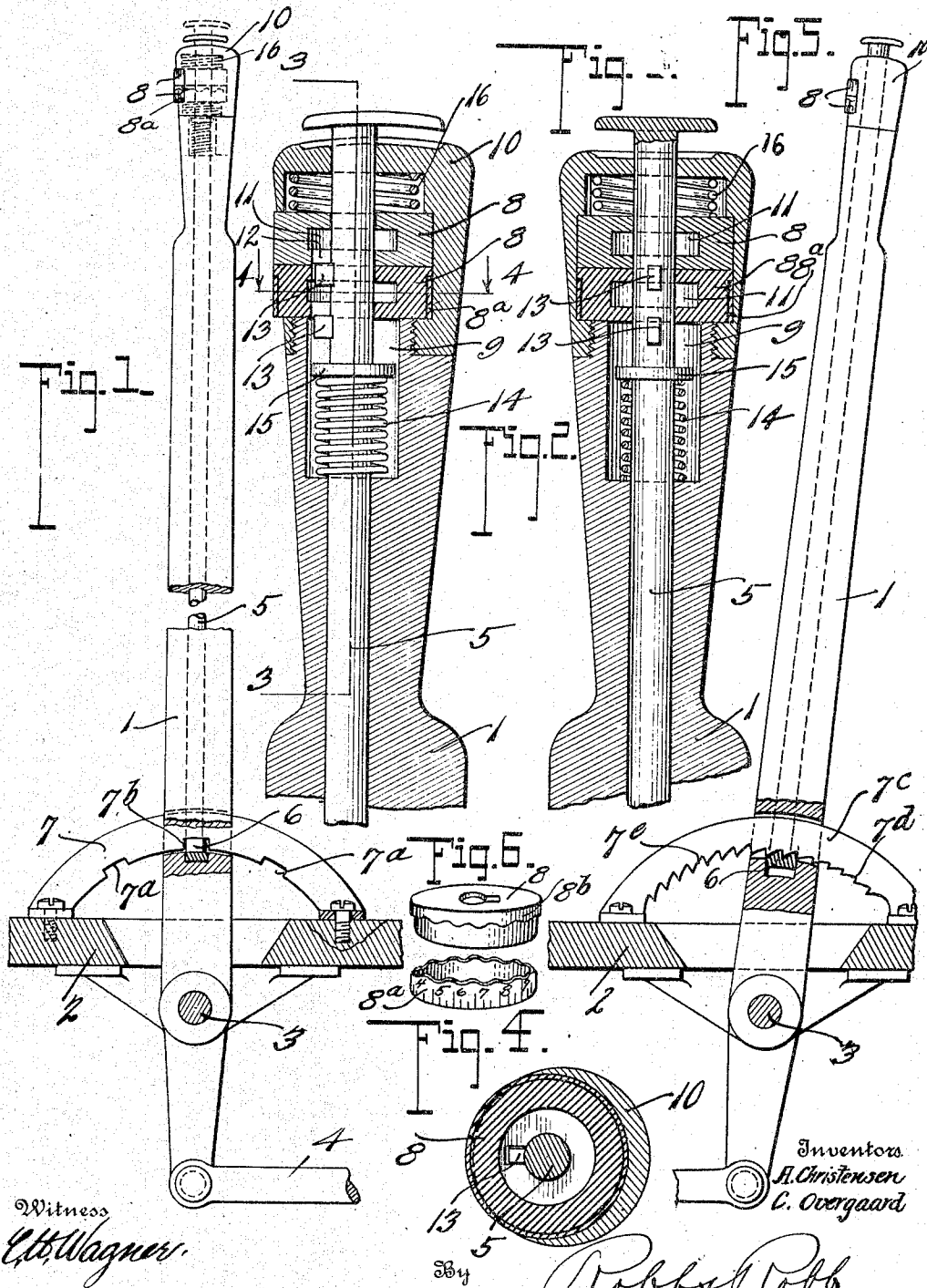


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 LOCKING MEANS FOR CONTROL LEVERS.  
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## LOCKING MEANS FOR CONTROL-LEVERS.

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Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that we, ALFRED CHRISTENSEN and CHRIST OVERGAARD, subjects of the King of Denmark, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Locking Means for Control-Levers, of which the following is a specification.

10 The present invention appertains to improvements in locking means for control levers, the object in view being not only to provide primarily against unauthorized movement of said lever whereby the mechanism which it controls is free for operation, but to so construct the locking means that when the lever is moved by the proper persons, its locking elements will be maintained from accidental disturbance which would preclude normalizing of said lever.

20 More explicitly, the locking instrumentalities of this device include permutation members, which normally, when the control lever is in its normal position, are free for relative adjustment to a known combination which will release the holding means for the lever, but when said lever is moved from this normal position, incidental to such movement the permutation members are held against permuting movement and the accidental shifting of the permutation members out of their registering position is thus guarded against so that the operator will not have to set the combination before returning the control lever.

35 The above and such other objects as may hereinafter appear are attained by the novel construction, combination and arrangement of parts to be hereinafter specifically described and claimed.

40 Reference will now be had to the accompanying drawing forming a part of this specification, wherein:

45 Figure 1 is a side elevation of a lever embodying the subject-matter of this invention, parts being broken away and shown in section for the purposes of clearness. Fig. 2 is a vertical sectional view of the handle portion of the control lever and showing the details of the permutation locking means. Fig. 3 is a vertical sectional view taken on the plane indicated by the line 3-3 of Fig. 2. Fig. 4 is a horizontal sectional view on the line 4-4 of Fig. 2. Fig. 5 is a side elevation of a lever of a slightly different type from that disclosed in Fig. 1 but em-

bodying the essential features of our device. Fig. 6 is a detail view of one of the permutation disks employed in this device showing the means for changing the combination at will.

60 Throughout the following detail description, and on the several figures of the drawing, similar parts are referred to by like reference characters.

65 In the description of this device, it is to be understood that the locking means of our invention is designed to be adapted for control levers of different types and it is immaterial whether this lever is used as a brake lever for a vehicle or a control lever for elevator hoists or yet a control lever for the shifting of gear instrumentalities and we do not wish to be confined to any particular application of said lever by reason of the disclosure of its embodiment in the drawing.

70 The numeral 1 designates a lever of conventional shape pivotally mounted upon a support 2 at 3, and having operative connection with the instrumentalities which it controls through the connecting rod 4. The lever 1 is provided with a longitudinally movable locking rod 5 which at its lower end is bent laterally to form a dog 6 engageable with a locking bar or segment 7 secured to the support 2 adjacent to the lever. Thus far the lever is of a conventional type and it is such character of lever that the locking means of our invention is applied to. This locking means consists of a plurality of permutation disks 8 mounted in the handle portion of the lever within a recess 9 provided for that purpose. To enable the disposition or access to the parts of this lock, the end of the handle is provided with a removable cap 10. It will be observed that the permutation disks 8 surround the longitudinally movable rod 5 and project at one side from the handle so as to enable the indicia on the peripheries of the disks to be seen. Each disk is formed with an annular channel 11 and in addition with a transverse slot 12 leading from said channel. The locking rod 5 adjacent to the permutation members is provided with one or more locking elements or projections 13 which in the normal or neutral position of the lever 1 are disposed to register with the respective annular grooves of the permutation disks 8 under which condition these disks are free to be rotated as desired, for

the purpose of obtaining a predetermined relative positioning of the disks with respect to each other constituting a known combination. When such known combination is obtained, or in other words, the disks are in proper registering position where the transverse slots 12 register with each other, it will be obvious that the locking rod 5 for the lever may be shifted longitudinally of said lever.

Assume for the purpose of this description that the lever above described is designed for the purpose of shifting gear members into operative relation when the lever is moved forwardly such that the mechanism will be driven in one direction, and movement of the lever rearwardly will shift the gear members into operative relation such that the mechanism will be driven in the reverse direction, the central or vertical position of the lever representing the neutral position. It is in this neutral position that it becomes desirable to lock the lever from unauthorized movement which would engage the gears and enable the operation of the mechanism driven thereby. Therefore, the segment or locking bar 7 is provided with forward and rearward notches 7<sup>a</sup> and an intermediate notch 7<sup>b</sup> in which the dog 6 is engageable to hold the lever at these different positions. The notch 7<sup>b</sup> is formed slightly deeper than the notches 7<sup>a</sup> which is an essential feature in this construction, for the reason that when in the neutral position of the lever the locking rod 5 will be movable upwardly under the actuation of the spring 14 seated in the recess 9 and against the collar 15 on the rod 5, a greater distance than when the dog engages in either of the notches 7<sup>a</sup>. The depth of the notch 7<sup>b</sup> is such that it will provide for the locking elements 13 on the rod 5 registering with the annular grooves 11 of the permutation members where they will be free to be rotated as hereinbefore mentioned. However, when the dog 6 is in one of the notches 7<sup>a</sup> it permits the rod 5 to move to such a position only where one of the locking elements 13 will interengage between the permutation disks and in the transverse slots 12 thereof so that both of the disks where only two are employed are held in their relative registering positions and may not be disturbed when the lever is in any other than its neutral position above mentioned. As premised, this eliminates the necessity of the operator being required to set the permutation elements at their proper combination should they accidentally become shifted when the lever is in its engaging position which would be either forwardly or rearwardly of the central point of its movement. As will be observed from Figs. 2 and 3 a spring 16 is disposed above the disks 8 and imparts friction to

said disks so that they will not move too freely.

In Fig. 5, the lever 1 is an ordinary brake lever such as used upon motor vehicles, provided with our locking mechanism in its handle but engaging a slightly different type of segment than shown with respect to the form disclosed in Fig. 1, the segment 7<sup>c</sup> being provided with a toothed edge as customary, the notches forming said teeth in the forward portion, however, being shallower as indicated at 7<sup>a</sup> than the notches at the rearward portion indicated by 7<sup>b</sup>. In the usual brake lever of this type the forward position is the release position whereas the rearward position is the brake set position and it is in the brake set position that the permutation members are designed to be operable. An additional feature of this construction lies in the provision of one of the permutation members with a shiftable indicia carrying element whereby a predetermined combination representing relative releasing positions of the disks may be changed when desired. To accomplish this object one of the permutation disks 8, preferably the lower one, is provided with an annular indicia carrying ring or band 8<sup>a</sup> which is disposed upon a reduced end of the disk and designed to have interlocking connection therewith to maintain it in a predetermined position. To this end one edge of the ring 8<sup>a</sup> is cut in a zigzag manner for cooperation with a similarly cut shoulder 8<sup>b</sup> on the disk. If for any reason it should be desired to change the combination it is only necessary to unscrew the cap 10 of the handle of the lever 1 which will release the permutation members and enable the ring 8<sup>a</sup> to be dropped a sufficient distance to disengage its interlocking connection with its carrying member and by shifting said ring slightly and reengaging it in position, a different combination may be secured, having reference to the indicia on the cooperating upper disk. The cap 10, it will be obvious, holds the ring 8<sup>a</sup> in position when it is screwed down upon the handle as shown in Fig. 2.

Having thus described our invention, what we claim as new is:

1. In a device of the class described, a movable controlling member, a locking member carried thereby, permutation members cooperating with the locking member to control operation thereof, and means co-acting with the locking member for maintaining the controlling member in a predetermined position and for holding the permutation members against permuting movement after movement of the controlling member aforesaid.

2. In combination, a lever, a locking member carried by said lever, means engageable thereby for holding the lever at

adjusted positions, permutation members co-operating with the locking member and adapted to permit engaging and disengaging of the locking member with respect to the holding means when set in a predetermined position, and means on the locking member coöperative with the permutation members to normally prevent movement of the locking member while allowing free movement of the permutation members, said means interlocking with the permutation members and preventing permuting movement thereof when the lever is disengaged and moved from its normal position.

3. In a device of the class described, a lever for controlling mechanism adapted to be operated, a locking member coöperating with the lever, means engageable by said locking member for holding the lever at adjusted positions, and permutation means controlling movement of the locking member with respect to the last mentioned means, said holding means being formed to permit movement of the permutation member only when the lever is in normal position.

4. A lever for controlling mechanism adapted to be operated, a locking member coöperating with said lever, a notched segment with which said locking member coacts to hold the lever at adjusted positions, permutation members coöperating with the locking member for controlling its release, the notches of the aforesaid segment being of different relative depth and thereby controlling the extent of movement of the locking member relative to the permutation members, and means intermediate the locking member and the permutation member whereby to permit movement of the permutation members only when the lever is in normal position.

5. Control means for operating mechanisms including a movable member, a locking element for holding said member at adjusted positions, a permutation device controlling the operation of the locking member, and means operable incident to the movement of the movable member aforesaid to hold the permutation device against permutation movement.

6. In combination, a lever, a locking rod for holding the lever at adjusted positions and movable longitudinally of the lever, permutation members on the lever coöperative with the rod, a locking element on the rod normally permitting free rotation of the permutation members when the lever is in one position, said rod being movable to release the lever when the permutation members are in a predetermined relative position, and means for holding the rod with the locking element interengaging the permutation members whereby to prevent their independent or relative movement.

7. In combination, a lever, a locking rod for holding the lever at adjusted positions and movable longitudinally of the lever, permutation members on the lever coöperative with the rod, a locking element on the rod normally permitting free rotation of the permutation members when the lever is in one position, said rod being movable to release the lever when the permutation members are in a predetermined relative position, and means for holding the rod with the locking element interengaging the permutation members whereby to prevent their relative movement, said means constituting the holding means for holding the lever at adjusted position.

8. A controlling lever, a support therefor, a locking member for holding the lever at adjusted positions shiftable longitudinally of said lever, permutation members surrounding the locking member and provided with annular channels, said members having transverse grooves coacting with the channels and adapted for registry, a locking projection on said locking member normally disposed in registration with the annular groove of one of said permutation members, and movable upon registration of the transverse grooves of said permutation members into position interengaging the permutation members whereby to prevent relative movement thereof.

9. A lever for controlling mechanism adapted to be operated, a locking member coöperating with said lever, a segment engageable by the locking member and having notches of different depths to receive the locking member, a permutation member on said lever, and locking means intermediate the permutation member and the lever, the notch engageable by the locking member first mentioned in normal position of the lever being relatively deep to permit such movement of said locking member as to free the permutation member of the locking means, and the other notch or notches being relatively shallower to bring the locking means into engagement with the permutation member when the lever is out of normal position.

10. In permutation locking means of the class described, a permutation disk adapted for disposition in a predetermined position, an indicia bearing ring carried by the disk and having an edge formed with peripheral locking elements, the disk being provided with corresponding locking elements arranged in the same plane and normally interengaging with those of the ring, said ring being displaceable from the disk to effect the change of the locking elements and incidentally a change of the combination.

11. In a device of the class described, the combination of a locking element, permutation members coöperating therewith to

control the same, means on said permutation members for indicating a predetermined relative positioning of said members for releasing the locking element, an indicia  
5 carrying member on one of said permutation members having interlocking connection with its carrying member, said indicia carrying member being removable to shift said interlocking connection whereby to ef-

fect a change of combination, and means 10 normally holding the disks in cooperative relation and the indicia carrying member in engaging position on its permutation member.

In testimony whereof we affix our signatures. 15

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