

O. F. WINCHESTER.

Improvement in System of Rifling Gun-Barrels.

No. 128,446.

Patented June 25, 1872.

fig. 1.

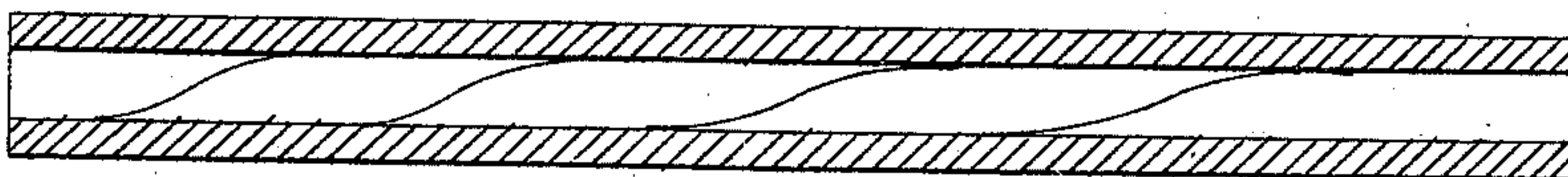


fig. 2.

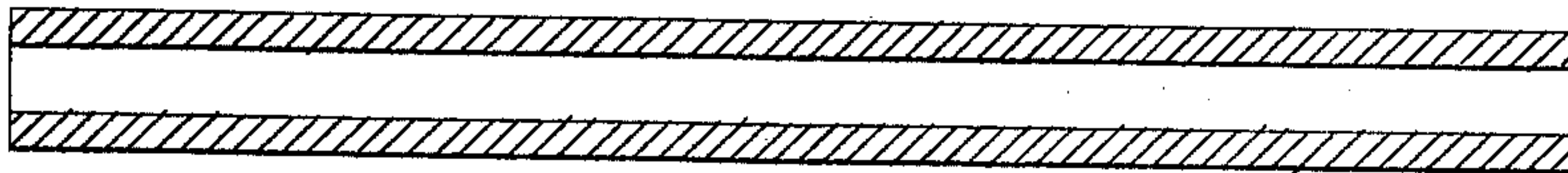
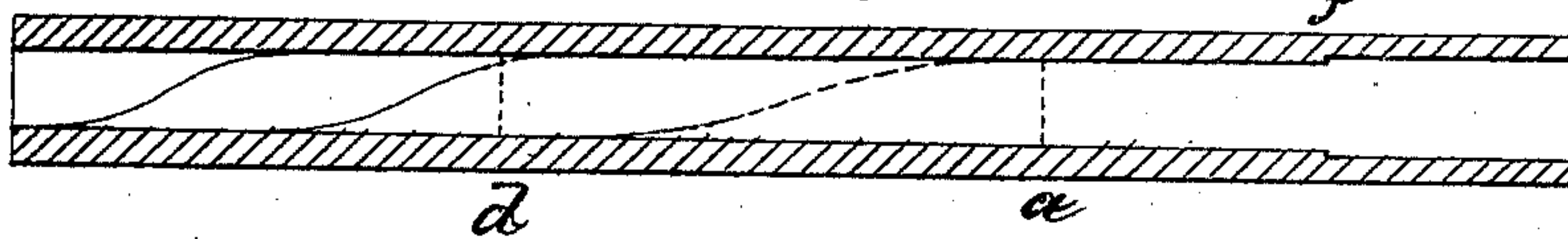


fig. 3.



Witnesses.

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IMPROVEMENT IN SYSTEMS OF RIFLING GUN-BARRELS.

Specification forming part of Letters Patent No. 128,446, dated June 25, 1872.

To all whom it may concern:

Be it known that I, OLIVER F. WINCHESTER, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Fire-Arms; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents, in—

Figure 1, a longitudinal section of the barrel rifled throughout; Fig. 2, a longitudinal section preparatory to rifling; and in Fig. 3, a longitudinal section of the barrel complete.

This invention relates to certain improvements in the construction of the bore of rifled arms and ordnance, for the removal or reduction of well-known difficulties existing in their use as now constructed. Primarily these difficulties, as now existing in rifled arms over smooth-bore arms, consist in the greatly-increased strain or bursting forces exerted upon the rifled barrel and the consequent increased recoil over that in the smooth bore under like conditions, and, incidentally, other difficulties are reduced and advantages obtained by the facilities afforded by this invention. One of these facilities is the opportunity to use an improved metallic cartridge, an invention for which I apply for a patent in an application of even date herewith, to which reference is hereafter made. These improvements in cartridges are incidental to the improvement claimed in this application, but primary in the claim for improvement in cartridges, viz., reduction of fouling, increase of range, accuracy, and consequent lower trajectory.

Rifled fire-arms, as now constructed, have a bore of nearly or quite a uniform caliber from breech to muzzle. The rifling in like manner extends from breech to muzzle, usually of an uniform twist or pitch through its entire length. The balls used in these arms have a diameter larger than the bore of the rifle, equal or more than the depth of the rifling, and in addition has the end of the metal cartridge-case crimped or bent, and forced down into the lead of the ball; consequently, when a gun thus constructed is fired it is necessary that a power be developed sufficient to overcome the following causes of resistance before the ball will

start: First, the inertia of the ball, or the resistance which a body at rest offers to being suddenly forced into rapid motion. Second, the resistance which the same body offers to being suddenly forced into a rotary motion upon its own axis by the rifling. Third, the resistance which the ball offers to being suddenly drawn out and reduced in diameter, slugged, or forced so as to fit the smaller bore or rifling in front of it. The clear inference from these facts is that the entire consumption of the powder takes place, and, consequently, the whole energy and bursting force of the explosive gases are developed before the ball starts. The object of this invention is to reduce the great pressure at the breech of the gun, and as far as possible to increase it at the muzzle, or equalize it throughout the whole length of the bore, thus reducing the danger of bursting or destroying the breech arrangement, reducing recoil, and increase its power, range, and accuracy. My invention consists in an improvement of the form and construction of the bore of arms and ordnance, as more fully hereinafter described, so as to remove, in whole or in part, one or more of the difficulties before enumerated, to the easy starting of the ball, and at the same time retain all the advantages of the rifled bore.

The first difficulty enumerated, viz., the inertia of the ball—cannot be removed or reduced, nor is it necessary so to do in order to accomplish the purpose of this invention, which is to reduce these difficulties in a rifled bore to the degree, or nearly so, in which the same exist in a smooth bore, and this, of course, exists in its full force in smooth-bore arms.

The second and third difficulty I propose to remove by the construction of the bore in such a manner as to combine the smooth bore with the rifled bore, and an easy transition from the former to the latter. To do this, after boring and rifling a barrel in the usual manner with a uniform or gaining twist, (I prefer the latter, as indicated in Figs. 2 and 1,) I bore out the breech end of the barrel one-third of its length—say to the point *a*—so as to remove the lands, leaving that section a perfect smooth bore, tapering from forty-five hundredths at the breech to forty-four hundredths at the forward end of this smooth-bore section. From this point I bore the center third of the bar-

rel—say to the point d —on a gradual taper, so that, starting from the smooth-bore at a , the full rifled bore is reached at d , leaving the full rifled bore of forty-two hundredths, which gives us, when finished, a barrel with a compound bore one-third or section smooth, the next third or section a gradual transition from a smooth to a full rifled bore, and the last section a full rifled bore. Here then we have all the conditions of a smooth bore at the breech for the easy starting of the ball, and all the conditions of the rifled bore at the muzzle, and which gives rotation and accuracy to the ball.

The proportions of the length of the different sections of the barrel as given above are not absolute, but will need be varied by circumstances in short barrels and light charges, or extra long barrels and heavy charges; so also the variations of the caliber of three hundredths between the breech and muzzle.

The removal of the fourth difficulty is made practicable by improvements made in metallic cartridges heretofore referred to. The use of these cartridges, which are made without a projecting flange, to serve as a positive step to fix the distance into which it shall enter the barrel, requires a new device not heretofore applied to rifled arms using ball cartridges. This cartridge is designed to be of sufficient length to receive the whole of the cylindrical portion of the ball, and its internal diameter

to coincide exactly with the caliber of the bore of the improved arm at its breech, so that when the shell is inserted into the barrel it shall form a continuation of the bore; consequently the ball will be held with sufficient lightness not to require the crimping of the shells. This construction of cartridge, therefore, requires a recess to be formed in the barrel at the breech, of a diameter corresponding to the exterior of the cartridge, and so as to form a shoulder at f , against which the forward end of the shell will rest.

These improvements in the construction of arms are readily applied to any existing arms, and the same arm can be easily adapted to the improved cartridge before mentioned.

I claim as my invention—

A barrel for fire-arms, or larger pieces in one piece, from end to end, and constructed with a compound bore—that is to say, having a section of the bore at the muzzle rifled, a section at the breech of smooth bore and larger caliber, and a section in the middle of the barrel rifled and tapered—so as to form a gradual transition from the breech-section smooth bore to the muzzle-section rifled bore, substantially as herein described.

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Witnesses:

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