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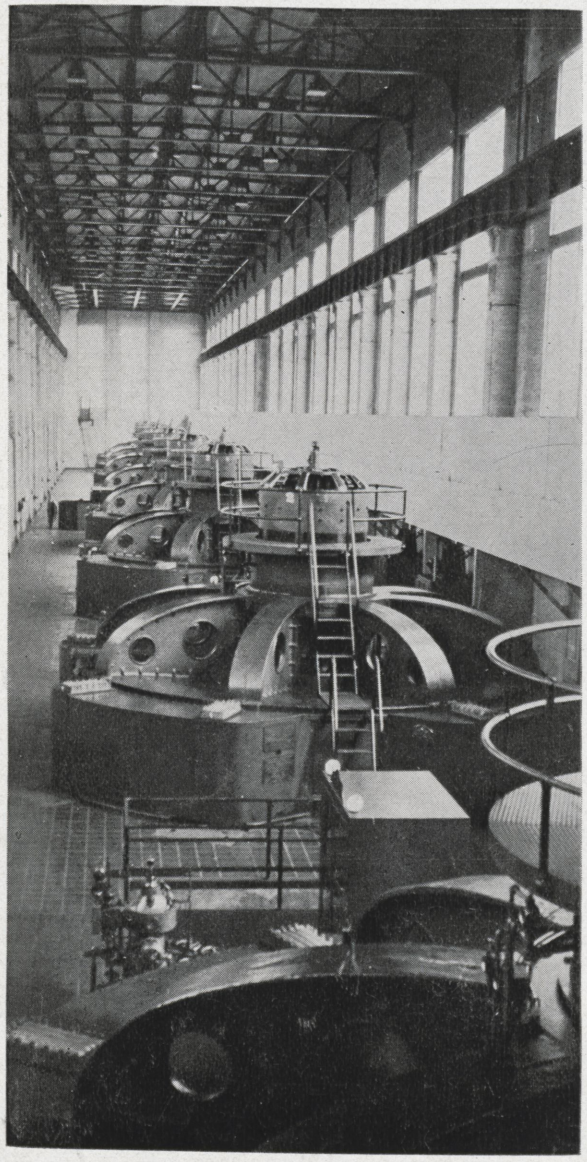

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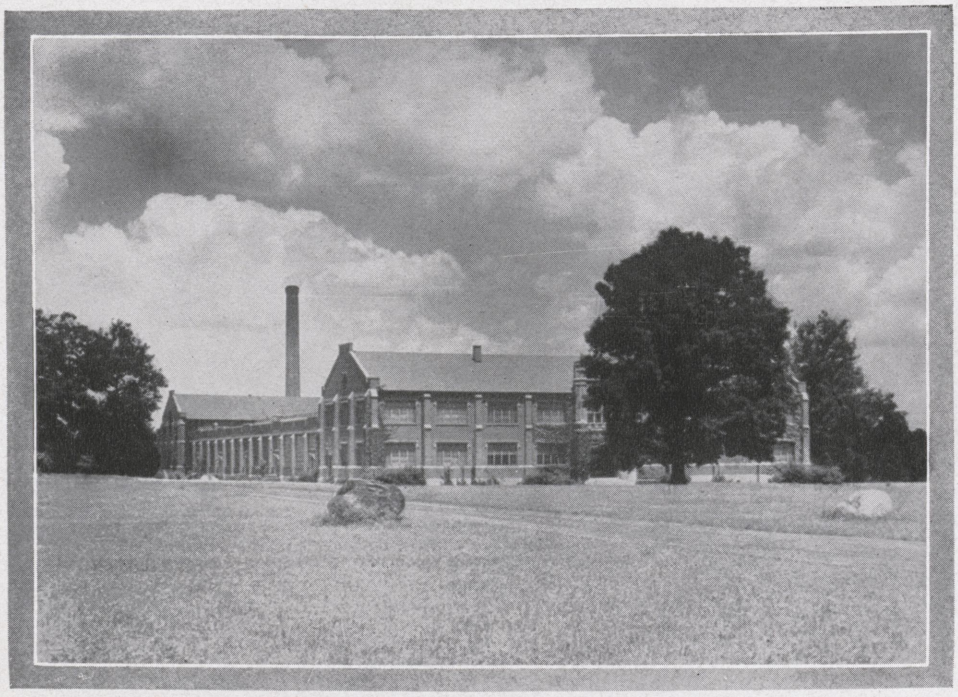

Good Engineers are an Asset to Any Country

INDUSTRIAL PROGRESS

depends upon technically trained men for Leaders
The students of technical schools must
assume this responsibility of leadership

Rose Polytechnic Institute

"A College of Engineering"

Terre Haute - Indiana

THE ROSE TECHNIC

Vol. XXXX

Number 7

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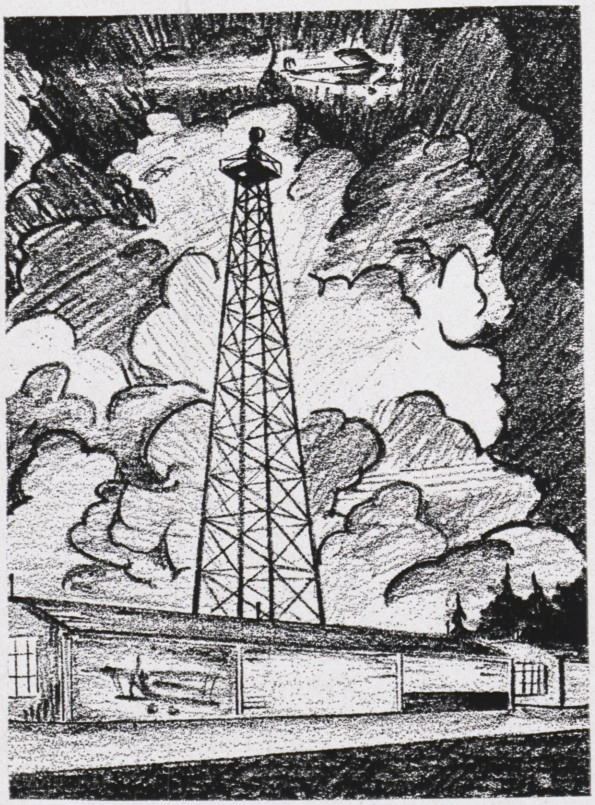
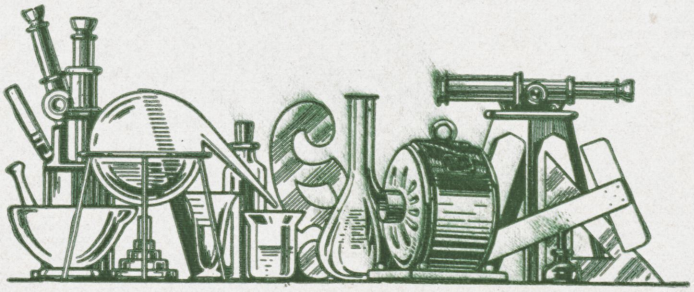


THE NIGHT MAIL

By R. M. CLARK



THE ROSE TECHNIC

THE TECHNICAL JOURNAL OF THE ROSE POLYTECHNIC INSTITUTE

Volume XXXX APRIL 1931 Number 7

What the Engineer should know about--

Patent Procedure

Interesting Sidelights May Save Time and Expense

By H. B. Hood, '24

In this age of Applied Science it is absolutely necessary that the engineer be well advised on the patent situation in his particular branch of engineering. Mr. Hood gives a very logical development of the subject of patents, patent rights, and patent protection.

—The Editors.

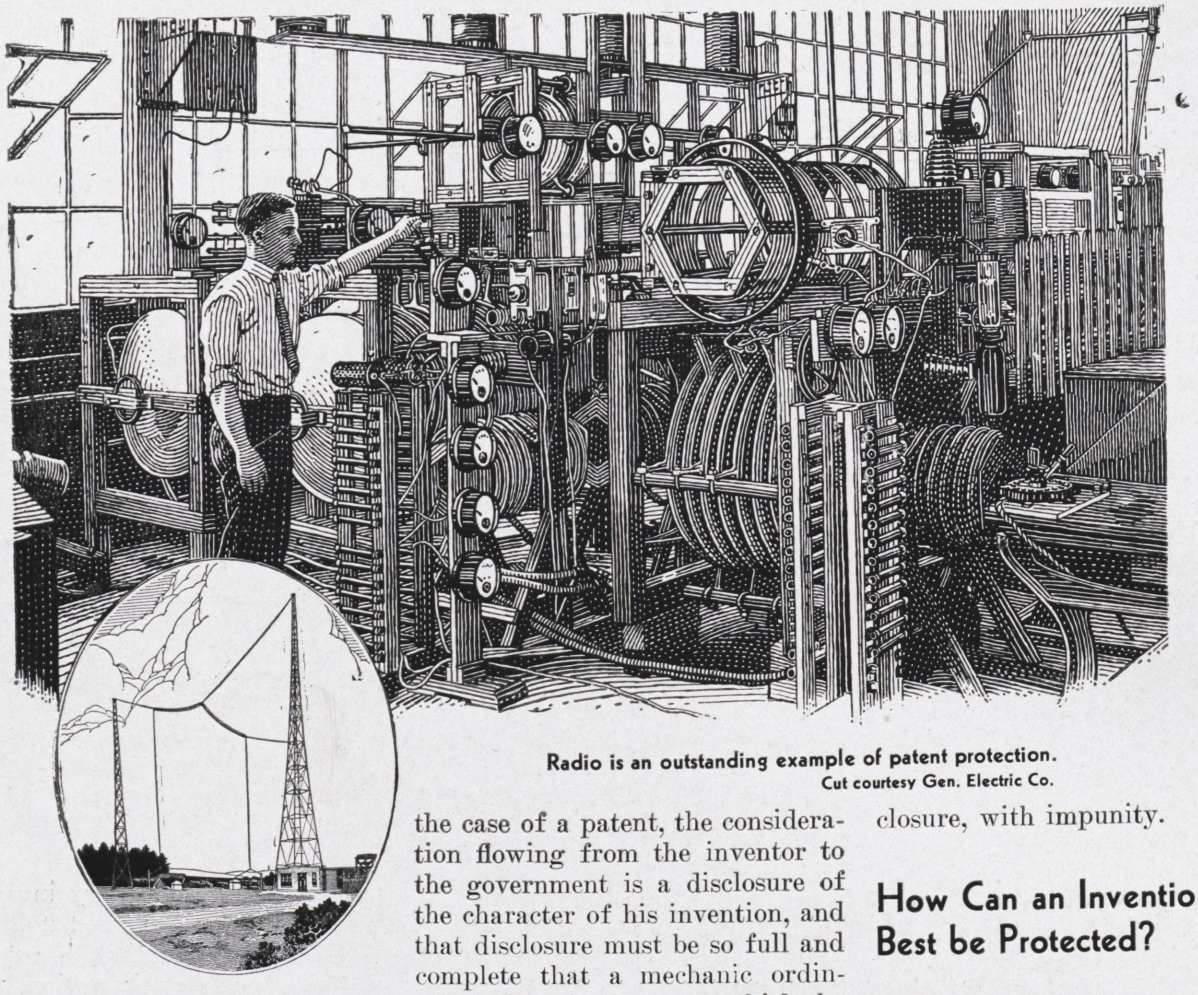
The proposition that every engineer is a potential inventor probably needs no supporting argument. An engineer has been defined as a man who is capable of doing what he wants to do, using such materials as are at hand. In living up to this definition, the engineer necessarily adapts to his uses instrumentalities which have not previously been so adapted, and in many instances such adaptation may amount to patentable invention.

The only positive definition of patentable invention which has ever come to the attention of the writer is so abstruse and so involved as to be incomprehensible to those who are not thoroughly versed in patent matters. Even the courts have ordinarily relied upon negative definitions and the most widely accepted one of these negative definitions is to the effect that if a modification or an adaptation is of such character that it would occur to a mechanic ordinarily skilled in the art to which the particular structure or improvement belongs, then it is not invention.

An engineer is not to be considered as a mere mechanic ordinarily skilled in the art in which he is trained, but must be classified in a higher category. It follows, then, that the developments which an engineer in the ordinary course of his duties is expected to make must very often fall into the class of inventions.

Just as every engineer is a potential inventor, so every inventor is a potential patentee. It does not necessarily follow that, because a man has made an invention, that invention is patentable. To be patentable, a development must be not only of such character as to be classed as an invention but it must be novel.

It may seem that there is a contradiction in terms here, since to a layman the word "invention" imports an idea of novelty. It is to be remembered, however, that many minds are often concentrated on a single problem and that several of those minds may reach the same conclusion or solution to the problem at different times. For instance, it is within the writer's knowledge that five engineers in widely separated parts of the country and having no means of communication of ideas have recently filed applications for patent on substantially the same complicated four-speed transmission unit. Now only one of those five men is entitled to a patent for the invention which each of the five has evolved, since our patent laws provide that a patentee must be first inventor of the device which he seeks to cover by patent.



Radio is an outstanding example of patent protection.
Cut courtesy Gen. Electric Co.

Since every engineer is a potential inventor, and since every inventor is a potential patentee, it must be obvious that some knowledge of patents should be acquired by every engineer.

What is a Patent?

The nature of a patent is almost universally misunderstood among those not acquainted with patent matters. For instance, it appears to be a common misapprehension that once a man has obtained a patent he is free to manufacture, use, and sell the device covered in his patent without fear of suit for infringement of any other patent. This is not true.

A patent is a contract between two parties. The inventor is one of the parties, and the Government of the Unted States is the other party.

It is a general rule that every contract must be supported by consideration—some benefit flowing from each party to the other. In the case of a patent, the consideration flowing from the inventor to the government is a disclosure of the character of his invention, and that disclosure must be so full and complete that a mechanic ordinarily skilled in the art to which the invention pertains, can with no intruction other than that included in the disclosure successfully make and use the patentee's invention. The consideration flowing from the government to the inventor is a promise, not to protect him in the use of his patented invention, but to uphold him in the establishment of a monopoly of that invention.

That is, the government does not say to the inventor, "We promise to hold you harmless against prosecution if you make, use, and sell the device of your invention"; but it says to him, "We will lend you the authority of our courts in preventing other persons from making, using, or selling the device of your invention."

This monopoly continues for seventeen years from the date of issue of the patent, and it cannot be renewed. Upon expiration of that period, the disclosure of the patent becomes public property, and any one may use that disclosure to the extent of the disclosure, with impunity.

How Can an Invention Best be Protected?

The engineer is drilled throughout his period of schooling in the habit of keeping notebooks. From the standpoint of protecting inventions, no other habit of his schooling can be preserved in later life to better advantage. Throughout all development work, the engineer should keep careful and rather inclusive notes. Those notes should be dated, and it is highly desirable to interlard them copiously with sketches. By all means show your notes periodically to some trusted acquaintance, and ask him to sign them so that if at some later date you are asked to state just when you first conceived a certain development you can refer to your notes and determine the date exactly, and so that under such circumstances it will be possible for you to prove by another witness that your developments were conceived at least as early as a certain date.

When your development is completed and you are satisfied that your idea is practical and operable, consult your patent attorney

as to the advisability and probability of patenting your development.

A Further Precaution

By all means it should be remembered that it is excessively dangerous to rush into the production of some new development without determining whether or not the production thereof will constitute an infringement of the patent rights of some other person. Instances by the score could be cited to illustrate the proposition that no concern should invest money in preparation for placing on the market a new product without first making an investigation as to the patent situation with regard to that product. Perhaps one instance will suffice for the purpose of the present article.

There is a company in Ohio whose business is the manufacture of excavating machines. A new type of excavator came onto the market some years ago, and the Ohio concern was asked by one of its customers to replace a broken part in one of those new machines which had been manufactured by another company. That replacement was made, and other owners of that type of machine asked for and obtained repairs and replacement parts from the Ohio company. Before long, the Ohio company decided that it would be worth while to go into the manufacture of units, adapting their own machines to operate in the manner of the new machine under consideration. This concern did not consult its patent attorney, but developed and placed on the market a unit closely resembling the unit of its competitor. Some time thereafter the Ohio concern was served with notice of patent infringement, and then, and only then, the patent attorneys were called in.

The details of litigation are, of course, not of interest here, but the upshot of that suit was an injunction against the Ohio concern forbidding it to manufacture further units of this type or to sell units which had been made but which had not been sold before the decision of the cause and a money judgment of many thousands of dollars.

During the pendency of the suit and in a matter of a couple of hours, the patent attorney suggested a design of unit which could be manufactured by the Ohio company in complete avoidance of the patents of the competitor.

Failure to consult their patent attorneys before designing and placing on the market the new unit saved the manufacturers perhaps $100 or $150 in attorneys' fees. It cost those manufacturers, however, some seven or eight thousand dollars in attorneys' fees to defend the suit which was filed against them, somewhere in the neighborhood of fifty thousand dollars in damages to the owners of the infringed patents, an inestimable amount in good will among customers and prospective customers, and all of the money which had been invested in designing and tooling up to produce the infringing unit.

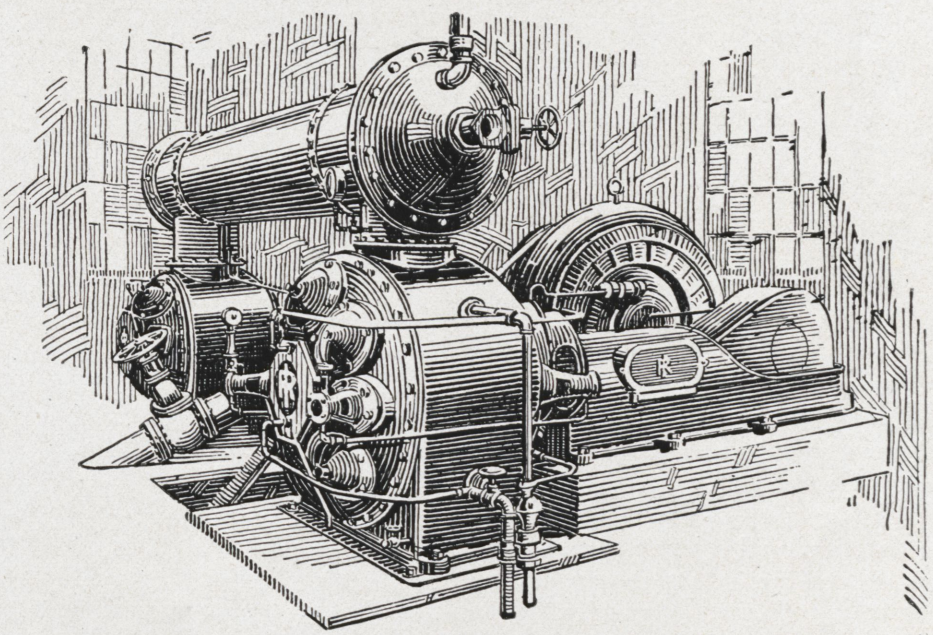
Steps Toward Procuring a Patent

When an inventor submits to his attorney a disclosure of a new development, his first question usually is "Can I get a patent on this improvement?" and his second question usually is "How much will it cost?" A discussion of fees and other costs would be inappropriate here. The attorney is practically never able to give an immediate direct answer to the first question.

Nearly 1,800,000 patents have been issued in this country alone. No man can say off-hand whether or not an invention submitted to him is new. The device in question certainly is not patentable if it is not new. The only way in which an attorney can obtain sufficient information on which to base an opinion of patentability is through the medium of a search through the records of the patent office to determine whether or not the device submitted to him, or a device which is substantially equivalent to the submitted device, has previously been patented. Such a search is rather generally recommended as a preliminary to the filing of a formal application for patent, and it is the writer's opinion that no desultory inventor should ever instruct his attorney to file an application for patent without having such a search made.

The reason for that feeling will probably be obvious. It is, of course, based upon the fact that a search of this character can be made for a cost to the inventor which is negligible compared with

(Continued to page 22)



Patents are involved in every phase of industry.
Cut courtesy Ingersoll-Rand Co.

X-Rays « Applied to Industry

A Scientific Curiosity becomes an Industrial Necessity

By L. Herndon Witt, Jr., m. '31

In 1895 Professor Kenrad Roentgen, of the University of Wurtzburg, Bavaria, discovered the radiations which bear his name, the Roentgen rays, more commonly known as the x-rays. The latter name was applied because their nature and mysterious properties were unexplained. The discovery of these rays was, in a measure, accidental. Professor Roentgen was studying the passage of electrical currents through an evacuated tube when he noticed that the radiations from the tube caused the florescence of barium platinocyanide. Almost immediately he discovered that when an opaque object was placed between the tube and the cyanide salt that these so-called x-rays partially penerated it and formed a shadow. Since that time great improvements have been made in the x-ray tubes, consequently the internal construction of many substances can be readily photographed.

Production of X-Rays

X-rays are produced by passing a high voltage electrical current through a vacuum tube. In this country the Coolidge tube (Fig. 1) is one of more commonly used types. It is a thin walled, highly evacuated glass tube having a tungsten filament attached to one end and a block of metal, called the target, attached to the other end. The tungsten filament is attached to an external circuit of low potential alternating current which is sufficient to heat it to incandescence. In this condition the tungsten will release small electrically charged particles, called electrons. The target end is made positive by the application of a high potential direct current. By polarizing the target positively the filament must be negative. When the current flows, the electrons given off by the tungsten will pass over the gap and strike the target or anode with extremely high velocity, producing, thereby, x-ray impulses. Therefore, if a continuous voltage is impressed on the tube, there will be a continuous stream of electrons, and, consequently, a continuous stream of x-ray pulsations which form the x-ray beam.

The quantity of these x-ray pulsations will depend entirely upon the temperature of the tungsten filament and the pressure forcing the current across the gap between the filament and the target. The Coolidge tube can be used for hours at a time without injurying it as there is no fluctuation in the gas pressure since the tube is very highly evacuated. Of course, care must be exercised to prevent the target from being melted by the bombardment of the electron particles.

The cathode or tungsten pole is concave so that the cathode rays emitted will be focused on the target. The target is set at the center of curvature of the concave tungsten filament, and has its face sliced off at such an angle that most of the x-rays will be reflected off through the bottom of the tube; see (Fig. 2). In the center of the target face is a small square of tungsten and, as most of the cathode particles bombard this spot, it greatly increases the life of the target, which would otherwise be rapidly pitted.

X-rays obey the same laws that apply to light and therefore have the same velocity. The difference in their wave lengths is the significant reason for their penetrating power. Ordinary light in the middle of the visible spectrum has a wave length of .000055 cm., while that of the center of the x-ray spectrum is about .0000000055 cm. Therefore, there is a difference of about 1/10,000 cm. in their wave lengths. Because of its extremely short wave length as compared with that of light, the x-ray is as decidedly penetrating as the ordinary light ray is easily absorbed.

Practical Applications

Now that we can visualize somewhat the x-rays, some practical applications will be discussed. Extensive use for the x-ray was made for the examination of the human body almost immediately after the process of obtaining these rays was sufficiently perfected. In the first place the body is a fairly easy thing to penetrate with the x-ray and in the second place there were countless patients who were more than willing to risk being x-rayed because of the possible benefits it might bring to them. Today patients are x-rayed for almost everything!

Industry soon followed the medical science in the use of the x-ray. Every manufacturer wants to give his customers the best for the lowest price. Two reasons inspire this desire: first, a good product usually insures a resale, and second, a low price frequently causes the initial sale. By the use of x-rays both of the above factors in the marketing of products can be helped.

The cost of x-raying products is low when one considers that it

Since the discovery of X-Rays thirty-six years ago, their use has steadily advanced up to the present time. Once only a scientific and dangerous novelty, these rays have come to be regarded as a necessity in the medical field. Every up-to-date manufacturer should be familiar with the results to be obtained by the application of X-Rays to his products—The Editors.

is practically the only way in which the internal construction of steel, metal castings, wood, and other opaque bodies can be studied unless the specimen is destroyed. Even after one specimen has been examined by cutting it up, there is the possibility that those following will be defective. Not only is the information obtained by x-ray accurate, but it is a rapid procedure.

The knowledge that an x-ray test is to be made on their products has a psychological effect on the workmen and causes them to be more careful. It causes the over-zealous inspectors to be fairer in their decisions, and at the same time it makes the careless or lazy inspectors become more careful.

Inspection of Materials

X-ray inspection has been used successfully on practically all opaque materials. The possible depth of examination of course depends upon the thickness and the atomic weight of the specimen. For instance, steel at present can be x-rayed to a depth of only 4½ inches.

The examination of castings has been a big field for the x-ray. Any flaws in the casting show plainly upon the negative, and by studying these negatives new methods of gating and pouring molds can be developed. Also, the flaws can be made to come in some part of the casting where they will not affect its strength. The discovery of a flaw before any machine work is done on a large casting will usually result in quite a large saving.

In the airplane industry practically every part must be x-rayed to determine its quality as only the highest quality of material is used since it is subjected to very severe strains. Railroads, too, use the x-ray to discover flaws in rails, axles, wheels, and other parts of machinery vital to safety; thereby, many wrecks are prevented.

Coal Inspection

X-rays have been used to detect the ash content of coal. The combustible portion of the coal is very transparent to the ray while the ash content is opaque to the ray as it consists largely of calcium and iron salts.

The applications of x-ray are too numerous to mention, and its possibilities are very wonderful. Before very long it will be possible to study the internal construction of every opaque body.

The industrial radiographic work of today may be divided into several classes depending upon the types of equipment. Substances such as aluminum castings, hard rubber articles, radio tubes, golf balls, etc., require a machine with a rated capacity of 75,000 volts to x-ray them. Now, if the specimens are grey iron castings 1½ inches thick or brass 1 inch thick, or welds, cutting gears, small forgings or ball bearings, then a machine with a capacity of 150,000 volts is required. For examining heavier work, a machine with 300,000 volts capacity must be used. If this high capacity machine is insufficient then a special machine which is capable of higher rated capacity will be necessary.

The apparatus necessary for general industrial work is an x-ray tube and the tube support, a transformer with a synchronous motor and a rectifying switch, and the control board. The apparatus in Fig. 1 uses a motor-generator set as the rectifier.

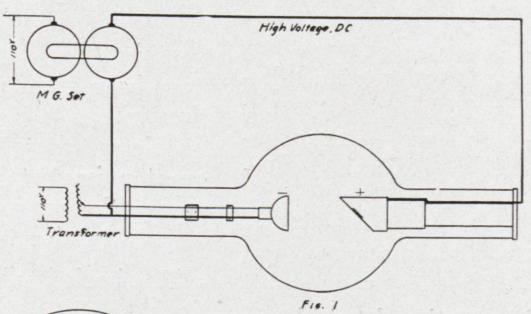


Fig. 1

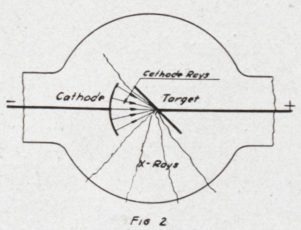


Fig 2

Fig 1 shows a simple X-ray tube wiring diagram.
Fig. 2 shows effect of cathode rays on target.

The Editor's Choice of Recent Books

These Latest Publications Reveal The Trend of Modern Industry

The Evolution of Industrial Organization

by B. F. Shields

This book is a history of the development of the industrial system from its most primitive form to the present age of machinery. The town stage, the guilds, the mercantile systems and the economic developments which brought about the industrial revolution are discussed. The consequent changes in industry, its effects upon various countries are also explained. The industrial development has brought with it new forms of ownership which competition has modified and strengthened by making consolidations and government regulation desirable. These various forms of business combinations are related in chapter II. The next chapter discusses scientific management as set forth by Fredrich W. Tavlor and his contemporaries. The effect of the trade union, its legal position, advantages, and disadvantages are debated and the methods of industrial remuneration employed in different countries are compared as to productivity and effect on the workers. The modern trend of industry has been toward the education of employees and vocational guidance has been provided by municipal agencies in many countries. The last chapter surveys the industrial welfare work which is being carried on today. Industry, realizing that welfare of employees is essential to their efficient productivity, has cooperated in many ways to improve working conditions.

The author of this work, Mr. B. F. Shields, is professor of commerce and dean of the faculty of commerce of the University of Dublin. It is a compilation of a series of lectures given by him at the University.

Isaac Pitman & Sons, New York, 5½x8½, 414 *pages*, $3.00.

Problems in Public Utility Management

by Cabot and Malott

This text presents specific problems which various public utility corporations have experienced and shows how they have been solved. The information has been gathered from printed reports from court and commission decisions, and from information supplied by officers of public utility companies.

The problems of public utilities have in the past been of both an economic and an egineering nature, but the engineering problems have been given so much consideration in the past that the economic problems have now assumed greater importance and for this reason the present work is devoted largely to the latter.

The book is divided into six sections. Each part is provided with an introduction which outlines the principles illustrated therein. The first section is entitled "Characteristics of Public Utilities." It explains the underlying reasons which determines what industries can best be operated as monopolies and which ones as competitive industries. The second section deals with the valuation, depreciation, and fair return on utility properties and cites many typical rate cases. The principles of marketing in the retail and domestic fields and the problems of production, public relations, and advertising are discussed in the next sections. The last section relates the problems of finance which have confronted many utilities and gives the method of solution in each case.

"Problems in Public Utility Management" is one of the series of Harvard Problem Books. It was written by Philip Cabot, professor of public utility management, and Deane Malott, assistant professor of public utility management at the Graduate School of Business Administration of Harvard University. — *McGraw-Hill Book Company*, 632 *pages*, 6x9, $6.00.

Die Design and Diemaking Practice

Edited by Franklin D. Jones

"Die Design and Diemaking Practice" is the most complete treatise on dies ever published. The information has been compiled over a period of years from articles which have appeared in Machinery contributed by the leading die designers of the country. It consists of illustrated descriptions of a large variety of typical dies employed in diversified power press operations. It is supplemented with practical and reliable information and data on die designing practice. The various types of dies are grouped together for the convenience of the engineer and each group is further subdivided. All dies illustrated in this volume have stood the test of actual use and hence are reliable. Costly ex-

perimentation may be avoided by using the dies which are known to be reliable.

The sections of the book dealing with diemaking practice give information of a general nature so that it can be applied to any job. The methods of laying out dies, figuring blank diameters, fitting and locations of punches, rotary filing, clearances, shear, and similar information is fully discussed.

Under the sections dealing with the types of dies come blanking dies, piercing and perforating dies, bending, forming, drawing, and expanding dies. Dies for drawing cups, flanges, conical forms, spherical and rectangular shapes, and expanding dies of rubber and hydraulic types are described.

The book is edited by Franklin D. Jones, associate editor of Machinery, and the author of "Gear Cutting Processes," "Tread Cutting Methods," "Mechanical Drawing," and other books.—*The Industrial Press, New York, 921 pages*, 6x9, $6.00.

Romance of the Machine

by Michael Pupin

This book has been written in defense of the contemporary American "machine civilization." Frequently Europeans have insinuated that the influence of American machinery might destroy the ancient culture of Europe, and that this same influence has already changed the ideals of the United States to sordid materialism. Mr. Pupin has shown that this indictment is false and that the present machine age has been due to the work of men whose ideals are distinctly not materialistic. He traces the political and economic development of the country and points out the upbuilding influences of machinery on the nation. The unification of the country in the last century was accelerated by the communication and transportation facilities which were made possible by the engineering and scientific endeavors of men who have been wrongly accused of having materialistic ideals. The Romance of the Machine points out the benefits of machinery and its contributions to civilization.

Michael Pupin is professor of electro-mechanics at Columbia University. He is the inventor of the Pupin coil which made possible transcontinental telephony. For his autobiography, "From Immigrant to Inventor," he was awarded the Pulitzer Prize in 1924.

Charles Scribner's Sons, New York, 111 *pages*, 4½x7½, $1.00.

Books are the means by which the engineer keeps in touch with the latest developments in his field.

Acoustics

by Stewart and Lindsay

This new book is a treatise on the theory and applications of the science of acoustics. In this branch of physics (human) knowledge of the theory has not preceded application as has been the case in other sciences. Speech and musical instruments were developed by experimentation but the theory has guided modern development in communication, such as radio, telephony, and devices used in national defence. These important and diversified applications of acoustics have created a demand for technical information on the subject, to satisfy which, the present work has been prepared.

Since engineers are usually interested in particular problems involving accoustics the text has been prepared by developing the theory for individual cases but the text is unified by ample cross references which guide the reader in the use of the book.

Among the subjects discussed in the book are acoustic waves; transmission through various media and conduit, impedance theory; filtration of sound; psysiological, architectural, and atmospheric acoustics.

George Walter Stewart is professor of physics at Iowa University and Robert Bruce Lindsay is associate professor of theoretical physics at Brown University. The book is an outgrowth of special lectures given in a graduate course at Yale by the first named author.

D. Van Nostrand Co., 358 *pages*, 6x9. $5.00.

Published Monthly by the Students of Rose Polytechnic Institute

The Rose TECHNIC

A Magazine Pertaining to Engineering and Allied Sciences

Member of Engineering College Magazines Associated

Greetings

With this issue of the Technic the next staff makes its debut under conditions which are especially auspicious. The high standard set in all departments during the previous year is surely worthy of recognition and imitation by the new members. It is our duty not only to maintain this standard but to raise it still higher and we all pledge ourselves to this commendable task.

However, no matter how worthy and ambitious the staff may be the magazine will not be a success without the assistance and cooperation of the students. It is the customary practice to make a plea for contributions and all possible aid at various times, particularly at a critical time such as the inauguration of a new staff, but this time we want to make this plea a little more serious and earnest than usual and we want you to consider it in a like manner. We need your assistance. Won't you help us make this the best Technic year in history?

Change in Tuition

Probably by this time everyone has heard of the change in fees and tuition for next year, but due to the fact that some misunderstanding might occur it should be emphasized that the change does not affect anyone now in school. It takes effect with the freshmen entering the Institute for the first time in September, 1931, and students of other classes entering for the first time. Under the new plan a single fee represents tuition, payable in two amounts as usual, instead of dividing this up into various classifications. The student fund and breakage fee are separate as formerly, but the registration fee has been combined with the tuition. Now a small sum is required for application for admittance the first time only.

The new fees are below the average for engineering schools, so those who are fortunate enough to be in school now are greatly privileged to be getting the same course at the old rates.

Tennis Courts

The tennis courts will be repaired or rebuilt some time during the spring. The courts have been in bad shape for some time and as a result of efforts of several members of the student body, improvements have been promised.

St. Pat's Celebration

St. Pat was royally honored by the Rose engineers during the 1931 festivities. The celebration began on the night of the 16th when the Student Council rode in state through Terre Haute in an old coach which carried St. Pat's dance publicity. The next afternoon found most of the student body at the Liberty Theater for the annual St. Pat's Show. Of course the events of the afternoon were enjoyed by both performers and audience.

The 34th annual St. Pat's Dance was held in the gymnasium, suitably decorated in Irish colors, with 375 couples in attendance. At 1:30 A. M. the strains of "*Au Revoir*" brought to a close one of the best celebrations in a long while. The committee, consisting of Mr. Witt, chairman, and Messrs. Charles White, Mees, Laatz, Potter, and Hans Fischer, is to be congratulated for its fine work.

The Crawfordsville Meteor

The spectacular accounts of the meteor which was supposed to have struck a Ford car near Crawfordsville, Indiana, some months ago,

are now forgotten, but doubts have recently been raised as to the authenticity of the story. It was doubted on several counts and these have been collected, reviewed, and discussed in a recent article in the Scientific American.

The principal points in the case are doubtless familiar to everyone so need only be recalled to mind. One Lawrence Swank, of Crawfordsville, was driving in the country in his Ford when he heard a whizzing noise and saw a fiery object strike the hood of his car with a terrific crash. He was frightened, as might be expected, so instead of attempting any investigation he returned to town. The next morning the holes in the hood and radiator, where the object had penetrated, were discovered: and also piece of foreign material in the generator. After a search a dent was found in the pavement at the scene of the incident. The only explanation of the whole affair seemed to be the meteor theory which was hence adopted.

Now for the objections. The material imbedded in the generator was carborundum, an artificial substance. The dent in the pavement was not in the proper location or direction to be caused by anything going through the car. Such a meteor, or fragment, as it was supposed to be, must have been very spectacular and would have been reported by at least a few observers, but not one person reported anything that night. The direction of travel through the hood was incorrect for a particle of the required size falling such a distance, according to the authority of experts. A meteor of the size indicated would normally not penetrate the hood. The driver drove for some time with the large hole in the radiator, which seemingly would have caused severe overheating, but nothing of this sort was reported.

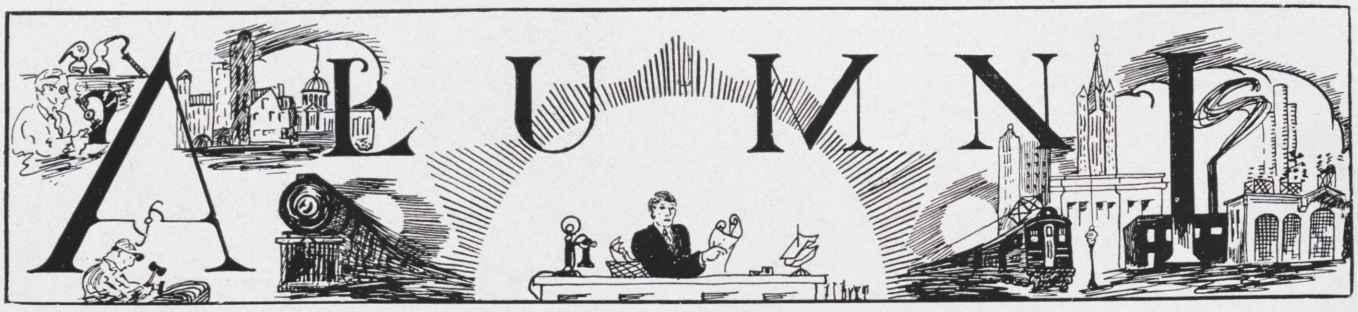
However, it must be admitted that something did occur and the attempted explanations in the article are almost as improbable as the newspaper stories. A wrench or bolt from an airplane, or a shot from a gun are suggested, but the theory that the author of the article seems to hold is that of a practical joke on Mr. Swank. The point of such a joke seems very vague but possibly a knowledge of local conditions might offer some light on the matter. Nevertheless, until some more plausible explanation is set forth the matter cannot be considered settled. The objections are all very good, but the alternative explanation, the joke idea, would seem to have almost as many fallacies.

Field Artillery Takes to the Air

A new application of aviation to war is shown by a recent report of experiments in the line of transporting field artillery by air. The transportation problem has always been a large one for artillery, and this newest solution should prove valuable. The trials are being made in the Canal Zone. A complete battery is loaded into bombing planes, transported a distance requiring four days by land, and prepared for firing within one and one-half hours after receiving the orders. Of course, this time saving is more striking in a broken country such as Panama but should prove of enormous value even in fairly open country.

A Tragedy Averted

The recent discovery of a plot to destroy the Akron, the world's largest airship, now under construction at Akron, Ohio, has warded off a great blow to the development of aviation. The plot consisted of freezing rivets in place with ice instead of hammering them into place. This would be sufficient, so the plotters hoped, to pass inspection, since the temperature inside the hangar where it is being constructed is always ten degrees below the outside temperature, but would of course result in destruction of the ship on the first flight. Several motives for the attempted sabotage were put forth, but regardless of the motive, if a disaster had occurred, aviation would have suffered seriously. The advisability of this enormous airship project is a widely debated question, and any tragedy such as would almost certainly have occurred would practically end any argument. Those doubting its practicability would have an irrefutable argument, and even its backers would suffer serious doubts, even if sabotage could be proven. The inspectors of this project are under a tremendous responsibility to the future of large airships and aviation in general.



Obituary

We regret to announce the death of Frederick W. A. Haller, '05 on March 17, 1931, at his home in Cincinnati, Ohio. Mr. Haller graduated as an Electrical Engineer.

Chicago Rose Tech Club

On Monday, March 9th, President C. D. McDargh called a committee meeting for luncheon at the Chicago Engineers Club, for the purpose of planning the Tech meeting for March 20th. Fortunately the regular Rose luncheon added to the group and many worth while suggestions were made.

Those present were: A. J. Hammond '89, H. W. Wetherbee '92, E. L. Jones '02, D. Rush '10, K. E. Harmas '22, T. L. Condron '90, W. G. Arn '97, C. L. Post '03, G. H. Brooks '16, and C. D. McDargh '25.

St. Louis Rose Tech Club

'98 Mr. Cale Wamsley, '98, was taken seriously ill early this winter, and was forced to give up his duties as president of the Rose Tech Club.

'21 Mr. Claude M. Gray, 21, has accepted the position of President pro tempore.

In a letter dated February 17th to the Club, Mr. Wamsley stated that he was "doing very well—gaining strength and weight slowly but steadily," which of course is pleasing to all of us. His present address is: Cale Wamsley, 225 S. E. 4th Avenue, Ft. Lauderdale, Fla.

Managers meet at Dorm.

The Board of Managers held a meeting at the Rose Dormitory, Wednesday, March 18th.

Members present were: A. J. Hammond '89, E. S. Butler '06, J .E. Bernhardt '08, B. H. Pine '03, and B. F. Failey '96.

Another Fellow

The rank of "Fellow," which is given to any member of the Ceramic Society for outstanding accomplishments in the Ceramic Field, has been bestowed upon Mahlon E. Manson '16. Marion W. Blair '03, and Robert D. Landrum '04 had previously received this honor.

'94 From the Chemical Foundation, Inc., we received two pamphlets written by Austin V. H. Mory. One, "Industrial Chemical Laboratories," and the other, "Nature was Notably Aided."

Mr. Mory is Associate Director of Research, Bakelite Corporation, Bloomfield, N. J.

'95 Francis H. Miller was recently made president of the Louisville Railway Company, Louisville, Ky. Mr. Miller has been Vice-President and General Manager for some time.

'06 Henry W. Wischmeyer has been promoted from supterintendent of motive power to purchasing agent of the Louisville Railway Company.

'11 Ernest C. Bradford is now operating manager in charge of all of the Baltimore House, Baltimore, Md.

'13 Thomas A. Novotney is now manager of the research department, National Radiator Corp., Johnstown, Pa.

'23 Albert E. Woollen, with the Standard Oil Company, has been transferred from Bakersfield, Calif., to Taft, Calif.

'25 Charles E. Moench has accepted a position with the Texaco Corporation at Lawrenceville, Ill.

Charles C. Withrow, with the Wabash Railway Company, has been transferred to Brunswick, Mo.

'26 Bruce R. Walsh has accepted a position with the Pennsylvania Railroad at Altoona, Pa. He will take up his duties April 1.

Frank Swearingen, with the Kentucky Actuarial Bureau, has been transferred from Owensboro, Ky., to Louisville.

'27 Fred Curl, ex-'27, is with S. J. Groves and Sons, Construction Company, of Minneapolis, Minn.

William A. Harris is with the R. C. A.-Radiotron at Harrison, N. J.

'28 Robert F. Taggart has returned to his old job with Harry Hake, Architect of Cincinnati. He is to be located at Columbus, Ohio, on the new state capitol job.

A daughter, Yolanda, was born to Mr. and Mrs. Guy S. Mahan, on February 26th. Mr. Mahan resides at 1588 Gray Avenue, Detroit, Mich.

(Continued to page 28)

Research and Progress

Lee C. Kelsey, Jr., m., '32

Grid-glow Tube Controls Fuel

Electrons harnessed in vacuum tubes have recently entered upon new usefulness as safety detectors to safeguard lives and property if the flame "goes out" in an oil burner in the home or apartment. Any such flame is slightly conductive of electricity. A very tiny current of electricity is therefore made to flow through the flame and through the grid-glow tube. Should the furnace flame go out, this tiny current ceases, the grid-glow operates other electron tubes to release switches, and the fuel oil is automatically turned off.

Failure of the pilot flame for any reason thus results in the automatic stoppage of the oil flow, before any excess of oil can involve danger. Several hundreds of these electronic safeguards are now installed in household oil burners, and it is expected that thousands of homes and apartments will shortly go to this form of automatic electronic protection.

The Automobile Industry

In the automobile industry as a whole are engaged directly or indirectly 4,700,000 persons, at an average annual wage of $1,200 per individual, giving to this group a total purchasing power of over $5.-500,000,000 per year, recent statistical research reveals. The magnitude of the industry is even more astounding when considered as including gasoline, finished rolled steel and iron, rubber, plate glass, and upholstery.

Eighteen per cent of the finished rolled steel and iron is used in the automobile industry, giving employment to more than 70,000 workers. Sixty per cent of all steel strip, 39 per cent of sheet steel, 29 per cent of steel in the form of bars, and 52 per cent of malleable iron is purchased by automobile makers. Thirty-seven per cent of aluminum production in the United States is consumed in producing castings, alloys, and sheets for automobiles.

Talking Lighthouses

Talking lighthouses to tell sailors miles out at sea just what lighthouse they are watching, or even to entertain these passing mariners with news of the day or weather forecasts, are possible by the modern process by which music, speech or any other sound may be modulated on a light beam, much as radio programs are sent out on the beams of radio waves from a broadcasting station. To the eye such a music-carrying beam looks quite as usual but if the beam is allowe dto fall on a photo-electric cell, properly arranged with vacuum-tube amplifiers an dother apparatus, the sound message on the lightbeam may be picked off and made audible to the mariner.

The beam from a revolving lighthouse, for example, may be made to sing a definite note whenever its rays fall on a small photo-electric cell mounted on a ship's bridge. Even the captain in his cabin thus would know, by the distinctive musical note of the beam, which lighthouse of several along the coast was then in sight. Such lighthouses now are distinguished by color or by the number and arrangement of the flashes as the light revolves. The use of color necessitates decreased intensity of the light, since colored lights are not so bright as pure white ones. The recognition of lights by flashes requires considerable practice.

It might be easier therefore to have each lighthouse identify itself by musical note or even by spoken words, although the former might require ship's captains to possess musical ears in addition to the manifold qualifications already necessary for that job.

Rail Zeppelin

Practical use of the "Zeppelin of the rails" designed by a Hanover engineer, awaits an answer to at least two questions.

Will the propeller driven car round sharp curves speedily and safely? That is the first question. And if the car will travel around curves at great speed, the next

(Continued to page 19)

Basketball

P. Arvard Smith, Jr., ch., '32

Rose has just completed the most successful season of basketball for several years. This year Rose won 8 and lost 12. Even though Coach Brown has been sick for a greater part of the season, he was able to bring together in the end a combination to beat our rivals (Normal.) This year has shown a revival of the Fighting Engineer spirit in both basketball and football. Hop to it gang and never let the old fighting spirit die.

Rose 31, Vincennes 20

Taking the lead late in the first half, Rose Poly marched to a 31-20 victory over Vincennes University in the return game played in the Rose gym.

The Engineers counted 13 times from the field and 5 points were added as a result of foul goals. Batman was high scorer of the evening with 11 points and Sawyers a close second with 8.

Summary and lineup:

Vincennes 20.	FG	FT	TP	PF
R. Snyder, f.	2	2	6	0
Kirkhof, f.	1	1	3	0
Pyle, c.	2	1	5	0
Sexon, g.	1	1	3	1
McCray, g.	0	1	1	1
H. Snyder, f.	1	0	2	1
Pickle, c.	0	0	0	1
Baker, g.	0	0	0	0
McElroy, g.	0	0	0	0
Totals	7	6	20	4

Rose Tech. 31.	FG	FT	PT	PF
Batman, f.	4	3	11	1
Kruzan, f.	1	0	2	1
Hylton, c.	0	0	0	2
Griffith, g.	2	0	4	2
Yaeger, g.	0	2	2	1
Richards, f.	0	0	0	1
Reinking, f.	1	0	2	1
Morrison, c.	1	0	2	1
Sawyers, g.	4	0	8	3
Spangenberg, g.	0	0	0	2
Totals	13	5	31	15

Officials—Referee, Russell, Indiana State; Umpire, Hannah, Indiana State.

Valparaiso 17, Rose 15

The tall and rangy Valparaiso team upset a small but fighting Rose team by the score of 17-15. The Engineers were greatly handicapped by the difference in size, but were a determined lot. At half time the score was 13-4 in favor of Valpo.

Rose returned to the court with the Fighting Engineer spirit and Valpo was lucky to win by 2 points.

Batman and Sawyers were best on the offense. Reinking and Yaeger were best on the defense.

Lineup and summary:

Valparaiso 17.	FG	FT	TP	PF
Kowolski, f.	1	1	3	0
Murtz, f.	0	1	1	0
Bauer, f.	1	3	5	2
Barmekhof, c.	0	2	2	1
Rosinski, g.	1	0	2	2
Shook, g.	1	2	4	0
Totals	4	9	17	5

Rose Poly 15.	FG	FT	TP	PF
Batman, f.	2	0	4	1
Richards, f.	0	0	0	1
Reinking, f.	1	0	2	1
Hylton, c.	0	0	0	3
Morrison ,c.	1	0	2	3
Sawyers, g.	1	2	4	3
Yaeger, g.	0	3	3	2
Totals	5	5	15	13

Officials: Referee, H. Conover; Umpire, N. Dunlap.

Rose 31, Indiana Law 12

After playing a listless first half and finding the score tied at 6-6 Rose came back strong in the second half to defeat Indiana Law School 31-12.

Each team made only one field goal during the first half but during the second period the Engineers outscored their rival 11-2 from the field.

As usual Yaeger played his bang-up game at defensive guard while Reinking and Sawyers were the high point men.

Lineup and summary:

Rose Tech 31.	FG	FT	TP	PF
Batman, f.	2	0	4	0
Reinking, f.	3	1	7	2
Kruzan, f.	1	1	3	2
Morrison, c.	0	0	0	1
Hylton, c.	1	1	3	3
Griffith, g.	0	0	0	2
Sawyers, g.	3	2	8	2
Spangenberg, g.	1	1	3	0
Yaeger, g.	1	1	3	0
Totals	12	7	31	12

Law School 12.	FG	FT	TP	PF
Marks, f.	0	1	1	3
Hughes, f.	0	0	0	1
Burns, f.	1	3	5	4
Allspaugh, c.	0	1	1	4
Phipps, c.	0	0	0	0
Simmons, g.	1	0	2	2
Smith, g.	1	1	3	1
Mazlin, g.	0	0	0	0
Totals	3	6	12	15

Referee: Hannah.

Rose Letter Men

Basketball: Sawyers (capt.), Yaeger, Hylton, Morrison, Fisher, Batman, Reinking, Spangenberg, Pacatte, Bruce, Mgr.

Football: Ogan (capt.), Reed, Simpcoe, Adams, Schaack, Creedon, A. Smith, Bruce, Ellis, Evans, Gillett, Hylton, Pratt, Tonetti (capt. elect), Kruzan, Mgr. Rockwood.

Spring Football

It has been decided to do away with track this year due to the cost of maintaining a track crew.

(Continued to page 30)

Campus Activities

L. Max Everman, ch., '33

Assemblies

At the assembly of March 5th, Mr. Witt, President of the local Tau Beta Pi chapter, announced the election of seven members of the Junior class to membership and presented them with pledge buttons. The speaker of the day, Mr. Birch Bayh, Director of Athletics in the Terre Haute schools, spoke on "Getting By." Both the talk and the speaker's observations on golf were enjoyed and appreciated by the student body.

At the assembly of March 12th, a two reel film on the conversion of coal into electricity by modern methods was shown. Mr. George H. Pfeif '05, Director of Industrial Relations for the General Electric Company, spoke briefly about modern electrical developments and about the position of Rose graduates in industry.

At the assembly of March 19th the Rev. Charles N. Tyndell spoke on "Purposefulness." The talk was enthusiastically received by the student body as were the introductory remarks.

Glee Club Features Minstrel

The Rose Glee Club gave an excellent performance on March 20th at the Kerman Grotto Minstrel in Terre Haute. The Glee Club rendered six numbers and Mr. Edward Griffith presented two accordion numbers all of which were well received.

Visitors

Mr. and Mrs. A. G. Williams of St. Louis, Mo., were recent visitors at Rose. Mrs. Williams is a daughter of the late Professor Thomas Gray, a distinguished member of the Rose faculty.

R. O. T. C. Appointments and News

At a recent parade of the R. O. T. C. battalion, orders were read making appointments and assignments for the remainder of the school year. The appointments to the battalion staff were as follows: L. Herndon Witt, Jr., Louisville, Ky., Cadet Major commanding the battalion; Robert S. Roach, Terre Haute, Cadet Captain and Adjutant; and Joseph L. Hunter, Terre Haute, Battalion Sergeant Major. The appointments of Cadet Captains and Company Commanders were announced as follows: Company A, J. Leonard Bruce, Terre Haute; Company B, James L. Barrett, Terre Haute; and Company C, Marvin C. Wilson, Bloomfield.

Under the newly appointed officers, the battalion is preparing for the annual spring inspection and competitive drill which will be held during May. Several special drills including Military Calisthenics, Mass Drill, and Silent Drill are being prepared for the occasion and a better showing than ever before is anticipated.

The drill period of March 7th was given over to the showing of training films. The Rose Military Band played at intervals during this period.

A. S. C. E.

The student branch of the A. S. C. E. was addressed on March 16th by Mr. Alexander Miller, District Engineer of the American Institute of Steel Construction. The talk was illustrated by pictures showing the building of the Bank of Manhattan Building. This meeting was open to the student body.

A. I. E. E.

The student branch of the A. I. E. E. will be host to a one day district meeting to be held about the middle of April. The branches to be represented are those of the University of Illinois, Purdue, and Rose.

A. S. M. E.

Mr. Arthur M. Hood '93 addressed an open meeting of the A. S. M. E. student branch on March 10th on the subject: "Patent Rights, Trademarks, and Procedure for Obtaining Patents."

(Continued to page 30)

Fraternities

Tau Bet. Pi

Indiana Beta of Tau Beta Pi has just pledged seven new men. The men are Howard White, Abe Goodman, Bob Clark, John Montgomery, Arvard Smith, Myron Clark, and Paul Froeb. The actives welcomed these men into the organization by giving them a banquet at the Deming hotel immediately after their pledging. Each pledge gave a short speech expressing his gratification of receiving a bid to the organization. President Prentice was the speaker of the evening. He gave a very interesting talk on college customs and traditions and how they have changed through the years.

Tau Beta Pi now has a large membership and is planning a number of things for the coming months.

Alpha Chi Sigma

Alpha Chi Sigma wishes to extend a hearty welcome to the following newly initiated members: Thomas Batman, Robert Broadhurst, Hans Fischer, J. D. McNair, Kyle Miller, Roger Peugnet, Charles Sipple, Chester Stock, and Robert Swoboda. It is felt that these men will form a valuable addition to the chapter.

Iota plans for the near future a professional meeting to be held at the Terre Haute House at which time it is hoped that Marvin C. Rogers, District Counselor, will be able to visit with us. Iota also hopes to have some representatives at the Alpha Chi Sigma dinner held in connection with the national American Chemical Society convention at Indianapolis. These are always very enjoyable affairs and as good an attendance as can be had is desired.

Alpha Tau Omega

With the close of the basketball season Brothers Sawyers and Spangenberg and Pledge Brothers Pacatte and Morrison were awarded Rose sweaters. Brother Bruce, who served as senior manager, was given a manager's letter. Brother Sawyers, captain of this year's five, was again elected to lead his team for the next year. Sawyers has been a varsity basketball man for three years, and this year he was high scorer of the team, receiving honorable mention on several all-state selections.

St. Pat's has come and gone, but a large part of the success of the festivities was due to the work of Brother Stimson, general chairman of the activities, and Brother Witt, chairman of the dance. Brothers Fischer, Clark, and Gillett also aided in the work.

The annual state dance and banquet were held on March 21 in the Riley room of the Claypool hotel, Indianapolis. Hal Rothert and his band furnished the music.

A tentative date, April 19, has been set for the formal initiation of pledges into Alpha Tau Omega.

Sigma Nu

Beta Upsilon's annual Pledge Dance was held February 28, at the chapter house. This dance is given by the members of the active chapter in honor of the new pledges and was the last of the series of entertainments at which they were guests. Music was furnished by "Bud" Cromwell's "Rhythm Kings" which proved a real incentive for the dancers to enjoy themselves to the utmost. The dance was chaperoned by Dr. and Mrs. Sousley and Prof. and Mrs. Stock.

When Tau Beta Pi recently announced their pledges, Beta Upsilon was pleased to note that two of her men, Myron Clark and Howard White, were taken into the honorary engineering frater-

nity. There are now six men from Beta Upsilon in Tau Beta Pi, four of whom are in the graduating class.

At the close of the basketball season two men in the chapter were awarded sweaters for contributing their part to Rose's successful season. The season was made a perfect success when the Rose clad warriors sent Indiana State home properly spanked for ruining our perfectly good football season. The men from Beta Upsilon that received letters were George Yeager and Art Reinking. Both of these men have several seasons ahead of them yet, George being a freshman and Art a sophomore.

Theta Kappa Nu

Now that the midterms are again a thing of the past, the brothers of Indiana Gamma are looking forward to Theta Kappa Nu's annual spring dance to be held in the near future. A committee is at work arranging the details, and we are expecting it to be one of the best ever held. Another dance occupying the minds of the brothers is the State dance, to be given on the evening of April 18, at the Hotel Severin in Indianapolis. Most of the brothers are planning to attend. A delegation from Indiana Gamma attended the annual Raccoon Scramble given by the Chicago Theta Kappa Nu Alumni Club at the Hotel LaSalle in Chicago on the night of April 4. They reported a wonderful time and enjoyed renewing friendships with many of the alumni, working in Chicago.

Indiana Gamma is again proud to announce its leadership over all other fraternities and non-fraternity men on the Rose campus in scholastic standing for the past term, and especial credit must be given to the scholarship men and to members of Tau Beta Pi. Brother Froeb has recently been elected to this honorary fraternity.

Men of Indiana Gamma have been very active in extra-curricular work again this year, and will continue to be for the ensuing year, as shown by the recent Technic and Modulus elections. Brothers Ahlers and Froeb have been re-elected, and pledge brother Fick elected to the Technic Staff. Chet Stock was chosen as editor-in-chief of the Modulus, and Bill Shofner as managing editor. Jim Guymon and Charles McGillivary are other brothers making a place on the new Modulus Staff.

Jim Hughes, who has been working in Chicago for the past year, dropped in for a visit recently, and is going to be with us again next year. Alumni visiting the house recently were Fred Andrews, Charles Lotze, Paul Baker, Don Henderson, and Pete Scofield. We are always glad to welcome the old "grads" back for a visit.

Theta Xi

On April 12 Kappa Chapter of Theta Xi plans to initiate one of the best groups of men ever pledged.

If spring football practice materializes we expect to have many of the brothers and pledge brothers out to get a share of what we hope and expect to be the glory of a winning team next fall.

Brother Laatz has been selected to serve as one of the Technic staff, and Brother Carter as one of the Modulus staff.

On Friday, March 13 a bowery dance was given by the Theta Chapter at Purdue. It was one of the outstanding events on the campus up there, and was a great success as those whose pleasure it was to attend will vouch for. Those in attendance from Kappa Chapter were: Brothers Laatz, Smith, Reed, Utz, Peugnet, Weinbrecht, Richmond, Axton, and Pledge Brothers Heiliger, Cutts, Keith, Kiefer, and Kiefner.

Saturday night March 21 an open house party was given in honor of the new pledges. Guests from the faculty were Professr and Mrs. H. C. Gray and Professor H. N. Chinn. Dancing was the popular pastime of the evening. Refreshments were served after which the brothers and guests departed in high spirits.

Brothers who have visited us during the past month are: Werner, Kadel, Merrill, Fisbeck, Johonnott, Renfro, Davy, Swartz, Jones and Raider.

Research and Progress

(Continued from page 15)

question is: How will its trips, made at the rate of 100 miles an hour or more, fit in with the existing train schedules? These questions are puzzling the designer of the queer shaped, high speed car. Designed so as to have the least air resistance and with a low center of gravity the car resembles a small zeppelin. It is 85 feet long, and weighs when empty 18½ tons. When fitted as a coach it can accommodate from 40 to 50 persons.

Thus far the "rail Zeppelin," invented by Dr. Franz Kruckenberg, has been tested only on a stretch of straight track leading out of Hanover. Actual experiments to start soon alone will tell whether as light a car as that now devised by the engineer can round curves at nearly the same speed with which it travels over the straight track and still remain on the rails. Assuming the coach will prove its merits on curves, the next obstacle is its schedules.

General installation of the car, it is pointed out, would mean changing block signals systems, automatic safety brakes and other devices all of which now are adjusted for trains running up to seventy-five miles an hour. The possibility of operating the car over separate tracks instead of on regular train rails has been suggested.

In devising this car Dr. Kruckenberg was concerned primarily with the construction of a vehicle that would combine economy with speed. An electric car designed and built in 1903 achieved a maxi-

(Continued to page 27)

RAILWAY ELECTRIFICATION - -

TO ADVANCE the technology developed by electrical pioneers who designed and applied electric railway equipment to conquer mountains and to speed terminal traffic — there's a task to try your temper!

During the business life of young men who now are students, thousands of miles of railroad will be electrified — the undeniable economies of electrical operation make this advisable. To carry out such a program will call for the services of many of the best-trained men — in the industries allied with electrical manufacturing as well as in the electrical industry itself.

Out of college, established in your profession, it may be *your* job to direct a part of this onward march of electrification.

General Electric has equipped more railroad right-of-way and electrified more lines than any other company. For the future, General Electric anticipates a continuation of the vision, skill, and progress which have thus far marked its contribution to industry and transportation.

Booklet GEK-55 tells about some of the railway electrification projects with which G-E engineers have been identified. Address your request to Publicity Department, General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC

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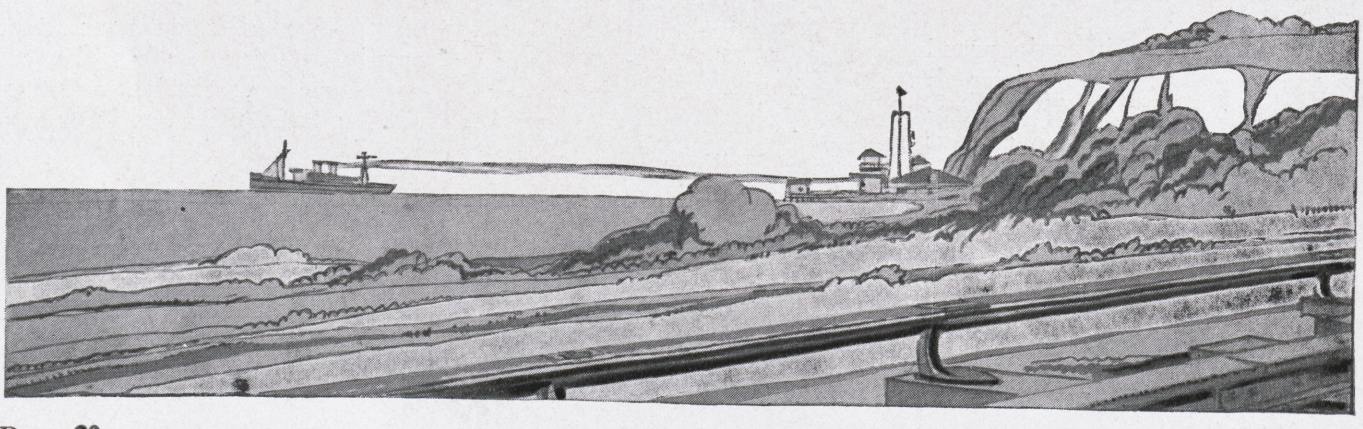

-IN THE FUTURE....

Will It Test Your Mettle?

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

Patent Procedure

(Continued from page 7)

the cost of filing an application for patent. If the search proves that the inventor's development is not novel, then the cost of filing an application is saved.

The Application

An application for patent in the United States takes the form of a communication to the Commissioner of Patents, the same comprising a drawing (which must be made in accordance with rather strict and somewhat arbitrary rules which have been laid down by the Patent Office for the convenience of that office); a specification, which is a detailed and inclusive description of the device illustrated in the drawings and which is required to refer to reference characters imposed upon the drawings; a petition, which is a formal paper and which constitutes a request for the issuance of a patent to the inventor; the claims, the character of which will be described hereinafter; and an oath, the statements in which are rigorously prescribed by the Patent Office and which must be signed and sworn to by the inventor.

The claims above mentioned are by far the most important feature of the application since according to law they define the limitations of the protection which is granted to the inventor by the issuance of a patent. Each claim is a statement of the limitations of the invention which the applicant believes he has made. A claim need not be limited to the specific elements disclosed in the drawing and described in the specification, but may be so broadly worded as to include mechanism which differs rather radically in appearance from that disclosed, but which consists of "substantially the same elements cooperating in substantially the same way to effect substantially the same result."

It will be obvious, then, that the drafting of claims is an art in itself, and is not to be attempted except by an expert.

The Prosecution of the Application

During the time when the writer was employed as an Examiner in the Patent Office, a fellow alumnus of Rose wrote, asking the writer to get a patent for him, stating that he realized that it would be a very simple matter for an Examiner in the Patent Office to obtain a patent for him without the usual delays. This is believed to illustrate a common misapprehension to the effect that the Patent Office is in the habit of issuing a patent merely upon a request. Nothing could be much further from the truth.

The Patent Office is divided into 63 divisions, each of which handles applications relating to certain types of subject matter. Each division comprises a primary Examiner, whose work is principally supervisory, and from three to ten assistant examiners who actually examine the applications which are filed.

Each assistant examiner handles applications covering a particular class of inventions, and he has conveniently arranged scores of shallow drawers full of copies of issued patents arranged according to the subject matter thereof. When an application is placed on an Examiner's desk, he usually glances rather causally at the drawing and then places it in his files to await its turn for examination in chronological order. Most divisions of the Patent Office are now from six to twelve months behind in their work. When the application in question is reached in its regular order, the Examiner reads the specification and the claims carefully and then turns to his files of issued patents and makes a search in an attempt to find some issued patent which, in his opinion, discloses the invention which is recited in the claims of the application under consideration. In this attempt the Examiner practically never fails.

After his search is complete, the Examiner writes a letter to the attorney who is prosecuting the application, calling his attention to the patents which the Examiner has found and stating that certain of the claims, or all of the claims, of the application are unpatentable over the disclosures of such patents. Upon receipt of that letter, the attorney orders from the Patent Office copies of the patents which have been cited by the Examiner, and when those copies are received, he studies the application and the cited patents to determine what, if anything, is patentable in the application over the cited patents.

The applicant or his attorney must respond to the Examiner's letter within six months from the date of that letter, and the attorney in making his response must reply to each objection raised by the Examiner. He is not required immediately to cancel all the claims that the Examiner has rejected. Instead he may modify the language of the claims, or he may argue the propriety of the Examiner's rejection without in any way changing the claims.

The attorney and the Examiner continue their correspondence until such time as they reach an agreement as to what claims can be allowed in the application, or until it appears that they can never agree. If an agreement is reached, the application is passed to issue and upon the payment of the fee required by the government, it issues as a patent.

If the attorney and the Examiner can not reach an agreement, the attorney has a right to appeal from the Examiner's decision first to a tribunal of the Patent Office known as the Board of Appeals and, if he is not satisfied with the decision of that tribunal, he may appeal therefrom to the Court of Custom and Patent Appeals in the District of Columbia.

Of course the right of appeal is exercised in relatively few cases, since usually the Examiner and the attorney can come to an agreement.

The Interference

When two or more inventors independently develop the same or substantially the same invention

and separately apply for patent protection thereon, the Patent Office declares what is known as an interference. An interference proceeding is comparable to a suit at law. The issue involved is the question of priority of invention, and is defined by one or more claims contained in each of the applications involved in the interference. Anything like a complete discussion of interferences would occupy more space than can be accorded to the whole of this article, and consequently we must leave this question with no more than a few general statements.

When an interference proceeding is declared, each applicant involved therein is required to file a sworn statement as to the dates when he

1. First conceived the invention described in the claims of the interference,
2. First made drawings thereof,
3. First made a written description thereof,
4. First disclosed it to other persons. and
5. First reduced it to practice either by making a working model (which in some cases must be a full sized device) or by filing a patent application thereon.

Thereafter, each party is given an opportunity to take testimony to prove the time of his invention and any other pertinent facts. After all the testimony is in the Examiner of Interferences in the Patent Office renders his decision as to which of the parties is the first inventor of the subject matter of the interference, and a patent may then issue to that party, containing the claims of the interference, and the subject matter of that interference then becomes prior art against the applications of the other parties to the interference. An appeal lies to the Board of Appeals of the Patent Office, and thence to the Court of Customs and Patent Appeals in Washington, from the decision of the Examiner of Interferences.

An interference may also be declared, under certain circumstances, between a pending application and an issued patent.

A consideration of interference practice, even as sketchily outlined as above, should bring home to the reader the real importance of keeping a detailed notebook, as suggested at the beginning of this article.

What Good is a Patent?

That is a question which is often thrown at us. A patent has been facetiously defined as a license for a law suit. Considered carelessly, perhaps this definition is justified, since a patentee is entitled to file suit based on his patent if, as, and when he chooses.

But filing suit on the patent is usually a last resort. Only the man of an unsually litigious frame of mind will go into court before

every other avenue of settlement has been found to be blind. The plaintiff, as well as the defendant, is put to considerable expense in litigation involving a patent. The plaintiff stands to win, of course, an injunction protecting him in his monopoly and a money judgment, provided the court is convinced of the righteousness of his claim and the validity of his patent. He must, however, gamble several thousand dollars in attorneys' fees in order to obtain a chance of winning his injunction and his decree for money damages.

Furthermore, every time a patentee goes into court he submits his patent to the consideration of the court and to attack by the defendant, and he stands, if judgment goes against him, to lose his patent, since the court may hold the patent to be invalid. Under those circumstances, of course, he loses not only his patent but also his attorneys' fees and his court costs.

There are five principal uses for patents. The first and most generally used of these is the bluff value of the patent. How many manufacturers, having submitted to them a novel article carrying a notice to the effect that the article is patented, will disregard that notice and enter upon the manufacture of that article or of a tolerable imitation thereof? Obviously, few will do so, since to do so is to invite an expensive lawsuit.

Most manufacturers prefer to drop an item rather than to defend a suit, even though they may feel that the item in question does not infringe a patent under which they have been threatened. In many cases, then, the mere calling of a patent to the attention of an infringer is sufficient to eliminate him from competition or to force him to take a license under the patent.

Secondly, a patent is valuable as a trading asset. Suppose manufacturer A owns a patent covering an article which is fairly successful. Suppose manufacturer B makes an improvement in that article which apparently will increase the commercial value thereof to a rather large extent. We shall suppose that A's patent is broad enough to include B's improvement, so that A can prevent B from manufacturing the improved article. B patents his improvement, and then calls upon A, asking for a free license to manufacture devices covered by A's patent. If B appears in this conference without a patent, A certainly will do no more than laugh at him. If, however, B appears with his patent covering the improved article and is able to convince A that A will make more money by manufacturing the improved article, even in competition with B, than he can make by manufacturing the original article without competition, then A will certainly agree to an exchange of free licenses, whereby A is permitted to manufacture devices in accordance with B's patent and B is permitted to manufacture devices infringing A's patent.

The Sherman Anti-Trust Law

is the manufacture and sale of vacuum tubes, purchased that patently held that contracts between competitors which constitute price fixing agreements are violations of the Sherman Law, in general. However, the owner of a patent may grant a license to another with the specific provision that the licensee shall not sell the patented article below a price fixed in the license contract; and it has been held that an agreement of this sort, where it is based upon a license under a patent, is not a violation of the Sherman Anti-Trust Law.

There are occasions when it is advantageous to a manufacturer to hold an absolute monopoly on a given device. If he owns a patent on that device, he may maintain his monopoly and, by judicious threats and the filing and vigorous prosecution of suits where necessary, he can maintain his position as the only manufacturer in the country of the device in question.

Another use for patents which is infrequently employed and which is made possible by certain provisions of our law which are almost unique is the use whereby a patented article is kept entirely off the market for the life of the patent. The patent laws of this country do not require a patentee to manufacture or to permit others to manufacture, use, or sell the invention covered by his patent. Occasionally situations have arisen in which a manufacturer has felt that he would be seriously damaged by the introduction onto the market of a patented device. Under those circumstances, the manufacturer may buy the patent in question and, owning the patent, may prevent any one from producing or from using the invention covered by that patent.

An example of this use of a patent is alleged to have arisen rather recently. According to the story, a radio receiving set was invented some two or three years ago, and a patent was obtained therefor, the set being unique in that it required no vacuum tubes for operation. It is stated that a large corporation, a major portion of whose business

(Continued to page 28)

Humor

Richard Toner, '34

He: "Blast those insects! They're the biggest damn blankety blank pests in the world."

She: "Henry, you forget that I'm here."

Absent-minded College Professor (after a date): "We'll go on from here next time."—*Reserve Red Cat.*

Then there's the one about the midget chemistry student who slipped and sat down in the solution with which he was experimenting. He got a little behind in his work.—*College Life.*

Freshman: "It took eight sittings."

Sophomore: "Have you been having your portrait painted?"

Freshman: "No, learning to skate."—*Boston Transcript.*

So I took the $50,000 and bought chairs for the standing army.

Customer: "I don't like the flies in here."

Waiter: "Sorry, sir, there'll be some new ones in tomorrow."—*Penn. State Froth.*

"They say Helen of Troy was faster than Lindbergh!"

"Howzat?"

"She made Paris in two hours!"

Absent-minded Salesgirl (as date kisses her good night): "Will that be all?"—*Battalion.*

"Curse it! Curse it!" hissed the villain, snatching at the fair maiden's waist.

"No, it ain't either," she retorted, "it's a girdle."—*Cornell Widow.*

"How come you are entering a plea of insanity?"

"No reason at all!"—*College Life.*

Then there's the proverbial frosh who thinks that his economics prof rides to class on a business cycle.—*Green Goat.*

They call a professors' meeting just a little forget-together.—*Minn. Ski-U-Mah.*

Item in Chicago Tribune: After the operation he failed to rally, lapsing into a comma from which he never fully emerged.

"And what did you tell your Dad when he suggested that you go to work in a drug store?"

"I said it was a vial occupation."

"How did you get banged up?"

"Skiing."

"What happened?"

"Couldn't decide which side of a tree to go around."—*Cornell Widow.*

If all the men at a frat house sat at the same table, undoubtedly they would reach.—*Minn. Ski-U-Mah.*

"My boy friend is in the R. O. T. C."

"Does he know the Manual of Arms?"

"So that was what his hands were doing last night!"

"I hear Katherine is marrying that X-ray specialist."

"Yes. What can he see in her?"—*College Life.*

Columbus was a great breeder. He crossed the Atlantic with three small ships.

Soph: "I'll bet you felt badly about the way your car got smashed up in the collision.

Frosh: "Yes, it doesn't look a bit worse than it did before.—*College Humor.*

A Bishop had been speaking with some feeling about the use of cosmetics by girls. "The more experience I have with it the more distasteful I find it."—*Fernie Free Press.*

"The girl I am married to has a twin sister."

"Gee! How do you tell 'em apart?"

"I don't try; it's up to the other one to look out for herself."—*College Life.*

MacDonald: "That's a poor blade you've got in your safety razor, Sandy."

MacTavish: "Well, it was good enough for my father, and it's good enough for me."—*Pathfinder.*

"If you touch me, I'll scream," threatened the auto siren to the chauffeur.

He: "We're coming to a tunnel. Are you afraid?"

She: "Not if you take that cigar out of your mouth."—*Tit-Bits.*

Research and Progress

(Continued from page 19)

mum speed of 134 miles an hour, while the Hanover engineer's car will travel only 113 miles an hour. However, it required 3,000 horsepower to move this electric car, while Kruckenberg's coach will attain a 95 mile an hour speed on 200 horse power.

Campbell's Bluebird

On Daytona Beach, Florida, Captain Malcolm Campbell on Feb. 4, raced his specially-built Bluebird along the sands at the tremendous speed rate of 245.733 miles an hour. Before passing the measured mile of the course, he had taken a flying start of 5½ miles. His achievement puts him far ahead of the previous world record for land vehicles which was held by the late Sir Henry Segrave, whose speed was 231.369 miles an hour. The fastest speed accomplished by man is held by a speedplane at 357.723 miles an hour.

The Bluebird is powered by a twelve cylinder Napier-Lion aviation engine, of 5½-inch bore and 5⅛-inch stroke. It is of the W type in which one bank of cylinders is mounted vertically on the crankcase and another bank radially disposed at each side at an angle of 60 degrees with the vertical. It is virtually three four-cylinder engines with a common crank-shaft and case. A super-charger is used, having three carburetors and intakes. The engine develops 1450 horsepower at 3600 revolutions per minute which, with a displacement of 1461 cubic inches, gives an output of practically one horsepower for each cubic inch. The car weighs 7840 pounds. There is therefore one horsepower for every 5.4 pounds of car weight. This performance figure will be appreciated when it is considered that our automobiles have from 24 to 36 pounds of car weight per horsepower.

The engine has a three point mounting on a sub-frame, with one support at the front and two in the rear. The wheelbase is 147 inches and the overall length is 25 feet. The tracks of the front and rear wheels are 64 and 62 inches respectively. Overall width is 6 feet.

Braking is a considerable problem with high speed vehicles. Most people appreciate the need of power to accelerate and maintain high speed but overlook the fact that the car must also be stopped. Brake linings consist chiefly of asbestos which of course is a non-conductor but the immense amount of heat developed warrants every effort to keep the heat from the brake shoes and to throw it into the drum where it can be dissipated. The braking surface is continuous but the inner surface which contacts with the shoes is serrated or interrupted, providing an air space insulation there between. The foot pedal pressure is augmented by a vacuum booster which actuates the single cross shaft.

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Patent Procdure

(Continued from page 25)

prohibits combinations in restraint of trade, and it has been consistent for a fabulous sum, and that the corporation has shelved the patent with the idea of keeping the device covered thereby off the market for the term of the patent. (Perhaps this tale should be slightly salted before consumption).

The advantage of this course, if it was actually followed, is readily apparent. If the country should be flooded with radio receiving sets which do not require vacuum tubes, the vacuum tube manufacturer would soon go out of business.

A still further, and seldom considered, advantage to be derived from attempting to obtain a patent license is the fact that an application for patent when filed is assigned a serial number, and is dated as of the date of the receipt thereof in the Patent Office. Whether or not a patent is granted upon that application, all the papers constituting the application are filed upon the termination of the prosecution of the application among the permanent records of the Patent Office. The files of applications which resulted in issued patents are never destroyed. The files of applications which do not result in issued patents are kept for twenty years and then, unless a protest is made by a party in interest, the files are destroyed.

Thus, the filing of an application for patent creates a record which will stand for at least twenty years, and which at any time during that twenty years will constitute absolute proof of the completion by the applicant of the invention described in that application at a date at least as early as the date on which the application was filed in the Patent Office. If, then, at some future date, some other person should obtain a patent purporting to cover that invention, the original applicant by reference to the files of the Patent Office may quickly and easily prove that the patentee's patent can have no validity in so far as it applies to the invention disclosed in that earlier-filed application. The filing of an application thus is comparable to the recording of a deed to real estate, together with the depositing of the deed in a safety deposit vault whence it can never be removed during a period of at least twenty years.

The limitations of space have necessarily reduced this article to the barest sort of outline of those features of the patent law which are of primary interest to the engineer. If it has left with the reader even a general idea of the value of patents, then it has served a purpose. If it has impressed upon the reader the importance of keeping definite and detailed record of all development and research work, then it has really performed a service.

There are a few salient ideas which the writer would like to leave with you. Of these, perhaps the most important is: Keep a detailed, illustrated notebook during all development and research work. Others are as follows: file patent applications disclosing and claiming any inventions which you may make; never enter upon the production of a new article, or the practice of a new process without first determining whether or not the production of that article or the practice of that process may infringe the rights of some other person; keep your patent attorney advised as to what you are doing in the development of novel ideas. He may be able to save you large sums in damages. He may be able to obtain for you large sums in tribute for the use by others of your invention.

Alumni

(Continued from page 14)

'29 Herbert B. Sliger is with the Commercial Solvents Corporation, and has been transferred to Cleveland, Ohio.

Wayne A. Dicks has become an instructor in the Dial School of the Michigan Bell Telephone Company, Detroit, Mich.

'31 Harold Kehoe is with the Illinois Highway Commission.

Bruce R. Walsh '26, Andy J. Nehf '28, Andrew H. Davey '30, and Harold J. Dicks '30, were our recent visitors. They all seemed to be very glad to get back to their Alma Mater.

Research and Progress

(Continued from page 27)

The body design is the result of extensive research with a model in wind-tunnel tests. One of the major changes in design is the size of the directional fin at the rear which is probably the most conspicuous part of the Bluebird. Being located behind the rear axle, it imparts stability to the car and assists in correcting any skid or surge from the straight path due to the resultant air pressure. The fin is about 5 feet from the top of the body and about 6 feet long. It is covered with aluminum panels. It is offset toward the right side in order to line up with the drive and the windshield.

It will be noted that the radiator is not a part of the streamlined body but sits forward so that air passing through it is ejected along the outside of the hood. This design was adopted to prevent interference that would be caused by the increased wind resistance if air were allowed to fill the inside of the body and emerge into the "cock-pit" or other outlets towards the rear. Cooling water enters the radiator through one upper tube and returns through two others. —*Machine Design.*

Gun Fire Capacity

Army officers at Aberdeen Proving Grounds have doubled the firing capacity of machine guns by using ethylene glycol, a chemical employed to keep automobile radiators from freezing. In experimenting, the officers substituted the fluid for water in the cooling mechanism of the guns and found that they could shoot twice as long as formerly. The fluid, it was discovered, ceased boiling almost as soon as the order to stop firing was given.

(Continued to page 30)

Water, it was said, continued to boil in the gun's jacket for some time after cessation of fire. They added that the loss of water by evaporation was almost twice as great as the loss of the chemical. —*The New York Times.*

Basketball

(Continued from page 16)

This is one of the reasons spring football has been announced. With this early start we are looking forward to a great season next year.

Let's all surprise the coach and go out for football this spring, then after we are out, gang, we must stick it out to the end to help our coach build a winning team.

Campus Activities

(Continued from page 17)

Debating

In recent debates over conscription of wealth in case of war the Rose teams met with two defeats. The negative team lost to a team representing Taylor University, Upland, Ind., by a small margin at Rose on March 20th, and the affirmative team lost to Franklin at Franklin on the same night.

The annual Rose-Purdue engineering debate sponsored by the Indianapolis A. S. M. E. will be held at the section meeting in Indianapolis during April.

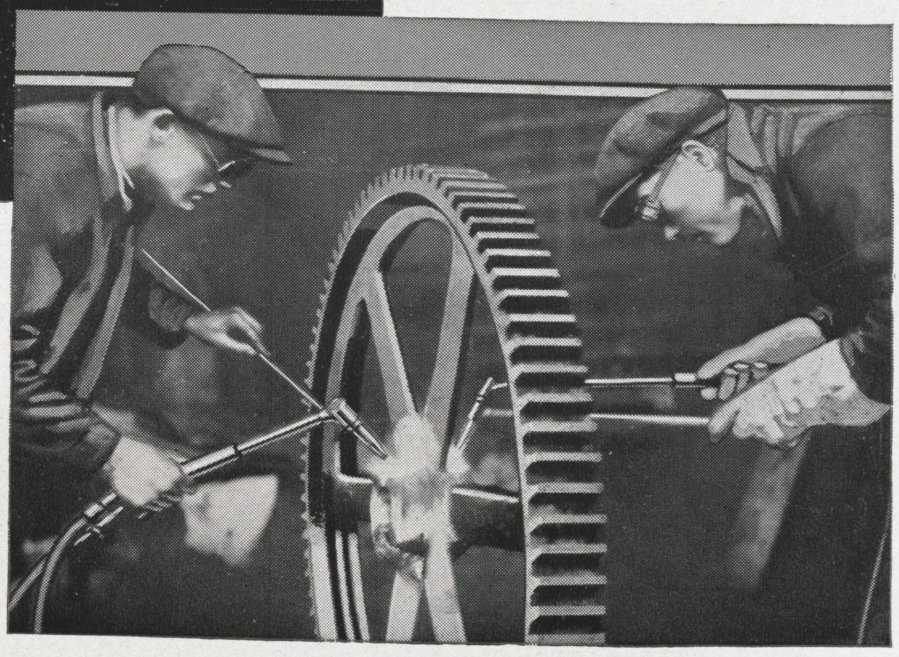
First Father—"Would you take your daughter to see a show like that?"

Second Father—"No, the chances are nine to ten she's already seen it."

Soph—"Where are you from?"
Fresh—"I'm from Providence."
Soph—"Oh, are you?"
Fresh—"No, R. I."

"That's where I shine," said the young man as he showed his blue serge suit to the tailor.—*Cornell Widow.*

THE FOE OF INDUSTRIAL WASTE ▲▲▲▲▲



MILLIONS of dollars of capital are dissipated yearly in discarded machinery and equipment. This figure would be many times as large but for the use of oxy-acetylene welding in the repair and maintenance of plant machinery. Much more can be saved by still broader application of the oxy-acetylene welding process.

The oxy-acetylene process of welding and cutting metals has many other interesting applications in the design, construction or fabrication of metal parts or structures. Tomorrow's engineers will be expected to know how to apply this modern metal-working process. Several valuable and interesting technical booklets on design and applications are available. Write us if you are interested.

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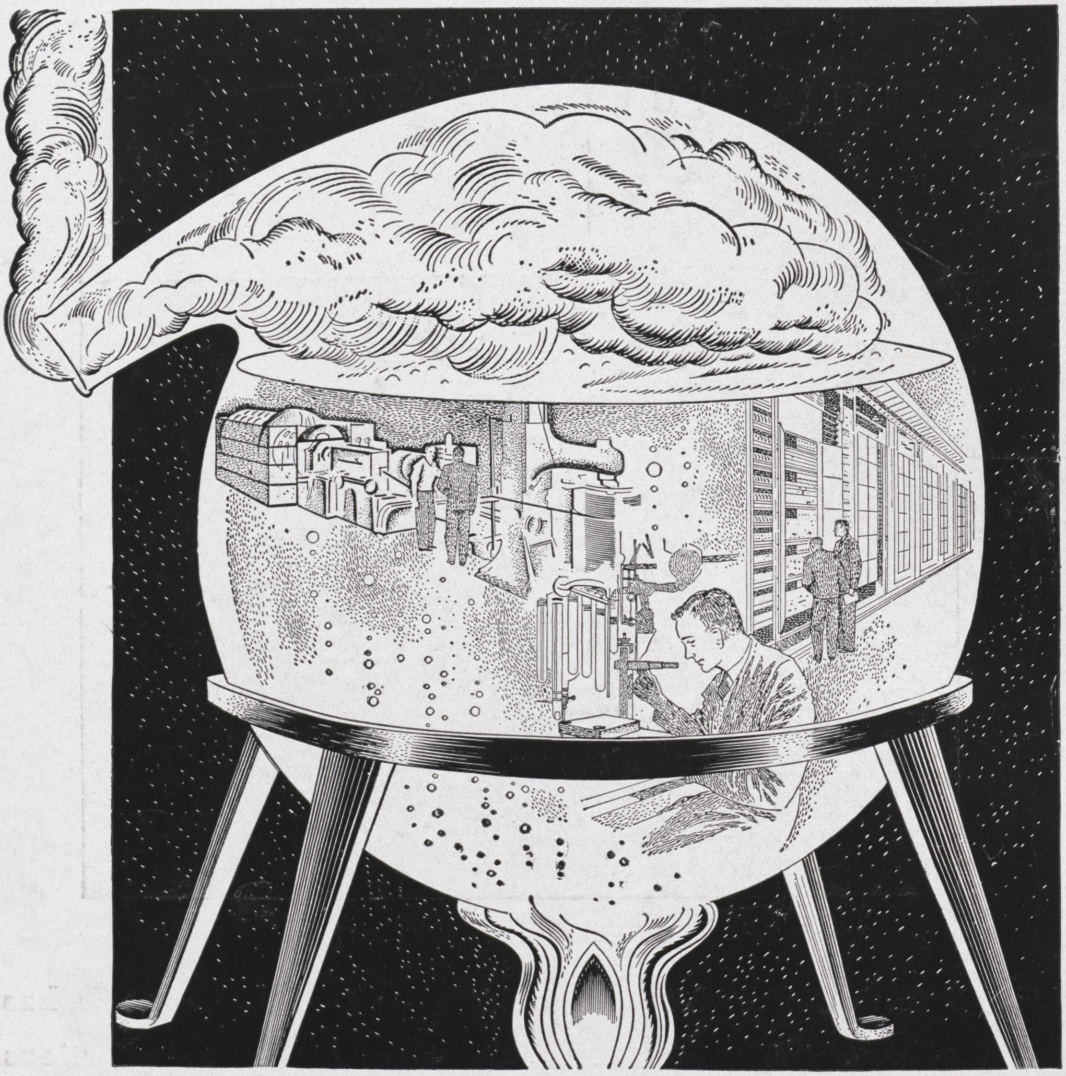

"Test it!"
the watchword of an industry

The Bell System—whose plant cost more than $4,000,000,000 and is still growing—offers wide opportunity to the man of engineering bent. Here he has ample scope for testing new ideas, not only in telephone apparatus development but also in manufacture, construction, installation, maintenance and operation.

No matter what his particular branch of engineering—electrical, mechanical, civil, industrial, chemical—his training stands him in good stead. For "telephone engineering" calls for the broad engineering point of view as well as specialization.

Basic technical knowledge, an appreciation of economic factors and the ability to cooperate are some of things that count in Bell System engineering. For men of this stamp, *the opportunity is there!*

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