Feb. 12, 1963 B. E. KING ET AL 3,077,145

MISSILE TRANSFER COUPLING

Filed June 14, 1961 2 Sheets-Sheet 1

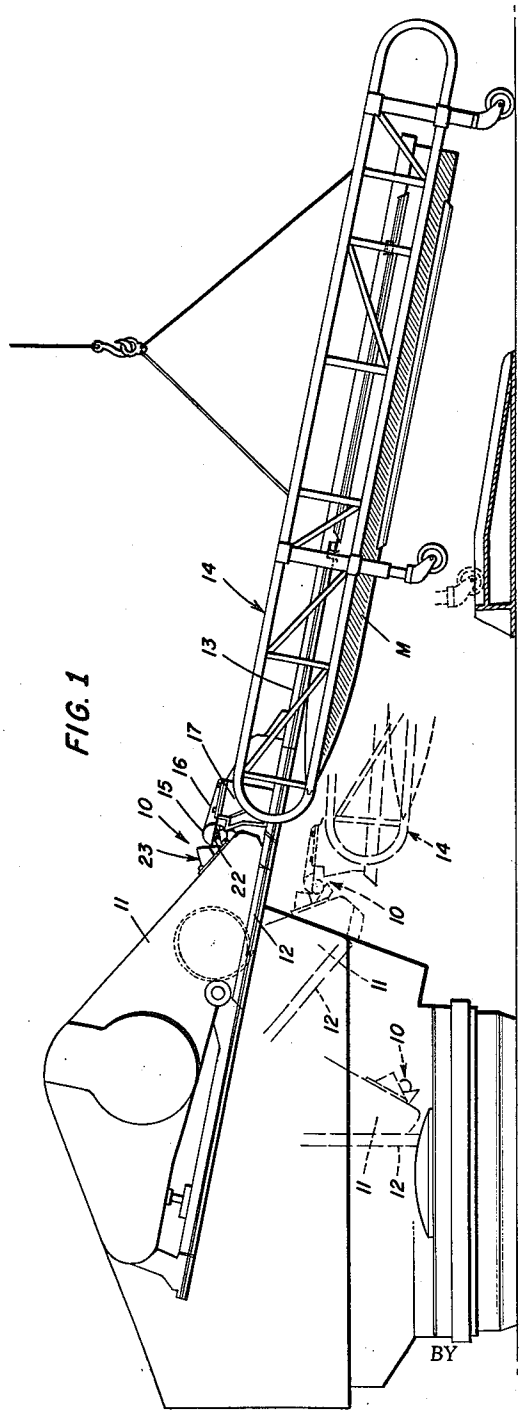


FIG. 1

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Filed June 14, 1961 2 Sheets-Sheet 2

FIG. 3

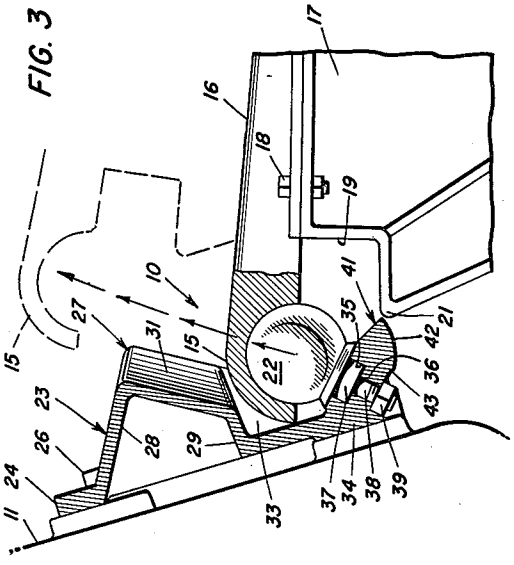


FIG. 5

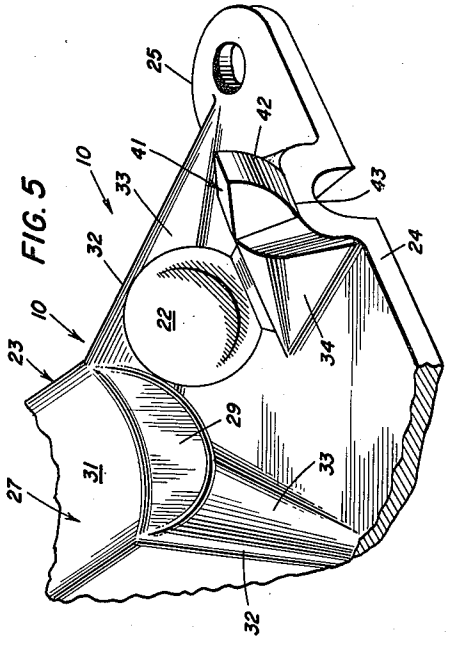


FIG. 2

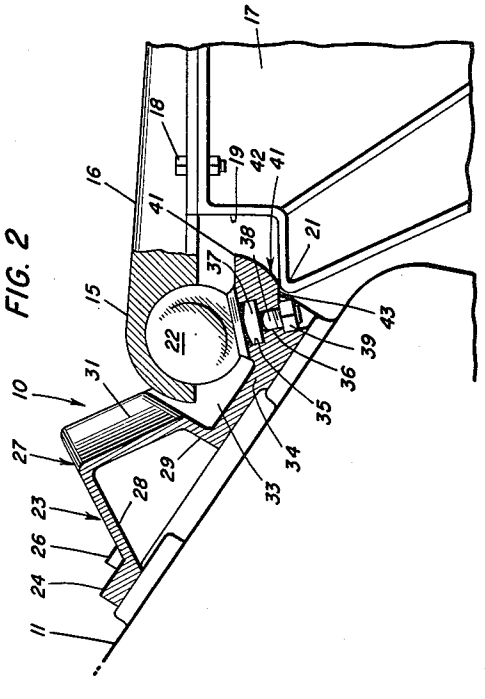
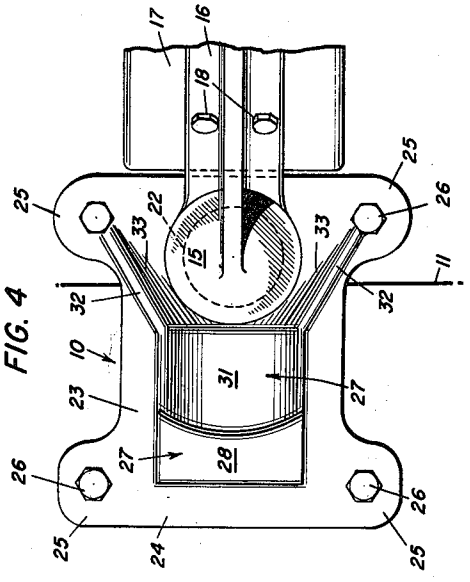


FIG. 4



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MISSILE TRANSFER COUPLING

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3 Claims. (Cl. 89—1.7)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to a coupling and more particularly to a new and improved quick detachable coupling, particularly adapted for use in connection with dollies and missile launchers.

The invention contemplates the provision of a coupling constructed and arranged to releasably couple a pair of devices together such that an object may be quickly transferred from one of the devices to the other device of the pair of devices. Moreover, the coupling provides suitable locking means for maintaining the coupling in a locked condition during a transfer operation. While the coupling of the present invention may be employed in connection with various devices it is particularly adapted for use in connection with missile transfer dollies and missile launching devices such, for example, as the type of dolly disclosed in copending application of George W. Gilbert, filed December 29, 1960, Serial No. 79,475 and the type of missile launcher disclosed in copending application of Sverre Kongelbeck, filed June 10, 1959, Serial No. 819,517.

During loading the missile into the launching system it is essential that the dolly is securely locked to the rotatable launching arm of the launcher so that the missile may be transferred from the dolly onto the launching arm of the launcher, the launching arm being subsequently released from the dolly so that the launching arm may be rotated from a missile transfer position to a missile storage position, whereupon the missiles may be moved into a conventional magazine below the deck of the ship by the rammer mechanism of the launcher. Moreover, during the missile transfer position it will be understood that when the coupling is in a locked condition the launching rail on the launching arm is maintained in alignment with the missile supporting rail carried by the dolly. Thus by this arrangement, the missile may be readily moved from the dolly onto the launching arm and subsequently stored in the magazine by movement of the launcher from a transfer position to a storage position.

It is an object of the present invention to provide a new and improved means for releasably connecting a pair of devices, machines or the like together during a transfer operation.

Another object of the invention is to provide a new and improved quick release hitch or coupling device.

A still further object of the invention is to provide a new and improved coupling wherein a socket member is releasably locked to a spherical member when the members are disposed at a predetermined angle.

An additional object of the invention is to provide a new and improved coupling having cam means for releasably locking and maintaining the coupling in a locked condition.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a view in elevation illustrating the coupling of the present invention and the manner in which the coupling detachably connects a missile transfer dolly to a rotatable launcher arm of a missile launcher, the launcher and dolly being shown schematically;

FIG. 2 is an enlarged fragmentary view of the arrangement of FIG. 1 illustrating the coupling or hitch in a coupled and locked condition;

FIG. 3 is a view similar to FIG. 1 illustrating the coupling in a released condition;

FIG. 4 is a view in plan of the device of FIG. 2; and

FIG. 5 is a fragmentary view in perspective of the coupling device.

Referring now to the drawings and more particularly to FIG. 1 thereof, there is illustrated a schematic view of a missile launcher and a transfer dolly connected together in accordance with the coupling of the present invention and generally indicated by the reference numeral **10**. The coupling is adapted to releasably lock the aforesaid dolly to the rotatable launching arm **11** of the launcher during a missile transfer operation in such a manner that the launching rail **12** on the launching arm is in alignment with the missile supporting rail **13** carried by the dolly frame **14**.

The coupling **10** comprises a socket member **15** carried by an arm **16** secured to a plate or support **17** in any suitable manner such, for example, as by bolts or the like **18**, the support **17** being attached to the missile supporting rail **13** carried by the dolly frame **14**, in any conventional manner. As more clearly shown on FIGS. 2 and 3, the support **17** is provided with a recess or cutaway portion **19** at the upper end thereof so as to form a detent or locking element **21**, the purpose of which will become more clearly apparent as the description proceeds.

The coupling **10** further includes a ball **22** carried by a support generally indicated by the reference character **23** and comprising a plate **24** having a plurality of ears **25**, secured to the rotatable launching arm **11**, as by bolts or the like **26**, FIG. 4, whereupon the support **23** may be rotated upon rotation of the arm **11**. The plate **24** is provided at one end thereof with a raised portion or protuberance **27** extending upwardly therefrom and comprising a rear wall **28**, a front wall **29**, an arcuate upper or top wall **31**, and a pair of guide members **32** formed with the front wall **29** and disposed on opposite sides thereof and inclined or flared outwardly therefrom, as best shown in FIGS. 4 and 5. It will be noted, FIG. 5, that each guide member **32** is curved or rounded on the innermost surfaces thereof as at **33**. The other end of the plate **24** is provided with a boss or protuberance **34** integrally formed therewith and extending upwardly therefrom and having a centrally disposed recess **35**, preferably square in shape, formed therein, and a bore **36** in communication therewith and extending through the boss **34**. Disposed within the recess **35** and attached to or integrally formed with the ball **22** is a boss **37**, preferably square in shape and having a shank or stem **38** formed therewith and disposed within and extending through bore **36**.

As best shown on FIGS. 2 and 3, a nut **39** is threaded on the end of stem **38** thereby to securely attach the ball **22** to the boss **34**, and maintain the ball in proper relationship with respect to the arcuate stop wall **31** and the flared guidewalls **32**. The boss **34** has formed therewith and extending outwardly therefrom a locking detent or element **41** having a front or forwardly disposed curved or cam surface **42** and a lower or bottom straight surface **43**, as best shown on FIG. 5.

Referring again to FIG. 2, it will be noted that the coupling or hitch **10** is in a coupled condition. In this position the socket **15** engages the ball **22**, the locking lip

21 on support 17 engages under straight surface 43 provided on boss 34, with the socket 15 in proximate relation with respect to arcuate wall 31 on protuberance 27. Thus, in this position the dolly is securely locked to the launcher arm 11 with the missile supporting rail 13 on the dolly in alignment with the launching rail 12 on the launching arm 11, whereupon the missile M may be transferred from the dolly in the conventional manner, such for example, as by a rammer mechanism (not shown).

During a coupling operation the socket 15 is guided by the curved or rounded surfaces 33 on guide member 32, as the dolly moves toward the launcher arm until the socket engages the arcuate stop wall on support 23, whereupon the socket is disposed in alignment and spaced relationship with the ball 22. Thus, upon rotation of the arm toward the socket, the ball engages the socket, the locking lip 21 on support 17 rides over cam surface 42 on detent 41 and engages under portion 43 on the detent thereby securely locking the dolly to the launcher arm. During uncoupling operation the launcher arm is rotated in a downwardly direction and thus locking lip 21 moves out of engagement with portion 43 and rides over cam surface 42 on detent 41 until it reaches a position, as shown in FIG. 3, whereupon the arcuate stop wall 31 on support 23 assumes a position to allow free movement of the socket to a release position upon additional rotation of the launcher arm.

It will be understood that during a missile transfer operation the launcher arm and dolly are in the position, as shown in FIG. 1 with the dolly locked to the launcher arm by the coupling of the present invention, with the missile M initially supported on the dolly rail 13 by the conventional front and rear missile lugs (not shown). It will further be understood that when the missile has been transferred to the launcher rail 12 on the launcher arm, the coupling 10 is uncoupled in the aforesaid manner. When this occurs the launcher arm is moved to a vertical position, as indicated in dashed outline, FIG. 1, whereupon the missile may be delivered into the conventional storage magazine (not shown) arranged below the deck of a ship. For a more complete description and the structural arrangement of the aforesaid launcher and magazine attention is directed to the copending application of Sverre Kongebleck, Serial No. 819,517, for Turret Launcher.

Whereas, the invention has been described with reference to an arrangement for detachably coupling a missile dolly to a rotatable launcher arm during a missile transfer operation, it will be understood that this is for illustrative purposes only and that the invention in its broader aspects discloses new and improved means for coupling a pair of devices together and maintaining them locked together and which may be automatically uncoupled.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the

scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In a detachable coupling of the character disclosed, a support, a semicircular socket carried by said support, a plate, a ball carried by said plate and receiving said socket, a fixed detent carried by and integrally formed with said plate and having a locking surface thereon, a fixed lip element carried by and integrally formed with said support and having a complementary locking surface thereon engageable with said locking surface on the detent for automaticaly locking and maintaining the plate and support in a locked condition and the ball and socket in a coupled condition, a pair of flared guide members carried by and formed integrally with said plate and extending upwardly therefrom and engageable by said socket for guiding the socket during a coupling operation, and an arcurate stop member carried by and integrally formed with said plate and inclined downwardly and forwardly and engageable by said socket for limiting the movement of the socket during a coupling operation, and for allowing free movement of the socket to an upcoupled condition, and a cam surface on said detent engageable by said lip element for guiding the locking surface on the lip element into and out of locking engagement with the locking surface of the detent.

2. In a coupling for releasably connecting a missile transfer vehicle to an ordnance device during a missile transfer operation, the combination of a missile launcher having a rotatable launcher arm, a wheeled transfer dolly having a frame, a plate carried by said launcher arm, a ball carried by said plate, a support carried by said frame, a socket mounted on said support in engagement with said ball during a missile transfer operation, a locking detent integrally formed with said plate, an additional locking detent integrally formed with said support and movable in locking engagement with the locking detent on the plate as the arm is rotated a predetermined amount in one direction for automatically locking and maintaining the ball and socket in engagement during a missile transfer operation and arcuate stop means integrally formed with said plate for limiting the movement of said socket during a coupling operation, said arcuate stop means allowing free movement of the socket to an uncoupled position as the arm is rotated a predetermined amount in a reverse direction.

3. In a coupling according to claim 2, wherein the detent on the plate includes a locking surface cooperating with a complementary locking surface on the detent on the support.

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