Feb. 10, 1970 P. W. FOURNIER ET AL 3,494,461

GRATING SUPPORT MEANS

Filed Dec. 18, 1968

Figure 1

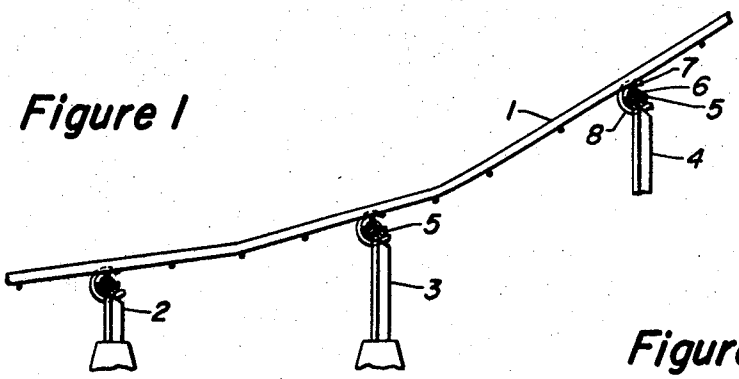


Figure 2

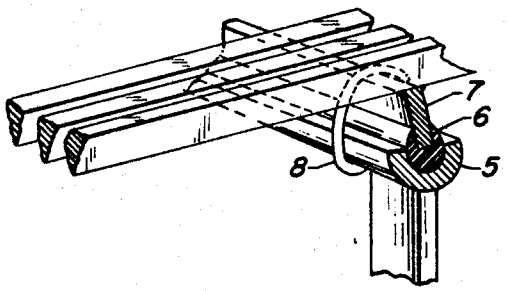


Figure 3

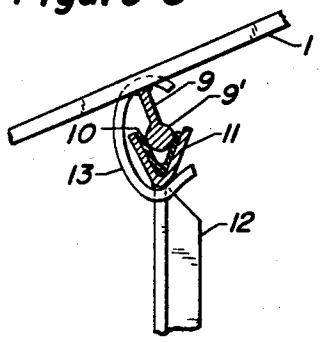


Figure 4

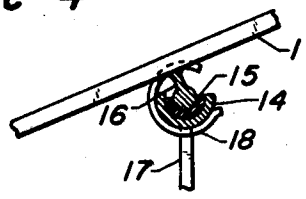


Figure 5

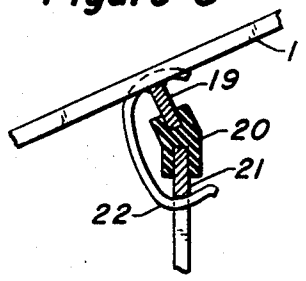
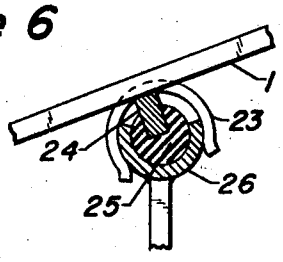


Figure 6



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GRATING SUPPORT MEANS

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U.S. Cl. 209—395 6 Claims

ABSTRACT OF THE DISCLOSURE

A grating support system, adapted for holding grating in varying angular positions, which uses cross-bar means on the grating adapted to be held within a cradle-form of resilient cushioning that is, in turn, adapted to be connected to or held by transverse bar support means in a manner to permit the cross-bar means to be held at varying angles with respect to a vertical plane. A preferred system uses C-clips that are sized to spring over the seated cross-bar means within cradle-form cushioning and bar support means to provide for a tight, bolt-free holding of the grating to the support means.

This invention relates to an improved cushioned support system for holding grating or heavy screen at varying angles with respect to support members and is particularly useful for supporting grating to be vibrated. More specifically, the improved system provides for a rapid, bolt-free installation of grating by using C-clip clamping of grating cross bars into engagement with interposed cradle-form cushioning and accompanying lower transverse bar support members, with the resulting cradled support arrangement being such that the grating and its cross-bars may be at vaying angular positions with respect to the lower support means.

It is recognized that there are many forms of spring action "C-clips" which have been used to hold wire, rods, and the like, to a beam, post or some other form of support member. For example, C-clips have heretofore been used to hold fencing to fence posts and wire lathing to metal furring strips, etc. However, there have been no known special systems which provide for holding a heavy grating material to an interposed cradle-form cushioning such that varying angles of grating positioning are readily accommodated.

It may be considered a principal object of the present invention to provide a cushioned grating support system which will easily accommodate varying angles or positions for the grating with respect to the supporting structure and also utilizes C-clip clamping means to preclude the need for conventional bolted types of connections.

It is a further object of the invention to use a cradle-form of rubber cushioning, or other resilient material, between the grating cross-bar means and the bar support means such that jarring action on the grating will be damped and, in addition, there will be improved holding characteristics for the C-clips used in connection with the assembled support system. As a result, the improved assembly is particularly adapted for effecting the installation of grating in vibrating tables or other places where the screen or grating is subjected to considerable jarring action from the material being screened or from the supporting zone.

Broadly, the present invention provides an improved grating support system providing for cushioning and angular positioning of the grating, in a manner which comprises, cross-bar means connecting with the grating to be supported, transverse bar support means adapted to extend under and hold said cross-bar means and support

the latter at varying angular positions, a resilient cradle-form cushioning means interposed and held between said cross-bar means and said transverse bar support means, with the cushioning also being adapted to hold the cross-bar mean at varying angles of position with respect to said bar support means, and spring type C-clip members sized to pass over said cross-bar means when seated in said cradle-form cushioning means and on said bar support means whereby to hold the grating tightly to the latter.

Various methods may be utilized for effecting the cushioning between the transverse or cross-bar means attached to the grating itself and the support means which, in turn, connects to posts, vibrating table extension arms, etc. In one special embodiment, a U shaped section or rubber, or other resilient material, may be formed around the lower edge of the cross-bar and have its lower portion sized and adapted to seat within a cadle-form of bar support member. In another instance, the lower portion of the cross-bar may be of a curved or rounded nature and adapted to fit within a transverse cradle support member which is sized and shaped to have an internally lined section of rubber or other resilient material which will hold the curved lower portion of the cross-bar. In each instance, it is desired that the relationship between the cross-bar means on the grating and the transverse cross-bar support means, as well as the cushioning means therebetween, permit angular rotation so that the grating may have various slopes with respect to a normally vertical support post or the framing under the transverse bar support means.

As a preferred method of effecting the tight engagement between the cross-bar means and the transverse bar support means, there shall be utilized spring clips, such as C-clips. Generally the C-clips are of stiff, springy types of steel which are capable of being temporarily spung apart to effect their engagement around the members which are to be clamped. Thus, they will subsequently exert a spring clamping action around the encompassed sections. The resilient cushioning section being used between the cross-bar members and the support members will have an added improved effect, when used in the present assembly with C-clip clamping, in that the cushioning unit can be partially compressed to permit a tight fitting seat clip to be engaged around the cross members or, conversely, the rubber cushioning will assist in compensating for variations in C-clip size and resilience so that there can be maintained a continuing tight engagement under jarring conditions.

As briefly noted hereinbefore, the present support assembly is particularly adapted for operating conditions where there is continuous jarring or vibration such as will occur in connection with vibrating tables or "shaker" tables which utilize heavy grating to do sizing and classification procedures. In still other instances, sloping sections of grating may be used to convey ores or the like and, at the same time, effect a classification operation. For example, in connection with certain classifying processes, or with vibrator tables, there will be one or more slopes provided for the upper heavy grating surface and it is desirable to be able to have a support system which will accommodate varying slopes for the grating itself with respect to the support means. Still further, it is desirable to have an assembly system which eliminates bolts or other cumbersome means of attachment of grating onto the table or to fixed support means.

Reference to the accompanying drawing and the following description thereof will assist in describing the present improved cushioned grating support system, as well as point out additional advantageous features attained in the use of the support cushioning and C-clamp attachment.

DESCRIPTION OF THE DRAWING

FIGURE 1 of the drawing is a diagrammatic elevational view indicating a grating having varying slopes and being supported on vertical support posts with transverse cradle-type support members and with cushioned C-clip assembly means.

FIGURE 2 of the drawing is a partial isometric view indicating the use of C-clips to effect the clamping of grating cross-bar means into cradle-form cushioning and trough type transverse bar support.

FIGURES 3, 4, 5 and 6 shows, in partial sectional elevational views, various modifications with respect to grating cross-bars, cushioning means, and transverse bar support members, with all assemblies being clamped with C-clip means.

Referring now particularly to FIGURES 1 and 2 of the drawing, there is indicated a sloping grating **1** being supported at varying angles with respect to vertical support members **2**, **3** and **4**. In each instance, across the top of the vertical support members, there is utilized a cradle-form of support member **5** adapted to hold a cushioning layer **6** that in turn accommodates and supports a cross-bar member **7**. The cross-bar members **7** are normally welded or otherwise fixedly attached to the lower side of the grating **1** in a manner to structurely support the weight of the grating and its superposed loading. Also, there is indicated in each attachment the use of a spring form, resilient C-clips **8** which are sized to be sprung around the top portion of a cross-bar **7** and under the transverse support member **5**. The C-clips **8** will, of course, be spaced apart laterally across the width of the support means, with the number used being dependent upon the width of the grating on the support means.

In the present embodiment, as best shown in the enlarged FIGURE 2, the cross bar means **7** may be of a generally rectangular form, with sufficient depth to insure rigidity and strength for holding the grating **1**. Placed around the lower edge of the cross-bar means **7**, there is a U-shaped rubber cushion member **6** which has a curved lower peripheral portion adapted to fit within an adapting curved, cradle-like bar support member **5**. The latter will in turn be supported by one or more posts or other support means which may carry from foundation means, as shown for post members **2**, **3** and **4** in FIGURE 1, or, alternatively, may comprise members extending from support framing within a shaker table or other type of classifying equipment.

As noted hereinbefore, it is of particular advantage to have a curved or rounded engagement between the transverse bar support means **5** and the lower portion of the cushioning, such as **6**, or between the cross-bar means and the cushioning, in order that there may be varying angles of support for the grating **1** with respect to the support bar means **5**. It may again be noted that the cushioning **6** also permits resiliency in effecting the engagement of C-clip members **8** around the assembled cross-bar means **7** and the bar support means **5** such that there is a resulting tight and non-bolted type of attachment of grating to the support members. Between the spring action of clip members **8** and the resiliency of cushioning **6** there is an added factor provided in attaining a tight jar-proof type of engagement which will tend to preclude the loosening or disengagement of C-clips **8** over a long period of time, especially under vibrating conditions. Generally, the U-shaped section **6** will be formed and fabricated of rubber with a long life and wear resilient capabilities; however, other rubber-like components, such as polyurethane, polyvinyl chloride, or other materials of the "plastic" type may well be used and provide satisfactory operational characteristics.

With respect to the C-clips **8**, they will, of course, be made of stiff, strong and resilient forms of steel that will have a continuing capability for maintaining the transverse bar members engaged under any jarring or vibrating conditions being encountered by the grating **1**. Thus, the diameter of the wire used in forming the C-clips **8** may well vary, depending on grating size and loading conditions. Still further, it is to be noted that the actual configuration may vary to suit the cross sections of the cross-bar means **7** and the lower transverse bar support means **5**. In many instances, it is conventional to utilize special tools which will effect the spreading of the C-clips during the installation procedure. Such tools, of course, being designed to hold the clips and fit them in between the bars or rods which form the superposed grating of the assembly.

In FIGURE 3 of the drawing, there is indicated a modified design and arrangement for each of the transverse members, however, it will be noted that each member is designed to permit angular rotation with respect to a vertical or horizontal plane so that there may be accommodation for various slopes of the grating **1**. In this instance, cross-bar **9** is provided with a lower curved portion **9'** that is adapted to fit into a V-shaped cushioning section **10** and corresponding V-form transverse bar support member **11**. The latter is indicated as being held by vertical support means **12** while C-clip means **13** at spaced points will be used to hold the assembly in a tightly clamped manner. It should be noted that the curved portion **9'** for the cross-bar means and the V-form arrangement for the transverse bar support means, in turn, provide a cradle for effecting a varying angular support arrangement to a grating **1**. The cushioning section **10** may be an entirely separate strip of rubber or other resilient material adapted to be placed within the V portion of support member **11** or may be directly attached to and made a part of the latter. In still another modification, the cushioning layer **10** may be wrapped around and attached to the lower portion **9'** for the cross-bar means **9**. However, in each instance there shall be the desired shock absorbing and cushioning effect, as well as the means for effecting angular rotation between the cross-bar means and the bar support means.

With reference to FIGURE 4 of the drawing, there is indicated a varying angle, cushioned support arrangement which utilizes a cradle form of transverse bar support **14** that is similar to the bar supporting means of FIGURE 2; however, in this instance, the intermediate cushioning **15** is indicated as having a semicircular or U-shape similar to that for the transverse bar member **14** in order that it may be affixed to the latter or at least readily be set within the transverse bar member. In view of the half circle or cradle type of configuration for the bar support means **14** and cushion **15**, there is provided a round or curved lower edge portion to the cross-bar means **16** that is attached to the underside of the grating **1**, whereby the latter can have varying angular positions with respect to the cradle-form support **14**. Again, there is indicated the use of C-clip means **18** which will be sized to fit between the grating bars of the superposed grating **1** and encompass the top of cross-bar means **16** and the underside of transverse bar support means **18**.

In FIGURE 5 of the drawing, there is indicated another modified support arrangement where the entire U or cradle effect for the cross-bar means on the grating is supplied by the cushioning member. In other words, cross-bar means **19** is supported within an H-shaped rubber or cushion section **20**. The H-shape is utilized for the cushioning member such that it may accommodate the upper bar and a lower rectangular-form bar support member **21**. In this design and arrangement, the resilient cushioning member **20** may be a preformed shape to acbar **19** with respect to support bar means **21**, or alternatively, the cushioning member **20** may be sufficiently resilient and deformable so as to be of a straight H-form that may be bent into an angular relationship, such as indicated in the drawing, whereby varying angles of adjustment may readily be accommodated. Again, the present assembly indicates the use of C-clip members **22** to

pass over the cross-bar means **19** and under the lower transverse bar support means **21** so that there is the tight engagement of the bar members in a manner to hold the intermediate cushioning tightly therebetween under jarring and vibrating conditions. In this instance the C-clips **22** may be rather narrow and elongated as compared to those in FIGURE 4, although, of course, it is not intended in the present invention to limit the C-clip to any one configuration or design or to any one type of material.

With regard to FIGURE 6 of the drawing, there is a modified type of C-clip to the extent that the plurality of clips **23** are shown with an open side facing down and away from the grid **1**. In this arrangement, the C-clips **23** may be tack-welded to the grating or to the upper edge of the cross-bar means **24** so that they are not readily removed or lost. However, it is not necessary that they be in any way fixedly attached to the grating section. The cushion member **25** in this embodiment has a rounded bottom to fit into a curved surface transverse bar support member **26**. Thus, the support arrangement is generally similar to that shown in FIGURE 2. The C-clips **23** should, of course, be designed and sized to effect a spring clip effect over and beyond the wide portion of support bar means **26**. It should be pointed out, however, that the outer periphery of bar means **26** need not be round inasmuch as a C-clip means may well slip around and grip onto a square or rectangular member quite readily in the same manner as partially encompassing a substantially rounded section.

By virtue of the various modifications indicated in the present drawing, it is obvious that there may be still other specific cross sections for the cross-bar members that are attached to the grating as well as varying cross sections for the cushioning strips and for the transverse bar support members. However, it is again reiterated that, in each instance, the lower portion of the cross-bar members or of the cushioning members and the upper supporting surface of the transverse bar support members are designed to permit slight angular rotation therebetween and in turn accommodate varying angular positions for the grating which is superposed over the cross-bar means as part of the assembly. Still further, while the present drawing indicates the grating to be formed of wedge-shaped bars, it is to be noted that the grating may be made of conventional rectangular bar means or of heavy forms of round or oval wire or rods such as may be encountered in connection with heavy screening so that it is not intended that the present cushioning system be limited for combination with only wedge-shaped bar grating.

We claim as our invention:

1. A grating support system providing for cushioning and angular positioning of the grating, which comprises in combination, cross-bar means connecting with the grating to be supported, transverse bar support means extending under said cross-bar means to support the latter at varying angular positions, a resilient cradle-form cushioning means interposed and held between said cross-bar means and said transverse bar support means, with such cushioning means also adapted to maintain the cross-bar means at a predetermined angle with respect to said bar support means, and spring type C-clip members sized to pass over said cross-bar means when seated in said cradle-form cushioning means and on said bar support means whereby to hold the grating tightly to the latter.

2. The grating support system of claim **1** further characterized in that the underside of said cushioning means is provided with a curved surface adapted to be held within said bar support means, said bar support means having a cradle-form sized to engage and hold the lower portion of the cushioning means.

3. The grating support system of claim **1** further characterized in that said cross-bar means has a curved lower edge portion and the upper face of said cushioning means is curved and sized to engage the lower portion of said cross-bar means whereby there may be angular rotation therebetween and said transverse bar support means is sized and shaped to engage and support said cushioning means.

4. The grating support system of claim **1** further characterized in that said transverse bar support means has a cradle-form and said resilient cradle-form cushioning means is formed of a separate strip capable of being bent and seated within said cradle-form transverse bar support means as a separate strip unattached to either the cross-bar means or the transverse bar support means.

5. The grating support system of claim **1** further characterized in that said resilient cradle-form cushioning means is of an H-form cross section adapted to fit under and cradle the underside of said cross-bar means while at the same time fit over and engage a top edge portion of said transverse bar support means.

6. The grating support system of claim **1** further characterized in that said C-clip members are attached at spaced points to said grating and the open portions thereof face downwardly from the underside to encompass the cross-bar means and the cushioning means and hold around said bar support means.

References Cited

UNITED STATES PATENTS

2,802,571	8/1957	Symons	209—394
3,042,206	7/1962	Olender	209—395

FOREIGN PATENTS

240,402	8/1962	Australia.

FRANK W. LUTTER, Primary Examiner

U.S. Cl. X.R.

209—313