

MANSFIELD, MORSE & MANSFIELD.

Projectile.

No. 35,103.

Patented Apr. 29, 1862.

Fig. 1.

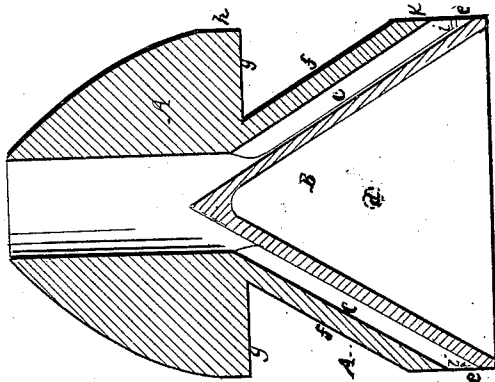
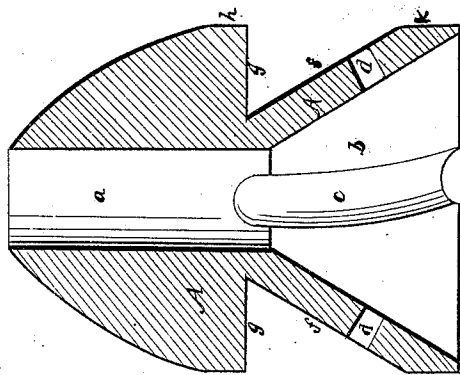


Fig. 2.



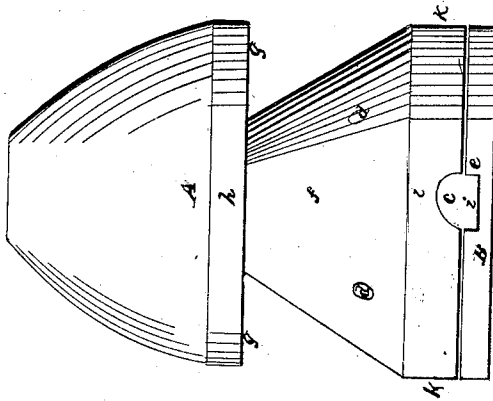
Witnesses.

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Fig. 3.



UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PROJECTILES FOR ORDNANCE, &c.

Specification forming part of Letters Patent No. 35,103, dated April 29, 1862.

To all whom it may concern:

Be it known that we, WILLIAM MANSFIELD, JEDEDIAH MORSE, and H. H. MANSFIELD, all of Canton, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Elongated Projectiles for Ordnance and Fire-Arms; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central section of a shot constructed according to our invention, representing it complete. Fig. 2 is a central section, representing the two parts of which the shot is composed detached from each other. Fig. 3 is an outside longitudinal view, corresponding with Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

One object of this invention is to obtain a rotary motion of an elongated projectile about its axis by the action of the atmosphere upon it when discharged from a smooth-bore gun; and to this end a part of the invention consists in providing in the rear of the projectile two or more spiral air-passages formed between two cones and communicating with a central passage in the front part of the projectile. Another object is to insure the projectile striking on its point; and to this end another part of the invention consists in making the rear portion of the exterior of the projectile of conical form externally as well as internally, the exterior surface of such conical portion being in rear of a shoulder over which, in the flight of the projectile, the air rushes against the said surface on all sides thereof.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

To carry out the first-mentioned part of our invention, the projectile requires to be made of two pieces; but the second part may be carried out equally well whether it be made of one or two pieces. The projectile represented in the drawings, illustrating both features of the invention, is made of two pieces, A and B. The front piece, B, has a central opening, *a b*, right through it, the front por-

tion, *a*, of the said opening being cylindrical or slightly taper, and the rear portion, *b*, being of conical form, enlarging toward the rear, where it is of a diameter nearly equal to the full caliber of the bullet. In the sides of the conical portion *b* of the opening there are formed two or more spiral grooves, *c c*, at equal distances apart. The piece B is a hollow cone, which fits snugly into the conical portion *b* of the central opening, *a b*, and so closes the said opening, except at the grooves *c c*, which it leaves open at their ends only, and converts into spiral passages communicating with the central opening or passage, *a*, in the front part of A. The piece B may be formed separately from the piece A, and afterward secured thereto by riveting or other suitable means; but we prefer to cast it in its place in A, first placing A in a suitable mold. In this mode of forming B, it is secured by drilling holes in A for the reception of some of the metal of which B is formed, as shown at *d d*. We propose to make the piece A of cast-iron and B of lead or other soft metal or alloy, and in that case by making B with a flange projecting in rear of A, as shown at *e e*, it is made to serve as a packing or wad to prevent windage, such flange having notches *i* provided in it opposite the grooves or passages *c c*.

By the above-described arrangement of a central passage, *a*, in the front part and spiral passages *c c* between cones in the rear part of the projectile, the air which is compressed before the projectile in its flight is caused to rush through the passage *a*, and thence through those *c c*, and by the arrangement of the latter the air is rendered more effective in producing a rotary motion of the projectile than if the spiral passages were arranged in cylindrical or plane form. One important advantage in making the passages between two cones is that it admits of their being made more true than they could be by coring.

The exterior conical surface, *f*, (which, in combination with the shoulder *g* in front, constitutes the principal feature of the second part of our invention,) coincides in position with the conical portion *b* of the opening *a b*, and with the piece B, and so forms a hollow cone, B *f*, the smaller portion of the exterior surface, *f*, being next the said shoulder, and the said shoul-

der about or in rear of the middle of the length of the projectile. The cylindrical portions h and k of the projectile, in front of the shoulder and in rear of the cone B f , fit the bore of the gun. The hollow cone B f makes the rear portion of the projectile very light, and brings the center of gravity so far forward that in the flight of the projectile its axis tends to keep tangential to the trajectory, and this desirable tendency is further aided by the air rushing over the shoulder g to fill the partial vacuum formed behind it in the flight of the projectile, such air striking on the conical surface f all round alike, and tending to hold back the base of the projectile and keep the point in front.

These improvements are applicable to explosive shells as well as to shot.

We do not claim the construction of projectile with spiral air-passages; nor do we

claim the construction of projectiles with conical cavities in their rear ends; but

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The spiral air-passages c c , formed between two cones, B b , and combining with a central air-passage, a , substantially as and for the purpose herein specified.

2. The combination of the external conical surface, f , forming the exterior of a hollow cone, and the shoulder g , substantially as and for the purpose herein specified.

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Witnesses:

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