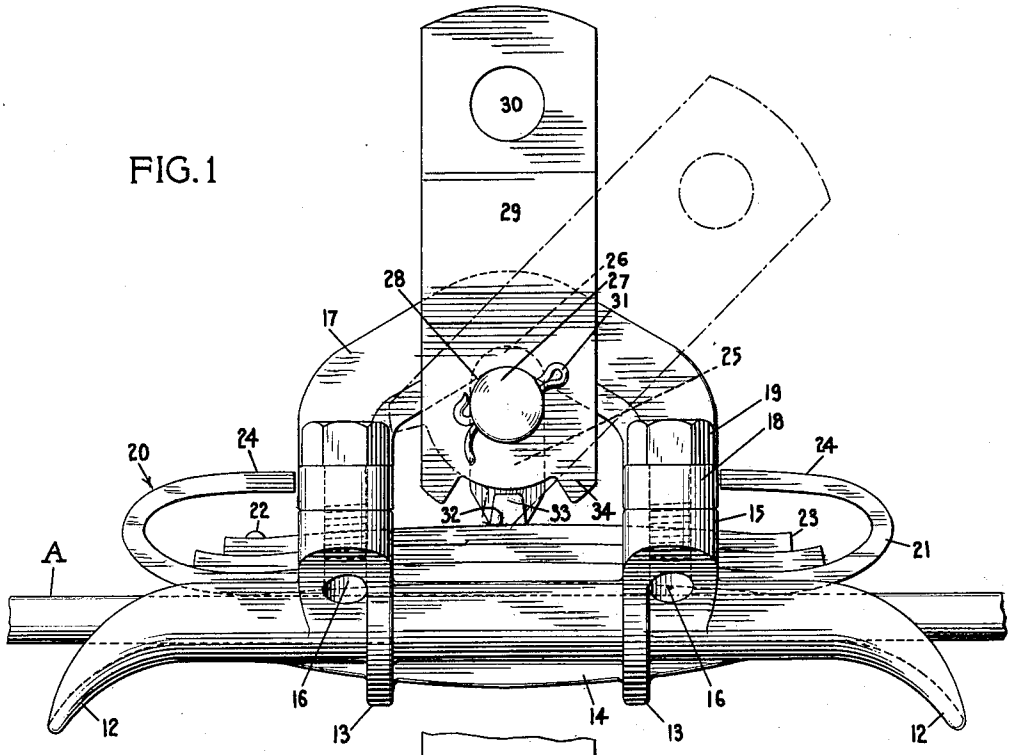
March 6, 1934. N. DEISCH 1,949,562

CONDUCTOR RELEASING CLAMP

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FIG. 1



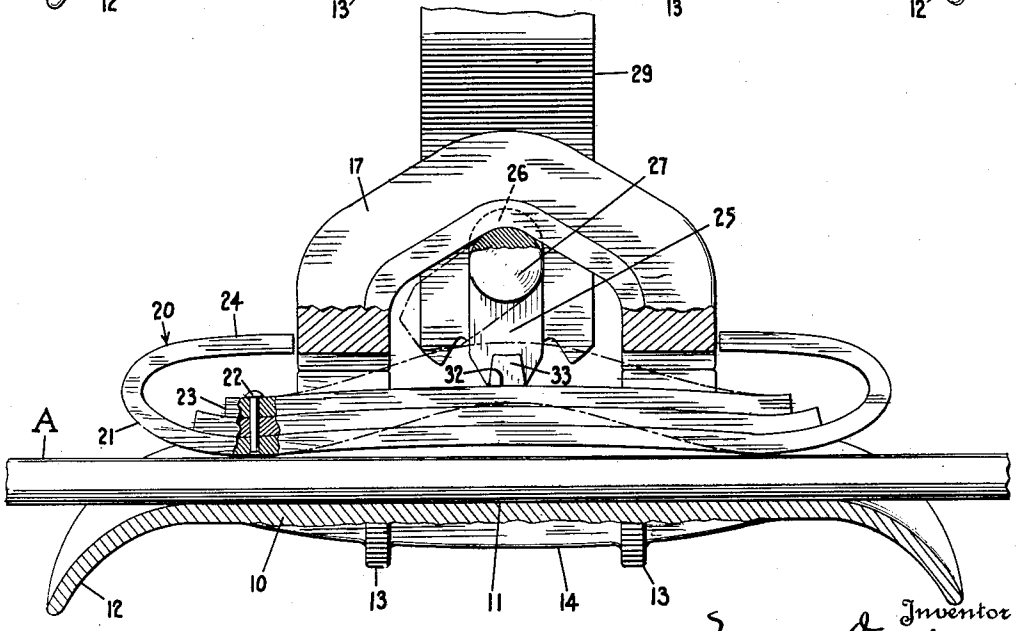


FIG. 2

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CONDUCTOR RELEASING CLAMP

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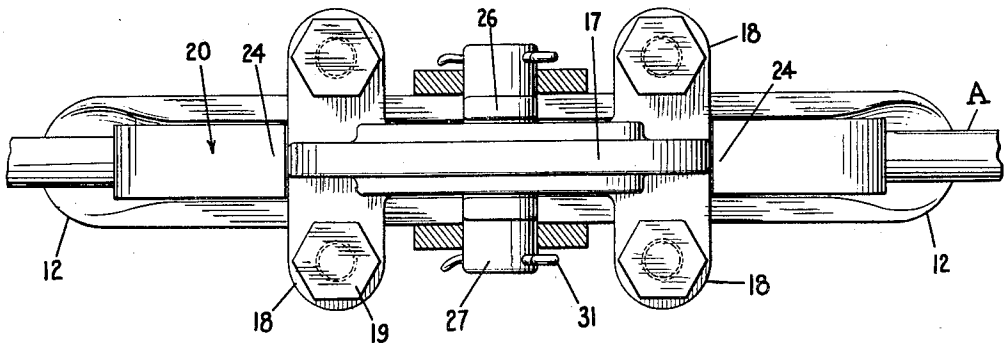


FIG. 3

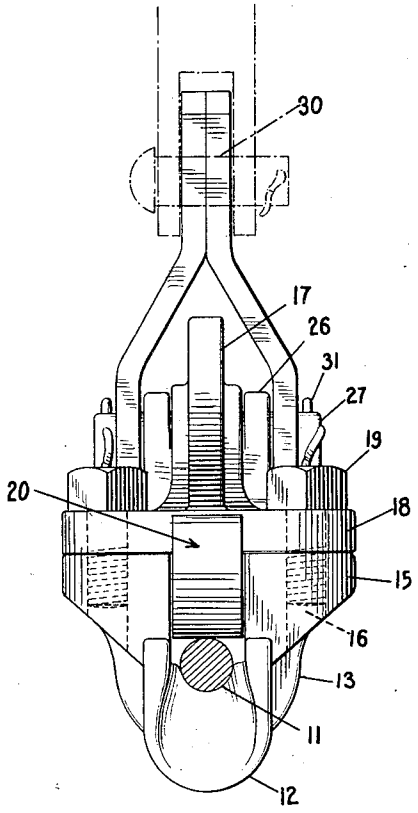


FIG. 4

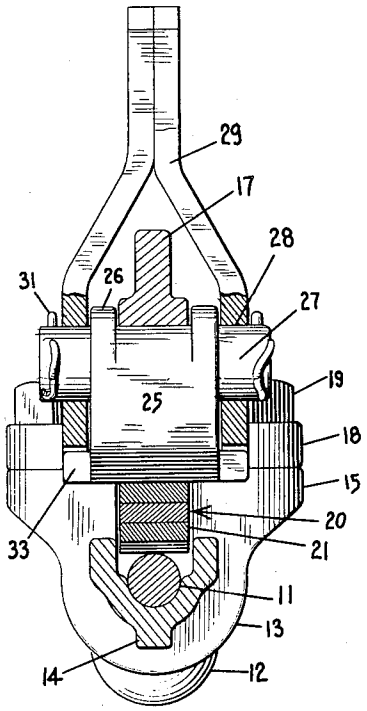


FIG. 5

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CONDUCTOR RELEASING CLAMP

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FIG. 6

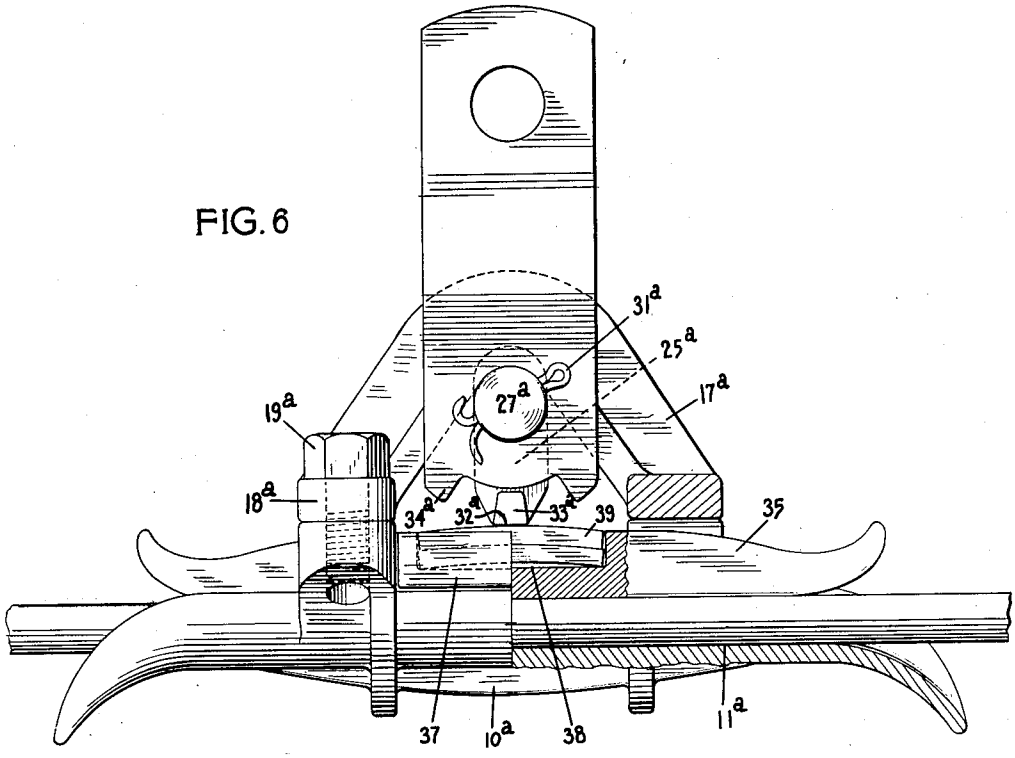
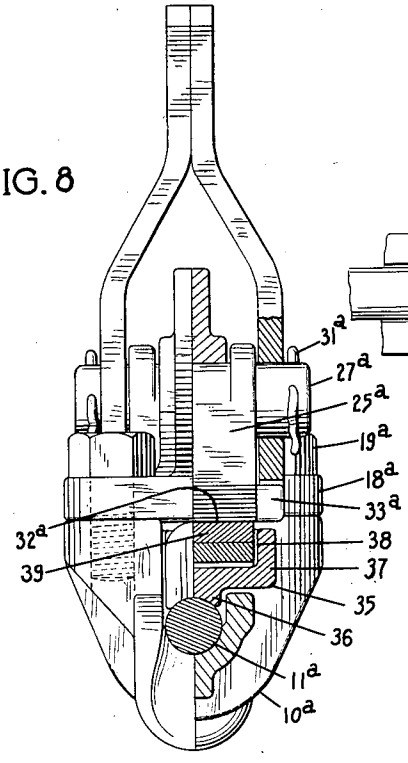


FIG. 8



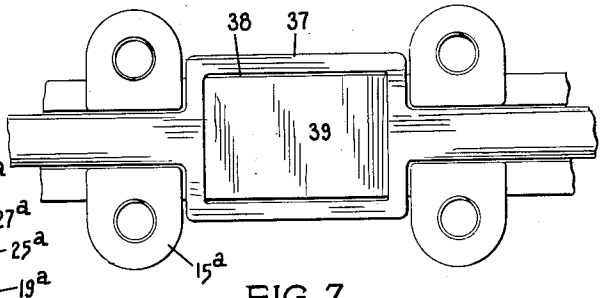


FIG. 7

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Patented Mar. 6, 1934 1,949,562

UNITED STATES PATENT OFFICE

1,949,562

CONDUCTOR RELEASING CLAMP

Noel Deisch, Washington, D. C., assignor to Locke Insulator Corporation, Baltimore, Md., a corporation of Maryland

Application November 11, 1929, Serial No. 406,421

14 Claims. (Cl. 248—31)

The invention relates to clamps for the suspension of the conductors forming part of high tension transmission lines.

The principal object of the invention, generally stated, is to provide a clamp adapted for suspending a conductor from the usual towers or other equivalent supports and characterized by capability of releasing its gripping action upon the conductor in the event of breaking thereof or excessive strain thereupon at one side of a tower, the result being that the conductor may slip with respect to one or more of the clamps and the strain be distributed instead of it all coming upon a single tower with possible damage thereto.

It is well known that under certain climatic conditions there may be a thick and very heavy accumulation of sleet or ice upon a transmission line and where the spans are very long it is possible that this great weight may cause breakage of the conductor or at least such tremendous sagging as to exert an excessive strain upon the adjacent tower. The same condition may occur as the result of high wind at one side or the other of a ridge and, indeed, from other causes. It is with these facts in view that I have devised the present invention which has for an important object the provision of a suspension clamp which is adapted and intended to be hung from a string of insulators, as is customary, and which will under ordinary circumstances grip the conductor with absolute firmness but which will under some circumstances release its holding action and permit the conductor to slip through.

Another important object is to provide a clamp of this character which may be described as trigger operated, that is to say one in which the holding action will be maintained until the clamp and the string of insulators suspending the same have been pulled by strain on the conductor into or beyond a certain predetermined inclination whereupon release occurs, not gradually, but suddenly and completely so that there will be a quick release.

Another object of the invention is to provide a clamp of this character which after release will not automatically reassume its clamping action with possible determent to an unarmored portion of the conductor in cases where armor is provided where the clamps are located, but which will remain open until manually reset in a proper manner by a repair tool.

Another object is to provide a clamp in which a certain freedom of movement or swinging of the clamp itself and supporting insulators may take place, as for example during ordinary windy weather conditions, or expansion and contraction of the conductor in a span affected by local temperature variations without releasing it, it being necessary that the inclination exceed a certain safe limit before release occurs.

A further object is to provide a clamp of this type in which the parts cannot become disassociated and lost when release takes place, adequate means being provided for always holding the parts together under every condition.

A still further object is to provide a clamp of the character described in which there is no wear upon any of the operating faces under normal conditions, there being consequently no diminution of the clamping action resulting from prolonged use.

An additional object is to provide a clamp of this type which will be simple and inexpensive to make, easy to apply or use, positive in action, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the details of construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of a clamp constructed in accordance with my invention showing the same in normal position in full lines and releasing position by dot and dash lines,

Figure 2 is a longitudinal sectional view with a few portions left in elevation,

Figure 3 is a plan view with the suspension member shown in section,

Figure 4 is an end elevation with the conductor in section,

Figure 5 is a vertical cross sectional view taken at substantially the center,

Figure 6 is a view partly in side elevation and partly in section showing a modification,

Figure 7 is a fragmentary plan view thereof with the yoke and suspension member omitted, and

Figure 8 is a view partly in end elevation and partly in central vertical cross section.

Referring more particularly to the drawings I have shown my clamp as comprising a lower clamping member 10 formed as an elongated body having a channel or groove 11 therein for the reception of the conductor A, the ends being preferably flared downwardly at 12 to avoid contact of any edges with the cable so that there will

be no noticeable bending strains upon vibration of the conductor. This lower clamping member is preferably reinforced by transverse ribs 13 at its underside and a longitudinally extending web 14 merging thereinto. At its upper portion this lower member is formed with laterally extending pairs of spaced ears 15 provided, preferably, with tapped holes 16, the ears having their lower portions merging more or less gradually into the body of the member so as to avoid sharp angles and provide a stronger structure.

The device further includes a yoke 17 which may be of substantially inverted U or V-shape and terminating in attaching portions or ears 18 overlying the ears 15 and rigidly secured thereto as by cap screws 19 threaded into the tapped holes 16. Obviously, bolts and nuts may be used in lieu of the cap screws as such elements are equivalents.

Cooperating with the lower clamping member 10 is an upper clamping member shown, in Figures 1 to 5, as a leaf spring assembly indicated generally by the numeral 20. This assembly is here represented as comprising a lower master leaf 21 upon which are superposed and to which are secured, as by rivets 22 or the like, shorter leaves 23. All of the leaves have a tendency to flex upwardly at the center, as shown in Figure 2, but are intended to be forced downwardly and held so in clamping relation to the conductor A by the means to be described. The master leaf 21 is shown as having its ends reflexly curved or extended toward each other as shown at 24, the ends terminating adjacent the opposite ends of the yoke 17 so that the spring assembly cannot become displaced under any conditions as these ends are in obstructing relation to the ears or attaching portions 18 of the yoke.

Located within the confines of the yoke is a trigger-like holding member or pressure maintaining element 25 prevented from lateral displacement with respect to the yoke as by means of spaced upstanding ribs 26 which straddle the bight portion of the yoke. This member is shown as having laterally extending trunnions 27 received within holes 28 in suspension links 29 which may be apertured at 30 for passage of any securing element for suspending them from the lower end of a string of insulators. Though there is little likelihood of disengagement of the links from the trunnions, the latter may if desired be equipped with cotter pins 31 which will positively prevent such a contingency. The lower end of the holding member 25 is preferably beveled off at opposite sides and is so finished as to have a comparatively small flat bearing surface 32 adapted to engage squarely upon the center of the master leaf at the top thereof for holding the spring leaf assembly down in clamping relation to the conductor and member 10. To provide for the desired releasing action the member 25 is provided at opposite sides with laterally extending lugs 33 located in the path of spaced lugs 34 or horns at the lower corners of the links 29. It is to be noted that the distance between the lugs 34 is considerably greater than the width of the lugs 33 so that the links 29 may have considerable movement about the trunnions 27 before the lugs 34 can engage the lugs 33 and trip the holding member or force it into releasing position.

The device is most readily assembled or installed on the line by first placing the member 25 in position within the yoke 17 and engaging the links 29 upon the projecting trunnions 27 and preventing withdrawal thereof by inserting the cotter pins 31. The lower clamping member 10 is then placed under the conductor and the spring assembly 20 placed over the conductor and within the groove or channel 11 in the lower clamping member. The parts are then so shifted or manipulated as to bring the lower clamping member in position beneath the suspended yoke 17 which is of course supported from the insulator string by means of the links 29. When the parts are properly positioned the ears 15 will be beneath the attaching portions or ears 18 on the yoke so that the cap screws 19 may be readily passed through the ears 18 and screwed down into the tapped holes 15. Just as soon as the screws have been started, care should be taken that the holding member 25 be in such position that its flat bearing surface 32 will engage squarely upon the top of the master leaf 21. As the cap screws are then turned down the leaf spring assembly 20 will be compressed into clamping engagement with the conductor. Clearly, the degree of clamping engagement may be varied by turning down the cap screws more or less. This completes the installation.

In the operation, it will be seen that under normal circumstances the insulator string depends substantially vertically with the links 29 extending practically straight down and with the holding member 25 maintaining the leaf spring assembly compressed against the conductor which is of course gripped between the spring assembly and the bottom of the channel or groove 11, thus providing an efficient holding action. A certain swinging movement of the insulator string and links 29 is permissible as should be possible to take care of minor swaying of the conductor under different conditions. However, in the event of the bringing of excessive strain upon the conductor at either side of the point of support, which strain might result from breakage of the support itself or a thick accumulation or coating of ice or sleet thereon, the insulator string and links 29 will be pulled excessively so that the links will assume a greatly inclined position with respect to the clamp, as indicated by dot and dash lines in Figure 1. When this occurs one pair of the horns or lugs 34 will engage against the lugs 33 and carry the member 25 along with the links, thereby causing the holding member to swing about the trunnions 27 as an axis. When this takes place the bearing surface 32 of the holding members rides off from the master leaf 21 of the spring assembly and there is then consequently nothing to hold the spring down in its clamping relation to the conductor and its natural upward flexing tendency will cause it to bow upwardly out of engagement with the conductor so that the latter will be free to slip through. This may occur at several towers or points of support and the excess strain upon the conductor is consequently distributed throughout perhaps several spans. The parts will remain in this released position until inspection of the line is made and repairs effected by a proper crew. There is an advantage in this feature that the clamp will not re-grip the conductor upon the cessation of the excess strain, and that is that particularly in cases where the conductor is armored at the clamping points my clamp cannot by any reengaging effect cause manipulation of the conductor by gripping it at an unprotected point. Reclamping is at any time readily reeffected manually by loosening the cap screws 19, restoring the holding member 25 to its

normal upright position, and then retightening the cap screws to the desired extent.

It is conceivable that numerous variations of the idea may be resorted to and in Figures 6, 7 and 8 I have illustrated a modification in which the lower clamping member 10^a is the same as above described but in which the clamping leaf spring assembly is replaced by an upper clamping member 35 which has a reduced longitudinally extending lower portion 36 fitting within the groove or channel 11^a and which has a widened intermediate portion 37 fitting between the lugs 15^a on the lower clamping member. A yoke 17^a, with attaching portions or ears 18^a, cap screws 19^a, a holding member 25^a with trunnions 27^a equipped with cotter pins 31^a are provided as above described, and the holding member is formed with lugs 33^a engageable by lugs 34^a on the links in exactly the same manner as above described. However, the upper clamping member 35 is formed centrally of its top with a recess or cavity 38 within which I locate one or more upwardly bowed plate springs 39 engageable by the bearing surface 32^a at the underside or lower end of the holding member 25^a.

The operation of this form is exactly the same as that of the first form, the only difference being a matter of detailed construction of the clamping means which engages upon the top of the conductor. In the first form of the invention it is the upwardly and backwardly bent ends of the master leaf spring which prevent longitudinal displacement of the upper clamping member whereas in this modification it is the enlarged central portion 37 of the clamping member which accomplishes the same result. Both forms of the invention possess substantially the same advantages and either may be used most advantageously as the beneficial qualities are common to both. From the foregoing it is believed that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiments of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. A clamp for supporting a conductor comprising a lower clamping member, a supporting member carrying the same, suspension means, an upper clamping member cooperating with the conductor and the lower clamping member, and trigger released holding means carrying said support and directly engaging the upper clamping member for normally holding the same in clamping relation to the conductor.

2. A conductor supporting device comprising upper and lower clamping members disposable upon a conductor, suspension means, a movable holding member carried by the suspension means and normally engaging the upper clamping member for holding the same in clamping relation to the conductor, and means carried by the suspension means and cooperating with said holding member for rendering the latter ineffective upon swinging movement of the suspension means beyond a predetermined limit with respect to the clamping members.

3. A conductor supporting clamp comprising upper and lower clamping members disposable against a conductor, suspension means pivoted with respect to said clamping members for supporting the same, means carried by and movable with respect to the suspension means and normally directly engaging and holding the clamping members in clamping relation to the conductor, and means for tripping said holding means and rendering the same ineffective upon swinging movement of the suspension means beyond a predetermined limit with respect to the clamping members.

4. A conductor supporting clamp comprising upper and lower clamping members, means for restraining said clamping members against relative longitudinal and lateral displacement, means carried by the lower clamping member and extending above the upper clamping member, holding means pivoted within said supporting means and normally engaging the upper clamping member for holding both clamping members in clamping relation to the conductor, suspension means pivoted upon said holding means, and coacting trip means on the holding means and suspension means for rendering the former ineffective upon swinging of the latter beyond a predetermined extent.

5. A conductor supporting clamp comprising upper and lower clamping members, means for restraining said clamping members against relative longitudinal and lateral displacement, means carried by the lower clamping member and extending above the upper clamping member, holding means pivoted within said supporting means and normally engaging the upper clamping member for holding both clamping members in clamping relation to the conductor, suspension means pivoted upon said holding means, and coacting trip means on the holding means and suspension means for rendering the former ineffective upon swinging of the latter beyond a predetermined extent, comprising laterally extending lugs on the holding means and spaced lugs on the suspension means engageable therewith.

6. A conductor supporting clamp comprising upper and lower clamping members, a yoke, means for adjustably securing the yoke to the lower clamping member, a holding member rockable within the yoke and normally engaging the upper clamping member, suspension means pivoted with respect to the yoke, and coacting means on the holding member and suspension means for moving the former out of engagement with the upper clamping member upon swinging movement of the suspension means beyond a predetermined limit.

7. A conductor supporting clamp comprising upper and lower clamping members, a yoke, means for adjustably securing the yoke to the lower clamping member, a holding member rockable within the yoke and normally engaging the upper clamping member, suspension means pivoted with respect to the yoke, and coacting means on the holding member and suspension means for moving the former out of engagement with the upper clamping member upon swinging movement of the suspension means beyond a predetermined limit, the upper clamping member embodying bowed spring means normally flexing away from the conductor but held in engagement therewith by said holding member.

8. A conductor supporting clamp comprising upper and lower clamping members, a yoke, means for adjustably securing the yoke to the

lower clamping member, a holding member rockable within the yoke and normally engaging the upper clamping member, suspension means pivoted with respect to the yoke, and coacting means on the holding member and suspension means for moving the former out of engagement with the upper clamping member upon swinging movement of the suspension means beyond a predetermined limit, the upper clamping member embodying spring means directly engaged by the holding member and prevented from longitudinal movement by the yoke.

9. A conductor supporting clamp comprising upper and lower clamping members, a support secured to the lower clamping member and extending above the upper clamping member, a member movable within the support and normally reacting thereagainst and against the upper clamping member for providing a clamping action, suspension means, and means normally out of engagement with said movable member operable upon relative swinging movement of the suspension means beyond a predetermined limit for shifting the position of said member to render it ineffective, the upper clamping member consisting of leaf spring means engaging the conductor and said member.

10. A conductor supporting clamp comprising upper and lower clamping members, a support secured to the lower clamping member and extending above the upper clamping member, a member movable within the support and normally reacting thereagainst and against the upper clamping member for providing a clamping action, suspension means, means normally out of engagement with said movable member operable upon relative swinging movement of the suspension means beyond a predetermined limit for shifting the position of said member to render it ineffective, and means on said upper clamping member cooperating with said support to prevent relative longitudinal movement of the upper and lower clamping members even when the movable member is shifted to ineffective position.

11. A conductor supporting clamp comprising upper and lower clamping members, a support secured to the lower clamping member and extending above the upper clamping member, a member movable within the support and normally reacting thereagainst and against the upper clamping member for providing a clamping action, suspension means, and means normally out of engagement with said movable member operable upon relative swinging movement of the suspension means beyond a predetermined limit for shifting the position of said member to render it ineffective, and means for adjusting said support toward or from the lower clamping member for adjusting the reaction of said member against the upper clamping member.

12. A conductor clamp comprising a lower clamping member, a substantially U-shaped yoke secured thereto and extending longitudinally thereof, an upper clamping member formed as a laminated spring located between the yoke and the lower clamping member and having upturned ends cooperating with the former whereby it will be restrained against longitudinal displacement, a cam-like keeper located within the confines of the yoke, and suspension links pivoted to said keeper and having means thereon for tripping the same and rendering the clamp ineffective when the links swing beyond a predetermined extent with respect to the clamp.

13. A clamp for supporting a conductor comprising a lower clamping member, a supporting member carried by the same, suspension means, an upper clamping member cooperating with the conductor and the lower clamping member, trigger released holding means carried by said support and directly engaging the upper clamping member for normally holding the same in clamping relation to the conductor, and means at the ends of the upper clamping member cooperating with the support for preventing longitudinal movement of the upper clamping member.

14. A clamp for supporting a conductor comprising a lower clamping member, a supporting member carrying the same, supporting means, an upper clamping member cooperating with the conductor and the lower clamping member and formed in its top with a cavity, bowed spring means entirely contained within said cavity, and trigger released holding means carrying said support and directly engaging said spring means for normally maintaining the upper clamping member in clamping relation to the conductor.

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