A NEW TORPEDO.

In the accompanying engravings, representing the Berdan system of attacking with a torpedo a ship protected by netting, Fig. 1 shows the mechanism for steering the torpedo, and Fig. 2 shows the positions assumed by the following and principal torpedo in sinking, passing beneath the net and striking the bottom and unprotected part of the ship, after the leading torpedo has been arrested by the netting.

This system is of two-fold application: (*a*) either the first torpedo, which is explosive, strikes the net and blows it to pieces, and the second torpedo, also explosive, connected with the first by a line and following it

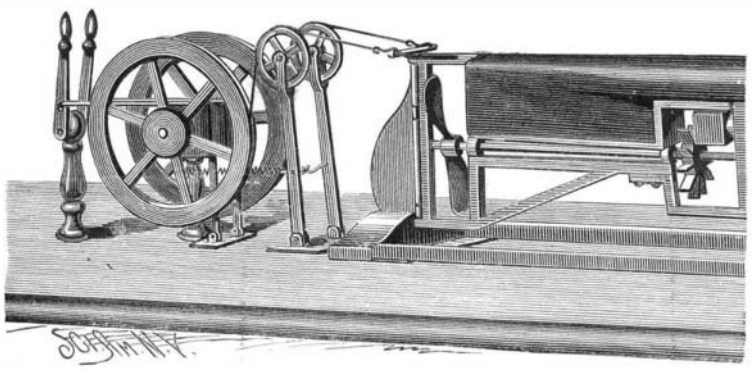


Fig. 1.—STEERING GEAR OF BERDAN TORPEDO.

at a distance of some thirty or forty feet, enters the rent which has thus been made in the net by the first, and so reaches the ship; or (*b*) the first torpedo, which is non-explosive, merely strikes the netting, stops, and serves as a fulcrum for the second—the real and explosive—torpedo to work upon.

In the first scheme each torpedo—the front and the rear one—resembles its fellow; each is explosive; the one is used to break up the netting, the other, proceeding through a clear passage, to break up the ship. The front torpedo is steered from the torpedo boat, and the rear one is guided by being connected with the first. Each has its own motive power, but that of the first is somewhat greater than that of the second.

The second scheme is, however, the one which attracts attention. The first torpedo here resembles the second one except that it is not explosive, is steered by rudder lines from the torpedo boat or from the shore, and that there are some peculiar contrivances in the second which cause it to make its dive under the net when the first torpedo becomes fouled in it. In approaching the ship each torpedo has its own motive power, the second being regulated to need a slight assistance from the first, afforded by means of a thin rope or wire cord. When the netting is reached, the first torpedo stops; the cord between the first and second torpedoes, formerly taut, at once slackens, and lets fall a species of rudder ledge or trap underneath the center of the second torpedo. The projecting ledge, being caught by the water as the second torpedo advances, is sufficient to drag the torpedo down into the water, where it will progress at an angle of 15° to the surface. In this manner it will dive under the ship's netting. Having gone the length of the tow line, the torpedo will be brought sharp up to the surface again; the surface in this case being the ship's bottom, not protected, as its sides are, by iron plates. Striking here the explosion follows. When the ship is not protected by nets, the only change made in the system is by using a shorter towing line. The rear torpedo does not float on the surface as it follows the first, but is balanced to sink a few feet below water, and so to escape destruction from the ship's shot.

The entire length of the torpedo is 31 feet; its width at midship section is 21 inches; its depth 31 inches; its displacement 2,800 lb. The explosive substance is guncotton or dynamite to the amount of 100 kilogrammes. This explosive is fired by a small copper pin being cut off when the impact takes place against the ship. A very slight shock is enough to effect this. Upon this pin being cut, it liberates a bolt, which shoots against the cap of an ordinary rifle cartridge, and the explosion follows. The motive power of the torpedo is obtained by the combustion of three rows of four one hundred pound rocket tubes filled with rocket powder; and this powder is compressed with a mixture of clay, which secures regular burning and the time required for the torpedo to run a distance of one English mile at the rate of twenty-four miles an hour. The pressure of gas given off will be about 2,000 lb. to the square inch; but if required, it may be increased safely up to 5,000 lb. The gas generated by combustion of the rocket powder rushes through a nozzle, and acts upon several compartments of a turbine which revolves the torpedo's screw.

The torpedo is to be steered from the torpedo boat throughout its entire course. The steering apparatus consists of two grooved wheels (Fig. 1), with a mile of fine plaited linen cord passing over dynamometers. Pressure is put on by friction brakes worked by two levers. In this manner the torpedo can be steered from leaving the torpedo boat to being fouled in the net. The second torpedo has no special steering apparatus, its direction being determined by that of the first. It is claimed that steering is facilitated by the fact that the steering lines and drag of the second torpedo keep the stern of the first always directed toward the steersman. As the first torpedo also runs just below the water line, a disk 3 or 4 feet above the water is used to steer by in the daytime, and a lamp reflecting only to the rear is used at night. Against torpedo boats or wooden ships the first torpedo only is used.

The claims made for this torpedo by its inventor, General Berdan, of Constantinople, are: 1, its steering apparatus; 2, its motive power; 3, the fact that it can be launched from any part of the coast or from any ship without any special arrangements for the purpose; and 4, the use of a pair of torpedoes acting together instead of a single one.

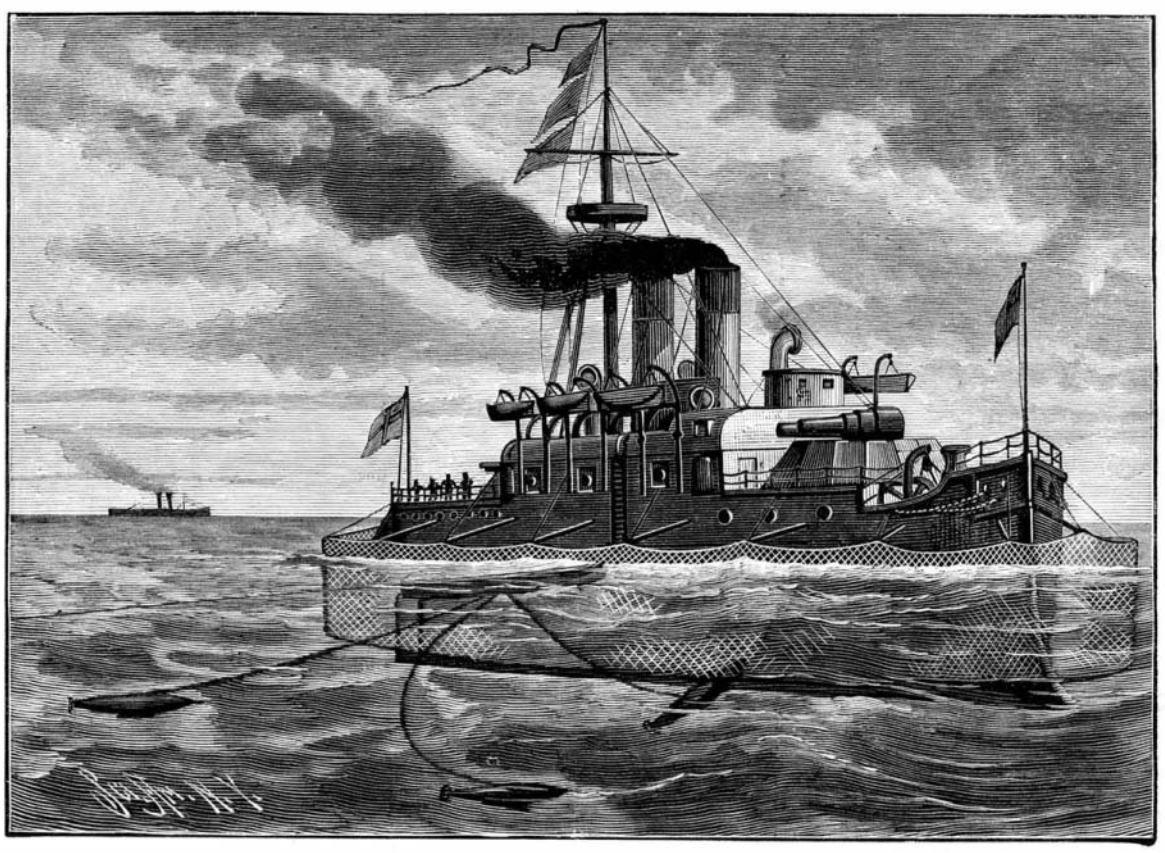


Fig 2.—THE BERDAN TORPEDO ATTACKING A SHIP PROTECTED BY NETTING.

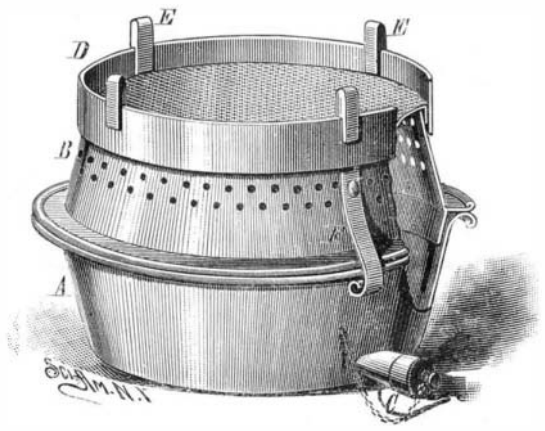
Light from Water Power.

The beautiful falls of Montmorency, one of the chief points of interest to the tourist visiting Quebec, are to be utilized for a novel purpose, that of generating electricity for lighting Quebec. The water is led from the river above the falls, through a sluiceway, to the edge of a precipice, 165 feet high, and from here through a tube to the base. The lower three-fourths of this tube is made of quarter inch boiler plate iron, the upper fourth of three inch plank. The tremendous pressure exerted by this column of water, 165 feet high and 24 inches in diameter at its base, will turn a turbine wheel at the rate of 600 revolutions per minute, giving a force of 900 horse power. This is transmitted almost direct to eight dynamos on the floor above, and from these sufficient electricity will be generated to light 800 arc lamps in Quebec, seven miles distant. The apparatus is very ingenious and extremely strong, and will probably be a great success.

There is only one other place in Canada—Ottawa—where anything of the kind is in use. Even now the process is in use at Montmorency, in Mr. Hall's lumber mills, where nine lights are run by a turbine 8 inches in diameter, having a force of 60 horse power. The tremendous pressure is shown when Mr. Hall turns on a hydrant, letting out a huge stream of water with a deafening roar. Pipes are led all through the lumber yard, into which water can be turned at a moment's warning and flood the entire place. The lumber mills themselves are run by power from the falls.

COMBINED MILK PAN AND CHEESE MOULD.

The pan, A, is provided with a tubular spout, C, for the purpose of drawing off the milk without disturbing the cream, which, as the milk runs off, will gradually



NOESSEL'S COMBINED MILK PAN AND CHEESE MOULD.

sink until it rests on the bottom. The spout stopper screws into an internally threaded outer end of the spout, and is attached to the pan by a chain, the end link of which connects with the stopper by a pin or rivet, so as to permit the screwing or unscrewing of the stopper without twisting the chain. The detachable hollow cover, B, is of about the capacity of the pan, and is made with sides inclining in a direction opposite that of the sides of the pan. The mouth end of the cover has a curtain which enters down within the pan to prevent leakage; the springs, F, hold the cover in place on the pan. The closed end of the cover is constructed to form a screen, and is provided with the legs, E. The cover serves a double purpose: it may be used as a strainer, through which the milk may be poured into the pan beneath; or if by accident the milk before being drawn off should form into clabber, then, after removing the cream with a spoon and replacing the cover, the whole utensil may be inverted to stand upon the legs, when the cover is converted into a curd or cheese mould, which will permit of the whey passing off through the screen and through holes in the side of the cover.

This article—the invention of Mrs. Sarah J. Noessel, of Benavides, Tex.—can be readily made by any tinsmith, and all the parts can easily be kept clean.

American Exhibition at Rome.

A permanent exhibition of United States products will be opened at Rome on November 1 of the present year. The exhibition is projected by some of the most prominent Italians, and will be conducted under the auspices of the Italian government and the United States Consul-General. It will have forty-one branches in the different Italian cities, and its managers promise to do all in their power to encourage trade between the two great nations. The permanent exhibition is to be free to all, and only such goods are invited as are apt to find a sale or to meet a want in Italy or the Mediterranean ports. The charge to exhibitors is $15 for twelve months, and the exhibition company will take full charge of the exhibit on its arrival in Rome. There should be some customers for American goods among 30,000,000 Italians, and our manufacturers wil ldo well to investigate this market.

THE *Manufacturers' Gazette* reports the sales of wool for the past week as having been the largest in the history of the Boston wool market. The sales amounted to a total of upward of 7,000,000 pounds, 6,800,000 of which are domestic. For the same week last year the sales were less than 3,000,000 pounds. This looks as if the woolen manufacturers were not going to remain idle.