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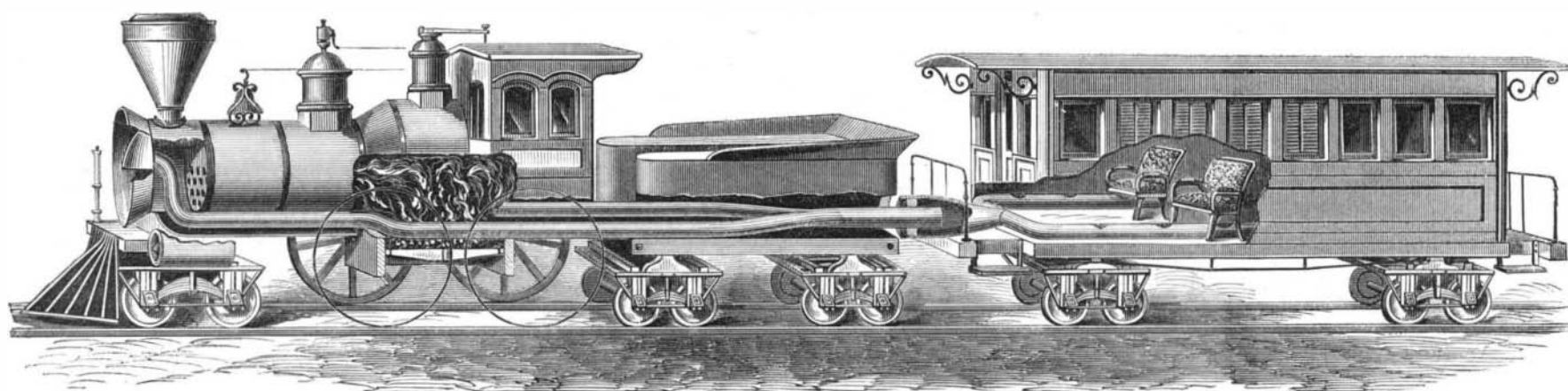
Novel Device for Heating and Ventilating Railroad Cars.

The object of the device seen in the accompanying engraving is to utilize the heat of the boiler and fire box of a railroad locomotive to warm a train of cars in cold weather, and to ventilate the cars with pure air free from dust or cinders in summer. The arrangement is quite simple. The front of the locomotive is provided with a funnel-shaped mouth, from which a pipe leads down under the boiler, and in close contact therewith. At the forward end of the fire box it divides into two branches; one passing along each side and through

a pulley (which is highest in the middle), is a great annoyance. With this expanding arbor, however, the pulley may be placed at any point on the mandrel and held evenly and firmly.

But in squaring up nuts its advantages are still more apparent. In addition to those already mentioned, the nut may be placed, as seen in the engravings, so that the face shall project beyond the end of the arbor, and neither the arbor itself nor the point of the tool be injured, while the cut will reach to the bottom of the thread. Beside this, the face of the nut will be always at right angles, or square with the thread, a result not always practicable with the ordinary

customed to see on the fishmongers' slabs and in the windows of the Wenham Lake Ice Company are all procured from Norway. A few years since this company procured their supply from Wenham Lake, near Boston, but the expense of freight rendered it so costly that they were obliged to seek for sources nearer home. In the hills situated a few miles from Drobak in Christiania Fjord there is a very pure lake fed entirely by springs belonging to this company, and from this source all the pure table ice is now supplied. There is a notion that water while in the act of congelation is purged from all foreign matter. This is only partially true. All its mineral



FRANCIS' CAR HEATING AND VENTILATING APPARATUS.

the tender, at the rear of which they again unite. Each car is furnished with similar pipes passing along under the seats, and fitted with registers that may be opened and closed at will. The union between the pipes of the different cars is plainly seen in the engraving, a bell mouth containing a packing for the end of the pipe, but sufficiently yielding to allow of lateral motion in rounding curves, etc. The front end of the pipe has a hood inside the funnel mouth, to prevent rain or snow from entering.

It is evident that if the pipes were left exposed to the atmosphere, but little heat could be realized; but to overcome this difficulty the inventor, for winter service, proposes to put a heavy non-conducting jacket entirely around the boiler and fire box, or sufficient to inclose the larger portion of the heating surface and the pipes. The other exposed portions of the pipe are also similarly protected. In the summer the jacketing of the locomotive is removed, and the pipe exposed to the external air.

Patented April 28, 1868, by Dr. Samuel W. Francis, who may be addressed at P. O. Box 240, Newport, R. I. The entire right is for sale.

Improvement in Mandrels for Turning.

The mandrel, one form of which is shown in the engravings, we have lately seen in use in one of the best machine shops in Connecticut, and was struck with its simplicity, ease of operation and evident handiness. It may be threaded to receive a nut for facing up and chamfering, or left plain to receive a gear, pulley, coupling, or anything that requires turning and facing.

Fig. 1 is a perspective view of the mandrel with a nut screwed on ready for facing, and Fig. 2 is a longitudinal section. The arbor, B, is bored through from end to end, the hole, for a portion of the length, being slightly tapering, as seen plainly in the section. From the open end of the taper the mandrel is sawed lengthwise into three equal parts, the slots extending back a distance adapted to the work to be done. A plug, A, fits the hole in the mandrel, and when driven in, it slightly expands the mandrel, holding whatever is seated on it very firmly, the expansion being equable, as the taper of the plug and of the conical hole exactly coincide. A slight tap on the other end of the plug releases the bearing by allowing the parts of the mandrel to resume their former position, a small nut, C, on the end preventing the plug from falling out and getting bruised or lost.

The ordinary smooth mandrel used for turning pulleys, etc., upon, must be turned slightly tapering, while the hole it is intended to fit should be perfectly straight. The mandrel must be driven through until its surface engages sufficiently to hold the object to be turned by its friction on the interior surface of the hole. A slight enlargement of the hole will change the position of the article on the arbor or mandrel, which, especially in turning a taper, as in facing

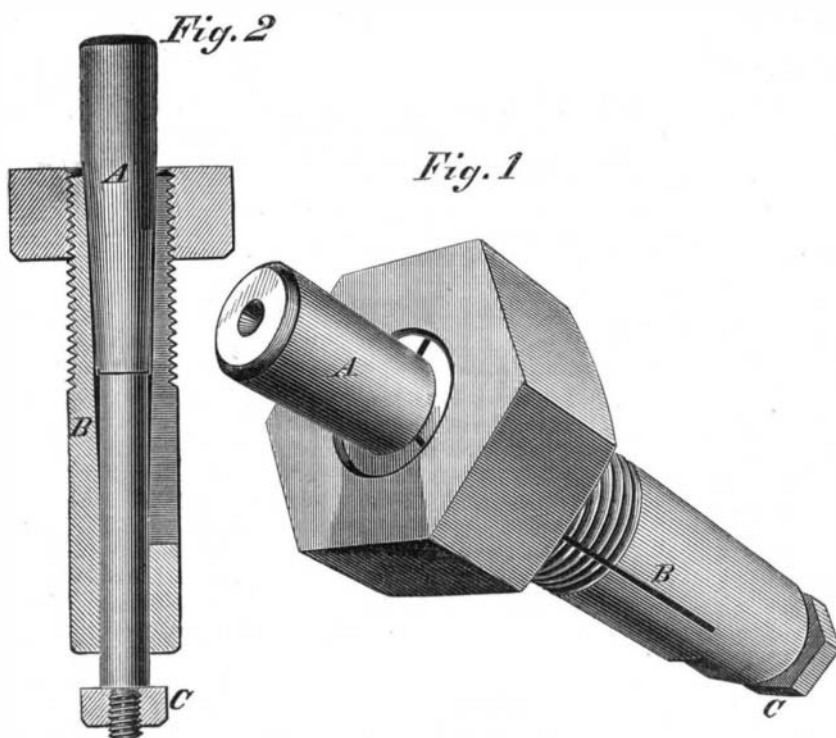
method of squaring up nuts. Patented August 4, 1868. The mandrels are made of all sizes to the standard gages by the inventor and manufacturer, A. F. Nagle, who may be addressed Box 347, Providence, R. I.

THE ICE TRADE.

During the late tropical weather, ice represented a real power in the community, just as in winter coal is an absolute necessity. No doubt if a few hot summers were to succeed each other we should speedily find as bountiful supplies of ice as we now do of fuel. The polar circle would be our mines, or we should lie in wait for the magnificent procession of icebergs which, according to Captain Scoresby, issue from their breeding places in Davis's Straits, and proceed southward until they touch the warm waters of the Gulf Stream, where they are a constant source of danger to passing vessels. A story is told of an American skipper who sailed upon an expedition in search of one of these bergs, grappled it, and promised himself a splendid reward. In tugging the glittering mass into harbor, however, he forgot that its submerged portion was eight times the depth of that which rose above the water line; consequently he never could get his convoy into any port, and was obliged to abandon it.

salts and any coloring matter it may contain are removed from it, but no organic matter is eliminated in the process. For this reason the clearness of the ice is no test of its purity; many a glittering lump when it dissolves absolutely smells. We state this by way of caution to those who think that the eye is the most perfect test of the purity of this grateful addition to the table. The Wenham Lake Ice Company, when they had satisfied themselves that the piece of water from which they secure their supplies was free from any impurity, not only purchased the lake but the farms surrounding it, in order to keep it in their own hands and secure it from any deleterious local drainage; and it is from this crystal cup that their translucent crops are gathered year by year. The process of reaping the ice crop is the same in Norway as in America. By the aid of a sharp ice plow the surface is ruled with parallel lines 21 inches apart; when the whole surface is marked in one direction the plow is set to work at right angles. In this manner the whole surface is divided like a chess board into squares 22 inches square and about a foot in depth; the ice saw divides these parallel lines, and, by the aid of the spade, a sharp wedge like implement, the squares are split apart with the utmost rapidity. In America, where the weather is at times changeable, the greatest anxiety is felt while the process of reaping is being carried

on, lest a thaw should come on and spoil the harvest. It is gathered in as fast as possible into the ice houses, which are, in fact, enormous refrigerators, built of pine wood, with double walls two feet apart, the intervening spaces being filled in with sawdust, which is one of the cheapest and most readily procurable non-conductors. In Norway, where the cold weather is not so liable to be broken up as in America, the harvest is gathered more at leisure; it is secured in the same manner, however, and the ice stores are on a very large scale, sufficient to afford a supply for two or sometimes three years. It seems absurd to talk of ice two years old; to keep the hand of Time from such a perishable article seems an absurdity, but as a fact, much of the table ice now supplied to us was reaped in the latter end of the year 1866. There is scarcely a fjord in Norway in which some trading vessel is not frozen in during the winter months, during which they ship a cargo and run over to England with the first favorable wind. The voyage with a fair wind is not more than four days, hence this island imports nearly the whole of the crop. Thus, in 1865, out of 44,823 tons exported, this island received 43,359 tons. The block ice is filled in with rough ice, and during its transport to the ice stores loses ten per cent. These blocks of ice are treated just like blocks of stone; the tools they are lifted with are similar. Considering



NAGLE'S PATENT EXPANDING MANDREL.

The trade in ice is of two kinds—the rough or local ice, which the coster gathers from the ponds and the artificial pieces of water, and the foreign ice, which is used principally for table purposes. The glittering cubes of pure crystal we are ac-

the quantities that are dealt with, a certain rough handling is unavoidable. When hoisted out of the ship's side they are placed in barges, and conveyed up to the storehouses, protected from the sun only by a tarpauling, and that a black