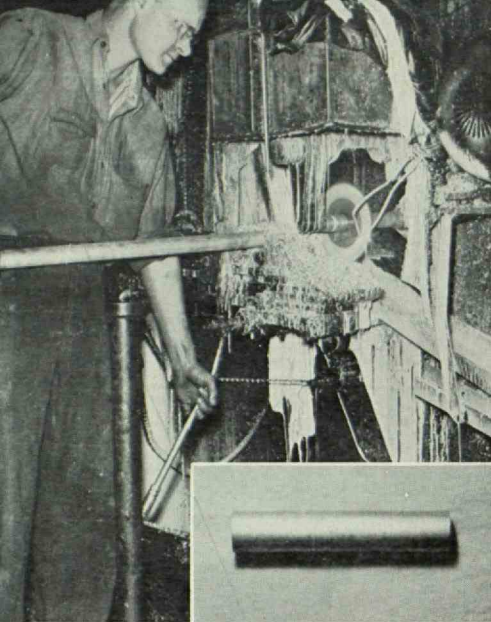


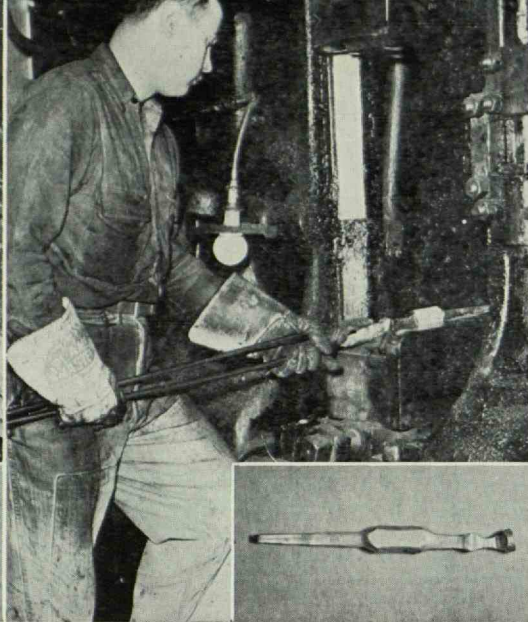
TECHNOLOGY

REVIEW *May* 1949

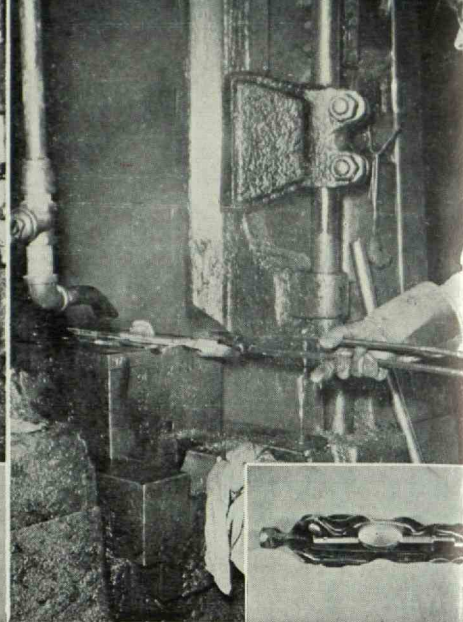




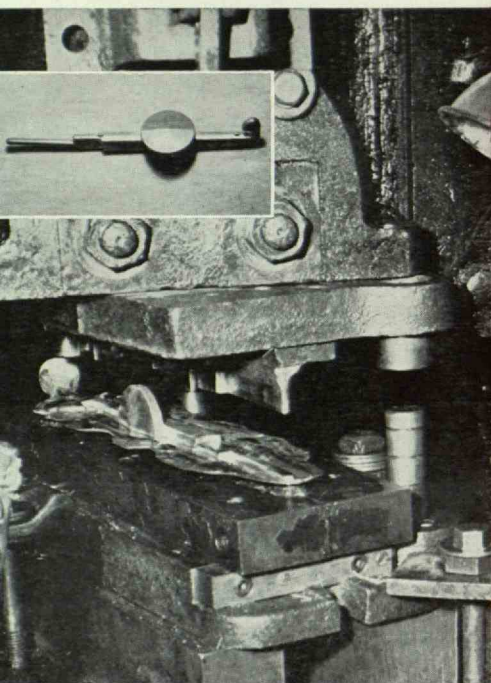
Cutting Bar



Lengthening and Shaping



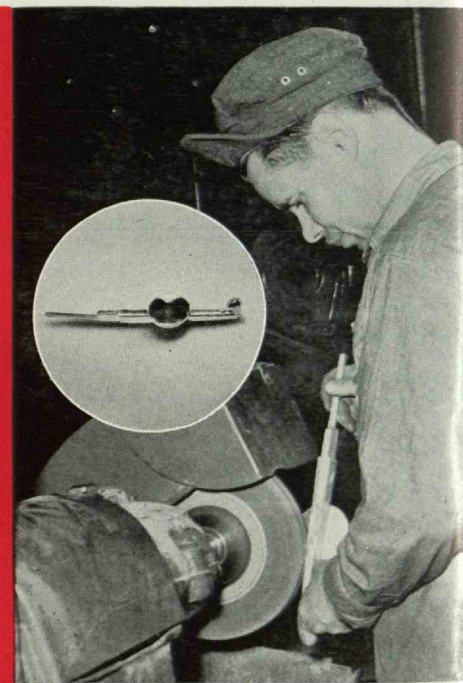
Shaping to the Die



Trimming the Flash

FORGING ALUMINUM

into
Pressure Cooker Tops



Finishing and Polishing

The Harvey Metal Corporation

HAROLD B. HARVEY '05

Engineers and Manufacturers

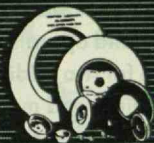
74th Street and Ashland Avenue

Chicago 36, Illinois

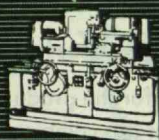
FORGINGS IN ALUMINUM — BRASS — BRONZE — COPPER — MAGNESIUM — MONEL — ALLOYS

MACHINING FACILITIES

$\frac{1}{20}$ the thickness of this page
is $\frac{1}{10,000}$ of an inch →



GRINDING WHEELS



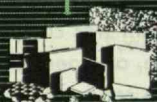
GRINDING MACHINES



REFRACTORIES



NORBIDE



NON-SLIP FLOORS



LABELING MACHINES



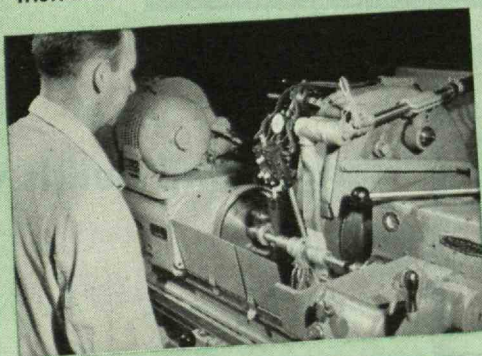
ABRASIVE PAPER
AND CLOTH...
SHARPENING STONES



$\frac{1}{10,000}$ of an Inch is Everyday Grinding Accuracy

MANY thousands of the products which serve you so faithfully, both in your home life and your business life — such as your automobile, your refrigerator, the airplane in which you travel and the machines in your office and plant — owe their dependability and long life to the accuracy of grinding. Many have parts ground to limits as fine as a tenth of a thousandth of an inch (one twentieth the thickness of this magazine page) by Norton grinding machines and Norton grinding wheels.

And many parts are still further refined, both for accuracy and surface finish, by Norton lapping machines. The work turned out on a production basis by these unique Norton machines is measured in millionths of an inch — must be gauged by complicated optical instruments making use of light rays.



If you have a production problem which involves extreme accuracy or high surface finish, or both, Norton engineers are at your service — highly trained experts on abrasives, grinding wheels, grinding machines and lapping machines.



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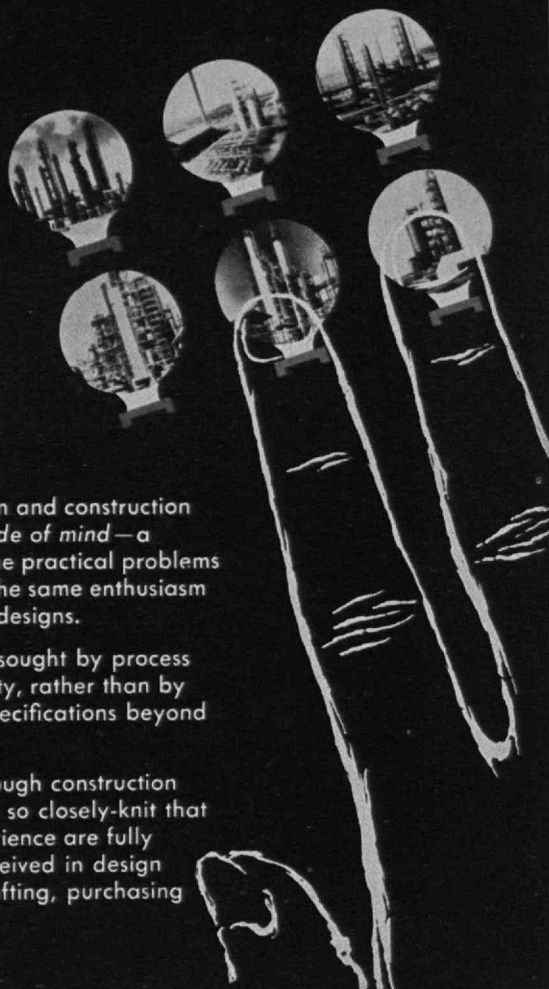
(Behr-Manning, Troy, N. Y. is a Norton Division)

ECONOMY

Economy in plant design and construction starts with an *attitude of mind*—a willingness to apply to the practical problems of the low-cost plant the same enthusiasm given to "perfectionist" designs.

Operating economy is sought by process and design ingenuity, rather than by ultra-refinement of specifications beyond the economic limit.

Economy is carried through construction by an organization so closely-knit that the lessons of past experience are fully utilized. Savings conceived in design accumulate through drafting, purchasing and construction.



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39 Rue Cambon, Paris 1er, France

Compañía Anónima Venezolana Lummus

Edificio "Las Gradillas"

Esquina Las Gradillas, Caracas, Venezuela



ECONOMY by prototype—

Time, rather than money, was the major concern when the first of these wartime butadiene plants was built. Successful in design and operation, it was the prototype for two additional plants, saving *both* time and money in construction. All have exceptional records of low operating cost.

ECONOMY by experience—

In furnishing plants for the production of ethylene, Lummus has combined its petroleum and chemical plant experience. High yields and low product cost per dollar of investment have been obtained, along with wide-range flexibility as to charge stock composition. Total capacity of Lummus ethylene plants is now some half-million pounds per day.

ECONOMY by expediency—

This smaller customer had rigid limits of first cost for its lube oil plant. Lummus accepted the challenge—the design was developed to permit use of existing and rebuilt equipment—located and purchased by Lummus for the job. This plant was completed exactly on schedule, and neutrals of zero pour test were ready for shipment on the second day of operation.

Fulfillment
Teamwork

designs and builds with **ECONOMY**

Resourcefulness
Perspective
Technique

AL.

Office,
p. III.

10 CENTS in U. S. Territories
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Light & Power

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Record Expansion in
Electricity Production

Factors: New Crop of Stores
And Factories; More Home
Appliances; Big Farm Use

An \$8,500,000,000 Investment

By ROBERT H. SELLITZ

Electrically minded Americans have
changed the nation's electricity makers into
biggest power expansion program the
world has ever seen.

Thumbnail measures of its magnitude:
to U. S. power making facilities
in 1939 are by themselves greater
combined generating capacity of
Great Britain. New capacity
completed in the next three
years as much as has been
electricity was discovered.
Hardstick: The \$8.5
power-making com-
pend on ex-
penditure
program.
spent
over
World

The Wall Street Journal,
February 21, 1949

10%

The power generating facilities designed
and constructed by Stone & Webster
Engineering Corporation through the years
total over 6,000,000 kilowatts, equivalent to
one-tenth of the total generating capacity
of all electrical utilities in the United States.

Work of the Corporation currently in
progress for leaders in the industrial and
public utilities field in all parts of the
country will increase this total over 2,000,000
kilowatts.

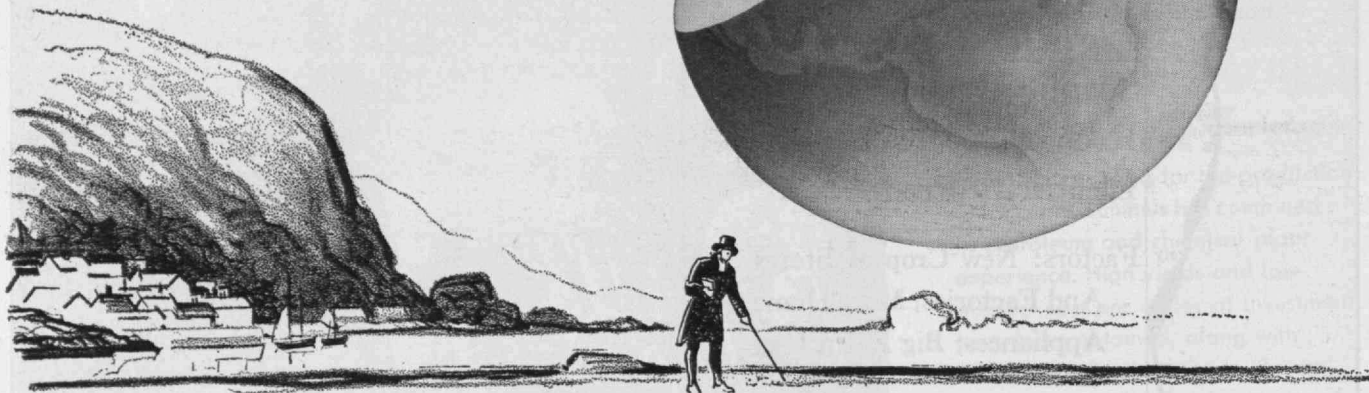


STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

TITANIC EARTH

TITANIUM
9th most plentiful element on earth



TITANIUM DISCOVERED

Back in 1791 an English clergyman, William Gregor, who liked to stroll and think on the beaches of Cornwall, became curious about the black sand he saw there. This gentleman of the cloth was also an amateur chemist and in this sand he discovered a new element. Almost coincidentally an Austrian named Heinrich Klaproth (also discoverer of uranium and zirconium) extracted the same thing from rutile and named it "Titanic Earth" for the mythical Titans. Hence our name Titanium.

Thereafter titanium was found in various places including the Ilmen Mountains of Russia (ilmenite) but although it is the ninth element in order of earthly abundance, it remained a mere laboratory curiosity until 1908.

TITANIUM OXIDE

At that time Dr. A. J. Rossi, expert in the reduction of metals, mixed titanium oxide with salad oil to make a white paint. In another 10 years a pure oxide was being produced which quickly won success as a pigment. Paint, false teeth, face powder, tires, shoes, glassware, textiles, inks, plastics, paper consumed an increasing tonnage of titanium oxide but still the pure metal was beyond industry's reach.

TITANIUM METAL & NATIONAL RESEARCH

Titanium is an affectionate metal, over fond of oxygen and nitrogen when at high temperatures. Even a fraction of a per cent of either makes titanium of little value as a structural material. Until recently there was no means of preparing titanium metal in a form sufficiently free of these elements to indicate any potential commercial value. Dr. W. J. Kroll of the Bureau of Mines has initiated many of the recent developments in titanium metallurgy by finding a means of preparing powdered titanium metal.

Only by exclusion of these gases can it be kept from embrittling combinations and when Remington Arms Company, a Du Pont subsidiary, laid its plans to produce metallic titanium in cast and rolled shapes, they knew that at National Research Corporation they could find the knowledge of vacuum technique that they needed.

The melting and casting of titanium was a natural for National Research. We planned the process, designed the equipment and installed it. Today this National Research Corporation pilot equipment is handling the highest quality of commercial metal — not much compared with aluminum — nothing at all com-

pared with steel — but so promising that millions will be spent by the industry within a few years to increase the quantity and lower the price.

USES OF TITANIUM METAL

Titanium stands fourth in abundance among the structural metals and there is plenty in the U. S. A. Tremendous strength, light weight, and remarkable corrosion resistance (comparable only to that of the noble metals) is a unique combination. Coming at a time when long-sighted people are viewing our metallic resources with alarm, it has an assured future. With the price pulled down to a few dollars a pound or less, titanium will be of primary importance to manufacturers of aircraft, automobiles, electric devices, gas turbines, superchargers, marine hardware, rockets, optics, jewelry.

WHAT NEXT?

So, with the help of National Research's high vacuum know-how, another material has been taken from the test tube to the factory. Where else can good men and ideas help — where can they help you? At National Research the best in brains, organization, equipment, and an unequalled accumulation of unique experience are available.

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Among the JOY executive personnel, we are proud to number the following men who are graduates of the Massachusetts Institute of Technology

James Andrew DRAIN '26
Vice Pres.-General Manager
Galt, Ontario, Canada

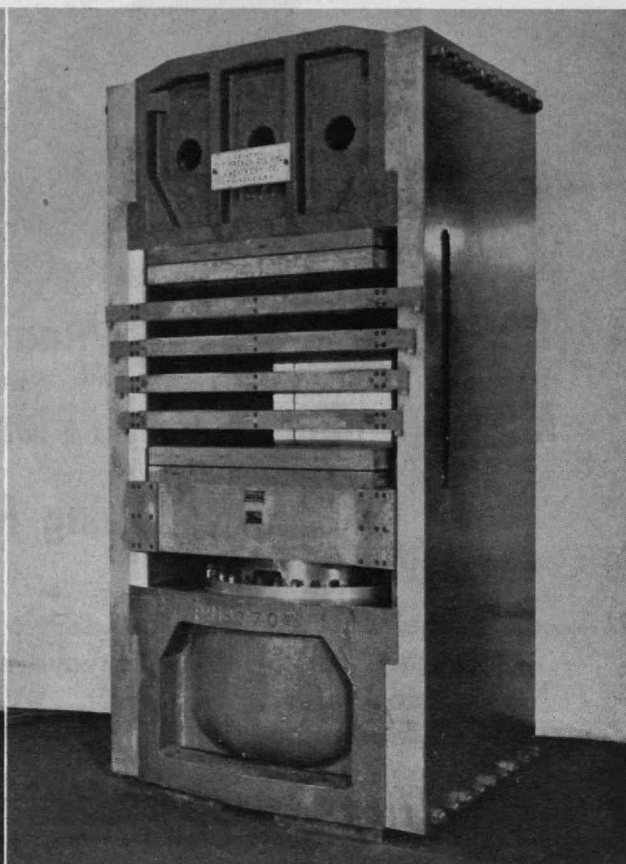
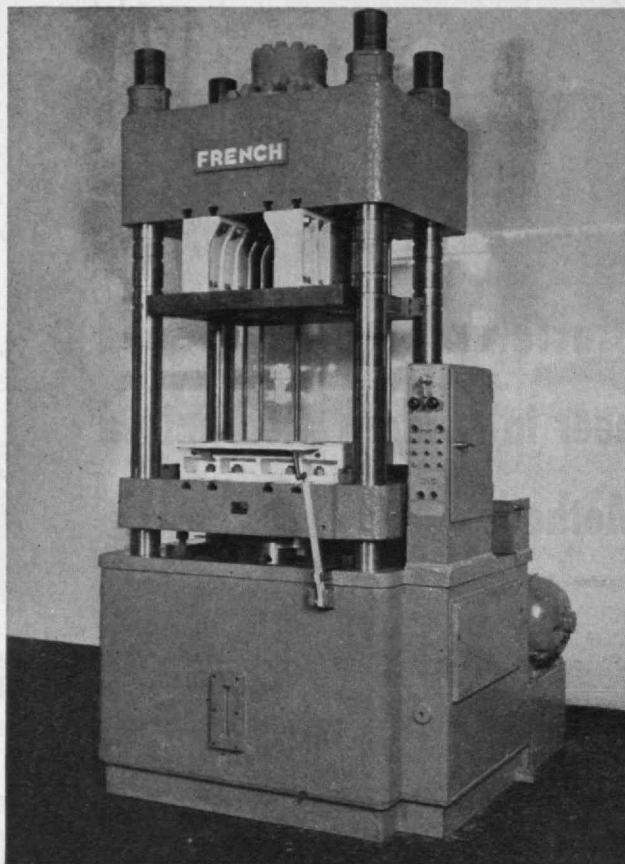
George Walter BERGMAN '27
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Benjamin Philbrick LANE '23
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Raymond MANCHA '26
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Special Hydraulic Equipment

VEGETABLE OIL MACHINERY

Hydraulic Presses
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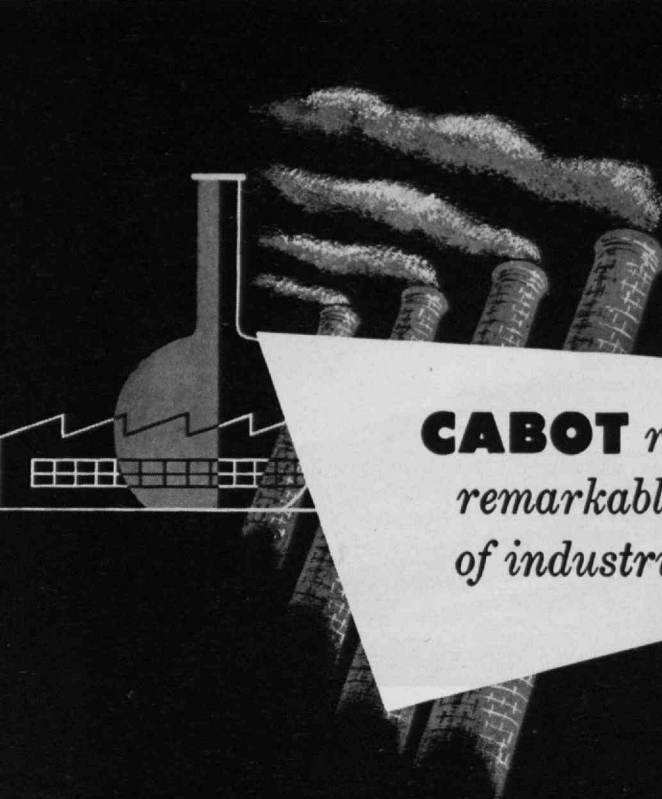
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Hydraulic Curb Presses
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Solvent Extraction Equipment

ALFRED W. FRENCH, JR. '26
Vice President

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and Paper Industries*

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CHARCOAL

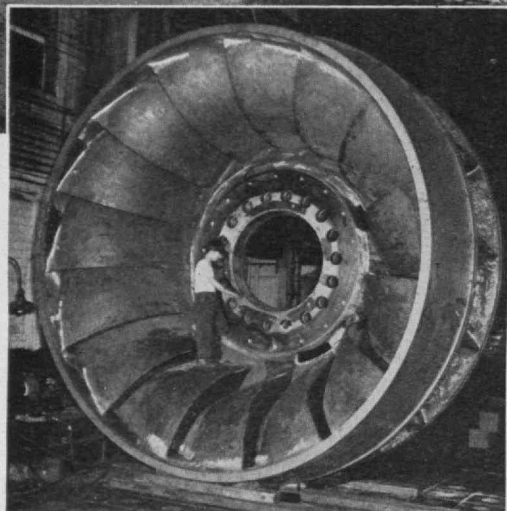
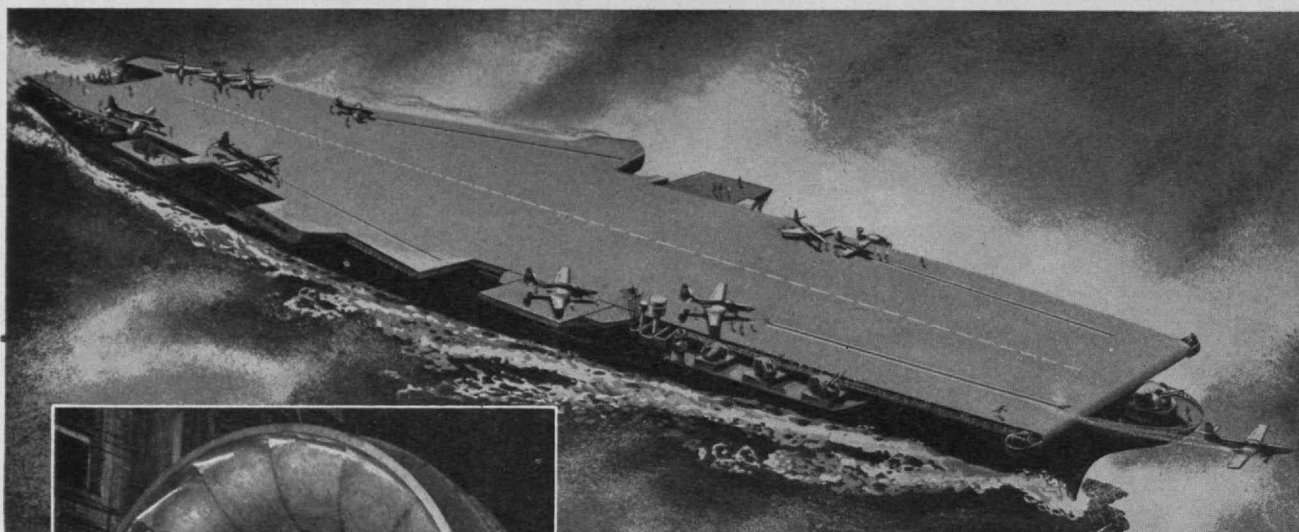
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An emotion of pride and achievement is attained with the design and building of a great ship or giant hydraulic turbine. Even more satisfying is this feeling when these products are the world's largest or most powerful. Included in the current back-log of almost \$200,000,000 at Newport News are the 1090-foot Aircraft Carrier, UNITED STATES, and nine 165,000 h.p. hydraulic turbines for Grand Coulee Dam, the world's greatest hydro-electric development.

In addition to these primary products paper making, rayon, wool carding machinery, and numerous other products are being built at Newport News.

Included in the Yard's 11,000 employees are twenty-eight graduates of M.I.T. Many of these alumni, starting with the President and General Manager, hold positions of high responsibility.

NEWPORT NEWS SHIPBUILDING & DRY DOCK COMPANY
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