Jan. 4, 1949. C. R. SUSKA 2,458,446

SELF-LOCKING LEVER CONTROL

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Fig. 1

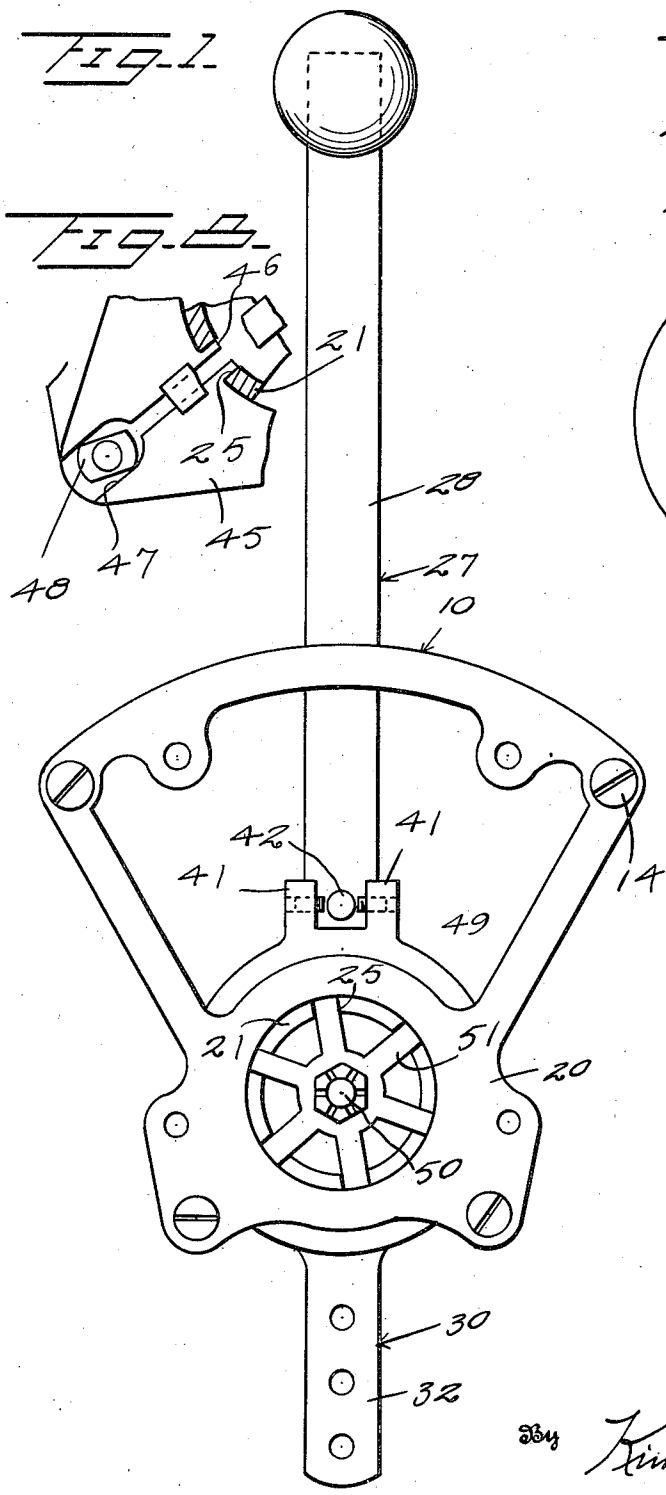
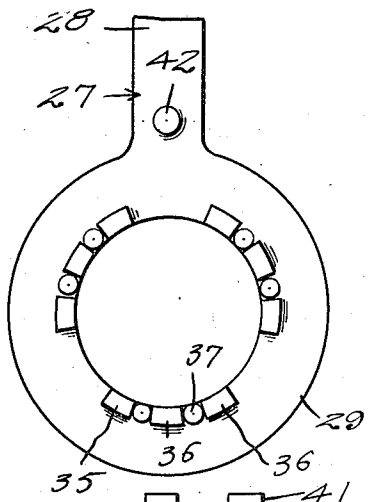


Fig. 2

Fig. 4



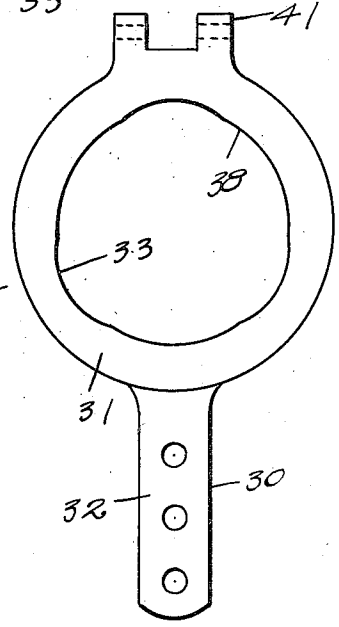


Fig. 5

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Fig. 2.

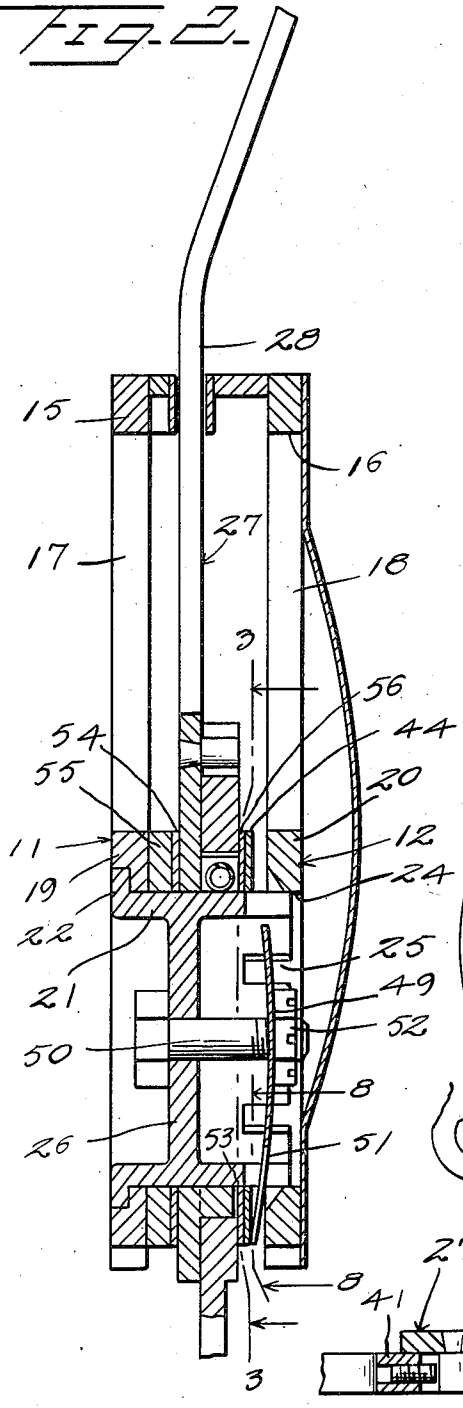


Fig. 7.

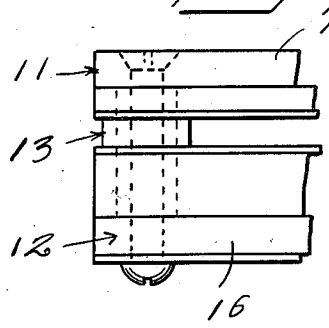


Fig. 3.

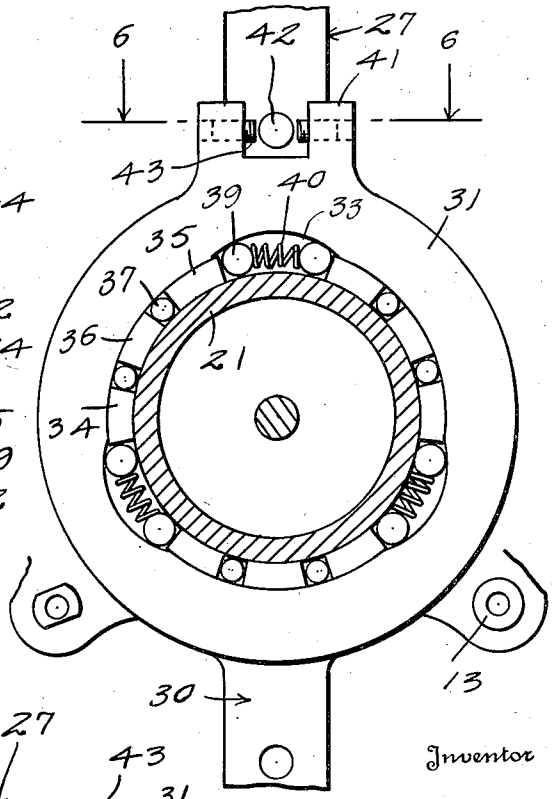


Fig. 6.

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2,458,446

SELF-LOCKING LEVER CONTROL

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1 Claim. (Cl. 74—531)

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This invention relates to automatic lever locking means.

One application of this invention applies to airplanes where a throttle control lever is provided which is normally frictionally held against creeping under vibration or pull from the driven lever, but in order to hold the control lever in adjusted position, the friction adjustment must be made so tight that undue effort is required to adjust the lever and a very close adjustment of the lever is difficult. It is, therefore, an object of this invention to provide a lever control which is so constructed and arranged that the driven lever is automatically locked in any adjusted position thereof so that it cannot creep or get out of adjustment. The control or driving lever may be optionally placed under a relatively light friction for ho'ding it in adjusted position, and when the driving lever is moved in either direction, the locking means for the driven lever will be automatically released so that the driven lever will freely move with the driving lever.

Another object of this invention is to provide a se'f-locking lever assembly of this kind which is very compact and will not get out of order under vibration.

Another object of this invention is to provide an improved self-locking lever assembly which includes a self-locking clutch formed of spring-pressed wedging elements which are here shown as locking rollers which are released by means of a circumferentia'ly arranged series of releasing lugs or fingers which are fixedly carried by the hub of the driving lever.

A further object of this invention is to provide in a lever assembly, adjustable means on the driven lever so that the driving lever will have initial movement without movement of the driven lever, this movement constituting the releasing cycle wherein the wedging or locking means for the driven lever are first moved to released position, and upon further movement of the driving lever the driven lever will move therewith. This adjustment is such that there is no appreciable movement between the two levers during the releasing cycle.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claim.

In the drawings,

Figure 1 is a detail front elevation of a self-locking lever assembly constructed according to an embodiment of this invention,

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Figure 2 is a fragmentary vertical section taken transversely through the assembly,

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a fragmentary front elevation of the inner portion of the driving lever,

Figure 5 is a detail front elevation of the driven lever removed from the assembly,

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 3,

Figure 7 is a fragmentary plan view of the top of the frame,

Figure 8 is a fragmentary sectional view taken on the line 8—8 of Figure 2.

Referring to the drawings, the numeral 10 designates generally a frame structure embodying a rear plate 11, a front plate 12 and spacer sleeves 13, disposed between the front and rear plates and secured therebetween by fastening members 14. The two plates 11 and 12 include upper longitudinal arcuate bars 15 and 16 respectively, which are formed integral with upwardly divergent bars 17 and 18 respectively.

The lower or inner ends of the bars 17 and 18 are formed integral with lower plates 19 and 20 respectively. A stationary tubular pivot member 21, formed with a rear annular flange 22, seating in an annular seat 23 extends through the plate 19 in the direction of the plate 20, extending through the central opening 24 formed in the plate 20. The forward end of the pivot member 21 is formed with a plurality of slots 25, the purpose for which will be hereinafter described.

A disc or plate 26 is formed integral with the pivot member 21, being disposed at a point between the ends thereof, as shown in Figure 2. A driving lever generally designated as 27 is loosely mounted on the pivot member 21 and includes an elongated lever 28 formed with an annular hub 29 loosely engaging about the pivot member 21. A driven lever generally designated as 30 is loosely mounted on the pivot member 21 on one side of the lever 27 and includes an annular hub 31 having a lever arm 32 extending therefrom, and adapted to be connected to the desired part of an operated member in the conventional manner, by means of cables, rods or the like.

The annular hub 31 is rotatably mounted on the pivot member 21 and is formed in the bore thereof with a plurality of circumferentially spaced apart cam offsets 33. The hub 29 of the driving lever 27 has extending forwardly therefrom, a plurality of circumferentially spaced apart releasing fingers 34 and 35. A lug 36 is

disposed between the pairs of releasing fingers 34 and 35, being spaced therefrom so that centralizing anti-friction elements 37 may be interposed in the spaces between the lugs 36 and the fingers 34 and 35 in order to hold the annular hub 31 concentric to the pivot member 21.

The anti-friction members 37 are interposed between the pivot member 21 and the bore 38 of the driving lever hub 31. The driving lever 30 is automatically locked in any adjusted position thereof to the stationary pivot 21 by means of pairs of wedging elements 39, between which a spring 40 engages. The rollers 39 are adapted to engage in the cam recesses 33 so that the driven lever hub 31 will be automatically locked against rotation in either direction. The releasing fingers 34 and 35 are disposed closely adjacent the wedging elements 39 so that rotation of the hub 29 in either direction will effect movement of one wedging element 39 of each pair to released position after slight lost motion of driven lever 27 so that after the locked wedging elements 39 are released, the driven lever 30 may move as will be hereinafter described, with movement of the driving lever 27.

In order to provide for movement of the driven lever 30 with the driving lever 27, the hub 31 of the driven lever has extending upwardly therefrom a pair of ears 41. A pin or abutment 42 is fixedly carried by the lower end portion of the lever 28, engaging between the ears 41. A pair of opposed set screws 43 are threaded through the ears 41 and are spaced from the pin or abutment 42 a distance sufficient that the driving lever 27 will have an initial lost motion relative to the driven lever 30 during which lost motion period the releasing fingers are operative to move one member of each pair of wedging rollers 39 to released position, after which one of the set screws 43 will strike the pin or abutment 42 and further movement of the driving lever 27 wil be accompanied by similar movement of the driven lever 30. The arrangement of the pin 42 on lever 27 and the ears 41 on hub 31 may be reversed if desired.

The pivot 21 is locked against rotation relative to the frame by means of a ring 44 disposed about the forward slotted end portion of the pivot 21. The ring 44 is formed with a split projection 45 which is provided with a pair of key members 46 engaging in one of the slots 25. The projection 45 is also slotted as indicated at 47, so that a flattened spacer sleeve 48 may engage in the slot 47 and thereby lock the ring 44 against rotation.

A resilient spider 49 which is mounted on a tensioning bolt 50 extending through the wall 26, has the radial arms thereof engaging through the slots 25 of the pivot 21 and the outer end portions of the arms 51 bear against the outer side of the key ring 44 so as to constantly urge this ring into face abutting relation to the outer side of an interposed friction ring 56.

A spider tensioning nut 52 is threaded on the outer end of the bolt 50 so that the spider 49 can be tensioned to the desired degree. A bearing ring 53 is interposed between the key ring 44 and the outer side of the hub 31 of the driven lever 30, and a second bearing ring 54 is disposed on the rear side of the hub 29 of the driving lever and is interposed between the hub 29 and a spacer ring 55.

In the use and operation of this invention, the driven lever 30 has the arm 32 connected in the conventional manner to the throttle of an airplane engine. The wedging elements 39 will automatically lock the lever 30 against swinging movement in either direction.

In order to provide for adjustment of the driven lever 30, the driving lever 27 is rocked in one direction and as an example, when driving lever as viewed in Figure 3, is rocked in a clockwise direction, releasing fingers 35 will bear against the adjacent wedging elements 39 and in the initial lost motion of lever 27 with respect to lever 30 releasing fingers 35 will move the adjacent wedging elements 39 to released position. After rollers 39, associated with releasing fingers 35 are released, further clockwise movement of lever 27 will provide for similar movement of lever 30. When lever 27 is swung clockwise to the desired position, this lever may be released whereupon springs 40 will automatically move wedging elements 39 confronting releasing fingers 35 to their locking position in the shallow ends of the cam recesses 33. Driven lever 30 is thereby automatically locked until driving lever 27 is again rocked in either clockwise or counterclockwise direction.

I do not mean to confine myself to the exact details of construction disclosed herein, but claim all variations falling within the purview of the appended claim.

What I claim is:

A lever control comprising a frame, a shaft fixed relative to said frame, a driving member formed with a hub rotatably engageable over said shaft, a driven member, a hub on said driven member formed with a central opening having peripherally spaced apart inwardly opening cam recesses, peripherally spaced apart bearing lugs on the hub of said driving member, the hub of said driven member engaging about the bearing lugs of said driving member, wedging elements between the lugs of said driving and driven members disposed in said cam recesses, releasing fingers on said driving member between the hubs of said driving and driven members engageable with the wedging elements for moving the latter to release position, a pair of confronting screws carried by one of said members, an abutment member carried by the other of said members positioned between said screws for engagement thereby whereby said driving member may have initial lost motion relative to said driven member, the initial lost motion of said driving member constituting the release cycle during which said release fingers are effective.

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