reagent present, and only depends upon the setting of the apparatus. The solutioner contains no valves, and requires no attention beyond the first adjustment. Their action can, perhaps, be better described by reference to Fig. 5. The solutioner consists of four cylindrical vessels, which fit one within the other, as shown. The gauze wire container, into which the reagent is put, is shown at R, the bottom of it being about two inches below the level of the scallop at top of cylinder N, Fig. 4. The water which comes from one of the pockets in the distributor is led by a pipe into the space between the cylinders P and Q. The water passes down the space between P and Q, and fills up the whole of the apparatus to the level of the scallop at top of N, dissolving the reagent, and forming a strong solution. The water which continues to flow down between the cylinders P and Q meets the strong solution descending from the cage, at the bottom of the apparatus, and carries it into the outlet space between N and O, and away over the scallop into the receiver T. This outer space then contains a column of solution, which is balanced by the column of water in the space between P and Q. This column of water must be longer than the column of solution, so that as the solution increases in strength the level of the water in the space between P and Q rises. When the outflowing solution attains a certain strength, water overflows at the scallop at the top of cylinder P, passes down the space between O and P, mixes with the solution at the bottom of the outlet space, and prevents it from getting any stronger. The amount of water flowing over this inner scallop automatically adjusts itself to keep the solution at constant strength, which can be regulated to a nicety by the screw shown at S, which raises or lowers the cylinder P, thus increasing or diminishing the difference in the head of water flowing over the scallop on N and the scallop on P. So delicate is the adjustment possible that any required degree of strength can be given to the solution flowing over the scallop on N, and this strength will be maintained so long as the reagent lasts, no matter what the variation may be in the quantity of water flowing through the solutioner; and the apparatus requires no attention whatever, except the occasional addition of reagent to the gauze basket.

Thus the machine supplies to the water, automatically and continuously, the exact amounts of the two reagents required per 1,000 gallons, whatever be the actual quantity of water passing. This is of special importance when the load is very variable, as in electric light stations.

The water, after the addition of the solutions, made as described, is passed through a treatment vessel in which the reagents act upon one another, and thus render the oil filterable. This reaction is very rapid, taking place in some two minutes. The water is made to traverse a definite path by means of deflection plates, so as to insure its being subjected to treatment for a sufficient time for the reaction to become complete. In this way the water is continually entering the apparatus at one end and passing out at the other.

After this treatment the water is found to have lost its milky appearance, the individual particles of oil, which could not previously be distinguished by the eye, having become entangled with the precipitate, forming visible masses readily capable of filtration. From the treatment vessel the water passes to the primary filter, a detail of which is not shown. This filter is constructed in sections working in parallel, each section arranged to be isolated and cleansed by a reverse stream of water, while the others continue to do duty. In these the coarser particles of the oil are removed.

From the primary filters the water passes to a small collecting tank, whence it is conducted to the filter proper.

In order to show pictorially the results of this process, as compared with mechanical filtration alone, we reproduce four photographs, which speak for themselves. The first shows water taken straight from the condenser; the second, the same water after careful mechanical filtration; the third, the same water purified by the Harris-Anderson system; and the fourth, for the sake of comparison, a similar bottle of pure distilled water.

After the completion of the process, the only residue in the water is a minute trace of soda salts, which, of course, have no harmful action on the boiler, but which tend, if anything, to prevent the formation of scale. The cost of the reagents seldom exceeds, and is usually less than one cent. per 1,000 gallons of water treated.

The Harris-Anderson apparatus is now in constant use at a large number of power stations in Great Britain, with excellent results obtained from an extended experience, and an installation of this machine can now be seen at work at the factory of Messrs. Pugsley, Dingman & Co., Toronto Junction, makers of Comfort Soap. Here the machine is treating 500 gallons of water per hour, which is the condensed exhaust of the main engine and several large pumps, and contains a large quantity of emulsified oil. This used to be run to waste into the sewers, but now passes through the purifier, and, after the removal of the oil, is fed to the boilers, and, being already at a temperature of 160 deg. Fahr. before going to the heater, represents a considerable economy. It is besides pure distilled water, containing no scale-forming properties. Examination of the boilers after only fifteen days' working showed a considerable reduction of scale on the heating surfaces and no traces of oil in the boiler.

Arrangements to inspect this plant can be made by communicating with John T. Webster, 109 Niagara Street, Toronto, agent for the purifier for Canada.

USE OF THE STROBOSCOPE.

It is a peculiarity of vision that impressions on the retina do not fade instantly but persist for a fraction of a second after a change has taken place in the aspect of the object viewed. This persistence of vision is what enables a fairly good view of a fair ground or baseball field alongside of a railroad track to be seen from the window of a rapidly-moving train, when, if the train were standing still, all that could be seen would be a high fence with narrow cracks between the vertical boards. When the car carries one by the fence rapidly the eye receives a series of views of the field through the cracks, which blend together and give the panorama effect. This peculiarity is taken advantage of in investigating the action of certain vibrating or revolving mechanisms like engine flywheel governors, etc. If a rapidly-running flywheel governor is seen for a fraction of a second at one spot at every rotation, it appears to the eye to stand in space and under that condition the in-and-out movements caused by changing load, may be readily seen. One method of obtaining this effect is to mount a radially-slotted disk on the flywheel shaft so that the slot covers the portion of the governor to be watched. In front of this disk is another slotted disk which stands stationary. Now if a strong light illuminates the object a flash of reflected light will reach the eye at every revolution. The same stroboscope effect was obtained in another way in the elaborate investigations of the Pelton water wheel which were carried on some months ago. To perfect the shape of these buckets so that they should have the maximum of efficiency and durability it seemed necessary to observe the action of the jet as it impinged on the buckets, but to get a perfect visual impression the buckets should stand still, which, of course, was impossible in running tests. An arc lamp was arranged with a shutter, which was worked in synchronism with the revolving water wheel. At every revolution a flash of light was directed upon the jet and buckets, giving them the impression of standing still while the water entered the buckets and flowed out at the sides. With the same apparatus instantaneous photographs of the jet and buckets were taken.—Machinery.

Henry Disston & Sons, Philadelphia, manufacturers of saws, files, etc., are locating a factory in Hamilton.

H. M. Whitney, the Boston millionaire, has purchased the asbestus mines at Thetford, Que., from the King estate. The purchase price is said to be $125,000. The asbestus mines will be worked on a large scale.