EXTINGUISHING OF FIRES IN OILS AND VOLATILE LIQUIDS.

A PAPER dealing with the difficult problem of extinguishing fires in oils and in volatile liquids, has been written by Edw. A. Barrier, of the Department of Inspection, Associated Factory Mutual Fire Insurance Companies, Boston, for the American Society of Mechanical Engineers, New York. In his article, Mr. Barrier says that our most common extinguishing agent, water, works rather unsatisfactorily, and frequently disastrously, where fires of this kind occur; but concedes that it is still the only one available where heroic measures are required. However, two or three other materials have been introduced as extinguishers which have given promising results, and Mr. Barrier's paper is devoted to a discussion of these materials and to the conditions under which they prove most efficient.

It is only fires in volatile liquids where these are not miscible with water, in which water is of little or no effect, save to wash the burning liquid out of the building, where it may be consumed completely, or, if the quantity of liquid is small, where it may be extinguished by the brute cooling effect of a large quantity of water sprayed upon the fire. Where the liquid (such as denatured alcohol, wood alcohol, grain alcohol, acetone, etc.) is miscible with water, water may, of course, be used effectively. For non-miscible liquids, soda and acid are somewhat more effective, though non-infallible, extinguishers. However, only two principles can be relied upon in the extinguishing of fires in volatile oils—e.g., either to form a blanket of gas or of some solid material over the burning liquid so as to exclude the oxygen of the air, or to dilute the burning liquid with a miscible and non-inflammable extinguishing agent.

Mr. Barrier proceeds by discussing sawdust and bicarbonate of soda as blanketing types of extinguishers.

Ordinary sawdust is an excellent extinguishing agent for certain volatile liquids, especially those of a viscous nature. In the fall of 1912, experiments were performed by the inspection department of the Associated Factory Mutual Fire Insurance Companies, and fires in lacquer and gasoline in tanks were extinguished with sawdust with results both surprising and satisfactory.

The liquids were placed in three tanks 30 in. long, 12 in. wide and 16 in. deep; 48 in. long, 14 in. wide and 16 in. deep; and 60 in. long, 30 in. wide and 16 in. deep. The sawdust was applied with a long-handled, light but substantially built snow shovel having a blade of considerable area. In every case the fires were extinguished readily, especially in the two smaller tanks which were about as large as any ordinarily employed for lacquer in manufacturing establishments.

The efficiency of sawdust is greater on viscous liquids than on thin liquids; because it floats more readily upon the former. The sawdust is not easily ignited; but, when ignited, both burns without flame, and does not generate sufficient heat to reignite the liquid. Again, the character of the sawdust, whether from soft or from hard wood, is not an important consideration; neither is the amount of moisture contained in it; and thus the drying out of the sawdust when kept in manufacturing establishments for a time, does not effect its efficiency. However, the experiments showed that the admixture of bicarbonate of soda increases greatly the efficiency of sawdust, both by shortening the time of extinguishing and by decreasing the amount of material necessary. A further advantage of the admixture is that it decreases the possible danger resulting from the presence of sawdust in manufacturing plants. It would be difficult, probably impossible, to ignite the mixture through any chance carelessness.

Though the efficiency of the sawdust is greatest on viscous liquids, such as lacquers, heavy oils, etc., it was tested very satisfactorily also upon ignited gasoline, both contained in the smallest tank and spread upon the ground. Tests of the mixture conducted in larger tanks upon ignited thin liquids were unsatisfactory; since the sawdust sinks before the whole surface can be covered, and the exposed liquid reignites.

Another agent to which attention has been devoted in recent years is carbon tetrachloride. It is non-inflammable, non-explosive, and readily miscible with oils, waxes, japan, etc. When mixed with inflammable liquids, it renders them non-inflammable, provided a sufficient quantity is added. The specific gravity of its vapor is about 5½ times that of air; consequently it settles very rapidly. As an extinguishing agent, it both acts as a blanqueting agent—covering the burning liquid with gas or vapor—and dilutes the inflammable liquid, rendering it non-inflammable.

The use of carbon tetrachloride as an extinguisher has been explored chiefly by certain manufacturers producing extinguishers which use liquids; but the claims made for these extinguishers are, for the most part, grossly exaggerated, declares Mr. Barrier. None of these is more efficient than carbon tetrachloride, and none is the equivalent of ordinary water extinguishers for general use on such materials as cotton, wool, paper, oily waste, etc. However, Mr. Barrier allows that, on volatile liquids, oils, etc., carbon tetrachloride has shown very satisfactory results under some conditions, and allowing for the skill of the operator and the nature of the fire. For example, in tank fires the length of time that the liquid has been burning is an important factor; for, where the sides of the tank have become heated, the only way in which the fire can be extinguished is to squirt the liquid forcibly at the sides. To squirt it directly into the liquid makes extinguishing much more difficult, if not impossible.

A second important consideration is the height of the liquid in the tank. Where the liquid is low, the sides form a pocket which retains the vapor and aids considerably in smothering the blaze. When the tank is nearly full, however, this condition does not exist, and it is then very difficult, if not impossible, to extinguish a fire in a highly volatile liquid, such as gasoline; and only the most skilled operators are successful in these cases. Further, the size of the tank or the extent of the fire if upon the floor is, as would be expected, of considerable importance. In tanks larger than about 28 in. by 12 in., more than one extinguisher and operator working at a time are necessary to extinguish a fire in such materials as gasoline. In one test where a tank 60 in. by 30 in. was used no less than seven operators were necessary, and even then it was only with the greatest difficulty that the fire was put out.

Mr. Barrier points out that his remarks apply to carbon tetrachloride as generally sold in the ordinary one-quart extinguishers, and proceeds to consider the probability of greater efficiency from a larger extinguisher. This, however, would have to be specially designed to make it readily portable by mounting on a truck or some similar means. The writer then discusses a few systems recently installed in which an elevated tank containing carbon tetrachloride was connected with automatic