## TRANSFORMER AND TESTING PLANT.

The following 60,000 volt testing plant has been designed and constructed by Messrs. Switchgear & Cowans, Limited, of Manchester, for the Union Cable Company:—

The current is taken from the local three-phase supply mains at 220 volts, and is transformed to 2,000 volts single-phase by the transformer shown on the right in Fig. 1. The single-phase current at 2,000 volts passes from the secondary terminals of this transformer to the primary terminals of the Cowan-Still regulating transformer (shown in the circular tank in the centre of the view, Fig. 1). The output of this regulating transformer at the secondary terminals is from zero to 2,000 volts. This feeds in turn the primary circuit of the high-tension transformer shown to the left-hand of the illustration, which gives out zero voltage to 60,000 volts, according as the hand-wheel of the Cowan-Still regulator is operated.

The plant has the advantage that there are no running parts, so that no dirt or dust is produced by its working. The control of the voltage on the high-tension transformer is gradual from zero to full volts, without any steps or jumps. For speed of manipulation the plant leaves nothing to be desired, as it is possible to pass from zero to full volts, or vice versa, in about ten seconds. If the test necessitates that the voltage should be applied suddenly, the article to be tested is connected to the bus-bars, the regulator turned until the correct testing voltage has been obtained, and then the switch shown on the extreme right in Fig. 1 is operated to switch off and switch on as many times as may be required.

The overall efficiency of testing sets of this type is high. In the case in point the alternative suggestion before the Union Cable Company consisted of a three-phase motor-generator taking the 220-volt supply at the motor side and driving a single-phase alternator, the latter being coupled

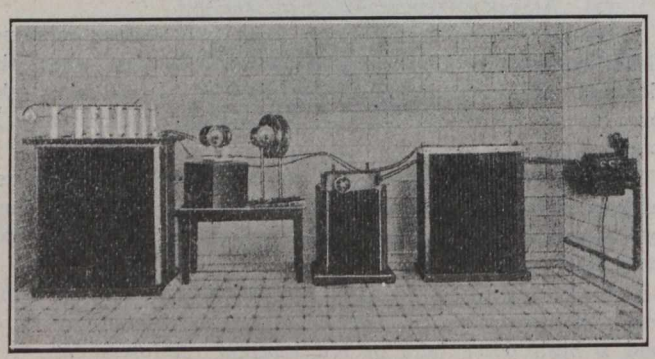

**Fig. 1—Testing Plant.**

directly to the primary of the high-tension transformer. With a set of this kind, provided with suitable regulators of the ordinary type, sufficient control of the high-pressure testing voltage can be obtained, but although in this case the existing supply at 220 volts three-phase was in favor of the motor-generator equipment, the overall efficiency of the transformer equipment was better. It is claimed that in cases where high-tension single-phase can be introduced directly to the regulating transformer, there is a very marked saving, both in capital cost and also in efficiency, by the use of the transformer equipment.

The capacity of the testing set illustrated is 50 kw. The transformers are made in all sizes, the smallest being of one kw., one of which has, we understand, been recently supplied to a colliery for testing purposes. Testing with a 1-kw. set is usually performed by the regulating transformer only. The makers supply this size of transformer in a circular steel case provided with a lid; the cable connections pass through bushes, and, when made, the lid is closed, and, if necessary, padlocked. The connections are single-phase. If three-phase current only is available, current is tapped off between two phases. The regulator is designed usually to raise the initial pressure to four times its value; thus any voltage may be applied for testing purposes up to four times the working pressure between phases.

Reverting to the larger type, as illustrated, the terminals of the H.T. transformer are arranged in the manner shown in the diagram (Fig. 2), and the connections shown in thick black lines are made by inserting flat copper links into clips. Testing may be performed at 10,000, 20,000, 30,000,

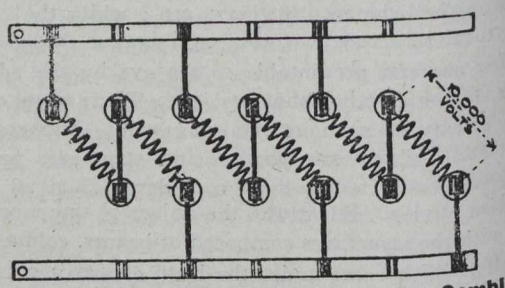


**Fig. 2.—High-tension Couplings, Allowing for Combinations from 10,000 to 60,000 Volts.**

40,000 or 60,000 volts, and a test may be taking place at 20,000 volts and another one at 40,000 volts simultaneously. For tests of moderate pressure, up to 10,000 volts, six tests may be proceeding simultaneously. At all voltages the operator has complete control by means of the regulating transformer.

The application of this transformer for testing purposes is rather inidental; its true application is for feeder regulation, for which purpose it is highly insulated, is inserted directly into the line of any given feeder, and boosts that feeder from zero to, say, 10 per cent. of the working voltage. The regulating transformer can also be designed to boost positively and negatively. For example, if it is desired to maintain a constant voltage of 6,000 at the secondary terminals of the transformer, a voltage variation on the feeder of between 5,700 and 6,300 may be successfully dealt with by a standard 10 per cent. transformer wound for boosting in both directions.

## SASKATCHEWAN ELEVATORS.

According to the figures supplied by the Board of Grain Commissioners, two hundred and forty-three new grain elevators were erected in the province during 1912, giving an increased capacity of 7,064,000 bushels. This number includes those built by the Saskatchewan Co-operative Elevator Company. It will also be seen from the accompanying tables that Saskatchewan has an elevator capacity of over two million bushels more than Manitoba, Alberta and British Columbia combined.

The following table gives the number and total capacity of elevators and grain storage warehouses in Saskatchewan in each of the years 1912-1907:—

| Year. | Number. | Total capacity. |
|---|---|---|
| 1912 | 1,252 | 36,503,000 |
| 1911 | 1,000 | 29,439,000 |
| 1910 | 909 | 26,440,000 |
| 1909 | 842 | 24,279,000 |
| 1908 | 638 | 18,138,500 |
| 1907 | 516 | 14,621,500 |