

26,300 kW Water Turbine Casing under Construction

OUTLINE OF FIVE FACTORIES

Recent progress at the five plants is reported : Kawasaki, Fukiage, Toyoda, Matsumoto, and Mie.

1. KAWASAKI FACTORY

This plant plays a vital role for our Company specializing in the production of heavy electrical machinery and apparatus. Lately, there has been a very brisk demand for such equipments and the present facilities and man-power are no longer able to meet it. Under these circumstances, enlargement of buildings, machinery and personal is steadily being realized to double the current output.

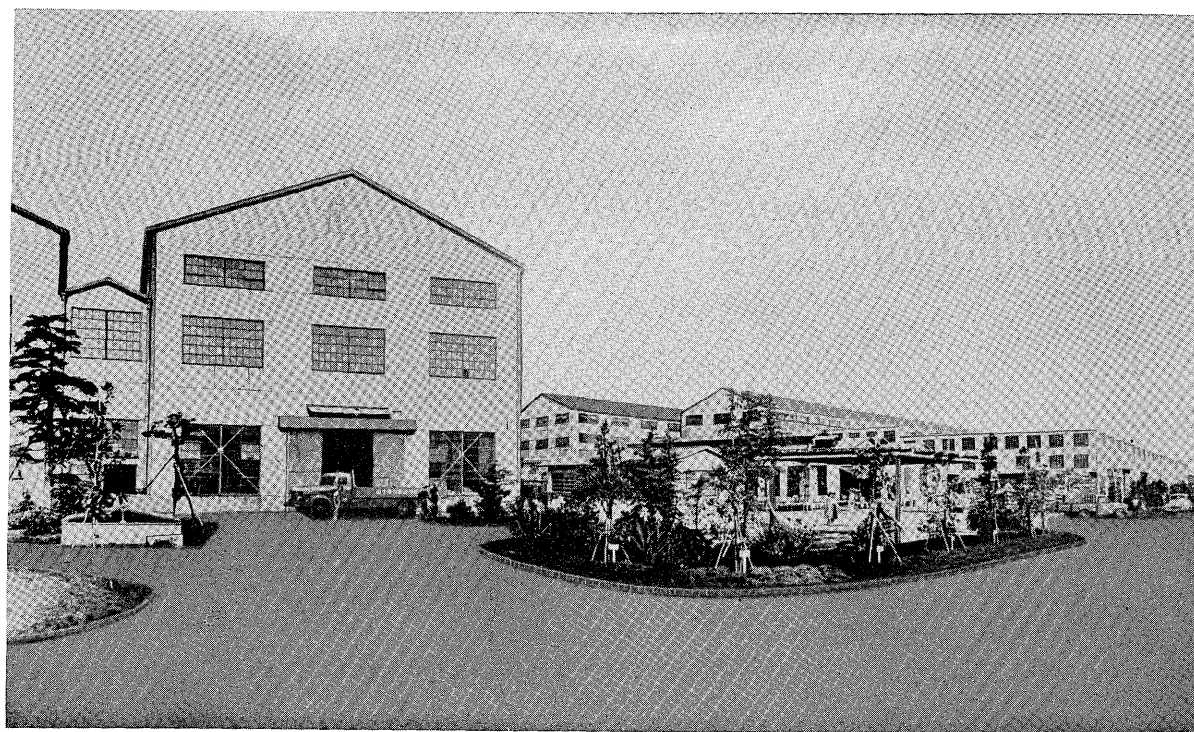
Major products from this plant include power equipment for hydraulic power generation, transmission and distribution; converters for electric railway traction and chemical engineering or other sources; motor applications for industries in general; electrical equipment for marine or rolling stock use. Recently, to these have been added winders for mine shafts and gas- and steam- turbines for land use. To suit the requirement of such combined products with electrical units, the set-up of the plant is fast being remodelled.

The plant is now capable of manufacturing turbines for hydraulic power generation with 100,000 kW output per unit, be they Francis, Pelton or Kaplan type. Among others, the plant excels in the manufacture of Kaplan type; a turbine now under construction breaks the domestic record with the figures,

37,000 kW, 36.6 m, 180/150 r.p.m. In the field of vertical Pelton turbines increasingly in demand on the domestic market, a record-maker with 16,000 kW, 333/400 r.p.m., is being constructed. The plant is also fully prepared to accept an order for equipments of pumping-up hydro-electric plants that have a promising future of development.

Production of power transformers by our Company has witnessed a spectacular advance in these few years. Our Company securely holds a foremost position in the technique of production; it has to its credit the development of perfectly shield oscillation-free type transformer using cylindrical coils and "Fahrbar" transformers (assembled transformers adapted for railway transportation).

The biggest unit completed so far is the one manufactured last year; three-phase, equivalent capacity 117,000 kVA, 275/154/10.5 kV. The potential capacity, however, is up to three-phase, 200,000 kVA, 275 kV. Besides, transformers for electric furnaces in chemical or steel making industry constitute another typical item of production. In this field, too, numerous records have been established; a unit presently under construction, three-phase, 27,000 kVA, 63 kV/234-130 V, will be



Kawasaki Factory. Left, Dynamo Factory. Right, Transformer Factory

one of large-capacity products in recent times.

In the line of converters, three types other than ordinary rotary converter are available from our Company, namely, mercury arc rectifiers, contact converters and selenium rectifiers; best type will be recommended to fit the customer's requirement. Nearly 100 units of pumpless-type mercury arc rectifiers have been produced so far and our Company is recognized as the greatest supplier in Japan of this apparatus. Besides application to d-c source in general, our Company pioneered in application to frequency converters for power use and static Leonard sets for motor application with remarkable results. The contact converters, the first commercial product of which was perfected five years ago, total 44 units, exceeding 300,000 A, counting the ones still under construction, and our Company is monopolizing the domestic market. Starting two years ago, production of selenium rectifiers is rising with sharp increase of demand.

As to breakers and switching equipment, our Company is in a position, with modern facilities, to fulfil every order for every type, be it for power or for industrial use; particularly, the expansion circuit breaker is one of the representative products and has won a great popularity from the customers.

Kinds of motors, mainly induction, synchronous and d-c motors, are widely supplied to industries covering iron and steel; chemical engineering; mining; cement; textiles; paper and etc. Especially, our Company has been rendering valuable services with high technique to iron and steel and chemical industries. As latest products there are such record-

making ones as 7,000 HP single-motor type Ilgner set for blooming mill; 7,000 HP twin-motor type Ilgner set for the same use; $5 \times 4,000$ HP d-c motors for finishing stand of continuous strip mill (under construction); 4,200 HP, 200 r.p.m. synchronous motor for compressor; 3,300 HP, 3,000 r.p.m. induction motor for the same use (under construction).

As marine equipment, a-c and d-c generators for sources on the ship and various types of cargo winches have been produced and delivered to domestic and exported vessels and their excellent performances are well appreciated.

In the newly initiated manufacture of shaft winders, German technology has been introduced; No. 1 machine, that is, double type Köpe winder for blind coal shaft, with electrical accessory equipment, is nearing completion. As a considerable number of coal shafts are being planned for digging, an increasing demand for this machine is anticipated in the future.

The gas turbine produced by our Company is closed-cycle system with a number of unique features. A 2,000 kW machine, production of which is rare not only in Japan but also in the world, has been completed and now is undergoing various tests at the plant. The gas turbine has a role in atomic power generation and a bright prospect is open before it.

The steam turbine manufacture is the field in which our Company has entered most recently; installation and enlargement of facilities are going on at the moment. Our Company is setting an eye on production of high-pressure, high-temperature machine in particular.

2. FUKIAGE FACTORY



Fukiage Factory

Four years have elapsed since this plant made a renewed start as a special maker of small switch apparatus. In that period total efforts have been devoted to improvement of conventional items and development of novel ones; in point of technology as well as production, a remarkable progress has been witnessed. Traditionally, there are numerous varieties of small switch apparatus and it is admittedly difficult to organize their production. The present scope of production is far from covering the whole field and the output is expected to jump depending upon the future development.

One of the typical new products is K 915 super small high-performance magnetic contactor with an annual output reaching 100,000. Production of K 138-2 small switch and K-244 g limit switch has been successfully organized. Varied controlling devices with combination of these small items are winning popularity among the users.

In addition, the plant is engaged in the manufacture of small transformers, below 500 kVA 30 kV, and is supplying various transformers for various purposes: oil-immersed, dry or noninflammable oil-immersed type.

3. TOYODA FACTORY

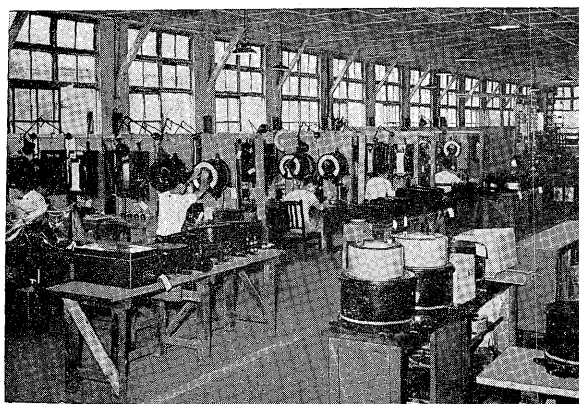
Recent progress of industrial automation in every field is conspicuous. Emphasis in production plants is laid on instrumentation and automatic control. Hitherto, this plant specialized in manufacture of industrial instruments, automatic control devices and so on; as production facilities are getting more refined and complex, requirements for instruments and automatic control devices become more vigorous and expansive. In view of this trend, this plant has been for some years developing varied kinds of pneumatic, electro-pneumatic, electronic, automatic equalizing instruments and control devices as well as conventional electric regulating apparatuses; a large number of them have been produced up to

the present. These instruments and devices need high precision and reliability for production; accordingly, production facilities and technique are required to be top-quality. The plant is equipped with many high-quality precision machines that can fabricate jigs for parts; testing facilities; and a perfectly dust- and iron powder-free, constant-humidity, constant-temperature room in which to assemble precision instruments, in an effort to secure highest quality products.

To give some examples of production under such circumspection, there are automated petroleum refinery; caprolactam manufacturing facilities; steel-making furnace; naphthalene producing facilities; gas generator equipment, etc. To these should be added deliveries in these three years of tens of automatic boiler combustion controllers that have been a monopoly of our Company.

Moreover, various standard power relays and switchboard instruments have been produced which are intended to serve as control panels for the products of Kawasaki plant. Also produced are devices for remote measurement or control; among them, the remote measurement device enjoys an established reputation and every power company in Japan largely depends upon it for power plant installation.

At the moment intense researches are being pushed to explore into a fresh field of instrumentation applying radioactive isotopes, magnetic amplifiers and so on.



Toyoda Factory

4. MATSUMOTO FACTORY

This plant was founded to specialize in manufacture of integrating wattmeters. Ten-years output since its foundation reaches 2,500,000 meters, single- and three-phase combined, accounting for 25% of total national production. About two years ago the plant entered into production of element of selenium rectifier. Successfully riding the boom, it has since become the biggest supplier of selenium rectifiers.

Watt-hour meters are a typical example of mass-produced electrical equipment; for production in quantities and at low cost, it is necessary to realize self-supply of jigs and parts by high-quality special machines. From this standpoint, the plant is steadily acquiring necessary facilities and spectacular improvement of productivity is expected. At present its facilities are capable of producing 60,000 a month, as converted to single phase.

Watt-hour meters are not only delivered within the country but also vigorously exported, with 400,000 deliveries already made to Taiwan and India.

Our Company has been the first in Japan to adopt vacuum vapourizing adhesion for production of selenium rectifier elements and through this has



Matsumoto Factory

been successful in mass-producing uniform, high-performance products. These products are in heavy demand as rectifying circuit for radio and television sets and as rectifiers for power and industrial d-c sources as well. Lately, with completed enlargement of facilities, it has come to have its capacity trebled.

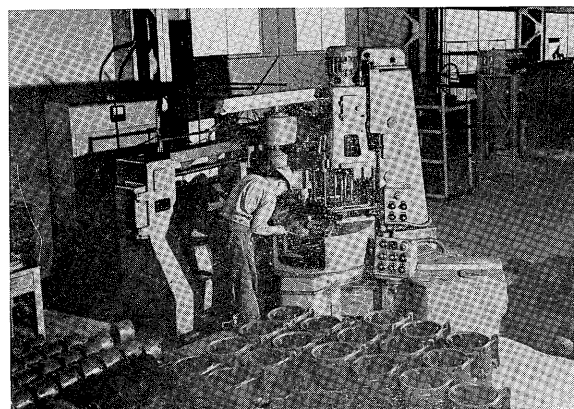
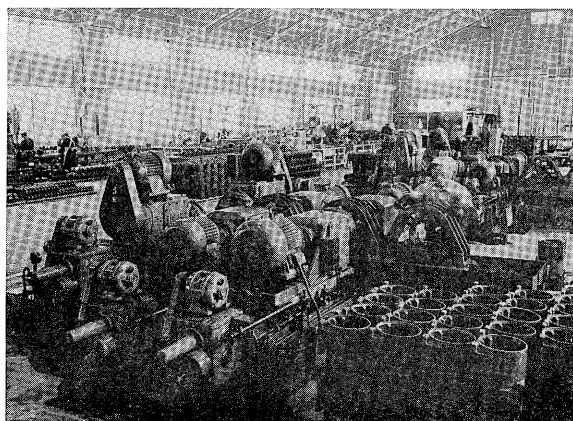
5. MIE FACTORY

This plant was originally established as a mass production plant for small induction motors. Afterwards it was expanded to produce single- or three-phase induction motors up to 100 HP; again its scope was widened to include special-purpose motors such as chemical engineering, coal mining, spinning, marine motors; hoist motors; pot motors for rayon manufacture. Now any and every type of motor can be produced at the plant. On the other hand, several years ago it began to make home appliances; now electric fans, electric washers, juicers and etc. occupy 40% of total output at the plant.

It is an evidence of successful modernization and rationalization of plant management that the output recorded a sharp increase despite increase of new items.

It means that shortening of production time and improvement of production quality have been forcibly promoted through introduction of automation and betterment of working method. As a matter of fact, time and number of labor lots for production of small motor have been cut to one third, leading to substantial reduction of production cost and elevation of production capacity.

The production capacity per month is 15,000 induction motors of various types; 5,000 washing machine; and 4,000 electric fans.



Mie Factory