

A careful consideration from the opposite points of view of cost of establishment, efficiency (frictional losses) and, quite specially, reliability, led to the choice of an arrangement with six pipe-lines of 39 inches inside diameter throughout, corresponding to a water velocity of 70 feet per second.

It must be said, that considering only the questions of cost and efficiency, a lesser number of pipes (with the same total area) would have been more satisfactory; but these considerations were over-weighed by the wish for an arrangement whereby the consequences of a breakdown in any parts of the plant were reduced to a minimum.

Should anything happen to one of the six pipe-lines, the five others would easily suffice for the total duty, the distributing pipes connecting the main pipe-lines to the turbines (and which are described in detail lower down) being arranged in such a way that any one of the turbines can be fed from any one of the pipe-lines. That is to say, one of the pipes can be considered as a spare.

the track, including 6 feet for the erection cable railway, is no less than 50 feet.

The individual length of the pipes is 20 feet. Each pipe rests on a wall of concrete extended across the whole width of the track. At each bend (of which there are 29 in a vertical and 4 in a horizontal direction) the pipes are anchored in huge concrete blocks, which are dimensioned so as to take with an ample margin of safety the weight of the adjacent section up to the next anchorage, as well as the forces resulting from the change of direction of the water velocity. Fig. 7 shows a typical example of these anchorages. The axial pressure is transmitted on to the concrete block by a number of cast-iron rings made in two halves.

The material used for the pipes is Siemens-Martin steel plate (boiler plate of the best quality) with a tensile strength of 24 to 28 tons per square inch, and minimum elongation of 25 per cent.. The thickness of plate were calculated on the basis of a maximum stress of 4 tons per square inch (at

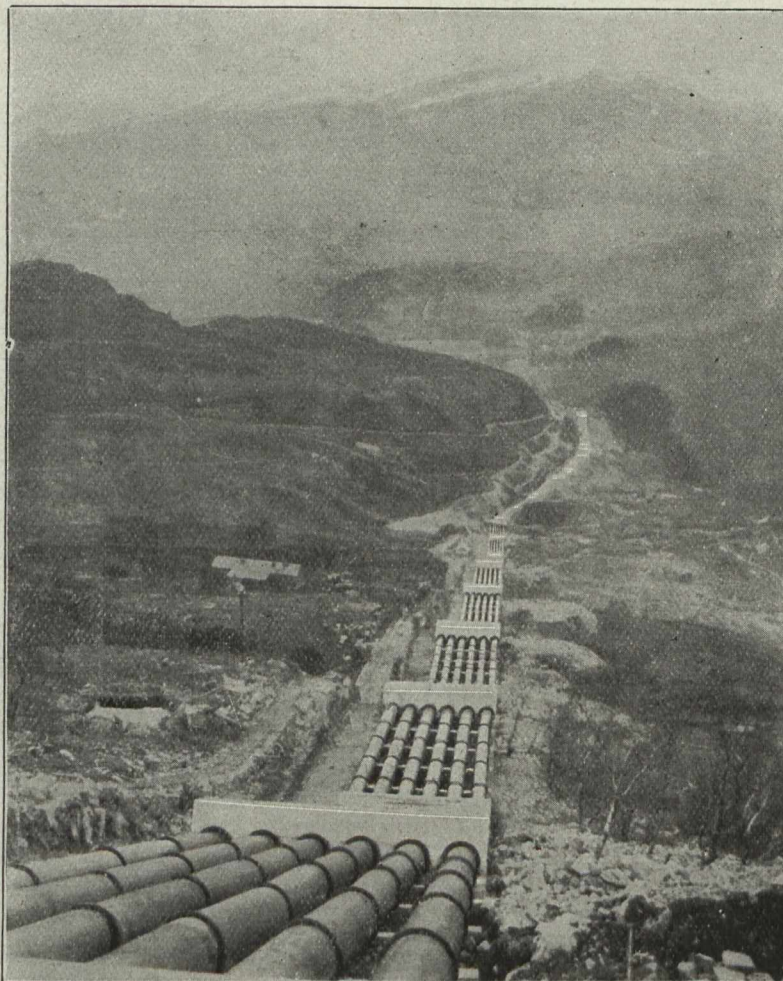


Fig. 2.

This same principle has been carried out in every detail of the plant, which in this regard at least, may well be said to be a model installation.

Provision has been made for future extension, when three more generator units of 3,000 B.H.P. could be put in; this will necessitate the installation of two more pipe-lines, the open conduit at the same time being already dimensioned for the increased capacity, which would then be nearly 40,000 B.H.P.

The complete digging work for the pipe-track has accordingly been made for 8 pipe-lines, and the total width of

working pressure) and vary between 10 m.m. at the top and 22 m.m. at the bottom. The total weight of the six pipe-lines is approximately 6,100 tons (distributing pipes included).

All the pipes are welded, and have two longitudinal and no circumferential welds, with the exception of the bends, which consist of two or three cylindrical pieces welded end to end.

The welding was effected by water gas and by quick working hammers mechanically operated. After welding, the whole pipe was thoroughly annealed in a large generator gas furnace; upon that it went through a rolling machine,