

Patented Apr. 11. 1865

Horatio Ames.
 By ally A.B. Stoughton

UNITED STATES PATENT OFFICE

HORATIO AMES, OF FALLS VILLAGE, CONNECTICUT.

IMPROVEMENT IN THE MANUFACTURE OF ORDNANCE.

Specification forming part of Letters Patent No. 47,177, dated April 11, 1867.

To all whom it may concern:

Be it known that I, HORATIO AMES, of Falls Village, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in the Method of Making Wrought Cannon; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side view of the cannon, still attached to the porter-bar by which it is handled, and showing by full lines the welding-lines externally, and by dotted lines the external finish and internal bore as they will appear when the cannon is finished. Fig. 2 represents a longitudinal vertical section through the cannon and porter-bar, as shown in Fig. 1. Figs. 3, 4, and 5 represent, respectively, a side and end view of one of the sections of concentric rings and a section through the same. Fig. 6 represents a die or former for giving a convex form to the end of the last welded-on piece, so that when the next piece to be welded is placed against it the first contact-surface and welding shall be at or near the bore, and thence continue toward the perimeter. Fig. 7 represents a centralizing-pin, furnished with handles, for the more convenient placing and removing of it. Fig. 8 represents a longitudinal section through the finished gun, and showing in very light lines where the welded lines are. Fig. 9 represents the method of making the interior ring of the series, so as to avoid a welded line in that portion of the gun which is to form the bore.

Similar letters of reference, where they occur in the separate figures, denote like parts in all the drawings.

The within-claimed improvements are based upon my original invention, for which Letters Patent were granted to me on the 16th day of August, 1864, and are designed for more economically and efficiently carrying out my original invention.

My invention consists, first, in the manner of making the interior ring of the series to avoid having a welded line in it.

It further consists in making the series of concentric rings of different lengths, the inner one being the longest and the next exterior one shorter, and so on, for the purpose of

making the ends of the sections of a convex form, to aid in the after welding.

It further consists in furnishing the portable and removable centering-pin with handles, so as to facilitate the matching of the sections and expedite the operation of placing and welding.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

I first, from a heavy bar, bolt, or slab of metal, C, Fig. 9, cut off pieces or sections *e*, through which have been previously bored the holes *f*, that afterward become portions of the bore of the cannon. I say "previously bored," because it is then more readily done, and because the boring will show whether the iron be sound and suitable for the purpose, and, if not, can be rejected without any further labor upon it. These sections *e* are then turned or planed off or otherwise reduced to a round ring, *a*, without a welded joint, which is very important, inasmuch as in the boring out of a gun where there is a welded joint the tool will cut or run in the weld and leave a rough spot or place. It is true that by thus making the interior ring I do not avail myself of the greatest strength of the metal; but I rely on my external rings for giving strength and protection to the internal one, while I have the other important advantage of not boring out the cannon against a welded line, but have solid metal to work in. In turning, planing, or otherwise reducing the section *e* from a square to a round form, as at *a*, I make a surface of clean iron or metal, free from cinder, scale, or impurities of any kind, and, besides, have an opportunity of judging of the solidity of the metal and its freeness from flaws or imperfections and its entire fitness for the place and use it is to be subjected to. I then prepare a second ring, *b*, which is nicely turned or planed on all its surfaces that are to be welded to or receive a weld from any other adjacent piece, and in like manner closely inspect it to see that it is entirely free from imperfections or flaws. The bore of the ring *b* should be such as to snugly fit over the interior ring, *a*. A third ring, *c*, is then made, turned, planed, or otherwise cleaned of scale or cinder, so as to show clean metal at all points or parts where it is to be welded, and critically examined as to its freeness from all flaws or imperfections, and its

bore should snugly fit over the ring *b*, and so on with other rings, if more than three be used.

The ring *a*, as shown in Figs. 3 and 5, is longer than the ring *b*, and the ring *b* is longer than the ring *c*, the object of this being that both the portion connected to the porter-bar and the new section to be welded thereto shall each have a slightly-convex surface, and so that when heated and placed together to be welded they shall touch first at or near the bore and the welding commence at that point and continue gradually toward the exterior, and by thus closing the joint work out all cinder, scale, or impurities that would otherwise render perfect welding an impossibility, or at least a very great uncertainty.

The forming of the cannon is commenced by welding to the porter-bar A a series of rings, D, and a plate, E—one, two, or more, sufficient to form the breech of the finished gun. The contact or welding surfaces of these pieces or parts should all be cleaned and examined as in the case of the concentric rings, and closely examined as to their fitness for the purpose, and after sufficient metal is thus welded together to form the breech portion of the cannon I begin to weld on the sections B of concentric rings *seriatim*. After each vertical weld is made I lay the die or former F against the end of the welded mass, and allow the hammer or ram to come up against it to give a convex form to said end. The next section, as well as the welded mass, being now placed in their respective furnaces in a vertical position, or so that the bore shall be in a horizontal position, and so placed as that the surfaces to be welded together shall be exposed to the density of the fire, while the other portions are protected from it, a welding heat is got up. The two parts are now swung out by proper cranes to the place of welding, where the section is matched to the other mass or portion by the means of the centering-pin G passing through its central bore and into the bore of the previous section, to keep the bore as nearly central and straight as possible, and it is there and thus held until the horizontal ram comes up and begins to weld it at, near, or around the bore first, (the pin preserving the shape of the bore,) and as soon as the new section is fast to the mass the pin is withdrawn. The mass may be now placed in a bed, die, or other support, and the horizontal ram, as well as a vertical ram or hammer, is brought in rapid contact with both the end and the exte-

rior of the mass until the welding is completed, when another heat, another section, and another similar operation is gone through with until the cannon is completed in the rough, and then the porter-bar may be cut off, and the gun worked, turned, or finished up, as shown by the dotted lines, Figs. 1 and 2, and bored out, as shown in Fig. 8, and the trunnions put on by screws or otherwise.

For the purpose of more readily handling, using, and withdrawing the centering-pin G, I attach or connect to it arms *g* and handles *h*, by which the operators work it, and raise, hold, or direct the section until the ram has come up and attached it, after which the pin is withdrawn. As the centering-pin receives the first blow of the ram, it is driven forward with the section, and, finding the hole or bore of the mass, it guides the section fairly to it, so that the blow of the ram which connects the section to the mass assists in rightly placing or matching it to the mass.

The rings *b c* are made from bars of proper length, width, and thickness, each of which is bent around and welded before being turned or bored, to clean its surface and to fit or match the adjacent rings.

When the gun and ring are brought together to weld on the ring, the gun is placed in a grooved die or bed under the upright hammer, so that the gun part is at rest while the ring is being welded thereto.

Having thus fully described the nature, object, and purpose of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. Making the interior ring, *a*, of a combined series out of solid metal and without a weld, substantially as and for the purpose described.
2. Making the section of a series of concentric rings, of which the inner one is longer than the one outside of it, substantially as and for the purpose described.
3. Welding the sections to the mass during one and the same heat by means of two hammers or rams, one working horizontally and the other vertically, substantially as described.
4. Combining with the centralizing or matching pin G the arms and handles *g h*, by which it is more readily operated, held, and withdrawn, substantially as described.

HORATIO AMES.

Witnesses:

GEORGE W. PEET,
A. C. RANDALL.