

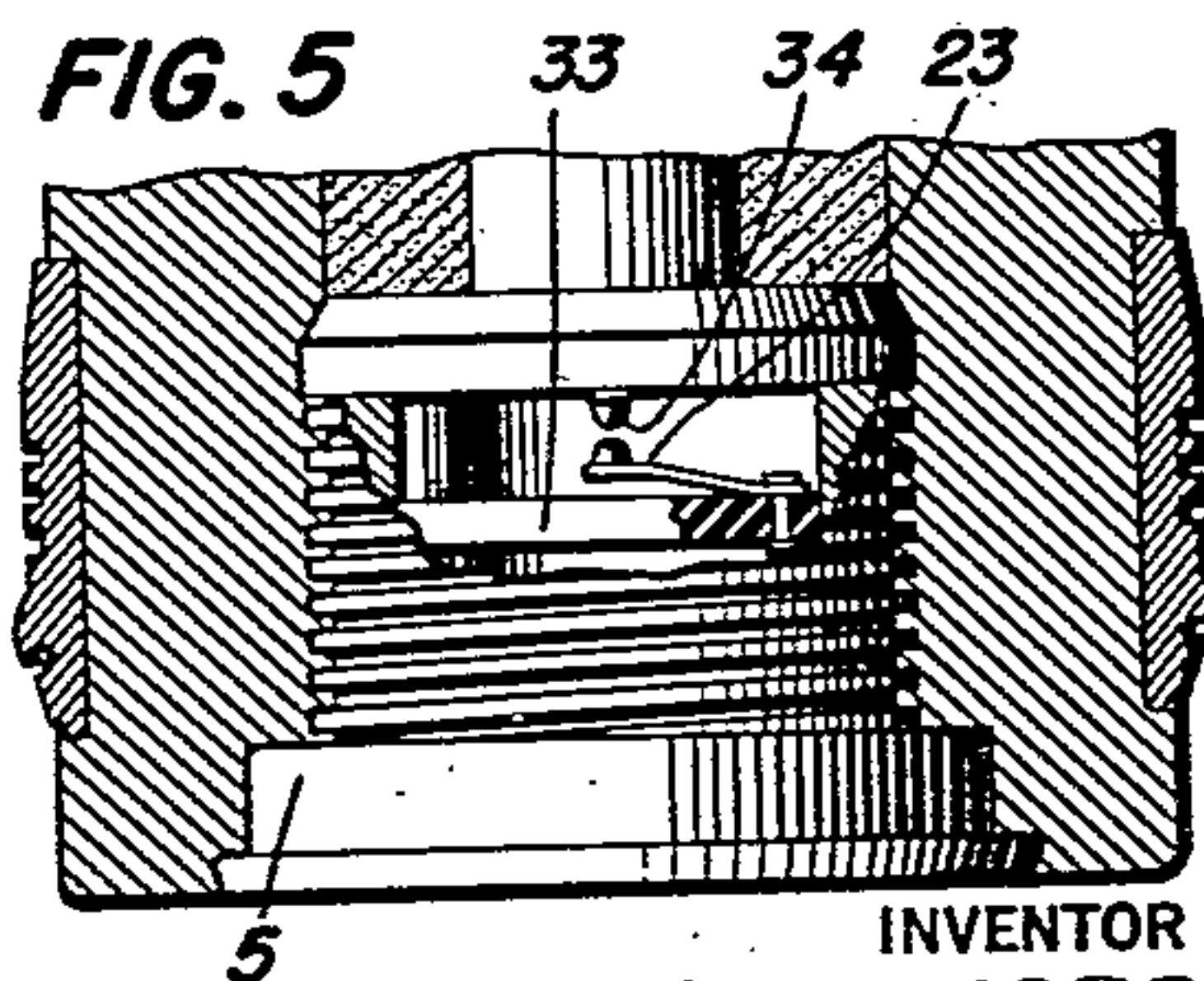
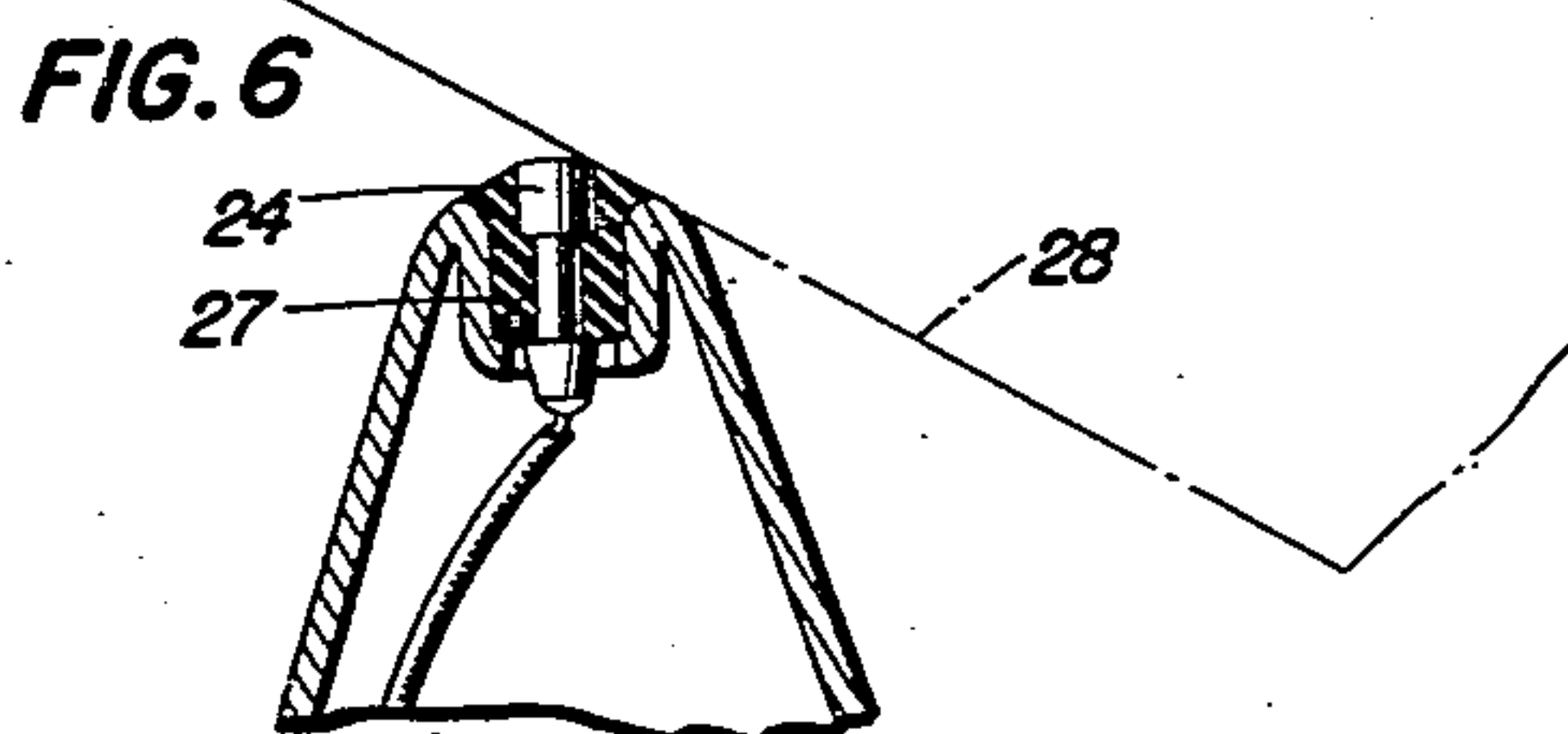
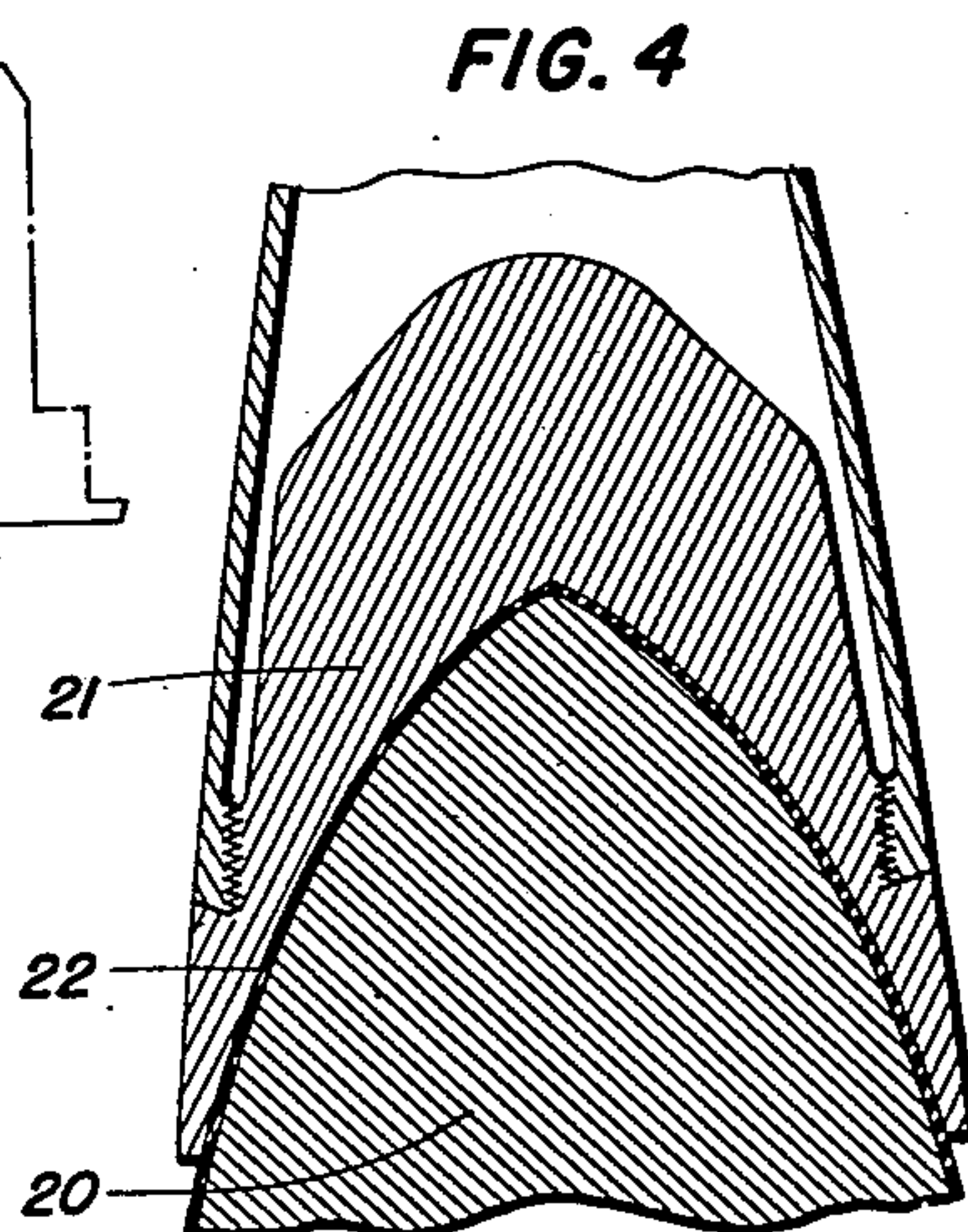
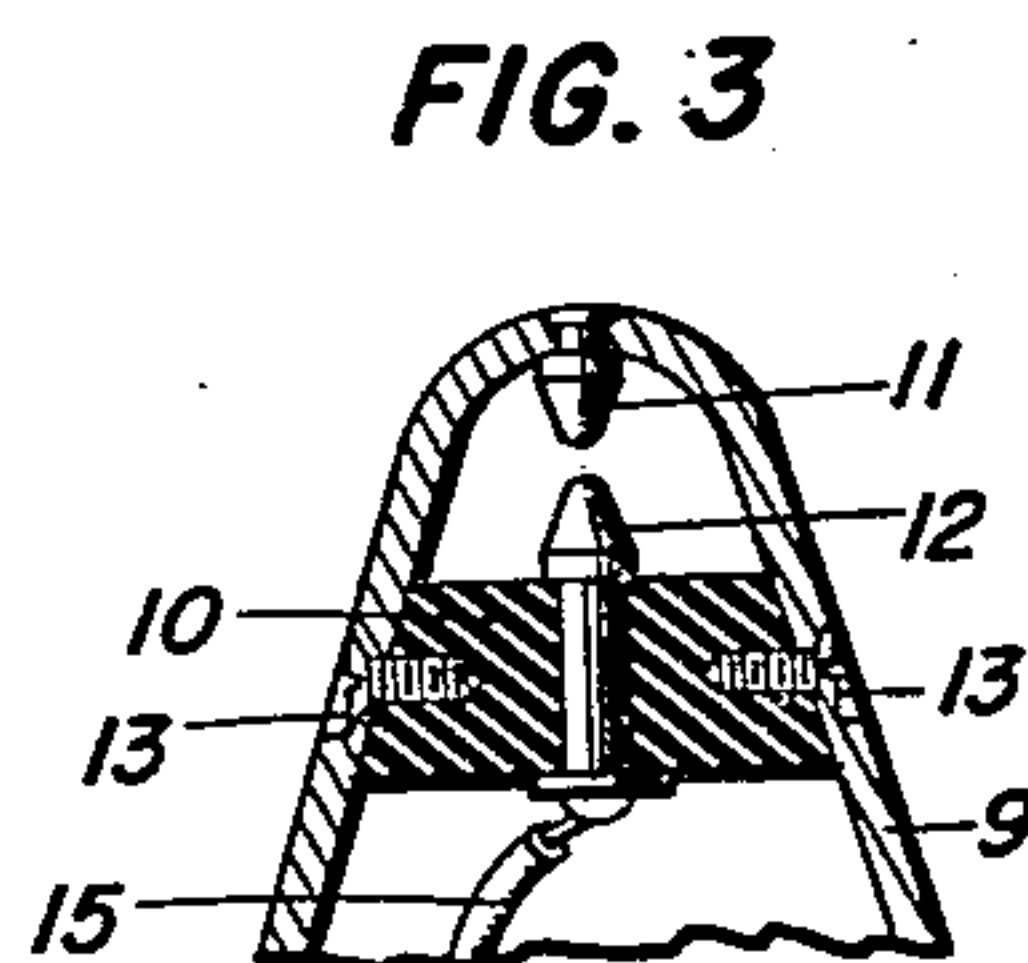
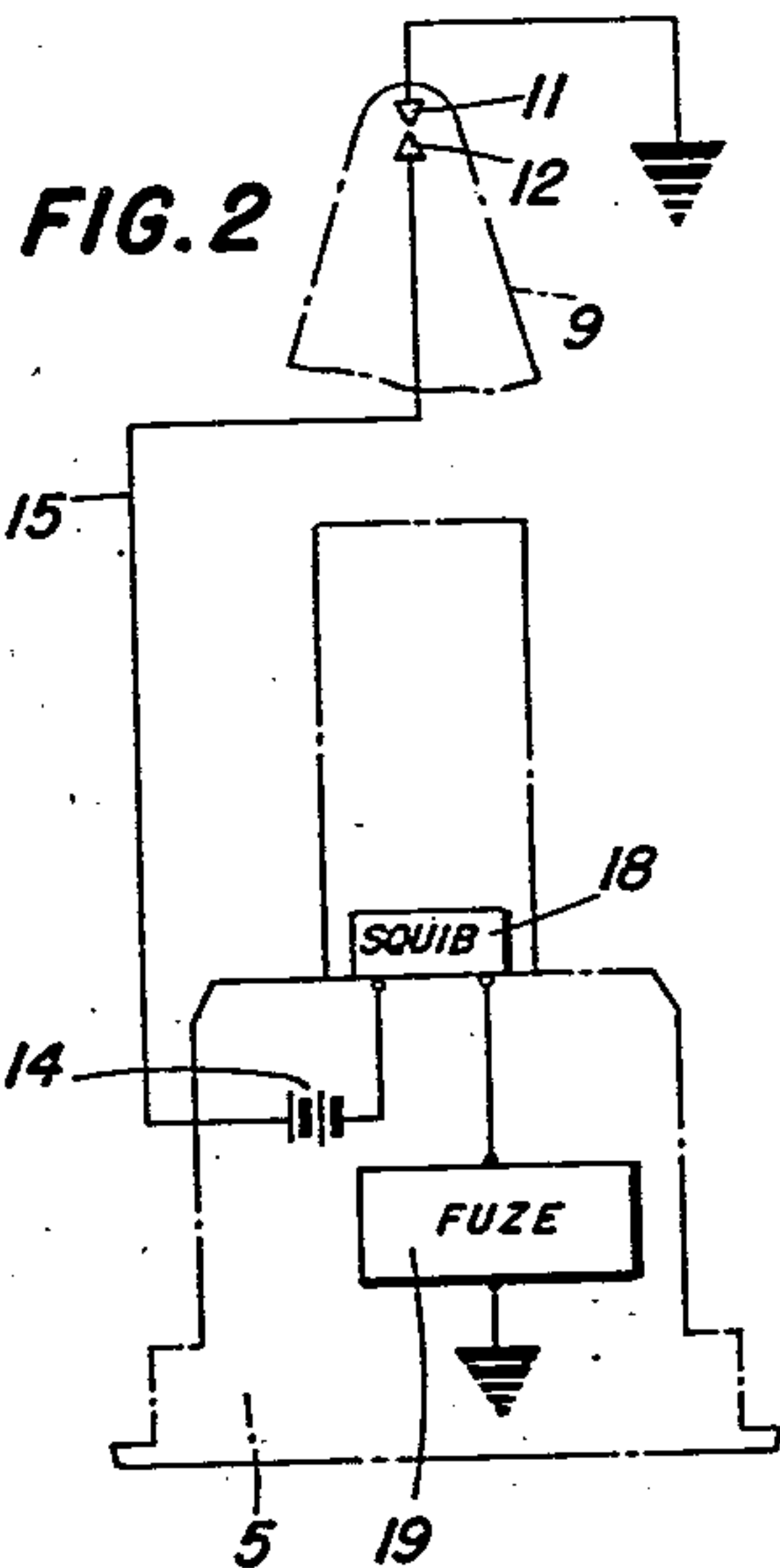
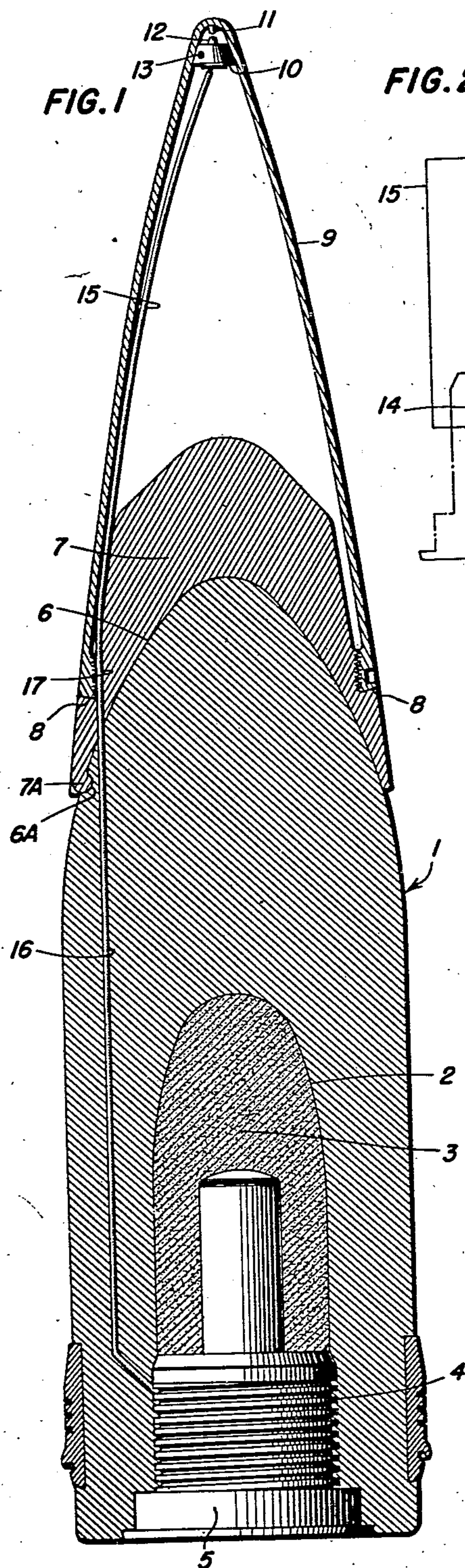
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2,485,887

PROJECTILE

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2,485,887

PROJECTILE

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2 Claims. (Cl. 102—56)

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This invention relates generally to explosive projectiles and more particularly to projectiles of the armor piercing variety.

Armor piercing projectiles in use up to the present time occasionally fail to operate because the impact produced by contact of such a projectile with the target is not sufficient to fire the inertia-operated detonating device employed in the projectile. This has been due largely to the fact that the projectiles are so heavy that the target fails to exert a sufficient retarding effect thereon.

One of the principal objects of the present invention, therefore, is to provide an improved armor piercing projectile incorporating novel means designed to assure detonation thereof upon contact with a target.

Another object of the invention is to provide a projectile of this character employing electrically operable detonating means of extremely simple and reliable character, and which is positive in operation, whereby detonation is assured.

A further object of the invention is to provide such an armor piercing projectile so constructed that the electrically operated detonating means neither weakens the projectile nor affects its ballistic characteristics.

Further objects of the invention will appear as the description proceeds.

In the drawing:

Figure 1 is an axial sectional view of a projectile incorporating a preferred embodiment of the invention;

Figure 2 is a wiring diagram;

Figure 3 is a detail sectional view of the circuit closing switch;

Figure 4 is a fragmentary sectional view showing a modified embodiment of the invention;

Figure 5 is a sectional view of the base portion of a projectile provided with a modified circuit-closing switch; and

Figure 6 is a detail sectional view of the nose portion of a projectile showing still another modified form of circuit-closing means.

Referring now to the drawing in detail, the numeral 1 indicates generally the body of the improved projectile, which may be formed of heavy metal of the type usually employed for this purpose and provided with an axial recess or cavity 2 which carries a charge of high explosive 3. Near its rear end the cavity is internally threaded, as shown at 4, to receive a base block or plug 5. The base block is designed to contain set-back switches, safety devices, and/or other components.

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The ogive 6 of the projectile may be of the conventional generally cone shape, and an armor-piercing cap 7 is shown attached thereto by means of tongue portions 7A bent into recesses 6A, said cap having a shoulder 8 formed near its rear end to receive the rim of an elongated hollow sheet metal windshield 9.

A circuit closing device, the body of which is designated 10 is mounted in the nose of the windshield by means of screws 13, and includes a forward contact 11 and a rear contact 12. Contact 11 is mounted or formed on the windshield at its forward end and "grounded" thereto, while rear contact 12 is mounted in close proximity to said forward contact but insulated therefrom by its supporting body 10, which is formed of suitable insulating material. It should be understood that, while the contacts 11 and 12 are normally disengaged, they are mounted in closely spaced relation so that but a relatively small amount of force is needed to distort the windshield sufficiently to cause them to engage each other. The wiring arrangement is clearly seen in Figure 2 of the drawings and, by referring to this view, it will be observed that the contact 12 is connected, by an insulated conductor 15, to one terminal of a battery 14, which may be housed in the base plug 5. The conductor 15 extends through passages 16 and 17, formed in the body 1 and cap 7, respectively.

While the passages 16 and 17 are herein shown arranged in the body and cap near their outer peripheries, said passages may be formed axially of the cap and body if desired. It will be understood that the passages 16 and 17 should be of the smallest diameter possible to accommodate the conductor 15 so that there will be no material weakening of the body of the shell, or of the armor-piercing cap 7.

The other terminal of the battery 14 is connected to one terminal of an electrically operable squib or primer 18, and the other terminal of the squib is connected to one terminal lead of a fuze 19. The fuze components are not shown in detail and it will be understood that the fuzing means may if desired be electrical, and that setback switches, time delay devices, and other electrically operated apparatus may be included. The other terminal lead from the fuze circuit is grounded to the body 1 which is electrically connected to the contact 11 through the cap 7 and the windshield 9.

In operation it will be understood that the contacts 11 and 12 of the switch 10 are normally separated prior to firing, as are any setback

switches or other safeguarding elements in the plug 5. When the projectile is fired, however, all circuits to the squib become closed, with the exception of the circuit including the contacts 11 and 12, so that the projectile is ready for firing upon contact with the target. Thus, when the forward end of the windshield 9 contacts the target, the contacts 11 and 12 will become engaged, closing the circuit to and firing the squib to detonate the projectile.

Inasmuch as the switch is mounted at the forward end of the projectile, it will be closed instantly upon engagement of the projectile with the target, so that forces of inertia will not be required to close the detonating circuit.

In Figure 4 modified switching means is shown which requires no special switching elements other than a frangible layer or coating of insulating material 22 between the body of the projectile 20 and the armor-piercing cap 21. Electrical connection is made to the cap 21 and to the body, and the circuit is closed by the puncturing of the coating or layer 22 which function will take place when the cap engages the target.

In Figure 5 of the drawing another modification is shown. In this view, a relatively sensitive spring switch 23 is mounted in the plug 5. The switch is shown as of the flexible reed type and is designed to be momentarily closed upon deceleration such as occurs when the projectile strikes even a relatively light target. The circuit connections for this switch are the same as those of the previously described modifications shown. For example, the reed may be insulated from the plug by its supporting body 33 and have a contact designed for engagement with a fixed contact 34 mounted on the plug.

In the modification shown in Figure 6 the switch is eliminated and in its place an insulated contact 24 is axially mounted in the nose of the windshield in the insulating bushing 27. In operation, when the projectile contacts a metallic surface, such as the wing of an airplane, the electric circuit will be closed by the bridging of the front end of the contact 24 and the rim of the windshield by a portion of the target sur-

face. A portion of the target is shown in dotted lines at 28.

What is claimed is:

1. A high explosive projectile including a body having an explosive charge therein, normally open-circuited electrically operable exploding means for the charge, a windshield carried by the body, and two electrical contact portions carried by the windshield and exposed at the nose of the latter, and designed to be bridged by an electrically conductive target to complete the circuit of the exploding means.

2. A high explosive projectile including a body having an explosive charge therein, a normally open-circuited electrically operable exploder for the charge, a windshield carried by the body, said windshield being of tapering contour and formed of electrically conductive material, an insulating section rigidly carried by and exposed at the surface of the windshield appurtenant the apex thereof, and contact means for said exploder comprising a contact element carried by said insulating section and insulated thereby from the windshield, whereby the open circuit of said exploder may be completed between said contact element and the windshield, upon simultaneous engagement of said windshield and said contact element with an electrically conductive target.

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