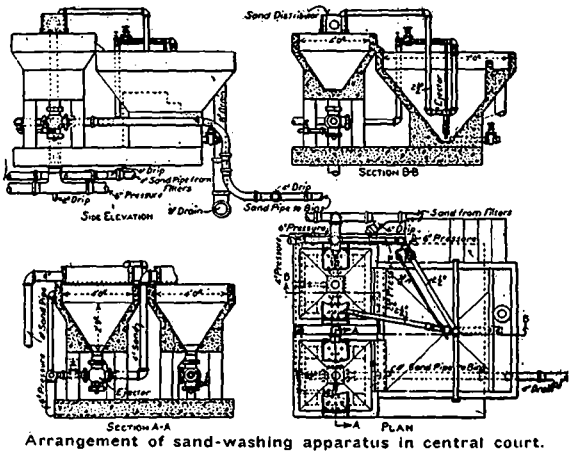
suspended a cross-piece that is placed athwart the top of the pipe. A rope passes at each end of the cross-piece to pulleys on either side of a steel belt, consisting of two sections, which is fastened at the centre of the pipe with turnbuckles. From the pulleys the, rope is brought down and fastened around the base of the pipe. When everything is adjusted the pipe is raised, and by the weight of two men swung into a horizontal position It is then lowered a few inches from the ground where the rope is kicked off, and the pipe placed safely on its



Arrangement of sand-washing apparatus in central court.

side. When required, the sections of the pipe will simply be rolled to the point of the trench at which they are to be lowered.

The thoroughness with which the work is to be carried out in general, is manifest in the way the filters are to be built. These are to have inverted groined arched floors, square concrete piers 13 ft. apart on centers, outside and cross walls of concrete, which will be built in sections 13 ft. long, and groined concrete roofs. The concrete will be mixed in a proportion of 1 barrel of Portland cement, 9 cu. ft. of sand and 16 cu. ft. of ballast. The contractor is required to provide centers for at least two complete filters, and no center may be struck without the express consent of the engineer. Owing to the importance of the matter of keeping the centers of such work in place, the specifications provide that: "No centers under the cylindrical vaulting near the wall shall be struck until the walls are thoroughly secured. Outside walls shall be considered as secured when the embankment is completed and compacted against them to the springing line. Cross walls shall be considered as secured when there are two rows of vaulting on the other side in place and set, whether supported by centers or not. The other arches in the roof shall be considered as secured when sufficient work is done beyond them to prevent the possibility of spreading and movement when the centers are struck, the amount of work depending somewhat upon the amount of fill already placed upon the adjoining vaulting."

The main drain which will be run down the center of each filter is to be a trough formed by depressing the concrete along this line. It will be 6 ft. 3 in. wide and covered with a reinforced concrete slab. The tile underdrains which will extend from it at intervals of 13 ft. are to be 10 in. split or channel pipes. The bottom of the filter bed will be covered with about 1 ft. of gravel or broken stone, on which the filter sand will have an average depth of 3½ ft. The sand is to have an effective size of 0.25 to 0.35 mm. and a uniformity coefficient of not more than 3.0. Not more than 1 per cent. of it may be finer than 0.13 mm., and no particles shall be above 5 mm. in diameter. The sand will be removed from the filters by portable ejector hoppers delivering it through wrought-iron pipes to sand washers. After being washed it will be delivered by ejectors to sand bins 34 ft. in diameter and 17½ ft. deep at the walls, the bottom being of a conical shape.

Provision is made for allowing the water above the sand to overflow at five elevations.

It will be impossible to use the ejectors and sand washers during the coldest winter weather. At such times the lake water is invariably clear, and the filters will clog but slowly, even though operated at the comparatively high rate that is proposed. Under these conditions it is not expected that it will be necessary to scrape the filters but once, or at most twice, during the winter. The sand taken off at such scrapings is to be piled in the filters, thrown out, together with that of the next scraping, at the time of the first cleaning, when it is warm enough to use the ejectors and washers. This procedure will reduce slightly the effective area of the filters during the winter weather, but it was found much cheaper to add an equal area to the filters than to protect the sand handling and washing apparatus so as to make it capable of use during winter weather.

The filtered water is to be delivered by the main drains of each bed through a 24 in. cast iron effluent pipe running through one of the regulating houses. Each pipe is provided with a reinforced concrete Venturi meter. The various pipes necessary for observing the head at different points on the filtration plant are to run to the regulating house, where they will be provided with the standard gauges and indicators. From the regulating house the filtered water will be delivered to a 72-in. reinforced concrete pure water pipe, which runs to the pure water reservoir constructed like the filter beds. A 72-in. outlet conduit constructed of reinforced concrete will connect the reservoir with the tunnel, through which the supply is delivered to the main pumping station of the city.

The connection of the outlet conduit with the mains laid across the bay to the city will be one of the greatest difficulties the engineers will have to contend with. How this will be accomplished has not as yet been definitely decided upon, but those in charge of the work are confident that it will be done in a remarkably short time, and without cutting off the city's water supply for more than a few hours.

After the filtration works have been completely installed, it is said that the city intend to convert the top of the filter area and the entire grounds of the plant into a public park for the residents of the Island and the many visitors who spend a great portion of their holidays during the summer months across the bay.

The engineer in direct charge of the work is Mr. F. F. Longley, and his assistant, Mr. W. Storrie,, both of whom have had a broad experience in undertakings of this character. The contract for the concrete pipes was carried out by the Lock Joint Company, under the supervision of Mr. John A. Hall, the "triangular mesh" reinforcement used in their construction being furnished by W. D. Beath & Co., Toronto.

AMONG THE EXHIBITS at the Industrial and Agricultural Exhibition, Lahore, there will be a working model of a grain elevator suitable for use in the Punjab. It is to be substituted for a full sized plant which a number of outside firms had intended to install, but abandoned owing to the time being too short for the purpose. The model, the construction of which is to be supervised by Capt. G. P. F. Osborne, R.E., manager of the Eastern Bengal State Railway, is to be about 5 feet long, 5 feet high, and show satisfactorily the working of an elevator. It is intended to show the manner in which grain can actually be handled, cleaned, put into bins, and taken out. It will be worked by electricity.