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Adams

[11] 3,841,768

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[54] **UNIVERSAL LOCK DEVICE FOR RIGHT HAND OR LEFT HAND APPLICATIONS**

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[52] U.S. Cl. **403/3,** 403/91, 403/99, 403/102, 403/118, 403/161

[51] **Int. Cl.** **F16c 11/10**

[58] **Field of Search** 403/3, 4, 69, 91, 99, 102, 403/118, 161, 162, 163, 43, 44, 46; 292/263, 276

[56] **References Cited**

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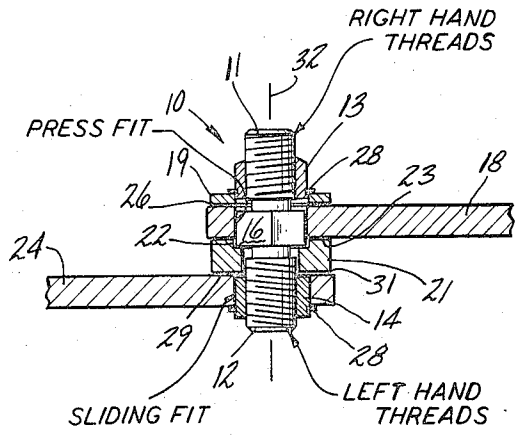
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Primary Examiner—Jordan Franklin
Assistant Examiner—Conrad L. Berman
Attorney, Agent, or Firm—Robert H. Bachman

[57] **ABSTRACT**

A lock device for a pair of members relatively movable about a common axis settable to lock or temporarily bind in a fixed relative position and reversible to lock in right hand or left hand applications.

5 Claims, 6 Drawing Figures



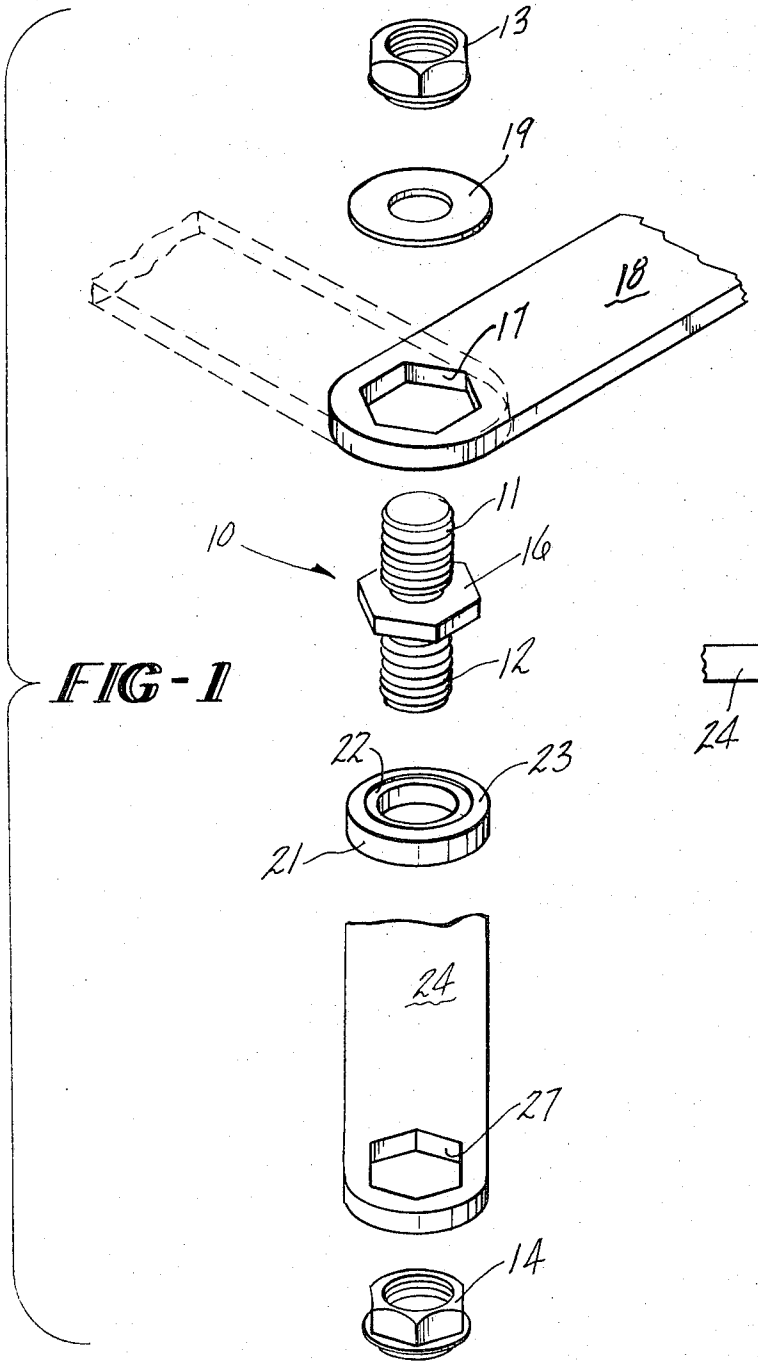


FIG-1

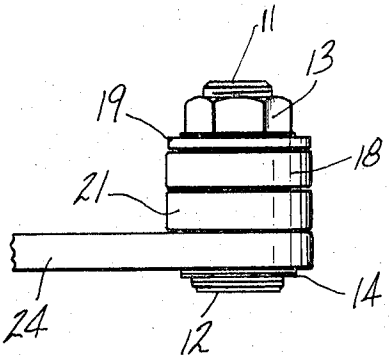


FIG-2

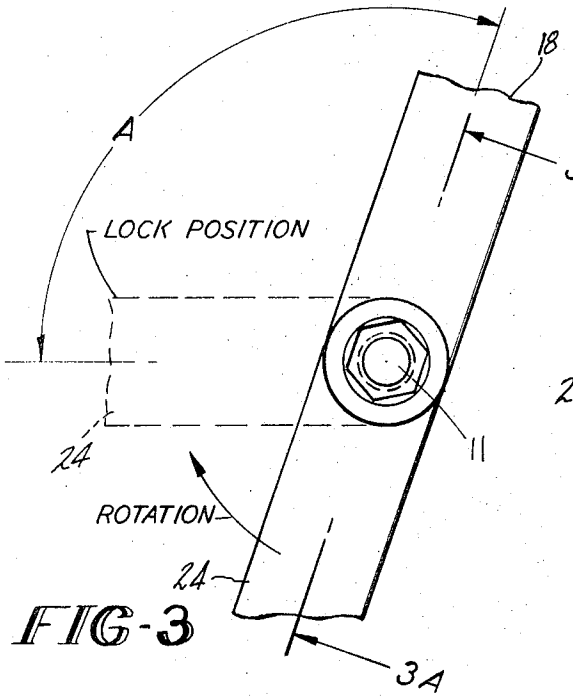


FIG-3

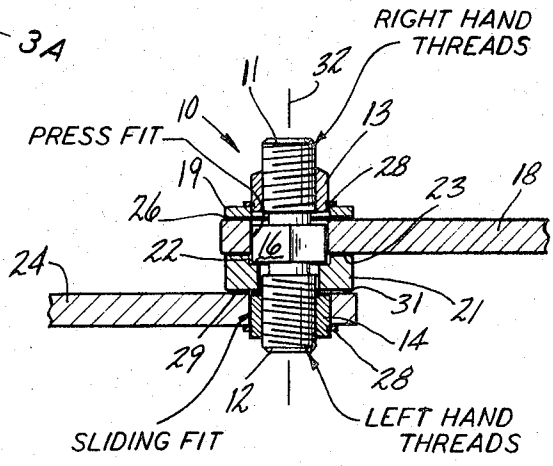


FIG-3A

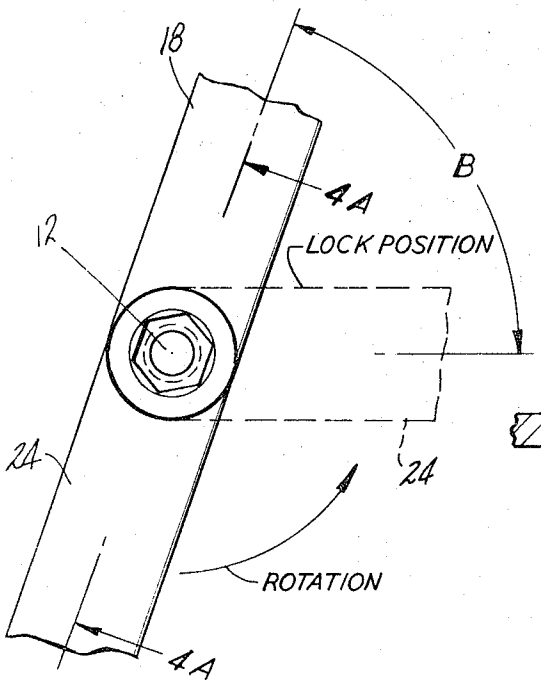


FIG-4

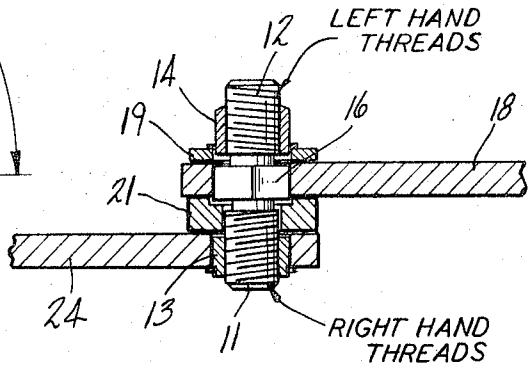


FIG-4A

UNIVERSAL LOCK DEVICE FOR RIGHT HAND OR LEFT HAND APPLICATIONS

BACKGROUND OF THE INVENTION

The present invention is based upon the well known principle of the lock or jam nut in which a first nut in threaded engagement with a mating bolt is temporarily bound or locked in a fixed position by positioning a second nut in close frictional engagement with the first nut whereby both nuts are precluded from backing off the bolt.

A particular feature of the present invention is the provision of a lock or binding device for a pair of relatively movable arms where the first arm is movable relative to the second arm in a predetermined direction and the device is settable so that a temporary lock action occurs at a predetermined radial or arcuate disposition of the arms.

The device is reversible by inverting or exchanging several of its integral members so that a lock or temporary binding action may be achieved when the arms are moved relative to one another in a direction opposite to said predetermined direction.

Stated otherwise, the lock device of the present invention is useful in right hand or left hand applications by the inversion of elements thereof.

A further feature of the invention is the provision of a right hand or left hand lock device useful in either hand without adding or removing piece parts making up the total lock device assembly.

A further feature of the invention is the provision of a right hand-left hand temporary binding device which lends itself to large scale mass production in that all piece parts of the device are fabricated in accordance with one set of specifications or manufacturing drawings.

Obviously, such a design precludes the necessity to stock right hand and left hand parts and eliminates bothersome inventory problems encountered in prior art devices where piece parts for right hand and left hand assemblies must be kept separate and appropriately labelled or marked.

SUMMARY OF THE INVENTION

A lock or temporary binding device embracing certain principles of the present invention may include a pair of relatively movable arms, a double-ended stud received by both arms defining a common axis about which both arms rotate, one end of said stud being formed with right hand threads and the opposite end being formed with left hand threads, cooperating single retainer nuts each in threaded engagement with a mating end of said stud to retain the arms as an assembly, said stud being received in a first arm with a pressed fit, a first retainer nut in threaded engagement with its mating stud end and settable to a fixed position relative to said first arm effective to exert a tensile stress on said stud tending to withdraw the stud from the first arm, a second retainer stud being slidably received in and keyed to the second arm, said second arm being rotatable relative to the first arm about said common axis in a predetermined direction until said arms temporarily bind while subtending a predetermined included angle and precluding further rotation in said predetermined direction, said arms retaining relative mobility in a direction opposite to said predetermined direction effective to release said arms.

Other features and advantages of the present invention will become more apparent from examination of the succeeding specification and claims when read in conjunction with the appended drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is an exploded view of a lock device illustrating the principles of the invention.

FIG. 2 shows the elements of FIG. 1 as an assembly.

FIG. 3 is a plan view of a lock device with the elements thereof disposed for a right hand application in which one arm is movable relative to the other arm in a clockwise direction to a jamming position indicated in dotted lines.

FIG. 3A is a sectional view of FIG. 3 as viewed in the plane represented by the line 3A—3A.

FIG. 4 shows the same elements arranged for a left hand application in which one arm is movable relative to the other in a counterclockwise direction to a binding position shown in dotted lines.

FIG. 4A is a sectional view of FIG. 4 as viewed in the plane represented by line 4A—4A showing the inverted position of certain elements necessary to convert from right hand to left hand application.

Referring now to the drawings, a stud indicated generally by the reference numeral **10** has one end **11** formed with right hand threads and an opposite end **12** formed with left hand threads. End **11** has a mating retainer nut **13** and end **12** has a mating retainer nut **14.** A central position of the stud **10** is formed with a lug **16** which is received in a pressed fit in an appropriately machined opening **17** formed in arm **18.** A friction washer **19** encircles the stud **10** and is sandwiched between arm **18** and retainer nut **13.** A spacer washer **21** having a counter bore **22** and a bearing surface **23** encircles the stud **10** and operates to space arm **18** from arm **24.** Bearing surface **23** is in sliding contact with the underside of arm **18** and counter bore **23** provides clearance for the lug **16.** Correspondingly, the underside of spacer **21** is in sliding contact with the top surface of arm **24.**

Referring now to FIGS. **3** and **3A**, the disposition of piece parts necessary to produce clockwise relative motion or to produce an assembly having a right hand application will be described.

Stud **10** is shown disposed vertically with lug **16** received in a pressed fit in arm **18** with end **11,** formed with right hand threads, projecting upwardly and end **12,** formed with left hand threads, projecting downwardly. Mating retainer nut **13** is wound tightly against washer **19** in turn bearing against the upper surface **26** of arm **18.** Sufficient torque is applied in setting retainer nut **13** so that it places the stud **10** under a tensile stress tending to withdraw lug **16** from its pressed fit with arm **18.**

Arm **24** is formed with a hexagonal aperture **27** providing a sliding fit for retaining nut **14** while retaining a keying action between the retainer nut and the arm.

Note that retainer nut **14,** (as well as retainer nut **13**), is formed with a collar **28** to retain arm **24,** preventing it from sliding free from its driving connection with arm **24.** Spacer washer **21** encircles lug **10** and separates arms **18** and **24** as is most apparent in FIG. **2.**

As stated previously, counter bore 22 is provided to afford clearance for lug 16; thus, arm 18 bears upon and rotates on bearing surface 23 of collar 21; correspondingly, bearing surface 29 engages mating surface 31 of arm 24.

The operation of the assembly of FIGS. 3 and 3A occurs as follows: holding arm 18, fixed arm 24, driving nut 14 is rotated clockwise relative to arm 18 causing arm 24 to move axially towards arm 18 along their common axis 32 as nut 14 traverses the left hand threads on mating end 12 until ultimately arm 24 locks or binds in the dotted line position shown in FIG. 3 precluding further relative rotation in a clockwise direction.

At this point, i.e., in the lock or binding position arms 24 and 18 subtend a given included angle A.

The lock position can be broken by holding arm 18 fixed and merely reversing the rotation of arm 24.

When it is desired to change the value of included angle A, i.e., change the lock or binding position of arm 24 relative to arm 18, it is simply necessary to change the setting of retainer nut 13. For example, if an angle larger than angle A is required or desired, nut 13 is tightened or set up relative to arm 18 in a direction which places additional tensile stress on stud 10 of sufficient magnitude to move lug 16 a slight increment further into arm 18 with the result that the binding or lock position is reached earlier, and the subtended angle between the arms 18 and 24 is larger than the angle A.

Correspondingly, if it is desired to achieve a lock or binding position with a subtended angle smaller than angle A, the retainer nut 13 is backed off incrementally so that the lock position is reached later creating a subtended angle between the arms 18 and 24 less than angle A.

Obviously, the setting of retainer nut 13 is adjusted when arms 18 and 24 are in an unlocked or free relationship.

FIGS. 4 and 4A show the disposition of the assembly when the jamming device is operable in the counter clockwise or left hand application.

To change the device from right hand operation of FIG. 3A to left hand operation of FIG. 4A, the unit is assembled in the fashion illustrated in FIG. 1 but arm 18 is inverted, the position of retainer nuts 13 and 14 are exchanged and the device reassembled into the arrangement shown in FIG. 4A.

In the arrangement of FIG. 4A, the left hand application retainer nut 14 is set up against arm 18 and after holding arm 18 fixed rotation of arm 24 in a counter clockwise direction will bring about a lock position between the two arms as represented by the included angle B of FIG. 4.

Here again, when it is desired to achieve a lock or binding position with a larger or smaller subtended angle than the angle B, the retainer nut 14 is set up against arm 18 moving lug 16 incrementally into the arm 18 or the nut 14 is backed off incrementally allowing the lug 16 to pull out of the arm 18.

It is anticipated that a wide variety of modifications and utility applications may be devised with respect to the present invention without departing from the spirit and scope thereof.

A typical application for the lock device of this disclosure is in hold-open devices for doors, windows and similar pivoting closures.

Obviously, there are many other applications where it is desired to move pivoting members relative to one another in right hand or left hand fashion to achieve a lock or binding position between the members at predetermined included angles, and this invention provides a basic initiatory assembly useful universally and selectively in right and left hand applications.

What is claimed is:

1. A binding or lock device for limiting relative motion of two members movable about a common axis comprising a pair of relatively movable arms, a double ended stud received by both arms defining the common axis, one end of said stud being formed with right hand threads and the opposite end being formed with left hand threads, a pair of cooperating retainer nuts each in threaded engagement with a mating end of said stud to retain said arms as an assembly, said stud being received in a first arm with a pressed fit, a first retainer nut in threaded engagement with its mating end and settable to a fixed position relative to said first arm effective to exert a tensile stress on said stud tending to withdraw said stud from the first arm, the second retainer nut being slidably received in and keyed to the second arm, said second arm being rotated relative to the first arm about said common axis in a predetermined direction until said arms lock or bind temporarily precluding further rotation in said predetermined direction, said arms retaining relative mobility in a direction opposite to said predetermined direction effective to release said arms.

2. The binding device of claim 1 in which the first arm carrying the stud is inverted and the mating nuts are correspondingly inverted relative to the second arm whereby said arms bind temporarily by rotating said second arm relative to the first arm in a direction opposite to said predetermined direction.

3. The binding device of claim 1 in which a bearing washer is disposed between said first arm and the first retainer nut.

4. The binding device of claim 1 in which a spacer washer encircles said stud and is disposed between said arms.

5. The binding device of claim 1 in which a spacer washer having a counter bore encircles said stud and is disposed between said arms with the counter bore facing said first arm.

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