COMMISSIONER'S DECISION

Obviousness - Resilient Tires For Conveyor Wheels

A resilient tire is mounted on the hub of the conveyor roller in a "friction fit" or "unbonded relationship." The unbonded feature permits the use of a low hysteresis (normal) rubber, which provides an unexpected beneficial result. Amended claims found allowable. New evidence presented at the Hearing satisfied the Board and the examiner that the subject matter is patentable.

Final Action: Modified.

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This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated October 6, 1975, on application 161,846 (Class 193-11). The application was filed on January 23, 1973, in the name of Andrew T. Kornylak, and is entitled "Resilient Rollers." The Patent Appeal Board conducted a Hearing on August 17, 1977, at which Mr. P. Kirby represented the applicant. Also in attendance was Mr. Y. Takada.

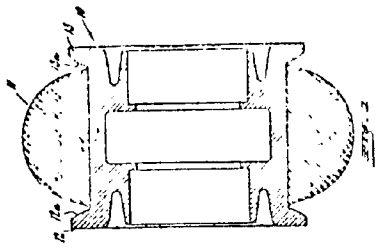
The application relates to a flanged wheel for a roller conveyor. An elastomeric tire, narrower than the wheel rim, is mounted in the rim in a "friction fit" or "unbonded"relationship. The unbonded feature (that is the tire is not fixed to the hub) allows the use of a low hysteresis (normal) rubber.

In the Final Action the examiner refused the application for failing to define patentable subject matter over the following United States patents:

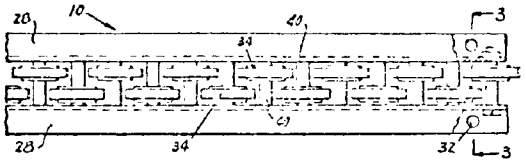
2,854,052	Sept. 30, 1958	Smith
3,443,674	May 13, 1969	Kornylak

The Smith patent relates to a tire and rim assembly. The object is to provide a tire and rim assembly, incorporating a resilient tire and a rigid rim, which may be subject to extreme overloads without damaging

or affecting the normal operation of the tire at normal loads. Figure 1, shown below, is illustrative of that invention:



The Kornylak patent relates to a rollerway for a roller conveyor adapted to handle heavy loads, such as heavy loaded pallets. Figure 1, shown below, illustrates that arrangement.



In the Final Action the examiner stated his position (in part) as follows:

> ...
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> This application stands rejected for failing to define any invention over this art. Roller conveyors are well known as shown by United States Patent 3,443,674, noted on page 2 line 3 of the instant application. To substitute a tire and rim like that of Smith into such known roller conveyor arrangement is held to be but expected skill. The same results are achieved by Smith as applicant, by the same means and for the same reasons. To provide axial corrugations is held to be but expected skill.
>
> As regards the "bonded" attachment in Smith it is noted that column 2 line 12 refers to a "demountable type" as well which is clearly not bonded. As regards applicant's comments re the deformation just up to the elastic limit in the instant device, it is noted that Smith, column 1 lines 21-37 states that his

> tire is to be compressed "under load to an extent slightly less than that at which rupture or breakdown of the tire would occur". It is held that this point is the same as that in applicant's although expressed in different terminology. Rupture or breakdown it is held would occur when the elastic limit is reached. Smith does show his tire at interface 14 occupying the entire width of the channel, but as is evident from his disclosure this is because he does not want to effect any breaking of the bond at the interface under load, in his bonded embodiment. In the unbonded embodiment this tire width at 14 would not be of any importance. Smith does show his tire of narrower width than the channel over most of the height thereof.
>
> ...

The applicant in his response to the Final Action had this to say (in part) as follows:

> ...
>
> The Smith patent does disclose that the tire may be compressed within the flanges due to the normal spacing, in the axial direction, between the flanges and the tire, so as to protect the tire. As set forth in column 3, lines 40-44, the tire and rail assembly is intended to be used as the tail wheel of an airplane, but it may be used advantageously for any purpose where extreme overloads of short duration are likely to be encountered. Within the meaning of a tail wheel for an airplane, there is certainly no extreme overloads of this type to be encountered in a gravity roller conveyor. At the time of the Smith patent, airplanes were generally landing at speeds in excess of 100 miles per hour on hard surface runways, for example, concrete. Unless special provisions are made for rotating a landing wheel of an airplane prior to landing, for example by turbine blades or an electic motor, the landing wheel will be stationary with respect to the airplane when it strikes the runway, and with it being realized that the runway has a speed relative to the airplane of greater than 100 miles per hour, it is seen that the forces tending to rotate the tire with respect to the hub are tremendous, and it would be highly undesirable and no doubt destroy the tire to have the tire rotate relative to the hub under such conditions; the hub is generally provided with roller bearings to provide for such acceleration from a stationary position to speeds in access of 100 miles per hour. While the Smith patent states that the tire 11, however, may be of a solid demountable type in which case a suitable means for mounting the tire must be employed (column 2, lines 9-13), whatever mounting means would be employed would certainly be designed to prevent any relative rotation or movement between the inner bearing surface of the tire and the outer bearing surface of the hub for the reasons mentioned above, and the term demountable with respect to such a vehicle wheel would have no more meaning than the fact that pneumatic tires of automobiles are demountable from the rim, and these are not in any sense provided so as to be relatively moveable in use. Therefore, the Smith patent does not have any teaching with respect to the tire being loosely mounted on the hub for relative movement in the axial

> and circumferential direction with respect to the hub as presently claimed, and any modification of the Smith patent in this direction would render the Smith wheel inoperative for its intended use as an airplane landing tail wheel.

One of the main points at the Hearing centered around the lack of clarity in an affidavit which was submitted on May 14/76 by the applicant and signed by Mr. Charles P. Tabler. At the Hearing the Board extended the applicant an opportunity to clarify certain issues including some points in that affidavit.

On November 9, 1977 the applicant submitted an expanded affidavit by Mr. Tabler and also presented further arguments to clarify some of the issues raised at the Hearing. He also stated that he was willing to cancel all the claims except claims 9 to 11. These claims were submitted, with minor amendments, in the above mentioned response of November 9, 1977. Claim 9 reads as follows:

> A gravity undriven roller conveyor, comprising: a stationary inclined rigid conveyor support; a plurality of substantially identical idler conveyor rollers serially arranged in a conveying direction downwardly along said inclined conveyor support; bearing means freely rotatably mounting each of said conveyor rollers on said conveyor support with parallel axes of rotation in a common inclined plane, said axes being perpendicular to said conveying direction down said inclined plane for supporting loads on said conveyor rollers and conveying loads from the top of said inclined conveyor support to the bottom of said inclined support solely by gravity; each of said rollers having a rigid wheel including an outer annular bearing surface concentric with its axis of rotation and a pair of axially spaced flanges integrally extending radially outwardly from axially opposed sides of said outer annular bearing surface; an annular tire of elastomeric material mounted on each wheel between said flanges and normally being of less axial width throughout its thickness than the corresponding axial space between said flanges; said tire having an inner annular bearing surface of complimentary shape with said wheel outer bearing surface for transmission of rotation thereto, said tire being mounted unbonded on said wheel for axial and circumferential relative movement between said inner and outer bearing surfaces of said tire and wheel respectively when the material of the tire is compressed; said tire having a radial thickness greater than the radial depth of said flanges; said elastomeric material of said tire having an elastic limit by which it acquires a

permanent deformation when radially compressed; and said flanges being of a radial depth relative to the radial thickness of said tire to completely receive the elastomeric material of the tire and directly engage a load being conveyed before the elastic limit of said elastomeric material is reached under radial compression by the load being conveyed.

In the prior art, high hysteresis rubber tires had been used to give good speed control of articles on a conveyor. These tires had been bonded to appropriate hubs. The use of normal (low hysteresis) rubber tires when bonded to hubs had caused uncontrolled run-away of articles on conveyors. Thus it was thought that the only way to solve the run-away problem was to use high hysteresis rubber tires. The prior use of normal rubber tires when bonded did not provide for speed control as the speed and acceleration increased substantially with an increase in load.

It is significant to note from the affidavits, that when a high hysteresis rubber tire is bonded the speed control is good with some slight slowing of the article as the load increases, but that merely unbonding this same tire provides a remarkable slow-down as load is increased. It is clear that unbonding the high hysteresis rubber tire in and of itself provides a substantial increase in load restraint. It is also clear that unbonding a normal rubber tire restrains the run-away condition that was associated with that arrangement when bonded, and in fact provides a very satisfactory conveyor with excellent speed control.

The present application in setting forth the fine speed control obtained by merely unbonding the tire (particularly when made of low hysteresis rubber) from its hub provides an unexpected beneficial result. This we believe sufficient to hold claims 9 to 11 allowable.

We find it unnecessary to comment further, because at the Hearing the examiner was satisfied that claims 9 to 11 would be allowable if the points made in the original affidavit were explained to his satisfaction. This was done in the submission of November 9, 1977.

We are satisfied that claims 9 to 11 are in allowable form and recommend the allowance of these claims when presented as claims 1 to 3.

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

I have reviewed the prosecution of this application and I agree with the recommendation of the Patent Appeal Board. Accordingly, I will accept claims 9 to 11 when presented as claims 1 to 3 and so request that amendment. The application is returned to the examiner for resumption of prosecution.

J.H.A. Gariepy
Commissioner of Patents

Dated at Hull, Quebec

this 29th. day of November, 1977

Agent for Applicant

Kirby, Shapiro, Curphey & Eades
77 Metcalfe St.
Ottawa, Ont.
K1P 5L6