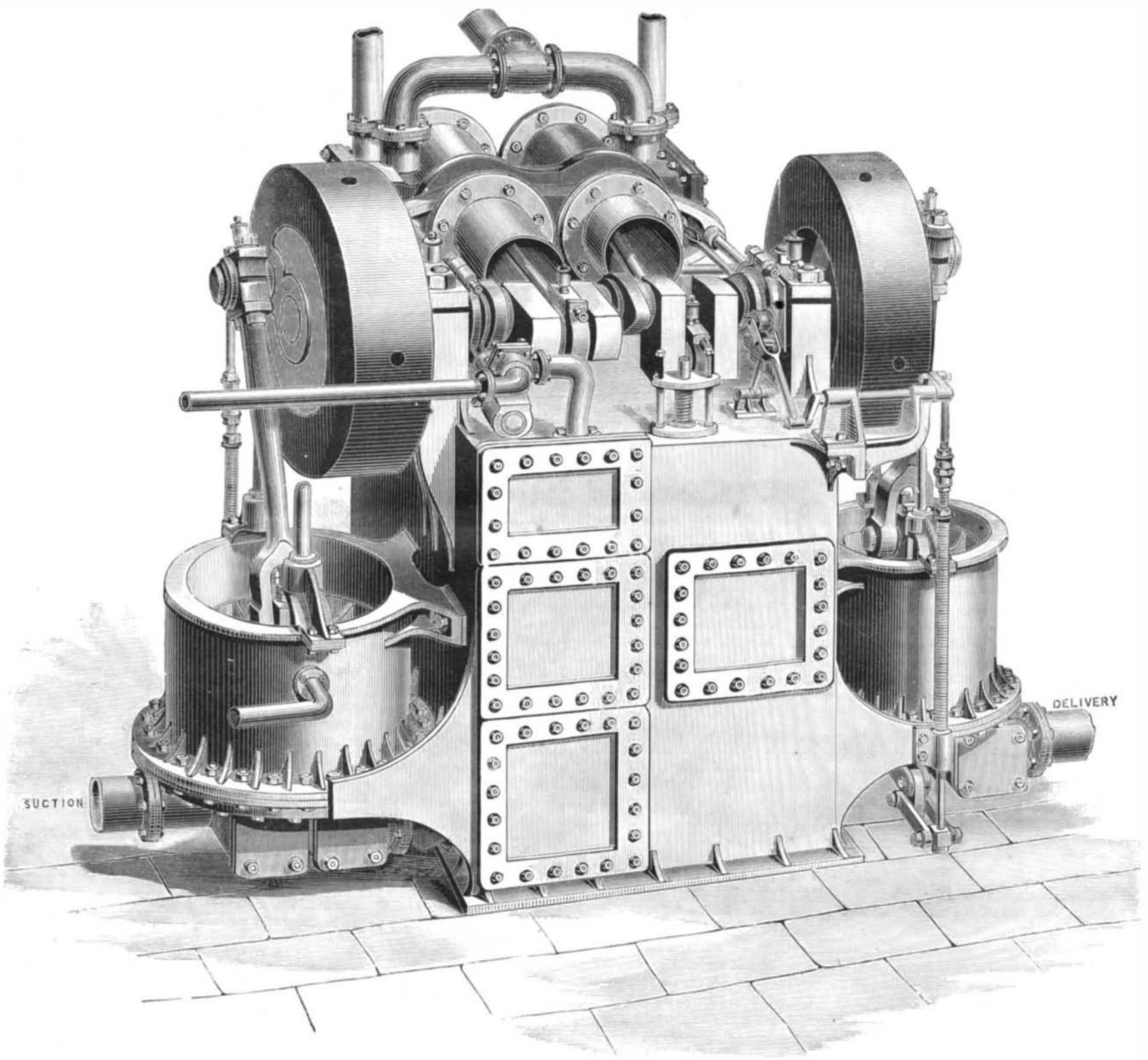
IMPROVED AIR REFRIGERATING MACHINE.

We illustrate a machine constructed by Messrs. Hall, of Dartford, for use in the Australian meat trade. The engraving is very nearly self-explanatory.

The machine consists of a pair of horizontal trunk engines, mounted on the top of a condenser. To one side is bolted a compressing cylinder, 27 inches diameter and 18 inches stroke. To the other side is bolted the expansion cylinder, 22 inches in diameter and 18 inches stroke; both these cylinders are open-topped. The valves are placed in the bottoms of the cylinders, and are worked by cams on the crank shaft and levers. Air is drawn into the compressing cylinder on the up stroke, and delivered on the down stroke, into the surface condenser at a pressure of about 50 lb. to 55 lb. on the square inch. The air here parts with its heat in the condenser, and it is then delivered into the expansion cylinder, the valve of which cuts off at about one-fourth stroke. The expanded air is then delivered through a pipe into the room to be cooled. About fifty per cent of the work expended in the compressing cylinder is returned in the expansion cylinder, the difference being made up by the engine. The machine is but one of several Messrs. Hall have in hand of different patterns. The outline diagrams show the form which they recommend for ordinary use, the height being kept down to render it specially suitable for use between decks, but the machine can be made to take any form almost, and can be made of any dimensions to suit particular requirements. The condenser, or refrigerator, consists of nests of brass tubes, through which the water circulates. The tubes are of brass, half an inch in diameter outside. The ends of the tubes are accessible through the man lids shown.—*The Engineer.*



IMPROVED AIR REFRIGERATING MACHINE.

The Utilization of Waste Ivory.

A curious and valuable contrivance has been explained to our Sheffield correspondent for the utilization of waste ivory—a subject of very great importance to other classes besides cutlery manufacturers, in consequence of the rapidly-increasing value of the article. The firm who have made the discovery—Messrs. Kilner Brothers, Albion Works, Holley street, Sheffield—have patented their plan, and applied it in the first instance to table cutlery. Their object is obtained by using odd ends of ivory, or ivory that is not sufficiently long for the ordinary length of handles, by cementing the pieces together, and by "tapping" the "tang." In this way each piece of ivory is screwed close to its fellow. The handle is then carved or fluted, by which means all joints are concealed. The tang passes through from end to end, and being riveted, the handle is prevented from leaving the blade, either by being placed in hot water, or by any other means which misdirected domestic ingenuity can contrive. Every housekeeper will appreciate this boon, as in the ordinary method of hafting table cutlery the handles come off with irritating frequency. By their patent, which is also applied to knives with bone, horn, and other handles, the firm can produce a really good article at about one-half the cost of ordinary knives. The ivory waste used in this way costs 2s. 6d. per pound—cut out of the solid piece it would be 20s. Among other specimens exhibited to our correspondent was a carving knife, the ivory handle of which, if the ivory was of one piece, would be worth 3s. 6d. The firm can supply the complete knife and fork for 4s. 3d., with the handle treated according to their patent.—*The Engineer.*

Omaha Waterworks.

The *Fireman's Journal* is informed that a suit has been begun by the Holly Manufacturing Company, of Lockport, N. Y., against the Omaha City Waterworks Company for infringement of Holly's patent of direct pressure. This suit, says the *Journal,* grows out of the fact that the Holly Company, after a long and bitter fight, was underbid by an Omaha company for the construction of the city waterworks. The Omaha company is building the works on the combined system of reservoir and direct pressure. It has distributed its pipe, partly built its reservoirs, and received part of the pumping machinery, and is under contract to complete the works by September next. This litigation may seriously complicate matters, and may postpone the completion of the works for some time, and possibly the plan of construction may have to be changed.

An Electric Storm.

A severe snow storm, accompanied by electrical disturbance and high wind, prevailed, January 6, over a space eight hundred miles wide, along the line of the Union Pacific Railroad between Omaha and Ogden. For twenty-four hours the telegraph wires were useless, the intensity of the electric storm being shown by the fact that when the telegraph key was opened by the operator a steady electric light burned at the connecting points. L. H. Korty, Chief Operator of the Union Pacific Telegraph lines, has kept a record for years, and with but one exception in twelve years, this storm occurred on the 5th, 6th, or 7th of January. It is believed that the entire Rocky Mountain region is visited by them.

To Fasten Cloth on Wooden Surfaces.

The following is said to be an excellent method of fastening cloth to the top of tables, desks, etc.: Make a mixture of 2¼ pounds of wheat flour, 2 tablespoonfuls of powdered rosin, and 2 tablespoonfuls of powdered alum; rub the mixture in a suitable vessel, with water, to a uniform, smooth paste; transfer this to a small kettle over a fire, and stir until the paste is perfectly homogeneous without lumps. As soon as the mass has become so stiff that the stirrer remains upright in it transfer it to another vessel and cover it up so that no skin may form on its surface. This paste is applied in a very thin layer to the surface of the table; the cloth, or leather, is then laid and pressed upon it, and smoothed with a roller. The ends are cut off after drying. If leather is to be fastened on, this must first be moistened with water. The paste is then applied, and the leather rubbed smooth with a cloth.

STRENGTH OF INSECTS.—At a meeting of the Maryland Academy of Sciences recently Dr. Theobald showed a species of a beetle and gave the following figures: Weight of beetle, two grains; weight moved by it, 5½ ounces—2,640 grains, or 1,320 times the weight of the beetle. A man weighing 150 pounds, endowed with the strength of this insect, should therefore be able to move 198,000 pounds, or nearly 100 tons.