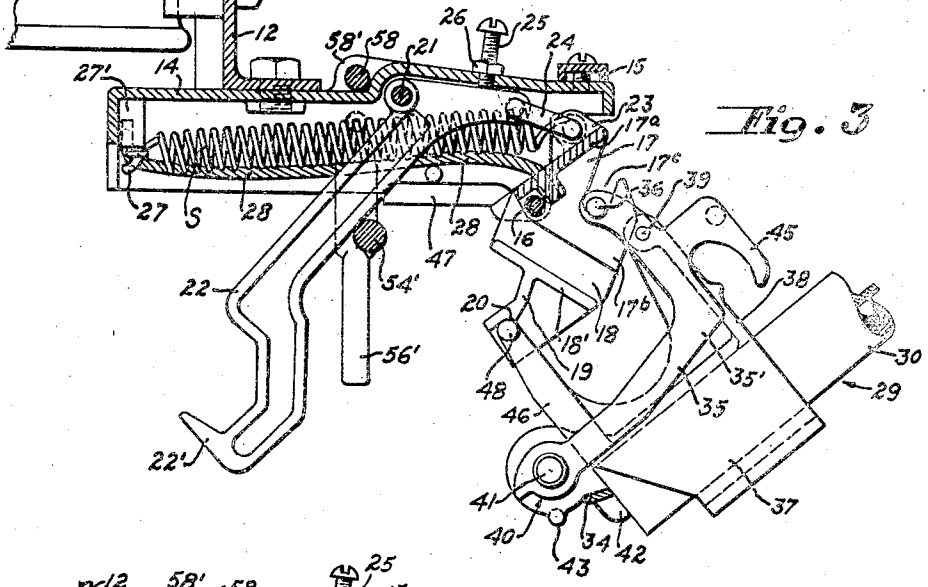
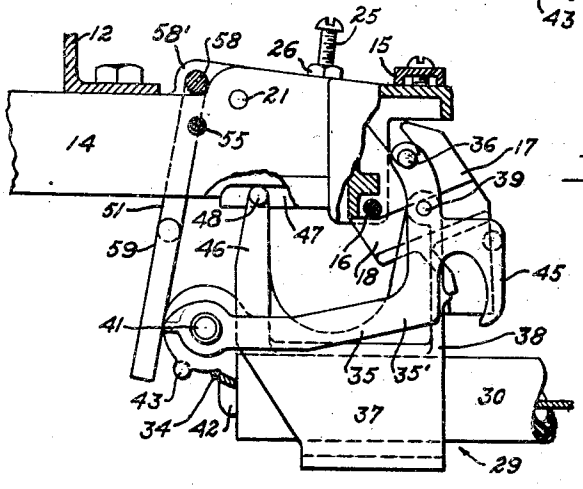


Fig. 4



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FUSE SWITCH

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Fig. 5

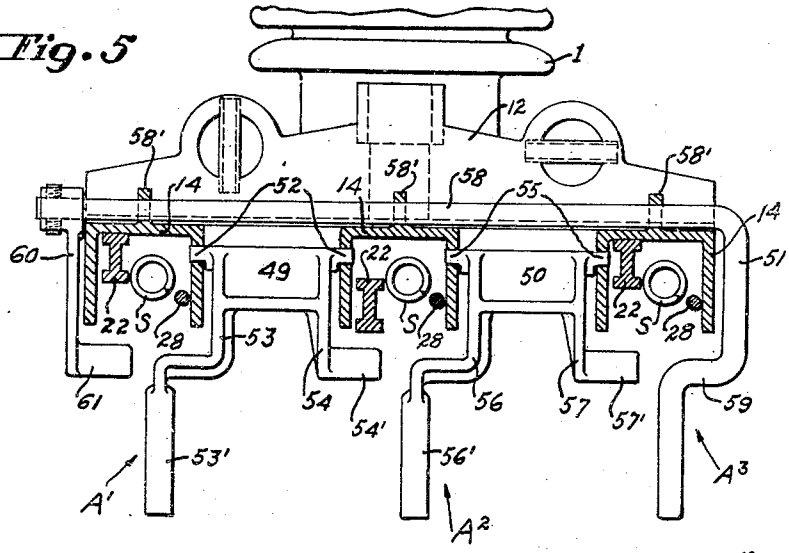


Fig. 6

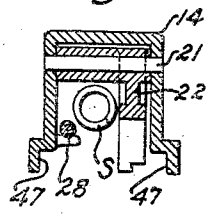


Fig. 7

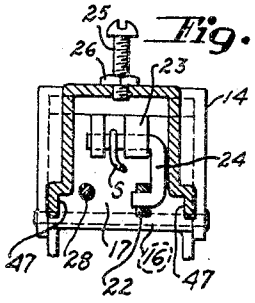


Fig. 8

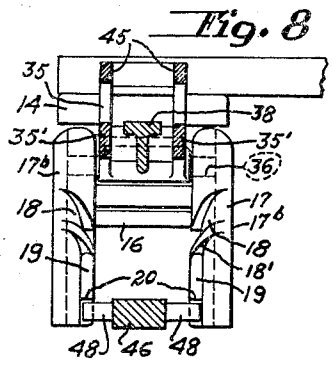
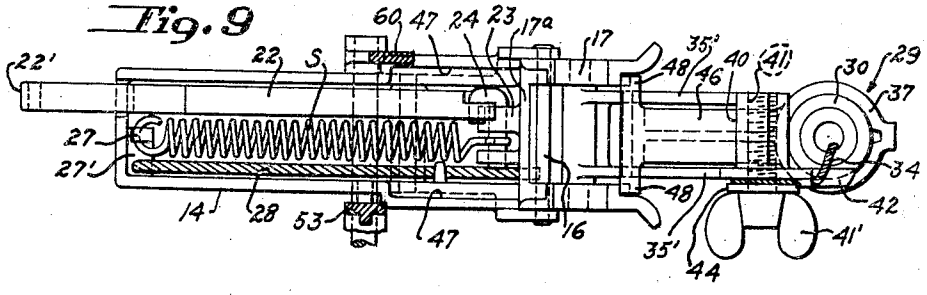


Fig. 9



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Patented May 25, 1937

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UNITED STATES PATENT OFFICE

2,081,623

FUSE SWITCH

Charles Adin Fox, St. Louis, Mo., assignor to James R. Kearney Corporation, St. Louis, Mo., a corporation of Missouri

Application April 6, 1935, Serial No. 14,999

15 Claims. (Cl. 200—126)

This invention relates generally to electrical fuse switches of the re-closing type adapted for use in protecting high voltage lines and equipment associated therewith, and more specifically to a structure of this type which includes a multiplicity of fuse cartridges adapted for automatic movement sequentially into operative positions in an electrical circuit as previously operatively positioned fuse cartridges of the group of fuse cartridges are rendered inoperative by short circuit or overload, the predominant object of the invention being to provide an apparatus of this type which is extremely simple in construction and operation and is capable of performing its intended function with a high degree of efficiency.

In protecting high voltage electrical lines and equipment associated therewith from the damaging effects of short circuits and overloads, it has become the practice of late to provide fusing apparatus which comprise each a plurality of fuse cartridges adapted for movement sequentially into operative fusing positions in the lines. These apparatus are usually capable of automatic actuation so that when the fuse element of the cartridge in the operative fusing position is blown because of a fault present in the line, such cartridge immediately drops out of the effective fusing position and is automatically replaced by another fuse cartridge having an operative, unblown fuse element associated therewith. None of the previously known apparatus of this type with which I am familiar completely solved the problem that made necessary the use of such apparatus, the deficiencies usually resulting from complexity of construction and operation, or, in the absence of this, an inability to perform the intended function in the required manner.

The prime purpose of this invention is to provide a fusing structure of the type described, which is of extremely simple construction and is operated in an equally simple manner. Because of the simple construction of the improved fusing structure disclosed herein, it is not necessary for the troublemen to familiarize themselves with a lot of mechanical details in order to service the apparatus. All a troubleman need know is how to re-fuse a cartridge and to understand that to remove a blown cartridge a certain lever must first be pulled to permit such removal. What he need not know is that when he pulls the lever referred to so as to permit removal of the blown cartridge he sets the cartridge-operating mechanism for its next operation of moving the subsequently associated cartridge into its effective fusing position. An important feature of the invention is that no set cycle of operations need be followed; that is to say, no certain cartridge need be placed in operative position at any particular time, as, regardless of what particular cartridge of the group of cartridges is in the effective operative position, the apparatus follows its normal sequence of operations in moving the cartridges into effective fusing positions. Also in operations of the improved apparatus an inherent time delay sufficient to permit temporary fault clearances is allowed.

Fig. 1 is a side elevation of the improved apparatus showing same supported by a cross arm which is shown in section.

Fig. 2 is an enlarged view, partly in section and partly in elevation, illustrating a cartridge-operating mechanism of the improved apparatus, and showing a fragment of a cartridge in the effective fusing position.

Fig. 3 is a view similar to Fig. 1, but showing a fragment of a cartridge in the reserve position.

Fig. 4 is a view partly in side elevation and partly in section, illustrating part of the mechanism shown in Figs. 2 and 3 but with a fragment of a cartridge in the ineffective or blown position.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 2.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 2.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 2.

Fig. 9 is a view, partly in section, taken on line 9—9 of Fig. 2, looking upwardly.

In the drawings, wherein is shown for the purpose of illustration, merely, one embodiment of the invention, A designates in Fig. 1 the improved apparatus generally. The improved apparatus includes a suitable insulator 1 about which a band 2 is arranged, said band being provided with spaced apart extensions 3 through apertures in which a clamping bolt 4 is extended for fixedly clamping the band about the insulator 1. The outer end portions of the extensions 3 are turned inwardly in overlapped relation, and formed through these overlapped portions are alined apertures through which a bolt 5 passes. The bolt 5 passes also through an aperture formed through a clamp portion 6 which, in association with a companion clamp portion 6b, provides means for attaching the apparatus A to a cross arm C or other support. The apparatus A may be shifted to various horizontal angular positions

by loosening the nut of the bolt 4 and moving the apparatus to the desired positions, after which said nut may be again tightened to clamp the insulator 1 in the position to which it has been adjusted.

Secured in any suitable manner to the insulator 1 at the upper end thereof as by means of a bolt is a cross member 7 which, as shown in Fig. 1, is of angular cross-sectional shape. The cross member 7 is provided with a lug 7^a which is provided with a curved depression adapted to receive a portion of the insulator, and extended upwardly from said cross member is an extension 7^b to which is attached by means of a suitable connector 8 a section P' of the power line of which the apparatus A forms a part.

Extended outwardly from the cross member 7 is a plurality of terminal elements 9. Each terminal element comprises a section of material bent double so as to provide a pair of substantially parallel, spaced apart, terminal portions joined together at one end of the terminal element by a connecting portion. These parallel portions of each terminal element are provided with torsional loops 10 to increase the resiliency of said terminal elements, and said parallel terminal portions are flared outwardly to facilitate passage of an element therebetween. Also, a clamp assembly 11 is associated with the parallel portions of each terminal element so as to prevent undue spreading thereof relative to each other. The inner ends of the terminal elements are seated in depressions formed in the cross member 7, and bolts 12^a are employed for securing said terminal elements to said cross member.

Suitably secured to the insulator 1 at the lower end thereof is a second cross member, which is designated by the reference character 12. The cross member 12 in shape resembles the cross member 7 already referred to herein, said cross member 12 being of angular cross section and having a lug 12' formed thereon which is provided with a curved depression that receives a portion of the insulator 1. The cross member 12 has attached to it through the instrumentality of a suitable connector 13 a section P^2 of the power line with which the apparatus A is associated.

Secured to the lower cross member 12 of the apparatus A is a plurality of housings 14, in the particular embodiment of the invention illustrated in the drawings three of these housings being shown. The housings 14 are closed at their top sides and in part at their ends, and are open at the bottoms as shown most clearly in Fig. 5, and said housings are spaced longitudinally of the cross member 12, as shown in the view referred to. The forward ends of the housings 14 are connected by a channel element 15 which serves to provide the structure with the required rigidity, and said housings 14 are alined vertically with the terminal elements 9.

Pivotally secured to each housing by a pivot element designated by the reference character 16 is a carriage 17, each carriage comprising a rear wall 17^a and parallel side walls 17^b, and formed in the opposite side walls of each carriage are alined, angularly extended slots 17^c which are open at the upper edges of said side walls. The opposed side walls of each carriage are provided with alined depressions 18 which serve as trackways in a manner to be hereinafter explained, the lower walls of said depressions being defined by ribs 18' which have ribs 19 associated therewith. The ribs 19 are provided with curved seats 20 which likewise serve a function to be hereinafter set forth.

Extended transversely of each housing 14 is a pivot element 21 which pivotally supports a cocking lever 22, said cocking lever having a portion extended forwardly of the pivot element 21 and a longer portion extended rearwardly thereof. At its rear end the cocking lever 22 is provided with a hook-like portion 22', and the rear wall of each housing is provided with a slot which is open at the bottom of said rear wall into which the rear end portion of said cocking lever is adapted to pass when it moves to an elevated position. The forward end of the cocking lever of each housing 14 is connected to an ear 23 extended from the associated carriage 17 by a link 24, and the top wall of each housing is provided with a screw-threaded opening that receives a screw 25 which extends into the interior of the housing and serves as an adjustable stop for limiting upward movement of the forward portion of the cocking lever. The screw 25 has a lock nut 26 associated therewith which is operable to lock the screw in positions to which it has been adjusted. Located within each housing 14 is a coil spring S which is attached at one end to the rear wall of the associated carriage 17 by being arranged in embracing relation relative to a portion of the link 24 which passes through the ear 23, the opposite end of said coil spring being attached to a hook-like element 27 formed on a portion 27' of the housing 14. Each housing 17 is also provided with a short section of flexible electrical conductor 28 which is suitably connected to the rear wall of the carriage 17 and to the portion 27' of the housing and serves as a conductor of electricity between said parts.

The assembly of co-operating parts associated with each housing includes a fuse cartridge 29, which is of so called expulsion type and comprises an open end tube 30 of insulating material. Although the precise construction of the tube is not important in so far as this invention is concerned, it preferably is of composite construction, embodying an inner tubular portion of horn fiber and an outer jacketing portion of "bakelite", or other insulating material having equivalent weather-resisting properties. Fixed to the upper end portion of the tube 30 of each fuse cartridge 29 is a cap 31, which serves as a terminal member. The cap 31 is secured to the tube by suitable means, such as rivets or pins, and is provided with a bore which receives an upper portion of the tube structure. Extended outwardly beyond the end wall of the cap 31 is a finger 32, which is adapted to move into the passageway between the parallel terminal portions of the associated terminal 9 during switch-closing movement of the cartridge. In the particular fuse cartridge illustrated in the drawings, the upper end thereof is closed by a head element in the form of an externally convex disk 33, and due to its convexity the disk will center itself relative to the resilient parallel portions of the terminal 9 so as to distribute the spring pressure equally on opposite sides of the fuse cartridge. A fuse link 34, having a fusible section 34', is suitably connected to the disk 33 and passes downwardly through the tube 30, and the downward pressure exerted by the resilient terminal 9 against the upper end of the cartridge tends to move the cartridge axially downwardly, which, as will hereinafter appear, results in tensioning of the fuse link.

At its lower end each fuse cartridge is pro-

vided with means for effecting its pivotal and detachable connection with the associated carriage 17. Such means include a hinge member 35 which is provided with trunnions 36 that are extended outwardly in opposite directions and are seated in the slots 17c formed in the opposite side walls of said carriage. The tube 30 of the fuse cartridge 29 has fixedly mounted thereon adjacent to its lower end a bracket member 37 which is provided with an upper extension 38, and the hinge member 35 is pivotally attached to said bracket member at the outer end of the upper extension 38 thereof through the instrumentality of a pivot element 39. The hinge member includes spaced apart side elements 35' as shown most clearly in Fig. 8, and the extension 38 of the bracket member 37 is disposed between these side elements with the pivot element 39 passing through apertures formed through the side elements and through an aperture formed through the outer end of the extension, which extension is of such length that it contacts with the inner faces of the opposed side elements of the hinge member.

At its lower end the hinge member is provided with a transversely extended portion 40, which integrally connects the opposed side elements of said hinge member, said portion 40 being provided with a screw-threaded opening formed therein that receives a bolt 41 which is provided with a winged head 41'. The hinge member is provided with an arcuate extension 42 which lies in contact with the lower end of the tube 30 at one side thereof when the fuse cartridge is in the fused condition, and also at the same side of the hinge member at which said arcuate extension is located an outwardly extended nub 43 is provided. When a fuse cartridge is fused and ready for use in the improved apparatus, the lower end of the fuse link 34 extends from the open lower end of the tube 30 and is passed under the extension 42 and is turned around the bolt 41, which is unscrewed to receive the end portion of the fuse link in embracing relation therewith. The bolt 41 has a washer 44 associated therewith, and the bolt-embracing portion of the fuse link is interposed between this washer and the adjacent side face of the hinge member 35, the bolt 41 being screwed inwardly after the bolt-embracing portion of the fuse link has been arranged in place so as to clamp this fuse link portion tightly in position in order to provide secure mechanical and efficient electrical connection between the fuse link and the parts to which it is attached. The nub 43 serves to retain the bolt-embracing portion of the fuse link in position about the bolt while the bolt 41 is being screwed into clamping position relative thereto.

Each hinge member 35 at its upper end is provided with a hook-shaped portion 45 which serves a function to be hereinafter set forth. Also, the bracket member 37 at the lower end of each fuse cartridge is provided with an extension 46 which passes between the side elements of the hinge member 35. When a fuse cartridge is in the circuit-closing position, as shown in Fig. 2, or in the reserve position, as shown in Fig. 3, the outer end of the extension 46 is seated against the seats 20 of the associated carriage 17. However, when a cartridge drops to the blown position the end of the extension 46 is disengaged from the seats and moves to the position in which it is shown in Fig. 4. In this connection it is important to note that the opposite side walls of each housing 14 at points adjacent to the lower edges are provided with depressed portions which provide guideways 47. When the carriage 17 of each housing assembly is in the reserve position illustrated in Fig. 3, the guideways 18 formed in the side walls of the carriage are in co-operative relation with respect to the guideways 47 at the lower edges of the side walls of the housing. The outer end of the lower extension 46 of each fuse cartridge is provided with outwardly extended portions 48 at the opposite sides thereof which, when the fuse cartridge moves to the blown position illustrated in Fig. 4, pass into the opposed guideways 47 in the side walls of the associated housing 14, and as will presently appear herein, the projected portions 48 are passed longitudinally of the guideways 47 of the housing and into and through the related guideways 18 of the carriage, when it is desired to detach a fuse cartridge from the associated carriage for re-fusing. This explains the co-operative relationship of the guideways 47 and 18 of an associated housing and carriage when the carriage is in the reserve position (Fig. 3).

By referring to Fig. 5, it will be noted that a cartridge-releasing element 49 is arranged between the left-hand housing 14 and the intermediate housing 14. Also, this view shows a similar releasing element 50 arranged between said intermediate housing 14 and the right-hand housing 14. The releasing element 49 is in co-operative relationship with the mechanisms associated with the left-hand housing and the intermediate housing, while the releasing element 50 is in co-operative relationship with the mechanisms associated with the intermediate housing and the right-hand housing. It will also be noted from the view mentioned that a third cartridge-releasing element 51 is provided which is in co-operative relationship with the mechanisms associated with the right-hand housing and the left-hand housing.

The releasing element 49 is provided with outwardly extended trunnions 52 which are seated in apertures formed in adjacent walls of the left-hand housing and the intermediate housing so as to support said mechanism for pivotal movement. The releasing element 49 includes a downwardly extended, laterally offset arm 53, the lower portion 53' of which is disposed in a downwardly extended position beneath the left-hand housing 14. At the opposite side of the releasing element 49 a downwardly extended arm 54 is provided, and this arm is provided with a laterally extended member 54' which is disposed beneath the intermediate housing 14. The releasing element 50 is constructed and arranged in conformity to the releasing element 49. That is to say, the releasing element 50 is provided with trunnions 55 which are seated in apertures formed in adjacent walls of the intermediate housing and the right-hand housing. Also, the releasing element 50 is provided with a downwardly extended, laterally offset arm 56 having a lower portion 56' which is located beneath the intermediate housing, and said releasing element at its opposite side is provided with a downwardly extended arm 57 which is provided with a laterally extended member 57' that is disposed beneath the right-hand housing. The releasing element 51 includes a rod portion 58 which is rotatably supported by bearing elements 58' formed on and extended upwardly from the top walls of the housings 14, this rod portion having a downwardly extended, transversely offset portion 59 whose lower portion is located in a position be-

neath the right-hand housing 14. At the opposite end of the rod portion 58 an arm 60 is fixed thereto, and this arm is extended downwardly from the rod portion 58 and is provided at its lower end with a transversely extended member 61, which is located beneath the left-hand housing 14.

For convenience in describing the operation of the improved apparatus, the three fusing units of the apparatus will be given separate reference characters; that is to say, reading from left to right in Fig. 5, these units will be designated respectively by the reference characters A^1, A^2, and A^3. With this in mind it will be assumed that the unit A^1 is in the circuit-closing position shown in Fig. 2, and that the units A^2 and A^3 are each in the reserve position illustrated in Fig. 3. The unit A^1 being in the closed circuit position, the coil spring S thereof is contracted, whereby the carriage 17 is drawn inwardly at its upper end, the toggle produced by the forward end portion of the cocking lever 22 and the associated link 24 being broken downwardly, as shown in Fig. 2. Also, the units A^2 and A^3 being in the reserve position, the rear end portions of the cocking levers 22 thereof are drawn downwardly, as shown in Fig. 3, with the result that the toggles produced by the forward end portions of the cocking levers and the links 24 have moved the upper portions of the carriages outwardly and thereby placed the coil springs under tension. With respect to the toggles referred to, it is important to note that the points of connection between the forward end portions of the cocking levers and the links 24 are located slightly above dead center as defined by an imaginary line drawn from the center of the points of connection between the links 24 and the carriages, and the center of the pivot elements 21. It is also to be noted that the screws 25 form stops which limit upward movement of the forward end portions of the cocking levers. This relation of the parts referred to locks the carriages in the position shown in Fig. 3.

Assume, now, with the units A^1, A^2, and A^3 arranged as described, the fuse link of the unit A^1 blows, due to a fault in the line. The ruptured fuse link will permit the hinge member 35 at the lower end of the fuse cartridge of said unit A^1 to swing about its pivot 39, which will result in downward movement of the fuse cartridge longitudinally of its major axis, whereby the finger 32 will be freed from the terminal 9 and the end of the lower extension 46 will be freed from the seats 20. The cartridge will then rotate outwardly and downwardly about the connection between the cartridge and its carriage defined by the trunnions 36 and the slots 17c, and the lower end of the hinge member 35 will strike the lower end portion 53' of the releasing element 49 (Fig. 5). This will result in the member 54' of said releasing element striking the cocking lever 22 of the unit A^2, whereby the toggle produced by said cocking lever and the associated link 24 will be broken downwardly to permit the coil spring S of the unit A^2 to forcibly snap the fuse cartridge of the unit A^2 from the reserve position to the circuit-closing position. In like manner, when the unit A^2 is in the circuit-closing position and the fuse link blows, the cocking lever 22 of the unit A^3 in reserve position is struck by the member 57' of the releasing element 50 to cause the fuse cartridge of said unit A^3 to be thrown into the circuit-closing position.

Also, when the unit A^3 is in the circuit-closing position and the unit A^1 is in the reserve position, rupture of the fuse link of said unit A^3 will result in the member 61 of the releasing element 51 striking the cocking lever of the unit A^1, to permit the coil spring S of said unit A^1 to draw the cartridge thereof to the circuit-closing position.

Because a blown fuse cartridge assumes a horizontal position, as illustrated in Fig. 4, which is different from the circuit-closing and reserve positions, troublemen may immediately recognize blown cartridges during their tours of inspection. In order to remove a blown fuse cartridge it is necessary first to re-cock the cocking lever 22 of the unit of which the blown cartridge forms part by drawing the rear end portion thereof downwardly. This is so because the forward upper portion of the housing 14 overhangs the slots 17c of an uncocked unit so as to prevent upward movement of the trunnions 36 out of said slots. After the cocking lever of a unit which has been blown is re-cocked, the slots 17c of the carriage 17 are positioned as shown in Fig. 3. The hook-shaped portion 45 of the hinge member may then be engaged with the aid of a suitable switch hook and the cartridge moved upwardly and outwardly. During such removal of a blown cartridge the outwardly extended portions 48 at the end of the lower extension 46 of the bracket member 37 at the lower end of the cartridge tube pass longitudinally through the guideways 47 of the housing 14 and into and through the related guideways 18 of the associated carriage 17. When a fuse cartridge is removed for inspection when it is in the reserve position, it is necessary merely to free the end of the lower extension 46 from the seat 20 and raise the trunnion out of the slots 17c.

When the troubleman has removed a blown fuse cartridge from the apparatus he re-fuses same and replaces it in the reserve position, the carriage 17 and the parts associated therewith having been moved to the reserve position when the cartridge was removed. The re-fused cartridge is then again ready for movement into the circuit-closing position in the manner already explained.

It is obvious in the operation of the improved apparatus disclosed herein that no set cycles of operations are followed. In other words, the present invention does not include a primary fusing unit and a secondary fusing unit which is placed in service only while the primary fusing unit is out of service. In the operation of the improved structure no particular fusing unit need be placed in operation at any certain time, as the apparatus follows its normal sequence of operations regardless of what fusing unit is in service. Also, as already stated herein, an inherent time delay is allowed between blowing of one fuse cartridge and automatic introduction of the succeeding fuse cartridge in the line to permit temporary fault clearances.

Another feature of the invention is that if it is desired to inspect any one of the fuse cartridges, the other two cartridges may be placed in fusing service while the inspection is being made. This reduces the possibility of the switch operating while the inspection is being made. A fuse cartridge may be moved by hand to an open position by drawing the rear end portion of the associated cocking lever 22 downwardly, and may be closed by tripping said cocking lever. When so operated by hand quick break and recloser ac-

tion is produced, which tends to eliminate arcing. Cocking of the levers 22 is accomplished by engaging the hook-shaped rear end portions thereof with the aid of a suitable switch hook.

The adjusting screws 25 constitute important elements of the improved structure, inasmuch as they serve to regulate the amount of travel of the levers 22 in the off center direction, and they must be adjusted very carefully with respect to the weight of various cartridges employed with the apparatus. In other words, switches of lower voltage rating using shorter cartridges require that the adjustments of the screws be made finer, while, in cases where higher voltage cartridges are used, the adjustments of the screws 25 must be such as to compensate for the additional weight of the longer cartridges.

I claim:

1. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, energy means connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to render said energy means effective, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the energy means of another fusing unit so as to permit said energy means to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

2. A fuse switch comprising a plurality of fusing units including each a pivotally supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

3. A fuse switch comprising a plurality of fusing units including each a pivotally supported carriage and a fuse cartridge pivotally supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

4. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and releasing means operable by being struck by a fusing unit moving out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

5. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means, including a pivotally supported lever, associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

6. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means comprising a toggle assembly associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

7. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, said cocking means comprising a pivotally supported lever and a link connected to said lever and to the associated carriage in a manner to provide a toggle connection for said carriage, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

8. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, said cocking means comprising a pivotally supported lever and a link connected to said lever and to the associated carriage in a manner to provide a toggle connection for said carriage, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit by actuating the cocking means thereof so as to permit said coil spring to move the associated carriage to a posi-

tion where the fuse cartridge carried thereby assumes the fusing position.

9. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, said cocking means comprising a pivotally supported lever and a link connected to said lever and to the associated carriage in a manner to provide a toggle connection for said carriage, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit by striking the pivotally supported lever of the cocking means thereof so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

10. A fuse switch comprising a plurality of fusing units including each a pivotally supported carriage movable to different positions and a fuse cartridge detachably supported thereby and having a fuse link associated therewith, said fuse cartridge being removable from said carriage by being moved relative thereto, means associated with each of said fusing units whereby rupture of the fuse link thereof causes said fusing unit to move out of the fusing position, means associated with each fusing unit adapted to move the fusing unit into the fusing position, releasing means operable by movement of a fusing unit out of the fusing position for releasing another fusing unit for movement into the fusing position, and a housing associated with each fusing unit and having a portion which is so related to the carriage thereof when said carriage is in a certain position that the fuse cartridge associated with said carriage may not be detached therefrom.

11. A fuse switch comprising a plurality of fusing units including each a pivotally supported carriage movable to different positions and a fuse cartridge detachably supported thereby and having a fuse link associated therewith, said fuse cartridge being removable from said carriage by being moved relative thereto, means associated with each of said fusing units whereby rupture of the fuse link thereof causes said fusing unit to move out of the fusing position, means associated with each fusing unit adapted to move the fusing unit into the fusing position, releasing means operable by movement of a fusing unit out of the fusing position for releasing another fusing unit for movement into the fusing position, and a housing associated with each fusing unit and having an overhanging portion which is so related to the carriage thereof when said carriage is in a certain position that the fuse cartridge associated with said carriage may not be detached therefrom.

12. A fuse switch comprising a plurality of fusing units including each a pivotally supported carriage movable to different positions and a fuse cartridge detachably supported thereby and having a fuse link associated therewith, said fuse cartridge being removable from said carriage by being moved relative thereto, means associated with each of said fusing units whereby rupture of the fuse link thereof causes said fusing unit to move out of the fusing position, means associated with each fusing unit adapted to move the fusing unit into the fusing position, releasing means operable by movement of a fusing unit out of the fusing position for releasing another fusing unit for movement into the fusing position, and a housing associated with each fusing unit and having a portion which is so related to the carriage thereof when said carriage is in a certain position that the fuse cartridge associated with said carriage may not be detached therefrom, the housing and the carriage of each fusing unit being provided with guideways which are in co-operative relation when the carriage is positioned properly for removal of the associated fuse cartridge through which guideways parts of said fuse cartridge pass during detachment thereof.

13. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, and pivotally supported releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

14. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means comprising a toggle assembly associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, a stop for limiting movement of said toggle assembly when the carriage is moved to the cocked position by the cocking means, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

15. A fuse switch comprising a plurality of fusing units including each a movably supported carriage and a fuse cartridge supported thereby, an expansible and contractile coil spring connected to the carriage of each fusing unit and adapted to move said carriage, cocking means comprising a toggle assembly associated with each fusing unit for moving and locking the carriage thereof in a manner to tension the associated coil spring, an adjustable stop for limiting movement of said toggle assembly when the carriage is moved to the cocked position by the cocking means, and releasing means operable by movement of a fusing unit out of the fusing position and adapted to release the tensioned coil spring of another fusing unit so as to permit said coil spring to move the associated carriage to a position where the fuse cartridge carried thereby assumes the fusing position.

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