#18/D
mcquade
4-5-82

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of

JAMES R. DIEHR, II and THEODORE A. LUTTON

Serial No. 602,463

Filed August 6, 1975

For DIRECT DIGITAL CONTROL OF RUBBER MOLDING PRESSES

Group Art Unit 236

Examiner: Joseph F. Ruggiero

September 25, 1981

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Dear Sir:

AMENDMENT

After the Supreme Court's Decision

Please enter 9/f

During the hearings at the Board of Appeals, the Court of Customs and Patent Appeals, and the U.S. Supreme Court there seemed to be no question as to what the claims meant. However, from the comments of some attorneys since then, it appears that, in the opinion of some, the claims do not literally say what everyone involved up to now has interpreted them as meaning. Therefore, the following amendments, fully supported by the application, are offered in the hope that they will clarify the meaning of the claims even to very critical readers and will therefore conform the literal meaning to the very meaning assumed by all the board members, judges, and justices

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

that have considered the case.

Please rewrite claims 1, 5, 7 and 11 as follows:

(Twice Amended)

1./ A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:

providing said computer with a data base for said press including at least,

natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the press,

initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,

constantly providing the computer with the temperature (Z),

repetitively [calculating] performing in the computer, at frequent intervals during each cure, integrations to calculate from the series of temperature determinations the Arrhenius equation for reaction time during the cure, which is

$$\ln v = CZ + x$$

where v is the total required cure time,

repetitively comparing in the computer at [said] frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

D1 cont'd

and said elapsed time, and

opening the press automatically when a said comparison indicates [equivalence] completion of curing.

(Twice Amended)

D2

5./ A method of operating a plurality of rubber-molding presses simultaneously curing precision molded compounds in conjunction with a computer, comprising:

providing said computer with a data base for each said press including at least,

natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the said press,

constantly informing the computer of the temperature (Z) of each mold,

informing the computer of the batch of the compound being molded in each mold,

constantly informing the computer of the elapsed time that the compound has been in each mold,

repetitively [calculating] performing for each said press at frequent periodic intervals during each cure in the computer, integrations to calculate from the series of temperature determinations the Arrhenius equation to determine the total required cure time, which is $\ln v = CZ + x$, where v is the total required cure time,

repetitively comparing at [said] frequent periodic intervals in the computer the calculated total required cure time and the elapsed time for each said press, and

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

opening each said press automatically when its elapsed time has reached its calculated total required cure time.

(Twice Amended)

7./ A method of manufacturing precision molded articles from selected synthetic rubber compounds with the aid of a digital computer, comprising:

providing said computer with a data base for a molding press to be used in the molding, including at least,

natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (X) dependent upon the geometry of the particular mold of the press,

installing prepared unmolded synthetic rubber of one said compound in a molding press cavity,

closing said press,

initiating an interval timer associated with said computer upon the closure of the press for monitoring the elapsed time of said closure,

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,

constantly providing the computer with the temperature (Z),

repetitively [calculating] performing in the computer, at frequent intervals during each cure, integrations to calculate from the series of temperature determinations the Arrhenius equation for reaction time during the cure, which is

$$\ln v = CZ + x$$

where v is the total required cure time,

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-5351

D3 Cancelled

repetitively comparing in the computer at [said] frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time,

opening the press automatically when a said comparison indicates completion of curing [equivalence], and

removing the resulting precision molded article from the press.

D4

(Amended)

11./ A method of manufacturing precision molded articles from selected synthetic rubber compounds in an openable rubber molding press having at least one heated precision mold, comprising:

(a) heating said mold to a temperature range approximating a predetermined rubber curing temperature,

(b) installing prepared unmolded synthetic rubber of a known compound in a molding cavity of a predetermined geometry as defined by said mold,

(c) closing said press to mold said rubber to occupy said cavity in conformance with the contour of said mold and to cure said rubber by transfer of heat thereto from said mold,

(d) initiating an interval timer upon the closure of said press for monitoring the elapsed time of said closure,

(e) heating said mold during said closure to maintain the temperature thereof within said range approximating said rubber curing temperature,

(f) constantly determining the temperature (Z) of said mold at a location closely adjacent said cavity thereof throughout closure of said press,

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

(g) repetitively [calculating] performing at frequent periodic intervals throughout closure of said press integrations to calculate from the series of temperature determinations the Arrhenius equation for reaction time of said rubber to determine total required cure time v as follows:

$$\ln v = cz + x$$

wherein c is an activation energy constant determined for said rubber being molded and cured in said press, [z is the temperature of said mold at the time of each calculation of said Arrhenius equation,] and x is a constant which is a function of said predetermined geometry of said mold,

(h) for each repetition of calculation of said Arrhenius equation herein, comparing the resultant calculated total required cure time with the monitored elapsed time measured by said interval timer,

(i) opening said press when a said comparison of calculated total required cure time and monitored elapsed time indicates completion of curing [equivalence], and

(j) removing from said mold the resultant precision molded and cured rubber article.

D 4 Cont'd

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6351

R E M A R K S

Claims 1, 5, and 7, as they stood prior to this amendment and as they went up to the Supreme Court, can be found in the preliminary amendment of August 5, 1975. Claim 11 can be found in the first amendment of April 19, 1976, following a first official action in this continuation application. The Examiner may want to refer to these papers.

As explained above, these amendments are being made to clarify the claims, actually conforming them to their meaning as understood throughout the prosecution of the application and in the appeals in the CCPA and the Supreme Court.

Claim 1 is amended to recite the step of repetitively performing integrations to calculate the Arrhenius equation from the series of temperature determinations. Previously, that portion of the claim recited simply "repetitively calculating in the computer ... the Arrhenius equation ... [by the formula] $\ln v = CZ + x$ where v is the total required cure time", and repetitively comparing each v calculation and the elapsed time.

This would be technically incorrect, if it were interpreted to mean that each calculated v value is based only upon the most-recent temperature determination, taking no account of all past variations in temperature. Such an interpretation is at odds with the remainder of the claim and with the entire application. The result would be erratic and inaccurate openings of the molds, probably occurring with a local increase in temperature as if the temperature had been at that increased valve all along, rather than the result to which the invention is directed. The point of the amendment is to guard against such an interpretation and to assure correct

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

interpretation of the claims.

This amendment to claim 1 clarifies the manner in which the calculations are performed, i.e. with integrations to take into account all of the series of temperature determinations up to the point of each integration. This is as disclosed in the specification at page 7, lines 5 through 8. It is also emphasized at page 7, lines 13 through 19. See also page 6, lines 4 through 6.

Another amendment to claim 1 is the removal of the word "said" in the first line of the next-to-last paragraph. As claim 1 stood, it might have been interpreted as equating the "frequent intervals" in that paragraph with the "frequent intervals" above in the "repetitively calculating" paragraph. However, it may be that the comparison of the most-recently calculated total cure time with the elapsed time occurs much more frequently than the occurrence of the actual calculations. For example, see page 3, lines 21-25 in the specification, where it is stated that the calculations may occur every ten seconds, but the comparisons every second. The inclusion of the word "said" by amendment to the claim August 5, 1975, was inadvertent, and it should be deleted, even though it has created no problems in the proceedings up through the Supreme Court.

Finally, claim 1 concluded with the molding press being opened when a comparison indicates equivalence. However, precise equivalence would rarely occur, and what was intended was that the mold press open when sufficient time has elapsed. This would usually be slightly more than sufficient time, since the comparisons are made at finite intervals (e.g., one second) and precise equivalence would almost always occur between comparisons. Although the claim was certainly understood in

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361

the way it was intended, it is preferred that amendment be made to clear up any possible doubts. Thus, the claim is amended to say that the molding press is opened when a comparison indicates "completion of curing".

Claim 5 is amended in the same manner as claim 1, with respect to the first two amendments made there, for the same reasons. In the last line of claim 5, different wording was used to define when the mold press is opened; so this does not require amendment.

Claim 7 is amended as claim 1, in all three areas, for the same reasons explained above with respect to claim 1.

Claim 11 is amended in paragraph (g) similarly to claim 1. Two paragraphs below, a clause defining the term Z is deleted, because Z is already defined above. In paragraph (h) no change is necessary, because the phrase "said frequent periodic intervals" is not included here. It is stated that a comparison occurs for each repetition of the calculation involving the Arrhenius equation, and this certainly would not preclude the comparisons occurring more frequently than the calculations.

In paragraph (i), the same amendment is made as was made at the ends of claims 1 and 7.

These amendments are believed to correct and clarify the claims, without changing the subject matter as found to be allowable in the Supreme Court appeal. It is respectfully requested that the amendments be entered and that the application be passed to allowance.

Respectfully submitted,

Robert E. Wickersham
Reg. No. 16,150
Attorney for Applicants
(415) 781-6361

LAW OFFICES
OWEN, WICKERSHAM
& ERICKSON
A PROFESSIONAL CORPORATION
433 CALIFORNIA STREET
11TH FLOOR
SAN FRANCISCO 94104
(415) 781-6361