

\$950 and \$1,273 respectively.—Messrs. Gordon & Helliwell, architects, have accepted tenders as follows for a store front on King street for George Coleman; Carpenter work, Thomas Hancock; hardware and brass trimmings, Aikenhead Hardware Co.; plate glass, McCausland & Son. For alterations to a store on King street east for Dr. Chaffec, to be occupied by Messrs. Simmers, seed merchants, the following tenders have been accepted: Carpenter work, plastering and metal work, Thomas Turff; masonry, William Halls & Son; heating, Wheeler & Bain.

ERRATUM.

In the CONTRACT RECORD of last week it was stated that the name of the Canadian Office & School Furniture Co., of Preston, Ont., had been changed to the Canada Office & Furniture Co. This was an error. The change of name should have applied to the Canadian Office & School Desk Agency, of Montreal.

BERLIN WATERWORKS ARBITRATION.

The town of Berlin, Ont., has recently assumed control of the waterworks, which were formerly owned and operated by a private company. The price to be paid by the municipality for the works was determined by arbitration, and amounted to \$102,000, which, strange to say, is exactly the estimate of value placed upon them by Mr. Willis Chipman, C.E., who acted as valuator for the corporation.

PUMPS FOR CONTRACTORS' USE.*

(Continued.)

Another way is by means of a hand pump. In any case, a foot-valve should be provided at the bottom of the suction pipe to retain the water until the pump is started. Sometimes the suction is done away with altogether, by fixing the pump below the level of the water, or more rarely submerged in it. In the latter case a vertical centrifugal is used, the spindle projecting some few feet above the surface, its weight being carried either by an adjustable gunmetal footstep or by a thrust bearing. This arrangement has the advantage of doing away with initial priming, as the pump case is always full of water, consequently the discharge commences directly the spindle is revolved. If required, an extra length of shafting

* J. L. Crathorne, in the Contract Journal.

may be coupled to the vertical spindle, the additional weight being taken by collars resting on the shaft bearings. In fixing this pipe care should be taken that the spindle is truly vertical, that the legs rest on an even foundation, and that the whole is firmly fixed. For working in difficult situations, the ordinary horizontal centrifugal may be obtained with a swivelling arrangement by which the pump, and with it the driving pulley, may be worked at any required angle without disturbing the suction. This plan works well in the small-sized pumps, but those of large capacity are apt to suffer in rigidity through its adoption.

PULSOMETER PUMPS.—These pumps, which are driven by the direct action of steam conveyed through a pipe, are specially useful in difficult situations where a belt-driven or other pump would be impracticable. The chief working part is a ball valve, which beats alternately on two seats. The pump consists, briefly, of two pear-shaped vessels, with necks joined in a single chamber. In this chamber there are two valve seats on which one ball valve beats. The action of the pump is very simple, the water being forced out of one chamber by the steam, which is then condensed, forming a vacuum, and draws the ball over, thus cutting off steam from the now empty chamber. Water now rises to fill this vacuum; meanwhile the same process is going on in the other chamber, and the action is continually kept up. As regards construction, all faces both inside and out should be machined. Grids of brass can be recommended, with planed surfaces, and bolted down on a planed face by bolts or studs, pitched all round the joint to ensure tightness. Rubber can be recommended for rendering the joints watertight. The foot valve may be of the ordinary grid type, but one of the three-lip form is to be preferred. With 50lb. of steam, water can be raised by these pumps to a total height of about 80ft., but with higher pressures this height can, of course, be exceeded. When the height to which it is required to force is too great for the available steam pressure, one pump may be used above another. If required, pulsometers may be worked

slung in chains, and steam may be conducted to them through flexible pipes, thereby allowing the pump to be raised or lowered without the trouble of stopping to alter steam-pipes. The absence of exhaust steam, which is a characteristic feature of the pulsometer pump, is a decided advantage in close situations, down shafts, etc. It has been rightly urged against the pulsometer method of pumping that the steam consumption is high; but when used in temporary operations, taking into consideration its special advantages not shared by any other pump, this objection is, perhaps, not of much account. Lately, however, an arrangement has been patented which enables the pulsometer to use steam expansively, to secure greater economy. This attachment is called the "Grel," and can be fitted to existing pumps. The makers state that these improved pumps will compare favorably in steam consumption with those of the direct-acting or fly-wheel type.

FLY-WHEEL PUMPS.—Though these

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