Jan. 16, 1940. W. C. McWHIRTER 2,187,518

CIRCUIT CONTROLLER

Filed Aug. 24, 1937 3 Sheets-Sheet 1

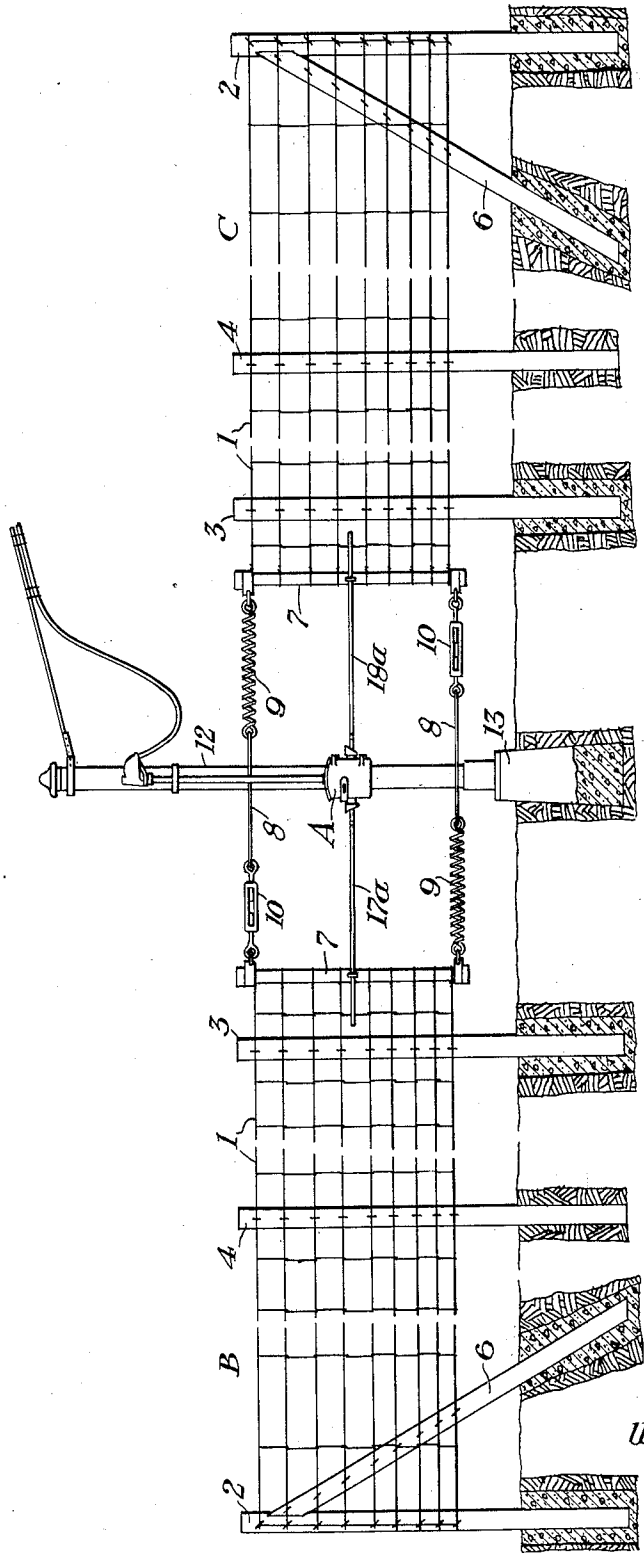


Fig. 1.

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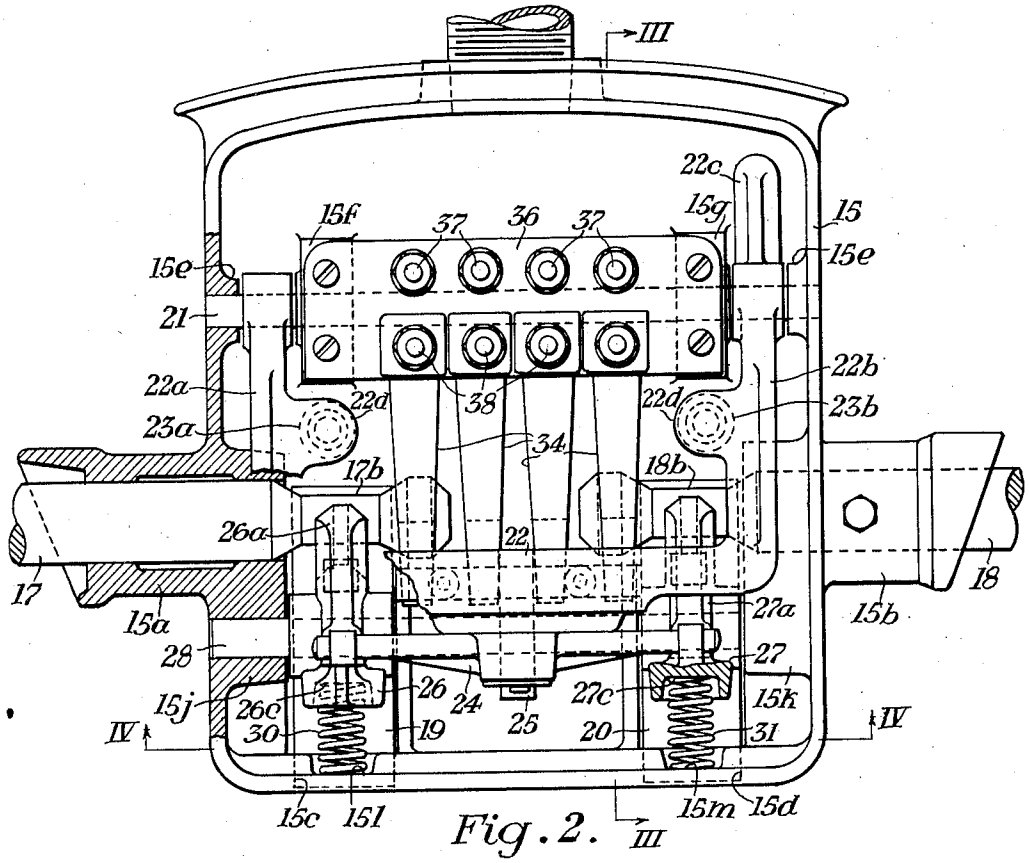


Fig. 2.

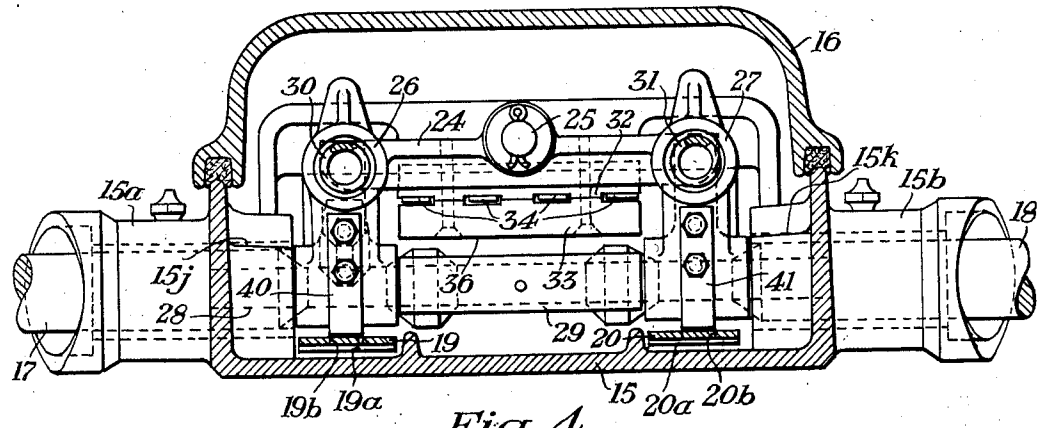


Fig. 4.

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CIRCUIT CONTROLLER
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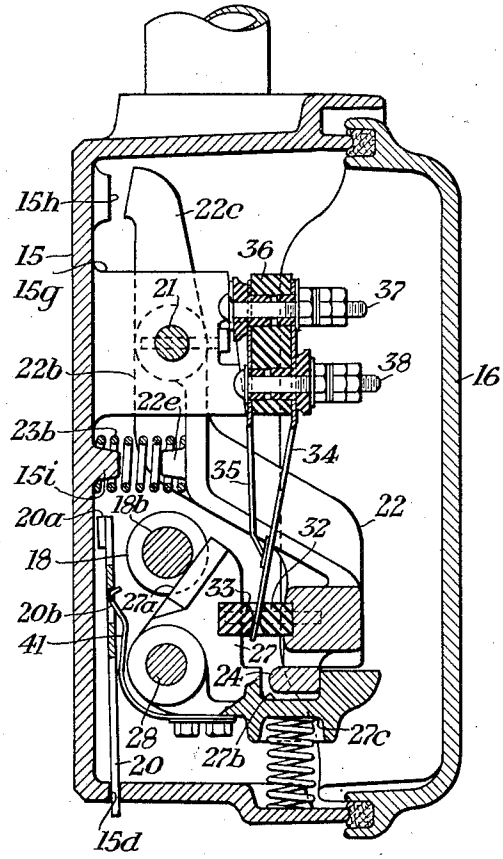


Fig. 3.

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2,187,518

UNITED STATES PATENT OFFICE

2,187,518

CIRCUIT CONTROLLER

William C. McWhirter, Wilkinsburg, Pa., assignor to The Union Switch & Signal Company, Swissvale, Pa., a corporation of Pennsylvania

Application August 24, 1937, Serial No. 160,641

3 Claims. (Cl. 200—52)

My invention relates to circuit controllers.

Circuit controllers embodying my invention are particularly suitable for, although in no way limited to, use in connection with slide detector fences of the type which are provided along the right of way of railroads at locations where obstructions to the right of way due to land or snow slides, falling rocks, falling trees, or the like are likely to occur, to control the usual block or other warning signals in a manner which will cause the signals to give a warning indication in the event that an obstruction occurs, and one object of my invention is to provide a novel circuit controller of the type described which shall be economical to manufacture, easy to install, and reliable in operation.

Other objects and characteristic features of my invention will appear as the description proceeds.

I shall describe one form of circuit controller embodying my invention, and shall then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is an elevational view illustrating a circuit controller embodying my invention connected with two adjacent sections of a slide detector fence. Fig. 2 is a front view on an enlarged scale of the circuit controller shown in Fig. 1, the door of the circuit controller and some of the parts being removed, and some of the parts being shown in section, to better illustrate the construction of the remaining parts. Figs. 3 and 4 are sectional views taken substantially on the lines III—III and IV—IV, respectively of Fig. 2.

Similar reference characters refer to similar parts in each of the several views.

Referring first to Fig. 1, I have here shown a circuit controller A embodying my invention operatively connected with a slide detector fence such as is commonly used to protect a railroad right of way through cuts, at the base of rocky slopes, or at any other location where an obstruction is likely to occur due to land or snow slides, falling rocks or trees, or the like. The fence may have any preferred construction depending upon local conditions, but, as here shown, the fence comprises two fence sections B and C, each consisting of a span of wire 1 supported by end posts 2 and 3, and as many intermediate posts 4 as the length of the span makes necessary or desirable. The end posts 2 and 3 are required to be firmly anchored in place, and, for this purpose, the lower ends of these posts will preferably be embedded in a suitable concrete base or foundation. Furthermore, the end posts 2 may, if desired, be braced by other posts 6, the lower ends of which are also embedded in concrete. The intermediate posts 4, however, need not be anchored in place any more firmly than is necessary to maintain them in upright positions, and these posts will therefore usually be embedded in the earth without providing any special foundation. Each span of wire 1 is rigidly fastened to the associated end post 2, but is slidably secured to the end post 3 and to each of the intermediate posts 4 in such manner that the span is free to move longitudinally with respect to these latter posts. The wire of each span extends for a short distance past the associated end post 3, and is secured to a tension bar 7. The two tension bars 7 are spaced apart in the manner shown and are resiliently connected by tensioning connections 8, each of which preferably includes a spring 9 and a turnbuckle 10 by means of which the tension of the associated spring 9 may be increased or decreased. The turnbuckles 10 are so adjusted, and the parts are so proportioned that the wire 1 of the two spans will normally be stretched tight, but that, if either span is struck by a falling object of sufficient size to cause a dangerous condition in the event the object falls onto the right of way of the railroad, the span will deflect and will move the tension bar toward the associated end post 3.

The circuit controller A is mounted on an upright post 12 which is securely anchored to a rigid foundation 13 at a location intermediate the two tension bars 7, and as best seen in Figs. 2, 3, and 4 comprises a suitable housing 15 provided at its forward side with a hinged cover 16 through which access to the operating parts of the circuit controller may be had for inspection or repair. The housing is also provided in its opposite side walls with guideways 15*a* and 15*b* which slidably receive two trip rods 17 and 18, and in its bottom wall with openings 15*c* and 15*d* which slidably receive drop indicators 19 and 20, respectively. The two trip rods 17 and 18 are operatively connected by means of operating rods 17*a* and 18*a*, respectively, with the tension bars 7 of the two fence sections B and C in such manner that any movement of the tension bars caused by lateral displacement of the fence wire 1 will cause corresponding longitudinal movement of the trip rods.

A transversely extending rod 21 is mounted in bosses 15*e* formed in the opposite side walls of the housing 15 above the guideways 15*a* and 15*b*, and in forwardly projecting lugs 15*f* and 15*g* which are provided on the back wall of the housing 15 opposite the two bosses 15*e*, respectively, and pivoted

on this rod between the bosses and the lugs are the two arms 22*a* and 22*b* of a depending U-shaped contact operating member 22. The contact operating member is biased, by means of two compressed coil springs 23*a* and 23*b*, to an outer extreme position in which an upwardly extending stop 22*c* formed on the upper end of the arm 22*b* engages a stop pad 15*h* formed on the back of the housing, but is adapted to be normally latched in an inner extreme position by means of latch mechanism which I shall describe presently. The coil springs 23*a* and 23*b* are interposed between the back wall of the housing and laterally projecting ears 22*d* formed on the arms 22*a* and 22*b* of the contact operating member 22, and are maintained in the proper positions by suitable guides 15*i* formed on the back wall of the housing 15 and other guides 22*e* formed integrally with the ears 22*d*.

The latch mechanism in the form here shown comprises a latch arm 24 which is pivotally mounted intermediate its ends on a depending stud 25 secured to the lower end of the contact operating member 22, and two latch dogs 26 and 27 which cooperate with the latch arm adjacent its opposite ends. The latch dogs 26 and 27 are pivotally mounted on a transversely extending rod 28 mounted in bosses 15*j* and 15*k* provided in the side walls of the housing 15 below the guideways 15*a* and 15*b*, and are maintained in the proper spaced relation by means of a spacing sleeve 29 pinned to the rod. The latch dog 27 is provided with a cam follower 27*a* which cooperates with a cam notch 18*b* provided in the inner end of the trip rod 18, and is constantly biased to the position in which the cam follower enters the notch 18*b* by means of a compressed coil spring 31, one end of which fits into a recess 27*c* in the latch dog and the other end of which fits into a recess 15*m* formed in the bottom wall of the housing 15. The latch dog 26 is similarly provided with a cam follower 26*a* which cooperates with a cam notch 17*b* provided in the inner end of the trip rod 17, and is constantly biased to a position in which the cam follower enters the notch 17*b* by means of a compressed coil spring 30, one end of which fits into a recess 26*c* formed in the latch dog, and the other end of which fits into a recess 15*l* formed in the bottom wall of the housing 15. The latch dog 27 is further provided with a notch 27*b* which is adapted to at times receive the adjacent end of the latch arm 24, and the latch dog 26 is further provided with a notch which is not visible in the drawings, but which is similar to the notch 27*b* in the latch dog 27, and which is adapted to at times receive the adjacent end of the latch arm 24.

The trip rods 17 and 18 are so adjusted that when the spans of wire 1 of the two fence sections B and C occupy the longitudinal positions to which they are biased by the tensioning connections 8, the notches 17*b* and 18*b* in these trip rods will align with the cam followers 26*a* and 27*a* of the latch dogs 26 and 27; and the parts are so proportioned that if the contact operating member 22 is moved to its inner extreme position, by pressing inwardly on the latch arm 24 at its point of connection with the operating member when the notches in both trip rods are opposite the cam followers, the ends of the latch arm will automatically enter the associated notches in the latch dogs, and will thus latch the operating arm in its inner extreme position. The parts are further so proportioned that, if either trip rod 17 or 18 is moved laterally far enough to force the associated cam follower out of the cam notch when the contact operating member is latched in its inner extreme position, as will be the case if the wire of the associated fence section is moved laterally by an object of sufficient size to cause a dangerous condition provided the object falls onto the right of way, the notch in the associated latch dog will move out of engagement with the latch arm. Both ends of the latch arm 24 are rounded, as shown in dotted lines in Fig. 4, and the notches in the two dogs 26 and 27 are made somewhat larger than the portion of the arm which enters the notch, as shown in connection with the notch 27*b* in the dog 27 in Fig. 3, so that when the notch in either dog moves out of engagement with the latch arm, the arm will then be free to rotate about the stud 25, without binding in the notch in the other dog, through a sufficient angular distance to permit the contact operating member 22 to move to its outer extreme position, and, as a result, as soon as either notch moves out of engagement with the arm the biasing springs 23*a* and 23*b* will move the contact operating member to its outer extreme position. The amount of lateral movement of the wire of the fence sections necessary to operate the latch mechanism may be varied by varying the longitudinal positions of the trip rods 17 and 18 with respect to the associated cam followers to thereby vary the distance that the trip rods must be moved to force the cam followers out of the notches, which variation may be made at the point of attachment of the operating rods 17*a* and 18*a* with the tension bars 7. The trip rods may have any desired lengths, but will preferably be of such lengths that they will extend only a short distance outside of the controller housing, and these rods will preferably be so constructed at their outer ends that the operating rods may be attached to the trip rods by means of a standard rod jaw and the usual pin and cotter.

Secured to the rear side of the contact operating member 2 are two juxtaposed insulating blocks 32 and 33 between which are clamped the free ends of a plurality of flexible contact fingers 34, here shown as four in number. Each contact finger 34 cooperates with an associated contact member 35 to form a contact 34—35. Each contact finger 34 and the associated contact member 35 are clamped to the opposite sides of an insulating block 36 by means of terminal posts 37 and 38, and the insulating block 36, in turn, is secured to the previously mentioned lugs 15*f* and 15*g*. Each terminal post 37 is electrically connected with the associated contact member 34, but is insulated from the associated contact finger 35, as will be apparent from an inspection of the drawing, while each terminal post 38 is electrically connected with the associated contact finger 35, but is insulated from the associated contact finger 34. The parts are so proportioned that, when the contact operating member 22 occupies its outer position, the contacts 34—35 will all be opened, but that, when the contact operating member occupies its inner position, the contacts 34—35 will all be closed.

It is desirable to provide some means which shall be visible for some distance away from the circuit controller to indicate when the contact operating member 22 has been moved to its outer extreme position due to the operation of the latch

mechanism by one or the other of the trip rods 17 and 18, and also to indicate which fence section caused the latch mechanism to become operated, and it is for this purpose that the previously referred to drop indicators 19 and 20 are provided. The drop indicator 19 is biased by its own weight to a lower position in which a stop bar 19a welded to its upper end engages the bottom wall of the housing 15 adjacent the slot 15c, but is adapted to be normally retained in an upper position when the cam follower 26a occupies the notch 17a in the trip rod 17, by means of a latch spring 40 which is secured to the latch dog, and which cooperates with the notch 19b provided in the indicator. The drop indicator 20 is likewise biased by gravity to drop to a lower position in which a stop bar 20a welded to its upper end engages the bottom wall of the housing 15, but is adapted to be normally retained in an upper position, when the cam follower 27a occupies the notch 18a, by means of a latch spring 41 which is secured to the latch dog 27, and which cooperates with a notch 20b provided in the indicator. The parts are so proportioned that, when the indicators occupy their upper or latched positions, they will be invisible from the outside of the housing, but that, when they occupy their lower or indicating positions, the lower ends of the indicators will then project downwardly below the bottom wall of the housing far enough to render these indicators readily visible for some distance away from the housing. To insure good visibility of the indicators, they may be painted any color which contrasts with the color of the housing, such for example, as red or white. It will be apparent that, when either latch dog is operated by the associated trip rod, the associated latch spring 40 or 41 will be withdrawn from the notch 19b or 20b in the associated indicator, and will thus permit the indicator to drop by gravity to its indicating position. After an indicator has been dropped to its indicating position, it may be reset provided the associated latch dog has then returned to its normal position, by merely lifting the indicator to its normal position.

The contacts of the circuit controller may be used to control the usual wayside or any other suitable signal in such manner that, when these contacts become opened, the signal will display a "stop" or "caution" indication depending upon the type of control provided. The means for controlling the signals by the controller forms no part of my present invention, and is, therefore, not shown in the drawings.

The operation of the circuit controller as a whole is as follows: Normally, the trip rods 17 and 18 ocupy the positions in which the notches 17a and 18a therein align with the cam followers 26a and 27a in the dogs 26 and 27, the operating member 22 is latched in its inner extreme position in which the contacts 34—35 are closed by means of the latch arm 24 and the dogs 26 and 27, and the two drop indicators 19 and 20 are held in their upper or non-indicating positions by the springs 40 and 41. When a slide occurs, the lateral pressure exerted against the fence forces the wire 1 to move longitudinally through the loose fastenings by which it is secured to the associated end post 3 and the intermediate posts 4, and this movement is transmitted through the fence to the associated tension bar 7, and thence to the associated trip rod, thus causing the associated trip rod to operate the latch dog controlled thereby. The operation of the latch dog, in turn, trips the latch mechanism and allows the drop indicator controlled by such latch dog to drop by gravity to its indicating position. The tripping of the latch mechanism permits the springs 23a and 23b to move the operating member 22 to its outer position in which the contacts 34—35 are open, thereby causing the governing signals to display a "stop" or "caution" indication, as the case may be until the obstruction is removed and the circuit controller is reset manually by the maintainer.

Although I have herein shown and described only one form of circuit controller embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A circuit controller comprising a housing, a contact operating member mounted in said housing for movement between two extreme positions and biased to one extreme position, contacts in said housing operatively connected with said contact operating member, two latch dogs in said housing biased to latching positions, means controlled jointly by said latch dogs and effective when and only when said latch dogs both occupy their latching positions and said contact operating member is moved to its other extreme position for latching said contact operating member in its other extreme position, separate means extending into said housing and cooperating with said two latch dogs respectively for at times moving said latch dogs to unlatching position, two indicators slidably mounted in said housing for movement between non-indicating positions in which said indicators are invisible from the exterior of said housing and indicating positions in which said indicators are visible from the exterior of said housing and biased by gravity to indicating positions, and means controlled by each of said latch dogs for latching a different one of said indicators in its non-indicating position when and only when the latch dog occupies its latching position.

2. A circuit controller comprising a housing, a contact operating member mounted in said housing for movement between two extreme positions and biased to one extreme position, contacts in said housing operatively connected with said contact operating member, two latch dogs in said housing biased to latching positions, means controlled jointly by said latch dogs and effective when and only when said latch dogs both occupy their latching positions and said contact operating member is moved to its other extreme position for latching said contact operating member in its other extreme position, separate means extending into said housing and cooperating with said two latch dogs respectively for at times moving said latch dogs to unlatching positions, two indicators slidably mounted in guideways provided in said housing and biased to drop by gravity to indicating positions in which the lower ends of said indicators project out of said housing, each said indicator being provided with an opening, and two latch springs secured to said two latch dogs respectively and one cooperating with each of said dogs at the opening in such dog for latching the indicator in a non-indicating position when and only when the latch dog occupies its latching position.

3. In a circuit controller for slide detector fences comprising a contact biased to an open position, means controlled by a pair of latch dogs

for retaining said contact in its closed position in opposition to said biasing means, and means adapted to be connected to separate fence sections for separately controlling said latch dogs, the combination of a pair of indicators movable by gravity from non-indicating positions in which they are invisible to indicating positions in which they are visible, and means controlled by each dog for retaining an associated one of said indicators in its non-indicating position until the dog is operated to open said contact, whereby when said contact becomes opened an indication is given of which fence section caused it to open.

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