Sept. 14, 1943. J. M. GWINN, JR., ET AL 2,329,529

ADJUSTABLE CABLE GUIDE

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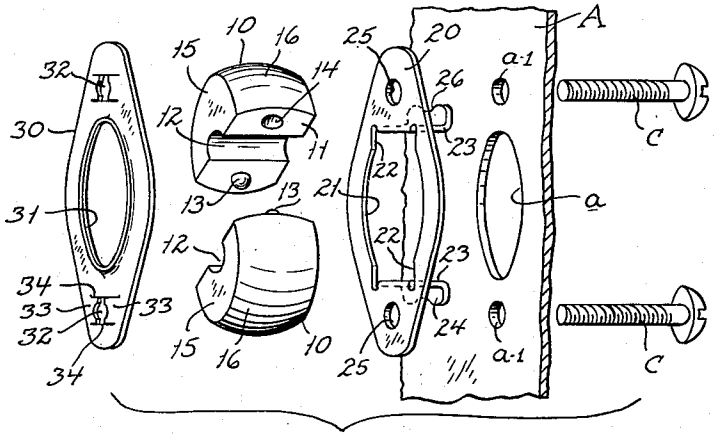

Fig. 1

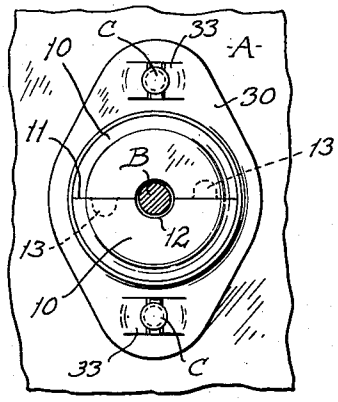

Fig. 2

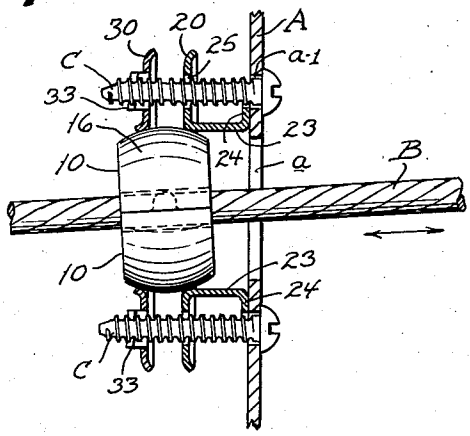

Fig. 3

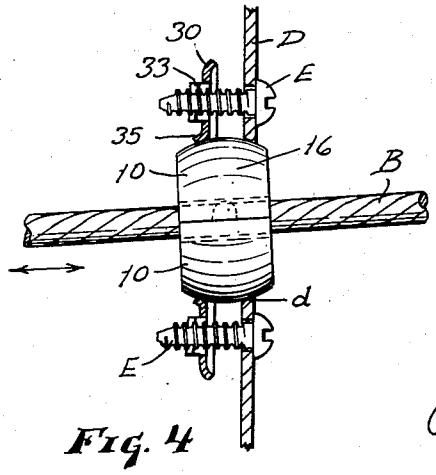

Fig. 4

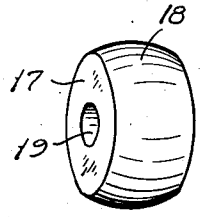

Fig. 5

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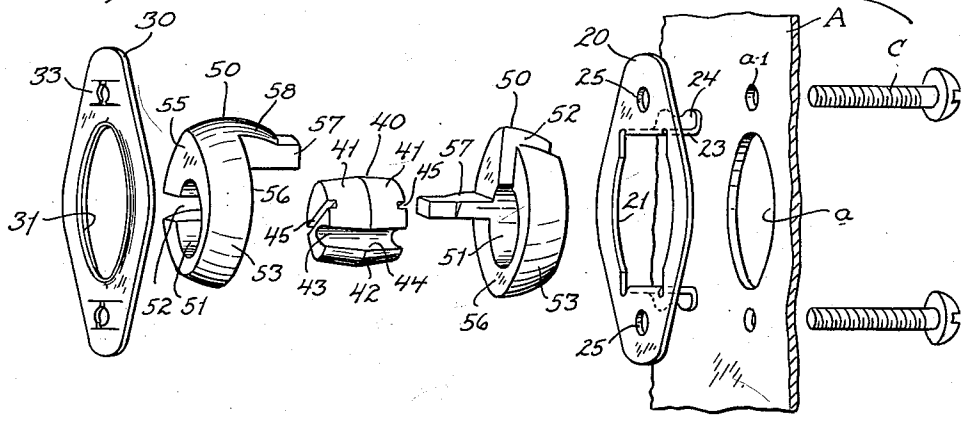
FIG. 6



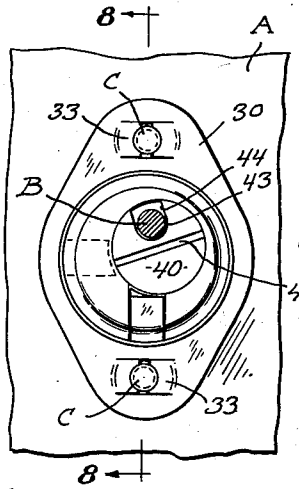


FIG. 7

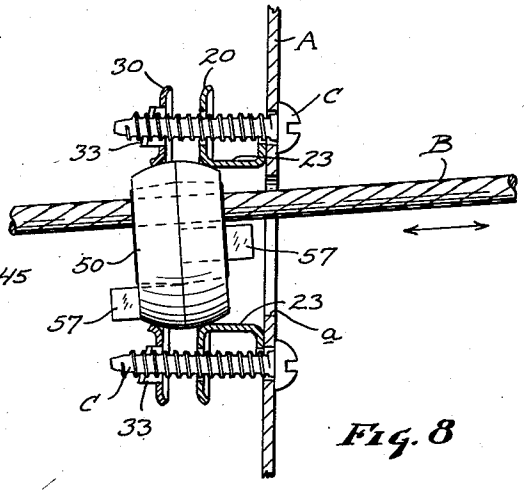


FIG. 8

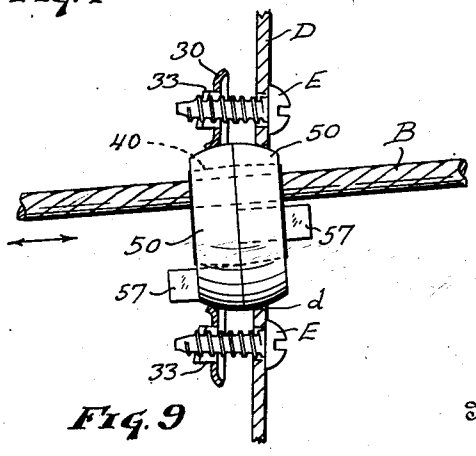


FIG. 9

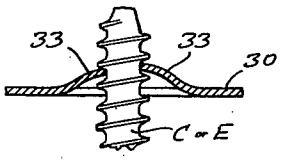


FIG. 10

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ADJUSTABLE CABLE GUIDE

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Application June 26, 1942, Serial No. 448,696

12 Claims. (Cl. 254—190)

This invention relates to an adjustably carried tubular guide or fairlead for positioning and allowing movement of a cable, so that the same may pass freely across a suitable support without being chafed or injured and without disturbing its support. To this end we have provided a tubular guiding block spherically curved on its exterior and mounted in a clamp engaging such surface so that the block may be tipped in any direction to align the guiding opening with the direction of the cable passing through the block.

Our clamp for the fairlead is specially formed to provide an embracing surface to position the fairlead while allowing it to be shifted and furthermore carries a pair of nuts to receive attaching screws. Preferably these nuts are formed of the material of the clamp itself by bringing up from its tongues to coact with the screw threads.

The objects of our invention are not only to provide the fairlead and its carrier in a form which, while being cheaply constructed, will be effective in service, but also to provide for the very quick attachment of the entire device. Due to the nuts carried by the clamp and automatically held in position thereby, the only tool needed in the mounting of our construction is a screw driver. The avoidance of movable nuts requiring wrenches greatly reduces the time for mounting the device.

A refinement of our invention, also claimed herein, provides for changing the position of the guiding hole within the fairlead block, so as to adjust laterally the position of such hole to fit the straight course of the cable guided without requiring accuracy in the original positioning of the fairlead holder.

Our fairlead construction is especially well adapted for use in airplane work where there are a number of cables which may extend through openings in various partitions, and where it is important that the cable be free for movement without any chance of fouling its support or injuring the cable. Reduction in time of installation is a particularly valuable feature at the present time in the construction and equipment of airplanes.

We contemplate, except in the simplest construction, making our fairlead separable so that it may be readily mounted on cables which are in place. This enables the ready substitution of a new fairlead in our positioned clamp for one which may have become injured.

Different embodiments of our invention are illustrated in the drawings and are hereinafter more fully described. The essential features will became more apparent from the description of these embodiments and from the appended claims.

In the drawings, Fig. 1 is a separated perspective of the various parts of one embodiment of our adjustable support; Fig. 2 is a face view of the parts of Fig. 1 assembled; Fig. 3 is a cross section of such assembled device, as indicated by the line 3—3 on Fig. 2; Fig. 4 is a vertical section to a modified form of holder for the fairlead member; Fig. 5 is a perspective of the modified form of the fairlead member itself; Fig. 6 is a separated perspective of a modified embodiment of our invention wherein the fairlead is provided with an adjustable barrel eccentrically carrying the guiding opening; Fig. 7 is a face view of the parts shown of Fig. 6 assembled; Fig. 8 is a vertical section on the line 8—8 of Fig. 7; Fig. 9 is a section of a modified form of holder, carrying the fairlead of Figs. 6, 7 and 8; Fig. 10 is a fragmentary cross section on an enlarged scale of one of the clamping members, illustrating the thread-engaging tongues thereof.

Referring first to the embodiment of Figs. 1, 2 and 3, the fairlead itself comprises two semicircular blocks 10, adapted to meet on a diametric plane 11 to form a complete annulus. Each block is formed with a semi-cylindrical central recess 12 and with a dowel pin 13 on one side of this recess and a corresponding hole 14 on the other side. The two parts of the fairlead are identical and when brought together each of the dowel pins occupies the hole 14 of the other member, thus producing a complete annulus bounding a cylindrical passageway. The fairlead has flat sides 15, while the periphery 16 is curved spherically, as shown.

The fairlead is retained by a two-part clamp with adjacent edges formed to engage the spherical surface of the fairlead. One member of this clamp 20 is an elongated sheet metal plate having an opening 21, which for the most part is circular, but at opposed ends thereof has parallel-sided extensions 22. This provides for the formation of cut-out tongues 23 extending from the body of the plate at substantially right angles thereto and then flanged at right angles to the inwardly bent portions, as shown at 24. This provides a pair of positioning feet adapted to engage the wall or post to which the clamp is to be secured. This clamping member is

formed with openings 25 for the passage of retaining screws as hereafter described.

The other member of the clamp consists of an elongated plate 20 having a circular hole 31 of the same diameter as the circular portion of the opening 21 of the other plate. Beyond this hole 31, the plate 30 carries nuts to engage the fastening screws. Preferably these nuts are formed each by a pair of oblique tongues 33 which are bent up from the body of the plate on opposite sides of a hole 32 which may receive the screw.

The tongues 33 are cut from the body of the plate 30, which is of spring material, by means of slits 34 and the hole 32, and are bent out obliquely to the plane of the member 30 and are slightly warped and their edges are notched, so that such edges bound one helical turn corresponding to a screw thread.

In Figs. 1 and 2, A represents a wall or partition having an opening *a* of indefinite size but sufficient for the free passage of the cable B, which is to extend through the mounted fairlead. On opposite sides of the opening *a* are two small openings *a*—1 having positions and dimensions corresponding to the openings 25 at the plate 20.

To mount our device on a plate A, a pair of screws C are passed through the plate, thence through the openings 25 of the plate 20. Then the fairlead 10 is placed against the member 20, the member 30 placed on the other side of the fairlead, the latter member providing the nuts for the two screws. The screws are then turned in somewhat loosely, the fairlead adjusted to the desired positions and the screws then tightened, clamping the fairlead.

The edges of the opening 21 in the plate 20 are slightly rounded so as to make a smooth bearing for the fairlead, and the edge about the periphery of the opening 31 on the plate 30 is slightly bent outwardly for a similar purpose, as shown in Fig. 3. The feet 24 of the member 20 may be slightly concave at their edges, as indicated at 26, and thus provided a good gauge for locating the holes *a*—1 in the supporting partition.

It will be seen that the fairlead may be mounted in the minimum of time, it being merely necessary to place the fairlead with its two clamping members in position and turn in the screws with a screw driver. The oblique tongues not only act as nuts for the screws but by reason of their spring action form locks preventing the screws working out of place due to the jarring action.

In Fig. 4, we have shown a cheaper construction wherein the stationary partition, indicated at D, itself constitutes one member of the clamp. This partition is provided with a circular opening *d*, larger than the circle bounding the flat side of the fairlead 10, but smaller than the largest periphery thereof. The edge of the opening *d* is rounded so that the fairlead may seat directly against such partition.

In this instance, the fairlead is clamped against the partition by a clamping plate which may be identical with the plate 30 of Figs. 1, 2 and 3, this plate being designated 30 in Fig. 4 and having the outward flange 35 at the edge of its central opening and the spring tongues to act as nuts for the screws E. It will be seen that the cable B is effectively guided by the fairlead in this abutment but may extend in various oblique directions through the wall D, as may be required.

In Figs. 1 to 4 inclusive, the fairlead is a two-part semi-circular member, which, as heretofore mentioned, enables it to be readily placed after the cable B is in position, which is a valuable feature enabling the quick replacement of damaged fairleads. However, a cheaper construction is to make the fairlead a single integral member, and such a fairlead is shown in Fig. 5. This fairlead has flat parallel sides 17 and a spherical surface 18 and a cylindrical bore 19, all corresponding to the same parts in the assembled two-part construction. Accordingly, the fairlead at Fig. 5 may be mounted in the clamping device of Figs. 1, 2 and 3, or that of Fig. 4.

In Figs. 6 to 9 inclusive, we have illustrated a refinement of our invention, wherein the fairlead carries a rotatable barrel which has an eccentrically positioned opening for the cable. Two embodiments of this construction are shown. In the embodiment of Figs. 6, 7 and 8, the clamp is identical with that of Figs. 1 to 3, and the same reference characters are applied thereto and also to the supporting wall and the retaining screws, so that any description on such parts is unnecessary. The fairlead member, however, is quite different from either the two-part fairlead of Figs. 1, 2 and 3, or the solid fairlead of Fig. 5.

The fairlead of Figs. 6, 7 and 8 is a three-part member comprising a barrel 40 and two split retaining rings 50. The barrel 40 is a substantially round member made up of two slightly tapered truncated cones 41 meeting at a central ridge 42. Extending longitudinally of the barrel is a recess which is U-shaped in cross section. That is to say, the innermost portion of its wall 43 is of semi-cylindrical formation, while flat portions 44 lead to the periphery of the barrel, as shown in Fig. 7.

The two ring-like members 50 which retain the barrel are formed identically with each other and each comprises a nearly complete annulus having a circular opening 51, slightly conical in correspondence with the coning of the barrel 40, and a lateral parallel-sided opening 52 leading from the conical recess to the outside. The exterior surface 53 of the nearly annular ring 50 is a segment of a sphere. This member is flat on its opposite sides, as indicated at 55 and 56.

From the side 56 (which bounds the largest periphery of the spherical surface) we extend a flat-sided lug 57 which has a width corresponding to that of the opening 52 and has its outermost surface formed spherically for a distance corresponding to the thickness of the ring between the surfaces 55 and 56. This is indicated at 58.

The two parts 50 are identical and may be formed by the same die or mold. When the three parts are mutually mounted, one of the conical surfaces 41 of the barrel snugly fits into the opening 51 of one of the members 50, the other conical surface 41 in the other member 50, while the lug 57 of each of these retaining split rings occupies the recess 52 of the other split ring. When the three parts are thus assembled, the construction illustrated in Figs. 7 and 8 is produced, thus making a completely annular body having a spherical exterior corresponding to that of the fairleads already described but now retaining the rotatable barrel 40. By this means the opening 43, 44 which receives and positions

the cable B, may be shifted in position to accommodate the straight course of the cable.

The lug **57** is shown as having a position about 90° different from the position of the notch **52**. We prefer to place it about this region because, due to the eccentric position of the opening **51**, there is more material of the split ring available for holding the lug than if it were much farther around on the split ring.

It will be noticed that each lug **57** extends laterally beyond the side of the fairlead, and either projecting lug thus furnishes convenient means for rotating the fairlead in the clamp before the latter is effectively tightened. Also it will be noticed that in the ends of the barrel we provide diametric grooves **45** which are adapted for the reception of a screw driver for turning the barrel in the fairlead split rings.

By the reason of the barrel occupying the fairlead rings eccentrically, and the passageway of the barrel being eccentric of it, we are enabled to locate the cable guide at any place within the circle defined by the outermost possible positions of the barrel opening. This feature enables the very accurate positioning of the cable guiding opening so that it may extend not only obliquely to the partition through which it passes, as illustrated in Fig. 8, but may occupy various regions in the hole *a* through the partition and need not be located at all centrally of such hole.

In the mounting this construction on a cable in position extending through the inner clamp and the partition, the barrel is first placed about the cable and then the notches of the fairlead split rings (which are at least as wide as the diameter of the cable) are passed across the cable and the rings shoved toward each other to embrace the barrel. Then the outer member of the clamp is applied by turning in the screws somewhat loosely, so that the fairlead may be shifted circumferentially and tipped and the barrel adjusted to give a perfect alignment of the barrel opening with the existing cable. Then the tightening of the screws locks the split rings in the clamp and also causes them to clamp the barrel in its adjusted position.

In Fig. 9, we have illustrated the same three-part fairlead construction as just described but have shown it mounted in the same clamp arrangement as in Fig. 4. Thus, in view we have shown the same wall D with its circular opening engaging the spherical exterior of one of the members **50**, while the clamp **30** engages the spherical exterior of the other member **50**, the device being retained on the wall D by the screws E, as heretofore described.

It will be seen that in all of the embodiments illustrated, we have provided a fairlead having an opening for the passage of the cable and having a spherical surface extending between two flat sides, such fairlead being held in position adjustably of itself by either an applied two-part clamp or a one-part clamp which coacts with a structural wall. In any case the construction is mounted by passing two screws through the wall, such screws engaging nuts carried by a clamping member.

While the thread engaging members, referred to as "nuts," may be carried in any suitable manner by the clamping member, we prefer the spring tongues heretofore mentioned. These tongues **33** in each of the embodiments are illustrated in a larger scale in Fig. 10, which is a cross section through the tongues on any of the clamping members **30** shown. When these tongues furnish the nut, the member **30** is made of spring material and the tongues provided by the parallel slits and openings are warped slightly to provide the desired screw thread to receive and lock the screw without the necessity of any additional nut or other fastening devices.

We claim:

1. The combination with a supporting plate having an opening through it, of a sheet metal clamping member having an opening through it, part of the edge of which opening is composed of circular arcs, tongues cut from the material of said plate bent inwardly therefrom at opposite sieds of the opening, said tongues being flanged at their ends to provide lateral extensions adapted to bear against said supporting plate, another sheet metal clamping member having an opening through it and formed with integral nuts beyond the opening, screws passing through the supporting plate and through openings in the first-mentioned plate and occupying the nuts of the second plate, and a separable fairlead adapted to be placed about a cable passing through the two clamping members and supporting plate and presenting, when its parts are together, a segment of a sphere on its exterior, the circular edges of the two clamping plates engaging such spherical surface.

2. A fairlead comprising a pair of cooperating members having spherical exteriors and having internal eccentrically placed openings and a barrel mounted in said opening and having an eccentrically placed opening adapted to position a cable passing through the fairlead.

3. A fairlead comprising two rings, each split by a notch and each having an exterior which is a portion of a single spherical surface, each ring having a projecting lug adapted to occupy the notch of the other ring to produce two coacting members having a common spherical exterior.

4. A fairlead comprising two rings, each split by a notch, each ring having a projecting lug adapted to occupy the notch of the other ring to produce two coacting members, and a barrel rotatably mounted in said members and having a longitudinal opening through it.

5. A fairlead comprising a barrel having an eccentrically placed longitudinal opening through it, the exterior of the barrel being composed of two truncated cones meeting in a ridge, a pair of members each having a conical opening to embrace one of the conical surfaces of the barrel, the exterior surface of said members comprising a single sphere, the meeting planes of the members being on the diameter of such sphere.

6. A fairlead comprising a barrel having a longitudinal eccentrically positioned open groove in it, the surface of the barrel comprising two truncated cones meeting in a ridge, and two split rings, each having a conical recess adapted to embrace one of the conical surfaces of the barrel when the two split rings are face to face, each split ring having a lug projecting from such meeting face and occupying an opening in the other split ring which leads from the conical cavity to the exterior, whereby the barrel and the two split rings may be placed across a cable in position.

7. A fairlead comprising a barrel having a longitudinal eccentrically positioned opening through it, the surface of the barrel comprising two truncated cones meeting in a ridge, and two split rings, each having a conical recess adapted to embrace one of the conical surfaces of the barrel when the two split rings are face to face, each split ring having a lug projecting from such meeting face and occupying an opening in the

other split ring which leads from the conical cavity to the exterior, said split rings and the exterior of said lugs having a surface which comprises a single sphere when the parts are together.

8. The combination with a support having an opening through it of a sheet metal clamping member having an opening through it, a part of the edge of which last-mentioned opening is composed of circular arcs, tongues cut from the material of said member and bent inwardly therefrom at opposite sides of the opening therein, said tongues being adapted to bear at their ends against the support, another sheet metal clamping member having an opening through it, means for holding the two clamping members and the support together and a fairlead surrounding a cable passing through the two clamping members and the support and presenting a spherical segment on its exterior, the circular edges of the two clamping members engaging said spherical surface.

9. The combination of two positioning members having openings through them with circular edges, a fairlead holder having a spherical exterior adjustably engaged by the circular edges of the positioning members and a fairlead having a cable guide hole, said fairlead being adjustably mounted in said fairlead holder.

10. An adjustable cable guiding means comprising a fairlead holder having a spherical exterior and having an eccentrically positioned opening through it, a fairlead barrel rotatively mounted in the fairlead holder and having an eccentrically positioned passageway, whereby the position of a cable passing through the passageway may be shifted, and clamping means engaging the exterior to hold the fairlead holder in various positions.

11. The combination of a clamp, a separable fairlead holder comprising two coacting members both having spherical exteriors of the same radius adapted to be engaged and held by the clamp in various tipped positions, a fairlead barrel rotatably mounted in the fairlead holder and held in position therein, said barrel having an eccentrically positioned passageway adapted to receive a cable.

12. A fairlead comprising a pair of cooperating hollow members having substantially flat meeting faces, said members having exteriors which when the members are together constitute a surface of a single sphere, registering eccentrically placed openings in said two members and a barrel rotatably mounted in said openings and its having an opening for the passage of a cable.

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