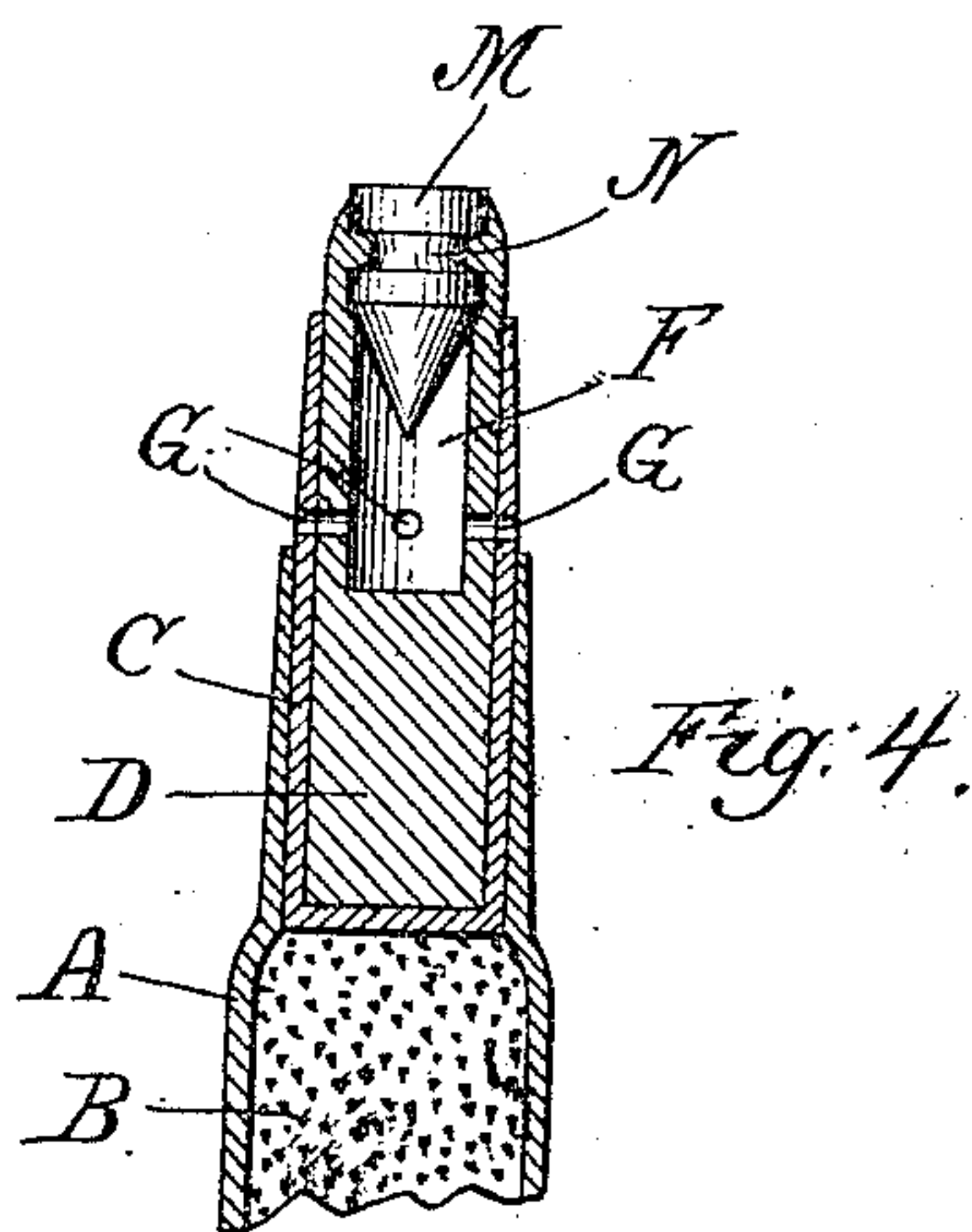
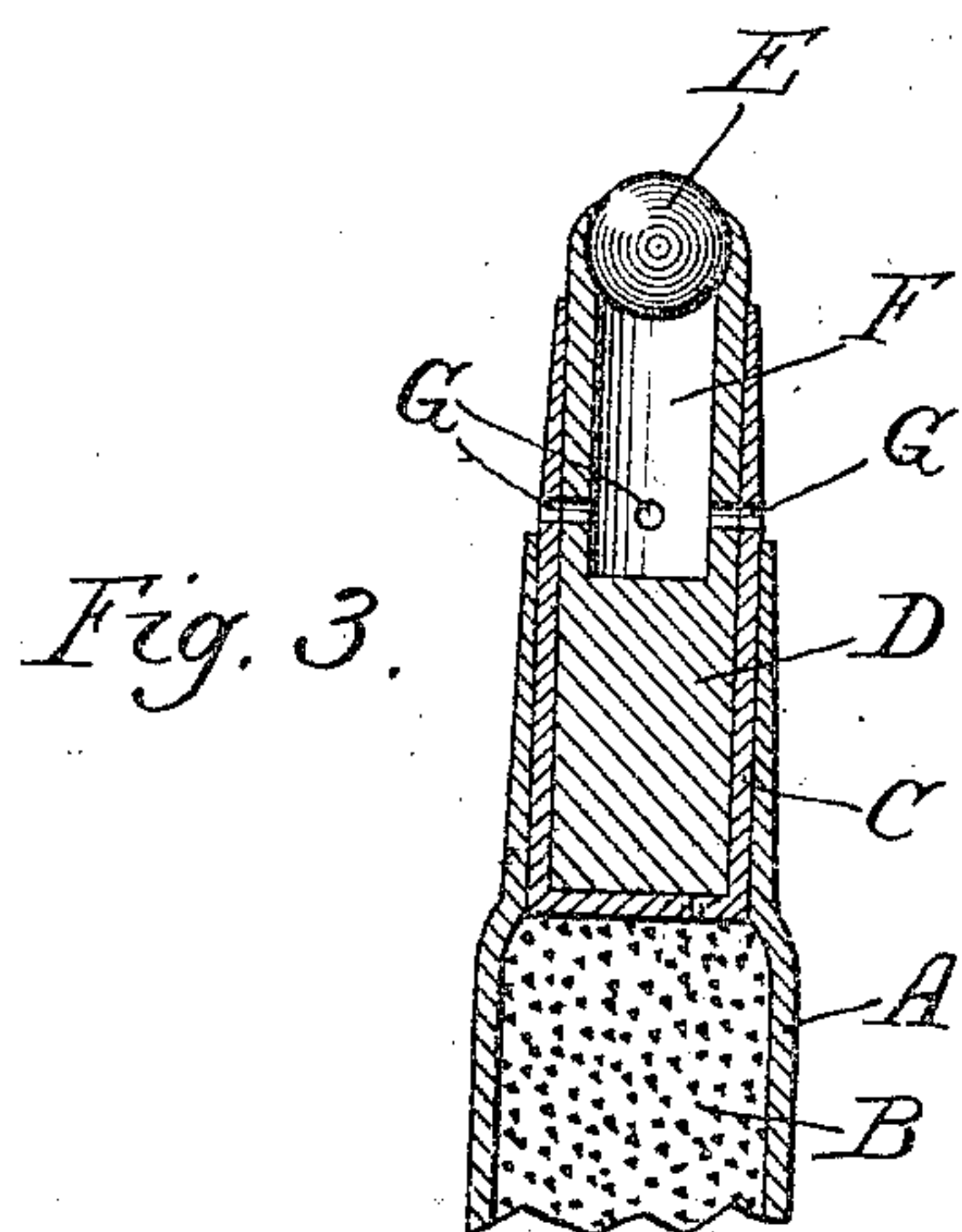
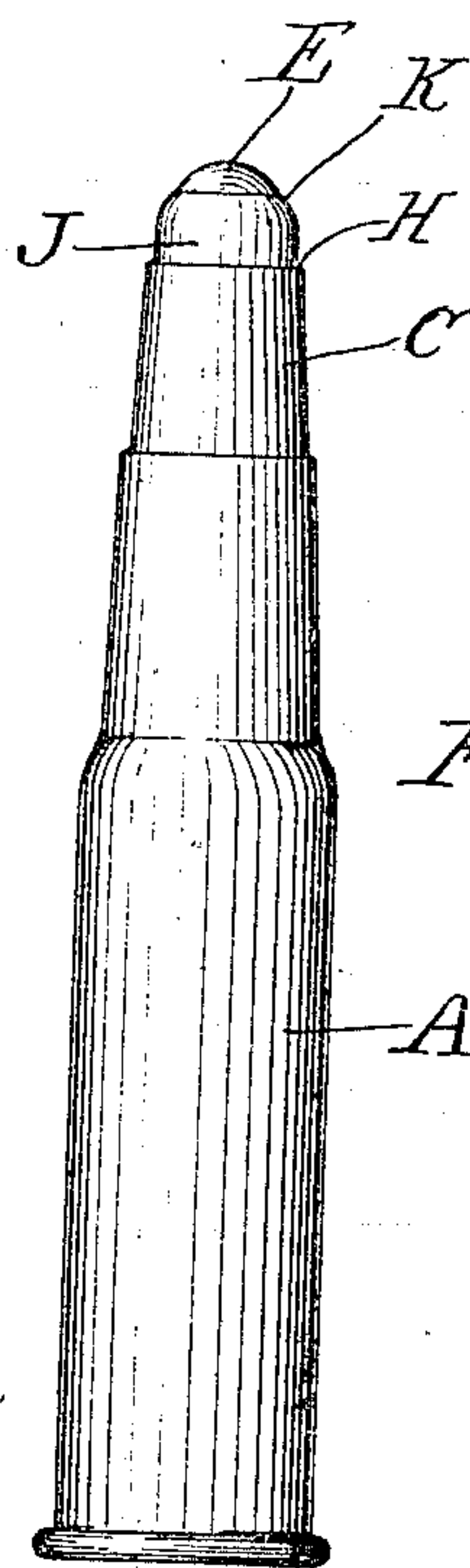
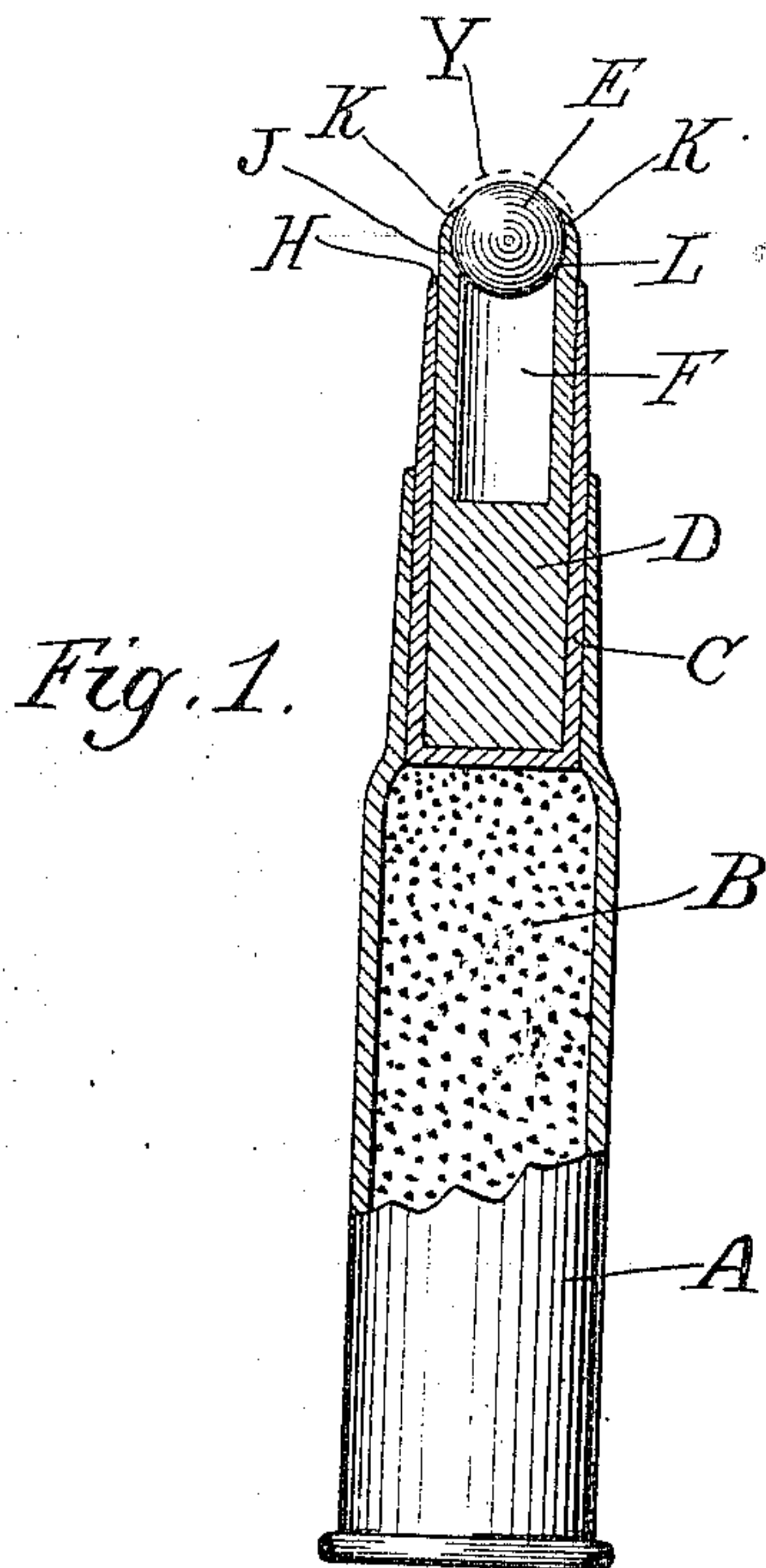


No. 843,017.

PATENTED FEB. 5, 1907.

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PROJECTILE.

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PROJECTILE.

No. 843,017.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed October 25, 1906. Serial No 340,447.

To all whom it may concern:

Be it known that I, GILBERT H. HOXIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Projectiles, of which the following is a specification.

My invention relates to projectiles and is illustrated in the accompanying drawings, wherein—

Figure 1 is a longitudinal section through a projectile. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal section through a modification. Fig. 4 is a corresponding section through a further modification.

Like parts are indicated by the same letters in all the figures.

A is a cylinder containing powder B. In the forward end is placed the projectile, which comprises the jacket C, preferably of thin metal, the filling D, preferably of lead and filling the whole of the jacket, and the impact part E, preferably of steel.

F is a chamber back of the impact part. It is shown as closed in Figs. 1 and 2 and as open, by means of the holes G G, in Figs. 3 and 4.

H is the forward end of the jacket C.

J is the forward end of the filling D.

K is a portion of that filling which overhangs, and thus retains, the impact part P.

L is a portion of the filling which lies between the end of the shell C and the impact part E or the path which the impact part is to travel.

The impact part M (represented in Fig. 4) is provided with a groove N, into which the metal of the filling D is run, so that the impact part is held in position. It will be noted in the structure shown that the cross-section of the impact part E is greater than the cross-section of the chamber F and less than the cross-section of the jacket at its mouth. The "filling" material, so-called, so far as its function of supporting the impact part near the mouth of the jacket need not, of course, fill the entire jacket. The filling proper may be described as that part of the filling material D which lies within the mouth of the jacket, helps choke the same, as hereinafter described, holds the impact part on the jacket, and is arranged so as to leave or form a relatively free passage-way for the impact

part into the jacket or through the mouth thereof.

In Fig. 1 I have shown in dotted lines an extension of the filling material at Y to cover the front end of the impact part. This is only to illustrate that so far as this part of the invention is concerned the function of the filling material is to hold the impact part, and the impact part is intended to take the blow or force of the first impact. A slight sheeting of another material—for example, that of the filling matter, not interfering with the effective operation of the impact part as such—could be used, if necessary or desirable, for the purpose of convenience in manufacture or to assist in holding the impact part in position.

I have shown chamber F as either closed or open to the exterior air and as filled only with air. It may be arranged in many other ways and may be filled with material other than air, gaseous or otherwise, provided the arrangement of parts and materials is such as to give the impact part a relatively free rangeway in its movement into the filling or jacket. If the explosive effect of the air or other such material as the chamber may contain is to be made use of, then of course the arrangement must be such as to confine such materials, and I prefer for that purpose a closed chamber. I think it important to have the filling and the impact part of different densities or weights per cubic unit. Another important feature is the arrangement of the parts so that when the impact part starts into this chamber its action is to choke or clog the forward end of the inclosing jacket, and thus split or break it open.

It is not perfectly easy to determine exactly what action takes place in the case of a projectile of the class described. Broadly speaking, my projectile consists of an impact part not integral with the filling or the jacket, a filling in the forward end of which the impact part is placed, a thin jacket surrounding the body of such filling, and a relatively open or free passage-way for the passage of the impact part into the body of the projectile.

The impact part should be supported so that it will not in its passage through the air separate itself from the rest of the projectile. It should have a passage-way into the interior of the projectile of such a nature as to permit it under relatively slight pressure to enter the

filling of the projectile or the jacket, the filling should be surrounded and retained in position by a relatively thin suitable jacket, and, finally, the parts should be arranged so that when the impact part starts into the projectile it will exert in the best possible manner a tendency to split or break the jacket laterally.

I seem to get the best results when the chamber back of the impact-point is relatively large and closed, though I also get good results when the chamber is smaller and when it is open to the exterior air. An important element of my invention, therefore, is the arrangement behind the impact part of a relatively free passage-way, which may be either a closed or an open chamber or may be a chamber filled with material other than air which would easily give way and permit the impact part to enter. It is possible that part of the action, or the action under certain conditions, is due to the explosive effect of the air when the chamber is closed.

The volume of the filling and the thickness of its walls within the jacket can obviously be varied greatly. It has here three functions: first, the usual function of the filling in such a projectile; second, the holding of the impact part in position, and, third, the furnishing of a relatively free way for the impact part within the jacket. As previously suggested, the size, shape, and arrangement of parts and the various material employed can be greatly changed without departing from the spirit of my invention. The jacket is preferably of thin sheet copper or brass, the filling material is preferably of lead, and the impact part is preferably of steel.

The use and operation of my invention are as follows: A projectile of a given diameter fired by a gun of a suitable bore will produce when it strikes the flesh of an animal a small hole—say twice the diameter of the projectile—and will pass through such flesh. Frequently animals are thus injured, but not fatally, or, if fatally, in such manner that they live for a considerable period, and thus escape from the hunter. Under such circumstances, of course, they are subjected to great pain. When my invention is applied to a projectile of the same cross-section fired by the same gun, it will produce a disruption of the animal tissues over an area many times the cross-sectional area of the hole made by the ordinary projectile. To be more specific, a projectile a quarter of an inch in diameter, being in all respects similar to like projectiles except that my invention is applied to it, and being fired under normal conditions for such a projectile, will enter the flesh of an animal and tear and lacerate the tissues through a region whose cross-sectional area is from three to four inches in diameter. Portions of the material of the projectile, particularly the jacket, may even pass into the tissues over a

much wider area. The result is that my bullet produces the effect of a hole four inches in diameter through the attacked tissues. The effect of such a wound is to shock the nervous system of the animal so as in most instances to produce the desired effect of securing the game with the greatest possible certainty and the least possible suffering to the animal. The animal will receive a mortal wound when struck by such a bullet in almost any part of its body, whether or not the vitals or principal bones are touched. The use of my projectile is intended to increase the execution of a given weapon, so that the hunter may use a lighter or smaller weapon and still secure more satisfactory results than by the use of the heavy weapon, and to increase the efficiency of the projectile so that a small one will have the same efficiency as a larger one. It is believed that this projectile, either by the explosive effect of the air or by the splitting effect of the impact part on the jacket, distributes the jacket portions through the tissues almost at the instant of impact in such a way as to greatly widen the sphere of destructive activity of the projectile. At the same time when hard substances—such as bone, thick cuticle, wood, metal, &c.—are attacked the tendency of the projectile appears to be to conserve its form, penetrate, and then proceed on its way as above described. Thus I increase the ordinary penetration efficiency over that of the smaller projectile in hard materials and get a greatly-increased efficiency in softer substances.

This projectile in its preferred form comprises an exterior jacket, with a filling therefor projecting therefrom at the open end, an impact part of relatively hard metal supported at the forward portion of the filling material and provided with a cavity within such filling material and within the jacket. Such a projectile will penetrate hard substances, such as bone or tough skin, without much spreading and will when it enters soft substances, either before or after penetrating such hard substances, spread or mushroom to a great extent, producing a highly-destructive effect. To do this, the impact part is effectively exposed—that is, it lies outside of any surrounding shell or jacket of hard or tenacious material—though, as explained, it may perhaps be embedded in the soft material which holds it. The free passage-way or cavity back of the impact part also seems essential, though how far the same must be a closed chamber has not yet been clearly established.

I claim—

1. A projectile comprising an impact part, a jacket open at the forward end, and a jacket-filling, the latter adapted to hold the impact part in position and provided with a relatively free passage-way for the impact part.

2. A projectile comprising an exposed impact part, a jacket open at the forward end, and a jacket-filling, the latter adapted to hold the impact part in position, and provided with a relatively free passage-way for the impact part.

3. A projectile comprising an impact part, a jacket open at the forward end and of relatively tenacious material and a jacket-filling of relatively yielding material, the latter adapted to hold the impact part in position, and provided with a relatively free passage-way for the impact part.

4. A projectile comprising an exposed impact part, a jacket open at the forward end and of relatively tenacious material and a jacket-filling of relatively yielding material, the latter adapted to hold the impact part in position, and provided with a relatively free passage-way for the impact part.

5. A projectile comprising an impact part, a jacket open at the forward end, and a jacket-filling, the latter adapted to hold the impact part in position, and provided with a chamber to form a relatively free passage-way for the impact part.

6. A projectile comprising an exposed impact part, a jacket open at the forward end and a jacket-filling, the latter adapted to hold the impact part in position, and provided with a chamber to form a relatively free passage-way for the impact part.

7. A projectile comprising an impact part, a jacket open at the forward end and of relatively tenacious material and a jacket-filling of relatively yielding material, the latter adapted to hold the impact part in position, and provided with a chamber to form a relatively free passage-way for the impact part.

8. A projectile comprising an exposed impact part, a jacket open at the forward end and of relatively tenacious material and a jacket-filling of relatively yielding material, the latter adapted to hold the impact part in position, and provided with a chamber to form a relatively free passage-way for the impact part.

9. A projectile comprising an impact part, a jacket open at the forward end, and interposed filling material adapted to hold the impact part in position on the jacket, and provide a relatively free passage-way into the jacket.

10. A projectile comprising an impact part, a jacket open at the forward end and with an inner relatively free passage-way, and interposed filling material in the mouth of the jacket and adapted to hold the impact part in position on the jacket in front of such passage-way.

11. A projectile comprising an impact part, a jacket open at the forward end, and interposed filling material in the mouth of the jacket adapted to hold the impact part in position on the jacket, the diameter of the

impact part being slightly less than the diameter of the jacket.

12. A projectile comprising an impact part, a jacket open at the forward end and interposed filling material in the mouth of the jacket adapted to hold the impact part in position on the jacket, the diameter of the impact part being slightly less than the diameter of the jacket, said jacket having a relatively free passage-way of less diameter than that of the impact part.

13. A projectile comprising a lead bullet having a recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug arranged in said recess to form the impact-point of the projectile, the said recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

14. A projectile comprising a lead bullet having a central recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug arranged in said central recess to form the impact-point of the projectile, the said central recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

15. A projectile comprising a lead bullet having a tapering recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug arranged in said tapering recess to form the impact-point of the projectile, the said tapering recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

16. A projectile comprising a lead bullet having a central tapering recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug arranged in said central tapering recess to form the impact-point of the projectile, the said central tapering recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

17. A projectile comprising a lead bullet having a recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug of a spherical form arranged in said recess to form the impact-point of the projectile, the said recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

18. A projectile comprising a lead bullet having a central recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug of spherical form arranged in

said central recess to form the impact-point of the projectile, the said central recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

19. A projectile comprising a lead bullet having a tapering recess in its forward end, a jacket inclosing the bullet in part with the forward portion thereof exposed, and an expander-plug of spherical form arranged in said tapering recess to form the impact-point of the projectile, the said tapering recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

20. A projectile comprising a lead bullet having a central tapering recess in its forward end, a jacket inclosing the bullet in part with

the forward portion thereof exposed, and an expander-plug of spherical form arranged in said central tapering recess to form the impact-point of the projectile, the said central tapering recess having a greater depth than the expander-plug to provide a closed air-chamber at the rear of the expander-plug.

21. A projectile comprising a relatively hard impact part, a relatively hard jacket, and a relatively soft jacket-filling, the latter adapted to hold the impact part in position, and provided with a relatively free passage-way for the impact part, such impact part lying outside of the jacket.

GILBERT H. HOXIE.

Witnesses:

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