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MAR 28 1951

SPRING 1951

PUBLISHED BY ELLIOTT COMPANY



**WELDING MAKES
A BETTER PRODUCT AND
A GOOD PICTURE**

In the weld shop of the Ridgway Division, work fabricate the stator frame of a large synchronous condenser. "Fabri-Steel" construction developed Elliott, has contributed the toughness, rigidity, a adaptability of welded steel to large motor and generator design.

powerfax

SPRING, 1952

VOL. XXX NO. 1

Published by Elliott Company... POWERFAX is a magazine of information for engineers and operators of steam and electric power plants, or in charge of industrial processes. More than 37,000 copies are distributed quarterly with the compliments of Elliott Company to its customers and friends. Address correspondence to C. W. Kalbfus, Editor, Elliott Company, Jeannette, Pa.

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Our Cover

This issue, our cover goes modern. The artist depicts the process of deaeration in an abstract design. Taking some artistic license, he shows water cascading over heating trays, steam sweeping upward and carrying dissolved gases out the vent.

District Offices

Arthur P. Grimm, of the Philadelphia office, is now in charge of the Wilmington, Delaware suboffice.

A Portland, Oregon, branch office of the Seattle office was recently announced. Mr. L. O. Ruud is resident field engineer and is located at 1305 Terminal Sales Building, Portland 5.

James A. Snyder, who has had four years' experience in the Jeannette blower application department, was recently transferred to the New York office. J. D. McCarthy, of the Jeannette engineering department, has also joined the New York office.

Recently assigned to the Chicago district office were D. J. Hutton, C. P. O'Neil, and Thomas C. Madsen.

The South's Mr. C-W

Back in 1904, when industrial opportunities in the South seemed few and far between, B. A. Schroeder was appointed Southern Representative (New Orleans) for the promising, young Crocker-Wheeler Electric Company. He soon sensed the market developing in the infant steel area around Birmingham, Alabama, established headquarters there, and began, what is to date, a 48-year hitch as "Mr. Crocker-Wheeler" in and around Alabama.

In 1912 he formed the General Machinery Company, broadening his product line to include, in addition to Crocker-Wheeler motors—gears, motor control, mining machinery, wire rope, and other types of equipment needed by the area's industry.

Mr. Schroeder has had an active and interesting career and is widely known and deeply respected throughout Alabama and nearby states. Devoted to sports and the outdoor life, he has been a pro ball player, hunter, yachtsman, deep sea fisherman, and aviator. He has owned three airplanes, surviving a serious crack-up in one of them.

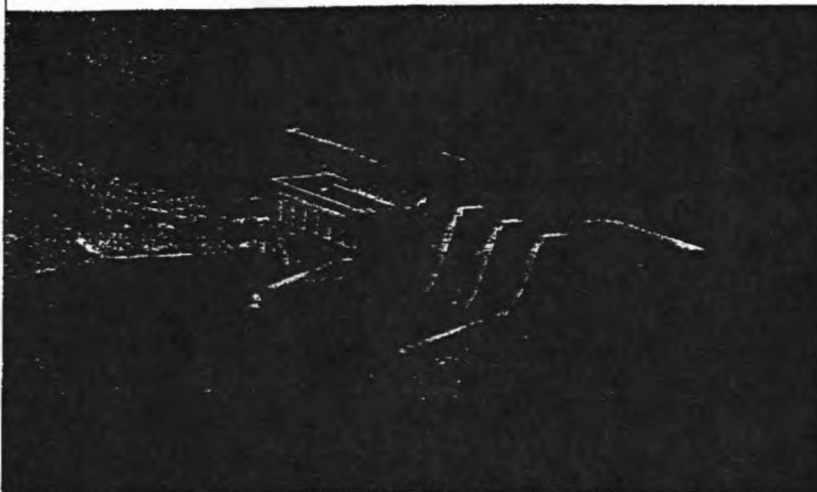


Although tapering off his business activities in recent years, "B.A." still guides General Machinery Company and enjoys preaching the merits of his first love, Crocker-Wheeler motors.

Old Name Plate

This name plate is interesting in connection with Mr. Schroeder for it was removed two years ago from a 2000-kw, 83½ rpm, 25-cycle, 6600-volt Crocker-Wheeler generator which Mr. Schroeder sold to the Tennessee Coal, Iron and Railroad Company for their Ensley Power Plant in 1906. This generator, which was driven by a Corliss engine, was in operation until two or three years ago. The engine has been replaced by a turbine drive and the old name plate was photographed at the time.





An aerial view of the Flambeau Hydro Station, showing a portion of its 2000-acre impounded reservoir. Note the use of tainter gates in the spillways of the concrete structure. A portion of the mile-long compacted-earth dam can be seen on either side of the concrete central section. At the left is the outdoor switchyard in which connections are made to transmission lines at 69,000 volts.

NEW HYDRO POWER FOR AMERICA'S DAIRYLAND

TEN years ago, two power cooperatives in the heart of America's midwest were merged to form Dairyland Power Cooperative. This extensive cooperative organization, embracing parts of four states—Minnesota, Wisconsin, Iowa, and Illinois—is aptly named since it serves the very heart of the nation's dairy industry. The cooperative is now operating 11 generating stations of all types; steam, diesel, gas-diesel, and hydro, each plant of the type most favorably adapted to its environment and to the needs of the Dairyland system. The 11 stations have a generating capacity of 130,000 kw.

For some years Dairyland has operated a small hydro plant located on the Root River near Lanesboro, Minnesota. During the past year, however, four hydros, all located on the Flambeau River, were acquired, three by lease arrangement and one by construction. The hydro power output of the three units, all small, totaled only 3800 kw, being located scarcely five miles apart. The Flam-

beau Hydroelectric Station, located upstream of the three older stations, is Dairyland's newest, and by far its largest, hydro plant. The new station, having three Elliott 5000-kw turbine-generating units, is located five miles northeast of Ladysmith, Wisconsin and utilizes a concrete dam and a clay-cored earthen dike to create a hydraulic head of some 65 feet.

After nearly three years of construction, the station went into service in January, 1951. The feasibility of the station was based on an average annual estimated output of 60 million kwh, but because of unusually heavy rainfall, the actual output in 1951 exceeded 90 million kwh. This station provides an economical source of electric power for the northern part of the Dairyland system.

During construction of the new plant, the river channel was temporarily diverted by cofferdams. The potential reservoir was carefully cleared of brush and trees, the trees being removed at ground level to

assure a clean and safe lake basin for boating and other recreation. When the old river channel was closed by an earth fill, the river flow passed through temporary openings in the concrete main dam. Augmenting the concrete main dam and power house a 5200-ft compacted-earth dike was constructed, its edges covered with stone riprap to minimize erosion. At station construction neared completion, the temporary dam openings were sealed with concrete and the river waters were forced to rise in the prepared reservoir. The result is a picturesque 2000-acre lake with a shoreline of nearly 24 miles and extending eleven miles into the lush surrounding farmland.

The generating equipment in the Flambeau Station consists of three Elliott vertical hollow-shaft water wheel generators, each rated 625 kva, 5000 kw, 225 rpm, 3 phase, 6 cycles, 4160 volts. These machines are driven by S. Morgan Smit Company's Kaplan-type turbine with the adjustable blades of which make

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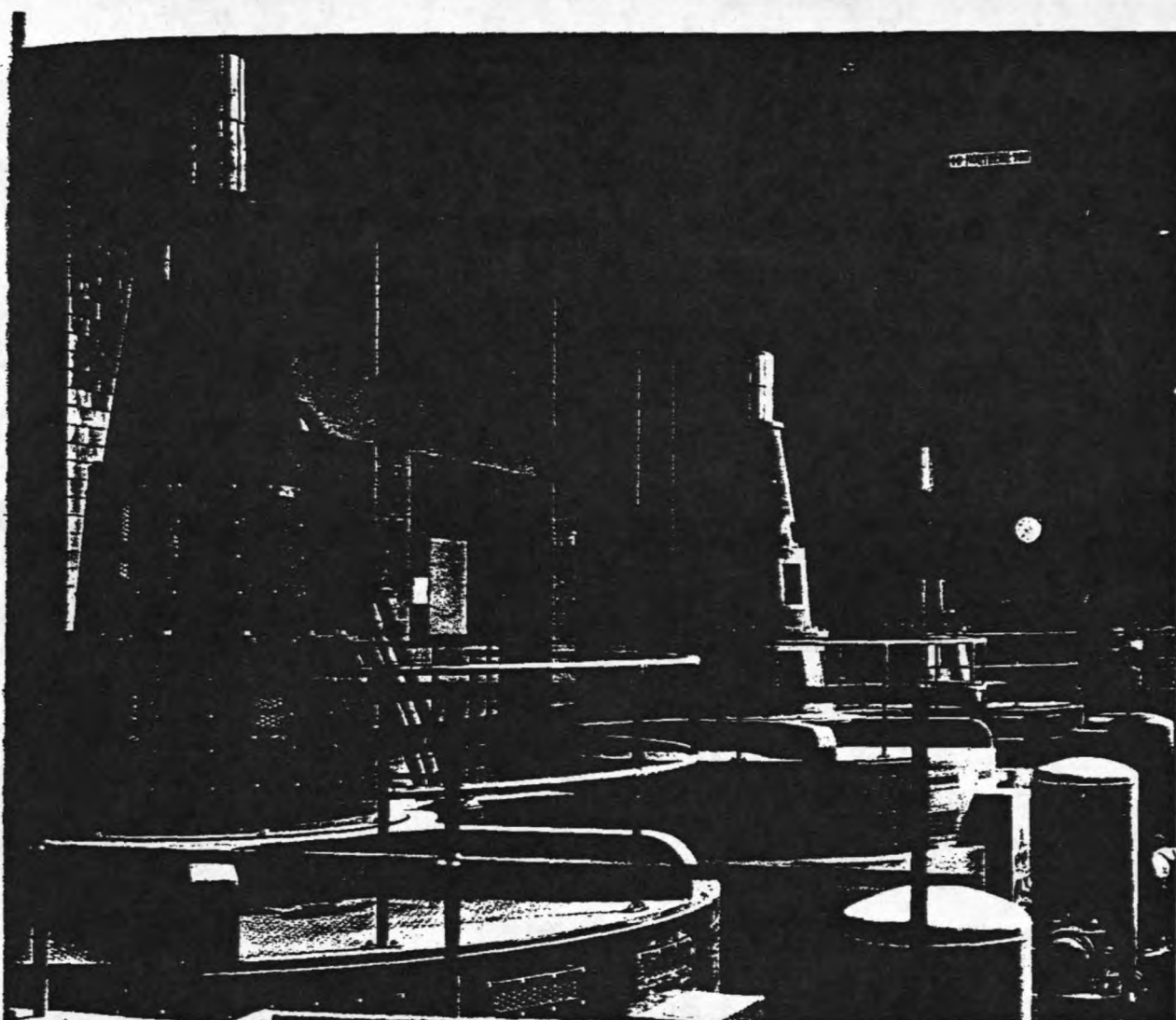
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it possible to gain maximum output from the stream in a low-head installation such as this.

Each generator is an open, self-ventilated unit, with main and pilot exciters, and excitation of the machines is controlled by rotating amplifier-type automatic voltage regulators, located on the switchboard in the control room.

Fargo Engineering Company, of Jackson, Michigan, handled the design and engineering for this project.

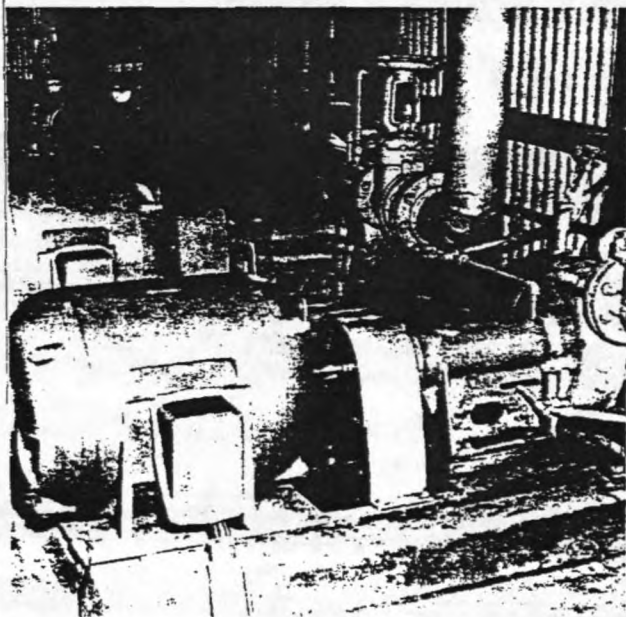


These identical Elliott vertical-shaft generators, each rated 6250 kva, 225 rpm, are driven by S. Morgan Smith Company turbines on a stream 65-ft head. This modern hydrostation is the latest addition to the generating facilities of the Dairyland Power Cooperative, LaCrosse, Wisc. In the picture can be noted the oil head assembly supplied by the turbine manufacturer, located directly above the direct-connected exciters. Above the oil head on each unit is the permanent magnet generator, part of the governor equipment furnished by the Woodward Governor Company. The door leading to the control room is seen at the rear.

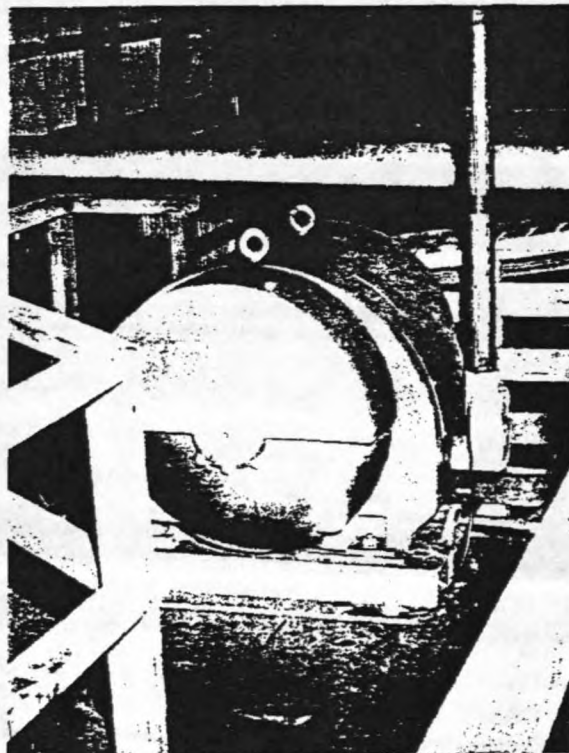


General view of the Empire, Alabama, car shakeout and crusher plant of DeBardleben Coal Corporation.

Two of several Elliott Crocker-Wheeler motors in service at DeBardleben Coal Corporation's new processing plant. These type BA motors, rated 75 hp, 220 v, 1800 rpm, drive twin flotation pumps which handle reclaim water from the washers.



This Elliott C-W 50-hp, 900-rpm protected-type induction motor with 13 per cent slip, operates a battery of jig machines which require high starting torque. Large heavy flywheels are on the jig crankshaft and the combined design requires a motor of the highest starting efficiency.



NEW PREPARATION PLANT FOR DeBARDELEBEN COAL CORPORATION

THE modern coal preparation plant is a highly mechanized factory whose product is a better, more uniform fuel, free of impurities, dust, and dirt.

The new plant of DeBardeleben Coal Corporation, Empire, Alabama, illustrated here, produces 1600 tons of the finest grade stoker coal every eight-hour shift. Many electric motors, predominately Crocker-Wheeler, power the various processing units. A wide variety of motor types are employed, including ordinary open motors of normal characteristics, totally-enclosed, fan-cooled *Scaledpower* designs, and high-torque motors. A battery of jig machines requires a high-slip motor with the highest starting torque that can be built into a squirrel-cage motor. The Elliott Crocker-Wheeler motors in service in this plant range from 125 hp down to 10 hp.

DeBardeleben Coal Corporation is one of the largest independent coal companies in the South. They operate another processing plant at Hull, Ala., as well as a by-product plant located south of Birmingham. The company mines coal from several different seams, blending it at DeBardeleben properties at Coyle and Dora, Ala.

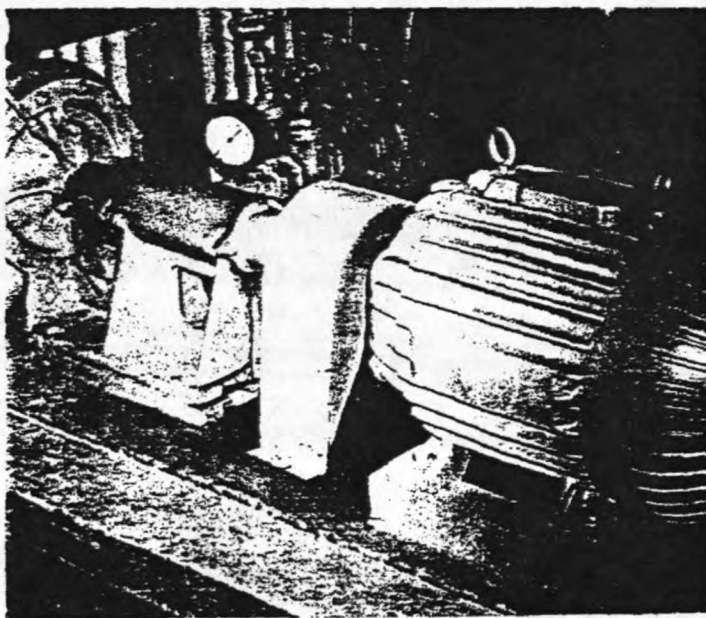
A retail outlet is maintained in Birmingham under the name, Empire Coal Yards. In addition, the Coyle Towing Company, New Orleans, and a barge line from Coyle, Ala., to the Gulf of Mexico are properties of this extensive organization.

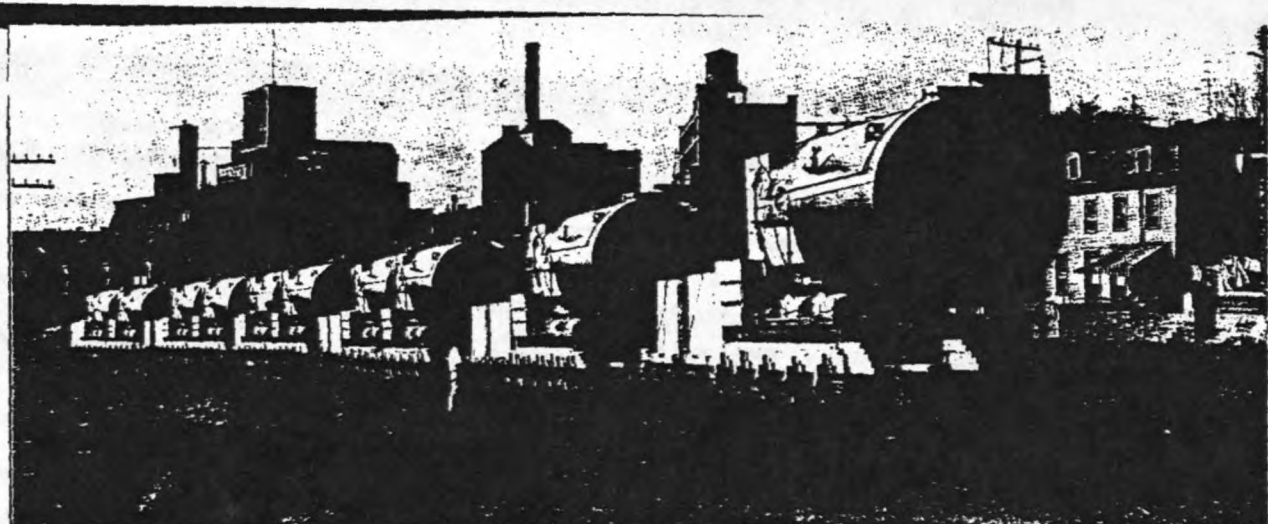
Operating offices are located at Sipsey, Alabama, about thirty-five miles west of Birmingham and near the center of their various coal properties. The executive offices are located in the Transportation Building in Birmingham.



This Elliott Crocker-Wheeler 75-hp, 1800-rpm motor drives a 1000-gpm relay pump, used to relay water from a large storage basin to the main plant reservoir.

This Elliott Crocker-Wheeler 25-hp, 1800-rpm motor is of the totally-enclosed fan-cooled Scaledpower type and drives a pump used in the flotation processing.





PACKAGED STEAM BOILERS OFFER CONVENIENT STEAM SUPPLY

HERE is a trainload of identical *Powermaster* steam generators on their way overseas. These compact, self-contained, "packaged boilers" require only connection of fuel, water, and electric lines to be ready to furnish steam.

Powermaster was developed in 1944 by Orr and Sembower, Inc., of Reading, Pa., manufacturers of steam equipment since 1885. They are made in ratings from 15 to 500 hp, in low- or high-pressure design, and are planned to operate on either oil, gas, or a combination fuel.

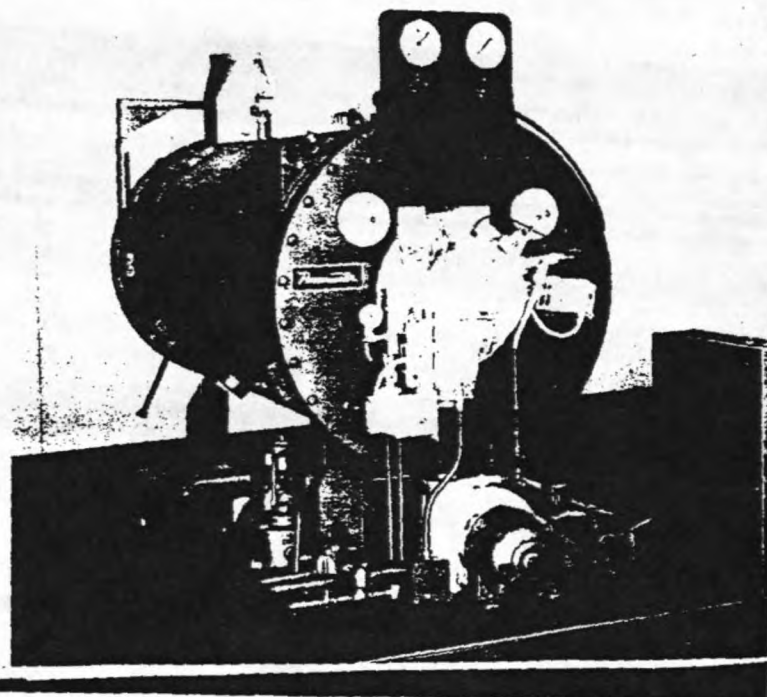
The blowers, compressors, and pumps which are incorporated in *Powermaster* generators are all driven by Elliott Crocker-Wheeler motors. In a typical unit, Crocker-Wheeler motors power water pump (3 hp),

air compressor and oil pump (2 hp), and blower for the burner (1½ hp C-flange mounting). In some designs, a spare boiler-water pump motor is included.

The Orr and Sembower *Powermaster* has a multitude of applications. Simple and self-contained, it is of course especially suited to temporary or emergency steam supply service.

In permanent installations, *Powermaster* units provide heating steam for hotels, factories, office buildings, as well as process steam in dairies, laundries, dry-cleaning plants, and bottling plants, to name just a few applications. The rugged, Crocker-Wheeler motors contribute to their fine reputation for reliable service in any application.

Control end of the Powermaster packaged boiler. The flanged-mounted Crocker-Wheeler motor in the foreground drives the blower for the oil or gas burner. Other Crocker-Wheeler motors provide power for water pump, air compressor, and oil pump.



BRAKE MOTOR SOLVES QUALITY PROBLEM, INCREASES PRODUCTION

LINDSAY, OBERHOLZER & COMPANY, industrial distributors at Philadelphia, Trenton, and Wilmington who handle Elliott Crocker-Wheeler motors, publish a monthly magazine entitled *Lindsay-Oberholzer News*. A recent issue carried an interesting story of how an Elliott C-W brake motor was applied to very good advantage on a loom. We quote:

"The William T. Carson Co., Philadelphia, had been vexed by a problem in their manufacture of zipper tape. Zipper tape must be woven to rigid specifications and when there are 'stop-marks,' these sections must be cut from the tape.

"These 'stop-marks' are imperfections that are caused when the power is shut off on a narrow fabric loom, and the loom coasts to a stop as it does in four or five revolutions.

"While it is coasting the batten does not pound the yarn into the tape with its full power. This leaves a loose weave or imperfection that shows up plainly as a 'stop-mark.'

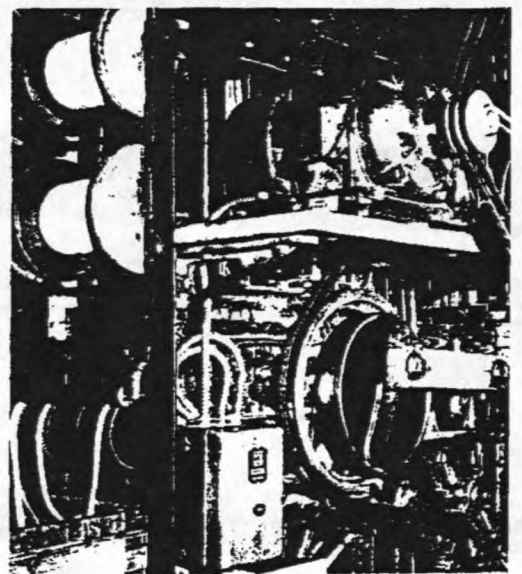
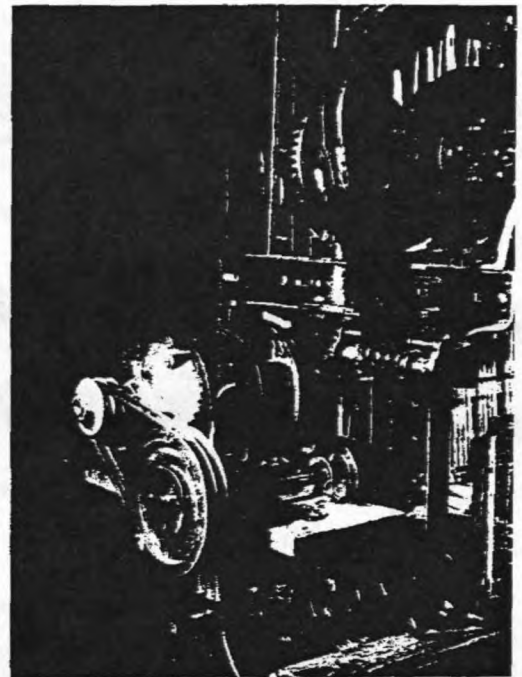
"You begin to realize the size of the problem when you learn that a loom is stopped for a variety of reasons—a broken thread, an empty bobbin—and the imperfections from each stop are multiplied because the loom is weaving 72 tapes at once. Hence each shutdown automatically produces 'stop-marks' on every single one of the 72 rolls of tape.

"How could these rejections be reduced? Lindsay-Oberholzer helped work out the solution, and the photographs of the converted loom drive indicate the way the following results were brought about. A major factor was the installation of a 1-hp Elliott Crocker-Wheeler brake motor, which now stops the loom in less than one revolution instead of four or five. This change not only improved the quality of the tape, but also made it practical to increase the loom speed by five per cent, resulting in that much increased production per loom.

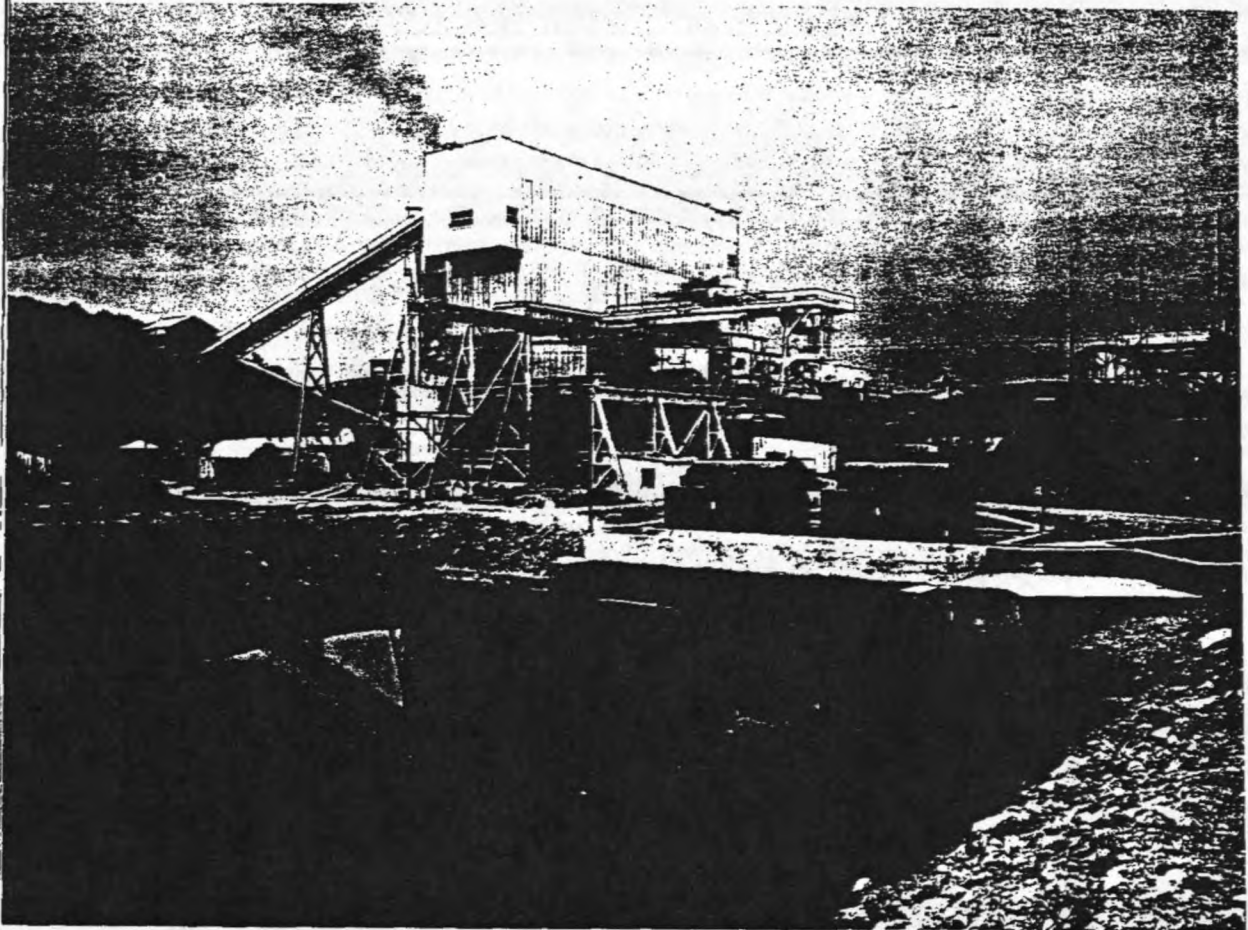
"Another feature of the new installation was the application of a two-step V-belt drive, which has resulted in longer belt life.

"The cost of the new equipment amounted to about \$200 per loom. But the saving, says Mr. Carson, amounts per loom per year to over \$500. Plus better quality tape."

Two of the installations of Elliott Crocker-Wheeler 1-hp brake motors on narrow fabric looms making zipper tape at the plant of William T. Carson Co., Philadelphia, Pa. The brake motors eliminate "stop-marks" on the tape, and stop looms within one revolution.

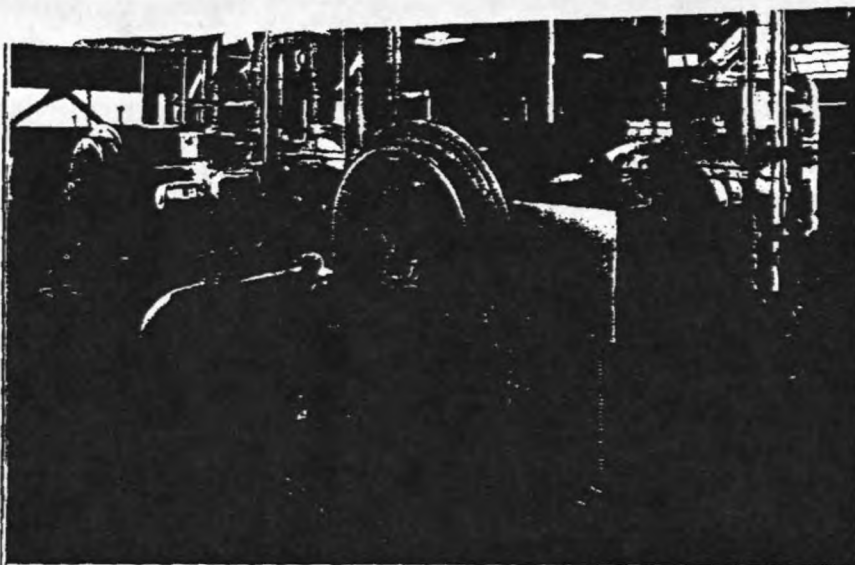


LOW COST AND FLEXIBLE DES



The Milesburg Station of West Penn Power Company is "semi-outdoor" in design for minimum investment, greatest flexibility. Aluminum siding forms the exterior walls. A traveling crane straddles the turbine room. Trash rack on water intake, outdoor switching equipment, and coal-handling facilities are visible in this view.

One of the two Elliott 13,000-sq ft, two-pass nondivided water surface condensers. Back-flushing valve is seen in the foregro



These three Elliott 500-hp two-pole induction motors drive the 545-gpm boiler-feed pumps.

employed instead of one larger unit. Each generator has a standard rating of 20,000 kw at 85 per cent power factor, 0.5 lb hydrogen pressure, 13.8 kv, 3600 rpm. Steam conditions are 900 F, 865 psi. The flexible, semi-outdoor design of the station provides for approximately doubling the capacity if needed.

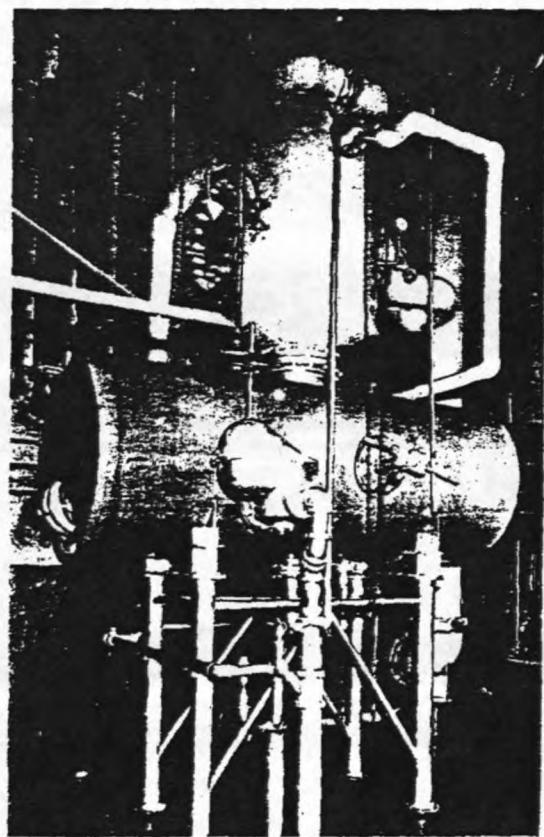
Elliott equipment in the station includes the two surface condensers with their twin two-stage ejectors, the boiler-feed pump motors, induced-draft fan motors, as well as other auxiliary electrical drives. Elliott twin strainers are used in ash sluicing and water service lines. The accompanying photographs show some of this Elliott equipment in operation.

A HOSPITAL DEAERATING HEATER INSTALLATION

THIS neat installation of an Elliott 28,000-lb-per-hr vertical deaerating feedwater heater mounted on a horizontal storage tank recently went into service at the Swedish Hospital, Minneapolis, Minn. Installed by Bjorkman Bros. Company, of Minneapolis, the heater replaced a 40-year-old open-type heater, which had been moved from an old power plant into the new hospital building. The present power plant contains two 300-hp and one 412-hp boilers, and two 400-kw steam engine-generators operating on 150 psi steam.

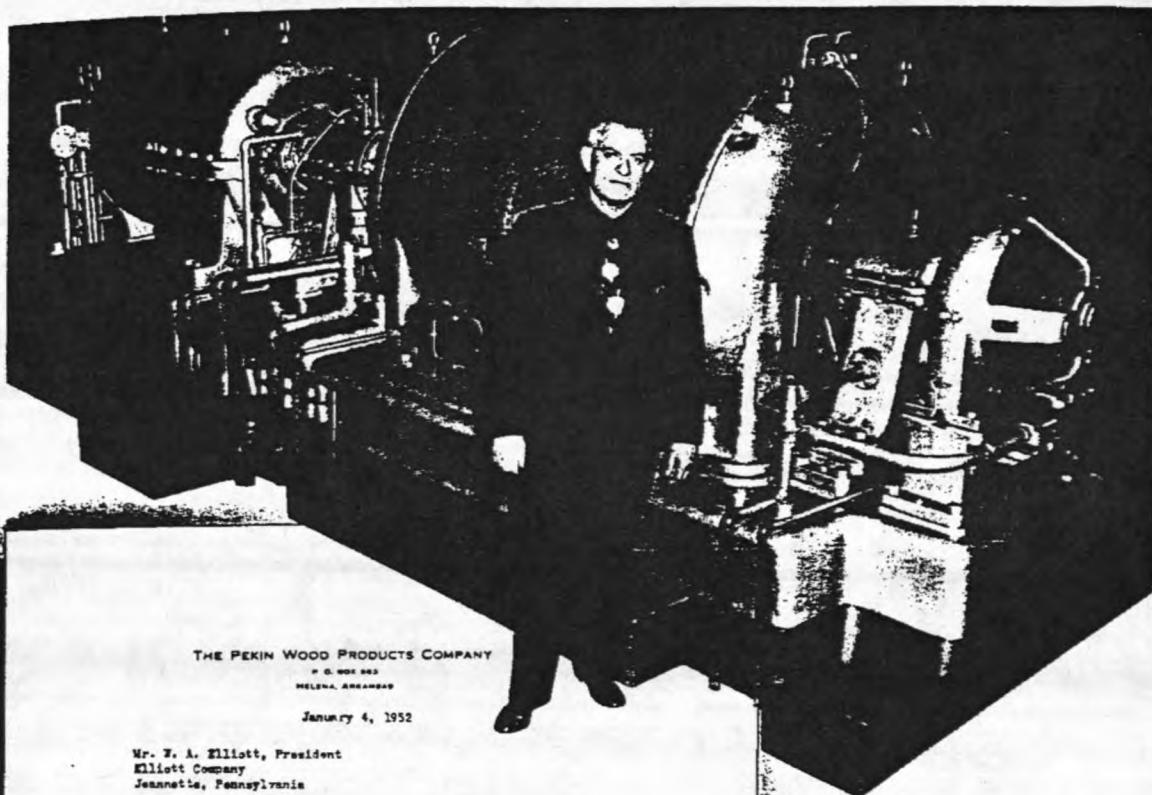
Returns from the heating system are pumped directly into the heater, uncontrolled, by vacuum pumps. An internal float control governs a water make-up valve which admits city water when necessary. The heater was located at a higher elevation than the old heater to increase the submergence on the reciprocating boiler-feed pumps. A. H. Guetchoff, chief engineer, is very well pleased with the operation of the new heater as compared with the old. He figures that he has increased the evaporation in the boilers from 8 to 8½ lb per 10,000 Btu, which results in a saving of 5.7 per cent on fuel, based on a normal winter's day operation of 430,000 lb of steam per day. Boiler feedwater temperatures average 212 F, as against 170 F with the old heater.

The new heater has definitely eliminated oxygen corrosion troubles in the boiler and steam piping.



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THE PEKIN WOOD PRODUCTS COMPANY

P. O. BOX 262
HELENA, ARKANSAS

January 4, 1952

Mr. W. A. Elliott, President
Elliott Company
Jeannette, Pennsylvania

Dear Sir:

Your recent issue of Powerfax, Headed Winter, 1951-Half Century
of Power Progress, was very interesting.

The article on page four about the Kear Turbine Company and
the photo of the early Kear Multi-Stage Turbine, brings back
memories to 1925. I was an assistant to Mr. E. A. Yessel,
Chief Engineer of Power, Heat and Light for Grubb Bros. Truck
Company located at Evansville, Indiana. He installed at that
time two small Kear Turbo-Generators - one - 1490 and one - 438
horse power generating units. We operated them for seven years
in the Evansville Plant; then in 1932 the two units were trans-
ferred to the Pekin Wood Products Company, a Chrysler subsidiary,
at Helena, Arkansas, and both machines are still in operation.
Each will still pull their capacity of 1,000 and 300 K.W. Also
a penny can be balanced on a hold down out board bearing cap
bolt, and the penny will stay in place while taking a two to
five hundred KW load change.

The writer has been in charge of the operation of these units
for the last twenty six and one half years. They have given
wonderful service, and in my honest opinion are good for another
twenty-six years. My only regret is that I will not be able
to stay with them that long for I was 32 when I first got
acquainted with them. As my company says - these units are
a part of me, or, I am a part of them.

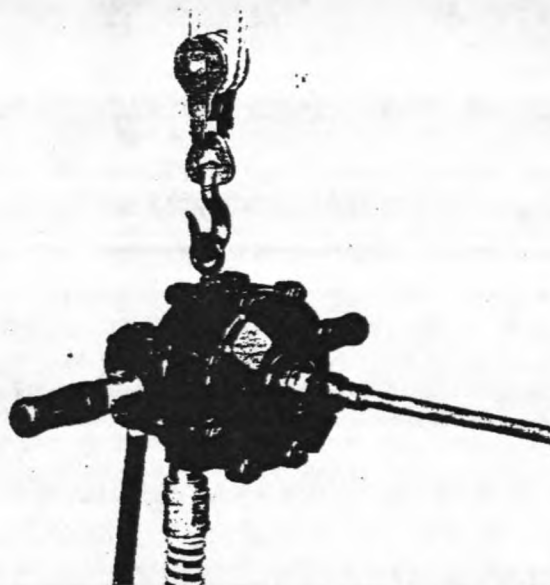
I am grateful to the Elliott Company for the splendid service
we have received from their products, otherwise my service
record would not have been as it is today.

We also use the Elliott Company feed water heaters; two Elliott
turbines, driving two boiler feed water pumps. The one of 50
HP has been in service for 26 years. That, I believe is a record
worth mentioning for the Elliott equipment and myself. When
better steam turbines are made, I believe Elliott Company will
make them.

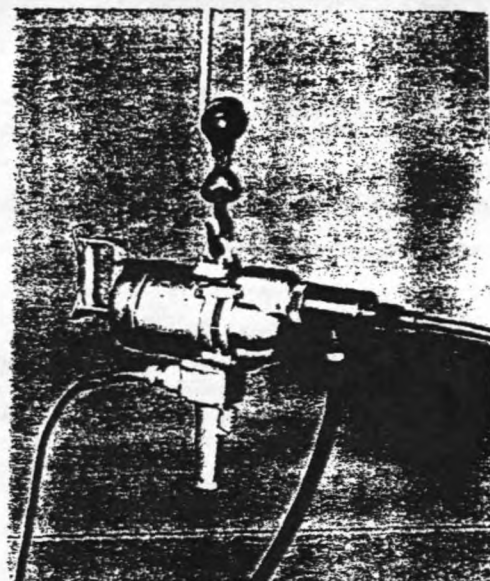
Sincerely yours,
W. L. Whitehead
W. L. Whitehead
C.E.

SPLENDID VETERANS

WE think you'll enjoy the
sincerity of Mr. Whitehead's
letter as much as we do. Of
course, after receiving such a
nice letter, we had to have a
photograph, and Mr. White-
head was kind enough to oblige.



Air- or steam-driven condenser tube cleaner of improved design. Note the operating trigger which is conveniently located at base of handle.



Redesigned electric motor-driven condenser tube cleaner, for use where compressed air or steam is not readily available.

MODERN CLEANERS FOR SMALL STRAIGHT TUBES

THE LAGONDA DIVISION of Elliott Company has developed a new line of suspension-type condenser cleaners which incorporate improvements in design and control.

The new cleaners are especially designed for cleaning small, straight tubes and, with the proper selection of cleaning tools, are equally efficient in removing either hard or soft deposits. In operation, they are supported from overhead by means of a trolley, rope-block, or hanger.

The new cleaner motor has been adapted from a tested Lagonda design which has had 40 years of successful application. Two ball-type thrust bearings, as used for years in heavy-duty Elliott refinery tube cleaners, absorb the push and pull forces imposed on the cleaner during operation.

A notable improvement has been

made in the control system. The control valve is actuated by a "squeeze" trigger located at the base of one of the operating handles. The trigger is convenient to the operator's right hand but not in a position to be opened accidentally. It actuates a simple throttle valve which can be regulated continuously from wide open to shutoff. When the operator releases the trigger, the valve opens and the motor stops.

This same trigger also controls the flow of water for cooling the drills and flushing out the loosened scale. The water-feeding mechanism features a new, self-adjusting packing which can be changed to handle either water or solvent, as the application demands.

An improved heavy-duty electric motor, with trigger-controlled valve and built-in water feeding attach-

ment on the front end of the motor is also available for use where a supply of compressed air is not on hand.

Two new drill heads have been designed for use with the new cleaners. For soft, gummy deposits, where strong flushing action is required, a "drill tip" and adapter is employed. This drill incorporates passages for four separate water (or solvent) jets, which prevent clogging by the gummy deposit being removed.

For extremely hard deposits, a carbide-tipped drill is recommended. Sharp carbide edges are brazed to the front of the drill body and strongly reinforced to prevent loosening. This drill is made in two sections, a soft, tough steel adapter section being used to absorb vibration and minimize shock to the hardened tip. As a result, it will outwear many ordinary tool steel drills.

NEW PRESSURE-TYPE LUBRICATOR FOR TUBE CLEANERS

ELLIOTT COMPANY'S tube cleaner divisions have recently announced a new sight-feed lubricator which assures adequate lubrication of tube cleaners and other air- or steam-powered tools.

Once set, this new Elliott lubricator requires no adjustment—no turning on or off. It is actuated entirely by pressure of the operating air or steam, not by flow. As long as pressure is supplied, oil is accurately metered into the operating hose. When operating pressure is off, oil flow is shut off tight.

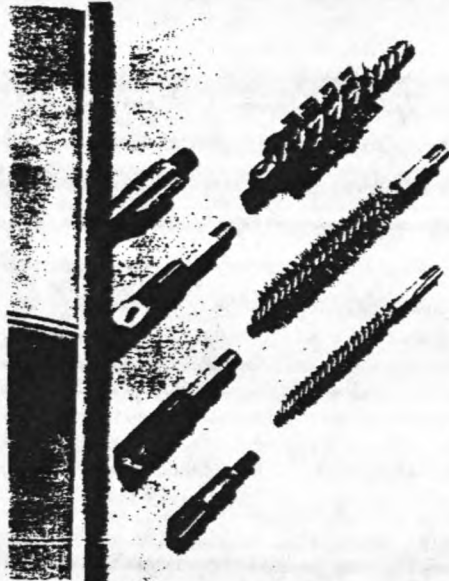
The rate of oil flow is controlled by a knurled cap on top of the lubricator. The cap is backed off to increase flow, tightened to reduce it. Depending upon the tool to be lubricated, flow is normally set for from 25 to 50 drops per minute, as observed in the sight glass. Once adjusted, oil flow is accurately maintained at the proper rate. In tube cleaner service, adjustment is correct when a fine mist is observed at the motor exhaust.

Oil is replenished by removing a knurled filler plug. The plug can be removed and reseated by hand, no further tightening being required for a leakproof fit.

Although especially designed for tube cleaner service, the Elliott pressure-type lubricator is suitable for

many other types of air- or steam-powered equipment. However, since its operation is based on pressure, not flow, a shut-off valve in the operating line must always precede the lubricator. It is therefore unsuited for use with tools which are controlled at the motor.

The new lubricator is supplied in two sizes—pint and quart capacities.



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Drills and brushes used for cleaning small straight tubes with the redesigned Lagonda tube cleaners. The "fulfilled" type wire brushes, at right, are for light deposits or for use with soft copper or brass tubes. The metal drills are, top to bottom:

- "PA" drill for light, hard deposits
- "CT" (carbide-tipped) drill for extremely hard, heavy deposits
- "El Paso" drill for light deposits in very small tubes
- "Drill tip" and adapter for soft gummy deposits

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ALCOHOL INJECTOR

THIS little device, consisting of a regulator and a sight-feed valve, is one of several made by our Lagonda tube cleaner division for a steel mill. The devices are for use in injecting alcohol into large air lines on the outside of buildings to prevent freezing. A small pump brings the alcohol to the regulating valve under a pressure somewhat in excess of the 190 psi which is used in the air lines. The injector can be regulated to feed alcohol from a drip to a stream. Traps are installed to collect the alcohol and use it over again.

NEW HYDROGEN-COOLED CONDENSER DESIGN

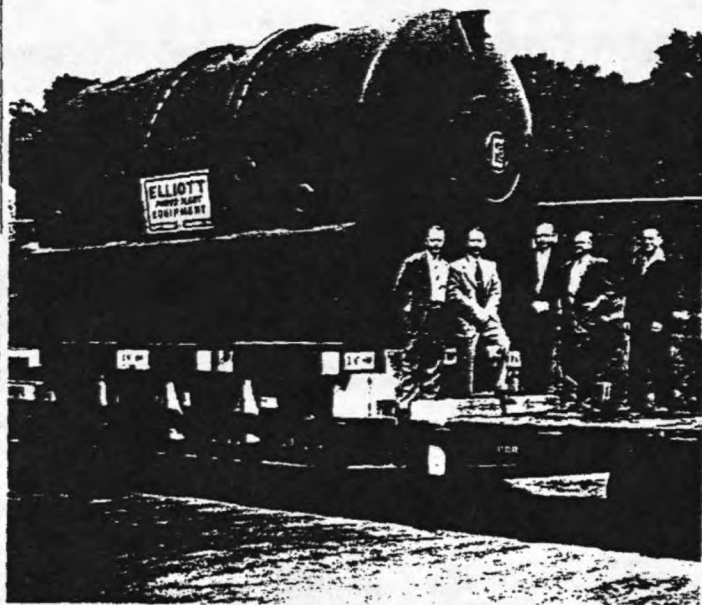
ON the opposite page you see the first of a new line of Elliott synchronous condensers. Notice its unusually clean lines and absence of unsightly external accessories.

This unit stabilizes the distribution system operated by the Bureau of Reclamation at Tucson, Arizona, delivering leading or lagging kvar's as required by the system.

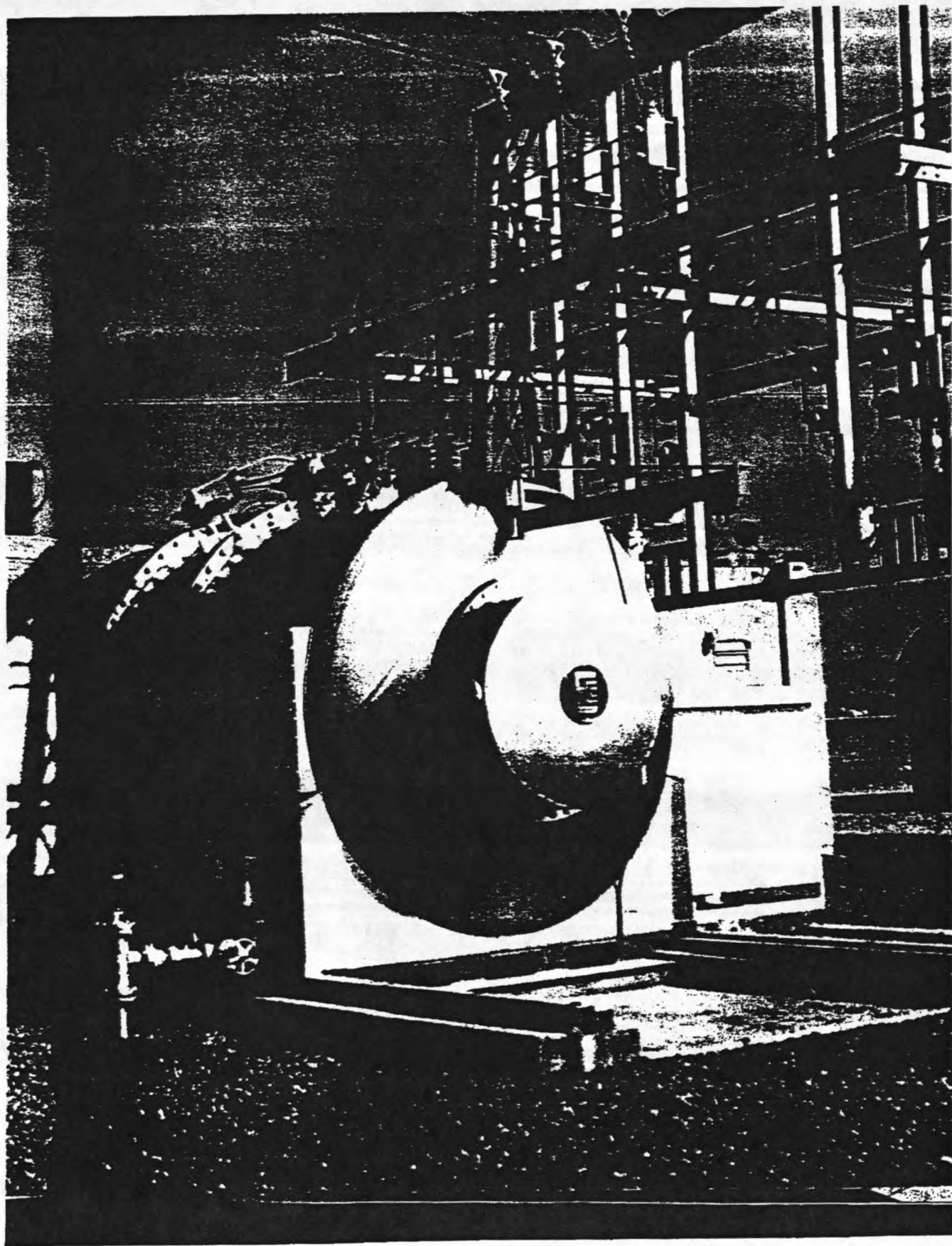
Truly "balanced" cooling is achieved through two gas-to-water heat exchangers, one at each end, plus large, positive-action rotor fans. Cooling gas temperature is kept uniformly low at all points within the housing.

Sturdy crane-booms are mounted on both end domes to facilitate the movement of heavy components in

and out of the hinged end doors. A two-ton hoist is seen in position on the near end. In addition, the grooved soleplates which extend beyond the foundation at each end, simplify handling of the end domes and the stator. Neat and compact, this condenser is typical of Elliott's current design. Its mechanical design is arranged for ease of assembly and disassembly. It is rated at 900 rpm, 3 phase, 60 cycles, 13,800 volts and at 0.5 psig hydrogen, delivers 20,000 kva, 0 leading PF. With the hydrogen pressure raised to 15 psig, output is 24,000 kva, 0 leading PF. Standard lagging capacity is 8400 kva at 0 PF, lagging. Four 50,000-kva units of the same basic design are being installed on the lines of another western utility.

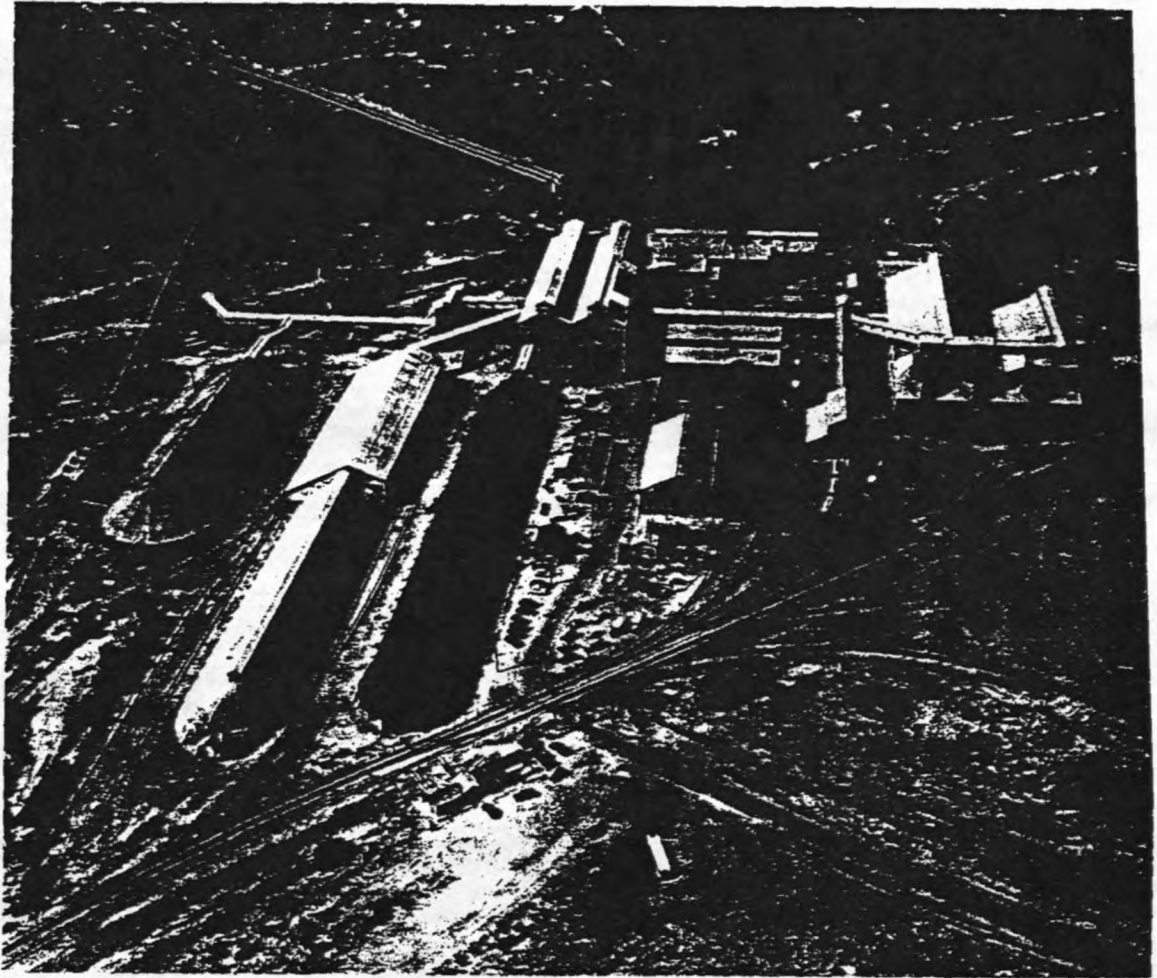


A group of Ridgway Division men looking over the new hydrogen-cooled synchronous condenser as it leaves Elliott's Ridgway, Pa., plant. Destination is Tucson, Arizona, where it will supply reactive kva to regulate voltage and stabilize the distribution system of the Bureau of Reclamation.



ELLIOTT TURBO-BLOWERS SERVE CARLSBAD, I

by HENRY H. BRUHN, Resident Manager, United States Potash Company, Carlsbad, N.M.



General view of the extensive operations of U.S. Potash Company at Carlsbad, New Mexico.

Two more views of the blowers. Discharge nozzles point down. The first Elliott turbine-driven blower was installed here 1932. Periodically, as the plant expanded, more were added to the line. The eleventh blower has just recently gone into service.

, N. POTASH INDUSTRY

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MINING and refining of potash is one of the lesser known but very important industries of the United States.

Potash salts have their largest use in the production of commercial fertilizer, potash being the "table salt" of the plant kingdom. Just as sodium chloride is necessary for the support of human life so also a certain amount of potassium salt is necessary if plant life is to exist.

Part of the world production of potash is also used in the production of various potassium chemicals, such as potassium hydroxide, potassium permanganate, chlorates, chromates, and many others. These potassium-bearing materials are used in the manufacture of soap, safety matches, munitions, and a host of other items, too numerous to mention here.

Over 90 per cent of the potash produced in the United States is mined in the vicinity of Carlsbad, New Mexico. Here potash in the form of the mineral sylvite, mixed with sodium chloride and other impurities, is found in rather flat-lying beds at depths ranging from 800 to 1000 ft below the surface. The ore, which is of a beautiful light pink



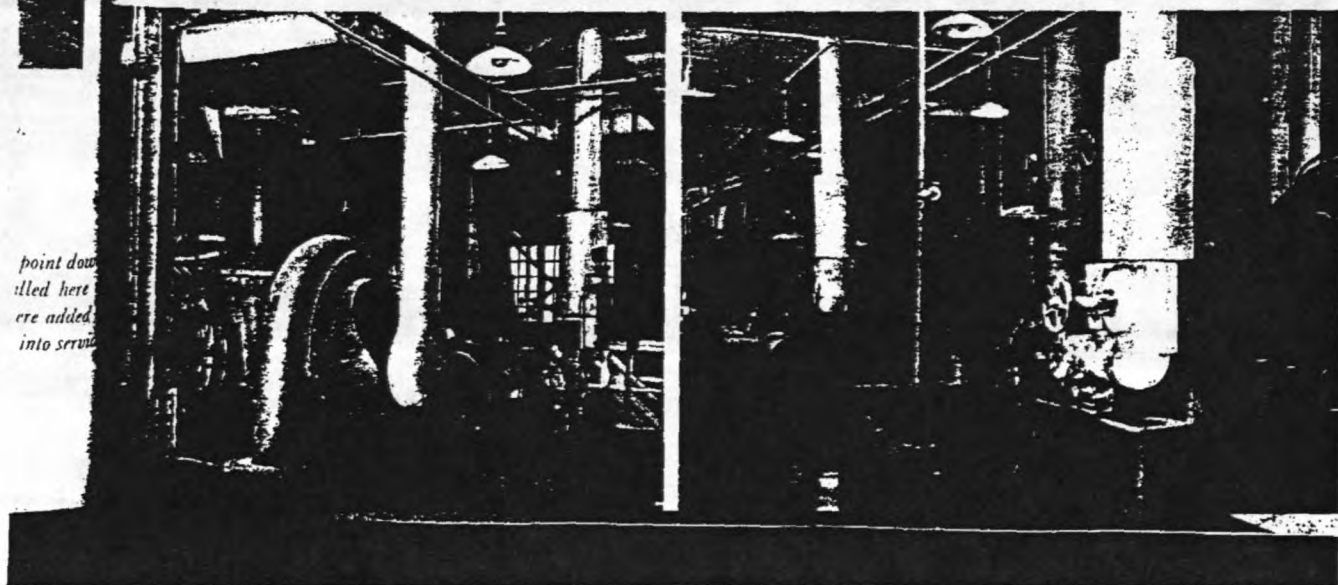
This photograph shows the line of Elliott turbine-driven single-stage blowers serving continuous filters in the Carlsbad plant. There were nine Elliott turbine-driven blowers at the time this picture was taken, with two more on order. The blowers are each rated 12,640 cfm, with an inlet pressure of about 3.5 in. absolute, discharging to atmosphere (barometer 26.5 in.) and are driven at 3670 rpm by Elliott steam turbines of about 160 hp.

color, is mined by mechanical methods, using practices very similar to those used in the mining of coal. The broken ore is hoisted to the surface, crushed, and processed by various methods in order to separate the potassium chloride which it carries

so that it can be shipped in the highly purified form. Various refining methods are used, such as hot solution separation, flotation, or tabling.

The United States Potash Company, the oldest of the three produc-

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ing companies in the Carlsbad area, uses a hot solution leaching process in order to separate the potassium chloride from sodium chloride and other minor impurities present in the ore. The process used consists of a continuous dissolving step in which potassium chloride goes into solution in saturated brines heated to 225 F. These saturated brines are then cooled in continuous crystallizer units by boiling under a vacuum, which cooling causes the potassium chloride crystals to fall out of solution as a pure, white fine-grained salt.

The slurry of crystals in saturated sodium chloride brine is then fed to top-feed Oliver filters where the brine is removed from the pure potassium chloride. A flow of air heated in gas-fired furnaces is drawn through the drums of these filters in order to remove the brine from potash crystals. The heated air also dries the thick residual cake of pure product as it revolves on the filter drum. The

flow of air is created by Elliott centrifugal blowers driven by Elliott steam turbines. These blowers are located on the suction side of the filters. The separated brine leaves a special trap and is returned again to the dissolving process. The air drawn from the trap is hot and saturated with moisture. Since the brines and moisture in the air are highly corrosive, the blowers used by the United States Potash Company are equipped with special alloy impellers which are designed to withstand the difficult conditions encountered.

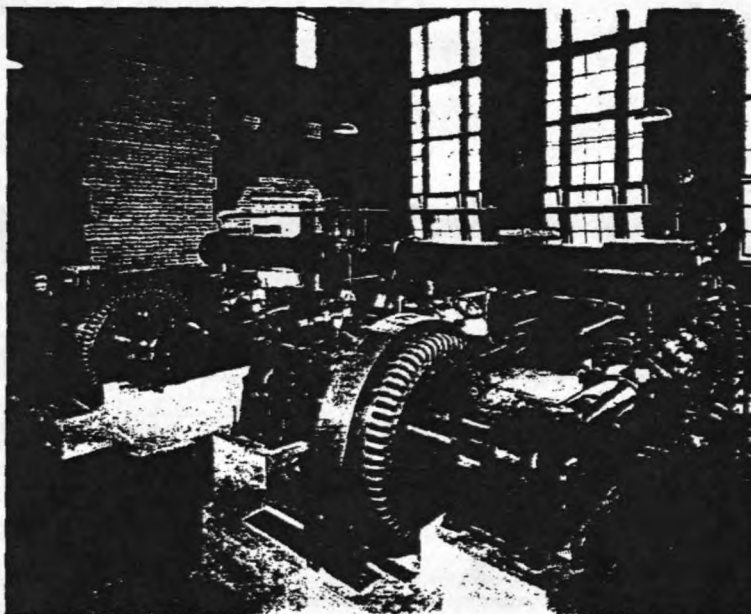
The first Elliott-blower-equipped filter unit was installed in the original United States Potash Company's refinery in 1932 and has been operating on a continuous 24-hour-a-day, 363-day-a-year schedule since that time. The machine, of course, has been taken out of service from time to time for maintenance and repair, and the turbine governor unit has been rebuilt and modernized in order to

keep step with governor improvements over the years. The downtime covering such alteration, maintenance, and repair has been almost nothing compared to the number of operating hours.

Since the original unit was stalled in 1932, eight more Elliott blower-equipped filter units have been installed, making a total of nine now in operation (November, 1952) and two additional units are on order for installation in the very near future.

United States Potash Company feels that the operation of the turbine-driven blowers has been quite satisfactory, particularly under the extremely difficult conditions under which they must operate. Moisture and corrosion from rust-producing salts is present both internally and externally on the blower equipment, and the machines have operated quite successfully under highly adverse conditions.

SYNCHRONOUS MOTORS AT VULCAN IRON WORKS



SYNCHRONOUS motor drive is ideally suited to the peculiar load characteristics of the reciprocating compressor. The neat twin-installation shown is in the steel foundry of Vulcan Iron Works, Wilkes-Barre, Pa., plant.

Both motors are engine-type Elliott "Fabri-Steel" design, rated 200 hp at 300 rpm, operating at 400 volts, 3 phase, 60 cycles. The compressors are 19½ x 12 x 12 Pennsylvania Pump and Compressor Company units, supplying air for a multitude of pneumatic tools throughout the Vulcan steel foundry. One of the two compressor units is kept on stand-by, ready to be thrown into operation where peak loads occur.

This plant has been operating on a 24-hour-per-day schedule, six days a week, with much of its output destined for the urgent program of steel mill expansion in the east.

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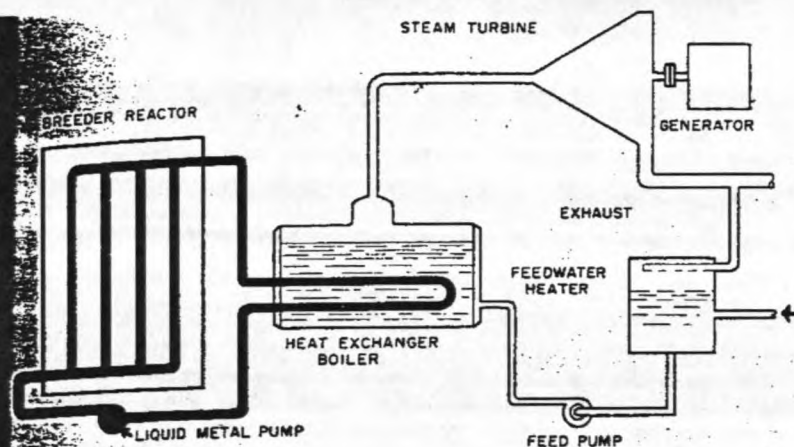


Diagram explains the general principle embodied in the Idaho atomic power plant. The breeder reactor at the left is cooled by a liquid metal. The heat so removed is carried to a heat exchanger by the liquid metal and there transferred to the water, converting it to steam. Steam is supplied to a steam turbine driving an Elliott generator. This diagram is by courtesy of Power Engineering.

ELLIOTT GENERATOR IN FIRST ATOMIC POWER PLANT

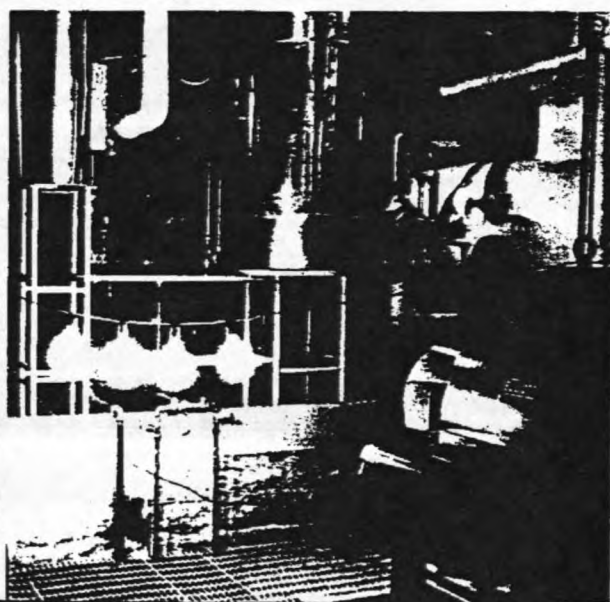
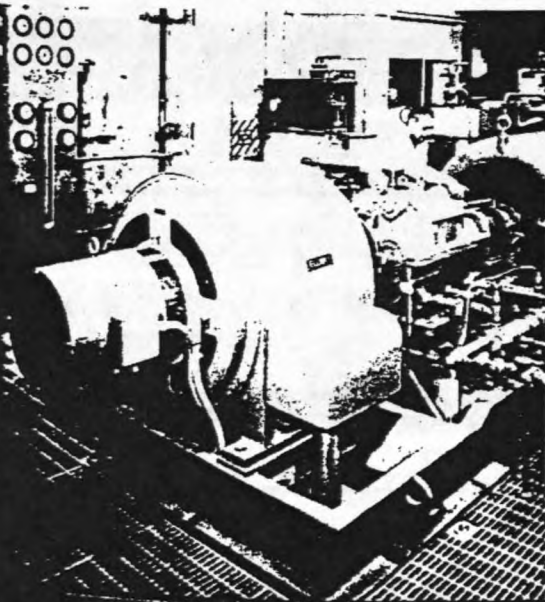
THE Elliott generator pictured below broke into the limelight early this year. Folks all over the country spotted the Elliott name plate on photographs which accompanied U.S. Atomic Energy Commission Release No. 407 outlining the first known use of electric power generated from atomic energy.

In a trial run on December 21 and 22, 1951, electrical power of more than 100 kw was generated by the Elliott generator shown in the photographs below. This power was used to operate the pumps and other reactor equipment and to provide light and electrical facilities for the building housing the equipment.

This history-making event occurred at the National Reactor Testing Station in Idaho. Mechanical power to drive this generator was provided by a steam turbine. Steam was generated by heat energy removed from the experimental breeder reactor by liquid metal circulated through the reactor, as diagrammed above.

This Elliott 300-kw 1200-rpm generator was the medium through which flowed the first kilowatts ever to be generated by atomic power. The geared turbine-generator is exactly the same as would be used in a conventional fuel-fired steam plant.

The light bulbs in this photograph were used to illustrate graphically the first known use of electrical power from atomic energy on December 20, 1951. Next day power was increased to a point where the entire building was supplied by power emanating from the atomic reactor.



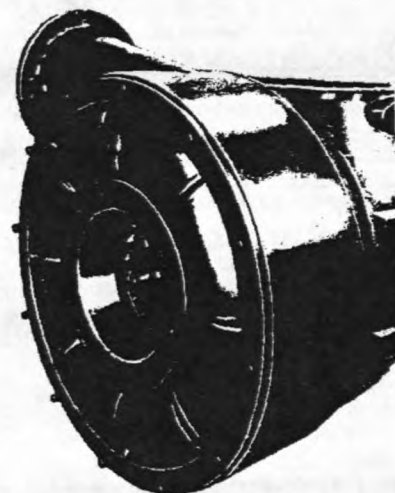
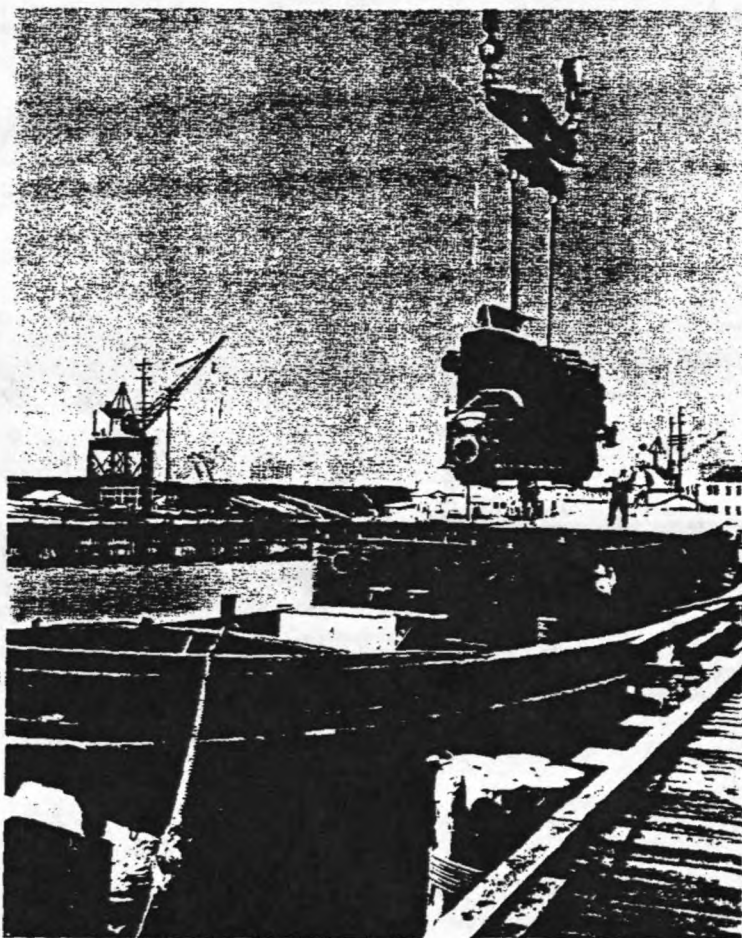
REPOWERED TUG SETS SERVICE RECORD

LITERALLY thousands of Elliott turbochargers are in service in all sorts of applications of four-cycle diesel engines, on locomotives, ships, and in stationary service. Many of these have set up interesting records for continuous service. Nevertheless, we are always glad to see a printed record involving an Elliott turbocharger. So the following is quoted from an article in the December 1951 *Marine Engineering and Shipping Review*.

"In less than two years since the installation of a 1750-hp Nordberg diesel engine, the tug *Titan*, owned and operated by the Sabine Towing Company, Inc., Port Arthur, Tex., has traveled 33,370 sea miles. During that period this powerful ocean-going vessel has been at work almost every day in the year and has never had a service failure.

"The *Titan* is further distinguished by being the most powerful tug in the

United States equipped with slow-speed, heavy-duty diesel engine directly connected to the prop shaft. This machinery arrangement has the advantage of eliminating cost, weight, and maintenance associated with geared reductions electric-motor drives. In addition, the choice of a heavy-duty, slow-speed engine contributed greatly to this vessel's enviable record for continuous, uninterrupted service.



This is the new Elliott turbocharger which adds substantially to the output of the diesel engine which powers the tug Titan.

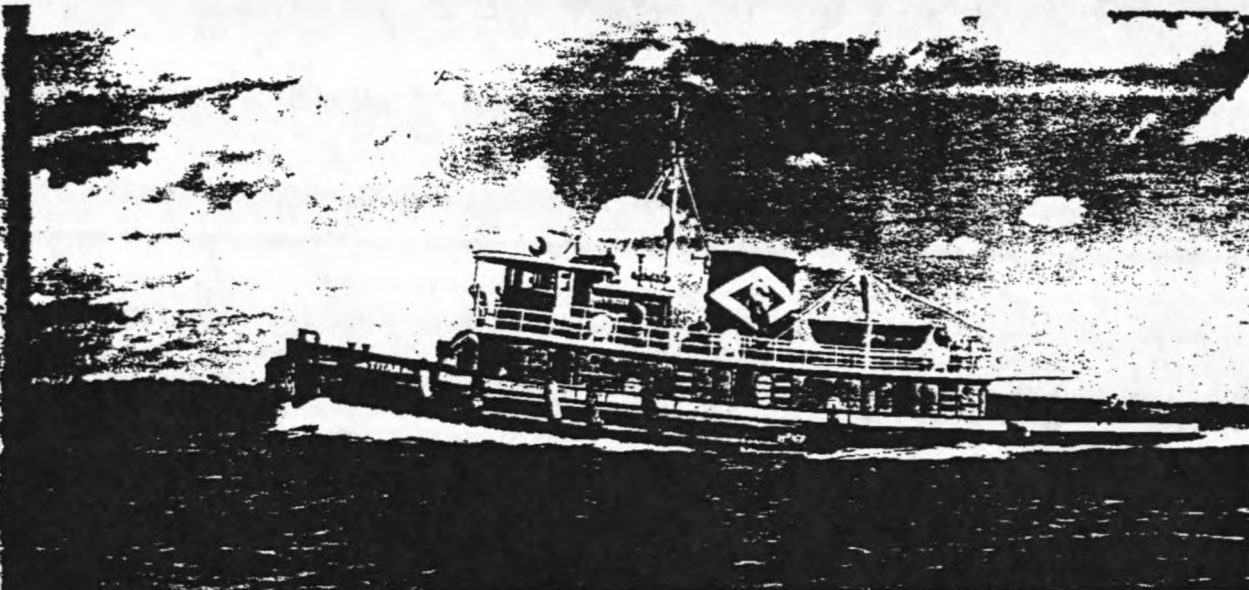
With the bridge deck and pilot house removed, the supercharged Nordberg engine is lowered onto its foundations in the Titan in repowering job.

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The tug Titan owned and operated by Sabine Towing Company, Inc., powered by a Nordberg 1750-hp diesel, supercharged by an Elliott turbocharger.

"Shortly after her shakedown cruise in 1949, the *Titan* was called upon to demonstrate her new-found power. A large 15,000-ton tanker, fully loaded, experienced engine trouble off Sabine, Texas. The *Titan* went out to bring the ship in, but the owners of the tanker wanted the ship in Philadelphia and so the *Titan* headed east with her in tow. The 1500 miles were made at an average speed of 7½ knots.

"In September of 1950, when the tail end of a hurricane hit the Louisiana coast, a large seagoing derrick barge, which was being used in offshore drilling operations by one of the major companies, was being towed to a port of refuge. This derrick barge had a crew of some ten men on board and she went adrift. The Coast Guard did not have a vessel available for her rescue, none of the harbor tugs would venture out into the teeth of this hurricane, so the Sabine Towing Company was asked to send the *Titan* to make the rescue. The *Titan*, under command of Captain H. G. McElwee, a veteran

of many years of ocean towing service with this company, put out to sea and with the aid of radar and wireless telephone, after some 24 hours of search, the derrick barge was located and through skillful seamanship and maneuvering a hawser was put on board and, finally, the derrick barge brought to a safe port of refuge. This is only one of several salvage operations that the *Titan* has performed during the hurricane season since being commissioned.

"The tug has been showing its muscles ever since. For many months last year it was active in moving Liberty and Victory-type cargo ships from the preparation area around Orange and Houston, Tex. to the storage area near New Orleans, La. Since the fall of 1950, the *Titan* has been towing a 40,000-barrel ocean barge back and forth between Houston and Jacksonville."

The tug *Titan* was originally built in 1912. A coal-burning tug fitted with a triple-expansion steam engine, it was used in the construction of the Panama Canal. In 1923, it was sold

to the Sabine Towing Company, was converted from coal to oil, and put into coastwise and ocean towing in the Gulf of Mexico and up the Atlantic seaboard.

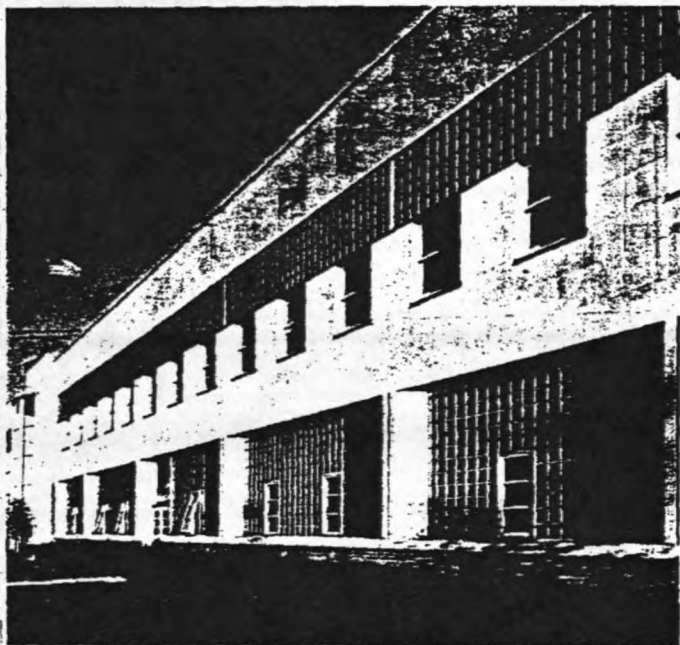
In 1949, the steam plant was replaced with a Nordberg turbocharged diesel engine—1750 shp at 327 rpm. This engine is not only the main propulsion unit but part of the engine power at the shaft can be used to drive a 120-volt, 80-amp generator. In addition to the Elliott turbocharger which serves the engine, the lubricating oil system includes an Elliott twin strainer.

As the *Titan* was rebuilt in making this change of power plant, great care was exercised to insure that the highly-powered, modernized tug would retain its excellent characteristics of balance and trim.

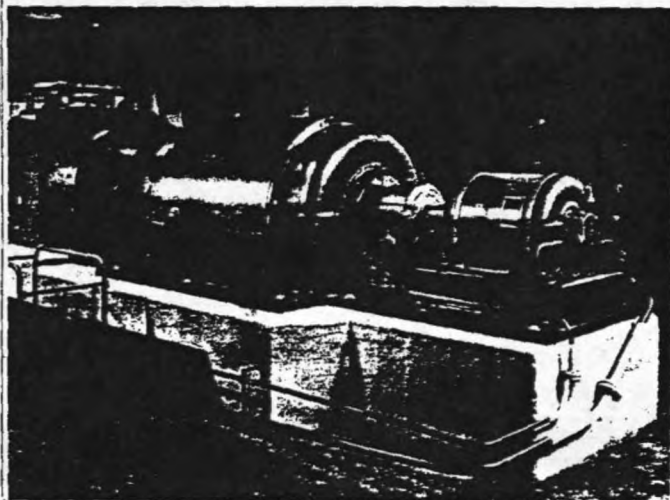
The Sabine Towing Company, Inc., which was founded in 1909, is an extensive organization. It operates five harbor tugs, three coastwise tugs (of which the *Titan* is one), and 12 intercoastal tugs, as well as many barges and a fleet of oil tankers.

EXTRACTION TURBINE CUTS POWER COSTS, BOOSTS PLANT PRODUCTION

by JOHN BALLA, Plant Engineer, Allen B. Wrisley Co.



Glass brick was extensively used in the construction of this strikingly modern Chicago plant of the Allen B. Wrisley Company, where some of the country's finest quality soaps and cosmetics are manufactured.



WHEN the management of Allen B. Wrisley Company, Chicago, planned a major expansion back in 1945, one of the first considerations was modernization of the power plant.

The Wrisley Company, which manufactures soaps and cosmetics, requires steam for process use as well as for electric generation. Formerly, plant power was provided, inefficiently and expensively, by two reciprocating steam engines supplemented by a diesel generator. Steam for both the steam engines and several production processes had been supplied at 185 psi.

The plant expansion program, however, promised a heavier process-steam load plus need for additional electric power. Solution to both problems was found in the installation of an Elliott extraction turbine-generator unit. First step in modernization was to increase boiler efficiency through the use of modern automatic controls, rigid control of boiler water and an extensive metering program. Steam pressure was increased to 200 psi, some 80 to 90 per cent of this steam going directly to the 1500-kw Elliott extraction turbine, the balance being used in plant processes requiring high-pressure steam. Steam for other processes is extracted from the turbine at 100 psi. The 5 psi exhaust steam is also employed in process work as well as for heating and air conditioning.

Not only does this system wring every last Btu from the steam, but it was found that increasing pressure from 185 psi to 200 psi on a number of processing units boosted their production at comparatively little extra cost.

Since installation of the 1500-kw Elliott turbine-generator, there has been no further need to purchase outside power to supplement the plant capacity. This, together with the improved production possible with higher pressure steam, has resulted in significant savings. To date, the Elliott turbine has been operating for more than five years, night and day, seven days a week, with no trouble whatsoever.

Two reciprocating steam engines and a diesel generator were replaced by this Elliott 1500-kw turbine-generator as part of the power plant expansion at Allen B. Wrisley Co., Chicago.

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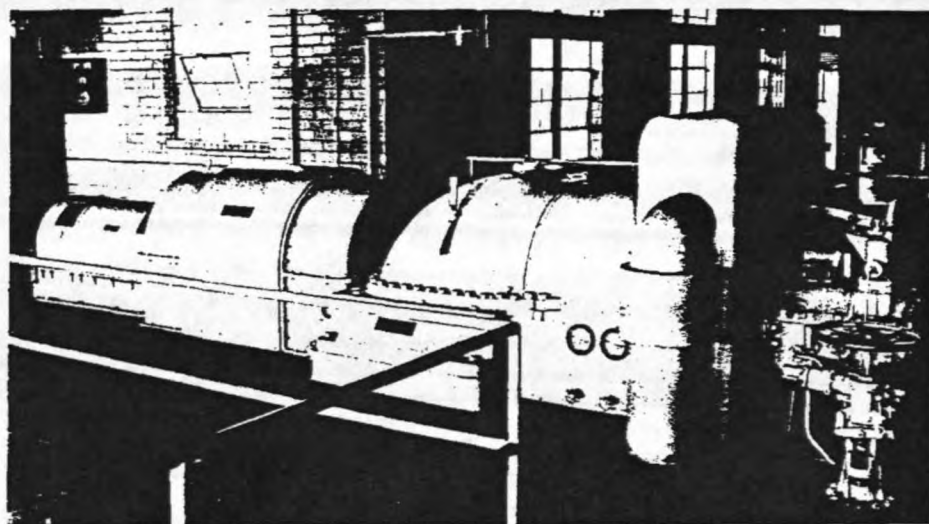
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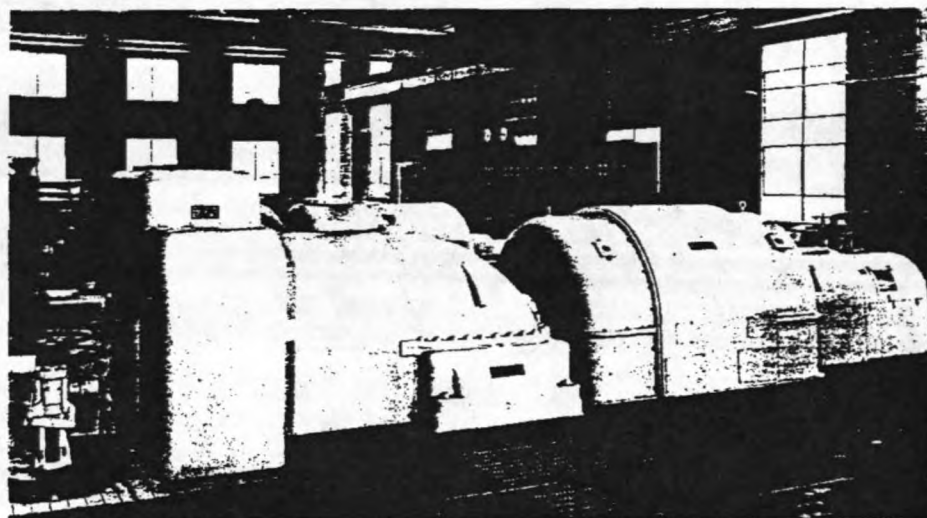
MIDWEST PLANTS ADD TURBINE-GENERATORS

DENISON, IOWA, is called the "hub" of western Iowa, and "The Beef Empire Shopping Center" by the local Chamber of Commerce. Its light and power plant dates back to 1913, when two turbine units gave a total capacity of 320 kw. In 1914 the city built a larger plant, installing two engine-generators. A 500-kw turbine-generator was installed in 1928, a 1000-kw unit in 1930, and a

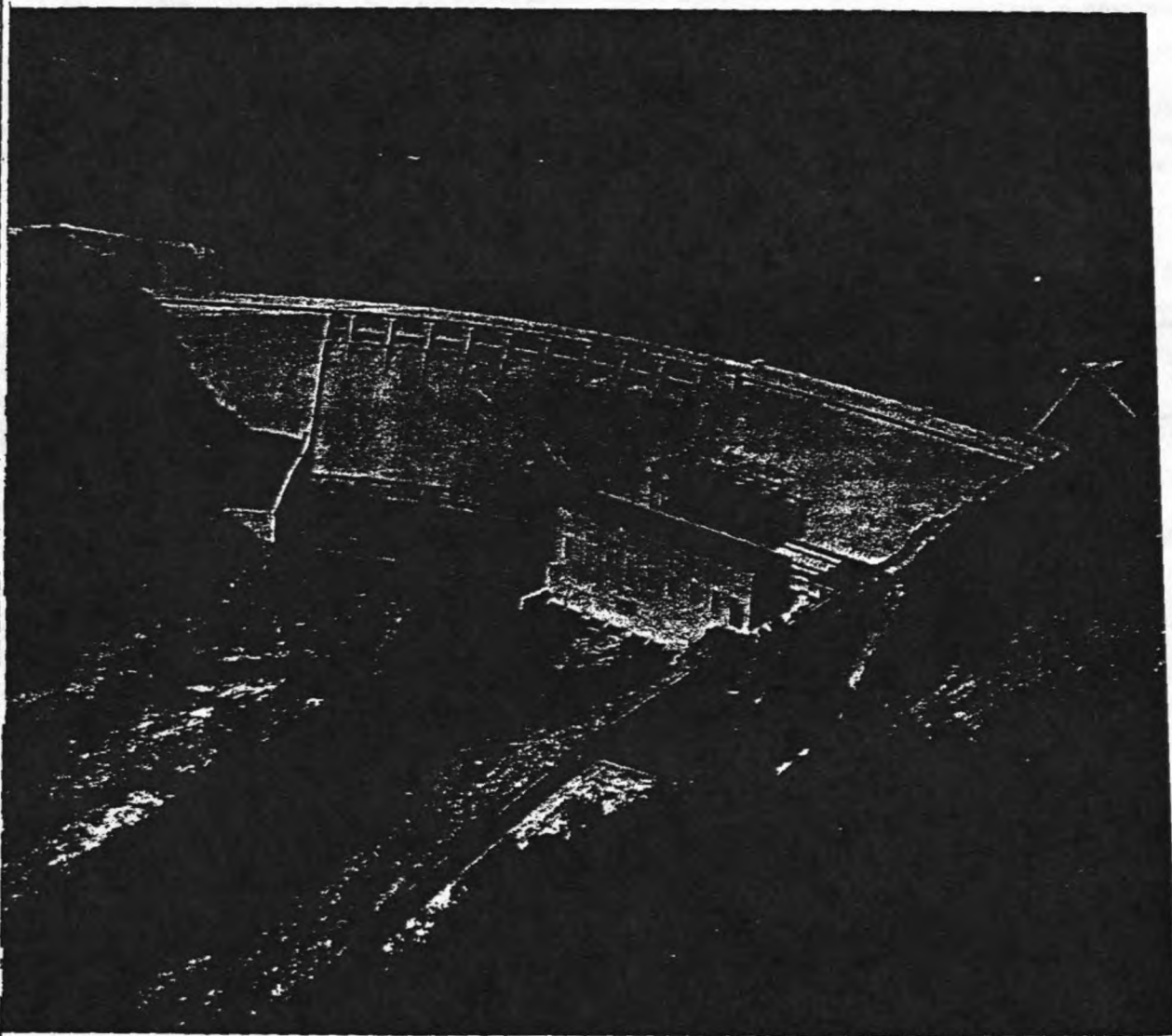
1500-kw unit in 1941. The latter units are served by Elliott surface condensers. Last spring the plant was brought up-to-date with the installation of the Elliott 3000-kw turbine-generator unit shown above.

HASTINGS, NEBRASKA, in a basically agricultural community, has considerable industry due to good transportation, water, and power

facilities. The city has had its own light and power plant since 1900. Capacity has increased with demand over the years. At present the plant contains one 3500-kw, one 2000-kw, and two 6000-kw turbine-generator units. The latest turbine-generator, a 6000-kw Elliott, operating at 400 psi, 825 F, is illustrated below. Both 6000-kw turbines are served by Elliott surface condensers.



SELF-CLEANING STRAINERS AT ALLATOONA DAM



View of the Allatoona Dam at Cartersville, showing the powerhouse at the foot of the dam.

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These Elliott 12-in. self-cleaning strainers are located in the take-off lines from No. 1 and No. 2 main penstocks to raw water header. They each handle 1300 gpm. One strainer is located on either side of a rotary control valve which separates the two main penstocks.

ALLATOONADAM on the Etowah River at Cartersville, Ga. (northwest of Atlanta) was built by the U.S. Corps of Engineers, Mobile District, for the development of water resources of the Alabama-Coosa River system; the main purpose of the dam being flood control and with a secondary function of producing power. The power output is presently sold to Georgia Power Company.

The lake created by the dam has a shore line of 260 miles at the top of the flood control pool, and 180 miles at the top of the power pool. It is becoming increasingly popular as a weekend recreational area featuring boating, duck hunting, and fishing.

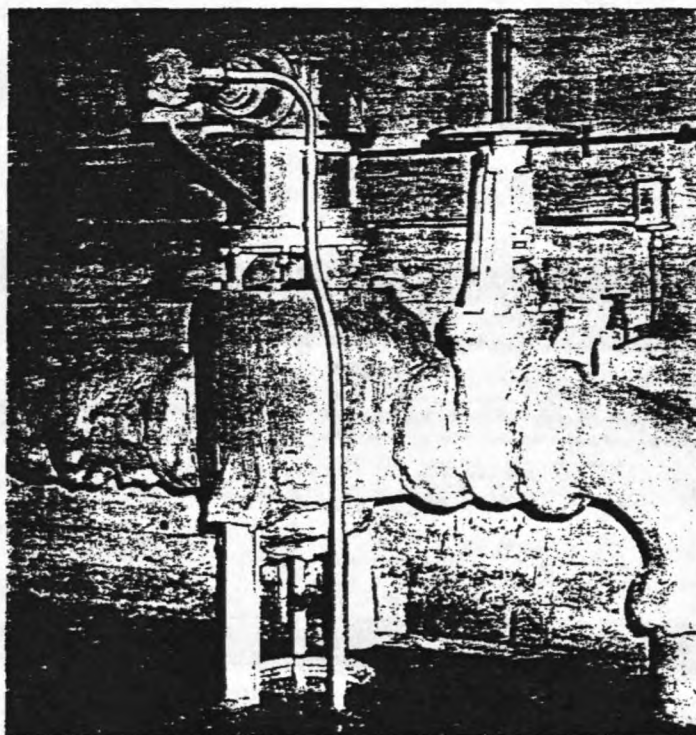
The dam rises 190 ft above the river bed and has a total length at roadway level of 1250 ft. Two hydro-generators, having a total capacity of 72,000 kw, are installed. A 2000-kw house turbine-generator unit provides auxiliary current, and supplies water for downstream users when the other units are not running.

An interesting feature of the raw

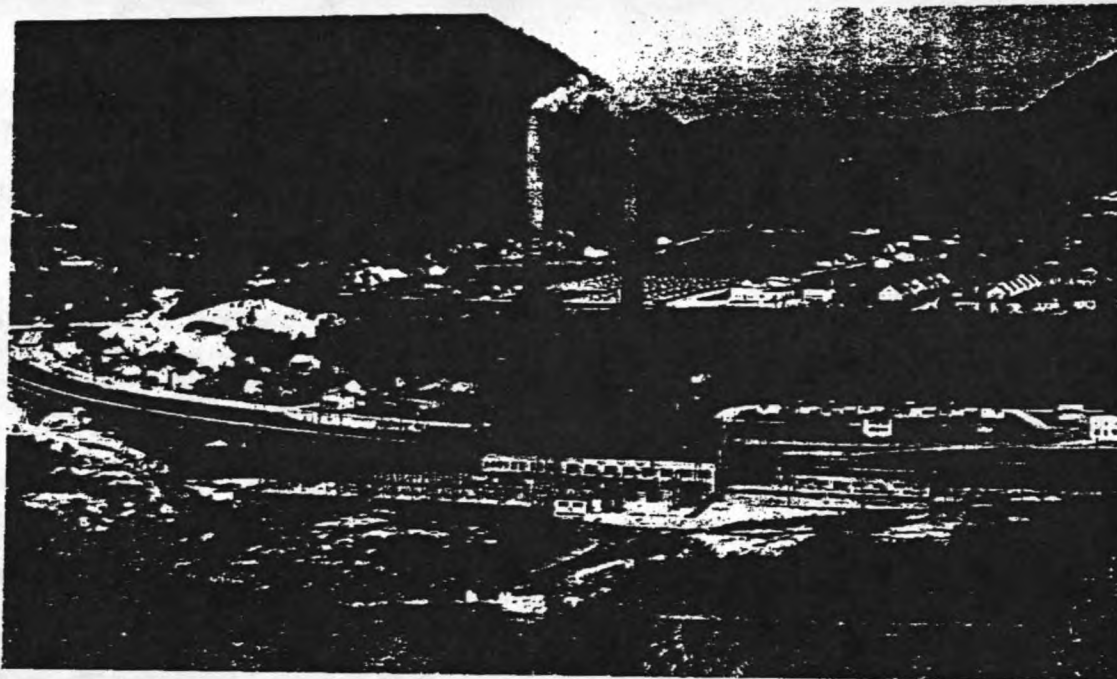
dam.

water system, which supplies cooling water for the generator stator, bearings, and wearing rings is the use of Elliott self-cleaning strainers, which operate continuously and automatically, and require no manual cleaning. They are located in the basement

of the power plant and are connected directly off the main intake water headers. One strainer is located on either side of a rotary control valve which separates the two main penstocks. A third strainer handles cooling water for the house generators.



This Elliott 10-in. self-cleaning strainer is installed in the feeder line from the service penstock to the raw water header. This strainer, furnished to pass 1000 gpm, handles cooling water for the house generator.



A general view of the enlarged Narrows Plant of the Virginian Railway Company, one of the most vital coal-hauling properties in the East.

NARROWS POWER PLANT OF THE VIRGINIAN RAILWAY COMPANY

AMONG the first railroads in this country to employ electric propulsion in freight service, was the coal-hauling Virginian Railway Company. Originating in the semi-bituminous and high-volatile coal fields of southern West Virginia, the Virginian winds 443 miles to the salt-water coal docks at Hampton Roads, Virginia.

Part of this route, between Mullens, W.Va. and Roanoke, is rugged mountain country containing some of the steepest railroad grades to be found anywhere. It was this portion of trackage, totalling 134 miles, which was first electrified back in 1925 to permit more and heavier trains in an effort to reduce the ton-mile cost of operation.

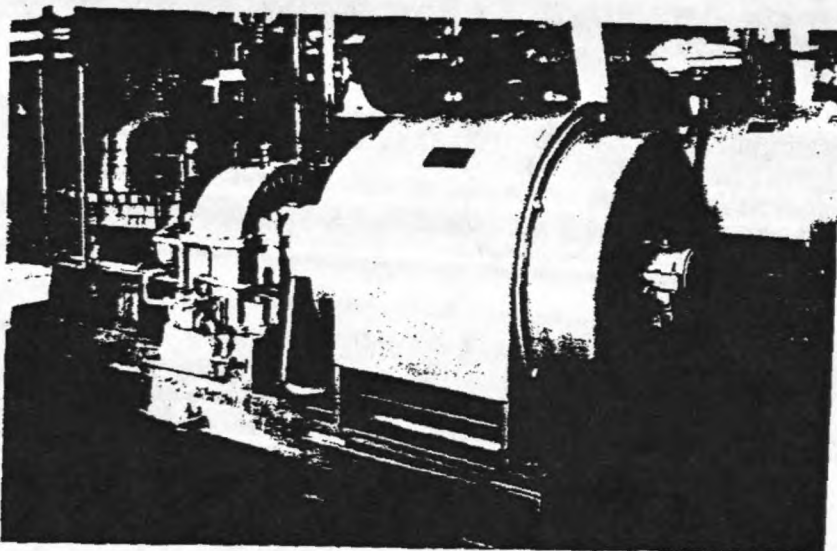
Power for this project was provided by the railroad's Narrows

An Elliott deaerating feedwater heater serves the new boiler. The horizontal heat exchanger which is seen in this picture, is mounted on a horizontal storage tank which is located on the floor below. The deaerating heater unit has a capacity of 1,000,000 lb per hr.

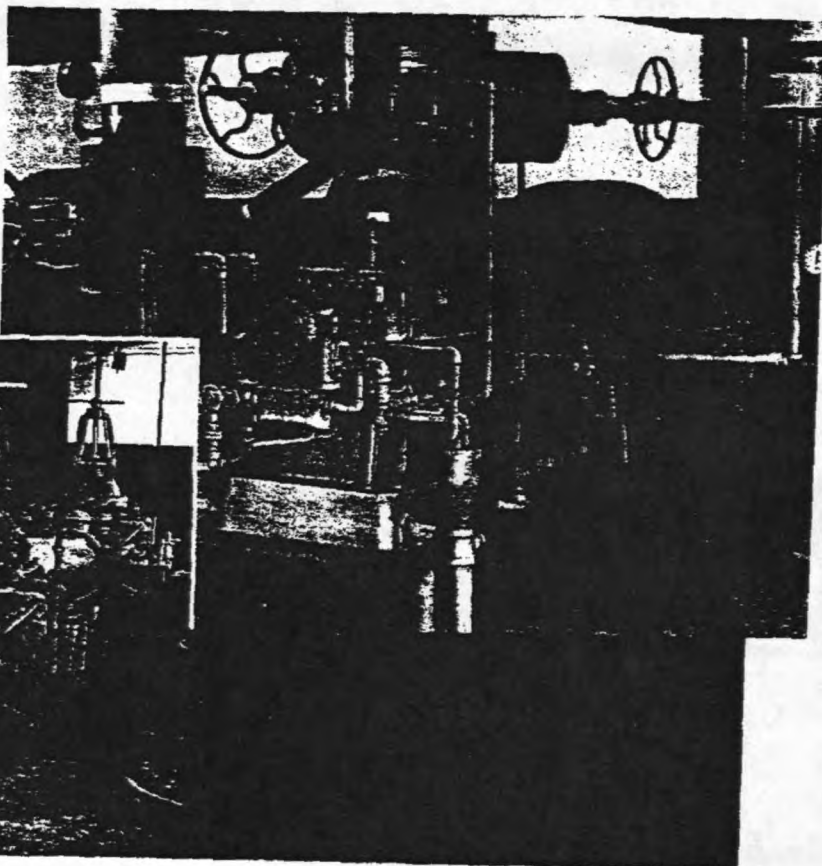


Power Plant, containing five water-tube boilers operating at 325 psig, 640 F, each rated at 125,000 lb per hr, supplying steam to four 10,000-kw turbine-generator units. Until 1944, this capacity was adequate. But the contemplated addition of four new locomotives threatened to increase peak loads some 20 per cent, making it necessary to increase the generating facilities. Gibbs and Hill, Inc. were employed in 1946 to rehabilitate the plant including any additions required. An extension to the existing plant was built and a new 200,000-lb-per-hr boiler with accessories and complete pulverized-coal-firing equipment was installed, along with a new 10,000-kw turbine-generator. The turbine room extension also accommodated the Elliott deaerating feedwater heater, the boiler-feed pumps, driven by Elliott motors and turbine, and Elliott water strainers, all illustrated here.

Installation of the new boiler and turbine and rehabilitation of the old equipment has greatly improved the over-all performance of the Narrows Plant, making it possible to handle the increased demand imposed by new electric propulsion equipment and heavier hauls.



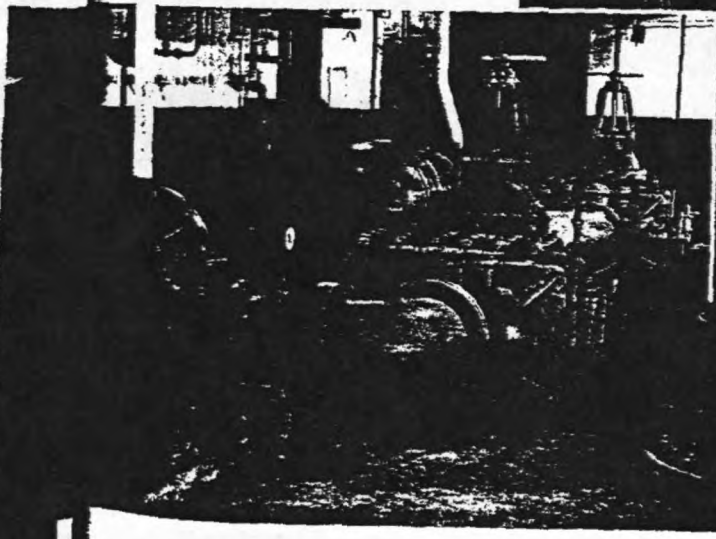
Two of the three boiler-feed pumps installed with the new boiler are driven by Elliott 350-hp, 25-cycle dripproof "Fabri-Steel" motors, through reduction gears (above). The third boiler-feed pump, illustrated below, is driven by an Elliott 360-hp steam turbine.



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AUTOMATIC POLISHING MACHINES EMPLOY DUST-TIGHT MOTORS

IN recent years, electroplating and electropolishing have become highly refined sciences, well-adapted to automatic production line techniques. Surface polishing and buffing operations, however, have resisted mechanization, since polishing, buffing, and glazing have traditionally been hand operations, performed by experienced craftsmen. Further, their mechanization presented intricate design problems, not easily solved.

One of the pioneers of automatic surface finishing is the Clair Manufacturing Company, Olean, N.Y. This organization has, for years, specialized in the design and manufacture of machines for the automatic buffing, glazing, and polishing of metal surfaces.

Clair has evolved seven basic

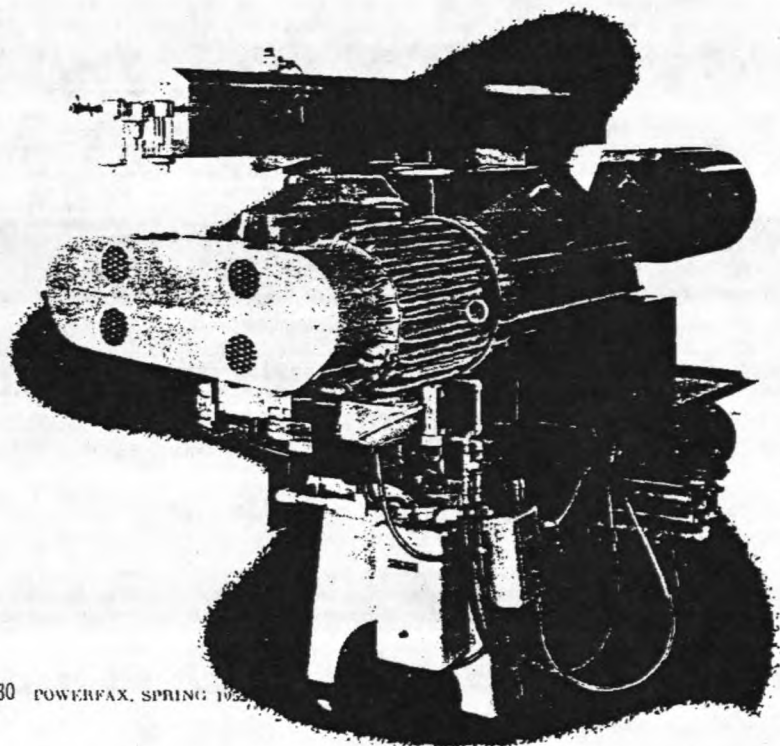
machine designs which, by a multitude of special modifications, can be adapted to practically any polishing problem. Each unit is, in effect, a standard design, tailored to the needs of a particular job.

No two finishing operations are identical, but common to all is the presence of abrasive dust and debris from the polishing medium. These dusts are a constant threat to all moving parts, including the motors which power the machines. Clair has tackled the dust problem, first, by eliminating rapidly wearing exposed mechanisms, such as cams, gears, worms, levers, and ratchets. Instead, buffers and polishers are directed over the contours of the work by completely enclosed hydraulically-actuated elements. This type of con-

trol offers freedom from wear and motion for the life of the machine. In addition, no friction-type bearings are employed, sealed antifriction bearings being used exclusively.

Secondly, for almost every application, Clair recommends totally enclosed driving motors whose bearings and windings are not exposed to the atmosphere of the installation. And, to quote Mr. Ray Kess, president of Clair Manufacturing Company, "... based upon superior performance, whenever totally enclosed motors are specified, we either arbitrarily install Crocker-Wheeler or recommend them to our customers. It is interesting to note that in one instance has a customer overridden our recommendation where total enclosed motors have been specified.

The motors to which Mr. Kess refers are Elliott Crocker-Wheeler Sealedpower design, whose distinctive ribbed outer housing has won with increasing acceptance since its introduction ten years ago. Ideal for dusty, dirty, "problem" applications, the Sealedpower motor is cooled by a stream of air propelled along its outer surface by an external fan at the end of the motor shaft. This brilliant air stream carries off heat and discourages accumulation of foreign matter on the motor frame.



Note the enclosed Sealedpower motor which drives the buffer on this Clair Manufacturing Company surface-finishing machine. This ingenious device automatically produces quality standard surfaces. The Elliott C-W totally enclosed Sealedpower motor is immune to the abrasive dust created by the polishing operation.



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The minister's wife had just died, and wishing a week's leave from his pulpit he wrote his bishop:

"I regret to inform you my wife has died. Please send a substitute for the weekend."

I was out with a stuffed shirt last night but on her it looked good.

"Waiter, there's two flies in my soup."
"So he finally caught up with her."

A short-sighted man lost his hat in a strong wind and was chasing it.

Woman: What are you doing there?

S. S. Man: Getting my hat.

Woman: Your hat! That's our black hen you're chasing.

If wives knew what stenographers think of their husbands, they wouldn't worry.

Imagination is what makes some politicians think they're statesmen.

"Do you mean to say that her vast fortune is merely a collection of trifles?"

"Yes, every time a wealthy man trifled with her she collected something."

What shakes a marriage to the core?

What turns love out and slams the door?
What makes divorce statistics soar?

It is the loud, the rhythmic snore.

Some people get the idea they are worth a lot of money just because they have it.

Kindly Clergyman (pinching little boy's knee): And who has nice chubby pink legs?
Little Boy: Mama.

He (making the time-worn excuse): "I'm afraid we'll have to stop the car for awhile. The engine is overheating."

She: "You guys are such liars. You always say the engine."

The time had come for the outstanding event of the year. New York was bedecked in all its finest. Millions of New Yorkers lined the streets for miles eagerly awaiting the parade that promised to be novel and different—"The Parade of Virgins." But alas, it was a total flop. One was sick and the other did not care to parade alone.

Sign in a public dancehall: "He who hesitates is not dancing."

Lady (at party): "Where is that pretty maid who was passing out cocktails a while ago?"

Hostess: "Oh, are you looking for a drink?"

Lady: "No, I'm looking for my husband."

He: "What do you think of girls?"

Him: "Girls are a must. And I'd like to have a half dollar for every one I ever mused!"

The car was crowded and the conductor was irritable.

"Where is the fare for the boy?" he snapped, as the father handed him one fare.

"The boy is only three years old."

"Three years! Why, look at him, he's seven if he's a day."

The father leaned over and gazed earnestly at the boy's face. Then he turned to the conductor.

"Can I help it if he worries?" he asked.

The cute little thing entered the Doc's office with a worried look.

"Doctor," she said, "I need an operation."

"Major?" asked the Doctor.

"No," she said, "Sergeant."

Who ever heard of a blind man joining a nudist colony?

Fair Plaintiff: When I get on the witness stand, I suppose that I'll have to bare everything.

Her Lawyer: Oh, no! I think not; it'll be sufficient if you merely cross your legs.

Here's a true story. Our Service Department got a telephone call requesting service on an oil tanker coming in to New York City. A telephone number was relayed to our New York serviceman. When the service man called the number a woman answered the phone and the conversation went something like this: "Can you tell me when the USS— is coming in?" The woman replied "Lord, I don't think we can handle a whole shipload". To which our man replied "What business are you in anyhow?" The woman then sweetly replied "Why don't you come over and see?"

A gentleman, on being informed that he was the proud father of triplets, was so overjoyed at the news that he rushed immediately to the hospital, where his wife and newly acquired family were and dashed pell-mell into the room.

The nurse, being out at the time, was irritated upon her return and remonstrated with the father.

"Don't you know better than to come in here in germ-filled clothes? Why, you're not sterile."

He looked at her and said, "Lady, are you telling me?"

Absent-minded Salesgirl (as her date kissed her goodnight): Will that be all?

The psychiatrist was examining Willie who had been giving his parents much concern.

"What do you like to do best, Willie?"

"I like to shoot birds."

"And what do you like to do next best?" asked the psychiatrist.

"Well, I like to make slingshots to shoot birds with."

"Well, what do you like to do next best?"

"I like to take little girls' bloomers off." Ah, thought the psychiatrist, now I'm getting somewhere.

"And what do you like to do then?"

"Take the elastic out of the bloomers to make more slingshots to shoot birds with."

A pinch of salt can really be imp dropping it on a big hunk of st

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