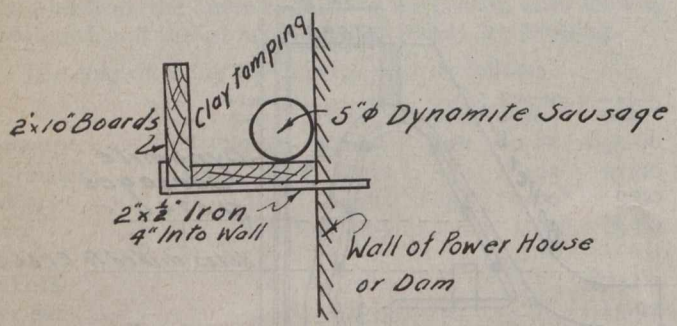
ness of 6 ft., with an opening in each to give access to the Venturi sluices, of which there were five, *viz.*, one under each spillway.

By thus increasing the thickness of the piers inside, a ledge 6 ins. wide was left on the upstream face of each pier and against this was placed a heavily reinforced concrete curtain wall, varying from 36 ins. thick at the floor level to 30 ins. thick at the top of the spillway. It will therefore be noted that the reinforcing did not pass into the piers at all, the only connection between curtain wall and piers being the above-named ledge and some stop-water timbers, half in one and half in the other. On the other hand, the curtain wall on the downstream simply rested on the piers, the reinforcing passing directly from end to end of the dam and into the abutments.

The deck of the dam consisted of a 6-in. slab of concrete in which was embedded expanded metal and 25-lb. rails for stop-log winches.

The penstocks require little or no description as they were simply steel flumes passing through a concrete gravity wall, with emergency gains of steel framing and gates, as shown on plan.

The power house itself was contained by six walls, each built of concrete (not reinforced) and about 2 ft. thick, arranged as shown on plan with steel roof trusses



Detail Showing Method of Using Dynamite Sausage

built into the concrete and covered with 2-in. lumber and wood shingles.

The time for completing the work being short and the authorities being anxious to get the new plant into operation, the company decided to meet their requests so far as lay in their power and therefore concluded to remove the dam and power house in three operations instead of two, as first intended, *viz.*, 1st, power house; 2nd, dam between the points marked α β on plan, and 3rd, the remaining intakes as convenient.

Demolishing the Power House

In order to ascertain the best way to remove the power house, holes about 6 ft. apart and half-way through the wall were dug in part of one wall. Two to four 1½-in x 8-in sticks of 60 per cent. N.G. dynamite were placed in each hole and mudcapped. These charges were exploded together and it was found that the dynamite broke through the wall and, while shaking and cracking it, did not break from hole to hole, and the walls, being held up in place by the roof trusses, did not fall. The following plan was therefore adopted: 10-in. x 2-in. boards were arranged in angle formation as per sketch and fastened to the wall at a sufficiently low elevation to permit of convenient working, and about 6 ft. below level of demolition. Straight dynamite, 60 per cent., arranged in bundles of five cartridges with a No. 6 electric blasting cap in each bundle, were placed in the boards and against the wall, leaving a space of about 2 ft. between each bundle, the bundles of explosives being pressed against the concrete by means of clay tamping, in other words, "mud-capped."

To fire the charge, the electric blasting caps were connected with the leads in series of ten, the whole being set off by throwing in a switch connecting to the 100-volt leads, which were close at hand. The result was all that could have been wished for, the walls being cut clean and the whole power house collapsed as anticipated.

In 1½ hours, five men placed and mud-capped the charges used to demolish the power house walls. Approximately 200 ft. of wall was thrown down.

Preparations for Dynamiting the Dam

When blasting out the dam, the abutment on the north side of the river, the four piers and the south gravity wall, all between the points marked α and β, were drilled to a depth of 30 ft. and in such way that the distance between each hole at the bottom was 4 ft.

A piston drill was used for drilling the holes; seventy holes being drilled in approximately 45 machine shifts of 10 hours each.

Now, instead of drilling holes in the upstream and downstream curtain walls, an operation which would have been tedious and expensive, if not almost impossible, owing to the network of reinforcing iron, instructions were given to procure 10-in. x 2-in. boards, nailed firmly together in the form of an L and arranged and supported against the inside of the curtain walls by means of 2-in. x ½-in. brackets. These angles were to be placed at 8-ft. centres, the first ones being at the same elevation as the bottom of the 30-ft. holes, thus accounting for six L's for each spillway, as per sectional elevation.

Loading the Dam

On November 9th, 1917, all necessary preparations having been made in advance, such as clay tamping, etc., a start was made to load the inside of the dam, which, being dry and warm, would not have any bad effect on the dynamite.

Canvas bags, 5 ins. in diameter and 9 ft. 0 in. long, were loaded with 14 bundles of 60 per cent. straight dynamite; each bundle contained 12 cartridges and were placed in the angles already prepared, and two No. 8 waterproof electric blasting caps were connected with each bag, one at either end.

Clay tamping was used to press the charge close up against the walls, as was done in the case of the power house, so as to obtain the maximum amount of work.

This was done for the six bags in each of the five spillways and great care was taken with the tamping as, although it has not been mentioned so far, a full head of water was against the dam and therefore the explosive had to work not only against the concrete reinforcing, but also against the water, which would minimize its effect to a great extent.

It was not thought advisable to flood the inside of the dam, as fears were entertained that the water might creep in between the bags and the wall, which might or might not have been disastrous.

On the morning of the 10th, loading of the holes was started from the deck and 60 per cent. polar forcite gelatine was used. The whole operation of loading was completed by 4 p.m.

The object of using two kinds of explosive for the work was as follows: To cut off and break up the reinforced concrete by mudcapping and to start it moving before the piers were smashed, an explosive of high velocity was necessary, so C.X.L. 60 per cent. straight dynamite was