
1964

Nov. 16-20, 23-27, 30, Dec. 1-4, 7-9

1965

Feb. 18

BETWEEN:

TRAVER INVESTMENTS INC. (formerly known as Traver Corporation) AND E. I. DUPONT DE NEMOURS AND COMPANY ..... PLAINTIFFS;

AND

UNION CARBIDE AND CARBON CORPORATION AND CELANESE CORPORATION OF AMERICA .. } DEFENDANTS.

Patents—Conflict proceedings—Limitation of effect of judgment in conflict action—Validity of claims in patent issued as result of conflict proceedings—Scope of conflict action—What constitutes the invention—Determination of first inventor—No adjudication on patent application not put in conflict by Commissioner of Patents—Disclosure of invention—Priority of invention—Principles relating to determination of meaning of inventor and in considering claims of patent application—Interpretation of the meaning of the claims in conflict—Effect of disclosing more than was invented—Effect of claiming more than was invented—Lack of knowledge of inventor of matters in specification of patent—Failure of inventor to act uberrimae fidei in his application for patent—Application of doctrine of substance and mechanical equivalence—

Restriction to claims of successful party in conflict proceedings—Conflict proceedings in this Court not alternative to having claims put in conflict by Commissioner of Patents—Patent Act, R.S.C. 1952, c. 203, ss. 28, 36 and 45(5), (7) and (8).

This is a conflict proceeding brought pursuant to s. 45(8) of the *Patent Act*, to determine the respective rights of the parties on their applications for patents related to a method and apparatus to treat polyethylene film to make its surface ink adherent. The patent applications in issue are the applications of Traver Investments Inc. No. 631,213, dated May 17, 1952, and No. 650,205, dated July 2, 1953, both of which were assigned to the plaintiff E. I. Dupont de Nemours and Company on July 25, 1962, and the application of the defendant, Union Carbide and Carbon Corporation, No. 627,046, dated February 18, 1952. The plaintiffs obtained a default judgment against the defendant, Celanese Corporation of America, prior to the trial of this action.

Prior to the commencement of this action the Commissioner made his decision in respect to the claims in the Traver Investments Inc. application No. 650,205 and the Union Carbide and Carbon Corporation application No. 627,046 but he took no action with respect to the Traver Investments Inc. application No. 631,213. In his decision the Commissioner of Patents ruled that there existed a conflict and that he would allow the claims to the respective applicants as set out in his decision.

The present action is directed to the claims dealt with in the decision of the Commissioner of Patents and certain other claims which were not dealt with in the decision of the Commissioner and were not in the respective applications of Traver Investments Inc. and Union Carbide and Carbon Corporation.

Held: That none of the findings in this conflict action puts an imprimatur of validity on the claims in conflict beyond the restricted meaning prescribed by s. 45(8) of the *Patent Act*, which is confined solely to the result which flows from such determination, namely, that the Commissioner of Patents must issue a patent containing the claims as hereinafter set out to the party mentioned. Their validity in such a patent in the usual meaning is a matter for determination only in an action for infringement or impeachment if such proceedings should be taken.

2. That the four matters to be adjudicated on in this action are what invention produces the successful result which is the subject matter of the patent applications, who invented it first, was the invention legally disclosed, and the validity of the claims as between the plaintiffs and the defendant, Union Carbide and Carbon Corporation, in the restricted meaning delineated by s. 45(8) of the *Patent Act*.

3. That the invention was the discovery that the phenomenon which made polyethylene film receptive to ink so the ink adhered to the film was produced by exposing the film to a form of electrical discharge; and that the form of the discharge which is essential to the process is aptly described as corona discharge, and further that the discovery that successful treatment of the polyethylene film by electrostatic discharge can be obtained only when the phenomenon of corona discharge is present, constitutes the invention.

4. That there was insufficient evidence adduced to establish that the application of the corona discharge treatment to the other materials mentioned in the claims, namely any plastics or associated structures other than polyethylene film, or any other resins or resinous materials, would result in improving their receptivity to printing inks.

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5. That this Court, in making its determination as to the issue of priority of invention as it is required to do by the statute, must find the date at which the inventor can prove he first formulated, either in writing or orally, a description which afforded the means of making that which was invented.

6. That some of the principles to be relied on in determining the meaning of inventor and in considering the claims of the patent applications are that an inventor must invent something that is a new and useful art, process, machine, manufacture, composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter; that an inventor must be the inventor of that which is disclosed and claimed and he may not claim what he has not described, or, putting it another way, the disclosure in his specification must support the claims or otherwise they are invalid, and in this respect there is a statutory duty of disclosure (s. 36, *Patent Act.*)

7. That it is relevant not only in the determination of the issue of priority of invention, but also in relation to the determination of the issue of the validity of the claims in conflict to note that the disclosures in any application, other than the disclosures in the subject application of the date of filing cannot be used by the respective subject applicants as an aid to the interpretation of the meaning of the claims in conflict, subject, however, to the two following principles of interpretation of the words in the claims, which principles limit in some measure the foregoing, namely: (a) if the words in a claim are clear and unambiguous, it will not be possible to expand or limit their scope by reference to the body of the specification, and (b) where the meaning of the terms employed in the claims is not clear and requires explanation, two sources are open to the patentee, viz., (i) the general meaning of the words as understood by the competent workmen in the art, and (ii) the precise meaning that has been given to them by the patentee in his specification.

8. That with respect to the application of the plaintiff, Traver Investments Inc., the inventor, Traver, purported to disclose more than he had invented and he also claimed much more than he had invented and in so doing he failed to establish by credible evidence that at any material time he had formulated, either orally or in writing, a description which affords the means of making that which he alleges he invented.

9. That on cross-examination with respect to the subject application, Traver admitted that concerning twenty-three matters in the specification bearing on technique, processes and equipment he knew nothing about them and that the ideas and the words employed concerning them were not his. By this evidence Traver himself established that his application does not comply with s. 36 of the *Patent Act* in that the specification does not describe his invention and the means of making that which he alleges he invented, or the operation and use as he now alleges was contemplated by him at any material time, but instead it is as contemplated by others and therefore irrelevant to the issue of who was the first inventor in this case; and he proves that the invention described in it is not his alleged invention.

10. That it is clear on the whole of the evidence that Traver did not act *uberrimae fidei* in his application, and on this ground alone he fails to establish that he was an inventor of anything, let alone a first inventor of the invention in issue in this case.

11. That the discovery which taught that successful treatment of polyethylene film could be accomplished by using any one of the many combinations of electrodes, dielectrics, spacing and voltage so long as corona discharge was present was genius and invention of the highest order and is not detracted from the least by the fact that Traver or some other person may have obtained successful treatment of polyethylene film without knowing why, by using one of the combinations of electrodes, dielectrics, spacing and voltage, and not recognizing that corona discharge was the essential feature of the invention.
12. That the doctrine of substance and mechanical equivalence is not relevant to the determination as to which of the four remedies provided by s. 45(8) of the *Patent Act* either party to the action is entitled to with respect to the conflict claims, the doctrine being applicable only in an action for infringement.
13. That entitlement of Union Carbide and Carbon Corporation to a patent containing claims in these proceedings is restricted to those claims, found to be legally in conflict between the parties to this action, which are within the ambit of the invention owned by Union Carbide and Carbon Corporation, which are contained in its application, and which comply with all relevant provisions of the *Patent Act.*
14 That in attempting to determine who was the first inventor and who disclosed the invention, only the Traver Investments Inc. application No. 650,205 and the Union Carbide and Carbon Corporation application No. 627,046, need be considered, because the Commissioner of Patents did not put in conflict the Traver Investments Inc. application No. 631,213 and therefore this Court is not called upon to adjudicate in respect to it, and the plaintiff's attempt to change this by its pleadings is of no avail. Its status is that of a pending application in the Canadian Patent Office not put in conflict between the two parties to this action.
15. That the claims which were not put in conflict between Traver Investments Ltd. and Union Carbide and Carbon Corporation by the Commissioner of Patents pursuant to s. 45 of the *Patent Act,* but which the parties sought to bring in issue between themselves in these conflict proceedings by their pleadings are not claims in respect to which this Court is required to adjudicate in that the Commissioner of Patents has not taken any action with respect to them pursuant to s. 45 of the *Patent Act* and these proceedings are not an alternative method, available to the parties of putting claims in conflict. The Commissioner of Patents alone is charged by the *Patent Act* with this duty.
16. That the plaintiffs' action is dismissed and the counterclaim of the defendant, Union Carbide and Carbon Corporation is allowed in part.

ACTION to determine rights of parties in conflict proceedings.

The action was tried by the Honourable Mr. Justice Gibson at Ottawa.

G. F. Henderson, Q.C. and *R. G. McClenahan* for plaintiff.

H. G. Fox, Q.C. and *D. F. Sim, Q.C.* for defendants.

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The facts and questions of law raised are stated in the reasons for judgment.

GIBSON J. now (February 18, 1965) delivered the following judgment:

This is a conflict proceeding under subsection (8) of section 45 of *The Patent Act*, R.S.C. 1952, chapter 203 as amended, to determine the respective rights of the parties on their applications for a patent or patents containing claims which are numbered in this action C-1 to C-94 and C-107.

The subject matter of the alleged invention concerns a method and apparatus to treat polyethylene to make its surface ink adherent.

Polyethylene became available in substantial quantities after World War II, and is useful as a wrapping material, especially for wrapping foods. It then had the disability that its surface would not take print satisfactorily, in that the ink would not adhere to it adequately; and this was a problem in the whole industry. The solution to this problem, by overcoming this disability, is the alleged invention and forms the subject matter of the conflicting claims by the parties, which gave rise to these proceedings.

The plaintiff, Traver Investments Inc. (hereinafter referred to as "Traver"), is a corporation organized and existing under the laws of the State of Illinois, one of the United States of America, and has its head office in the City of Chicago, in the said state. This plaintiff was formerly known as Traver Corporation and by change of name it became Traver Investments Inc. The plaintiff, E. I. DuPont de Nemours and Company, is a company having its head office and place of business in the City of Wilmington, in the State of Delaware, one of the United States of America.

The defendant, Union Carbide and Carbon Corporation (hereinafter referred to as "Union Carbide"), is a body corporate and politic having a place of business in New York City, in the State of New York, one of the United States of America. The defendant, Celanese Corporation of America, is a body corporate and politic having a place of business at Newark, in the State of New Jersey, one of the United States of America.

The plaintiff, Traver Investments Inc., filed an application of invention in the Canadian Patent Office for an invention of one George W. Traver on May 17, 1952, and this application was given a file wrapper No. 631,213 and it is Exhibit 1 in this action. A second application was filed by it also on July 2, 1953, and that application was given a file wrapper No. 650,205, and it is Exhibit 2. (This plaintiff also filed an application in the United States Patent Office on October 26, 1950, and that application was given a file wrapper No. 192,313 in that office, and a copy of it is Exhibit 3.) This plaintiff assigned all its rights in the first two applications to the plaintiff, E. I. DuPont de Nemours and Company on July 25, 1962, which assignment was registered on September 11, 1962.

The plaintiffs allege that the date of the invention which was the subject matter of these applications was in May-June, 1949; and that the product using this invention was commercially marketed in March, 1950, submitting that an order for the production of such product had been taken in February, 1950.

The defendant, Union Carbide and Carbon Corporation, filed its application for a patent or patents in the Canadian Patent Office on February 18, 1952, and it was given the file wrapper No. 627,046, and it is Exhibit D-11 in this action. (This defendant had acquired prior to the above date all the rights of Visking Corporation, referred to in these reasons.)

The defendant, Union Carbide and Carbon Corporation, alleges a date of invention at least as early as May 3, 1950.

The defendant, Celanese Corporation of America, also filed applications for Letters Patent in the Canadian Patent Office, which were given Nos. 675,787 and 682,030, bearing dates November 10, 1954, and March 5, 1955, respectively; but this defendant did not appear at this trial, the plaintiffs having obtained default judgment against it on April 16, 1964.

Categorizing these claims may assist in explaining the matters raised at trial and therefore it is done in this way, namely:

1. *Claims concerning treatment of polyethylene involving the phenomenon known as "corona discharge"*

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C-3, C-6, C-9, C-12, C-87 to C-89 incl., and C-92 to C-94 incl.

2. *Claims concerning treatment of plastics and associated structures*
C-1, C-2, C-4, C-5, C-7, C-8, C-10 and C-11.

3. *Claims dealing with treatment of resins and resinous materials*
C-37, C-40, C-67 to C-76 incl.

4. *Claims in Canadian Patent No. 662,521 issued May 17, 1963*
C-13 to C-17 incl., and C-107.

5. *Claim in Canadian Patent No. 674,718 issued November 26, 1963*
C-83.

6. *Claims which are not now in conflict between the parties to this action (settled)*
C-77.

7. *Oher claims not put in conflict by the Commissioner between the parties to this action*
C-21, C-32, C-33, C-38 to C-43 incl., C-48 and C-61.

It may also be helpful to further categorize these claims with a view to demonstrating the status in this lawsuit of each of them in so far as the plaintiffs and the defendant, Union Carbide, are respectively concerned. This is set out under four headings, numbered hereunder A, B, C and D, in respect to each of the plaintiffs and the defendant, Union Carbide, that is to say:

IN RESPECT TO THE PLAINTIFFS, (TRAVER *et al.*)

A. *Conflict claims which were not in the plaintiffs' (Traver's) application for a patent (Exhibit 2), but which were offered to Traver by the Canadian Patent Office*
C-1 to C-12 incl., C-25 to C-28 incl, C-37, C-44 to C-47 incl., C-49 to C-52 incl., C-57, C-72, C-67 to C-77 incl., C-88 to C-94 incl.

B. *Claims which the plaintiffs (Traver) had in its application (Exhibit 2) but which were offered to others in conflict by the Canadian Patent Office*
C-18 to C-20 incl., C-22 to C-24 incl.

C. *Claims put in conflict by the Commissioner of Patents and asserted by the plaintiffs (Traver)*
All the claims in A plus B above, plus D on Union Carbide list (*infra*).

D. *Claims not put in conflict by the Commissioner of Patents, but which are asserted in this action by Traver and are all the other claims not listed in A, B or C, which were not in the Traver application (Exhibit 2) and which were also not offered to the plaintiff Traver in the conflict proceedings by the Canadian Patent Office*

The claims in this group, Traver asserts, are put forward in this action in two ways, namely, in that they are

(i) the claims which are the subject matter of the default judgment obtained by the plaintiffs against the defendant, Celanese Corporation on April 16, 1964 (referred to above); and

(ii) the claims which were put in issue in this action by the pleadings of the plaintiffs. Under (i) above, these claims are C-32, C-33, C-38 to C-43 inclusive, C-48 and C-61.

Under (ii) above, these claims are C-13 to C-17 inclusive, and C-107.

IN RESPECT TO THE DEFENDANT, UNION CARBIDE

A. *Conflict claims which were not in the defendant Union Carbide's application (Exhibit D-11) but which were offered in conflict to Union Carbide by the Canadian Patent Office*

C-18, C-19, C-20, C-22 to C-31 incl., C-34 to C-37 incl, C-44, C-46, C-51, C-53 to C-60 incl, C-62 to C-64 inclu., C-67 to C-82 incl., C-84 to C-94 incl.

B. *Claims which were in the application of the defendant Union Carbide (Exhibit D-11) but which were offered to others in conflict by the Canadian Patent Office*

C-1 to C-12 incl.

C. *Claims put in conflict by the Commissioner of Patents, and asserted by Union Carbide*

These consist of all claims under A and B above, plus D on Traver list (*infra*).

D. *Claim which was not put in conflict by the Commissioner of Patents but which Union Carbide brings in issue by its pleadings even though it was not in its application (Exhibit D-11).*

C-21 only.

Pursuant to subsection (7) of section 45 of *The Patent Act*, R.S.C. 1952, chapter 203, as amended, the Commissioner of Patents made his decision in respect to the claims in the plaintiff's (Traver's) application No. 650,205, dated July 2, 1952 (Exhibit 2) and the defendant Union Carbide's application No. 627,046, dated February 18, 1952 (Exhibit D-11); but he took no action in respect to the plaintiff Traver's application No. 631,213 dated May 17, 1952.

Exhibit 37 in this action sets out the various claims by number, indicates who was the respective originator of each claim, the respective person or persons between or among whom each claim was put in conflict by the Commissioner of Patents, and the decision pursuant to the statute of the Commissioner in respect to each of them.

The plaintiff Traver, not being satisfied with the decision of the Commissioner in respect to these claims, pursuant to the statutory right prescribed in subsection (8) of section 45 of *The Patent Act*, commenced these proceedings in this Court on March 29, 1962.

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In this action, as provided in subsection (8) of section 45 of *The Patent Act,* there may be a determination

either

(*a*) "that there is no conflict between the claims in question",

or

(*b*) "that none of the applicants is entitled to the issue of a patent containing the claims in conflict as applied for by (it)",

or

(*c*) "that a patent or patents, including substitute claims approved by the Court, may issue to one or more of the applicants",

or

(*d*) "that one of the applicants is entitled as against the others to the issue of a patent including the claims in conflict as applied for by him."

But none of the parties to this action, which was commenced in this Court following the decision made by the Commissioner of Patents (that there existed a conflict and that he would allow the claims to the respective applicants as set out in his decision), was necessarily limited to adducing evidence and making submissions in respect thereof to this Court to one or more of the four remedies set out above and as provided for by said subsection (8) of section 45 of *The Patent Act;* but instead either of the parties was entitled to, and did in fact adduce evidence and made submissions in argument to justify this Court in making other and adidtional determinations, which are set out later in these reasons.

As to this latter, one of the main matters considered was the construction of the plaintiffs' application in the Canadian Patent Office, Exhibit 2, in relation to the issue of priority of invention.

At this trial not only was verbal evidence adduced, but many documents, memoranda, letters, materials, photographs, sketches, text book excerpts, etc., were introduced and filed as exhibits; and also there were various demonstations held in Court of treatment processes with various apparatuses, to samples of polyethylene film.

In this adjudication of the issues raised in this action, it is,

of course, clear that none of the findings put an *imprimatur* of validity on the claims in conflict beyond the restricted meaning prescribed by subsection (8) of section 45 of *The Patent Act,* which is confined solely to the result which flows from such determination, namely, that the Commissioner of Patents must issue a patent containing the claims as hereinafter set out to the party mentioned. Their validity in such a patent in the usual meaning is a matter for determination only in an action for infringement or impeachment if such proceedings should be taken.

Section 28 of *The Patent Act,* R.S.C., chapter 203, as amended, sets out certain requirements which must obtain before an applicant may obtain a patent, and it reads as follows:

28. (1) Subject to the subsequent provisions of this section, any inventor or legal representative of an inventor of an invention that was

(*a*) not known or used by any other person before he invented it,

(*b*) not described in any patent or in any publication printed in Canada or in any other country more than two years before presentation of the petition hereunder mentioned, and

(*c*) not in public use or on sale in Canada for more than two years prior to his application in Canada,

may, on presentation to the Commissioner of a petition setting forth the facts (in this Act termed the filing of the applictaion) and on compliance with all other requirements of this Act, obtain a patent granting to him an exclusive propery in such invention.

(2) Any inventor or legal representative of an inventor who applies in Canada for a patent for an invention for which application for a patent has been made in any other country by such inventor or his legal representative before the filing of the application in Canada is not entitled to obtain in Canada a patent for that invention unless his application in Canada is filed, either

(*a*) before issue of any patent to such inventor or his legal representative for the same invention in any other country, or

(*b*) if a patent has issued in any other country, within twelve months after the filing of the first application by such inventor or his legal representative for patent for such invention in any other country.

(3) No patent shall issue for an invention that has an illicit object in view, or for any mere scientific principle or abstract theorem.

Any applicant as envisaged by said section 28 must also in the specification part of his application comply with section 36 of *The Patent Act,* which reads in part as follows:

36. (1) The applicant shall in the specification correctly and fully describe the invention and its operation or use as contemplated by the inventor, and set forth clearly the various steps in a process, or the method of constructing, making, compounding or using a machine, manufacture or composition of matter, in such full, clear, concise and exact terms as to

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enable any person skilled in the art or science to which it appertains, or with which it is most closely connected, to make, construct, compound or use it; in the case of a machine he shall explain the principle thereof and the best mode in which he has contemplated the application of that principle; in the case of a process he shall explain the necessary sequence, if any, of the various steps, so as to distinguish the invention from other inventions; he shall particularly indicate and distinctly claim the part, improvement or combination which he claims as his invention.

(2) The specification shall end with a claim or claims stating distinctly and in explicit terms the things or combinations that the applicant regards as new and in which he claims an exclusive property or privilege.

.....

The matters in this action for adjudication are firstly, what invention produces the successful result described earlier, secondly, who invented it first, thirdly, was the invention legally disclosed, and lastly, the validity of the claims as between the plaintiffs and the defendant Union Carbide (in the restricted meaning delineated by section 45(8) of *The Patent Act.*)

Dealing first with the invention, I find, on a consideration of the whole of the evidence that the invention was the discovery that the phenomenon which made polyethylene film receptive to ink so the ink adhered to the film was produced by exposing the polyethylene film to a form of electrical discharge; and that the form of this discharge which is essential to the process is aptly described as corona discharge.

The corona discharge that I refer to is the term used in its colloquial meaning, and not in its classical meaning, as discussed in the evidence. I find that most experts in the field at all material times used and at present use the term corona discharge in its colloquial meaning to describe the phenomenon which produces the successful result in this matter. In this sense the words "corona discharge" are used in these reasons, and this use of the words "corona discharge" correctly describes the material phenomenon which is referred to in the relevant specifications and claims in issue and in the evidence adduced in this action.

I also find on the evidence that electrostatic discharge range is a term which covers any electric action in such an apparatus as Exhibit 42 illustrates (or any variation thereof as may be accomplished as, for example, by changing the shape of the electrodes, etc.) which produces an electrostatic field; and included in its range are the Townsend range, the

corona range, and the sparking range; that electrical discharge includes any form of discharge which involves the passage of ionization current and that in the Townsend range it will not cause successful treatment when applied to polyethylene film, but instead the corona range must be reached before there can be successful treatment; and that unless the range of corona discharge is reached when an apparatus such as is illustrated in Exhibit 42 (or any variation thereof) is operating, there will not result successful treatment of polyethylene film so as to make it ink adherent.

I also find that there was insufficient evidence adduced to establish that the application of this successful treatment process to any other plastics or associated structures other than polyethylene film, or to any other resins or resinous materials, would result in improving their receptivity to printing inks.

I also find on the evidence that "corona discharge" is not equivalent to or synonymous with the other following words used in the said specifications, claims and/or evidence, namely, "electrostatic discharge to increase the unsaturation of surface molecules in said treated surface" (being words which merely suggest the result of the treatment without teaching how it is done), "subjecting the said surface to the action of electrostatic discharge while employing an alternating current to render the surface molecules of said treated surface receptive and strongly adherent, etc." (being words to the same effect as were found above), "electronic bombardment", "frequency . . . is substantially in excess of 60 cycles per second", "electrostatic discharge under a voltage in excess of ten thousand volts, to increase the unsaturated linkages", "diffuse electrical discharge", "glow discharge", "concentrated high voltage glow discharge", "the voltage of the circuit being sufficient to modify said surface, etc.", "thin electrode in a high voltage circuit, etc.", "gas filled discharge tube in a high voltage circuit", "diffuse discharge between said electrodes", "diffuse electrical discharge", "electronic bombardment" and "brush discharge".

A brief glossary of terms was put in evidence as Exhibit D-9, and in essence was proven to adequately define the words set out, and may be helpful in providing a dictionary for some of the words and phrases used in these reasons, and it is as follows:

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GLOSSARY

1. CORONA

The physical manifestation of a corona discharge. Corona results when a gas, usually air, has been stressed until a condition is maintained wherein some ionization of the gas is present and oxygen mol rearrangement takes place forming ozone, the presence of which may be detected by the odour manifested when corona is present. A purplish discharge or glow under reduced light may be seen in the vicinity of the metallic parts so charged with a sort of crackling noise. The stressed air is nearly at a point of break down or spark discharge yet quite controllable. Ambient atmospheric pressure, if reduced will induce corona discharge at relatively lower voltage than at normal 14.7 lbs. pressure.

2. CORONA DISCHARGE

A form of electrostatic discharge producing a corona.

3. ELECTRIC CORONA

Corona produced by electricity.

4. GLOW DISCHARGE

Activated gas resulting in emanation of light. See Crooks tube; neon light.

5. GLOW DISCHARGE OF ELECTRICITY

The glowing discharge from a gas or vapour induced by electricity.

6. POTENTIAL

Another term for voltage in electrical engineering.

7. ELECTRICAL POTENTIAL

Same as potential in electrical engineering.

8. HIGH ELECTRICAL POTENTIAL

High voltage. An ambiguous term requiring explanation to convey precise information. Depends upon the field involved; e.g. household lighting, overland transmission, radio transmission.

9. ELECTROSTATIC POTENTIAL

The voltage of an electrostatic charge.

10. POTENTIAL GRADIENT

Nature of the voltage drop between two points in a system subject to electrical charge or an electrical flowing current.

11. ELECTRICAL STRESS

Another term for electrical potential.

12. HIGH VOLTAGE

An ambiguous term. See No. 8.

13. ELECTROSTATIC FIELD

The volume of space being subjected to electrostatic stress.

14. ELECTROSTATIC STRESS

The voltage in an electrostatic field.

15. ELECTROSTATIC ACTION

The action created by an electrostatic discharge. The action involving charging and/or discharging of an effective condenser.

16. ELECTROSTATIC FIELD OF SUBSTANTIAL INTENSITY

Electrostatic field of high voltage. By itself an ambiguous term. See high voltage, high electrical potential.

17. ELECTROSTATIC ACTION OF RELATIVELY LOW INTENSITY

Electrostatic action carried on at relatively low voltage. An ambiguous term since it may refer to voltage of intensity below an unknown or unexpressed value.

18. ELECTROSTATIC FORCE FIELD

Same as No. 13.

19. ELECTROSTATIC DISCHARGE

Flow of electric current in discharging from a condenser surface.

20. ELECTROSTATIC DISCHARGE FIELD

Same as electrostatic field where there is actual current flow.

21. ELECTRONIC BOMBARDMENT

Action of moving electrons in encountering some object.

22. ELECTRON BOMBARDMENT

Same as No. 21.

23. ELECTRICAL DISCHARGE

The flow of current from higher to lower potential. As for example, from charged surface or from battery.

24. ELECTRICAL FIELD

A broader term than electrostatic field: Might refer to electromagnetic field as well.

25. ELECTRICAL FIELD WITH UNIFORM POTENTIAL GRADIENT

An electrical field wherein the potential differences from one point to any other equi-distant part is the same.

26. DIFFUSE ELECTRICAL DISCHARGE

An unconcentrated electrical discharge.

27. ELECTRODE

In an electric system one of a pair of interconnected conductors.

28. GROUND

One conductor in a system; usually of lowest potential of the system.

29. ELECTRON EMITTING SOURCE

A material in a condition and under surrounding condition to emit electrons; as for example, in an electron vacuum tube the filament when heated to sufficient temperature.

30. ELECTRON EMITTING ELEMENT

Same as No. 29.

31. GAS FILLED DISCHARGE TUBE

Gas filled tube activated so that gas gives off energy such as light; for example, a neon tube.

32. DIELECTRIC

A body through which or a medium in which, electric attraction or repulsion may be sustained. Dielectrics are always insulators; glass

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is a dielectric, because unlike charges on opposite sides of a plate of glass, attract each other.

33. DIELECTRIC MATERIAL

Any material constituting a dielectric.

34. ARCING

The passage of electricity through a medium along a path changed from non-conducting to conducting.

35. OZONE

O_3. An unstable form of oxygen created by ionization of oxygen or oxygen-containing gases.

There were also filed as Exhibits 41, 42 and 35 (set out in Schedule A to these reasons) certain drawings which illustrate the physical layout of the fundamental equipment which may be employed in utilizing the process which gives the successful treatment referred to above, to polyethylene film. Many variations of this fundamental apparatus may be devised to produce the desired result and these exhibits are merely illustrative of the kind of apparatus which may be used to produce successful results.

In Exhibit 41 there is illustrated a functional sketch of the basic equipment, namely, an oxy-dry tube under which is passed the polyethylene film which is to be processed, which rests on a ground electrode, which in this sketch is a plate. The remainder of the sketch illustrates the means of regulating (the Varic) and monitoring (the voltmeter and the ammeter) the voltage and current involved in operating the apparatus at the level produced by means of the step-up transformer.

In Exhibit 42 there is illustrated a second view of the fundamental treatment arrangement. In it is shown the oxy-dry tube, the film to be treated, and the lower electrode in a blown-up version so that the mechanism may be more clearly seen.

The first electrode is the argon gas enclosed in the tube. The second electrode is the conductive metal plate shown below the film. The glass which is the envolpe of the oxy-dry tube is the buffer dielectric. The electrodes are connected to a high voltage alternating current source, which is produced after the manner illustrated in Exhibit 41. When this system is activated an electrical discharge takes place in the region indicated on the sketch between the

tube and the bottom electrode, and only when this electrical discharge reaches a certain level and is maintained within that certain level will successful treatment of the film take place. This said level is identified by a sound sometimes described as a frying sound which is evidence of the presence of ozone gas, which is normally generated when this discharge occurs in air, and it is pungent; and there is also an emission of light from the discharge region which is a bluish color. This phenomenon has the appearance of corona discharge and as stated is so colloquially described by the experts in this field and the level at which this form of electrical discharge occurs is aptly described as the corona range.

On the upper right hand corner of Exhibit 42 is a simplified model of an atom. The nucleus of the atom is represented by a cluster of spheres and around the nucleus are illustrated orbital electrons.

In the normal state a balance of charge exists between the positive nucleus and the negative electrons or in some cases between the positive nuclei of two atoms and their orbital electrons. Ionization of an atom occurs when one or more of the orbital electrons becomes detached as a result of excitation by, for example, an electric field.

When ionization takes place the net electrical charge on the atom is positive (the positively charged atom is called an ion) and one or more negatively charged electrons is or are released, and is or are free to act on other particles such as other atoms.

In this illustration in Exhibit 42, because of the high voltage the air in the gap between the electrodes becomes highly ionized. Because the current is alternating both positively charged ions and negatively charged electrons are attracted to the electrode beneath the polyethylene film, and the film is probably subjected both to electronic bombardment and ion bombardment. When this takes place at the level of discharge in the corona range successful treatment of the polyethylene film results.

The precise physical phenomenon that thus occurs to the polyethylene film is not known. This constitutes the theory of the invention.

But in contradistinction, the discovery that successful treatment can only be obtained when the phenomenon

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of corona discharge is present, constitutes the invention.

Exhibit 35, which is also set out in Schedule A to these reasons, is a copy of the drawings included in the plaintiffs' (Traver's)application, Exhibit 2, filed in the Canadian Patent Office, July 2, 1953. On it are seven figures. The first four of these figures essentially were in the plaintiffs' (Traver's) application, Exhibit 1, filed in the Canadian Patent Office on May 17, 1952. But Exhibit 35 does not illustrate the drawings attached to the plaintiffs' (Traver's)United States application, Exhibit 3, filed on October 26, 1950. The drawings attached to it illustrate essentially the Cameron Slitter apparatus, which is referred to later in these reasons.

The plaintiffs called two main expert witnesses, namely, Lewis C. Bancroft, who is a research supervisor at the Engineering Physics Laboratory of the plaintiff DuPont and who is a Bachelor of Science and Engineering from Princeton University, having graduated in 1950 in electrical engineering and having obtained a Master of Science degree in engineering at Princeton in 1952; and Ernest E. Lewis, who is research manager for the Film Department of the plaintiff DuPont and who graduated in 1936 from Colorado College with a Bachelor of Arts degree, majoring in chemistry, and who obtained his Ph.D. at Columbia University in 1940 in the field of organic chemistry.

Mr. Bancroft gave testimony regarding the electrical engineering processes and phenomena in connection with the treatment process and apparatus which is the alleged invention of Mr. Traver, and Dr. Lewis gave testimony concerning polyethylene film and other plastics and associated structures and also concerning other resin and resinous materials.

The defendant Union Carbide called as its expert witnesses Edward R. Hughes, who was an electrical engineer, having graduated in 1915, and who was at one time a student of Dr. Charles Proteus Steinmetz, and who has had extensive experience in the field of electrical engineering; and the alleged inventors, *viz.*, firstly, George M. Adams, who has a Master of Science degree, having graduated in chemical engineering from the University of Michigan at Ann Arbor and who was actively employed by Visking Corporation during all the material times when he alleges

he was the co-inventor of the process under discussion in this law suit (this division of Visking Corporation having been purchased subsequently by the defendant Union Carbide); and secondly, the other alleged co-inventor, Sidney J. Wakefield, who had attended Milwaukee School of Engineering for three and one-half years and who at the material times was an employee of Visking Corporation in its Electronics Department; and also Reinhard Max Stopp, who was employed by the Meisel Press Company, which was a printing press manufacturing company, with plant premises in Dorchester, Massachusetts, and who was the chief designer and engineer with that company for many years and until his retirement and who was the designer of the wax spray unit on the Meisel press which was referred to in evidence on this trial by Traver for the plaintiffs, and which is illustrated in a drawing, Exhibit 11, filed on this trial.

The witnesses, Messrs. Hughes, Adams and Wakefield, adduced evidence on behalf of the defendant Union Carbide in reference to the electrical engineering aspects of the alleged invention, now the property of the defendant, Union Carbide; and Mr. Stopp gave evidence as to the precise limitations of the uses of the Meisel press.

Of course these experts were not in agreement in all the technical aspects of the matters in issue in these proceedings, and did not definitely and certainly establish in evidence all the scientific matters about the subject process and the validity of some of the alleged claims as to what the process could accomplish. For example, the theory of what happens to the surface of a piece of polyethylene film which has been successfully treated was not established; nor was it established that the application of corona discharge treatment process would improve ink adherency to the many other plastics and associated structures, or to resins and resinous materials. And, as another example, there was disagreement concerning the categorization of various phenomena that occurred when apparatus using the subject process was put in operation.

But such a situation in matters such as this must always exist, because experts also operate in a world of possibilities and probabilities as does the Court. The experts can only weigh the probabilities based on their training and experience and make their best educated guesses, but the

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Court is left with the usual legal standard of proof, namely, more probable than not, or as it is sometimes put, the preponderance of believable evidence. And this was the test employed in reaching the conclusions in these reasons where it was necessary to resolve any conflict in such expert testimony.

As heretofore stated, expert testimony categorically established that the existence of corona discharge was essential for successful treatment in the process of treating polyethylene film by subjecting it to high tension electric stress; and it also established that before this discovery invention experts in the field had thought corona discharge was parasitic; and it also established that it did not matter what permutations or combinations of apparatus or process were employed, so long as corona discharge resulted, such being the sole factor in an electrostatic field which produces successful treatment.

Predicated on this, the second and third issues to determine concern finding the person (from whom the parties derived their respective rights by assignment) (i) who was the first inventor and (ii) who disclosed orally or in writing a description which afforded the means of making that which was invented (*Christiani v. Rice*[1]); that is, referring to the persons who so affirm in this action, was it George W. Traver (who has heretofore assigned his rights to the plaintiffs) or was it the alleged co-inventors George H. Adams and Sidney J. W. Wakefield (whose rights have been assigned to the defendant Union Carbide).

In this determination in my view only two applications need be considered, namely, the plaintiffs' application number 650,205 filed in the Canadian Patent Office July 2, 1953 (Exhibit 2 in this trial), and the defendant Union Carbide's application number 627,046 filed in the Canadian Patent Office February 18, 1952 (Exhibit D-11 in this trial).

I say this because the Commissioner of Patents did not put in conflict the plaintiffs' application number 631,213 filed May 17, 1952, and therefore this Court is not called upon to adjudicate in respect to it; and the plaintiffs' attempt to change this by its pleadings is of no avail. Its status is that of a pending application in the Canadian Patent Office not put in conflict between the two parties now in this action.

[1] [1930] S.C.R. 443 at 456.

PRIORITY OF INVENTION

Priority of invention is to be determined by the application of the judicially defined meaning of the words of section 28 of *The Patent Act* to the facts which were adduced and established by credible evidence at this trial.

Before these proceedings were commenced in this Court what transpired heretofore between the parties in respect to their respective applications, Exhibit 2 and Exhibit D-11, was briefly as follows.

By reason of section 45(5) of *The Patent Act,* the parties were required and each did file an affidavit with the Commissioner of Patents in which each applicant complied with that subsection and stated:

(1) the date of the conception of the invention,

(2) the date of making of the first drawing,

(3) the date of making of the first written or verbal disclosure,

(4) the dates and nature of the successful steps subsequently taken by the inventor to develop and perfect the said invention.

George W. Traver (represented by plaintiffs) alleged the following four dates:

(1) that during month of May, 1949, he conceived the invention,

(2) that the first drawing illustrating the invention was made on August 22, 1950,

(3) that the first oral disclosure was made in May, 1949, and the first written disclosure was made on February 3, 1950,

(4) that during December, 1949, to January, 1950, and thereafter the continuous polyethylene sheet treating process was used commercially.

Messrs. Adams and Wakefield (represented by the defendant Union Carbide) for their said dates set out the following in their affidavits:

(1) that on or before March 17, 1950, they conceived their invention,

(2) that the first drawing of the invention was made on or about March 23, 1950,

(3) that the first oral disclosure to others was made on or about March 21, 1950,

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(4) that the first sale of polyethylene film treated on an apparatus made for production purposes, utilizing the invention occurred in May, 1950.

Then the Commissioner as he was required to do by subsection (7) of section 45 of *The Patent Act*, determined which in his opinion was the prior inventor. He did this independently, without either party knowing or seeing what was in the other party's affidavit and without any of the deponents being subjected to cross-examination by the Commissioner or by the other party to test the validity of any of the facts alleged in such affidavits. The Commissioner's decision was made "after examining the facts stated in the affidavits". In reaching such decision, what the Commissioner was called upon to do by the statute in his consideration of the above four dates set out in the respective affidavits of the applicants (and the other facts in such affidavits) was not to give any particular weight to any of these said four dates to reach his determination but to consider the matter at large, and thereby somehow to determine the prior date of invention and the date and the mode in which the first written or verbal disclosure of such invention was made.

As previously stated, the results of the said decision in respect to the invention and the claims is noted in these proceedings on the schedule which was filed as Exhibit 37.

After such decision, on March 29, 1962, the plaintiffs commenced this action in this Court; and the issue of a patent or patents containing such claims in conflict, as this Court may find are warranted by the evidence, awaits the decision of this Court.

Now this Court, as stated, in making its determination as to the issue of priority of invention as it is required to do by the statute, must find "the date at which the inventor can prove he . . . first formulated, either in writing or verbally, a description which (afforded) the means of making that which (was) invented".

This is the test prescribed by Canadian patent law as enunciated in *Christiani v. Rice* (*supra*); and Rinfret, J. (as he then was) at p. 456 further proclaimed:

> There is no necessity of a disclosure to the public. If the inventor wishes to get a patent, he will have to give the consideration to the public; but, if he does not and if he makes no application for the patent, while he will

run the risk of enjoying no monopoly, he will none the less, if he has communicated his invention to "others", be the first and true inventor in the eyes of the Canadian patent law as it now stands, so as to prevent any other person from securing a Canadian patent for the same invention.

The determination of who is the prior inventor in this case also necessarily involves a number of principles in relation (a) to the meaning of inventor and also (b) in relation to the claims.

Some of these principles are:

(1) that an inventor must invent something that is a new and useful art, process, machine, manufacture, composition of matter, or any new and useful improvement in any art, process, machine manufacture or composition of matter;

(2) that an inventor must be first to so invent;

(3) that an inventor must be the inventor of that which is disclosed and claimed and he may not claim what he has not described; or putting it another way, the disclosure in his specifications must support the claims or otherwise they are invalid; and in this respect there is a statutory duty of disclosure (section 36 of *The Patent Act*). (*Minerals Separation North American Corporation v. Noranda Mines Ltd.*[1])

This latter principle numbered 3 above is relevant in this case in respect to the issue of priority of invention because of what was contained in the respective patent applications and because of what was said and done at the various material times, by the alleged inventors. As a result the application of this principle is of assistance in the determination of the truth of the two questions of fact, *viz.*, firstly, as to what was invented, and secondly, as to who invented it first.

It is also helpful to note that this latter particular principle was more categorically defined by the learned former President of this Court, Thorson P., in the above cited case wherein he marshalled in precise fashion the elements that go to make up this principle, and which he had extracted from a number of prior cases where the same were established, and which are:

[1] [1947] Ex. C.R. 306.

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(*a*) that the description must be both clear and accurate containing a correct description of the invention as contemplated by the inventor, and of its operation or use as contemplated by the inventor;

(*b*) that it must be free from avoidable obscurity or ambiguity and be as simple and distinct as the difficulty of description permits;

(*c*) that it must not contain erroneous or misleading statements calculated to deceive or mislead the persons to whom the specification is addressed and render it difficult for them without trial and experiment to comprehend in what manner the invention is to be performed;

(*d*) that it must not direct the use of alternative methods of putting it into effect if only one is practicable, even if persons skilled in the art would be likely to choose the practicable method;

(*e*) that the description of the invention must be full, that is, its ambit must be defined, for nothing that has not been described may be validly claimed;

(*f*) that the description must also give all the information that is necessary for successful operation or use of the invention, without leaving such results to the chance of successful experiment; and if warnings are required in order to avert failure, such warnings must be given;

(*g*) that the inventor must act *uberrimae fidei* and give all information known to him that will enable the invention to be carried out to its best effect as contemplated by him.

It is also relevant not only in the determination of the issue of priority of invention, but also in relation to the determination of the issue of the validity of the claims in conflict to note that the disclosures in any application, other than the disclosures in the subject application at the date of filing, cannot be used by the respective subject applicants as an aid to the interpretation of the meaning of the claims in conflict, subject, however, to the two following principles of interpretation of the words in the claims, which principles limit in some measure the foregoing, namely:

(*a*) if the words in a claim are clear and unambiguous, it will not be possible to expand or limit their scope by reference to the body of the specification and

(*b*) where the meaning of terms employed in the claims is not clear and requires explanation, two sources are open to the patentee, namely,

(i) the general meaning of that word as understood by the competent workman in the art, and

(ii) the precise meaning that has been given to it by the patentee in his specification.

Employing the above principles, the plaintiffs' (Traver's) application and then the defendant's (Union Carbide) (Adams and Wakefield) application are now analyzed by examining,

(*a*) the oral or verbal evidence adduced at this trial, and

(*b*) the written evidence,

for the purpose of determining what credible evidence was adduced to the satisfaction of the Court to enable it to make a finding on the balance of probabilities as to issue of priority of invention.

THE PLAINTIFFS' (TRAVER'S) APPLICATION

Traver said in his disclosure affidavit filed in the United States Patent Office, in his application, Exhibit 3, and sworn to on January 4, 1954 (a copy of which is Exhibit D-1 in this trial), that he had conceived his invention and first disclosed it on July 7, 1948. At this trial he contended that the first dates of conception of his invention and disclosure should have been May or June, 1949. He explains the swearing of this affidavit which I find he swore falsely by saying that his lawyer, Horace Dawson, of Chicago, Illinois, told him that it was all right to sign and swear it. Traver does not, even at this trial, say that he got confused about the date nor does he give any explanation from which it could be validly inferred that he did not swear falsely. In effect, he says, and I so find, that he knew he was swearing a false affidavit at that time.

The next alleged oral disclosure concerns the so-called Meisel Press story. Traver said in evidence that on or about May or June, 1949, he had used the Meisel Press at Traver Corporation and has successfully treated polyethylene film and that he had told Mr. Fred J. Pool, Manager of Plastics

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Division of Traver Corporation, about it. He did not mention anything about this Meisel Press story in his U.S. application, Exhibit 3, which was filed on October 26, 1950, or in his first Canadian application, Exhibit 1, filed on May 17, 1952, or in the only application before this Court, Exhibit 2, which was filed July 2, 1953. The first time he mentioned it was on his discovery deposition in the United States interference proceedings held at Palm Beach, Florida, in 1963.

Fred J. Pool, a sometime employee of Traver Corporation, on the other hand, in his evidence at this trial, stated that he did not recall Traver ever telling him anything about treating polyethylene film by using the Meisel Press.

Mr. Junius Cook, the sometime patent attorney of Mr. Traver and the Traver Corporation, also was not told anything about it in 1950 at least, even though Mr. Cook at this trial in discussing the Meisel Press (having investigated the drawing sometime between 1950 and the date of this trial) tried to give some credence to Traver's story.

The defendant's witness, Stopp, who had invented the Meisel Press, gave evidence to the effect that without very substantial alterations, the alleged juxtaposition of elements in it were such that the oxy-dry tubes could not be so located to give a gap of less than one-quarter of an inch to permit successful operation of the machine and therefore I am of opinion that in the circumstances of the alleged operation of the machine, described by Traver in evidence, it would have been impossible to have produced successful treatment of the polyethylene film.

In my opinion, therefore, the story that successful treatment was had by employing the Meisel Press as told by Traver is not true and I so find.

Traver then gave evidence that in 1949 in about June, he caused the said Fred J. Pool, an employe of Traver Corporation, and Arthur Groh, who was the superintendent of the production department, to set up an experimental process for treating polyethylene plastic film by using a conventional oxy-dry tube and a metal ground bar inserting the film in between and they obtained successful treatment by electrically energizing the tube through a conventional 10,000-volt transformer that they used extensively at

Traver Corporation at that time which transformer was connected to the conventional 110-volt power system.

Traver alleged he caused to be connected the single electrode of the oxy-dry tube and the ground bar electrically with the 10,000-volt transformer and plugged the primary winding of the transformer into the socket supplied to the conventional 110-volt A.C. power supply system at the Traver Corporation in Chicago; and the result was an electrical discharge so applied to the side of the polyethylene film facing the tube. He alleges that the gap between the tube and the ground bar was one-eighth of an inch and that on that particular occasion successful treatment was obtained in that ink adhered to the film after the scotch tape test had been employed. The scotch tape test was employed by taking a piece of scotch adhesive tape and pressing it upon the inked portions of the film and then stripping the tape from the sheet. Using such a test, successful treatment was demonstrated, he said, to have been obtained in that the ink still adhered to the film.

This original one-tube set-up, Traver said, was taken apart and is not now in existence but he said that a reproduction of it was made in 1955 and a photograph of this reproduction was made in 1955, a copy of which photograph was filed as Exhibit 14 on this trial.

Traver then alleged that he immediately directed Fred Pool to proceed with the building of a multiple tube set-up exactly like the single tube unit using eight tubes instead of one and using a metal foil instead of a plate. He says that this multiple tube apparatus was set up around about June, 1949, and that the same principles were employed in setting it up as were employed in the single tube apparatus; and he said that this multiple tube apparatus is illustrated by the photograph, Exhibit 14. He said that the original apparatus is not now in existence but that a reproduction of this machine was made in 1955 and a photograph of such reproduction was taken and a copy of that photograph was filed as Exhibit 15.

Then Traver says that as a result of obtaining successful results on this machine, the principle components of which are illustrated in Exhibit 42, he instructed Fred Pool to proceed with adapting a machine known as the Cameron

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slitter so that it could be used in this process to give constant treatment to polyethylene film.

Pool admitted that during all this time, and indeed until sometime between 1954 and 1959, he did not know that corona discharge was essential in any such process for the successful treatment of polyethylene film. Pool said he only found this out from one Kritchever at this later point in time, at which later time Kritchever told him to drop the word corona into any evidence he gave in any proceedings concerning this process.

Kritchever also says he only found out in 1954, or perhaps later, that it was essential that corona discharge be present using any treatment apparatus to obtain successful treatment of polyethylene film.

This Cameron slitter permitted a roll of polyethylene film on a master band to pass over and under numerous rollers and to go around a large top roller and then to be exposed to a bank of oxy-dry tubes and then be rewound at the finish end.

The Cameron slitter in its usual operation was used for slitting rolls of paper and films and this machine was particularly adapted for slitting film from a master roll of a given width into smaller rolls and rewinding these smaller carefully cut rolls on five separate shafts so as to prevent them from intertwining.

Traver said he instructed Pool to take out the knives from the Cameron slitter which was used at the plant of Traver Corporation and place on the most exposed top roller a bank of about five oxy-dry tubes, so placed in a curb bank that they would be set about one-eighth of an inch from the metal roller.

Traver said that this Cameron slitter was so adapted in about September 1949, and that the first time he saw it in operation was about April, 1950, but he said that he received a report on February 3, 1950, on its operation from Fred Pool, with which report were enclosed samples of polyethylene film, one of which was supposed to have been treated by the oxy-dry tube method in the Cameron slitter. A copy of this letter was filed as Exhibit 17.

It should be noted that this letter makes reference to the use of a 15,000-volt transformer, whereas there was no evidence that a 15,000-volt transformer had ever been

purchased by Traver Corporation. In addition, these words appear in the letter, *viz.*:

> . . . Apparently, the higher the voltage, the better the treatment. We are going ahead with a design for commercial treatment using this method.
>
> We still have some problems with the electrostatic field we create in this process, but as we have discussed, perhaps the continuous grounded belt might be helpful.
>
> Will keep you posted as we develop this further.

Traver then stated he returned this letter to Pool after writing on it these words, "Good work! Now let us give this top priority so that we can process all our Poly orders."

Then the evidence was that this Cameron slitter was used at least until the early part of 1951 in the Traver Corporation for treating intermittently polyethylene film.

Then in 1951, according to the evidence, a flat plate apparatus as is illustrated in figure 7 on Exhibit 35 was built and used to treat polyethylene film on a production basis.

In this connection, it should be noted that the drawings included in the United States application, Exhibit 3, filed in the United States Patent Office on October 26, 1950, in effect illustrate the Cameron slitter; and that the drawings in the first Canadian application, Exhibit 1, which was filed in the Canadian Patent Office on May 17, 1952, are illustrated in figures 1, 2, 3 and 4 of Exhibit 35; and that only in the Canadian application, Exhibit 2, filed on July 2, 1963, are there drawings which are illustrated by all the seven figures on Exhibit 35. (In fact, Exhibit 35 is a reproduction of the drawings filed with the application, Exhibit 2.)

The allegations that the first written description or disclosure made by Traver was made by him in the said memorandum from Fred J. Pool under date February 3, 1950, Exhibit 17, must of necessity be confined to the apparatus set-up illustrated by Exhibit 42, and it is significant that in this memorandum there is no mention of spacing, and no mention of any of the things which are associated with corona discharge, and also it is suggested that a 15,000-volt transformer was employed in the operation of this apparatus.

The next written disclosure claimed to have been made by Mr. Traver was in a memorandum prepared by the said Junius F. Cook, sometime patent lawyer for Mr. Traver,

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on August 22, 1950, and on a drawing made at the same time, both of which are filed as Exhibits 25 and 26.

These documents also do not disclose the spacing or voltage employed or a description of any of the other ingredients of the phenomenon of corona discharge.

In addition, although Traver alleged that this Cameron slitter was used on and off all during 1950, there were no production records produced, no production figures given and no evidence adduced as to what products or materials the machine was slitting and treating other than the so-called job pockets, Exhibits 19A, 20A and 23A.

The Cameron slitter was supposed to have been employed in treating the film which was used in making the plastic bags found in the job pockets, which were introduced in evidence as Exhibits 19A, 20A and 23A.

These job pockets, the witness Kritchever stated he found when he searched in the records which had been taken over from Traver Corporation by Container Corporation when the latter purchased certain of the assets of the former. Kritchever did not know the time or the year they were found, but he stated that they were found, after a search was made for evidence following instructions given by Horace Dawson, the patent attorney who completed the preparation of Exhibit 1, after it had been handed over to him after its partial preparation by Mr. Junius Cook. (This is the same Mr. Dawson who also prepared Exhibit 2, and who also prepared Traver's false affidavit, Exhibit D-1.)

The witness Harris called by the plaintiffs alleged that he inspected this adapted Cameron slitter (which it was alleged was producing successful treatment to polyethylene) at Traver Corporation in December, 1949; and he said that Paul Traver, brother of the alleged inventor, told him about it, and took him and showed it to him but did not suggest that he keep such information confidential, even though Visking Corporation, by whom Harris was employed, was the largest producer of polyethylene film in the world and this discovery and the machine which produced successful treatment to polyethylene film would have been at that time a major breakthrough in the art.

On this evidence, I find it is impossible to believe that the Cameron slitter was employed to give successful treatment on any commercial production basis during the year

1950 or that the plastic bags allegedly found in these so-called job pockets were actually in these pockets since 1950 or were from a production run of plastic bags successfully treated by the Cameron slitter in 1950.

It is also impossible to find on this evidence that there was any successful treatment on any commercial production basis (and certainly not by any process that Traver knew and realized was successful because of the *sine qua non,* the presence of corona discharge), by Traver Corporation during 1950 and this is especially so because it is unbelievable, and I so hold, that Horace Dawson, the patent attorney, who as stated finally prepared Exhibit 1 and did prepare Exhibit 2, and under whose direction all the searches for evidence were made, would not have cautioned Kritchever and these other persons (whom he was at that time directing to search for proof of priority of invention by Traver) to take even the most elementary precautions to make identification of these bags provable so that what they found as a result of the searches in the records taken over from Traver Corporation could be submitted to a Court with reasonable expectation that such evidence would be accepted as proving something. But no such identification was made according to the evidence, and therefore it is a reasonable inference that no physical evidence was found that could be so identified and proven. It is significant that Dawson was not called as a witness to tell what he did and what instructions he gave and what he found or caused to be found as a result of those instructions.

The failure to have Dawson testify at this trial in part has assisted me in reaching the conclusions I have, in respect to this part of the evidence, but I would have reached the same conclusions even if I had drawn no inference from his failure to testify.

I am therefore unable to find that there was any oral or verbal evidence adduced proving that there was any invention by Traver disclosed by way of a description which afforded the means of making that which was alleged to have been invented by him at least during all of 1950.

It was also alleged that Traver made certain written disclosures.

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Hereunder is set out some of the relevant documentary evidence concerning this allegation by Traver.

Exhibit 17 filed is a copy of a letter dated February 3, 1950, from Pool to Traver, with an endorsement on it made by Traver after he received it. This the plaintiffs allege was the first written disclosure of the invention of Traver. There is, however, nothing in this memorandum which constitutes a description by Traver "which affords the means of making that which (was alleged to have been) invented."

Exhibit D-3 which was filed, concerns the Maple Crest Wrapper which Traver is supposed to have treated in his deep-freeze unit at his ranch, and it is a memorandum from Traver to Pool, apparently received by Pool on July 31, 1950. From the evidence it appears Pool had sent him two samples, one treated by a so-called flame process of Kritchever and the other treated by the Cameron slitter apparatus by Traver Corporation. On this memorandum, Traver wrote these words, "How did we do it this time?"

These words, it may be said, are hardly the words of an inventor, who now alleges at this trial that he conceived and disclosed both verbally and in writing a description of his invention (and in which he now alleges he realized that corona discharge was the important factor which produced successful treatment) which afforded the means of making that which was invented.

Exhibit D-1 which is the preliminary statement by way of an affidavit which George Traver filed in respect to the U.S. application, Exhibit 3, was apparently called for in the interference proceedings in the United States in respect to the same. This affidavit as stated was prepared by Horace Dawson and sworn by George Traver on January 4, 1954. In this affidavit Mr. Traver swore: "The date upon which the invention was first disclosed to others was July 7, 1948."

Exhibit 25 which is a memorandum dated August 22, 1950, was prepared by Mr. Junius Cook and it concerns a conference among Messrs. Pool, Groh and Cook held on that date.

This is supposed to have represented the full knowledge of Traver at that time of his invention. But it is significant to note that there is no mention of the voltage to be used, no mention of gap, no mention of corona discharge, and no mention of ozone in this memorandum. In other words

there was no description in these documents which afforded the means of making that which was alleged to have been invented.

Exhibit 26, filed, is a sketch made by Cook on August 22, 1950, at the said conference showing the treatment equipment to be used in making the alleged Traver invention operable but it should be noted that it does not indicate any of the ingredients which would show anyone how to produce successful treatment of polyethylene film. In other words, it would fail to teach any competent workman what he had to do to get successful treatment.

Exhibit 34, filed, is a copy of a letter of August 23, 1950, from Cook to Traver Corporation enclosing copies of Exhibits 25 to 26.

Exhibit 3, which is a copy of the U.S. Patent application of George W. Traver which consists of claims, specifications and drawings (essentially the Cameron slitter) to which George W. Traver swears on October 17, 1950, contains these words, namely, that "I have read the foregoing specifications and claims and I verily believe I am the original, first and sole inventor of the invention on discovery in means for and method of conditioning plastic films for printing, described and claimed therein." But again, this document suffers from the same disabilities as Exhibits 25 and 26, and the same comments apply to it.

Exhibit 22 is a copy of a letter dated June 3, 1950, from Fred J. Pool of Traver Corporation, to a customer of it, namely, Graham Paper Company, St. Louis, Missouri. From it, an inference could be drawn that Traver Corporation was not using the Cameron slitter process to treat polyethylene film. Mr. Pool's precise words in this letter are: "Please be advised that recently developed technique will enable us to offer this customer printed Tralon bags with printing far superior to any which has been previously available. For this reason we have slightly delayed shipment of their order so that this new process may be utilized in manufacturing this run. We have scheduled shipment of these bags for the week of June 12, or sooner."

It is possible that Traver Corporation may have been purchasing treated film from Visking Corporation at that time. And it is also possible that someone in the Traver Corporation at that time may have known that there existed

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a process and apparatus to successfully treat polyethylene film to make it ink adherent. But certainly, on the evidence, there is no question about it that neither Traver nor Pool nor anyone in Traver Corporation did know in June, 1950, and indeed until at least 1954, that corona discharge was the factor which was producing successful treatment and the only factor; and certainly there was no evidence adduced that either Traver or anyone acting under his directions did at any time so identify such factor as the critical one. In my opinion, on the evidence, Traver found this out from someone else, long after October, 1950.

The evidence is, as was proved by a demonstration in Court, using the set-up that Traver alleged was used in 1950 and $\frac{3}{8}''$ spacing, that no successful treatment resulted. So Traver, or Traver Corporation, if they produced successful treatment of polyethylene film in 1950 must have employed only the oxy-dry tube set-up, 10,000 volts and $\frac{1}{8}''$ spacing, but nowhere in the evidence is there any proof that in 1950 Traver formulated verbally or in writing a description of such.

Pool in his 3 February 1950 letter, Exhibit 17, did not describe such a set-up; and Traver, in Exhibit 3, did not confine himself to such a set-up and also did not describe it. In Exhibits 25 and 26, also, Cook did not described it. Instead, in both these documents, the matter is put broadly.

The only conclusion therefore that can be reached is that Traver did not nor did anyone under his direction cause to be formulated verbally or in writing a description which afforded the means of making that which Traver alleged he invented, at least up to October 17, 1950.

It is a proper conclusion to find that up to that date, Traver and the others under his direction were experimenting. But now, in retrospect Traver is saying that he used the oxy-dry tube, 10,000 volts and $\frac{1}{8}''$ spacing set-up to get successful treatment and disclosed it, because he now knows that that particular set-up will produce successful treatment, in that corona discharge will be present.

But it is clear that all the evidence adduced on behalf of the plaintiffs (Traver) was directed to the attempt to prove that sometime early in 1950, and at least prior to the alleged material date of Adams and Wakefield (defendant Union Carbide), namely, May 3, 1950, Traver successfully

treated polyethylene film so as to make it ink-adherent using a process in which the phenomenon of corona discharge was present and that he knew and disclosed this factor as the critical one, and disclosed both verbally and in writing a description which afforded the means of making that which was invented.

The attempt was not successful.

Certainly, neither Traver nor anyone acting under Traver's directions discovered at least until after October 17, 1950, that isolating corona discharge as the critical factor was the invention.

I therefore find that the evidence adduced by and on behalf of Traver did not establish that Traver at any time was the inventor of the treatment process involving the phenomenon of corona discharge; and as stated, that alone is the invention which is the subject of these proceedings. Indeed, the evidence adduced by and on behalf of Traver affirmatively established that he was not the inventor of this treatment process.

In coming to this conclusion, I have taken into consideration that it is true that someone, between 1952 and 1953, found out that corona discharge was the factor and slipped in the word corona in a patent application for Traver's alleged invention and the word corona appeared for the first time in the Traver 1953 application, Exhibit 2; but even the person who caused these words to be inserted in that application, Exhibit 2, did not know their true significance. The specification at page 20 only employed the word corona as follows:

> The corona observed during the operation is believed to be visible evidence of such flow of electrons. However, it is believed that the treatment may be effected by the electron flow even without such visible evidence.

I have also taken into consideration that it may be that Traver, without any knowledge of what any other inventor was doing, sometime in 1950, after the month of October, did discover that successful treatment could be had by employing the Cameron slitter process, Exhibit 42, providing a $\frac{1}{8}''$ gap was used (although there is some doubt that there was any precise knowledge or understanding that the width of the gap was critical using this particular apparatus), but he claimed even in 1950 on October 20 in his

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U.S. application, Exhibit 3, too broadly and not what he at this trial now alleges he had invented.

In addition, in his application, Exhibit 2, which is the subject application which this Court has to consider and which was filed July 2, 1953, he may have disclosed in an obtuse way that he may have invented, namely, the process of treatment as employed in the Cameron slitter, the basic elements of which are set out in Exhibit 42, which again required a spacing of no more than $\frac{1}{8}''$, but he did not confine his purported disclosure to this. Instead, he purported in that application to disclose more than he had invented and he also claimed much more than he had invented, and in so doing he fails to establish by credible evidence that at any material time, and certainly not up to 20 October 1950, he had formulated, either in writing or verbally a description which affords the means of making that which he alleges he invented.

In so doing, he breached the legal principles above referred to, which he was required to observe before he would obtain an adjudication that he was a first inventor in this case.

A few references to the evidence will suffice to demonstrate this.

In respect to Exhibit 2, the subject application, Traver admitted on cross-examination that concerning twenty-three matters in the specification, bearing on techniques, processes and equipment, he knew nothing about them, and that the ideas and the words employed concerning them were not his. By this evidence Traver himself established that his application does not comply with section 36 of *The Patent Act* in that the specification does not describe his invention and the means of making that which he alleges he invented, or the operation and use as he now alleges was contemplated by him at any material time, but instead it is as contemplated by others and therefore irrelevant to the issue of who was the first inventor in this case; and he proves that the invention described in it is not his (Traver's) alleged invention.

This cross-examination also clearly established that the specification is obscure and ambiguous, and employing the correct principles in the interpretation of the words, it is clear that it does not teach the competent workman the

means of making that which Traver claims to have invented, and therefore the only reasonable conclusion is that Traver had not formulated at any material time the means of making his alleged invention.

It also established that there was no credible evidence that Traver had made the invention of the corona method of treatment (which all witnesses agreed was essential to successful treatment). At all material times, it is clear he knew nothing about it.

It also established that there was no credible evidence that even at the date of his application, Exhibit 2, viz., 2 July 1953, Traver understood how to make the invention reproducible.

From what has been said above and from the whole of this evidence, also, it is abundantly clear that Traver in his application did not act *uberrimae fidei,* and on this ground alone he fails to establish that he was an inventor of anything, let alone a first inventor of the invention in issue in this case.

These words, however, do not exhaust the findings which could be made in respect to Traver's application, Exhibit 2, but they are sufficient for the purpose of these reasons.

Specifically, therefore, in dealing with the evidence and in elaboration of the finding already made, I find that Traver in the memorandum sent to him by Frederick J. Pool, under date of 3 February, 1950, in the memorandum and drawings prepared by Junius Cook dated 22 August 1950, Exhibits 25 and 26, in his U.S. application for patent dated 26 October 1950, Exhibit 3, and in his Canadian application dated 2 July 1953, Exhibit 2, or at any material time, in any other written document which was introduced in evidence at this trial, or verbally to any person at least until after 22 August 1950 Traver did not formulate a description "which (afforded) the means of making that which (he now alleges he) invented". Traver during all material times overreached to an unconscionable extent and in law he is the inventor of nothing in so far as the subject matter of this trial is concerned.

APPLICATION OF DEFENDANT UNION CARBIDE (ADAMS AND WAKEFIELD) (EXHIBIT D-11)

The evidence of the defendant Union Carbide established that on March 21, 1950, the first successful result was

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obtained and recorded in a book regularly kept in connection with the normal work of George Adams (Exhibit D-12, pages F, G, H, I, J); and that on May 3, 1950, it was recognized that corona was the essential phenomenon which had to be present to accomplish successful treatment of polyethylene film (Exhibit D-12, page S), Adams having between these dates tested, analyzed and discarded ultra-violet light, x-rays, radio frequency, ozone, and passage of electrical current through the sheet.

These written memoranda, and the verbal disclosures to the Visking Corporation employees in March, 1950, each constituted a complete description affording a means of making that which was invented.

On the evidence I find that it was not obvious or natural on March 21, 1950, after the first successful result was obtained, to discover and isolate the corona that was present as the element and the only element that would produce successful treatment of polyethylene film,

This discovery which taught that successful treatment could be accomplished by using any one of the many combinations of electrodes, dielectrics, spacing and voltage so long as corona discharge was present, was genius and invention of the highest order. And it is not detracted from in the least by the fact that Mr. Traver or some other person employed or acting for him or Traver Corporation or independently, may have obtained without knowing why, even before March 21, 1950 (which, as stated above, I do not find), successful treatment of polyethylene film by using the particular combination of an oxy-dry tube, 10,000-volt transformer, and a $\frac{1}{8}''$ spacing and confined solely to such combination, while not recognizing that corona discharge was the essential feature of the invention.

This latter conclusion is supported in many places in the evidence; but one such reference will demonstrate this unequivocally, namely, an excerpt from the cross-examination of Pool, which reads as follows:

> Q. And, so, are we also agreed that as of August 22, 1950 neither you nor Mr. Cook, nor Mr. Traver regarded corona as an essential feature of this alleged invention?
>
> A. I don't think we knew what was taking place or why precisely.

Q. And is it fair to say, then, in view of that lack of knowledge, that you did not specifically regard corona as essential?

A. I don't think we knew at that time whether corona was essential or not. We knew an oxy-dry tube under certain conditions would do the job. Why and what it did, we didn't know.

. . . .

Q. And, last, but not least, the voltage, is that right?

A. We suspected that the voltage we had was satisfactory under the conditions that we were then experimenting with.

Q. You suspected, but you didn't know?

A. We didn't know, that's right.

During all this relevant period Sidney J. Wakefield, the co-inventor with Adams, said he worked cooperatively with Adams and I find he corroborates the evidence of priority of invention and disclosure within the principle or test enunciated in *Christiani v. Rice* (Exhibit D-19, D-20, D-21, D-24).

I find also that the commercial production by Visking Corporation using this invention was commenced on a regular basis at least as early as July 31, 1950 (Exhibits D-17 and D-18).

The conclusion therefore I reach is that as between the plaintiffs and the defendant Union Carbide Adams and Wakefield (for the defendant Union Carbide) were the inventors, within the meaning of section 28 of *The Patent Act*, R.S.C. 1952, chapter 203, as amended, and the cases, of the method (and article resulting therefrom) of treating a polyethylene structure so as to make ink adherent to its surface, by subjecting the surface of such polyethylene which is to be imprinted subsequently, to high voltage electrical stress accompanied by corona discharge.

VALIDITY OF THE CONFLICT CLAIMS

Having so found, it now is necessary, as between the plaintiffs and the defendant Union Carbide to consider the conflict claims (all of which are set out in schedule B to these reasons) to determine to which (and to what extent) of the four remedies provided by section 45(8) of *The Patent Act*, the defendant Union Carbide is entitled.

In this determination the doctrine of substance and

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mechanical equivalence is not relevant, although the contrary was urged for the plaintiffs, such being applicable only in an action for infringement.

Entitlement to a patent containing claims in these proceedings is restricted to those claims (a) found to be legally in conflict, between the parties to this action and (b) which are within the ambit of the invention owned by the defendant Union Carbide, and (c) which are contained in the application, Exhibit D-11, and (d) which comply with all relevant provisions of *The Patent Act*.

The claims put in issue in this action may be considered by separating the claims into seven categories or groups, and having done so, to adjudicate in respect to each:

1. The claims which were not put in conflict between the plaintiffs (Traver) and the defendant Union Carbide by the Commissioner of Patents pursuant to section 45 of *The Patent Act*, but which the parties sought to bring in issue between themselves in these conflict proceedings by their pleadings, I find are not claims in respect to which this Court in this action is required to adjudicate in that the Commissioner of Patents has not taken any action in respect to them pursuant to section 45 of *The Patent Act* and these proceedings are not an alternative method, available to the parties (by these proceedings), of putting claims in conflict. The Commissioner of Patents alone is charged by *The Patent Act* with this duty, and if, in another and a proper case, he should fail to do his duty, there are other appropriate remedies available to any party who should feel aggrieved. If either of the parties in this case felt that the Commissioner of Patents had not done his duty in failing to put certain claims in conflict between them, either or both should have taken other appropriate action to provide a remedy. What the parties purported to do in this case by their pleadings is not appropriate. In respect to this group of claims no other adjudication other than this is therefore made as between the plaintiffs (Traver) and the defendant Union Carbide. These claims are: C-13 to C-17 inclusive, C-21, C-32, C-33, C-38 to C-43 inclusive, C-48, C-61, C-83 and C-107.

(It should be noted, regarding the above claims, that

(a) in respect to claims numbered C-32, C-33, C-38 to C-43 inclusive, C-48 and C-61, that these were the subject matter of the default judgment dated April 16, 1964, obtained by the plaintiffs (Traver) against the defendant Celanese Corporation of America; but such judgment vis-a-vis the issues between the plaintiffs (Traver) and the defendant Union Carbide in this action is immaterial;

(b) in respect to claims numbered C-13 to C-17 inclusive, that they are now included in Canadian Patent No. 662,521 issued May 17, 1963; and in respect to claim numbered C-83, it is now included in Canadian Patent No. 674,718, issued November 26, 1963; but such facts vis-a-vis the issues between the plaintiffs (Traver) and the defendant Union Carbide in this action are also immaterial.)

2. Claim C-77 is the subject of a settlement and was not in issue at the trial of this action.

3. Claims 44 to 52 (which are taken from the so-called Lemon application—see Exhibit 37) which refer to treatment by "glow discharge", or by a "spaced thin and elongated electrode in a high voltage current", or by "an electrode and a gas-filled discharge tube in a high voltage circuit", or by "a thin electrode in a high voltage circuit" I find are not equivalent or synonymous with treatment by corona discharge; and no evidence was adduced that treatment by such methods would be successful, and therefore I find that treatment by such processes is not within the ambit of the invention; and therefore that the defendant Union Carbide is not entitled to the issue of a patent containing such claims.

4. In respect to claims C-1, C-2, C-4, C-5, C-7, C-8, C-10 and C-11 all of which concern treatment of plastics and associated structures, I find that there was no evidence adduced that treatment of such materials by the corona discharge process would be successful, and therefore the defendant Union Carbide is not entitled to the issue of a patent containing such claims.

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5. In respect to claims C-37, C-40, C-67 to C-76 inclusive, all of which deal with the treatment of resins and resinous materials, I find that there was no evidence adduced that treatment of such materials and substances would be successful by the corona discharge process, and therefore Union Carbide is not entitled to the issue of a patent containing such claims.

6. Claims C-3, C-6, C-9, C-12, C-87 to C-89 inclusive, C-92 and C-93 I find are all claims for the method (or article) resulting from employing the method known as the corona discharge method, of treating polyethylene structures so as to make ink adherent to its surface and therefore they are all within the ambit of the invention, and the defendant Union Carbide is entitled to the issue of a patent containing such claims.

7. All other claims in issue, I find, do not legally describe the phenomenon which produces successful treatment to polyethylene structures, and therefore the defendant Union Carbide is not entitled to the issue of a patent containing such claims.

In the result, therefore, the plaintiff's action is dismissed with costs, and the defendant Union Carbide's counterclaim to the extent indicated in these reasons is allowed with costs.

Judgment accordingly.

SCHEDULE "A"

(This is Schedule "A" to the Reasons for Judgment of Gibson J., in Traver Investments Inc., et. al., and Union Carbide and Carbon Corporation, et. al., Court No. A–598.)

Exhibit No. 35, at trial.

435

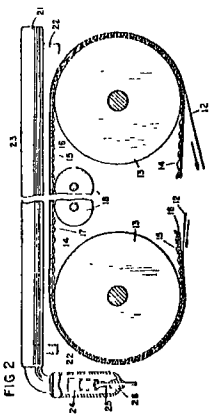


FIG 2

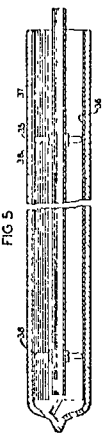


FIG 5

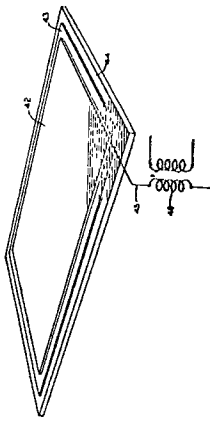


FIG 7

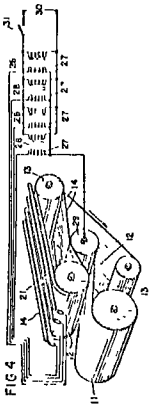


FIG 4

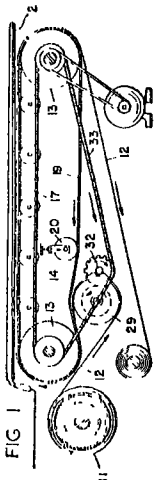


FIG 1

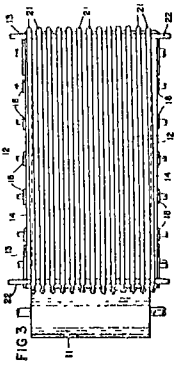


FIG 3

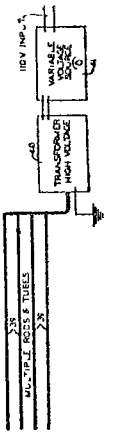


FIG 6

91540—12½

Exhibit No. 41, at trial.

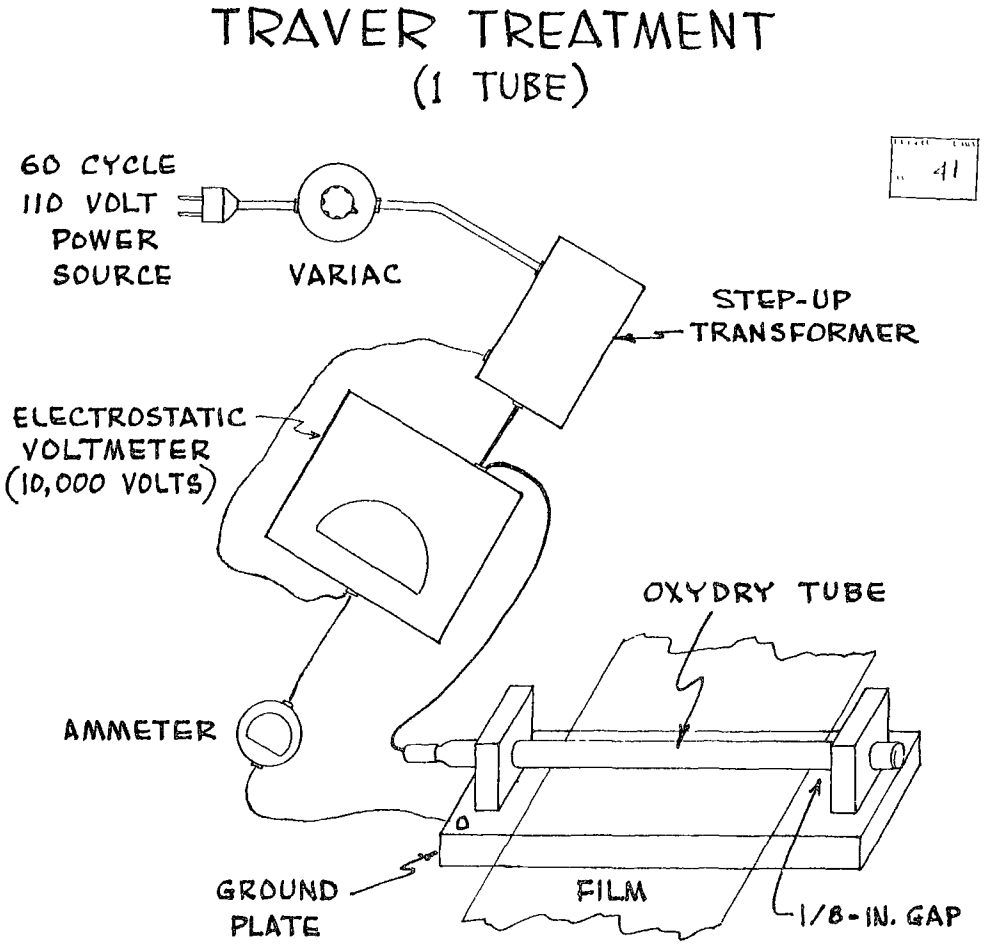
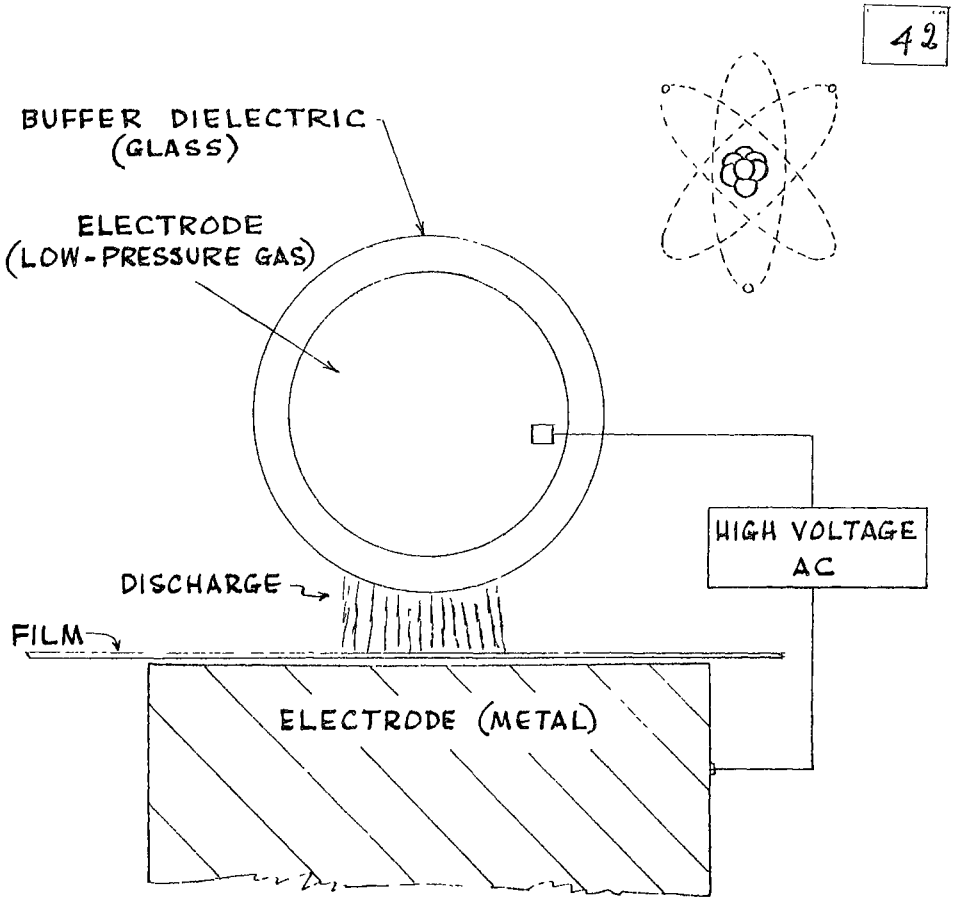


Exhibit No. 42, at trial.

FUNDAMENTAL TREATING ARRANGEMENT



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SCHEDULE "B"

(This is Schedule "B" to the Reasons for Judgment of Gibson J., in Traver Investments Inc., et al., and Union Carbide and Carbon Corporation, et al., Court No. A-598.)

(These claims are set out in Exhibits 4 and 83 filed; and the letter "C" followed by a number at the left designates the respective claims number references.)

C1 The method of treating plastic structure to render a surface thereof adherent to subsequently imprinted ink impressions which comprises directly exposing the surface of the structure to be imprinted to high voltage electric stress accompanied by corona discharge.

C2 The method as set forth in claim 1, characterized in that the plastic structure is a film.

C3 The method as set forth in claims 2 and 3, characterized in that the plastic structure is formed of polyethylene.

C4 The method as set forth in claim 1, characterized in that the treated surface of the structure is subsequently imprinted.

C5 The method as set forth in claim 2, characterized in that the treated surface of the film is subsequently imprinted.

C6 The method as set forth in claim 2, characterized in that the film is formed of polyethylene and the treated surface thereof is subsequently imprinted.

C7 An article of manufacture comprising a plastic structure having a surface resulting from direct exposure to high voltage electric stress accompanied by corona discharge to provide ink adhesion.

C8 An article as set forth in claim 7, characterized in that the plastic structure is a film.

C9 An article as set forth in claims 7 and 8, characterized in that the plastic structure is formed of polyethylene.

C10 An article of manufacture comprising a printed plastic structure wherein the imprints are on a surface which prior to imprinting had been directly exposed to high voltage electric stress accompanied by corona discharge.

C11 An article as set forth in claim 10 wherein the plastic structure is a film.

C12 An article as set forth in claim 11 wherein the polyethylene plastic structure is formed of polyethylene.

C13 A method of treating plastic film to improve the adhesion of ink impressions subsequently imprinted thereon which comprises subjecting the directly opposite surfaces of said plastic film simultaneously to the same zone of action of high voltage stress accompanied by corona discharge.

C14 A method as set forth in claim 13 wherein the film is a polyethylene film.

C15 A method of treating plastic film to improve the adhesion of ink impressions subsequently imprinted thereon which comprises continuously passing said film through a zone of action of high voltage stress accompanied by corona discharge and maintaining said film in said zone to expose simultaneously the directly opposite surfaces thereof to the action of said high voltage stress accompanied by corona discharge.

C16 A method as set forth in claim 15 wherein the film is a polyethylene film.

C17 An apparatus for treating plastic film to improve the adhesion thereof to ink impressions subsequently imprinted thereon comprising a pair of stationary electrodes disposed in parallel spaced relationship to provide a gap therebetween, means to produce high voltage stress accompanied by corona discharge in said gap, means to pass a film through said gap, and means on each of the opposed surfaces of the electrodes to space said film during passage through said gap from said electrodes whereby the directly opposite surfaces of the film are simultaneously exposed and subject to said high voltage stress accompanied by corona discharge upon passage through said gap.

C18 The method of treating a polyethylene body to render a surface thereof adherent to decorative matter, which consists of subjecting the surface portion to the action of an electrostatic discharge to increase the unsaturation of surface molecules of said treated surface, whereby upon the application of decorative matter to said treated surface, said matter is strongly adherent thereto.

C19 The method of treating a polyethylene body to render a surface thereof adherent to decorative matter, which consists of subjecting said surface to the action of electrostatic discharge while employing an alternating current, to render the surface molecules of said treated surface receptive and strongly adherent to decorative matter applied thereto.

C20 The method of treating a surface of a polyethylene body to render the same adherent to decorative matter, which comprises subjecting said surface to electronic bombardment of at least sixty cycles per second.

C21 The process of claim 20 in which the frequency is substantially in excess of sixty cycles per second.

C22 The method of treating a polyethylene body to render a surface thereof adherent to decorative matter, which consists of subjecting said surface to the action of electrostatic discharge under a voltage in excess of ten thousand volts, to increase the unsaturated linkages in the polyethylene surface molecules, whereby upon the application of decorative matter to said treated surface, said matter is strongly adherent thereto.

C23 A decorated polyethylene product, comprising a polyethylene body having on one unoxydized surface thereof polyethylene molecules which are unsaturated, and decorative material adhering to such surface.

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C24 A decorated film product, comprising a polyethylene film having on an unoxydized surface thereof polyethylene molecules having double bonds, and decorative material adhering to said surface.

C25 Process for the treatment of the surface of a body of polyethylene resin, which comprises subjecting a surface of a body of polyethylene resin substantially uniformly to a diffuse electrical discharge to improve the receptivity of said surface for printing inks.

C26 Process for the treatment of the surface of a film of polyethylene resin, which comprises subjecting a surface of a separate, discrete, self-supporting film of polyethylene resin to a diffuse electrical discharge to improve the receptivity of said surface for printing inks.

C27 Process for the treatment of the surface of a film of polyethylene resin, which comprises passing said film continuously into a diffuse electrical discharge, said surface being treated substantially uniformly with said discharge to improve the receptivity of said surface to printing inks, and continuously taking up said film while retaining its treated surface.

C28 Process for the treatment of the surface of a film of polyethylene resin, which comprises treating a surface of a separate, discrete, self-supporting film of polyethylene resin to improve the receptivity of said surface for printing inks by passing said film continuously between electrodes while maintaining a sufficiently high difference in potential between said electrodes to cause a diffuse electrical discharge between said electrodes, continuously moving said film relative to said electrodes, and continuously taking up said film while retaining its treated surface.

C29 Process for the treatment of the surface of a film of polyethylene resin, which comprises subjecting a surface of a film of polyethylene resin to a diffuse electrical discharge to improve the receptivity of said surface for printing inks by passing said film continuously between electrodes, while maintaining a sufficiently high difference in potential between said electrodes to cause said diffuse electrical discharge between said electrodes and while limiting said discharge to prevent the formation of localized arcs through weak spots in said film, said surface being treated substantially uniformly with said discharge, and continuously taking up the resulting treated film with its treated surface intact.

C30 Process for the treatment of a polyethylene resin which comprises subjecting said resin to a diffuse electrical discharge by passing said polyethylene resin between electrodes to which a high electrical potential is applied and between which is positioned a sheet of dielectric material.

C31 Process for the treatment of the surface of a separate, discrete, self-supporting film of polyethylene resin, which comprises passing said film continuously between electrodes, maintaining said electrodes at a sufficiently high difference in potential to cause a diffuse electrical discharge between said electrodes, bringing the surface of the film to be treated uniformly into contact with said discharge to improve the

receptivity of said surface to printing inks while maintaining a solid dielectric between said film and one of said electrodes, continuously moving said film relative to said electrodes, and continuously taking up the resulting treated film with its treated surface intact.

C32 Process for the treatment of the surface of a body of polyethylene resin, which comprises subjecting a surface of said body to a diffuse electrical discharge to improve the receptivity of said surface to coating materials and then coating at least a portion of the resulting treated surface.

C33 Process for the treatment of the surface of a body of polyethylene resin, which comprises subjecting a surface of said body to a diffuse electrical discharge to improve the receptivity of said surface to coating materials and then coating at least a portion of the resulting treated surface with a coating material which is fluent and continuous under the conditions of coating.

C34 Process for the treatment of the surface of a body of polyethylene resin, which comprises subjecting a surface of a body of polyethylene resin to a diffuse electrical discharge to improve the receptivity of said surface for printing inks and then printing on the resulting treated surface with a printing ink.

C35 Process for the treatment of the surface of a film of polyethylene resin, which comprises subjecting a surface of a film of polyethylene resin to a diffuse electrical discharge to improve the receptivity of said surface for printing inks and then printing on the resulting treated surface with a printing ink.

C36 Process for the treatment of the surface of a film of polyethylene resin, which comprises subjecting a surface of a film of polyethylene resin to a diffuse electrical discharge to improve the receptivity of said surface for printing inks by passing said film continuously between electrodes while maintaining a sufficiently high difference in potential between said electrodes to cause a diffuse electrical discharge between said electrodes, said surface being treated substantially uniformly with said discharge, and then printing on the resulting treated surface with a printing ink.

C37 Apparatus for the treatment of a continuous film of resin, said apparatus comprising an electrode, means for causing a diffuse electrical discharge to emanate from said electrode, means for moving a continuous film of resin past said electrode with a surface of said film in said discharge and means for taking up said film while retaining its treated surface.

C38 Apparatus for the treatment of a continuous film of polyethylene resin, said apparatus comprising a pair of electrodes, means for causing a diffuse electrical discharge between said electrodes, means for moving a continuous film of polyethylene resin continuously between said electrodes with its surface uniformly in said discharge, and a windup roll for continuously taking up the resulting treated film with its treated surface intact.

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C39 Apparatus as set out in claim 38 in which one of said electrodes comprises a plurality of parallel wires spaced from the surface of said film.

C40 Apparatus for the treatment of a continuous film of resin, said apparatus comprising electrodes, means for causing a diffuse electrical discharge between said electrodes, means for moving a continuous film of resin continuously between said electrodes with a surface of said film in said discharge, and solid dielectric interposed between one of said electrodes and said film for limiting the current between said electrodes to prevent localized arcs from passing between said electrodes through weak spots or pin holes in said film.

C41 Apparatus for the treatment of polyethylene resins, which comprises a pair of electrodes, means for applying a high potential to said electrodes to cause a diffuse electrical discharge between said electrodes, means for supporting the polyethylene resin between said electrodes with a surface of said resin exposed to said discharge and a sheet of dielectric material between said polyethylene resin and at least one of said electrodes.

C42 A method of treating a surface of an article formed of polyethylene or similar material having a wax-like surface to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises exposing the surface to a concentrated high voltage glow discharge of electricity along a narrow line at a voltage and for a time sufficient to modify said surface to render the latter adherent to the coatings.

C43 A method of treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises moving the article into a concentrated high voltage glow discharge of electricity along a narrow line at a voltage and for a time sufficient to modify the surface facing said discharge to render the latter adherent to the coatings.

C44 A method of treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises moving the article into the space between narrow spaced electrodes in a concentrated high voltage circuit to expose a surface of said article to a high voltage glow discharge at a voltage and for a time sufficient to modify said surfaces to render the latter adherent to the coatings.

C45 A method of treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises moving the article into the space between an electrode spaced from a gas-filled discharge tube, said electrode and tube being in a high voltage circuit, thereby exposing at least a portion of a surface of said article to a high voltage glow discharge, the voltage and time of exposure being sufficient to render said surface adherent to the coatings.

C46 A method of treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring,

adhesive or the like, which comprises passing the article over a metal roller and between the latter and a thin electrode spaced therefrom, said roller and electrode being in a high voltage circuit, thereby exposing at least a portion of a surface of said article to a high voltage glow discharge, the voltage and time of exposure being sufficient to render said surface adherent to the coatings.

C47 A method of treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises passing the article over a metal roller and between the latter and a gas-filled discharge tube spaced therefrom, said roller and tube being in a high voltage circuit, thereby exposing at least a portion of a surface of said article to a high voltage glow discharge, the voltage and time of exposure being sufficient to render said surface adherent to the coatings.

C48 A method of treating opposed surfaces of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, which comprises moving the article over an electrode having a layer of non-conducting semi-porous material on the surface thereof and between said electrode and another electrode spaced therefrom, said electrodes being in a high voltage circuit, thereby exposing at least portions of opposite surfaces of said article to a high voltage glow discharge, the voltage and time of exposure being sufficient to render said surfaces adherent to the coatings.

C49 Apparatus for treating the surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, comprising spaced thin and elongated electrodes in a high voltage circuit, said electrodes being spaced apart to permit the article to be moved therebetween with a surface spaced from one electrode, and the voltage of the circuit being sufficient to modify said surface to render the latter adherent to the coatings.

C50 Apparatus for treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, comprising an electrode and a gas-filled discharge tube in a high voltage circuit, said electrode and tube being spaced apart to permit the article to be moved therebetween with a surface spaced from one of them, and the voltage of the circuit being sufficient to modify said surface to render the latter adherent to the coating.

C51 Apparatus for treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink, colouring, adhesive or the like, comprising a metal roller and a thin electrode in a high voltage circuit, said roller and electrode being spaced apart so that the surface of an article running over the roller facing the electrode is spaced therefrom, and the voltage of the circuit being sufficient to modify said surface to render the latter adherent to the coatings.

C52 Apparatus for treating a surface of an article formed of polyethylene or similar material to receive coatings, such as printing ink,

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colouring, adhesive or the like, comprising a metal roller and a gas-filled discharge tube in a high voltage circuit, said roller and tube being spaced apart so that the surface of an article running over the roller facing the tube is spaced therefrom, and the voltage of the circuit being sufficient to modify said surface to render the latter adherent to the coatings.

C53 Process for the treatment of a polyethylene resin which comprises subjecting a surface of said resin to a diffuse electrical discharge in an electrical field having a substantially uniform potential gradient to improve the receptivity of said surface to printing inks.

C54 Process for the treatment of a polyethylene resin which comprises subjecting a surface of said resin to a diffuse electrical discharge by passing said polyethylene resin between a pair of plate electrodes of extended area to which a high electrical potential is applied to improve the receptivity of said surface to printing inks.

C55 Process for the treatment of a polyethylene resin which comprises subjecting a surface of said resin to a diffuse electrical discharge by passing said polyethylene resin between a pair of plate electrodes of extended area positioned uniformly distant from one another to which a high electrical potential is applied to improve the receptivity of said surface to printing inks.

C56 Process for the treatment of a polyethylene resin which comprises subjecting a surface of said resin to a diffuse electrical discharge in an electrical field having a substantially uniform potential gradient while another surface of the polyethylene resin is in contact with a solid surface to improve the receptivity of the first-mentioned surface to printing inks without imparting to said other surface an improved receptivity to printing inks.

C57 Process for the treatment of polyethylene resin film which comprises passing a discrete, separate self-sustaining film of a polyethylene resin between electrodes maintained at a sufficiently high potential difference to cause a diffuse electrical discharge between said electrodes, while one surface of said film is in contact with a solid surface and another surface of said film is exposed to said diffuse electrical discharge so that an improved receptivity to printing inks is imparted to said exposed surface while the surface which is in contact with said solid surface does not develop receptivity to printing inks.

C58 Process for the treatment of a polyethylene resin film which comprises continuously passing a discrete, separate self-sustaining film of a polyethylene resin between a pair of electrodes of extended area positioned uniformly distant from one another and maintained at a sufficiently high potential difference to cause a diffuse discharge between said electrodes while all of the surface of one side of said film is exposed to said discharge and all of the surface of the other side of said film between said electrodes is in contact with a solid surface so that an improved receptivity to printing inks is imparted to said exposed side while said other side does not develop receptivity to printing inks, and continuously moving said film away from said

electrodes while maintaining the discharge-treated surface of said film intact.

C59 Apparatus for the treatment of polyethylene resin which comprises a pair of electrodes of extended surface area, means for applying a high potential to said electrodes to cause a diffuse electrical discharge between said electrodes, and means for supporting the polyethylene resin between said electrodes with a surface of said polyethylene resin exposed to said discharge.

C60 Apparatus for the treatment of polyethylene resin which comprises a pair of electrodes of extended surface area, means for applying a high potential to said electrodes to cause a diffuse electrical discharge between said electrodes, and means for moving the polyethylene resin between said electrodes with a surface of said polyethylene resin exposed to said discharge

C61 Apparatus for the treatment of polyethylene resin which comprises a pair of electrodes of extended surface area uniformly spaced from one another, means for applying a high potential to said electrodes to cause a diffuse electrical discharge between said electrodes, and means for moving the polyethylene resin between said electrodes with a surface of said polyethylene resin exposed to said discharge.

C62 Apparatus for the treatment of polyethylene resin which comprises a pair of electrodes, means for applying a high potential to said electrodes to cause a diffuse electrical discharge between said electrodes, and means for supporting the polyethylene resin with the surface in contact with a solid between said electrodes and with another surface exposed to said discharge, and means for moving said polyethylene resin relative to said electrodes and said solid.

C63 Apparatus for the treatment of resin film which comprises an arcuate convex electrode of extended area for supporting a film of resin continuously supplied thereto with said film about said electrode, a second electrode, said second electrode being of extended area, arcuate and concave, and being spaced from said first electrode with its concave side facing the convex side of said first electrode, and means for maintaining said electrodes at a potential difference such that there is a diffuse electrical discharge between said electrodes.

C64 Apparatus as set forth in claim 63 in which said first electrode is a rotatable cylinder.

C65 Apparatus as set forth in claim 64 in which a sheet of dielectric material is spaced between one of said electrodes and said film of resin on said cylindrical electrode.

C66 Apparatus as set forth in claim 65 in which said second electrode is spaced uniformly distant from said cylindrical electrode, said apparatus including a guide for leading said film away from said cylinder electrode after said film has been subjected to said discharge.

C67 The method of rendering a resinous surface wettable which comprises subjecting said surface to a corona discharge.

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C68 The method of rendering a resinous material wettable which comprises passing said resinous material between two electrodes which are maintained at such a potential difference as to produce a corona discharge therebetween.

C69 The method of increasing the wettability of resinous material which is normally not wettable, which comprises subjecting said resinous material to a corona discharge.

C70 The method of treating resinous material to increase its wettability and adherent qualities which comprises subjecting said resinous material to a corona discharge.

C71 The method of rendering a resinous material adherent which comprises passing said resinous material between two electrodes which are maintained at a potential difference which produces corona therebetween.

C72 The method of increasing the adherent quality of resinous material which comprises subjecting it to a corona discharge.

C73 The method of rendering a normally nonadhering resinous material more adherent which comprises exposing said material to electrical corona.

C74 The method of rendering resinous material adherent which comprises exposing said material to electrical corona for a period of time, depending upon the degree of adherence desired.

C75 The method of rendering resinous material wettable which comprises electrically exposing said material to electrical corona for a period of time, depending upon the degree of wettability desired.

C76 Apparatus for subjecting resinous material to a corona discharge comprising a first electrode, a second electrode spaced from said first electrode, means to apply a corona discharge producing potential to said electrodes, and means to pass said material between said electrodes.

C78 Process which comprises subjecting a surface of a body of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge to improve the receptivity of said surface for coating materials.

C79 Process which comprises subjecting a surface of a sheet of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge in a gaseous atmosphere to improve the receptivity of said surface for coating materials.

C80 Process which comprises subjecting a surface of a sheet of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge by passing said sheet continuously into close proximity to an electrode from which said diffuse discharge is emanating, said discharge being insufficient to rupture said film.

C81 Process which comprises subjecting a surface of a sheet of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge by passing said sheet continuously between electrodes while maintaining a sufficiently high difference in potential between said electrodes to cause a diffuse discharge to emanate from at least one of said electrodes and taking up the resulting coated sheet material while maintaining its treated surface.

C82 Process which comprises subjecting the surface of a body of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge insufficient to rupture the film in an electrical field having a substantially uniform potential gradient.

C83 Process which comprises subjecting the surface of an article of organic polymeric material selected from the group consisting of polyamides, polyethylene terephthalate, polystyrene and polyvinyl chloride to a diffuse electrical discharge while one surface of said article is in contact with a solid surface of dielectric material.

C84 Process which comprises subjecting a surface of a sheet of polystyrene material to a diffuse electrical discharge in a gaseous atmosphere to improve the receptivity of said surface for coating materials.

C85 Process which comprises subjecting a surface of a sheet of organic polymeric material to a diffuse electrical discharge in a gaseous atmosphere to improve the receptivity of said surface for coating materials, said polymeric material being a polyamide.

C86 Process which comprises subjecting a surface of a sheet of polyethylene terephthalate to a diffuse electrical discharge in a gaseous atmosphere to improve the receptivity of said surface for coating materials.

C87 A method for the production of a polyethylene terephthalate film having improved surface bonding properties that comprises treating a polyethylene terephthalate film which has been molecularly oriented by drawing but has not been heat-set, by subjecting a surface of the film to high voltage electric stress accompanied by corona discharge.

C88 The process of treating a polyethylene surface of a sheet of solidified polyethylene to improve the bonding property of the treated surface which comprises, directing a corona discharge into contact with the surface to be treated in an oxygen containing atmosphere.

C89 The process of claim 88 and wherein the corona discharge is generated by electrodes between which the solidified sheet passes.

C90 The process of treating the surface of solidified polyethylene to improve the bonding property of inks and adhesives to the treated surface consisting in exposing the surface to electron bombardment in proximity to an electron emitting source.

C91 The process of treating the surface of a solidified polyethylene article to improve the bonding property of inks and adhesives to the

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treated surface consisting in exposing the surface to electron bombardment in an electrostatic field and in proximity to an electron emitting element.

C92 The method of treating a polyethylene body to render a surface thereof adherent to subsequently imprinted ink impressions which consists of directly exposing the surface of the body to high voltage corona discharge.

C93 The method of treating a polyethylene body to render a surface thereof adherent to subsequently imprinted ink impressions thereon which consists of directly exposing the surface of the body to a high voltage corona discharge and then printing upon said exposed surface.

C94 The method of treating a polyethylene body to render a surface thereof adherent to subsequently imprinted ink impressions thereon which consists of exposing the surface of the body to a high voltage corona discharge and then printing upon said exposed surface

C107 An apparatus for treating plastic film to improve the adhesion thereof to ink impressions subsequently imprinted thereon comprising a pair of electrodes disposed in spaced relationship to provide a gap therebetween, means to produce high voltage stress accompanied by corona discharge in said gap, means to pass a plastic film through said gap, and means on each of the opposed surfaces of the electrodes to space said film during passage through said gap from said electrodes whereby both surfaces of the film are simultaneously exposed and subjected to said high voltage stress accompanied by corona discharge.