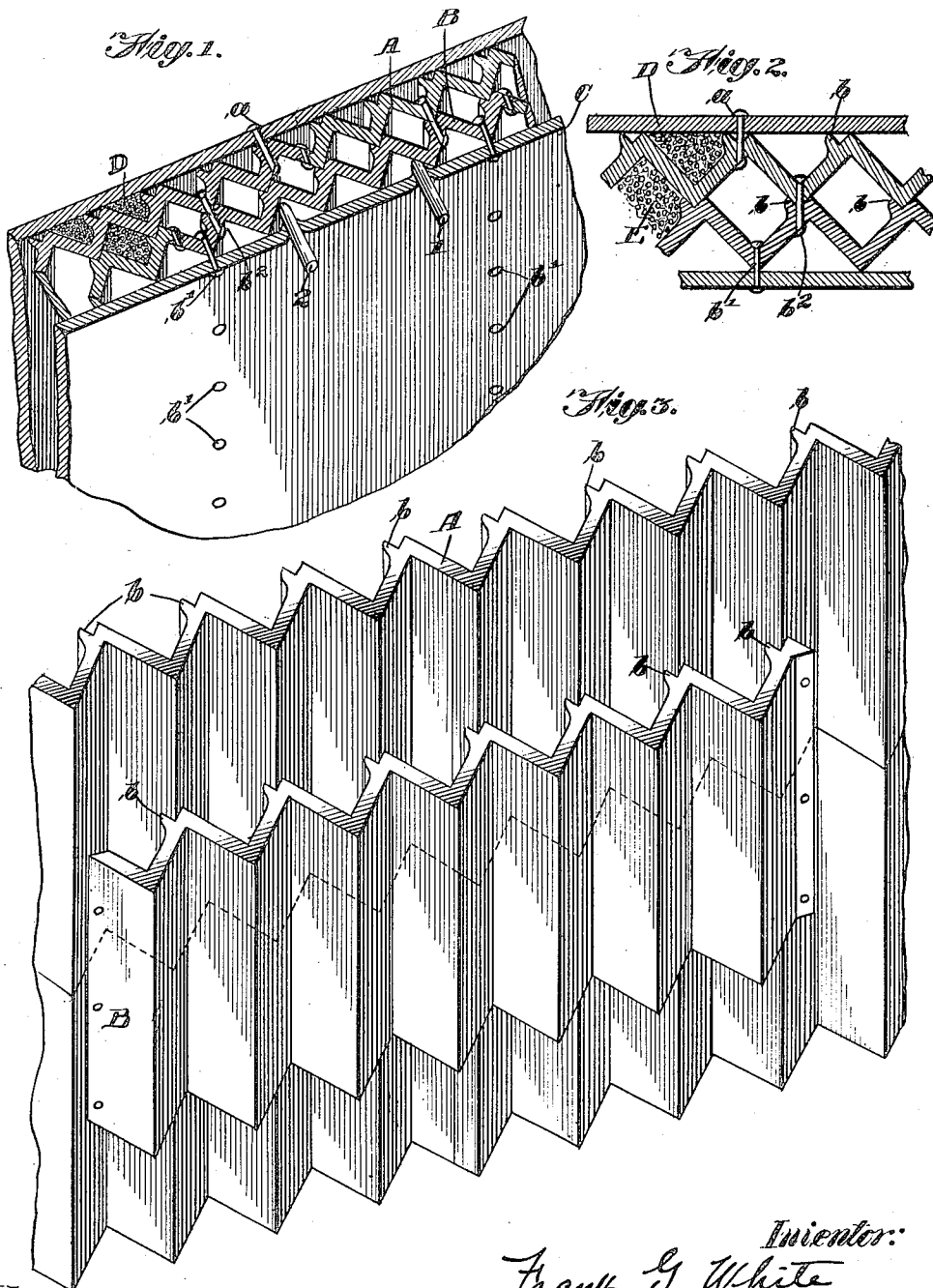


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F. G. WHITE.
ARMOR PLATE.

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ARMOR-PLATE.

SPECIFICATION forming part of Letters Patent No. 787,065, dated April 11, 1905.

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To all whom it may concern:

Be it known that I, FRANK G. WHITE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented a certain new and useful Improvement in Armor-Plate, of which the following is a specification.

My invention relates to armor-plate in general, but more particularly to a form of plate adapted to be secured to the sides of war vessels.

Generally stated, the object of my invention is to provide an armor-plate of simple and inexpensive construction and adapted to effectively protect war vessels against projectiles.

A special object is to provide an armor-plate so constructed as to combine a minimum of weight with a maximum capacity to resist penetration.

Another object is to provide an armor-plate which can be applied in the form of superimposed plates or sections of such character that the wall of armor-plate can be of any desired thickness.

A further object is to provide a construction whereby the armor-plate will not only tend to deflect the projectiles, but will also present a smooth exterior surface capable of resisting the well-known injurious effects of scouring.

These and other advantages and further objects will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a perspective of a portion of armor-plate constructed in accordance with my invention. Fig. 2 shows a sectional view of the armor-plate shown in Fig. 1. Fig. 3 is a perspective of several of the plate-sections, illustrating the manner in which the same are assembled together.

As thus illustrated, my improved armor-plate may consist of a number of superimposed plate-sections A, B, and C, secured, as illustrated, to the sides of the ship D. The superimposed layers or plates A and B can, it will be readily understood, be made in sections adapted to be connected at their edges

to form a continuous layer or sheet of armor-plate. The outer or superficial layer C of the multiple-plate armor thus provided can consist of a sheet of metal, substantially as illustrated. In cross-section both of the superimposed sheets or layers A and B are preferably bent or so formed as to present a number of ridges or angular corrugations, as shown in the drawings. The inner layer or corrugated sheet A can be secured to the side of the ship by means of bolts *a*, the same being preferably passed through near the apexes or corners of the angular corrugations which rest or impinge upon the sides of the ship. The next layer or sheet of corrugated metal B is preferably provided with ridges or beads *b*, each one being preferably arranged adjacent to the edge or apex of one of the angular corrugations. In this way the back of the layer of metal sheet B is provided with a number of grooves or seats adapted to receive the outwardly-projecting angles or edges of the layer or sheet of metal A. - When fitted together, as shown in Figs. 1 and 2, it will be seen that the edges or apexes of one plate are slightly to one side of the opposite edges or apexes of the next outer layer of corrugated sheet metal. The flat outer layer or sheet C can be secured to the corrugated sheet B by means of bolts *b'*. In a similar manner bolts *b''* can be employed for binding the two multiple angle or corrugated layers A and B together. Some non-inflammable substance—as, for example, corn-pith D—can be packed into the recesses between the corrugated sheets or layers of metal. The angle-plates or corrugated sections can, it will be seen, be made from one pattern and can all have their backs provided with the seats or grooves adapted to receive the edges of another layer of corrugated sheet metal. In this way the armor-plate as a whole can be of any desired thickness, the thickness being varied by applying a greater or smaller number of the corrugated layers.

There are several advantages in a construction of the foregoing character. For example, should a projectile 1 strike as shown in Fig. 1 it will of course be deflected to one

side and prevented from doing any serious damage. Again, should a projectile 2 strike as shown in Fig. 1 it will likewise be deflected to one side, even though it strikes the outer corrugated layer at the bottom of one of the channels. This is for the reason that after penetrating the first corrugated layer it then strikes the side of one of the angles or corrugations of the next layer or sheet of metal. This, it will be seen, is due to the fact, as previously explained, that the edges or angles of the inner and outer plates are not brought in line, but, to the contrary, are arranged slightly out of line, so as to have what might be termed a "staggered" arrangement. Now in the case of projectile 1, it of course easily penetrates the flat outer layer C; but upon coming in contact with the angular surface of the sheet or layer B it is then immediately deflected to one side. During this deflection it will be seen that the flat outer layer C exerts a retarding effect, inasmuch as the twisting or turning of the projectile causes it to bind in the hole it has made in the said flat outer layer. The corn-pith or other non-inflammable material also has several advantages. For example, it tends to displace water from between the plates. Again, it will close holes made by the projectiles and will also tend to reduce impact. In other words, it will be seen that my improved armor-plate is not only characterized by a multiple-plate construction, but also by an impact-reducing and successive deflective action. Thus it not only can be of minimum weight, but also practically of the maximum capacity to resist penetration. Furthermore, although it is so constructed as to insure a deflecting action, so as to minimize the liability of penetration, it at the same time presents a smooth exterior surface which cannot be torn up or damaged by the well-known scouring action of a bursting shell. This scouring action on the side of a vessel has made it undesirable to employ armor-plate presenting a rough outer surface. A shell bursting on a rough-exterior surface sweeps everything clean and tends to tear off any corrugations or deflecting-surfaces with which the armor may be exteriorly provided. With my improved arrangement, however, the bursting shell is received by a flat outer surface, which is not in any way damaged by the scouring action, and at the same time the construction is such that the principle of deflection in armor-plate is taken advantage of to the fullest extent.

By employing a plurality of superimposed yielding layers, such as the corrugated metal sheets A and B, it will be seen that I obtain what may be termed a "multiplied reduction of impact." In other words, I provide a plurality of superimposed yielding layers which yield successively to the impact of the projectile.

If desired, other materials can be mixed with the corn-pith or other non-inflammable material and packed into the recesses in the manner explained. As more clearly shown in Fig. 2, the bolts *a* and *b* are preferably arranged to extend through the grooves or seats provided by the beads or ridges *b*. With this arrangement the bolt or rivet holes are less liable to cause a weakening of the plates when fastened together. With my improved construction a projectile cannot possibly enter the ship at an angle of more than forty-five degrees, which is harmless. This, it will be seen, is due to the fact that although a projectile may pass directly and squarely through the first and second layers it will then be deflected to one side by the next layer. In other words, the arrangement is such that a projectile cannot possibly penetrate the armor without encountering one or more deflecting-surfaces. In this way, as stated, the projectile must turn to one side before it can reach the ship and can only reach the latter at an oblique angle. It is well known that the deflecting of a projectile to one side, so as to cause it to advance sideways through the armor-plate rather than in an endwise direction, greatly reduces the liability of its doing any great damage and of its penetrating entirely through.

What I claim as my invention is—

1. A multiple-plate armor comprising a plurality of superimposed sheets of corrugated metal, the edges or angles of one plate being arranged out of line with respect to the angles or ridges of the next inner plate, and a flat outer layer of sheet metal.

2. A multiple-plate armor comprising a plurality of superimposed corrugated layers of sheet metal bound together by bolts, the back of one plate being provided with grooves or seats adapted to receive the angles or corners of the next inner plate, and a flat outer layer of sheet metal.

3. A multiple armor-plate comprising a plurality of superimposed layers of corrugated sheet metal arranged so that the corners or angles of one sheet are out of line relatively to the corners or angles of the next inner sheet.

4. An armor-plate comprising a plurality of superimposed layers of corrugated sheet metal, and a suitable non-inflammable material packed into the recesses formed between the said plates.

5. An armor-plate comprising a plurality of superimposed layers of sheet metal, each layer of sheet metal being provided with a plurality of deflecting-surfaces, the deflecting-surfaces of each layer being more or less out of line with those of the adjacent layers.

6. Armor-plate composed of a plurality of superimposed layers of corrugated sheet metal, and bolts for binding said layers together, said bolts extending through some of

the corrugated plates at points slightly to one side of the edges or angles of the corrugations.

5 7. An armor-plate composed of superimposed layers of corrugated sheet metal, the back of each layer being provided with grooves or seats adapted to receive the angles or edges of the adjacent sheet of corrugated metal and bolts or rivets for binding

said layers of sheet metal together, said bolts 10 extending through the superimposed sheets at points where the angles of the inner sheet engage the said grooves or seats on the back of the next outer sheet.

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