COMMISSIONER'S DECISION

OBVIOUSNESS: Process for improving the brightness of clays.

In an earlier Commissioner's Decision on this application the conflict claims were refused, and then deleted. This decision refuses amended claims and the application as a whole in view of the art cited.

FINAL ACTION: Affirmed

This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated October 15, 1974, on application 967273 (209-88). The application was filed on August 5, 1966, in the name of Joseph Iannicelli et al, and is entitled "Process For Improving The Brightness Of Clays." The Patent Appeal Board conducted a Hearing on September 10, 1975, at which Messrs. N.S. Hewitt and G. Seaby represented the applicant.

Previously the application had been involved in conflict proceedings with two other applications, during the course of which claims C1 to C5 were refused as covering matter obvious in view of certain cited art. The applicant requested a review of that rejection, and the Commissioner supported the refusal on May 8, 1973. An appeal was taken to the Federal Court of Canada, but subsequently withdrawn, and the conflict claims removed. The applicant then submitted amended claims 1 to 8 which in his submission "clearly distinguish over the art cited by the Examiner and takes account of the Commissioner's decision of May 8, 1973."

The application relates to a process for purifying white-firing clay suitable for use in the manufacture of ceramic articles using electromatic means to remove impurities. In the prosecution terminated by the second Final Action, the examiner refused the application as being obvious in view of the following references:

United States Patent

90,565 May 25, 1869 Lynd

Publications

(a) Wet Magnetic Separator For Feebly Magnetic Minerals, part I by G.H. Jones and Part II by W.J.D. Stone. Delivered at the International Mineral Processing Congress, London, 1960, and issued June, 1962 as Bulletin of the Department of Mines and Technical Surveys, Group VI, Paper No. 34.

(b) Effect of Variable Adjustments on Separation in Jones Magnetic Separator.

Preprint Number 63B303, paper presented at the Fall Meeting, AIME, September 11 to 13, 1963.

(c) "Ceramic Ware" pages 230-233 June 30, 1962. S. Hiyama et al.

In the Final Action the examiner stated (in part):

...

Applicant argues that "there are five aspects of importance to the process of the invention, namely the intensity of the magnetic field, the time the clay slurry is exposed to the intensity, the percent solids of the slurry, the deflocculation of the slurry prior to treatment in the high intensity magnetic energy field and the maximum possible size of the clay particles. It is a combination of these features which gives the optimum effect to the process ...". It is held that there is no novelty in any individual aspect nor is there any novelty in the combination of features claimed by applicant. There is no unexpected result achieved.

Applicant has argued that reference (c) does not specifically teach the processing of kaolin. Since the reference (Table 5.12) lists three clays, one of which is a type used for ceramic ware, it is not invention to use the same process on a similar clay.

Applicant has argued novelty in the fineness of his particles, and that he uses a gauss higher than 5,400. Yet reference (c) indicates that higher gauss separators are available which would be more effective for removing mica, especially finely divided particles of mica. One of these is the Jones separator of publication (a), which is capable of producing a field strength of at least 10,000 gauss. In publication (a) the author states (page 717) "the author aimed therefore to develop a machine suitable for the wet separation of feebly magnetic minerals including even the least magnetic of these, such as muscovite mica and tourmaline". On page 733 it is stated

> "Although Magnetic separation has long been a useful tool of the mineral dressing engineer, available equipment until recently has been of limited effectiveness on separations involving materials ranging in particle size from 100 mesh down to a few microns. This was particularly the case with weakly magnetic minerals.
>
> With the acquisition in the spring of 1959 of a Jones wet magnetic mineral separator the Mines Branch put into operation the only pilot unit of this machine in existence. This high intensity wet magnetic separator differs in design from existing machines and has been developed to be particularly effective in the fine particle size range, especially on weakly magnetic minerals."
>
> ...
>
> Applicant submits that his combination of high field intensity, relatively long residence time, solids content, particle size and deflocculation are all critical features necessary to achieve optimum results. This submission is not accepted. First, if the claimed residence time varies from 1 to 8 minutes, the time can hardly be said to be critical. In a similar manner the claimed field intensity varies between 8500 and 18,000 gauss, so it also is not critical. Secondly, while applicant's claimed range may achieve optimum results for his clay it has not produced unexpected results. It is the result of routine experiment using his particular clay treated in a manner shown to be known by the applied references.

The applicant in his response dated April 11, 1975 cancelled claims 1 to 8 and submitted amended claims 1 to 4. It is the amended claims which the Board will consider. In his response the applicant stated (in part):

> The Examiner takes the position in the Final Action that there is no novelty in any of the five individual features of the process of the present invention, nor any novelty in their combination. The Examiner's use of the word "novelty" is, in applicants' submission, strained, confusing and inconsistent. Novelty, by definition, means something is not new. Thus, the Examiner has never been able to cite any single reference which discloses the combination of the five features referred to hereinafter which are of critical importance to the process of the present invention to achieve purification of kaolin clay on a commercial scale and has, in fact, combined references in an attempt to show that the combination of features would be obvious to a person skilled in the art. In fact, none of the references cited by the Examiner even mention kaolin clay, the purification of which the process of the present invention is specifically concerned with, and which as will be submitted

hereinafter, is a unique material for this process insofar as its purification is concerned. It is further submitted, as will be detailed hereinafter, that the Examiner has failed in the cited prior art to show individually even a majority of the five specific features which are critical to the process of the present invention. Clearly, therefore, the rejection of the claims of lack of novelty in the features and their combination on the basis of a combination of references is erroneous and has no place in the Final Action.

...

It is further pointed out that the present invention is concerned with removal of paramagnetic and even weakly paramagnetic materials from a kaolin slurry containing such materials in colloidal sizes, and at throughput rates sufficiently great to make the removal process economical on an industrial scale. It is emphasized that the paramagnetic materials in the kaolin clay with which the present invention is concerned are not even considered to be magnetic by workers in the art, whereas the materials removed by the references cited by the Examiner are highly magnetic and more magnetically susceptible by a factor of one hundred million. It is respectfully submitted to the Commissioner that the purification of kaolin clay in involving the removal of weakly paramagnetic materials which would not even be considered magnetic by persons skilled in the art would not be obvious from an article which discloses the removal of magnetic materials and particularly ferromagnetic materials of high susceptibility from a different type of clay. Thus, as is clearly set forth on page 1 of the disclosure of the present application in lines 6 through 10, the applicants have determined that clay contains particles of varying discoloration and some of these particles are feebly magnetic. The phrase "feebly magnetic" is used to refer to particles of low magnetic susceptibility and, as has been stated heretofore, of the order of one hundred million times less than the magnetic susceptibility of the material separated in the cited art. It is submitted that the discovery that the impurities in the kaolin clay do have a magnetic susceptibility, albeit only four times as high as the magnetic susceptibility of the clay itself, was a critical discovery of some magnetic susceptibility, which is nowhere disclosed in the art cited by the Examiner, which does not even refer to kaolin clays, the process of the present invention is virtually impossible to be formulated. It is submitted therefore that in view of this fundamental omission from the prior art, and lack of appreciation by the workers in the field of a difference in magnetic susceptibility, albeit marginal between the clay and the impurities, the prior art has no possibility whatsoever of rendering the process of the present invention in any way obvious. It is submitted that the Examiner's assumption that kaolin clay is similar to ceramic clays, such as ball clays, is an assumption in vacuo which the Examiner without supporting evidence, should not make and further, the evidence as submitted herein clearly shows that the Examiner's assumption is erroneous in fact. It is submitted that in view of this erroneous assumption alone, the Examiner's rejection fails and the claims should be allowed.

On April 16, 1975 the applicant supplied exhibits to show "that operating at these high intensity magnetic fields provides a process of a different order than is achieved operating at the low energy magnetic fields of the prior art." On May 15, 1975 the applicant submitted further exhibits in support of his position.

The patent to Lynd establishes that it is known in the art to use artificial or natural magnets to remove iron and other discoloring-matters from solutions of argillaceous substances which are to be used for the manufacture of white wares.

The publication "Wet Magnetic Separator For Feebly Magnetic Minerals" (Jones and Stone) reads at page 717:

> ... the author aimed therefore to develop a machine suitable for the wet separation of feebly magnetic minerals including even the least magnetic of these, such as muscovite mica and tourmaline.

And at page 733:

> Although Magnetic separation has long been a useful tool of the mineral dressing engineer, available equipment until recently has been of limited effectiveness on separations involving materials ranging in particle size from 100 mesh down to a few microns. This was particularly the case with weakly magnetic minerals.
>
> With the acquisition in the spring of 1959 of a Jones wet magnetic mineral separator the Mines Branch put into operation the only pilot unit of this machine in existence. This high intensity wet magnetic separator differs in design from existing machines and has been developed to be particularly effective in the fine particle size range, especially on weakly magnetic minerals.

Also at page 743 a list of conclusions are given:

> (3) The Jones unit makes effective separations on fine materials containing minerals considered weakly magnetic, or not suitable for magnetic separation at all.
>
> (5) The indicated susceptibility of some muscovites in the Jones separator suggests a possible application in the clay industry.
>
> (6) The Jones machine may be used to separate minerals of different magnetic susceptibilities in very fine sizes.

The "Ceramic Ware " publication shows the removal of iron by the Mitsubishi magnetic separator with a flux density of 5400 gauss with treating times of 30, 36 and 47 seconds when applied to ceramic wear material. It also shows the use of the Shinko separator capable of raising the magnetic flux density to about 18,0000 gauss.

The application is for a method of processing Kaolinitic clay for the production of ceramic articles. Kaolin (china clay) is extracted from the ground and contains iron-containing impurities which causes specking or poor colour when the clay is fired. The applicant forms a slurry of the Kaolinitic clay and subjects the slurry to the action of a non-homogeneous magnetic field to separate paramagnetic particles therefrom. Amended claim 1 reads:

> A method of improving the brightness of kaolin clays by removing discoloring contaminants therefrom which includes the step of subjecting a deflocculated kaolin clay-water slurry of from 20 to 40 percent solids and composed of particles finer than 44 microns and 90 percent finer than two micron diameter particles to a high intensity magnetic energy field of at least 18,000 gauss for a period of from 1 to 8 minutes and removing said clay slurry from said field.

The question to be considered is whether the applicant has made a patentable advance in the art.

The applicant stated at the Hearing that he may have been the first to discover that the kaolin clay contained paramagnetic materials which caused discoloration. In our view, however, it is clear from Jones that in the separation art paramagnetic materials were removed for color control. In the cited publication (a) Jones states (page 717) that "the author aimed therefore to develop a machine suitable for the wet separation of feebly magnetic materials including even the least magnetic of these, such as muscovite mica and tourmaline." Experiment number 11 (page 740) teaches the use of high gauss to remove "sufficient material of some magnetic susceptibility" from talc to effect an increase in brightness, which is the same purpose as that of the applicant. In a similar manner, experiment 13 teaches the removal of

paramagnetic material for color control. Also claim 1 of the reference to Lynd reads: "The process of removing iron, copper, and other discoloring matters from potters clay and other argillaceous substances, by subjecting the clay in solution, to the action of one or more magnets...." Furthermore, on page 740 Stone presents a table showing the separating power of high gauss magnetism on various paramagnetic substances.

In the Final Action and at the Hearing the applicant emphasized that he was concerned with kaolin clays, and that the present invention has the following critical features:

1. The intensity of the magnetic field being at least 18,000 gauss;

2. The time the clay slurry is exposed to the field, namely 1 to 8 minutes;

3. The percentage solids of the slurry, namely 20 to 40 percent;

4. The deflocculation of the slurry prior to magnetic separation; and

5. The maximum particle size of the clay slurry, and further, as will become clearer hereinafter, the magnetic susceptibility of the clay particles which are peculiar to a kaolin clay.

The first of these, "the intensity of the magnetic field being at least 18,000 gauss," is known in the art. We quote from the applicant's response of Feb. 8, 1971: "Furthermore, Ellis (1937) clearly teaches the application of field intensities on the order of 10-20 Kilogauss in wet magnetic separation of materials of low magnetic susceptibility." Page 3 of "Ceramic Ware" reads: "However, the wet-type tubular powerful magnetic separator manufactured by Shinko Electric is capable of raising the magnetic flux density to about 18,000 gauss, and is very effective for removing mica, especially mica contained in finally divided particles." Reference publication 63B303 at page 3, line 29, reads: "It is obvious that an increase in the magnetic field strength will result in an increased extraction of the more feebly magnetic minerals."

The second feature is: "The time the clay slurry is exposed to the field, namely 1 to 8 minutes. The time factor was discussed by the applicant in his letter of February 8, 1971 (see reference of Feb. 15, 1971) which reads, in part:

> ....The prior art most relevant to this concept appears to be Lynd (1869) which indicates very long retention, on the order of 16-48 hours [6-12 hours in the first LYND patent] and thus appears to actually be relying in part on a sedimentation process as well as low field intensity magnetic separation. The Payne (1939) reference refers to controlled rates of flow which may be related to retention time... . The "Ceramic Ware" publication of 1962 appears to (from the translation provided by the Japanese) involve high fields and greater than 30 second retention times....

At the Hearing the applicant stressed that the retention times referred to in "Ceramic Ware" is in fact the <u>total</u> treating time of the slurry, and does not indicate the actual time any portion of the slurry undergoes a specific treatment. We have no reason to disagree with this. We also agree that there is no teaching in the art cited of the specific retention time given in his new claims. We will, however, discuss this point later.

The third feature is: "The percentage solids of the slurry, namely 20 to 40 percent." It is standard to vary the concentration of the slurry as the need requires. No unexpected result was achieved from the particular range used. In reference publication 63B303, cited by the examiner, at page 15, at line 8, we read: "On a number of materials, good separation has been obtained using up to 40% solids. The nature of the material being treated will influence the upper limit. Thirty percent solids would probably be the limit for fine sticky clays." This feature appears than to be a common expedient in the art.

The fourth feature is: "The deflocculation of the slurry prior to the magnetic separation." It is observed that the reference publication "Effect of Variable Adjustments on Separation in Jones Magnetic Separator" teaches that good dispersion of the slurry is essential before the

magnetic separation step. Page 18, line 25, reads: "On such samples the necessary steps must be taken to ensure that dispersion is achieved." Dispersion and deflocculation are of course synonymous terms in the mineral separating art. This is brought out in the applicant's response of February 17, 1972, on page 7, which reads: "... it is submitted that the word 'dispersed' as used in the present specification is the equivalent of defloculated."

The fifth feature is: "The maximum particle size of the clay slurry, and further, as will become clearer hereinafter, the magnetic susceptibility of the clay particles which are peculiar to kaolin clay." However we do not agree that the magnetic susceptibility of clay particles is peculiar to kaolin clay. In ceramic processes clays of two general types are used: ball clays, and kaolin or china clays. The name, kaolin, refers to a group of white or nearly white clays composed chiefly of the mineral kaolinite. Although ball clays contain kaolinite they are generally composed of a higher silica-to-alumina ratio than is found in most kaolins, as well as greater amounts of accessory inorganic and organic materials. The conclusion of reference publication (a) (Jones & Stone), page 743 reads (in part):

> (3) The Jones unit makes effective separations on fine materials containing minerals considered weakly magnetic, or not suitable for magnetic separation at all.
>
> (5) The indicated susceptibility of some muscovites in the Jones separator suggests a possible application in the clay industry.
>
> (6) The Jones machine may be used to separate minerals of different magnetic susceptibilities in very fine sizes.

These conclusions clearly indicate that the Jones separator had an expected application in the clay industry (which includes kaolin clays), and for use with different magnetic susceptibilities in very fine sizes.

We have analysed the features (steps) of the process separately, but are mindful that the claim must be considered as a whole. Referring again, now, to feature 2 (retention time) we observe that the prior art was also concerned with retention times, but not possibly of the same order as considered in the claims. This however, in our view, is the only novel feature in claim 1.

As mentioned Lynd uses a total treatment time of 6 to 12 hours, while in the Ceramic Ware publication the retention time, according to the applicant, is less than 1 second. We must, therefore, consider whether the applicant is entitled to a selection patent. The nature of the inventive step required in a selection patent was discussed by Evershed J. in Dreyfus and Others' Application (1945) 62 R.P.C. 125 at 132.

> If it has already been disclosed that any one of a number of specified media may be used in the course or for the purpose of carrying out some manner of manufacture, then there can be no invention, no manner of new manufacture, in the selection of some only out of the total number of media previously disclosed for the same general purpose; for, ex concessis, the use of those selected few as appropriate for that purpose has already been disclosed and the work done which has led to the selection has resulted not in invention but in verification. Invention, if invention there be, must involve at the least the discovery that the selected members possess qualities hitherto undiscovered, peculiar to themselves and not attributable to them by virtue merely of the fact of their belonging to a class specified by the earlier inventor." (emphasis added)

We observe that the object of the invention is, "to provide a method for increasing the brightness of clays by the removal of discoloring contaminants." It is also interesting to note the object of the invention in the Lynd patent, which we find, "is to remove [by the action of artificial or natural magnets] the iron, copper and other discoloring matter from argillaceous substances [Potter's Clay] which are to be used for the manufacture of white and other wares...."

The applicant states in his disclosure (page 3) that the brightness of clays may be increased as much as several brightness points through the use of high intensity magnetic energy. He then goes on to state that the Jones wet magnetic separator is available and will produce "a maximum field intensity of between 20,000 to 22,000 gauss." We previously stated that Jones suggested a possible use in the clay industry for his wet magnetic separater. In our view it does not matter that the applicant decided to use it with a particular clay (Kaolin) as opposed to other clays. The object of the exercise is the same - removing weakly paramagnetic discoloring matter from any substance.

The applicant then experimented with a clay slurry using different retention times, and varying the flux of the magnetic energy field. In the circumstances this must be considered non-inventive trial and experiment with a known concept to produce an improved product. In other words, it is a mere verification to determine the most suitable retention time. While Lynd took 6-12 hours, it is reasonable to assume that at that time (1869) the magnetic flux density used was of a low order. The applicant states that, "the force fields of the prior art seldom exceeded 1500 gauss...." We think it is also fair to assume that it is but expected skill to use new and more powerful magnets as they are developed. The retention time is bound to change from Lynd's 6 to 12 hours with the appearance of more powerful magnets.

We have concluded that the work which has led to the particular time selection has not resulted in invention, but in verification (Vide: Dryfus and Others' Application, supra). Mere verification is not patentable (See Sharp and Dohme v Boots Pure Drug (1927) 44 RPC 367 at 402). There must be an adoption of means to ends impossible without exercise of the inventive faculty (See Esso Research and Engineering Co.'s Application (1960) R.P.C. 35 at 57).

We are satisfied that neither the process of the claims nor the specification as a whole discloses a patentable advance in the art. It comes within the category of a matter to which the Supreme Court referred in Crossley Radio v Canadian General Electric, 551 at 557, when it stated: "...we do not think the inventive element necessary to constitute subject matter is made sufficiently evident."

We recommend that the decision in the Final Action to refuse the application be affirmed.

J.F. Hughes
Assistant Chairman
Patent Appeal Board

I concur with the findings of the Patent Appeal Board and refuse to grant a patent. If any appeal under the provision of Section 44 of the Patent Act is contemplated, it must be commenced within six months of the date of this decision.

J.A. Brown
Acting Commissioner of Patents

Dated at Hull, Quebec

this 3rd. day of

October, 1975

Agent for Applicant:

Marks & Clerk
Ottawa, Ontario