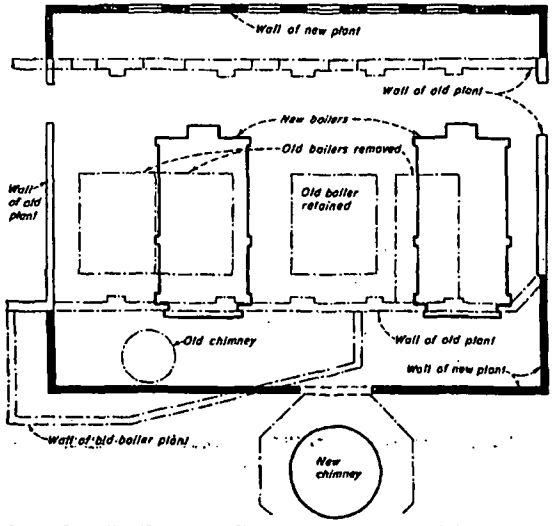
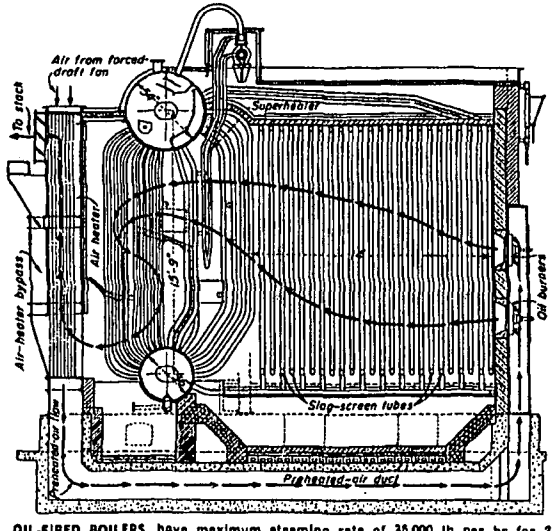
NEW PLANT SUPERIMPOSED ON OLD ONE



PLANS FOR THE NEW PLANT: First step was to erect a new building around the old one, suitable to house three new boilers and their auxiliary equipment



OIL-FIRED BOILERS have maximum steaming rate of 35,000 lb per hr for 2 hours. They have tubular air heaters to heat combustion air from 80 to 300 F

grade coal. Provisions have therefore been made in the windbox and furnace design so the fuel can be readily changed to pulverized-coal firing if it becomes desirable.

The furnace has been equipped with a slag screen and made large enough to keep the heat release below 22,500 Btu per cu ft per hr at peak load. Ash doors are large; provision is made for an ash conveyor and its intakes in the boiler-room floor. If fuel is changed, the lower burners will be removed and their holes in the furnace wall bricked up. A forced-draft pulverized-coal burner will replace the upper oil burner.

Fuel Oil. Oil is received by tank car and pumped to three 28,000-gal tanks near the boiler plant. These tanks are heat insulated and encased in sheet aluminum to retain as much heat as possible in the oil. Oil and steam lines from the boiler room to the tanks are installed in wooden runways filled with insulation and incased with sheet metal so that the steam line acts as a heater for the oil lines. Provision is made at the storage tanks for steam-heating them and the tank cars.

Two tank cars can be spotted on the siding. Oil is pumped from these to any one of the three storage tanks. In addition, piping is arranged to permit pumping oil from any tank to the oil heaters in the boiler plant or from any one tank into another. The latter provision takes care of an emergency such as would arise if a tank started to leak.

Uninterrupted Steam Supply. As previously mentioned, distilling processes are continuous operations that, once started, should not be interrupted. Therefore in the boiler-plant design everything economically possible has been done to insure an uninterrupted steam supply. The boilers connect to a loop steam header valved in such a way that either boiler can be used to feed the process and heating lines should either header section be out of use.

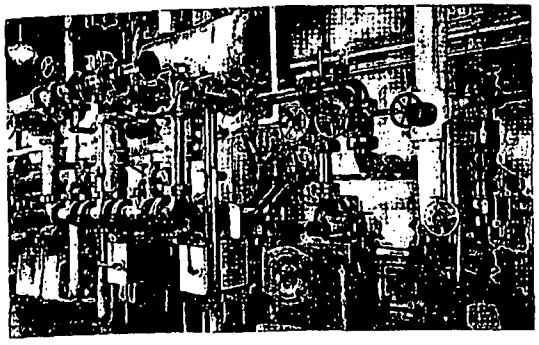
Practically all auxiliaries are in duplicate, one motor and one steam driven. Oil unloading and transfer pumps include a steam-driven direct-acting and a motor-driven rotary. Heaters and burner pumps are provided in a similar combination. For boiler feed, steam-turbine and motor-driven centrifugal pumps are installed (see photo, p 69). An exception to duplication of equipment is the forced-draft fan, which is motor driven, on each boiler. If the fan's drive should fail the air heater can be bypassed to keep the boiler going until the other unit is brought into service.

There is always the possibility of a failure of power to the plant, which is being provided for by the installation of an emergency internal-combustion engine-driven generator unit. This will take care of essential power needs among them the forced-draft fan motors.

Boiler Instruments. Fuel costs are comparatively high for either coal or oil; therefore it is essential that plant efficiency be maintained at a high level. To this end the boilers have been provided with a full complement of indicating and recording meters and equipped with automatic combustion control (photo on p 67).

With these meters the operator has *practically complete knowledge* of boiler and auxiliary performance without leaving the control board. Then by the aid of the automatic-control equipment he can obtain from the boilers practical test performance in everyday operation. In this installation, such performance is an average boiler and furnace efficiency of 84%. In addition, the new plant provides much needed boiler capacity and improved boiler-plant efficiency of about 40%.

The author expresses his thanks to F W Rofley, secretary, and H J Senk, plant manager, Melchers Distilleries Ltd, and their staff, for cooperation and assistance in carrying out the work of modernizing the company's boiler plant and in preparation of this article.



BOILER FEEDWATER EQUIPMENT includes two feedwater pumps, one motor- and one steam-turbine-driven. Each unit is rated 70,000 lb per hour at 175 psi

PRINCIPAL STEAM AND ELECTRICAL EQUIPMENT

Boiler Plant of Melchers Distilleries

STEAM-GENERATING EQUIPMENT:

Boilers and air heaters.....Dominion Bridge Co
Boilers; 3 drum, bent tube; integral furnace; 8000 sq ft of heating surface in boiler and waterwalls; rated continuous steaming capacity 30,000 lb per hr; maximum 2-hr steaming capacity, 35,000 lb per hr; 200-psi drum-design pressure, 125-psi operating pressure at superheater outlet; 425 F, total steam temperature; 2100 cu ft furnace volume; 22,500 Btu maximum heat release per cu ft per hr.
Superheaters.....Superheater Co Ltd
Boiler-supporting steel, casings, ducts and breechings
Dominion Bridge Co
Boiler refractories.....Canadian Firebrick Co
Boiler heat insulation.....Asbestos Ltd
Boiler refractories and insulation installed by.....Atwood Ltd
Soot blowers, air puff.....Diamond Specialty Ltd
Chimney.....Francis Hankin & Co
Radial brick, 175 ft above boiler-room floor, 78 in. inside diameter at top, lined for lower 50 ft.

FEEDWATER SYSTEM:

Feedwater chemist.....Milton Hersey Co
Feedwater heater.....Darling Bros
Whitlock, 6-pass horizontal, 195-sq-ft heating surface
Feedwater regulators (Copes).....Peacock Bros
Continuous blowdown.....Permutit Co of Canada
Nonflash, heat exchanger and orifice rate-of-flow control
Water columns with Klinger reflex water-level gage
Dominion Bridge Co
Feed pumps, 2 (Weir).....Peacock Bros
One turbine-driven, one motor-driven, 70,000 lb per hr, 175 psi.
Feed-pump turbine, 3600 rpm; steam condition 125 psi, 425 F, 5-psi back-pressure.
Feed-pump motor.....Lancaster Motor & Dynamo Co
Squirrel-cage, 32 hp, 440 v, 3550 rpm with automatic device to cut in turbine driven pump if electric power fails.

METERS:

Steam-flow air-flow meters, steam-temperature recorders, draft gages (7 point), CO_2 indicators and recorders, steam-pressure and temperature recorders, and feedwater-temperature recorders
Republic Flow Meters Co
Boiler water-level and oil-storage-tank liquid-level recorders
Republic Flow Meters Co
Oil-pressure gages.....Mensing, Maxwell & Moore
Thermometers.....Manning, Maxwell & Moore

COMBUSTION EQUIPMENT:

Automatic combustion control (Hagan Corp)
Dominion Flow Meter Co
Air Compressor, 18 cfm, 100 psi.....Ingersoll-Rand Co
Oil burners, 2 per boiler (Todd)..Combustion Engineering Corp, Ltd
Windboxes and ducts.....Henderson Barwick Co
Oil heaters, 2 (Peracoil).....Davis Engineering Corp
Electric heater, 6 kw (Todd).....Combustion Engineering Corp, Ltd
Oil pump, direct-acting, steam.....Dean Bros Co
Oil pump, rotary, motor driven.....De Laval Steam Turbine Co
Oil steam-pump governor.....Leslie Co
Oil pressure constant-relief valve.....A. W. Cash Co
Relief valves.....Crosby Steam Gage & Valve Co
Oil-temperature regulator.....Spence Engineering Co
Suction and discharge oil strainers (Todd)
Combustion Engineering Corp, Ltd
Oil-storage tanks, three, 28,000 gal, each.....Toronto Iron Works
Oil-storage-tank heat insulation.....Asbestos Ltd
Oil-transfer pump, direct-acting, steam.....Dean Bros Co
Oil-transfer pump, motor driven.....Viking Pump Co
Oil-transfer-pump motor, 5 hp.....Canadian General Electric Co
Forced-draft fans, vane control.....Canadian Blower & Forge Co
Motor driven, 10,000 cfm at 7 in. wg and 100 F.
Force-draft-fan motors, 15-hp, squirrel-cage
English Electric Co of Canada
Fan-motor starters, across the line.....Canadian Controllers

VALVES, PIPING AND TRAPS:

Piping contractor.....The Garth Co
Safety valves (Consolidated).....Manning, Maxwell & Moore
Nonreturn, blowdown and feedwater stop valves.....Hopkinson, Ltd
Main stop valves at boilers.....Hopkinson, Ltd
Steam-line gate and globe valves.....Crane Co
Feedwater-line valves.....Jenkins Bros
Oil-line gate and globe valves.....Crane Co
Pressure-reducing valves.....Mason-Neilan Regulator Co
Traps.....Armstrong Machine Works
Expansion joints.....Yarnall-Waring Co
Piping insulation.....Eaman-Riggs, Ltd
Plant construction and chimney foundation..Bremner Constr Co, Ltd