

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte PETRUS H. W. SWINKELS, MAARTEN H. ZONNEVELD  
and HENRICUS J. LIGTHART

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Appeal No. 98-2420  
Application No. 08/573,854<sup>1</sup>

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ON BRIEF

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Before COHEN, FRANKFORT, and PATE, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed December 18, 1995.

Appeal No. 98-2420  
Application No. 08/573,854

This is a decision on appeal from the examiner's final rejection of claims 1 through 5, all the claims pending in the application.

Appellants' invention is directed to a compressed air abrasive particle blast system. Of importance to appellants is the desire to provide a system that operates at a significantly lower operating pressure (i.e., an absolute pressure between 2 and 4.5 bar as compared to conventionally available abrasive particle blast systems which operate at approximately 7 bars), while also maintaining abrasion effectiveness. As noted on pages 2 and 3 of the specification,

[t]he invention is based on the recognition that a considerable reduction in the operational pressure is indeed possible when the ratio of the smallest diameters of the HP-air pipe and the blast pipe is chosen to lie between 0.6 and 0.9. The absolute pressure  $P$  then lies between 2 and 4.5 bar. When the diameter of the blast pipe is chosen to lie at least between 4mm and 20 mm at this ratio, it is found that the speed of the mixture issuing from the blast pipe substantially does not change, and also that the output, i.e. the quantity of abrasive particles per unit time and per unit surface area to be treated, shows very little change. The considerable reduction in the HP-air pressure, on the other hand, renders the system energy-

Appeal No. 98-2420  
Application No. 08/573,854

efficient for use in mass manufacture, such as for making many small holes in thin plates. A reduction of the absolute pressure  $P$  to 3.7 bar for a smallest diameter  $d_2$  of the blast pipe of 6 mm and a smallest diameter  $d_1$  of the HP-air pipe of 4.5 mm, i.e. a ratio of 0.75, leads to a power saving of approximately 45% compared with a system operating at 7 bar with diameters of 6 and 3 mm, respectively.

It does have to be true for values chosen for the absolute pressure  $P$  and the ratio  $d_1/d_2$  that  $P < 13.25 - 12.5 d_1/d_2$  because otherwise the underpressure in the mixing chamber becomes too small with a higher  $P$ -value for obtaining a sufficient venturi action. It is even possible for a backflow effect to occur.

A reduction in the operating pressure is only possible, however, in that the transport of the abrasive particles to the mixing device is not dependent on the operating pressure. Preferably, the transport mechanism is a vibratory mechanism. A vibratory transport mechanism achieves that the abrasive particles are evenly distributed during transport. Even if the distribution should be irregular during the entry of the particles from the hopper into the vibrating conveyor of the vibratory mechanism, the vibratory mechanism will ensure that the particles are evenly distributed nevertheless. An even distribution of the particles leads to a constant inflow of particles into the mixing chamber, and contributes to a flow density of the mixture issuing from the blast pipe which is as constant as possible.

Appeal No. 98-2420  
Application No. 08/573,854

Claims 1, 2 and 3 are illustrative of the subject matter on appeal and a copy of those claims may be found in Appendix A of appellants' brief.

The sole prior art reference of record relied upon by the examiner as evidence of obviousness under 35 U.S.C. § 103 is:

Merrigan	4,067,150	Jan. 10,
1978		

Claims 1 through 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Merrigan.

Appeal No. 98-2420  
Application No. 08/573,854

The text of the examiner's rejection with regard to the appealed claims and rebuttal to the arguments presented by appellants appears in the final rejection (Paper No. 9, mailed January 30, 1997) and the examiner's answer (Paper No. 14, mailed November 19, 1997). Rather than reiterate appellants' position on the obviousness issues raised in this appeal, we make reference to the main and reply briefs (Paper Nos. 13 and 15) for a complete statement of appellants' arguments.

#### OPINION

Having carefully considered appellants' specification and claims, the applied Merrigan reference, and the respective viewpoints of appellants and the examiner, we have reached the conclusion that the examiner's rejection of claims 1 through 5 under 35 U.S.C. § 103 is not well founded and, therefore, will not be sustained.

Like appellants, we find no teaching, suggestion, or incentive in the applied Merrigan reference which would have made it obvious to one of ordinary skill in the art at the

Appeal No. 98-2420  
Application No. 08/573,854

time of appellants' invention to make the high pressure air inlet (62) to the mixing chamber (52) therein with a smallest diameter  $d_1$  and the blast pipe outlet (64) of the mixing chamber with a smallest diameter  $d_2$ , wherein the ratio of  $d_1/d_2$  is between 0.6 and 0.9, as required in each of the independent claims on appeal. The examiner's position (answer, page 4), that the disclosure in Merrigan of a ratio of "approximately one-half" (col. 2, lines 22-25) is "sufficiently broad to encompass at least the lower range of 0.6," is without merit. In this regard, we agree with appellants' arguments as set forth in the brief and on pages 2 and 3 of the reply brief.

With respect to the requirement in independent claims 1 and 3 that the system operate at an absolute pressure  $P$  of between 2 and 4.5 bar, we share appellants' view as expressed on pages 3 and 4 of the reply brief. While Merrigan may suggest a pressure range of 35 to 120 pounds per square inch for the operating pressure of the vibrator housing (32), there is no suggestion in Merrigan that the operating pressure in the mixing chamber (52) would be anything other than the conventional 7 to 8 bar, and certainly no teaching or

Appeal No. 98-2420  
Application No. 08/573,854

suggestion of an operating pressure for the mixing chamber (52) as low as 35 pounds per square inch or anywhere near the claimed range of between 2 and 4.5 bar.

As a further point, we also agree with appellants that Merrigan fails to teach or suggest "a transport mechanism for transporting abrasive particles from the hopper into the mixing chamber at a rate that is substantially not dependent upon the value P," as set forth in claim 3 on appeal. See, particularly, appellants' argument bridging pages 4 and 5 of the reply brief.

For the foregoing reasons, the decision of the examiner rejecting claims 1 through 5 under 35 U.S.C. § 103 based on Merrigan is reversed.

REVERSED

IRWIN CHARLES COHEN )

Appeal No. 98-2420  
Application No. 08/573,854

Administrative Patent Judge	)	
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CHARLES E. FRANKFORT	)	APPEALS
Administrative Patent Judge	)	AND
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WILLIAM F. PATE	)	
Administrative Patent Judge	)	

CEF/sld

Appeal No. 98-2420  
Application No. 08/573,854

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Appeal No. 98-2420  
Application No. 08/573,854

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REVERSED

Prepared: April 12, 2000