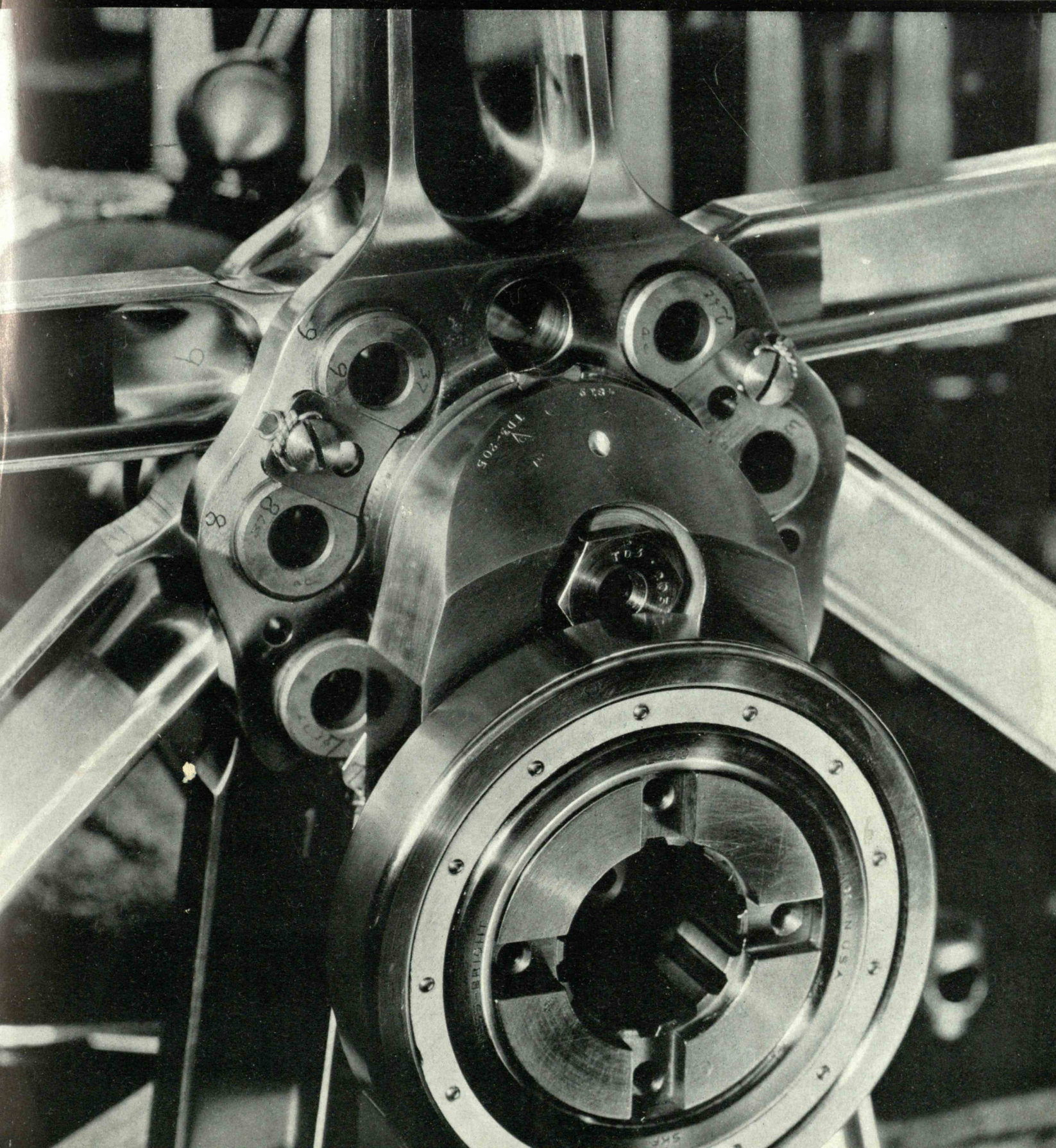


May 1937

TECHNOLOGY

REVIEW

Title Reg. in U. S. Pat. Office



*After a man's
heart...*



*...when smokers find out the good things
Chesterfields give them*

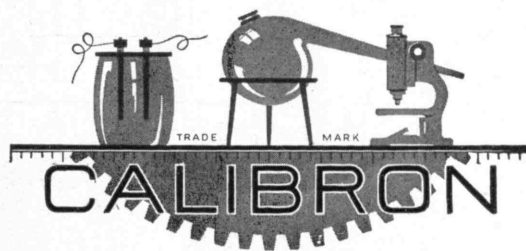
*Nothing else
will do*

Copyright 1937, LIGGETT & MYERS TOBACCO CO.

THE TABULAR VIEW

WITH the editorial correspondence that flows into The Review office in mounting volume come many photographs that point the morals and illustrate the comments indited by our readers. Since many of these pictures have as much saliency as the letters they accompany, The Review, as you may see on the next page, has decided to present in its correspondence columns as many such pictures as it considers interesting. Illustrated letters, therefore, will be welcome, but the pictures must be pertinent, reproducible, and of general interest. ¶ The widespread response that greeted the brain testers (see page 264) recently published in The Review vividly called to our attention the astonishing number of people who enjoy sharpening their wits on such enigmas. Already we have received many additional problems, and with the promise to publish them at the first opportunity, we herewith send out a call to our readers to send in still more. We will give adequate recognition to the sender of each problem published. Here's hoping for a collection of teasers contributed entirely by our readers. Try your pet problem (and it must be a real problem) on The Review family.

SOMEWHAT hesitatingly we add another article on trailers to the many that have appeared in the nation's press in recent months, but the contribution (page 278) of JOHN E. BURCHARD, '23, is such a refreshing and illuminating footnote to this volume of material that we would be remiss in not publishing it before some other magazine does. Mr. Burchard has published widely on the subject of housing, and he is a very active Editorial Associate of The Review. ¶ The Friends of the M.I.T. Library recently celebrated their formal inauguration with a banquet and rejoiced greatly to secure as their speaker A. EDWARD NEWTON, who refers to himself as "a not unsuccessful essayist." He dealt first with the materials of writing at the age of 15, and now he is the author of "The Amenities of Book-Collecting and Kindred Affections," "A Magnificent Farce and Other Diversions of a Book-Collector," "Dr. Johnson" (a play), "The Greatest Book in the World and Other Papers," "This Book-Collecting Game," "A Tourist in Spite of Himself," "End Papers," "Derby Day and Other Adventures." As might be guessed from the tenor of the foregoing titles Mr. Newton is a collector of first editions of important English books, and he is president of the Friends of the Library, University of Pennsylvania. As if enough had not already been mentioned to fill the time of a reasonably active man, we find that Mr. Newton entered the electrical business in 1890 and continued in it until 1931, having been president of the Walker Switchboard Company and chairman of the board of the I-T-E Circuit Breaker Company. ¶ MARGARET PAIGE HAZEN is Reference Assistant for the Technology Library, and, in addition to her labors for the Institute, is one of the regular book reviewers of the Boston *Evening Transcript*.



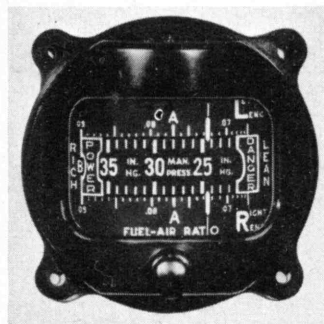
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Dual Indicator for Two-Engine Ship



PERFECT CONTROL OF FUEL-AIR RATIO

Designed as a flight instrument, the Cambridge Aero-Mixture Indicator determines the Fuel-Air Ratio of the engine mixture by analyzing a sample of the exhaust gas. The Indicator, calibrated in Fuel-Air Ratio over a range of from .11 to .065, provides a continuous guide enabling the pilot to control accurately the all-important mixture ratio at sea level or high altitude.

The use of this instrument accordingly makes possible best engine performance under any given set of conditions . . . maximum economy in fuel consumption . . . increase in payload . . . greater safety in that it enables the pilot to fly the maximum length of time when fuel supply is low.

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MAIL RETURNS

PICTURES AND LETTERS FROM REVIEW READERS

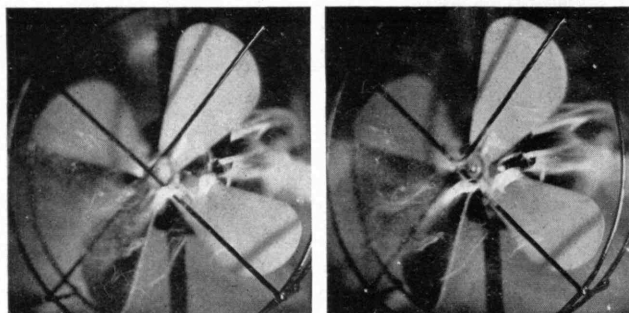


FIG. 1

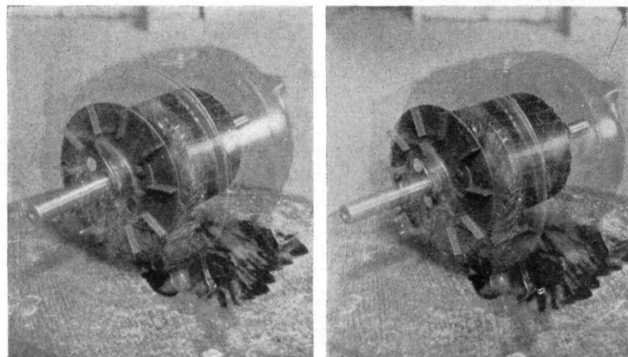


FIG. 2

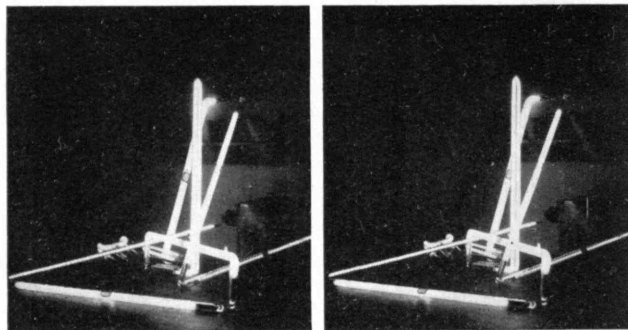


FIG. 3

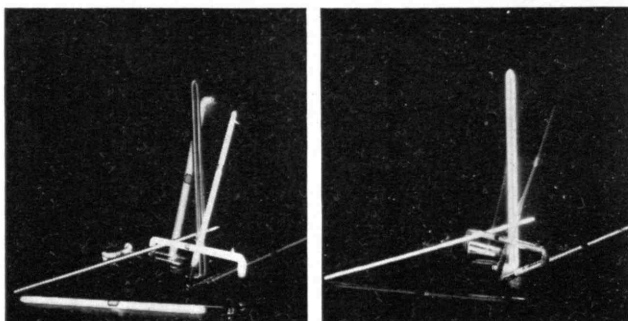


FIG. 4

Novel Stereos

THE adjacent pictures, described in the letter below, show still other novel uses of the stereoscopic camera when it is focused with ingenuity and imagination.

TO THE EDITOR:

"Seeing Solid" in the March Review was a delightful exposition of a fascinating subject whose possibilities in education and in research are unlimited. Let me suggest two or three additional applications which may add a little value to the inspiring illustrations of the text: A stereogram has been used to show the operation of a circuit breaker, opening under short-circuit conditions. The switchboard panel was illuminated throughout, so that the initial and final positions of the breaker arms are shown, as well as their locations (by silhouette) at the instant of extinction of the arc. By means of the principles explained in "Seeing Solid," the exact form and extent of the arc may be deduced. In the hope that you can use extra material, I inclose some stereograms which were taken with a special stereocamera loaned to me by Tru-Vue. . . .

Fig. 1 indicates what may be done in the analysis of airflow patterns. The picture is that of a wisp of cigarette smoke being chopped up by a fan rotating at 2,000 revolutions per minute. The light source was an open-arc stroboscope with brass electrodes, having an average of about 50 kilowatt input during each flash. As a wind-tunnel tool, this type of stereostroboscopic photography shows promise.

Fig. 2 illustrates a method of showing the insides of a machine, properly called a phantom view in three dimensions. The small motor was dissected and its parts (rotor, stator, frame) mounted and photographed in succession in correct relative positions. An unexpected and amusing incidental is the splotch of paint on the stool top on which the parts were mounted. This particular picture requires about 15 minutes of study before all of its possibilities are realized, even by a person familiar with the internal construction of a motor. It is necessary to refocus the eyes in roving from one part to another just as if the actual object were being studied.

Fig. 3 and Fig. 4 involve interesting physiological considerations. Fig. 3 is a group of gas tubes of various colors, photographed without filters. Fig. 4 is the same group taken through Wratten filters, No. 22 right-hand, No. 60 left-hand, the best pair available at the time. To get the most interesting reaction, the viewer should be equipped with these or similar filters (dyed gelatin squares suffice), red to the right eye, blue-green to the left, after looking at the regular black-and-white print to secure the normal reaction. With the filters, to many people, the result in Fig. 3 will be a subjective black-and-white; others will be unable to coördinate the prints and will even lose more or less of the three-dimensional impression. Next looking at Fig. 4, a few persons can combine the pictures into a three-dimensional unity with an approximation of natural color, but a greater number will fail to react to either the color-stimulus or the depth impression or both. . . .

Whether two-color stereograms can ever be applied usefully . . . remains an open question so far as I am concerned. . . . Whether you use the pictures or not, I remain a booster for The Review as a publication of interest and inspiration without an equal.

University of Cincinnati

L. R. CULVER, '22

(Concluded on page 264)

It's Easy To Make Money NOW...

Five years of pent-up replacement buying are now thrusting orders on companies whose operating expenses, in the past five years, have been intelligently pruned to the bone. Such orders are being "taken" by the suppliers with practically no selling expense. No wonder most companies in various industries are reporting big profits NOW!

BUT...WHAT OF THE FUTURE?

Will these same companies then lose their new-found prosperity? Will salesmen then seek buyers, as buyers are now seeking suppliers? Will sales expenses rise and profits decrease, as selling becomes more competitive? Past experience indicates they will.

How can your present profits be continued into the future?

By starting NOW to coordinate effective sales plans, which our experience has proven will "sell goods to increase profits"—when orders are hard to get.

RYAN,* LEACH & GOODE

Sales Engineers

NEW YORK

CHICAGO

*PAUL RYAN—XV₃—1922

Try this new

STARRETT **S-M** MOLYBDENUM

Hacksaw Blade

The combination of long-wearing Molybdenum and the special Starrett heat-treating process makes a blade that will stand up longer and cut fast even through tough metals. Order a trial supply from your distributor. Write for the revised Starrett Catalog No. 25L.

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THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes, Standard for Accuracy
ATHOL, MASS., U. S. A.

Use Starrett Hacksaws



Samson Trade Mark

Samson Cordage Works

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Herbert G. Pratt, '85, Pres. and Treas.

Mills at Shirley, Mass., Anniston, Ala.,
and Icard, N. C.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, arc lamp cord, shade cord, Venetian blind cord, awning line, and cord for many other purposes, also cotton twines.

SAMSON SPOT CORD



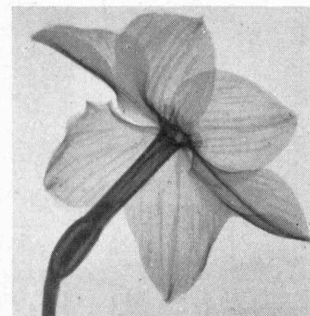
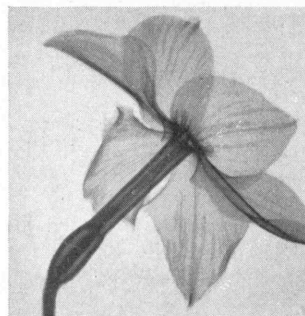
Trade Mark Reg. U. S. Pat. Off.

Our extra quality, distinguished at a glance by our trade mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than forty years.

MAIL RETURNS

(Concluded from page 262)

Narcissus



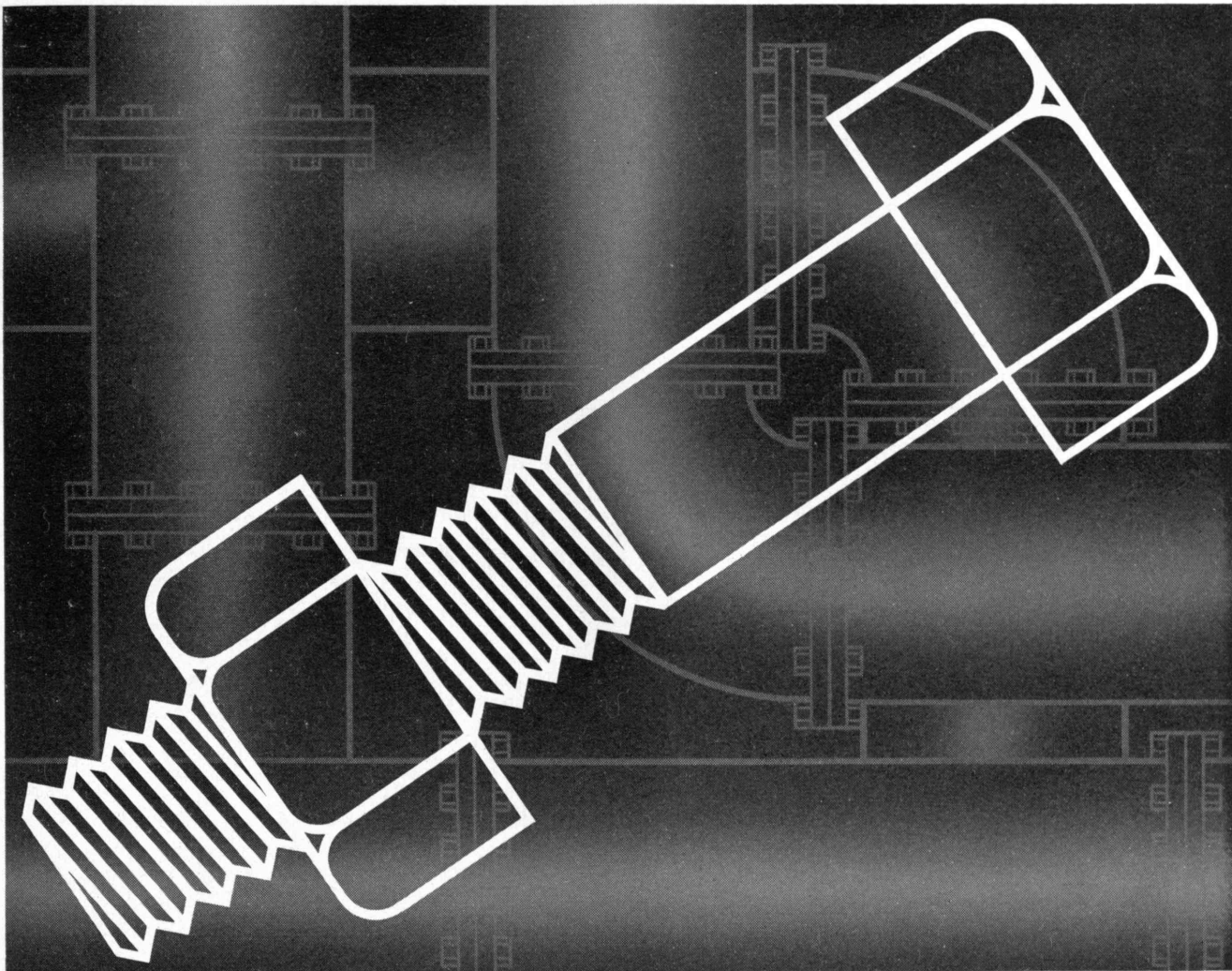
FROM RICHARD S. MORSE, '33, of Eastman Kodak Research Laboratories came the above stereoscopic Grenz-ray lens photograph of a narcissus. It was made by H. F. Sherwood with extremely soft x-rays over a wavelength of approximately one-and-a-half microns. Mr. Sherwood utilizes such stereoradiographs in the examination of cork, leather, cloths, artificial silks, and other materials, and in the study of small insects.

Runners-up

LAST month we promised to give you the names of the contestants who missed only one problem each in solving the Hudson brain testers (or, as one respondent calls them, brain wreckers) and of any whose responses were too late to catch the April issue. In the latter class, we have one perfect set from GEORGE VAN S. GREGORY, Cambridge, Mass. The Review, in the largeness of its heart, would like to keep on giving free subscriptions to successful solvers and regrets that Mr. Gregory's answers did not arrive at an earlier date.

Here are the Honorable Mentions: H. S. ANDERSON, West Orange, N. J.; W. W. GOODHUE, '11, Winchester, Mass.; G. L. HOWSE, '34, Chicago, Ill.; H. C. JOHNSON, '36, Boston; W. A. JONES, '18, Harrisburg, Pa.; KIRK MILES, '33, Gunterville Dam, Ala.; P. A. ROBERT, '32, Binghamton, N. Y.; I. E. ROSS, JR., '30, Dayton, Ohio; J. E. TURNER, '33, East Orange, N. J.; M. R. WILLIAMS, '27, Charleston, S. C. For seven of these men it was problem No. 8, concerning the minimum number of weights, which marred their otherwise perfect scores. One stumbled on problem No. 3, confusing the names of the president, professor, instructor, and janitor; one erred in his answer to the counterfeit-coin problem; one "had had" trouble with problem No. 2. The Review appreciates the interest shown by these men and commends their ability to grapple with the most recalcitrant problems.

Accompanying the answers to the problems were such comments as the following: "I sat down to figure out four or five of these things [the combinations of six nines to make 100], and it has now got to the point where I must stop or else apply for admission to some institution"; "I must confess that I was unable to complete the group while standing up. Moreover, the back of an old envelope would not have sufficed"; "I found out some things about George I that my Sunday School lessons omitted"; "I hope you publish more of these brain testers as they cause considerable interesting discussion at random gatherings." [EDITOR'S NOTE: We will.]



"Take care of the pennies . . ."

ONE bolt is small, and comparatively inexpensive — either to buy or to make. But — bolts "in the mass" can easily represent a very considerable outlay. The saving of even a small fraction of a cent in the production cost may come to a substantial sum in the aggregate.

For example: One concern has standardized on Chrome-Moly (SAE 4140) bolts because they are easier to machine — resulting in savings on both tool

expense and machining time. In addition, their improved physical properties assure better service performance.

Moly steels are cutting production costs throughout industry because they are more economical to fabricate — whether the process be heat-treating, forging, carburizing, or machining. . . . They also impart to finished products higher quality, resulting in better service.

Our free technical book, "Molybdenum," will prove useful to engineers and production heads interested in cost cutting and product improvement. Our monthly news-sheet, "The Moly Matrix," keeps readers informed on Moly developments. Consult our laboratory when ferrous problems get tough. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company

A TOUGH GRIND

—AND THE



Belt maintenance cut from
\$280 a year to zero!

Driving Pulley 54" x 11"
Driven Pulley 7" x 11"
Idler 12" x 11"
Driven Pulley R.P.M.
— 3400

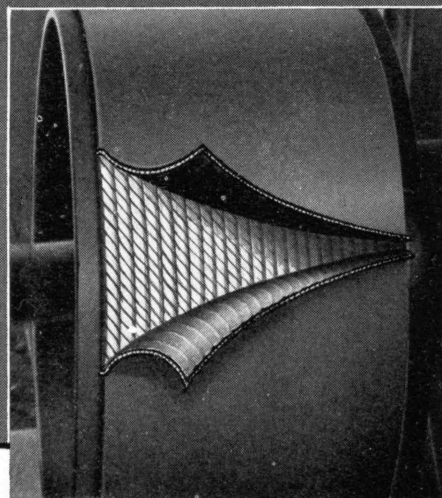


-Specified

GOODYEAR COMPASS "40"
ENDLESS CORD BELT

for

Jay Bee Hammermill Drive
George Q. Moon & Company
Binghamton, New York



HERE is an eye-opening story of belting economy for every industry using hammermills for grinding or pulverizing — for every heavy-duty drive operator.

Previous to 1934 the maximum life of any belt on the Jay Bee Hammermill Drive blueprinted here was six months and the average six to ten weeks. Belt maintenance averaged \$70 a quarter — \$280 per year.

Then in May 1934 a Goodyear Compass "40" Endless Cord belt was installed after careful analysis of this drive by the G.T.M. — Goodyear Technical Man. Today, 36 months later, it looks as good as the day it was installed — and in all this time it has never been taken up once!

Not One Penny's Upkeep

But the most astounding fact of

COMPASS cover cut away to show how endless, stretchless, heavy rope - cords carry the load. There are no plies to separate — no weak-link splice!

all is this. The Goodyear Compass cost originally only \$40 and to date not one cent has been spent upon it in maintenance. Compare that with \$280 a year spent in keeping up previous belts! The Compass has given *six times longer service than the best of its predecessors*—effecting a saving of \$840 in belt maintenance expense alone.

Goodyear Compass Belts give this superior low-cost service on all heavy-duty drives because their patented endless cord construction is the most nearly stretchless and most flexible known. Let the G.T.M. help you reduce costs with this mill-proved belt. To consult him, write Goodyear, Akron, Ohio, or Los Angeles, California — or the nearest Goodyear Mechanical Rubber Goods Distributor.

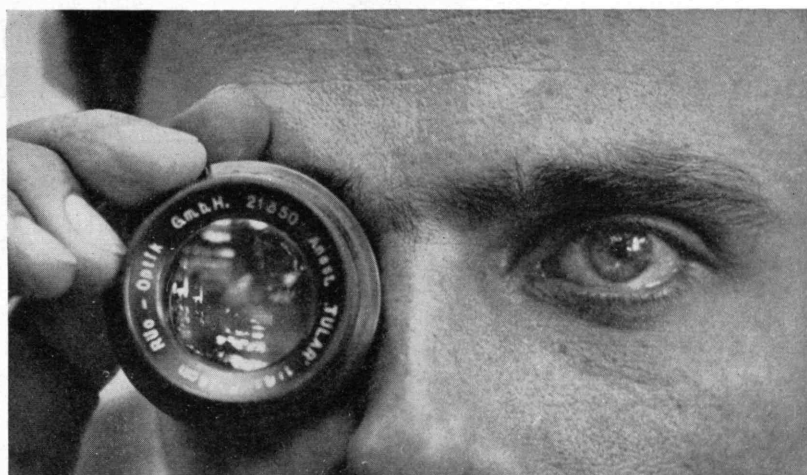
**BELTS
MOLDED GOODS
HOSE
PACKING**

Made by the makers of
Goodyear Tires

THE GREATEST NAME

IN RUBBER

GOOD YEAR



Leonhardt-Black Star

THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 39, NO. 7

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MAY, 1937

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Courtesy SKF Industries

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Edwin Levick

SLENDER AND GRACEFUL

... but limited in capacity and once dependent on sail alone, the Gloucester schooner, Gertrude L. Thebaud, is characteristic of the most beautiful type of fishing vessel ever built. Shorn of bowsprit and bald-headed without their topmasts, these craft, fitted with engines, are now competing with. . . (Look right)



Roberts

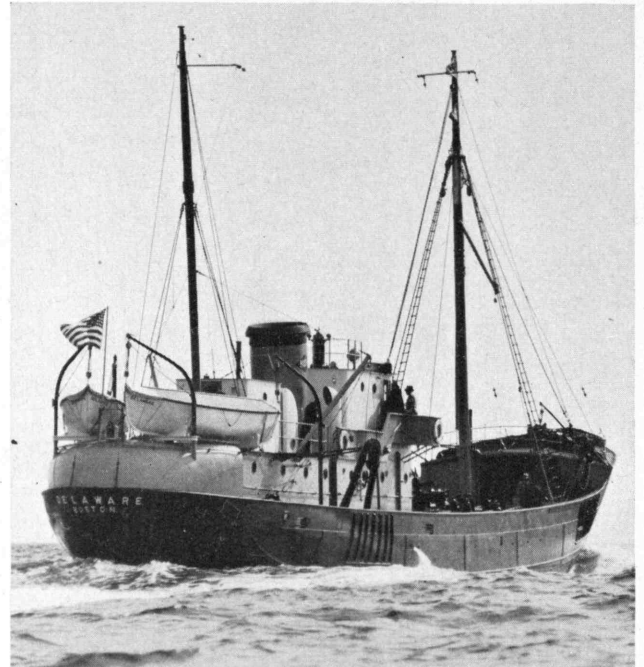
ARMS

... of fishermen, however powerful, failed to meet the demands of high-production commercial fishing. Special machinery was designed and now proves its worth at sea and ashore. Here a group of weir fishermen are hauling their nets by methods now being replaced by. . . (Look right)

FISHING MACHINES

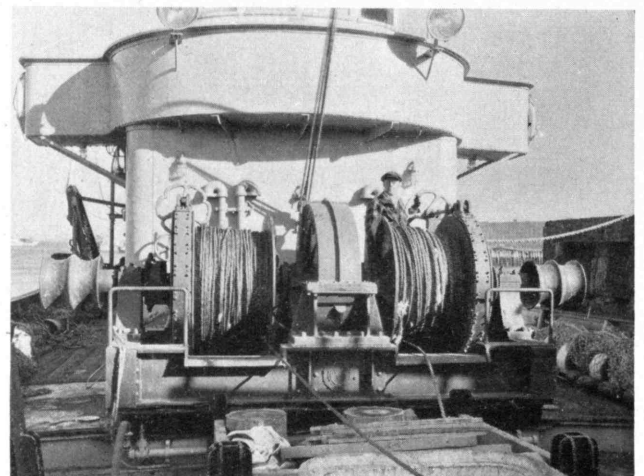
of the North Atlantic

Modern deep-sea fishing, as related on the next page, has gone in for the machine age, hook, line, and sinker—and trawler. In the surrounding pictures are some contrasts and some close-ups that emphasize the businesslike, engineerlike features of the North Atlantic trawler. What it lacks in beauty is offset by its efficiency, comfort, cleanliness



POWERED PROGRESS

... in this latest type of Diesel trawler. Compact and seaworthy, with nickel-clad holds that carry up to four hundred thousand pounds of fish caught by the best gear obtainable, these modern fishing machines keep in touch with market conditions by radio and drive through any storm to meet demands ashore



WINCHES

... which have the pull of a thousand arms. Firmly bedded amidships on a trawler, the sinews of this 120-horse power winch are used to trawl huge, wide-spreading nets on the bottom of the sea and bring up as much as fifteen thousand pounds of fish in one set of the gear