

C. ZEGLÉN.
WIRE FABRIC ARMOR PLATE.
APPLICATION FILED JUNE 7, 1917.

1,376,304.

Patented Apr. 26, 1921.

Fig. 1.

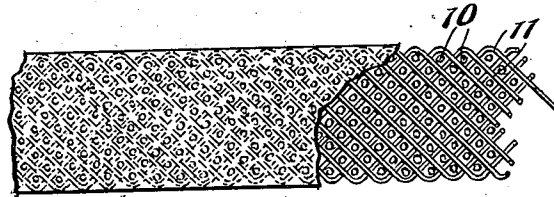
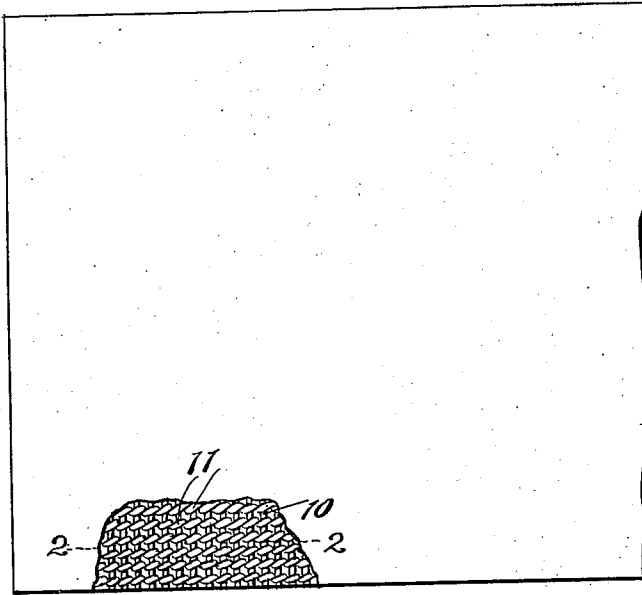


Fig. 2.

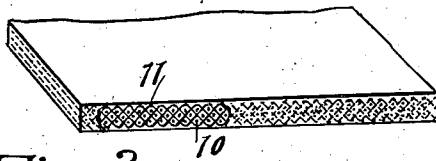


Fig. 3.

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WIRE-FABRIC ARMOR-PLATE.

1,376,304.

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To all whom it may concern:

Be it known that I, CASIMIR ZEGLER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Wire-Fabric Armor-Plates, of which the following is a full, clear, and exact description.

This invention relates to a wire fabric armor plate and process of producing the same, the product being adapted for military purposes such for example, for the construction of war vessels, armored cars, shields for guns and other apparatus, breast-plates and the like.

The principal object of the invention is to produce a wire fabric plate which is strong, not easily penetrated by a projectile, and which for a given resistance to penetration is light in weight.

In carrying out my invention I utilize a multiply woven fabric which is impregnated with molten metal and is preferably rolled to produce a substantially solid plate. This fabric is formed of metal wires and can be made in any thickness or with any given number of plies, the number of plies, the closeness of weave, the thickness of the weft and warp wires forming the same, and the materials from which the wires are formed depending on the thickness of the ultimate plate to be produced and the particular use for which it is designed.

The invention may be further briefly summarized as consisting in certain novel details of construction and in certain novel steps of the improved method which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawing, Figure 1 is a plan view with part broken away showing a plate made in accordance with my invention; Fig. 2 is a cross sectional view substantially along the line 2-2 of Fig. 1; and Fig. 3 is a similar view showing a plate employing a woven fabric composed of a less number of plies and of smaller wire than illustrated in Fig. 2.

In making my improved armor plate which may be used for a variety of purposes such as mentioned above, I employ what I term a multiply woven fabric made out of metal wires to give the plate its great strength and resistance to penetration by projectiles. The form of fabric which I prefer to employ is clearly illustrated in

Figs. 2 and 3, this fabric consisting of a number of layers of weft or filling wires 10, and warp wires 11, which are looped around the weft wires and extend back and forth diagonally from one surface of the fabric to the other. The weft wires extend in straight parallel lines while the warp wires are bent and woven or looped around the straight weft wires. To produce a fabric of this kind it is essential that the warp wires be readily flexed or bent, while this quality or characteristic is not required of the weft wires inasmuch as they extend in straight lines. I therefore prefer to employ for the weft wires, hard material such as nickel-steel and for the warp wires, relatively soft material such as soft steel, nickel, copper or German silver, the more expensive material such as German silver being employed when very strong, thin plates are to be produced, such for example, as may be used for the manufacture of breast-plates.

After the fabric is made it is impregnated or embedded in molten metal, this molten metal being preferably nickel-steel, or other alloy from which plates used for military purposes are usually formed. This can be done in numerous ways, such for example, as immersing and then withdrawing the fabric from the molten metal, or by pouring the molten metal over the fabric.

Next the impregnated or embedded fabric is rolled by passing the same a suitable number of times between rolls which roll the plates to the desired thickness, and at the same time produce solid plates substantially free from openings or interstices.

This produces a plate which is exceedingly strong and has very great resistance to penetration by shells, and for a given degree of strength and certain resistance to penetration it is lighter in weight than any armor plate heretofore produced of which I am aware.

The plates constructed in the manner above explained, can be made in any size and any thickness desired. The thickness may be varied from a fraction of an inch, say one-sixteenth of an inch to a thickness of several inches. For different thicknesses of plates I utilize fabric composed of different numbers of plies or layers of weft wires and generally also of different thickness or size of the wires, the thin plates containing a fabric made of fewer plies and preferably of smaller wire than the relatively

thick plates. I may also, of course, vary the materials of which the wire is formed, the particular materials depending upon the required tensile strength and the required resistance to penetration. Regardless of the number of plies of which the fabric is composed, it will have the same general structure or form of weave, the weft wires extending in straight lines and the warp wires diagonally back and forth from one surface to the other and being looped around the surface weft wires as shown. For example, in Fig. 2 I have shown an armor plate containing a woven fabric of ten plies, and in Fig. 3 an armor plate containing a woven fabric of three plies. It will be observed that in the fabric such as shown in Fig. 3, using relatively small weft and warp wires a closer weave is obtained than with a fabric formed by heavier or larger wires.

I am aware that heretofore armor plate has been used or proposed for use having a wire netting or mesh embedded therein, and I am not claiming broadly the idea of embedding a wire mesh or woven fabric in metal, but I believe it is new with me to employ a multiply woven metal fabric, and

I believe it is new also to form the body of the plate with a multiply woven fabric, and fill the interstices or spaces around the wires with molten metal.

While I have shown one form of weave or one form of my invention, I do not wish to be confined to the precise details shown, and aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. An armor plate containing a multiply woven wire fabric composed of relatively hard weft wires and relatively soft or flexible warp wires interwoven with the weft wires.

2. An armor plate comprising a multiply woven metal fabric with its interstices filled with metal, said fabric consisting of layers of relatively hard weft wires and relatively soft or flexible warp wires looped around the weft wires and extending diagonally through the fabric.

In testimony whereof, I hereunto affix my signature.

CASIMIR ZEGLEN.