

## Description

### BACKGROUND OF THE INVENTION

The field of the present invention is shock and vibration isolators. More particularly, the invention relates to an isolator for isolating a device or instrument from shock and/or vibration occurring during movement of the instrument.

During filming sequences with a motion picture or video tape camera, it is often necessary for the camera to be moved in space over a floor or supporting surface. For proper filming, the camera movement must be accomplished smoothly. Even small amounts of shock or vibration of the camera can result in unsatisfactory filming due to shaky or erratic recorded images. Consequently, it is necessary to provide a steady platform for the camera by isolating the camera from shock and vibration.

The prior art isolators have various disadvantages. In some instances, specific weights or counterweights must be added to provide balancing and to compensate for the weight of the camera. Other known isolators can handle only cameras in specific weight ranges. In addition, highly trained and experienced camera operators may be required especially with operator carried systems. In addition, certain of these known isolators are mechanically complex, expensive, and difficult to use.

Commonly, a motion picture or video camera is mounted on an extendable elevation arm of a wheeled dolly to facilitate camera movement and angle changes, as required by the filming sequence. As the dolly wheels roll over the supporting or floor surface, irregularities (for example cracks, bumps, depressions, debris particles, etc.) generate shock and/or vibration which can be transmitted through the structure of the dolly to the camera. These transmitted mechanical impulses degrade steady filming ability. Since the camera may be elevated substantially above the surface on the dolly arm, the effects of a small crack or bump in the floor surface are amplified at the camera position.

### SUMMARY OF THE INVENTION

The present invention as defined in claim 1 is directed to a shock and vibration isolator which prevents shock and vibration generated by movement from disturbing a steady platform. To this end, first and second guide bars slidably extend through ferrules of a support plate. Guide rails are linked at their ends to the guide bars. A mounting plate having ferrule arms is slidably mounted on the guide rails. Biasing means or springs are provided for biasing the support plate to its transverse center position, and for biasing the mounting plate towards a center longitudinal position. The guide bars have a radius of curva-

ture in a plane perpendicular to the plane of the support plate.

Preferably, the guide bars and guide rails are connected at their ends to connecting blocks. Adjustable friction clamps are advantageously included to vary the sliding friction between the support plate and guide bars, and the mounting plate and guide rails. The adjustable friction clamps may include a lever fixed to a drive stud threadably engaged through a boss, a clamp band overlying a friction sleeve partially surrounding the guide bar, and a stud having an end engageable to the clamp band. Actuation of the lever causes the stud end to reversibly clamp band and sleeve around the guide bar to vary the amount of sliding friction. In a preferred embodiment, the clamp band includes a slot and a relieved section opposite to the slot.

Preferably, the support plate has ferrules disposed at opposite ends thereof with spaced apart self-aligning ball bushings disposed within the ferrules and surrounding the guide bars.

Accordingly, it is an object of the present invention to provide a shock and vibration isolator for isolating a steady platform from mechanical disturbances.

It is a further object of the invention to provide a vibration isolator which effectively provides isolation regardless of the weight of the instrument or device mounted upon the steady platform.

It is a further object of the invention to provide an isolator adaptable for use on a camera dolly. Other and further objects and advantages will appear hereinafter.

### BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein similar reference characters denote similar elements throughout the several views :

Figure 1 is a perspective view of a motion picture camera mounted upon the isolator of the invention, and supported on an extendable arm of a camera dolly ;

Figure 2 is a perspective view of the isolator of the invention ;

Figure 3 is a plan view of the isolator of Figure 2 ; Figure 4 is a plan view in part section of the support plate and guide bars of the isolator of Figure 2 ;

Figure 5 is an end view in part section of the support plate and guide bars of Figure 4 ;

Figure 6 is a schematic illustration of a guide bar passing through the support plate with the curvature of the guide bar exaggerated for illustration purposes ; and

Figure 7 is a section view of an adjustable friction clamp.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning in detail to the drawings, as shown in Figure 1, a motion picture camera 12 is secured to the isolator 14 positioned on a camera dolly 10.

With reference to Figure 2, the isolator 14 includes a mounting plate assembly 16 having left and right journal or ferrule arms 38 and 36, respectively. A mounting plate 40 is secured to ferrule arms 36 and 38 with fasteners 42. The mounting plate 40 has a slot 44 extending outwardly to the sides of the plate 40 from a counterbore 46 concentric with a central opening 45 through the plate 40.

Passing through the ferrule arms 36 and 38 are right and left longitudinal guide rails 24 and 22, respectively. The ends of guide rails 24 and 22 are joined to connecting blocks 28, 30, 32 and 34. Centering compression springs 48 are positioned around the guide rails 22 and 24, in between the ferrule arm 36 and the connecting blocks 34 and 28, and similarly in between ferrule arm 38 and connecting blocks 32 and 30. The compression springs 48 are made of stainless steel coiled wire, preferably 1.37 mm (.054 inch) diameter, and with a spring constant adjusted to enable the springs 48 to exert centering spring forces on the mounting plate assembly 16.

Front and rear transverse guide bars 18 and 20 extend in between connecting blocks 28, 30, 32 and 34. A support plate assembly having front and rear ferrules 60 and 62, respectively, is slidably mounted on the guide bars 18 and 20, with the guide bars passing through the ferrules 60 and 62. Compression springs 48 are disposed around the guide bars 18 and 20 in between the ferrule 60 and connecting blocks 28 and 30, and similarly, between ferrule 62 and connecting blocks 32 and 34.

With reference to Figures 3, 4 and 7, each of the ferrule arms 36 and 38 and ferrules 60 and 62 has a friction clamp assembly 51 for adjusting the amount of sliding friction. With specific reference to Figure 7, the friction clamp assembly 51 includes a friction clamp lever 50 secured to a drive stud 78 which threadably engages a boss 80. The end of the drive stud 78 engages a metallic clamp band 76 substantially surrounding guide bars 18 and 20 and guide rails 22 and 24. The clamp band 76 has a relieved section 84. A sleeve 74 is positioned in between the clamp band 76 and the guide rails and guide bars. The sleeve 74 is a teflon-graphite-brass material having a low coefficient of friction and having the characteristic of not sticking or binding to adjoining metal surfaces. The sleeve 74 is also slotted in the manner of the clamp band 76. A set screw 82 engages the clamp band 76 at a position opposite to the drive stud 78 for alignment purposes.

Referring to Figure 5, the support plate assembly 26 is attachable to a mounting bracket 56 of the dolly

10 via a platform stud 54.

As shown in Figure 6, the transverse guide bars 18 and 20 each have a slight radius of curvature such that the ends of the bars adjoining the connecting blocks are closer to the floor 76 than are the centres of the transverse guide bars. This radius of curvature, which is greatly exaggerated for purposes of illustration in Figure 6, is preferably in the range of from 91 to 376 cm (36 to 148"). In contrast, the longitudinal guide rails 22 and 24 are straight. The ferrules 60 and 62 have bores 68 and 70 extending therethrough at an angle to one another. The angle  $\Theta$  formed by the longitudinal axes of the bores 68 and 70 and the horizontal axis 72 is  $0.721^\circ$  when R equals 241 cm (95") and  $1.914^\circ$  when R equals 91 cm (36").

Also, as shown in Figure 6, within the ferrules 60, 62 are spaced apart self-aligning ball bushings 66 which provide sliding bearing surfaces against the guide bars 18 and 20. For clarity, the friction clamp 51 is not illustrated in Figure 6.

In operation, the isolator acts to absorb shock and vibration as the dolly 10 rolls over the floor surface 76 which generally includes imperfection which, without the isolator 14 would result in shocking or jarring of the camera 12. The isolator 14 allows the mounting plate 40 freedom to move both transversely and longitudinally to absorb shock and vibration, without imparting sudden movement to the camera, by virtue of the inertia of the mounting plate assembly 16 and the inertia of the camera.

Typically, as the dolly rolls over the floor 76, the direction of the shock and vibration mechanical impulses generated by running over a bump or hole is laterally on a radius due to the bump or hole normally affecting only one wheel at a time. The particular radius and the direction of these impulses is a function of several variables, including the tyre tread dimensions of the dolly, the amplitude or dimension of the bump or hole in the floor surface 76, and the structural stiffness and flexure characteristics of the dolly structure. The direction of the dolly wheels as the bump or hole is encountered may also affect the radius. Due to the longitudinal wheel base being longer than the transverse wheel base and the normal direction of movement in use being longitudinal the greater movement responsive to a bump or hole will be transversely which is why it is the transverse guide bars which are curved.

An approximately 213 cm (84") radius guide bar accommodates the movement for impulses which are common to certain production motion picture camera dollies. By providing the transverse guide bars 18 and 20 with a radius of curvature, angulation of a camera mounted on the mounting plate 40 is avoided even for relatively large horizontal displacements resulting from components of shock impulses generated when the dolly wheels roll over a bump or hole. For exceptionally small dollies, the preferred radius of the

guide bars would be substantially less. Conversely, a larger radius would be used for large crane dollies.

Experimental results reveal that it is preferable for the support plate assembly 26 to be mounted longitudinally on the dolly 10, i.e. parallel to the longer axis of the dolly and thus parallel with direction of most dolly moving shots, generally front and back, and parallel with the direction of extent of its longitudinal guide rails 22. The longitudinal guide rails 22 and 24 are preferably straight because during acceleration of the dolly, the camera secured to the mounting plate 40 must not be allowed to angulate due to displacement on a curved guide rail. In addition, since the dolly is dimensionally longer in a longitudinal direction, i.e. from front to back, the longer wheel base reduces angulation when the camera is directed laterally or off to one side of the dolly. The straight longitudinal guide rails 22 and 24 absorb shock and vibration in the direction of the axis of the rails. This shock and vibration may be due to the impact of a dolly wheel rolling over a bump or hole, as previously described but it is especially common due to the lack of smooth pushing of the dolly by the dolly operator, a long-standing problem in the art.

When the isolator 14 is provided on a dolly 10 having pneumatic tires, the pneumatic tires effectively eliminate ordinary rolling shock and vibration in the vertical direction with the isolator 14 absorbing horizontal shock and vibration components, such that the camera 12 remains exceptionally steady. This enables the dolly-isolator-camera combination to be used in a wide range of circumstances and in many cases, eliminates the need to lay track for the dolly to roll on to provide adequate smoothness.

While the support plate assembly 26 and the mounting assembly 16 are ordinarily allowed to slide freely on the transverse guide bars 18 and 20 and longitudinal guide rails 22 and 24, respectively, in certain instances, (e.g. with an exceptionally heavy camera 12), it may be advantageous to increase the sliding frictional forces using the friction clamp assemblies 51. By turning the clamp lever 50, as shown in Figure 7, the clamp band 76 and underlying sleeve 74 are compressed against the guide rails 22 and 24 or the guide bars 18 and 20. The increase in the normal force at the interface between the sleeve 74 and guide rails 22 and 24 or guide bars 18 and 20 increases the amount of friction present. When fully engaged, the friction clamp assemblies 51 provide sufficient clamping force to prevent any sliding movement.

## Claims

1. A vibration isolator comprising : a support plate assembly (26) having at least one ferrule (60, 62) ; at least one transverse guide bar (18, 20) passing through said ferrule, said transverse guide bar having

a radius of curvature (R) in a plane perpendicular to the plane of said support plate assembly ; and transverse biasing means (48) for biasing said support plate assembly towards a transverse centre position on said transverse guide bar.

2. A vibration isolator according to claim 1, further comprising a mounting plate assembly (16) having at least one ferrule arm (36, 38), and at least one longitudinal guide rail (22, 24) for supporting said mounting plate assembly disposed perpendicular to said transverse guide bar (18, 20), said longitudinal guide rail passing through said ferrule arm ; and longitudinal biasing means (48) for biasing said mounting plate assembly (16) towards a centre longitudinal portion.

3. A vibration isolator according to claim 2, wherein the support plate assembly (26) comprises a support plate (58) having first and second ferrules (60, 62) disposed at opposite ends thereof, first and second rail curved transverse guide bars (18, 20) slidably extending through said first and second ferrules, respectively ; first and second said longitudinal guide rails have their ends linked (at 28, 30, 32, 34) to said first and second transverse guide bars (18, 20) ; and the mounting plate assembly comprises a mounting plate (40) having first and second ferrule arms (36, 38) slidably mounted respectively on said first and second guide rails.

4. A vibration isolator according to claim 3, further comprising first and second pairs of spaced apart ball bushings (66) disposed within said first and second ferrules (60, 62) and surrounding said first and second guide bars (18, 20), respectively.

5. Apparatus according to claim 3 or 4, wherein said mounting plate (40) has a centrally located opening (45), a counterbore (46) concentric with the opening, and opposing slots (44) extending outwardly from said counterbore.

6. A vibration isolator according to claim 3, 4 or 5, further comprising means (51) for adjusting sliding friction between at least one of said ferrules (60, 62) and the guide bar (18, 20) extending therethrough.

7. A vibration isolator according to claim 6, wherein said means (51) for adjusting friction comprises a lever (50) fixed to a drive stud (78) threadably engaged through a boss (80), and a clamp band (76) overlying a friction sleeve (74) partially surrounding said guide bar (22), said stud (78) having an end engageable to said clamp band (76), such that actuation of said lever (50) causes said stud end reversibly to clamp said band and sleeve around said guide bar.

8. A vibration isolator according to claim 7, wherein said clamp band (76) includes a slot (86) and a relieved section (84) opposite to said slot.

9. A vibration isolator according to any one of claims 3 to 8, wherein said transverse biasing means comprises first and second pairs of compression springs (48) positioned around said first and second



guide bars would be substantially less. Conversely, a larger radius would be used for large crane dollies.

Experimental results reveal that it is preferable for the support plate assembly 26 to be mounted longitudinally on the dolly 10, i.e. parallel to the longer axis of the dolly and thus parallel with direction of most dolly moving shots, generally front and back, and parallel with the direction of extent of its longitudinal guide rails 22. The longitudinal guide rails 22 and 24 are preferably straight because during acceleration of the dolly, the camera secured to the mounting plate 40 must not be allowed to angulate due to displacement on a curved guide rail. In addition, since the dolly is dimensionally longer in a longitudinal direction, i.e. from front to back, the longer wheel base reduces angulation when the camera is directed laterally or off to one side of the dolly. The straight longitudinal guide rails 22 and 24 absorb shock and vibration in the direction of the axis of the rails. This shock and vibration may be due to the impact of a dolly wheel rolling over a bump or hole, as previously described but it is especially common due to the lack of smooth pushing of the dolly by the dolly operator, a long-standing problem in the art.

When the isolator 14 is provided on a dolly 10 having pneumatic tires, the pneumatic tires effectively eliminate ordinary rolling shock and vibration in the vertical direction with the isolator 14 absorbing horizontal shock and vibration components, such that the camera 12 remains exceptionally steady. This enables the dolly-isolator-camera combination to be used in a wide range of circumstances and in many cases, eliminates the need to lay track for the dolly to roll on to provide adequate smoothness.

While the support plate assembly 26 and the mounting assembly 16 are ordinarily allowed to slide freely on the transverse guide bars 18 and 20 and longitudinal guide rails 22 and 24, respectively, in certain instances, (e.g. with an exceptionally heavy camera 12), it may be advantageous to increase the sliding frictional forces using the friction clamp assemblies 51. By turning the clamp lever 50, as shown in Figure 7, the clamp band 76 and underlying sleeve 74 are compressed against the guide rails 22 and 24 or the guide bars 18 and 20. The increase in the normal force at the interface between the sleeve 74 and guide rails 22 and 24 or guide bars 18 and 20 increases the amount of friction present. When fully engaged, the friction clamp assemblies 51 provide sufficient clamping force to prevent any sliding movement.

## Claims

1. A vibration isolator comprising : a support plate assembly (26) having at least one ferrule (60, 62) ; at least one transverse guide bar (18, 20) passing through said ferrule, said transverse guide bar having

a radius of curvature (R) in a plane perpendicular to the plane of said support plate assembly ; and transverse biasing means (48) for biasing said support plate assembly towards a transverse centre position on said transverse guide bar.

2. A vibration isolator according to claim 1, further comprising a mounting plate assembly (16) having at least one ferrule arm (36, 38), and at least one longitudinal guide rail (22, 24) for supporting said mounting plate assembly disposed perpendicular to said transverse guide bar (18, 20), said longitudinal guide rail passing through said ferrule arm ; and longitudinal biasing means (48) for biasing said mounting plate assembly (16) towards a centre longitudinal portion.

3. A vibration isolator according to claim 2, wherein the support plate assembly (26) comprises a support plate (58) having first and second ferrules (60, 62) disposed at opposite ends thereof, first and second rail curved transverse guide bars (18, 20) slidably extending through said first and second ferrules, respectively ; first and second said longitudinal guide rails have their ends linked (at 28, 30, 32, 34) to said first and second transverse guide bars (18, 20) ; and the mounting plate assembly comprises a mounting plate (40) having first and second ferrule arms (36, 38) slidably mounted respectively on said first and second guide rails.

4. A vibration isolator according to claim 3, further comprising first and second pairs of spaced apart ball bushings (66) disposed within said first and second ferrules (60, 62) and surrounding said first and second guide bars (18, 20), respectively.

5. Apparatus according to claim 3 or 4, wherein said mounting plate (40) has a centrally located opening (45), a counterbore (46) concentric with the opening, and opposing slots (44) extending outwardly from said counterbore.

6. A vibration isolator according to claim 3, 4 or 5, further comprising means (51) for adjusting sliding friction between at least one of said ferrules (60, 62) and the guide bar (18, 20) extending therethrough.

7. A vibration isolator according to claim 6, wherein said means (51) for adjusting friction comprises a lever (50) fixed to a drive stud (78) threadably engaged through a boss (80), and a clamp band (76) overlying a friction sleeve (74) partially surrounding said guide bar (22), said stud (78) having an end engageable to said clamp band (76), such that actuation of said lever (50) causes said stud end reversibly to clamp said band and sleeve around said guide bar.

8. A vibration isolator according to claim 7, wherein said clamp band (76) includes a slot (86) and a relieved section (84) opposite to said slot.

9. A vibration isolator according to any one of claims 3 to 8, wherein said transverse biasing means comprises first and second pairs of compression springs (48) positioned around said first and second



transverse guide bars (18, 20), respectively, with the springs of said first and second pairs disposed on opposite sides of said first and second ferrules (60, 62), respectively.

10. A vibration isolator according to any one of claims 3 to 9, further comprising blocks (28, 30, 32, 34) joining the ends of said guide bars (18, 20) to the ends of said guide rails (22, 24).

11. A vibration isolator according to any preceding claim, wherein said radius of curvature R is between 91 and 376 cm (36 and 144").

12. A vibration isolator according to claim 11, wherein said guide bars (18, 20) have a radius of curvature (R) of approximately 213 cms (84").

13. A vibration isolator according to any preceding claim, wherein the or each ferrule (60, 62) has first and second guide bar receiving bores (68, 70) extending from first and second ends of said ferrule through to a centre point of said ferrule, said first and second bores having longitudinal axes intersecting at an angle (20).

14. A vibration isolator according to claim 2, for use with a dolly comprising : front and rear said transverse guide bars (18, 20) having left and right connecting blocks (28, 30, 32, 34) at the ends thereof ; a left said longitudinal guide rail (22) joining said left front (30) and left rear (32) connecting blocks ; a right said longitudinal guide rail (24) joining said right front (28) and right rear (34) connecting blocks ; the support plate assembly (26) comprising : a support plate (58) slidably attached to said guide bars (18, 20) by said ferrules (60, 62) ; and the mounting plate assembly comprising a mounting plate (40) slidably attached to said guide rails (24, 22) whereby said support plate is adapted to be disposed inbetween the dolly (10) and said mounting plate ; the curvature of said guide bars being such that they form an arc between said connecting blocks, with the centre of said guide bars in use of the isolator being further from the ground than are the ends of said guide bars.

15. A vibration isolator according to any preceding claim, wherein said transverse guide bars and said longitudinal guide rails are round in cross-section.

## Patentansprüche

1. Vibrationsisolator mit einer mindestens eine Zwinke (60, 62) aufweisenden Stützplattenanordnung (26), mit mindestens einer durch die Zwinke verlaufende, sich in Querrichtung erstreckenden Führungsstange (18, 20), wobei die sich in Querrichtung erstreckende Führungsstange einen Krümmungsradius (R) in einer zu der Ebene der Stützplattenanordnung senkrechten Ebene aufweist, und mit in Querrichtung verlaufenden Vorspannmitteln (48) zum Vorspannen der Stützplattenanordnung

in Richtung auf eine in Querrichtung mittlere Position auf der sich in Querrichtung erstreckenden Führungsstange.

2. Vibrationsisolator nach Anspruch 1, desweiteren mit einer mindestens einen Zwingenarm (36, 38) aufweisenden Montageplattenanordnung (16) und mit mindestens einer sich in Längsrichtung erstreckenden Führungsschiene (22, 24) zum Stützen der Montageplattenanordnung, die sich senkrecht zu der sich in Querrichtung erstreckenden Führungsstange (18, 20) befindet, wobei die sich in Längsrichtung erstreckende Führungsschiene durch den Zwingenarm hindurch verläuft, und mit sich in Längsrichtung erstreckenden Vorspannmitteln (48) zum Vorspannen der Montageplattenanordnung (16) in Richtung auf eine in Längsrichtung mittlere Position.

3. Vibrationsisolator nach Anspruch 2, in dem die Stützplattenanordnung (26) eine Stützplatte (58) mit an einander entgegengesetzten Enden davon befindlichen ersten und zweiten Zwingen (60, 62), wobei sich erste und zweite schienenförmig gebogene, sich in Querrichtung erstreckende Führungsstangen (18, 20) jeweils verschiebbar durch die ersten und zweiten Zwingen hindurch erstrecken, wobei die Enden der ersten und zweiten der sich in Längsrichtung erstreckenden Führungsschienen (bei 28, 30, 32, 34) mit den ersten und zweiten sich in Querrichtung erstreckenden Führungsschienen (18, 20) verbunden sind, und in dem die Montageplattenanordnung eine Montageplatte (40) umfaßt, die erste und zweite Zwingenarme (36, 38) aufweist, die jeweils verschiebbar auf den ersten und zweiten Führungsschienen angebracht sind.

4. Vibrationsisolator nach Anspruch 3, desweiteren mit ersten und zweiten Paaren von beabstandeten Kugellaufbuchsen (66), die sich innerhalb der ersten und zweiten Zwingen (60, 62) befinden und jeweils die ersten und zweiten Führungsstangen (18, 20) umgeben.

5. Vibrationsisolator nach Anspruch 3 oder 4, in dem die Montageplatte (40) eine sich in der Mitte befindende Öffnung (45), eine weitere Bohrung (46), die konzentrisch zu der Öffnung ist, und einander gegenüberliegende Schlitze (44) aufweist, die sich ausgehend von der Bohrung nach außen erstrecken.

6. Vibrationsisolator nach Anspruch 3, 4 oder 5, desweiteren mit Mitteln (51) zum Einstellen der Gleitreibung zwischen zumindest einer der Zwingen (60, 62) und der sich dort hindurch erstreckenden Führungsstange (18, 20).

7. Vibrationsisolator nach Anspruch 6, in dem die Mittel (51) zum Einstellen der Reibung einen Hebel (50), der an einem durch einen runden Knopf (80) durch Einschrauben in Eingriff bringbaren Spannschraube (78) befestigt ist, und ein Spannband (76) umfassen, das über einer die Führungsstange (22) teilweise umgebenden Reibungslaufbuchse (74)



liegt, wobei ein Ende der Schraube (78) mit dem Spannband (76) in Eingriff bringbar ist, so daß bei Betätigung des Hebels (50) das Schraubenende das Band und die Laufbuchse um die Führungsstange herum reversibel einklemmt.

8. Vibrationsisolator nach Anspruch 7, in dem das Spannband (76) einen Schlitz (86) und eine dem Schlitz gegenüberliegende Entlastungsaussparung (84) umfaßt.

9. Vibrationsisolator nach einem der Ansprüche 3 bis 8, in dem die sich in Querrichtung erstreckenden Vorspannmittel erste und zweite Paare von Kompressionsfedern (48) umfassen, die jeweils um die ersten und zweiten sich in Querrichtung erstreckenden Führungsstangen (18, 20) herum angeordnet sind, wobei die Federn der ersten und zweiten Paare sich jeweils auf einander gegenüberliegenden Seiten der ersten und zweiten Zwingen (60, 62) befinden.

10. Vibrationsisolator nach einem der Ansprüche 3 bis 9, desweiteren mit Blöcken (28, 30, 32, 34), die die Enden der Führungsstangen (18, 20) mit den Enden der Führungsschienen (22, 24) verbinden.

11. Vibrationsisolator nach einem der vorhergehenden Ansprüche, in dem der Krümmungsradius (R) zwischen 91 und 376 cm (36 und 144") liegt.

12. Vibrationsisolator nach Anspruch 11, in dem die Führungsstangen (18, 20) einen Krümmungsradius (R) von etwa 213 cm (84") aufweisen.

13. Vibrationsisolator nach einem der vorhergehenden Ansprüche, in dem die oder jede Zwinke (60, 62) die erste und zweite Führungsstange aufnehmende Bohrungen (68, 70) aufweist, die sich ausgehend von den ersten und zweiten Enden der Zwinke hindurch bis zu einem Mittelpunkt der Zwinke erstrecken, wobei die ersten und zweiten Bohrungen Längsachsen haben, die sich in einem Winkel (20) schneiden.

14. Vibrationsisolator nach Anspruch 2, zur Benutzung mit einem Kamerawagen, umfassend: vordere und hintere sich in Querrichtung erstreckende Führungsstangen (18, 20), die linke und rechte Verbindungsblöcke (28, 30, 32, 34) an ihren Enden aufweisen, eine linke sich in Längsrichtung erstreckende Führungsschiene (22), die die linken vorderen (30) und die linken hinteren (32) Verbindungsblöcke miteinander verbindet, eine rechte sich in Längsrichtung erstreckende Führungsschiene (24), die die rechten vorderen (28) und die rechten hinteren (34) Verbindungsblöcke miteinander verbindet, wobei die Stützplattenanordnung (26) eine über die Zwinke (60, 62) verschiebbar an der Führungsstange (18, 20) angebrachte Stützplatte (58) und die Montageplattenanordnung eine verschiebbar an den Führungsschienen (24, 22) angebrachte Montageplatte (40) umfaßt, wodurch die Stützplatte zwischen dem Kamerawagen (10) und der Montageplatte angeordnet werden kann, wobei die Krümmung der Führungsstangen derart ist, daß sie einen Bogen

zwischen den Verbindungsblöcken bilden, wobei der Mittelpunkt der Führungsstangen bei Benutzung des Isolators weiter vom Boden entfernt ist als die Enden der Führungsstangen.

15. Vibrationsisolator nach einem der vorhergehenden Ansprüche, in dem die sich in Querrichtung erstreckenden Führungsstangen und die sich in Längsrichtung erstreckenden Führungsschienen einen runden Querschnitt aufweisen.

## Revendications

1. Isolateur de vibrations comprenant : un assemblage de plaque de support (26) comprenant au moins un fourreau (60, 62), au moins une barre de guidage transversale (18, 20) passant dans ledit fourreau, ladite barre de guidage transversale possédant un rayon de courbure (R) dans un plan perpendiculaire au plan dudit assemblage de plaque de support, et des moyens de sollicitation transversaux (48) pour solliciter ledit assemblage de plaque de support en direction d'une position centrale transversale sur ladite barre de guidage transversale.

2. Isolateur de vibrations selon la revendication 1, comprenant en outre un assemblage de plaque de montage (16) comportant au moins un bras à fourreau (36, 38) et au moins un rail de guidage longitudinal (22, 24) pour supporter ledit assemblage de plaque de montage disposé perpendiculairement à ladite barre de guidage transversale (18, 20), ledit rail de guidage longitudinal passant dans ledit bras à fourreau, et des moyens de sollicitation longitudinaux (48) pour solliciter ledit assemblage de plaque de montage (16) en direction d'une portion longitudinale centrale.

3. Isolateur de vibrations selon la revendication 2, dans lequel l'assemblage de plaque de support (26) comprend une plaque de support (58) comportant des premier et second fourreaux (60, 62) disposés à ses extrémités opposées, des première et seconde barres de guidage transversales (18, 20) incurvées, en formant des rails et s'étendant de façon coulissante dans lesdits premier et second fourreaux respectivement, lesdits premier et second rails de guidage longitudinaux ont leurs extrémités raccordées (en 28, 30, 32, 34) auxdites première et seconde barres de guidage transversales (18, 20), et l'assemblage de plaque de montage comprend une plaque de montage (40) comportant des premier et second bras à fourreau (36, 38) montés de façon coulissante respectivement sur lesdits premier et second rails de guidage.

4. Isolateur de vibrations selon la revendication 3, comprenant en outre des première et seconde paires de douilles à billes espacées (66), disposées dans lesdits premier et second fourreaux (60, 62) et entourant lesdites première et seconde barres de guidage



(18, 20) respectivement.

5. Dispositif selon la revendication 3 ou 4, dans lequel ladite plaque de montage (40) comprend une ouverture (45) située centralement, un contre-alésage (46) concentrique à l'ouverture, et des fentes opposées (44) s'étendant vers l'extérieur à partir dudit contre-alésage.

6. Isolateur de vibrations selon la revendication 3, 4 ou 5, comprenant des moyens (51) pour ajuster le frottement de glissement entre l'un au moins desdits fourreaux (60, 62) et la barre de guidage (18, 20) qui le traverse.

7. Isolateur de vibrations selon la revendication 6, dans lequel lesdits moyens (51) pour ajuster le frottement comprennent un levier (50) fixé à un tronçon d'arbre d'entraînement (78) s'engageant par vissage dans un bossage (80), et une bande de serrage (76) recouvrant un manchon de friction (74) entourant partiellement ladite barre de guidage (22), ledit tronçon (78) présentant une extrémité destinée à s'engager dans ladite bande de serrage (76) de manière que l'actionnement dudit levier (50) entraîne ladite extrémité du tronçon en sens inverse et à serrer ladite bande et le manchon autour de ladite barre de guidage.

8. Isolateur de vibrations selon la revendication 7, dans lequel ladite bande de serrage (76) comprend une fente (86) et une section en retrait (84) à l'opposé de ladite fente.

9. Isolateur de vibrations selon l'une quelconque des revendications 3 à 8, dans lequel lesdits moyens de sollicitation transversaux comprennent des première et seconde paires de ressorts de compression (48) disposés autour desdites première et seconde barres de guidage transversales (18, 20) respectivement, les ressorts desdites première et seconde barres étant disposés sur les côtés opposés desdits premier et second fourreaux (60, 62) respectivement.

10. Isolateur de vibrations selon l'une quelconque des revendications 3 à 9, comprenant en outre des blocs (28, 30, 32, 34) reliant les extrémités desdites barres de guidage (18, 20) aux extrémités desdits rails de guidage (22, 24).

11. Isolateur de vibrations selon l'une quelconque des revendications précédentes, dans lequel ledit rayon de courbure (R) est compris entre 91 et 376 cm (36 et 144 pouces).

12. Isolateur de vibrations selon la revendication 11, dans lequel lesdites barres de guidage (18, 20) ont un rayon de courbure (R) d'approximativement 213 cm (84 pouces).

13. Isolateur de vibrations selon l'une quelconque des revendications précédentes, dans lequel le ou chaque fourreau (60, 62) comprend des premier et second alésages (68, 70) de réception pour les barres de guidage, s'étendant depuis les première et seconde extrémités dudit fourreau en passant par un point central dudit fourreau, lesdits premier et second

alésages ayant des axes longitudinaux se coupant en formant un certain angle (20).

14. Isolateur de vibrations selon la revendication 2, destiné à être utilisé avec un chariot comprenant : lesdites barres de guidage transversales avant et arrière (18, 20) comportant des blocs de connexion (28, 30, 32, 34) de gauche et de droite à leurs extrémités, le rail de guidage longitudinal de gauche (22) reliant lesdits blocs de connexion avant de gauche (30) et arrière de gauche (32), le rail de guidage longitudinal de droite (24) reliant lesdits blocs de connexion avant de droite (28) et arrière de droite (34), l'assemblage de plaque de support (26) comprenant : une plaque de support (58) fixée de façon coulissante auxdites barres de guidage (18, 20) par lesdits fourreaux (60, 62), et l'assemblage de plaque de montage comprenant une plaque de montage (40) fixée de façon coulissante auxdits rails de guidage (24, 22), ladite plaque de support étant ainsi adaptée à être disposée entre le chariot (10) et ladite plaque de montage, la courbure desdites barres de guidage étant telle qu'elles forment un arc entre lesdits blocs de connexion, le centre desdites barres de guidage, lorsque l'isolateur est utilisé, étant plus éloigné du sol que les extrémités desdites barres de guidage.

15. Isolateur de vibrations selon l'une quelconque des revendications précédentes, dans lequel lesdites barres de guidage transversales et lesdits rails de guidage longitudinaux sont de section ronde.