located, while the other contains any stationary parts of the sterilising plant.

On the apparatus car is fitted a benzine motor of the well-known automobile motor type, an alternate-current machine direct coupled to the axle of the latter, and producing

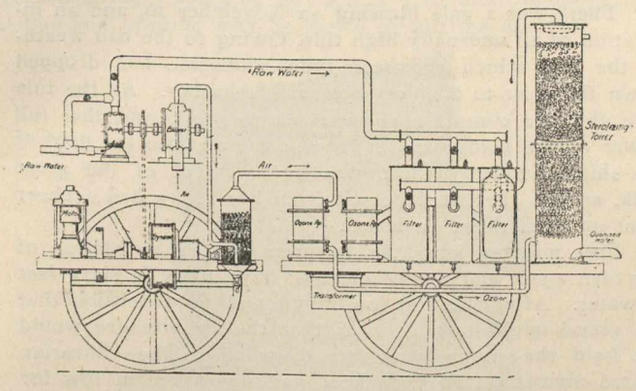

Fig. 3.—Transportable Ozone Plant for Military Purposes.

the low-tension primary alternate current for the transformer; a small toothed wheel water pump drawing in the raw water and throwing it into the sterilising tower, a small blower, supplying the air for the ozone apparatus, and the sterilising tower, and some spare parts.

The sterilising car contains two spring-supported Siemens ozone cases (one of which serves as a reserve), with eight ozone tube elements each; a transformer for generating high-tension current from the low-tension primary alternate-current derived from the apparatus car; three parallel preliminary filters, consisting of sheet metal cylinders that contain closed filter bags, through which the raw water is thrown before its admission into the tower, so as to be freed from any coarser impurities; a cylindrical sterilising tower made of iron sheets. This latter is filled with pebbles of the size of pigeons' eggs, or with cement-coated pumice stone; and consists of two parts placed one above the other, which may be inclined to one side.

The two cars are placed side by side in the course of operation, the water pump of the apparatus car throwing the raw water through a thick suction and pressure hose into the quick filters and the sterilising towers, while the air from the blower of the apparatus car traverses a thinner hose on its way to the ozone apparatus, and thence to the lower part of the sterilising tower. The primary current of the alternate-current machine is finally supplied through a cable to the transformer on the sterilising car.

The plant has been designed for an output of 500 to 600 gallons of water per hour, and the car requires for its operation an expenditure of about 2-H.P. It works without any circulation of the ozone air current, the ozone being generated with such a surplus as to be used only to one-third or one-half even in the case of the worst quality of water.

THE STEAMSHIP BAVARIAN RAISED

A feat the account of which will be interesting to engineers generally, and marine men throughout the world, was the floating of the Allan liner Bavarian, which was fast on Wye Rock in the St. Lawrence River, 38 miles from Quebec, since November 4th, 1905.

The Bavarian, which is a 12,000 ton vessel, 500 feet long, was practically turned into a huge steel bubble by being pumped full of compressed air, in order that she might float free of the rock.

Robert O. King and W. W. Wotherspoon are the young engineers who have successfully fought to free the great steamship from the grasp of the rock on which she was held fast for nearly a year, by the principle of compressed air as used in the construction of the large New York tunnels.

When the ship ran on the rocks on the night of November 3rd her bottom was badly pierced amidships. Many of the apartments filled with water, and when she settled down the engines were forced up so that the inner funnel showed 18" above the rim of the outer one, and the plates were so badly torn that the wreckers, after making a careful examination, declared that the raising of the vessel would be a most difficult proposition. More than $150,000 was expended by expert wreckers to reclaim the vessel, but it was of no avail. The owners worked on her for several weeks, and then turned her over to the London Lloyds, and the underwriters, after having tried all the old methods for raising ships, gave up the attempt, and reported that they would receive tenders from anyone who would undertake the work.

Last June Robert O. King, a graduate of McGill University in Civil Engineering, consulted a friend of his, W. W. Wotherspoon, a young engineer who was employed on the work of tunneling the East River, New York. He referred to the caisson work they had seen in connection with a large bridge, when visiting New York, when Mr. King asked Mr. Wotherspoon how a caisson sunk in the river differed from a ship without a bottom, and he remarked that he believed the water could be expelled from a wreck in the same manner that it was forced from the caisson. Mr. King then stated that he believed the Bavarian could be raised by using compressed air to force the water from her holds.

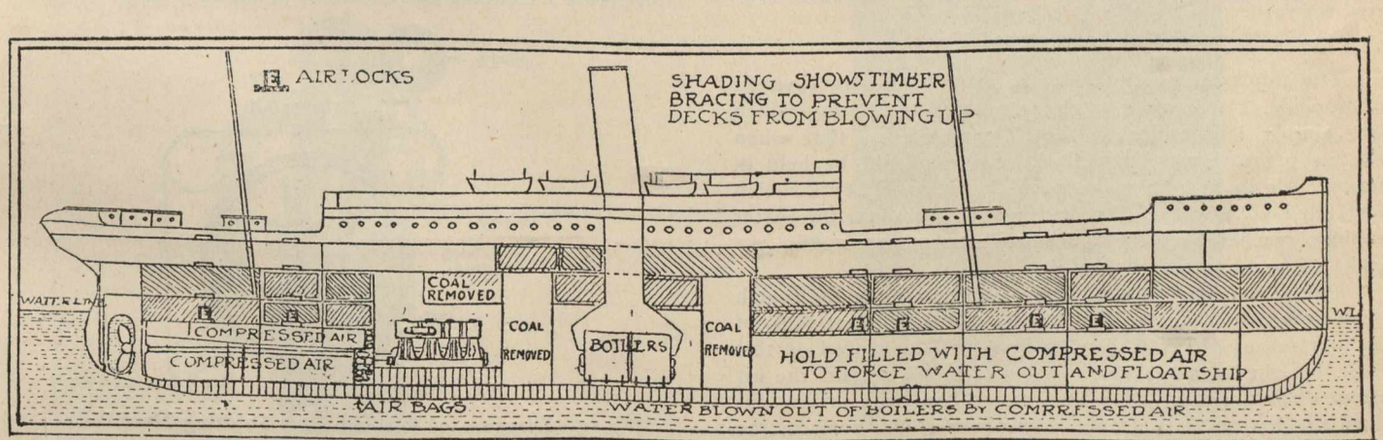

Diagram showing how the wrecked R. M. S. Bavarian was floated by compressed air.

After a visit to the steamer it was decided that this method would prove successful, and the two young men made up their minds to tender for the salvage of the vessel. A contract, however, had already been awarded to Captain Leslie, of Kingston, who was again going to attempt the raising of the steamer. The plans were laid before the Captain, and he agreed to join the engineers in the salvage of the great ship, which was estimated to be worth at least $1,000,000.

Some difficulty was met in raising money for the enterprise, but after the plans had been approved by such men