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(72) Inventors:

- **Micheletti, Giorgio**
37010 Sant'Ambrogio Di Valpolicella (IT)
- **Micheletti, Andrea**
37010 Sant'Ambrogio Di Valpolicella (IT)

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(74) Representative: **Jorio, Paolo et al**
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(71) Applicant: **Idroservice S.r.l.**
37017 Lazise (IT)

(54) **Method and device for processing scrapped railroad sleepers**

(57) A method of processing scrapped railroad sleepers (2) having a surface layer impregnated with preservative substances, wherein at least the surface layer is removed by hydrodemolition. There is described

a device (1) having a hydrodemolition station (3), where a number of oscillating nozzles (11) direct high-pressure water jets onto the lateral faces (10) of the sleeper (2); and a conveying system (5) for feeding the sleepers (2) through the hydrodemolition station (3).

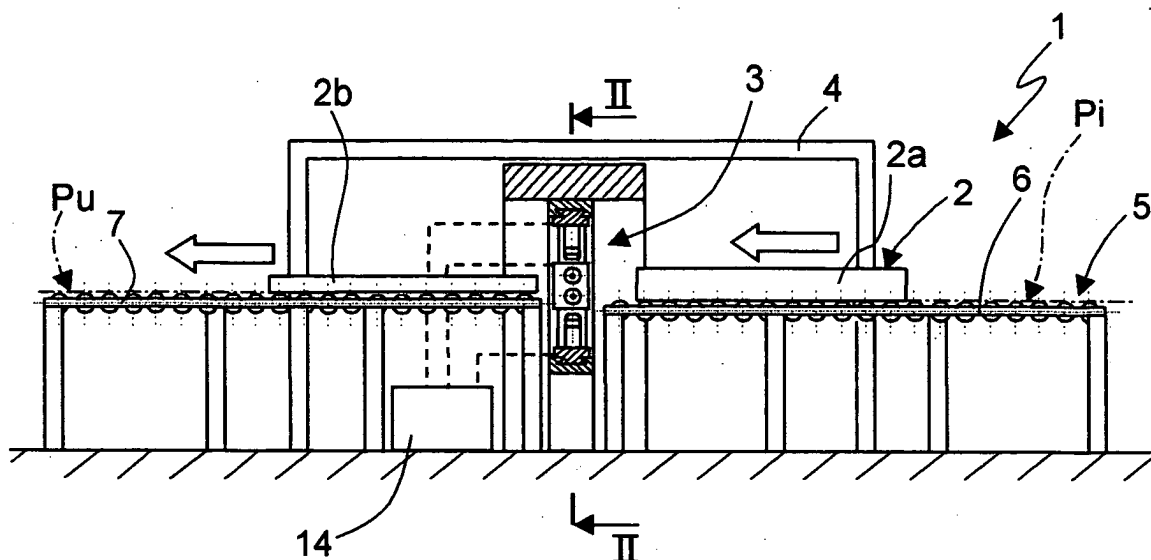


Fig. 1

Description

[0001] The present invention relates to a method of processing scrapped railroad sleepers, and to a device for implementing such a method.

[0002] As is known, railroad sleepers are defined by rectangular-section slabs placed on the ballast, crosswise to and for supporting the rails. Though other materials have recently been introduced, sleepers are traditionally made of wood and normally impregnated with preservative substances, in particular mineral oil, to prevent degradation on exposure to atmospheric agents.

[0003] Impregnation with preservative substances creates an extremely hard, tough, compact surface layer which, though effective in actual use, poses serious problems in disposing of scrapped sleepers in the event of replacement or dismantling of the line.

[0004] The preservative treatment, in fact, prevents the sleeper from being burned, on account of the highly contaminating toxic fumes given off; and the extremely hard surface layer prevents it from being cut using conventional sawing equipment.

[0005] One known method of processing scrapped sleepers consists in machining off the surface layer using special cutters, which, however, is extremely slow and expensive.

[0006] It is an object of the present invention to provide a method of processing scrapped railroad sleepers, designed to eliminate the aforementioned drawbacks typically associated with the known state of the art.

[0007] According to the present invention, there is provided a method of processing scrapped railroad sleepers, characterized by comprising the step of removing a surface layer of said sleepers by hydrodemolition.

[0008] The present invention also relates to a device for processing scrapped railroad sleepers, characterized by comprising a hydrodemolition station having at least one nozzle generating a high-pressure water jet directed onto a sleeper to remove at least one surface layer of the sleeper.

[0009] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic side view of a device for processing scrapped railroad sleepers in accordance with the present invention;

Figure 2 shows a schematic, larger-scale section along line II-II in Figure 1.

[0010] Number 1 in Figure 1 indicates as a whole a device for processing scrapped railroad sleepers 2.

[0011] The device substantially comprises a hydrodemolition station 3 enclosed in a soundproof booth 4; and a conveying system 5 for feeding sleepers 2 through station 3.

[0012] More specifically, conveying system 5 comprises an input conveyor 6 for feeding the sleepers 2 for processing to station 3; and an output conveyor 7 for carrying the processed sleepers 2 away from station 3. Conveyors 6 and 7 are aligned and spaced longitudinally to leave sleepers 2 free in the processing area.

[0013] Hydrodemolition station 3 (Figure 2) substantially comprises four hydrodemolition heads 8, each facing a respective lateral face 10 of sleeper 2. Each head 8 comprises two parallel nozzles 11 perpendicular to, and spaced apart in a direction crosswise to, relative face 10 of the sleeper; and a slide 12 supporting nozzles 11 and movable along a respective guide 13 parallel to the plane of respective face 10 and perpendicular to the travelling direction of sleeper 2. Slides 12 may be moved along respective guides 13 in conventional manner not described.

[0014] Nozzles 11 are conveniently spaced apart by a distance equal to half the width of relative face 10; and slides 12 are movable back and forth along respective guides 13 between respective limit positions, shown by the dash lines, in which one of the nozzles reaches one edge of the face, and the other nozzle is located at the centreline of the face. By appropriately combining the travelling speed of head 8 with that of sleepers 2, the whole surface of face 10 can therefore be swept with no overlapping.

[0015] Heads 8 are connected to a known high-pressure hydrodynamic unit 14, not described in detail, for supplying the nozzles with high-pressure water of, for example, 500 to 2500 bars, and preferably of 1000 to 2000 bars.

[0016] Conveyors 6, 7 conveniently define respective supporting surfaces P_i , P_u for sleepers 2 at different levels: surface P_u is conveniently higher by an amount equal to the thickness of the material removed during processing.

[0017] Operation of device 1, from which the processing method according to the invention is easily deducible, is as follows.

[0018] Sleepers 2 are fed longitudinally by input conveyor 6 to hydrodemolition station 3, where high-pressure water jets 15, with a flow rate ranging, for example, between 20 and 200 l/min, are directed by nozzles 11 onto faces 10 of the sleeper, and disintegrate the material to a depth which is predefinable by varying the pressure and flow rate of the jets.

[0019] As sleepers 2 move along, all the lateral faces 10 are swept completely and simultaneously by the oscillating movement of heads 8.

[0020] Figure 1 shows an in-process sleeper 2 comprising an unprocessed portion 2a on conveyor 6 upstream from hydrodemolition station 3, and a processed portion 2b on conveyor 7 downstream from hydrodemolition station 3. The action of nozzles 11 is shown in Figure 2.

[0021] Processing is much faster and cheaper than machining; and, by appropriately adjusting the depth of the surface layer removed, sleepers with substantially

no impregnating substances can be obtained, and which can be disposed of by burning or cutting into smaller portions (bars, planks or blocks) using conventional sawing equipment.

[0022] Clearly, changes may be made to device 1 as described herein without, however, departing from the scope of the accompanying Claims.

[0023] In particular, the number, arrangement and movement of nozzles 11 may differ.

[0024] For example, only one nozzle per head may be employed. In the event more than two nozzles are used on each face, the distance between the nozzles should be substantially equal to the width of the face divided by the number of nozzles. The nozzle may also be operated by rotary, as opposed to oscillating, systems.

[0025] As opposed to only removing a surface layer, the method described may be used to demolish the whole sleeper; in which case, the device can be simplified by eliminating output conveyor 7.

Claims

1. A method of processing scrapped railroad sleepers (2), **characterized by** comprising the step of removing at least one surface layer of said sleepers (2) by hydrodemolition.
2. A method as claimed in Claim 1, **characterized by** comprising the step of feeding a sleeper (2) through a hydrodemolition station (3), and directing at least one high-pressure water jet (15) onto each face (10) of said sleeper.
3. A method as claimed in Claim 2, **characterized by** comprising the step of oscillating each said jet (15) in a direction parallel to the respective said face (10) of the sleeper (2) and perpendicular to the travelling direction of said sleeper (2).
4. A method as claimed in Claim 2 or 3, **characterized by** comprising the step of directing a number of jets (15) onto each said face (10) of the sleeper (2); said jets (15) being spaced apart, crosswise with respect to said face (10), by a distance equal to the width of said face divided by the number of jets acting on the face (10).
5. A method as claimed in any one of the foregoing Claims, **characterized by** completely demolishing said sleepers (2).
6. A device for processing scrapped railroad sleepers, **characterized by** comprising a hydrodemolition station (3) having at least one nozzle (11) generating a high-pressure water jet (15) directed onto a sleeper (2) to remove at least one surface layer of the sleeper.
7. A device as claimed in Claim 6, **characterized by** comprising conveying means (5) for feeding said sleeper (2) through said hydrodemolition station (3).
8. A device as claimed in Claim 6 or 7, **characterized in that** said hydrodemolition station comprises a number of heads (8) facing respective faces (10) of said sleeper (2); each of said heads supporting at least one nozzle (11), and being movable back and forth along a respective guide (13) in a direction parallel to said respective face (10) of the sleeper (2) and perpendicular to the travelling direction of said sleeper (2).
9. A device as claimed in Claim 8, **characterized in that** each said head (8) comprises a number of nozzles (11); said nozzles (11) being spaced apart, crosswise with respect to said respective face (10) of the sleeper (2), by a distance equal to the width of said respective face divided by the number of said nozzles (11) on said head.
10. A device as claimed in one of Claims 7 to 9, **characterized in that** said conveying means (5) comprise a first conveyor (6) upstream from said hydrodemolition station (3), and a second conveyor (7) downstream from said hydrodemolition station (3); said first and said second conveyor (6, 7) being spaced longitudinally apart to leave said sleeper (2) free in a processing area.
11. A device as claimed in Claim 10, **characterized in that** said first and said second conveyor (6, 7) define respective supporting surfaces (Pi, Pu) for the sleepers (2) at different levels; the surface (Pu) defined by said second conveyor (7) being higher than said surface (Pi) defined by said first conveyor (6) by an amount equal to the thickness of the material removed during processing.

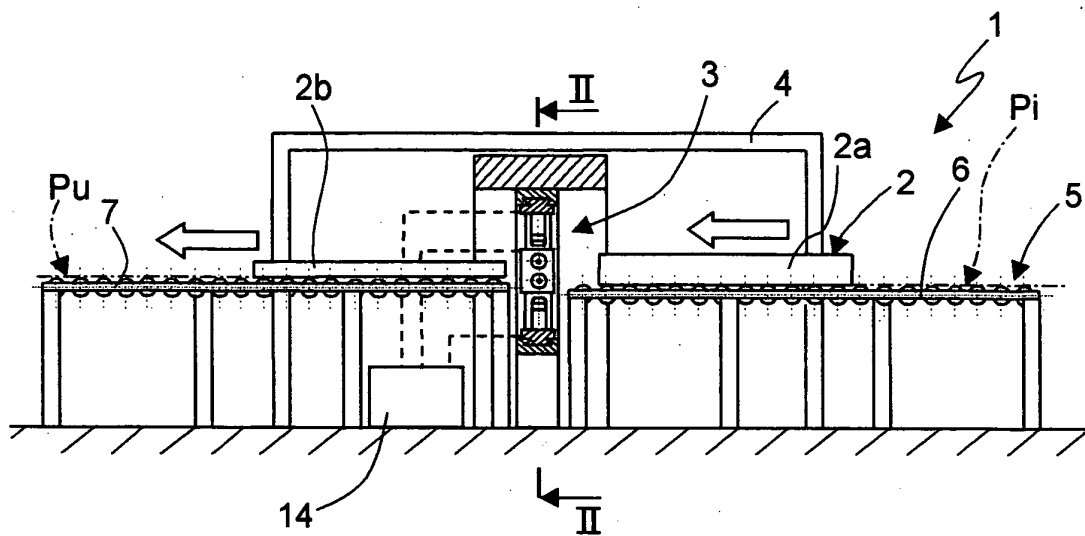


Fig. 1

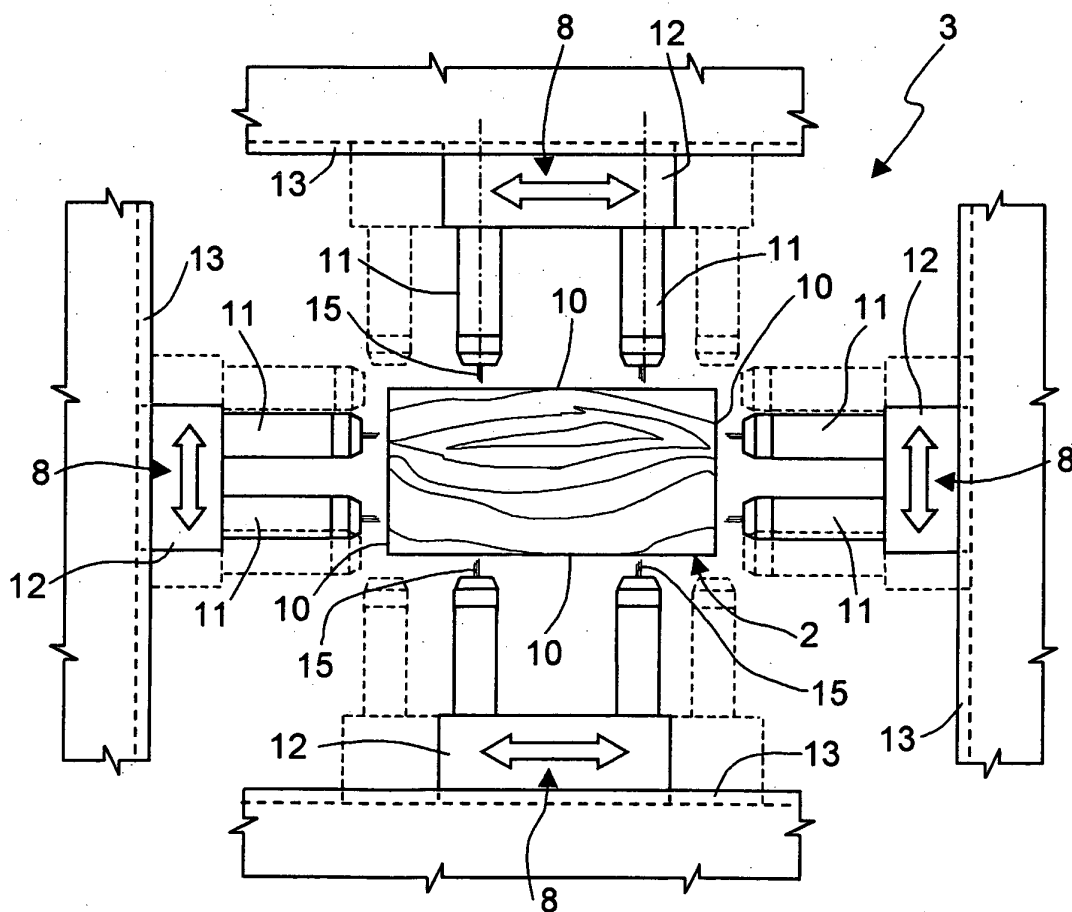


Fig. 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 5558

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E01B E01C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 October 2003	Examiner De Neef, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 01 5558

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on .
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