(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 927 389 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.10.2015 Bulletin 2015/41

(21) Application number: **14200217.9**

(22) Date of filing: **23.12.2014**

(51) Int Cl.:
E04F 11/18 *(2006.01)* ***E04F 21/26*** *(2006.01)*
B23K 37/04 *(2006.01)* *F16B 7/00* *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **04.04.2014 DE 202014002934 U**

(71) Applicant: **BS Tools UG (haftungsbeschränkt)**
71032 Böblingen Baden-Württemberg (DE)

(72) Inventor: **Skegro, Katharina**
71032 Böblingen (DE)

(74) Representative: **Meyer zu Bexten, Elmar**
Reinhold-Nägele-Hof 7
71034 Böblingen (DE)

(54) RAILING ASSEMBLY AID

(57) The invention relates to an aid (10) for assembling a railing (14, 15) from a handrail (15) and at least one post, said aid comprising

a base body (11) for aligning the handrail (15) perpendicularly above an end face of the post,
a supporting member (12) detachably attached to the base body (11) for supporting the base body (11) above the post,
two complementarily formed retaining members (13) detachably attached to the base body (11) for clamping the handrail (15) against a cylindrical support pin (14) protruding from the end face,
wherein a hollow-cylindrical notch traverses the supporting member (12) for sliding the aid (10) axially onto the support pin (14), the notch resiliently opening up into a front face of the supporting member (12) for extracting the aid (10) radially from the support pin (14).

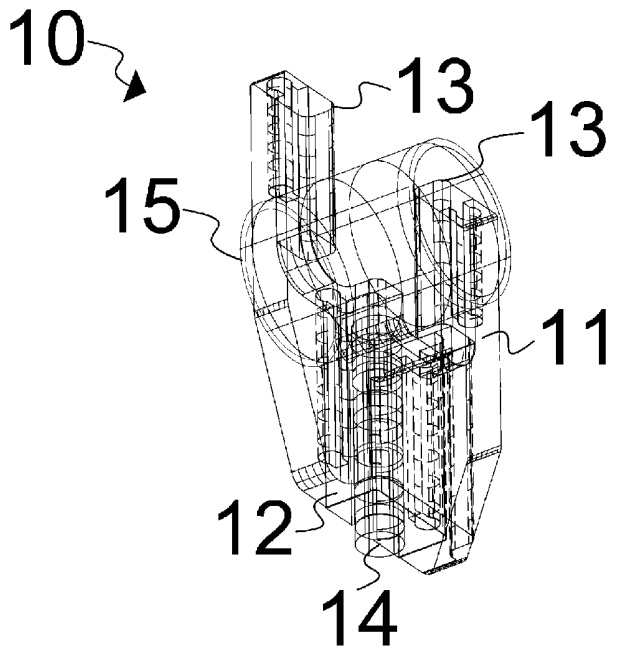

Fig. 1

EP 2 927 389 A1

Description

Technical Field

[0001] The invention pertains to an aid for railing assembly. The invention further pertains to a method of assembling a railing.

Background Art

[0002] In architecture, by handrail is meant any rail that is designed to be grasped by the hand so as to provide stability or support. When not mounted directly to walls such as by bracket arms, state-of-the-art handrails are typically supported by posts. Handrails are commonly used while ascending or descending stairways to prevent injurious falls. MAKI, B.E., et al. Efficacy of handrails in preventing stairway falls: a new experimental approach. Safety Science. April 1998, vol.28, no.3, p.189-206. discusses the influence of handrail design on ability to generate stabilizing force.

[0003] Typical railing strength requirements provide for a continuous load of 75 kg-m and concentrated load of 90 kg. While some decorative wood balusters accommodate these loads, steel and aluminum members are commonly employed for railing assembly.

[0004] US 8522495 B (PEETERS JOHANNES HENDRICUS ALPHONSUS [NL]; FIBERCORE IP B V [NL]) 17.11.2011 discloses a tubular handrail element, the cross section of which is defined by a closed tube wall which encloses an internal cavity, and also a series of supports fastened to the handrail element. At least one counter piece is located in the interior of the handrail element. Each support is fastened to a counter piece via a fastening element which protrudes through the tube wall of the handrail element. The handrail element includes a thermosetting material.

Summary of invention

[0005] The present invention aims to provide an aid for railing assembly.

Technical Problem

[0006] Modern handrail design tends toward a minimalistic and slim appearance that conflicts with the internal cavities imposed by conventional fastening elements. There is thus a requirement for precise spot welding to securely fasten the handrail to a terminal pin of each associated post. To this end, as with any resistance welding technique, the respective post and handrail need accurate alignment to yield an equally solid and esthetically pleasing result.

Solution to Problem

[0007] The problem is solved by means of a railing assembly aid according to Claim 1 and a method of assembling a railing according to Claim 13.

Advantageous effect of invention

[0008] The invention significantly simplifies the assembly of railings by suspending the handrail perpendicularly above its support post while an assembly operator joins the handrail to the post. Once the handrail is securely fastened to one post, the proposed assembly aid may be removed and reused for connecting the handrail to the next post, allowing for an entire railing of arbitrary length to be assembled using a single apparatus. Use of an assembly aid according to an embodiment of the invention thus facilitates significant savings in time and effort.

[0009] A method according to an embodiment of the invention may be performed by a single assembly operator without further human assistance. Furthermore, it may be adapted to handrails and posts of various shapes and sizes by means of detachable supporting and retaining members. Due to these and other features, the invention is suited for various application scenarios such as railing, staircase, and balcony construction.

Brief description of drawings

[0010]

Figure 1 is a perspective view of an aid according to the invention.
Figure 2 is a first elevation view of the assembly aid.
Figure 3 is a plan view of the assembly aid.
Figure 4 is a second elevation view of the assembly aid.
Figure 5 shows a first step of a method of assembling a railing.
Figure 6 shows a second step of the method.
Figure 7 shows a third step of the method.
Figure 8 shows the customized assembly aid.
Figure 9 shows a fourth step of the method.
Figure 10 shows a fifth step of the method.
Figure 11 shows a sixth step of the method.
Figure 12 shows the fully assembled railing.

Description of embodiments

[0011] Figure 1 to Figure 4 elucidate the structural features of an aid 10 used to assemble a railing 14, 15 from a handrail 15 and a post, the latter being reflected in the drawings solely in the form of a cylindrical support pin 14 protruding from its upper end face.

[0012] As shown in Figure 1, the aid 10 comprises a base body 11 that effectively aligns the handrail 15 perpendicularly above the post's non-depicted end face. Attached to the base body 11 are a supporting member 12 and two complementarily formed retaining members 13 that serve different purposes: While the supporting member 12 supports the base body 11 above the post, the

retaining members 13 clamp the handrail 15 against the above-mentioned support pin 14.

[0013] More specifically, as best seen in Figure 2, the base body 11 consists of a central section - to which the supporting member 12 is attached - and two opposite lateral sections - to each of which a retaining member 13 is attached -, lending the base body 11 an essentially U-shaped profile. To allow the supporting member 12 to receive the support pin 14, a vertical notch traverses the former from top to bottom.

[0014] As indicated in Figure 3, the notch is essentially hollow-cylindrical but opens up unilaterally into a front face of the supporting member 12, thus facing away from the central section which, to accommodate the supporting member 12 bilaterally enclosed by the lateral sections, is offset adequately against the latter.

[0015] The supporting member 12 thus sandwiched flush between the lateral sections is formed of resilient hard rubber to permit the support pin 14 to exit the aforementioned notch through its front opening if moderate pressure is applied on the aid 10. In order to accommodate support pins 14 of different diameters, the supporting member 12 itself may further be detached from the base body 11. To this end, the lateral sections are grooved paraxially and the supporting member 12 is tongued bilaterally, allowing for a convenient upward extraction of the supporting member 12 from the base body 11. In the opposite downward direction, the lateral sections form a dead stop as depicted in Figure 4. It is well understood that, in an alternative embodiment, the base body 11 may be configured *mutatis mutandis* to allow for an insertion of the supporting member 12 from the underside of the central section.

[0016] Drawing attention to Figure 2 again, a second pair of grooves is formed in the lateral section and extending axially parallel such that the retaining members 13 - tongued unilaterally on their part - may be detached from the lateral sections by their respective upward extraction from the base body 11. This way, matching pairs of retaining members 13 can be introduced into the aid 10 to embrace handrails of varying dimensions.

[0017] The remaining figures illustrate a method of assembling a railing 14, 15 using the proposed aid 10. It is assumed that the steps of this method are performed by a skilled assembly operator, such as a locksmith, making use of a parts kit that contains supporting members 12 whose notches measure 10, 12, 14, and 16 mm in diameter. Accordingly, the parts kit provides for a set of four pairs of retaining members 13 which, in conjunction with the geometry of the base body 11, yields a spacing of 33.7, 42.4, 48.3, or 60 mm between the former.

[0018] In a first step depicted in Figure 5, taking into account the diameter of the cylindrical pin 14, the operator selects the supporting member 12 from the parts kit and attaches it to the base body 11. In a second step depicted in Figure 6, now based on the dimensions of the handrail 15, she picks a pair of corresponding retaining members 13 from the kit, attaching them to the base body 11 as well. In a third step depicted in Figure 7, the assembly operator slides the aid 10 thus obtained axially onto the support pin 14, thereby inserting the latter into the apparatus' central notch. This third step results in the intermediate result shown in Figure 8, representing the aid 10 assembled for the task at hand.

[0019] In a fourth step depicted in Figure 9, the assembly operator makes use of the retaining members 13 to clamp the handrail 15 against its support pin 14. In a fifth step depicted in Figure 10, the operator forms spot welds while the base body 11 aligns the handrail 15 perpendicularly above the end face, thus joining the handrail 15 to the post. In a sixth step depicted in Figure 11, she extracts the aid 10 by hinging it away from the support pin 14. Finally, in a sixth step, the operator finalizes the weld with the aid 10 extracted, resulting in the fully assembled railing 14, 15 shown

in Figure 12.

Industrial applicability

[0020] The invention may be applied, inter alia, in the building and horticultural industries.

Reference signs list

[0021] Similar reference signs denote corresponding features consistently throughout the attached drawings as follows:

10	assembly aid
11	base body
12	supporting member
13	retaining member
14	support pin
15	handrail

Citation list

[0022] The following documents are cited throughout this document:

Patent literature

[0023] US 8522495 B (PEETERS JOHANNES HENDRICUS ALPHONSUS [NL]; FIBERCORE IP B V [NL]) 17.11.2011

Non-patent literature

[0024] MAKI, B.E., et al. Efficacy of handrails in preventing stairway falls: a new experimental approach.

Safety Science. April 1998, vol.28, no.3, p.189-206.

Claims

1. Aid (10) for assembling a railing (14, 15) from a handrail (15) and at least one post, comprising
a base body (11) for aligning the handrail (15) perpendicularly above an end face of the post,
a supporting member (12) detachably attached to the base body (11) for supporting the base body (11) above the post,
two complementarily formed retaining members (13) detachably attached to the base body (11) for clamping the handrail (15) against a cylindrical support pin (14) protruding from the end face,
wherein a hollow-cylindrical notch traverses the supporting member (12) for sliding the aid (10) axially onto the support pin (14), the notch resiliently opening up into a front face of the supporting member (12) for extracting the aid (10) radially from the support pin (14).

2. Aid (10) according to Claim 1 wherein the supporting member (12) consists of hard rubber.

3. Aid (10) according to Claim 1 or Claim 2 wherein the supporting member (12) and the retaining members (13) interlock with the base body (11).

4. Aid (10) according to any of the preceding claims wherein the base body (11) is essentially U-shaped.

5. Aid (10) according to Claim 4 wherein the base body (11) comprises an essentially U-shaped profile with a central section and two lateral sections.

6. Aid (10) according to Claim 5 wherein the supporting member (12) is attached to the central section and each retaining member (13) is attached to an opposite lateral section.

7. Aid (10) according to Claim 6 wherein the central section is offset against the lateral sections and the supporting member (12) is bilaterally enclosed by the lateral sections such that the notch opens out away from the central section.

8. Aid (10) according to Claim 7 wherein the lateral sections are grooved paraxially and the supporting member (12) is tongued bilaterally and sandwiched flush between the lateral sections such that the supporting member (12) may be detached from the central section by extracting the supporting member (12) from the base body (11).

9. Aid (10) according to Claim 8 wherein at least one of the lateral sections forms a dead stop for the supporting member (12).

10. Aid (10) according to any of Claim 6 to Claim 9 wherein the lateral sections are grooved paraxially and each of the retaining members (13) is facing the other retaining member (13) and tongued unilaterally such that the retaining members (13) may be detached from the lateral sections by extracting each retaining member (13) from the base body (11).

11. Aid (10) according to any of the preceding claims wherein the notch measures 10 mm, 12 mm, 14 mm, or 16 mm in diameter.

12. Aid (10) according to any of the preceding claims wherein the base body (11) and the retaining members (13) are dimensioned such that the retaining members (13) are spaced apart at a distance of 33.7 mm, 42.4 mm, 48.3, or 60 mm.

13. Method of assembling a railing (14, 15) from a handrail (15) and at least one post by means of an aid (10) according to any of Claim 1 to Claim 12, comprising,
depending on the cylindrical support pin (14), selecting the supporting member (12) from a parts kit,
depending on the handrail (15), selecting two complementarily formed retaining members (13) from the parts kit,
attaching the supporting member (12) and the retaining members (13) to the base body (11),
sliding the aid (10) axially onto the support pin (14) by means of the notch, clamping the handrail (15) against the support pin (14) by means of the retaining members (13),
joining the handrail (15) to the post while the base body (11) aligns the handrail (15) perpendicularly above the end face, and
extracting the aid (10) radially from the support pin (14) by means of the resilient opening.

14. Method according to Claim 13, comprising
forming at least one spot weld while the base body (11) aligns the handrail (15) perpendicularly above the end face and
finalizing the weld with the aid (10) extracted.

15. Method according to Claim 13 or Claim 14 wherein the aid (10) is extracted by hinging the aid (10) away from the support pin (14).

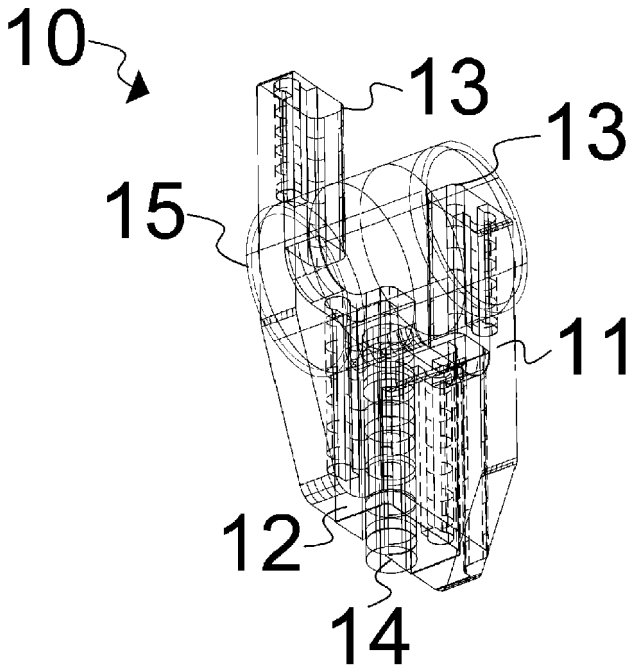

Fig. 1

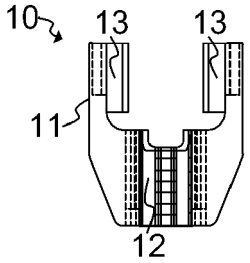

Fig. 2

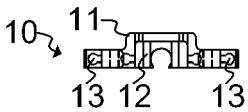

Fig. 3

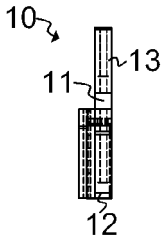

Fig. 4

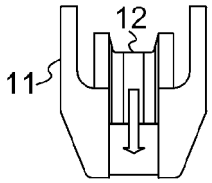

Fig. 5

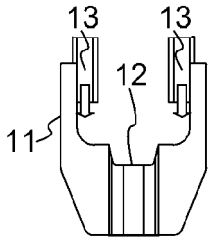

Fig. 6

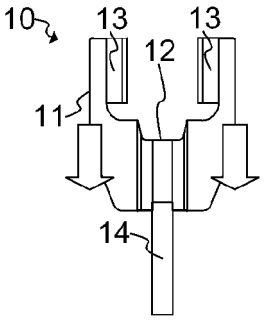

Fig. 7

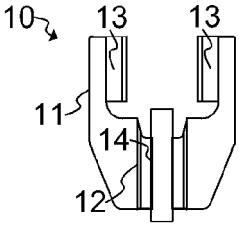

Fig. 8

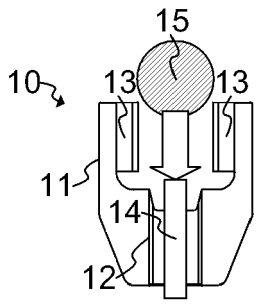

Fig. 9

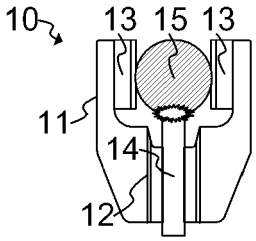

Fig. 10

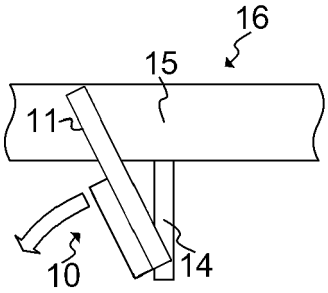

Fig. 11

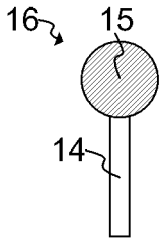

Fig. 12

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 20 0217

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/012122 A1 (GREY DOG DESIGNS PTY LTD [AU]; HEALY COLIN PATRICK [AU]; LYNE SIMON SA) 1 February 2007 (2007-02-01) * figures 2,4-5 * * claims 1,3,6 * * page 2, paragraph 1 * * page 3, paragraph 3 * * page 3, paragraph 5 * * page 5, paragraph 3 * * page 6, paragraph 3 *	1-15	INV. E04F11/18 E04F21/26 B23K37/04 ADD. F16B7/00
A	EP 0 677 349 A1 (PAULI & SOHN GMBH [DE]) 18 October 1995 (1995-10-18)	1	
A	US 6 386 519 B1 (PRIEFERT WILLIAM D [US]) 14 May 2002 (2002-05-14)	1	

TECHNICAL FIELDS SEARCHED (IPC)

E04F
B23K
F16B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 August 2015	Estorgues, Marlène

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 20 0217

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-08-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007012122 A1	01-02-2007	EP 1912763 A1	23-04-2008
		WO 2007012122 A1	01-02-2007
EP 0677349 A1	18-10-1995	AT 201346 T	15-06-2001
		EP 0677349 A1	18-10-1995
US 6386519 B1	14-05-2002	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 8522495 B **[0004] [0023]**

Non-patent literature cited in the description

- **MAKI, B.E et al.** Efficacy of handrails in preventing stairway falls: a new experimental approach. *Safety Science,* April 1998, vol. 28 (3), 189-206 **[0002]**
- **MAKI, B.E. et al.** Efficacy of handrails in preventing stairway falls: a new experimental approach. *Safety Science,* April 1998, vol. 28 (3), 189-206 **[0024]**