

**THE DOWE BULLET PROOF CUIRASS.**

So much has been written about the Dowe protective cuirass, that our illustration of a test made of the invention at a London music hall, "The Alhambra," will be interesting. It also points a moral in showing an invention in the art of war applied to the art of amusement.

Herr Dowe is a tailor of Mannheim, Germany. For a year and a half, he says, he worked on his invention, looking after his business during the day time. During his dinner time he would test his material in the shooting park. His wife was meanwhile lying ill, and just before he completed his invention she died, thus giving a touch of pathos to the inventor's story of his work.

The sample of the cuirass exhibited in London is in

crowd assembled, whereupon it transpired that Mr. Maxim's exhibition took largely the aspect of a practical joke, and his shield proved to be a plate of nickel steel, the carbon being the "organic material." Mr. Maxim himself says that he had no idea that his 7s. 6d. offer would be taken so seriously. He says that some hundred of the visitors, headed by a very pompous officer, left indignantly ("in a great huff," Mr. Maxim put it) when they found that his cuirass was only a "steel plate in a bag." It was subjected to fire, and, though weighing but 7 pounds to the square foot, resisted modern ammunition. Mr. Maxim, however, did not put the armor on his own person to be fired at, so Herr Dowe still leads him. The Maxim exhibition really went to show what good gun shields can be made of nickel steel. The English papers seem

circulation will break and rot out the scale, no matter how hard it may be. This grate should outlast a boiler, because the shaking device, being underneath the water bars, cannot be readily burned out or warped, as it is protected by the water in the bars and is unique in this respect. The fires can be kept low and bright at all times, and owing to this the combustion is quite perfect, and fires can be kept at a white heat.

With bituminous coal, fires need not be cleaned for weeks, except by shaking, as all parts of the fire can be cleaned with the least motion of shakers. The shaking device is in two parts, one half being in front and the other half at the back, and each can be operated independently of the other. All the water is fed through the grate into the boiler, and by this means, when the water enters it, it is at the same tempera-



Herr Dowe and the Cuirass.



Capt. Martin.

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appearance a block of felt two or three inches thick and about eighteen inches square. The construction is a secret, Herr Dowe keeping the cuirass under lock and seal, except when in his own hands. For two years Herr Dowe has contracted with his manager, Captain Martin, to exhibit his invention, and our illustrations show the two men as they have been appearing in London.

As exhibited, a rifle ball is first fired through a block of oak. Then the cuirass is hung upon a horse and is fired at without disturbing the animal in any way. Next the inventor puts on the cuirass, as shown in the cut, and his manager, Captain Martin, fires a bullet from a short distance, without affecting the inventor. As a final test, the cuirass is placed over a sheet of glass and arrests a bullet, the glass not being injured.

The Dowe cuirass will weigh, it is thought, eight pounds. But it is easy to see that it might have an extended application in war in the construction of gun shields and in the protection of cavalry. It seems incredible that the material described should succeed in stopping the bullet of such a piece as the United States Navy rifle, which has nearly penetrated forty-two inches of dry oak, and in another trial has gone completely through sixty-two one inch pine boards superimposed. In any case Herr Dowe shows the possession of great nerve and of a very full measure of the courage of his convictions in acting the living target for the exhibition of his invention.

As a species of burlesque comment on the Dowe in-

very indignant at Mr. Maxim's action. His own account indicates that he did not credit the full claims made for the Dowe cuirass, and that his exhibition was intended to be to some extent a criticism thereon.

Later on he produced his plate of steel at the Westminster Aquarium, where it was exhibited. It was marked with the word "Maxim" down its center, indicating the bullet proof area. This was fired at, but the bullets failed to penetrate. Outside the limits of the name it was penetrable. Mr. Maxim, on being invited to stand behind his cuirass, declined to do so. While ready and apparently anxious to cast cold water upon Herr Dowe's invention, he would not act as a similar exponent of the merits of his own steel armor.

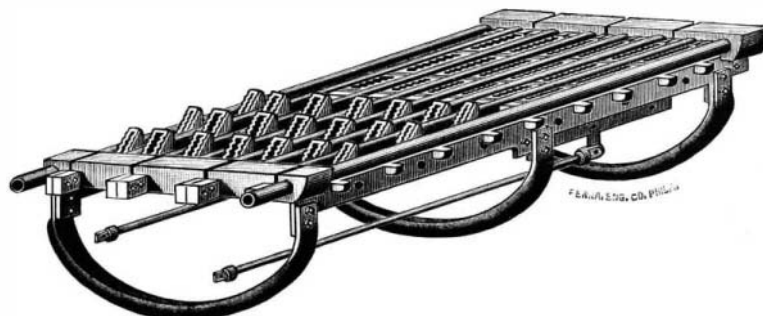
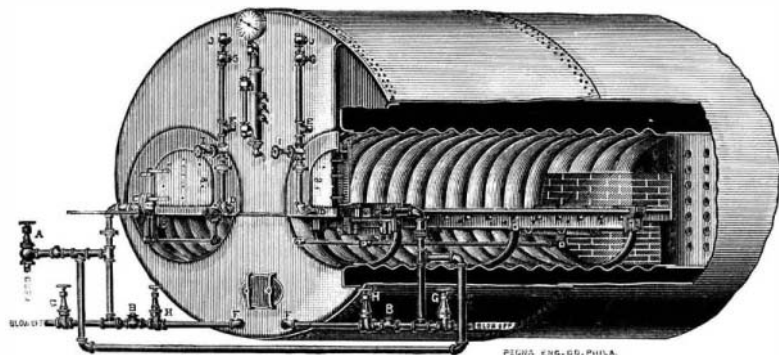
At another of the London halls a team of rifle experts have been exhibiting a bullet proof dress worn by a woman, one of their number. This marks the third music hall exhibition of defensive armor, and at least indicates that we may require armor-piercing projectiles for small arms as well as for the great rifles. A cuirass has also been reported from Hungary, invented by an officer of the Austrian army, named Sylander, so there seems to be abundant choice of material.

**THE REAGAN MARINE WATER CIRCULATING AND SHAKING GRATE.**

The accompanying cuts represent the marine grate manufactured by Water Circulating Grate Company,

ture as the water already in the boiler, thereby keeping the boilers equalized at all times. The connections are made so that the grates and boilers are blown simultaneously, keeping both grate and boiler free from sediment and scale. It is said that with this grate the work of three boilers can be done with only two, and save coal besides. The average increase of power which they give is claimed to be about 33 per cent. This grate makes steam very fast and holds it steady. The gain in temperature when feeding is from 110 to 130 degrees Fah., and the higher the pressure, the better the results. Marine boilers equipped with this grate will always have an equal expansion, which is a great point and worthy of consideration, especially with marine boilers.

Users of this grate claim a saving of 20 to 30 per cent in fuel and a large gain in power; inferior coal and coke, screenings, sawdust and shavings, show big results. In cases where coke and bituminous coal are used, there is no necessity of ever cleaning the fires at all. All parts of this grate are interchangeable, and can be taken from or put together without removing the grate or blowing the boiler down. When the grate is adapted to marine boilers, all the work on the grate is done before it is put into the furnace, and when finished is pushed in whole and in one solid piece; it is then dropped into its position. All grates are made to conform in size to the furnaces, and no alterations are necessary, all the feeds and blowoffs being left just as found; in other words, nothing need



**THE REAGAN MARINE WATER CIRCULATING AND SHAKING GRATE.**

vention, Hiram S. Maxim, of London, announced himself as also the inventor of a cuirass. His proposition, however, was taken in dead earnest. The story is amusing. He claimed that he had something better and lighter than the Dowe shield, stated that it was made of organic and inorganic material, offered to sell the secret for 7s. 6d., and announced an exhibition. The thing was taken seriously by the public. A great

1028 Filbert Street, Philadelphia, and show grate before it is put in and after it is connected. With this grate a marine boiler can be kept at the same temperature both at the bottom and top and is equalized throughout. One hundred pounds of pressure or more can be obtained in from fifty to sixty minutes, as the circulation carries the water from the bottom of the boiler and returns it at the top, whether feeding or not. The

be altered or deranged. A pump or injector can be used, and hot or cold water can be fed as desired.

A large number of these grates have been in use for some time, and show little sign of deterioration. Moreover, this invention is no longer in its experimental stage, but, on the contrary, has long since been proved to the satisfaction of users to be reliable as a fuel-economizing and labor-saving device.