Engineering: Sea and Land

INCRUSTATIONS IN WATER MAINS.

(Continued.)

By Thomas Ward, A.M. Inst. C.E., Member Association of British Waterworks Engineers.

It certainly seems extraordinary that hitherto this subject should have received such scant attention. Fanning and Burton, well-known writers, scarcely allude to it. This ommission is surprising on the part of the latter as his book is recoguised as the most up-to-date one. He strongly insists upon the coating of pipes by Dr. Angus Smith's method, and inferentially the conclusion can be drawn that this is a sufficient precaution to take. Experience, however, shews that it does not answer in all cases. With a few exceptions the minutes of the proceedings of civil engineers are silent on the matter.

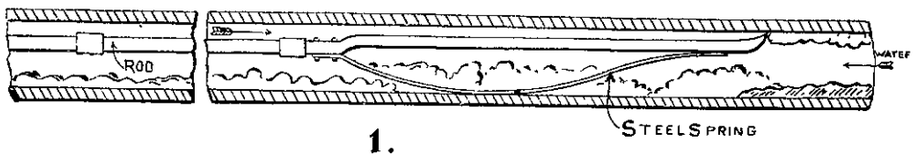
Jamieson's paper has been mentioned in my former article. Messrs. Henderson and Mansergh also have written about it. Preparatory to the latter's report on the Lancashire Waterworks in 1875, as mentioned in vol. 68, he was made aware that the discharging power of the original 8-inch main was seriously diminished and recommended that it be scraped, which was carried out in the year 1878 with great success, the apparatus used being that devised by J. G. Appold, modified by Thomas Kennedy, managing director of the Glenfield Company, Kilmarnock. The methods adopted consisted in making use of the pressure of water in the mains to drive scraping tools: its form and construction is shown in diagrams Nos.1 and 3. The engineer to the Wakefield Corporation has another kind, and a company has been formed in England to take it up. The machine is somewhat in the form of an ordinary winch fitted with a winding drum worked by hand, carrying a chain working in a spurred wheel similar to a bicycle chain. This chain turns the wheel which works the cutter. The machine is fixed on the top of the ground and is placed on rails, and as the cutters work their way through the pipes it is pulled along the rails by an endless rope over a pully.

The method of working is to take out one length of pipe over which excavation the apparatus works: another length of pipe is removed about 150 yards further along, from which place the debris from the encrusted pipe is removed. If the pipes are very much filled up, another pipe must be cut out at a much shorter distance than the above: but hitherto pipes have been cleaned out as far as this before a fresh excavation is required. This expedient is only suitable for diameters of 3″, 4″, and 6″.

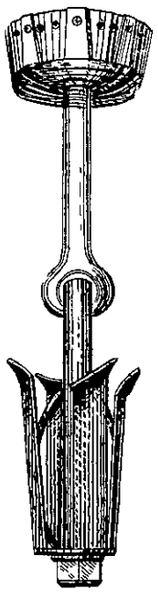
Before scraping was resorted to, new mains were laid and old ones taken up when much corroded; or the mains were taken up and heated, which involved the substitution of another main. When another main to Wainui-o-mata is laid down the opportunity should be taken to thoroughly overhaul and clean the present mains.

Pipes have also been cleaned by hand labour. The tool used is shown in diagram No. 1. The cutting edge being of steel of the same curviture as the internal diameter of the pipe against which it is pressed by the steel spring. As the cutter proceeds along the pipe rods are added. It is driven forward and backwards by men working on the excavations made by means of ropes: horses have also been used being attached to the apparatus by chains.

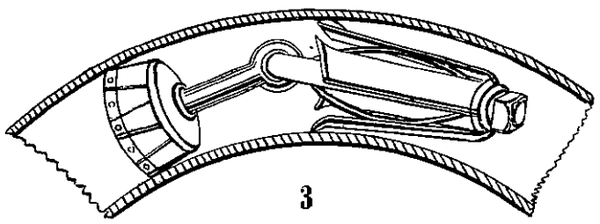
The form of scraper now used is shown in diagrams 2 and 3. It consists of two distinct parts connected by a swivel joint. The front carrying the four steel scrapers, and the rear portion the steel propelling pistons. Leather discs intersected by radial cuts, and stiffened at the back by lead plates, are placed behind the pistons: the cutting edges are set in such a way that should the scraper encounter anything in the shape of a projection such as a ferule screwed into the pipe, the whole machine will slew or turn round, and pass the obstruction without getting blocked, while the leather packing behind the pistons will fold back and pass any obstruction that can be passed by the pistons themselves. Originally, two sets of scrapers and two pistons were used on the one rod, but owing to its length it could not be passed along bends in the pipes. To overcome this, one set of scrapers and one piston were taken off, and in place of the rigid iron rod, one with a



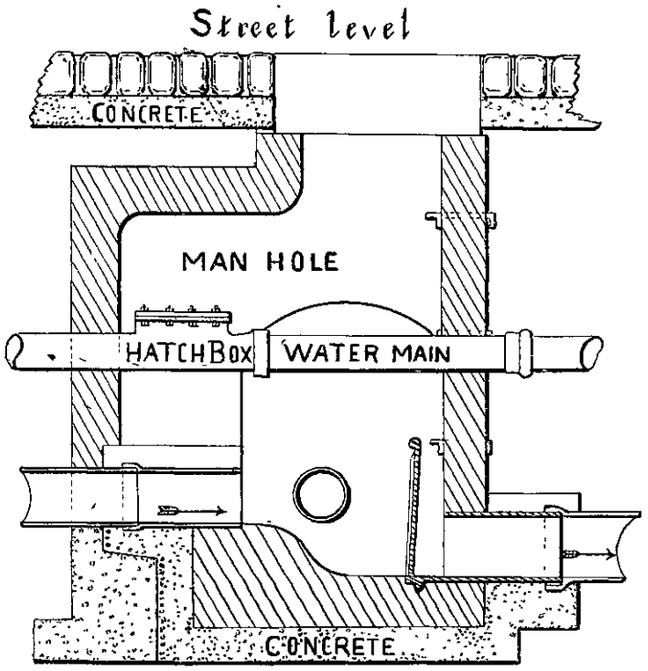
1.



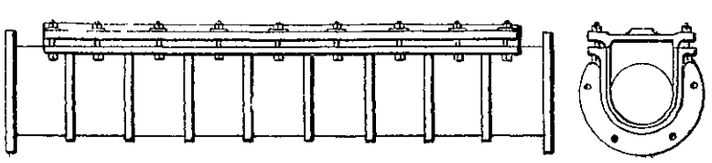
2.



3



5.



4