Feb. 7, 1961 G. L. PIGMAN 2,970,542

BOMB RELEASE DEVICE

Filed July 13, 1956 5 Sheets-Sheet 1

FIG.1.

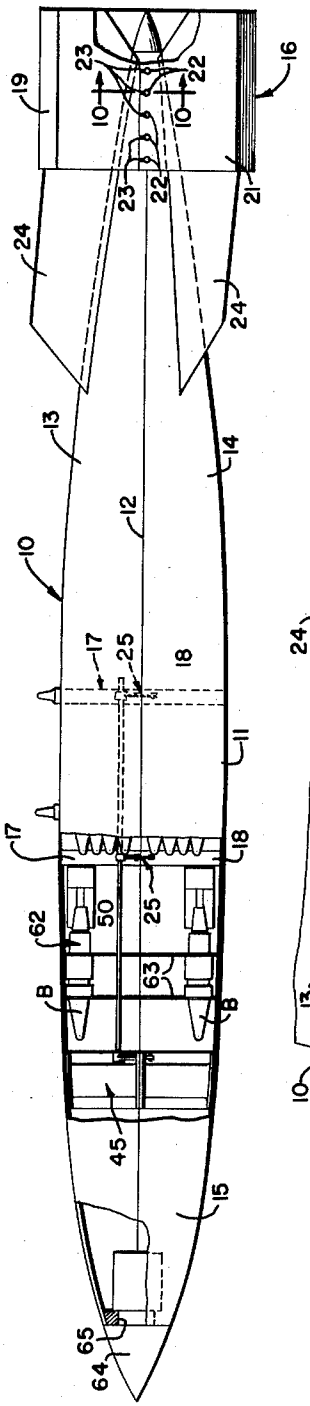
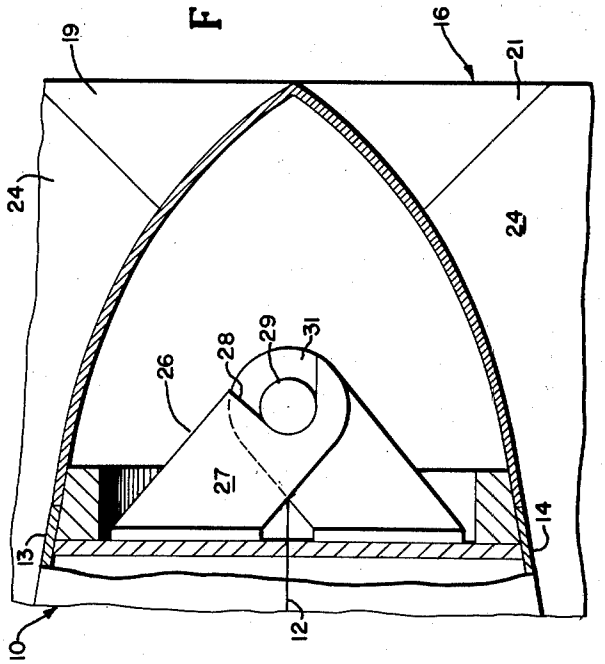


FIG.9.



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Feb. 7, 1961 G. L. PIGMAN 2,970,542

BOMB RELEASE DEVICE

Filed July 13, 1956 5 Sheets-Sheet 2

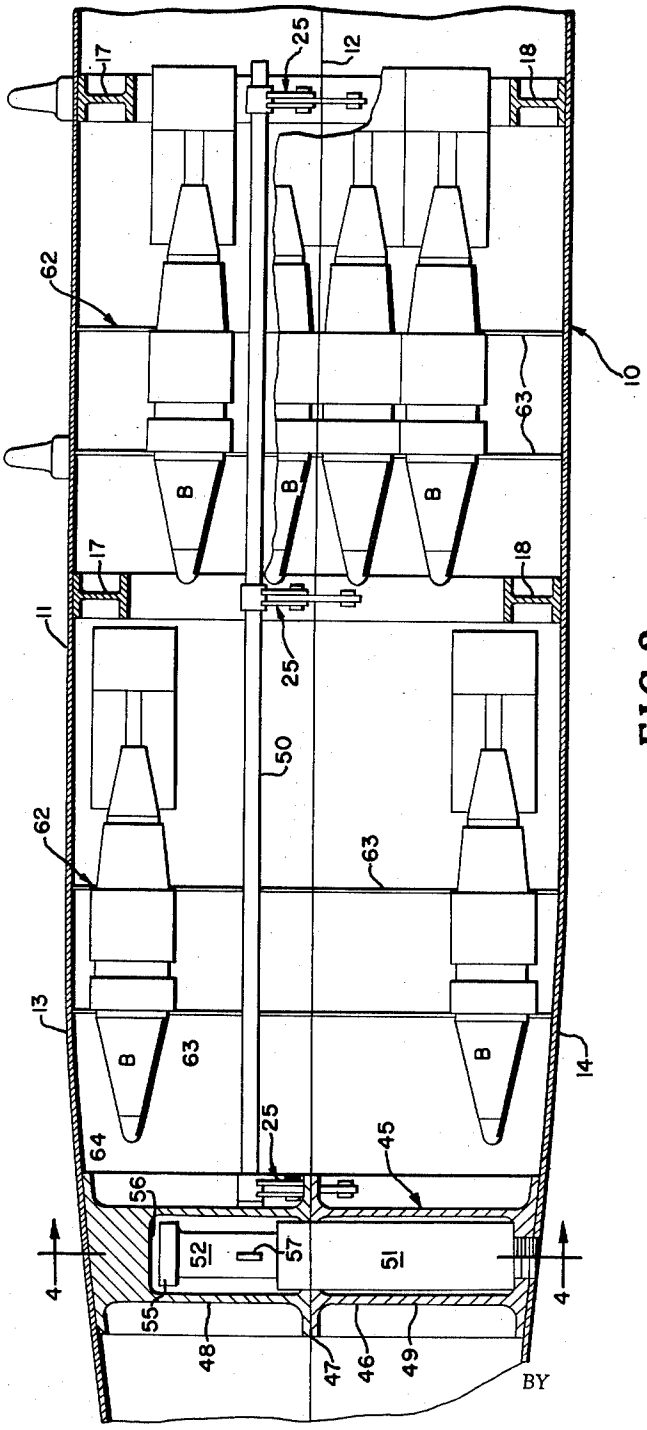


FIG.2.

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BOMB RELEASE DEVICE

Filed July 13, 1956 5 Sheets-Sheet 3

FIG.3.

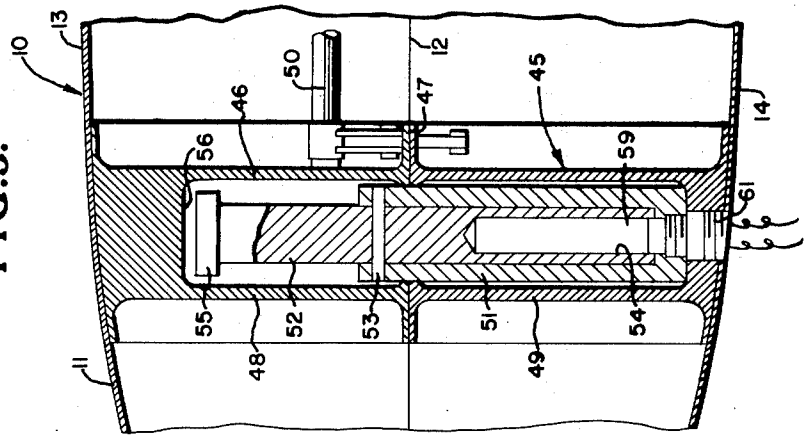
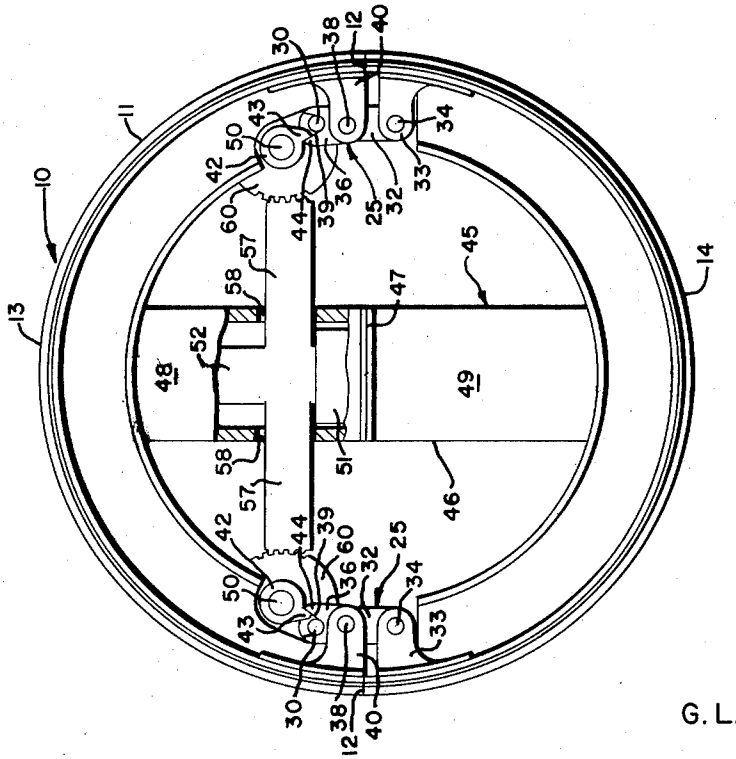


FIG.4.



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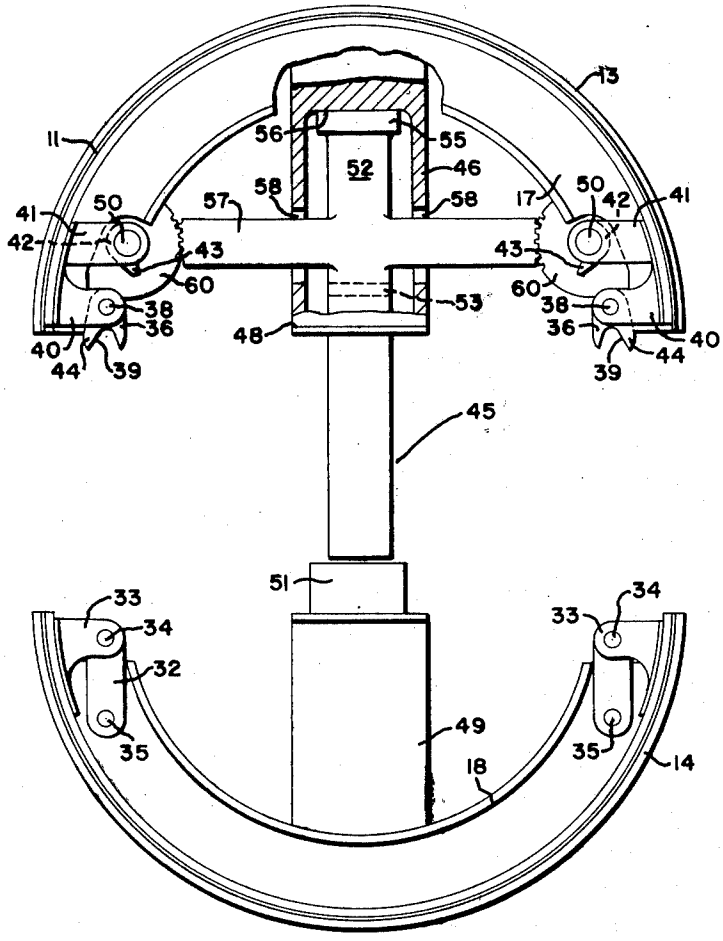
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Feb. 7, 1961 G. L. PIGMAN 2,970,542

BOMB RELEASE DEVICE

Filed July 13, 1956 5 Sheets-Sheet 4

FIG.5.



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Feb. 7, 1961 G. L. PIGMAN 2,970,542

BOMB RELEASE DEVICE

Filed July 13, 1956 5 Sheets-Sheet 5

FIG.6.

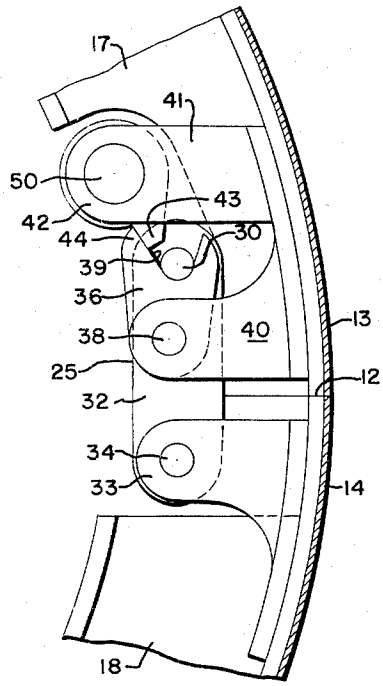


FIG.7.

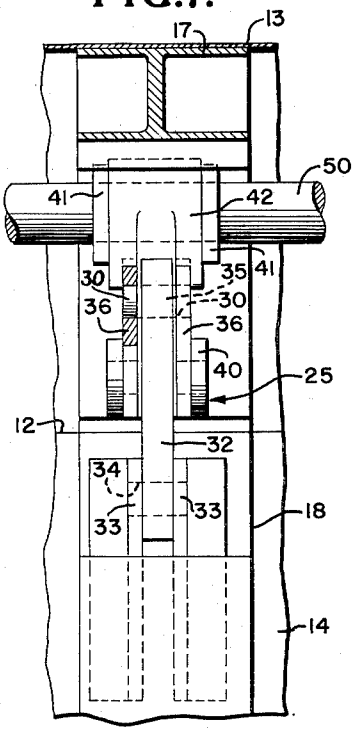


FIG.8.

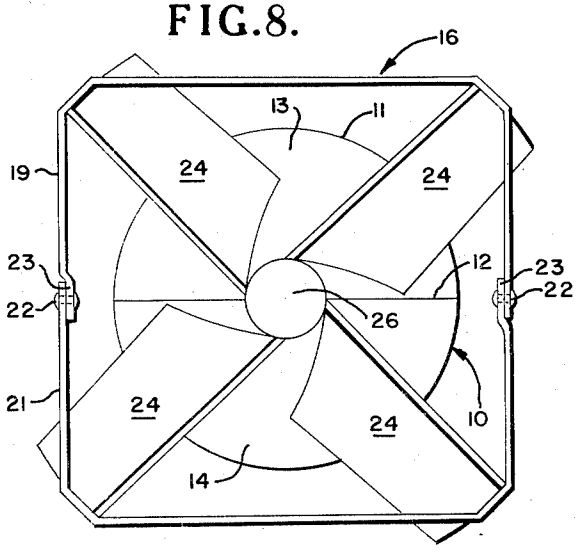
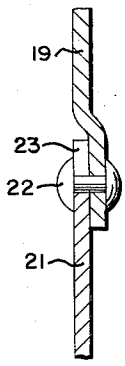


FIG.10.



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United States Patent Office 2,970,542 Patented Feb. 7, 1961

2,970,542

BOMB RELEASE DEVICE

George L. Pigman, Homewood, Ill., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed July 13, 1956, Ser. No. 597,831

2 Claims. (Cl. 102—7.2)

The present invention relates to a bomb adapted to be dropped from an aircraft in flight and more particularly to a device for transporting and releasing a plurality of miniature bombs upon a target.

Moreover, the invention contemplates the provision of a bomb assembly comprising a pair of normally locked separable shells or casings for releasably maintaining a plurality of miniature bombs therein and having new and improved means for unlocking and separating the shells to effect the release of the miniature bombs.

An object of the present invention is to provide new and improved means for transporting and releasing a plurality of miniature missiles from a separable carrier missile.

Another object of the invention is the provision of a new and improved carrier missile characterized by explosive means arranged to initiate the operation of a release mechanism to permit the release of a plurality of miniature missiles contained within the carrier missile.

Still another object is the provision of a carrier missile comprising a pair of normally locked separable members, which are unlocked and separated in response to an explosive actuated device whereupon a cluster of miniature missiles is dispersed therefrom at a predetermined height above the ground.

A still further object is the provision of a carrier missile having a pair of normally locked separable members hinged at one end and comprising new and improved explosive actuated releasing means for unlocking and separating the hinged member.

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 an elevational view partially in section of the carrier missile constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary sectional view of the carrier missile and locking means thereof;

Fig. 3 is an enlarged sectional view of the explosive device for actuating the release mechanism to a release position;

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 4 illustrating the shell elements unlocked and separated;

Fig. 6 is an enlarged fragmentary end elevational view of one of the locking devices;

Fig. 7 is an enlarged fragmentary side elevational view of one of the locking devices;

Fig. 8 is an enlarged view of the carrier bomb as seen from the tail or trailing end thereof;

Fig. 9 is an enlarged fragmentary sectional view illustrating the hinge connection between the separable shell members of the carrier missile; and,

Fig. 10 is an enlarged fragmentary sectional view taken on the line 10—10 of Fig. 1.

Referring now to the drawings and more particularly to Fig. 1 thereof, the numeral 10 generally indicates the carrier missile comprising an elongated casing or shell 11, split longitudinally as at 12 along the entire length thereof to provide a pair of semicircular members 13 and 14, the casing 11 having a nose 15 and tail fin assembly 16. The member 13 is provided with a plurality of mutually spaced supports H-shaped in cross-section and reinforcing elements 17, the member 14 being provided with a plurality of complementary supports and reinforcing elements 18, the supports 17 and 18 being secured to the members 13 and 14 in any suitable manner such, for example, as by welding the parts together.

As more clearly shown in Figs. 8 and 10, the tail assembly 16 comprises a pair of substantially U-shaped members 19 and 21 detachably secured together by a plurality of pins 22 carried by member 19 and disposed within complementary slots 23 formed in member 21, the members 19 and 21 each being provided with fins 24 secured thereto and to the semicircular elements 13 and 14 respectively. The aforesaid slot and pin arrangement is provided to permit separation of members 19 and 21 when the normally locked elements 13 and 14 are actuated to a release position. The elements 13 and 14 are maintained in a normally locked condition by a plurality of latches generally indicated by the reference character 25, and arranged in opposition with respect to each other and bridging the longitudinal split portion 12 of the casing 11. As shown in Fig. 9, the elements 13 and 14 are hinged at the trailing end of the missile as at 26, the hinge constituting support 27 mounted on member 13 and having a notch 28 formed therein for detachably receiving a pin 29 carried by a support 31 mounted on the element 14 whereupon the sections 13 and 14 are additionally detachably locked together.

Referring now to the latches 25, it will be noted, Figs. 6 and 7, that each latch comprises a link 32 pivotally mounted at one end thereof between a pair of brackets or supports 33 by a pin 34, the brackets being carried by member 14, the other end of the link having a pin 35 secured thereto and extending outwardly from opposite surfaces thereof to provide a pair of protruding lugs 30. A pair of locking detents 36 are pivotally mounted at one end thereof on a pair of brackets or supports 40 respectively by a pin 38, the brackets being carried by member 13, the other end of each detent having a notch or recess 39 formed therein for receiving one of the lugs 30.

As more clearly shown in Figs. 2 and 4, each of the latches 25 is provided with an actuating shaft 50 rotatably supported on member 13 by bearings 41 carried by member 13 and having a plurality of release devices or cams 42 mounted thereon, each cam being provided with a stop 43 normally in engagement with a complementary member 44 bordering the notches 39 respectively in such a manner that they maintain the latches in a normally locked condition and are capable of releasing the latches as the shafts 50 are rotated and the cams are moved thereby an amount sufficiently to cause disengagement of members 43 on the cams from members 44 on detents 36. It will be understood that when the latches are in a locked condition, the force from links 32 pivoted on pin 34 with respect to detents 36 pivoted on pin 38 exerts a moment about pin 38 in such a direction as to maintain the latches locked against the aforesaid stops.

As more clearly shown in Figs. 2 and 3 an explosive actuator generally indicated by the reference character 45 is arranged in the forward end of the casing 11, and comprises a housing 46, split as at 47 to provide a pair of separable members 48 and 49. A tubular element 51 is disposed within and secured to member 49 and has a plunger 52 releasably locked thereto by a shear pin 53.

A recess 54 is formed in one end of the plunger 52, the other end thereof having a head 55 formed thereon in predetermined spaced relation with respect to the end wall 56 of member 48. The plunger 52 carries a pair of oppositely disposed arms 57, the arms each extending through complementary slots 58 (Figs. 4 and 5) formed in member 48 and having rack teeth formed thereon for engagement with a pinion 60 mounted on the end of each of the shafts 50 whereupon rotative movement is transmitted to the shafts 50 and cams 42 to release the latch members 25 in response to movement of the plunger 52.

An explosive charge 59, Fig. 3, is disposed within the recess 54, the charge being maintained within the recess by a retaining plug 61 in threaded engagement with the housing 49 and tubular element 51 and in abutting engagement with the charge.

As more clearly shown in Fig. 2 a plurality of bomb assemblies 62 comprising a number of miniature bombs B are arranged within the casing 11 and releasably locked together in any suitable manner such, for example, as by a plurality of retaining rings 63, each ring being preferably formed of a plurality of separable segmental elements adapted to separate and disperse the miniature bombs as the assemblies are released from the casing 11.

A suitable fuze 64 such, for example, as a conventional proximity fuze may be mounted in the nose 15 of the bomb as at 65, the fuze being adapted to fire the explosive charge 59 after the bomb has been released from an aircraft in flight and when the bomb is a predetermined distance above the ground target area. The explosive charge, if desired, may be provided with a suitable time delay pyrotechnic element adapted to be fired as the carrier missile is released from the aircraft thereby to fire the explosive charge in time delayed relation with respect to the release of the carrier missile from the aircraft. By the aforesaid firing arrangements the miniature bombs will be released and dispersed to provide a most effective and destructive explosive pattern upon the target area.

From the foregoing, it will be understood that the aforesaid members 13 and 14 are normally locked together by the latches 25 and hinge structure, and maintained in a locked condition until the explosive charge 59 is fired. When this occurs the force of the explosion will drive the piston or plunger 52 outwardly with sufficient force to sever shear pin 53 whereupon the head 55 on the plunger 52 moves into engagement with wall 56 and forcibly separates members 13 and 14. It will be understood, however, that during movement of the plunger 52 and before the head 55 engages wall 56, rotary movement is imparted to shafts 50 through rack arms 57 and pinions 60. Upon rotation of shafts 50, cams 42 are rotated in a clockwise direction, whereupon detents 36 and links 32 are moved in a counterclockwise direction until stops 43 on cams 42 disengage stops 44 on detents 36. After the detents have been moved a predetermined amount, it will be understod that the latch force passes a dead-center position thereby causing the moment of the latch force to change directions such that it assists in further opening of the latches and subsequently causes separation of the detents 36 from the links 32. When this occurs the members 13 and 14 are unlocked and forcibly blow apart as shown in Fig. 5 whereupon the bomb assemblies 61 are released and the miniature bombs B dispersed upon a target area as the separable segmental elements of the retaining rings 63 fall away from the miniature bombs.

In view of the foregoing, it will be apparent that a new and improved carrier missile has been devised having a pair of normally locked separable members for releasably maintaining a plurality of bomb assemblies

therein, the locking means comprising a plurality of latches and rotary cams, the cams being actuated by an explosive device to release the latches and forcibly separate the pair of members thereby to release the bomb assemblies upon a target.

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

What is claimed as new and desired to be secured by Letters Patent in the United States is:

1. A carrier bomb adapted to contain a plurality of miniature missiles comprising a casing comprising a pair of normally locked semicylindrical members, a pair of oppositely disposed shafts rotatably supported within said members, a plurality of latches associated with each of said shafts for locking said members and movable to a release position to unlock the members, a plurality of detents pivotally mounted on one of said members in engagement with said latches respectively for maintaining said latches in a locked condition and adapted to move said latches to said release position as said detents are moved a predetermined amount, means on said shaft for moving said detents upon rotation of said shafts, a housing having a pair of separable elements disposed within said casing and carried by said members respectively, an explosive charge arranged within one of said elements, a plunger releasably locked to one element and movable to a release position within the other element in response to an explosive force applied thereto, means for firing said charge and applying said force to said plunger, rack means on said plunger, and complementary means on each of said shafts in engagement with said rack means for rotating said shafts as said plunger is moved to said release position, said plunger being adapted when in said release position to forcibly separate said members subsequently to the release of said latches thereby to disperse said missiles upon a target.

2. A plurality of means for releasably locking a pair of pivoted semicylindrical casings together, each of said means comprising a link pivotally mounted on one of said casings, detents pivotally mounted on the other of said casings, each of said detents having a bifurcated end portion formed thereon, a pin carried by said link and being normally seated in the bifurcated portion of said detents, the detents and link being disposed in alignment for locking said casings together, a rotatable cam normally abutting said detents for effecting unseating of said pin upon rotation thereof thereby to unlock said casings; at least one shaft rotatably secured to said other casing and upon which the rotatable cam of each of said means is fixedly mounted; a gear fixedly mounted on said shaft; an elongated housing secured within each of said casings, said housings being in registry when said casings are locked together, a slidable piston positioned in said housings, at least one arm perpendicularly affixed to said piston; rack teeth formed on the extremity of said arm and operatively engaging said gear; and an ignitor arranged in said housing, said ignitor being adapted to move said plunger within said housing upon ignition thereof, thereby to effect rotation of said shaft and unlocking of said casings, said piston also forcibly effecting opening of said casings subsequent to the unlocking thereof.

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