Nov. 28, 1950 E. C. DEAL 2,531,970

BRAKE WITH DRIVE RELEASE

Filed Nov. 15, 1946 2 Sheets-Sheet 1

Fig. 1

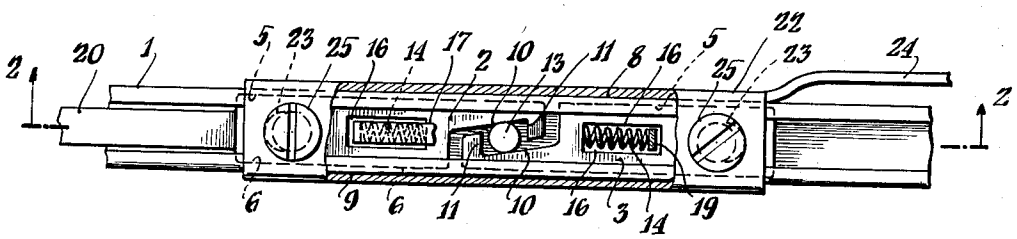


Fig. 2

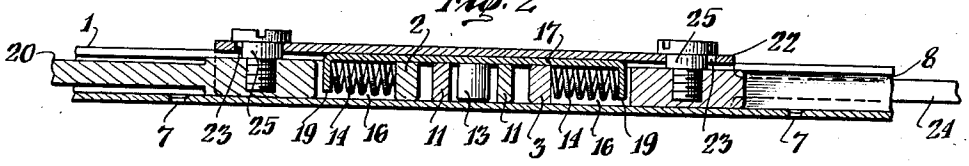


Fig. 3

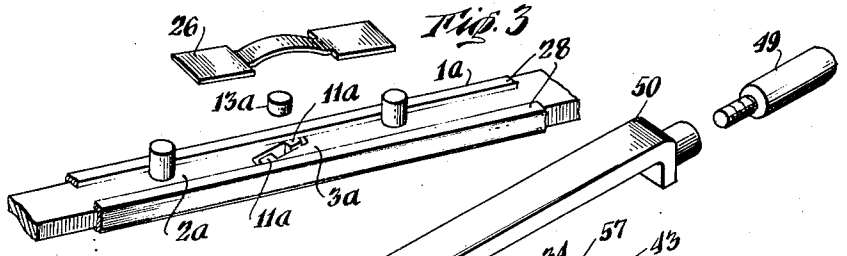


Fig. 4

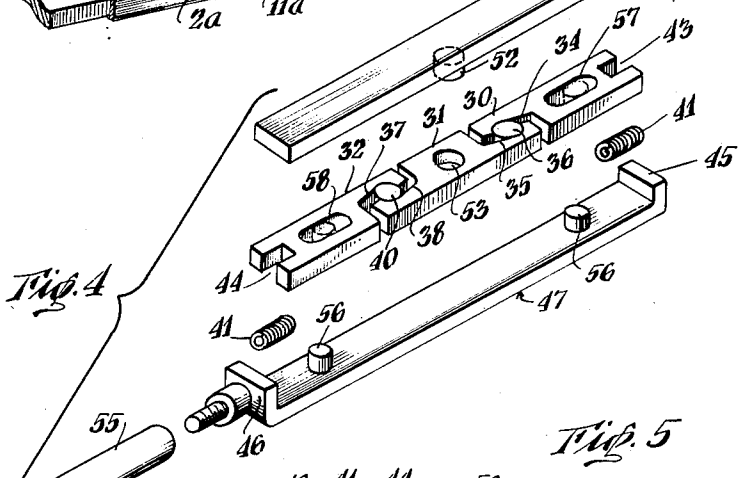
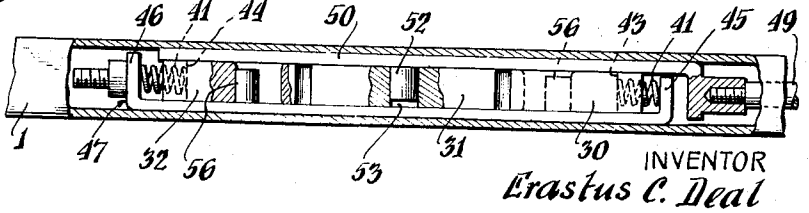


Fig. 5



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Fig. 7

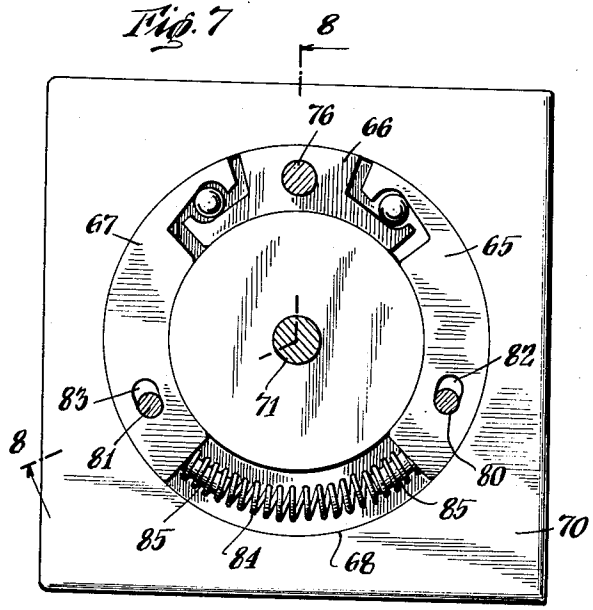


Fig. 8

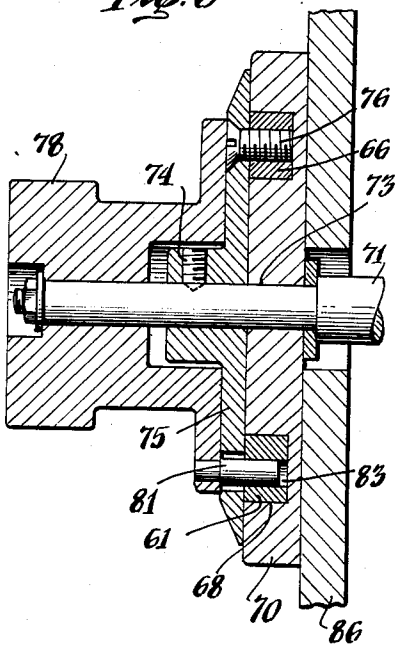


Fig. 9

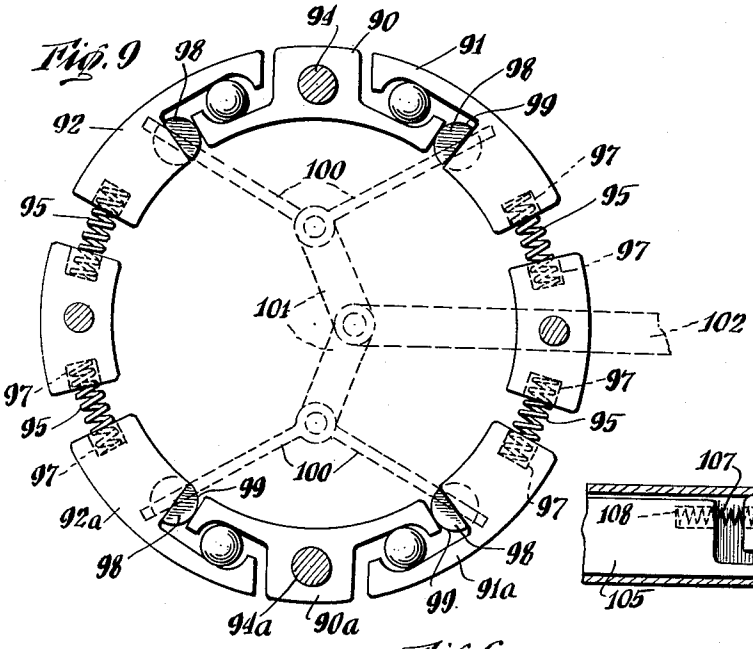


Fig. 10

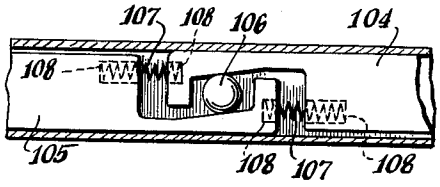
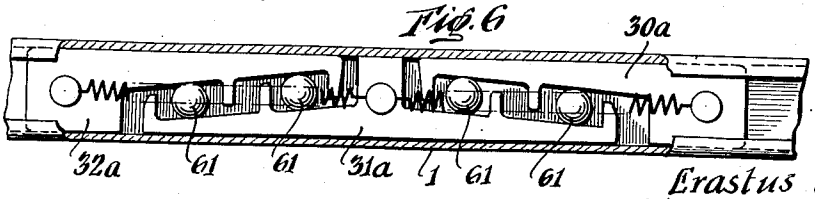


Fig. 6



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UNITED STATES PATENT OFFICE

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BRAKE WITH DRIVE RELEASE

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Application November 15, 1946, Serial No. 710,213

10 Claims. (Cl. 192—8)

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The present invention relates to locking devices and more particularly to a slidable locking device adapted to retain a particular setting or position of the machine or part with which it is connected.

With many machines, structures or devices, it is either necessary or desirable that a part be retainable in one of a number of settings or positions and yet that the machine, structure or device be readily adjustable to different settings or positions. For example, in pivoted controls, such as throttles, switches, levers and brakes, it is desirable to prevent or minimize accidental displacement of a given setting and yet to maintain the control rod in readily adjustable position; again, in connection with an outboard motor it is desirable that the motor be readily movable by means of the tiller or handle but that it automatically lock into position when the hand is removed from the tiller to thereby resist vibration of the motor and motion of the water and thus maintain the motor in fixed position. A still further example of structures wherein the present device is desirable is in connection with furniture or telescopic stands such that the article of furniture or stand automatically unlocks to permit any desired adjustment and yet automatically locks when the adjustment is completed. The foregoing are merely illustrative examples of places where the present lock may be utilized. The present invention aims to provide a relatively simple and inexpensive adjustable or slidable lock adapted to be used to perform the above tasks.

An object of the present invention is to provide a new and improved slide lock.

Another object of the invention is to provide a new and improved slide lock having relatively few moving parts.

Another object of the invention is to provide a slide lock adapted to provide a more uniform distribution of locking pressures.

Another object of the invention is to provide a new and improved slide lock which is readily adaptable to circular or arcuate form.

A further object of the invention is to provide a lock having an improved releasing or adjusting mechanism.

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

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been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a plan view, partly broken away, illustrating a preferred embodiment of the present invention;

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

Fig. 3 is an exploded view of another form of the invention;

Fig. 4 is an exploded perspective view showing an additional form of the invention;

Fig. 5 is a longitudinal sectional view, partly broken away, showing the slide lock of Fig. 4 assembled with a guideway;

Fig. 6 is a plan view, partly broken away, illustrating another form of the invention;

Fig. 7 is a plan view illustrating an arcuate form of the invention;

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 7;

Fig. 9 is a plan view illustrating a form of the invention similar to that shown in Figs. 7 and 8; and

Fig. 10 is a plan view illustrating a modified form of the present invention.

Referring again to the drawings and more particularly to Figs. 1 and 2 thereof, there is shown an adjustable slide lock embodied in a guideway or channel member 1. The guideway 1 is adapted to be secured by any suitable means, for example by screws through apertures 7, to any convenient part of the structure of mechanism to be controlled by the slide lock and the guideway may be of any suitable length, depending upon the desired limits of movement. The slide lock illustrated in these two figures comprises holding or locking members 2 and 3 having a relatively close but slidable fit at their outer sides 5 and 6 thereof with upstanding wall portions 8 and 9 of the channel member 1; the locking members are preferably of such width that they slide freely within the channel member 1 upon assembly and during adjustment of the lock.

The inner end of each the slidable members 2 and 3 is shown provided with an inclined or wedging surface 10 and inwardly extending retainer projections 11. The inclined surfaces 10 of the slidable holding members are adapted to receive between them a ball, roller or other spreader member 13, this member being retained in operative position at all times by the inwardly extending retainer projections 11. As either one of the slidable members 2 and 3 is pushed or

urged inwardly with respect to the other, the intermediate spreader member 13 positioned between the inclined faces of the slidable members tends to move along the inclined surfaces toward the "high" points of the inclines in such manner as to press the slidable members 2 and 3 outwardly into contact with the upstanding wall portions 8 and 9 of the channel or guideway 1; the greater the force or pressure with which one slidable member is urged toward the other, the more firmly or securely will the two holding members 2 and 3 be locked or engaged with the wall portions of the guideway 1.

As either of the slidable holding members 2 or 3 is pulled outwardly, or in a direction away from the other slidable member, the ball, roller or other type of spreader member 13 tends to move toward the "low" points or areas of the inclined surfaces on the slidable holding members 2 and 3 and thus these members are unlocked or freed from gripping engagement with the walls of the guideway or channel 1. Inward or "pushing" pressure tends to lock the mechanism in position, and outward or "pulling" pressure on either of the slidable members tends to unlock the device and facilitate its movement to a new position with respect to the guideway 1.

While the locking action may be performed satisfactorily with the mechanism and parts above described, it is preferable that the slidable holding members 2 and 3 be resiliently or slidably urged toward each other at all times to thereby facilitate retention of the lock at any position within the guideway in which it may be placed. In the embodiment disclosed in Figs. 1 and 2, the slidable holding members or wedges 2 and 3 are shown urged toward each other by springs 14 located within sockets or recesses 16 of the holding members, the springs being interconnected with each other by a substantially U-shaped link member 17 having tab portions 19 extending into the recesses 16 and over the ends of the springs 14. Interconnecting the springs of the holding members in this manner causes the ball, roller or other spreader member 13 to at all times urge the holding members 2 and 3 outwardly into engagement with the walls of the guideway.

The sizes or strengths of the springs 14 utilized for urging the wedge members toward each other will depend upon the size and weight of the wedge members which will in turn be influenced by the particular mechanism or structure with which the lock is to be used. A relatively light or weak spring is generally sufficient to urge the wedge members outwardly into engagement with the side walls of the channel.

While the lock may be connected in any desired manner with the part to be controlled and with an operating handle or lever, one form of achieving this is shown in Figs. 1 and 2. As shown, the part to be controlled is preferably connected with an extension 20 of the wedge or holding member 2; when the normal tendency of the part being controlled is to urge the extension 20 and the wedge member 2 toward the complementary wedge member 3, the effect is to lock the device firmly into position against undesirable movements. A new setting may be readily made by means of the saddle or plate member 22 shown extending around the exterior of the lock and having elongated apertures or slots 23 fitting around pins or bolts 25 secured to the holding members 2 and 3; as the extension 24 of the saddle or plate member 22 is moved toward the left or right, the inwardly disposed edges of the apertures or slots press against adjacent portions of the pins 25 and are thus effective to pull a holding member toward the left or the right, depending upon the direction in which the extension 24 is moved. The pulling action of the saddle upon either of the holding members or wedges tends to move the spreader member 13 toward the low points of the inclined surfaces on the wedge members 2 and 3 and to thus free the wedge surfaces from engagement with the side walls of the guideway. As the extension 24 is released, the springs 14 and interconnecting link member 17 move the holding members 2 and 3 toward each other and the spreader member 13 presses them outwardly into engagement with the side walls, to thereby instantaneously secure the new setting or adjustment.

In Fig. 3 the ball, roller, or other spreader member 13a is illustrated retained in position by a substantially flat cover member 26, the side edges of which project outwardly beneath the inwardly extending flanges 28 of the guideway 1a. The spreader member 13a is thus maintained in position within the recess formed at the ends of the wedge members 2a and 3a. The lock illustrated in this figure may be pulled along the guideway in either direction and is adapted to immediately lock into position upon application of inwardly directed pushing pressure against either of the wedge or holding members 2a or 3a.

In Figs. 4 and 5, the slide lock is shown embodied in another form of the invention. In this form three wedging or holding members 30, 31 and 32 are utilized having complementary inclined surfaces adjacent the ends thereof. The inclined or wedging surface 34 of the right holding member 30 is adapted to co-operate with an inclined or wedging surface 35 of the inner holding member 31 and intermediate spreader member 36; the inclined surface 37 of the left holding member 32 is adapted to co-operate with a complementary wedging surface 38 at the opposite side of the inner holding member 31 and with an intermediate roller, ball, or spreader member 40. As either of the outwardly disposed holding members 30 or 32 is pressed toward the inner holding member 31, the effect is to cause lateral or transverse movement of the holding member into engagement with the walls of a guideway or channel member.

The inner holding member 31 locks the device securely in position regardless of the direction in which it tends to move; a tendency to move the inner holding member 31 toward the right causes the lock to tighten with the guideway walls, and a tendency to move this same member 31 toward the left likewise causes the lock to tighten firmly into engagement with the guideway walls. The wedging or holding members 30, 31 and 32 may be resiliently or yieldably urged toward each other and into engagement with the walls of a guideway by springs 41 retained within recesses 43 and 44 of the right and left holding members 30 and 32, respectively, by abutting portions 45 and 46 of a control member 47.

The locked, controlled or "driven" member of a particular mechanism is preferably connected with the intermediate wedge 31 of the slide lock shown in Figs. 4 and 5 so that regardless of direction in which it tends to move the setting will be retained. An extension 49 of the controlled member may be connected with a saddle or cover 50 having a projection 52 fitting into a recess 53 of the inner holding member 31. Con-

trolling or adjustment of the lock may be achieved by connecting the control rod 55 with the control member 47, which has projections or pins 56 fitting into elongated apertures or slots 57 and 58 of the right and left wedge members 30 and 32, respectively. The pins 56 are preferably normally positioned in the vicinity of but slightly outwardly of the mid-portion of the lengths of the slots and are adapted to be moved into contact with the outer ends of the slots 57 and 58; upon movement of the control rod 55 toward the left or right the action will be to "pull" the wedge 32 to the left or the wedge 30 to the right, as the case may be. If a "following" wedge should tend to stick in position the pin 56 in its slot may subsequently contact an inner wall of the slot and free it with a positive action. Thus the slide lock may be moved in either direction upon movement of the control rod 55, and yet the connecting rod 49 is maintained in position as long as the control rod 55 is not actuated.

In Fig. 6 there is illustrated a form of the invention in which each of the inclined surfaces of holding members 30*a* and 31*a* is of relatively great length and intermediate each of the complementary inclined surfaces are positioned a plurality of rollers, balls or other spreader members 61. The wedge or holding members 30*a*, 31*a* and 32*a* of this modified form of the invention operate similarly to those described in connection with Figs. 4 and 5 but the plurality of spreader members and relatively great lengths of inclined surfaces tend to distribute the gripping or holding effect over a comparatively great length of surface, and hence to provide a greater and more secure frictional engagement or locking together of the parts.

In Figs. 7 and 8, the present slide lock is shown embodied in a circular or arcuate form. The side edges or surfaces of the wedge or holding members 65, 66 and 67 are of curved or arcuate shape and are shown fitted into a circular or arcuate groove 68 of a plate member 70. The holding members 65, 66 and 67 are provided with inclined surfaces and spreader members similar to those described in connection with Figs. 4 and 5. As either of the holding members 65 or 67 is pulled in a direction away from the inner holding member 66, the lock may travel freely within the path or groove 68; as either of the outwardly disposed holding members 65 or 67 is pressed toward the inner holding member 66, the lock immediately engages securely into position. A tendency to move the inner holding member 66 in either direction tightens the device firmly into position.

A member or shaft 71 to be controlled by means of the slide lock is shown extending through an aperture 73 of the plate member 70 and secured by a set screw 74 to a plate member 75, which is in turn fastened by a screw 76 to the center wedging member 66. Any force tending to rotate the member 71 is carried through the set screw 74, plate member 75 and screw 76 to the center wedging member 66 and serves to engage the lock more firmly in its set position.

A new setting may be readily established by rotating the knob or setting dial 78 which is connected with the outwardly disposed holding members 65 and 67 by pins 80 and 81. As the knob 78 is turned in clockwise direction, the pin 80 presses against an outer edge of a slot 82 (Fig. 7) and tends to pull the holding member 65 around in the path 68 to thus permit a new setting of the shaft 71. As the knob is turned in a counterclockwise direction, the pin 81 presses against the outer edge of the slot or aperture 83 and likewise facilitates adjustment of the shaft 71 to a new setting. A spring 84 fitted over projections 85 of the holding members 65 and 67 tends to normally maintain the slide lock in engaged position with the upstanding walls of the groove or recess 68. This rotary form of lock may be secured in operating position upon an instrument panel or other base 86.

In some instances it may be desired to provide an unusually strong lock effect, and in Fig. 9 there is illustrated, more or less diagrammatically, one form of slide lock for achieving this purpose. At the upper part of this figure there is shown a slide lock comprising a central holding member 90 adapted to co-operate with right and left holding members 91 and 92, respectively, in a manner similar to that described in connection with Figs. 7 and 8; that is, the structure disclosed in Fig. 9 is shown adapted to travel in a curved path. The lower part of Fig. 9 is similar to that described at the upper part of this figure. The machine, mechanism or part to be retained firmly in position may be connected with the upper and lower inner or center holding members 90 and 90*a* by pins 94 and 94*a*. As the controlled or locked part tends to move, there is effected secure engagement of the wedge or holding members with the walls of a channel or groove (not shown) due to the action of the complementary inclined surfaces and intermediate spreader members.

In this modification, the strong locking effect may be enhanced by utilizing strong springs 95 for forcing the various holding members into engagement with the walls of the channel. Since the springs are quite strong they are shown substantially straight, instead of curved as in Fig. 7, and retained in position by sockets or apertures 97 into which their ends extend. The very strong normal locking effect of these springs may be overcome during adjustment to a new setting by providing release pins 98 intermediate the ends of the locking wedges having camming surfaces 99 thereon adapted to achieve separation of the wedge members upon movement thereof. Rotation of the pins or releasing members 98 may be obtained by any suitable lever construction, here shown as rods 100 connected to links 101 and control shaft 102; as the shaft 102 is moved longitudinally the links 101 are effective to move the rods 100 and rotate the release or unlocking pins 98, thus causing the camming surfaces thereon to spread the holding members and unlock the mechanism for movement to a new setting.

In Fig. 10 the inclined or wedging surfaces of an adjustable lock are shown so disposed with respect to each other as to provide a locking or engaging action with the side walls of the channel upon outward or pulling movement and to achieve release or unlocking of the slide lock upon pushing one of the holding members toward the other; that is, the action is opposite to that hereinabove described. In this form of the invention pulling outwardly on one of the holding members 104 causes the spreader member 106 to force the inclined surfaces apart and effect transverse movement of the holding members 104 and 105 into engagement with the walls of the guideway. As the holding members are pushed toward each other, the spreader member 106 moves toward the open or low portions of the inclined surfaces and the slide lock may be moved longitudinally along the guideway. Suitable springs

or yieldable means 107 projecting into recesses 108 may be used to spread the holding members 104 and 105 and hold the lock in adjusted position within a guideway. Likewise suitable controlled and controlling members similar to those described in connection with the preferred embodiment may be associated with the sliding or wedging members to obtain desired locking and unlocking actions.

It will be seen that the present invention provides a new and improved slide lock having a minimum number of rugged parts. The slide lock of the present invention is adapted to securely and firmly retain a mechanism, structure or device in adjusted position and yet to permit instantaneous movement thereof to a new setting. The present slide lock is readily adaptable to use with instruments, mechanisms or devices which operate along a curved path or with a rotary movement.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope 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 channel-like guideway having spaced arcuate side walls, a first member of substantially arcuate shape in said guideway having locking surfaces adjacent opposite ends thereof, additional members of substantially arcuate shape in said guideway each having a locking surface adjacent an end thereof adapted to co-operate with said first mentioned locking surfaces, spreader members such as rollers intermediate said co-operating locking surfaces adapted to effect secure engagement of said first mentioned member with one of said arcuate side walls and of said additional locking members with another of said arcuate side walls, and means for selectively positioning said members with respect to the guideway.

2. In a device of the class described, the combination of a longitudinally curved guideway including spaced longitudinally curved side walls, a member provided with a longitudinally curved side wall and having locking surfaces at opposite ends thereof disposed toward opposite ends of said guideway, additional members each provided with a longitudinally curved side wall and each having a body portion substantially filling the space between said side walls and each having a locking surface adapted to co-operate with one of said first mentioned locking surfaces, spreader members intermediate said co-operating locking surfaces adapted to spread said members and effect secure engagement of each of the locking surface members with a wall of the guideway, means intermediate the ends of said additional members normally urging said members into engagement with the guideway, and means for selectively positioning said members with respect to the guideway.

3. In a device of the class described, the combination of a guideway including a pair of spaced arcuate generally parallel guiding walls, a member of substantially arcuate form in said guideway having locking surfaces adjacent opposite ends thereof facing toward one of said arcuate guiding walls, additional members of substantially arcuate form each having a locking surface adjacent one end thereof facing toward the locking surface of said first mentioned member adapted to co-operate with the locking surfaces of said first mentioned member, movable spreader members intermediate said co-operating locking surfaces adapted to effect secure engagement of the locking members with the arcuate guiding walls of the guideway, means intermediate the ends of said additional members normally urging said members toward said first mentioned member and into engagement with the arcuate guiding walls of the guideway, and means for selectively positioning said members with respect to the guideway.

4. In a device of the class described, the combination of a guideway having spaced side walls, longitudinally spaced locking members having locking surfaces at inwardly disposed portions thereof each facing toward the same side wall and having portions substantially filling the space between said side walls, an intermediate locking member having a plurality of locking surfaces each facing toward an opposite side wall than and adapted to complement the locking surfaces of said first mentioned locking members, spreader members intermediate said complementary locking surfaces adapted to effect separation of said members and locking of said intermediate locking member with one side wall of the guideway and said spaced locking members with an opposite side wall of the guideway, and means adapted to be used to selectively position the locking members with respect to the guideway.

5. In a device of the class described, the combination of a guideway having spaced side walls, longitudinally spaced locking members having locking surfaces at inwardly disposed portions thereof each facing toward the same side wall and having portions substantially filling the space between said side walls, an intermediate locking member having a plurality of locking surfaces each facing toward an opposite side wall than and adapted to complement the locking surfaces of said first mentioned locking members, spreader members intermediate said complementary locking surfaces adapted to effect separation of said members and locking of said intermediate locking member with one side wall of the guideway and said spaced locking members with an opposite side wall of the guideway, and yieldable means pressing against outwardly disposed end portions of said spaced locking members urging them toward said intermediate locking member and into locking relationship with the guideway, and means adapted to be used to selectively position the locking members with respect to the guideway.

6. A device as claimed in claim 4 in which a plurality of spreader members is provided intermediate each set of complementary locking surfaces.

7. A device as claimed in claim 4 in which a plurality of spreader members is provided intermediate each set of complementary locking surfaces and longitudinally spaced with respect to the guideway.

8. A device as claimed in claim 4 in which the means for selectively positioning the locking members includes cam-like means having a portion located intermediate portions of said locking members adapted to facilitate movement of said locking members such as to release them from gripping engagement with guideway walls.

9. A device as claimed in claim 4 in which said spaced side walls of the guideway are of arcuate

shape radially spaced apart and stationary with respect to each other, said locking members are of generally arcuate shape, and the means for selectively positioning the locking members includes cam means between portions of the intermediate locking member and a portion of each of the spaced locking members.

10. In a device of the class described, the combination of a guideway, holding members in generally end-to-end relationship in said guideway engaging with and slidable along spaced walls of said guideway, each holding member having an inclined surface portion overlapping and facing toward an inclined surface portion of another holding member and each having a projection extending inwardly toward an inclined surface portion of another holding member with the projections forming a pocket for a spreader member, a spreader member freely contained in said pocket intermediate said overlapping inclined surfaces, an operating member for moving said device along the guideway, and cooperating pin and recess means corresponding to each of said

holding members providing a plurality of selective contacts for selectively moving the holding members with said operating member as a unit along the guideway.

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