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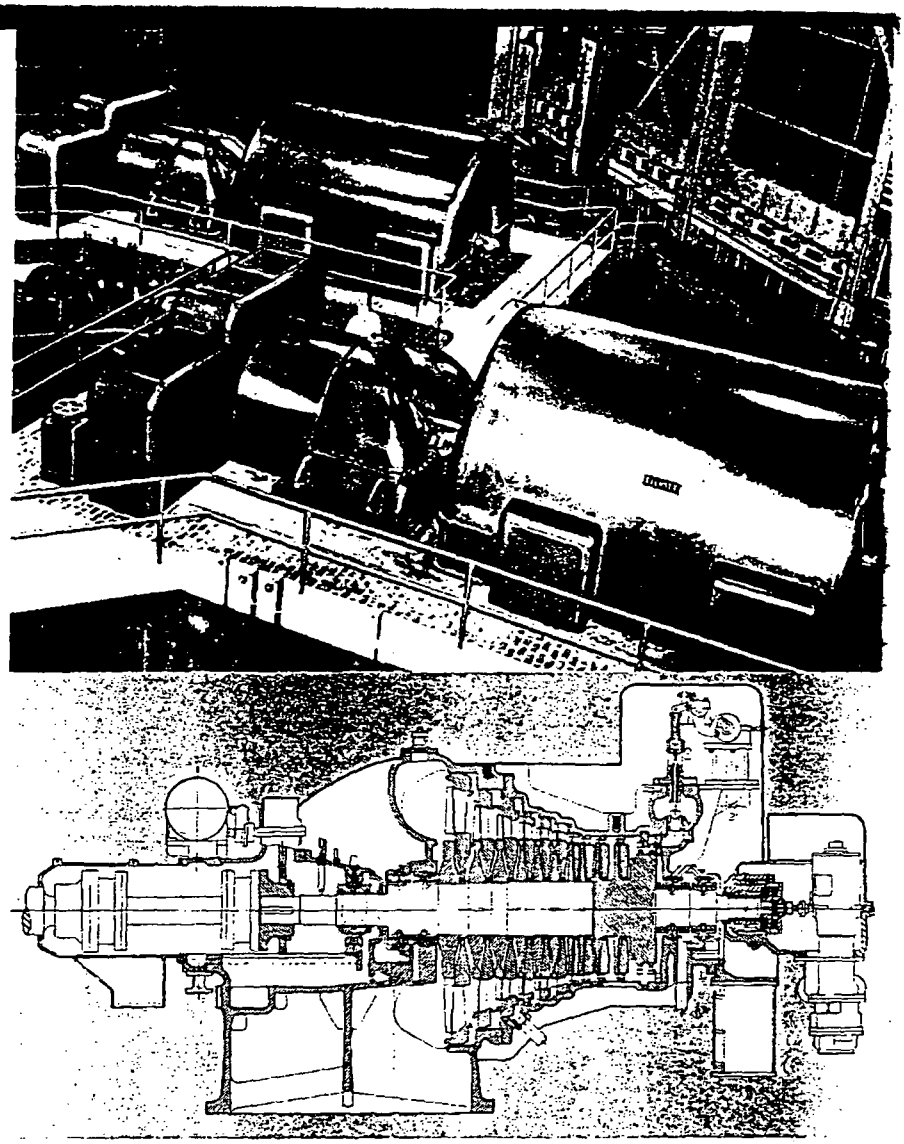

The photograph above shows two Elliott blast furnace compressors, rated 100,000 inlet cfm each, driven by 11,000-hp turbines, steam conditions 250 psig, 700 F. The sectional view shows a blast furnace compressor drive for steam conditions of 800 lb and 900 F.

The small single-stage turbine is a production type of machine designed to give reliable service where it is not economical to use a more efficient type of machine. In larger horsepowers, 200 and above, single-stage turbines are still the most common type used; however, there are indications that as fuel costs increase the more efficient multistage turbines will justify their higher initial investment.

The multistage machine, such as is illustrated at the left, retains many of the essential features of the single-stage turbine, including the lower half steam admission and the single governor-controlled inlet valve together with a couple of hand valves. At the same time it improves the economy by the addition of several Rateau stages in the casing. In some instances this multistage turbine, which can be built in sizes up to a few thousand horsepower, is equipped with the same type of oil governor as is found in single-stage machines, or it may be equipped with a vertical relay governor such as the one illustrated at the left.

The next step up the line is the multistage turbine equipped with an integral steam chest and multiple inlet valves to get improved economy at part load and also to obtain the improved governing that goes with multiple valves. This type of machine, depending upon construction details and number of stages, reaches up to the largest horsepowers. It finds considerable application in the 2000- to 5000-hp range for compressor drives. A large portion of the mechanical-drive turbine field is for compressor drive, both reciprocating and centrifugal types. These compressors are installed in refineries and other process industries such as steel mills, coke ovens, gas works, refrigeration plants, and the like, and these applications hold promise of an expanding market. For example, a modern refinery addition may require six or eight compressors each requiring a 4000- to 5000-hp turbine drive. The speed of these compressors, normally running from 5000 to 7000 rpm, has recently been stepped up to 10,000 and 12,000 rpm. With the advent of the gas turbine, compressor design has received considerable attention, and rotative as well as tip speeds are being increased. It is now common to have compressors designed with a tip speed of 900 fps, and indications point to higher speeds in the future. The driving turbines for these compressors thus become high-speed machines. This subject will be discussed in a future article dealing with turbines designed for 10,000 and 12,000 rpm.