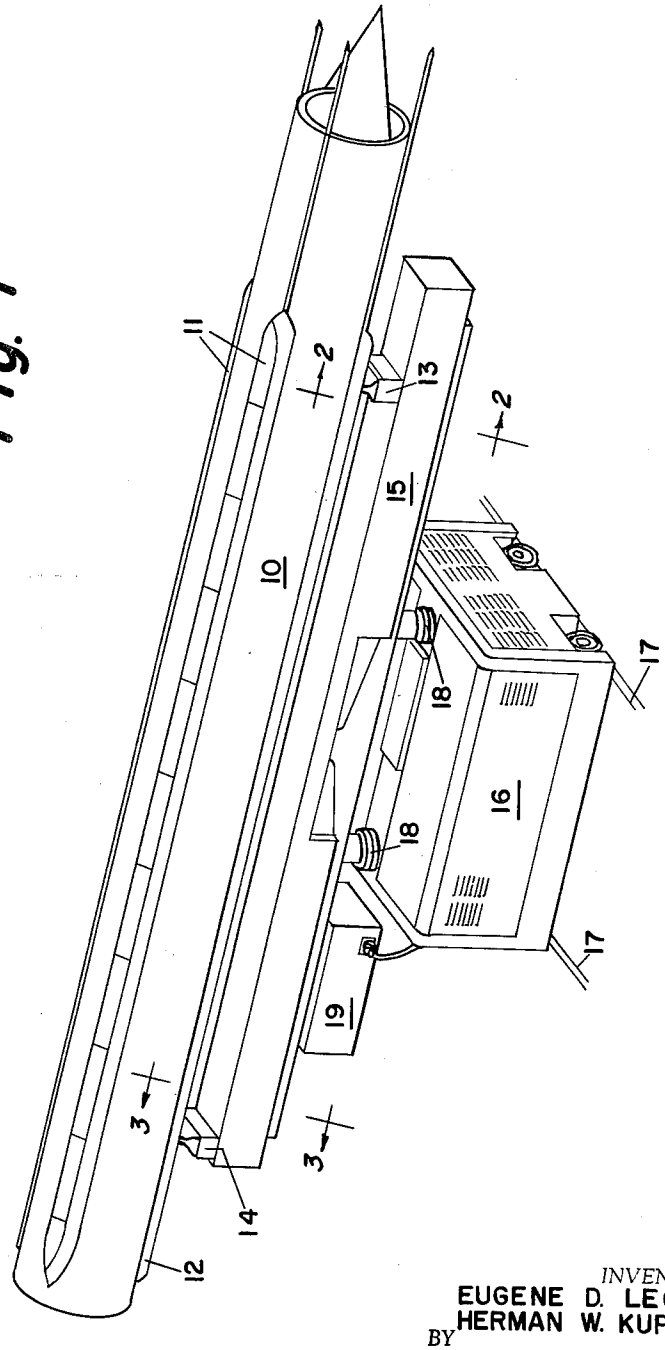
Sept. 7, 1965 E. D. LEGG ETAL 3,204,525

MISSILE DEVICE AND ATTACHMENTS THEREFOR

Filed Feb. 20, 1964 3 Sheets-Sheet 1

Fig. 1

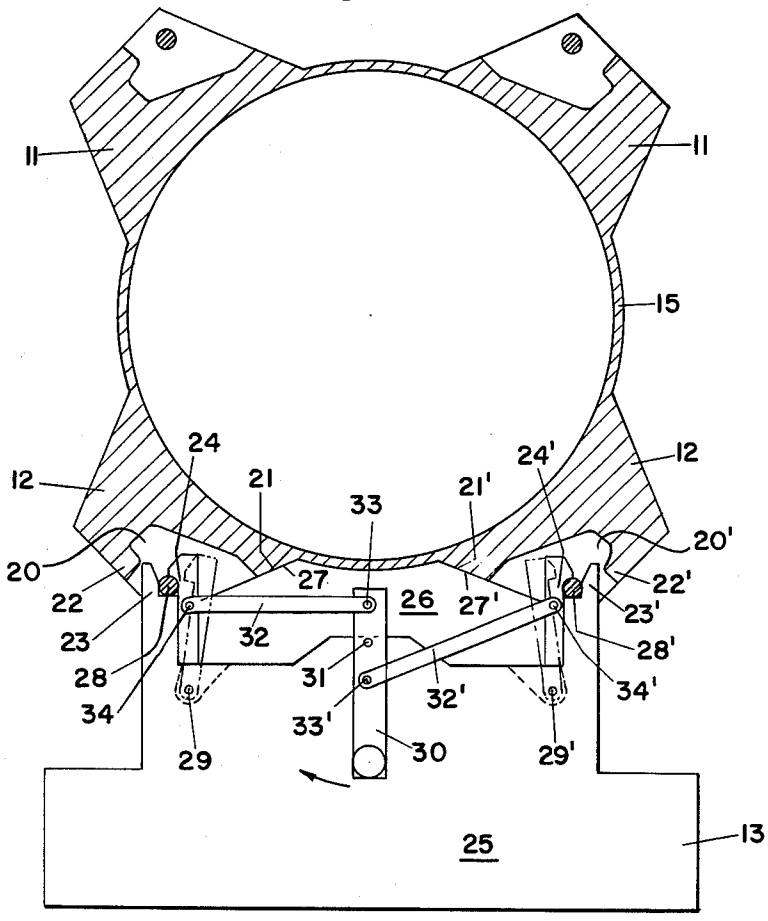


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MISSILE DEVICE AND ATTACHMENTS THEREFOR

Filed Feb. 20, 1964 3 Sheets-Sheet 2

Fig. 2



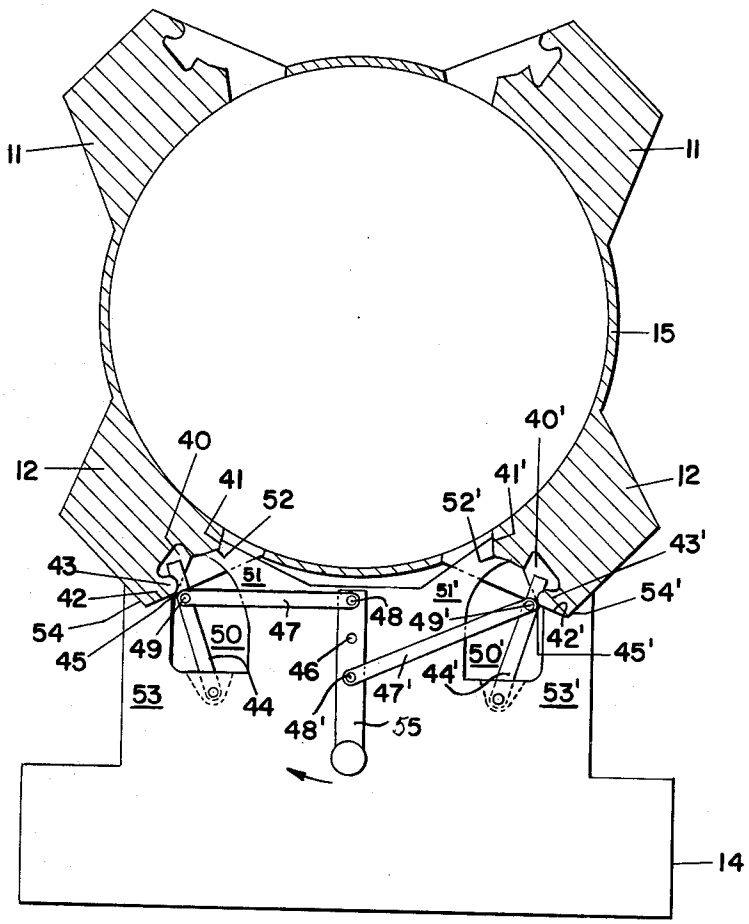
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Filed Feb. 20, 1964 3 Sheets-Sheet 3

Fig. 3



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MISSILE DEVICE AND ATTACHMENTS THEREFOR

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1 Claim. (Cl. 89—1.7)

The present invention relates to missile launching systems and is concerned particularly with arrangements for overcoming problems inherent in transporting or handling of missile structures on shipboard.

In general, a system for launching missiles from shipboard requires an area where a number of missiles are stored and which is located remotely from the launching area. In large naval vessels, the storage area is usually located at a lower deck in order to provide some physical or cover protection for the missiles against enemy attack, while the launching area is located on an exposed deck to permit ready operation or firing of the missile. Various conveying equipment is required to handle the missiles in their transport to the storage area when they are delivered on shipboard and also in their transport from the storage area to the launching area. This conveying equipment is in the form of wheeled transfer cars having elevating equipment for transporting the missile structures along a surface and for moving the structures between decks. Since the missile structures are of substantial length, overhead rails are utilized for the purpose of suspending the assembled missile compliments to permit their being inspected and readied for launching.

The missile structures which require the above outlined conveying equipment are of the type which are comprised of two complemental tubular bodies, one termed a booster containing the propellent or explosive medium, while the other is termed the missile and contains the electrical guidance, warhead, etc. components. The booster complement differs in certain respects from the missile complement in that it has connecting elements for suspending it directly from the overhead rail and in turn functions to support the missile complement. The overhead rail and booster connecting elements are so designed as to permit an assembled booster and missile to move along the overhead rail and to be launched, after which the booster complement separates during flight from the missile complement which continues in flight.

With certain types of missile structures it has been customary to use a heavy metal band formed by hinged sections in order to encompass the missile complements in transporting them from one area to another, after which the bands are removed when the complements are assembled on the overhead rail. These clamping band arrangements have been satisfactory with missile complements which are sufficiently rugged to withstand their usage, but with missile cmplements which are of thin walled or fragil construction, their use is precluded, since the clamping band structures are too heavy and cumbersome to permit efficient handling of the complements or missile structures.

The present invention is concerned with the missile complement structure of a missile assembly and is directed to arrangements which permit the missile complement to be readily handled and maintained in position during transport.

The principal object of the invention is to equip the missile complement with circumferentially and longitudinally spaced connectors which extend from its periphery and are adapted to coact with securing means which permit the complement to be readily handled and transported.

Another object is to provide supports for the missile complement which have a securing means for coacting with the circumferentially and longitudinally spaced connectors for maintaining the complement in fixed position during transport.

Another object is to provide supporting blocks having latching or clamping means for releasably receiving the connectors to maintain the complement is fixed position during transport.

Other objects and advantages of the invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a view in perspective of a booster complement of the invention supported on a transfer car in position for movement along a deck area.

FIGURES 2 and 3 are enlarged partial sectional views taken on the lines 2—2 and 3—3, respectively, of FIGURE 1.

Referring to FIGURE 1, the missile complement is indicated at 10 and is formed on an elongate tube of substantial length. The exterior of the missile complement is provided with longitudinally extending fairings or ribs, which are arranged in an upper pair identified at 11—11 in FIGURE 1 and a lower pair 12—12, only one of which is visible in FIGURE 1. The rear or end at the left of the figure will be united to the front end of the booster (not shown) when the missile complements are assembled and as heretofore mentioned, the booster complement is suspended from an overhead rail by means of connectors on the booster and the booster then supports the missile complement and forms an assembly which is ready for inspection or for launching.

In order to efficiently handle or transport the missile 10, it is provided with connectors, not shown, in FIGURE 1, but which are formed in the upper farings 11—11 and also the lower fairings 12—12. Details of the connectors will be explained in the description of FIGURES 2 and 3, and are designed to be attached to latching or clamping devices which are mounted on supporting blocks represented at 13 and 14 which are fixedly secured to a frame or beam 15 mounted on a vehicle 16.

The vehicle 16 is known as a transfer car in the missile handling art and is usually operated on trackage 17—17 for moving the missile complement along a deck level and is provided with elevators 18—18 for raising the missile complement for assembly with the booster compliment. Various control equipment is provided in a compartment 19 and also in the vehicle 16 for regulating the operation of the transfer car and elevators but it is not necessary to be described for the purpose of this invention.

As shown in FIGURE 2, the upper fairings 11—11 are spaced 90° apart and the lower fairings 12—12 are also spaced 90° apart and in effect form the missile into upper and lower symmetrical halves. The upper fairings and lower fairings are generally similar in configuration and design so that the missile may be handled by reversing from its shown position. Only the fairings 12—12 will be described in detail to show the manner of connecting the missile with the supporting block 13 through either set of fairings.

Similar cavities 20–20′ are provided in each of the fairings as shown in connection with the fairings 12—12 and the cavities are of irregular design forming inner flanges 21–21′ and outer flanges 22–22′. A space (not identified) is provided therebetween for the reception of attaching means which is shown as fixed arms 23–23′ and movable arms or latches 24–24′ which are part of the structure of the supporting block 13. The flanges 21–21′ are inclined, as shown, and form abutments which seat on the support 13 and for this purpose the support 13 is formed of a front wall 25 and a rear wall 26 which,

although not shown, are connected to form a unitary structure. The rear wall 26 is provided with inclined mating seats 27–27' which receive respectively the flanges 21–21'. Anchoring means in the form of pins 28–28' extend longitudinally of the cavities 20–20' respectively and are clamped between the fixed arms 23–23' and the movable latch arms 24–24' as shown in FIGURE 2. The front wall 25 of the support 13 has the fixed elements 23–23' formed integral therewith and the latch elements 24–24' are pivotally secured at 29–29' respectively to the front wall 25 and are movable relative to the fixed elements 23–23' by means of a lever system. The lever system is comprised of an actuator 30 which is pivotally mounted at 31 to the wall 25 and is interconnected with the latch element 24 by means of a lever 32 which is pivotally mounted to the actuator 30 at 33 and to the latch 24 at 34 and the actuator 30 is also pivotally mounted to lever 32' at 33' and to the latch element 24' at 34'. To release the missile, the actuator 30 is moved in the direction of the arrow from its disclosed locking position.

FIGURE 3 is a modified type of handling arrangement for the missile 10 and differs from FIGURE 2 in certain details of the support and also in certain details of the configuration of the cavities. In actual use the modification of FIGURE 3 will be located rearwardly of that described in connection with FIGURE 2.

Similar cavities 40–40' are provided in each of the fairings as shown in connection with the fairings 12–12 and the cavities are of irregular design forming inner flanges 41–41' and outer flanges 42–42'. A space (not identified) is provided therebetween to permit movement of a latch arm which is operated by a lever system. The configuration of the cavities forms anchoring means in the form of lugs or detent portions 43–43' for coacting with levers 44–44' which have recesses 45–45' formed therein. The levers 44–44' are operated by means of an actuator 55 which is pivotally mounted at 46 to the supporting block 14 and in turn is connected to the lever 44 by means of a linkage 47 which is pivotally mounted to the actuator at 48 and to the lever arm at 49. The actuator 55 is similarly connected to lever arm 44' by means of linkage 47' which is pivoted to the actuator at 48' and to the lever at 49'.

The supporting block 14 is provided with slots 50–50' forming inner ribs 51–51' providing seating areas 52–52' and outer ribs 53–53' which provide seating areas 54–54'. The seating areas 52–52' and 54–54' are generally channel shaped and receive respectively the inner flanges 41–41' and the outer flanges 42–42'. When the support 14 and the missile 10 are assembled as shown in the FIGURE 3, the missile is rigidly locked permitting it to

be readily transported or elevated by the transfer car 16.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that, within the scope of the appended claim, the invention may be practiced otherwise than as specifically described.

We claim:

In combination

(a) an elongate tubular missile component having first and second longitudinal ribs extending in radial symmetry from its outer surface,

(b) a first longitudinal recess in said first rib and a second longitudinal recess in said second rib,

(c) said recesses being spaced transversely and disposed in opposed relation,

(d) a first anchoring means extending longitudinally of said first recess and a second anchoring means extending longitudinally of said second recess,

(e) an elongate beam having first and second longitudinally spaced transverse supporting blocks extending upwardly thereof,

(f) each supporting block having upper seat areas disposed in opposed relation and spaced transversely a distance equal to that of the spacing between said first and second anchoring means,

(g) said elongate beam being mounted generally horizontally on a vehicle and maneuverable thereby to locate the seat areas for receiving the anchoring means when the missile component is positioned generally horizontally thereabove with the ribs depending therefrom,

(h) a latching device mounted on each supporting block having link arms providing opposed clamps and

(i) each latching device being operative to move the clamps into engagement with the anchoring means for securing the missile component whereby it may be maintained generally rigid.

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