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Datasheet for the decision of 7 July 2017

Case Number: T 2326/14 - 3.2.08

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Language of the proceedings: EN

Title of invention:
Manipulator of low inertia for laser cutting machines for flat sheet metals

Applicant:
SALVAGNINI ITALIA S.p.A.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

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Case Number: T 2326/14 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 7 July 2017

Appellant: (Applicant)	SALVAGNINI ITALIA S.p.A. Via Ing. Guido Salvagnini, 1 36040 Sarego (VI) (IT)
Representative:	Mittler, Enrico Viale Lombardia 20 20131 Milano (IT)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 June 2014 refusing European patent application No. 10169263.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	M. Foulger
	Y. Podbielski

Summary of Facts and Submissions

I. With the decision dated 3 June 2014, the examining division refused the European patent application no. 10169263.0. The examining division found that the subject-matter of claim 1 did not involve an inventive step in view of
D1 (US 2008/0197118 A1) in combination with the teaching of either
D2 (US 2001/0006595 A1) or
D4 (FR 2 800 659 A1).

II. The appellant (applicant) filed an appeal against this decision. The appeal was filed in the prescribed form and within the given time limits.

III. The appellant requested the grant of a patent based on claim 1 as filed with the letter dated 18 October 2016 and claims 2-4 as originally filed.

IV. The independent claim under consideration reads as follows:

"Laser cutting machine for flat sheet metals placed on a horizontal plane, comprising a laser cutting head (14) and a manipulator with a longitudinal movement axis X and a transversal movement axis Y perpendicular to said longitudinal axis and parallel to the horizontal plane of the sheet metal, said manipulator comprising a supporting equipment (15) for said laser cutting head (14) which is displaceable along said axes, characterized in that said supporting equipment (15) comprises two sliding blocks (5, 6) driven by respective independent actuators (7, 8) to move along the axis Y at a variable mutual distance, and two rods (9, 10) arranged as a V for the articulated connection

of said sliding blocks (5, 6) to said laser cutting head (14), a first rod (9) having a first end hinged on a first sliding block (5) to be rotatable around a first axis (11) perpendicular to the horizontal plane of the sheet metal and a second end integrally fixed to said head (14) and a second rod (10) having a first end hinged on a second sliding block (6) to be rotatable around a second axis (12) perpendicular to the horizontal plane of the sheet metal and a second end hinged on said second end of the first rod (9) to be rotatable around a third axis (13) perpendicular to the horizontal plane of the sheet metal."

V. The appellant argued essentially that:

D1 disclosed a laser cutting machine for flat sheet metals according to the preamble of claim 1.

The person skilled in the art wishing to improve the performance of the laser cutting machine described in D1 would not have applied the teaching of D2 because this document described a heavy spindle tool. Moreover, the structure described in D2 was unsuitable for moving a laser cutting head above a flat, horizontal, metal sheet because there were no means shown to attach the structure to the rails. If the structure of D2 were rotated by 90° in order to fit it to the laser cutting machine known from D1 then it would fall over. The same reasoning applied to the teaching of D4. Neither D2 nor D4 contained any teaching that their supporting structures could be used in a rotated position with mechanisms extending laterally in a cantilevered position.

Thus the subject-matter of claim 1 involved an inventive step in view of documents D1,D2 and D4.

Reasons for the Decision

1. Inventive step

1.1 D1, cited in paragraph [0010] of the published application, is the most relevant prior art and describes a laser cutting machine according to the preamble of claim 1.

In this known machine, the supporting equipment for the laser cutting head, shown for instance in Fig. 1, comprises a moving member (5) carried by a supporting structure (3). The moving member is moveable along the Y axis and carries first and second slides (11,12) with associated first and second actuators (13,14) for controlling their movements along a pair of guide blocks (7,8). Together this forms an articulated connection.

1.2 The subject-matter of claim 1 therefore differs from the machine known from D1 in that:

the supporting equipment comprises two sliding blocks driven by respective independent actuators to move along the axis Y at a variable mutual distance, and two rods arranged as a V for the articulated connection of said sliding blocks to the laser cutting head, a first rod having a first end hinged on a first sliding block to be rotatable around a first axis perpendicular to the horizontal plane of the sheet metal and a second end integrally fixed to said head and a second rod having a first end hinged on a second sliding block to

be rotatable around a second axis perpendicular to the horizontal plane of the sheet metal and a second end hinged on said second end of the first rod to be rotatable around a third axis perpendicular to the horizontal plane of the sheet metal.

1.3 The problem to be solved is, according to the application as published, paragraph [0007], to provide a solution which allows the work performance of the machine to be increased. The claimed solution achieves this by providing a manipulator in which both actuators can be mounted on the main beam whereas in D1 the moveable member must carry both slide actuators. This leads to a manipulator with lower inertia which can consequently provide a faster work rate.

1.4 The claimed solution to this problem is not obvious from the teaching of D2. D2 does not deal with a laser cutting machine but rather a machine tool. Moreover, in D2, see figure 2, the support rails are arranged in the horizontal plane and the machine head moves in a vertical plane. D2 does disclose an embodiment with V articulated connection and two sliding blocks but does not have any means which attach the sliding blocks to the horizontally arranged rail 12, see Fig. 2 and paragraph [0052]. Hence if it were to be rotated through 90° then the sliding blocks would fall off. Although paragraph [0052] mentions that "all possible orientations of the movement system in the space are of course possible without difficulty, i.e. suspended from above, supported from below (with the Z axis in the vertical direction) or at acute angles or diagonals even"; there is however no hint as to how this could be achieved. Thus D2 does not provide a concrete teaching for moving the head in the horizontal plane as shown in D1 and required by present claim 1. Hence, the skilled

person would not have considered the teaching of D2 to solve the problem posed.

Moreover, in D2 the second rod is attached to the mid-point of the first, longer rod and not the second end of the first rod as required by present claim 1. Thus, even if the person skilled in the art were to consider the teaching of D2, this would not lead to the subject-matter of claim 1.

1.5 Neither does D4 render the claimed solution obvious. D4 relates to a moving device, in particular for a working tool (page 1, lines 1-4), and describes three embodiments: a first embodiment shown in figures 1-4, a second embodiment shown in figures 5-7, and a third embodiment, shown in figures 8-10. Only this third embodiment is provided with sliding blocks driven by actuators to move along the main beam.

The third embodiment teaches a manipulator mounted on horizontal guide rails, see page 8, lines 11-12. The machine head thus moves in a vertical plane, see figures 8 and 10. The connection between rail, 16, and manipulator is formed by the parts 22 and 24 which are in the form of an inverted "U" and merely rest on the rails. As in D2 there is no means disclosed that would permit the arrangement to be rotated through 90° so that the manipulator would be suitable for cutting sheet metal arranged horizontally as in D1. Thus, the teaching of this embodiment of D4 could not have been applied to the laser cutting machine known from D1 without further modification; there is no hint in the cited prior art which would render such a modification obvious for the skilled person. Thus, it was not obvious to apply the teaching of D4 to solve the

problem posed.

1.6 Therefore the subject-matter of claim 1 involves an inventive step.

2. Adaptation of the description

The description is not fully adapted, in particular because there appears to be a line missing at the top of page 2 as filed with the letter dated 28 November 2016 which in the originally filed application read "reduced masses and strokes, mounted on the first system of main axes XY". The Board deems it appropriate to remit the case to the examining division for adaptation of the description.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division with the order to grant a patent based on:

   Claims - Claim 1 as filed with letter dated 18 October 2016 and claims 2-4 as originally filed

   Description - To be adapted

   Drawings - Figures 1-8 as originally filed

The Registrar: The Chairman:

K. Boelicke M. Alvazzi Delfrate

Decision electronically authenticated