

L. T. LOWDER.

MEANS FOR PREVENTING INJURY IN USING X-RAYS.

(Application filed Nov. 23, 1901.)

(No Model.)

Fig. 1.

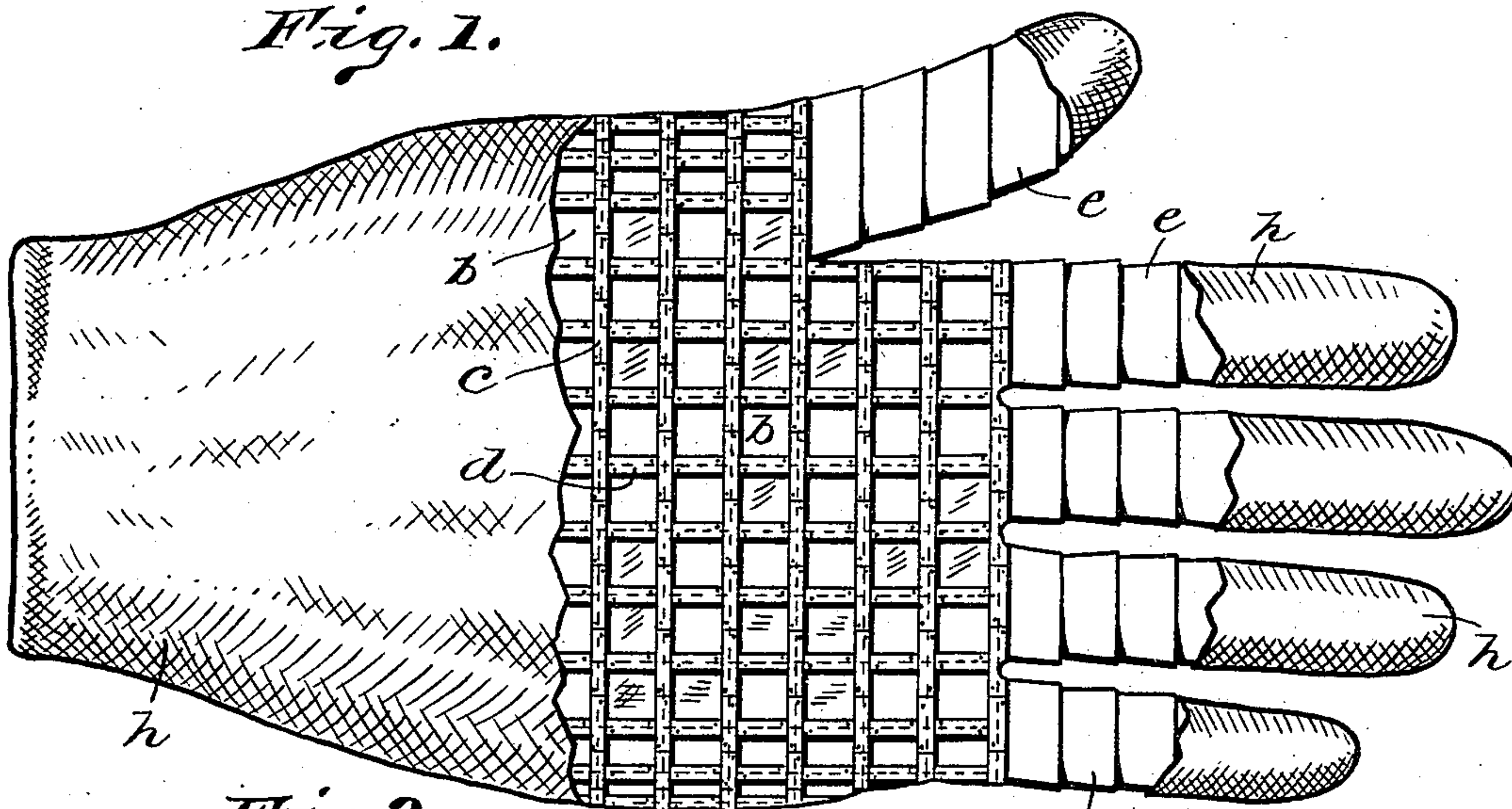


Fig. 2.

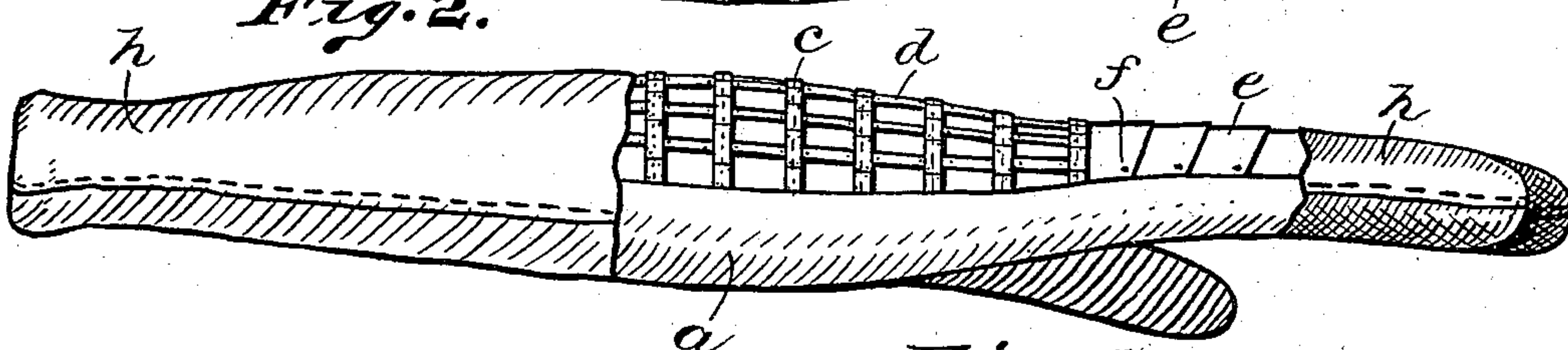


Fig. 3.

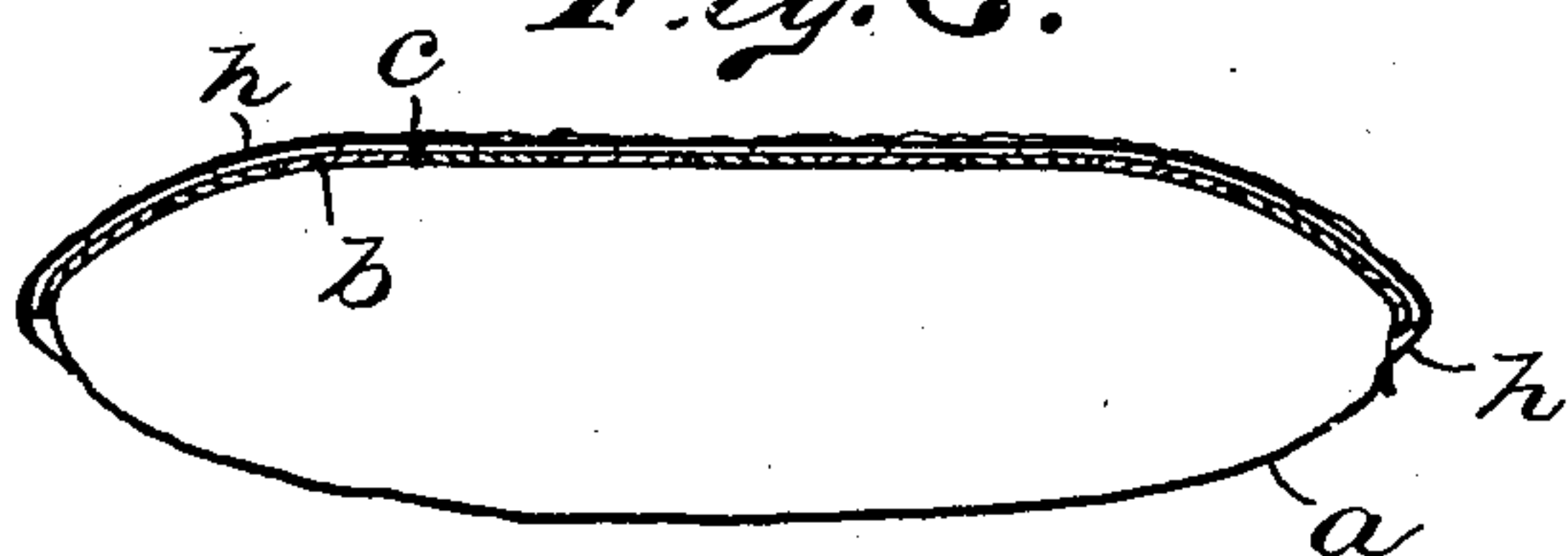


Fig. 4.

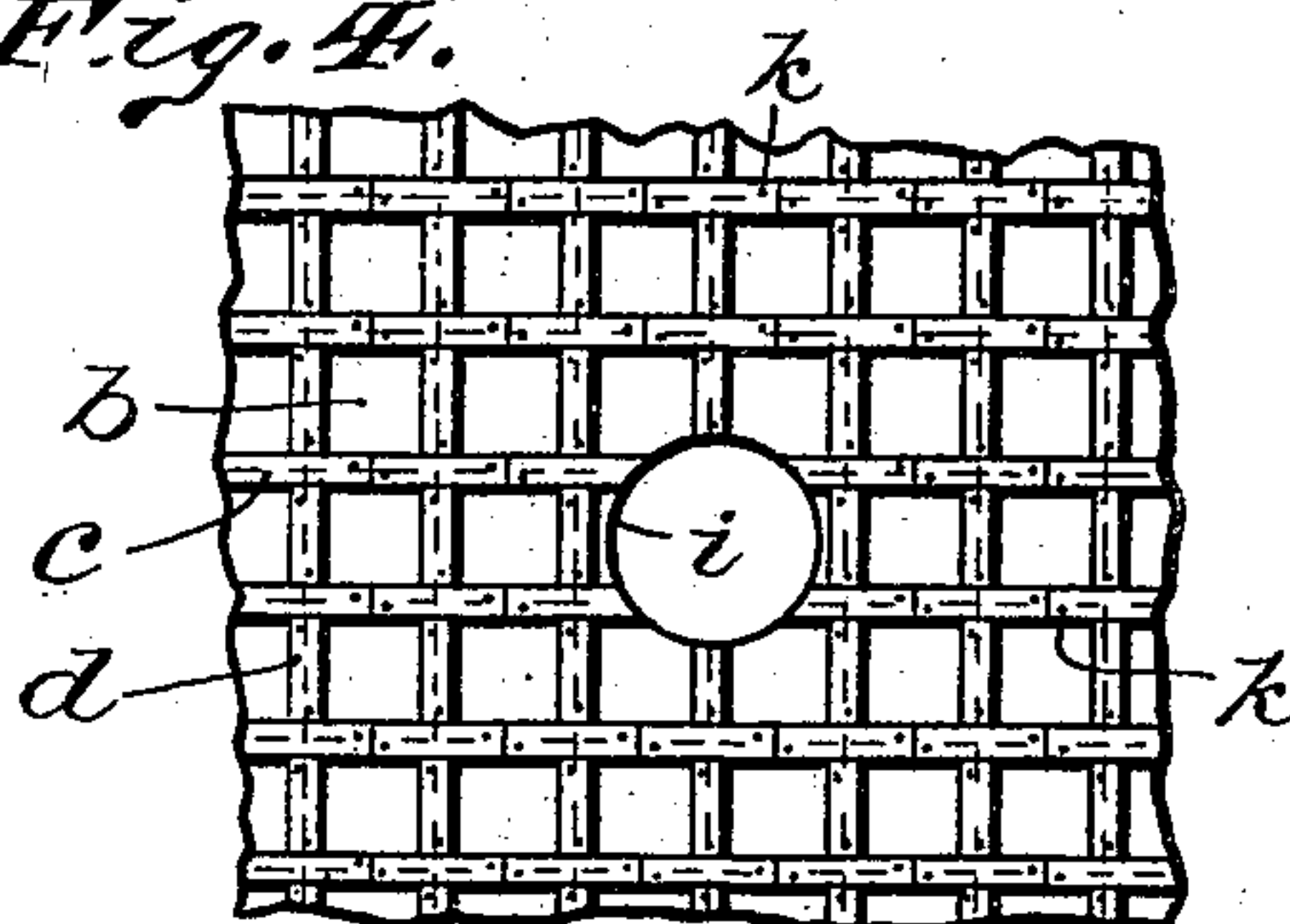


Fig. 6.

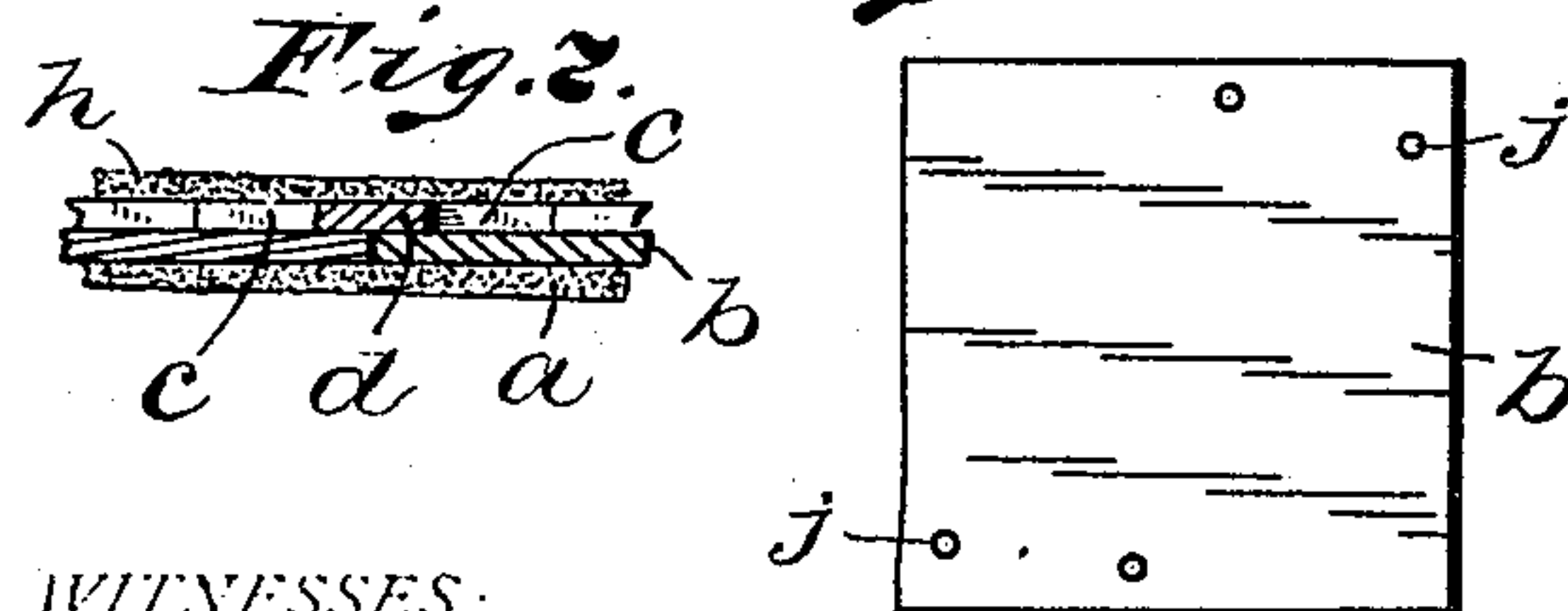
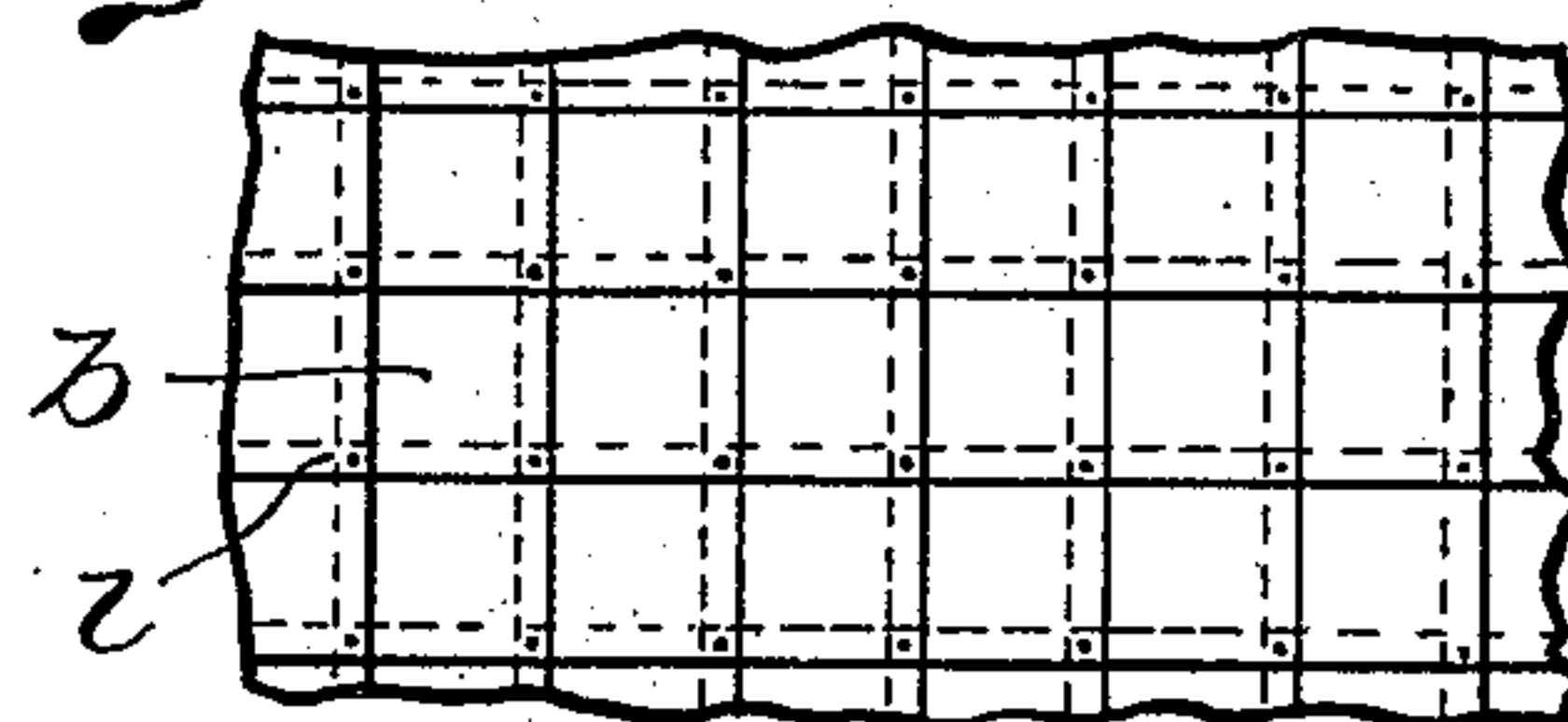


Fig. 5.



WITNESSES.

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UNITED STATES PATENT OFFICE.

LINDSEY T. LOWDER, OF BLOOMINGTON, INDIANA.

MEANS FOR PREVENTING INJURY IN USING X-RAYS.

SPECIFICATION forming part of Letters Patent No. 710,201, dated September 30, 1902.

Application filed November 23, 1901. Serial No. 83,386. (No model.)

To all whom it may concern:

Be it known that I, LINDSEY T. LOWDER, a citizen of the United States, residing at Bloomington, in the county of Monroe and State of Indiana, have invented certain new and useful Improvements in Means for Preventing Injury in Using X-Rays; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to devices of various forms for protecting both the operator and the person operated upon from the annoying and in some cases injurious effects produced by unintentional exposure of the hands and other parts to X-rays when using that peculiar force.

The invention consists of laminated armor or a covering that is proof against penetration of the X-rays, the essential parts of the armor being lead or other suitable material having similar characteristics formed in comparatively small thin plates, so as to be flexible without bending of the material itself, a medium for supporting the non-penetrable material, and preferably a covering for the non-penetrable material to prevent soiling of the hands and fabrics by contact therewith.

Referring to the drawings, Figure 1 represents a top or plan view of a glove having my invention embodied in the construction thereof, parts of the covering being broken away and exposing the armor; Fig. 2, a side view of the glove; Fig. 3, a transverse sectional view of the glove, taken at the body portion thereof; Fig. 4, a fragmentary plan view of the armor-plates as designed for a covering for the person to be operated upon; Fig. 5, a fragmentary plan view showing a modified form of arrangement of the plates in the construction of the armor; Fig. 6, a plan view of a plate forming part of the armor, and Fig. 7 a fragmentary transverse sectional view showing the laminations.

Similar reference characters in the several figures designate corresponding parts.

In construction I employ as a vehicle for

carrying the armor a glove or a sheet of suitable material, such as cloth. When it is designed to protect the hands of the operator, a glove is employed, and when operating upon a person a sheet form is employed in which is a suitably-shaped aperture to admit the rays to the part intended to be explored. In the drawings I show several plans for constructing the armor, and obviously other details of construction may be suggested by the artisan.

In the drawings, *a* indicates the glove structure, which, as above stated, may be made of any suitable material and to which the armor-plates *b* are secured in any suitable manner, so that the plates may move slightly at their edges, somewhat as do fish-scales. The glove may have fingers, as shown, or it may be formed as a mitten.

The armor-plates *b* in the present case comprise thin lead plates, rectangular and preferably square in plan, laid on the back of the glove and having perforations *j*, whereby they are secured by means of threads or similar devices. In Figs. 1, 2, and 3 the abutting edges of the plates *b* are indicated by dotted or broken lines, the joints, however, in practice being slightly open, so as to permit of some independent movement of the plates relative to the glove fabric. Short welt strips *c* of lead are laid over the joints of the plates *b* end to end in one direction, and other like strips *d* are laid over the other joints in a transverse direction, the strips being suitably attached also to the glove fabric or structure. While the plates *b* may extend over the backs of the fingers, especially on mittens, I preferably cover fingers of gloves with semibands *e*, having overlapping edges, each semiband being composed of either one or more pieces and pivoted together at the sides of the fingers, as at *f*. The armor is then protected against accidental injury by a covering *h*, which is attached at its edges to the structure *a*, and the covering also prevents contact with the lead, which, as is well known, would leave marks upon anything against which it might be rubbed.

In Fig. 4 the plan of the armor plates and welts is shown as above described, *k* indicating small rivets by which they may be attached when made in sheet or blanket form,

an aperture *i* admitting the rays to the desired parts of the person that may be covered by the sheet.

In Fig. 5 the armor-plates *b* are shown as having overlapping edges, *l* indicating the fastenings, and welts being dispensed with. The points of attachment may be varied according to the plans of the armor.

It will be understood that the armor is placed only upon the backs and sides of the hands and that other material than lead may be employed as armor; also, that the aperture *i* may be changed in plan to suit requirements. The gloves may also extend as gauntlets to cover the forearms.

In practical use the armored glove may be worn in the usual manner, and the inner sides being pliable will not appreciably affect the sense of touch of the operator, who must usually expose his hands to the direct rays in his operations. In making examinations of persons the body is covered with the sheet-armor and the rays directed to the aperture *i*, the surrounding parts being protected from the injurious effects by the armor.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Means for preventing injury incidental to the use of X-rays to parts of the human form while permitting the rays to penetrate parts designed to be operated upon, the same comprising armor substance that is impervious to the X-rays conforming to the parts of the human form about or surrounding the part designed to be operated upon, and a supporting substance for the armor substance also conforming to the parts of the human form about the parts to be operated upon.

2. Means for preventing injury incidental to the use of X-rays to parts of the human form while permitting the rays to penetrate parts designed to be operated upon, the same comprising an armor substance that is impervious to the X-rays conforming to the parts of the human form about or surrounding the part operated upon by the rays, the armor substance being changeable or alterable for admitting the rays to the parts operated upon, and a supporting substance for the armor substance also conforming to the parts of the human form about the parts operated upon.

3. Means for preventing injury incidental to the use of X-rays to parts of the human form, the same comprising an armor substance that is impervious to the X-rays formed into small thin plates slightly flexible in themselves, a form extending against the said armor substance conforming thereto, and means securing the said substance to the form.

4. Means for preventing injury incidental to the use of X-rays comprising an armor substance that is impervious to the X-rays conforming to the back parts of the human hand,

and a form extending against the said armor substance conforming thereto, and also extending therefrom and conforming to the inner parts of the human hand, the said armor substance being attached to the said form, substantially as set forth.

5. In a hand-covering, the combination with the glove composed of flexible material, of the armor-plates composed of small perforated sections of material impervious to X-rays extending over the back parts of the glove with the edges abutting, the welt-strips extending over the abutting edges of the plates, the securing devices extending through the perforations and into the glove structure, and the outer covering extending over the plates and the welt-strips, substantially as and for the purposes set forth.

6. In a means for preventing injury by X-rays, the combination of the hand-glove, the rectangular plates that are impervious to the X-rays and having perforations therein and extending over the back parts of said glove, the semibands impervious to the X-rays extending over the backs of the glove-fingers and having the pivotal fasteners, the fastening devices extending through said perforations and into the structure of the glove, and the outer covering extending over the said plates and said semibands and secured to said glove, substantially as and for the purposes set forth.

7. In a means for protecting the hand from the X-rays, the combination of the glove having the thin small plates that are impervious to X-rays and having the perforations near the edges thereof and extending with the abutting edges over the back of said glove, the securing devices extending through said perforations, the long welt-strips extending over abutting edges of the plates in one direction, the short welt-strips extending over abutting edges in a transverse direction and between said long strips, said strips being impervious to the X-rays, and the outer covering extending over the said plates and said strips, substantially as and for the purposes set forth.

8. In means for preventing injury incidental to the use of X-rays, the combination of the supporting form, an armor substance that is impervious to the X-rays comprising extremely thin frail plates attached to the supporting form, the welt-pieces also composed of substance that is impervious to the X-rays and covering the joints of said plates, and the covering for the said armor substance, for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LINDSEY T. LOWDER.

Witnesses:

HARRY D. PIERSON,
E. T. SILVIUS.