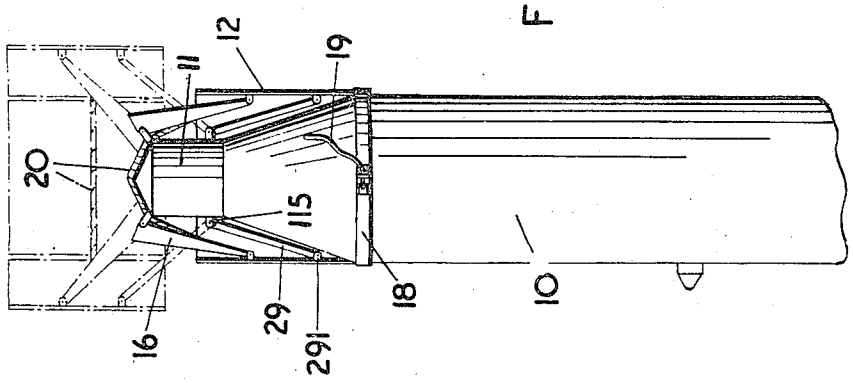
Jan. 17, 1950 W. L. LAX ET AL 2,494,885

BOMB AND OTHER STORES CONTAINER FOR DROPPING FROM AIRCRAFT

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Fig. 7.



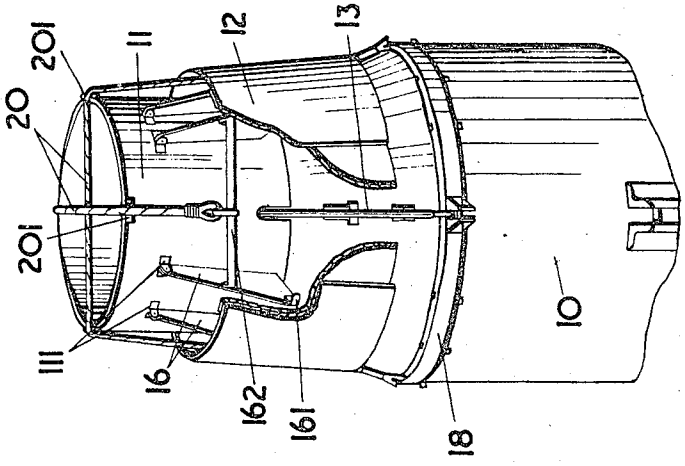


Fig. 1.

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BOMB AND OTHER STORES CONTAINER FOR DROPPING FROM AIRCRAFT

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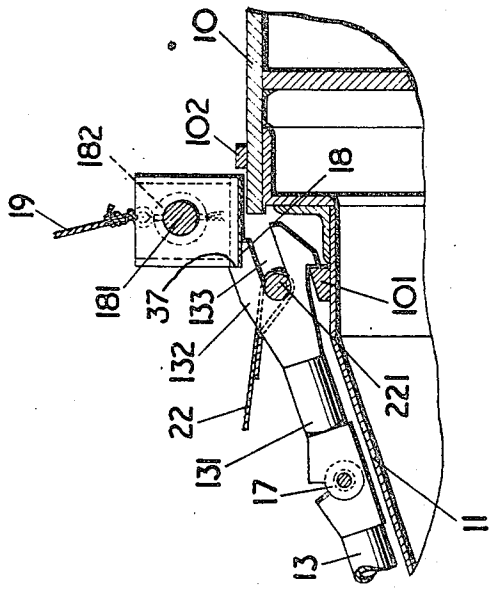


Fig. 6

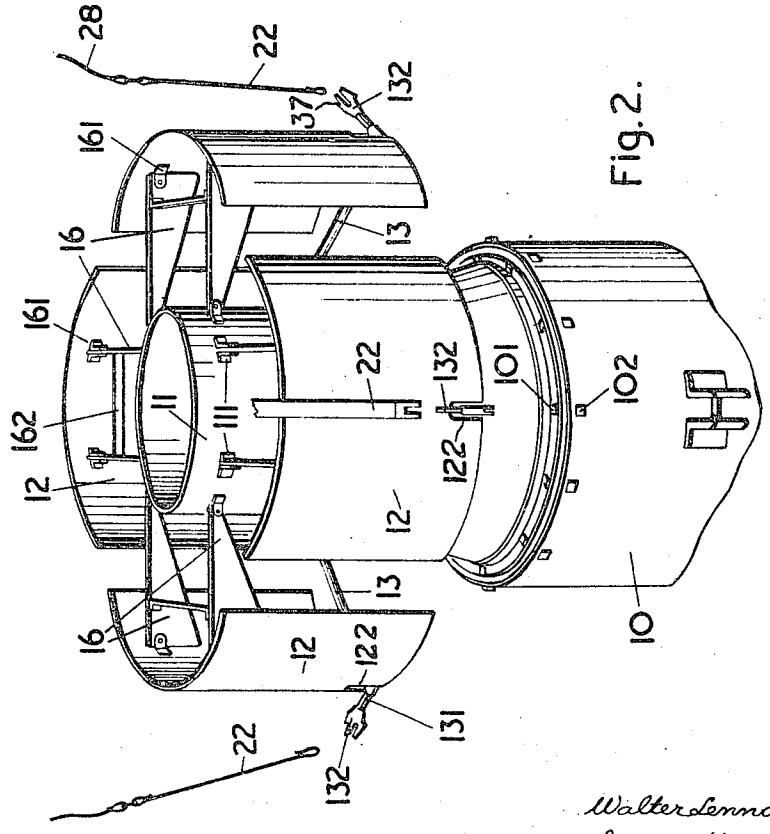


Fig. 2.

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BOMB AND OTHER STORES CONTAINER
FOR DROPPING FROM AIRCRAFT

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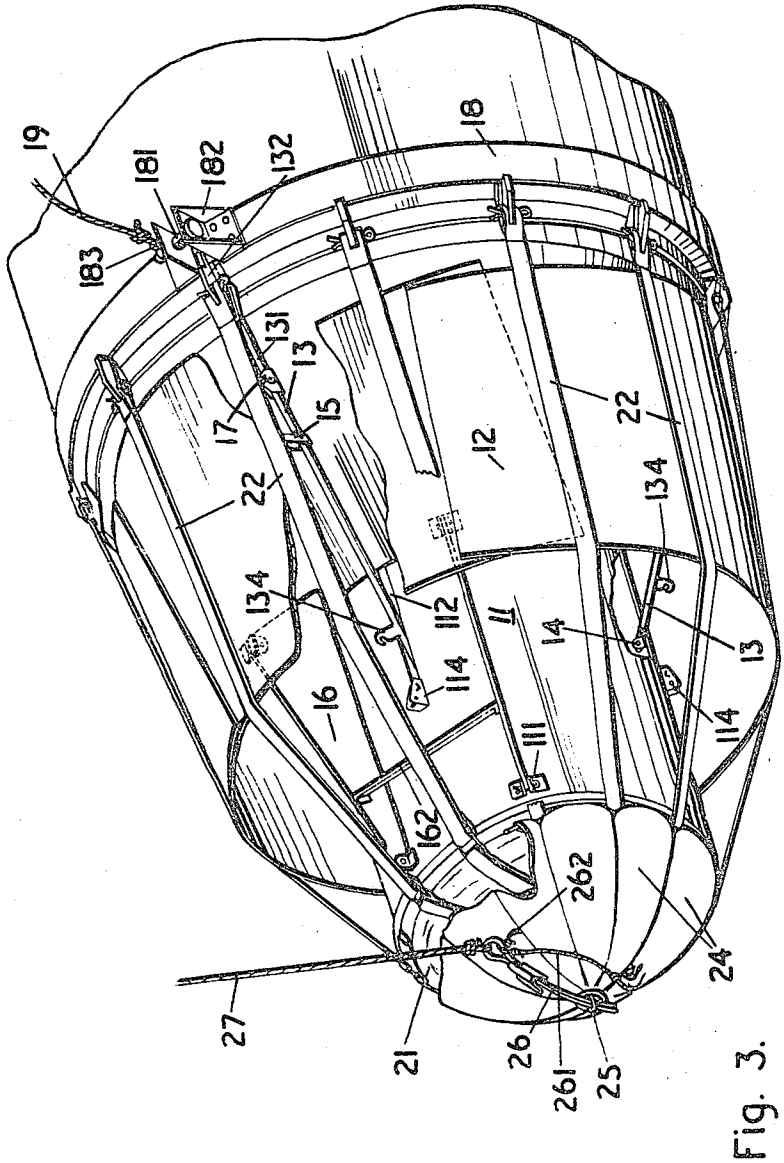


Fig. 3.

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BOMB AND OTHER STORES CONTAINER FOR DROPPING FROM AIRCRAFT

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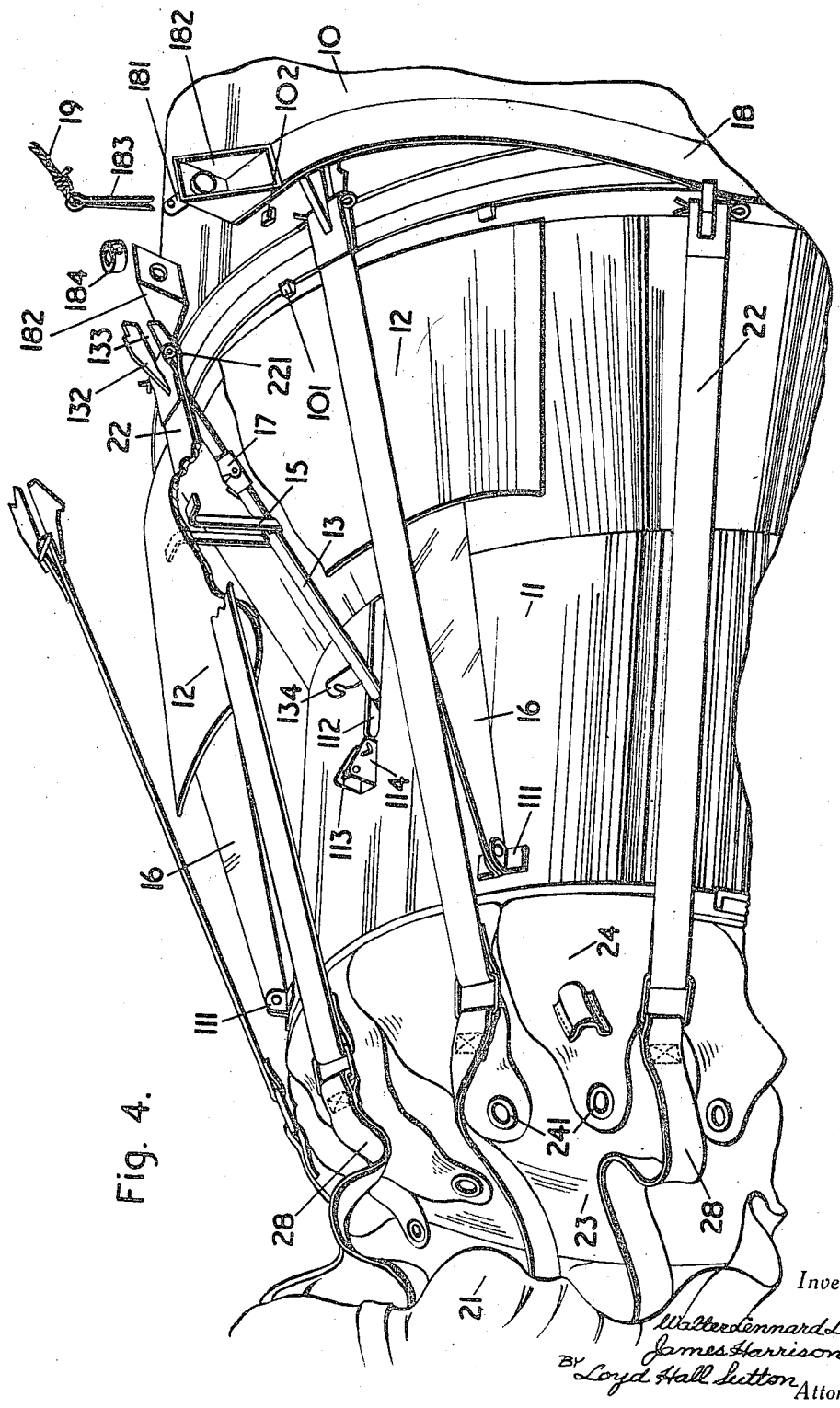


Fig. 4.

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BOMB AND OTHER STORES CONTAINER FOR DROPPING FROM AIRCRAFT

Filed June 29, 1945 5 Sheets-Sheet 5

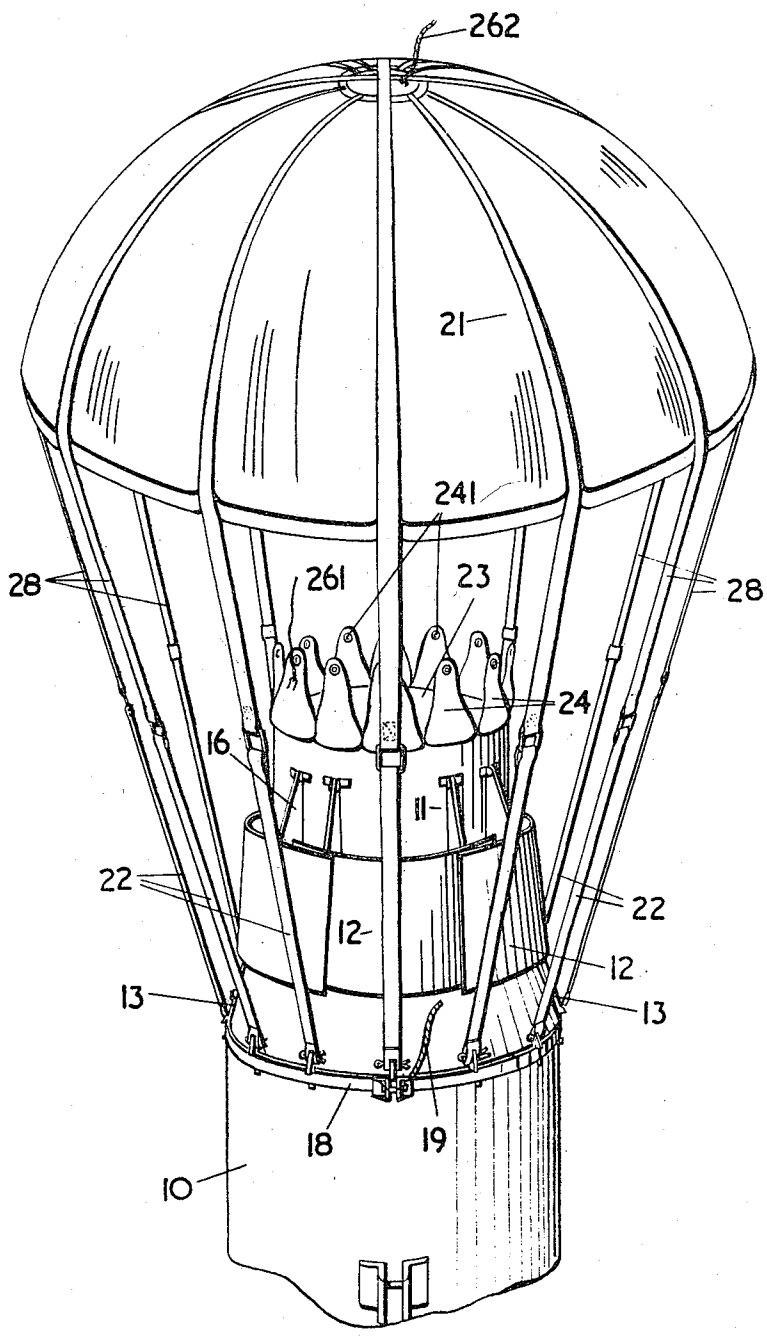


Fig. 5.

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Patented Jan. 17, 1950 2,494,885

UNITED STATES PATENT OFFICE

2,494,885

BOMB AND OTHER STORES CONTAINERS FOR DROPPING FROM AIRCRAFT

Walter Lennard Lax and James Harrison, South Farnborough, England

Application June 29, 1945, Serial No. 602,224
In Great Britain July 1, 1944

11 Claims. (Cl. 102—4)

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This invention relates to improvements in bombs and other stores containers (hereinafter termed "bombs") for dropping from aircraft.

The main object is to provide new or improved stabilising means which will ensure that the bomb occupies a minimum amount of stowage space and yet has maximum corrected movement in flight. A further object is the provision of bomb stabilising means which will facilitate the design of a bomb having the maximum useful capacity in relation to the stowage space occupied. A still further object is the provision of stabilising means for a bomb such that it can be used, at will, either as a projectile which can be aimed accurately or as a projectile with low terminal velocity and which is eminently suitable for dropping either singly or in a cluster upon a target area.

According to the invention, the stabilising means comprises a collapsible or expansile drum tail which is in its folded or retracted state when the bomb is in the stowage position on the aircraft, and which is adapted to be erected or expanded when the bomb is released from the aircraft, the erection or expansion of the drum tail being effected by aerodynamic and/or mechanical means.

The bomb may also be fitted with a parachute and be adapted to be dropped under the control of either the drum tail or the parachute according to the manner in which it is released from the aircraft, the arrangement being such that when released for dropping under parachute control the parachute opens and the drum tail remains inoperative, and when released for dropping under drum tail control the drum tail is brought into the operative position by the opening of the parachute and the latter then frees itself from the bomb so as to leave it under the stabilising control of the drum tail.

The invention will be described with reference to the accompanying drawings:

Fig. 1 is a perspective view of one form of drum tail in the contracted position for stowage.

Fig. 2 is a perspective view of a further form of the invention showing the drum tail erected by a detachable parachute.

Fig. 3 is a perspective view showing the drum tail and parachute in position for stowage.

Fig. 4 is a perspective view showing a portion of the drum tail and parachute at instant of release.

Fig. 5 is a perspective view showing bomb falling under the control of the parachute with the drum tail in inoperative position.

Fig. 6 is a detail view partly in section showing

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the arrangement for retaining the drum tail retracted.

Fig. 7 is a diagrammatic side elevation of a further form of the invention.

The rear end of the bomb or container 10 is provided with a tail tube 11 having connected thereto a plurality of tail segments 12 adapted to lie in a retracted position as shown in Figs. 1 and 3 around the tail tube 11 within the maximum diameter of the bomb 10 during stowage but capable of being expanded to form a drum tail during the descent of the bomb by assuming the position shown in Fig. 2 in which the maximum diameter of the segments is increased above that of the bomb whereby they effect a stabilising moment during the descent.

The segments 12 are affixed to the tail tube 11 by articulated rods 13 pivoted at one end on brackets 14 (Fig. 3) mounted on the interior of the tail tube 11 and at the other on brackets 15 carried on the inner surface of the segments 12. In addition to the rods 13, the segments 12 are supported by arms 16 pivoted to brackets 111 on the tail tube 11 and to brackets 161 on the segments to provide with the rods 13 a parallelogram or like linkage. Stiffening members 162 may be provided between the arms 16 of each segment which assist aerodynamically in the erection of the drum tail. The rods 13 pass through slots 112 in the tail tube 11. The lower portion 131 of the rods 13 is pivoted thereto at 17 and formed with a slotted latched end 132 (Fig. 6) by which the rods 13 are affixed to the bomb 10 when the drum tail is in the retracted position. The bomb is formed with a circumferentially arranged set of projections or lugs 101 behind which the latch portions of the ends 132 engage and with a series of locating members 102 on its outer diameter. The ends 132 are retained in position by a circumferential band 18 engaging recessed portions 37 in the ends 132 and located by the members 102. The ends of the band 18 are secured together by a pin 181 (Figs. 3 and 4) passing through lugs 182 on the band and locked in position by a bifurcated pin 183 passing through a collar 184 and hole in the pin 181. One end of a cord 19 is attached to the pin 183, the other end being connected to the aircraft. Thus when it is desired to release the bomb to fall under the control of the drum tail the pin 183 is withdrawn by the cord 19 and the band 18 falls away, thereby freeing the arms 13 from the bomb 10 to allow the drum tail to expand.

The drum tail may be expanded on release of

the band 18 by springs, elastic cords or bands 20 connected between the members 162 and extending over the end of the tail tube 11 as shown in Fig. 1, rods 201 being welded to the tail tube 11 to prevent chafing of the band 20 on the tail tube, or the drum may be expanded by a parachute 21; certain of the rigging lines 22 of which are connected to the ends 132 of the arms 13 as shown in Figs. 2 to 6.

In some cases it may be desired to provide a bomb which may be released either under the control of the drum tail for stabilisation when falling on a specific target or under the control of a parachute to allow it to reach the ground with a low terminal velocity. This feature of the invention is illustrated in Figs. 2 to 6 of the drawings. The parachute 21 may be contained in a housing in the form of a dished plate 23 fitting loosely upon or in the rear end of the tail tube 11. Petal-like flaps 24 connected to the housing enclose the folded parachute and are held together at their apices by a wire 25 passing through eyelets 241 in each flap with a pin 26 passing through a loop in the wire whereby on withdrawing the pin 26 the flaps 24 are released to allow the parachute 21 to unfurl, or the parachute may be contained in any other known type of housing. The pin 26 is maintained in position by a thin cord or weak link 261. Also attached to the pin 26 is a static cord 27 by which the pin 26 is withdrawn on rupture of the weak link 261. The other end of the static cord 27 is connected to the aircraft. One end of a further cord 262 is also attached to the pin 26, the other end of which is attached to the crown of the parachute 21. This cord 262 is somewhat stouter and longer than the cord 261 so that on withdrawal of the pin 26 this cord tautens after rupture of the cord 261 and assists in the withdrawal of the parachute from the housing after which it, in turn, is ruptured by the pull on the static cord 27.

Shroud lines 28 from the parachute 21 are connected to the rigging lines 22 to suspend the bomb from the parachute (Fig. 5) where it is dropped with the drum tail unexpanded, or to move the drum into its expanded position on release of the band 18 (Figs. 2 and 4).

When the bomb is to be dropped under the stabilising control of the drum tail the cord 19 withdraws the pin 183 to free the band 18 on release of the bomb from the aircraft and the static cord 27 withdraws the pin 26 allowing the parachute 21 to unfurl (Fig. 4). The rigging lines 22 connected to the ends 132 of the arms 13 tauten thereby pivoting the ends 132 upwards about joint 17 and raising them to expand the tail segments 12 into their erected position, this operation being assisted by the air flow around the bomb 10 once the diameter of the drum tail has been increased beyond that of the bomb. Slots 122 may be provided in the segments 12 to allow the articulated portion 131 of the rod 13 to move sufficiently to free the rigging lines 22. When the drum tail is fully expanded, pins 221 (Fig. 6) by which the rigging lines 22 are connected to the ends 132 slide out of slots 133 therein thereby releasing the parachute 21 from the bomb 10 which thereafter falls under the stabilising control of the drum tail. When the drum tail is fully expanded hook members 134 on the rods 13 engage locking pins 113 mounted on brackets 114 carried by the tail tube 11 to retain the drum tail in the expanded position. The rigging lines from the parachute 21 which

are connected to arms 13 fly loose on the release of the band 18 (Fig. 4).

If the bomb is to be dropped under the control of the parachute 21 (Fig. 5), the cord 19 is released from the aircraft and therefore the pin 183 is not withdrawn and the band 18 remains in position around the bomb 10 thereby preventing the erection of the drum tail. The static cord 27 releases the pin 26 as above described to allow the parachute 21 to unfurl and the bomb descends suspended from the parachute on the rigging and shroud lines 22, 28 with a low terminal velocity.

In the modification shown in Fig. 7 the drum tail is retained in the retracted position for stowage by the band 18 and raised into the erected position on release of the band by elastic cords 20 as hereinbefore described with reference to Fig. 1, but the rods 13 of the parallelogram motion are replaced by links 29 pivoted at one end to brackets 291 on the inside of the segments and at the other end to the brackets 115.

It will be seen that the provision of a drum tail which is retractable within the maximum lateral or diametrical dimension of the bomb, and which when erected affords an effective stabilising control, facilitates the designing of a bomb which, for a given stowage space occupied, will have the maximum useful capacity.

What we claim is:

1. A device adapted for dropping from aircraft comprising a body portion and tail tube in combination with an expansile drum tail of greater diameter when expanded than the bomb, a plurality of segments forming the drum tail and adapted when contracted to lie within the maximum diameter of the bomb, a parallelogram linkage by which each segment is connected to the tail tube, a band extending circumferentially of the body to maintain the linkage and drum collapsed during stowage, pins retaining the ends of the band together, a cord connected to one of the pins by which it is withdrawn to release the band and a parachute connected to the linkages by which said linkages and segments are moved to erect the drum tail on the release of the band.

2. A device adapted for dropping from aircraft as in claim 1, slotted articulated arms forming one member of the parallelogram linkages, and rigging lines from the parachute detachably connected to the lower ends of the slotted arms by which the tail drum is erected after release of the retaining band.

3. A device adapted for dropping from aircraft as in claim 1, slotted articulated arms forming one member of the parallelogram linkages, rigging lines from the parachute detachably connected to the lower ends of the slotted arms by which the tail drum is erected after release of the retaining band, a housing for the parachute, petal-like flaps by which the parachute is enclosed for storage, an anchor pin by which the flaps are held in the closed position and a static cord for withdrawing the pin and releasing the parachute.

4. A device adapted for dropping from aircraft comprising a body portion and tail tube in combination with an expansile drum tail of greater diameter when expanded than the bomb, a plurality of segments forming the drum tail and adapted when contracted to lie within the maximum diameter of the bomb, a parallelogram linkage by which each segment is connected to the

tail tube, a band extending circumferentially of the body to maintain the linkage and drum collapsed, articulated arms forming one member of the parallelogram linkage, a parachute, rigging lines from the parachute connected to the lower ends of the arms, further rigging lines from the parachute to the retaining band, a housing for the parachute, petal-like flaps by which the parachute is enclosed for stowage, an anchor pin by which the flaps are held in the closed position and a static cord for withdrawing the pin and releasing the parachute.

5. A device adapted for dropping from aircraft comprising a body portion, a stabilising tail operatively connected to said body portion, a parachute, linking means between said parachute and said body portion, both said tail and said parachute being collapsed in inoperative position prior to dropping of the device from the aircraft, and selectively actuatable means for either rendering said parachute effective to control the fall of said device after it has been dropped and retaining said stabilising tail in inoperative position, or for expanding said stabilising tail to operative position and releasing said parachute from the device so that the fall of the latter is controlled by said tail only.

6. A device adapted for dropping from aircraft comprising a body portion, an expansile tail operatively connected to said body portion, a parachute, connecting means between said parachute and said body portion, said parachute being collapsed in inoperative position prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, means for normally retaining the elements of said tail in retracted position, means operable at will prior to dropping of the device for releasing the elements of said tail to permit expansion of the tail, means for effecting expansion of the tail, and means operable as the result of expansion of said tail for freeing said parachute from connection to said body portion after said tail has been expanded.

7. A device adapted for dropping from aircraft comprising a body portion, an expansile tail operatively connected to said body portion and having elements normally retained in retracted position, a parachute, means for housing said parachute in collapsed condition prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, connecting means between said parachute and the elements of said tail for erecting said tail after said parachute hs unfurled, means for releasing the elements of said tail for erection by the action of said parachute, and means for freeing said parachute from connection to the elements of said tail after the tail has been erected.

8. A device adapted for dropping from aircraft comprising a body portion, a plurality of elements forming an expansile drum tail operatively connected to said body portion, means for normally retaining said elements in retracted condition, a parachute, means for housing said parachute in collapsed condition prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, connecting means between said parachute and said elements for erecting said tail after said parachute has been unfurled, means for releasing said elements for erection by the action of said parachute, and means for freeing said parachute from connection to said elements after said tail has been erected.

9. A device adapted for dropping from aircraft comprising a body portion, a plurality of elements mounted for pivotal movement in relation to said body portion to form an expansile tail for the stabilisation thereof, means normally retaining said elements in retracted condition, a parachute, means for housing said parachute in collapsed condition prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, connecting means between said parachute and said elements for erecting said tail after said parachute has unfurled, and means for releasing said elements for erection by the action of said parachute.

10. A device adapted for dropping from aircraft comprising a body portion, a plurality of elements pivotally mounted in relation to said body portion to form a stabilising tail therefor, means normally retaining said elements in retracted condition, a parachute, means for housing said parachute in collapsed condition prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, connecting means between said parachute and said elements for erecting said tail after said parachute has unfurled, means for releasing said elements for erection by said parachute, and means operable upon erection of said elements to free said parachute from connection to said elements.

11. A device adapted for dropping from aircraft comprising a body portion, a plurality of arcuate members, a parallelogram linkage connecting each of said arcuate members to said body portion, a band extending circumferentially of said body portion to maintain said linkages and said arcuate members in collapsed condition, locking means for releasably retaining the ends of said band in juxtaposition, means for effecting the release of the ends of said band, a parachute, means for housing said parachute in collapsed condition prior to dropping of the device from the aircraft, means for releasing said parachute to permit it to unfurl after said device has been dropped, and connecting means between said parachute and said arcuate members and linkage for erecting the latter to form a stabilising tail for said body portion after said parachute has unfurled.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,339,188	Frecska	May 4, 1920
1,890,175	Brandt	Dec. 6, 1932
2,349,735	Kimmel	May 23, 1944
2,397,114	Anzalone	Mar. 26, 1946

FOREIGN PATENTS

Number	Country	Date
556,302	France	Apr. 11, 1923
612,030	France	July 24, 1926
618,654	France	Dec. 20, 1926
473,958	Great Britain	Oct. 22, 1937