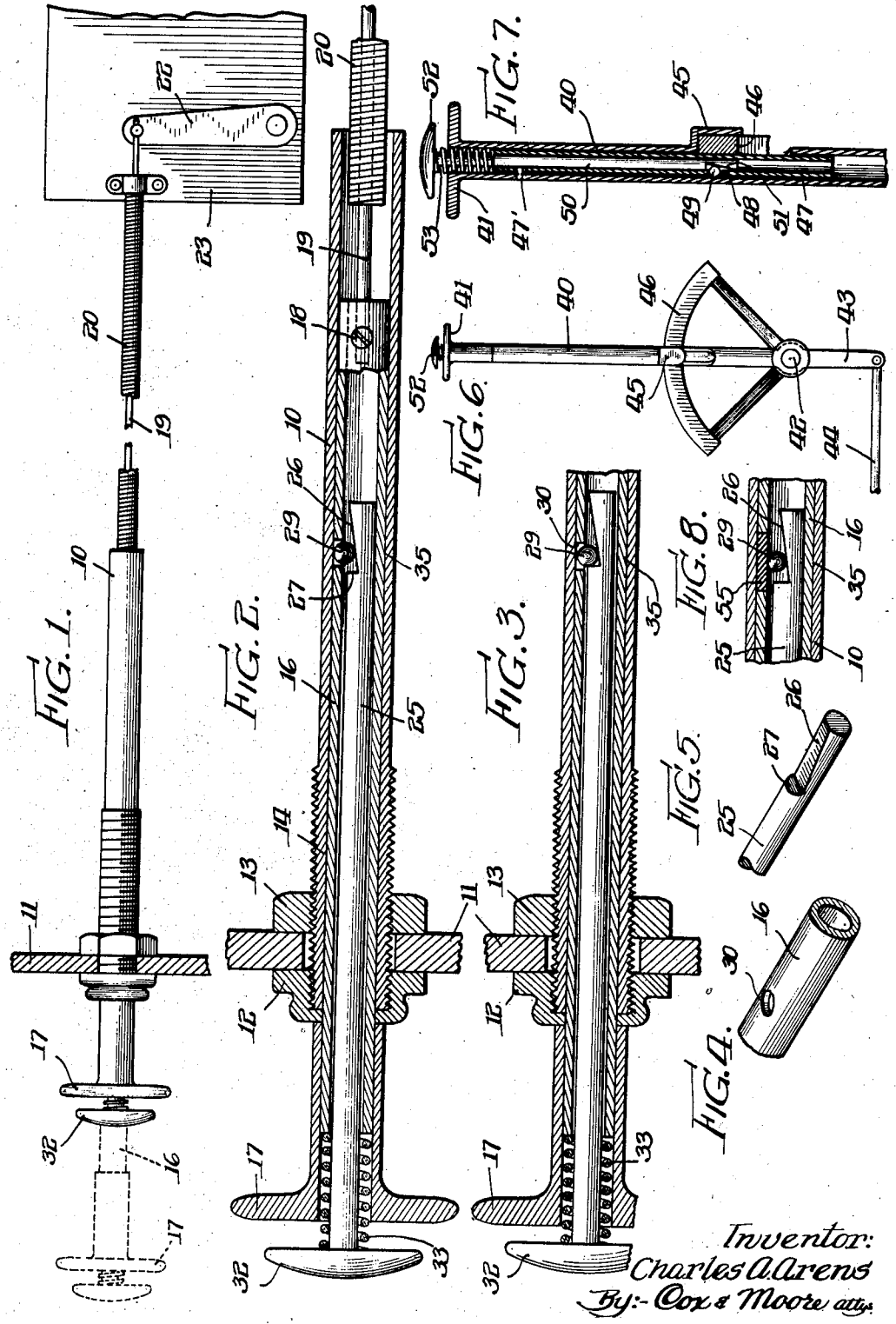
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HOLDING OR LOCKING DEVICE

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HOLDING OR LOCKING DEVICE

Charles A. Arens, Chicago, Ill.

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This invention relates to locking devices, and more particularly to locking devices for use in holding control mechanisms in adjusted position.

It is an object of the invention to produce a locking device of simplified construction which may be readily manipulated to locking and to release positions and whch, when in locking position, provides an effective and efficient holding mechanism of improved locking strength.

More specifically it is an object of the invention to provide a locking device particularly adapted for use with control mechanisms which is automatically urged into locking position, but which may be readily released by manipulation of a suitable release member. Other objects are to produce a locking device for control mechanisms which is operative to grip and hold the mechanism in any increment of adjustment, which does not disturb the adjusted position of the control mechanism upon movement to locking position, and which, when released from locking position, produces no drag upon or other interference with the normal adjustment of the control mechanism.

Still further objects are to provide a locking device which requires no adjustment to compensate for wear of its parts during use, to provide for the instantaneous and invariable release of the device from locking position when occasion requires, and to provide for the adjustment of the locking element whereby to vary the degree of positiveness with which such element grips and holds the controlled parts in adjusted position.

Still other objects and advantages of the invention will be apparent from the following specification when taken in connection with the accompanying drawing, wherein certain preferred embodiments of the invention are illustrated.

In the drawing, wherein like reference numerals refer to like parts throughout:

Fig. 1 is an elevational view of one form of control mechanism having the locking device of the present invention applied thereto.

Fig. 2 is a longitudinal sectional view of a part of the device of Fig. 1 on an enlarged scale showing the lock operating parts.

Fig. 3 is a view similar to Fig. 2 but showing the locking device in released position.

Fig. 4 is a partial perspective view of the operating sleeve of the control mechanism.

Fig. 5 is a partial perspective view of the control shaft of the locking device.

Fig. 6 is a view showing a control mechanism of modified form having the locking device of the invention applied thereto.

Fig. 7 is a partial longitudinal section of the mechanism shown in Fig. 6, and

Fig. 8 is a partial view showing a still further modified form of the invention.

Referring first to Figs. 1 to 5 inclusive, it will be seen that the embodiment of the invention therein set forth for purposes of illustration comprises a main housing sleeve 10 of a control mechanism adapted to be secured to a suitable support such as a dashboard 11 by means of lock nuts 12 and 13. The lock nuts are threaded upon the threaded portion 14 of the housing sleeve into tight gripping engagement with either side of the dashboard whereby to hold the sleeve in fixed position thereon. Journalled within the housing sleeve 10 for longitudinal movement therein is an operating sleeve 16 forming a part of the control mechanism. A manually operable knob or member 17 is rigidly carried upon the outer end of the operating sleeve and serves as a means for manually manipulating the sleeve. The inner end of the operating sleeve is secured by means of a set screw 18 to one end of a control cable or wire 19. This control cable, which may be any form of suitable flexible cable, is slidable within a sheath 20 and is secured at its other end to the lever 22 of the device 23 to be operated. The mechanism of the present invention is particularly adapted for use with control mechanisms for manipulating the various controls, such as carburetor controls or the like, of automotive or aircraft vehicles, and it has been illustrated in the drawing in association with such a device. However, it is to be understood that the locking mechanism of the invention is equally appplicable to various types of control mechanisms and to devices other than control mechanisms which are adjustable to various positions of adjustment and wherein it is desired to retain such devices in adjusted position against accidental displacement therefrom.

Mounted for free sliding movement within the operating sleeve 16 of the control mechanism is the control shaft 25 of the locking device. A notch is formed at the inner end of the control shaft having an angular cam surface 26 and a relatively sharp abutment surface 27. The notch carries a ball 29 which is adapted to engage the inner surface of the housing sleeve 10 through an opening 30 in the operating sleeve 16. Fixed to the outer end of the control shaft is a release button or member 32. A compression spring 33 bears against the inner face of the release but-

ton and against the end of the operating sleeve 16 thereby normally urging the release button and its associated control shaft 25 outwardly or to the left relative to the sleeve 16 of the control mechanism.

In operation the compression spring normally urges the control shaft 25 to the left relative to the operating sleeve 16 of the control mechanism. This causes the cam surface 26 to force the ball 29 into engagement with the interior surface of the housing sleeve 10 at the upper portion thereof as shown in Fig. 2. At the same time the inner end of the control shaft 25 is pushed downwardly by reaction against the ball into engagement with the lower part of the operating sleeve. This in turn forces the operating sleeve against the housing sleeve setting up friction between the two sleeves at the point indicated by the numeral 35 in Fig. 2. The operating sleeve 16 of the control mechanism is, therefore, held in fixed or adjusted position relative to the stationary housing sleeve 10. When the release button is moved manually to the right relative to the operating sleeve 16, against the action of compression spring 33, as shown in Fig. 3, the abutment surface 27 is brought into engagement with the ball 29 and the ball is allowed to drop into the base of the notch of the control shaft, thereby releasing the friction between the sleeves 10 and 16 at the point 35. The operating sleeve of the control mechanism is thus released for free movement to its various adjustable positions, one of which is indicated in dotted lines in Fig. 1.

It will be seen that the locking device is automatically urged at all times into locking position by the compression spring. When in locking position it firmly and effectively holds the operating sleeve of the control mechanism in its adjusted position. The locking mechanism is movable to locking position without in any way disturbing the adjusted position of the operating sleeve, and the lock is effective to hold the sleeve in any position whatsoever to which it may be moved and not merely at predetermined spaced points as is true with conventional locking devices, such as pawl and ratchet locks and the like. On the other hand, the lock may be instantaneously released as occasion requires merely by squeezing the release button 32 and the knob 17 relatively together as shown in Fig. 3. When so released, the lock produces no drag whatsoever upon the operating sleeve of the control mechanism so that the latter may be freely moved to a new position of adjustment. No special manipulation of the knob 17 or other parts of the control mechanism is necessary, to effect the lock release, and no adjustment for wear of the locking parts is required. The positiveness of the friction grip between the sleeves 16 and 10 at the point 35 may be varied by changing the angularity of the cam surface 26 or by changing the strength of the compression spring 33. In certain instances it may be desired merely to retain the control mechanism in adjusted position against inadvertent movement due to vibration or the like. In other instances a very positive lock may be desired. In such case it is merely necessary to increase the strength of the compression spring or decrease the angularity of the cam surface 26 whereby to increase the friction which will be set up at the point 35.

In Figs. 6 and 7 the invention is shown applied to a pivoted lever control mechanism. In this instance a control lever 40, in the form of a hollow sleeve, is adapted for movement by an operating knob or handle 41 about a pivot 42. The lever has an extension 43 secured to a control cable 44 adapted to be connected to the device to be controlled. The lever 40 carries a projection 45 adapted to engage against the outer surface of a fixed sector 46. Carried within the lever or sleeve 40 is a second sleeve 47 having an opening 48 through which a ball member 49 is adapted to project into engagement with the sleeve 40. The sleeve 47 is slightly smaller than the sleeve 40 and is free to move laterally therewithin, but it is held from longitudinal movement by a pin 47'. The sleeve 47 carries within it a slidable control shaft 50 having a notch 51 at the lower end thereof and a release or operating button 52 at the upper end thereof. A compression spring 53 bears against the upper end of sleeve 47 and against the button 52 and is adapted to urge the control shaft 50 upwardly with respect to the sleeve 40.

As the shaft 50 is moved upwardly, the notch 51 at the lower end thereof forces the ball 49 outwardly into engagement with the outer sleeve 40 as in the previously described embodiment of the invention. Inasmuch as the sleeve or lever 40 has some free axial movement upon its pivot 42, this causes the projection 45, which is an integral part of sleeve 40, to be urged to the left as seen in Fig. 7 into engagement with one side of the fixed sector 46. At the same time the lower end of the control shaft 50, by reaction against the ball 49, urges the sleeve 47 laterally relative to sleeve 40 into frictional engagement with the other side of the sector. The pivoted lever is thus frictionally locked with the sector in adjusted position. Upon depression of the release button 52, the action of the compression spring 53 is overcome, the ball is released into the deep part of the notch 51, and the lever 40 is released for free adjustment to any desired position.

In Fig. 8 there is shown a still further modified form of invention. In this instance the construction illustrated is similar to that shown in Figs. 1 to 5 inclusive except that there is a friction block 55 of suitable friction material arranged in an opening in the operating sleeve 16 and adapted to frictionally engage the housing sleeve 10 when pushed thereagainst by the ball 29. In this construction when the locking mechanism is in locking position not only will there be friction set up between the sleeves 10 and 16 at the point 35, as in the embodiment of the invention illustrated in Figs. 1 to 5, but additionally the friction block 55 will be frictionally urged against the stationary housing sleeve and thus anchored thereto. Inasmuch as the operating sleeve is prevented from movement longitudinally relative to the block, the block thus constitutes an additional means for locking the operating sleeve 16 in adjusted position.

It is obvious that various changes may be made in the specific embodiments of the invention shown and described for purposes of illustration. The invention is, therefore, not to be limited to the precise embodiments illustrated, but only as indicated in the following claims. It is to be understood that the term "locking" as herein used is used in its broadest sense, that is, as previously stated, the strength and effectiveness of the compression spring or the angularity of the cam surface in the notch of the control shaft may be varied to produce a positive lock, a relatively weak friction holding device, or any degree of locking effectiveness between these limits. Ac-

cordingly the term "locking" has been used to indicate either a positive lock or merely a friction holding device of strength sufficient only to satisfy the requirements of a given installation.

The invention is hereby claimed as follows:

1. In a control mechanism, a fixed housing sleeve, a movable control linkage having an operating sleeve slidable within the housing sleeve, said operating sleeve having an opening therein, a friction block arranged within said opening, a ball engageable with the block, an elongated control member arranged within the operating sleeve, said control member having a cam surface engageable with the ball, resilient means for urging the control member longitudinally within the operating sleeve whereby to cause said cam surface to urge the ball into engagement with the friction block and the block into engagement with the housing sleeve and to cause the control member to react against the operating sleeve, whereby to lock the operating sleeve in position relative to the housing sleeve.

2. In a control mechanism, a fixed housing sleeve, a control linkage having an operating sleeve slidable within the housing sleeve, a knob adapted for manual operation secured to the operating sleeve, said operating sleeve having an opening therein, a ball arranged within the opening, a control shaft within the operating sleeve, said control shaft having a cam surface engageable with the ball to force the same on longitudinal movement of the control shaft relative to the operating sleeve into engagement with the housing sleeve, the control shaft being adapted upon engagement with the ball to force the operating sleeve into frictional contact with the housing sleeve, and said control shaft having an end thereof projecting beyond the end of the operating sleeve, a spring encircling the control shaft for urging it in one direction longitudinally of the operating sleeve, and a manually operable knob on the projecting end of the control shaft for moving the shaft against the urging action of the spring.

3. In a control mechanism, a pivoted control lever, a fixed sector having a guiding surface, said lever having an extension slidable along said sector guiding surface, and means for urging the extension into frictional gripping engagement with the guiding surface in any pivoted position of said lever comprising a member having a cam surface and an abutment against which the cam surface is adapted to engage.

4. In a control mechanism, a pivoted control lever, a fixed sector having a guiding surface, said lever having an extension slidable along said sector guiding surface, means for urging the extension into frictional gripping engagement with the guiding surface in any pivoted position of said lever comprising a member having a cam surface and an abutment against which the cam surface is adapted to engage, resilient means for urging the cam surface member into abutment engaging position, and manual means for overcoming the action of the resilient means.

5. In a control mechanism, a control lever comprising a pivoted sleeve, a fixed sector having a guiding surface, said sleeve having a projection slidable along the guiding surface of the sector, a second sleeve arranged within the first mentioned sleeve, said second sleeve having an opening therein, a ball arranged within the opening, an elongated control member within the second sleeve having a cam surface engageable with the ball, and means for moving the control member axially of the second sleeve to cause the cam surface thereon to force the ball into engagement with the first sleeve and force the projection on said sleeve into frictional engagement with the sector guiding surface.

6. In a control mechanism, a fixed guide member, an operating member slidable along the guide member through a given range of travel, a handle associated with the operating member adjacent one end to facilitate the manipulation thereof, a transmission linkage secured to the other end of the operating member adapted to be connected to a device to be controlled, a locking member carried by the operating member but shiftable relative thereto and through predetermined limits, said locking member having a cam surface formed thereon, an abutment against which the cam surface is adapted to be engaged, and resilient means for moving the locking member relative to the operating member to bring said cam surface into engagement with said abutment, said locking member being adapted on engagement of the cam surface and abutment to thrust the operating member into frictional engagement with the fixed guide member whereby to lock the operating member to the guide member at any position within its range of travel.

7. In a control mechanism, a fixed guide member, an operating member slidable along the guide member through a given range of travel, a handle associated with the operating member to facilitate the manipulation thereof, a transmission linkage secured to the operating member adapted to be connected to a device to be controlled, a locking member movable with the operating member but shiftable relative thereto and through predetermined limits, said locking member having a cam surface formed thereon, an abutment against which the cam surface is adapted to be engaged, and means for moving the locking member relative to the operating member to bring said cam surface into engagement with said abutment, said locking member being adapted on engagement of the cam surface and abutment to thrust the operating member into frictional engagement with the fixed guide member whereby to lock the operating member to the guide member at any position within its range of travel.

8. A control mechanism as defined in claim 7 wherein the fixed guide member is a sector having a guiding surface along which the operating member is slidable.

9. A control mechanism as defined in claim 7 wherein the fixed guide member is a sleeve member within which the operating member is slidable.

10. In a control mechanism, a fixed guide member, an operating member slidable along the guide member through a given range of travel, a handle associated with the operating member to facilitate the manipulation thereof, a transmission linkage secured to the operating member adapted to be connected to a device to be controlled, a locking member movable with the operating member but shiftable relative thereto and through predetermined liimts, said locking member having a cam surface formed thereon and said operating member having an opening formed therein, a ball arranged within the opening in the operating member adapted to be engaged by the cam surface of the locking member, and resilient means for moving the locking member relative to the operating member to bring the cam surface into engagement with the ball, said locking member being adapted on engagement of its cam sur-

face with the ball to thrust the operating member into frictional engagement with the fixed guide member whereby to lock the operating member to the guide member in any position within its range of travel.

11. In a control mechanism, a fixed guide sleeve, an operating sleeve slidable within the guide sleeve through a given range of travel, a handle associated with the operating sleeve adjacent one end to facilitate the manipulation thereof, a transmission linkage secured to the other end of the operating sleeve adapted to be connected to a device to be controlled, a locking member mounted within the operating sleeve but shiftable relative thereto and through predetermined liimts, said locking member having a cam surface formed thereon and said operating sleeve having an opening formed therein, a ball arranged within the opening in the operating sleeve adapted to be engaged by the cam surface of the locking member, and a spring for moving the locking member relative to the operating sleeve to bring the cam surface into engagement with the ball, said locking member being adapted on engagement of its cam surface with the ball to thrust the operating sleeve into frictional engagement with the fixed guide sleeve whereby to lock the operating sleeve to the guide sleeve in any position within its range of travel.

12. In a control mechanism, a fixed guide sleeve, an operating sleeve slidable within the guide sleeve, a control linkage secured to one end of the operating sleeve adapted to be connected to a device to be controlled, a handle secured to the other end of the operating sleeve, a locking member mounted within the operating sleeve, said locking member having a handle juxtaposed to the handle of the operating sleeve, said locking member being movable to locking and release positions within the operating sleeve, a spring embracing the locking member and adapted to engage against the operating sleeve and the locking member for moving the locking member to release position, and locking means operated by the locking member as said member is moved to locking position, said locking means being adapted on operation to lock the operating sleeve to the guide sleeve.

CHARLES A. ARENS.