COMMISSIONER'S DECISION

UNOBVIOUS: Inventive Step over Prior Art Teaching.

CLAIMS DEFINITE: Functional Definition of Desired Result.

The mode of producing snow by crystallization of a thin film as it leaves the trailing edge of rotating blades not taught by the prior art. Amendment of claims accepted explicitly stating the limitations essential to produce the desired result.

FINAL ACTION: Overcome by Amendment.

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This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated September 22, 1972 on application 055,093. This application was filed on June 23, 1969 in the name of David B. Ericson et al, and refers to an "Atomization Apparatus And Method." The Patent Appeal Board conducted a Hearing on September 12, 1973, at which Mr. P. Kirby and Mr. M. Cohen represented the applicant.

In the prosecution terminated by the Final Action the examiner refused claims 1 - 7, 9 - 14 and 16 - 19 for failing to define any inventive step over the prior art, and for being indefinite.

The cited prior art is as follows:

Canadian Patents:

1)	46,068	May 16, 1894	Anderson
2)	240,128	May 13, 1924	Kehoe et al

United States Patents:

3)	2,070,728	Feb. 16, 1937	Hanft
4)	2,671,650	Mar. 9, 1954	Jauch et al
5)	2,968,164	Jan. 17, 1961	Hanson

In response to the Final Action the examiner stated in part:

> Claims 1, 2, 3, 16 and 17 in this application stand rejected for failing to define an inventive step over the state of the prior art shown by any one of patents 1), 2), 3) or 4). All structure defined in these claims is shown by the references. The step of applying the water to the blades to form a film as set forth in claims 16 and 17 is not patentable because it is inherent in the operation of the devices of these patents.
>
> Claims 9-14, 18 and 19 stand rejected for failing to define an inventive step over any one of patents 1), 2), 3), or 4) in view of patent 5). The use of rotating surfaces to atomize water

> is common knowledge as shown in patents 1) to 4). To use these atomizers to make snow is held to be a mere matter of choice and expected skill. Hanson shows it is known and old to use a rotating surface, 28 Fig. 2 of his patent, to throw or atomize water from said surface into an air stream for the purpose of making snow. Thus it is clear that Hanson teaches using an atomizer like device to form snow. To substitute known atomizers for the Hanson type and make snow is held to be a mere substitution of equivalents and but expected skill.
>
> Claims 4-7 and 9-14 stand rejected for failing to structurally distinguish over the art Patents 2), 3) and 5), particularly Kehoe's et al. There is nothing in Kehoe to prevent it from operating in the same manner as the device set forth in claims 4 or 9. Functional qualification and use to which a device is put do not provide structural distinction over the art. They are in the realm of desired result. Claims 5 to 7 and 9 to 14 do not set forth any structure which is not obvious in view of the art and thus they stand rejected. That these claims set forth "fan" blades, while the reference Kehoe shows water driven blades is held not an inventive difference. The term "fan blade" can mean only a device resembling a fan and this the blades in the references do.
>
> ...
>
> Claims 1-7, 9-14 and 16-19 stand rejected as indefinite. Each of these claims sets forth the film formation and atomization features only in general and vague terms qualified by a statement of desired result. The precise nature of the shape of the blade surfaces, their extent, rotational speed and the rate of feed of liquid thereto are not set forth nor are the precise location and configuration of the liquid feeding ports so as to form a film only set forth. The above presently absent characteristics are held essential to clearly define that structure which will have substantially all liquid depart from the blade at the trailing edge. This rejection on indefiniteness is made without reference to the prior art and is made solely on the basis of the requirements for definite and clear claims as set forth in Section 36 of the Patent Act.

The applicant, in his response dated December 14, 1972 to the Final Action, stated in part:

> The key to applicant's invention is the provision of a spinning blade atomizer wherein water is disposed on the surface of the blade in the form of a thin film that migrates to the trailing edges of the blades and then leaves the trailing edges in the form of finely divided particles that are directed axially of the spinning blades by the air stream created thereby. The major points of the design are that the provision of a thin film yields a high degree of evaporative cooling of the water as it moves over the surface of the blades whereby to condition the water to transform to ice after atomization. The second aspect of

the invention is that by requiring the major portion of the water to leave the blades at the trailing edge thereof a maximum transit time for the water while it is part of the film moving over the blades is provided whereby to maximize the time of evaporative cooling and hence the temperature reduction resulting therefrom. Lastly, the water leaves the blades in the form of small droplets which readily convert to ice of a fine granular quality that is an excellent substitute for snow.

While the prior art references relied on by the Examiner teach one or the other of these features, none teaches the combination which is necessary to achieve the result obtained by applicant's device. Thus for example Jauch et al U.S. Patent 2,671,650 does not teach the formation of a thin film on the rotary blades which film maximizes the evaporative cooling effect.

The Examiner rejects claims 1, 2, 3, 16 and 17 as being unpatentable over Anderson, Kehoe et al, Hanft or Jauch et al. Anderson does not teach the formation of a film on the blades C at all. What Anderson teaches is the use of the blades C to interrupt the streams and to fling the water outwardly in a radial direction. Thus Anderson completely fails to suggest the formation of the flowing film, as called for in these claims and the exiting of the major component of the film from the trailing edges of the blades to provide atomization as called for in the claims. Kehoe, as already noted, does not provide for atomization as called for in the claims and flings its sheets of water in a radial direction in opposition to the requirements of the claims. Hanft concededly forms a film, as already noted, but flings the water in a radial direction and does not serve principally as an atomizer. Lastly, Jauch et al does not form a film as called for in the claims and does not fling the film off the blades off the trailing edges as required therein. Thus claims 1, 2, 3, 16 and 17 clearly define patentable subject matter over references 1:, 2:, 3: or 4). The Examiner states that it is inherent to form a film but this is negated by the teaching of Jauch et al wherein particles are formed rather than films. Secondly, there is nothing inherent in the structure of the references to call for a major portion of the liquid to leave at the trailing edges of the blades and a number of the references clearly negate this teaching and state that the liquid leaves at the outward edges thereof (see Hanft and Kehoe et al). Thus the allowance of claims 1, 2, 3, 16 and 17 is solicited.

...

In connection with this rejection, the Examiner took the position that no reliance could be placed on functional qualifications. It is submitted that such a position is not well founded in law. It is well settled that it is permissible to claim functionally in the sense of claiming in terms of a desired result.

This application relates in general to the crystallization of a liquid and more specifically to a method and apparatus for efficiently making snow under a variety of conditions. Claim 1 reads:

A device for atomizing liquids comprising:

a rotatable hub with a central axis,

a plurality of fan blades extending radially outward from said hub for rotation with said hub about said central axis, each of said fan blades having a leading edge and a trailing edge,

means for applying the liquid to be atomized to said fan blades so as to provide a flowing film of liquid over the surface of said fan blades when said fan blades are rotating, the major component of flow of said film being toward said trailing edges of said fan blades, to provide atomization off said trailing edges of said fan blades.

The basic reference to Hanson relates to a snow maker wherein a water spray is conducted by fan forced air, with figures 2 and 3 showing a deflector 28 with vane 29 being contacted by the water. The reference to Jauch discloses an atomizing device wherein a film of liquid flows over disk 42 to be flung off the edge thereof into the path of the blades 44. In the reference to Hanft a device feeds water up a tube to exit at 16 for contact by air forced by fan blades 15. The reference to Kehoe discloses an atomizing device in which water exiting at ports 4 contacts first the blades 6 of small radial extent, and then contacts blades 8 of large radial extent; while the reference to Anderson discloses an atomizer whereby water exiting from ports A contacts the radial blade C.

A very informative Hearing was held on September 12, 1973, at which the applicant agreed to furnish further comments on the question of "functionality in the claims." Two additional problem areas were also specifically discussed; one related to the term "atomizing device" as opposed to "a crystallizer", and the other related to the cooling effect on the film of water on the blade of the crystallizer, particularly in relation to paragraph 2 of page 12 of the specification which reads:

> From the above tests it may be seen that the device of this invention has a wide range of operating capabilities. When used to make snow, snow may be made from water having temperatures substantially above freezing and may be made in an atmosphere having a temperature substantially above that necessary for the creation of snow. This is because the operation of this invention is such that where the cooling effect is optimized, the water temperature can be brought to within the 10°F. (-12°C.) to 15°F. (-10°C.) range where atomized particles will be converted to snow. In order to make snow by a rapid process, the temperature of the atomized droplets must be brought down to a maximum temperature somewhere between 10°F. and 15°F. Such a temperature is required to bring about the rapid conversion of a light droplet to snow.

At the Hearing the applicant also indicated his willingness to make certain amendments to the claims, and on the day following the Hearing the applicant was verbally requested to forward in writing the amendments he proposed for consideration by the Board.

On September 18, 1973 the applicant further responded to the Final Action furnishing a brief which discussed the jurisprudence on "functionality in claims" (to be commented on later) and proposed the following:

> Arising out of the discussion at the Hearing, applicant has certain suggestions for amendment to the claims. These are set out below for consideration by the Board, in the hope that such amendments will be found better to define the invention and to render the claims allowable.
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> The proposed amendments are:
>
> Claims 1 to 8, first line, change "device for atomizing liquids" or "atomizing device" to --crystallizer--.
>
> Claim 1, add to the end of the claim, --, a substantial portion of said major component of flow being below the crystallization temperature as it leaves said trailing edges whereby to rapidly crystallize--.
>
> Claim 9, line 13, change "the liquid" to --water--; and at the end of the claim add basically the same text as is proposed to be added to the end of claim 1, except to change the wording to refer to a substantial portion of said "water" being below the "freezing" temperature etc.

> Claim 11, add to the end of the claim basically the same text as proposed for the ends of claims 1 and 9, i.e. to call for "a substantial portion of said major component of flow being below the freezing temperature..."
>
> Claims 16 and 17, line 1, change "atomizing" to --crystallizing--.
>
> Claims 16 to 19, change "fan blades" to --power driven fan blades--; delete "in such a fashion as" and change "significant" to --major--.
>
> Claims 16 to 19 add to the end of each claim essentially the same text as is proposed to be added to the end of claim 1, employing in claims 16 and 17 the term "crystallization temperature", since these claims are not limited to water, and in claims 18 and 19 the term "freezing temperature", since these claims are limited to use with water.

The proposed amendments to the claims, to use the term "crystallizer" instead of the expression "device for atomizing liquids," and to state in claims 1 to 8 that: "...a substantial portion of said major component of flow being below the crystallizating temperature as it leaves said trailing edges whereby to rapidly crystallize...," in the opinion of the Board relate to what appears to be the very essence of the advance the alleged invention made over the prior art. This also applies to the amendments which have been suggested for claims 9 to 19.

It follows that in consideration of these amendments the only cited prior art of any significance is the reference to Hanson, which basically produces a fine spray which is contacted by fan forced air to produce snow or ice crystals. Claim 1 of this reference reads:

> The method of forming, distributing, and depositing snow upon a surface, including: mechanically providing a large volume movement of air at atmospheric pressure; said movement of air created by a motor-driven propeller, said air having an ambient temperature at or below about 30 degrees Fahrenheit; and projecting water into said movement of air in an amount and at a rate such that substantially all of the water so-introduced is at least partially crystallized prior to depositing on said surface.

Since there is no indication from this reference, that the water forms a film on the fan blade nor that the component of flow is below its

crystallization temperature as it leaves the trailing edges whereby it rapidly crystallizes as disclosed in the instant application, the Board is satisfied that the claims so amended would distinguish over the prior art.

The second ground of rejection with respect to the "claims being indefinite" is discussed at length in the brief presented to the Board dated September 18, 1973. While the Board agrees with the applicant that it may be permissible in some cases to functionally define an invention in terms of a desired result, it is at the same time essential that the claims be clear and distinct as required by Section 36 of the Patent Act. In any event, the Board is also satisfied that the question of the claims being indefinite will be resolved by the proposed amendments.

The Board therefore recommends that the ground of objection in the Final Action, with respect to claims 1 to 7, 9 to 14 and 16 to 19 as being too broad in view of the cited prior art, be affirmed and that new claims giving effect to the amendments proposed by the applicant be acceptable as overcoming the objections of the Final Action which includes "any doubt of the claims being indefinite."

J.F. Hughes,
Assistant Chairman,
Patent Appeal Board.

I concur with the findings of the Patent Appeal Board and affirm the decision to refuse the claims over the prior art cited in the Final Action, but will accept claims amended in accordance with the recommendation of the Board. The applicant has six months within which to so amend the claims, or to appeal this objection under Section 44 of the Patent Act.

J.A. Brown,
Acting Commissioner of Patents.

Dated and signed this
29th day of October,
1973, in Hull, Quebec.

Agent for Applicant

Kirby, Shapiro, Curphey & Eades,
Ottawa, Ontario.