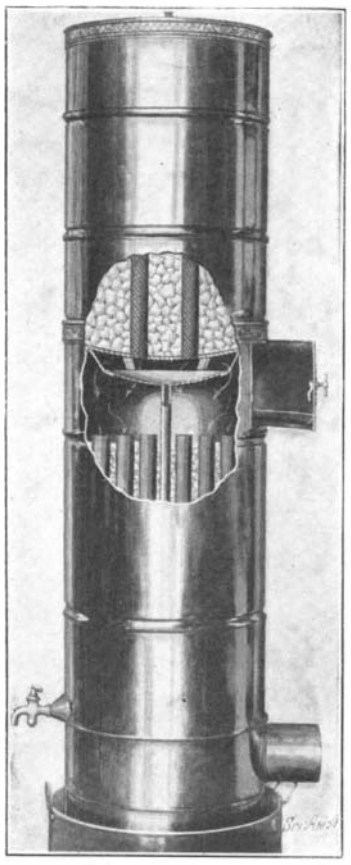
AIR-COOLING APPARATUS.

Prof. Willis L. Moore, Chief of the United States Weather Bureau, Washington, D. C., has invented an apparatus which is designed to moderate the extremes of summer heat just as a stove moderates the extremes of winter cold. This novel cooling stove, however, operates on principles which are the reverse of those of the heating stove. The fuel used is broken ice which is so disposed and mixed with salt as to create a draft through the apparatus in a downward instead of an upward direction. Referring to our engraving, it will be observed that the parts are inclosed in a cylinder of heat-conducting material. The interior is divided into two chambers by a diaphragm having openings at intervals along its edge. Cracked ice is placed in this upper chamber and woven-wire tubes conduct air through this ice and the diaphragm into the lower chamber. This is quite an important feature of the invention, for broken or granulated ice when melting has a tendency to cake into a solid mass, which eliminates interstitial spaces and precludes the proper diffusion of air through the mass and also retards and eventually wholly obstructs its flow. The woven-wire tubes always insure a passageway, and becoming imbedded in the ice serve to hold it up against gravitating into a cake at the bottom and allow lateral diffusion of air through the tubes into the interstices of the ice. The lower chamber of the apparatus is also filled with ice which, however, is more finely broken and is mixed with salt, which lowers its melting point greatly. The air circulation is completed to the bottom of the apparatus by a number of thin metal pipes projecting above the ice level. In order to prevent ice-water in the upper chamber from running along the bottom of the diaphragm and dripping into these pipes, a drip-pan is placed above them which catches this water and directs it to the waste pipe. Cold air is heavier than hot air, so that the natural tendency of the air at the top of the apparatus would be to fall down through the tubes, thus establishing a current which is further strengthened by making the lower chamber colder than the upper one. At the bottom of the device the cold air passes out into the room through the large tube shown at the right in our engraving. The cooling apparatus is provided with a trough at the bottom which is adapted to catch any water condensed from the atmosphere on coming in contact with the cold walls of the cylinder, from which it will be observed that the apparatus dries the air in the room. Furthermore, it purifies the air by absorbing in the ice and brine any particles of dirt or dust carried thereby.

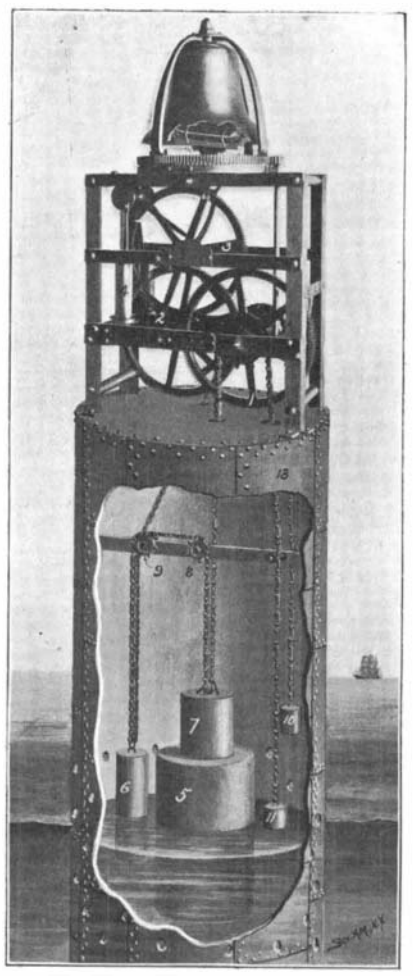


AIR-COOLING APPARATUS.

Big Ben, the celebrated clock of London, which regulates the time of a large portion of the British Empire, is having the dials on each of its four sides illuminated with 60-candle power Nernst lamps. The clock was formerly lighted by 24 gas jets on each dial, and on each night a man had to climb up and light these 96 jets. Two men spend three afternoons of each week winding it.

A BELL-BUOY OPERATED BY TIDE MOTOR.

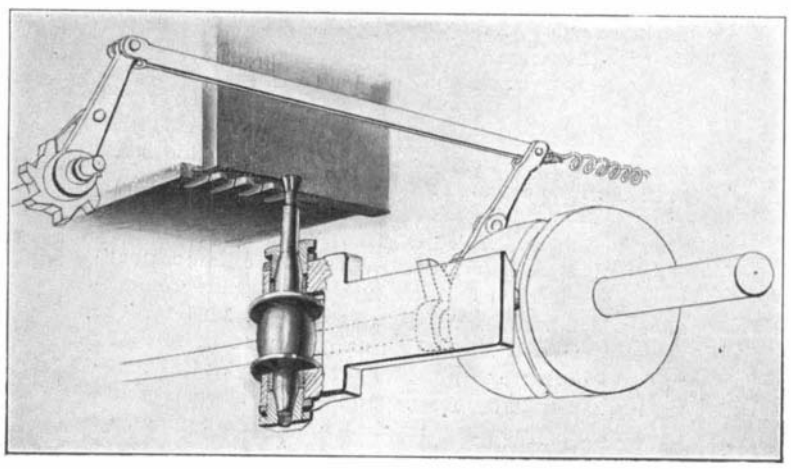
Ordinarily, bell-buoys are rung by the motion of the waves, which causes a steel ball to roll about on a plate under the mouth of the bell, and strike against its inner surface. With a view to making the action of the rolling ball positive, regular, and of a constant power, the Tidal Motor Power Company, of Seattle, provides a motor mechanism actuated by the rise and fall of the tide. The mechanism will be readily understood by reference to our illustration, in which the cylinder 13 is broken away to show the arrangement of the float and the weights. Connected to the gear wheel 1, by ratchet devices are two sprocket wheels. The chain connecting the weight 7 and weight 11 passes over one of these sprocket wheels, and over the other runs a chain connecting weight 6 and weight 10. The float 5 is connected to the weight 6 by a chain passing up through weight 7 and over the idlers 8 and 9. In our illustration, it is assumed that the tide is rising, and so the float is lifting weight 7, while weight 11 takes up the slack. The slack in the chain connecting the float with weight 6 permits the latter to drop slowly, rotating the gear wheel 1. The weight is so balanced as to move downward more slowly than the float moves upward, so that it will continue to operate the gear wheel at a constant rate while the tide is turning, and until the float begins to fall. Thereupon weight 7 continues the operation, while the float 5 falls and lifts weight 6, the slack being taken up by weight 10. The train of gearing 1, 2, 3, serves to greatly increase the speed of rotation imparted by the weights, and communicates the motion to a pair of plungers, working in the cylinder 4, and also to the cradle which carries the steel ball. The plungers govern the rocking of the cradle, so that the ball strikes the bell with a uniform stroke. The vertical rod shown at the right, in our illustration, is driven by bevel gearing on the driving shaft, and serves to slowly rotate the bell so as to prevent it from breaking under the constant hammering of the steel ball.



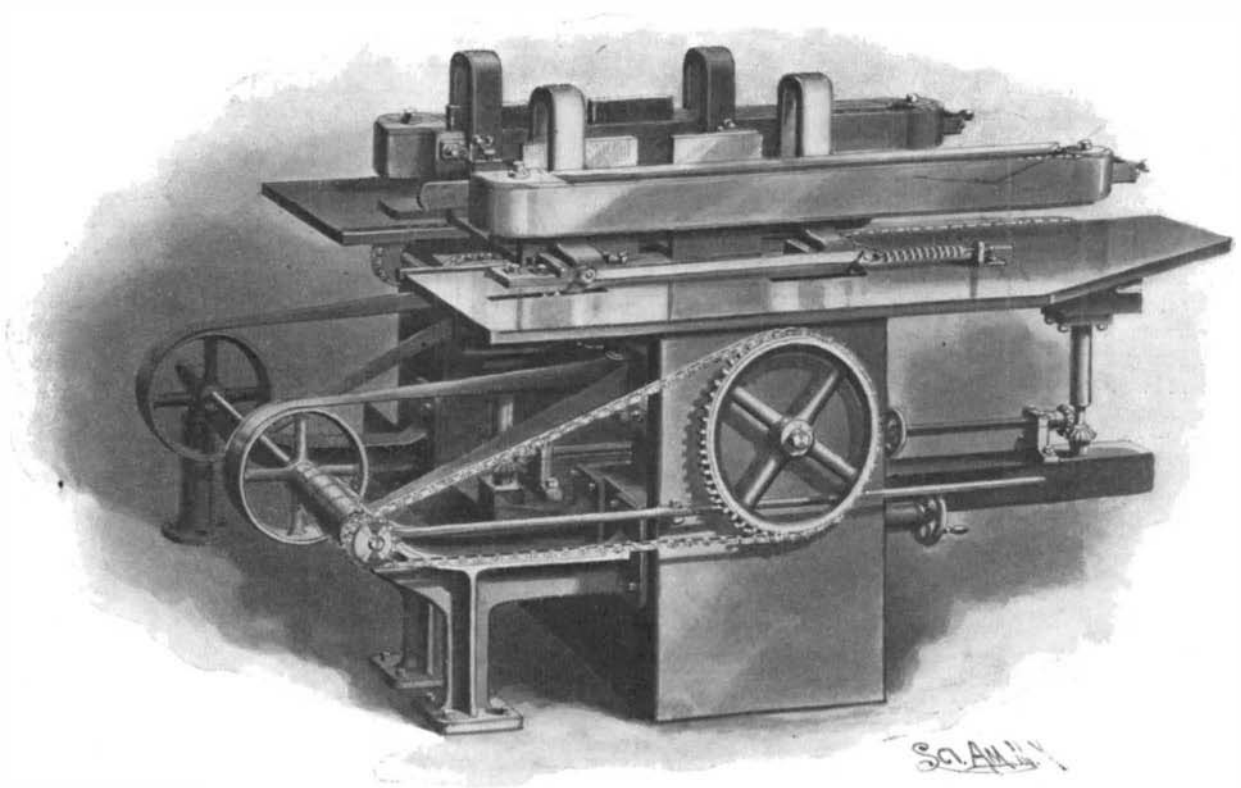
BELL-BUOY OPERATED BY THE TIDE.

DOVETAILING MACHINE.

An improved automatic dovetailing machine has recently been invented by Mr. J. T. T. Grim, of Cumberland, Md. The machine is self-feeding, it only being necessary for the operator to place the stock on the bed, so that the conveying chains may engage the same, and when power is applied the material will be moved properly relative to a rapidly-revolving cutter, and the mortises and tenons cut as desired without further attention on the part of the operator. The machine comprises two sets of mechanisms designed to operate on opposite ends of a bureau drawer or like piece of work. One set is mounted on a carriage which may be moved toward or away from the fixed mechanism to suit different sizes of work. The work is clamped, as shown in the general view, with the pieces in which the grooves are to be cut laid horizontal, while the others, on which the tenons are to be formed, are held in a vertical position. Two conveyor-chains are provided for each piece, and lugs bolted therein at proper locations serve to engage the pieces and feed them forward intermittently. The cutters, of suitable shape, are mounted in spindles which are rapidly rotated by belt connection with pulleys on the countershaft shown at the left of our engraving. The cutter spindles have bearings in brackets mounted to slide in guideways, to give the proper inward and outward movement of the cutters in forming the grooves and tenons. This movement is accomplished by means of a roller on each bracket, which is guided by an eccentrically-arranged cam-groove, as shown in our detail view. The cams are mounted on a shaft driven by sprocket and chain gearing from the counter-shaft. By means of a clutch connection on the counter-shaft, the rotation of the cam-shaft may be started or stopped at will. An intermittent or step-by-step motion is imparted by the cam-shaft to the conveyor-chains through the medium of a ratchet device, which is also shown in our detail view. It will be observed that a ratchet wheel is mounted on the conveyor-shaft, and is engaged by a pawl carried on a link,



CAM-ACTION OF THE DOVETAILING MACHINE.



IMPROVED DOVETAILING MACHINE.