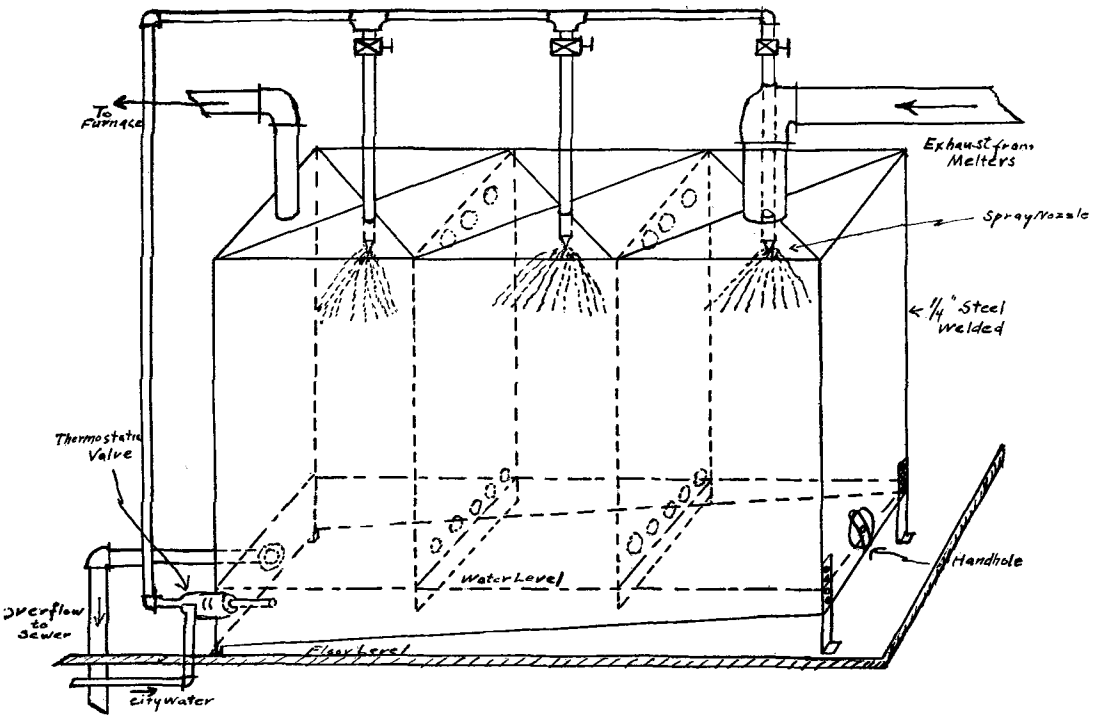
Deodorizing Rendering Gases

A New Simple Device Which Has Been Effective in a Plant in a Large Mid-Western City

By S. C. STRUNZ



Diagrammatic sketch of the Strunz deodorizer for gases generated in rendering plants

EXHAUST gases from rendering plants have been the cause of untold troubles for years among renderers in all parts of the world. Where rendering plants are located in or near thickly populated areas or in the midst of large cities, as is frequently the case, constant conflict with city authorities is almost the inevitable consequence of the release of unpleasant odors upon the community. Renderers have always appreciated the difficulty of this problem and in some cases have solved it satisfactorily, although there still exist a great many plants which for one reason or another have been unable to solve it and as a consequence remain in conflict with the authorities.

The ill-smelling gases which accompany the rendering of fats are inherent in the business. Just so long as these gases are permitted to escape from the rendering plant, they will cause trouble. The solution of the problem is not to permit them to escape, but to remove them from the exhaust of the melters and destroy them. For this purpose, innumerable methods have been tried, including vacuum pumps and other means, but few have worked successfully. A system for deodorizing rendering operations which has passed the test of practical operation in the center of a large city, was designed several years ago by the writer under the stress of necessity. Other

methods did not prove effective; the method to be described has proved altogether successful and a patent on the equipment for this purpose has been applied for.

THE equipment as designed and now operated is composed of a large steel welded tank made of quarter inch steel and divided into three compartments of equal size by plates which extend from the top almost to the bottom. The bottom of the tank slopes off to permit draining and easy cleaning and the plates extend into the water which is always present in the bottom, forming a water seal. At the top of the steel dividing plates, there are three perforations of one-half inch diameter to permit escape of light gases which form at the top of each chamber. In the bottom of the dividing plates, just above the level of the water, are five two-inch openings through which the bulk of the gases and uncondensed steam may pass to the next chamber for further washing, cooling and condensation. Except for openings for the pipe line from the melter, for spray nozzle openings, for the exhaust gas outlet and for the water overflow, the tank is made gas tight. The diagram shows the general plan of construction.

Exhaust gases and steam from the melter come over through a four inch pipe into the top of the first chamber. The gas is subjected to a very fine spray of cold water as it enters the top of the chamber. The effect here is to create sufficient vacuum to have a constant pressure from the melter in the direction of the deodorizer. When the melter is shut down, there is no danger of water from the deodorizer being drawn back into the melter as is the case with some types of equipment. Some steam is condensed and gases washed and cooled in the first chamber by the spray. Uncondensed steam and gases pass through the openings to the second chamber and are subjected to a second spraying, then pass on to the third chamber for still a third spray operation. Volatile liquids, and minute portions of entrained solids are removed by the spray, falling into the water at the bottom of the tank. True gases which have been separated from the ill-smelling volatile liquid and solid constituents by washing with the cold spray, pass on through the third chamber and out through the top from which point they are piped to the boiler room and burned under the furnace.

The water in the bottom of the tank is kept at a constant level by an overflow pipe which leads to the sewer. The flow of water through the spray nozzles, which are Koerting nozzles with a one-eighth inch opening and which give a very fine mist, is controlled by a thermostatic valve immersed in the water at the bottom of the tank through the side wall of the tank. This valve is set to maintain a temperature of about 90° Fahrenheit in the water in the tank. This temperature is about as high as the water can be permitted to go into the sewer without a liberation of bad odors from the sewer waters, and at the same time, is fairly economical from the point of view of water consumption in the spraying operation. Of course, the lower the temperature of the water which overflows from the tank, the less chance there is of trouble from odors being liberated from this waste water when it is turned into the sewer. At the same time, to aim to keep this temperature too low means that the water consumption in the sprays will be somewhat greater than it should be. Ninety degrees was the temperature decided upon for actual use after trying out both higher and lower temperatures. The deodorizer operated at this temperature has worked very satisfactorily in the center of a large midwestern city, effectively eliminating the bad odors from the plant and surrounding community.

IN the practical operation of the deodorizer, several things were found out. A certain quantity of solid matter comes over from the melters and the compartments of the tank are equipped with hand holes so that this may be cleaned out from time to time after the tank is drained. A year or two may elapse before this becomes necessary. In actual use, the deodorizer is hooked up to two or three melters. When the melting operation is started, the first material to come over contains a large proportion of moisture in the form of steam, and as the melter continues and the temperature rises, the moisture content of the exhaust gases is reduced and the exhaust consists mostly of non-condensible gases and other volatile liquids. The melters are hooked in and run two together, that is, one is started and an hour or two later, the other is started so that the exhaust with a large proportion of steam from one is mixed with the dry exhaust of the other. This tends to equalize the temperature of the exhaust entering the deodorizer and has been found to be more economical in the matter of water consumption. In the meantime, a third melter and perhaps a fourth can be loaded or unloaded

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