E. D. WILLIAMS.

Wad for Ordnance.

No. 35,273. Patented May 13, 1862.

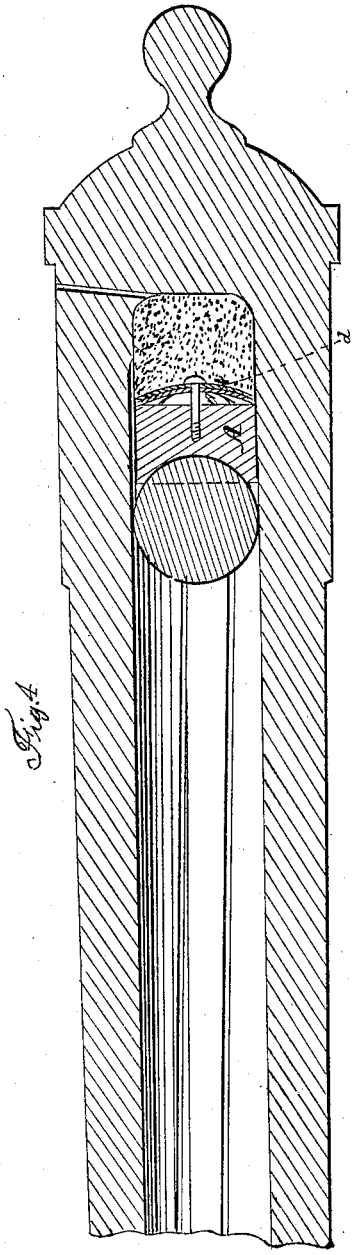

Fig. 4.

Fig. 5*

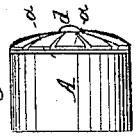

Fig. 3.

Fig. 5

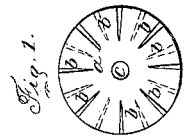

Fig. 1.

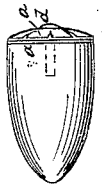

Fig. 2.

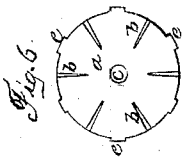

Fig. 6.

Witnesses:

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ELIJAH D. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WADS FOR ORDNANCE AND OTHER FIRE-ARMS.

Specification forming part of Letters Patent No. **35,273**, dated May 13, 1862.

To all whom it may concern:

Be it known that I, ELIJAH D. WILLIAMS, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and Improved Wad for Ordnance and other Fire-Arms; 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.

My invention consists in a wad composed of two or more concavo-convex disks of metal, each having a series of radial or nearly radial openings, so arranged with respect to similar openings in the other or others that the metal of one covers the openings in the other, such wad being constructed of such diameter relatively to that of the bore of the gun in which it is to be used that it will pass easily through the bore in loading, but that the explosive force of the powder in firing or the force employed in ramming the charge home, or both of these forces, will act upon it to change its concavo-convex form to a plane or a form approximating nearer to a plane by which it will be spread laterally, and caused to fill and close the bore between the powder and the projectile in such manner as to prevent all escape of gases, and obtain the application of the entire explosive force of the powder to the projection of the projectile, and in such manner that in rifled guns it will be caused to receive and also impart to the projectile a rotary motion.

Figure 1 in the accompanying drawings is a face view of the wad constructed in a manner adapted for small-arms, for smooth-bore ordnance, and for rifled ordnance of small caliber. Fig. 2 is a side view of an elongated ball having a wad attached. Fig. 3 is a side view of a sabot for a spherical ball having the wad attached. Fig. 4 represents a longitudinal section of a cannon, and exhibits in section the application of the wad and sabot represented in Fig. 3. Fig. 5 is a longitudinal view, partly in section, representing the manner of applying the wad in a musket-cartridge. Fig. 5* is a front view of the wad shown in Fig. 5.

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

The wads represented are all composed of two disks, *a a*, that number serving in most or all cases as well or better than a greater number. The said disks may be made of any metel softer than the gun for which they are to be used. I propose to make them of brass or zinc, but generally of the latter, as it is cheaper and works very well. They may be made by punching or otherwise cutting them from the plate metal, of a diameter somewhat larger than the bore of the gun in which they are to be used, and with a series of taper slits, *b b*, extending from their edges about half-way to the center in a radial direction, the object of such slits being to allow them the necessary flexibility; and after they have been cut out or otherwise formed of the requisite form and size, they may be brought to the required concavo-convex form between suitable dies in a press, and this change of form reduces the diameter sufficiently to allow them to pass easily through the bore of the gun in loading. The concavo-convex form may be produced by the same operation as that by which the disks are cut out. The proper thickness of the disks will depend upon the size. For wads three inches in diameter I propose to use a thickness of about one-twelfth of an inch, and in about the same proportion for other sizes. The two disks to form the wad may be riveted together or otherwise united at the center, as shown at *c* in Fig. 1, or disconnected, as shown in Figs. 5 and 5*; but in any case, in order to prevent windage, care must be taken in inserting them into the cartridge or into the gun, so that the metal of one covers the slits in the other, as represented in Figs. 1 and 5*, in each of which the slits in the back disk are represented in dotted lines supposed to be seen through the front disk; but I consider it in all cases better to secure them together. When the ball is inserted in a cartridge, there is perhaps not so much necessity to attach the disks together, as the wrapper or case of the cartridge may keep them in place, as shown in Fig. 5. When used with elongated bullets or other projectiles which are inserted in the gun without or separately from a cartridge, the disks may be secured to the projectile by a rivet, pin, or screw, *d*, at the center, as shown in Fig. 2; but when intended to be used with a spherical cannon-ball, or with a projectile which presents a convex surface toward the charge of powder, it should be attached by a screw, *d*, to the rear end of a sabot, A, as shown in Figs. 3 and 4, as it is necessary that a nearly flat

surface shall be presented to the wad on the side opposite to the powder. The sabot may be made of fibrous materials, sawdust and glue, or any other suitable substance or composition. This wad, however used, should preferably be inserted in the gun with the convex side toward the breech, especially in muzzle-loading guns, as it will pass down the bore more easily when inserted in that direction if it happen to fit snugly; but it will operate with the concave side toward the breech. In ramming the projectile home its pressure against the wad tends to flatten it, and so cause its expansion laterally toward the walls of the gun, which tends to close the bore for the prevention of windage before firing; but when the gun is fired the pressure produced on the back of the wad flattens and expands it laterally still more, making it fit the bore tightly and preventing windage; and also, if the wad be large enough, and the gun rifled, forcing its edges into the grooves, and so causing it to derive a rotary motion as it moves forward, which motion it imparts by friction to the projectile.

The slits *b b* are of great service in imparting rotary motion to the projectile, as in the case of a leaden ball, or in the use of a sabot the pressure of the wad against the ball or sabot causes the lead or material of the sabot to be forced into the said slits; and in the case of an iron projectile the edges of the said slits will catch upon any small projections that may be left, either accidentally in casting or by design, upon its rear end. I propose, however, for rifled guns of large caliber, to have the wad made with projections *e e*, as shown in Fig. 6, to fit the grooves.

Some of the advantages of this wad are, first, that while it is adapted to the most rapid muzzle-loading, it is made to completely close the bore of the gun; second, that it is adapted to every variety of ordnance and fire-arms, and every variety of projectile; third, the ease and certainty with which, when used in rifled guns, it communicates rotary motion to projectiles, whatever may be their shape, or the material of which they are composed.

I do not claim, broadly, a concavo-convex wad made in every manner and of every material; but

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

A wad composed of two or more concavo-convex disks of metal, provided with slits *b b*, and combined substantially as herein specified.

E. D. WILLIAMS.

Witnesses:

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