Aug. 11, 1931. T. G. HITT 1,818,478

PYROTECHNIC DISPLAY DEVIC.

Filed March 11, 1930

Fig. 1.

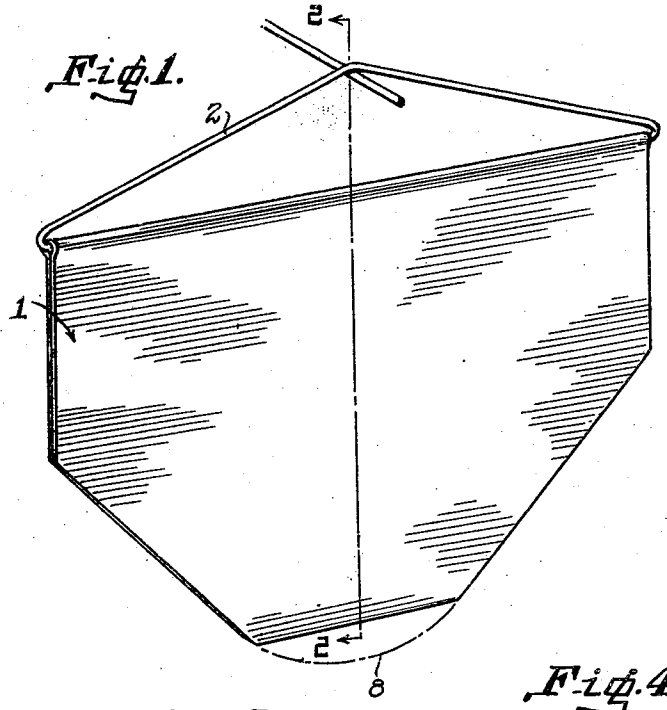


Fig. 2.

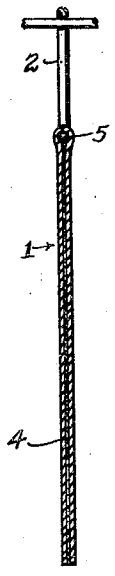


Fig. 3.

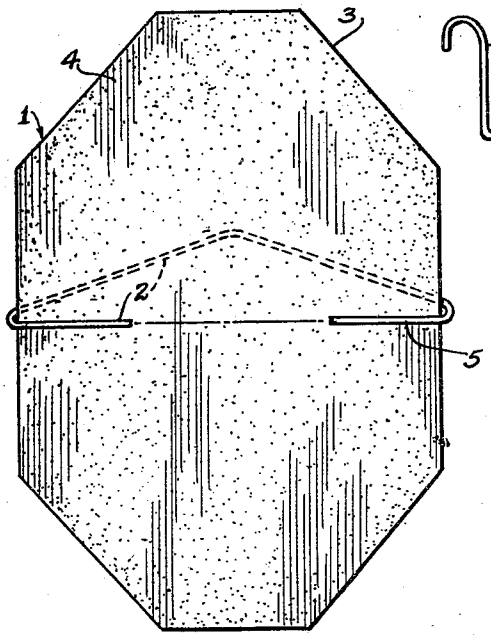
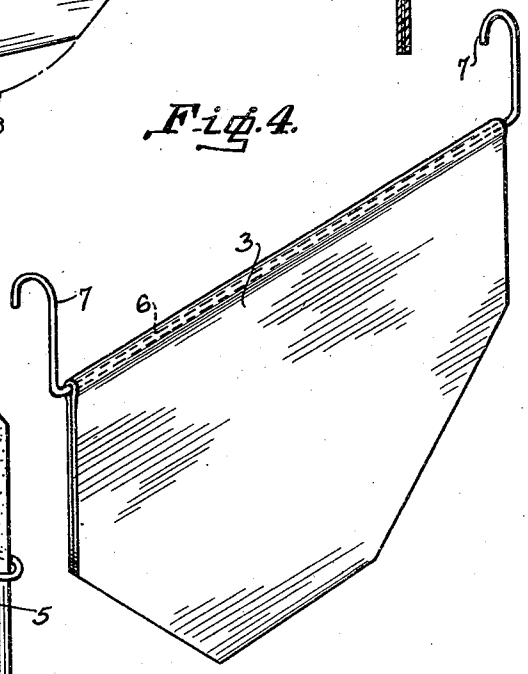


Fig. 4.



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UNITED STATES PATENT OFFICE

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PYROTECHNIC DISPLAY DEVICE

Application filed March 11, 1930. Serial No. 434,979.

This invention relates to pyrotechnic display devices and has for its object the provision of combustible means capable when ignited, of producing a brilliant shower spectacle, the shower being confined substantially to a single plane, whereby the direction of the dispersal of the sparks may be controlled.

Another object of the invention is to provide suspending means in combination with the combustible portion of the device, of good heat conductivity for the purpose of quenching the combustion of that part of the device immediately supported by the suspending means so that no part of the device shall fall until it has been completely consumed.

Still another object of the invention relates to the novel process for manufacturing the pyrotechnic display device.

Referring now to the drawings in which a preferred and practical embodiment of the invention is illustrated and wherein the same characters of reference are used throughout the several figures to designate identical parts:

Figure 1 is a perspective view of the pyrotechnic display device showing the same suspended from a rod.

Figure 2 is a cross section taken for instance along the line 2—2 of Figure 1.

Figure 3 is a plan view showing the blank, and the suspending device in position in a step of the process of manufacturing the device.

Figure 4 is a perspective view of a slightly modified form of the invention.

Referring now in detail to the several figures and first adverting to that form of the invention shown in Figures 1, 2 and 3, the combustible portion of the device is denoted by the reference character 1, the same being shown suspended by a wire bail 2.

The combustible portion is formed as shown in Figure 3, of a sheet of paper or other suitable inflammable material 3, upon one side of which is spread a plastic composition 4, the specific ingredients of which are not material to the present invention, it being only essential that the material be combustible in nature and include as a constituent some substance capable of becoming incandescent during the combustion, such for instance as a chemical mixture of aluminum or other substances well known in the art of pyrotechnics. The plastic composition also preferably includes an ingredient which adheres to the paper, the plastic composition being spread in the form of a wet paste, whereupon the paper is folded upon itself, preferably in the middle, so as to enclose on both sides, the plastic composition, forming a laminated sheet in which the plastic composition is exposed only at the side and lower edges. The wire bail 2, bent as shown in Figure 3 or otherwise as may seem most advantageous in the manufacture and use of the article, has the end portions 5 thereof laid upon the wet side of the pasted sheet as shown, so that when the sheet 3 is folded the ends 5 of the bail are enclosed in the fold and preferably in contact with the plastic composition. When the latter dries, the two sides of the folded sheet are firmly adhered together.

The pyrotechnic device may then be suspended in any suitable manner and preferably from a high elevation and ignited at its lower most portion. The paper sheet 3 is less actively combustible than the plastic combustion so that the two sides of the folded paper sheet act as curtains to inhibit the projection of the sparks, limiting the emanation of the sparks to the exposed edges of the combustible composition so that the resulting shower is confined to a plane. This promotes the safety of the firework so that it may be held with one of the plane sides tangent to the front of the body or parallel to any surface without the danger of any sparks flying forwardly or rearwardly of the device. The confining of the combustion to the edge portions of the laminated sheet also enhances the force of projection of the incandescent particles, thus increasing the trajectory of said particles and increasing the breadth of the shower.

The bail 2 being of metallic wire and, having the ends 5 thereof within the fold of the sheet 3, acts as a heat dissipating device,

withdrawing heat from those portions of the combustible layer adjacent the ends 5 so that when the combustion has substantially reached the ends 5, it is retarded by the withdrawal of heat, giving time for the laminated sheet to burn up evenly to both corners before either corner is entirely consumed, thus preventing any portion of the unconsumed and still burning sheet from falling to the ground.

In Figure 4, the slight modification consists in the substitution of a straight wire 6 for the bail 2 shown in Figure 3. This straight wire passes continuously through the apex of the fold and the free ends 7 may be bent by the user of the device around any suitable support. The bail in this instance acts as a combustion retarder all along the apex of the fold, giving time for the whole sheet to burn up to the apex before the latter is consumed, thus preventing any part of the device from falling until it is entirely burned out.

It has been found experimentally that the shape of the folded laminated sheet materially affects the spread of the shower and that for most spectacular results, the laminated sheets should be wider at the top and converged toward the lowermost end.

As shown in dotted lines at 8 in Figure 1, the lowermost portion of the pyrotechnic display device may, if desired, be rounded so that it may be most conveniently lit at the bottom of the arc.

While I have in the above description endeavored to disclose what I believe to be a preferred and practical form of the invention, it is to be understood that the specific details are merely by way of example and are not to be considered limitative in their relation to the scope of the invention.

What I claim as my invention is:

1. A pyrotechnic display device comprising a laminated combustible sheet including an intermediate layer, adapted to be vertically suspended, said intermediate layer being more actively combustible than the outer layers, whereby the latter restrict the emanation of the combusting products of the intermediate layer to a plane substantially embracing the edges of the sheet.

2. A pyrotechnic display device comprising a laminated combustible sheet including an intermediate layer adapted to be vertically suspended, said intermediate layer being more actively combustible than the outer layers whereby the latter restrict the combusting products of the intermediate layer to emanation edgewise of the sheet, and suspending means including a metal portion arranged at the top of said sheet in contact with the intermediate layer thereof.

3. A pyrotechnic display device comprising a laminated combustible sheet including an intermediate layer having the property of throwing out incandescent sparks while burning, said sheet being adapted to be vertically suspended, said intermediate layer being more actively combustible than the outer layers whereby the latter restrict the combusting products of the intermediate layer to emanation edgewise of the sheet.

4. A pyrotechnic display device comprising a laminated sheet, including paper outside layers and an intermediate layer of a substance having the property of throwing off incandescent sparks while burning, said outer layer being continuous over the top of said intermediate layer, and wire suspending means having a portion extending within said outer layer at the top thereof.

5. Pyrotechnic display device comprising a laminated sheet including an intermediate highly combustible layer interleaved between the sides of a folded sheet of less degree of combustibility.

6. Pyrotechnic display device comprising a laminated sheet including an intermediate highly combustible layer interleaved between the sides of a folded sheet of less degree of combustibility, and suspending means for said device adjacent the line of fold.

In testimony whereof I affix my signature.

THOMAS GABRIEL HITT.