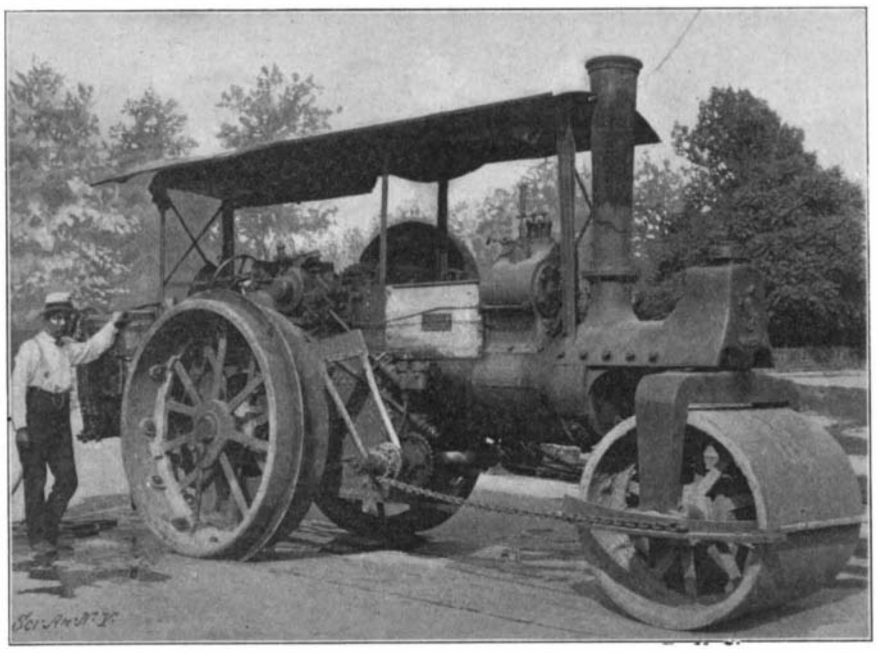
NEW METHOD FOR CUTTING ASPHALT PAVEMENT.

It is an ordinary practice, in repairing asphalt pavements, to cut through the asphalt to be removed by means of wedges or chisels. This requires two men; one to hold the wedge and the other to handle the sledge, so that the operation is slow and consequently expensive. An improvement on this primitive method is shown in the accompanying illustration. It consists in fastening cutters to the rims of the rear rollers of a steam roller. These cutters are made in two sections, so that they may be easily applied. They have an L-shaped cross section, and are secured to the rollers by fastening bolts, which project through the base portions at suitable intervals, and pass through the usual pin openings formed in the rim of a wheel. When the machine is operating, it may be necessary to apply water to the cutter. Therefore a tank is supplied on the machine at each side, and water may be fed slowly onto the cutters through spigots. In operation, when the machine is passing along the pavement, its great weight will force the cutter through the asphalt to the bed of the street. By moving the machine back and forth, the cuts may be made as close together as desired, so that with ordinary tools, blocks of asphalt may be readily broken up.

Mr. Joseph Richards, of 840 Girard Avenue, New York city, who is the inventor of this attachment, informs us that with it he has cut as much as eighteen hundred linear feet in forty minutes when the thermometer was below freezing. Obviously this is a very cheap and simple method of doing what has heretofore been regarded as very slow, tedious, and expensive work.



CUTTING ASPHALT WITH STEAM ROLLER.

THE PRODUCTION OF LOW TEMPERATURES.

It was not very long ago when the experiment of freezing mercury, as performed in physical laboratories, was considered quite remarkable. To-day, however, it is not so looked upon; and the physicists have shown us that by the judicious use of liquefied gases extremely low temperatures in the neighborhood of 200 deg. Centigrade (392 deg. Fahrenheit) below zero can be obtained without very much trouble.

If, however, theoretically, no man of science ignores the fact that such extreme intensity of cold can be produced, many, on the other hand, practically, find it materially impossible to produce them.

Contrary to what one would suppose, nevertheless, it is not extremely difficult to obtain very low temperatures with apparatus easy to procure. As Prof. d'Arsonval demonstrated recently at the Academy of Sciences, with certain judicious precautions, one can easily produce temperatures between —60 deg. C. and —195 deg. C. (—140 deg. F. and —383 deg. F.).

Thus, if some chloride of methyl be placed in a porous receptacle, by its simple and natural evaporation through the sides of the vessel, the temperature will reach 60 deg. C. below zero. With carbonic acid or acetylene, it is easy to obtain temperatures ranging from —112 deg. C. to —115 deg. C. (—233.6 deg. F. to —239 deg. F.) To do this, acetone which has been previously cooled is made to absorb carbonic acid or acetylene snow, either of which may be easily obtained at ordinary temperatures and varying pressures by opening a cylinder containing liquid carbonic acid or acetylene. The cold produced by the sudden evaporation of a part of the liquid mass, lowers the temperature sufficiently to transform the rest of this mass into a snow which, left to itself, then slowly melts. The snow is caught in a napkin, rolled up in the shape of a cone, into which the jet of carbonic acid or acetylene is directed from the cylinder containing the liquefied gas. This snow, especially that derived from acetylene, is very soluble in acetone. At —80 deg. C. (—176 deg. F.) acetone will dissolve more than 2,500 times its volume of acetylene. The snow, in dissolving, will lower the temperature 20 deg. C. further, and, if the acetone has been sufficiently cooled beforehand, this will bring the final temperature down to —115 deg. C.

The method pursued by M. d'Arsonval for obtaining by this process the lowering of the temperature to —115 deg. C. is as simple as it is ingenious. It consists in hastening the evaporation of the carbonic acid or acetylene snow, by a suitably cooled current of air. For this purpose, he makes use of a double coil of tin pipe obtained by inserting in a piece of pipe 10 millimeters in diameter and 10 meters long another pipe of the same length, but only half the diameter, and then rolling the two into a spiral, after which they are packed in a wood box stuffed with wool to prevent exterior radiation.

The upper end of the small pipe is connected to a blower and the lower end is introduced into the bottom of the solution of snow-acetone, while the upper end of the large pipe opens into the air and the lower end passes in through the stopper of the vessel containing the solution. The air that is blown in through the small pipe passes through the volatile liquid and produces very rapid evaporation—evaporation which is accompanied, naturally, by an enormous absorption of heat. As a result of this, the gases that are disengaged are at a very low temperature. But these cold gases must make their exit through the large pipe which incloses the small, thin, tin one through which the air was drawn in. Therefore the entering air is cooled economically by the gases of evaporation before it reaches the mixture of snow-acetone.

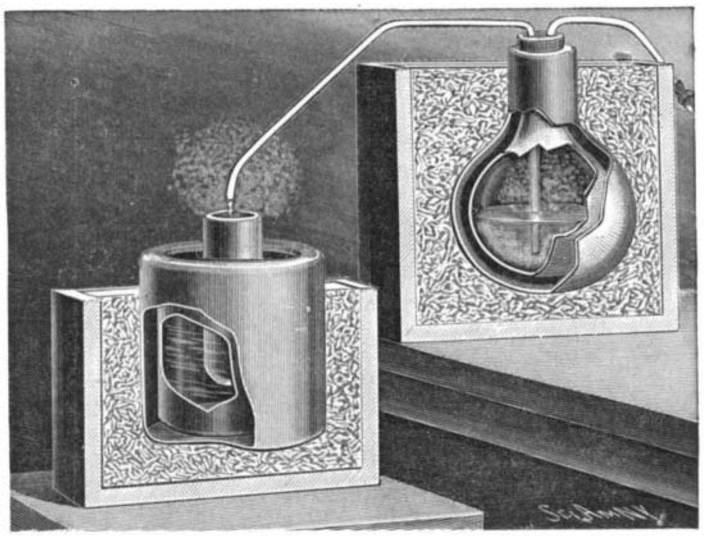


Fig. 2.—ANOTHER METHOD OF FREEZING GASOLINE BY LIQUID AIR.

For temperatures still lower than 115 deg. C. below the melting point of ice, recourse must be had to liquid air, which can now be easily produced by the Linde process. The following is the method pursued in obtaining these intense degrees of cold that it is possible, moreover, to maintain perfectly constant.

The liquid air is placed, in order to avoid its rapid loss by evaporation when exposed to the air, in a closed vessel that is as impermeable as possible to heat—a vessel consisting, as is generally known, of a double casing of silvered glass packed in a wool lined box.

In another silvered, double walled vessel, likewise packed in a box in wool, some gasolene is placed. This liquid, if it has been made in the usual way, is capable of resisting without congealing a temperature as low as —194 deg. C. (—317.2 deg. F.), which is that of ebullition of liquid air under the normal pressure. Into this bath of ether, which constitutes the medium to be cooled and to be maintained at a constant temperature, a sort of test tube of thin copper is introduced. If the experimenter then forces liquid air through this tube and causes it to fall drop by drop into the vessel surrounding it, by the evaporation of this air he will obtain a cooling of the gasoline which may be maintained constant if the flow of liquid air is suitably regulated. For this, M. d'Arsonval uses two different arrangements which are equally simple. The first consists in employing as a reservoir for the liquid air a double walled flask closed by a cork through which two tubes pass. One of them goes to the bottom of the flask, so that its end is below the surface of the liquid air. The other, which merely passes through the stopper, terminates in a rubber bulb. By squeezing the bulb and thus exerting a pressure on the volatile liquid air in the flask, the latter is forced in small quantities through the outlet tube which leads to the small metal cup inside of the vessel containing gasoline. The apparatus is nothing more or less than an application of the pipette of the chemist.

The other arrangement, which is perhaps even more commodious, consists of a double walled glass tube terminating at the bottom in a small pipe, the flow of liquid air through which can be regulated by a vertical glass needle.

By following the above described methods of M. d'Arsonval, great intensities of cold can be obtained without using an excessive amount of liquid air. "With cylindrical silvered vessels of about a liter in capacity," says this illustrious physicist, "the loss of heat by exterior radiation at —194 deg. C. can be reduced to 20 grammes of liquid air per hour—a very small quantity, as will readily be seen, and one that will make the employment of liquid air quite practical."—Translated for the Scientific American from La Nature.

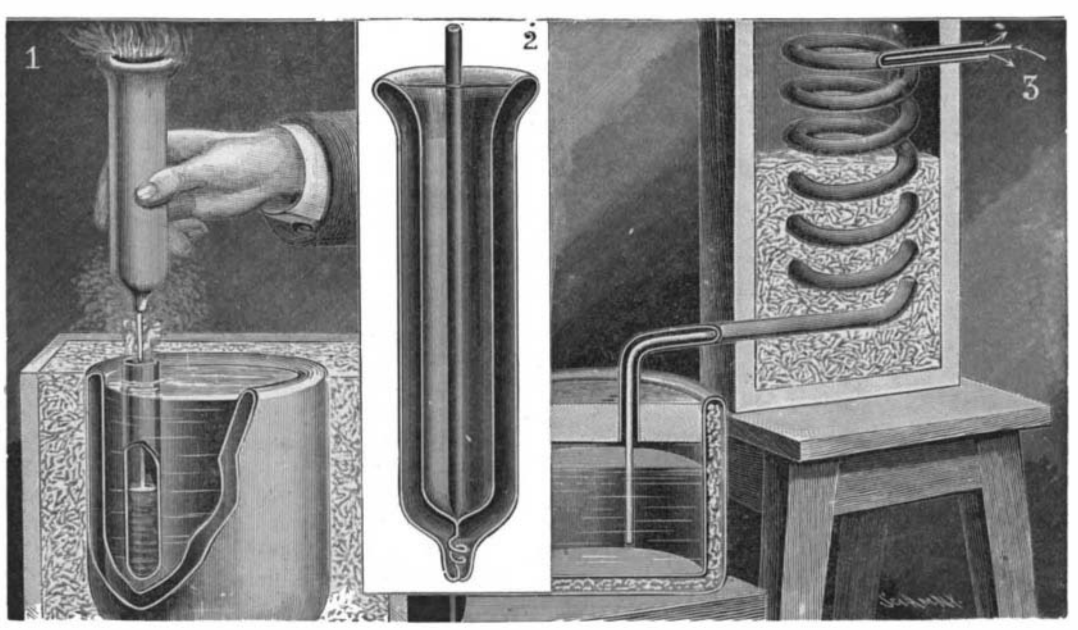


Fig. 1.—1. FREEZING GASOLINE BY LIQUID AIR. 2. TUBE OF LIQUID AIR. 3. APPARATUS FOR VOLATILIZING CARBONIC ACID DISSOLVED IN ACETONE.

Several very interesting experiments in fruit and vegetable drying have been carried out at Northingtown Farm, Worcester, England, with the new apparatus which has proved so successful for hop drying. The invention consists in drawing the hot air into a grid-work of steam pipes, through which air passes into the chamber beneath a "slotted" floor, on which the hops are placed. This method of heating the air prevents the assimilation of sulphurous gases by the products treated, and makes burning impossible. Samples of carrots, potatoes, sliced and shredded apples, and other fruits and vegetables were submitted to temperatures ranging from 90 deg. to 140 deg. After six hours all were in the state of dryness required for commercial purposes. The cost of working the system is trifling, and it is expected that a new agricultural industry will soon be opened in which English fruit-growers may successfully compete with the Germans, who now export about $700,000 worth of dried fruit and vegetables annually to Great Britain.