ENGINEERING AND SCIENCE
Monthly

Vol. VII, No. 10 November, 1944

THE FLASH OF GENIUS DOCTRINE
Approaches the Patent Office

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ENGINEERS and scientists are rather closely associated with inventions and patents. It seems appropriate that the views of William D. Sellers should be presented to the readers of *Engineering and Science.* In many cases the interest in patents of highly trained technical men is not paramount to but incidental to and the result of their work in their particular field. As a matter of fact, the trained engineer or scientist probably is not as prolific in the procurement of patents as those who have not had as much formal training.

Charles F. Kettering of General Motors has written a very interesting article on "How Can We Develop Inventors" which appeared in "Mechanical Engineering," April, 1944. His remark about engineers in the field of invention is worth quoting.

"Some years ago a survey was made in which it was shown that if a person had an engineering or scientific education, the probability of his making an invention was only about half as great as if he did not have that specialized training.

"Now that is very interesting, and I have spent a great deal of time wondering why it is so. As a result, I have arrived at a definition of what an inventor is. An inventor is simply a fellow who doesn't take his education too seriously.

"You see, from the time a boy is six years old until he graduates from college he has to take three or four examinations a year. If he flunks once, he is out. But an inventor is almost always failing. He tries and fails maybe a thousand times. If he succeeds once, he is in. These two things are diametrically opposite.

"We often say that the biggest job we have is to teach a newly-hired boy how to fail intelligently. We have to train him to experiment over and over and to keep on trying and failing until he finally learns what will work.

"We also have to teach him that everything is not in the books. In his education he invariably gets the idea that this is so because his textbook is always the last word and final authority on whatever he is studying. If we fail to do this, sooner or later he will say, 'There is no sense trying this experiment because page 284 of this book says it won't work'."

The technical men should have a little insight into the patent picture. Mr. Sellers' article should provoke a little thought along these lines.—EDITOR.

THE recent decision by the United States Court of Appeals for the District of Columbia in the case of *Potts et al v. Coe* will give pause to all interested in the future of patents in this country. Decided January 18, 1944, and to be found at *60 U.S.P.Q. 226,* the decision was written by Justices Arnold and Miller with Justice Edgerton concurring. The influence of Justice Arnold's background stands out clearly. The doctrine of the "flash of genius" has taken a big stride toward the Patent Office.

The "flash of genius" test for invention has been received by the patent bar with irreverence, considering its high sponsorship. So long as it remained a fiction on Mt. Olympus it was not intolerable. That it would filter down to lesser courts was recognized as probable but the hope remained that it would be modified, restricted, or abandoned before the danger went too far. Proposed legislation to effect the removal of this unwelcome and unnecessary growth has been and is being discussed. The case here referred to makes it clear that the need for early action is urgent.

In the case *Potts et al v. Coe* appellant Potts brought a 4915 action in the District Court seeking the grant of a patent covering an automatic stock quotation board. The Patent Office had rejected certain of the claims as a simple combination not involving invention of ideas disclosed in the prior art. The District Court agreed with the Patent Office.

The decision of the Appellate Court, written by Judges Thurman Arnold and Miller, affirmed the decision of the lower court without a reference in the decision to the prior art structures, the Court instead relying upon an "inference" of non-invention under the circumstances. The Court stated the following:

> In this case we have before us a complicated improvement in electrical communication made by an employee of and assigned to a research group that has long dominated and raised to a new level the application of science to communication. These circumstances in the absence of evidence of individual achievement, create at least an inference that the machine is a step by step improvement, the result of skill and experimentation in the use of existing knowledge, and not an invention. That inference, which is not rebutted in the record, supports the findings of the court below that there is no invention in this case.

The inventor Potts was an employee of the Teletype Corporation and the invention was assigned to that corporation. The Court referred to public records such as the Report of the Federal Communications Commission on the Investigation of the Telephone Industry in the United States and pointed out that the Teletype Corporation is a wholly owned subsidiary of Western Electric which in turn is a manufacturing subsidiary owned and controlled by the A. T. and T. Company. The Court pointed out that the appellant was a member of the research staff of a subsidiary of the Bell System, comprising an interlocking group of companies controlled

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by A. T. and T., which dominates the telephone services in the United States and which has spent vast sums on engineering research, some $242,000,000 between 1916 and 1935. The Court also pointed out that the Bell System owns or controls some 9,000 United States patents and has licenses under nearly 7,000 more; that its research laboratories employ about 4,500 people in various scientific fields.

In considering the appellant's right to a patent on his application the Court made it clear that a mere consideration of the objective advance which the claimed invention represented over the prior art known to the Patent Office would not be sufficient. Such a consideration would not evaluate the individual achievement as required by the "flash of genius" doctrine. The Court stated the following:

> In determining whether invention has been made the character of the article or process, its novelty, and its advance over the prior art are merely evidentiary. The ultimate question is the character of the contribution made by the inventor. There is no invention without inventive genius. The objective advance does not identify or evaluate the individual achievement, ... And so the trend of the recent decisions has been to emphasize more and more the character of the individual achievement rather than the qualities of the product in determining patentability.

Recognizing that in order to determine the individual achievement it would be necessary to know the inventor's background and surroundings the Court stated:

> The burden of proof of patentability is on the applicant. Prior to the development of corporate research the circumstances under which the alleged invention was made were ordinarily not examined. The oath of the applicant was considered as a sufficient *prima facie* showing of intention provided the article itself was sufficiently novel but today where the record shows that the real party in interest is a vast research organization possessing advantages not available to the outside scientist it would be contrary to modern experience to assume that the burden of proving the presence of inventive genius has been met without evidence disclosing the level of the art in that research organization at the time the application is made. This principle simply emphasizes the importance of individual achievement which is the aim of the patent law.
>
> In order to evaluate the contribution of the inventor the court must reconstruct the conditions under which he worked, with emphasis on the contribution of others.

There appeared to be considerable doubt in the mind of the Court that patents are a suitable reward for developments by research organizations as evidenced by the following:

> In other words, patents are not intended as a reward for a highly skilled scientist who completes the final step in a technique, standing on the shoulders of others who have gone before him. By the same token they are not intended as a reward for the collective achievement of a corporate research organization.

This viewpoint was justified in the following words:

> Today routine experimentation in the great corporate laboratories can produce results beyond the imagination of 20 years ago. But such contributions to industrial art are more often than not the step by step progress of an entire group, not the achievement of an individual. Such an advance is the product not of inventive ability but of financial resources and organizing ability of those who operate the laboratories.
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> The corporate research laboratory of today has given us the greatest invention of modern times, the knowledge of how to invent. Under a disorganized system of invention a hundred men would hunt for the needle in the haystack, the prize going to the successful finder while the efforts of the others served only to scatter the hay in all directions. Organized invention has changed the entire process. Each man is given a section of the hay to search. The man who finds the needle shows no more "genius" and no more ability than the others who are searching different portions of the haystack.

The decision attempted to answer the argument that patents should be viewed as a means to protect investments in research and in the following words:

> It is sometimes argued that the investments in research by dominant corporate groups should be protected by law in order to encourage them to spend more money for research and thus extend that domination. The reading of such a principle into the patent law should require an act of Congress.

In the prosecution before the Patent Office the applicant Potts had apparently made no showing as to the advance his individual contribution represented over the personal or private prior art of his assignee. He was content to argue, as have millions of applicants before him, that his contribution represented a patentable advance over the public prior art as evidenced by the references developed by the Examiner in the Patent Office. The Court, however, found that under these circumstances, and particularly in view of the vast research organization of the assignee, that there was an "inference" that the inventor's contribution was merely a "step by step improvement" and not an invention. The "absence of evidence of individual achievement" with respect to this private prior art created this "inference" and the holding was as set forth in the paragraph first quoted in this paper.

From this decision, which is a clear case of the filtering down to the lower courts of the Supreme Court's "flash of genius" doctrine, it is clear that the Patent Office will have to change its method of handling applications if the directions of this Court are to be followed. The level of invention has now become an individual thing differing with each inventor. That which is a patentable invention for one man with one background is not at all a patentable invention for a second man with a different background. To comply with requirements of this Court, which is in the nature of an appellate tribunal as to the Patent Office by virtue of the existence of 4915 actions, the Patent Office should require, and the applicant is under a burden to provide, data showing the state of his own personal prior art at the time he made his invention. Failure to do this, at least in the case of an inventor with a large research organization, as in the instant case, gives rise to an "inference," according to the decision, that no invention is present.

Let us consider an assumed case. Inventor *A* is a poor uneducated cotton picker with no library and with no knowledge of mechanics. He invents an improved article having at the time no knowledge of the prior art. Inventor *B*, working as an engineer for a manufacturer making articles in the field of this new invention, makes the identical invention as did Inventor *A*. Admittedly the mental effort which the uneducated cotton picker displayed is more astonishing and less to be expected than that displayed by Inventor *B*. Because of Inventor *A's* lack of education and knowledge of the field relative to his invention his mental effort may be considered a "flash of genius." Inventor *B* with an engineering education, with a knowledge of his company's field, and also its private and secret files, would hardly be called a genius and his effort could hardly be called for him a "flash of genius." The net advance over the public prior art is identical in each case, however.

In the proposed case, applying the doctrine of *Potts v. Coe*, Inventor *A* would be entitled to a valid patent while Inventor *B* would not. Inventor *A* disclosed the "flash of genius" that Inventor *B* did not display. This fact remains despite the identity of the inventions and the equality of the advance over the public prior art.

If the doctrine of *Potts v. Coe* is to be recognized and given effect it is doubtful that many patents owned by corporations having research organizations are of any validity. If this doctrine is to be given effect in the

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to solve a problem by completely passive resistance, by utter resignation.

These experiments of Maier and others extend our frontiers for two reasons: They substantiate the theory that some nervous breakdowns, at least, result from psychological frustration rather than from purely physical illness. Moreover, they throw some light on the practical problems of heredity and environment by determining whether the children of neurotic rat parents are more easily disturbed than are the children of "Horatio Alger" parents. To control the environment, it is, of course, necessary to have both neurotic and normal young rats raised by neutral foster parents.

THE FUTURE OF PSYCHOLOGY

All of these studies present certain foci of emphasis which give us clues to the future development of the science of psychology. They show us the psychosomatic principle—that mind and body are a unity, that there are no mental phenomena divorced from physiological or chemical influences, and conversely that there are no body changes which are uninfluenced by mental phenomena. They give us more understanding of what the psychologist calls readjustive behavior. They show us that, whereas we bring into the world an innate pattern of reflexes and of hungers, it is possible to modify these inherited mechanisms to an enormous degree. That means that it is possible to produce either the civilized man or the criminal, the sane or the insane, the selfish or the altruistic, by varying the kinds of conditions under which the child is reared. We know now enough to prevent a considerable percentage of all the insanity and of the crime which bedevils the world, if the public is willing to apply to these problems the techniques which modern science has developed. It is not over-optomistic to state that we also know enough to prevent future wars as we learn to feed properly the fundamental hungers of individual men. Psychologists are emerging from the ivory tower of the early years of experimentation and are taking an increasing interest in problems of social control and progress. The research which they are carrying on will yield better ways of living.

The Marker Principle

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performs the following tasks in a time interval of about one-half second.

1. The marker locates the test terminals of the called line, using a "number-group-connector" circuit to accomplish this mission.
2. The called line is then tested to see if it is idle or busy, and if found to be busy, the marker orders the trunk circuit equipment to return a busy signal to the calling subscriber. This test also indicates what type of ringing current should be applied in order to signal the proper party on the line.
3. From the test terminals the marker then determines the location of the called line on the line-link frame.
4. The marker then selects a clear channel for a talking circuit from incoming trunk to the called subscriber's line, in the same manner that the originating marker set up a channel from the calling subscriber to the outgoing trunk.
5. Under control of the marker, the relay equipment in the incoming trunk circuit applies the proper type of ringing current to the called line and sends an audible ringing signal back to the calling party.
6. If the called number is that of a P.B.X. (private branch exchange) or a subscriber having more than one line, the marker will recognize this arrangement and test all of the lines associated with this subscriber's listed telephone number, testing as many as 20 simultaneously, and will select an idle one. A point of special interest here is that whereas all previous telephone switching systems required that all the lines to one subscriber be numbered consecutively to permit this "trunk hunting" feature, the crossbar system with its marker operation permits scattering the trunks of a P.B.X. group, or they may even be assigned in certain instances to a special group of numbers outside the regular 10,000 series. This scattering of trunks which have high incoming calling rates is of particular interest to the traffic engineer since it permits better balancing of the load carried through the various channels of the equipment.
7. If the number which has been called is an unassigned line, or one which has been disconnected, the marker recognizes this condition, and routes the call to a special intercepting operator.

TROUBLE INDICATOR CIRCUIT

With a system as intricate and complicated as the crossbar system, the location of the source of trouble would be a very involved process, and would cause equipment which should be working at a high call fill to be held out of service a considerable length of time unless some automatic trouble-indicating feature were included. When a marker encounters circuit trouble, it routes the call over an alternate channel and calls in a trouble indicator circuit which locates the trouble and sounds an alarm, thus permitting the repairman to get the faulty equipment back in service in a minimum length of time.

NEW TYPE RELAY

One item of equipment which has not been mentioned thus far but which contributes in a large measure to marker operation, is a new type of relay which is called the "multi-contact relay." This relay employs two magnets and two armatures, each of which operates half of the contacts. With both halves functioning together, the relay will close 60 contacts simultaneously; however, the halves may be operated separately with a maximum of 30 contacts each. Each contact is double, the end of each moving contact spring being forked with a contact on each tine of the fork. With a single contact the number of failures per thousand operations is very small, but with two contacts in parallel, the probability of failure is negligible. With this type of relay, the large number of circuits in the marker can be extended to the associated equipment almost instantaneously, permitting a high call handling capacity for each marker.

CONCLUSION

Present indications are that the marker principle is here to stay, and new applications of this type of circuit continually are being discovered. That this is not just a laboratory model, but is a commercially-proved system is evidenced by the initial installation which has been functioning in New York for several years, and other installations scattered across the United States, including two or three in the East Bay district of San Francisco. To date none has been introduced in southern California, the step-by-step system being used exclusively in this area thus far. As far as the telephone user is concerned, he places a call through a crossbar system in exactly the same way that he does through a step-by-step system, but to the telephone engineer the introduction of the marker principle represents an entirely new approach to the problem of telephone switching.

Flash of Genius Doctrine

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Patent Office then the Patent Office must institute a new type of prosecution in which each inventor-applicant is required to show his personal prior art. The ramifications of such a requirement in cases of research organizations of any size constitute a tremendous burden. A

premium would be placed upon fraud, deceit, and misrepresentation.

It is clear that the time has arrived when legislative enactments must be forthcoming which will restore the patent law to a sound position. The current judicial trend, visible from many signposts, is toward the elimination of patents as a factor in American economic life. The question of what is to be considered a patentable invention is but one of a number of questions to be considered as is indicated by the "Report of the National Patent Planning Commission" *(XXV J.P.O.S. 455)* and by the Committee Report to the Patent Law Associations of the United States, entitled "Program for the Development of American Patent Law and its Administration" *(XXVI J.P.O.S. 104)*. Whether or not a "uniform test or standard" for determining patentability, as recommended by the Commission, is possible or practical is doubtful. There is no doubt, however, but that the "flash of genius" should not be that test or standard. A statute which does no more than eradicate this cancerous misconception and which leaves to courts of original jurisdiction the determination of each case upon its merits will be a real step forward.

C. I. T. NEWS

MECHANICAL ENGINEERING LABORATORY IN PROCESS OF CONSTRUCTION

Excavation for a Mechanical Engineering Laboratory was started in September. The building covers an area of approximately 50 by 70 feet opposite the Aeronautics Building, and adjacent to the alley which comes into the campus from San Pasqual Street. The building will consist of two basements and three stories above ground, and will house a portion of the Mechanical Engineering Department equipment and offices.

The immediate necessity for this building was the result of the large amount of space required for War Project work on the campus. In addition to providing quarters for the Mechanical Engineering Department some space will be temporarily utilized by the Construction and Maintenance group of the Institute.

It is of particular interest to note that the contract for the construction of this building was awarded to Ray Gerhart, class of '13, who is a Pasadena contractor. It is hoped that this laboratory will be the first of several units to be built after the war to provide for other facilities of the engineering departments. Present plans call for the completion of the unit now under construction some time in February, 1945.

1943-44 MEMBERSHIP

Affairs of the Caltech Alumni Association are conducted on a fiscal year basis from July first to June thirtieth, each year. An item which may be of interest to the Alumni is that concerning the number of participating members for the fiscal year ending June 30, 1944.

A recent tabulation shows that there were a total of paid members amounting to 1,200 and of these 171 were fully paid Life Members. It is somewhat difficult to arrive at a figure indicating the total number eligible for membership but based on an approximation of the number, we find that about 40 per cent of those eligible, actually paid dues for the support of the Association. Insofar as information is available concerning similar associations, it appears that this is a very good record.

ATHLETICS

UNDEFEATED, untied, and unscored on, Caltech's powerful football team closed an enthusiastic, but brief, season early in October. Final exams, Commencement and vacation placed a natural limitation on the schedule.

When the coach, Chief Specialist Mason Anderson, assembled the squad at the opening practice in August, it appeared that a strong and experienced team was in the making. Soon installed in starting positions were: Don Tillman (220), Associated Student Body President at center, John Sogorka (215) and Leo Coda (160) guards, Paul Kohlhaas (211), and John Nichols (195) tackles, and Don Snyder (195) and Howard Westlake (165) ends, Ross Dana (185) and Leo Voyles (180) halves, Bill Young (197) quarter and Bill Gulley (175) full. This lineup started all games. The line averaged 194, the backs 184 and the team 194. Dana, Young, Kohlhaas and Sogorka played at Stanford, and Gulley, Snyder and Coda had junior college experience. Tillman and Nichols were Caltech students as civilians and had played in high school.

In the opening game at the Rose Bowl, Tech trampled rough-shod over the Redlands Bulldogs 67-0. Striking swiftly behind a well oiled offense, the Beavers scored their first touchdown in five plays, and rolled up a 27-0 halftime score. Tech scored at will and even the playing of reserves for more than half of the game did not retard the scoring. The Engineers rolled up 17 first downs and 405 yards, while holding the Bulldogs to three downs and 28 yards.

Leo Voyles scored three times on reverse plays, while Ross Dana, at half, and Bill Gulley at full, were consistent ground gainers.

The return game at Redlands resulted in a 39-0 Tech victory and started out as a repetition of the preceding game. The Beavers scored in the first eight minutes on a 20-yard forward pass from Gulley to Dana and a 27-0 lead was again established at half time. In the second period, Redlands opened up with their spread formation and flanker passes, and while always threatening, never were able to penetrate the Caltech 20.

Playing in the Coliseum, Tech maintained its perfect record in trouncing the U.S.C. Jayvees 20-0. The Engineers took the opening kickoff and marched 88 yards to score in the first four minutes. Ross Dana put the ball in scoring position with a 38-yard run, and Leo Voyles scored on a reverse from the three-yard line. Three plays later, Voyles raced 65 yards on another reverse to score the second time. Final tally came in the third quarter when Bill Gulley plunged from the three-yard line, after a 56-yard march.

In the final game, Tech handed U.C.L.A. Bruin Jayvees a 33-0 defeat in the Rose Bowl. Sparked by Ross Dana, who crossed opponent territory twice, and was on the tossing end of another score, and Bill Gulley, whose deft aerials and runs set up three tallies, the Engineers tallied in every quarter but the third. When the final gun popped, the winners had marked up a total of 20 first downs against a mere four for the JV's.

Forty-five men were retained on the squad all season, and practically all men were used in all games. The starting lineup, however, was seldom used more than half of any one game.

Thus ended the season for the greatest football team in Caltech history. Coach Anderson produced a smooth and well drilled team, which was tops in all departments. The diversified attack and the precision in execution made it one of the most interesting of all Caltech football teams.