

THE STEAM SIREN OR FOG HORN.

Fog signals, many of which are required at different points on the Atlantic and Pacific coasts, are of several kinds. Some are steam whistles, the sound of which is made deeper or louder by being sent through a trumpet, but the most effective is probably the siren. This ingenious machine consists of a long trumpet and a steam boiler. The sound is produced by the rapid revolution past each other of two flat disks pierced with a great number of small holes, a jet of steam under high pressure is projected against the disks, which revolve past each other more than a thousand times a minute; as the rows of small holes in the two disks come opposite each other, the steam vehemently rushes through, and makes the singular and piercing noise which a siren gives out. One of these machines, of which we give an illustration, cost about \$3,500 complete, with its trumpet, boiler, &c.

Daboll's trumpet is worked by an Ericsson engine, and requires no water for steam.—*Harper's Magazine.*

SAFETY BELL SIGNAL FOR RAILWAYS.

It is generally agreed that travelling on railroads is somewhat safer at night than during the day time. Fewer trains run at night, the attention of the driver is not so much distracted from his work and light signals, that is lamps are more clearly seen than semaphores in the day. But in the case of danger signals such as torpedoes and danger lights, there is always possibility that the former may fail to explode or the latter to be seen. In order to render the attraction of the engineer a matter of certainty, M. Steppens, in the *Chronique de l'Industrie*, suggests the simple arrangement represented in the engraving on page 319. Two posts are erected on each side of the track, at a suitable distance from the draw, switch, or other point, the connection of which the engine driver must be informed of before proceeding. Between the tops of these is a stout wire, on which are three travelers, A, the lower and vertical portions of which serve for supports for a line B, which passes over pulleys on the posts, is connected with the switch lever, and carries at its free end a counterpoise C. Secured to the line B, which passes through and is secured to its vertical arms, is a double lever D. One arm carries a bell, the other extends down and has a disk-shaped end directly over the middle of the track. When the switch lever is properly adjusted, the counterpoise is raised, and the lever carried by the rope B, over to the left of the track, as indicated by the dotted lines; should, however, the rails be wrongly placed or left open, the arrangement of the connecting lever is such that the counter weight draws the bell lever into the position shown. As soon as a train comes along, a projection on the smoke stack of the engine strikes the disk arm of the lever and rings the bell, thus warning the engineer. The usual signals for the eye may, of course, be connected to apparatus in the ordinary manner.

HORIZONTAL ENGINE.

We give, on page 319, a perspective view of a type of horizontal engine now being made as a speciality by Messrs. Hamilton Woods, and Co., of the Laver Foundry, Salford, Manchester, the particular engine illustrated having a cylinder 18 in. diameter with 36 in. stroke. The first engine of this type was made five years since for working the machine in the locomotive shop of the Tasmanian Railways, and has done exceedingly good work. Others have since been made for breweries and manufactories, among them one for Messrs. Wright, Turner, and Son's mill at Pendleton, where with a pressure of 80 lb. in the boiler, the engine making 72 revolutions, it has been indicating 100 horse power, the engine nominally being 20 horse power.

The engine, as shown, has the expansion link raised by a hand-wheel and screw, the expansion slide on the back of the main slide being thus regulated, for general purposes, where the work is pretty constant, this is sufficient and preferred, as if some of the machines are idle, the engineer can easily regulate the screw accordingly; where a more sensitive action is required an arrangement is provided for raising or depressing the link by the governor. The design of the engine is very neat and substantial.

ACTION OF WATER ON LEAD PIPES.

(By CHAS. W. VINCENT, in *Iron.*)

In most great towns the water, after it passes from the mains of the water companies, is distributed to, and through, the houses of the inhabitants in lead pipes. Every now and then some wiseacre who has learnt enough chemistry to know that plumbic oxide is sometimes formed by the action of water on lead, creates a panic in the mind of the public by pointing out this important fact. A great fuss is then made, and a great deal is said about the danger of this poison being overlooked until too late, from its being introduced into the human system in almost imperceptible quantities, there to accumulate until fatal consequences to health and strength are produced.

Experiments are then upon immediately directed to be made by the professional chemists of the locality, who accordingly proceed to plunge pieces of pure lead and lead-piping into the waters accused, into distilled water, fresh rain water, well water, &c.

The results to be expected are well known, and have been well known for the last fifty years. The distilled water attacks and dissolves the lead with very great rapidity; rain water not quite so rapidly, the well water but seldom attacks it at all, and the river water, if it has travelled through any considerable distance, never. Few people have had long experience of a country district without meeting with more or less of such a panic; but that Paris, one of the most scientific of cities, and better supplied with chemists than perhaps any in the world, should have been frightened by such a silly outcry, is certainly matter for astonishment. It is, however, true. Paris has lately had her equanimity very greatly disturbed by having this terrible grievance added to her other troubles. According to a petition presented to the Municipal Council of Paris (and acted on by it), "the unwholesomeness of water which has remained for any length of time without circulating, in tubes of lead, is a fact recognized by the chemists and physicians of all ages and of all countries. The water so situated dissolves the lead, and, when thus contaminated, its employment for culinary use will give rise to veritable poisoning—slow, chronic, without producing sudden fatalities, and for that reason all the more dangerous, for the lead accumulates in the organisms, and only reveals itself when the mischief is consummated."

The consternation was extreme, though no one could be found who was suffering the direct effects of lead poisoning; however, Professor Dumas, Dr. Belgrand, and Dr. Felix Le Blanc, came to the rescue, and as their experiments, though not at all novel, are, being recent, nevertheless very comforting to sanitary engineers and medical officers of health, who are at all times liable to have to answer for the water under their charge upon similar grounds, they may be shortly summarised.

Professor Dumas in five flasks put samples of distilled water, rain water, Seine water, Oureq water, and surface well water, into each flask he then put granulated lead. The first water-flask, when submitted to the action of sulphurated hydrogen, gave indications of lead in solution when the contact had been only momentary between the water and the metal. In the case of those other waters which were more or less charged with calcareous salts, no lead was found, even after standing for a considerable time. The rapidity, Dumas says, with which pure water charges itself with lead is very surprising, but the effect produced by the merest traces of calcareous salts present in solution in preventing this reaction is not less so.

Belgrand and Le Blanc directed their enquiries to the actual effect produced by leaden pipes at present in use. They found that the total amount of leaden tubing was not very great in comparison with other kinds of pipes. In the city of Paris there are, for water conveyance:—Cast-iron mains, 1,466,500 miles; iron plates asphalted, 75,700 miles; lead pipes (about), 3,600 miles—total, 1,545,800 miles.

The public mains are manifestly above suspicion. It is only the short private branches which are of lead. The total number of these leaden connections is 39,495. The result of most careful experiments made upon the water from different sources, after passing through the lead branch into the house was that in inhabited houses, that is to say, where the water never remains stationary in the lead branch for more than ten to twelve hours, not a trace of lead could be discovered.

With regard to water which is allowed to remain for a considerable time in contact with lead, the amount of the action depends entirely on the purity of the water. In distilled