Nov. 17, 1959 L. D. BONBRAKE 2,913,198

SONOBUOY DISPENSER

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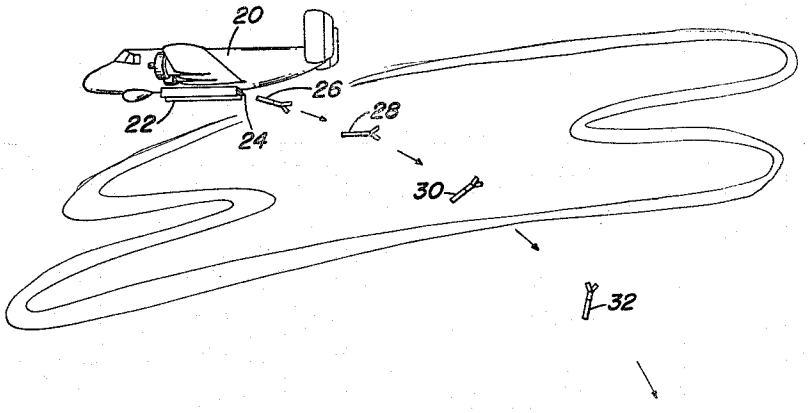


FIG. 1

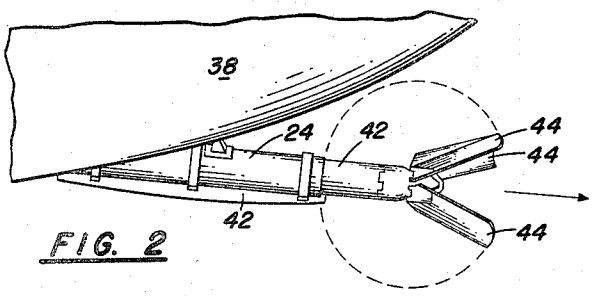
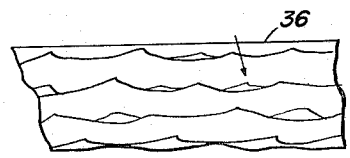


FIG. 2



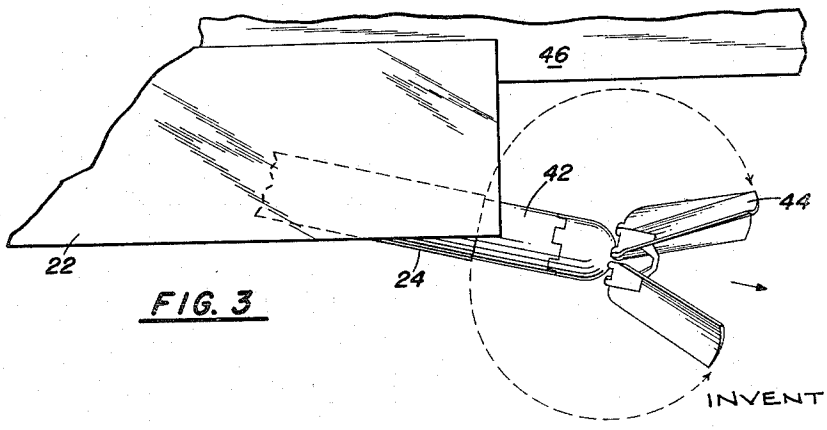


FIG. 3

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SONOBUOY DISPENSER

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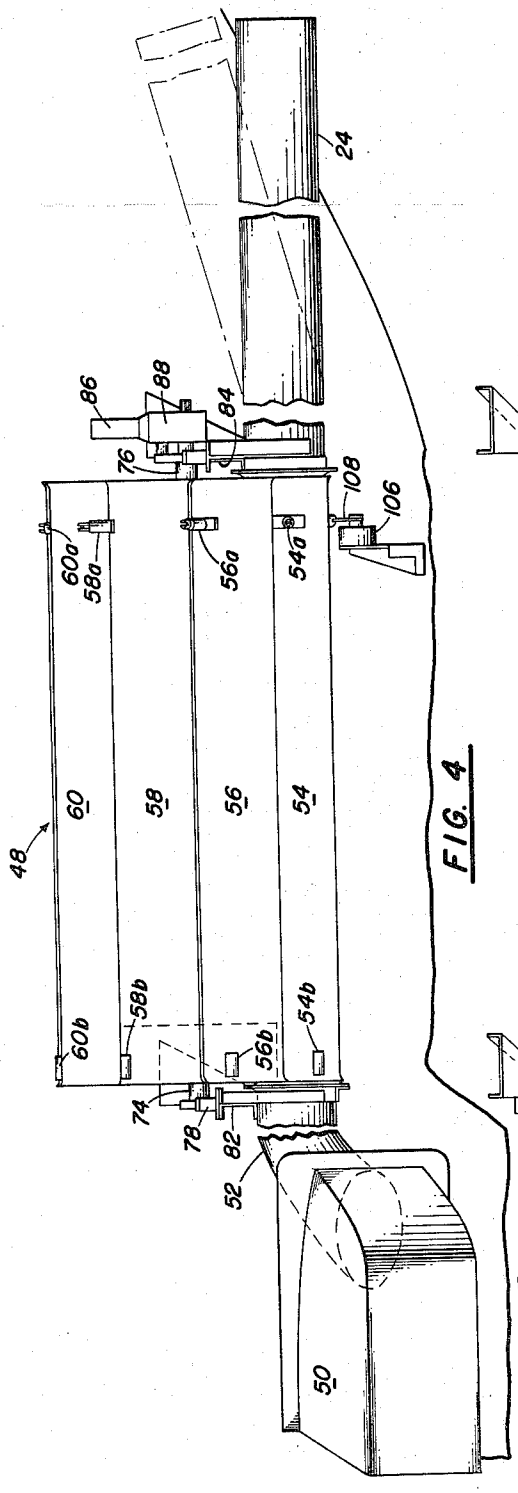


FIG. 4

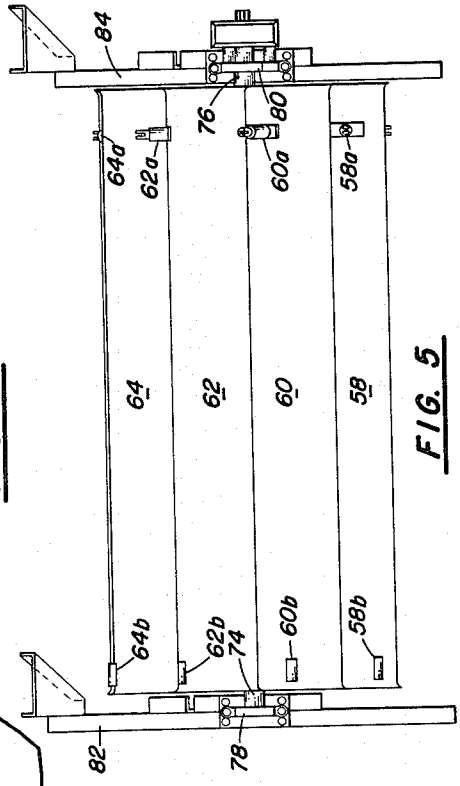


FIG. 5

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SONOBUOY DISPENSER

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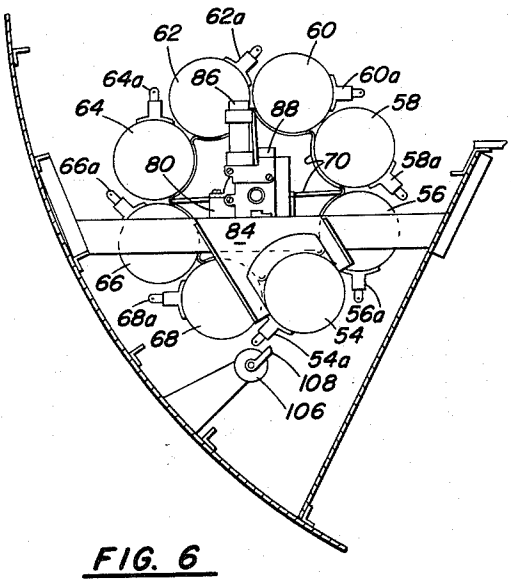


FIG. 6

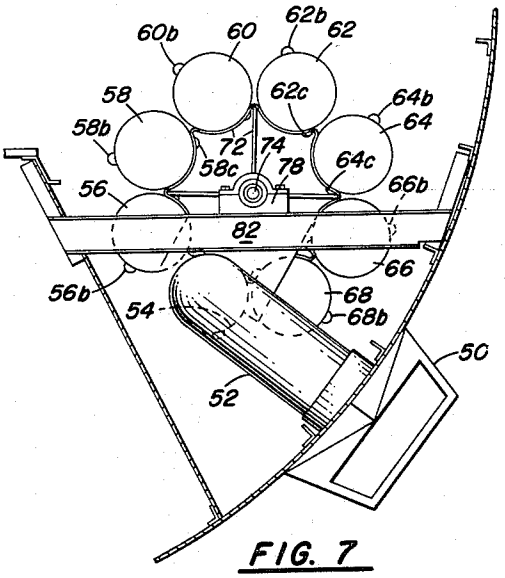


FIG. 7

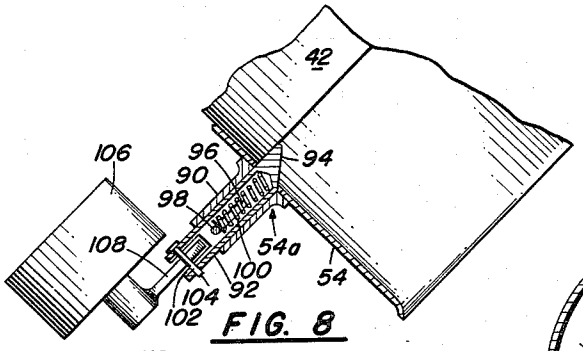


FIG. 8

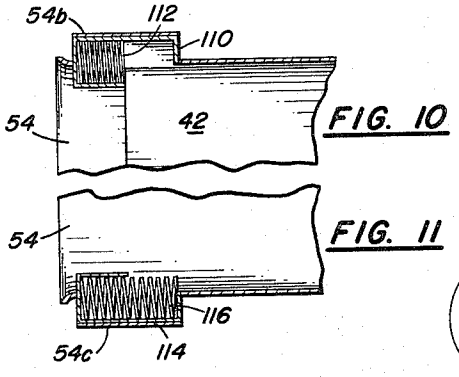


FIG. 10

FIG. 11

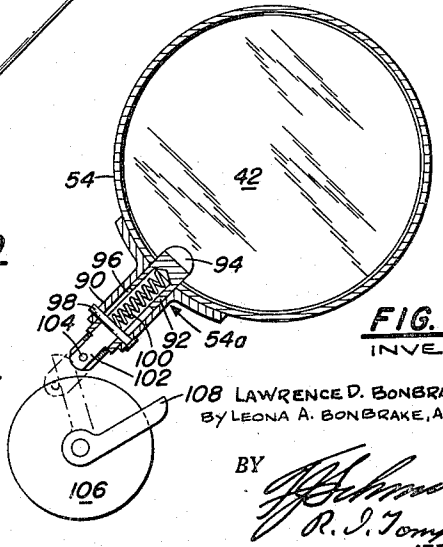


FIG. 9

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United States Patent Office 2,913,198 Patented Nov. 17, 1959

2,913,198

SONOBUOY DISPENSER

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Application October 4, 1955, Serial No. 539,040

4 Claims. (Cl. 244—137)

This invention pertains to a sonobuoy dispenser and more particularly to a sonobuoy dispenser having a revolving storage drum located within an aircraft between a plenum chamber and a discharge tube.

In depositing sonobuoys or other objects onto the sea, it is desirable that they be placed in a definite pattern, and that they be handled with as little inconvenience as possible. Up to now, there has been no ready means to accomplish this, the sonobuoys having been merely pushed or kicked from a plane moving at a speed in the 200–300 knot class. This sometimes resulted in damage to the plane or sonobuoy. Also, at such speeds, even a slight delay will cause an inaccuracy in the pattern.

It is therefore an object of the present invention to overcome these and other disadvantages by providing a sonobuoy dispenser which is completely automatic in its operation.

Another object of the invention is to provide a sonobuoy dispenser wherein the sonobuoys are stored within the aircraft and are ready for instantaneous use.

A further object of the invention is the provision of a sonobuoy dispenser wherein the sonobuoys are automatically ejected clear of the aircraft.

Still another object is to provide a sonobuoy dispenser having a minimum weight and small power requirements.

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 a view of an airplane equipped with the dispenser of the present invention and a plurality of sonobuoys decending therefrom,

Fig. 2 shows a portion of the fuselage of an airplane and a sonobuoy ejection tube extending therefrom,

Fig. 3 shows a portion of the fuselage of an airplane having a torpedo or bomb bay, and a sonobuoy ejection tube extending therefrom,

Fig. 4 is a side view of a sonobuoy dispenser made in accordance with the invention,

Fig. 5 is a top view thereof,

Fig. 6 is a view of the dispenser of Fig. 4 looking from the rear of the aircraft,

Fig. 7 is a view of the dispenser of Fig. 4 looking from the front of the aircraft,

Fig. 8 is a side view, partially in cross-section of the releasable detent for the sonobuoy,

Fig. 9 is an end view of the detent means of Fig. 8 partially in cross section,

Fig. 10 is a cross-sectional view of the spring stop for the sonobuoy, showing the spring stop compressed, and

Fig. 11 is a view similar to Fig. 10, but with the spring stop uncompressed.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 1 an aircraft 20 having bomb or torpedo bay doors 22 open, and a sonobuoy dispensing tube 24 extending therefrom. A plurality of sonobuoys are shown falling from aircraft 20; however, the relationship of the sonobuoys on the drawing is not necessarily an accurate representation, since the time delay between the dispensing of the sonobuoys may be varied at will. Sonobuoy 26 is shown just after it has left the tube 24 and sonobuoy 28 is shown in an approximately level attitude. Sonobuoy 30 is shown still further behind the aircraft 20, its nose beginning to point downwardly, sonobuoy 32 is shown in the almost vertical position and sonobuoy 34 is in the vertical position, just about to strike the water 36.

In Fig. 2, an ejection tube 24 is shown extending from the fuselage 38 of an airplane which does not have a bomb bay or torpedo bay. Instead, its rear underside has been modified to permit the depression of tube 24 and its carrier 40 from a recessed position. The sonobuoy 42 shown leaving tube 24 is of a type having autorotation fins 44 which are pivoted to lie against the body of the sonobuoy 42 in the storage position, and to pivot to the position shown by spring action upon clearing the tube 24. The dotted circle indicates that tube 24 is so positioned with relation to fuselage 38 that the fins 44 will not strike the fuselage 38 during their pivoting motion. Tube 24 is substantially parallel to the slipstream.

Fig. 3 shows ejection tube 24 extending from an aircraft fuselage 46, tube 24 having been lowered from within the bomb or torpedo bay upon opening of the doors 22. Sonobuoy 42 is shown emerging from the tube 24, and the dotted circle, as before, shows that the tube 24 is so positioned that the pivoting fins 44 will not strike the fuselage 46.

In Fig. 4 there is shown the dispenser 48, a plenum chamber 50 and connecting tube 52, and ejection tube 24, the stored position of which is indicated by dot and dash lines. The dispenser 48 consists primarily of a plurality of holder tubes arranged in a circular pattern, as may be seen from Figs. 6 and 7. Fig. 7 also shows the plenum chamber 50 to be placed exteriorly of the aircraft. The holder tubes 54, 56, 58, 60, 62, 64, 66 and 68 are preferably made of a paper base, phenolic covered material, and are held in relative position by a rear frame 70 and a front frame 72. Frames 70 and 72 are in turn supported by a front shaft 74 and rear shaft 76 mounted in bearings 78 and 80. Front bearing 78 is supported by bar 82 which is attached to the frame members of the aircraft and rear bearing 80 is supported by bar 84 also attached to frame members of the aircraft. Hence, it will be seen that the holder tubes 54 to 68 may be rotated about shafts 74 and 76.

Rotation is accomplished in a step-by-step manner by means of a mechanism including a motor 86 and appropriate gearing within gear box 88, the details of which do not form a part of the present invention.

Each of the holder tubes 54 to 68 has a detent 54*a* to 68*a* and diametrically opposed spring stops 54*b* and 54*c* to 68*b* and 68*c*. Referring to Fig. 8, there is shown a fragment of the rear end of holder tube 54 with a sonobuoy 42 therein and detent 54*a* thereon; detent 54*a* comprises a sleeve 90 fixed to the exterior of the holder tube 54, and having therein a moveable latch member 92. Latch member 92 has a rearwardly facing beveled face 94, and is urged toward the interior of holder tube 54 by means of a spring 96 abutting against a bar 98 which passes through a slot 100 in the latch member 92. At the end of latch member 92 opposite beveled face 94 there is a bifurcated portion 102 through which a pin 104 extends. A solenoid 106 is placed in juxtaposition with tube 54 so that arm 108, when actuated, will contact pin 104 and withdraw latch member 92, as shown in Figs. 8 and 9. As may be seen from Figs. 4 and 6, the solenoid 106 is mounted in the aircraft so that it will cooperate with that detent 54*a* to 68*a* which is in position upon rotation of dispenser 48.

At the front end of each of the holder tubes 54 to 68 are the diametrically opposed spring stops 54*b* and 54*c* to 68*b* and 68*c*, as above noted. In Fig. 10 there is shown the front end of holder tube 54 with a sonobuoy 42 therein. The spring stop 54*b* is seen to comprise a generally cylindrical body 110 mounted on the holder tube 54 so that approximately one half of it is outside the holder tube 54 and one half is inside. The rear inside quarter of body 110 is cut away, and a spring 112 is within the body 110. When a sonobuoy is inserted into holder tube 54, its nose engages with spring 112 and compresses it, until the nose engages with the body 110 within the holder tube 54, and is stopped thereby. In Fig. 11, holder tube 54 is empty, and the spring stop 54*c* is seen to be identical with spring stop 54*b*, comprising a cylindrical body 114 within which is a spring 116. Spring 116 is uncompressed.

In operation, a sonobuoy is inserted nose first and fins folded through dispensing tube 24 into one of the holder tubes. Assuming this to be holder tube 54, the nose engages with beveled face 94 and depresses latch member 92. The sonobuoy then slides forward until its nose engages with springs 112 and 116, compressing them, and is finally stopped by cylindrical bodies 110 and 114, the appearance being as in Fig. 10. Meanwhile, the rear of the sonobuoy has passed the detent 54*a*, and spring 96 has caused latch member 92 to return to the position shown in Fig. 8. Thus, the sonobuoy is firmly held in the holder tube. The dispenser 42 is then rotated until another holder tube is in line with dispenser tube 24, and that holder tube is loaded as above described.

After all holder tubes are loaded, the aircraft takes off and flies to an area to be sowed with sonobuoys. Dynamic pressure in plenum chamber 50 continuously acts against the nose of the sonobuoy in holder tube 54, which is seen to be in line with both connecting tube 52 and dispensing tube 24. Dispensing tube 24 is depressed, as illustrated in Figs. 2 and 3, and solenoid 106 is actuated at the proper time, causing arm 108 to rotate, to thereby engage pin 104 and withdraw latch member 92 from tube 54. The sonobuoy will then be pushed out of holder tube 54 by the combined force due to springs 112 and 116 and dynamic air pressure acting against its nose, and will emerge from dispenser tube 24. Thereafter, motor 86, acting through gearing in gear box 88 will rotate dispenser 48 so that holder tube 56 is in line with connecting tube 52. The above described action may continue until all sonobuoys have been dispensed.

It will be understood that the invention is readily adaptable to dispense other objects than sonobuoys, and that it is possible to construct the dispenser 48 with as many holder tubes as is desirable.

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 is:

1. In an aircraft, a plenum chamber for receiving ram air, a connecting tube having one end connected to said plenum chamber, dispenser means secured to the frame of said aircraft contiguous to the other end of said connecting tube, said dispenser means comprising a plurality of holding tubes mounted on a rotatable frame, the longitudinal axes of said tubes being parallel to each other and to the connecting tube, each of said holding tubes being adapted to receive a sonobuoy therein, a retractable detent projecting into the interior of the aft end of each holding tube for releasably holding the sonobuoy therein and a biasing means in the forward end of each holding tube for biasing the sonobuoy toward the aft end of the holding tube, an ejection tube secured to said aircraft in axial alignment with said connecting tube, the forward end of said ejection tube being contiguous with the aft end of said dispensing means and the aft end of said ejection tube projecting from said aircraft and means secured to said aircraft for rotating said frame to place one of said holding tubes in axial alignment with said connecting tube and said ejection tube and for retracting said detent whereby the sonobuoy will be ejected from the aircraft under the combined forces of the ram air and said biasing means.

2. The apparatus as claimed in claim 1 wherein said biasing means comprises a coil spring having its axis parallel to the axis of the holding tube and lying partially in said holding tube, and said detent comprises a plunger mounted on said holding tube for radial movement, said plunger having a beveled face facing the aft end of said holding tube and spring means biasing said plunger and beveled face into said holding tube whereby a sonobuoy inserted into the aft end of said holding tube will engage said beveled face and compress said detent and will thereafter engage and compress said coil spring, said plunger being biased into engagement with the aft end of said sonobuoy when the forward end of said sonobuoy has compressed said coil spring.

3. The apparatus as claimed in claim 2 wherein said means for rotating said frame and retracting said plunger comprises a motor for rotating said frame in a step-by-step manner and actuator means secured to said aircraft for retracting the plunger and beveled face from within the holding tube in axial alignment with said connecting tube and ejection tube.

4. In an aircraft, a chamber pressurized by ram air, a connecting tube having one end connected to said chamber, sonobuoy dispensing means mounted within said aircraft, the forward end of said dispensing means being contiguous to the other end of said connecting tube, said dispensing means comprising a movable frame, a plurality of holding tubes mounted on said frame, each of said holding tubes being adapted to receive a sonobuoy, means secured to each tube for releasably holding the sonobuoy within the holding tube and for biasing the sonobuoy toward the tube end opposite said connecting tube, an ejection tube secured to said aircraft in axial alignment with said connecting tube, the forward end of said ejection tube being contiguous to the aft end of said dispensing means and the aft end of said ejection tube projecting from said aircraft, and means for moving said frame in a step-by-step manner to successively place each holding tube in axial alignment with said connecting tube and ejection tube and for releasing the releasable holding means of the axially aligned tube whereby the sonobuoys will be successively ejected from the aircraft through the ejection tube by means of the ram air applied from said chamber through said connecting tube and the biasing means.

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