

Aug. 8, 1944.

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BOMB HANDLING EQUIPMENT

2,355,341

Filed April 12, 1943

2 Sheets-Sheet 1

Fig. 1

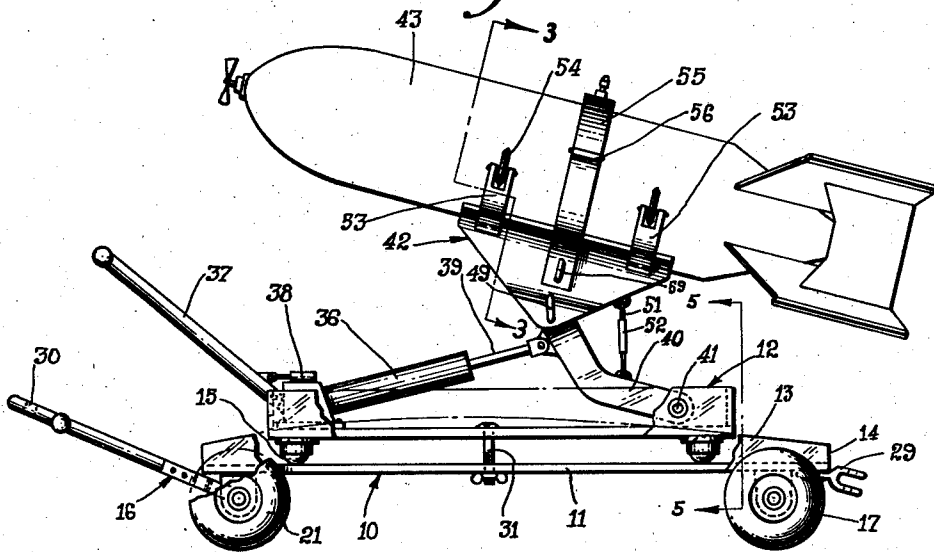
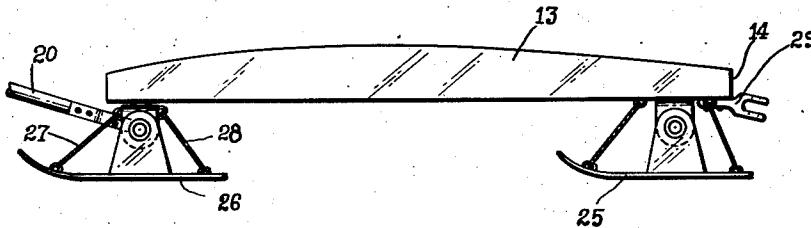


Fig. 2



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Fig. 3

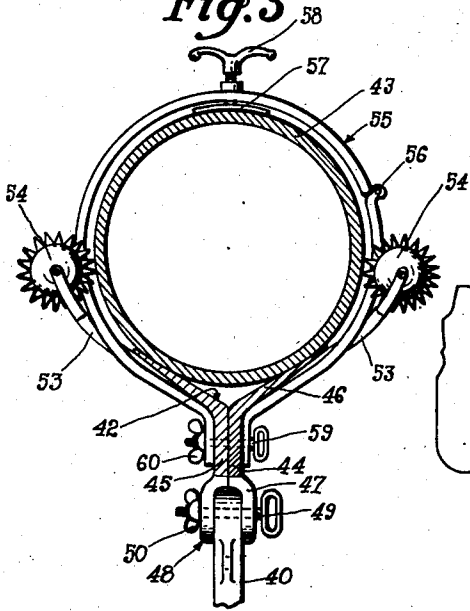


Fig. 4

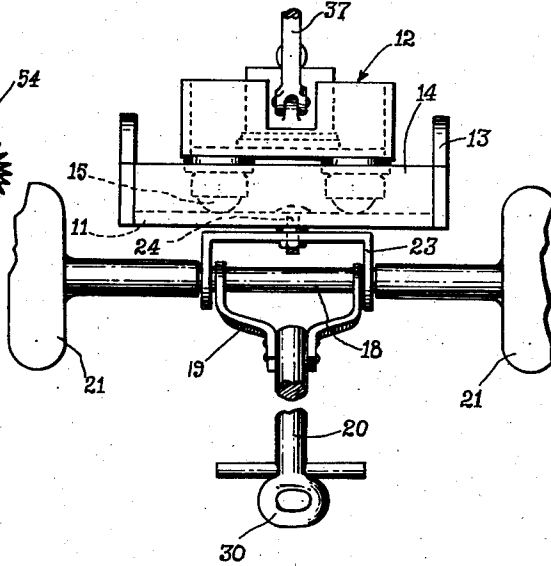
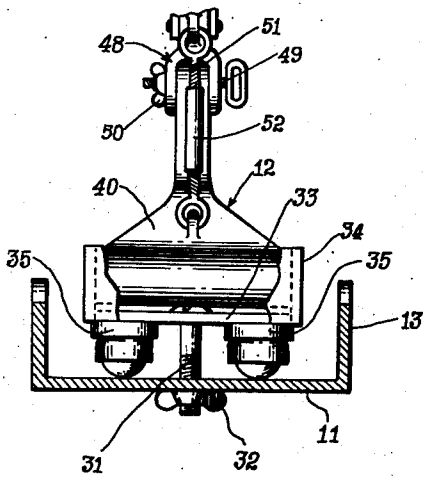


Fig. 5



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BOMB-HANDLING EQUIPMENT

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6 Claims. (Cl. 214—1)

This invention relates to bomb-handling equipment and more particularly to a combined truck and lift arrangement for transporting and loading the bombs into the bomb racks of airplanes.

The ordinary conveying and handling equipment in use for locating bombs in the bomb racks within the bottom of the airplane are without sufficient adjustments so as to eliminate entirely the necessity of the ground crew using physical force to finally position the bombs in the racks. The present equipment may seem suitable for locating bombs in their racks while the airplane is on level ground or concrete surface, but they are not adaptable for use on rough terrain, having depressions, or ice, or even on a desert. With this equipment and in order that the airplane can be quickly loaded in the field under poor conditions, it is necessary that too large a number of men be kept on hand for this work.

It is, therefore, the principal object of the present invention to provide a self-contained unit which can be used to convey the bomb to the airplane over a rough field and accurately locate the bomb in proper position within the bomb rack regardless of the roughness of the terrain without the need for exertion of physical force on the part of the ground crew.

It is another object of the present invention to provide a bomb-handling arrangement which will make possible a reduction in the personnel of the bomb-handling crew.

According to the present invention, there has been provided a bomb-handling arrangement wherein an infinite number of adjustments of the bomb by the arrangement may be had. The arrangement consists of a wheeled supporting frame having a floor on which a hoisting truck is mounted for lateral movement thereover. After the wheeled frame has been located generally under the airplane, the hoist can then be adjusted on the floor of the wheel frame to more definitely locate the bomb in vertical alignment with the bomb rack. The hoisting truck has a bomb-retaining carrier in which the bomb is disposed and this carrier is adjustable in a fore and aft direction to place the bomb in a desired tilted position, thereby correcting for any of the wheels of the supporting frame which may have dropped into the depression. The bomb carrier has four sharp pointed star-wheels which engage with the bomb to prohibit axial displacement of the bomb with respect to the carrier, while at the same time permitting rotative adjustment of the bomb about its axis. Means is provided for locking the hoisting truck to the floor of the wheel frame and for

locking the bomb to the bomb-retaining carrier in order to hold tight the truck and the bomb while the same is being transported.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawings, in which

Fig. 1 is a side view, in elevation, of the bomb-handling arrangement with a bomb thereon, and with the hoisting truck and the bomb locked for transport by the arrangement.

Fig. 2 is an elevational view of another form of carriage utilizing runners or skids instead of wheels for its support.

Fig. 3 is an enlarged detail view, in cross section, taken through the bomb and the bomb-retaining carrier along the lines 3—3 of Fig. 1 and illustrating particularly the manner in which the bomb is retained in the bomb-retaining carrier at times when it is being transported.

Fig. 4 is a fragmentary front view of the wheel frame and of a part of the hoisting truck.

Fig. 5 is an enlarged detail view, partly in section, illustrating the manner in which the hoisting truck is secured to the floor of the wheel frame and as taken along the line 5—5 of Fig. 1.

Referring now particularly to Fig. 1, there is shown a wheeled frame 10 having a floor or platform 11 on which is mounted a hoisting truck 12. The floor 11 of the frame has side walls 13 and end walls 14 which serve to limit the lateral movement of the hoisting truck 12 which has rollers 15 to allow for lateral movement of the hoisting truck over the floor 11. The forward portion of the platform 11 is supported by a steerable wheel truck 16, while the rear part of the frame is supported on non-steerable wheels 17.

As viewed in Fig. 4, it will be noted that this steerable wheel truck 16 includes a transverse axle 18 to which is connected a fork portion 19 of a combined handle and coupling member 20. On the outer ends of the axle 18 there are disposed respectively wheels 21. The connection of the axle 18 with the floor 11 of the carriage is obtained by means of a downwardly extending swivel yoke 23 pivoted to the floor by a pivot bolt 24.

Referring now to Fig. 2, it will be noted that instead of the provision of wheels 17 and 21, there may be provided skids or runners 25 and 26. Each of the runners are braced respectively at their forward and rearward ends by brace wires 27 and 28. Such a carriage may be more adaptable for use on a snow covered field or even on a sand covered field, the runners tending to

hold better the carriage and its burden on the surface of the more rough field. In order that these carriages can be coupled to another, there is provided a rear coupling 29 and a forward coupling portion 30 on the forward end of the steering handle member 20.

Referring now particularly to Fig. 5, there is shown a fastening bolt 31 having a wing nut 32 for securing the hoisting truck to the floor 11 of the carriage 10 to prevent the hoisting truck with the bomb therein from sliding laterally while the bomb is being transported over the rough field to the airplane. When it is desired to align the bomb more definitely in the vertical alignment with the bomb rack, the fastening bolt 31 is removed, thereby freeing the hoisting truck so that it can be moved over the platform 11 of the wheel truck 10. The carriage for the hoisting truck as well as the wheeled frame 10 has its bottom 33 and side walls 34. The rollers 15 may take the form of casters or may be ball shape to fit within socket structure 35 in the manner shown more clearly in Fig. 5. Since the hoisting truck 12 is always on a flat floor surface, it will be seen that it can be readily and easily adjusted for the vertical alignment for the bomb with the bomb rack of the airplane.

The hoisting truck includes an extensible fluid actuated strut 36 into which fluid is pumped by means of a pump handle 37 extending forwardly to a location readily accessible to the operator. With up and down movement of this handle 32, a pump 38 on the forward end of the platform 33 of the hoisting means will be actuated to deliver the fluid to the fluid actuated strut 36. Out of the strut 36 there is extended a working rod 39 which connects with the upper end of a lever 40 pivoted to the side walls 34 of the hoisting truck as indicated at 41. As this lever 40 is pivoted rearwardly, a bomb-retaining carrier 42 with a bomb 43 therein, is raised vertically. To lower the carrier and its bomb, fluid is emitted from the strut 36 to effect inward movement of the working rod 39 and pivotal movement of the lever 40 in a counter-clockwise direction.

The bomb-retaining carrier 42 as viewed more clearly in Fig. 3 is made in two parts 44 and 45 which are flanged as indicated at 46 to support the bomb 43. The two parts 44 and 45, when assembled together, form substantially a Y between the outwardly extending legs on which the bomb is supported, the bomb being of circular contour makes line contact with the flanges 46. Each of the parts 44 and 45 has an outwardly extending offset portion 47 so that as the parts are assembled, there is provided a yoke formation 48 adapted to fit over the upper end of the lever 40 of the hoisting truck. The connection between the end of the lever 40 and the yoke 48 is by means of a bolt 49 extending through the yoke and the lever 40 to provide a pivotal union of the bomb carrier 42 with the lever 40. The bolt 49 is held in place by a wing nut 50. With this arrangement, the bomb carrier can be tiltingly adjusted in a fore and aft direction about a transverse pivot point provided by the fastening bolt 49. In order to secure the bomb-retaining carrier and its bomb in its adjusted position with respect to the lever 40, there is provided a connecting link 51. This connecting link 51 has a turnbuckle 52 therein, by means of which the pivotal adjustment of the carrier is effected.

Secured to the flanges 46 are outwardly and upwardly extending brackets 53 bifurcated at their upper ends to receive pointed star-wheels

54. These star-wheels 54 can rotate in the brackets 53 and the points of the same pierce the surface of the bomb 43. If an adjustment of the bomb about its axis is desired, this is simply effected by rotating the bomb on the starwheels which are always in engagement with the surface of the bomb. Since the wheels pierce the bomb surface, this rotative adjustment of the bomb can be effected without the bomb shifting longitudinally with respect in the bomb carrier.

In addition to the hoisting means being locked by the fastening bolt 31 to the platform 11 of the carriage 10, there is one other lock in the shape of a hinged band 55 for securing the bomb 43 to the bomb-retaining carrier. This band 55 has a hinge connection 56 to allow the band to be wrapped about the bomb. As viewed in Fig. 3, it will be noted that the only contact of the band 55 with the bomb is by means of a vertically adjustable screw plate 57, operable by a handle 58 to be screwed down onto the top of the bomb and to thereby force the bomb against the flanges 46 of the bomb-retaining carrier. The ends of the band 55 have holes therein and are so fastened as to be nested under the flanges 46 and are there retained by a fastening bolt 59 having a wing nut 60 thereon.

It should now be apparent that there has been provided a bomb-handling arrangement wherein any physical effort on the part of the gun crew to align the bomb with the bomb racks has been eliminated in that practically an infinite number of positions of the bomb may be obtained. It should also be apparent that there has been provided an arrangement by virtue of these adjustments which can be used nearly as well on rough ground as on a smooth or flat ground.

While various changes may be made in the detailed construction, it shall be understood that these changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim as my invention:

1. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground, hoisting means on the carriage to give vertical adjustment to a bomb being carried by the arrangement and including a bomb-retaining carrier, rotatable elements on said carrier for supporting said bomb, said elements permitting rotation of the bomb about its axis and having sharp projections which bite into the casing of said bomb to hold the latter against movement in the direction of said axis, whereby in addition to vertical adjustment of the bomb on its carriage a rotative movement of bomb about its axis may be had.

2. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground, hoisting means on the carriage to give vertical adjustment to a bomb being carried by the arrangement, a bomb-retaining carrier on the hoisting means for receiving the bomb, and star wheels on the bomb-retaining carrier for retaining the bomb against axial displacement while permitting rotative adjustment of the bomb about its axis, whereby in addition to vertical adjustment of the bomb on its carriage a rotative adjustment of the bomb about its axis may be had.

3. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground and having a flat floor therein, a separable truck movable over the flat floor for lateral

adjustment with respect thereto, a bomb holder pivotally mounted on said truck for fore and aft tilting adjustment and supporting said bomb so that it may be freely rotated about its longitudinal axis, and means for varying the elevation of said holder, whereby there is provided an arrangement for handling bombs which can locate the bomb in an infinite number of positions.

4. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground, a hoist mounted on the supporting carriage for lateral adjustment with respect thereto, a bomb-retaining carrier adapted to carry a bomb mounted on the hoist for pivotable adjustment with respect thereto, and star-wheels on the bomb-retaining carrier for retaining the bomb against axial displacement while permitting rotative adjustment of the bomb about its axis, whereby there is provided an arrangement for handling bombs which can locate the bomb in an infinite number of positions.

5. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground, a hoist mounted on the supporting carriage for lateral adjustment with respect thereto, a bomb holder on the hoist, rotatable elements carried by said holder and upon which said bomb is supported, said elements permitting rotation of the bomb about its axis and having sharp projections which bite into the casing of said bomb to

hold the latter against movement in the direction of said axis, means for locking the hoist to the supporting carriage to prevent adjustment thereof, and means for locking the bomb to the bomb-retaining carrier, whereby the hoist and bomb can be locked in place while the bomb is being transported.

6. In a bomb-handling arrangement, a supporting carriage adapted for movement over the ground and having a flat floor therein, a separable hoist truck movable over the flat floor for lateral adjustment with respect thereto, a bomb holder pivotable on the hoist truck for fore and aft tilting adjustment with respect thereto, rotatable elements carried by said holder for supporting said bomb, said elements permitting rotation of the bomb about its axis and having sharp projections which bite into the casing of said bomb to hold the latter against movement in the direction of said axis, means for locking the hoist to the supporting carriage to prevent lateral movement thereof, means for locking the bomb-retaining carrier in its adjusted position to the hoist truck, and means adapted to lock the bomb to the bomb-retaining carrier, whereby the hoist truck, bomb-retaining carrier and bomb can be locked in place while the bomb is being transported.

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