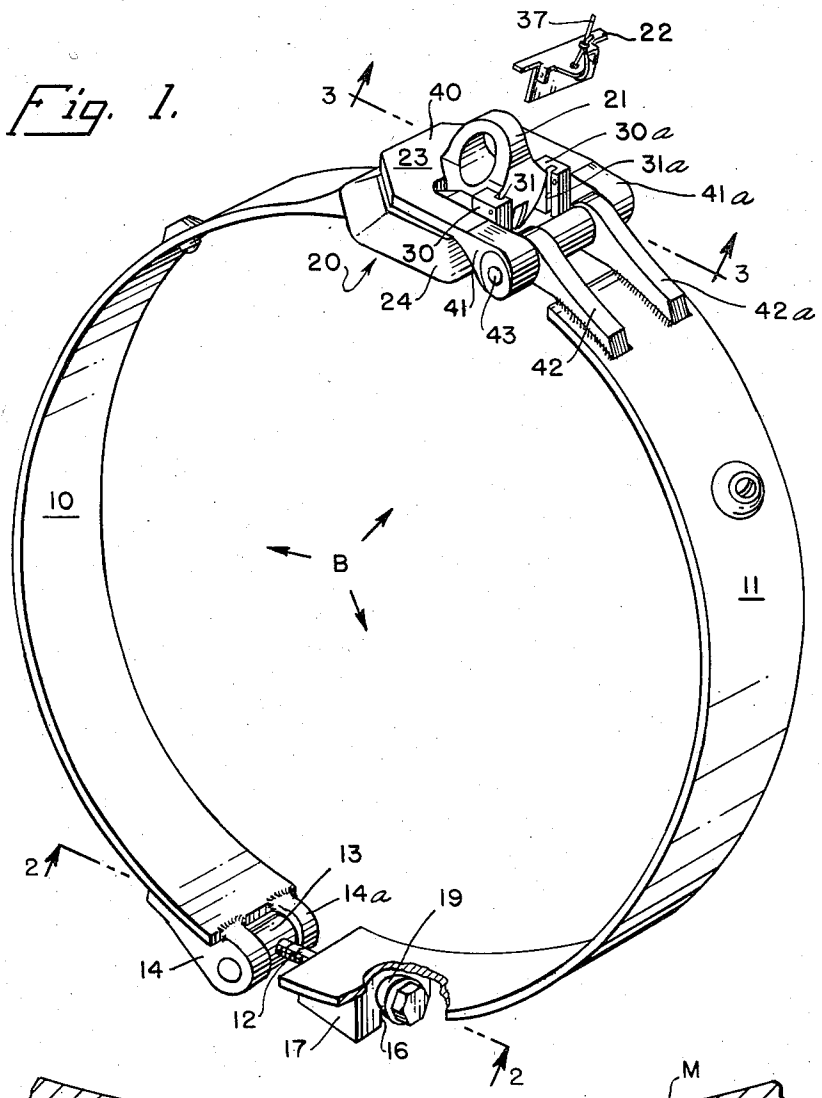
March 11, 1958 A. H. BARROWMAN 2,826,119

TORPEDO SUSPENSION BAND

Filed Nov. 13, 1953 2 Sheets-Sheet 1

Fig. 1.



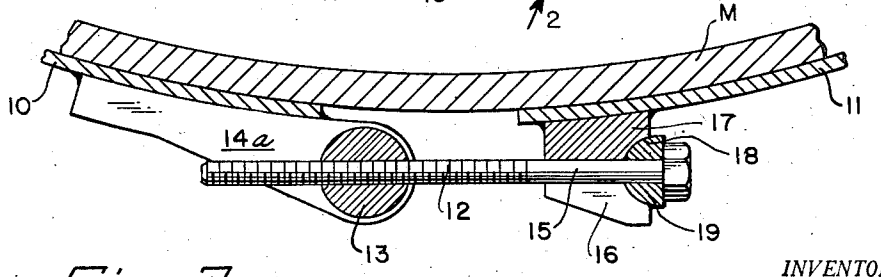


Fig. 2.

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TORPEDO SUSPENSION BAND

Filed Nov. 13, 1953 2 Sheets-Sheet 2

Fig. 3.

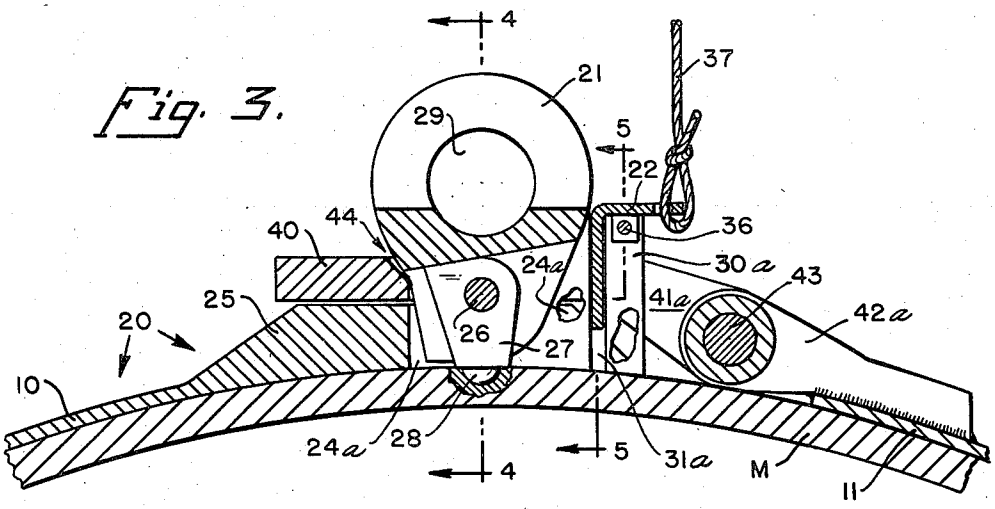


Fig. 4.

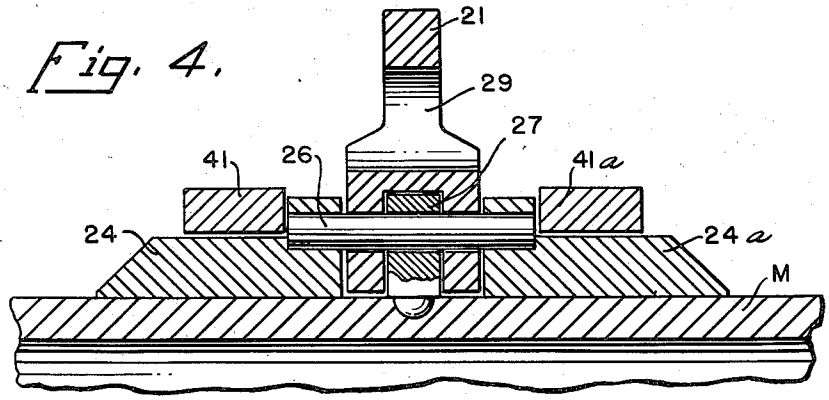
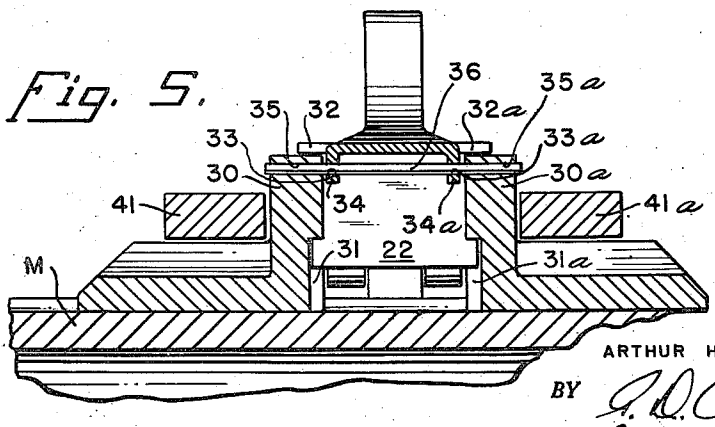


Fig. 5.



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TORPEDO SUSPENSION BAND

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5 Claims. (Cl. 89—1.5)

This invention relates to improvements in breakaway bands for suspending and launching missiles, such as torpedoes, from aircraft.

It has become common practice to carry missiles, such as torpedoes, by aircraft, suspending same by breakaway suspension bands which separate from the torpedo after having been dropped, thus permitting the torpedo to be propelled through water without objectionable protuberances which would otherwise interfere with its sonic guidance controls and also adversely affect its speed. Bands of this type are disclosed in U. S. patent application of John M. Stockard, Serial No. 331,124, filed January 13, 1953, now abandoned, and U. S. patent application of Herman J. Niedling, Serial No. 324,161, filed December 4, 1952, now U. S. Patent No. 2,786,392. In these devices cooperating camming surfaces are employed which become effective to separate the band from a missile due to the tension in the band when the missile is dropped from an aircraft, the separation being prevented while the band is secured to the aircraft, by engagement of cooperating surfaces on the band and aircraft. While these devices are simple in construction and highly satisfactory in many installations there are other installations where they are not entirely satisfactory since there is no positive control over the distance below the aircraft that separation occurs with the possibility, in some instances, of the separated bands striking rearward portions of the launching aircraft.

One of the objects of this invention is to provide a breakaway band for a missile which is conditioned to automatically release from the missile after the latter has dropped a safe distance to prevent the separated band from striking the launching aircraft.

Another object is to provide a breakaway band with cammingly engageable surfaces which effect separation in a novel manner.

Further objects, advantages and salient features will become more apparent from the description to follow, the appended claims, and the accompanying drawing, in which:

Fig. 1 is a partially exploded and broken away perspective of the breakaway band forming the subject of the invention;

Fig. 2 is an enlarged section taken on line 2—2, Fig. 1, showing a portion of a missile associated with the band;

Fig. 3 is an enlarged section taken on line 3—3, Fig. 1, portions being broken away, showing a portion of a missile suspended by the band;

Fig. 4 is a section taken on line 4—4, Fig. 3, portions being broken away; and

Fig. 5 is a section taken on line 5—5, Fig. 3.

Referring in detail to the drawing, and particularly Figs. 1 and 2, a breakaway band B, which forms the subject of the invention, comprises two substantially semicircular portions 10, 11 which are secured together at their lower ends by a bolt 12 which threadedly engages a trunnion 13, pivotally carried at its ends by spaced

lugs 14, 14*a*, rigidly affixed to the lower end of band portion 10, the bolt having a shank portion 15 extending through a downwardly open slot 16 in lug 17, rigidly affixed to the lower end of band portion 11. Slot 16 is provided with an enlarged counterbore 18 at its upper outer end which receives an enlarged collar portion 19 on the bolt which retains the bolt in position so long as the band is tensioned. When no tension exists in the band, however, portion 19 may disengage from the counterbore, permitting shank portion 15 of the bolt to pass out of the slot, thus permitting separation of the band portions. This construction is conventional in breakaway bands of the type to which this invention relates and the details form no part of the invention, per se, it being understood that this construction is exemplary only of a separable band tensioning device which may be employed with the novel construction to now be described.

As shown in Fig. 1, the novel construction just referred to comprises, in general, a saddle member 20, rigidly affixed to the upper end of band portion 20, a suspension lug 21, pivotally carried by the saddle member, a locking plate or key 22, removably carried by the saddle member, and a yoke or buckle member 23 pivotally carried by the upper end of band portion 11.

Referring to Figs. 3 to 5, saddle member 20 is generally U shaped in plan, having a pair of spaced leg portions 24, 24*a* connected by a bight portion 25. Suspension lug 21 is disposed in the space formed by legs 24, 24*a* and pivotally connected to the legs by a pivot pin 26, the ends of which are affixed as by welding to the legs, as best shown in Fig. 4. This pin also pivotally carries a positioning member 27 having a spherical portion 28 at its lower end which engages in a mating aperture in missile M to locate the latter in a predetermined position relative to an aircraft carrying same. Suspension lug 21 is provided with an aperture 29 which receives a conventional launching hook or shackle (not shown) carried by the aircraft.

The outer or right ends (Figs. 1 and 3) of legs 24, 24*a* of saddle member 20 are provided with upwardly extending projections 30, 30*a*, these projections and the legs having confronting grooves 31, 31*a* therein, respectively, which slidably receive key 22, formerly referred to. Key 22 is blanked and formed as a stamping having laterally projecting ears 32, 32*a* which rest upon the tops of projections 30, 30*a*, respectively, to limit downward movement of the key in the slot and facilitate alignment of apertures 33, 33*a* in downwardly projecting ears 34, 34*a* with apertures 35, 35*a* in projections 30, 30*a* so that a locking pin or wire 36 may be inserted through the various apertures to prevent unauthorized upward movement of the key in its retaining grooves. The lower end of a lanyard 37 is tied to the key in any suitable manner, such as illustrated in Figs. 1 and 3. Yoke or buckle member 23 is generally U shaped in plan having a bight portion 40 and a pair of legs 41, 41*a* extending from the bight portion, the ends of these being pivotally connected to lugs 42, 42*a*, rigidly affixed to the upper end of band portion 11, by a pivot pin 43 extending through the legs and lugs.

Referring to Fig. 3 it will be observed that the pivotal axis of pin 43 is below the zone of contact 44 between bight 40 and suspension lug 21 and since the band is in tension it tends to cammingly urge the suspension lug in a clockwise direction around the axis of pivot pin 26. This urge, however, is resisted by abutment of the upper left edge of key 22 with the right side of the suspension lug. It will be apparent, therefore, that so long as key 22 is disposed in its locking position in grooves 31, 31*a*, the buckle member cannot rotate the suspension lug. It will be apparent, however, that when key 22 is removed

from its locking position and no weight is carried by the suspension lug the latter may pivot clockwise and the buckle fly off over the top of same thus releasing the band portions **10**, **11** from the securement therebetween and permitting the band to separate from the missile.

In operation, a pair of the described devices are disposed on a missile, such as torpedo, and suitably tensioned by bolts **12**, the safety pins **36** being in place as shown. The suspension lugs are then disposed on well known hooks or shackles of the aircraft and the upper ends of the lanyards tied to the aircraft with a desired amount of slack therein. The safety pins are then removed and the breakaway bands are now in condition to disengage from the missile when it is dropped from the aircraft. When dropped by the hooks, and when the lanyards become taught, they remove the keys **22** and permit the buckle members to pass over the tops of the suspension lugs as previously described. The lengths of the lanyards are preferably so chosen that they do not remove the keys until the missile has fallen a sufficient distance below the aircraft to prevent the separated bands from striking the aircraft.

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 specifically described.

What is claimed is:

1. Apparatus for suspending a missile from an aircraft having a bombrack and a movable missile supporting hook associated therewith, comprising; a flexible tensioned band adapted to substantially encircle the missile having separable upper ends, one of the upper ends having a saddle member affixed thereto having a pair of spaced portions, a suspension lug having a lower portion disposed between said spaced portions and pivotally connected thereto for movement about an axis substantially parallel to the axis of the missile, said lug having an upstanding portion with an aperture therein through which the hook is adapted to removably extend, a buckle member having a bight portion and a pair of spaced legs extending from the bight portion, the ends of the legs being pivotally connected to the other upper end of the band for swinging movement about an axis substantially parallel to the axis of the missile, the legs straddling front and rear sides of the lug, the bight portion adapted to cammingly engage the lug and tend to rotate it in a direction to permit disengagement of the buckle member from the lug, the weight of the missile, while suspended from the hook, preventing the rotation aforesaid, the bight of the buckle member adapted to pass over the top of the lug and release the band from the missile when the missile is released from the hook.

2. Apparatus for suspending a missile from an aircraft having a bombrack and a movable missile supporting hook associated therewith, comprising; a flexible tensioned band adapted to substantially encircle the missile having separable upper ends, one of the upper ends having a saddle member affixed thereto having a pair of spaced portions, a suspension lug having a lower portion disposed between said spaced portions and pivotally connected thereto for movement about an axis substantially parallel to the axis of the missile, said lug having an upstanding portion with an aperture therein through which the hook is adapted to removably extend, a buckle member having a bight portion and a pair of spaced legs extending from the bight portion, the ends of the legs being pivotally connected to the other upper end of the band for swinging movement about an axis substantially parallel to the axis of the missile, the legs straddling front and rear sides of the lug, the bight portion adapted to cammingly engage the lug and tend to rotate it in a direction to permit disengagement of the buckle member from the lug, a locking key removably carried by said spaced portions of the saddle member engaging the lug and preventing its rotation aforesaid, and a lanyard connected at one end to the key and at its other end to the aircraft, the construction being such that after the missile is released from the hook the lanyard becomes taught and removes the key from the saddle member, permitting the bight of the buckle member to pass over the top of the lug and release the band from the missile.

3. Apparatus in accordance with claim 2 wherein said spaced portions include confronting upwardly open slots, and said key is a plate slideably disposed in said slots.

4. Apparatus in accordance with claim 2 including a missile positioning member pivotally carried by the lug having a lower portion adapted to project into a mating depression in the top of the missile.

5. A breakaway suspension band for aircraft carried missiles comprising; a tensioned band adapted to substantially encircle a missile and having separable upper ends, an apertured suspension lug pivotally carried by one of the upper ends and engageable with a pivoted member carried by the other of the upper ends for preventing separation of said ends, said lug and said member being pivoted about parallel axes extending in directions substantially perpendicular to the plane of the band, a removable key carried by said one of the upper ends engaging the lug and preventing pivoted movement thereof and adapted to be removed from said one of the upper ends upon outward radial movement in the plane of the band, a lanyard secured at one end to the key and at its other end to the aircraft adapted to remove the key from the band after the missile and band have bodily dropped together a predetermined distance below the aircraft, permitting said lug to pivot out of engagement from said pivoted member and said ends to separate under urge of tension in the band, the lug and pivoted member remaining affixed to the respective ends of the band after separation thereof.

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