Previous methods of air storage have been the use of pressure tanks, compressing the air in them under high pressure, and then reducing it to that required for use in the filters. This involves an enormous waste of energy, and in studying this question it was ascertained that a method had been devised and a patent application made for a scheme that would accomplish that process. Arrangements were, therefore, made for the use of this arrangement, which consists of an inverted tank on the order of a gasometer, weighted sufficiently to produce the pressure required in the filter beds, then building the tank of such volume as to give the required amount of air. A further study of this revealed the convenience of utilizing the water tank as a seal tank for the air tank. A combination was, therefore, designed, using an inverted air tank on top of the water storage tank.

A small generating plant is to be installed in duplicate at the pumping station, which will be sufficient to furnish power to operate all the motors at one time. This plant will be required to be only about one-third the size of a plant which would be required to operate wash pumps and blowers sufficient to apply water and air directly, the result of this being a very uniform draft on the power station, a more economical use of power, and some economy in the cost of installation. The small pumps for supplying the wash water to the wash-water tank and the air to the air tank will be designed to operate about 50 to 75 per cent. of the time, and will be arranged to operate automatically, so that during the washing of a filter when the water level falls a few inches in the storage tank the motors supplying the wash water, if they are not running, will be automatically started, and will continue to operate until the level is brough up to its normal, when the automatic switch will cut them out. The same arrangement will be applied to the air storage tank, which is designed for volume and not pressure. The motors, therefore, require no care except to see that they are kept in proper shape.

As the plant is located above the point from which water pressure is secured and hydraulic valves are in use, it, of course, becomes necessary to provide pressure for the hydraulic valves; this is done by a small automatic control pressure pump and a surge tank which automatically controls the pressure of the operating cylinders of the valves. These features, as far as the writer's experience or knowledge goes, are unique, and it is believed that it is their first application.

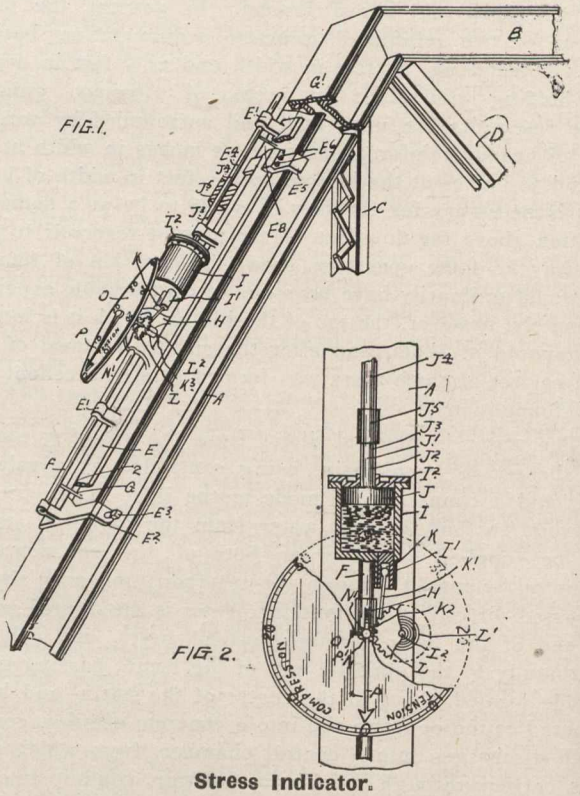
The reagents or chemicals will be stored in the second floor of the building above the office; this storage room will be equipped with an electric hoist for unloading from the wagons and conveying to the storage room. Inside the storage room there will be baskets and a track for delivering the chemicals from the storage space to the dissolving boxes above the solution boxes, which are also located in this room, so that the labor of handling is reduced to a minimum.

The building will be lighted by both gas and electricity. For heating there will be used a low-pressure cast-iron heating boiler in the basement, arranged to use natural gas as fuel.

Immediately beyond the plant there will be a round reinforced concrete basin, into which the water from the washing of the filters will be drained. This basin will provide several hours' sedimentation, so that after washing the filters the wash water carried into it will have an opportunity to settle, the heavy accumulations going to the bottom. The bottom of this tank slopes to the centre, and an outlet standpipe is placed near the centre, so arranged as to drain down to within 4 feet of the bottom; to this will be connected an electrically driven pump, which will take the settled water and pump it back into the sedimentation basin. In this manner it is expected to give the highest economy in the use of the wash water. The location, of course, of this plant and the high head against which all the water is pumped form the only condition which would make for economy in an arrangement of this character, but it is believed that the saving that will be accomplished in this manner will more than justify the expense of the necessary structures for accomplishing it.

IMPROVEMENTS IN STRESS INDICATORS.

What appears to be a valuable invention has just been patented by Mr. Walter P. Chapman, M. Can. Soc. C.E., resident engineer of the Canadian Northern Railway at Toronto. The device is applicable to both compressive or tensile stresses, and is particularly adaptable for testing the strength of steel construction, bridges and buildings, whereby the amount of tension or compression in pounds to the square inch, under any load, stationary or movable,



Stress Indicator.

may be ascertained quickly and closely, so as to obviate to the greatest extent possible the structure in any of its parts or members exceeding the limit of safety.

The invention consists of an instrument comprising a suitable base, a stationary rod at one end in suitable supports on the base, and a longitudinal adjustable rod held in suitable supports on the base at the opposite end, provided with a pin extending into a hole in the plate of the end post and connected to a hydraulic cylinder, a supplemental cylinder extending from one end of the main cylinder, a minor piston located therein, a gear-wheel mounted on a suitable arbor and having a spring attached thereto to counterbalance the pressure on the minor piston, an arbor mounted in suitable bearings and provided with a pinion meshing with the gear-wheel, a dial suitably supported and indexed at the outer edge, and a hand adjustably supported on the end of the arbor.