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May 9, 1944. J. D. HUME 2,348,387

AERIAL BOMB PROTECTIVE APPARATUS

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Fig. 1.

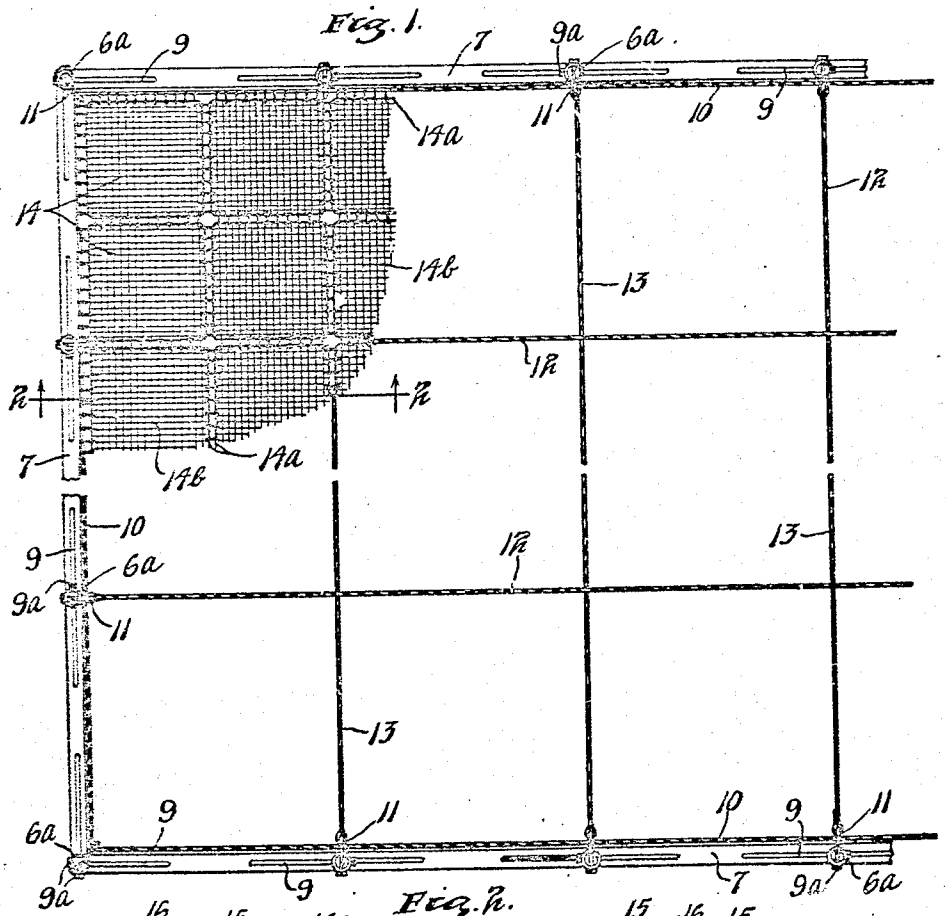
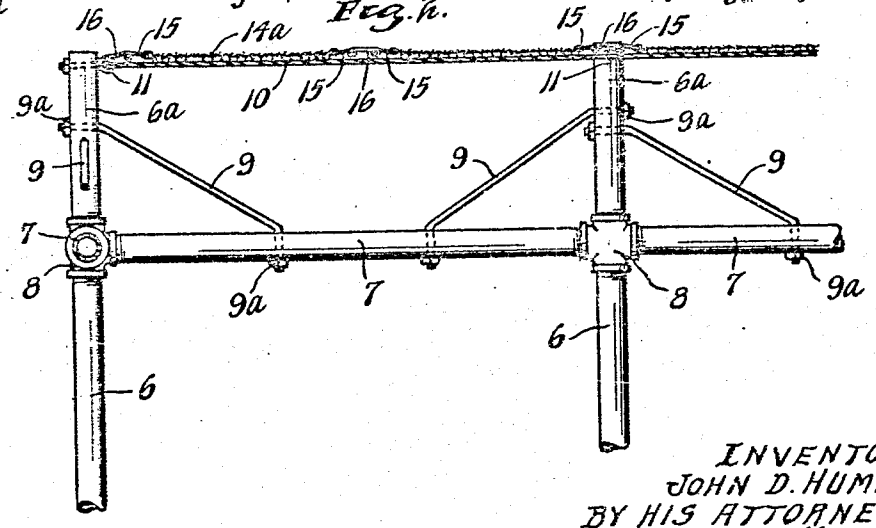


Fig. 2.



INVENTOR.
JOHN D. HUME.
BY HIS ATTORNEYS.
Williamson & Williamson

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Fig. 3.

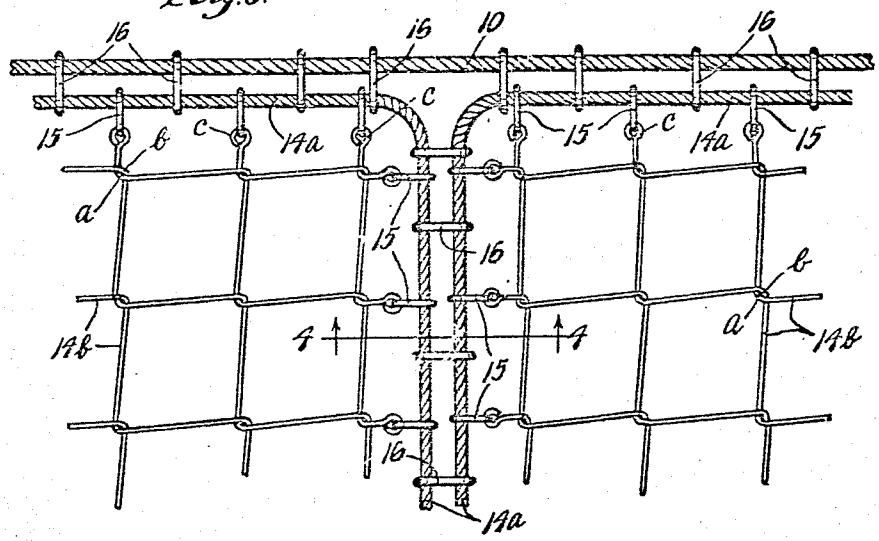
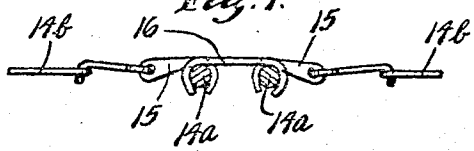


Fig. 4.



INVENTOR.
JOHN D. HUME.
BY HIS ATTORNEYS.
Williamson & Williamson

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AERIAL BOMB PROTECTIVE APPARATUS

John D. Hume, Minneapolis, Minn.

Application October 19, 1940, Serial No. 361,927

1 Claim. (Cl. 109—49.5)

My invention relates to apparatus for protecting streets, buildings, ships, supplies, etc., from aerial bombs in warfare.

It is an object of my invention to provide a comparatively simple, but highly efficient protective netting structure which may be stretched for a desired distance or area above buildings, highways, ships and other points where human lives or supplies and ammunition are in danger.

More specifically, it is an object to provide a yielding or resilient network construction adapted to be mounted, if desired, at high altitudes and constructed to have a minimum tendency to detonate explosive bombs.

A further object is the provision of such protective structure wherein the bomb-receiving network is readily replaceable in relatively small units, and wherein the mesh of the netting cannot be stretched or enlarged to permit an object of larger size to force its way therethrough.

Still a further object is the provision of a strongly re-enforced protective network supported by a simple upstanding frame and constructed to be quickly and readily set up or taken down.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and in which:

Fig. 1 is a top plan view of an embodiment of the invention;

Fig. 2 is a vertical cross section taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary detail view showing the connection of the netting units with the supporting cables, the interconnection of said units and the non-stretchable weaving construction of the netting proper, and

Fig. 4 is a detail cross section taken on the line 4—4 of Fig. 3.

In the embodiment shown in the drawings, an upright framework is provided comprising a plurality of elongated, upright posts 6 shown as constructed from rigid metal pipe and spaced apart and arranged in the outline of a closed geometrical figure such as a rectangle, triangle, circle, ellipse or the like. These supporting posts are, of course, securely anchored at their lower ends, not shown, and are braced adjacent their upper ends by crossed bars shown in the form of pipes 7, as shown connected by four-way threaded couplings 8 with posts 6. Short post extensions also, as shown in the form of pipes 6*a*, extend vertically above posts 6 and, as shown, are threadedly connected with the couplings 8. These post extensions may be braced by diagonal brace rods 9 which, as shown, have bent extremities passing through bores drilled through the pipes and secured to the respective pipes 6*a* and 7 by suitable means such as threaded nuts 9*a*.

As shown, a main netting-frame-supporting cable 10 is supported from the several post extensions 6*a*, passing through suitable eyes 11 in the form of eye bolts, as shown secured to the upper ends of extension posts 6*a* and arranged on the inner sides of said posts to define a geometrical figure.

A single elongated cable 10 is preferred to permit uniform adjustment at all parts of the netting, although, of course, a number of supporting cables may be used between the several posts, if desired. Additional netting-supporting elements are formed by crossed, spaced series of cables 12 and 13, said cables extending between opposing post extensions 6*a* and being, as shown, secured to eye bolts which may be the same eye bolts 11 through which the main-supporting-cable 10 is passed. These crossed-supporting-cables 12 and 13 constitute a strong, very coarse network upon which the bomb-receiving network is supported. The cables 10, 12 and 13, as well as the network, sag somewhat and are purposely constructed to so sag, although the drawings do not indicate such sagging.

The bomb-receiving netting is made up of a multiplicity of connectible and readily replaceable units, indicated as entireties by the numeral 14. Each unit, as clearly shown in Fig. 3, comprises a flexible, closed frame 14*a* preferably constructed of cable or heavy wire and a network 14*b* composed of a number of bent wires or semi-flexible rods interwoven to prevent enlargement or stretching of the several meshes formed.

The several wires or rods 14*b*, as shown in Fig. 3, are first bent at substantially right angles at points *a* to embrace and interlock with right angular bends *b* of an adjacent rod. The first mentioned rods are then bent at right angles in the opposite direction from the first bending to form the bends or points *b* for engagement with the adjacent rods, and the bending and reversed bending is continued until the extremities of the rods extend past the netting structure in position for attachment to the flexible cable frame 14*a*. In other words, the multiplicity of rods forming the netting are of zig-zag shape, preferably bent at substantially right angles, alternate rods in the netting units being disposed in parallel relation, and the rods between said alternate rods

being disposed in complementary relationship with said alternate rods and with the angles or elbows of the zig-zag form interlocked with the elbows of the first mentioned alternate rods.

As shown, these extremities of the rods are provided with eyes *c* which are swingably connected with the shanks of hooks 15, said hooks engaging and embracing the flexible frame or cable 14*a* to secure the netting proper thereto.

The units comprising flexible frame members 14*a* with the netting 14*b* attached thereto are detachably connected together and to the main netting-supporting-cable 10 by means of double hook members 16 having straight body portions and a hook at each extremity thereof. These double hook members secure portions of the frame 14*a* of the outermost units to the main network-supporting-cable 10 and other portions of the frames of the units to the frames of the adjacent units.

The entire network construction, including the widely spaced crossed-supporting-cables 12 and 13, as well as the main network-supporting-cable 10 and the cable and wire construction of the netting units provide a substantial yieldability and resiliency to the structure.

In use the netting construction is positioned at some considerable distance above the area or thing to be protected and may be disposed in a generally horizontal position or inclined to the horizontal to suit specific requirements. When an aerial bomb drops upon the netting construction, it in most instances strikes one of the bent wire or rod netting units 14*b* which, with the separate rods, the frame cable 14*a*, the supporting-crossed-cables 12 and cable 10, readily yields, greatly cushioning the impact of the bomb and stopping and collecting the same. The resiliency of the parts specified, if the network is stretched at an inclined angle to the horizontal, may be used to cause the bomb to rebound or deflect the same away from the objects protected, if desired.

Due to the resiliency of the network construction and to the bent wires 14*b* of very small diameter, there is little chance of a bomb being detonated by its impact against the network.

Furthermore, because of the woven structure of the bent rods or wires 14*b* the meshes of the network units formed cannot be enlarged or stretched, as with most woven wire, to permit passage of a bomb or other article therethrough. By an inspection of Fig. 3 it will be seen that attempted stretching or arcuate bending of any one side of the rectangle forming a mesh opening through connection with adjacent rods, prevents distortion of any of the sides of said rectangle. This is important in a protective construction of this type.

It will further be seen that the upright elevated frame for my netting is strong, durable and efficiently re-enforced adjacent the network-supporting-extensions 6*a* of the posts.

If one or more netting sections 14 are injured by the impact or explosion of an aerial bomb, they may be readily replaced by detaching the double hook members 16 and installing a new section or sections. With my improved structure, therefore, no substantial area of the protective netting can be destroyed at one time, and the destruction, if any, can be quickly replaced.

From the foregoing description it will be seen that I have provided a simple, efficient and improved protective apparatus for protecting buildings, ships, troops, ammunition and other things from aerial bomb attack.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

Aerial bomb protective apparatus comprising, a network-supporting-frame, a series of widely spaced reinforcing flexible elements supported from said frame, and a layer of flexible netting secured to said frame and supported on said flexible elements, said layer of netting being made up of a plurality of readily replaceable netting units, and quick detachable means for connecting said units together.

JOHN D. HUME.