

[54] **LOCK AND RELEASE FOR STRAP CONNECTOR**

[75] Inventor: **John A. Gaylord**, Greenbrae, Calif.
[73] Assignee: **H. Koch & Sons, Inc.**, Corte Madera, Calif.
[22] Filed: **Feb. 22, 1972**
[21] Appl. No.: **228,148**

[52] U.S. Cl. **24/230 A, 244/151 A**
[51] Int. Cl. **A44b 19/00**
[58] Field of Search **244/151 A, 151 B, 244/151 R, 294/83 A, 83 AB, 83 AE, 24/73 PH, 201 LP, 201 D, 230 LP, 230 NP, 230 AL, 230 AM, 230 AV, 230 AP, 230 R, 230 AS, 230 AT, 230 AK, 230 AN, 230 A**

[56] **References Cited**

UNITED STATES PATENTS

2,845,676	8/1958	Huber	24/201 D
3,183,568	5/1965	Gaylord	24/230 A
3,624,674	11/1971	Gaylord	24/230 AV

FOREIGN PATENTS OR APPLICATIONS

1,419,811	10/1965	France	24/230 A
-----------	---------	--------------	----------

Primary Examiner—Donald A. Griffin
Attorney—George B. White

[57] **ABSTRACT**

This lock and release is for the rocking shaft of the type of strap connector used on parachutes, for instance, of the type shown in U.S. Pat. No. 3,183,568, wherein a rocking shaft has a cut away portion to permit the insertion of the prongs of the male connector and then it is turned into a notch in the prongs of the male connector for locking the male connector in the female connector. The rocking shaft is locked in place by a lever at a reduced end thereof and a gas actuator valve and plunger pushes a spring pressed bolt out of a keeper to free the lever and the rocking shaft for rotation and substantially simultaneously with the freeing to admit the gas pressure into a cylinder to move a piston against the action of a spring, which piston is connected to said lever to rock the lever and the rocking shaft into prong releasing position. The coil spring in the cylinder automatically returns the piston into its initial position and thereby rocks the lever and the shaft into locking position whereupon the spring pressed bolt pushes the plunger and the valve back into the initial locking position.

6 Claims, 6 Drawing Figures

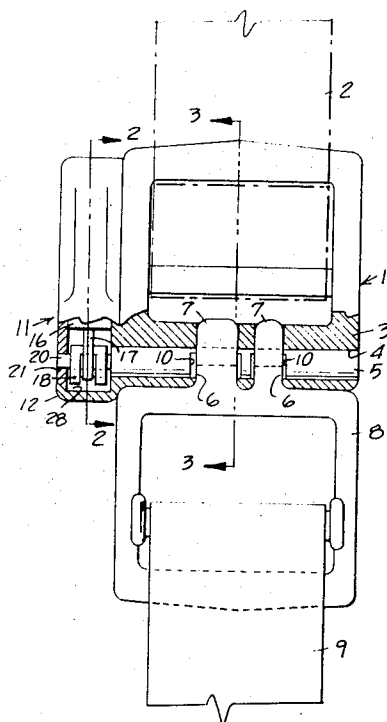


FIG. 3.

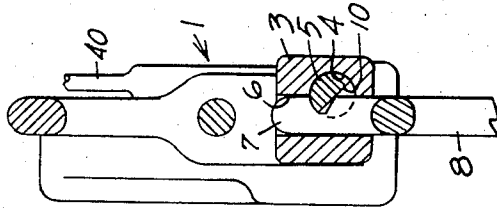


FIG. 1.

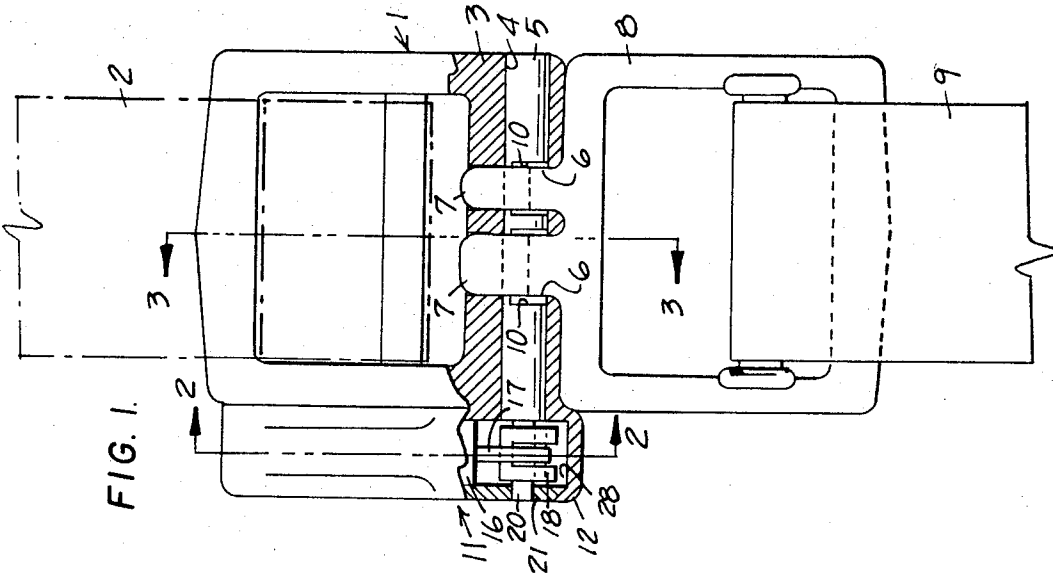
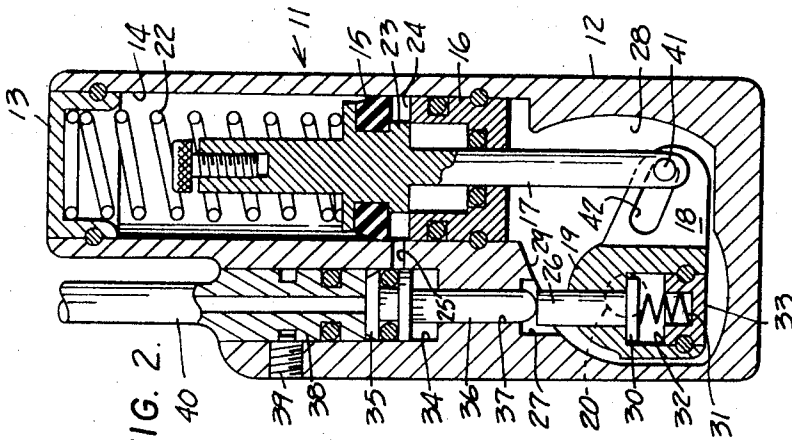
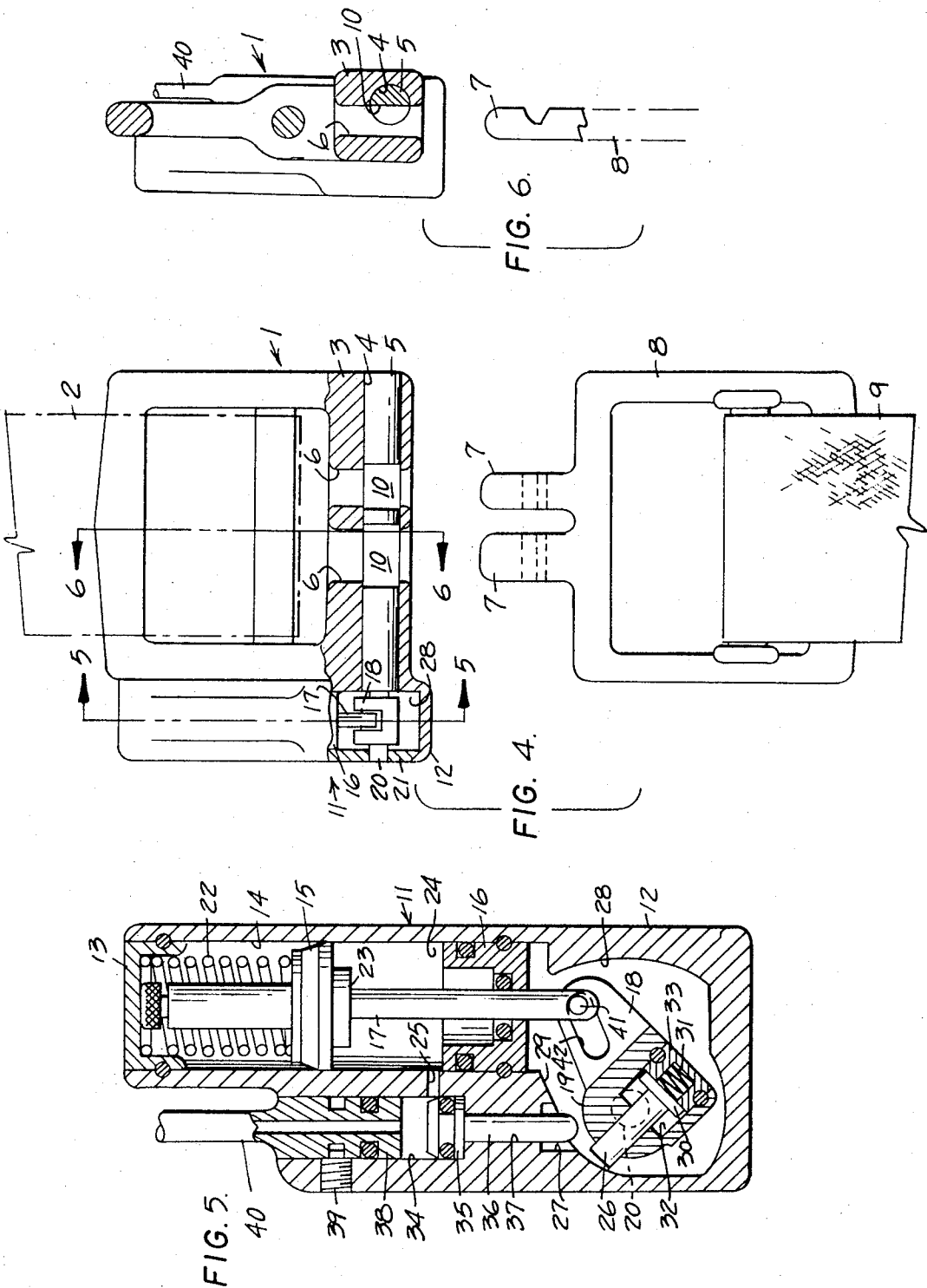


FIG. 2.





LOCK AND RELEASE FOR STRAP CONNECTOR

BACKGROUND OF THE INVENTION

The positive locking of strap connectors on a parachute and instantaneous and foolproof release are extremely important and several types of lock and release devices have been used previously. The primary object of the present invention is to provide positive locking of a gas pressure actuated lock and release wherein the rocking shaft is positively locked against oscillation until and unless actuating gas or air under pressure is applied for releasing the strap connector.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a partly sectional front view showing the male connector engaged with the female connector to connect the respective straps.

FIG. 2 is a sectional view taken on lines 2—2 of FIG. 1.

FIG. 3 is a sectional view taken on lines 3—3 of FIG. 1.

FIG. 4 is a partly sectional view showing the male connector released from the female connector.

FIG. 5 is a sectional view taken on lines 5—5 of FIG. 4 showing the device in releasing position.

FIG. 6 is a sectional view taken on lines 6—6 showing the female connector in releasing attitude.

DETAILED DESCRIPTION

A female connector 1 is formed as a ring or loop to accommodate a strap 2. In the body 3 of the female connector 1 is a transverse hole 4 in which is journaled a rocking shaft 5. A pair of pockets 6 extend through the body 3 at right angles to and intersecting the hole 4 to receive the prongs 7 of male connector 8 to which is secured another strap 9. Portions of the rocking shaft 5 in registry with the pockets 6 are cut away diametrically so as to form recesses 10 as shown in FIGS. 3 and 6. By rocking the shaft from the position shown in FIG. 3 into the position shown in FIG. 6 the recesses 10 are in registry with the pockets 6 and permit the insertion or withdrawal of the prongs 7.

The improvement of the present application is the locking and releasing device 11 shown in detail in FIGS. 2 and 5. A hollow casing 12 is formed on one side of the female connector 1. A suitable cap 13 closes the cavity which forms a cylinder 14 in which works a piston 15. A plug 16 closes the inner end of the cylinder 14 and a rod 17 extends from the body of the piston 15 through the plug 16 and is connected to a lever 18. The hub 19 of the lever 18 is suitably keyed to a reduced end 20 of the rocking shaft 5. The reduced end 20 is journaled in the outer wall 21 of the casing 12. A coil spring 22 in the cylinder 14 bears against the cap 13 and the body of the piston 15 normally to urge the piston so as to turn the lever 18 into locking position shown in FIG. 2. The body of the piston 15 has a flange 23 which abuts against the plug 16 to produce a space 24 opposite an intake hole 25, so that when gas is admitted through the intake hole 25 into the space 24, the pressure pushes the piston 15 toward the cap 13, and the rod 17 pulls the lever 18 from the position shown in FIG. 2 into the position shown in FIG. 5 and turns the hub 19 so as to rock the shaft into the position shown in FIG. 6 for releasing the prongs 7 of the male connector 8.

The locking device in the hub 19 of the lever 18 includes a locking pin 26 which extends into a recess 27 in the top of an enlarged cavity 28 below the cylinder 14 which accommodates the lever 18 and the hub 19. The top of the cavity 28 above the hub 19 forms a curved wall 29 and the recess 27 is formed in the curved wall 29. The pin 26 is slideable through the hub 19 and has a limit flange 30 at its inner end which limits the projection of the pin 26 upwardly. A coil spring 31 in a pocket 32 in the hub 19 is normally urging the pin into the locking position shown in FIG. 2. For assembly purposes the bottom of the pocket 32 is closed by a suitable plug 33.

In the event there is a tendency for oscillation or rocking, the pin 26 would abut against the side of the recess 27 and would prevent the turning of the rocking shaft 5 into releasing position.

A valve cylinder 34 extends parallel with the cylinder 14 and the intake passage 25 connects the valve cylinder 34 with the cylinder space 24 below the valve 15. A sliding valve 35 works in the valve cylinder 34. A stem 36 extends from the sliding valve 35 through a hole 37 into the recess 27. The stem 36 is such relative length that when engaged by the pin 26 it presses the valve 35 against an intake plug 38 fixedly held in the top of the valve cylinder 34 by a suitable set screw 39. The intake plug 38 has a suitable conduit 40 for connection to a source of gas or air pressure.

The device operates as follows:

In the locking position shown in FIG. 2 the coil spring 22 presses the piston 15 downwardly. The lower end of the rod 17 is connected by a cross pin 41 extended through elongated slots 42 in the arms of the lever 18 and holds the lever in locking position. The locking pin 26, pressed by spring 31 engages the valve stem 36 and presses the valve 35 against the intake plug 38 and thereby covers the intake passage 25. The pin 26 prevents the rocking of the shaft 5 into releasing position. When gas under pressure is introduced through the conduit 40 and the opening through the intake plug 38 it forces the valve 35 downwardly against the bottom of the cylinder 34 and thereby uncovers the intake passage 25, simultaneously the stem 36 pushes the pin 26 out of the recess 27, thus as the air pressure entering into the space 24 moves the piston 15 against the action of the spring 22 the rod 17 pulls the lever 18 upwardly and the pressed pin is freed to slide along the curved wall 29 and the hub 19, being keyed to the reduced end 20 of the shaft 5, turns the shaft 5 into the releasing position shown in FIG. 6. After the gas pressure is relieved, the spring 22 pushes the piston 15 down to the initial position and turns the pin 26 into registry with the valve stem 36 so that the pin 26 returns the valve 35 to the initial position closing the intake passage 25.

I claim:

1. A lock and release device for locking and turning a rocking shaft in a female connector of a strap connector device, comprising,
 - a main cylinder on said female connector,
 - a piston working in the main cylinder,
 - transmission means to connect the piston to the rocking shaft to convert reciprocation of the piston into turning of the rocking shaft in respective opposite directions,
 - a valve cylinder adjacent said main cylinder connected to a source of a pressure medium,

3

means to communicate said valve cylinder with said main cylinder for transmitting said pressure medium from said valve cylinder into said main cylinder,

a valve in said valve cylinder, said valve in its initial position closing said communicating means, connecting means to connect said valve to said rocking shaft to obstruct turning of the rocking shaft in an initial position of said valve wherein said pressure medium transmitting means is inoperative, and to free said obstruction in valve opening position substantially simultaneously to admit pressure medium to said communicating means thereby to actuate said piston for turning said rocking shaft into connector releasing position.

2. The lock and release device for strap connectors specified in claim 1, and

said transmission means connecting the piston to the rocking shaft including,

a lever extended from said rocking shaft,

a piston rod extended from said piston and connected to said lever for rocking said shaft according to the reciprocation of said piston.

3. The lock and release device for strap connectors specified in claim 2, and

said obstructing connecting means including, a valve stem,

a resiliently yieldable obstruction element extended from said rocking shaft to said stem and being movable by said stem into a non-obstructing position when said valve is moved from said initial position to a position admitting pressure medium to said main cylinder.

4. The lock and release device for strap connectors specified in claim 2, and

said valve connecting means including,

a hub on said lever fixedly connected to said rocking shaft,

an obstruction element extended from said hub to said stem,

a body adjacent to said valve cylinder having a recess

4

therein to receive said obstructing element in its obstructing position, and resiliently yieldable means in said hub to normally urge said obstructing element into said recess, and to permit said obstructing element to be pushed by said valve stem out of said recess into non-obstructing position.

5. The lock and release device for strap connectors specified in claim 1, and

said main cylinder and said valve cylinder being parallel on the body of said female connector,

a hollow casing below said cylinders, and

said obstructing and valve connecting means being in said casing and being connected to said transmission means from said piston for substantially simultaneous actuation.

6. The lock and release device for strap connectors specified in claim 5, and

said casing having a recess in registry with said valve stem,

said transmission means including,

a lever connected to said rocking shaft,

a connecting rod connecting said piston to said lever for rocking said shaft according to the reciprocation of said piston,

said means to communicate said valve cylinder with said main cylinder being a valve passage normally covered by said valve in said valve cylinder,

said valve being moved in said valve cylinder by the pressure medium introduced into said valve cylinder toward said rocking shaft,

said lever having a hub secured on said rocking shaft, said obstructing valve connecting means, including an obstructing element movable in said hub,

resiliently yieldable means to normally urge said obstructing element into said recess thereby to obstruct rocking of the shaft and permit said stem to push said obstruction element out of said recess into non-obstructing position when said valve is moved away from said valve passage.

* * * * *

45

50

55

60

65