Sept. 13, 1932. A. O. AUSTIN 1,876,583

INSULATOR

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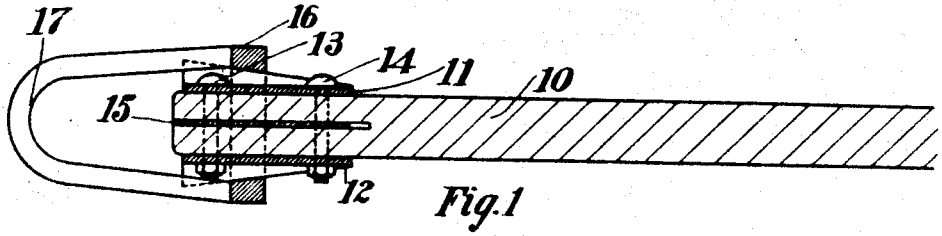


Fig. 1

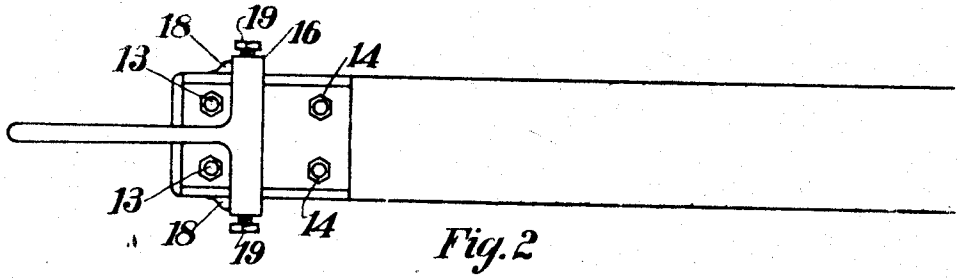


Fig. 2

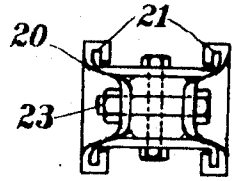


Fig. 4

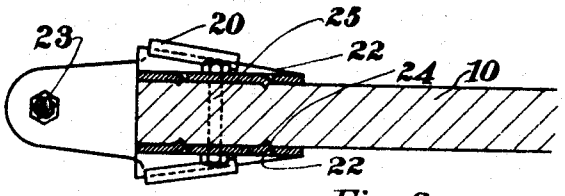


Fig. 3

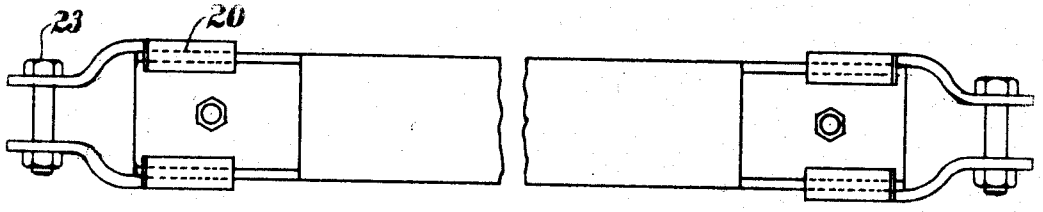


Fig. 5

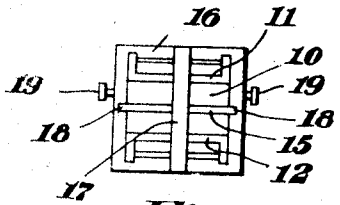


Fig. 12.

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Sept. 13, 1932. A. O. AUSTIN 1,876,583

INSULATOR

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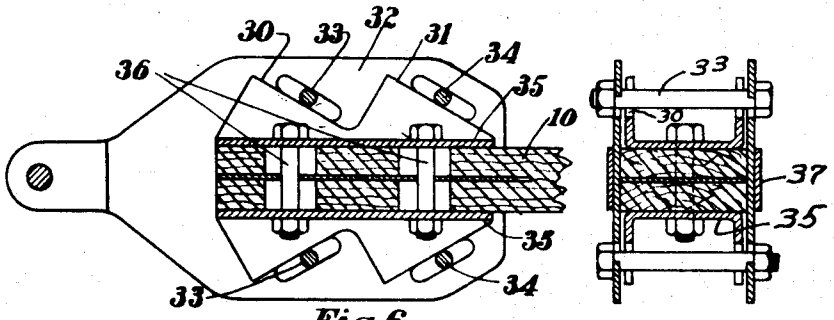


Fig. 6

Fig. 7

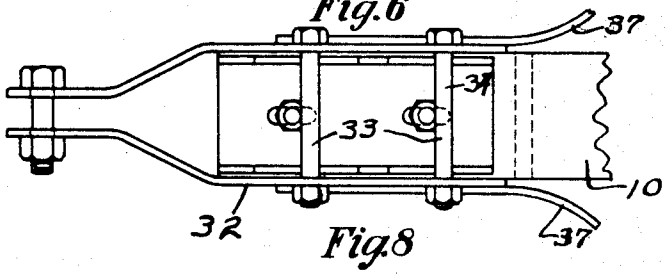


Fig. 8

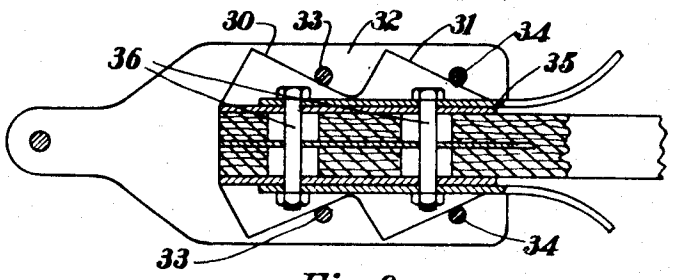


Fig. 9

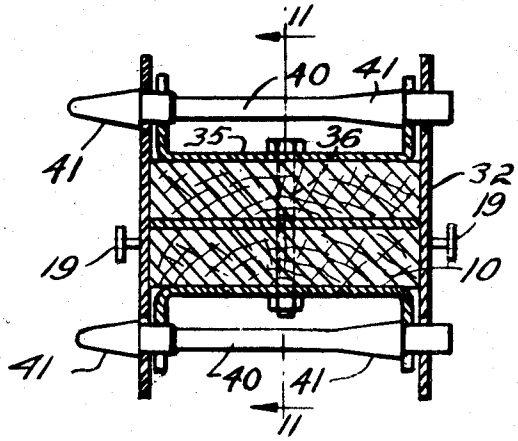


Fig. 10.

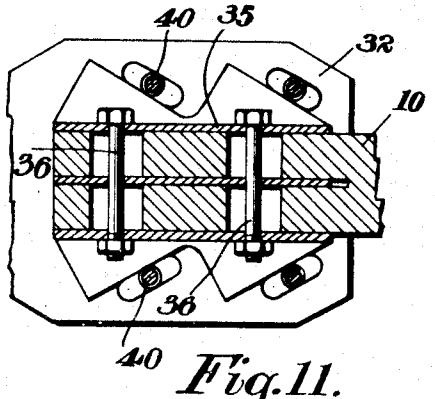


Fig. 11.

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Patented Sept. 13, 1932 1,876,583

UNITED STATES PATENT OFFICE

ARTHUR O. AUSTIN, OF NEAR BARBERTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE OHIO BRASS COMPANY, OF MANSFIELD, OHIO, A CORPORATION OF NEW JERSEY

INSULATOR

Application filed September 17, 1928. Serial No. 306,442.

This invention relates to insulators and especially to strain insulators for supporting high mechanical loads and has for one of its objects the provision of an insulator, the fittings for which may be readily assembled with the stress member in the field.

A further object is to provide an insulator of high mechanical strength which may employ wood, fibre or similar material for its stress member and with which fittings of simple and inexpensive construction may be employed. Other objects and advantages will appear from the following description.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawings and described in the following specification and it is more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a longitudinal section of one end of an insulator embodying one form of the present invention.

Fig. 2 is a plan view of the insulator shown in Fig. 1.

Fig. 3 is a view similar to Fig. 1 showing a slight modification of the invention.

Fig. 4 is an end view of the insulator shown in Fig. 3.

Fig. 5 is a plan of the insulator shown in Figs. 3 and 4.

Fig. 6 is a view similar to Fig. 1 showing a further modified form of the invention.

Fig. 7 is a transverse sectional view of the insulator shown in Fig. 6.

Fig. 8 is a plan of the insulator shown in Fig. 6.

Fig. 9 is a view similar to Fig. 6 showing a slight modification of the form of the invention shown in Fig. 6.

Fig. 10 is a view similar to Fig. 7 but showing a slightly modified form of the invention.

Fig. 11 is a vertical section on line 11—11 of Fig. 10.

Fig. 12 is an end elevation of the device shown in Fig. 1.

This invention is in the nature of an improvement over that covered by my prior Patent Number 1,497,319. In the manufacture of strain or tension insulators where considerable length is desired to provide a high flashover voltage, as where insulators are used to guy wood structures, or to prevent dangerous leakage currents, it is very advisable to produce an insulator at minimum cost. Where the tension members are large, it is very desirable that the construction be such that the tightening heads attached to the wood or other stress members can be applied in the field and the desired results be secured with certainty.

The present invention is designed particularly to provide a construction which may be readily assembled and which will provide the desired insulation and mechanical strength.

In Fig. 1 the insulating member 10, usually made of wood, has channel sections 11 and 12 bolted to it with bolts 13 and 14. Where very high tensions are desired or where it is necessary to keep down the bearing pressure to develop a given tension, friction plates 15, as described in my previous patent, may be used. The channel sections 11 and 12 have tapered sides so that the tightening ring or yoke 16 bears upon these edges. The slope depends upon the coefficient of friction between the several members, it being essential that the tightening ring 16 shall slide up on the inclined edges or surfaces of the members 11 and 12 before the latter will slip upon the insulating member 10.

The bolts 13 and 14, as well as the friction between the members 11 and 12 and the insulating member 10, tend to prevent the gripping surfaces of the members 11 and 12 from sliding. The surfaces 11 and 12 may also be provided with small projections or roughened to further increase the effective friction. In roughening the surfaces, however, care should be taken that the mechanical strength or surface of the member 10 be not seriously damaged.

Where tension is applied to the eye 17 or tightening ring 16, the ring 16 will slide up on the inclined surfaces provided on the members 11 and 12 until the reaction between these surfaces and the tightening ring 16 is sufficient to balance the load. It is evident that where the inclined surface and the co-

efficient of friction is such that slippage between the member 16 and the members 11 and 12 will take place before the members 11 and 12 will slip on the insulating member 10, tightening will always take place to develop the necessary frictional component between the members 11 and 12 and the stress member 10 so that the head will not be pulled off of the insulating member.

The construction is such that the heads may be readily applied to insulating members in the field, the method being as follows. The bearing plates 11 and 12 are slipped into the bearing ring 16, the small ends of the wedges being adjacent the ring 16 so that the whole combination can be slipped over the wood member 10 until the holes in the plates 11 and 12 match up with the holes provided in the insulating member 10. The bolts 13 and 14 are then run through the members 10, 11 and 12 and tightened, and if the additional frictional plates 15 are also used, the bolts are threaded through the holes in these plates also. The bolts are clamped up so as to insure some initial friction which, with the bearing on the wood, insures that the ring 16 will slide on the inclined surfaces of 11 and 12 before slipping will take place between the bearing plates 11 and 12 and the wood member 10. Where a load is applied and will not be subsequently released, it is not even necessary to use the bolts 13 and 14 to insure the operation except in the case where frictional plates are used. Even in this case these may bear upon the ring 16, if they are provided with projections or shoulders 18. Where the shoulders are used, the bolts 13 and 14 are either omitted or usually do not pass through a closed hole in the plate.

In installations where the stress is likely to be relieved or for construction reasons it may be advisable to keep the ring 16 firmly in position with respect to the other members of the head. In order to do this, bolts or members 19 may be run through the ring and screwed down against the tension member 10.

In the construction shown in Figs. 3, 4 and 5, the clamping ring 16 is replaced by tightening plates 20 which have inclined slots or channels 21 which slip over the inclined edges 22 of the gripping plates. Where tension is applied to the bolt 23, the tightening plates are drawn up on the inclined surfaces, exerting pressure which is transferred to the member 10, increasing the frictional resistance between the bearing plates and this member. This friction may be further insured by projections 24 and the bolt 25. It is evident that the effect of the groove 20 gripping the inclined surfaces may be provided in a number of different ways as by projections or an interrupted slot scheme. The terminal bolt 23 can be tightened down so that the plates 20 will not become loose on the gripping members, holding the parts in position so that vibration will not take place. In other respects, the construction is similar to that of Fig. 1.

It is evident that in place of a single inclined surface, several inclined surfaces with complementary parts may be used as shown in Fig. 6. In Fig. 6, a slightly modified scheme is shown which makes it possible to largely eliminate any danger of the tightening member seizing or striking upon the bearing plates and pulling them off before sufficient bearing friction is obtained between the bearing members and the insulating member. This construction also makes it possible to use very much steeper inclined surfaces so that the distance between terminals will increase but slightly for any tightening effect.

In the form shown in Fig. 6, the bearing between the inclined surfaces 30 and 31 and the tightening plate 32 takes place through the bolts 33 and 34, the bodies of the bolts acting as roller bearings. It is evident that the bearing in this case does not depend upon a difference in slipping friction and much steeper angles may be used. The resulting tension must be taken up by a component in the direction of pull. The angle must be such that this component will not exert too high a bearing pressure so as to destroy the insulating member 10. Bearing plates 35 may be clamped with bolts 36 as in the other case. A form of this kind is particularly applicable where it is difficult to obtain the necessary friction between the insulating member and the bearing plates and still maintain angles steep enough to insure quick tightening action. This is particularly true where very hard woods are used, or where the roughness of metal parts may occasion sticking between the surfaces. It is evident that any number of bearing surfaces may be provided.

After the heads are in place, the bearing bolts 33 and 34 may be tightened so that they will be held firmly in position and insure a grip as soon as tension is applied to the members. In general, the dimensions are such that the bolts 33 and 34 stay at the bottom of the slot so as to give the maximum latitude for tightening. It is evident that a type of this kind may be used where materials are likely to swell through absorption of moisture. As there is little friction, the swelling action will cause the tightening plates, together with the bearing bolts 33 and 34 to move downward in the slot and relieve the pressure. In many cases, it is desirable to apply discharge horns or flux grading members to provide the best possible condition as shown at 37.

Fig. 9 shows a construction similar to that of Fig. 6 but in which the bolts 33 and 34 are not provided with slots in the plates 32 and consequently slide on the inclined surfaces 30 instead of rolling thereon.

In the form of the invention shown in

Fig. 10, the roller or holding pin 40, instead of being in the form of a straight cylindrical bolt, like that shown at 33 in Figs. 6 and 7, is provided with tapered portions 41. The parts are so proportioned that the lower edges of the slots in the side plates 32 are slightly below the inclined faces 30 on the clamping plates so that it is necessary to force the pins 40 into the slots. Because of the inclined faces 41, the pins can be driven into place, thus bringing the lower edges of the slots into registration with the inclined faces on the gripping plates. This places an initial pressure on the gripping plates so that they can be held in place without danger of relative movement of the parts, even before the tension of the load is placed upon the insulator.

I claim:

1. An insulator comprising a stress member, gripping plates engaging opposite faces of said stress member and having outer projecting flanges at the opposite edges thereof provided with inclined outer bearing edges, a fitting having a yoke mounted to engage said inclined bearing edges to transmit the load on said insulator and to force said gripping plates against the surfaces of said stress member, and means for supplementing the frictional contact between said gripping plates and stress member to prevent slipping of said gripping plates on said stress member.

2. An insulator comprising a stress member, channel shaped bearing plates engaging opposite faces of said stress member, the edge flanges of said bearing plates each having a plurality of inclined portions forming bearing surfaces, and a fitting having contacts with each of said inclined bearing faces to transmit the load on said insulator and to press said gripping plates against said stress member.

3. An insulator comprising a stress member, gripping plates engaging opposite faces on said stress member and having inclined bearing surfaces on the outer faces thereof, a fitting comprising holding plates disposed at opposite edges of said stress member, said holding plates having inclined slots therein registering with the inclined bearing surfaces of said gripping plates, and rollers mounted to travel in said slots and to bear on said inclined bearing surfaces.

4. An insulator comprising a tension member, gripping plates engaging opposite faces of said tension member and having inclined bearing surfaces, holding members having inclined slots, rollers for engaging said slots and bearing surfaces to transmit the stress of the load on said insulator and to exert wedging action on said bearing surfaces to force said gripping plates against said tension member, said rollers having tapered portions thereon to exert initial pressure on said gripping plates when said rollers are driven into place in said slots and in contact with said bearing surfaces.

5. An insulator comprising a stress member, gripping plates disposed at opposite sides of said stress member and having inclined bearing faces thereon, a fitting having a closed ring surrounding said stress member and gripping plates and engaging said inclined bearing faces for transmitting the load on said stress member and for forcing said gripping plates into firm frictional engagement with said stress member, and means for initially securing said gripping plates in place on said stress member to hold said gripping plates in position irrespective of the frictional contact between said gripping plates and stress member.

6. An insulator comprising a stress member, gripping plates disposed at opposite sides of said stress member and having inclined bearing surfaces on their outer faces, a fitting comprising a pair of holding members disposed at opposite edges of said stress member and having projections thereon engaging the bearing faces on said gripping plates, and a cross tie connecting said holding members.

7. An insulator comprising a stress member, channel plates engaging opposite faces of said stress member and having their edge flanges projecting away from said faces and tapered to provide inclined bearing faces, and holding plates disposed at each of the opposite edges of said stress member, each holding plate having projections thereon forming grooves slidably engaging the edge flanges of said channel plates, and means connecting said holding plates to form a support for said insulator.

In testimony whereof I have signed my name to this specification this 15th day of September A. D. 1928.

ARTHUR O. AUSTIN.