Nov. 22, 1960 A. C. BRUNO 2,960,741

CLEVIS PIN WITH DOUBLE ACTING LOCKING OPERATING MEANS

Filed March 28, 1958

FIG. 1.

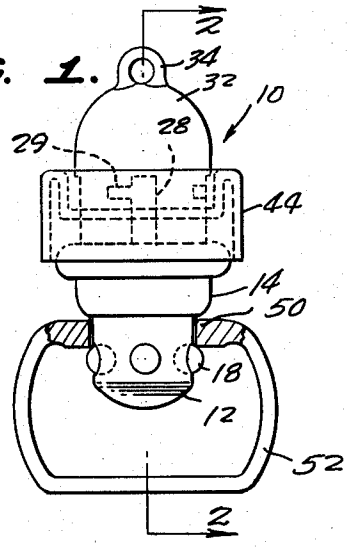



FIG. 2.

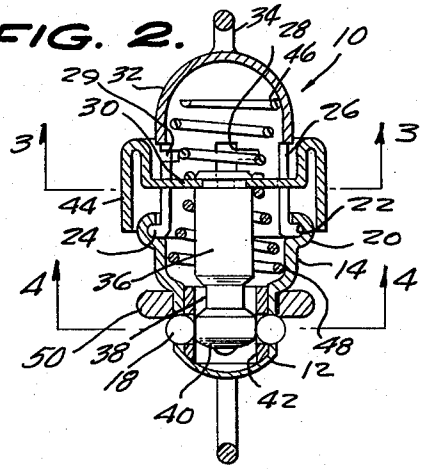



FIG. 4.

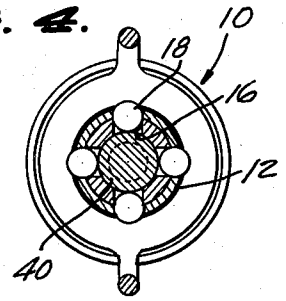



FIG. 5.

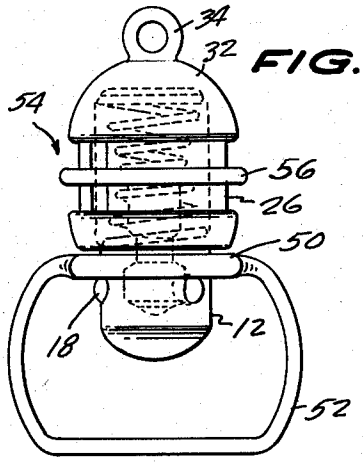



FIG. 3.

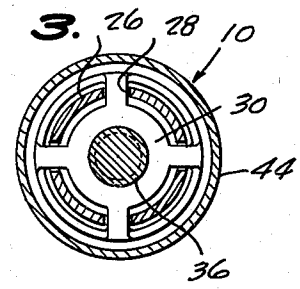
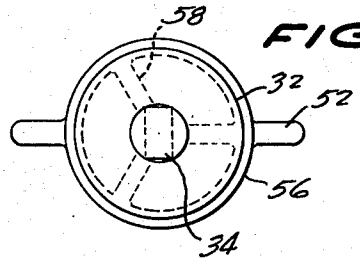



FIG. 6.




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United States Patent Office 2,960,741 Patented Nov. 22, 1960



2,960,741

# CLEVIS PIN WITH DOUBLE ACTING LOCKING OPERATING MEANS

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Filed Mar. 28, 1958, Ser. No. 724,681

2 Claims. (Cl. 24—211)

The present invention relates to a clevis pin of the ball detent type.

An object of the present invention is to provide a clevis pin which lends itself to ease of operation while inserting into or removing from a clevis.

Another object of the present invention is to provide a clevis pin which lends itself to one hand operation while inserting into or removing from a clevis and one which is manually actuable by either the application of a pulling force or the application of a pushing force relative to the clevis into which it is to be inserted or from which it is to be removed.

A further object of the present invention is to provide a clevis pin of simple structure, one sturdy in construction, and one economically feasible.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawing, in which:

Figure 1 is a view of the clevis pin of the present invention, shown inserted into a clevis with a portion of the clevis shown in section;

Figure 2 is a view taken on the line 2—2 of Figure 1;

Figure 3 is a view taken on the line 3—3 of Figure 2;

Figure 4 is a view taken on the line 4—4 of Figure 2;

Figure 5 is a view of a modified form of the clevis pin of the present invention, shown inserted into a clevis; and

Figure 6 is an end view of the clevis pin shown in Figure 5.

Referring in greater detail to the drawing in which like numerals indicate like parts throughout the several views, the clevis pin, according to the present invention, is designated generally by the reference numeral **10** in Figures 1 to 4 and is of the following construction. A cup-shaped element **12** has a rim extending about and projecting outwardly from the open top of the element **12**, the rim being designated by the reference numeral **14**.

A circular aperture, four in number as shown in Figure 4, extends through the wall of the cup-shaped element **12** intermediate the bottom and the open top thereof, such aperture being designated by the reference numeral **16**. A ball **18** is positioned in each aperture and is of a diameter greater than the aperture. Normally, as shown in Figure 4, a peripheral portion of each ball **18** projects through and out of the associated aperture **16**.

The portion **20** of the rim **14** remote from the cup-shaped element **12** is outwardly turned so as to provide an annular groove **22** receiving therein an outwardly turned bead **24** on one end of a sleeve **26** which extends about the rim **14**, the bead **24** being fixedly secured to the rim **14** in the groove **22**.

The sleeve **26** is provided with a plurality of longitudinally extending slots **28** through which project the legs of a spider **30** which has its central portion within the sleeve **26** and transversely of the sleeve **26**.

A coupling head **32**, of cup-shape formation, carries on its bottom an eye formation **34** for attachment thereto



of a flexible element (not shown). The rim of the coupling head **32** is formed integrally with and fixedly secured to the end of the sleeve **26** remote from the cup-shaped element **12**.

A plunger **36** extends axially of the cup-shaped element **12**, the rim **14**, and the sleeve **26**, and has one end in engagement with the balls **18**. A groove **38** extends about the portion of the plunger **36** inwardly of the end which engages the balls **18** so as to form a camming portion **40** on the adjacent end of the plunger **36**. A bearing sleeve **42** fits within the cup-shaped element **12** and forms a surface against which the camming portion **40** of the plunger **36** slides upon reciprocatory movement of the plunger **36**. The plunger **36** may be moved to a position in which the balls **18** enter either the groove **38** or enter the inner ends of their respective apertures **16** exteriorly of the camming portion **40**.

Hand actuable means is positioned exteriorly of the spider **30** and is operatively connected thereto for effecting the movement of the plunger **36**. The portion of the plunger **36** remote from the camming portion **40** is provided with an annular groove in which is seated the inner periphery of the spider **30**, fixedly securing the spider **30** to the plunger **36**. This hand actuable means consists in a ring **44** formed integrally with the free ends of the legs of the spider **30** and circumposed about the sleeve **26** and spaced therefrom, as shown most clearly in Figure 2. The spider **30**, with its legs movable in the slots **28** in the sleeve **26**, constitutes means connecting the plunger **36** to the sleeve **26** for reciprocatory movement.

Spring means is operatively connected to the plunger **36** and to the spider **30** for biasing the plunger **36** to the position in which the camming portion at the one end of the plunger **36** is in engagement with the balls **18**. Specifically, this spring means consists in a pair of helically-coiled springs **46** and **48**, each conical in shape, the larger end of the spring **46** being seated in the bottom of the coupling head **32** and the smaller end of the spring **46** bearing against the central portion of the spider **30**. Similarly, the larger end of the spring **48** is seated in the interior of the rim **14** and the smaller end of the spring **48** bears against the opposite side of the central portion of the spider **30**. The springs **46** and **48** are balanced so that the camming portion **40** of the plunger **36** is normally in engagement with the balls **18** and holds them in their positions in which their peripheral portions are exteriorly of the outside surface of the cup-shaped element **12**. In this position, the balls **18** bear against one side of a clevis ring **50** into which the cup-shaped element **12** is insertable and from which the said element is withdrawable when the plunger **36** is moved to the position in which the camming portion **40** is one side or the other side of the balls **18**. The clevis ring **50** has a bail **52** fixedly secured and formed integrally therewith for attachment to a connected element.

Each slot **28** is provided in one wall with a transverse opening **29** (Figure 1) receiving the adjacent leg of the spider **30** when the ring **44** has been manually shifted to the position in which the camming portion on the one end of the plunger **36** is out of engagement with the balls **18** and ring **44** manually rotated a portion of a revolution. The provision of the openings **29** serves as a means of releasably locking the plunger **36** in the out of engagement position.

In Figures 5 and 6, a modified form of the clevis pin is shown and designated by the reference numeral **54**. All of the components previously described with reference to the clevis pin **10** are present in the clevis pin **54** with the exception of the ring **44** for which is substituted a narrower ring **56** mounted upon and formed integrally with the legs **58**, shown in dotted lines in Figure 6, of the associated spider which is carried on the plunger

within the sleeve **26**, and having the same camming portion at one end thereof bearing against the balls **18** which project partially through the apertures provided in the cup-shaped element **12**.

In use, the bail **52** is fixedly secured to an article to which is to be connected the clevis pin **10**, **54**, of the present invention. The cup-shaped element **12** is insertable into the clevis ring **50** after the ring **44**, **56**, has been shifted longitudinally upon the sleeve **26** to the position in which the camming portion **40** of the plunger **36** is out of engagement with the balls **18** and the balls **18** are permitted to be forced into their apertures in the position in which their peripheral portions no long project from the periphery of the cup-shaped element **12**. The rings **44**, **56** may be moved in either direction on the associated sleeve **26** to effect this movement of the plunger **36**. This permits one-hand operation of the plunger **36** with the application of either a pulling force thereto or the application of a pushing force thereto.

What is claimed is:

1. In a clevis pin construction, a cup-shaped element provided with a circular aperture in the wall thereof intermediate the bottom and the open top, a ball of a diameter greater than said aperture positioned within said cup-shaped element and having a peripheral portion projecting through and out of said aperture, a rim extending about the open top of said element, a sleeve extending about said rim and having one end fixedly secured to said rim, a coupling head fixedly secured to the other end of said sleeve, a plunger extending axially of said cup element, said rim, and said sleeve and having one end in engagement with said ball, means connecting the other end of said plunger to said sleeve for reciprocating movement of said plunger relative to said sleeve, said means supporting a spider fixed to the other end of said plunger and movably supported in slots formed in said sleeve, hand actuable means exteriorly of and operatively connected to said means for effecting the movement of said plunger, and spring means operatively connected to said plunger and said first-named means for biasing said plunger one end into engagement with said ball.



2. In a clevis pin construction, a cup-shaped element provided with a circular aperture in the wall thereof intermediate the bottom and the open top, a ball of a diameter greater than said aperture positioned within said cup-shaped element and having a peripheral portion projecting through and out of said aperture, a rim extending about the open top of said element, a sleeve extending about said rim and having one end fixedly secured to said rim, a coupling head fixedly secured to the other end of said sleeve, a plunger extending axially of said cup element, said rim, and said sleeve and having one end in engagement with said ball, means connecting the other end of said plunger to said sleeve for reciprocating movement of said plunger relative to said sleeve, said means embodying a spider fixed to the other end of said plunger and movably supported in slots formed in said sleeve, and hand actuable means exteriorly of and operatively connected to said means for effecting the movement of said plunger, said hand actuable means including a ring exteriorly of said sleeve and connected to said spider for movement with the latter.

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