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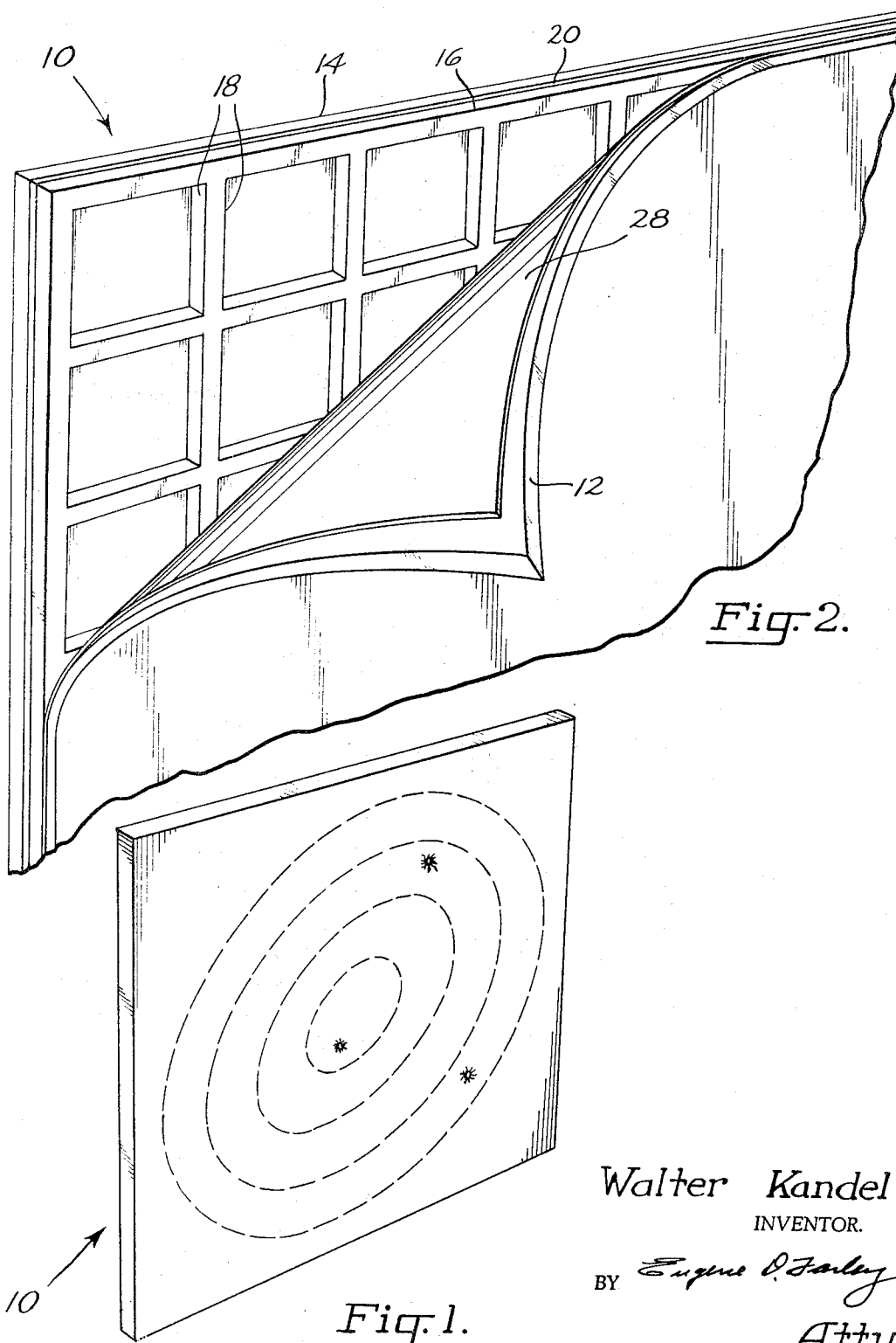
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3,330,561

SELF-MARKING FIREARM TARGET EMPLOYING LIQUID MARKING MATERIAL

Filed March 29, 1965

2 Sheets-Sheet 1



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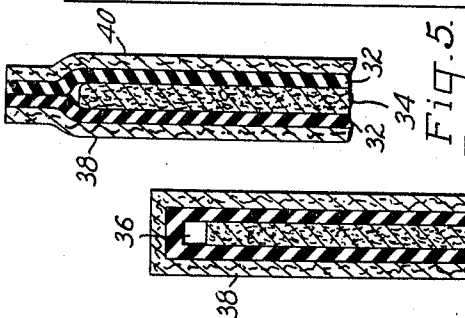
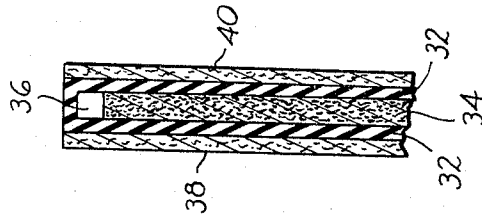
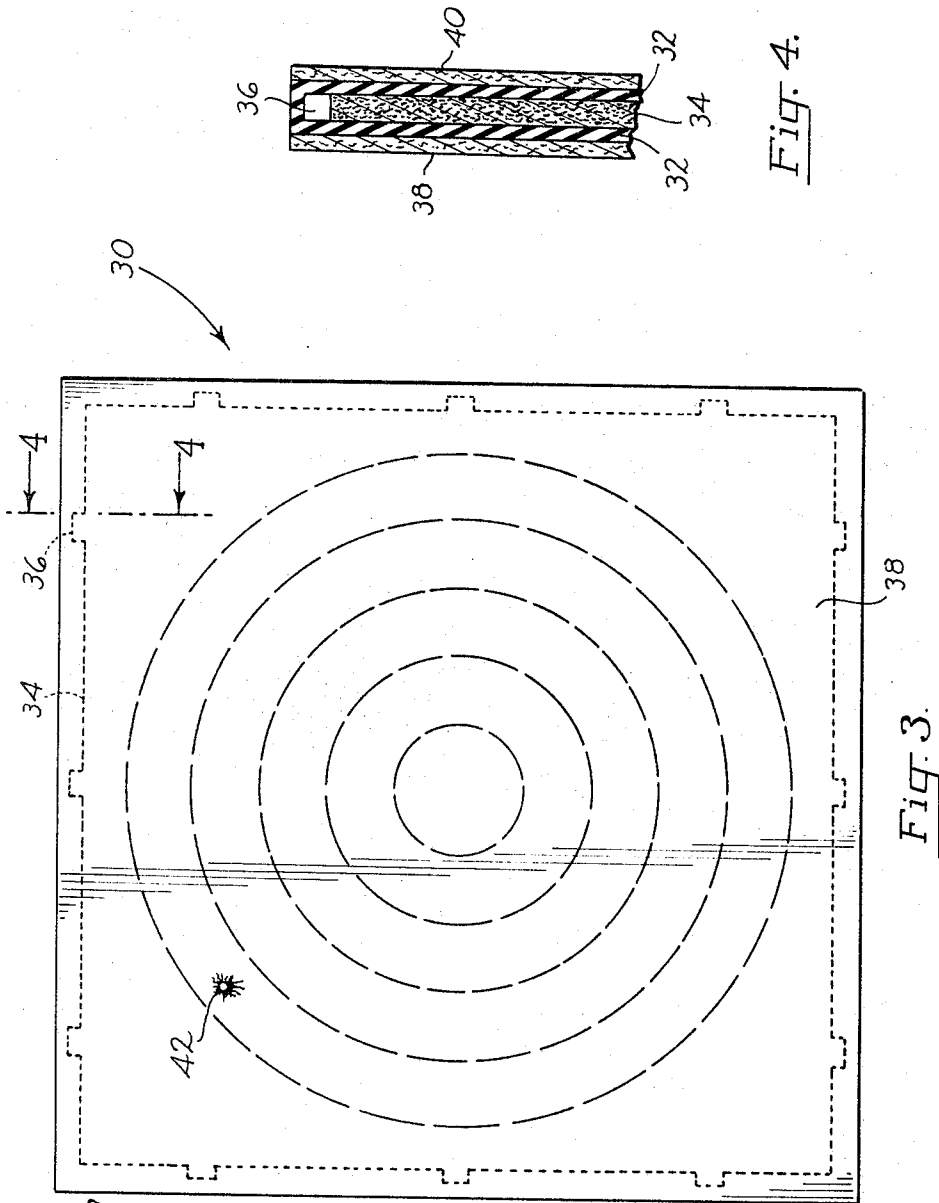
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2 Sheets-Sheet 2

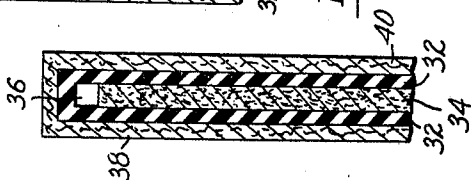


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Fig. 6.



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SELF-MARKING FIREARM TARGET EMPLOYING LIQUID MARKING MATERIAL

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9 Claims. (Cl. 273—102.1)

This application is a continuation-in-part of the patent application of Walter Kandel, Ser. No. 346,666, filed Feb. 24, 1964, for Self-Marking Firearm Target, now abandoned.

This invention relates to a firearm target which is self-marking in that when it is penetrated by a bullet, the resulting puncture area becomes covered or permeated by a colored material, thereby enhancing the visibility of the puncture.

When target shooting with conventional targets, a well known problem is present in that the bullet punctures through the target are almost invisible to the marksman as he stands some distance away from the target. Hence he has no way of knowing how well he is shooting until he inspects the target at close range.

It is the general object of the present invention to provide a target which is self-marking in that, when it is struck by a bullet, the area about the puncture is colored with a dye or other coloring material and becomes readily visible, even at a substantial distance.

It is another object of the present invention to provide a self-marking target which is manufactured easily and inexpensively and which is usable in accordance with the usual target shooting practices, but much more efficiently.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claims, considered together with the drawings, wherein:

FIG. 1 is a perspective view of the presently described self-marking firearm target;

FIG. 2 is a fragmentary view of the target of FIG. 1 with the surface layer stripped away to reveal the interior construction;

FIG. 3 is a plan view of the target of my invention in another of its embodiments;

FIG. 4 is an enlarged, fragmentary, sectional view taken along line 4—4 of FIG. 3; and

FIGS. 5 and 6 are enlarged, fragmentary, sectional views similar to FIG. 4 showing my invention in other of its embodiments.

Generally stated, the firearm target of my invention comprises a bullet-puncturable target sheet having face and back surfaces. A solid or liquid colored material is interposed between the surfaces, where it normally is concealed from the marksman's view. The color of the colored material contrasts with the color of the face surface of the target sheet. Accordingly, when the target is punctured, the colored material is released and clearly indicates the puncture area to the marksman at his shooting station.

Considering the foregoing in greater detail and with particular reference to the drawings:

In the form of my invention illustrated in FIGS. 1 and 2, the target comprises a target sheet indicated generally at 10. The sheet is laminar, comprising a face sheet 12, a back sheet 14 and an interposed grid sheet 16. The outer surface of the face sheet is marked with target insignia in the usual manner.

Sheets 12 and 14 may comprise separate sheets of porous, liquid-absorbent paper of the kind ordinarily used in the manufacture of targets. Grid sheet 16 may be manufactured from polyethylene or other water-proof plastic material. It is formed with a pattern of individual grids

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18 of relatively small size so that a very large number of the grids are present beneath the target area.

Face sheet 12, back sheet 14 and grid sheet 16 adhesively are united to each other in target-sheet forming relation. This may be accomplished in various ways, although preferably it is accomplished by coating the inner faces of the face and back sheets with varnish, or other waterproof adhesive material, forming layers 20, 28. After the sheet surfaces are coated in this manner, they may be superimposed stepwise upon the front and back surfaces of grid sheet 16. This not only assembles the laminar target sheet, but also forms a multiplicity of small, water tight receptacles between the sheets.

Preliminary to the final gluing-up operation, these partially-formed receptacles may be filled with a colored material, which preferably comprises a colored dye, or colored paint.

As an alternative form of the invention, each receptacle may be filled with an aqueous liquid having a predetermined pH. Surface sheet 12 may be impregnated with a chemical indicator which changes color at the pH of the aqueous liquid. The colored material then is developed when the aqueous liquid in the punctured receptacle contacts the indicator on the surface sheet.

Such contact occurs during use of the target. Each bullet creates a puncture hole which penetrates one of the receptacles present between the two sheets. The dye or pigment contained in the punctured receptacle thereupon is released so that it marks the face surface area about the puncture hole in the manner indicated in FIG. 1. Similarly, if the receptacles are filled with aqueous liquid of a predetermined pH and the face sheet is impregnated with a chemical indicator, a distinctive color is developed by the coaction of these two materials.

In either case, the bullet hole is rendered easily visible even from a substantial distance, thereby clearly indicating to the marksman the location of each bullet hole on the target.

In the form of the invention illustrated in FIGS. 3 and 4, the coloring material is confined in a liquid-proof, puncturable envelope.

Thus the target, indicated generally at 30, includes an envelope 32 made preferably of plastic which not only is liquid-proof, but which also is proof against evaporation of contained fluids. Accordingly it may comprise such plastics as polyethylene or cellophane, or a composite of both materials, one side being of polyethylene and the other of cellophane.

The plastic envelope conveniently may be manufactured by using heat sealable plastic materials. Two sheets of the plastic material may be superimposed one upon the other and the overlying margins sealed to form the finished envelope 32. Envelope 32 contains a quantity of liquid coloring material absorbed in an absorbent material which preferably comprises a porous filler sheet 34.

The composition of the filler sheet may be varied, but it may be made from blotting paper, cloth, or porous plastic. In any case, it is saturated with a liquid coloring material, used in amount sufficient to color the exposed target surface in the puncture area.

In the event that porous filler sheet 34 is not self-sustaining, it may be maintained in position, uniformly distributed across the entire area of the envelope, by vacuum sealing the envelope in known manner, illustrated in FIG. 5. In the alternative, it may be supported physically by mechanical means illustrated in the drawings.

To this end the porous sheet may be provided at spaced intervals with peripheral projections or tabs 36. These extend into the area of heat sealing of the plastic, so that when the plastic margins are sealed, the tabs are

locked in position and thus support porous sheet 34 in its operative position.

Glued or otherwise fastened to the front of the liquid-filled plastic envelope is a target sheet 38. The target sheet comprises a sheet of porous paper marked with the target pattern in the usual way. It is sufficiently porous to absorb coloring material rapidly and in substantial quantity.

Glued or otherwise fastened to the back of envelope 32 is a backing sheet 40, which may comprise a sheet of cardboard of sufficient stiffness to hold the target erect when it stands on edge advantageously. If desired, target sheet 38 and backing sheet 40 may be fabricated as an envelope, dimensioned to contain plastic envelope 32, as illustrated in FIG. 6.

The manner of use of the self-marking target of FIGS. 3 and 4 is similar to that of FIGS. 1 and 2.

When the target is penetrated by a bullet, the puncture hole through plastic envelope 32 releases a quantity of the dye or other coloring liquid with which porous filler sheet 34 is saturated. The coloring material then is absorbed in porous target sheet 38 making the area about the bullet hole highly visible. Although a certain quantity of coloring material will leak out through the bullet hole, most of it will be retained distributed throughout porous filler sheet 34 to be released by subsequent bullet punctures during the normal use life of the target.

It accordingly will be seen that there is provided an apparatus in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A firearm target comprising a laminar, bullet-puncturable target sheet including a porous face sheet and a back sheet, interposed between the face and the back sheet a grid of puncturable liquid-tight receptacles, each containing a quantity of liquid colored material, the color of the colored material contrasting with the color of the face sheet of the target, the face and back sheets and the grid being adhesively united to each other in target-sheet forming relation.

2. The target of claim 1 wherein the receptacles contain an aqueous liquid of predetermined pH and wherein the face sheet is impregnated with a chemical indicator which is color alterable at the said pH.

3. A firearm target comprising a laminar, bullet-puncturable target sheet including

- (a) a face sheet of liquid absorbent material marked with a target pattern;
- (b) an envelope of liquid-proof material secured to the rear side of the face sheet in target-sheet forming relation, and
- (c) a quantity of liquid coloring material contained in the envelope,
- (d) the color of the coloring material contrasting with the color of the face sheet of the target.

4. The firearm target of claim 3 including a quantity of porous material contained in the envelope, the liquid coloring material being absorbed in the porous material.

5. The firearm target of claim 3 wherein the envelope comprises two superimposed sheets of water-proof, heat sealable plastic, the envelope including a porous filler sheet interposed between the plastic sheets, the filler sheet having a plurality of peripheral projections, the plastic sheets being peripherally sealed one to the other, the sealed area including the peripheral projections of the filler sheet, thereby locking the same in place, the liquid coloring material being absorbed in the filler sheet.

6. The firearm target of claim 3 wherein the envelope comprises a vacuum sealed envelope for maintaining the coloring material uniformly distributed throughout the area of the envelope.

7. The firearm target of claim 3 including a stiff backing sheet fastened to the outside of the envelope on the side thereof opposite the face sheet.

8. The firearm target of claim 3 including a stiff backing sheet fastened to the outside of the envelope on the side thereof opposite the face sheet, the face sheet and backing sheet formed as an integral container dimensioned to receive the envelope.

9. The target of claim 3 wherein the envelope contains an aqueous liquid of predetermined pH and wherein the face sheet is impregnated with a chemical indicator which is color alterable at said pH.

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