

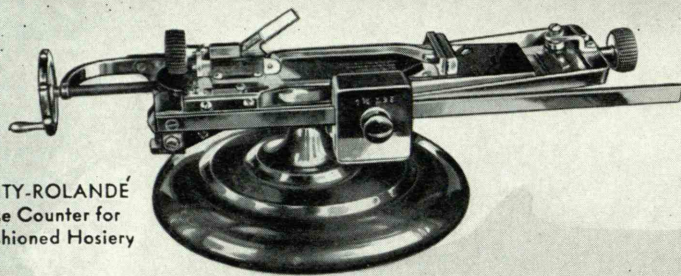
May 1941

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



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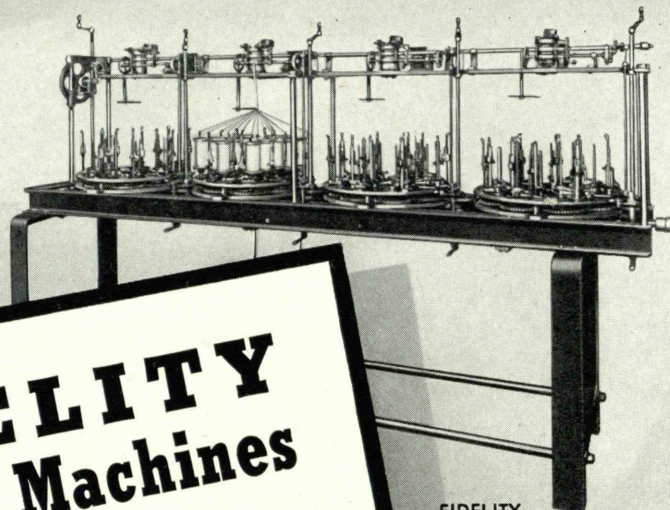
FIDELITY MACHINES help management keep the percentage of *real* output high, because they are simple to run, are so designed as to reduce unnecessary physical effort to the minimum. Easy to maintain in top working condition.

Here are machines to back you up in your defense and regular production schedules.

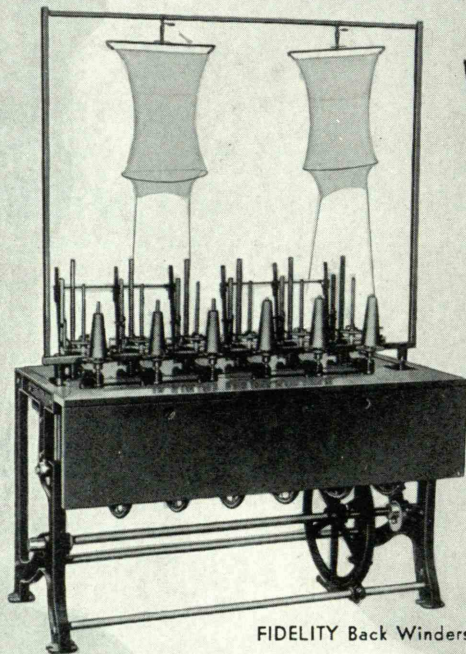
Write for new bulletins on the machines illustrated here.

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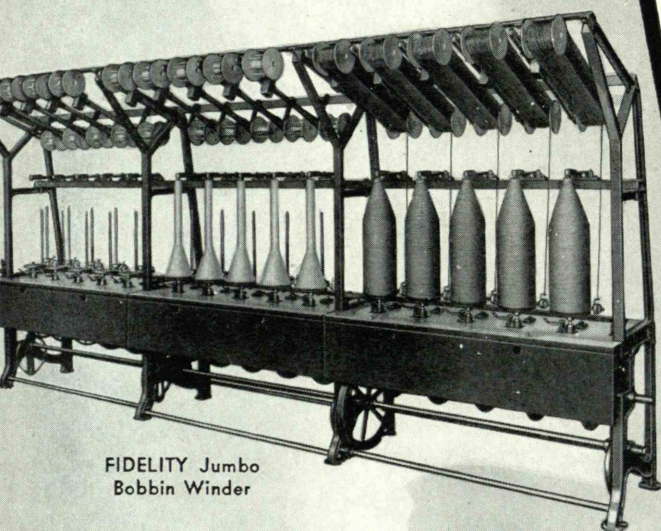
FIDELITY
Braiding
Machines



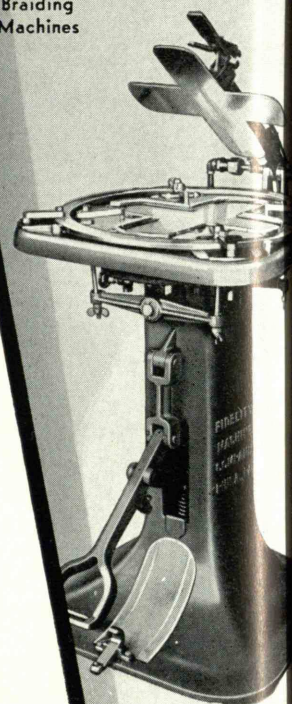
FIDELITY Back Winders



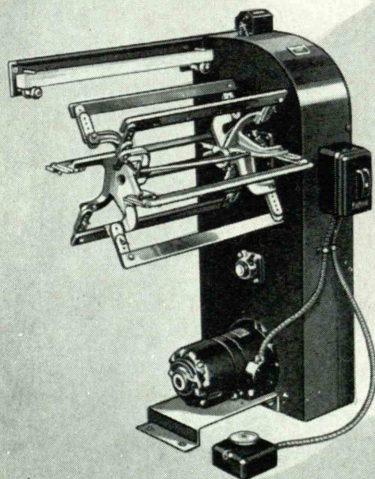
FIDELITY Jumbo
Bobbin Winder



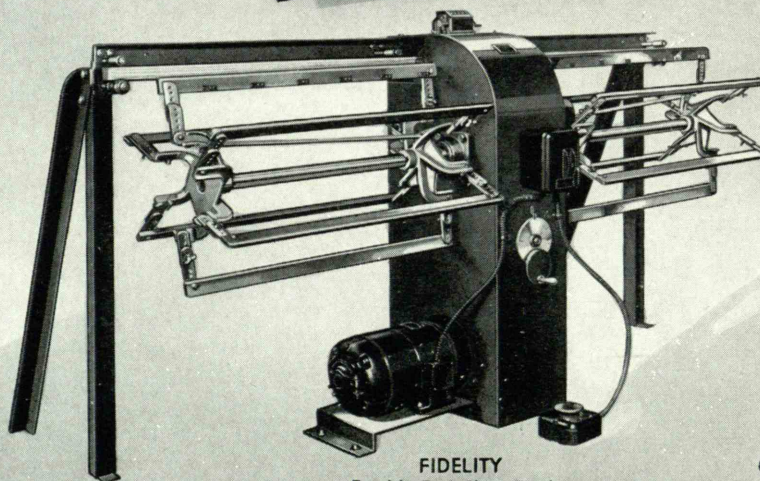
FIDELITY
Pocket Edge
Folding Machine



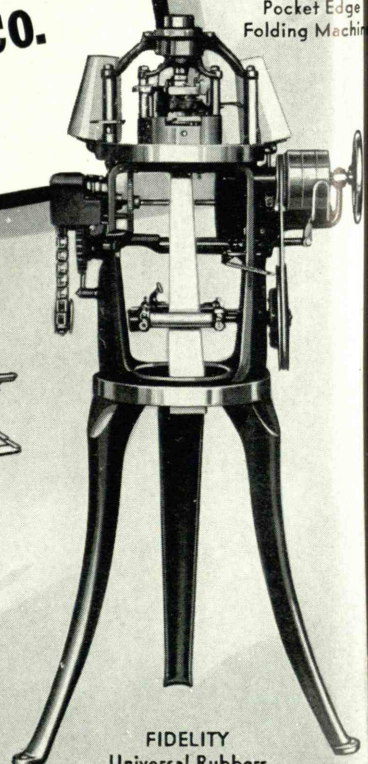
FIDELITY
Single-End Skein Reeler

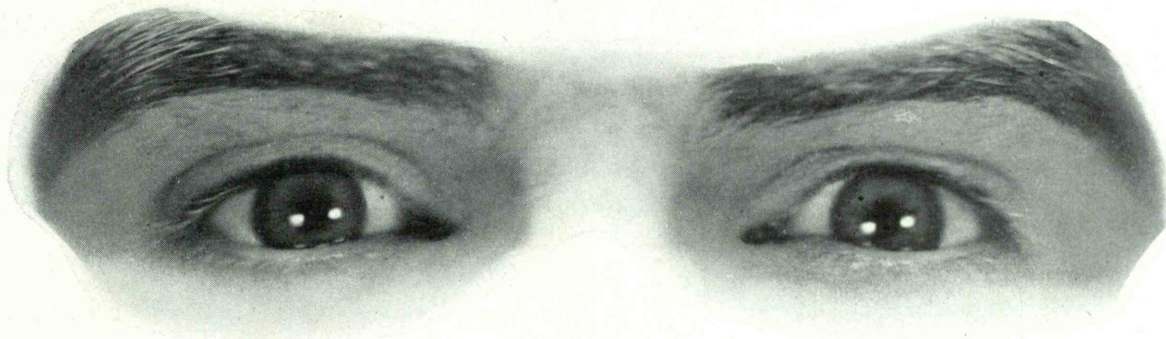


FIDELITY
Double-End Skein Reeler



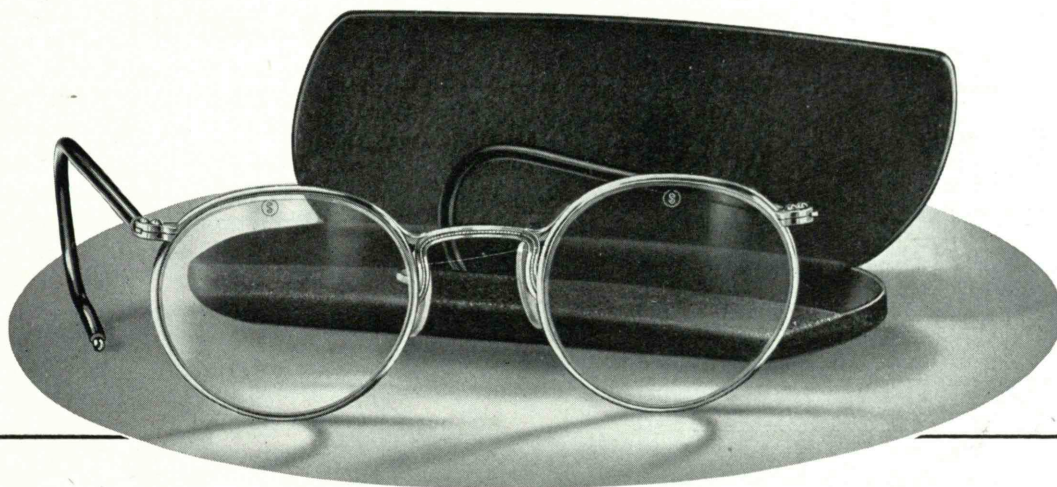
FIDELITY
Universal Rubbers





Look this Fact Straight in the Eyes:

You Can't Control Your Costs Until Your Workers Wear Goggles



As long as you let one worker's eyes go unprotected . . . so long are your costs momentarily at the mercy of an eye-accident that will assess you anywhere from \$5 to \$2,000 or more. And today, with production speeding faster and faster, the chances for eye-accidents are grow-

ing far greater than ever before.

So it's hard-headed business (*more, it's cooperation with National Defense*) to armor your workers' eyes with good American Goggles that always cost less, per pair, than the slightest eye-accident they prevent.

Let your AO Industrial Representative help you to control your costs by "Americanizing" every pair of eyes in your plant . . . quickly and economically, without disturbing routine. Call him in now, *before an accident strikes* . . . get the protection of American Goggles.

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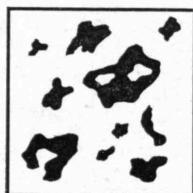
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Just for Fun!

A CHALLENGE

TO YOUR INGENUITY

IT is easy to see that there are just ten separated black areas in the square below, even though one of them contains two "holes." Can you invent a device which would give an accurate numerical count of such areas automatically, regardless of their size and shape?



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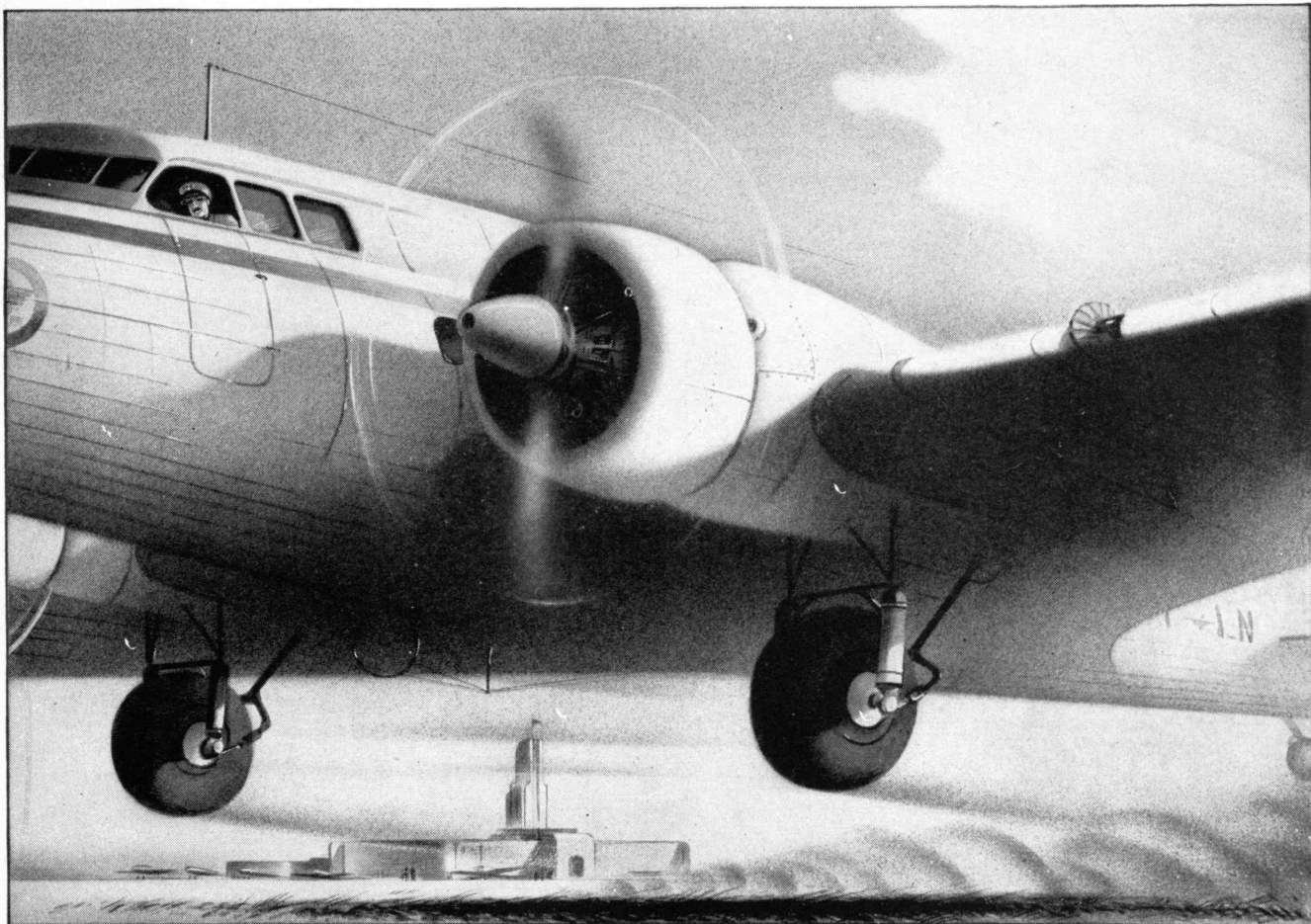
THE TABULAR VIEW

Curare Cure. — To bring the unruly into useful order is no small part of the function of science, expressed in hundreds of different fields, conspicuous among which is that of medicine. Here known techniques, predictable therapies, reliable drugs, and other agents have been provided by scientific research to sustain the skill of the practitioner in his efforts to insure mankind against disease. This constantly continuing endeavor of science has only in comparatively recent years come much before the general eye, and still the drama and the inspiration which such endeavor affords yield place too often to the more spectacular appropriating of science for less desirable ends. Much interest therefore attaches to RICHARD C. GILL's account (page 297) of the taming of the jungle arrow poison, curare, which during the past few years has been converted from a mysterious and undependable witch doctor's brew to a predictable and highly useful physician's medicament. A graduate of Cornell, Mr. Gill was for a time a member of the faculty of Lafayette College. Thereafter he was in commercial foreign service in South America, where in 1929 he acquired a ranch in the eastern sub-Andes which he has since used as a permanent expeditionary base for his own work and that of others with bona fide interests in exploration and investigation. Starting with general ethnographic surveys of the region, Mr. Gill became specifically interested in primitive Amazonian *materia medica*, out of which grew his work on curare.

Mercury. — Stone breaker in Australia, timber cruiser in Canada, copper miner in Arizona, RICHARD HALLET has included also in a crowded life intervals at sea as seaman on a British bark, fireman on a British mail packet, and watch officer on a United States Army cargo transport carrying horses to France in the days of the first World War. Hence he writes of destroyers (page 299) with the comprehension of ships and men which is attainable only through varied experience, and with the reflectiveness about states and systems which is to be had only from retrospect on such experience.

Boost. — Speed and more speed and how to get it constitute a problem generally in the fore of aeronautical minds. The physical limits imposed on what can be attained by one means must be offset, if possible, by resort to some other means. On this front, then, the engineering experimenter is seeking ways to supplement by unusual techniques the standard approaches to his problem. This critical business is canvassed for The Review (page 302) by PAUL COHEN, '35, Editorial Associate, able editor of *The Tech* in years past, and frequent contributor of shrewd analyses to The Review in years current.

Antique Artisans. — From his explorations of technology's past, LEROY L. THWING, '03, has returned before to The Review with anecdote, legend, and history — most recently in Decem- (Concluded on page 326)



WHERE "GOOD ENOUGH" WON'T DO

There are no "unimportant" parts in an airplane engine. Efficiency and dependability demand perfect performance all along the line. Consequently the only standard for selecting materials should be ability to meet the requirements.

Nickel-Chromium-Molybdenum and Nickel-Molybdenum oil hardening steels are being chosen for many engine parts such as crank shafts, pins and accessory gears because of their demonstrated capacity for doing their jobs. Not only do they develop

the necessary strength and toughness, but also the requisite hardness, and they machine in the fully heat treated condition.

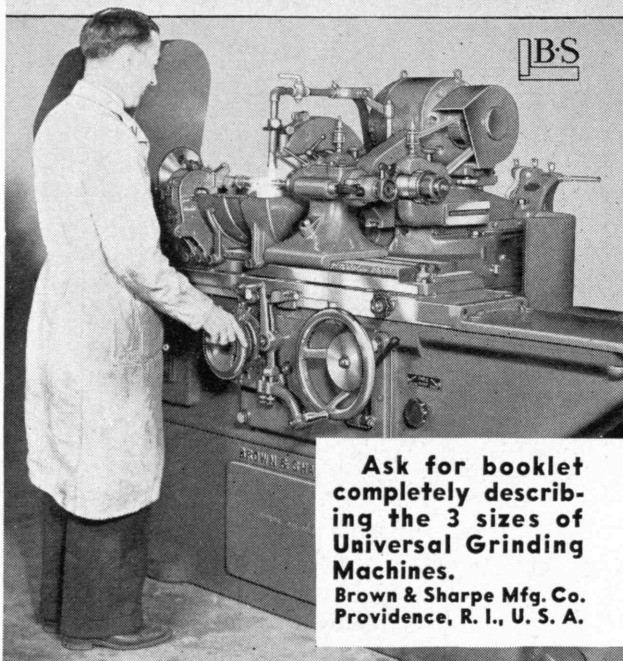
Thus they give the engine manufacturer confidence in the performance of the parts and help keep his production costs within reasonable limits.

Our booklet, "Molybdenum in Steel", which contains a great deal of practical data, will be gladly sent free on request to technical students and others interested in improved materials.

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MAIL RETURNS

Industrial Economics

FROM B. EDWIN HUTCHINSON, '09:

. . . I want to speak very highly of an article in the March Review by Henry M. Wriston on "The Worth of the Initiative." In a not too indirect way the thoughts in this article, in my opinion, bear on the subject of the Institute's prospective activity in the field of industrial economics. I have a feeling that our industrial techniques have far outstripped the development of our economic philosophy. I find myself groping to suggest some method which might bring the potential resources of the Institute to bear more directly on this larger problem. . . .

Detroit, Mich.

Teaching Fire Control

FROM FRANK L. AHERN, '14:

I have read with interest in the March issue of The Review the article, "Sir Thomas Gresham's Picture," by John E. Burchard, '23, discussing the effects of fires on cities. . . .

In my article, "Safety Is Good Management," in the March, 1940, issue of The Review, you will recall that I placed some emphasis on the suggestion that the fundamentals of fire protection and safety be included in engineering and architectural courses. It is a satisfaction to report that a course in fire protection engineering is now being given at George Washington University in connection with the Engineering Defense Training Program sponsored by the United States Office of Education.

Washington, D. C.

Small Arms for Industry

FROM ROBERT H. JOHNSON, '26:

The editorial, "Small Arms for Industry," on page 241 of your April issue is very interesting. May I inquire from what source you obtained the figure of \$20,000,000 as the volume of portable-tool business for 1937? As far as I know, accurate figures are unavailable, since a large section of the portable-tool industry makes no reports on volume of sales. [The Review's figure was based on Bureau of the Census statistics for 1937. — Ed.]

You refer to the use of portable tools in the construction of battle-ships, locomotives, and airplanes, and go on to say: "A husky miner pounding at rock with a steel and a hand hammer can bore little more than five to ten feet of hole during an eight-hour day, whereas a modern pneumatic drill during the same time can penetrate 100 to 150 feet of rock." Yet you state later that the typical tool is driven by a high-speed universal motor through reduction gearing. In the applications to which you refer and in the various forms of hand tools which you list, a large percentage of the machines are hammers. In almost every instance they are operated by compressed air. In addition to these percussion-type machines, many of the rotating tools . . . are air operated. One can therefore hardly say that the typical tool is driven by a high-speed universal motor. The typical tool in the industries you mention is, I believe, air operated.

In the fifth paragraph you mention certain circumstances under which the power-driven tool is not only faster but better. You say: "When supplied with an adjustable clutch, a nut runner will set nuts to within 10 per cent of a predetermined tension, much closer than can be expected of handwork." A pneumatic tool without an adjustable clutch will accomplish this result when supplied with reasonably uniform air pressure, corresponding to reasonably uniform voltage for an electric tool. Moreover, the air tool does not require an engaging clutch when repetitive operations make necessary several engagements of a screw-driver bit or chuck in rapid succession. In this circumstance the electric machine would require not only an adjustable clutch but also an engaging clutch, because the inertia of the motor would cause the screw-driver bit or chuck to continue to spin for an appreciable time after disengagement, making it impossible to start another operation instantly. . . .

In general, not any known method of power transmission commercially available to an industrial plant will give, in proportion to power, the light weight and small size that compressed air gives. . . . Pelham, N. Y.

How *Linde* PROCESSES


help produce machines and machine tools

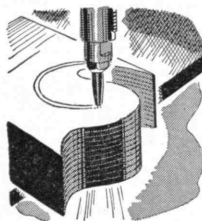
● The production of machinery and machine tools of every type can be speeded up, costs can be reduced, and results improved, by using one or more of the many processes which Linde has made available. Some of these Linde processes are outlined at the right.

Linde can supply everything you need to use these and other related processes—oxygen, acetylene, carbide, and the necessary apparatus. By buying from Linde, you can centralize your source of supply—can effect savings in materials handling, book-keeping, and parts inventories. Equally as important, Linde Process Service can offer on-the-job assistance to help you use these and other Linde processes profitably. For the full story, write any Linde office.



Linde Oxygen, Prest-O-Lite Acetylene, and Union Carbide are readily available wherever you operate.

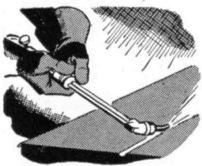
THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
General Office  Offices
New York, N. Y. in Principal Cities
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Limited, Toronto



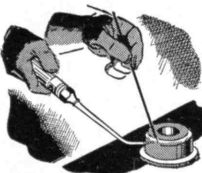
Flame-Cutting—Oxy-acetylene machine flame-cutting produces finished or semi-finished steel parts of almost any size, shape or thickness—rapidly and economically. Flame-cut parts, when joined by welding, make possible substantial savings in weight and bulk. In addition, flame-cutting simplifies design changes—enables manufacturers to hold down parts inventories—lessens dependence on outside sources of supply—minimizes machining time and expense—and makes one-of-a-kind production economically practical.



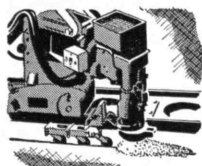
Flame-Hardening—Linde has developed dependable methods for flame-hardening dies, gears, lathe ways and other machine parts. A carefully controlled surface case can be imparted without affecting the composition or ductility of the base metal. Linde Process Service can help you obtain uniformly good results.



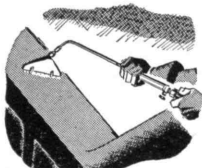
Gouging—This relatively new Linde process removes surface metal without harm to adjacent areas. It is used to gouge out faulty or temporary welds—to correct defects in forgings or castings—to provide clearance for moving parts—and to prepare plate-edges for welded fabrication.



Hard-Facing — To make wearing parts last longer, Haynes Stellite hard-facing materials can be most effectively applied by the oxy-acetylene welding flame.



Unionmelt Welding — This remarkable electric process—available only from Linde—automatically joins metal of practically any commercially used thickness, in one pass and at extremely high speeds. This process offers interesting possibilities in the fabrication of machine bases.

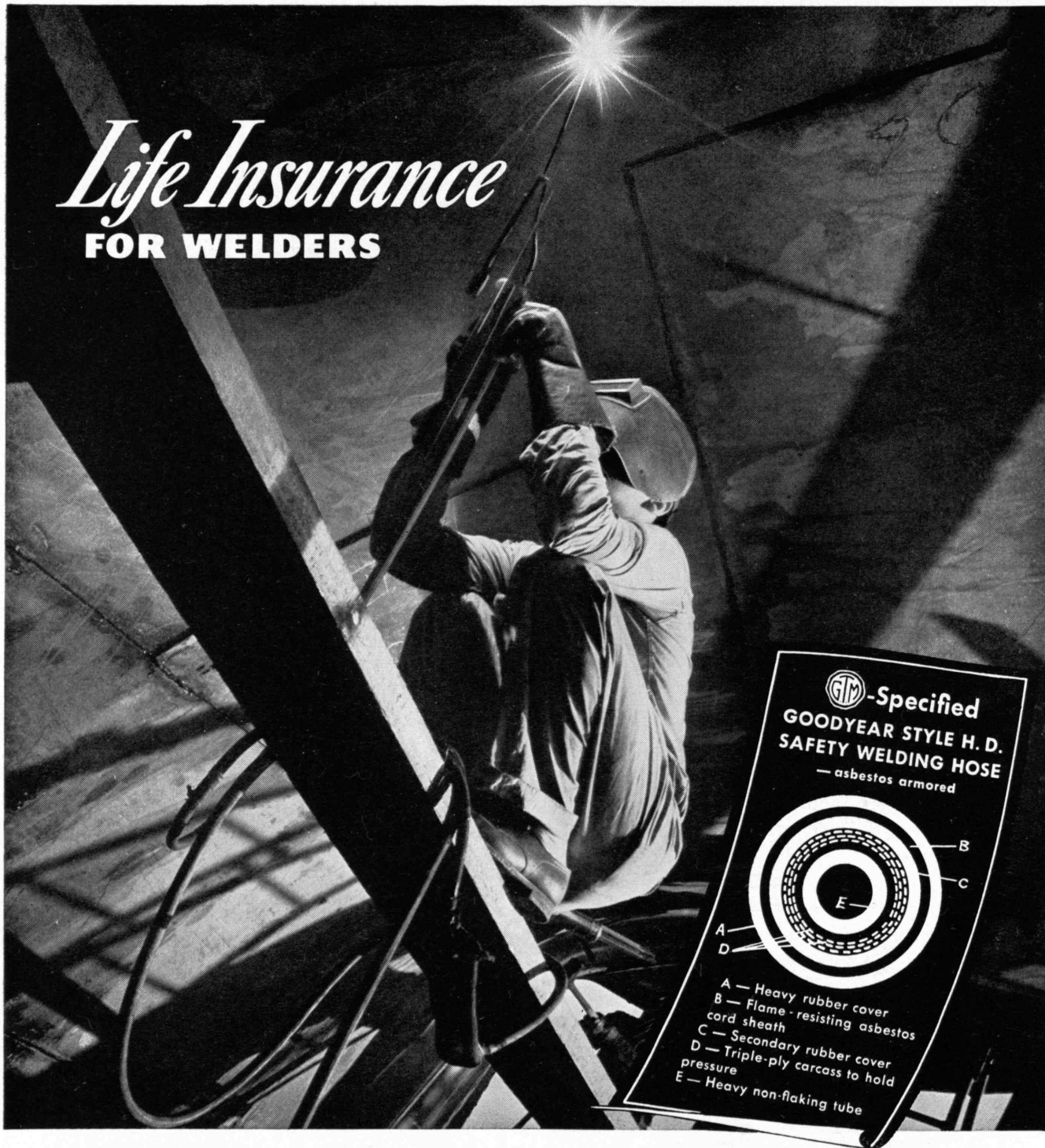


Descaling — Structural steel, annealed forgings or castings, and other parts can be rapidly freed from scale by Linde's flame-descaling apparatus. Flame-cleaning is a similar application of the process which drives out occluded moisture, and prepares steel for a more lasting paint job.

**LINDE OXYGEN • NITROGEN • HYDROGEN • OXWELD APPARATUS
UNION CARBIDE • PREST-O-LITE ACETYLENE • UNIONMELT WELDING**

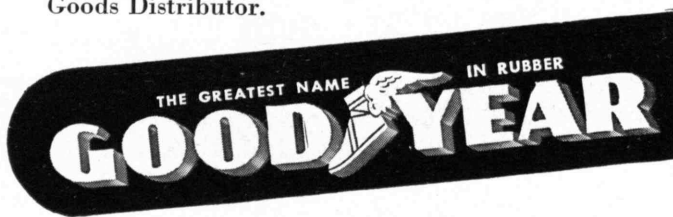
The words "Linde," "Prest-O-Lite," "Union," "Oxweld," and "Unionmelt" are trade-marks of Units of Union Carbide and Carbon Corporation

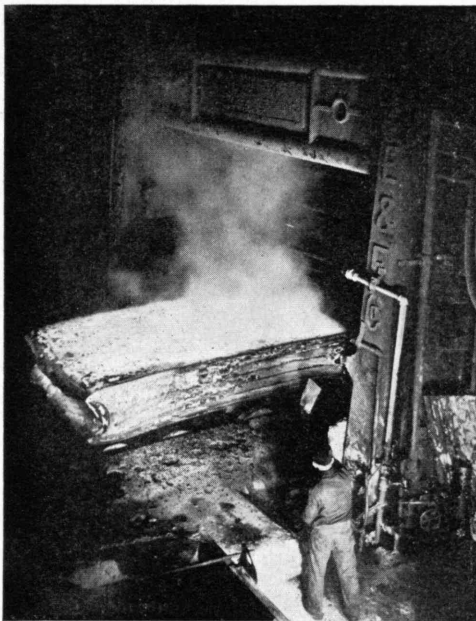
Life Insurance FOR WELDERS



WELDING in close quarters has long been one of the more dangerous jobs in industry. Should the incandescent metal-fusing flame accidentally hit the gas-feeding rubber hose lines, they burn through instantly — *and wham!* Explosions have put many a welder on the casualty list. But fortunately, this peril has now been practically eliminated by the G.T.M. — *Goodyear Technical Man*. Seeking a way to protect welding hose against flame while keeping the flexibility required for work in narrow confines, Goodyear technicians hit upon asbestos. A special, heavy asbestos cord was developed that could be woven into hose plies like ordinary cotton cord, and Goodyear Style H.D. Safety Welding Hose was born. Its asbestos armor prevents burning through from

accidental contact with the torch or gobs of molten metal. It saves welders' lives — *because it has a ten times higher safety factor than conventional hose!* Goodyear now builds many types of asbestos-bodied hose for operations where intense heat must be endured. To consult the G.T.M. about them, write Goodyear, Akron, Ohio or Los Angeles, California — or phone the nearest Goodyear Mechanical Rubber Goods Distributor.





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An ingot weighing 93,000 pounds being rolled on the world's largest plate mill, which has 206-inch rolls

VOLUME 43

NUMBER 7

THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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From a photograph by Carl A. Segerstrom, Jr., '39

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