longer time before they can be removed. When the concrete blocks are removed from the forms they are placed in the storage room and tested at different ages. Cylinders are also made from the same concrete that is used in the blocks, and the results of tests of the cylinders and of the blocks establishes a relation between the strength of the concrete in the cylinder and that of the concrete in the block.

When the blocks and cylinders are placed in the storage room, each test piece is numbered and its number is filed away on a card in a card index. Each card bears the date on which the test piece is to be tested and the cards are filed in chronological order. This brings the current date at the front of the drawer each morning, when cards bearing the same date are taken out and the pieces are taken from the storage room and tested. The results are compiled on forms and later published in reports issued by the Geological Survey.

Concrete blocks are tested at the laboratories in two different ways; first as shown in Fig. 3, to see how much of a centre load each block will stand. Although blocks are not actually subjected to a load of this kind in practice, the results of this test make it possible to compare the relative values of different building blocks. Second, after the block has been broken at the centre by this load, each half is placed in the testing machine and crushed, in order to find the crushing strength of the block. The results of this crushing test show how much pressure similar cement blocks will stand when used in actual building construction.

The results of the great fires at San Francisco and at Baltimore demonstrated very clearly the fact that modern

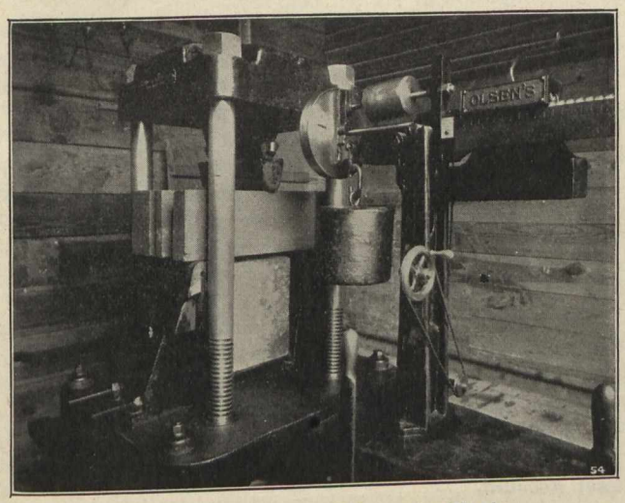

Fig. No. 3.—Testing Concrete Blocks.

buildings are not so nearly fireproof as they should be, and as they can be made. The lack of fireproofing in the past has been due somewhat to the reluctance of owners to add a small percentage to the cost of their buildings by properly fireproofing them. The failure to employ fireproof construction more generally, however, was due in part to the fact that proper information was lacking, and many engineers, architects, and owners who tried to make their buildings fireproof used all the information at their command at the time of building.

The art of fireproofing has been developed rapidly within the last few years, but there is still much to be done, especially in relation to the fire-resisting properties of concrete. In order to obtain information to meet these needs a series of fire tests are being carried on by the Geological Survey at the Fire Underwriters' Laboratory at Chicago.

For this purpose a hanging door, having a steel frame and a one-foot wall of fire brick inside of it, is used. At the centre of this frame there is an arched opening of about the size of an ordinary door. For the fire tests this opening is built up successively with different materials, ordinary building brick, fire brick, hollow tile blocks, the different kinds of cement building blocks, stone, concrete and terra cotta. After the opening is filled, a flaming gas jet is played all over the door for a long time, and when the heated surface is very hot, the gas is turned off and the door allowed to cool. In some tests the cooling takes place slowly, in others a stream of water is played on the door immediately after the gas is turned off in order to reproduce as nearly as possible the actual conditions in a fire.

When these tests are completed, the results will not only show engineers and architects what material is best for fireproofing, and how much should be used to procure the best results, but will also teach the small builder, the builder of a home, what kind of a cement block is best adapted to make his house fireproof.

It is the consensus of opinion among engineers that a reasonably fireproof building can be constructed, and it is hoped that the art of fireproofing will be so developed in the next few years that the public will also be convinced that this is true. It is also desirable that the public should be thoroughly informed as to fire-resistive qualities of the various classes of building materials, and it is expected that the work being done by the United States Geological Survey will furnish reliable information, not only on this subject, but also in regard to the strength and other properties of these materials.

TELEPHONES IN THE LUSITANIA.

For probably the first time in the history of telephony, passengers on a steamship were able to talk direct to London, Paris, and other important centres. The occasion was the sailing of the Cunard liner "Lusitania," which, on hauling alongside the Princess Landing Stage to embark passengers, was immediately connected by cable with the shore. This ship, together with the "Mauretania," now being completed by Messrs. Swan Hunter, and Wigham Richardson, has been fitted with a central battery, private branch exchange, designed to be connected with the Liverpool and New York telephone exchanges when the ship is in port. Ten pairs of wires are carried from the distributing frame to a specially designed box at each side of the ship. It is through these boxes the connection with the shore exchange is made. They contain ten pairs of platinum-tipped bronze springs carried on an ebonite slab. The ten pair cable is taken through a nozzle in the box, and the conductors are connected on to their respective terminals. Three similar boxes are fitted, in small chambers, on the landing stage in pits beneath the deck, each having ten junction lines from the town exchange terminating on them. Ten pairs of wires are carried in a flexible cable fitted at each end with a cable head. The head consists of a gunmetal casting fitted with ten pairs of platinum-tipped studs carried on an ebonite slab. The cable is passed through a brass nozzle and the conductors connected to terminals inside the cable's head. When the cable head is in position on the fixed terminal box an automatic spring catch secures the contact of the studs and springs, thus connecting the exchange junction through to the ship's switchboard. In connection with the sailing of the "Lusitania" a device designed for landing the passengers' baggage on the deck from the landing stage was for the first time brought into operation. This consists of a steel lattice framework capable of telescopic extension carrying an endless band fitted with cross battens. The upper end is lifted on to the ship's rail and the band set in motion, and the luggage is placed on the traveller and carried up to the deck. The machine is driven by means of an independent electric motor. It worked excellently, and carried the baggage on board at the rate of about 3,600 packages per hour.

ELECTRIC IRRIGATION.

The first electric irrigation system ever used in Southern British Columbia has just been installed. A pumping station has been erected, and the electric energy used to work this plant comes over the West Kootenay Power Company's line from phœnix. It is considered that the establishment of this plant will, in a great measure, solve the problem of the irrigation of several thousand acres of fruit lands in the Kettle Valley.