

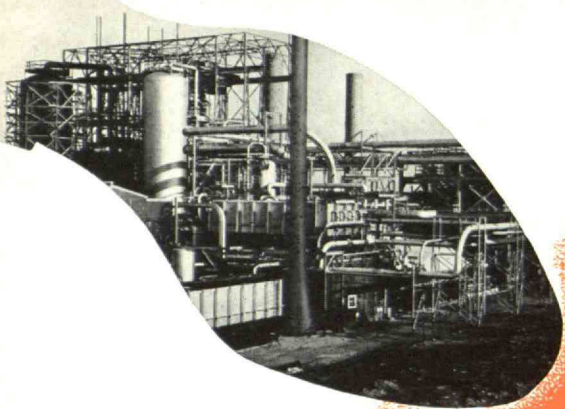
*January* 1942

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office







# A BACKWARD LOOK

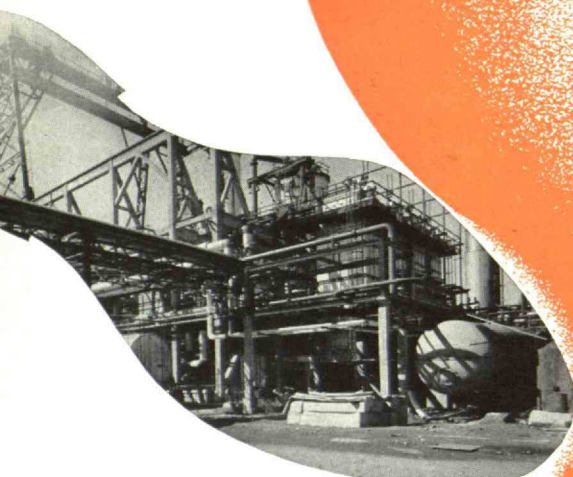
## *before a Forward Step*

Unforeseen developments . . . unhopd-for opportunities . . . unheard-of products . . . these are in store for the chemical processing industry.

But before any forward step is tried, a backward look should be taken at what has gone before . . . at the record of the engineering and construction organizations whose plants and units have made records for fast-starting and low-cost, efficient, dependable operation.

BADGER offers the services of widely experienced chemical engineers who have been responsible for the design and construction of many such plants and units in the chemical processing industry. Their collaboration with your own engineers cannot help but be of considerable value in carrying out that new project of yours.

10-BCO-2



# E. B. BADGER & SONS CO.

Boston, Mass.

New York

Philadelphia

San Francisco

London

Paris

*Chemical Engineers and Contractors Specializing in Distillation, Evaporation, Extraction and Solvent Recovery*



## A Dark Picture of NATIONAL DEFENSE

A dark side of National Defense is that eye accidents are slowing up the vital production of planes, tanks, guns, ships. Last year *eye accidents* alone resulted in the loss of 8,455,000 man-days—a figure which is 30% greater than the time lost by strikes during the same period . . . a figure which is a national *disgrace*.

Do *your* part to make this picture *bright*. Protect all your workers, men and women, with safe, comfortable, American Goggles—goggles that have the *extra* impact-resisting protection of Deep-Curved Super Armorplate Lenses, ground, if desired, to individual prescriptions. Call in your nearest AO representative today.

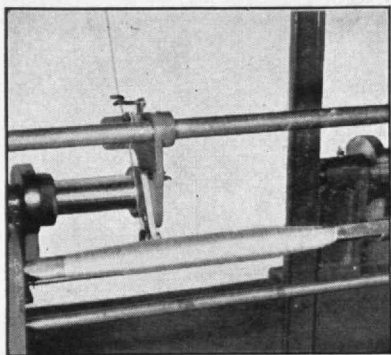
# American Optical Company

Southbridge



Massachusetts





# *New* **FIDELITY Quill Winder...**

## **Accurate Taper Winding of Wire for Weaving of Wire Cloth for**

### **• FILTERS • SCREENS • SIFTERS, etc.**

The new FIDELITY Quill Winder for accurate, high-speed taper winding of wire—six packages of uniformly even lay and taper at one time—speeds production for manufacturers of wire cloth for filters, screens, sifters, etc.

The taper is automatically governed by pressure control buttons which reverse and successively shorten the traverse in the same operation.

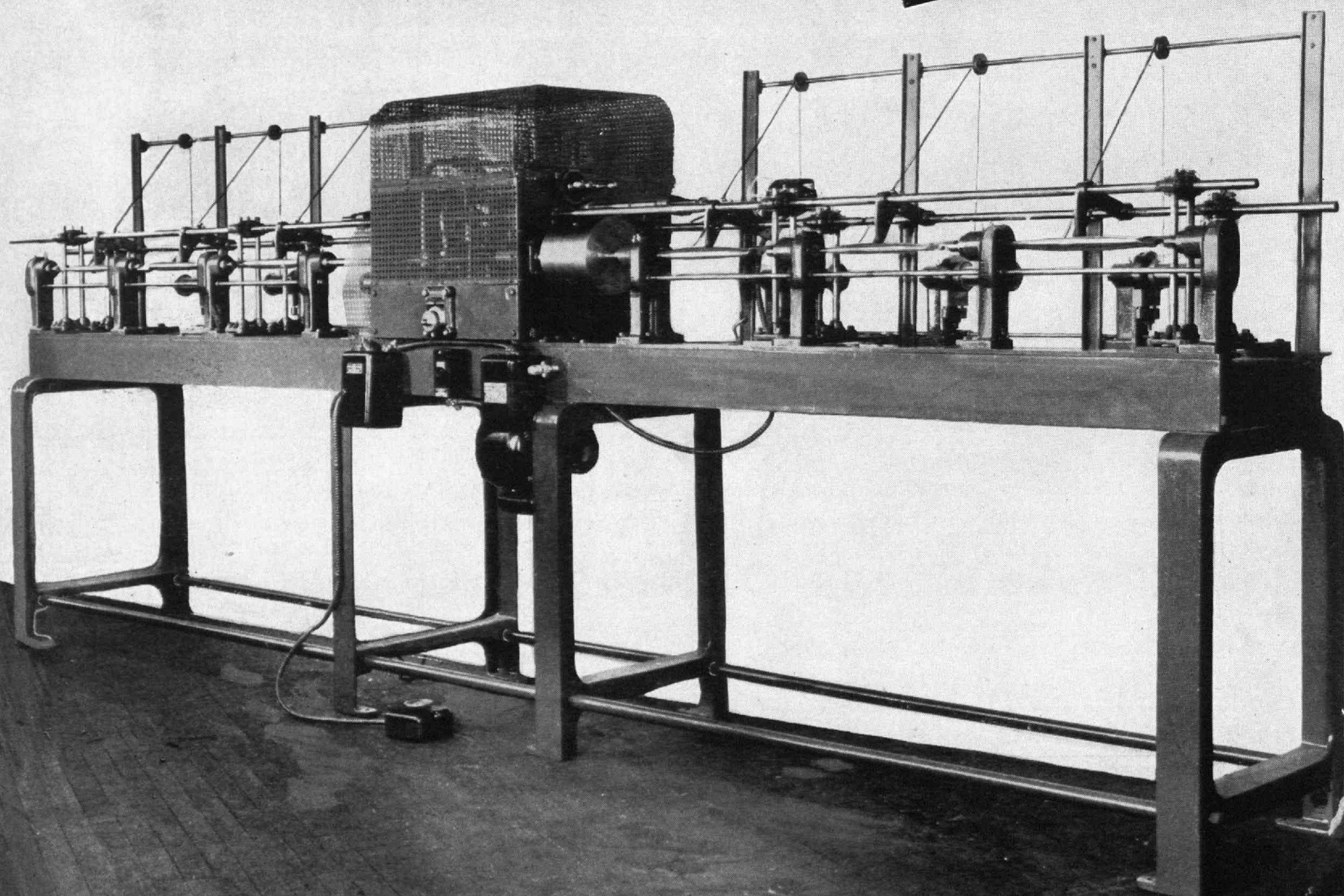
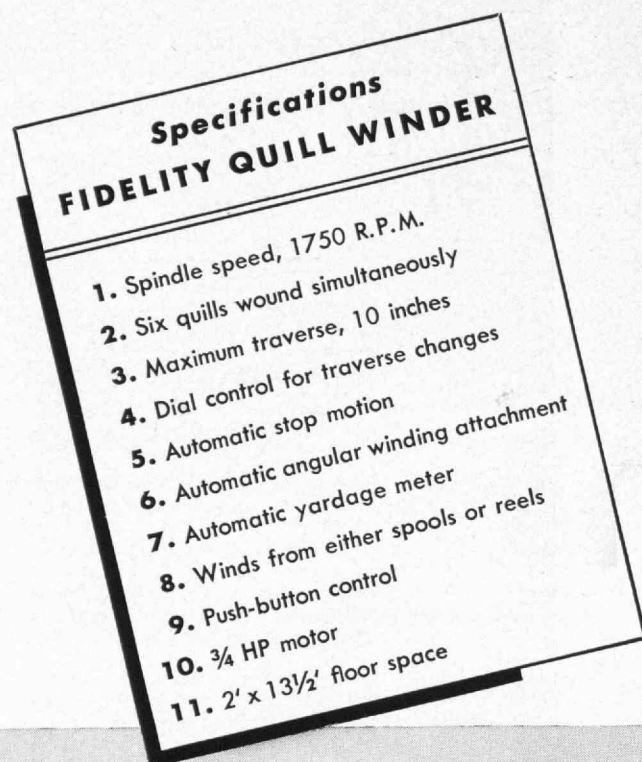
A clutch regulates tension to conform to speed and pick-up . . . eliminates wire breakage. Other outstanding advantages include: hydraulic control, individual motor drive, stop motion on feeder and winder, and automatic yardage meter.

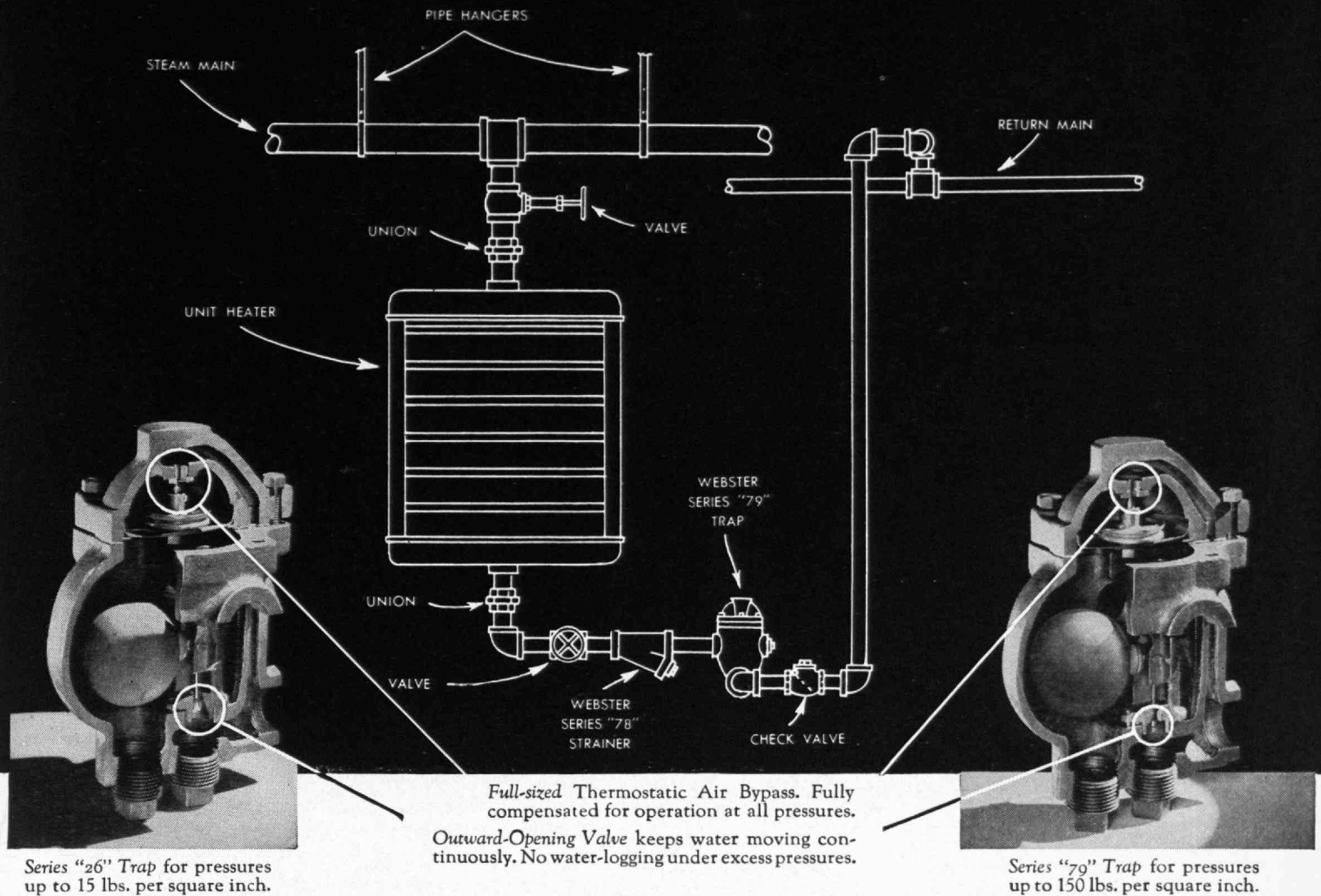
You can wind wire from spools or brake-controlled reels depending on your requirements.

**For further information and details, write for Bulletin**

## **FIDELITY MACHINE COMPANY**

**3908-18 Frankford Avenue, Philadelphia, Pa.**





# -ideal for Unit Heaters

There is nothing intermittent in the operation of Webster Combination Float and Thermostatic Traps. . . They provide *continuous draining*. The float-controlled *outward opening valve* stays open as long as there is water present. Stepping up the pressure results in quicker heating up.

Then, consider overload capacity. When you have steam coming into a cold unit heater with a fan blasting cold air across it, the trap must handle a tremendous volume of condensation for a short time. Under this condition the generous thermostatic bypass of the Webster Combination Float and Thermostatic Trap plays an extra part . . . handling a substantial volume of condensation and only closing when the trap body is finally filled with saturated steam.

Air binding of unit heaters is unknown with Webster Combination Float and Thermostatic Traps. The full-sized thermostatic bypass insures continuous and immediate discharge of all the air and non-condensable gases that pass into the trap. The thermostatic element is no snap-action after-thought. It has the same capacity as the famous standard  $\frac{1}{2}$ " Webster Thermostatic Trap.

There are a score of other advantages . . . You will find them covered in detail in our catalog. But, try one on your next unit heater application. You'll be surprised and pleased. Pretty good deliveries, too—everything considered.

WARREN WEBSTER & COMPANY, CAMDEN, N. J.  
Pioneers of the Vacuum System of Steam Heating : : Est. 1888  
Representatives in 65 principal Cities : : Darling Bros., Ltd., Montreal, Canada

H. F. MARSHALL '19

See our exhibit at the 7th International Heating and Ventilating Exposition, Commercial Museum, Philadelphia, Pa., January 26-30, 1942.

-since 1888  
**Webster**  
Systems of  
Steam Heating



## *Just for Fun!* A CHALLENGE TO YOUR INGENUITY

HERE is a simple problem that will not make you work too hard at this rushing season of the year. — Suppose that, in an election to fill 5 offices, each of 100 voters votes for 5 out of 10 candidates—a total of 500 votes being cast.

### VOTE FOR 5

A	B	C	D	E	F	G	H	I	J
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What is the largest number of votes a candidate could receive and still definitely lose?

What is the smallest number a candidate could receive and still definitely win?

*Answers: Eighty-two and eighteen.*

We specialize in industrial physics and offer a  
"GUARANTEED RESEARCH SERVICE"

**CALIBRON PRODUCTS, INC.**  
West Orange, New Jersey



Lane-Wells Radioactivity Well Logging Service gives oil well operators "eyes to see through steel" by obtaining accurate logs of formations through multiple

strings of casing. The story of this Lane-Wells Service is available to Petroleum Engineers. Write: Lane-Wells, Los Angeles, California.

GUN  
PERFORATOR  
•  
ELECTROLOG  
•  
OIL WELL  
SURVEYS



## THE TABULAR VIEW

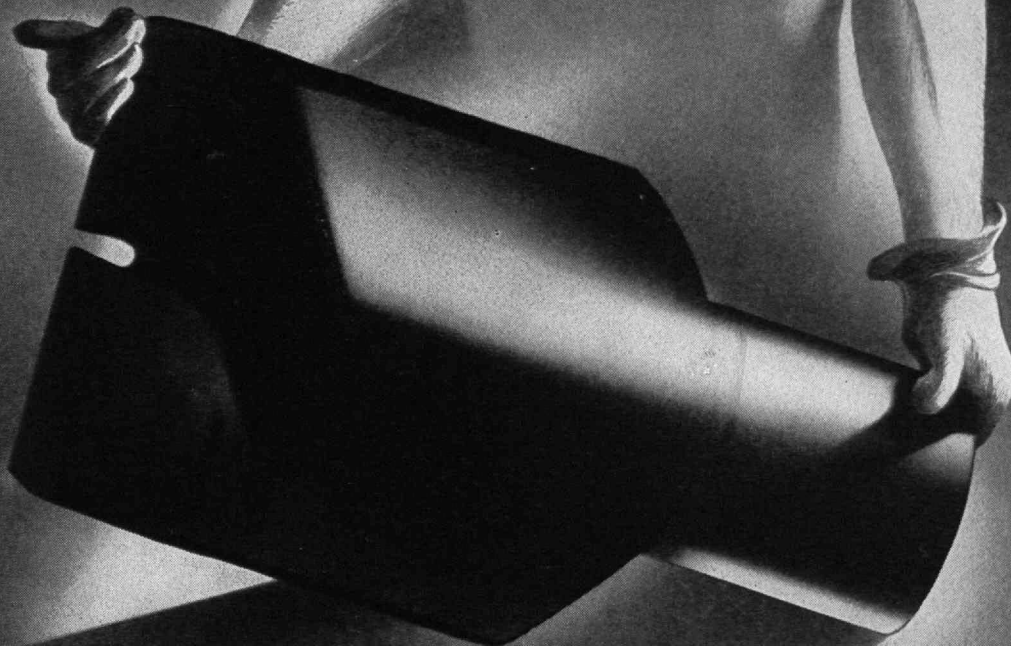
**Khnum.** — How deflocculants, flint, precision measurements, and other items from the paraphernalia of science have been marshaled to assist artists in giving more people the benefit of their art is described in this issue of *The Review* (page 120) by FREDERICK H. NORTON, '18, Associate Professor of Ceramics at Technology, and GEORGE DEMETRIOS, the American sculptor. Professor Norton's researches into matters ceramic, extending over the past fourteen or fifteen years, are well known to many readers of *The Review*. Mr. Demetrios has been working with Professor Norton during the past two years.

**Economizing.** — Black gold becomes a more and more vital asset as war rings the world. Conserving petroleum resources is hence of increased importance. T. V. MOORE, '29, who describes (page 124) conservation in production, is with the production research department of the Humble Oil and Refining Company, Houston, Texas.

**Menu.** — The perennial questions of what to eat, how much of it, and why, become increasingly complicated from day to day. In this issue (page 127) JAMES A. TOBEY, '15, familiar to *Review* readers through his earlier discussions of allied topics, applies the touchstone of common sense to a number of current dietary ideas.

**How Use the Land?** — From the stimulating conference on principles of city replanning held at Technology by the Urban Land Institute last fall, *The Review* presents two provocative analyses of a matter whose bearing on the lives of millions of Americans is intensified yearly. ARTHUR W. BINNS (page 130), who considers the question of replanning our cities from the point of view of the active real estate man, is director of the National Association of Real Estate Boards and chairman of the association's committee on housing and blighted areas. GORDON WHITNALL (page 131) approaches the problem from the point of view of the student of the theory of city planning. A consultant on planning and government to cities and counties, Mr. Whitnall established the planning department of Los Angeles more than twenty years ago.

**WANTED** *Production Engineer:* starting salary \$6,000.00 per year. Should be a graduate of an accredited mechanical engineering school, 30 to 35 years old, to be in charge of all engineering and planning activities for an old, well-established, financially sound company in the Chicago area, making a nationally distributed, high precision product, a substantial percentage of which at the present time is defense work. Applicant should have had mass production experience preferably on precision work; should have a combination of executive and engineering ability. Please address reply to: Box A, *The Technology Review*, M.I.T., Cambridge, Mass.



**Problem: Impact plus wear in thin sections.  
Answer: Chromium-Molybdenum (X4130) steel.**

The aircraft use of Chromium-Molybdenum (X4130) steel has established its effectiveness in parts requiring high strength and toughness in light sections.

The steel is meeting similar requirements in drag-bit blades. They are normalized from 1650 F., oil quenched from 1550 F., and tempered at 900 F.


The allowable high temper, with a retained hard-

ness of 363 B.H.N., provides good wear resistance in addition to the required impact and tensile strength.

Technical details concerning X4130 steel and its applications will be found in our booklet, "Molybdenum in Steel". A copy of this informative technical booklet will gladly be sent to technical students and any others who may be interested.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.  
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • CALCIUM MOLYBDATE

**Climax Molybdenum Company**  
**500 Fifth Avenue • New York City**



**TRUSTWORTHY TOOLS**

- speed-up precision measuring
- reduce spoiled work
- and accelerate the flow of Defense Production

Ask for Catalog showing the complete line of these quality tools. Brown & Sharpe Mfg. Co., Providence, R. I., U.S.A.

**BROWN & SHARPE TOOLS**

**BATH  
IRON WORKS  
CORPORATION**

*Shipbuilders and  
Engineers*

**BATH, MAINE**

## MAIL RETURNS

### *Utilization of '41*

FROM STANLEY BACKER, '41:

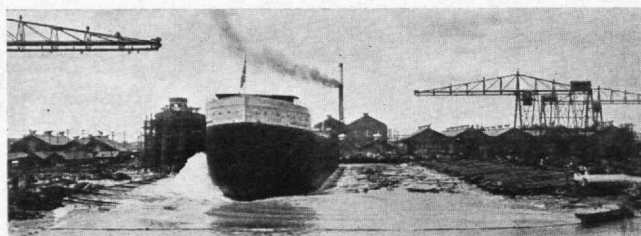
Your readers may be interested in the way in which the Quartermaster Corps is utilizing the services of the various members of last year's graduating class. Definite assignments have been received by one graduate from the Course in Marine Transportation, who is working in the office of the quartermaster general, marine transportation section; by two members of the Course in Food Technology, who are assigned to the subsistence school at the Chicago Q.M.C. food laboratories; by one student from the Course in Building Engineering, who is assigned to the office of the constructing quartermaster at Camp Edwards; and by two graduates from the division of textile technology, who are working in the textile laboratories at Philadelphia and Jeffersonville. Of course, in other branches of the services Technology men have received assignments which correspond in character to their undergraduate work, but these examples appear particularly indicative of the Army's appraisal of the technical school on the Charles.

Philadelphia, Pa.

### *Side Launching*

FROM ALFRED L. FITCH, '84:

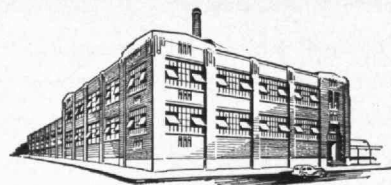
The reference to side launching on page 13 of the November Review suggests that a photograph of a side launching which I made on June 25, 1908, might interest you. This was the first time I had heard of the practice and the only one I ever saw.



The picture shows the ore boat *Daniel B. Meacham* at the Great Lakes Engineering Works near Detroit. The photograph was taken from an excursion boat carrying a party attending a meeting of the American Society of Mechanical Engineers in Detroit. As I remember, the *Meacham* was about six hundred feet long. I have no information as to how the motion was stopped.

North Easton, Mass.

**Speed with  
Economy**



*The Pullman Co.*

From our data on past industrial projects and our *experience with current conditions*, we can give you a dependable estimate of the cost and completion date of a building before any commitments are made.

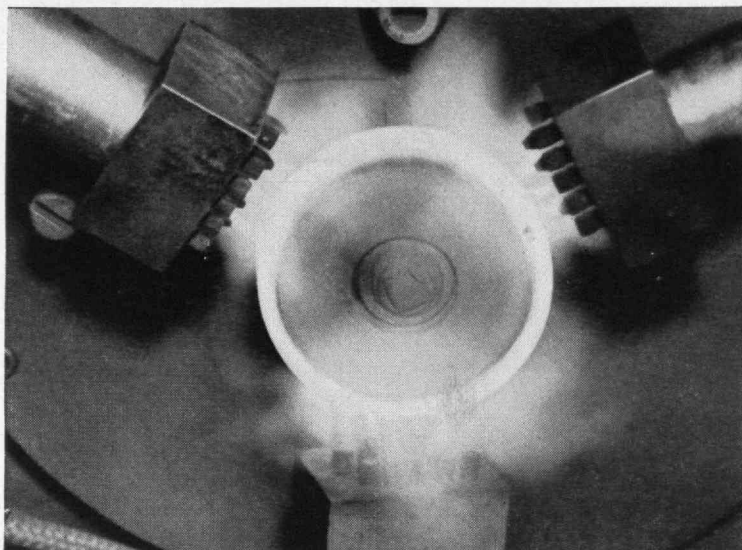
**W. J. BARNEY CORPORATION**  
101 PARK AVENUE, NEW YORK  
**INDUSTRIAL CONSTRUCTION**

*Alfred T. Glassett, '20, Vice President*



# How OXY-ACETYLENE FLAME-HARDENING

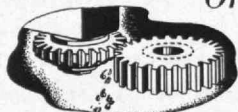
## *helps produce better gears at lower cost*



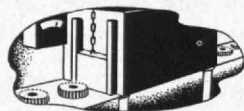
**What Flame-Hardening is**—Oxy-acetylene flame-hardening imparts a hard case to steel and iron parts by means of heating and quenching. Because it can be closely controlled, this method of making wearing parts last longer gets the desired hardness *at only the points where wear occurs*. It does not affect the chemical composition or toughness of the core.

### The Story at a Glance

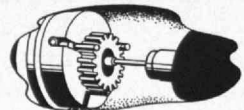
#### Ordinary Method



1. Cutting teeth and *undersized* bore in gear blank.

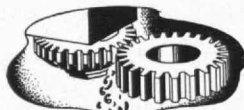


2. Furnace-hardening, with resultant distortion.

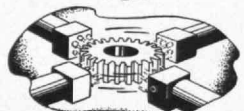


3. Chucking gear by teeth, then grinding out bore.

#### Flame-Hardening Method



1. Gear rough- and finish-machined to final dimensions.



2. Flame-hardening by spinning and quenching.

**RESULTS:** Gear hardened only where wear occurs — harder case — production speeded up — money saved.

**T**HE Fellows Gear Shaper Company manufactures equipment for cutting, finishing, and testing gears. Oxy-acetylene flame-hardening is an important part of the Fellows method because it lowers production costs and helps produce better gears. These gears are flame-hardened by the spinning method. Each gear is rapidly rotated as oxy-acetylene flames are directed upon the teeth as shown at the left—and then is quenched in an oil bath.

#### How Flame-Hardening Saves

Before flame-hardening was adopted, the gears were hardened by furnace heat-treating. To assure gears of accurate dimensions, the finish-machining had to be done *after* hardening. The procedure was to rough-cut, heat-treat, and then finish. To permit final machining, the hardness of the gear could not be too high.

When hardened by the oxy-acetylene method, the gears can be both rough- and finish-machined *before* hardening, without danger of distortion. This reduces machining time and costs. Even more important, the finished gear is a *better* gear, because a considerably harder case can be imparted to it—and at only the points where wear occurs.

#### And Linde Helped Apply It

In the development of this modern machinery for producing good gears in less time and at lower cost, it was Linde's privilege to work with the Fellows organization in applying flame-hardening successfully. If you are interested in using flame-hardening, welding, cutting, or other related processes, remember that you can obtain the gases—the apparatus—and the ability to help you use them—from Linde!

#### The Linde Air Products Company

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street  
New York, N. Y.

Offices in  
Principal Cities

In Canada: Dominion Oxygen Company,  
Limited, Toronto

LINDE OXYGEN . . . PREST-O-LITE ACETYLENE  
UNION CARBIDE . . . OXWELD APPARATUS

The words "Linde," "Prest-O-Lite," "Union," and "Oxweld" are trade-marks of Units of Union Carbide and Carbon Corporation.

# This we have, this we hold

**IMPORTANT:** *It may happen that here and there a Goodyear dealer this fall will be unable to supply you instantly with your size Goodyear "G-3" All-Weather tread tire. If this should occur, please be patient. Do not blame him if his stock is momentarily low. There is a reason for it. This advertisement attempts to tell you what it is.*

**T**HERE IS THE RIGHT of a man to stand on his own two feet, and with his own hands and talents carve out a place for himself and his family.

There is the right of a woman to look hopefully ahead, to raise up her brood in dignity and self-respect, undictated to save by her own mother-wisdom and conscience.

There is the right of a boy to lead the hale, free life of boys, flying kites when the wind blows, playing cops and robbers when he wants, going to school when he must—and out of it all somehow shaping a future to a good pattern.

There is the right of a small child to its chance for health and love and laughter, to a good start toward who-knows-what fine and useful life in years to come.

Simple things, aren't they, these things that spell America and add up to freedom!

So simple, so wholesome, it seems daft that somewhere bombs scream down to blast them, tanks lunge to crush them, bullets fly to drive from the minds of men the idea that these

are their rights, inalienable.

**B**ut the bombs do fall, the tanks do roll, the bullets do fly—and in such a world our only shield seems to be more bombs of our own with bombers to carry them, more tanks and the cannon to arm them, more bullets and faster guns to fire them.

So it is that from Goodyear factories meant for building things to enlarge life and make it better, now must flow in a swelling tide the things our country needs if we are to hold what we have.

Skills and facilities developed that a peaceful world might have better tires, floor coverings, soles and heels, transmission belts and a thousand like useful things, now focus on the making of barrage balloons, bomber wings and tails, bullet-puncture-sealing inner tubes and fuel tanks, gas masks, rubber tank track treads and a host of other Goodyear-made

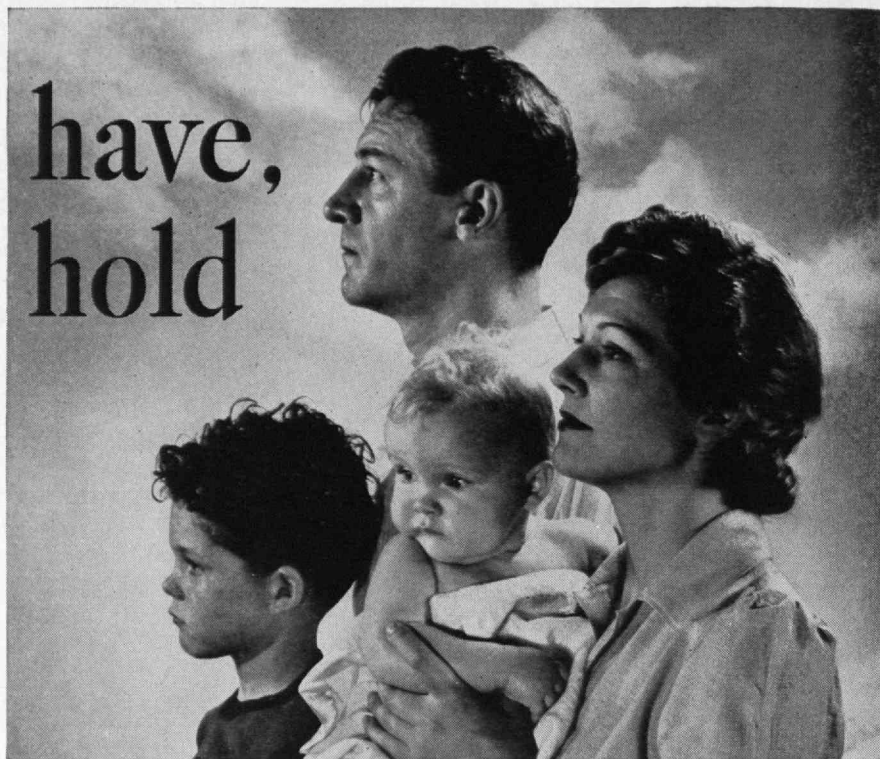
products for national defense.

This is no choice of ours—like yourself, we would far rather spend our days making this a land where life can be richer, liberty enjoyed, where the pursuit of happiness can go steadily on.

But when the decision lies between helping our government prepare for impregnable defense of such things, or running the risk of having them swept away, there is no option and we feel as we know you do.

That is why, for the time being, some Goodyear dealer may not have in stock the particular size and kind of Goodyear tire you want—simply because, that which we in America have, we intend to do our part to hold.

Compared with holding it, what else matters?



**MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND**

All-Weather—T.M. The Goodyear Tire & Rubber Company