J. R. N. OWEN.

PROJECTILES FOR SMOOTH-BORE CANNON.

No. 195,040. Patented Sept. 11, 1877.

Fig. 1.

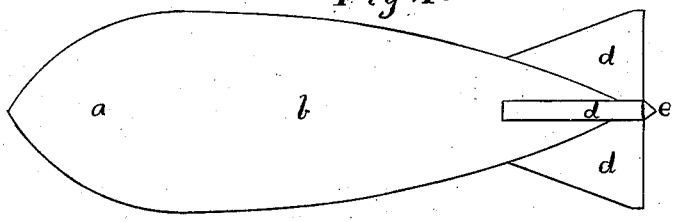


Fig. 3.

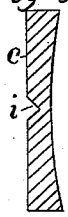


Fig. 2.

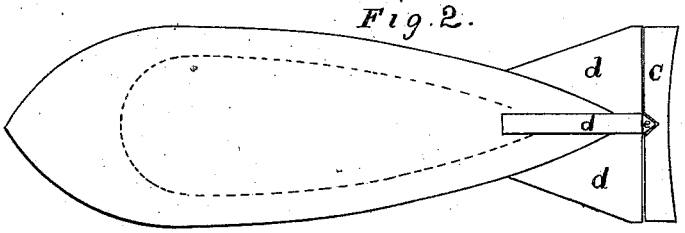


Fig. 4.

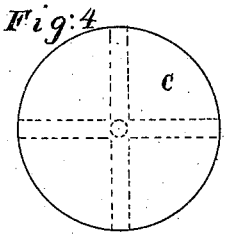


Fig. 5.

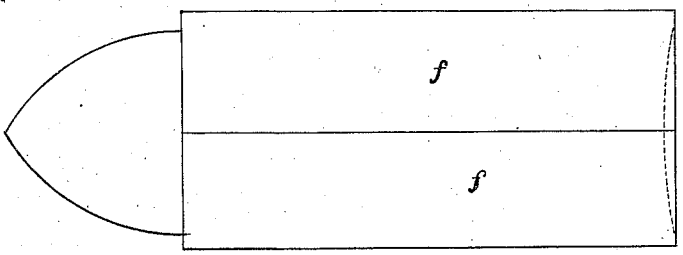


Fig. 7.

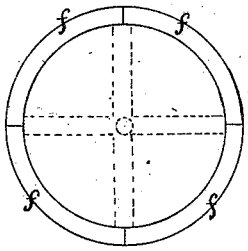


Fig. 6.

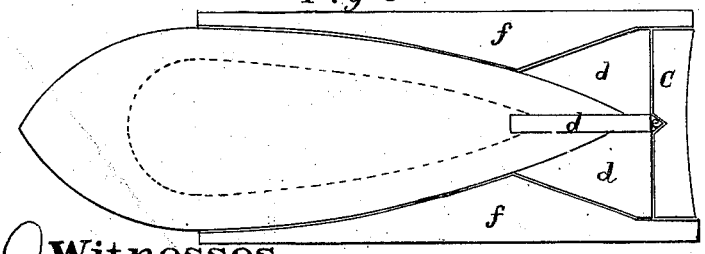
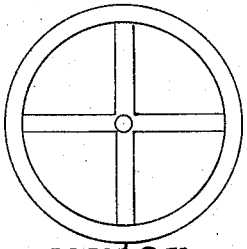


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH R. N. OWEN, OF HAMILTON, NEVADA.

IMPROVEMENT IN PROJECTILES FOR SMOOTH-BORE CANNON.

Specification forming part of Letters Patent No. **195,040**, dated September 11, 1877; application filed April 24, 1877.

To all whom it may concern:

Be it known that I, JOSEPH R. N. OWEN, of Hamilton, county of White Pine and State of Nevada, have invented an Improved Elongated Projectile for Smooth-Bore Cannon; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

This invention is designated as the "feather-bolt" shot or shell; and relates to an improvement in the construction of the projectile itself, by which I secure an accurate and steady flight throughout its range when fired from smooth-bore guns, and the certain maintenance of its long axis in a position tangential to the line of trajectory at all points of its flight, without the usual spinning motion of a rifle projectile, in combination with certain fittings essential in adapting it to the conditions and requirements to which it is subjected within the bore of the gun, and while being driven by the expanding powder-gases, but which are stripped from it when beyond the influence of the latter.

In the accompanying drawings, Figure 1 represents the naked feather-bolt, the body of which may be described as two oval conoids, *a b*, joined together at their bases. The anterior conoid may be projected by means of a radius equal to one, one and a half, or one and three-quarters of the greatest transverse diameter of the shot, as may be deemed best.

The posterior conoid should be at least twice as long as the anterior, so as to throw the center of gravity well in front of the center of figure; and in cored shot or shell this proportional length may be still further increased with advantage, till a maximum desired weight of shot for the caliber is attained, as by the increased relative length of the posterior conoid the accuracy of the projectile is more certainly secured. This arrangement of the center of gravity far in advance of the center of figure is the principal condition requisite to the satisfactory performance of the projectile.

To complete the figure of the feather-bolt, three, four, or more stout triangular feather-flanges, *d d d*, are raised symmetrically upon the slope of the posterior conoid, at or near its rear end, and in a line with the long axis of the shot. These feather-flanges rise from the sides of the shot, along a longitudinal space about equal to three-fourths, more or less, of its greatest transverse diameter, their posterior inner angles being very near to the extreme apical point *e* of the conoid, and their rearward edges forming right angles with the long axis of the shot.

Between the outer posterior angles of opposite flanges the space is precisely equal to the major transverse diameter of the shot, and the anterior outer edges of the flanges form angles of greater or less acuteness with its long axis, so as to offer to the resisting atmosphere inclined surfaces, which aid in maintaining the axis of the shot in proper relation to the line of trajectory during its flight.

This projectile may be formed solid or hollow, as a shell, the latter method being deemed always the best, as any desired increase of weight may be better attained by an advantageous increase of length.

Though it may be made of any other suitable metal, the feather-bolt should be of the best oil-tempered steel, for the principal reason, first, that in adapting the projectile for the certain maintenance of accurate flight when fired from a smooth-bore gun, its rear end is, to some extent, necessarily reduced in substance and weakened; and, secondly, in the service for which it is principally designed—that of piercing iron armor—only the best and strongest materials are suitable in projectiles.

Upon the basis of an assumption (which contravenes the generally-accepted theory upon the subject, but which is nevertheless positively sustained by experiment and by many well-known facts) that the powder-gases continue to exert a very important influence upon the projectile, even for some distance beyond the muzzle of the gun, in determining its velocity and range, the feather-bolt is provided with a strong metallic shoe or sabot, *c*, made, preferably, of tough wrought-iron. This shoe or sabot is in the form of a thick circular disk, equal in diameter and circumference to the transverse section of the shot at the bases of the conoids. The anterior face of this disk, which comes in contact with the rear end of the shot, is plane, and in its center is

a countersink, *i*, which is formed to receive the apical point *e* of the rear end of the shot, which projects slightly behind the edges of the feather-flanges, and is shaped to accurately fit the countersink. The balance of the area of this face is strongly buttressed by the posterior edges of the feather-flanges, and supported in the intervening spaces by the rear ends of the several sections of the jacket, to be described further on. The rear face of this disk is made more or less concave, to receive and hold the impact of the powder-gases. This shoe is not designed to be fastened to the shot, but arranged to fit within the end of the jacket, so that, on leaving the gun, it may be stripped from the shot with the jacket as soon as the gases cease to hold it in place. (See Fig. 3, a side or edge view of section of shoe, and Fig. 4, view of anterior face of the same.)

The feather-bolt is also provided with a jacket, cylindrical in its outer form, or very nearly so, and composed either of some soft, spongy wood, such as swamp-cypress, white-pine, bass-wood, or cotton-wood, accurately fitted in segments, marked *f f f*, over the contour of the shot, from its largest part at the bases of the conoids to the rearward edge of its shoe, and bound to it by a strong wrapping of canvas, which is not represented in the drawings, or of papier-maché, molded upon it in one piece, or any other light compressible material of suitable character, that may serve to maintain the long axis of the slot coincident with that of the bore and prevent balloting, and, where the shot is used in a tapering bore, may receive and yield to the gradual compression of the taper as the shot traverses the bore.

Fig. 5 is a lateral view of the feather-bolt completely cased in a segmental wooden jacket, not wrapped; Fig. 6, the same view with front half of jacket removed to show the fitting of the segments and the shoe in place. Fig. 7 is an end view of the shot incased in its jacket and the shoe in place; Fig. 8, the same view with the shoe removed to show the rear edges of the feather-flanges.

In these drawings the jacket is represented with its transverse diameter considerably greater than that of the shot, which arrangement adapts it more especially for use in a breech-loading gun with smooth tapering bore, sufficiently large near the powder-chamber to receive the full-sized jacket with ease, but tapering regularly to such size at the muzzle as to barely admit the passage of the shot and its compressed jacket through it.

When the shot is used in a gun of even bore throughout its length, the diameter of the jacket need not exceed that of the shot to this extent, as in that case it will serve only to center the shot, while, by the conservative system and the tapering bore, much greater force will be imparted to the projectile at and beyond the muzzle of the gun without any material exaggeration of the maximum gas-pressure, which usually occurs at the seat of the shot or the powder chambers.

I thus provide a projectile that will, when fired from a cannon, maintain a steady flight with its longitudinal axis tangential to the line of trajectory, so that its impact will be received by the point, whatever distance from its starting-point it may come in contact with the object it is fired at.

In this application for Letters Patent I do not claim, as a special device, the elongated double conoidal shot, nor a shot with raised flanges on its sides, for the purpose of imparting a rotary movement around its major axis, nor anything appertaining to the construction of the gun; but,

What I do claim, and desire to secure by Letters Patent, is—

The shot provided with radial feathered flanges *d*, jacket or surrounding-case *f*, and separate disk-shaped sabot *c*, substantially as herein shown and described.

In witness whereof I have hereunto set my hand and seal.

JOSEPH R. N. OWEN. [L. S.]

Witnesses:
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OTTO BOETZEL.