

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS C. MCCAVOUR

Appeal No. 2000-1654
Application 09/097,860

HEARD: October 11, 2001

Before COHEN, STAAB, and MCQUADE, Administrative Patent Judges.
MCQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Thomas C. McCavour appeals from the final rejection of claims 1 through 23, all of the claims pending in the application.

THE INVENTION

The invention relates to "concrete reinforced corrugated metal plate arch-type structures, such as used in overpass bridges, water conduits, or underpasses, capable of supporting

large superimposed loads" (specification, page 1).

Representative claim 1 reads as follows:¹

1. A composite concrete reinforced corrugated metal arch structure comprising:

i) a first set of shaped corrugated metal plates interconnected in a manner to define a base arch structure of a defined span cross-section, height and longitudinal length, said base arch having a crown section and adjoining hip sections for said span cross-section and corrugated metal plates of defined thickness having corrugations extending transversely of the longitudinal length of said arch to provide a plurality of curved beam columns in said base arch;

ii) a second series of shaped metal plates interconnected in a manner to overlay and contact the first set of interconnected plates of said base arch, said second series of interconnected plates extending continuously in the transverse direction to include at least said arch crown and being secured directly to said first set of interconnected plates;

iii) said interconnected series of second plates and said first set of plates defining a plurality of individual, transversely extending, enclosed continuous cavities, each said cavity being defined by an interior surface of said first set of plates and an opposing interior surface of said second series of plates;

iv) concrete filling each said continuous cavity from cavity end to end as defined by the transverse extent of said second series of plates, said concrete filled cavity defining an interface of said concrete encased by said metal interior surfaces of said interconnected second series of plates and first set of plates;

v) said interior surfaces of said cavity for each of said first and second plates having a plurality of shear bond connectors at said encased concrete-metal composite interface, said composite shear bond connectors being a rigid part of said first and second plates to ensure that the concrete and metal act

¹ At the oral hearing, appellant's counsel stated that the "second set of corrugated plates" recited in claim 16 were the same as the "second series of . . . corrugated metal plates" recited in parent claim 3, and that claim 18 should depend from claim 16 rather than claim 15.

Appeal No. 2000-1654
Application 09/097,860

in unison when a load is applied to said arch structure, said shear bond connectors providing a plurality of curved beam column stiffeners to enhance combined positive and negative bending resistance and axial load resistance of said base arch structure, there being a sufficient number of said second series of plates to provide a sufficient number of said curved beam column stiffeners to support anticipated loads imposed on said structure.

THE PRIOR ART

The references relied on by the examiner to support the final rejection are:

Sivachenko	4,186,541	Feb. 5, 1980
Gurtner et al. (Gurtner)	4,318,635	Mar. 9, 1982
Wilson et al. (Wilson)	5,326,191	Jul. 5, 1994
Sattler et al., (Sattler) ² German Patent Document	2657229	Jul. 28, 1977

THE REJECTION

Claims 1 through 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Wilson, Gurtner, Sivachenko and Sattler.

Attention is directed to the appellant's main and reply briefs (Paper Nos. 10 and 13) and to the examiner's final rejection and answer (Paper Nos. 3 and 11) for the respective

² An English language translation of this reference, prepared on behalf of the United States Patent and Trademark Office, is appended hereto. The record also contains a translation submitted by the appellant with the main brief (Paper No. 10). We have used the Office translation in discussing the reference in this decision.

Appeal No. 2000-1654
Application 09/097,860

positions of the appellant and the examiner with regard to the merits of this rejection.³

DISCUSSION

I. Grouping of claims

The appellant allows that for purposes of this appeal "the claims stand or fall together" (main brief, page 4). Therefore, pursuant to 37 CFR § 1.192(c)(7), we have chosen representative claim 1 and shall decide the appeal on the basis of this claim alone. Claims 2 through 23 shall stand or fall with claim 1.

II. The merits of the rejection

Wilson discloses a corrugated metal box culvert 78 having a crown 82, haunches 84 and sidewalls 80. A continuous corrugated metal reinforcement 86 overlies at least a major portion of the crown, and possibly portions of the haunches and sidewalls, and preferably extends the length of the culvert. Bolts connect the troughs of the corrugated reinforcement to the crests of the corrugated culvert to define transversely extending cavities (see

³ The record indicates that the instant application is a continuation of Application 08/662,070, filed June 12, 1996, now U.S. Patent No 5,833,394, granted November 10, 1998. Given the similarities between the appealed claims and the patent claims, in the event of further prosecution the examiner may wish to consider whether a double patenting issue exists.

Figure 6) which serve to optimize the load carrying capacity of the culvert.

Gurtner discloses a similar culvert structure 10 composed of a corrugated metal arch and a plurality of corrugated metal reinforcing ribs secured to the arch to define transversely extending cavities.

It is not disputed that the culvert disclosed by either Wilson or Gurtner responds to all of the limitations in claim 1 except for those pertaining to the concrete fillings and the shear bond connectors. The examiner's reliance on Sivachenko and Sattler to cure these shortcomings is well founded.

Sivachenko discloses a corrugated steel plate structure designed for use in a variety of applications including box culverts. As described by Sivachenko with reference to Figure 7,

to increase the strength and rigidity of the plate, two [corrugated] plates 2 can be secured to each other to form a double plate 24 by aligning respective peaks and troughs 6, 8 and intermittently securing the aligned peaks and troughs to each other with bolts 26, rivets or welds (not shown). Interior spaces 28 can be filled with concrete 30 and for that purpose the upper corrugated plate may be provided with a plurality of spaced-apart concrete filling holes 32 through which the fresh concrete can be introduced into the interior spaces [column 7, lines 55 through 64].

Sattler discloses a stiffener for the trimmed, sloped end of a corrugated pipe culvert 1. According to the reference,

[e]ach of these stiffeners consists of a corrugated sheet bent into a pan 3 which encompasses the cut end of the corrugated pipe 1 from below and runs with a radial separating space from it in a circumferential direction as can be seen in particular in Figures 1 and 2. Sheet metal pan 3 is attached to corrugated pipe 1 with the aid of threaded bolts 4 and forms with its edge corrugations 5 guide beads for walls 6 which close off the annular space created between sheet metal pan 3 and corrugated pipe 1 in the direction of the pipe axis. This annular space has a concrete filling 7 which, with the aid of headed stud connectors [8], is firmly joined to sheet metal pan 3 and corrugated pipe 1 so that, for the stiffener, a composite structure is created in which tensile forces are absorbed by the corrugated sheets of pipe 1 or of pan 3 and the compressive forces are absorbed by concrete filling 7 [translation, pages 6 and 7].

A person having ordinary skill in the art would have found ample suggestion or motivation in Sivachenko's disclosure of the strengthening and stiffening benefits of concrete fillings in a corrugated metal structure and in Sattler's disclosure of the force-absorbing advantages afforded by headed stud connectors which firmly join such fillings and metal structure to provide the corrugated metal arches disclosed by Wilson and Gurtner with concrete fillings and shear bond connectors of the sort recited in claim 1. The express teachings in the prior art relating to these benefits/advantages belie the appellant's position that the

Appeal No. 2000-1654
Application 09/097,860

proposed reference combination stems from impermissible hindsight.

The related argument (bolstered by the publication appended to the main brief) that an arch structure having the curved beam column stiffeners recited in claim 1 (i.e., the enclosed cavities, concrete fillings and shear bond connectors) embodies surprising and unexpected resistance to various stresses and forces so as to "permit greatly increased spans for the arch structures and novel clearance envelopes for the arch structures which are very significant compared to the prior art" (main brief, page 4) is also unpersuasive. To begin with, claim 1 does not specify any particular span length or a novel clearance envelope. Thus, this line of argument is not commensurate with the relatively broad scope of the claim. Moreover, given the fair teachings of the applied prior art with respect to the strengthening, stiffening and force-resisting properties of concrete fillings and shear bond connectors, it is neither surprising nor unexpected that curved beam column stiffeners of the type recited in claim 1 would impart increased strength to an arch structure.

In light of the foregoing, the combined teachings of Wilson, Gurtner, Sivachenko and Sattler justify the examiner's conclusion

Appeal No. 2000-1654
Application 09/097,860

that the differences between the subject matter recited in claim 1 and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. We shall therefore sustain the standing 35 U.S.C. § 103(a) rejection of claim 1 and of claims 2 through 23 which stand or fall therewith.

SUMMARY

The decision of the examiner to reject claims 1 through 23 is affirmed.

Appeal No. 2000-1654
Application 09/097,860

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

IRWIN CHARLES COHEN)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
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)	APPEALS AND
LAWRENCE J. STAAB)	
Administrative Patent Judge)	INTERFERENCES
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Administrative Patent Judge)	

Appeal No. 2000-1654
Application 09/097,860

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