

No. 41,464.

PATENTED FEB. 2, 1864.

F. F. SMITH.
COOLING AND TEMPERING CAST CAST-STEEL PLOW PLATES.

Fig. 1^a.

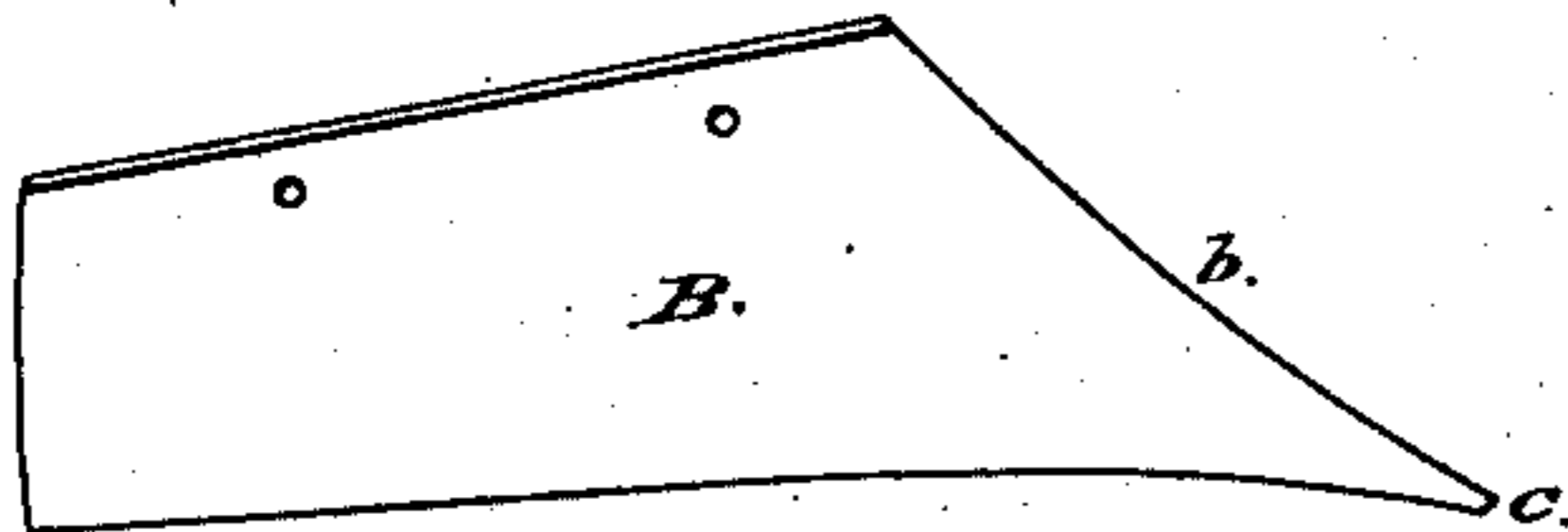


Fig. 2^a.

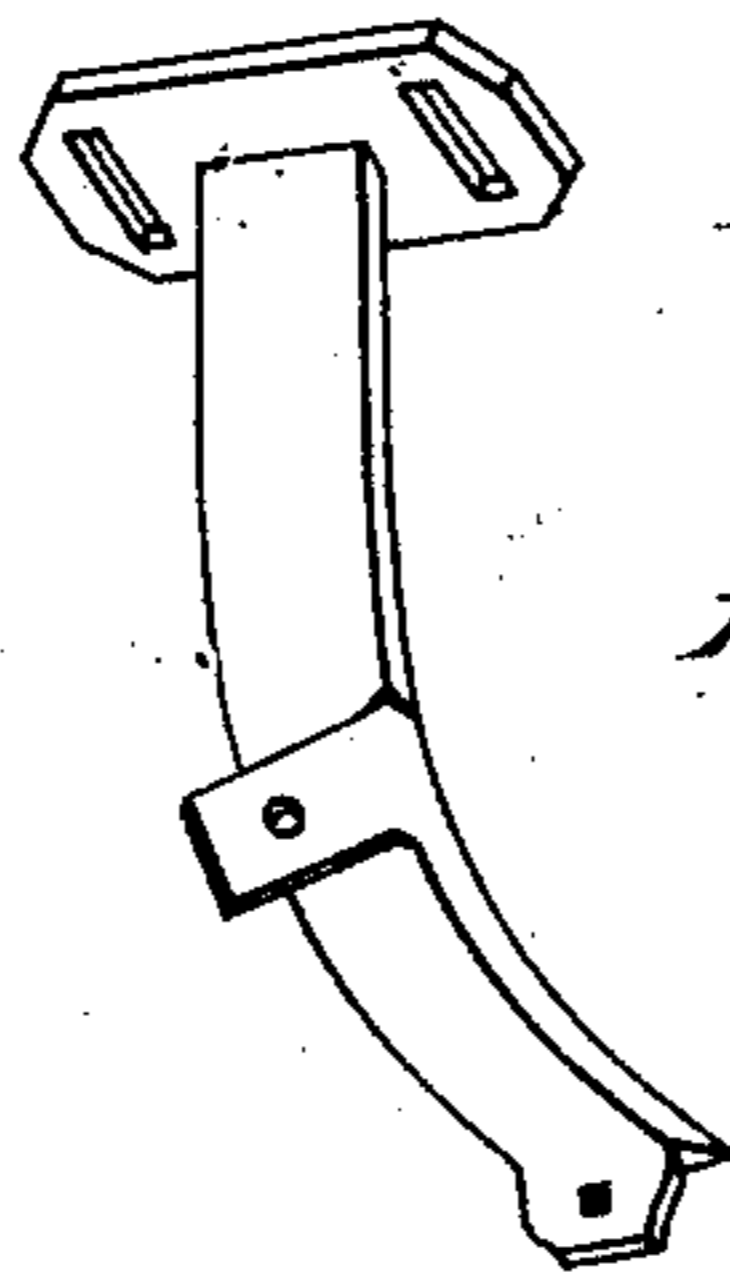
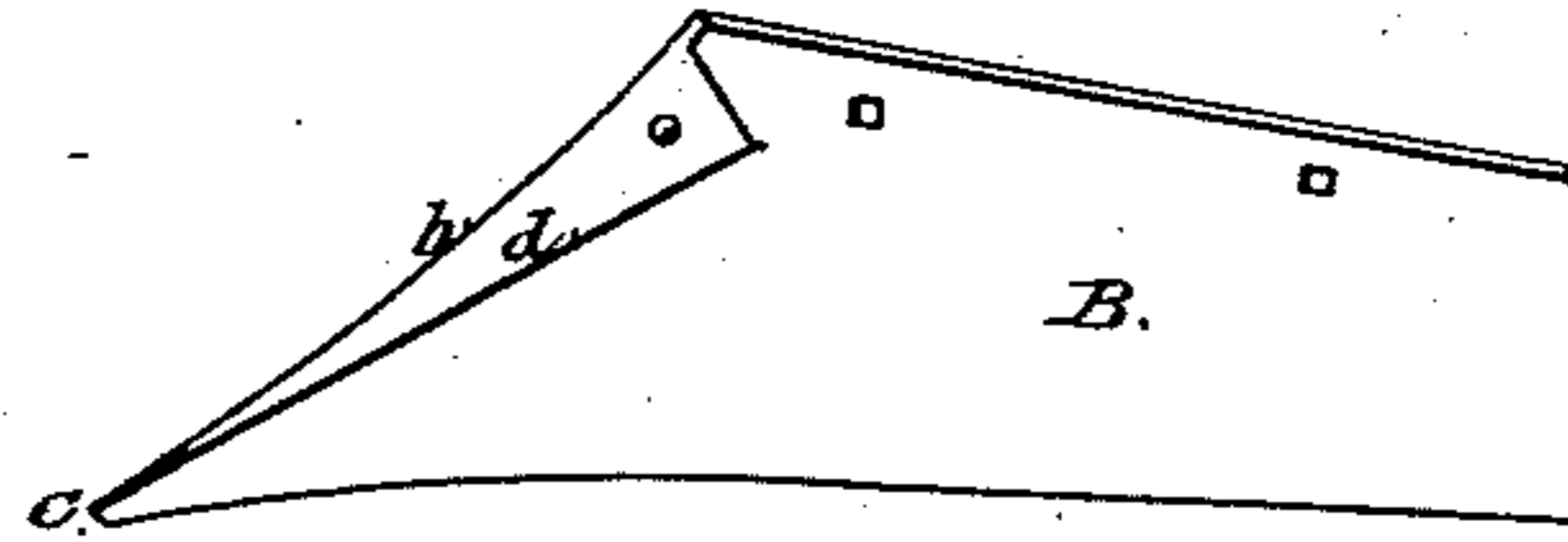


Fig. 5.

Fig. 3^a.

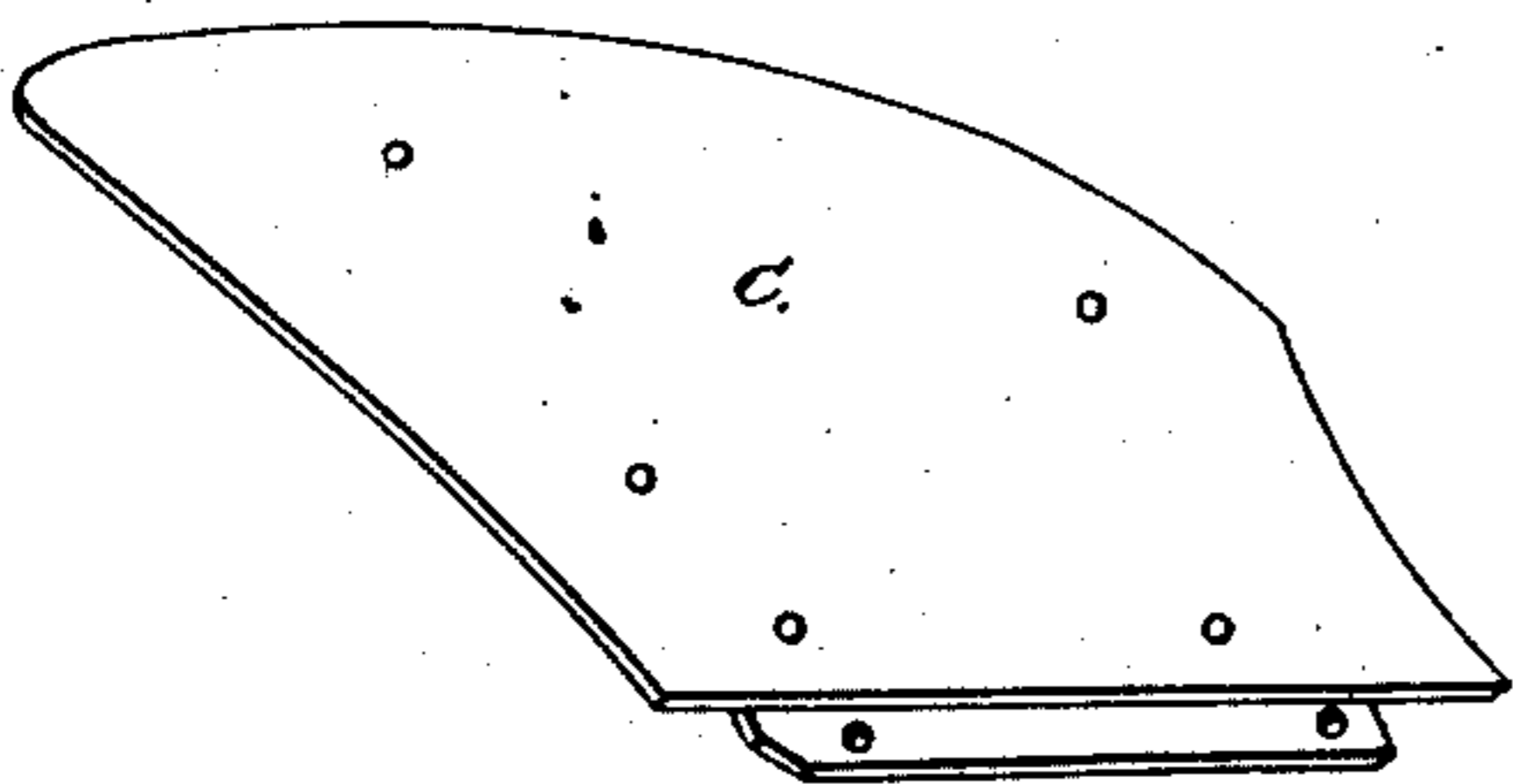
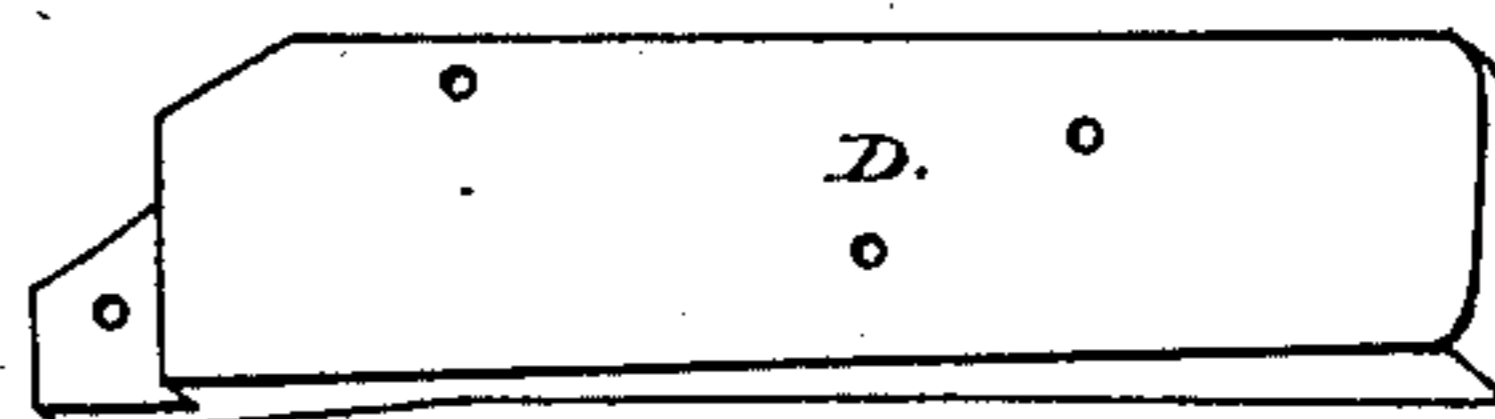


Fig. 4^a.



Witnesses:
Emmett Quinn
J. W. Jayne

Inventor:
F. F. Smith
By atty W B Stoughton

UNITED STATES PATENT OFFICE.

F. F. SMITH, OF COLLINSVILLE, CONNECTICUT, ASSIGNOR TO HIMSELF AND SAMUEL W. COLLINS, PRESIDENT OF THE COLLINS COMPANY, OF SAME PLACE.

IMPROVEMENT IN COOLING AND TEMPERING CAST CAST-STEEL PLOW-PLATES.

Specification forming part of Letters Patent No. 41,464, dated February 2, 1864.

To all whom it may concern:

Be it known that I, F. F. SMITH, of Collinsville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Cooling and Tempering Cast Steel Plows; 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—

Figures 1^a, 2^a, 3^a, 4^a, Plate 3, represent a share, a mold board, and a landside, and, by the shading in red, further illustrate the cooling and tempering process they undergo.

The nature of the improvement which I have made consists in the manner in which I cool and temper my cast cast steel plow-plates after they have been removed from the molds, to prevent cracking and to harden certain portions, and this constitutes the nature of the present invention, for which I ask for Letters Patent.

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

After the castings are prepared they are tempered, and in tempering are cooled, so as to vary the hardness or softness of the steel, as may be required for endurance, or resistance to wearing away, or strength in different portions of the same plate. The mold-board C, the share B, and the landside D are all hardened or softened at different points, as will be explained. The castings are heated in a suitable furnace to the ordinary degree of heating cast-steel for tempering it, and then their margins are cooled by dipping them into cold water, as indicated by the shading in red in Figs. 1^a, 2^a, 3^a, 4^a, Plate 3. By this process the margins of the plates are cooled before plunging or immersing the whole plate in the water, and sufficient heat returns to the margins from the heated portion of the plate to draw out any temper or hardening produced by the margin dipping, but does not heat the margins so much as to cause them to harden when the whole plate is immersed in brine or salt-water to harden the portions thereof not cooled by the above-

described margin dipping. By this process of cooling and hardening or tempering, the plates, where they have bolt-holes or must resist great strain, are comparatively soft, so as not to break; but where they are to resist wearing or attrition they are very hard. After the plates are thus hardened or tempered, they should be immediately returned to the furnace and heated a few seconds, but not enough to draw the temper, after which they may be taken out with safety, and if, on examination of the workman, any portion of the plate may require to have the temper of that portion farther drawn, he may draw it by the usual process. I draw the temper of the edge of the share B as shown by the shading in red, and this I do until the first appearance of the blue color shows in the steel, which is a familiar guide to workmen skilled in tempering steel. I also draw the temper on the upper portion of the landside D, and the upper edge or side of the mold-board C, as shown by the shading in red, but this I draw until the steel indicates a straw color, which is also a familiar guide to the workman skilled in tempering steel. The plates thus tempered and set up into a plow give the plow all the necessary strength of soft steel at the points where strength is required, as at the joints and around the bolts near the joints, and of hard steel at the cutting-edge of the share B, which edge may be harder than the edge of an ax or common edged tool, but not so hard as the hardest tempering can make it.

The value of a hardened cast-steel plow, such as is made from my plates, is very obvious to those acquainted with the character and formation of the prairie-soils, more particularly as they are composed of black muck, clay, sand, and gravel. Sand and gravel will cut or scratch a soft-metal plow, and the muck will so adhere to this marred surface on the mold-board, landside, and share as to cause great weight of draft, much cleaning, and but indifferent work in plowing furrows, while a hardened or tempered cast cast-steel plow will clear itself from day to day until worn out, and is of much lighter draft on this account. The soft metal in the landside

D and the return or shin d of the share B are at points or positions in the plow where there is but little wear, but very great strain, and great care should be taken in making their joints perfect, especially those where the share and landside are joined.

In dipping the edges of the plates to cool them, they may be immersed a little below and then raised a little above a fixed line, so as to prevent such line from being too abrupt, and making a better blending of the soft and harder portions thereof.

After the plates have been dipped into brine to temper them, they should be dipped into fresh water to wash out the salt, for if the

salt is allowed to remain in the depressions in the metal it will corrode it or deepen the slight inequalities and require more grinding to get a polished smooth surface.

Having thus fully described my invention and explained how it is carried out in practice, what I claim therein as new, and desire to secure by Letters Patent, is—

The cooling and tempering of cast steel plow-plates, substantially in the manner and for the purpose herein described.

F. F. SMITH.

Witnesses:

A. B. STOUGHTON,
EDM. F. BROWN.