

COMMISSIONER'S DECISION

OBVIOUS: Result Achieved Same Way As Prior Art.

Separating annular members from hollow shaft by applying heat abstracting medium to the hollow shaft to loosen the endmost annular member while retaining the remaining members in tight fit in the shaft is not a patentable advance over the prior art, which above the removal of a railway car wheel from an axle by applying heat abstracting gas to contract the axle. Applying cold and/or heat medium for fitting and removing shrink-fitting members are well known expedients.

FINAL ACTION: Affirmed.

This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated April 9, 1974, on application 095,177 (Class 26-87) for a "Method Of And Means For Separating Interference-Fitted Members."

Briefly the application relates to a differential expansion technique for disassembling mating parts which fit together. A cooling medium such as a compressed gas is applied to the inner member so it shrinks and the parts can be separated easily.

In the prosecution terminated by the Final Action the Examiner rejected claims 1 to 13, 15 to 34, and 36 to 41 for lack of invention in view of the following reference, common knowledge and expected skill:

U.S. 1,980,156 - Nov. 6, 1934 - Emrick

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

Claim 1 refers to a plurality of side-by-side outer "annular" members of which only the "endmost" member is to be removed, hence the cooling and shrinking is performed "only in the area" of this endmost member, This selective cooling is shown in figure 8 of the reference. The wheels of figure 8 are not in the "side-by-side" relation disclosed by applicant, however, the shrinkage is limited to the area of only one wheel which will ensure that the other retains its interference fit and will conserve the cooling gas by not cooling other areas where the fit is to be retained. The nearness of the side-by-side outer members is only a matter of degree which necessitates greater or lesser care in application of the cooling gas.

Although the reference does not show the cooling gas directed to the inside of the wheel-and-axle assembly of figure 8, it is held to be obvious to one skilled in the art to do so when access to the inside of the inner member is available. It is particularly obvious in view of figures 5, 6 and 7 wherein a nozzle is inserted into the interior of a hollow member.

Further evidence of the lack of inventive ingenuity is apparent in consideration of figure 5. The outer member is illustrated as a unitary body but it is readily apparent that it could be an assembly of aligned parts from which the hollow inner member is to be extracted. In operation of this embodiment, an endmost member would be removed by pulling it off the inner member in the manner described as the normal operation of the device rather than by use of the hammer member which would require relative movement of the inner member and all outer members.

...

Regarding applicant's arguments against rejection of the above-mentioned claims, the arguments are not well founded. Applicant has not taken into account the fact that the rejections are based on lack of invention over the reference in view of common general knowledge and expected skill. The rejections were not based upon "anticipation" nor need they be. A showing of the absence of inventive ingenuity, sufficiently meritorious to warrant patent protection, is also a valid basis for the rejection of claims.

It is not required that "the prior art itself ... provide a teaching that would render a claimed subject matter obvious". If the distinction over the prior art is well-known in related arts or is obvious to one exercising ordinary skill in the art, there is no requirement to show anticipation. When chain hoists, conveyors, flame rings and thermocouples are so well known as to fall into the realm of common general knowledge they may not be relied upon to provide patentable distinction over any reference in a field in which such devices are commonly employed unless they are employed in a new and inventive manner which is not the case here. It is not required that all these features be "found in the references".

The reference to "self serving statements" of the examiner is presumed to refer to the examiner's contention that, the features not specifically disclosed in the cited reference, but which he states to be of common knowledge or of expected skill, are merely the opinion of the examiner. The devices referred to above are well known. They constitute part of the prior art and it is not the "mere opinion" of the examiner that such devices are well known in the art. Applicant may see such devices as the above-mentioned chain hoists, conveyors, flame rings and thermocouples in many laboratories, heat-treating specialty shops and machinery-manufacturing facilities. They are

of such common knowledge that they may be cited with a specific reference as an acceptable alternative to a single reference of "prior art which provides an anticipation" of the invention. Judicial decisions have affirmed the validity of rejections based on prior art and evidence of common knowledge to show lack of ingenuity and lack of patentable improvement in the art.

The Applicant in his response dated July 9, 1974 to the Final Action stated (in part):

The Emrick patent does not teach or suggest applicant's invention as claimed. The best that may be inferred from the Emrick reference is that the shaft in Fig. 8 may have a wheel at each opposite end. Emrick was not faced with the problem, and does not suggest how to solve the problem, which the applicant has solved, for the removal of side-by-side interference-fitted annular members, such as depicted in Fig. 1 of the applicant's drawings. In other words, what Emrick has is a member at one end of a shaft and another member at the opposite end of a shaft and that is the best that can be inferred from Emrick. It should be noted that in Emrick it is even suggested that merely applying the chilling tool head to the outer end of the shaft may not be sufficient to remove the wheel and that, therefore, the additional tool 72 of that reference be applied to the shaft at the inner side of the wheel. In addition, Emrick must take precaution to avoid chilling the wheel while chilling head and the wheel. This is a necessarily slow and cumbersome method of removing wheels from the shaft.

...

Claim 1 and claims 2-12 dependent therefrom are believed to be patentably distinguished because the Emrick reference and no other reference of which applicant is aware has any showing or suggestion of an elongated hollow metal carrying member with a plurality of shorter annular metal members interference-fitted in side-by-side relation on the outer perimeter of the elongated member. The Emrick reference does not teach or suggest how to selectively remove the interference-fitted members one at a time from an end of the member while retaining the remaining members interference-fitted thereon. Applicant accomplishes this, according to claim 1, by chilling and shrinking selectively only the area of the elongated member encompassed by the endmost of the annular members by application of heat-abstracting medium to the area at the inside of the elongated member whereby to effect loosening of the endmost member from the elongated member while retaining the remaining of the annular members on the elongated member by virtue of the interference-fit.

The Examiner admits that the reference does not show the cooling gas directed to the inside of the elongated member on which the other members are fitted. Contrary to what the Examiner says, this is not obvious to one skilled in the art because the art does not teach it. It is respectfully submitted that the art can only know what has been taught the art. The reference applied to the claim does not teach the method. Accordingly, the method must be presumed to be new and the claim should be allowed.

Of interest in this case is the rationale of the Supreme Court in The Commissioner of Patents v. Farbwerke Hoechst, 25 Fox Pat.

C. 99 (1964) at 107 where it stated:

With respect, the judgment of this Court did not proceed on the narrow ground that novelty and utility are the only attributes of patentability. The judgment of this Court affirmed the judgment of the Exchequer Court for reasons common to both judgments, namely, an adoption of the principles stated by Jenkins J. in IN RE MAY and BAKER LTD. and CIBA LIMITED (1948), 65 R.P.C. 255, and as far as I can see, until the question was raised in the reasons delivered in the Exchequer Court no one ever doubted the principle that invention is an essential attribute of patentability. In any case, in this Court, as far as I know, wherever the question has been material the judgments have always so held.

This application relates to a method and means for separating side-by-side annular metal members from a hollow metal carrying shaft about which the annular metal members are carried in interference fit. A tube having an end nozzle is inserted into the axial bore of the carrying shaft and is capable of movement relative to the shaft. When heat-abstracting gas such as liquid nitrogen is supplied to the tube, the carrying shaft shrinks in the vicinity of the nozzle thereby enabling separation of the annular member at that location. Separation may be expedited by provision of heating means to the annular member.

The Emrick patent discloses means for seating or separating interference fitted members by contracting the inner member by using a heat abstracting gas thereon. In one example removal of a railway car wheel from the axle is shown wherein the heat abstracting gas is applied to the exterior of the outer axle portion through a socket head adapted to fit over it. Another embodiment shows the means for the fitting or removing of a tubular bushing in a bore end; this embodiment also shows the use of the heat abstracting medium within the bushing bore. Claim 1 of this reference reads:

A method of separating a part from a tight encircling seat, which consists in conducting a highly expansible refrigerant fluid under pressure to the part, permitting the refrigerant to expand against the part so as to chill and shrink the same, and withdrawing the part from the seat.

What we must consider is whether the applicant has made a patentable advance in the art in view of the Emrick patent, common knowledge and expected skill. It is assumed that by "common knowledge" the examiner is referring to "common general knowledge" of those skilled in the art.

It is important to note that the "basic idea or principle" of shrinking an inner member to separate interference fitted members is shown in the citation. The disclosure on page 1, column 2, starting at line 68, reads:

A specific object of my invention is to use as the refrigerating agent a highly expansible fluid maintained as a liquid under pressure so that the fluid can be conveyed by its own pressure to the point of application with little if any, expansion and consequently little absorption of heat, and then to liberate the fluid at the desired point so that by its rapid expansion it will absorb a large volume of heat and will cause instant chilling and contraction of the object with which it contacts.

Emrick, on page 1 of the disclosure beginning at line 24, also discussed what was known in the art:

Occasionally, parts that have been joined by shrink fitting or have rusted fast, are separated by heating the outer member so that it will release its hold on the inner member Sometimes this differential expansion is accentuated by applying water or ice to the inner member to carry off the heat conducted therein from the outer member and thus prevent it from expanding.

Therefore in order for the applicant to obtain a patent he must show an inventive application of this known "idea or concept."

Applicant argues that the Emrick reference does not show "an elongated hollow metal carrying member with a plurality of shorter annular metal

members interference-fitted in side-by-side relation on the outer perimeter of the elongated member." He adds that Emrick does not teach how to selectively remove the interference-fitted members one at a time from the end of the member while retaining the remaining annular member in position.

While it is true that Emrick does not disclose the removal of a plurality of shorter annular metal members in side-by-side relation from an elongated shaft, he does show the removal of a railway car wheel from an axle and a bushing from the bore of a tool. In the latter instance a charge of "carbon dioxide is introduced into the bushing through the tool head, so as to cause contraction of the bushing." The nearness of the side-by-side outer members in our view is only a matter of degree which necessitates greater or lesser care in the application of cooling gas.

The applicant uses a nozzle in the bore of the retaining shaft to direct his coolant at a specific location such as adjacent the endmost annular outer member. By contrast Emrick states that in order "to separate parts that are tightly fitted one within the other I apply a refrigerating agent to the inner member to shrink the same and loosen the joint between the two members." (see top of page 1, column 2) It is an expected step to direct coolant in the area of the endmost annular member as it must be removed prior to the removal of any subsequent member. It is also expected that the remaining annular members will be retained in position due to the localized effect of the coolant in a manner similar to Emrick's rail wheel.

The applicant's device is specific to internal bore cooling. Emrick also discloses this type of cooling and "it is particularly adapted for the insertion of long liners or bushings into sockets or bores. This

tool also involves a somewhat different principle of operation. In the tool described above a large part of the expansion of gas takes place within the tool head" (See 3rd para., page 3, of the disclosure) In other words the "inner member" is contracted by "CO₂ coolant means" using a suitable tool comprising flutes and ports to direct the coolant to the interior of the bore.

It was argued that the "Emrick's patent does not teach or suggest applicant's invention as claimed" since he was not faced with the problem that the applicant has solved. This application does show means for maintaining the elongated hollow carrying member in vertical suspension by attaching a holding plate with eye bolts having an attached chain supported by a hook. In addition it also shows the use of a movable platform to change the vertical position of the coolant supply tank which in turn moves the attached nozzle arrangement within the bore of the elongated carrying member. To vertically suspend the shaft, or move the nozzle axially in the shaft bore, does not involve the use of creative skills, but only the normal skills of a person in this art. There are other obvious arrangements which achieve the same result, i.e. moving the shaft and maintaining the nozzle and heating ring stationary, which would not be considered patentable.

Of interest, attention is directed to United States Patent 2,839,143, dated June 17, 1958, which is of record in the prosecution of the application. This patent relates to improved methods and apparatus for disconnecting a selected joint of a string of pipe or tubing. The patent is particularly concerned with a method in which the temperature change is effected by cooling a portion of the pipe or by cooling one portion of the joint and heating another portion. It is observed that the disconnecting procedure is carried out while the pipe structure is in the vertical position, and the cooling or refrigerating unit (containing CO₂) is lowered to the desired location on the inside of the pipe.

We now consider the claims. Claim 1 reads:

A method of separating from an elongated hollow metal carrying member a selected one of a plurality of shorter annular metal members interference-fitted in side-by-side relation on the outer perimeter of the elongated member, comprising: effecting chilling and shrinking of said elongated member selectively in only the area thereof encompassed by the endmost of said annular members by application of heat abstracting medium to said area at the inside of the elongated member, whereby to effect loosening of the endmost member from the elongated member; maintaining the interference fit of the remaining of said annular members in place on the outer perimeter of the elongated member; and separating the loosened endmost member from the elongated member, while retaining the remaining of the annular members on the elongated member by virtue of said interference fit.

Claim 1 is therefore basically directed to the method of separating a selected member of a plurality of shorter annular metal members which are interference fitted in side-by-side relation on the outer perimeter of an elongated carrying member by using heat-abstracting gas within a selected bore location of the carrying member. This claim also specifies that the remaining annular members are maintained at their location by virtue of an interference fit.

By contrast Emrick, as previously stated, discloses the disassembly of various devices having inner and outer members held together by an interference fit, by applying a cooling agent, such as liquified carbon dioxide, to the inner member to cause shrinkage of the inner member to prevent it from expanding. By using liquified carbon dioxide "at any desired point," Emrick was able to dispense with the "application of heat." Prior general knowledge then includes heating and cooling of the outer and inner members, plus Emrick's superior cooling technique, which could obviously be used with or without the application of heat to the outer member.

The selective application of a coolant within the bore of a shaft to shrink it and thereby release the outer member merely applies the principle taught by the Emrick patent. Furthermore, there is no patentable significance

in the means of retaining the remaining outer member in their respective position, as the cooling gas shrinks the elongated shaft in immediate area of the nozzle and does not significantly effect any other portion of the shaft. Consequently the interference fit of the remaining members is not disturbed. The claim does recite that the method is for use with interference-fitted members having a plurality of side-by-side outer members. It is clear, however, that one skilled in the art would have no difficulty in applying the principle used by Emrick to such an assembly. In our view, therefore, claim 1 does not disclose a patentable advance in the art.

Claims 2 and 3 which depend on claim 1 relate to suspension, transport and nozzle arrangements, which limitations are not patentably significant.

Claims 4, 5 and 6 depend directly or indirectly on claim 1, and include a heating ring to heat the outer annular member to enhance separation.

Emrick (as quoted above) in discussing the prior art, stated it was previously known that "parts that have been formed by shrink fitting or have rusted fast are separated by heating the outer member...." He also noted that sometimes this differential expansion is accentuated by applying coolant to the inner member to carry off the heat conducted therein. Later Emrick says, "My invention has for an object to overcome the difficulties and disadvantages above enumerated by dispersing with the application of heat...."

The principle therefore of simultaneous use of heat and coolant is discussed in the citation, and these claims do not disclose any new or unexpected result.

Claims 7 to 12, which depend directly or indirectly to claim 1, add limitations, such as moving and aligning the nozzle in the bore and

transporting the separated member. These limitations, however, are not patentably significant. Independent method claims 13 and 15 which detail the removal procedure of the lower member, in addition to effecting a temperature differential, are in the same category as refused claim 1.

Claims 16 to 21 which depend directly or indirectly on claim 15 introduce limitations such as heating, transporting and separating. All the limitations have been discussed in claims 1 to 12 and these remarks are applicable to claims 16 to 21.

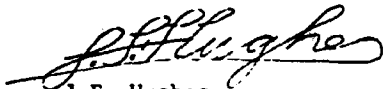
Claims 22 to 34, 36 to 41, which are for an apparatus to carry out the method of the previously discussed claims, are substantially the same as the previously rejected method claims, since they are couched in terms of apparatus. Accordingly our comments in respect of claims 1 to 13 and 15 to 21 apply equally to claims 22 to 34 and 36 to 41.

The Board is mindful that when assessing an alleged invention the combination of a claim as a whole must be considered. In our view however, even considering the combination to be novel it lacks the prerequisite of inventive ingenuity. No new result has been achieved, nor a result which can be considered to have flowed from an inventive step.

The applicant argues that "all the Patent Act requires is that the presented process or machine be new and useful" and there is no requirement for inventive ingenuity as called for by the examiner. The Patent Office, supervised by the Court, does examine for inventiveness, wherein the necessary patentable attributes are novelty, utility and inventive ingenuity (Vide, Commissioner of Patents v Farbwerke, supra). In our view the claims in question may possess novelty but they lack the prerequisite of inventive ingenuity.

It must be kept in mind that while it is important to encourage inventions because of their desirable influence upon trade and manufacture, yet it is equally important that manufacturers or traders of the public generally should not be hampered by the granting of patents where there has been no exercise of the inventive faculty.

We are satisfied that the rejected claims do not represent a patentable advance in the art. The applicant has achieved a result in substantially the same manner as taught by the prior art. The Board recommends that the decision of the examiner to refuse claims 1 to 13, 15 to 34 and 36 to 41 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 on claims 1 to 13, 15 to 34 and 36 to 41. The applicant has six months within which to cancel the refused claims or appeal this decision under the provision of Section 44 of the Patent Act.

Decision accordingly,



A.M. Laidlaw,
Commissioner of Patents.

Dated at Hull, Quebec
this 24th. day of
March, 1975.

Agent for Applicant

Smart & Biggar,
Ottawa, Ontario