Columbia Broadcasting Sys. v. Sylvania Electric Prod.

United States District Court, D. Massachusetts

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OPINION

CAFFREY, District Judge.

This is a civil action for alleged infringement of three patents relating to color television picture tubes, namely, Fyler and Rowe Patent No. 2,690,518, and two Giuffrida Patents, Nos. 3,179,836 and 3,222,172. At issue herein as to all three patents are both validity and infringement.

1. *The Fyler and Rowe '518 Patent*.

This patent concerns itself with a mechanical feature of a color television picture tube called a shadow mask. The evidence indicates that eventually, in the slow development of the color picture tube, different colors were produced by utilizing three electronic beams emanating from the narrow part, or neck, of the tube directed toward a glass plate or screen near the exterior surface of the tube on which were placed hundreds of trios of phosphor dots. Each trio consisted respectively of a red, a green, and a blue phosphor dot, and each dot would give off light of the named color when activated or struck by an electronic beam.

As early as 1938 it was suggested that the accuracy of the impingement of the electronic beam on the proper-colored phospor dot be controlled by placing between the source of the electronic beam and the phosphor dots a masking device, or selective barrier of some sort, so aligned as to prevent the electronic beam from impinging on a dot of an unwanted color, i.e., the masking device or selective shield was to be constructed with holes so positioned that the electronic beam or gun which was intended to activate red phosphor dots would hit or impinge upon only red phosphor dots. Other holes were placed in the mask so as to hopefully insure that the electronic gun designed to activate the blue phosphor dots would impinge only upon

470 the blue *470 phosphor dots, and likewise as to the green dots.

Radio Corporation of America (RCA), a pioneer in the field of developing commercially acceptable and marketable color television, first developed a color picture tube which contained as the shadow mask (as these shields are now called), a flat metal plate with hundreds of holes, which plate was tightly secured to a large heavy steel frame. Immediately behind this flat metal plate was a flat glass plate, or screen, bearing trios of phosphor dots. The phosphor dots and the tiny holes on the metal plate were so positioned with respect to one another that the holes effectively prevented the beam from any of the three electronic guns from activating a dot of the wrong color. Experience soon established, however, that a high percentage of the electronic energy from the electronic beams struck and, therefore, heated, the metallic shadow mask. Because of the well-known fact that metal expands when heated, the heating of the flat metallic plate carried with it enough lateral movement of the tiny holes to cause a misalignment between the holes and the phosphor dots. This misalignment, or "lack of registry," as it is called in the jargon of the industry, caused the production of undesirable colors, smears of colors, etc. RCA attempted to circumvent this difficulty by pre-heating the metallic screen prior to its being secured to the frame and then clamping it under tension to the frame while in a hot and expanded condition. This attempted solution did not prove to be commercially feasible. Among its drawbacks were the difficulty and high expense of manufacture, lack of brightness, and a tendency still to misregister when overheated. Fyler and Rowe, the coinventors, conceived the idea that if the shadow mask could be constructed as a segment of a sphere it would not have to be preheated and thus could be mounted free of tension. This, in turn, made it possible that when heated, and being spherical, it would expand radially rather than laterally as its temperature rose from the impingement thereon of the stream of electrons from the three guns in the neck of the tube. Stating the effect differently, the expansion of the curved shadow mask would be along the axis of the electronic beams rather than across the axis of the beams, as was the expansion movement due to heating when the holes were located on a flat

metallic screen or shadow mask.

The effect of changing the movement of the holes from lateral to radial was to eliminate any significant disturbance of the alignment between the holes and the phosphor dots. This, in turn, maintained a desirable and commercially acceptable level of registry. Other side products of this redesign of the tube interior were the elimination of the massive frame, high tension, and heavy glass plate which had previously been used as the location of the phosphor dots. It made it possible to deposit the phosphor dots on the spherical glass surface of the face plate of the tube itself, thus producing a relatively larger picture from a given size tube than had been produced when the phosphor dots were located on the glass plate well inside the shell of the tube.

To obviate any possibility that the serious difficulties and the substantial amounts of money and years of time invested by the electronics industry in the development of a commercially acceptable color television picture tube may be understated by the foregoing portion of this opinion, which states in rather general and non-technical language the nature of this controversy and the difficulties sought to be solved by this patent, I now recite herein, and accept as factual, Paragraphs 19 through 59 of the Pre-Trial Stipulation filed by the parties. In so doing I have in mind the criteria set forth by the Supreme Court in Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1965), particularly the considerations recited by the Court at pages 17-19 with regard to "obviousness," the various ramifications thereof and tests therefor. I also have in in mind the
471 observation of the Court of *471 Appeals for this Circuit in Colourpicture Publishers, Inc. v. Mike Roberts Color Productions, 394 F.2d 431, at p. 434 (1st Cir. 1968):

> "`[C]ourts, made up of laymen as they must be, are likely either to underrate or overrate, the difficulties in making new and profitable discoveries in fields with which they cannot be familiar * * *.' * * * A layman can be beguiled into finding a device `obvious' just because it appears so simple when the deed has been done."

COLOR TV HISTORY (In Part)

19. Public broadcasting of television, as of radio, is lawful only when carried on under license of the Federal Communications Commission and in accordance with its prescribed ″standards.″ Those standards for each broadcasting service result in a single uniform type of electrical signal which home receivers are designed to receive but do not make reference to the design of the reproduction device, as in television, the picture tube per se.

20. Broadcasting of monochrome television pictures, commonly called ″black-and-white″, was authorized in 1946 based on development over a number of years, during which there was effort also on color television, along several lines, but without yielding an acceptable system at that time. In 1949, in the light of the situation as it then saw it, the FCC called for proposals of standards for a color television system.

21. An acceptable color television system required development in the several departments of the system including the viewing camera, the transmitter circuitry, the receiver circuitry and the picture tube at the receiving end.

22. CBS and RCA were early proponents of color TV systems, which were demonstrated to the FCC in November, 1949 along with others. The CBS system was publicly demonstrated in November, 1950 and was adopted by the FCC as the national standard, to become effective November 20, 1950. It remained the single standard until December, 1953.

23. That CBS system, called a ″field sequential″ system, used a monochrome picture tube at the receiver with an added rotating disc in front of the tube through which the tube was viewed. The disc was made up of red, green and blue filters forming sectors of the disc whose passage in sequence in front of the tube was timed to coincide with the reception of red, green and blue ″fields″ in rapid sequence, giving the viewer the sensation of seeing the three colors at once. This gave an acceptable color picture but had the disadvantage of not being ″compatible″, meaning that, without an adapter, the several millions of existing conventional receivers could not receive in

black-and-white the field-sequential picture sent out for reception in color, and that a set equipped for color reception by this system had to have added parts to enable it to receive in black-and-white the conventional black-and-white picture. Hence, two standards were required, one for color and one for black-and-white.

24. This disadvantage of the "field sequential" system had led others to work on a system which would be compatible, enabling the owner of a color set to receive either a broadcast in color or a conventional broadcast in black-and-white, and enabling the existing black-and-white receivers to receive the color program in black-and-white. RCA had demonstrated such a compatible system, called "dot sequential", in 1946, but it utilized three picture tubes, one for each color, with mirrors to combine the three images into one picture seen by the viewer. This system was demonstrated to the FCC in November, 1949, along with the CBS system, and was inferior for reasons which more than offset its advantage of compatibility.

25. In September, 1949, in recognition of this, RCA had started an intense effort to develop an all-electronic system using a single color picture tube, with appropriate receiver circuitry to replace its three-tubes-plus-mirrors
472 arrangement *472 and thereby to gain FCC approval. It undertook five different ways of producing a color picture. None of these approaches was basically new. Two of them employed for color selection a shadow mask tube, one in a three-gun version and another in a one-gun version; and others employed different systems of effecting a color selection as among variously arrayed tri-color phosphors.

26. On March 29, 1950, at a press conference attended by representatives of the television industry, RCA demonstrated receivers having a single shadow-mask tube, in both three-gun and one-gun versions. This was the first public demonstration of an all electronic system (no mirrors, no rotating disc) using single tri-color tubes. In the tubes, the tri-color phosphors were arrayed as triads of dots in a screen formed on a flat glass plate mounted inside the tube near the viewing end and the mask was a flat sheet of perforated metal held parallel to the screen and under tension in a

surrounding frame. The parallel screen and tensioned shadow mask, sometimes called the ″planar″ or ″drum-head″ arrangement, was similar to that described in RCA's patent 2,625,734 of H.B. Law, granted January 20, 1953, on an application of April 28, 1950. This demonstration was repeated for the FCC on April 6, 1950 and marked the beginning in public of the RCA effort to gain FCC approval of a compatible dot-sequential system in place of the CBS field-sequential system. The planar or drumhead shadow-mask tube was capable of use in either system.

27. This effort by RCA was supported by two groups. First, the ″Condon Committee″ set up by the Bureau of Standards came out on July 10, 1950 in favor of an all-electronic, dot-sequential system. Second, in November, 1950, an industry committee, called the National Television Systems Committee (NTSC), was set up to investigate the various systems, and on June 1, 1951, it announced a new ″composite″ system of the compatible, all-electronic type which combined the best of several earlier proposals of that type and which it proposed to test in the field. The RCA shadow-mask tube as well as certain other proposed picture tubes were suitable for use with the NTSC system. In the same month, the FCC published criteria and procedures for proposals of new standards for color TV. Field tests by the NTSC and demonstrations by RCA took place at intervals during the latter half of 1951 and through 1952, involving various specific alternatives. All employed the RCA shadow-mask tube of the ″planar″ configuration.

28. Meanwhile, several factors delayed the advent of color TV broadcasting on any substantial scale despite the adoption in October, 1950, of the CBS system as a national standard. RCA initiated proceedings against the action of the FCC in adopting that system. In November, 1950, after an unsuccessful attempt to get the FCC to stay action in order to permit a demonstration of the RCA system, RCA obtained a court order restraining the FCC from proceeding with its adopted standards. That continued until set aside by the Supreme Court in May, 1951 (Radio Corp. of America v. United States, 341 U.S. 412, 71 S.Ct. 806, 95 L.Ed. 1062). Further, there was a ″freeze″ by the FCC of the grant of permits for new TV stations; and until

mid-1953, because of the Korean War, there were severe restrictions on the manufacture of TV equipment.

29. In January, 1953, based on its investigation and tests of various sets of signal specifications and related transmitter and receiver techniques and values for its "composite" system of the "simultaneous" type, the NTSC adopted a single set of specifications; and in May, 1953, it conducted formal tests of the particular system thus crystallized. By the mid-part of 1953, it was rather generally taken that that NTSC system would be accepted as a new national standard.

30. In December, 1953, the FCC adopted the NTSC system on an application
473 to that end filed by the NTSC in *473 July, 1953. RCA had amended its somewhat earlier proposed specifications to conform to those of the NTSC, and several other companies had filed petitions in mid-1953 for adoption of the NTSC system and its specifications, viz., Philco, General Electric, Motorola and Sylvania. On September 8, 1953, CBS had filed a like petition, urging prompt adoption of the NTSC system.

31. In the period 1951-1953, the picture tubes used in public tests and demonstrations were mostly of the shadow-mask type, and tube manufacturers, including the parties here, worked on that tube. Other styles of tubes adapted to the NTSC system were being investigated and developed as alternatives. Examples of the other styles of tube were, first, the "Apple" or index tube on which Philco Corporation spent great effort over several years, with interchange of some findings with the defendant Sylvania; and, second the "Lawrence" or "Chromatic" tube devised by Dr. Ernest O. Lawrence and advocated by Chromatic Television, Inc. Among others engaged in developmental work on the Lawrence tube were CBS Laboratories and Sylvania. No commercially acceptable form of the Apple or Lawrence tubes was developed by the end of 1953.

32. In June 1951, RCA made available to its licensees sample shadow-mask tubes and tube parts and offered additional sample tubes for developmental purposes. In July, 1953, RCA held a symposium to provide information on an

improved shadow-mask tube and tube manufacturers, including the parties to this suit, were shown the RCA "drum-head" shadow-mask tube which was put in pilot production in August 1953. By February 1954, RCA was producing such tubes at a rate of some 2000 tubes a month. This activity of RCA in 1953 had been in anticipation of the action of the FCC in December 1953 by which the NTSC system was approved.

33. Broadcasting of color programs, which had previously been on an experimental basis, began in a limited way early in 1954. However, color television was slow in achieving public acceptance. Both the retail price of receivers and the cost of live color programs were much higher than for black-and-white; and in the early years after 1953 few color programs were sponsored because of their high cost and the small audience. It was not until 1963-1965 that the "hen-and-egg" cycle (prospective receiver purchasers waiting for broadcasts which awaited sponsors who awaited receiver purchasers to provide an audience) became unblocked and color TV came into its own.

VIII *Events at CBS-Hytron 1951-1955 (In Part)*

34. In mid-1951, CBS acquired Hytron Radio and Electronics Company, a manufacturer of semiconductor products, electron tubes of the receiving type and black-and-white television picture tubes. The Hytron Company became the CBS-Hytron Division of CBS.

35. Prior to June of 1951, Mr. Marshall Wilder was engaged in the making of experimental color television picture tubes at CBS Laboratories in New York. From June to July 1951, Messrs. Perry and Harcher of CBS-Hytron were at CBS Laboratories to work with Wilder, particularly in the making of phosphor screens by a photographic contact method. On August 15, 1951, within CBS, Perry proposed the making of a phosphor screen by the photographic method of projecting light through the aperture mask to be used in the picture tube.

36. In October of 1951, the patentee Rowe was engaged by CBS-Hytron on a consultant basis, because of his knowledge of photographic processes used

in photoengraving, to work on various photographic methods of manufacturing phosphor screens for television picture tubes. On December 1, 1951 the patentee Rowe became a full-time employee of CBS-Hytron to continue his work on color television picture tube screens with Mr. Perry and others. Ultimately, Messrs. Perry and Rowe developed the technique which became the subject matter of their patent No. 3,080,231, application
474 *474 for which was filed October 20, 1953.

37. During April, 1953, a photoresist process was used for the first time at CBS-Hytron to form a tri-color screen on the spherical inner face of a color TV tube; and CBS-Hytron obtained a shadow mask of Foto Form glass, which CBS-Hytron formed into a spherical shape and mounted in a tube in which the screen was so formed. The first TV color picture tube so made by CBS-Hytron was tested on and after May 5, 1953 and, as to mask material and mounting for a curved mask, that was the only construction of tube built prior to June 1, 1953.

38. On April 17, 1953, Dr. Frank Stanton, President of CBS, sent to an executive group within CBS, including Messrs. Bruce Coffin and Lloyd Coffin of CBS-Hytron, the then confidential memorandum identified as production document 9-1394 to 9-1399 (here incorporated by reference as Stipulation Exhibit 3).

39. CBS-Hytron announced at a press conference on October 5, 1953, its "Colortron" color TV tube which it was preparing to manufacture and which it described in part at that conference, including the fact that the tri-color screen was deposited on the curved inner face of the tube by a photoresist process, and had a curved shadow mask of metal mounted within the tube in the manner described in the publication and Toronto speech identified in paragraph 15 above.

40. In 1957, CBS terminated the color TV operations of CBS-Electronics and in 1961 it terminated all operations of CBS-Electronics.

IX. *Events at RCA, 1950-1954 (In Part)*

41. RCA began a research and development program relating to color television at least as early as 1940 in which year a crude all-electronic reception of color television was demonstrated to the Federal Communications Commission at Camden, New Jersey. The project was discontinued during the war years. In October of 1946 RCA demonstrated an all-electronic projection type color television receiver at Princeton, New Jersey, using a separate tube for each color and a system of mirrors for combining the three color images. In August 1949 RCA announced a system of all electronic high definition color television in which the receiver, still using a separate tube for each color and the mirrors, was capable of receiving programs transmitted in black and white as well as in color.

42. The brochure published by RCA in December 1955 and entitled ″Color Television″ (here incorporated by reference as Stipulation Exhibit 4) is a correct statement of facts as far as it goes. It is understood that its statement at page 12 that soon after March 1950 the three-gun color tube was ″in quantity production at the RCA tube plant in Lancaster, Pennsylvania″ means that that tube was being produced in a quantity sufficient to meet RCA′s needs for internal and public tests and demonstrations and is to be taken in the light of the statement at page 15 that a pilot production line was established in 1953 at that tube plant.

43. The first marketed color television picture tube was RCA′s 15″ planar mask tube, number 15GP22, described in a brochure dated July 15, 1953 (plaintiff′s Exhibit 17). This was an improved version of a tube identified as developmental type C 73293-C and described in a brochure (plaintiff′s Exhibit 16) published by RCA in June of 1951.

44. The next tube to be announced by RCA, on January 21, 1954, was a 19″ version of the planar mask type of tube (see plaintiff′s Exhibit 18) entitled ″Symposium on RCA Developmental Large Picture Tri-Color Kinescope″, C 73629. RCA then planned to be in commercial production of this tube at the rate of some 2,000 tubes per month by the end of 1954. In February of 1954 RCA was producing approximately 2,000 tubes per month of the 15GP22 type. *475

45. After the public announcement by CBS-Hytron on October 5, 1953 of its 15″ Colortron tube, and as a reaction to that announcement, RCA by about October 10, 1953 made a makeshift tri-color tube with the phosphor screen deposited by a photoresist process on the inner spherical face plate of the tube and with a spherically curved metal shadow mask. This tube worked but there was poor color rendition in parts of the screen. This was done at the Lancaster, Pennsylvania, plant of the RCA Tube Division. Also, on October 10, 1953, A.C. Grimm of RCA prepared a report entitled ″Preliminary Study of the CBS-Colortron Tube″ which is here incorporated by reference (see Moodey Deposition Exhibit 3, part of Plaintiff's Exhibit 28) and is a correct statement of the information and conclusions of the interested RCA group at its Lancaster tube plant at that date. By intense effort of a number of people, another tube of the same configuration and mode of screen formation was made and was tested on October 19, 1953. These tubes encouraged RCA to undertake further work, and it embarked upon a ″crash program″ to develop a 21″ all glass tube in which the phosphor screen and shadow mask were substantially spherical in shape but of rectangular outline as contrasted with the circular outline of the screen and mask in the tube announced by CBS and the tube tested on October 19, 1953.

46. Before October, 1953, RCA had gained knowledge of photoresist techniques for forming tri-color phosphor screens on the curved inner faceplate of a tube, as a result of a conception of such a technique by its employee H.B. Law, in November 1948, and some limited experimental work with that technique by others within RCA from time to time during the intervening years. The subject was given a relatively low priority and an objective given high priority concerning the shadow mask tube was one, not achieved, of getting ″interchangeability″, i.e. an ability in production to use any of a number of masks with any of a number of screens, rather than to match each individual mask and screen. The opinion in Radio Corporation of America v. Philco Corporation, 275 F. Supp. 172 (D.C.N.J. 1967) deals with this subject.

47. Also, in February 1950, Miss Hannah C. Moodey of the RCA group at

Lancaster had had the idea of a curved shadow mask for a tri-color television picture tube in which the phosphor screen was to be formed on the curved inner face of the tube by one or another photographic process including the projection photoresist technique; but prior to October 1953 RCA had done no work with such a curved mask or with its mounting in such a tube, and had not before made such a tube.

48. Moodey Deposition Exhibits 3 through 22 and 28 through 34, part of Plaintiff's Exhibit 28 herein, are correct records of work done at RCA in the period October through December of 1953 on color television tubes.

49. On January 21, 1954, RCA demonstrated to its licensees a 19-inch round tube having the planar configuration of screen and mask as in its earlier 15-inch tube, the 15GP 22, which it had similarly demonstrated to its licensees in mid-1953. The RCA plan then was that the 19-inch tube would largely replace the 15-inch tube; and the word was that it was then producing around 2,000 tubes a month.

50. In March, 1954, at a symposium for its receiving set licensees, RCA emphasized its 19-inch tube referred to above, and announced that production of it would come in the latter part of the year. It stated, however, that although it would take orders for these tubes, and was producing 2,000 tubes a month, it would not stockpile either the 15-inch or 19-inch tube.

51. In May, 1954, RCA announced that it would no longer take orders for either the 15-inch or the 19-inch tube; an event which marked its
476 discontinuance of shadow-mask tubes of the planar configuration. *476

52. On July 16, 1954, RCA announced, by a letter "To All Equipment Manufacturers" (Plaintiff's Exhibit 22) that it would have and would demonstrate in September a 21-inch shadow-mask color TV tube, corresponding to the popular size of black-and-white tube.

53. On September 15 and 16, 1954, RCA demonstrated the 21-inch round shadow-mask tube to its licensees, as described in a document (Plaintiff's Exhibit 27) entitled "Symposium and Demonstration of RCA 21-inch Color

Tube, Simplified Color Receiving Circuitry, and Color Equalizer". This was the first RCA tube, commercially produced and sold, that had the phosphor screen on the inner tube face and curved shadow mask and, with modification from time to time, was the tube principally sold for a number of years. The construction illustrated at page 25 of the above document included "thermal compensating tabs", sometimes called hinges, and leaf springs by which the frame surrounding the mask was attached to the tube wall. In the latter part of 1955, RCA discontinued the use of such tabs.

X. *Events at Sylvania — 1950-1956*

54. In August, 1950, Sylvania submitted to Hytron, the predecessor company of the plaintiff's division, CBS-Hytron, a license proposal calling for a royalty rate of ½ of 1% of the selling price of tubes using any one of several patents in Sylvania's portfolio.

55. In 1951 Sylvania brought suit in the U.S. District Court in Illinois against National Video Corporation for infringement of the Bowie Ion-Trap patents. In March of 1953 Sylvania wrote to CBS-Hytron suggesting a resumption of the discussion of the proposed license, enclosing a list of its licensees, which list included several of the larger manufacturers of black-and-white television picture tubes. A response was made by CBS-Hytron in May of 1953 suggesting that the negotiations be deferred pending the outcome of Sylvania's suit against National Video. This suggestion was neither accepted or rejected by Sylvania, but additional patents were cited for consideration by CBS-Hytron. In July of 1954, the Court in Chicago found the Bowie patents of Sylvania to be valid and infringed by National Video. Sylvania immediately apprised CBS-Hytron of the decision and pressed CBS-Hytron to resume negotiations for a license.

56. A meeting was arranged between officers of Sylvania and CBS-Hytron at which time CBS-Hytron proposed that the decision on a license be deferred until the expected appeal in the National Video case was decided, at which time, if Sylvania won the appeal, CBS-Hytron would sign the license and pay to Sylvania back royalties. Sylvania accepted the proposal.

57. The expected appeal by National Video from the decision against it in Chicago never materialized, because Sylvania and National Video had settled. Accordingly, the Sylvania-CBS-Hytron Agreement based on the outcome of the appeal became a nullity.

58. At the meeting, which took place on August 24, 1954, Mr. Zimmer, President of Sylvania, brought up the possibility of Sylvania's taking a license under patents expected to be issued to CBS-Hytron on color television picture tubes. On February 21, 1956, a cross-license (Plaintiff's Exhibit 24) was executed between Sylvania and CBS-Hytron. That license expired December 31, 1959.

XI. *Sylvania's Color Tube History*

59. Sylvania conducted more or less continuous experimentation in color tubes from as early as 1950, at its laboratories at Bayside, and after April 1953 at its picture tube plant at Seneca Falls. Before October 1953 its major efforts were in connection with the RCA drumhead shadow mask tube, the Philco "Apple" tube and the Lawrence tube, together with the work of Levy and Levine described in their publication of September 1953 that is
477 Defendant's Exhibit O herein and the work described in Levine *477 Patent No. 2,840,470 that is Plaintiff's Exhibit 31 herein. (End of stipulation.)

In the light of the above-recited state of the television industry's attempt to invent, develop, and mass-produce a profitably-marketable tube for color TV, I think it is highly significant that Richard Orth, RCA's vice-president in charge of all picture tube activity, testified that between the years 1950 and 1953 RCA spent "many millions of dollars" *without* producing a commercially satisfactory color picture tube. Four of the senior television scientists from RCA — Orth, Grimm, Moodey and Law — all of whom had been working for some time in the field of color picture tube development, were deeply and favorably impressed by the contribution made by Fyler and Rowe when they learned of it. More significantly, the RCA corporation graphically demonstrated its opinion of the Fyler and Rowe patent by paying CBS over a million dollars for licenses under it and switching its entire production of

color television tubes to the patented spherical screen — untensioned spherical mask tube — which it continues to manufacture to the present time. It is also significant that the plaintiff has licensed Amperex Electronics Corporation and six Japanese television manufacturers, and at one time had a four-year reciprocal license agreement for this tube with the defendant.

The testimony of John Van Dyne, of Westinghouse Electric Corporation, proves that that company also was so impressed by the contribution of this patent that it switched its production of this type tube because of the improved customer acceptance resultant therefrom. Finally, W.H. Lamb, color tube manager of defendant itself, reported with reference to the development of the Fyler and Rowe tube, "We all agree this is a very desirable advance in the state of the art and in the long run will probably be the method of making color tubes as long as an aperture mask is used." (Ex. 34)

I rule that the Fyler and Rowe patent is valid. It embodies invention and it was far from obvious to those skilled in the art. In so ruling, I have in mind the very substantial, if not gigantic, expenditures made unsuccessfully by other manufacturers seeking to develop a commercially marketable color picture tube, and, of course, I have in mind the number of licenses taken by plaintiff's competitors, the various testimonials of scientists employed by the competition which are part of the record in this case, as well as the statement of Sylvania's general counsel as to the reasons why defendant took the four-year license under Fyler and Rowe, "(CBS) has one patent which we infringe in making either the round or rectangular tube."

I rule that defendant's attempt to show that the Fyler and Rowe patent was anticipated by the prior art is not factual and lacks legal merit. An examination of the evidence relative to the works of Kaplan, Avins, and Lawrence, the three publications in the prior art principally relied on by the defendant as proving anticipation because they were not cited to the Patent Examiner, demonstrates that these articles do not, either alone or in combination, anticipate the claims in suit.

The Kaplan article discussing parallax barrier geometry cannot be said to clearly disclose the use of a spherical mask in conjunction with a spherical screen on which are placed trios of phosphor dots. In so ruling I accept the expert opinion of Professor Truman S. Gray, Professor of Engineering Electronics in the Department of Electrical Engineering at the Massachusetts Institute of Technology, a specialist in the field of electronics with a wide range of experience in electrical engineering. I accept Professor Gray's observation with reference to Kaplan:

> "The whole of the test is in the language of stereoscopic imagery * * I feel he leaves the reader in a very doubtful position so far as going
478 *478 ahead to design a practical color television tube."

Still further, on cross-examination, Professor Gray observed with reference to Kaplan:

> "The question is what are the shapes of the elements in three dimensions. I don't think he teaches or tells you that."

In view of Professor Gray's high degree of expertise and extensive experience in the field of electronics, and the fact that this Kaplan paper had little, if any, meaning to a man of his learning, I draw the inference that nothing contained in Kaplan would have been obvious to a person having *ordinary* skill in the art.

With further reference to Kaplan, it should be noted that defendant's expert, Mr. Glen A. Burdick, manager of color tube design and development for Sylvania Electric Products, Inc., testified on direct examination that the Kaplan article recommended the use of a spherical shadow mask. However, on cross-examination (R.423), Mr. Burdick testified with further reference to the Kaplan article, "I don't find anything in that section to back up my answer and I will retract it."

Perhaps the most significant proof of the lack of contribution of the Kaplan paper which defendant is trying to torture into anticipation is the fact that Kaplan himself, about a year after the publication of the paper in question,

filed a patent application (Ex. 32), Figure 1 of which shows a color tube utilizing a flat phosphor screen and a drumhead parallax mask or grid structure. Nowhere in this patent did Kaplan suggest utilization of either a spherical mask or a spherical screen.

The contention that Avins' Patent '568 (Ex. A) anticipated Fyler is put to rest by the following testimony of defendant's own expert, Mr. Burdick (R. 420):

> Q. You will agree, I am sure, that this patent has to do with circuitry?

A. Yes, it does.

> Q. Does it teach anything about construction of a picture tube?

A. No, it does not.

Mr. Burdick also conceded that the Lawrence patent (Ex. A), which defendant claims anticipated the invention herein, involves the use of pretensioned wires as a shadow mask, these wires being pre-stressed for the same purpose that a planar mask is pretensioned. This patent does not anticipate the claims in issue here and it also lacks the use of a phosphor screen on the face plate. I am also persuaded that neither Hansen '448 nor Schroeder '548 (Ex. A) anticipated Fyler '518.

With regard to defendant's contention that the Fyler patent must be declared void because of an alleged non-compliance with the provisions of 35 U.S.C.A. sec. 112, I rule that this contention is not supported by the credible evidence and I find, on the basis of defendant's Exhibit O, the July 1953 issue of the Sylvania Technologist; Exhibit 31, an application for patent filed by Levine on September 27, 1951; Exhibit 3, the deposition of Hannah C. Moodey; and Paragraph 46 of the Pre-Trial Stipulation, that it was generally known in the trade prior to October of 1953 how to utilize photoresist techniques for forming tri-color phospor screens on a curved inner surface of a tube. I find that Fyler patent '518 contains a specification of its

invention, and of the manner and process of making and using it, adequate to enable any person skilled in the art to make and use a practical and workable embodiment thereof within the requirements of 35 U.S.C.A. sec. 112.

On the question of infringement by defendant of Fyler patent '518, in addition to the statement of Sylvania's general counsel quoted (p. 24, supra, from Ex.C), it is clear that each and every element of Claim 7 of this patent reads upon plaintiff's Exhibit 7, a typical Sylvania color television picture tube, as Dr. Law testified. I accept his testimony and I rule that plaintiff's
479 patent is infringed by defendant's product. Cf. *479 Foster Metal Products, Inc. v. Jacoby-Bender, Inc., 255 F.2d 869 (1st Cir., 1959).

2. *The Giuffrida Patents '836 and '172*

These patents are concerned with the interior construction of the color television tube and, more particularly, with compensating for the effect of the vertical component of the earth's magnetic field which operates to deflect downwardly a horizontal stream of electrons. At the trial Professor Gray demonstrated rather graphically by the use of a cathode ray tube set up so as to emit a visible green stream of electrons that if some action is not taken by the manufacturer the magnetic pull of the earth's magnetic field will produce some misregistry by reason of its causing a deviation in the flow of the electronic beam. Early attempts to compensate for this had consisted, for the most part, of using magnetic shields, or coils, which proved to be expensive and difficult to manufacture. Giuffrida's invention consisted in computing mathematically the amount of electronic beam deflection caused by the earth's magnetic field in the Northern hemisphere, and using this information to compute a degree of physical misalignment for the location of the electronic beam source which would cancel out the effect of the vertical component of the earth's magnetic field. It is significant, but not controlling, that the Giuffrida patents here in suit have survived an interference in the Patent Office and the United States Court of Customs and Patent Appeal with an application of RCA.

I rule that the Giuffrida patents were not obvious to one skilled in the art. The paper prior art sought to be relied on by defendant as anticipating Giuffrida, I find, is remote from and non-suggestive of Giuffrida's invention. Sanford '620, for example, is aimed at eliminating the risk of electrocution inherent in the high voltages inside a television picture tube, and describes a method for making an adjustment for misregistry from outside the tube. It does not mention the earth's magnetic field at all. Epstein '276 and Hansen '448 likewise fail to mention the earth's magnetic field.

Nothing adduced at the trial, either in the prior art or in the use of shields or magnets, suggests Giuffrida's concededly simple but nevertheless ingenious and cost-free solution of the problem of correcting electronic beam deflection caused by the earth's magnetic field, which I rule goes far beyond the "mere improvement in result," referred to by Judge Woodbury in Hanovia Chemical Mfg. Co. v. David Buttrick Co., 127 F.2d 888, 894 (1st Cir. 1942).

It has been conceded by defendant (Tr. p. 408) that Giuffrida is infringed by certain of defendant's tubes.

An order will be entered that all three patents in suit are valid and infringed
487 by defendant. *487

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