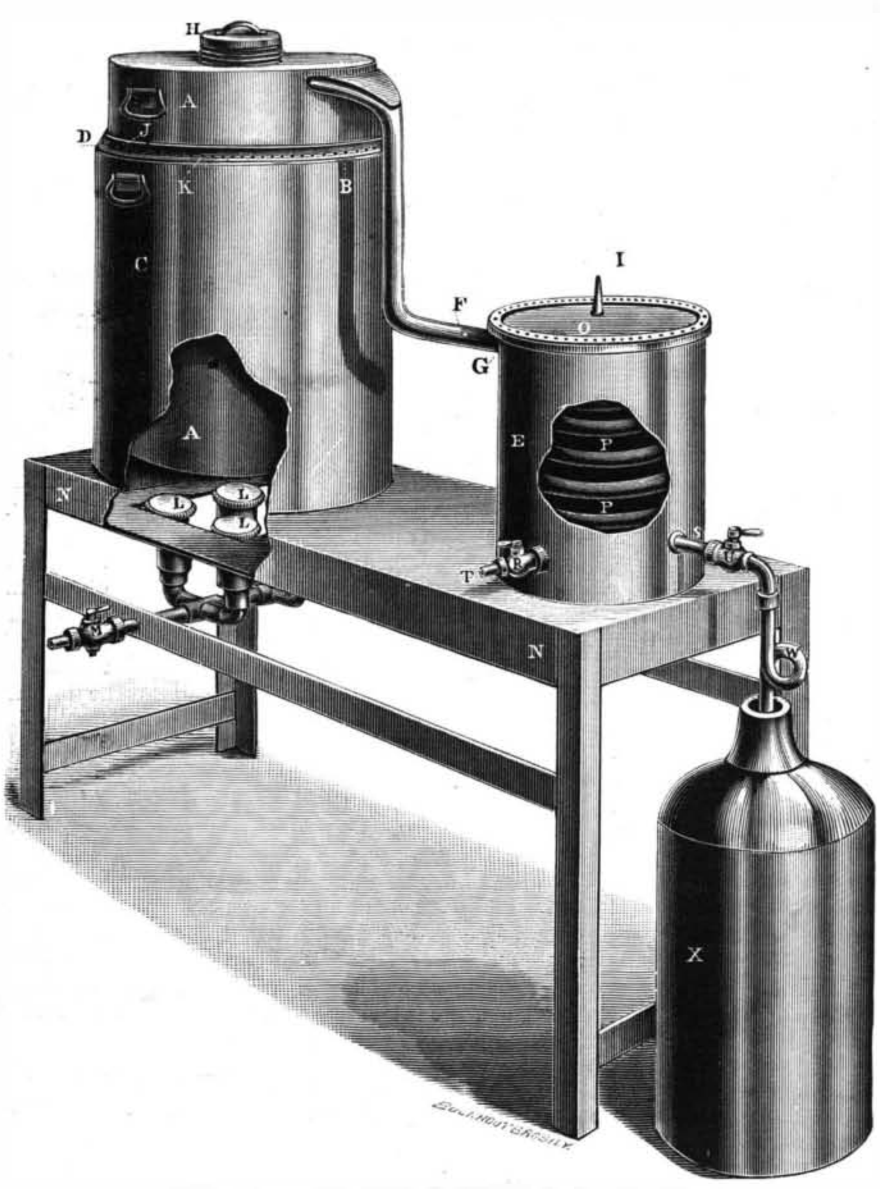
A DISTILLING APPARATUS FOR FAMILIES.

The illustration shows a very simple, comparatively inexpensive, and most efficient form of distilling apparatus, well adapted for use by private families, and in schools, hotels, restaurants, and other places where it is usual to have drinking water always at hand, and where absolutely pure water is a prime necessity. The simple boiling of water, as practiced in many families, or filtering it in even the most perfect way, is by no means certain to destroy all the disease germs, and those which are most dangerous to health may escape separation or destruction by these processes. By distillation, however, absolutely pure water is obtained, and the apparatus shown is of so simple a character that any person capable of boiling an ordinary tea kettle can operate it to distill from two to four gallons per hour. The boiler, A, is of copper, lined with tin. C is a galvanized case or jacket for supporting the boiler over the gas burner, and is detachable at D B, and it is also intended to act as a flue to utilize the heat from the gas burner on the sides of the copper boiler, so as to use all the heat the gas produces on the boiler before it passes out through the perforated ring, J. H is a screw cover, removable for filling or cleaning. F is the connecting pipe from the boiler to the copper condensing coil in condenser tank. G is a union for connecting the boiler and condenser. P is the condensing coil. E is the tank that holds the condensed water and has an inlet for cold water by a slip rubber or other tube at T. I is the outlet for the warm water to escape from the condensing tank by a rubber or other tube. L are the burners, and N is the iron frame that supports the gas burners and also the apparatus. S is the outlet for the condensed water, and X is a glass or other vessel to receive the condensed water ready for use. K are the vent holes, in the ring that rests on the jacket, that allows the exhausted gases to pass off. R is a faucet for drawing off the water from the condensing tank when not required for use. O is a removable cover for cleaning out the condensing tank. M is a gas cock used to regulate the supply of gas to the burners. There is no pressure on any part of the apparatus, as the vapor is condensed as fast as it is made, and the condensed vapor or water passes into the receiver. With all water used for cooking and drinking purposes supplied in this way it is an impossibility that it should contain any disease germs.

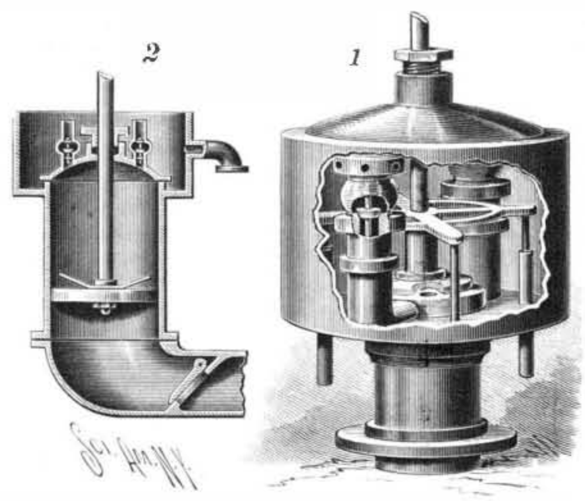


JAMES CURRAN'S WATER DISTILLING APPARATUS.

This apparatus is manufactured by the Jas. Curran Manufacturing Co., manufacturers of steam heating apparatus, New York City, and is on exhibition at No. 397 Fifth Avenue, and at the factory, No. 516 West 36th Street. It has been adopted and is in use by several public institutions, having the indorsement of some of the highest medical authorities.

AN IMPROVED RELIEF VALVE.

This valve is more especially designed for use on air pumps of condensing engines, to insure an easy seating of the inlet and outlet valves, and prevent excessive wear of the valves and the lining in the air pumps. The improvement has been patented by Mr. Andrew L. Harrison, of the United States revenue steamer Colfax, Wilmington, N. C. Fig. 1 is a view



HARRISON'S RELIEF VALVE.

in perspective, partly broken away, showing the improvement applied to the air pump of a propeller engine, and Fig. 2 is a sectional view of its application to the air pump of a condensing engine. At the bottom of the valve casing is an inlet pipe connected with the top of the condenser, the water and air rising in the condenser passing into this inlet according to the action of the plunger of the air pump. The valve seat on the upper end of the inlet has openings closed by a water delivery valve sliding vertically on a hollow stem of the seat, the upward stroke of the valve being limited by a spider. In the bottom of the casing are vertical outlet pipes whose inner ends extend up nearly to the spider, so that the valve always works in the water accumulating in the lower part of the casing, rising only so far as necessary to discharge the water brought up from the condenser by the plunger of the air pump, and seating itself very easily. Into the end of the inlet pipe, where it extends just above the bottom of the casing, open inlets leading to air valves of any approved construction, located within the casing and discharging near its top, the air being discharged from the casing by the vertical outlet pipes through which the water is discharged. As the air enters the inlet on top of the water, it passes out through the side pipes leading to the air valves before the water lifts the central valve from its seat to permit the water to pass into the casing, the valve again closing when the plunger is on its downstroke to prevent the previously lifted water from flowing back, and the water rising in the casing only to the top of the outlet pipes. As shown in Fig. 2, the air outlet valves are arranged directly in the main valve, which is in this case a float top valve, the air being similarly discharged in advance of the water and without unseating the water delivery valve.

Manganese in Colombia.

The principal manganese deposits are found about forty-five miles northeast of Colon, going toward the San Blas point, in the Department of Panama. The ore is found in the shape of bowlders embedded in clay and distributed along the ore belt. These bowlders vary in weight from fractions of a ton tofifty, one hundred, three hundred, and four hundred tons, and sometimes they are associated with jasper.

A company composed of Baltimore capitalists has been organized to develop mines, and a railroad from Viento Frio, on the coast, to the Nispero deposits has already been located and is now in progress of construction. The line is six and a half miles long, with steep grades and sharp curves.

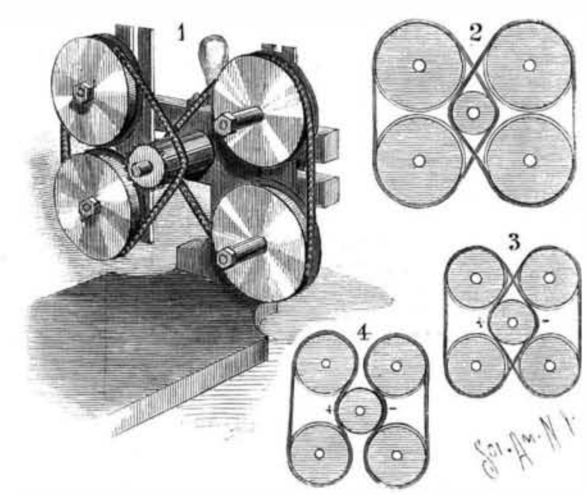
There are many other manganese deposits in that neighborhood, but as they are almost completely underground and with very few surface indications, their commercial value has not yet been ascertained; but strong probabilities seem to indicate that thorough prospecting with a steam drill will reveal some valuable ore bodies.

Carbonic Acid in Air.

A paper on the value of determinations of the proportion of carbonic acid in air as a measure of the efficiency of ventilation has been contributed to the *Journal* of the American Chemical Society by Mr. E. H. Richards, who states that for the past nine years the Laboratory of Sanitary Chemistry at the Massachusetts Institute of Technology has had exceptional opportunities for investigating this subject, because the Walker building is mechanically ventilated under the direction of an expert, and is fully controlled by the engineer, who has records for all these years of the quantity and temperature of the air supplied to each room, and of the temperature of these rooms taken four times every day. During these nine years, some 5,000 determinations of the carbonic acid have been made in these rooms by 200 students. Many problems arising out of these circumstances have been studied and reported upon; but the net gain of knowledge appears to be meager. The outer air surrounding the institute shows an ordinary proportion of from 3·7 to 4·2 parts of carbonic acid in 10,000 parts of air. The air in the empty rooms shows a rise of carbonic acid of about 0·5 part, due to decomposition of the organic matter present in the flues, the floors, and the walls. The air of the building, in general, of the halls, reading rooms, etc., which are open, and in which people are constantly moving about, is maintained at about 5 parts as an average of all tests for eight years. The air of most of the lecture rooms has contained from 6 to 8 parts; rising to 10 or 12 parts for the large and more crowded rooms, according to the state of the weather outside. From this experience, it would appear that students can work well in a clean room with about 7 parts in 10,000 of carbonic acid. Much more than this causes dullness; and anything over 13 parts is an almost insuperable obstacle to the full acquisition of knowledge by the classes.

A CURRENT COLLECTOR FOR DYNAMOS.

This collector takes the current from the commutator cylinder by a rolling contact, thus avoiding the friction and wear due to the use of commutator brushes. The improvement has been patented by Mr. Charles R. Roberts, of Addison, Pa. Fig. 1 represents the collector in position on a dynamo, Fig. 2 being a



ROBERTS' CURRENT COLLECTOR FOR DYNAMOS.

sectional view, showing the relative proportions of the parts, more particularly for high and ordinary speeds, while in Fig. 3 the parts are better proportioned for low speed. In Figs. 3 and 4 different applications of the chains are shown, the current being positive on the left and negative on the right in Fig. 2, while, as in Fig. 3, the terminals of the field magnets must be changed to generate a current. As will be seen, a pair of sheaves is arranged on either side of the commutator cylinder, and chains passing around these sheaves form electrical contact with the sides of the cylinder, the point of contact between the chains and the cylinder being the same as that of the ordinary commutator brushes. By changing the distance between the sheaves and the commutator cylinder, and also by altering the distance between the sheaves themselves, the amount of surface on the commutator cylinder covered by the chains may be readily varied. With this improvement the commutator keeps cool and does not require oiling. It may be applied to most machines now in use, being run equally well either backward or forward, and is very inexpensive.