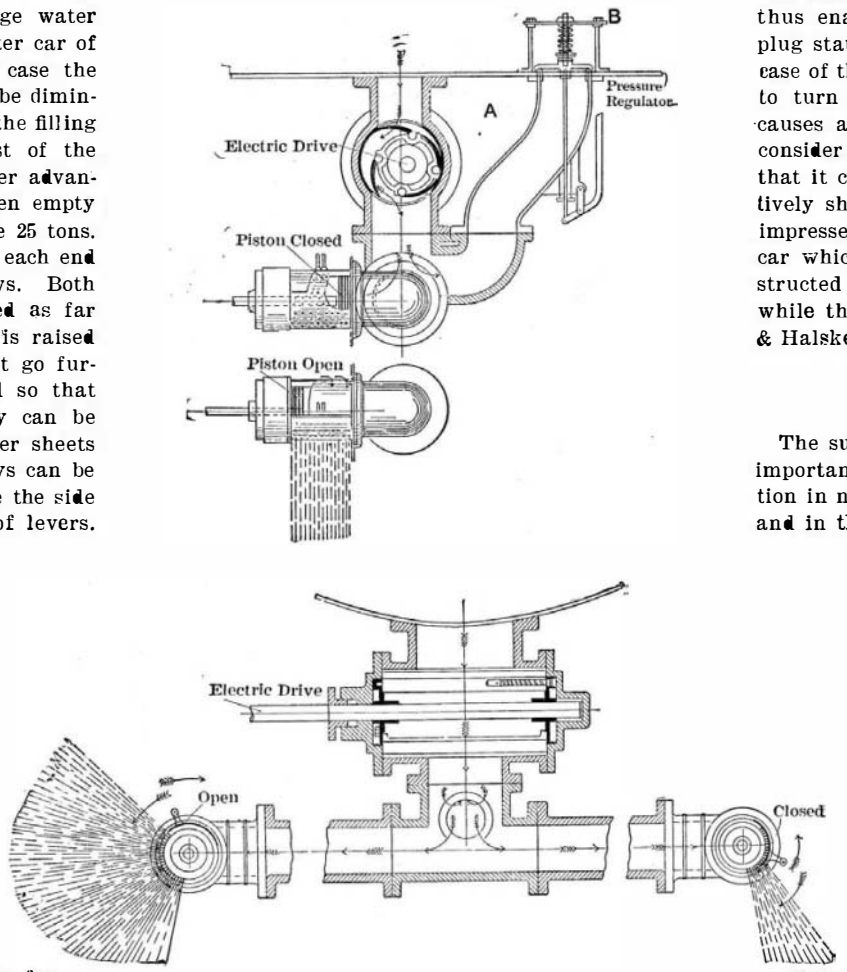
MOTOR SPRINKLER AT COLOGNE.

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

A new type of motor sprinkling car is now in use in connection with the traction lines of the city of Cologne. It is intended to run upon the tramway tracks, and for this purpose it is equipped with a trolley pole of the loop pattern. The car is mounted upon two bogies, each of which carries a motor of the traction type giving from 35 to 40 horse-power. The reservoir has a large capacity, some 2,000 gallons, and it was considered an advantage to have a large water tank using a double bogie rather than a lighter car of smaller capacity, seeing that in the former case the number of plug stations for filling the car can be diminished, and besides, less time is consumed for the filling operation. This balances the increased cost of the larger car, and the latter has also many other advantages. The weight of the sprinkling car when empty is about 14 tons, and when filled up it is some 25 tons. There are two sprays on the sides and one at each end under the platforms, as our engraving shows. Both the sprinklers under the platforms are placed as far forward as possible, so that the dust which is raised by the car itself is laid at once and does not go further. The sprinkling apparatus is arranged so that the spread and also the width of the spray can be regulated. The maximum spread of the water sheets together is some 50 feet. Both the end sprays can be regulated by pedal from either platform, while the side jets are likewise controlled by another set of levers.

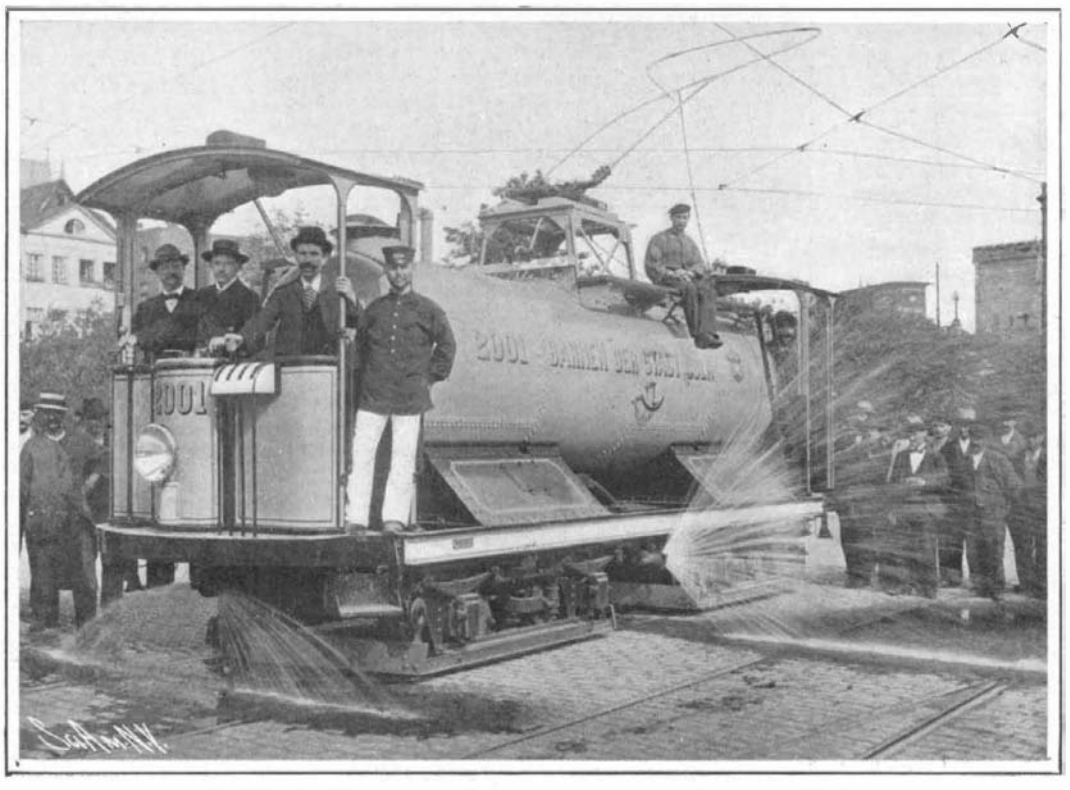
The platform sprays are shown in section in the diagram. The device consists of a sprinkling box which is connected by piping with the main water tank. In the box are two different outlets which the arrows indicate and each half is thus fed separately. A partition divides the box into two parts, and one side has larger sprinkling holes than the other, so as to change the feed. By using one side or the other, or else both together, we obtain three different strengths of water spray. An inner curved guide-plate gives an even distribution of the water. A strainer placed in the piping stops any floating matter. The two side jets are independent of the former. They are shown in the sectional views. One feature is that the width of the jet is independent of the water level in the tank and is kept constant down to the emptying point. To carry this out, a device is placed in the piping at *A*, which gives a constant feed. It consists of a rotating drum placed eccentric in a cylindrical chamber and driven by a small 4-horse-power motor situated under the tank. Upon the drum is mounted a set of vanes which can lie against the surface or can be raised by springs. During the rotation the vanes are thus made to work against the periphery of the cylinder and form a set of feeding pockets by which the water is drawn in from above and distributed to the lower pipe at a constant rate. By a pressure regulator in connection with the tank (shown at *B*) the pressure of the supply water can be controlled at will. This device is operated by levers from the platform. In this case the overflow or superfluous water is sent back to the tank by an appropriate piping. To give each of the side sprays the same pressure in the piping, the regulator can be used to control the strength of the jet. Again, the water can be let out of the sprinkler under pressure by using the motor-operated distributor, or the latter can be left open and the water flows out of the tank in the ordinary way. The former has the advantage of giving a stronger as well as a uniform jet, while in the latter case the spray varies with the water level in the tank.

The spray apparatus has also another method regulating the pressure and also the width of the jet. This will be observed in the second diagram. The sprinkler consists of a cylinder having a number of rows of holes, and inside the cylinder is a tight piston which can be pushed back and forth so as to close off a given row of holes, and so on to a full stop of the water. This controls the width of the feed. Another device, which is shown on the right, consists of a revolving shutter which turns around the feeding cylinder and is operated by a lever. By working the shutter the holes can be uncovered more or less and so the spread of the water can be adjusted from zero up to the full feed. By using these two devices together the operator can secure any desired adjustment of the spray, and each side is independent of the other. In this way the car can be made to water the whole width of the street, whether the car is on one track or the other. The sprinkling car is filled from plugs or hydrants which are situated at certain designated points, and a side track brings the car in front of the watering plug. It is filled by two 3-inch hose, and the time required is about ten minutes. As to the performance of the new car, it is very satisfactory, when we remark that with a tank capacity of 2,000 gallons, an average speed of seven or eight miles an hour and a width of spray varying from 25 to 50 feet total, it covers some three miles of road. During the summer season, when the greatest work is required, the new car will cover some 700,000 square yards of surface as compared with 150,000 square yards with an ordinary horse watering car. The operating cost of the motor sprinkling car is calculated at 20 marks ($5) per day, including electric power, maintenance, and wages. For the same service, five of the horse sprinklers of 400 gallons' capacity would be needed, and the operating cost figures 10 marks ($2.50) each, or a total of $12.50. We thus have an economy of $7.50 per day for the system, and for 100 working days this gives an annual saving of $750.



Details of the Motor Sprinkling Car.

In order to avoid interfering with the traffic of the electric traction lines, the sprinkling car is made to run close behind one of the passenger cars, and it is thus enabled to arrive at the next side-track at the plug station before the next car comes along. In the case of the horse sprinklers, the latter are often obliged to turn out in order to let the cars pass, and this causes a series of gaps in the sprinkling. When we consider the advantage of the motor sprinkler, and also that it covers a large extent of surface in a comparatively short time and with a smaller personnel, we are impressed with the utility of the new system. The car which is now operating at Cologne has been constructed by the firm of Zypen & Charlier, of that city, while the electrical equipment is supplied by Siemens & Halske.



MOTOR SPRINKLING CAR IN USE IN THE CITY OF COLOGNE.

STERILIZATION OF WATER.

BY EMILE GUARINI.

The subject of the sterilization of water is of prime importance because unimpeachable water is the exception in nature; it is found only in uninhabited regions, and in the soil at a level which it cannot reach without slowly percolating through thick strata of well-filtering sand. All other waters collected in populous neighborhoods, spring waters as well as surface waters, should be considered as suspicious. The conclusion is that with the exception of a very few cases, all waters should be purified bacteriologically before being distributed for potable purposes. The two practical methods of biological water purification on a large scale are: 1. Filtration, which reduces the number of bacteria water contains. 2. Treatment by ozone, which radically annihilates all pathogenic germs. Experience has shown that filtration is not always an adequate way of sterilization; moreover, it is stated that "filtration is not sterilization; it is a makeshift which should be improved upon."

Ozonization, on the contrary, is said to fulfill all the requirements of the improvement wished for. So long as ozonized water contains free ozone when leaving the sterilizing apparatus, it is practically sterile, i. e., free from pathogenic germs.

Ozone has exceptional advantages for this purpose. Without introducing any new element into the water, it destroys all discoloring organic matters, all unpleasant odors and tastes, and, with certainty, the pathogenic and other bacteria, with the exception of a few harmless spore-bearing bacilli which the water may contain. The ozone present in the water which leaves the sterilizers is retransformed into ordinary oxygen by from 15 to 20 seconds' exposure to the open air, at the very utmost. Ozonization, therefore, leaves in the sterilized water nothing but some ordinary oxygen—some atmospheric air, in fact. This is an improvement, because superaeration makes water, if anything, more palatable and digestible, and takes away all fear of injury to the distributing plant, because ordinary oxygen does not attack iron and lead mains and pipes. Several systems have been devised to sterilize water by means of ozone. The most recent among them, we believe, is the De Frise system, which embodies several new and interesting characteristics and is put in practical use at the experimental works of Saint Maur, near Paris (France).

The De Frise ozonizers are without dielectric and are kept at the proper temperature; they have sharp metallic points which receive the high-tension current, and are juxtaposed to metallic surfaces connected with the earth. They are worked with tensions higher than 20,000 volts. The air is aspired through them by pumps which force it, when ozonized, through the sterilizer. The apparatus are either horizontal or vertical. The vertical type occupies less room than the horizontal one, which is easier to survey, however. The sterilizers are made on the washer principle; they are provided with a number of