Aug. 13, 1957 J. H. REID 2,802,374

LOCKING DEVICE

Filed Sept. 26, 1955

Fig. 1.

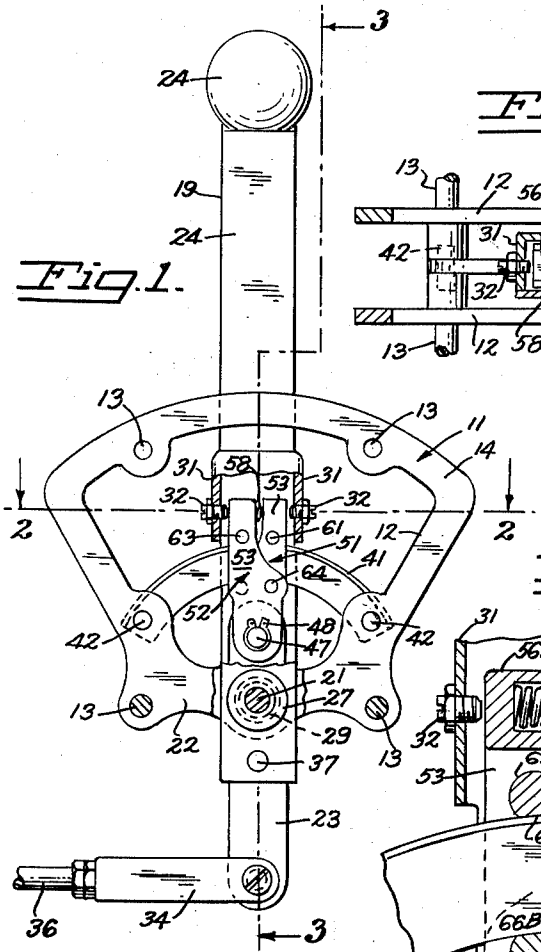


Fig. 2.

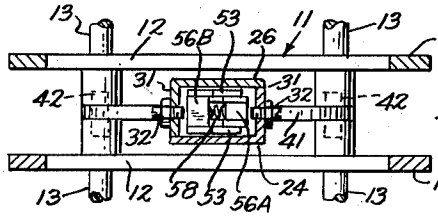


Fig. 3.

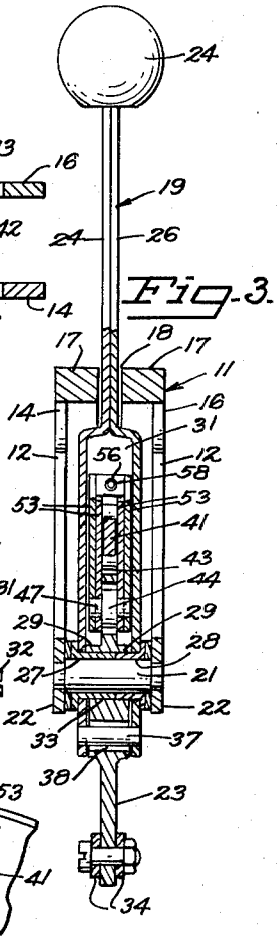


Fig. 4

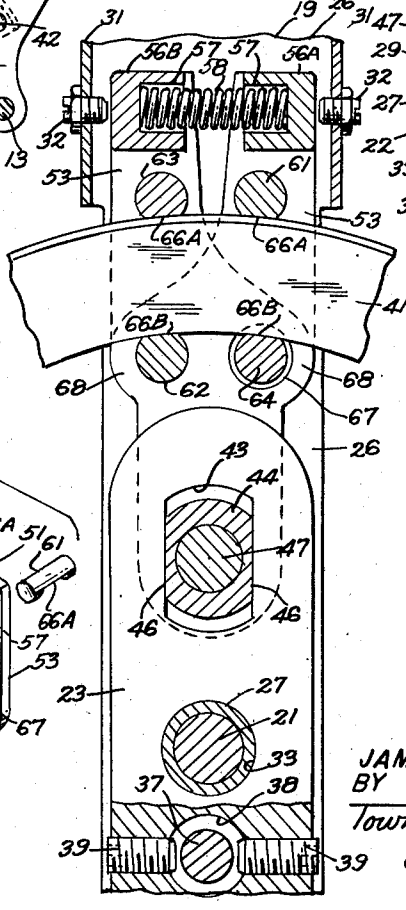
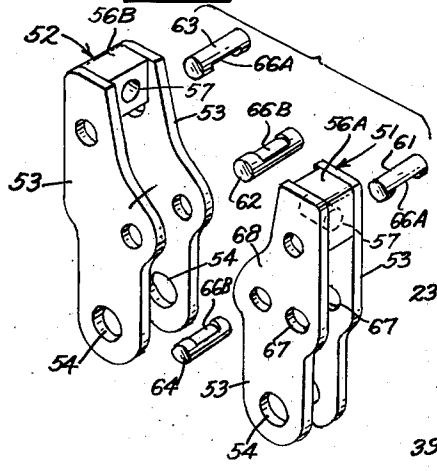


Fig. 5.



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LOCKING DEVICE

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9 Claims. (Cl. 74—531)

This invention relates to a new and improved irreversible locking control and comprises an improvement over Patent No. 2,703,499 issued March 8, 1955. The present invention incorporates many of the advantages and features of the aforesaid Patent No. 2,703,499, but in addition has additional features as hereinafter more particularly set forth.

Among the advantages of the present invention are its simplicity and inexpensive construction which are occasioned by certain structural features described hereinafter.

Another feature of the invention is the facility of manufacture and assembly of the device as compared with prior structures and this increases the adaptability of the device for mass production.

Still another advantage of the invention is the fact that the space occupied is reduced, facilitating installation in confined quarters.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a side elevation partly broken away in section to reveal portions of the device;

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

Fig. 3 is a vertical sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary sectional view of a portion of the structure; and

Fig. 5 is an exploded perspective view of certain parts of the locking mechanism.

The mechanism hereinafter described is mounted on a frame **11** which, in side elevation, is of substantially truncated sector shape, the center of the frame being cut away in apertures **12** to reduce weight and to afford access to the interior parts. The frame is mounted by means of pins **13** at each of four locations to a stationary support (not shown). One of the features of the present invention is the fact that a plurality of controls may be mounted parallel in a bank and accordingly the pins **13** may be used to connect the frame **11** to identical adjacent frames. Frame **11** consists of parallel front and back members **14** and **16** which are substantially identical in construction. Inwardly facing edge portions **17** are provided to connect the front and back together with a gap **18** between the edge portions through which projects the control handle **19** as hereinafter set forth.

Extending between the front and back frame members **14** and **16** is main pivot pin **21** which is located on the center line of the device and is journaled in cross members **22** at the bottom of the frame. Both the control handle **19** and the driven lever **23** are pivoted about main pivot pin **21** as a center.

The control handle **19** has a knob **24** at the top from which depend front and back stems **24** and **26** through gap

18. Below gap **18** stems **24** and **26** are bifurcated and separated to provide ample space to mount the lock mechanism hereinafter described. A sleeve consisting of two parts **27** and **28** extending inward from opposite faces of the frame fit over main pivot pin **21** and are, in turn, received in holes **29** in the lower ends of the bifurcations of the control handle **19**. The side edges **31** of at least one of the stems **24** or **26** of the control handle **19** are turned inwardly to provide a mounting for control set screws **32** as hereinafter described.

The driven lever **23** is a lever of the first class which is pivoted about the pivot pin **21**. Lever **23** is formed with a hole **33** through which sleeve **27—28** projects. The lower end of driven lever **23** is connected to the bifurcated end **34** of a control **36** which may be a throttle control or other driven member. An adjustable loose connection between the control handle **19** and driven lever **23** is provided by means of pin **37** which extends between the stems **24** and **26** and passes through an enlarged hole **38** in driven lever **23**. Set screws **39** threaded into the side edges of driven lever **23** project into the enlarged holes **38** and are arranged to contact pin **37** and move the same when control handle **19** is moved. Within the limits of the adjustment of set screws **39** hereinafter described, a locking mechanism is provided to prevent reversal of the movement—i. e., movement of the driven lever **23** is not transmitted to the control handle **19**.

The latching mechanism is mounted on a quadrant-shaped bar **41** concentric with pivot pin **21** and attached to the frame **11** by means of pins **42** at its opposite ends. An elongated slot **43** is formed in the upper end of driven lever **23** in which is positioned a journal sleeve **44** having flattened sides **46** fitting against the edges of slot **43** so that sleeve **44** may slide relative to lever **23** to maintain concentricity between quadrant bar **41** and the locking mechanism even with extreme load conditions. Journal sleeve **44** receives lock pivot pin **47** which is secured by means of split retaining rings **48**.

Inner and outer shoe assembles **51** and **52** are pivoted about pin **47**. Each shoe assembly comprises parallel plates **53** formed with apertures **54** at their lower ends for the lock pivot pin **47**. The upper end of each assembly comprises a spacer **56** which is welded to the plates **53**. The spacer **56A** for inner assembly **51** is narrower than the spacer **56B** for the outer assembly, the width of the outer spacer **56B** being sufficient to permit movement of the inner spacer between the plates of the outer spacer. Spacers **56** are formed with inwardly facing recesses **57** in which is received a helical spring **58** which biases the inner and outer show assemblies apart with lock pivot pin **47** as a center.

Four hardened shoe pins are provided, two shoe pins **61** and **62** in the inner shoe assembly **51** and two shoe pins **63** and **64** in the outer shoe assembly **52**. The pair of pins of each shoe assembly are on opposite side edges of the quadrant bar **41** and are also on opposite sides of a center line drawn from the lock pivot pin **47** normal to the quadrant bar, thereby being located in diagonally opposite positions. Each pivot pin **61—64** is cylindrical and is ground with an arcuate gripping surface **66**. The outer pins **61** and **63** have a gripping surface **66A** with a curvature equal to the curvature of the upper edge of the quadrant bar **41**, whereas the lower pins **62** and **64** are ground with a gripping surface **66B** of a curvature equal to that of the lower edge of the quadrant bar. Enlarged holes **67** are formed in the plates **53** of the inner shoe assembly **51** to permit passage of pin **64** without interference. It will be observed that except for holes **67**, each of the plates **53** is substantially identical, each having a laterally extending projection **68** to receive the lower pins **62** and **64**. Such construction facilitates manufac-

ture and assembly of the device and simplifies the construction.

The function of spring **58** is to bias the inner and outer shoe assemblies apart and this results in frictional engagement of the gripping surfaces **66** of the pins **61—64** with the edges of quadrant bar **41**. To unlock the device, set screws **32** on the inwardly projecting edges of control handle **19** bear against the spacers **56**. Thus as the control handle **19** is moved in either direction about pivot pin **47** as a center, set screw **32** contacts inner and outer shoe assemblies **51** and **52** and causes the shoe pins **61—64** to disengage from the quadrant bar **41** and permit movement. After the shoes are unlocked, set screws **39** contact pin **37** to move driven lever **23**, the set screws **32** and **39** being so adjusted that the sleeve pins **61—64** are first unlocked. When force is transmitted from the driven lever **23**, no unlocking is accomplished, and hence the control lever **19** is not moved. Accordingly the control herein described is irreversible.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. In a locking control apparatus, a bar, a structure movable on said bar, means for always locking said structure against forces tending to move it acting from one side of the bar, said means also automatically releasing said structure for movement from forces on the other side of the bar, said means including a pair of pivoted locking elements slidably positioned on the bar in gripping relationship therewith and wherein each of said locking elements contacts the bar on both its upper and lower surfaces and wherein the uppermost contacting portion of one locking element is opposite the lowermost contacting portion of the other element and vice versa, one of said locking elements being slidable partially within the other of said locking elements, said locking members being in sliding bearing engagement with each other in at least two opposed directions to maintain said locking elements constantly positioned for parallel locking and unlocking movement.

2. In a locking control apparatus, a bar, a structure movable on said bar, means for always locking said structure against forces tending to move it acting from one side of the bar, said means also automatically releasing said structure for movement from forces on the other side of the bar, said means including a pair of pivoted locking elements slidably positioned on the bar in gripping relationship therewith and wherein each of said locking elements contacts the bar on both its upper and lower surfaces and wherein the uppermost contacting portion of one locking element is opposite the lowermost contacting portion of the other elements and vice versa, one of said elements being bifurcated, the other of said elements being disposed at least partially within the bifurcations of said first named element, said locking members being in sliding bearing engagement with each other in at least two opposed directions to maintain said locking elements constantly positioned for parallel locking and unlocking movement.

3. An apparatus according to claim 2 wherein are provided a pair of pins in each of said locking elements, one pin of each pair contacting said bar on one side of said bar for the locking engagement with said bar and the other of said pins contacting said bar on the other side of said bar for the locking engagement with said bar.

4. An apparatus according to claim 2 wherein are provided a pair of pins in each of said locking elements, one pin of each pair contacting said bar on one side of said bar and the other of said pins contacting said bar on the other side of said bar, each of said pins being cut away along one of its cylindrical surfaces, the cut-away portion of said pin being parallel to said bar, said cut-away portions contacting said bar for the locking engagement therewith.

5. A locking control apparatus comprising a bar, means mounting said bar, a structure movable relative to said bar, and locking means for locking said structure against forces acting from one side of said bar tending to move said structure, said locking means releasing said structure for movement by forces acting from the other side of said bar, said locking means comprising a pair of locking members slidably positioned on said bar in gripping relationship therewith and wherein each of the locking members contacts said bar on opposite surfaces thereof, and wherein the contacting surfaces of the respective locking members are diagonally oppositely disposed from one another, said locking members being positioned to at least partially overlap one another, the contacting surface of one said locking member being in a directly opposite position relative to said bar from the opposite contacting surface of the other locking member, one of said members being bifurcated adjacent the zone in which said members overlap and the other of said locking members fitted within the bifurcated portion of said first mentioned member, and a pin pinning said locking members together through their overlapping portions, said pin connecting said locking members to said structure.

6. A locking control apparatus comprising a bar, means mounting said bar, a structure movable relative to said bar, and locking means for locking said structure against forces acting from one side of said bar tending to move said structure, said locking means releasing said structure for movement by forces acting from the other side of said bar, said locking means comprising a pair of locking members slidably positioned on said bar in gripping relationship therewith and wherein each of the locking members contacts said bar on opposite surfaces thereof, and wherein the contacting surfaces of the respective locking members are diagonally oppositely disposed from one another, said locking members being positioned to at least partially overlap one another, the contacting surface of one said locking member being in a directly opposite position relative to said bar from the opposite contacting surface of the other locking member, each said locking member comprising a pair of parallel plates and a spacer between said plates holding the same apart in parallel relationship, the spacer of one of said members being wider than that of the other said member and one of said members fitting partially between the parallel plates of the other said member and being in bearing engagement therewith in opposed directions normal to said parallel plates.

7. An apparatus according to claim 6 wherein each of said locking members is provided with a pair of pins which comprise the contacting surfaces contacting said bar.

8. An apparatus according to claim 6 wherein each of said locking members is provided with a pair of pins which comprise contacting surfaces contacting said bar, and wherein at least one pin of the wider of said locking members passes through a hole in the narrower of said locking members, said hole being of greater diameter than said pin.

9. A locking control apparatus comprising a bar, means mounting said bar, a structure movable relative to said bar, and locking means for locking said structure against forces acting from one side of said bar tending to move said structure, said locking means releasing said structure for movement by forces acting from the other side of said bar, said locking means comprising a pair of locking members slidably positioned on said bar in gripping relationship therewith and wherein each of the locking members contacts said bar on opposite surfaces thereof, and wherein the contacting surfaces of the respective locking members are diagonally oppositely disposed from one another, said locking members being positioned to at least partially overlap one another, the contacting surface of

one said locking member being in a directly opposite position relative to said bar from the opposite contacting surface of the other locking member, each said locking member comprising a pair of parallel plates and a spacer between said plates holding the same apart in parallel relationship, the spacer of one of said members being wider than that of the other said member and one of said members fitting partially between the parallel plates of the other said member, and which further comprises resilient means biasing said locking members apart, said resilient means contacting said spacers.

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