May 2, 1933. J. M. JESTER 1,907,182

RELEASING CLAMP

Filed Sept. 20, 1928 2 Sheets-Sheet 1

Fig. 1.

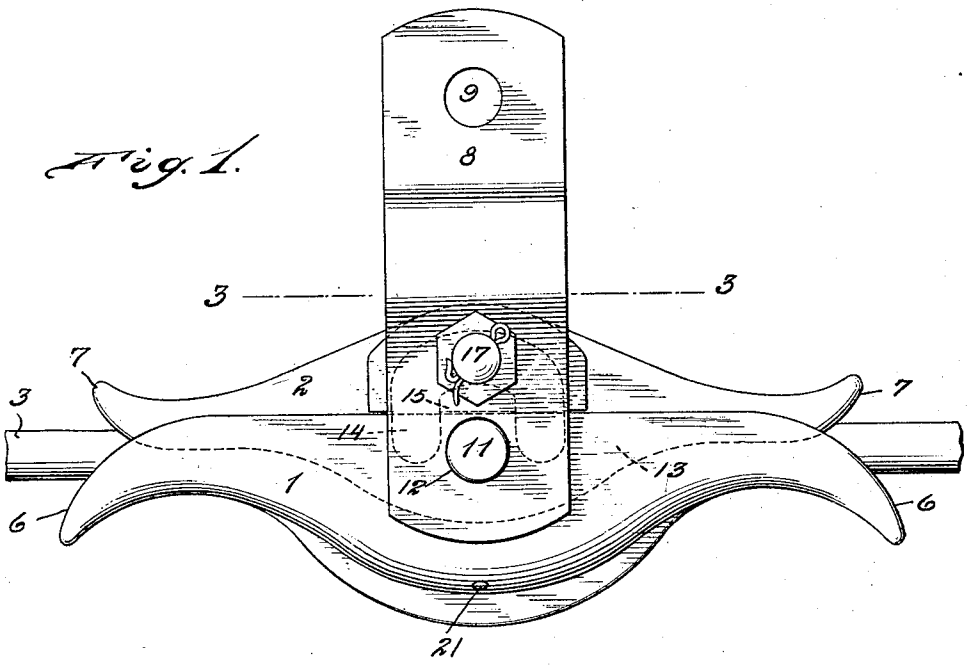
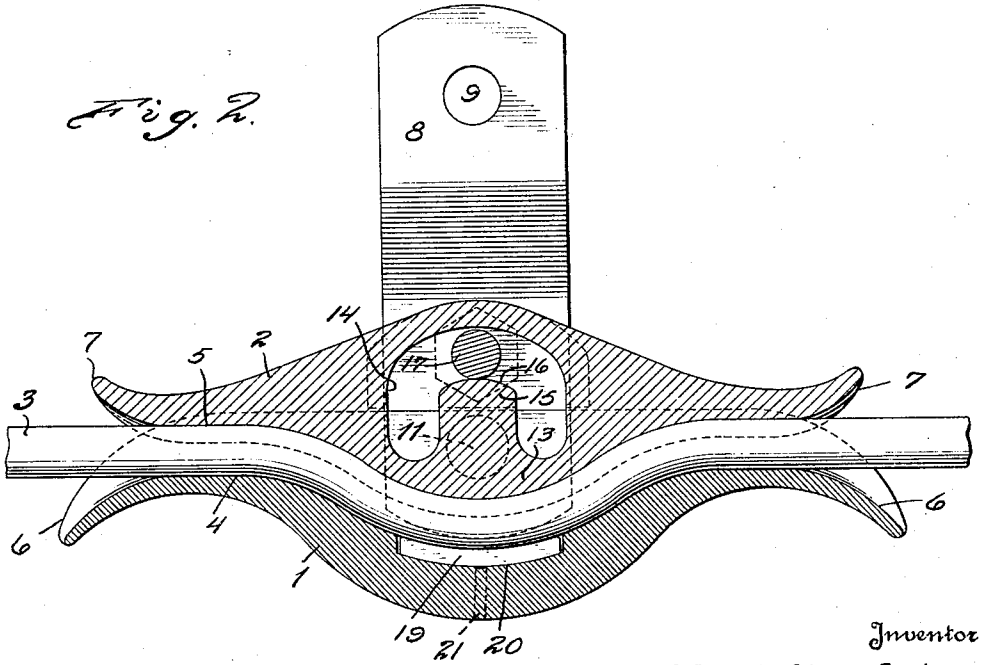


Fig. 2.



Inventor

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by Thurston Mitchell

his Attorney

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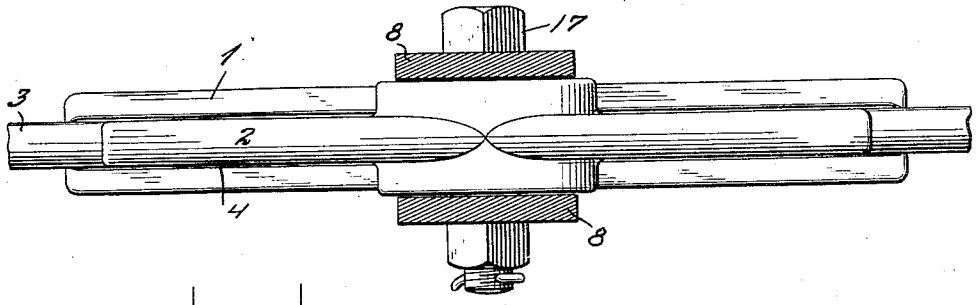
Fig. 3.



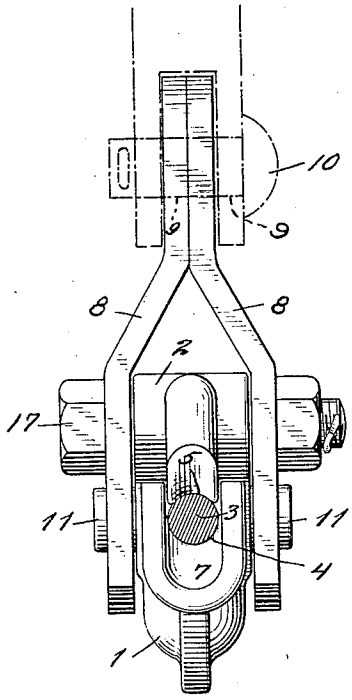


Fig. 4.

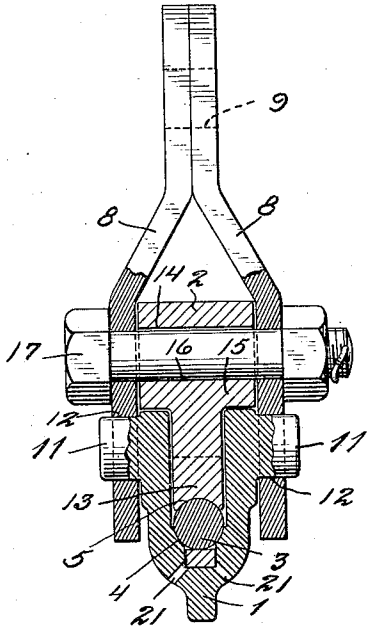


Fig. 5.

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By [signature]

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UNITED STATES PATENT OFFICE

JOHN MILTON JESTER, OF WASHINGTON, DISTRICT OF COLUMBIA

RELEASING CLAMP

Application filed September 20, 1928. Serial No. 307,136.

The invention relates to clamps employed for suspending conductors such as are used in high tension transmission lines.

It is well known that it is customary to suspend conductors by means of clamps carried by strings of insulators hung from towers which are frequently located long distances apart. It frequently occurs that sleet or ice may accumulate upon the conductor at one side of a tower and not at the other side owing to the existence of local storms and the difference in atmospheric conditions along the line. Furthermore, particularly where the line passes over the mountains or valleys, high winds may cause the bringing of a greater pressure upon the conductor at one side of a tower. Regardless of which may be the case, the fact remains that the strain is unequally distributed as that portion of the conductor which is coated with ice or sleet or that portion which is subjected to the action of high winds exerts a greater strain at one side of the tower than at the other. This is highly objectionable and it has occurred that towers have been pulled over. It is, of course, desirable to build the towers as light as possible to withstand the service for which they are intended and it is not practical to make them so strong as to be capable of withstanding every conceivable strain.

With the above facts in view I have devised the present invention which has for its general object the provision of a suspension clamp adapted to open and release the conductor upon the occurrence of an excessive strain at one side or the other of a tower so that the conductor may slide through until the strain is equalized, thus relieving the tower of those forces tending to pull it over.

An important object of the invention is to provide a clamp for this purpose which is capable of maintaining its grip until the string of insulators from which it is suspended has been pulled through an arc of a certain predetermined extent or moved into a certain angular position with respect to the normal or vertical, release occurring only after the safe angle or inclination has been passed.

Another object of the invention is to provide a clamp embodying cam means for holding it in gripping relation to the conductor, the conductor itself supplying the force for effecting release when the cam means becomes ineffective.

A further object of the invention is to provide a clamp having suspension means located at the longitudinal axis of the conductor so that the clamp may accommodate itself to vibrations of the conductor without exerting any bending strains thereon.

Yet another object of the invention is to provide a clamp of this character incorporating spring means for maintaining a tight grip upon the conductor and compensating for any manufacturing variations in the parts.

Another object is to provide a clamp of this character in which the clamp means is enclosed and consequently protected against the possibility of the accumulation of ice, dirt or other foreign matter which might interfere with the releasing action.

An additional object is to provide a releasing clamp which will be simple and inexpensive to manufacture, easy to assemble and install, 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 the clamp in its normal or holding position,

Figure 2 is a vertical longitudinal section therethrough,

Figure 3 is a cross section taken on the line 3—3, of Figure 1, showing a plan view of the clamp itself,

Figure 4 is an end view with the conductor in section, and

Figure 5 is a vertical central cross sectional view with portions in elevation.

Referring more particularly to the drawings, I have shown the clamp as comprising

lower and upper members 1 and 2 between which the conductor 3 is gripped. The member 1 is represented as having a transversely curved groove or seat 4 therein which conformingly receives the conductor, and the member 2 is formed with a similar groove or seat 5. Both of these seats are here shown as of compound curved shape, considered longitudinally of the clamp, though it should be distinctly understood that the seats may be straight throughout if preferred. This is not illustrated as it is an obvious variation. However, there is an advantage in employing a curved seat as will be hereinafter explained. It is preferable that the ends of both members 1 and 2 be flared outwardly as shown at 6 and 7 respectively so as to avoid contact of the edges with the conductor at any time. The suspension means is shown as comprising the links 8, or their equivalent, which may be apertured as at 9 for passage of a securing bolt, pin or the like, 10, for mounting the device at the lower end of a string of suspension insulators. The lower clamping member 1 is preferably formed with laterally extending trunnions 11 which are integral therewith and which are located preferably at the longitudinal center line of the conductor beyond the clamp. It is quite apparent that a through bolt could be employed by modifying the structure slightly, though the integral formation of the trunnions is of advantage in reducing the number of parts. The links 8 have their lower ends divergent and apertured at 12 for pivotal engagement of the trunnions 11 therewith so that the clamp may accommodate itself to vibrations of the conductor. The seat, channel or groove 4 in the lower member 1 is of considerable depth and the upper member has its groove formed in a considerably reduced portion 13 received within the groove or channel in the lower member as clearly shown in Figure 5. The upper member 2 is formed, preferably within the area covered by the links, with a cam slot 14 at substantially the center of which is a cam projection 15 having an active surface 16 concentric with the trunnions 11.

The clamping means further includes a bolt 17 passing through holes 18 in the links 8 and through the cam slot 14, this bolt bearing against the active surface 16 and constituting the means for holding the members 1 and 2 in clamping relation to the conductor. To take care of any manufacturing variations such as are bound to occur and to insure a proper holding action at all times it is preferable to provide a leaf or plate spring 19 located within a recess 20 in the seat or groove 4 in the lower member 1. As it is conceivable that rainwater may enter the clamp I may find it advisable to provide one or more drain holes 21 at the lowermost part of the groove or seat 4 so as to permit it to escape.

In assembling the clamp, the members 1 and 2 with the bolt 17 out, are arranged between the links 8 with the trunnions 11 received within the holes 12. The bolt 17 is then inserted through the holes 18 and through the slot 14 at one side or the other of the upstanding cam projection 15. By means of some suitable tool the assembled clamp is then moved or swung with respect to thhe links 8 to bring the bolt 17 up over and into engagement with the active cam surface 16. The assembly is then suspended from the insulator string by means of a pin or its equivalent 10 and the installation is complete. In service, it will be apparent that in the event of a certain excessive strain at one side of the tower tending to swing the insulator strain to one side or the other, the clamp will retain its holding action. As a matter of fact the bolt 17 may play along the cam surface 16 in accordance with swinging movement of the insulator string on account of wind or expansion and contraction of different sections or portions of the conductor. However, in the event that there is an excessive strain at one side of the tower, resulting for instance from the accumulation of ice or sleet on the conductor, the insulator string, and of course the clamp, will swing to a marked extent. Just as soon as the angular position reaches such a point that the bolt 17 can slide off either end of the cam surface 16, there is nothing to hold the parts 1 and 2 together in clamping relation to the conductor and the conductor is consequently released, the action being facilitated by the natural tendency of the conductor to straighten out.

If the seats or grooves be straight instead of longitudinally curved, there is of course no such straightening tendency, this being the only advantage in having the kink in the conductor except that the curvature would permit the use of a through bolt instead of the trunnions illustrated. Just as soon as the clamp is released the conductor may of course slide through until the strains at the opposite sides of the tower become equal.

From the description and a study of the drawings it will be apparent that I have thus provided a very simply constructed clamp for the purpose specified and one which will efficiently perform all the functions for which it is intended. It will be noted that there are but three parts aside from the links and that the cost will therefore be very slight.

While I have shown and described the preferred embodiment 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 clamping device for suspending a conductor, comprising a pair of clamping members, suspension means therefor, cam means for maintaining the clamping members in clamped relation upon a conductor, said cam means including a slot within one clamping member, and a projection defined by the slot and having a cam surface.

2. A clamping device for suspending a conductor, comprising a pair of clamping members, suspension means therefor, cam means for maintaining the clamping members in clamped relation upon a conductor, and spring means enclosed within one member engaging against the conductor for taking up play and compensating for manufacturing variations.

3. In a clamp of the character described, upper and lower clamping members, suspension means pivotally connected with one member, the other member having a cam slot and a projection therein, and means carried by the suspension means and extending within said cam slot and engaging said projection for holding said clamping members in clamped relation to a conductor.

4. In a clamp of the character described, upper and lower clamping members, suspension means pivotally connected with one member, the other member having a cam slot therein, means carried by the suspension means and extending within said cam slot for holding said clamping members in clamped relation to a conductor, one member having a recess therein at its conductor engaging portion, and a spring within said recess.

5. A clamping device for suspending a conductor, comprising a pair of clamping members, suspension means therefor, cam means for maintaining the clamping members in clamped relation upon a conductor, and spring means located within one member engaging against the conductor for taking up play and compensating for manufacturing variations, the lower clamping member having holes therein permitting outlet of any water which may accumulate therein.

6. A clamp of the character described comprising upper and lower members disposable against opposite sides of a conductor, said members being grooved longitudinally to define seats receiving the conductor, trunnions projecting laterally from the lower member, suspension links straddling the clamp and pivotally engaged upon said trunnions, the upper member being formed at its center with a slot and with an upstanding cam projection, and a bolt passing through the links and the slot and engaging said cam projection for holding the clamping members in clamped relation upon a conductor.

7. A clamping device for suspending a conductor, comprising a pair of clamping members disposable upon the conductor, pivoted suspension means therefor, one member having a curved slot therein and a projection defined by the slot, the projection having a curved surface concentric with the pivot of the suspension means, a member carried by the suspension means and extending into said slot in engagement with the curved surface of the projection for normally maintaining said clamping members in clamping relation to the conductor, and means within the other member for applying pressure against the conductor.

8. A clamping device for suspending a conductor, comprising a lower clamping member, an upper clamping member, suspension means pivotally connected with the lower clamping member, the upper clamping member having an opening and an upstanding projection extending into the opening and constituting a cam, the upper surface of the projection and a portion of the upper wall of the opening being concentric with the pivotal mounting of the suspension means, and a member carried by the suspension means and traversing said opening and normally in engagement with the upper surface of the projection for maintaining the clamping members in clamping relation upon the conductor.

9. A clamp for suspending a conductor, comprising a lower clamping member formed at its sides with trunnions, an upper clamping member, suspension links pivoted upon the trunnions, the upper clamping member being formed with a cam slot and a cam projection, and means on the links projecting into said slot in engagement with said projection for normally maintaining said clamping members in clamping relation to the conductor.

10. A clamp for suspending a conductor, comprising a lower clamping member formed with a longitudinally extending groove defining a seat for the conductor, an upper clamping member having a longitudinally extending reduced portion received within said groove, trunnions projecting latterally from the lower clamping member, and suspension links pivoted upon said trunnions and carrying means normally holding the clamping members in clamping relation to the conductor.

11. A clamping device for suspending a conductor, comprising upper and lower clamping members disposable against a conductor, the upper clamping member being

formed with a cam slot and a projection having a cam surface, suspension means, a transverse element carried by the suspension means and extending into said slot in engagement with said projection for normally maintaining said members in clamping relation to the conductor, and a spring within the lower clamping member in engagement with the conductor for holding said transverse element in close engagement with the projection.

In testimony whereof I affix my signature.

JOHN MILTON JESTER.