July 10, 1945. E. C. DEAL 2,380,030

SLIDE LOCK DEVICE

Filed March 18, 1942

Fig. 1

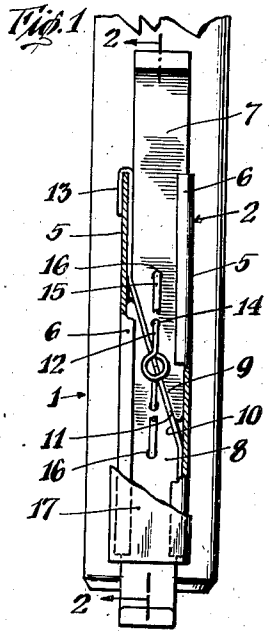


Fig. 2

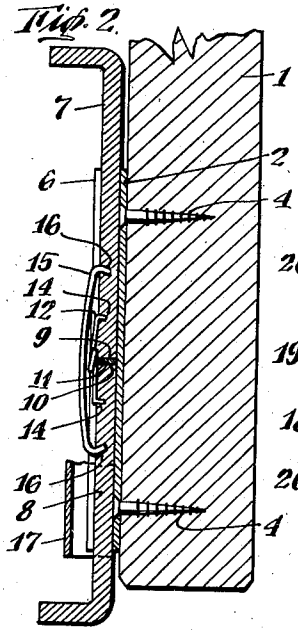


Fig. 3.

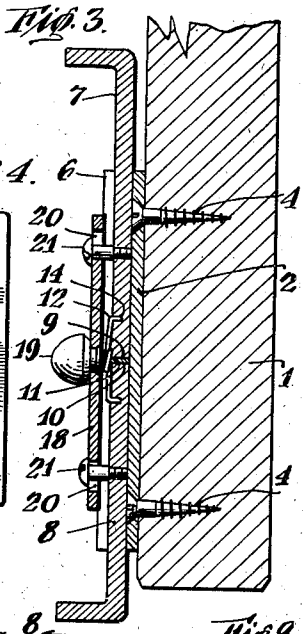


Fig. 4.

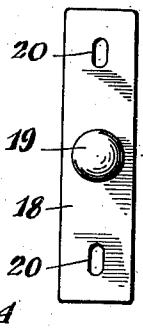


Fig. 5

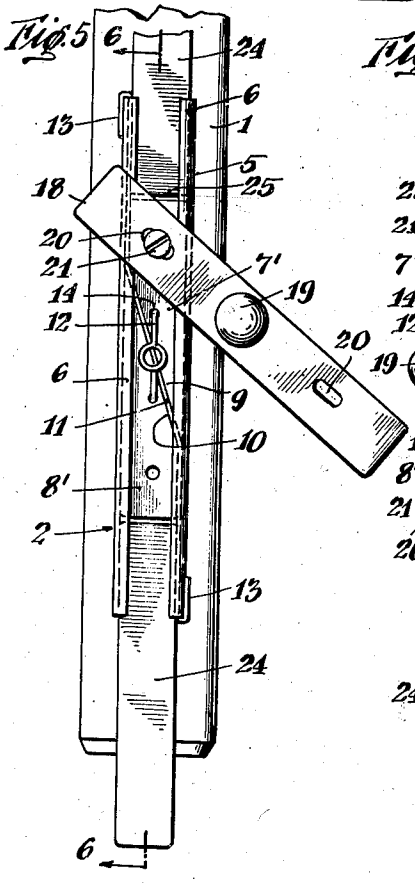


Fig. 6

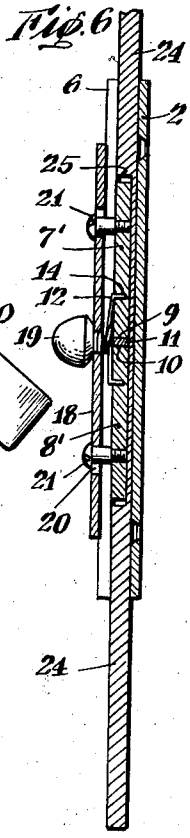


Fig. 7

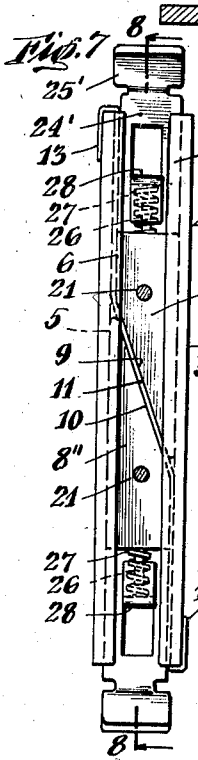
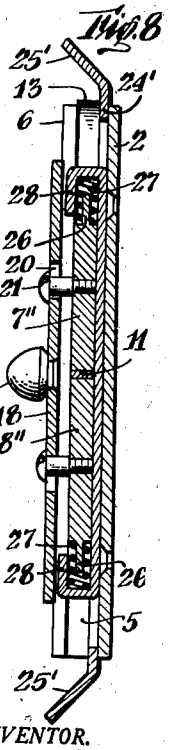


Fig. 8



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2,380,030

SLIDE-LOCK DEVICE

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Application March 18, 1942, Serial No. 435,246

18 Claims. (Cl. 45—139)

The present invention relates to mechanical adjusters and slide-lock devices and more particularly to improvements extending the field of adaptability and usefulness of the type shown in Reissue Patent No. 20,327, granted to me April 13, 1937.

As illustrative of a single application, the present embodiment of the invention is shown applied to a table leg. Tables tend to rock when placed on a floor which is not level. The present device, in one of its simplest uses, will lengthen the leg of a table to compensate for uneveness in the floor. In addition, the device may be utilized, in bolts for doors, transom adjustments, window adjustments, chair adjustments, emergency brakes for cars and the like, microphone stands, photography screens, lamps, tripods, jacks for cars and numerous other articles and devices in which a slide-lock adjustment is helpful and feasible. In enumerating the above uses, there is no intention of limiting the invention to those named, or to an extent less than the most comprehensive scope of the invention in the art, as the invention is of general application. In the various uses, it is desirable that the slide members be readily adjustable to different positions and that they be readily and securely locked in those positions. Likewise the device should permit the slide members to be unlocked without difficulty.

The present invention is an improvement upon my patent identified above and aims to provide a stronger construction, to improve the locking adjustment, and to extend the field of usefulness of the invention.

An object of the invention is to provide an improved slide-lock device.

Another object of the invention is to simplify the adjustment of slide-lock devices.

Another object of the invention is to increase the life and durability of slide-lock devices.

Another object of the invention is to provide a device in which the slidable members are locked in position subject to limited movement with respect thereto.

Another object of the invention is to provide a device in which the slidable members are locked in position subject to a limited movement in either direction in opposition to resilient means.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification, wherein

Fig. 1 is a front view of the device applied to the leg of a table;

Fig. 2 is a longitudinal sectional view along the line 2—2 of Fig. 1;

Fig. 3 is a longitudinal sectional view, corresponding to Fig. 2, of another embodiment of the invention;

Fig. 4 is a detailed top plan view of the transfer or adjuster bar removed from the embodiment shown in Fig. 3;

Fig. 5 is a front view of another embodiment of the invention, the transfer or adjuster member being turned to a position at one side to expose the elements under it;

Fig. 6 is a longitudinal sectional view along the line 6—6 of Fig. 5 with the transfer member in place;

Fig. 7 is a front view of another embodiment of the invention with the transfer member removed; and

Fig. 8 is a longitudinal sectional view along the line 8—8 of Fig. 7, with the transfer member in place.

Referring again to the drawing and more particularly to Figs. 1 and 2 illustrating one embodiment of the invention, there is shown for purposes of illustration a table leg 1 having a guideway or casing 2 secured to it by screws 4. The casing 2 has sides 5 turned inwardly at 6 to partially enclose and form a guideway for wedge members 7 and 8, which have wedge surfaces 9 and 10 respectively.

A flexible member 11 extends between the two wedge surfaces 9 and 10 with its respective ends extending along sides of the wedge members and secured to diagonally disposed corners at the ends of the casing 2. The member 11 is illustrated as a flexible strip of metal but it may be in the form of a wire, cable or the like. The ends of the flexible member 11 may be bent around the sides of the casing to form hooks 13 which are preferably soldered or welded to increase the security of the connection. It will be understood that the ends of the member 11 may be secured to the casing 2 or to the fixture on which the casing is mounted in any other suitable manner and that they may be fixed in position intermediate the ends of the casing. A connecting member, illustrated in the preferred em-

bodiment as a spring 12, is secured at its respective ends to the wedge members in any suitable manner. As illustrated, the ends of the spring may be bent to hook into apertures 14 in the wedge member. Other means such as studs attached to the ends of the spring and fitting in the apertures may be utilized if desired. The spring is under tension in the preferred embodiment and tends to urge the wedge members 7 and 8 toward each other. When pressure is applied to a wedge member tending to move it in a direction away from the other wedge member, the two wedge surfaces 9 and 10 are pulled apart so that the flexible member 11 may slide between the wedge members and the latter may slide along the guideway 2 to any desired position. For example, in Figs. 1 and 2, the wedge member 8 may be pressed downwardly to lengthen the leg 1 of the table and thereby to compensate for any unevenness in the floor. On the other hand, any attempt to force the wedge member 8 upwardly, for example, by placing weight on the table, causes the wedge surface 10 to press against the flexible member 11 and to clamp it against the wedge surface 9, and to thrust the wedges against the sides of the channel thereby creating friction which adds to the locking action of the wedge surfaces. In this way, the wedge member 8 is locked against upward movement in response to pressure applied to it. On the other hand, it may be moved upward very readily by applying upward pressure to the wedge member 7. In that case, the wedge members 7 and 8 are pulled apart, thereby unclamping the flexible member 11 and permitting upward movement of the two wedge members to shorten the adjusted length of the table leg.

Under normal operations, the spring 12 is sufficiently strong to cause one wedge member to follow the other in the adjustments. It has been found however, that there is a tendency for individuals not familiar with the principles and operation of the adjuster to try to pull the two wedge members apart. In some cases, the spring 12 has been unduly strained and the operation of the device impaired. The present invention provides a member 15 having hooked ends adapted to fit into recesses or apertures 16 in the surface of the wedges 7 and 8. The member 15 may be secured to the wedges in any other suitable manner, for example, it may be attached to studs fitting in the apertures 16. The member 15 may be rigid, in which event a slight play is allowed between the ends thereof and the apertures 16 in order to permit the wedge members 7 and 8 to move apart or the member 15 may be slightly flexible to allow the wedge members to move apart to permit adjustment. In either case, the member 15 should be sufficiently strong to relieve the spring 12 of any extraordinary strain and to prevent it from being impaired by misuse of the device. A suitable cover 17 may extend over the guideway 2 thereby to improve the appearance of the device and to protect it against dust and dirt.

The construction illustrated in Figs. 3 and 4 is similar to that illustrated in Figs. 1 and 2 and the corresponding parts have been similarly numbered. The essential difference is the provision of a member 18 with a knob 19 to facilitate the operation of the slide-lock. The member 18 has slots 20 adjacent its respective ends with studs or screws 21 extending therethrough and into the wedge members 7 and 8 to secure it in position. The purpose of the elongated slots 20 is to permit a limited relative movement between the screws 21 and the member 18. The position of the ends of the slots is such that when the member 18 is moved in one direction, for example, upward, it is effective upon the wedge member 7 to move it away from the wedge member 8 and thereby effect an adjustment in that direction. When the member 18 is moved in the opposite direction, it becomes effective on the member 8 and ineffective on the wedge 7 and moves the member 8 away from the member 7 to effect an adjustment in the opposite direction. In other words, the member 18 transfers forces applied to it to the proper wedge member for making an adjustment, and hence may be called a transfer member. A knob 19 is provided so that one grasping the knob may move the slide-lock device in either direction merely by pressing the knob in the desired direction; thus all difficulty is eliminated in the adjustment of the device heretofore occasioned by lack of knowledge as to its principle and operation. In addition, the member 18 prevents excessive movement of the wedge members 7 and 8 away from each other and in this way the member serves also to relieve the spring 12 of excessive strains and hence the use of the member 15 shown in Figs. 1 and 2 is not necessary but may be included if desired.

The member 18, with or without the spring 12, permits the wedge members to move into and out of clamping relation with respect to the flexible member 11. Hence, the spring 12 is not essential in obtaining the locking action and may be omitted in the embodiments of Figs. 1 to 6, if desired. In some instances, the position of the members is such that the force of gravity tends to force the wedge members toward each other.

In the embodiments described above, each wedge member may be moved in one direction but is locked against movement in the opposite direction. In some cases, it is desirable that one or both wedge members be locked against undesirable movement in either direction. This may be accomplished by the embodiment illustrated in Figs. 5 and 6 of the drawing where the wedge members 7' and 8' are mounted on a carriage or member 24. As illustrated in the embodiment shown, the member 24 is provided with a recess 25 having a length slightly greater than the combined length of the wedge members 7' and 8'. This additional length of the recess is desirable in order to permit the wedge members to be separated for adjustment of the member 24 along the guideway. The wedge members are provided with a flexible strip 11 which extends between them and which is secured to the guideway 2. Likewise, the wedge members are provided with the preferred means of adjustment; that is, the bar 18 connected by studs or screws 21 in slots 20 to the wedge members. When the carriage member 24 is forced upward, one end of the slot 25 presses against the wedge member 8' and thereby locks the two wedge members in position, preventing movement of the member 24 in that direction. If the member 24 is moved in the opposite direction, the opposite end of the slot 25 will engage the wedge member 7' and force it against the metal strip 11 to lock the parts in position; thus the wedges will lock the member 24 against movement in either direction. Therefore, pressure on the member 24 is ineffective to move it, except for the slight play between the slot 25 and the wedge members, which may be small. On the other hand, if one engages the knob 19 and presses it

downwardly, the lower slot 20 will engage the lower screw 21 to separate the wedge members so that the wedge members and the member 24 are moved any desired distance downward. By pressing the knob 19 in the opposite direction, the opposite wedge member 7' is separated and the member 24 and the wedge members may be moved in that direction to any desired extent; thus the member 24 may be adjusted in either direction by the knob 19. As soon as the knob is released the member 24 is locked against movement in both directions.

It is sometimes desirable that the adjustable member have a limited movement in one or both directions in opposition to a resilient means, for example, if the adjustable member is being used as a bolt or latch for a door, or the like, a cam surface may be provided on the end of the adjustable member so that in closing the door, the member will automatically latch the door. At the same time the position of the latch member may be readily adjusted to compensate for variations in the relative positions of the parts of the latch due to wear or to slight changes in relative positions of the respective mountings therefor. The embodiment illustrated in Figs. 7 and 8 is designed to achieve this objective. The slide-locking member is here shown as a member 24' with its ends bent into flanges 25' at an angle of about forty-five degrees, thereby forming a cam surface. The wedge members 7'' and 8'' have the flexible member 11 passing therebetween. The ends of the wedge members have pins or studs 26 projecting outwardly with resilient means such as springs 27 thereon. The member 24' has a part 28 preferably punched out of it and bent up to form an abutment for the ends of the springs 27. The wedge members 7'' and 8'' are mounted on and movable relative to the member 24' and are urged toward each other by the springs 27. Pressure applied in either direction to the member 24' will cause the member to compress one of the springs 27 and continue to move in that direction until one of the abutments 28 is engaged by one of the studs 26 and further movement is prevented.

The space between the ends of the studs 26 and abutments 28 determines the distance the member 24 will move without the operation of member 18 by knob 19 for greater travel. Thus a limited movement is possible in either direction in opposition to the springs 27, which retain the wedge members in locked position unless and until they are separated by movement of the bar member 18. While the movement of the member 24' in the direction to compress one of the springs 27 decreases the compression on the spring at the other end somewhat, nevertheless sufficient compression remains to keep the wedge against which it operates pressed into a locked position until the wedge is unlocked for readjusted movement by operating bar 18. The member 24' may be moved in either direction by the knob 19 as described above with reference to Figs. 5 and 6.

In the operation of the embodiment illustrated in Figs. 1 and 2, the wedge members 7 and 8 are held in position by the combined action of the spring 12 and auxiliary holding member 15. When either wedge member is forced toward the other, the two are locked in position through the intermediation of the flexible member 11 and the casing. If either wedge member is forced away from the other, the wedge surfaces are separated, permitting the flexible strip 11 to slide therebetween, and both wedge members can be moved any desired distance in that direction along the guideway. When the adjustment is completed, the wedge members are automatically locked in position against any pressure which tends to press the two wedge members together.

The wedge members 7 and 8 may be adjusted in the same manner in Fig. 3. An auxiliary adjusting means is provided by means of the bar 18 therein which is connected through slots 20 in its ends and screws or studs 21 extending therethrough to the wedge members. The slots 20 are so positioned relative to the studs that when the bar is moved upward the stud in the member 7 is engaged and the stud in the wedge member 8 is intermediate the ends of the slot. In this way, pressure upward on the knob 19 will move the wedge members upward. Conversely, downward pressure on the knob 19 will cause the bar 18 to engage the stud in the wedge member 8 and move the latter downward. The public knows that a knob is ordinarily for adjustment purposes and hence will use the knob 19 for adjusting the slide-lock device. An individual without any instructions may therefore adjust the device in either direction merely by movement of the knob 19. This is particularly advantageous since it is extraordinary that a member will slide in one direction and will not slide in the other direction, hence persons encountering the phenomenon in using the device of Figs. 1 and 2 are inclined to try to find out how it operates and in so doing may apply unusual strains to the device. The bar 18 serves the additional function of limiting the distance which the wedge members 7 and 8 may move apart. In this way, if a person should by any chance attempt to pull the wedge members 7 and 8 out of the casing, excessive strain on the spring 12 is prevented by the bar 18.

The embodiment illustrated in Figs. 5 and 6 is for the purpose of preventing movement of the adjustable member in either direction, except by pressure upon the knob 19. The wedge members 7' and 8' are mounted in a recess in the adjustable member 24 with slight clearance at the ends of the wedge members. With this construction, any pressure on the member 24 in either direction forces the wedge members together in locked position. The wedge members however may be separated by pressure on the knob 19 as described previously and the member 24 together with the wedge members moved in either direction. As soon as the knob 19 is released, the member 24 and the wedge members are automatically locked in position.

The construction illustrated in Figs. 7 and 8 is somewhat similar to that illustrated in Figs. 5 and 6 but has the additional function of giving limited movement to the adjustable member 24' through the intermediation of the springs. As described above the wedge members 7'' and 8'' may be moved in either direction by the knob 19 and bar 18. When released, the adjustable member is automatically locked in position subject to limited movement in opposition to the springs 27.

It will be seen that the improvements upon my prior patent provide a more durable and effective construction with a greater field of utility. Instructions for the operation of the device become unnecessary and the chances of persons using the device applying excessive and unusual strains to the parts are minimized or eliminated. The reinforcing bar relieves the springs of exces-

sive strains, making the structure more rugged and fully capable of withstanding the rough usage to which it may be subjected. The above advantages are achieved without increasing materially the cost of the construction.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the scope and spirit of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. In a device of the class described, the combination of a guideway, cooperating wedge members slidable in the guideway and having opposed wedge surfaces, a flexible member extending between the said wedge surfaces and secured to the guideway at points spaced longitudinally thereof sufficiently to permit longitudinal movement of the wedge members, resilient means for urging said wedge members against the flexible member passing between the wedge surfaces and a member operatively connected to said wedge members for preventing excessive strains on said resilient means.

2. In a device of the class described, the combination of a guideway, cooperating wedge members slidable in the guideway and having opposed wedge surfaces, a flexible member extending between the said wedge surfaces and secured to the guideway at points spaced longitudinally from the wedge surfaces, a rigid member and means operatively connecting said rigid member to said wedge members to permit them to move apart to a limited extent for adjustment thereof.

3. In a device of the class described, the combination of a guideway, cooperating wedge members slidable in the guideway and having opposed wedge surfaces, a flexible member extending between the said wedge surfaces and secured to the guideway at points spaced longitudinally thereof sufficiently to permit longitudinal movement of the wedge members, resilient means for urging said wedge members against the flexible member passing between the wedge surfaces, a member of greater strength than said resilient means and means for operatively connecting said last-mentioned member to said wedge members to limit their movement away from each other.

4. In a device of the class described, the combination of a guideway, a pair of wedge members adapted to move along said guideway and having opposed wedge surfaces, a flexible strip of material extending between said wedge surfaces and secured to the guideway at points spaced from the wedge surfaces to permit longitudinal movement of the wedge members, and means operatively connecting said wedge members for moving them along said guideway, said means being effective upon one wedge member when moved in one direction and upon the other wedge member when moved in the other direction.

5. In a device of the class described, the combination of a guideway, a pair of wedge members adapted to move along said guideway and having opposed wedge surfaces, a flexible strip of metal extending between said wedge surfaces and secured to the guideway at points spaced from the wedge surfaces to permit longitudinal movement of the wedge members, and a slotted bar, means engaging the slots in said bar operatively connecting said bar to said wedge members said engaging means and said slots being adapted to permit limited movement of the bar relative to the wedges whereby the wedges are forced apart when said bar is moved in either direction.

6. In a device of the class described, the combination of a guideway, a member mounted to slide in said guideway, a pair of wedge members movable in said guideway, means for mounting said wedge members on said member, said mounting means permitting limited longitudinal movement of said wedge members with respect to said member, a flexible strip of material extending between the wedge surfaces of said wedge members and secured to opposite sides of the guideway at points spaced longitudinally from the wedge surfaces whereby said member is normally locked by the wedges and the flexible strip against movement exceeding the limited movement in either direction except when the wedges are moved apart to permit said member to slide along said guideway.

7. In a device of the class described, the combination of means forming a guideway, a member mounted to move along said guideway, a pair of wedge members slidable in said guideway and operatively connected to said first mentioned member by means permitting a limited longitudinal movement and having abutting wedge surfaces, a flexible strip of material extending between the wedge surfaces of the wedge members and secured to the guideway at points beyond the wedge surfaces to permit longitudinal adjustment of the wedge members, and means operatively connected to the wedge members permitting said wedge members to draw apart from each other slightly for adjustment of said first member when one of the two wedge members is moved away from the other.

8. In a device of the class described, the combination of a guideway, a carriage mounted to move along said guideway, a pair of wedge members mounted on said carriage in the guideway by means permitting a limited longitudinal movement of the members, said wedge members having abutting wedge surfaces, a flexible metal member extending between the wedge surfaces and secured to the guideway at points beyond the wedge surfaces to permit longitudinal adjustment of the wedge members, and means operatively connecting said wedge members to permit them to draw apart from each other slightly when one of the two wedge members is moved away from the other thereby to permit said carriage to be moved to adjusted positions along the guideway.

9. In a device of the class described, the combination of a guideway, a member mounted to move along said guideway, a pair of wedge members mounted on said first member by means permitting a limited longitudinal movement of the wedge members, said wedge members having abutting wedge surfaces, means effective upon said wedge members to retain the wedge surfaces in their abutting position and to permit them to move apart slightly when one wedge member is moved away from the other for adjustment of the position of said first member along the guideway, and a flexible metal member extending between the wedge surfaces of the wedge members and secured to the guideway at points beyond the wedge surfaces to permit adjustment of said first member along the guideway.

10. In a device of the class described, the combination of a channel member, a member adapted to move along the channel of said chan-

nel member, a pair of wedge members mounted on said second member in the channel by means permitting limited longitudinal movement of the wedge members, said wedge members having abutting wedge surfaces, resilient means adapted to urge said wedge members toward each other, a flexible metal member extending between the wedge surfaces of the wedge members and secured to the channel member at points beyond the wedge surfaces to permit longitudinal adjustment of the wedge members and of said member movable along the channel member.

11. In a device of the class described, the combination of a casing, a slide member adapted to move along said casing, a pair of wedge members in the casing having abutting wedge surfaces carried by said slide member, a flexible metal member extending between the wedge surfaces of said wedge members and secured to said casing at points spaced from said wedge surfaces, abutments on said slide member and spring members engaging said abutments and said wedge members to urge said wedge members together and to lock the wedges against movement along the casing, whereby said slide member may have a limited longitudinal movement in opposition to said springs after being locked and may be adjusted from one position to another by separation of said wedge surfaces.

12. In a device of the class described, the combination of a channel member, a slide member adapted to slide along the bottom of said channel, a pair of wedge members mounted on said slide member and having abutting wedge surfaces, a flexible metal member extending between said wedge surfaces and secured to the ends of said channel member, projections on said slide member and springs under compression intermediate said projections and said wedge members to urge said wedge members toward each other to lock the wedge members in position, said springs permitting limited relative movement between the wedge members and said slide member.

13. In a device of the class described, the combination of a guideway, a slide member adapted to slide along the guideway, a pair of wedge members mounted on said slide member and having abutting wedge surfaces, a flexible metal strip extending between said wedge surfaces and secured to said guideway at points spaced from said wedge surfaces, and resilient means operatively connected to said slide member and to said wedge members to urge one of said wedge members toward the other to lock the wedge members in position, said resilient means permitting limited relative movement between the wedge members and said slide member.

14. In a device of the class described, the combination of a guideway, a pair of wedge members adapted to move along said guideway and having opposed wedge surfaces, a flexible strip of material extending between said wedge surfaces and secured to the guideway at points spaced from the wedge surfaces to permit longitudinal movement of the wedge members, means operatively connecting said wedge members for moving them along said guideway, said means being effective upon one wedge member when moved in one direction and upon the other wedge member when moved in the other direction, and a carriage in said guideway operatively connected to said wedge members by means permitting a limited longitudinal movement and movable with said wedge members as a unit.

15. In a device of the class described, the combination of a guideway, cooperating wedge members slidable in the guideway and having opposed wedge surfaces, a rigid link member, and means operatively connecting said rigid member to said wedge members to permit them to move apart to a limited extent for movement of the two wedge members along the guideway.

16. In a device of the class described, the combination of a guideway, a pair of wedge members adapted to move along said guideway and having opposed wedge surfaces for locking the members in position in the guideway, and means operatively connecting said wedge members for unlocking the wedge members and for moving them along the guideway, said means being effective upon one wedge member to separate it from the second when moved in one direction and effective upon the second wedge member to separate it from the other wedge member when moved in the opposite direction.

17. In a device of the class described, the combination of a guideway, a member mounted to slide in said guideway, a pair of wedge members slidable in said guideway, said wedge members having wedge surfaces thereon, means for securing said wedge members to said first mentioned member, said securing means permitting a limited longitudinal movement of the wedge members with respect to the first mentioned member, a flexible strip of material extending between the wedge surfaces of the wedge members and secured to opposite sides of the guideway at points spaced longitudinally from the wedge surfaces whereby said first mentioned member is normally locked against movement exceeding the limited movement in either direction and a connecting member operatively connected to said wedge members by means of screws and slots adapted to separate said wedge members to release the locking action and to move said first mentioned member in one direction when said connecting member is moved in said direction and to separate said wedge members and move said first mentioned member in the opposite direction when said connecting member is moved in the opposite direction.

18. In a device of the class described, the combination of a guideway, a member mounted to slide in said guideway, a pair of wedge members secured to said first mentioned member by means permitting a limited longitudinal movement of the members and adapted to lock said first mentioned member in adjusted positions in said guideway, and a connecting member operatively connected to said wedge members by means permitting a limited longitudinal movement with respect thereto and adapted to separate said wedge members to release the locking action when moved in either direction and to move said first mentioned member in one direction when said member is moved in said direction and to move said first mentioned member in the opposite direction when said connecting member is moved in the opposite direction.

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