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D E C I S I O N
of 29 June 1994

Case Number: T 0911/90 - 3.2.5

Application Number: 83111957.3

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Language of the proceedings: EN

Title of invention:
Press apparatus for reducing slab width

Applicant/Patentee:
Hitachi, Ltd.

Opponent:
SMS Schloemann-Siemag AG

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
- "Inventive Step - yes"

Decisions cited:
-

Catchword:
-



Case Number: T 0911/90 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 29 June 1994

Appellant: SMS Schloemann-Siemag AG
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Respondent: Hitachi, Ltd.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 20 September 1990
rejecting the opposition filed against European
patent No. 0 112 516 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: C. V. Payraudeau
Members: H. P. Ostertag
A. Burkhart

Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal against the decision of the Opposition Division by which the opposition against European patent No. 0 112 516 had been rejected pursuant to Article 102(2) EPC.

The documents DE-A-2 017 306 (D1), GB-A-2 062 522 (D2) and DE-A-2 531 591 (D5) referred to in the reasons for the decision of the Opposition Division are also relevant to the present decision.

II. Oral proceedings were held.

(i) The Appellant requested that the decision under appeal be set aside and that the patent be revoked

(ii) The Respondent (Patentee) requested that the appeal be dismissed.

(iii) Claim 1 of the patent as granted reads as follows:

"1. Press apparatus for reducing the width of a slab comprising:

a pair of press tools (3) disposed on both widthwise sides of a slab feed line so that their press surfaces for compressing a slab (1) face each other, at least one of said press surfaces being constituted by a parallel surface (3A₁) that is substantially parallel to the slab feed direction and an inclined surface (3A₂) to the slab feed direction (Z) and vibrating means (5) for vibrating said press tool having the inclined surface (3A₂);

characterized by a width regulating means (4) for regulating the position of said press tool (3) in the slab width direction; and

a control means (27, 20) adapted to detect the fact that the forward end of said slab (1) has been disposed between the parallel surfaces (3A₁) of said press tools (3) to actuate said width regulating means (4) as well as to actuate said vibrating means (5) after a predetermined compression is effected."

(iv) The Appellant essentially argued as follows:

The press apparatus for reducing the width of a slab as shown in the embodiment according to Figures 11 and 12 of document D5 discloses not only all the features of the preamble of Claim 1 of the patent in suit, but also the first feature of the characterizing part of Claim 1, i.e. a width regulating means for regulating the position of the press tool in the slab width direction, see the paragraph bridging pages 13 and 14. Document D2 shows a press apparatus for reducing the width of a slab, whereby the slab is stopped in a predetermined position between the press tools prior to compressing the slab, see page 2, lines 16 to 39. The stopping of the slab presumes the presence of a detector. Hence, it would be a normal design option for the skilled person to improve the press apparatus according to document D5 by including the detector according to document D2, and, according to the circumstances, the associated control means to actuate the width regulating means and vibrating means.

The Appellant further argued that the skilled person would readily find by performing routine tests on the press according to document D5 that, by positioning the width regulating means, an initial compression is automatically effected in view of the molten state of the slab and that the vibrating means need only be actuated after effecting such a predetermined compression. Consequently, the subject-matter of Claim 1 is obvious in the light of the teachings of documents D5 and D2.

This conclusion can also be reached by combining the teachings of document D2 and document D1. The latter document discloses a press apparatus for reducing the width of metallic workpieces, comprising width regulating means and vibrating means. A difference with the subject-matter of Claim 1 of the patent in suit is that the press surfaces are constituted only by a surface parallel to the slab feed direction, i.e. without an inclined surface portion. Since this feature is known from document D2, a combination of document D1 and D2 leads to the conclusion that the subject-matter of Claim 1 of the patent in suit is obvious.

- (v) The Respondent on his part submitted essentially the following.

Document D5 does not disclose whether the eccentric shaft shown in Figures 11 and 12 is a vibrating means according to the invention, or a means for performing corrective pressing strokes. The four screws, which are connected by chain driven sprockets, are only meant to set up and to secure

the press tools against the slab, they are not width regulating means in the sense of the invention, which actively regulate the width of the slab. This construction is not capable of exerting a pressure high enough to compress the slab.

From the teaching of document D2, i.e. that the slab stops in a predetermined position, it cannot be concluded that a detector is employed for that purpose, since the stopping can also be effected by an operator. Neither document D2, nor any other cited document discloses a control means according to Claim 1 of the patent in suit, which regulates the complex process of reducing the width of a slab.

The press tools according to Figure 4 of document D1 extend over the full length of the slab, so that they are only suitable for reducing the width of a slab by a small amount. This results also clearly from the fact that the press surfaces are parallel. Since document D1 does not disclose vibrating means, control means or width regulating means, any attempt to combine the documents D1 and D2 in order to arrive at the invention must fail.

Reasons for the Decision

1. *Novelty*

It is not disputed by the parties that none of the cited documents discloses an apparatus comprising all the features of Claim 1 of the patent in suit. Hence, there is no need for further substantiation of this matter.

The subject-matter of Claim 1 of the patent as granted is therefore new within the meaning of Article 54 EPC.

2. *The invention*

The invention relates to a press apparatus for reducing the width of a slab as a rolling stock.

The problem that the present invention seeks to solve is to provide an apparatus for reducing the slab width with improved pressing efficiency and production yield (i.e. a shorter time required for pressing), whereby the formation of so-called "dog bones" (i.e. a configuration wherein due to the transversal pressing forces on the slab the edges of the slab in the slab feed direction are thick compared to the middle portion of the slab) is avoided, cf. column 2, lines 45 to 52 of the description.

This problem is solved by the press apparatus with the features as specified in Claim 1.

In particular, it is proposed to provide width regulating means, which are operated under control means, and whose purpose is to effect a predetermined compression when the forward end of the slab is detected between the parallel surfaces of the press tools, whereafter the vibration means are activated.

3. *Inventive Step*

- 3.1 Document D5, which discloses the closest prior art and which is cited in the description of the patent in suit at column 2, lines 30 to 44, describes a press apparatus for forging rolling slabs of steel or other metal (see e.g. Figure 3), whereby the press tools (forging tools

3) are mounted on their prime movers (piston - rod assembly 21, 22) so as to be rigid in the direction in which they penetrate the slab, but flexible in the moving direction of the latter. This flexibility is brought about by a slight rocking of the tool about its axis. In this way the forward progress of the slab is not impeded by the working strokes of the tools.

The embodiment according to Figures 11 and 12 of document D5 shows a press apparatus comprising all the features of the preamble of Claim 1 of the patent in suit. This press consists of a base 41 and two slidable housings 42. The vibrating means consists of a forked connecting rod driven by an eccentric shaft, by which coaction the press tool is rocked. Four screws 43 control the distance and assure parallelism of motion of the two housings 42. One of the screws is equipped with a thrust bearing 47 to assure correct position with respect to the centre line of the slab (cf. the paragraph bridging page 13 and 14).

Document D5 does not disclose that the screws 43 can be activated to effect an initial predetermined compression, when it has been detected that the forward end of said slab has been disposed between the parallel surfaces of the press tools. In fact, document D5 is silent about means to detect the forward end of the slab. It is to be concluded that the screws 43 are merely means to position the press tools with respect to the slab; the screws 43 are not actively employed in compressing the slab, as in the patent in suit. Document D5 thus fails to disclose width regulating means according to the invention.

Control means which perform the functions spelled out in the characterizing portion of Claim 1 of the patent in suit are (hence) also not disclosed in document D5.

- 3.2 The problem addressed in document D1 is to provide an apparatus for making large or substantial reductions in the width of metallic slabs, while avoiding a cross-sectional shape of the slab having the form of a dog bone or hourglass, see e.g. page 3, third paragraph. This problem is solved by providing a press comprising press means to reduce the width of a slab and constraining means in a direction normal to the slab. It is thus seen that although document D1 is concerned with a similar problem as the present invention, the solution proposed in document D1 is considerably different.

The embodiment of Figure 4 of document D1 discloses (cf. page 7, last paragraph to page 9, first paragraph) an apparatus for reducing the width of metallic workpieces, such as slabs, whereby a piston cylinder assembly 57 exerts a force sufficient to effect substantial reductions in the slab 59. A piston cylinder assembly 79 is used to reduce local increases in slab thickness simultaneously with the reduction in width thereof. A worm wheel and worm assembly 63 is provided for the purpose of positioning the press tools (squeezer heads 64, 65) for accommodating slabs of different widths, see page 8, line 12.

It follows that document also D1 fails to disclose width regulating means in the sense of Claim 1 of the patent in suit. Document D1 discloses neither control means nor vibrating means. A fourth major difference between the press according to the invention and the press according to document D1 is that according to the invention the press surfaces are constituted by a surface parallel to

the slab feed direction and an inclined surface. In the embodiment of Figure 4 of document D1 the press tools extend the full length of the slab to be worked upon.

It can therefore be concluded that document D1 fails to disclose the essential features of the invention.

3.3 Document D2 discloses (see Figure 1 and page 1, lines 85 to 105) a press apparatus that is utilized before a rolled material is subjected to a width reducing press in the form of a rolling mill having vertical press rolls. The problem to be solved by the invention according to document D2 is to avoid the formation of fishtails, i.e. a recess at either end of the rolling material, that usually occur during the width reducing operation (cf. page 1, lines 43 to 48). According to document D2, this problem is solved by shaping the trailing and end portions of the slab into tapered form, before the slab is fed to the width reducing press. The slab is rolled into the press apparatus, and is then stopped in a position whereby the trailing end is disposed between the parallel surfaces of the press tools. While the slab remains stationary, i.e. before it enters the rolling mill, the press apparatus compresses the leading end portion thereof. The press tools, whose surfaces are constituted by a surface parallel to the slab feed direction and an inclined surface, are driven by pistons in hydraulic cylinders.

Neither width regulating means, vibrating means nor control means are disclosed in document D2. The press apparatus according to D2 only reduces the width of a trailing and/or end portion of a stationary slab. In contrast, according to the present invention the (whole) width of a rolling slab is reduced.

Therefore, the prior art according to document D2 cannot suggest the essential characteristics of the patent in suit to the person skilled in the technical art.

- 3.4 Summarising, none of the documents D5, D1 and D2 discloses width regulating means or control means effecting the timing sequence, i.e. detecting the position of the slab - pressing - vibrating, as defined in Claim 1 of the patent in suit.

The skilled person would therefore - starting out from the press apparatus according to documents D5 or D1, neither by his expert knowledge alone, nor in combination with the teaching of document D2, arrive at the subject-matter according to Claim 1.

Hence, the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

4. Consequently, the patent as granted can be maintained.

Order

For these reasons it is decided that:

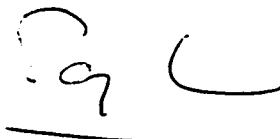
The appeal is dismissed.

The Registrar:



A. Townend

The Chairman:



C. Payraudeau