

C. F. BROWN.  
Shell.

No. 2,374. }  
No. 33,378. }

Patented Oct. 1, 1861.

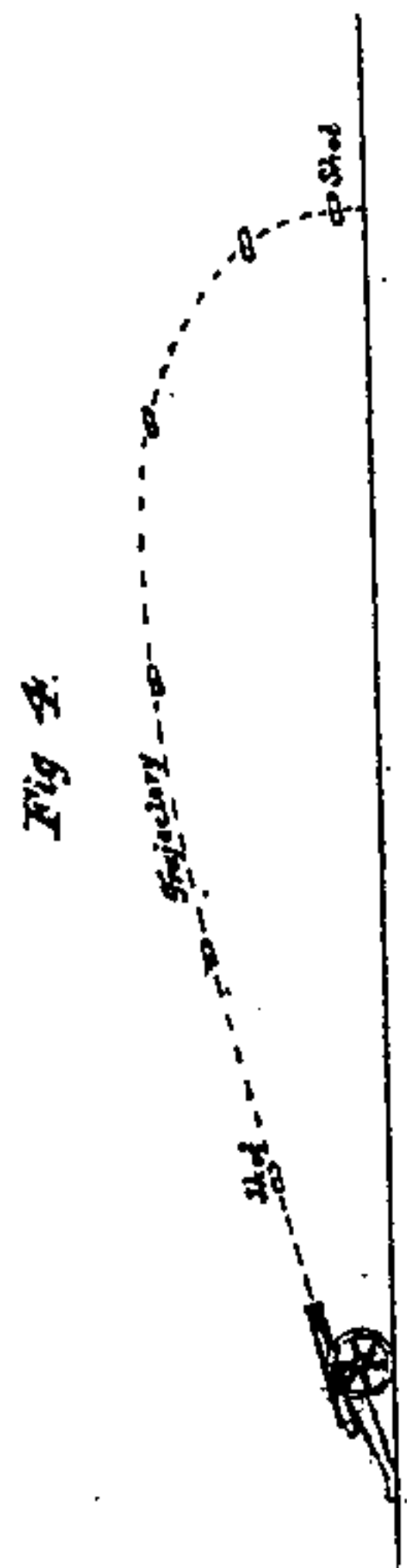


Fig. 3.



Fig. 1.

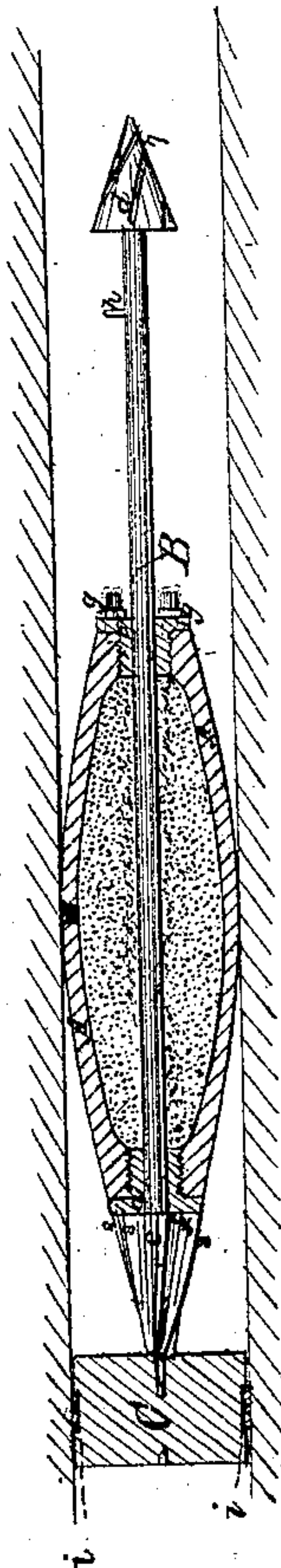
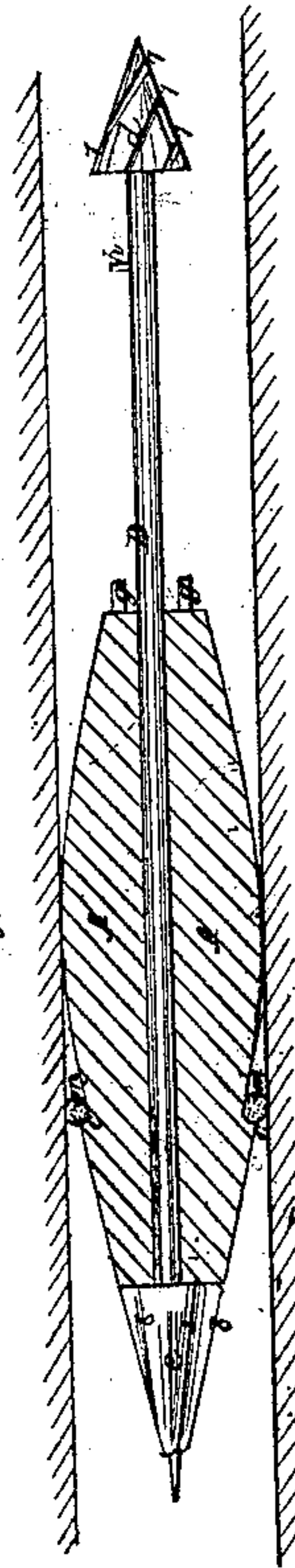


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PROJECTILES FOR ORDNANCE.

Specification forming part of Letters Patent No. 33,378, dated October 1, 1861.

*To all whom it may concern:*

Be it known that I, CHARLES F. BROWN, of Warren, in the county of Bristol and State of Rhode Island, have invented a new and useful Improvement in Projectiles for Ordnance; and I 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 longitudinal sectional view of a shell with my improvement, showing its condition when in the gun. Fig. 2 is a similar view of a solid shot with my improvement. Fig. 3 exhibits a longitudinal view of a projectile in its flight. Fig. 4 is a diagram illustrative of what my invention is designed to avoid.

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

The principal object of my invention is to prevent the axis of an elongated projectile from remaining parallel with the axis of the bore of the gun from which it has been discharged and compel it, during the flight of the projectile, to coincide or be tangential to the trajectory line. Its further object is to provide, when the projectile is made hollow, for the firing of its contained charge by percussion; and to these ends my invention consists in the construction of a projectile, as hereinafter described.

A is the body of the projectile, made in the form of a prolate spheroid, truncated at each end. The solid projectile shown in Fig. 2 has its body bored centrally for the reception of the central sliding rod, B; but the hollow projectile shown in Fig. 1 has its body fitted with screw-heads *a a'* screwing into its ends, and these heads are bored centrally for the reception of the said rod, which may pass right through the charge of powder contained in said body for producing its explosion. The said body is charged at a hole in one side, which is afterward closed by a screw-plug, *n*. The body of the solid projectile, Fig. 2, is made with a groove or shoulder, *c*, around its rear portion for the reception of a grommet, *m*, of rope or spun yarn, the object of which is to keep the axis of the projectile coincident with the axis of the bore of the piece of ordnance from which it is fired, to prevent windage, and to cause the projectile to have a rotary motion imparted

to it by the said grommet passing through the grooves of the bore. The body of the hollow projectile is without this groove or shoulder, as, instead of the grommet, it has employed in connection with it and at its rear a wad or expanding sabot, C, (represented in Fig. 1,) to prevent the possibility of the fire from the charge of the gun passing around the rod B into the powder-chamber within the body. This sabot will be presently more fully explained. The rod B should be considerably longer than the body A. I prefer to make its entire length, including its head *d* and shoe *e*, equal to at least twice the length of the body. The head *d* and shoe *e*, which are screwed onto the rod separately, are made of iron or steel, the head *d* preferably of steel, and both of conical form, and the head *d* is formed with spiral grooves 7 7 and the shoe *e* with spiral wings 8 8, the pitch and direction of such grooves and wings being such that the resistance encountered by their surfaces from the air in the flight of the projectile will tend to produce a rotary motion of the rod B on its axis, such rotary motion, in case of the projectile being used in a rifled gun, being in the same direction as the rotary motion of the projectile produced by the rifle-grooves. The body A of the hollow projectile may have, also, cut in the rear portion of its exterior surface grooves 10 10, which are intended to have the same effect on the body that the grooves 7 7 and wings 8 8 have on the rod B. The rear end of the body A has projecting from it one or more fixed pins, *f f*, the object of which is to act upon the wings 8 8 of the shoe *e*, when the said shoe is in contact with the body, for the purpose of transmitting to the body the effect of the rotary motion of the rod B; and suitable projections, *g g*, are formed on the front end of the body to be acted upon by a pin, *h*, projecting from the rod B, for the purpose of transmitting the effect of the rotary motion from the rod to the body when the head *d* is sufficiently near the body. In a shell the projections *g g* terminate in nipples for the reception of percussion-caps, as represented in Figs. 1 and 3, for effecting the firing of the charge in the body; but the pin *h*, though long enough to come in contact with the projections near their connection with the body of the projectile, must not be long enough to strike the caps.

The sabot C, Fig. 1, consists of a cylindri-



cal piece of wood surrounded by a band, *i*, of copper or other metal softer than the gun, and the pointed end of the conical shoe *e* is driven into this sabot before the insertion of either sabot or projectile into the gun. When the gun is fired, the sabot is driven forward upon the conical shoe *e*, and caused to be expanded laterally, so that its band *i* is made to fill the grooves, and so prevent windage and cause the sabot to receive a rotary motion in passing along the grooves, which rotary motion is caused (by the wings *S S* entering the wood) to be imparted to the rod *B*, and through it to the body *A*. When the projectile is inserted in the gun after the charge of powder, the shoe *e* fits close up to the body *A*, and so allows the body to be near the charge, a considerable portion of the rod then protruding through the front of the body, as shown in Fig. 2; but after the body of the projectile has left the gun the resistance of the air, acting against the head *d* of the rod, allows the body *A* to move along the rod till its front end comes in contact with the pin *h*, leaving the rod protruding from the rear of the body in the manner shown in Fig. 3, in which condition the rod, being caused by the pin *h* and projections *g g* either to give rotary motion to or receive it from the body, performs the function of the tail of an arrow—that is to say, it serves to keep the axis of the projectile nearly coincident with (*i. e.*, tangential to) the trajec-

ory line—and so causes the projectile to strike on its point, thus obviating the great difficulty in the use of ordinary elongated projectiles with rifled guns, viz: the tendency of the axis of the projectile to continue throughout the flight parallel with the axis of the bore of the gun, as illustrated by Fig. 4, which represents the trajectory described by the ball with a certain elevation of the gun and the position of the ball at various points in its flight.

In case of the projectile being a shell and charged with powder and capped at *g g*, the pin *h* must be strong enough to prevent its being broken by the accidental dropping of the projectile, but not so strong but that, on the head *d* of the projectile striking the object at which it was thrown, the momentum of the body carrying it forward after the rod has been wholly or partly arrested will bring the caps on the nipples in contact with the back of the head *d*, and so cause them to be exploded, and to carry fire to the charge, and thus produce the bursting of the body.

What I claim as my invention, and desire to secure by Letters Patent, is—

A projectile constructed and operating substantially as herein specified.

CHARLES F. BROWN.

Witnesses:

ALFRED BOSWORTH,  
BELLE F. BROWN.