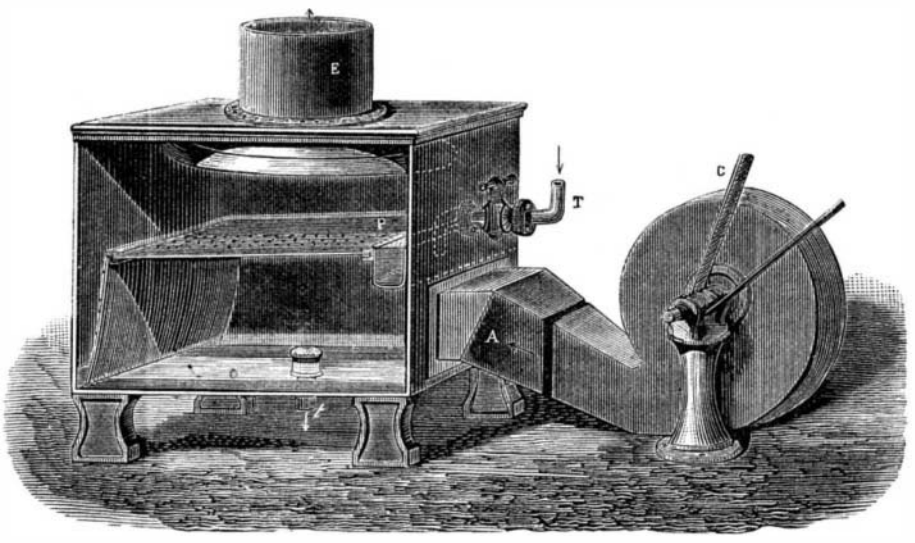
A NEW AIR REFRIGERATOR.

We extract from *La Nature* the annexed engraving of a novel and ingenious device, which may be used with equal facility either as a refrigerator or as a heater or purifier of a current of air. A fan blower, at C, driven by the belt, forces a blast in by the conduit, A. The air passes up through a finely perforated plate, P, over which runs a stream of water, entering at T, and escaping below at *t*. The air finally emerges at E. If cold water, drawn from a well or cistern, or admitted from a running brook, be supplied at T, the air, by passing through it, becomes thoroughly cooled; and if hot water be used, the reverse is the case. At the same time the blast is deprived of any atmospheric germs or dust which may be in it, and is delivered purified. Or it may be impregnated with antiseptic or perfumed material, by suitably mingling such with the water. The apparatus is the invention of MM. Nézereaux and Garlandat, and would seem practicable for use in many localities.



NEZEREAUX AND GARLANDAT'S AIR REFRIGERATOR.

The Emperor Bell.

The third largest bell in use in the world was recently placed in the southern tower of the cathedral in Cologne, Germany. Three castings were made, of metal obtained by melting French cannon captured during the Franco-Prussian war. Two were unsuccessful, but the third was perfect. The twenty guns used weighed 50,000 German pounds, and to these was added 80,000 lbs. of tin. The time of melting was but ten hours, and twenty-nine minutes sufficed to fill the mold. The cooling continued for four weeks. The bell is 10 feet 8 inches high, and 11 feet 2 inches in diameter. Its total weight is over 25 tuns. Of the larger bells in existence, two, those of Moscow, weighing respectively 193 and 63 tuns, are broken. Pekin has one bell weighing 53 tuns, and Novgorod, Russia, one of 31 tuns—both of which are in use.

WOODWORKING MACHINERY IN ENGLAND.

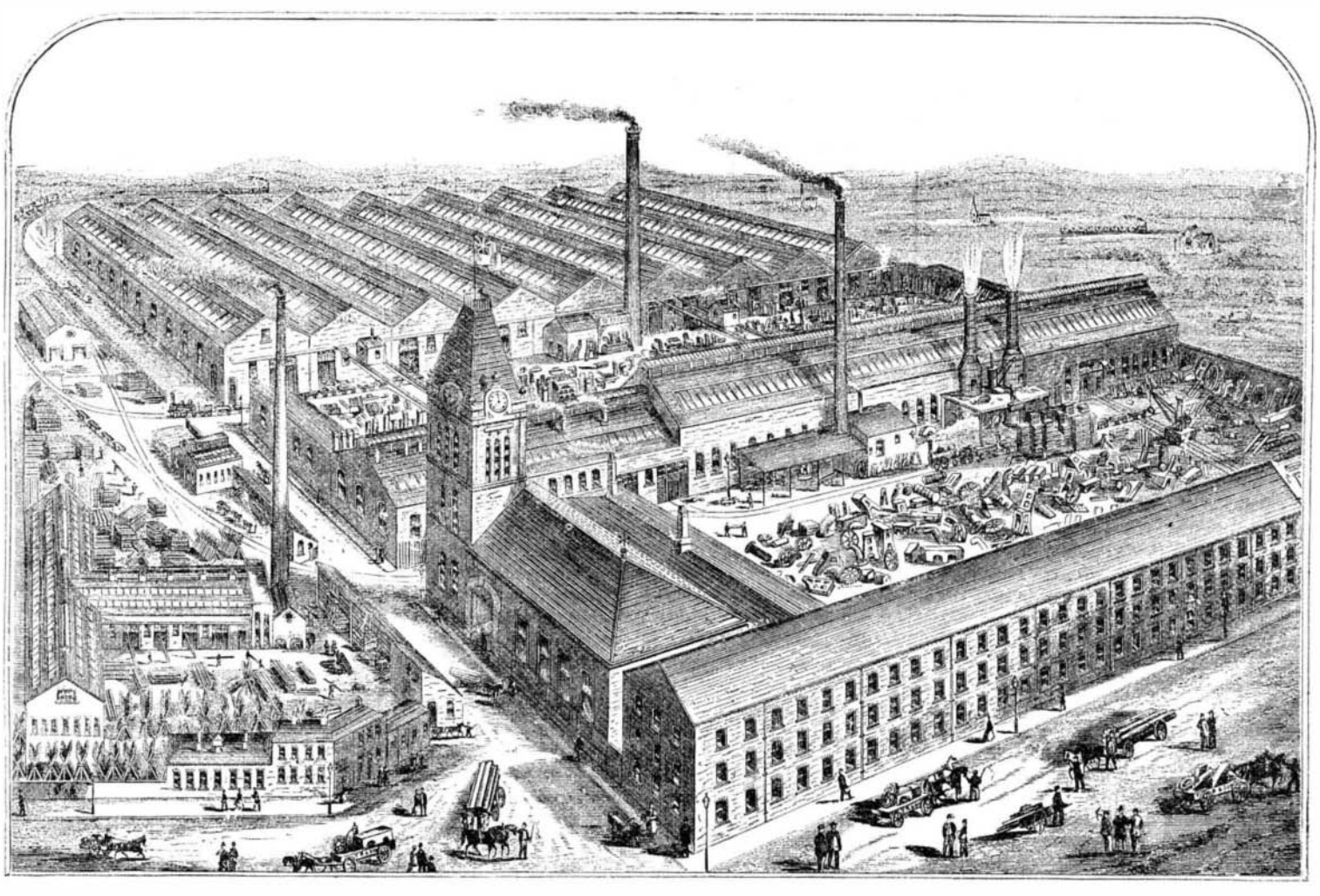
Our engraving gives an excellent birdseye view of a very extensive woodworking machinery establishment in England. It is owned by Messrs. Thomas Robinson & Son, and the *Timber Trades Journal* states that it is the largest factory in the world of its kind, machines for special woodworking operations, such as shipbuilding, cooperage, wagon building, door and window sash making, being constructed in large numbers, and railway and car-building companies being applied with complete sets of plant. The works cover an area of about seven acres, and give employment at present to 1,200 men.

The general arrangement may be seen from the engraving. The fitting shop is built in sheds, on one flat, except 178 feet of the end, which is built with a gallery round, and left open up the middle for a traveling crane. It has a total length of 537 feet, and a width of 103 feet. It is fitted up with all kinds of tools by the best known makers. There may be seen in different stages of progress all kinds of machinery for the conversion of timber to its various uses. Particularly to be noticed in course of erection are some very fine machines for railway wagon building for the Midland and the Lancashire and Yorkshire Railway Companies, and for the Japanese Government. All these machines, many of which are completed, exhibit strength combined with elegance. The galleried end of the fitting shop is devoted to the erection of steam engines, to the designing and construction of which this firm has paid especial attention, so as to make them suitable for the driving of sawing machines. The gallery round this shop is used for the fitting of small machines, principally saw benches and light engines.

Passing out of the fitting shop at the end, we come into the boiler shop, where boilers of all kinds are constructed, a specialty being made of those intended for sawmills, where it is desirable to burn up the waste from the machines. This shop is fitted up with a steam riveting machine, and all the most modern tools used in boiler making. The smithy runs parallel with the fitting shop, and is separated from it by a yard in which are stored the castings as they come out of the foundery. An overhead steam traveling crane runs the whole length of the yard, as far as the boiler shop, and is found very convenient both for economizing space and for loading purposes The smithy is fitted up with steam hammers, forging, punching, and shearing machines, and all the most modern appliances. It is of proportionate extent with the fitting shops, being 298 feet long by 49 feet wide. Parallel with the smithy, a railroad and offices and stores intervening, stands the pattern shop and foundery.

The pattern shop is a large three-storied building, 183 feet long by 48 feet wide, the ground floor being occupied by pattern makers, and the upper rooms for storing patterns. Messrs. Robinson & Son turn out some very heavy castings, and their foundery is one of the special objects of interest. It is one of the largest in Lancashire, having a length of 316 feet by 94 feet wide, and is divided up the center by a row of massive cast iron pillars, on each side of which are two overhead steam traveling cranes, which traverse the whole length of the building, thereby effecting very great economy of labor. Outside the building are stoves for drying cores, sand-mixing sheds, grinding mills, and three cupolas for melting the metal. Another important branch of this establishment is the forge. Messrs. Robinson perform themselves all the various operations of converting the metal to a suitable state for the fitting shops. All shafts for log frames and engines, and other heavy forgings, are made here from the scrap produced in the other departments. The scrap is heated in two furnaces, the escaping gases from which pass at a high temperature through the flue of a vertical boiler, and are sufficient to generate steam for the supply of two large steam hammers, one of three tuns and one of one tun, underneath which the metal is worked. This not only prevents any waste of material, but insures to the firm a material for the principal working parts of their machines of exceptional strength and quality.

Separated by the street from the buildings just described, as shown on the left of our illustration, Messrs. Robinson and Son have a large woodworking establishment, where they have for many years carried on an extensive business in sawing up logs of timber, and working the same into various forms suitable for building purposes, such as doors, windows, and moldings of every variety. This, by giving practical experience of the requirements of the work, and of the actual working of the machinery for it, has doubtless conduced to the attainment of the simplicity and efficiency for which their woodworking machinery is especially renowned.



ROBINSON & SONS' WOOD-CUTTING MACHINE WORKS, ROCHDALE, ENGLAND.

Preserving Fodder and Leaves.

A correspondent of the *American Farmer* says that, when roots or potatoes are either frozen or in any way so damaged that they cannot keep good a long while, or when these products in the spring begin to grow or sprout, the only way to save them without loss is to preserve them in trenches. These trenches ought to be about eight feet broad, at least five feet deep, and of any length. The sides ought to be perpendicular, so that the mass may settle equally. To keep the food clean and to save all the juice, it is preferable to build these trenches of bricks laid in cement. The roots are cut, packed, and stamped as closely as possible; and should there be a great surplus of juice, chopped straw may be mixed with it, to enlarge the bulk. Salt is not at all necessary to preserve this fodder, but it may be used about in the proportion of a quarter of a pound of salt to one hundred pounds of leaves or turnips. Above the filled trench the fodder is to be heaped up like a roof, so that the rain water may run off easily. After this the heap is covered with tree leaves and with soil A straw cover would be too porous, likewise a stiff soil is better than sand. The earth ought to be rammed so that a closed cover of about two feet and a half in thickness is formed; and should the soil begin to burst or to break, stamping ought to be repeated. The principal matter of importance is to keep off the atmospheric air, else the mass proceeds to molder and to putrefy. Leaves and chopped roots treated in this way will keep good many years.

The Old Grievance of Car Ventilation.

The vexed question of car ventilation, says the *National Car Builder*, has again come to the front, and is vigorously handled in the local columns of our city journals. The writers on the subject are doubtless commuters, who travel on the crowded night and morning trains that run to various points in the neighborhood of the city. A more severe test of their endurance can hardly be devised, and it is quite natural that the grumblers, in what they have to say, should speak feelingly. Fancy a car on a moist December evening, packed to its full capacity — doors and top ventilators closed, windows doubly closed with weatherstrips, and two stoves in full blast; then imagine a conglomerate odor, increasing in power every moment, made up of musk, baked peanuts, cigar stumps, kerosene, old boots, fried onions, and tanglefoot whisky—and the peculiar inwardness of the situation is partially realized. And yet, strange to say, the smallest current of outside air, let into this seething pit of foulness, is pretty sure to give offence to some one, and he too seeks an outlet for his indignation in the newspapers. This shows that the proper ventilation of cars is an impossibility so long as it is subject to the control of passengers.