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(54) **SYSTEM AND MACHINE FOR LAYING WOODEN COVERINGS**

(57) In flooring, strips (1) are fixed to footing pieces (2) by several anchors (3) which on one part are fixed to said footing pieces using pressure and on the other are attached to the strips (1). From each anchor (3) emerge elastic lugs (4) terminated in a sharp point (1) to introduce it in the sides of the footing pieces (2) constituting the fixing means to said footing piece. Furthermore, each anchoring element comprises at least one elastic side rib (6) opposite said lugs (4) to be housed in a groove (7) of

the strips (1).

The machine comprises a conveyor belt (8) supplying a plurality of anchors (3) and actuating means to fix each anchor to the respective footing pieces using pressure, as well as perforating means (9) to perforate the sides of the footing piece in order to receive the sharp points.

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Description

Object of the invention

[0001] The present invention relates to a system and a machine for installing wooden floors, mainly for installing wooden floors outdoors.

Background of the invention

[0002] Traditionally, wooden floors for outdoors have been installed by fastening the wood planks forming the floor to supporting floor-boarding joists by means of screws that are applied on the wood planks.

[0003] This traditional installing system has several drawbacks. Firstly, the upper part of the screw remains visible, which leads to a non-esthetical result. Furthermore, the wood planks are damaged, since holes must be made on it and in multiple positions.

[0004] To solve these drawbacks, other installation systems have been devised.

[0005] One of the known systems comprises the provision of a series of non-visible cramps that are fastened to the joists bay means of screws. In this case, cramps comprise lateral projections that are introduced in slots provided in the wood planks forming the floor. Other installation systems make use of nylon rings or plastic square pieces.

[0006] Despite of the improvements provided by these systems used in the state of the art, all of them have a common drawback in that they require a great amount of screws, cramps, nylon rings or other like items to be used to secure the fastening elements. As it will be understood, the installing of the screws is very time consuming and at the same time it leads to a very uncomfortable operation for the installer of this kind of floors.

Summary of the Invention

[0007] The present invention aims, as a main purpose, to provide means to solve the problems linked to this kind of activities. The proposed objective is totally accomplished by means of the system and machine that are described hereinafter and whose main features are summarized, in the characterizing part of claim 1 and annexed.

[0008] According to a first aspect of the invention, the system for installing floors that is proposed herein is especially suitable for installing wooden floors of the type that are formed of a plurality of planks that are fastened on floor-boarding joists, the fastening being performed by means of a plurality of anchoring elements that are fastened to the joists and that remain coupled to the said planks, wherein, according to the invention, said anchoring elements have been designed and built in such a manner that they are fastened to the joists simply by pressure, without the need of any other additional elements.

[0009] In accordance to a preferred embodiment, and

with the aim previously put forward, each of the said anchoring elements have resilient legs that are affixed to the joist, and at least one lateral projection, preferably also of a resilient nature, that is located in a slot provided in the said planks.

[0010] Additionally, the resilient legs for fastening to the joist carried by the anchoring elements comprise a sharp tip susceptible of being introduced within the sides of the joists.

[0011] Preferably, the sharp tips of the said resilient projections are introduced in the sides of the joist.

[0012] Advantageously, the said anchoring elements are built of a plastic material.

[0013] According to a second aspect of the invention, the machine for installing wooden floors that is disclosed is characterized by the fact that it comprises:

- means for feeding a plurality of anchoring elements, and
- driving means that perform the fastening by pressure of each of the said anchoring elements to a joist.

[0014] Additionally, the machine also comprises means for drilling the joist.

[0015] Preferably, the said feeding means incorporated in the machine are connected with said driving means, in such a manner that when they are driven, they cause the anchoring elements to go forward, and the means for drilling the joist also being connected to the said driving means.

[0016] According to a preferred embodiment of the machine of the present invention, the said feeding means comprise a conveyor belt that feeds the anchoring elements forward; the said driving means comprise a knob that, in a first position, causes the driving of the means for drilling the joist and, in a second position, activates the feeding means for them to perform the fastening by pressure of one of the said anchoring elements to a joist; the said drilling means comprising a pair of drill elements capable of drilling the sides of a joist.

[0017] According to a preferred form of embodiment, the said driving means comprise an air compressor external to the machine.

[0018] The main advantage of the system of the present invention, is that it does no longer need any screws to be used, on the contrary as all the systems used up to present. This leads to remarkable savings in costs and time.

[0019] With the purpose of illustrating all what is been said hereinbefore, lets consider the following practical example: the installation of a wooden floor with a surface of around 100 m² by using the conventional techniques requires about 3.000 screws; if we have in mind that every time that a screw has to be applied, the installer must duck down, put the screw in place and perform the screwing action, one can easily calculate that the time required for installing a single screw by the traditional systems is approximately the same time that is needed to install four

anchoring elements by means of the system proposed by the present invention,

[0020] Furthermore, from an economical point of view, it is also easily understood that the system of the invention represents a considerable saving in materials costs, since it can be proved, by a simple calculation, that the cost of the anchoring elements is much cheaper than the cost of the screws (approximately half the cost).

[0021] Furthermore, the anchoring elements of the system can be painted in a color as desired, as they are preferably made of plastic, with a color similar to that of the timber being used, which remarkably enhances the final aesthetics of the floor.

[0022] On the other hand, using the machine according to the present invention, the installer is also prevented from having to duck down for installing the anchoring elements, which represents a great improvement in the convenience with which the installer can perform his/her work and, at the same time, a great saving in time.

Brief Description of the Drawings

[0023] For a better comprehension of what is stated in the present description, a set of drawings are attached, wherein an example of practical embodiment is schematically represented, only by way of illustrative and non-limiting example. In the said drawings:

Figure 1 is a lateral side view showing the installation of an anchoring element on a joist, as well as the coupling of the said anchoring element with one of the wood planks;

Figure 2 is a perspective view of an anchoring element of the type used with the system of the present invention, which anchoring element has only one lateral projection;

Figure 3 is a perspective view of an anchoring element of the type used with the system of the present invention, provided with two lateral projections; and

Figure 4 is a schematized, lateral side view of a machine according to the present invention.

Description of a Preferred Embodiment

[0024] With respect firstly to Figure 1 of the drawings, a wooden floor is seen which is provided with the installation system of the present invention. The floor is formed of a plurality of planks 1, located side by side, the planks 1 being fastened to floor-boarding joists 2 by using a plurality of anchoring elements 3.

[0025] In Figures 2 and 3, examples are shown of anchoring elements 3 made according to the present invention and used in the system for installing wooden floors that is described. As it can be seen, each anchoring element 3 is built in such a manner that it has two resilient

legs 4, protruding from end opposite positions, each leg being provided in its free end with a sharp tip 5, which projects inwardly.

[0026] Additionally, the anchoring element 3 comprises one (Figure 2) or two (Figure 3) lateral projections 6, protruding contrarily to the said end legs 4, each design providing the choice to couple said element, depending on the case, to a single plank or to two planks collaterally placed one to another.

[0027] The mentioned projections 6 are formed by a first portion perpendicular to the plane of the anchoring element, which in the operative position of the latter will be positioned substantially vertical, and by a second portion projecting from the first portion substantially parallel with the plane of the anchoring element, and that in the operative position of the latter will be positioned substantially vertical. This last portion is designed to be housed in a longitudinal slot 7 formed in the wooden planks 1, as it is represented in Figure 1, and that will be described with further detail hereinafter.

[0028] The anchoring elements 3 are preferably of a plastic material, thus permitting them to be colored according with the tone of the timber of the planks 1, as it has been said earlier.

[0029] Both the legs 4 and the projections 6 are resilient, thus permitting them to be deformed when they undergo any tension. In the case of the legs 4, the same can be deformed to be open during the anchoring by pressure of the element 3 to the joist 2. On the other hand, in the case of the projections 6, the same can be deformed being urged to the interior, thus permitting them to be housed in the said slot 7 defined by said planks 1.

[0030] When securing the anchoring element 3 to the joist 2 by means of pressure, the sharp tips 5 become inserted within the said joist 2, which makes unnecessary the use of screws or any other retaining devices.

[0031] With reference now to Figure 4 of the drawings, it can be seen the schematized representation of a form of embodiment of the machine proposed by the present invention, that can be used to install the said anchoring elements 3.

[0032] The machine comprises a plurality of anchoring elements 3 arranged on a conveyor belt 8 constituting, according to the form of embodiment of the invention, a means for feeding the said anchoring elements 3.

[0033] As it will be understood, it is not indispensable that the feeding means consist of a conveyor belt 8, but it can consist of any other means capable of pushing the anchoring elements in such a way that they can be placed in a continuous manner.

[0034] The machine comprises drilling means for making holes in the joists 2 for the introduction of the sharp tips 5 of the anchoring elements 3. Such drilling means consist, according to the embodiment shown, in a pair of drill devices 9, provided in the positions appropriate for the practical performing of such holes.

[0035] In the same way, the machine of the present invention also comprises driving means that are embod-

ied in a drive lever 11 and an air compressor, built out of the machine and that has not been represented for the sake of clarity.

[0036] A machine with the features described hereinbefore has operates as follows. When an anchoring element 3 is to be placed, the machine is made to lean on the floor and the lever 11 is actuated until it reaches a first position, in which the drill devices 9 are activated to drill holes in the joist 2.

[0037] Immediately after, with the actuation of the lever 11 up to a second position, the anchoring element 3 is secured by pressure to the joist 2, as it has been explained above.

[0038] At the moment of the securing, the conveyor belt 8 pushes all the anchoring elements 3 downwards, in such a way that a new anchoring element 3 is immediately ready for its securing, repeating the action performed before.

[0039] As it will be understood, the dimensions of the machine of the present invention have be calculated to be the appropriates to make unnecessary for the installer to duck down whilst he/she is executing the tasks for securing the elements to the joist, as is the usual case in the known systems for installing wooden floors. In this manner, the placing of anchoring elements is much quicker and convenient.

[0040] Despite that reference has been made to a particular embodiment of the invention, it is obvious for the skilled in the art that the system and machine described herein are susceptible of numerous variations and modifications, and that all the described particulars can be replaced for others technically equivalent, without departing from the protective scope defined in the appended claim.

Claims

1. System for installing wooden floors, the floor being formed of a plurality of wooden planks (1) that are fastened on floor-boarding joists (2), which fastening is performed by means of a plurality of anchoring elements (3) that, on the one hand, are fastened to the joists (2) and that, on the other hand, are coupled to the said planks (1) of the floor, **characterized in that** said anchoring elements (3) are fastened to the joists (2) by pressure.
2. System according to claim 1, **characterized in that** each anchoring element (3) has end resilient legs (4) that protrude from said anchoring element, and that embody a means for fastening to the joist (2), and **in that** each anchoring element comprises at least one lateral projection (6) protruding in a direction opposite to that of the end resilient legs (4), and that has been configured to be housed in a slot (7) provided by the said planks (1) of the floor
3. System according to claim 2, **characterized in that** each of the end resilient legs (4) formed on each anchoring element (3), has a end portion having a sharp tip (5) susceptible of being introduced within the sides of the joist (2).
4. System according to claim 2, **characterized in that** the at least one lateral projection (6) is resilient too.
5. System according to one or more of the previous claims, **characterized in that** the said anchoring elements (3) are of a plastic material.
6. Machine for installing wooden floors, conceived and designed for the implementation of the system of one or more of the claims 1 to 5, **characterized in that** it comprises:
 - feeding means (8) for providing a plurality of anchoring elements (3), and
 - driving means (11) devised to perform the fastening by pressure of each of the said anchoring elements (3) on the respective joist (2).
7. Machine according to claim 6, **characterized in that** it also comprises drilling means (9) provided for performing holes on the sides of the joist (2) devised to house the insertion of the sharp tip (5) portions provided in each anchoring element (3).
8. Machine according to claim 6, **characterized in that** the said feeding means (8) are connected with said driving means (11), in such a manner that when they are driven, they cause the said anchoring elements (3) to move forward.
9. Machine according to claim 7 or 8, **characterized in that** the said means (9) for drilling the sides of the joist (2) are also connected to the said driving means (11).
10. Machine according to one or more claims 6 to 9, **characterized in that** the said feeding means (8) consist of a conveyor belt arranged to move the anchoring elements (3) forward
11. Machine according to one or more claims 6 to 10, **characterized in that** it further comprises an actuator knob (11) of the driving means, whereby in a first position, the drilling means (9) of the joist (2) are activated and, in a second position, the feeding mean (8) are activated and an action is executed in which one of the said anchoring elements (3) is fastened on a joist (2).
12. Machine according to one or more claims 6 to 11, **characterized in that** the said drilling means consist of a pair of drill devices (9).

13. Machine according to one or more claims 6 to 12, **characterized in that** the activation of the said driving means is performed by means of compressed air provided from a compressor external to the machine.

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INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER		
IPC7 E04F15/04, 21/20, B27F7/02		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC7 E04F15+, 21+, B25C1+, B26F1+, B27F7+		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CIBEPAT, EPODOC, WPI, JAP		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5394667 A (Ron Nystrom) 07.03.1995; Figures 9-13; Column 2 line 53 - Column 3 line 27; Column 5 line 5-53; claims 1-12	1-5
X A	US 1974259 A (Lug Lox Flooring Company) 18.09.1934; Figures 1-4; Page 1 line 1 - Page 2 line 53	1 2
A	US 1714738 A (Smith Arthur R.) 28.05.1929; the whole document	1-5
X	US 3134105 A1 (Truswal Systems Inc) 26.05.1964; Figures 3,4 y 7; Column 1 line 9 - Column 2 line 4; Column 3 line 19-24; Column 4 line 4-22; claims 1-8	6,8,10,13
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
		29 JULIO 2005 (29.07.2005)
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US5394667 A	07.03.1995	NONE	-----
US1974259 A	18.09.1934	NONE	-----
US1714738 A	28.05.1929	NONE	-----
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