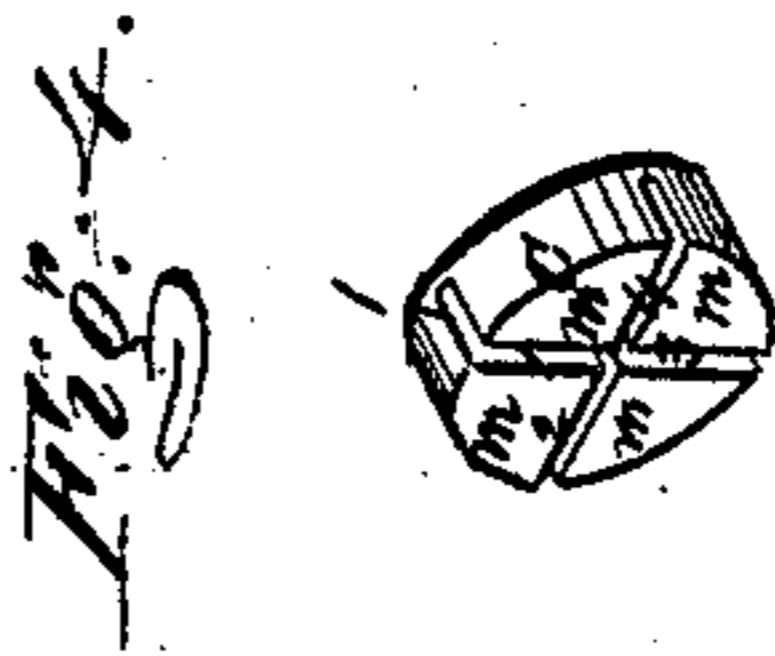
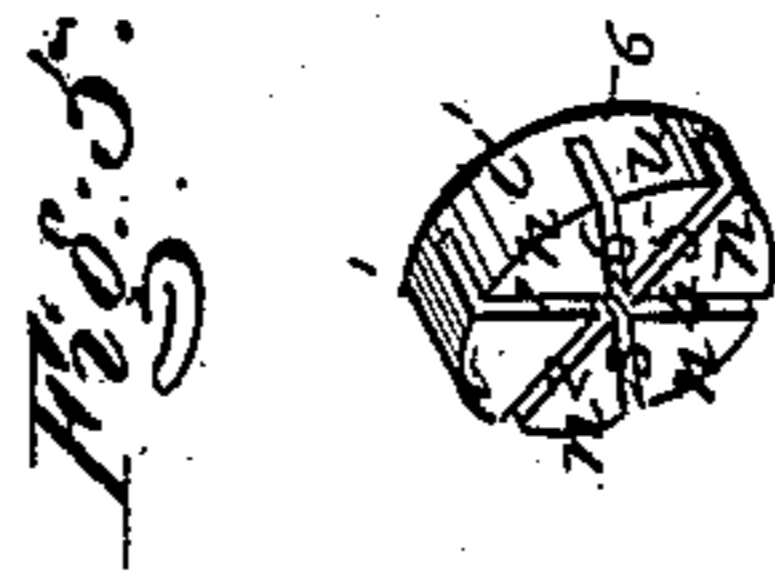
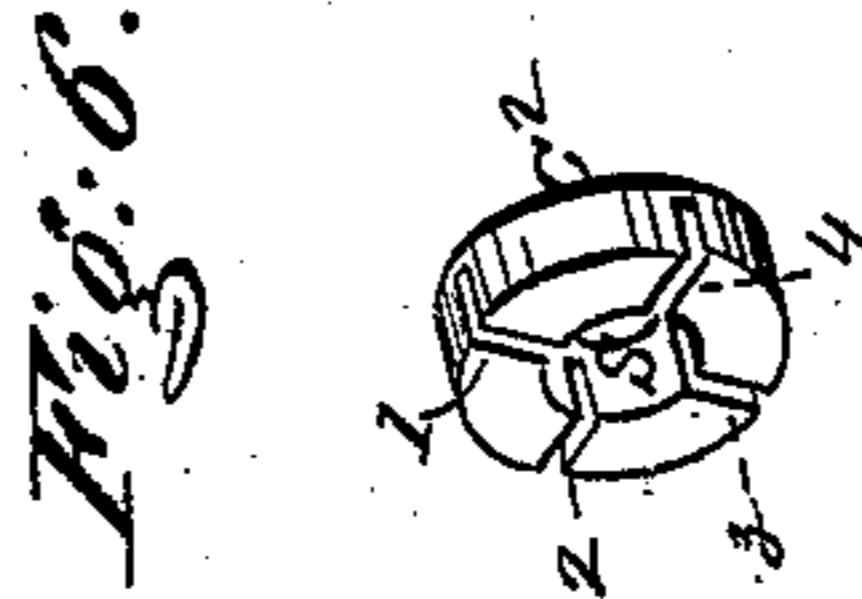
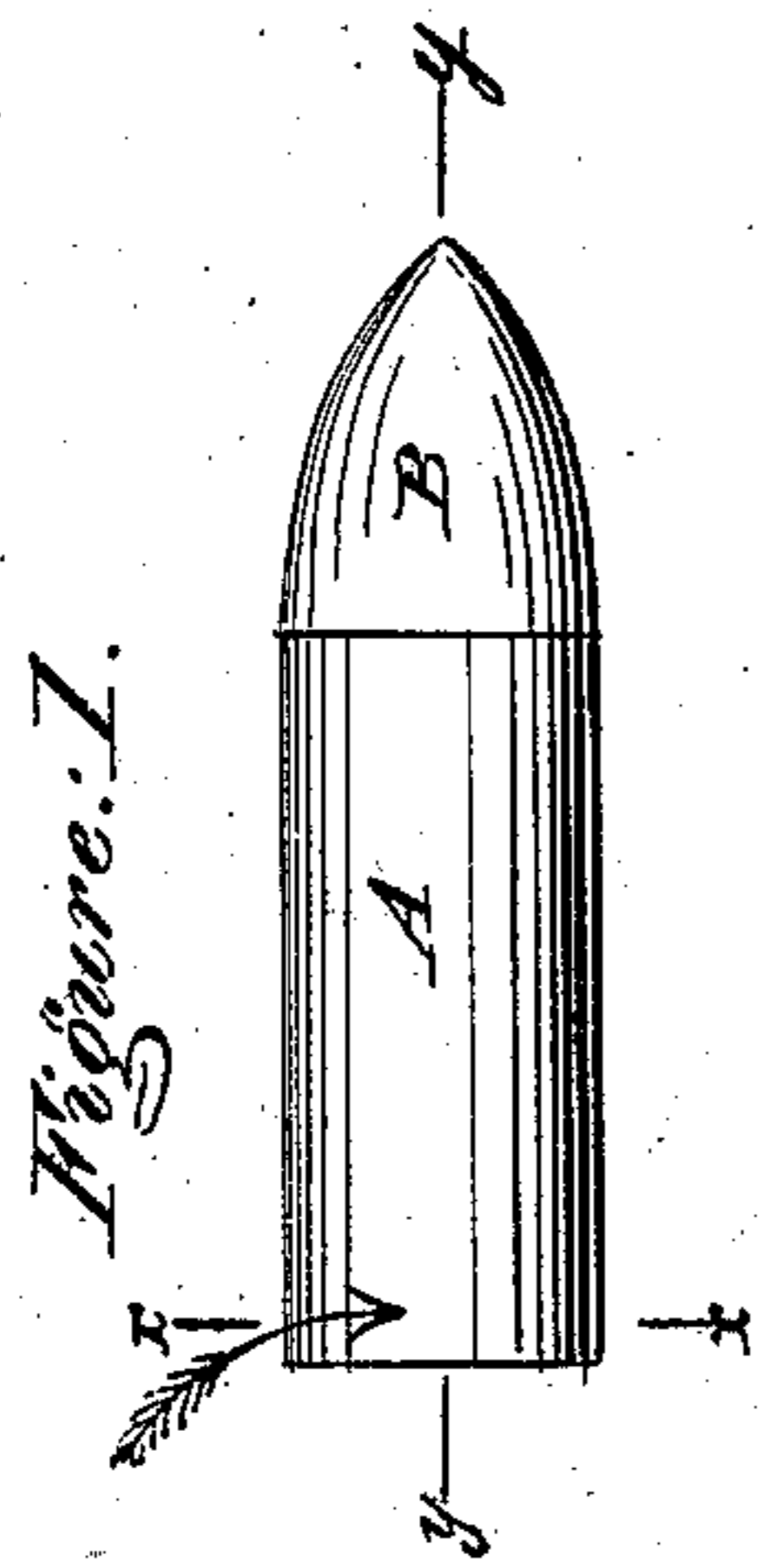
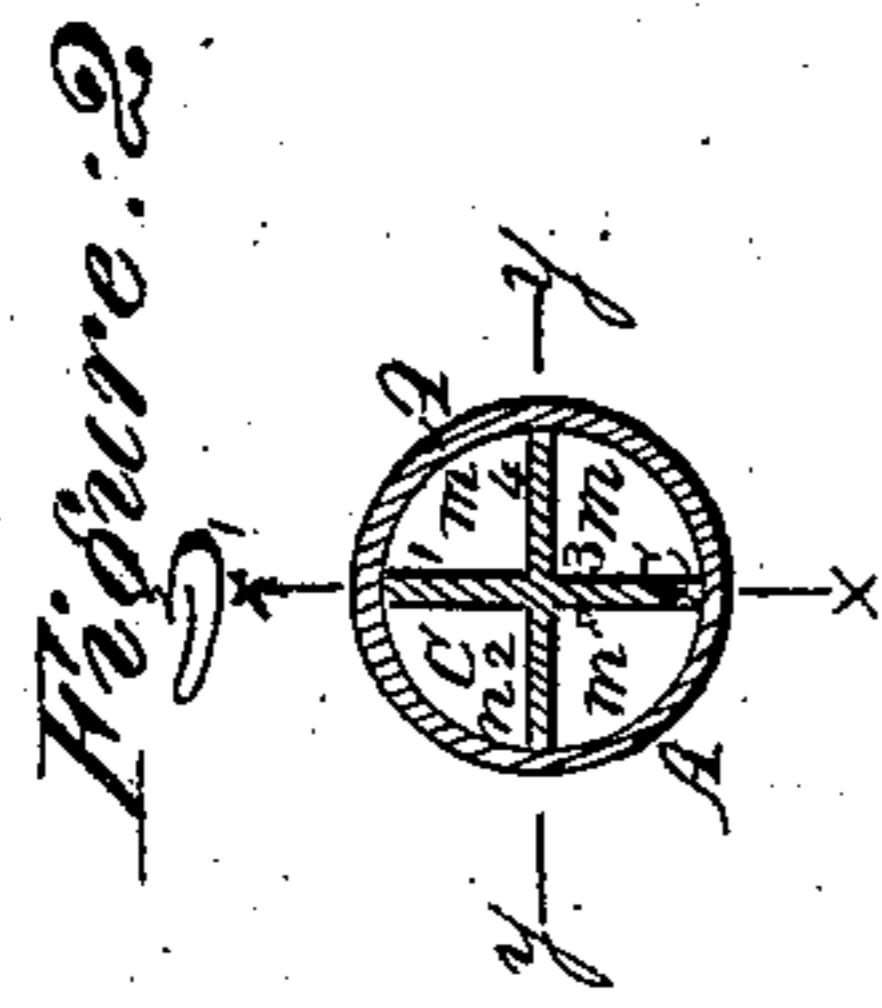
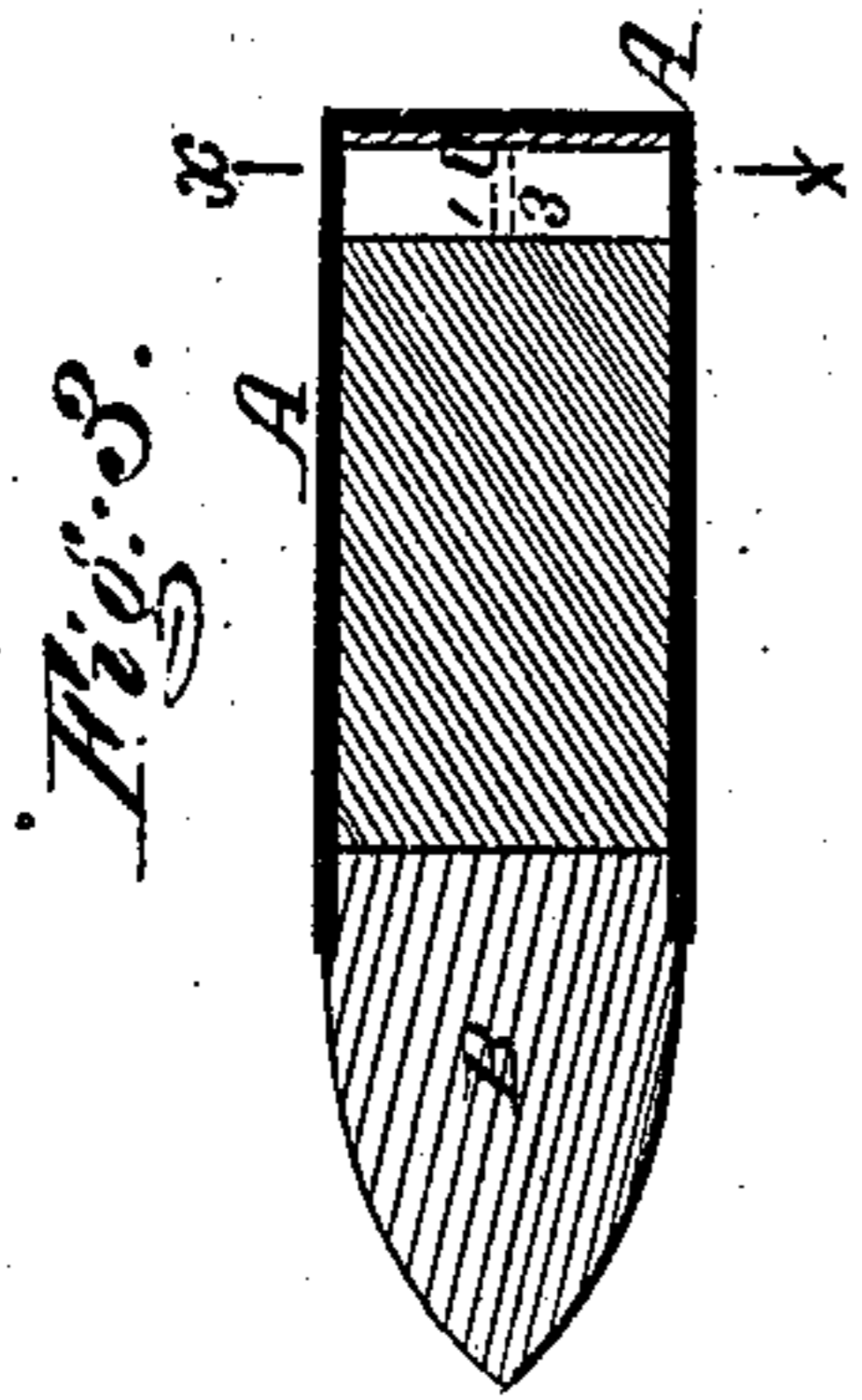


E. K. ROOT.  
Cartridge.

No. 44,660.

Patented Oct. 11, 1864.



*E. K. Root.*  
By his Attorneys,  
*D. A. Mc Intire*

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# UNITED STATES PATENT OFFICE.

E. K. ROOT, OF HARTFORD, CONNECTICUT.

## IMPROVEMENT IN PRIMED METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. 44,660, dated October 11, 1864.

*To all whom it may concern:*

Be it known that I, E. K. ROOT, of Hartford, of Hartford county, in the State of Connecticut, have invented a new and useful Improvement in Cartridges; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to that kind of cartridge in which the charge of powder and the percussion powder or fulminate are inclosed within a metallic case, and in which the fulminate is exploded by concussion between two surfaces, which are made to approach each other inside of the case or shell of the cartridge.

Several modes of constructing this kind of cartridge have been suggested previous to my said invention, among which I may mention, that which involves the use of a wire or rod, arranged diametrically in the case of the cartridge, and having the fulminate located between its end and the internal surface of the case, and there exploded by concussion between the end of the said cross wire or rod and the cylindrical case, these two surfaces being caused to approach each other by the blow of the hammer of the gun, and pinch the fulminate between them; and, also, that method of construction in which, in lieu of a rod or wire, a solid block of metal is arranged within the cylindrical case, between the periphery of which and the internal surface of the case the fulminate is pinched and exploded by means of the hammer striking against the exterior of the case and forcing its surface and that of the inclosed block toward each other. (This kind of cartridge is shown and described in an application filed by me some time ago.)

But in both of these methods of constructing a metallic cartridge without any flange, having the fulminate so arranged within the case as to be pinched (and thus exploded) between the surfaces of the shell and an independent piece, which surfaces approach each other in a direction about corresponding to the line of a diameter of the case, various objections and defects exist, to overcome which, and afford a simple, more effective, and more desirable metallic cartridge, are the objects of

my present invention; which consists in the employment within the case of the cartridge, of a split block, so made that its several solid portions or sections may be forced toward and against each other, to compress and explode fulminate placed between the adjacent surfaces of such sections or solid portions of such block, as will be hereinafter more fully explained.

To enable those skilled in the art to make and use my invention, I will proceed to describe the construction and operation of one of my improved cartridges, referring by letters to the accompanying drawings, in which—

Figure 1 is an elevation of one of my improved cartridges. Fig. 2 is a cross-section at the line  $x x$ , Fig. 1. Fig. 3 is a longitudinal section at the line  $y y$ , Fig. 1; and Fig. 4 is a perspective view of the collapsible fulminate-block removed from the cartridge. Fig. 5 is a similar view of another form of split block; and Fig. 6 is a perspective view of still another form of split block.

A is the metal case of the cartridge, which is made in the form of a plain cylinder, with a head or closed end at the rear, and having a ball, B, inserted in the usual manner in its open and forward end. C is a metal block or piece, which is located within the case A, at its rear end, and which is made to contain the fulminate in a manner to be presently explained. The interior of the case A is completely filled, except the space occupied by the piece C, with powder in the usual way. I have indicated the space occupied by the powder in the drawing by a blue tint, and have exaggerated the size of the cartridge over that used in an ordinary gun or pistol, for the purpose of more distinctly showing the forms of the several parts.

The metallic piece C, which may be denominated a collapsible fulminate-block, should be made of a suitable alloy or composition of metals to possess sufficient hardness and at the same time withstand any chemical effect which the fulminate might exert upon it, and should correspond in its contour or perimeter to the interior of the shell or case A. This block C is nearly severed into four segments, (see Figs. 2 and 4,) by two diametrical slots cut across one of its flat surfaces or faces, as clearly shown, and these slots are filled with



fulminate or detonating powder, as indicated by a red tint in the drawings. The piece C is slotted in such manner that the stock left at the bottoms of the slots is just sufficient to hold the sections *m m*, &c., together in their proper relative positions during the manipulations of charging the slots or crevices between said sections with fulminate and inserting the block into the rear end of the case A, and the stock left is, at the same time, so little as to admit of the portions *m m m m* being easily and completely compressed together, for the purpose of pinching or compressing the fulminate between their adjacent surfaces, to explode it, in a manner to be presently explained.

The operation of a cartridge thus made may be thus explained: The cartridge being inserted into the chamber of a fire-arm, where it is to be exploded, the outer surface of the case A is struck by the hammer of the arm about in the direction indicated by the arrow, Fig. 1, at any point around the shell A not too far from its base, whereby the thin metallic case A is forced slightly inward, or toward the axis of the cartridge, carrying with it the portion or portions of the piece C which happen to be nearest the point struck, and causing the fulminate to be suddenly crushed or compressed between the adjacent surface of the said piece and the other opposite sections or portions of block C.

It will be seen that if the block C have as many as three cuts or slots radiating from its center. It cannot be struck anywhere on its periphery without causing the sections or some of them to be crushed together, at some point, sufficiently to explode the fulminate contained in the slots or crevices between them. And it will be understood that wherever the fulminate is ignited by the concussion between any two or more adjacent surfaces of the sections *m m m m*, the ignition will be always conveyed to the rear end of the charge of powder and to the center of the base of the charge.

In lieu of the block C, slotted as described, several separate and distinct blocks, with the fulminate placed or distributed between their adjacent surfaces or edges, may be employed. I have only proposed that the sections *m m m m* be held together, as shown, because I deem it preferable, affording as it does a better opportunity to readily prepare the sections with the thin layers of fulminate before inserting them into the case A.

At Fig. 5 I have shown the block C<sup>1</sup> cut or slotted more frequently than that shown in the preceding figures, or so as to form a greater number of sections, *n n n n n n*. This form of block or sections will, of course, take more fulminate to fill its grooves than that

shown at Fig. 4, but may be deemed more desirable perhaps, on account of affording more opportunities for the concussion of the adjacent sides of sections.

At Fig. 6 I have shown another form of block, C<sup>2</sup>, which is in the shape of an annular ring, or circular disk with the center portion cut out, having slots 1 2 3 4 cut across its flat face and nearly through it, as clearly shown. The operation of this form of block or sections, when placed in the case A and forced together, as explained of the other form, is similar to that of the others already described, except that in this last-named form of sections the fulminate when ignited will communicate fire to the powder filled into the hollow space or portion *s*. But this form possesses over the others the advantage of requiring less fulminate than the others require, its fulminate spaces 1 2 3 4 not being so long, while at the same time it is as effective in every respect.

One of the great advantages of my new cartridge over one in which the fulminate is put on the periphery of a rigid disk is the great facility and little danger with which the block may be prepared with the fulminate and inserted within the case, and that in such manner as to completely fill the bore of the case A, which is of great importance, since, if the fulminate and all the surfaces between which it is confined be in perfect contact, the slightest depression of the case A will effect the certain explosion of the fulminate.

Another advantage to be ascribed to my improved mode of priming the cartridge is the economy of fulminate, for since the space of three radial slots is sufficient, and their surface is only about one-half that of the entire circumference, it follows that a great saving is effected over the method of putting the fulminate over the entire circumference of the disk.

Having fully explained my invention, and not wishing to limit myself to any peculiar form of the block C, or combination of movable sections,

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

The employment within the case of the cartridge of movable sections of solid material having fulminate confined, or arranged between their adjacent surfaces or edges, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand and affixed my seal this 3d day of May, 1864.

E. K. ROOT. [L. S.]

Witnesses:

GEORGE G. SILL,  
R. D. HEEBLAND.