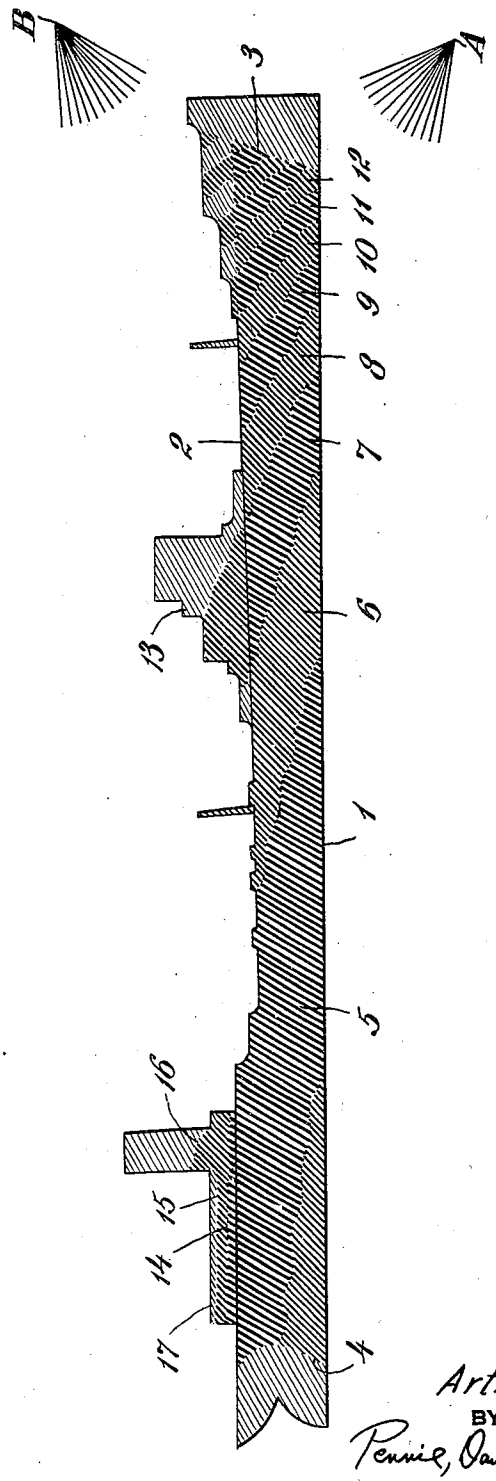
Aug. 11, 1942. A. D. ROBSON 2,292,848

CAMOUFLAGE

Filed March 11, 1942



INVENTOR
Arthur D. Robson
BY
Pennie, Dais, Marvin & Edmonds
ATTORNEYS

Patented Aug. 11, 1942 2,292,848

UNITED STATES PATENT OFFICE

2,292,848

CAMOUFLAGE

Arthur D. Robson, New York, N. Y., assignor to Standard Varnish Works, Staten Island, N. Y., a corporation of New York

Application March 11, 1942, Serial No. 434,156

5 Claims. (Cl. 114—15)

I have invented a camouflage for ships which provides, in addition to low visibility at a distance, effective distortion within the range of visibility. My camouflage thus adds an important element of protection to those secured with systems hitherto used. To torpedo a ship, a submarine for example must first spot the ship and must then determine the speed and direction of the ship to aim the torpedo. Camouflage which provides only the protection of low visibility loses its value once the ship has been spotted. Camouflage which interferes with determination of speed and direction after the ship is spotted, however, provides continuing protection. My invention provides just such continuing protection without impairing the value of the low visibility protection which it also provides.

In terms of low visibility protection, my camouflage is akin to the "dazzle" system successfully used for many years and, like the dazzle system, depends upon visual contrast between adjacent color masses. This visual contrast may be provided by differences in color, differences in tint and shade, or differences in color and tint or shade. As distinguished from such prior systems, however, my camouflage depends upon and is characterized by a special arrangement and configuration of the visually contrasting masses.

In the camouflage of my invention these masses are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other. The generally parallel sides of the trapezoidal masses are generally parallel with the water line and the sheer and the other sides of the trapezoidal masses are irregular boundaries approximating a series of straight lines passing through a common focal point. This common focus lies beyond the end of the hull, or, particularly as applied to ships with large superstructures, beyond that portion of the hull patterned with reference to the focus, and, either above the sheer extended or below the water line extended, at a point such that there is a substantial variation between both the area and the angularity of the masses at one end of the hull as compared to the masses at the other end of the hull. In general, this common focal point should lie not more than about half the hull length beyond the end of the hull carrying the smaller trapezoidal masses and should be above the sheer or below the water line by a distance not less than about that between the generally parallel sides of the trapezoidal masses and not more than about the hull length. The lines generally defining the non-parallel sides of the trapezoidal masses advantageously form substantially equal angles with adjacent lines at the focal point and the focal point is with advantage positioned so that the largest trapezoidal mass is more than three times the area of the smallest trapezoidal mass extending from water line to sheer. Although the number of trapezoidal masses may be varied, a minimum of five is provided for best results. These visually contrasting masses are applied to the hull as surface coatings and thus follow the strakes forming the hull of a ship. In the foregoing description of my camouflage, and throughout this specification and the appended claims, I refer to these masses as they appear in projection on a vertical plane parallel to the keel of the ship in the interest of brevity, clarity and accuracy.

The accompanying drawing illustrates, diagrammatically, such a projection of a ship embodying the camouflage of my invention. The limitations imposed by rule based upon the necessities of a particular method of reproducing patent drawings, requiring the use of differentiated hatchings to show visual contrast rather than distinction between continuous color, tint or shade as in conventional practice, make the accompanying drawing somewhat less than satisfactory as a representation of my invention, although, properly interpreted, it accurately illustrates the technique of my camouflage. For example, in practice the ship illustrated might be camouflaged with three contrasting colors which are represented in the drawing as follows: a light color such as haze grey by light lines 30 degrees from the horizontal, a somewhat darker color such as ocean grey by heavier lines 45 degrees from the horizontal and a still darker color such as navy blue by still heavier lines at 60 degrees from the horizontal.

The ship illustrated comprises a hull, the portion above the water line being illustrated between water line 1 and the sheer 2, and the usual superstructures. The apparent length of the hull is diminished by painting a portion of the bow beyond the boundary 3 and a portion of the stern beyond the boundary 4 a light color. The hull between the boundaries 3 and 4 is camouflaged in accordance with my invention.

Referring particularly to the projection of the hull defined by the water line 1 the sheer 2 and the boundaries 3 and 4, the hull carries a series of visually contrasting surface coatings in the form of adjoining trapezoidal masses 5, 6, 7, 8, 9, 10, 11 and 12 progressively diminishing in area from the stern to the bow of the ship. These

trapezoidal masses are defined by generally parallel sides, generally parallel with the water line and the sheer and by irregular non-parallel boundaries approximating a series of straight lines passing through and forming substantially equal angles with adjacent lines at a common focal point A. This focal point A is beyond the bow, the end of the illustrated hull carrying the smaller trapezoidal masses, and is below the water line by a distance somewhat exceeding the distance between the water line and the sheer. The progressive increase in area of adjacent contrasting masses, from right to left, substantially exceeds that corresponding to arithmetical progression. The area of the largest trapezoidal mass 5 substantially exceeds three times, is approximately fourteen times, the area of the smallest trapezoidal mass extending from water line to sheer, mass 12. The focal point establishing the non-parallel boundaries of the trapezoidal masses, instead of being located as at A, may be located for example at B or at a point just beyond the stern of the ship corresponding to a point A or point B. The location of this focus should in any event be such as to establish differences in area and differences in angularity between adjacent contrasting masses in the series carried by the hull of the general order illustrated.

The camouflage just described is with advantage carried across the superstructure above the hull at least to some extent. Where the superstructure is narrower than the full beam of the hull, the irregularity of the non-parallel boundaries of the trapezoidal masses tends to conceal any such break in outline even though the ship is viewed from the quarter rather than the beam. Since elements of the superstructure may be silhouetted against the sky more sharply than the hull, the full pattern of my camouflage may not be carried across the superstructure. For example, the band 7 may be carried across the superstructure 13, whereas the band 9 which geometrically would pass across the topmost part of this superstructure may be omitted from this superstructure. Also, boundaries of the contrasting masses, where they are carried across the superstructure, may be varied, for example as illustrated by the boundary 14, the boundary 15 and the boundary 16 on superstructure 17. Also, a light and a medium color may be substituted, respectively, for a medium and a dark color to establish contrasting masses on the superstructure corresponding to contrasting masses on the hull of which they are continuations, as they are illustrated in the drawing.

With ships with a large superstructure, for example, the application of my camouflage to the entire hull length may add areas, particularly at higher elevations or opposite the common focal point, too large or too continuous to be entirely effective. In this situation, I limit the arrangement of trapezoidal masses to something less than the length of the hull and position the common focal point, above the sheer or below the water line as described, and beyond the end of that portion of the hull carrying these trapezoidal masses. Beyond the end boundary of the trapezoidal masses, the hull then may be camouflaged by the conventional dazzle system.

Low visibility at a distance is secured with my camouflage as a result of the same principles effective in application of the dazzle system. Also, with my camouflage, the same contrasting masses establishing this low visibility, by arranging the masses in a progressive scale approaching the geometrical and by arranging these masses in a scale of progressive angularity, provide an element of distortion affording substantial protective values at close range or under other conditions such that the protection of low visibility has been lost. The difficulties of determining speed and direction of the ship added by my camouflage, from any distance affording a submarine for example reasonable security in operation, will be apparent from an examination of a projection or model actually colored as illustrated by convention in the accompanying drawing against a background properly representing, in color and in density, sea and sky. The camouflage of my invention, moreover, can be easily and quickly laid out and applied to any ordinary ship.

I claim:

1. A camouflaged ship comprising a hull carrying a series of visually contrasting surface coatings which, in projection on a vertical plane parallel to the keel of the ship, are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other, the generally parallel sides of the trapezoidal masses being generally parallel with the water line and the sheer and the other sides of the trapezoidal masses being irregular boundaries approximating a series of straight lines passing through a common focal point beyond but not more than about half the hull length beyond the end of the hull carrying the smaller trapezoidal masses and above the sheer or below the water line by a distance not less than about that between the generally parallel sides of the trapezoidal masses and not more than about the hull length.

2. A camouflaged ship comprising a hull carrying a series of visually contrasting surface coatings which, in projection on a vertical plane parallel to the keel of the ship, are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other, the generally parallel sides of the trapezoidal masses being generally parallel with the water line and the sheer and the other sides of the trapezoidal masses being irregular boundaries approximating a series of straight lines passing through and forming substantially equal angles with adjacent lines at a common focal point beyond the end of the hull carrying the smaller trapezoidal masses and so positioned that the largest trapezoidal mass is more than three times the area of the smallest trapezoidal mass extending from water line to sheer.

3. A camouflaged ship comprising a hull carrying a series of not less than five visually contrasting surface coatings which, in projection on a vertical plane parallel to the keel of the ship, are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other, the generally parallel sides of the trapezoidal masses being generally parallel with the water line and the sheer and the other sides of the trapezoidal masses being irregular boundaries approximating a series of straight lines passing through a common focal point beyond but not more than about half the hull length beyond the end of the hull carrying the smaller trapezoidal masses and above the sheer or below the water line by a distance not less than about that between the generally parallel sides of the trapezoidal masses and not more than about the hull length.

4. A camouflaged ship comprising a hull carry-

ing a series of visually contrasting surface coatings which, in projection on a vertical plane parallel to the keel of the ship, are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other, the generally parallel sides of the trapezoidal masses being generally parallel with the water line and the sheer and the other sides of the trapezoidal masses being irregular boundaries approximating a series of straight lines passing through a common focal point beyond but not more than about half the hull length beyond the end of the hull carrying the smaller trapezoidal masses and below the water line by a distance not less than about that between the generally parallel sides of the trapezoidal masses and not more than about the hull length.

5. A camouflaged ship comprising a hull carrying a series of visually contrasting surface coatings which, in projection on a vertical plane parallel to the keel of the ship, are in the form of adjoining trapezoidal masses progressively diminishing in area from one end of the ship to the other, the generally parallel sides of the trapezoidal masses being generally parallel with the water line and the sheer and the other sides of the trapezoidal masses being irregular boundaries approximating a series of straight lines passing through and forming substantially equal angles with adjacent lines at a common focal point beyond that portion of the hull carrying the smaller trapezoidal masses and so positioned that the largest trapezoidal mass is more than three times the area of the smallest trapezoidal mass extending from water line to sheer.

ARTHUR D. ROBSON.