SLOTTING MACHINE.

The accompanying illustration represents a very powerful slotting machine recently designed and constructed by W. Collier & Co., of Salford, England. This machine is intended for the heaviest class of engine and rolling mill work, and great care has been taken in its design and construction to insure uniformity of strength in all the details, so that the heaviest cuts may be taken without either danger of breaking or springing in the machine. It will be seen from the engraving that the machine is of the ordinary type, with a lever quick-return motion, so arranged that not only is the ram raised more quickly when it ascends, but in the cutting or descending stroke about two to one in power is gained by the lever. The machine takes in articles 13 feet 6 inches in diameter, and has an adjustable stroke up to 4 feet. The circular table is 8 feet diameter, and has worm teeth cut from the solid metal in its periphery, for self-acting circular motion. The traverse of the tables is 8 feet longitudinally and 8 feet transversely, and of course self-acting variable feed motions are employed in the longitudinal, transverse, and circular movements, while a quick hand motion is also fitted to each.

The foot of the machine which carries the tables is made extra long, so that the tables may be wound to the front, and a heavy casting or forging be placed upon them by means of a traveling crane, and then be wound or slid back underneath the cutting tool. The advantage of this is obvious, for it enables the machine to be loaded and unloaded without the crane having to pass over the machine itself, which stands 23 feet high. The slide in which the cutting ram works can be raised and lowered by a screw, so as to form a bearing to the cutting ram, close down to its work. The position of the cutting ram in this slide can be altered by a man standing on the table of the machine; this is done by placing a small worm wheel in the bottom end of the screw in the ram, and by means of a small cross shaft, with a worm gearing into this worm wheel, and a square in the end of the shaft, a man standing on the table can, with a screw key, raise and lower the ram without having to use a ladder to get to the top of the ram in the usual manner. An enlarged detail arrangement of the main wheel, lever, and connecting rod is shown separately.

The foot or front portion, on which the table slides, is placed on the top for the convenience of the workman standing on it, and the table beds in three places upon it, one in the center directly under the cut and one on each side. To provide for slotting awkward pieces, a round hole, 3 feet 6 inches diameter, is cast in the foot of the machine to permit an object to pass through, if necessary. Great care has been taken to secure wide bearing surfaces to all the working parts, and all V slides are made to bed on the top and angle, as well as the bottom surface. The machine is very powerfully geared, and driven by belts 7 inches wide. The frame is cast in two pieces, to enable it to be carried on the railway, the joint being as indicated on our engraving. The total weight of the machine will be 65 tons. The heaviest casting is about 24 tons. It will be seen from the foregoing particulars, which we obtain from the *Engineer*, that this is one of the heaviest slotting machines ever made.

SEA WATER AS A BEVERAGE.

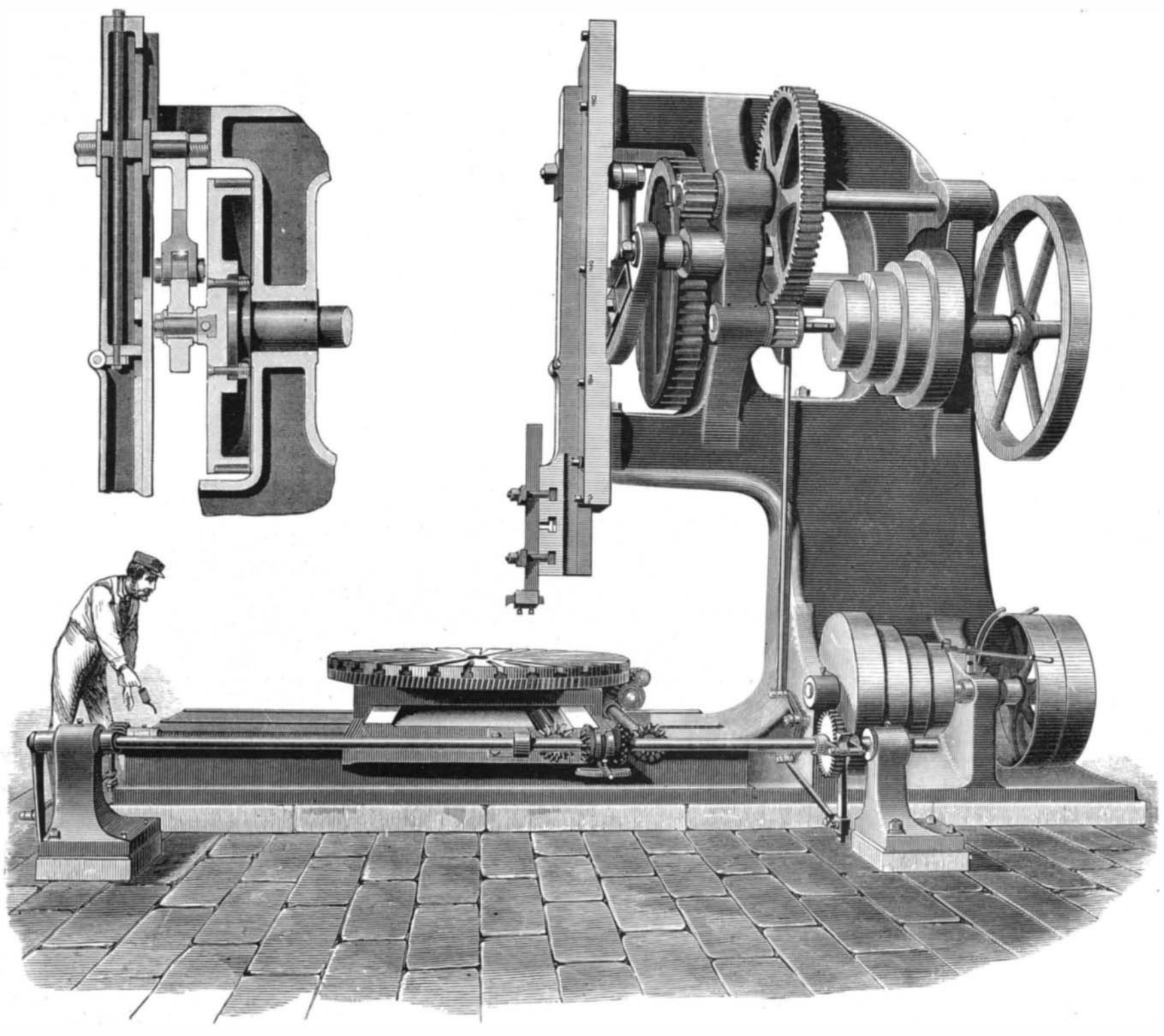
The distressing effect of sea water when swallowed in quantity is known to every one; the maddening effect of a continued use of it as a beverage by castaways at sea is familiar to all readers of shipwreck narratives. Perhaps no more terrible experience ever falls to the lot of humanity than to be afloat on the ocean, with

"Water, water everywhere,
And not a drop to drink."

Yet it is an experience which every one is liable to who goes to sea. To seafaring people it is a constant menace; yet it is not impossible to accustom the stomach to the use of sea water habitually and without discomfort. The capacity of the human organization to adapt itself to new conditions, even to the extent of becoming indifferent to violent poisons such as arsenic, has been abundantly proved; and accordingly there seems nothing incredible in the report that the inhabitants of Easter Island and isolated coral islands such as the Paumotou Islands, where rains are infrequent and springs unknown, are accustomed to use sea water habitually as a beverage. It is scarcely more nauseous than many saline spring waters that people learn to relish; and once the system has become used to the reception of it no unpleasant or disturbing results will follow its habitual or occasional use. In many parts of the world the natives drink freely of brackish waters which strangers cannot tolerate; and we have been told of sailors who have trained their stomachs to receive sea water as kindly as fresh water. In view of the constant risk which seafaring people run of being caught with a short supply of ordinary potable water it would seem to be a wise precaution on the part of all such to master the situation in advance. By gradually increasing the proportion of sea water in their daily drink, they might learn to use sea water not only with impunity but with life-saving effect in emergencies, and that without any serious preliminary discomfort.

[A contributor sends us the above, based apparently on authenticated fact, but it seems to us rather doubtful. In every quart of sea water there is over an ounce of solid salts, the principal of which is chloride of sodium. From half an ounce to an ounce of this acts as an emetic and purgative, and on the other hand, a quart of water per day is about as little as will comfortably support life. It is difficult to see how any one can become habituated to living on a strong emetic, which must be taken in large doses at the very beginning and not in minute quantities as in the case of arsenic. As for sailors habituating themselves to sea water drinking there is little need of their so doing. A shallow pan filled with salt water, covered with an inclined plane of glass and exposed to the sun, is a very simple way which is almost always available for converting salt water into fresh. The solar heat causes evaporation, and the vapor condensing on the glass is caught in a receptacle.—EDS.]

THE iron product of the Lake Superior district during 1877 amounted to 1,020,859 tons, valued at nearly $4,000,000. It is thought that, considering the depressed state of the iron market, this showing is a good one, the output being larger than was expected, although but few mines were worked at a profit.



SLOTTING MACHINE FOR HEAVY WORK.