

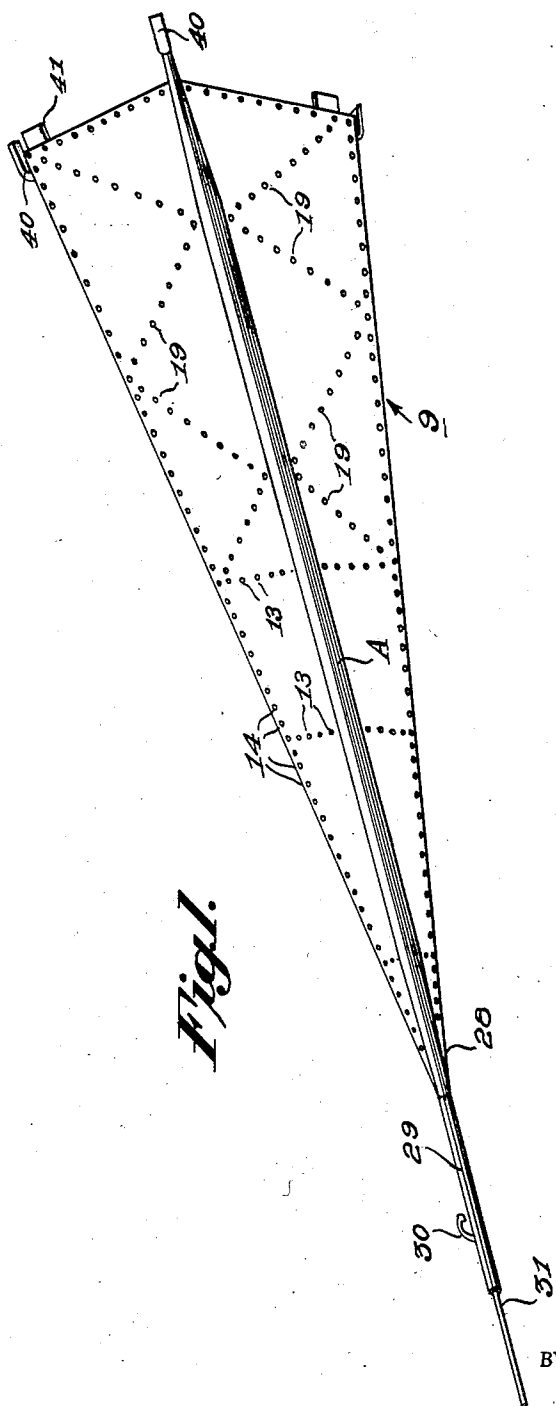
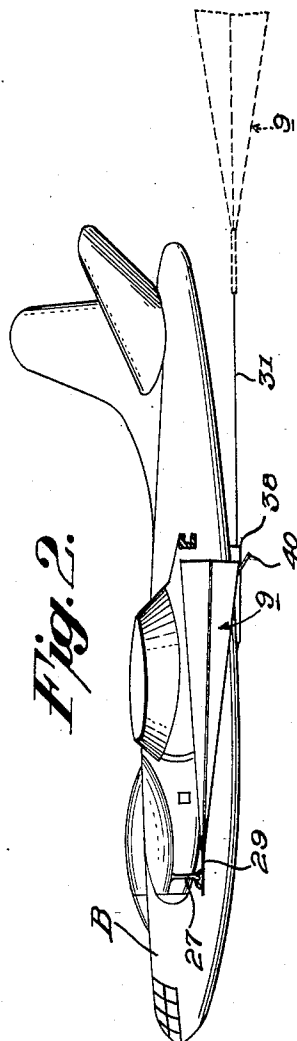
Sept. 3, 1957

R. B. COTTON
AERIAL TOWED TARGETS

2,805,065

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

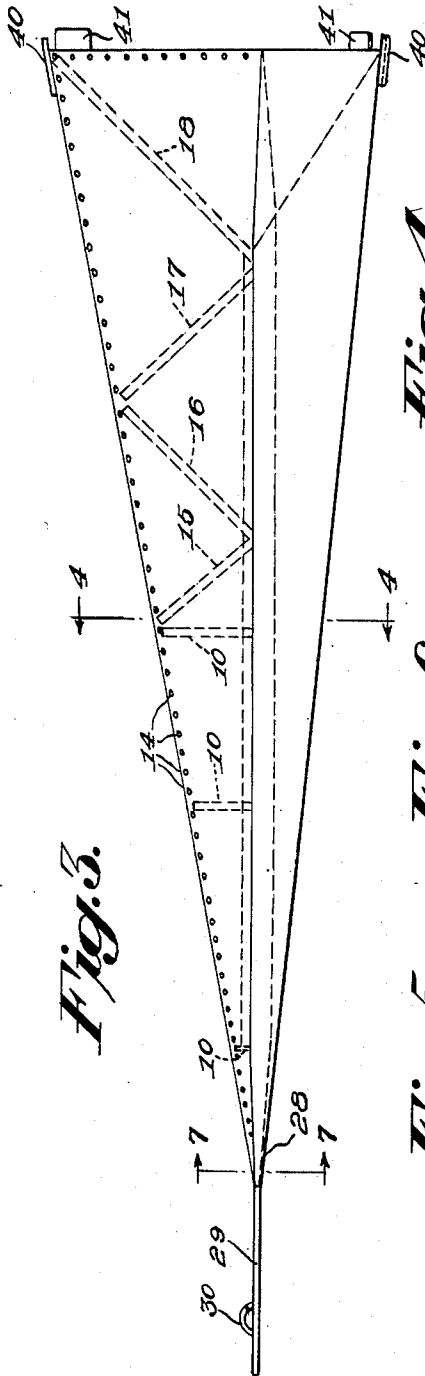


Fig. 3.

Fig. 4.

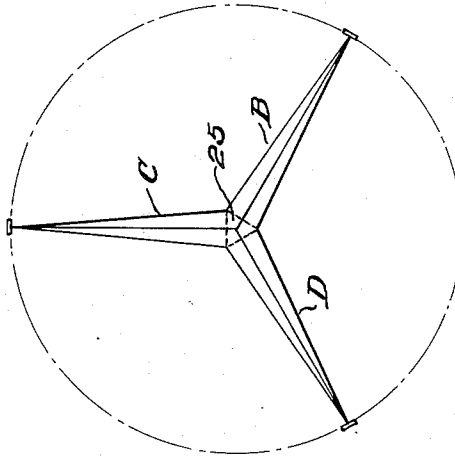
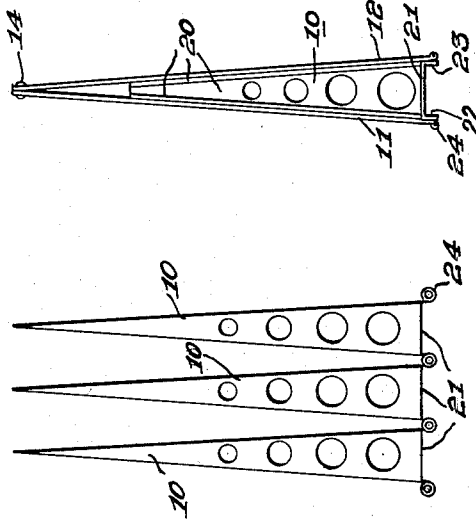


Fig. 5.



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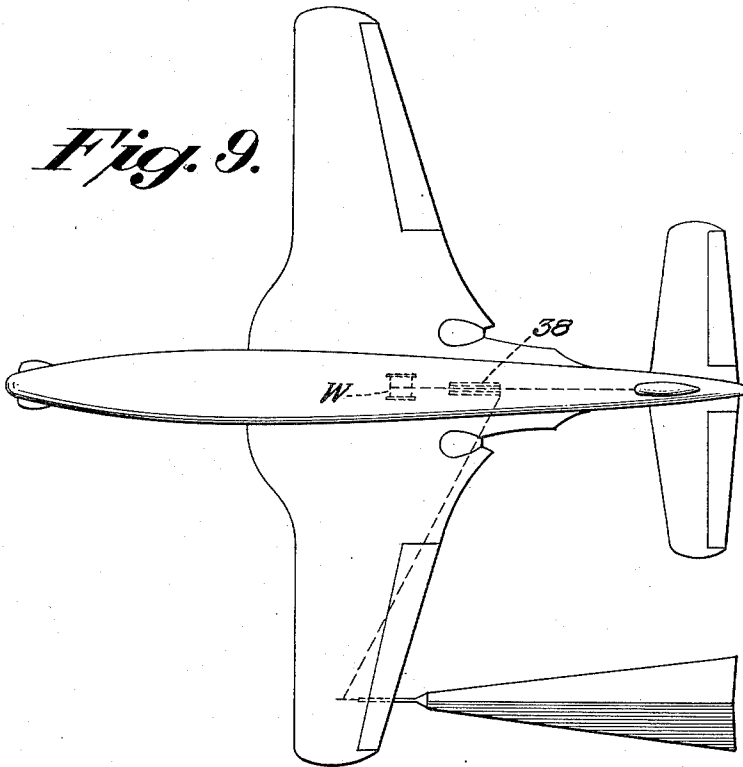
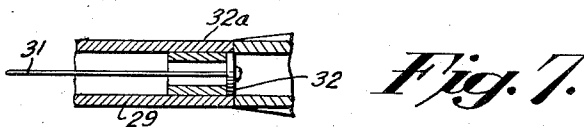
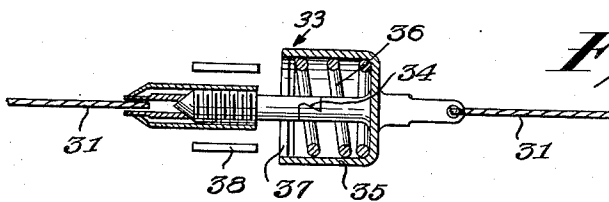


Fig. 8.

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AERIAL TOWED TARGETS

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6 Claims. (Cl. 273—105.3)

This invention relates to a towed aerial target.

It is an object of this invention to provide a target capable of being towed at high speeds.

A further object is to provide a target having high reflection characteristics for radar and light waves with a large surface area.

Another object is to provide a target, which if desired may be rotatable.

Still a further object is to provide an easily stowed and collapsible target.

Yet a further object is to provide a target constructed to be floatable on water and for nose penetration into the ground after release to be retrievable, if desired.

And still another object is to provide a target with a novel tow cable coupling system for automatic release from towing position when desired.

With these and other objects in view, the invention consists in the construction, arrangement and combination of parts hereinafter described and particularly pointed out in the claims, it being understood that I do not intend to limit myself to the details of construction.

In the drawings like parts throughout the several views are given like numerals and are thus identified in the following detailed description;

Figure 1 is a side isometric view of one form of the present invention assembled for use;

Figure 2 is a side elevation view of a target carrier aircraft with the target in launching position at take-off and with the same shown in dotted towing position after take-off;

Figure 3 is a side elevation view of the target shown in Figure 1;

Figure 4 is a cross section view taken on section line 4—4 of Figure 3;

Figure 5 is a more or less diagrammatic view showing the target collapsed for stowing or shipping;

Figure 6 is a detail in cross section of one of the wings or panels of the target;

Figure 7 is a broken detail view of the fair lead tube and the tow cable connection at the target nose on line 7—7 of Figure 3;

Figure 8 is a longitudinal sectional detail view of the cable release means;

Figure 9 is a diagrammatic top plan view showing the tow cable extending from the outrigger tube to the target fair lead tube.

Referring to the drawings and first with particular reference to Figures 1, 3 and 6, there is disclosed a target means broadly constructed according to the present invention and comprising an elongated body which includes a plurality of wings or panels 9 which radiate from a common axis and which are substantially equally spaced about said axis. The panels or wings 9 are of isosceles triangular form in cross section and of right angle triangular form in side view and the base ends of said triangular wings are in the sides of an equilateral triangle in the center of which is said axis and which base ends provide

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the tail portion of the body. The outer edges of said panels or wings are inclined from the relatively wide end of the body to a nose at the opposite end thereof.

Each wing or panel 9 is a double walled member and comprises a plurality of forms 10 having opposed parallel sides and opposed outwardly inclined sides as indicated in Figures 5 and 6. These are preferably provided with apertures for maximum lightness of the body.

Each wing further comprises a pair of opposite side sheets 11 and 12 which are secured to said forms 10 as by means of rivets 13 and the said sheets extend beyond the outer ends of forms 10 and are secured to each other as by rivets 14. Other forms, such as truss members 15, 16, 17 and 18 are disposed between said sheets and to which the sheets are secured, as by rivets 19. Each panel further comprises a base plate 21 having inwardly projecting flanges 22, which are secured to the inner edges of the side sheets 11 and 12 as by rivets 23, and the said plates 21 of the three wings are disposed in the sides of said equilateral triangle and provide a central chamber 25 extending longitudinally of the body.

Hinge edges 24 are secured to the inner edges of the side sheets 11 and 12 for receiving a wire or the like pintle by which the three panels are hingedly connected with provision for removal of at least one of said pintles whereby the wings are capable of being folded as in Fig. 5 for facilitating storage thereof. The said side sheets have polished exterior surfaces and high reflectivity for radar waves and light waves and serve as air foils C, B and D during flight.

The nose 28 of the target body is plugged with an elongated tube 29, which serves as a fairlead for a tow cable 31. This tube is also formed with an eye hook 30 for attaching to the bomb rack generally indicated at 27.

The tow cable 31 extends through the fairlead tube 29 and is provided with an end holding means, such as a bushing 32^a rigidly supported within the tube 29 and through which an end of the cable extends, together with a disc 32 freely engaged with the inner end of the housing to which disc the said end of the cable is secured, thereby providing a swivel connection between the tow cable and the target body. This swivel plate or disc 32 permits rotation of the target during towing, see Figure 7. Also, the tow cable 31 includes an automatic release coupling, see Figure 8, comprising a cable coupler head 33, a splice joint 34, a cup shaped cylinder 35 around the splice joint having a spring 36 and a release plunger 37. Pressure applied to the plunger by outrigger tube 38 disengages the spliced joint and releases the target 9 when desired. The detail structure of the spliced joint of Fig. 8 is not herein claimed as applicant's invention.

The tow cable 31 from the splice joint leads from the fairlead tube 29 under the aircraft wing into the outrigger tube 38 and to the winch drum W. This tube permits the cable 31 to trail from the end of the same, as shown in Figure 2, while towing the target.

The bases of the side members or wings of the target are provided with ground skids 40, which are used to stabilize the target during take-off, see Fig. 2. Also the bases of the side members are provided with trim tabs 41 adapted to stabilize the target in the air, improve lift and when and if desired to provide for rotation when positioned alternately up and down to develop torque with the slip stream.

The tow cable 31 is preferably anchored at the tow end to the drum of the winch in the aircraft, which is controllable by the pilot or any occupant of the aircraft to either reel the cable in or out as necessary. As the winch is well known in the art, the same is not shown in detail,

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Operation

The launching of the target consists of first connecting the target hook 30 to the bomb rack 27, while the carrier aircraft is on the landing deck or runway, so that one of the ground skids 40 rests upon the runway. The aircraft takes off and the tow cable is reeled out to trail the target after the same is released from the bomb rack 27.

After the target has been towed and the mission completed, the same may be returned to a position above home base or released in the air at any desired location by the automatic release coupling prior to landing. This release is accomplished by reeling in the tow cable 31 with the winch means, until the pressure plate or plunger 37 engages the end of the outrigger tube 38. This causes the plunger plate 37 to be pressed in against the action of the spring 36, to thereby part the splice joint 34. Positioning of the trim tabs prior to take-off may control lift and also the degree of rotation to be imparted to the target during flight.

Thus there is provided a lightweight rigid target body, adapted to be visible in light, reflect radar waves, be independently released and also to have buoyancy if dropped on water. Also, if released over the ground the fairlead tube will pierce the ground and the target will stand up so as to be easily found for reuse and to prevent damage to the target.

Without further description it is believed that the present invention is clearly understandable to others authorized to practice the same. While only one embodiment of the invention is described and illustrated in detail, it is to be expressly understood that other combinations, modifications and arrangements of the parts which will now probably occur to others skilled in the art are to be considered a part hereof. To determine the scope of the present invention, reference should be had to the appended claims.

What is claimed is:

1. An aerial target having a base and a nose comprising an elongated body including a plurality of panels or wings radiating from an axis and disposed in substantially uniformly spaced relation circumferentially of said axis, said panels each including a base plate and a pair of side sheets which converge from opposite edges of said base plate to a line of contact thereof which converges from said base to said nose, said panels being of like dimensions, and said base plates in cross section being in

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the sides of an equilateral triangle and providing a central chamber extending longitudinally of the body, and said base providing the tail portion of the body.

2. The aerial target described in claim 1, wherein said nose supports fairlead means for a tow cable, said fairlead means comprising a hollow tube projecting from said nose and being in communication with said chamber and said tow cable being formed with a swivel connection within said tube, to thereby permit rotation of the said body during aerial towing thereof.

3. The aerial target described in claim 1, wherein said tail portion of the body includes trim tabs and take-off runners.

4. An aerial target according to claim 1, wherein each of said wings comprises a plurality of formers having opposite outwardly converging side walls, and said side sheets being secured to said former side walls, the outer edges of said sheets extending beyond the outer ends of said formers and being secured in contacting relation.

5. The aerial tow target described in claim 4, wherein the said formers are relatively larger at the tail end of the body than at the nose end thereof.

6. An aerial tow target comprising a plurality of like dimension airfoils of elongated triangular form in side elevation and of isosceles triangular form in cross section with inner edges of the side walls of the airfoils being disposed in uniformly spaced relation about the central longitudinal axis of the target, a hinge connection for each pair of adjacent inner edges of said side walls, said hinge connections each including a pintle extending substantially throughout the length of said airfoils and at least one of which is removable whereby said airfoils may be rotated about the remaining pintles and folded into parallel relation with each other for facilitating storage of the target.

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