

PATENT SPECIFICATION (11)

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- (21) Application No. 25892/78 (22) Filed 31 May 1978 (19)
 (31) Convention Application No. 7 719 272 (32) Filed 23 June 1977 in
 (33) France (FR)
 (44) Complete Specification published 11 March 1981
 (51) INT. CL.⁸ E04G 7/22
 (52) Index at acceptance
 E2A 370 375 418 GEA
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(54) IMPROVEMENTS TO ASSEMBLY ELEMENTS, INTER ALIA FOR SCAFFOLDING

(71) We, SOCIETE NOUVELLE DES ECHAFAUDAGES TUBULAIRES MILLS, a French Body Corporate, of 82 rue Edouard-Vaillant, 93350 Le Bourget, France, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to assembly elements used (a) for clamping a cylindrical element (having a circular or other cross-section) after axially or laterally engaging the cylindrical element and (b) for securing one or more transverse elements to the cylindrical element.

The invention applies more specifically to assembly components for scaffolding used (a) to clamp a tubular vertical upright after axially or laterally engaging the tubular vertical upright and (b) for securing the upright to one or more transverse connecting and/or wind-bracing elements such as longitudinal members or cross-members and/or diagonal members.

Some known assembly elements of the same kind comprise female or male parts permanently secured to the cylindrical element, e.g. by welding, to co-operate with male or female parts borne by the transverse elements to be secured. This method has a number of disadvantages, i.e.:

A considerable increase in the cost of manufacturing the cylindrical elements;

A limitation in the possible forms of assembly, since the cylindrical elements can have only a limited number of attached female or male parts;

An increase in the weight of the cylindrical elements, and

Difficulty in handling or storing the cylindrical elements owing to the attached female or male parts.

Other known assembly elements of the same kind comprise components which are bolted together. This method has a number of disadvantages, i.e.:

The assembly elements are relatively expensive to manufacture;

They take a considerable time to assemble, and

Special tools are needed.

The aim of the invention is to obviate the disadvantages of the known assembly elements. A first aim is to construct an assembly element which is inexpensive to manufacture. A second aim is to construct an assembly element which can be used for a wide variety of assembly operations. Another aim is to avoid the use of cylindrical elements which are difficult to manufacture. Another aim is to avoid increasing the weight of the cylindrical elements. Another aim is to avoid the use of cylindrical elements which are complicated to handle or store. Another aim is to construct assembly elements which can be assembled without special tools.

The assembly element according to the invention is characterised in that it comprises two half-rings interconnected by two pins, each half-ring having a deformable inner part adapted to bear against the surface of the cylindrical element and an outer part forming with the inner part a space adapted to receive the ends of one or more transverse elements, at least one of the two pins being adapted to tighten the two half-rings when the or each pin is moved with respect thereto.

As can be seen, the tightening results (a) in securing the two half-rings with respect to the cylindrical element and (b) clamping the ends of the transverse elements between the inner part and the outer part of the two half-rings. The operation can be performed simply by moving one of the two pins in either direction, using an ordinary hammer.

According to an advantageous feature of the invention, one of the two pins is constructed so that when it is axially moved with respect to the two half-rings it comes loose from one of them so that the two

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half-rings can open by pivoting around the above pin.

According to another advantageous feature, the inner part of the two half-rings is made easily deformable by an axial slot formed in the centre region of the aforementioned inner part.

In order axially to lock the two half-rings on to the vertical element, the inner part of each half-ring can be provided with apertures for engagement by relief patterns provided on the vertical element.

In addition to the aforementioned features, the invention comprises other features which are preferably used at the same time and will be described in greater detail hereinafter.

The invention can in any case be understood from the following description and accompanying drawings, the description and drawings relating to a preferred embodiment of the invention and of course being non-limitative. In the drawings:

Fig. 1 is an exploded perspective view of an assembly element according to the invention;

Fig. 2 is a perspective view of the assembly element shown in the open position;

Fig. 3 is a horizontal section through an assembly element shown in the closed position around a tubular vertical upright;

Fig. 4 is a horizontal section through the same assembly element but shown when locked around the vertical upright so as to secure it to two transverse wind-bracing elements;

Fig. 5 is a vertical section through the assembly element shown in Fig. 4;

Fig. 6 is a plan view of scaffolding constructed from assembly elements according to the invention, and

Fig. 7 is a view in elevation showing part of the scaffolding in Fig. 6.

As shown in Figs. 3-5, the assembly element, denoted by the general reference 1, can be used (a) for clamping a cylindrical element 2 (such as a vertical tubular upright) after axially or laterally engaging in the upright (2) and (b) for securing upright 2 to a number of transverse connecting and/or wind-bracing elements 3 (such as longitudinal members or horizontal cross-members and/or diagonal members).

As clearly shown in Figs. 1-5, the assembly element 1 mainly comprises two half-rings 4, 5 interconnected by two pins 6, 7.

Each half-ring 4, 5 has a deformable inner part 4a, 5a respectively constructed to bear against the surface of upright 2, and an external part 4b,

5b respectively, constructed to co-operate with the corresponding inner part 4a, 5a to form spaces 8 to receive the ends 3a of transverse windbracing elements 3.

Pin 6 is an ordinary pivot. Pin 7 is constructed so that, when moved with respect to the two half-rings 4 and 5, it tightens them. Advantageously pin 7 is moved axially in either direction, using an ordinary hammer. For this purpose, one end of pin 7 has a head 7a formed with a radial prolongation 7b so that it can be axially moved in either direction, using a hammer.

In order to ensure that the axial motion results in tightening the two half-rings 4 and 5, pin 7 has an eccentric part 7c connected by a slope 7d to the pin proper.

Pin 7 is also constructed so that when it moves axially with respect to the half-rings 4 and 5, it releases one of them (half-ring 5) so that the two half-rings 4, 5 can open by pivoting around pin 6.

In order to prevent pin 7 coming out of its recess in half-ring 4, the pin has abutment means, advantageously comprising at least one and preferably two diametrically opposite axial grooves 7e co-operating with two radial studs 9 secured by welding or the like to half-ring 4. Stud 9 can form part of a half-washer 10 welded to the half-ring 4.

Advantageously, half-rings 4 and 5 are made of steel (e.g. heat-treated to obtain deformability and resilience) and are made from a steel band.

At pins 6 and 7, half-rings 4 and 5 have curved overlapping lugs, i.e. half-ring 4 has four lugs 4c and half-ring 5 has two lugs 5c.

In order to increase the deformability of the inner parts 4a, 5a of half-rings 4 and 5, each inner part has an axial slot 11 in its centre region, i.e. substantially between pins 6 and 7.

On each side of slot 11, part 4a and 5a has radially bent lugs 12 which extend into notches 13 formed in the facing region of the outer part 4b or 5b. As a result of this feature, lugs 12 abut the edges of notches 13 when the two half-rings 4, 5 are tightened and when some spaces 8 are unoccupied by the ends 3a or transverse wind-bracing elements (Fig. 4).

Advantageously, in order axially to lock half-rings 4, 5 on to the relief patterns 14 disposed diametrically opposite one another. Patterns 14 engage in apertures 15 formed in the inner part 4a, 5a of each half-ring 4 and 5. Apertures 15 can extend on each side of slot 11, in which case it is usually necessary to use an opening assembly element which can be engaged sideways.

Alternatively (not illustrated) the opposite method could be followed, i.e. of forming the tubular upright with apertures for engaging relief patterns on the inner part of each half-ring.

Advantageously, in order to improve the strength, in the up-down direction, of the

bond between the transverse connecting and/or wind-bracing element 3 and the upright 2, the end 3a of the transverse element bears on the inner part 4a or 5a of the half-ring 4 or 5 under consideration. To this end, end 3a has an abutment surface 3b co-operating with the upper edge of the inner wall 4a or 5a in question (Fig. 5).

An assembly element 1 constructed in the previously-described manner can always be secured outside the relief patterns 14 formed on upright 2, in which case element 1 can be secured at any required angle. The result is an axial locking action due entirely to clamping between the inner parts 4a, 5a and the surface of upright 2.

Alternatively element 1 mounted in the aforementioned manner can be placed just above another element 1 which in turn fits on to relief patterns 14.

To prevent pin 7 prematurely moving from the position in which the two half-rings 4, 5 are clamped and locked on to upright 2 (Fig. 4) to the position at which it releases half-ring 5 (Fig. 2), a shoulder 7f is disposed so that it hinders but does not prevent pin 7 from coming loose from half-ring 5. Shoulder 7f abuts the lower edge of the curved lug 5c of half-ring 5.

The following is a description of how an assembly element constructed in the aforementioned manner is assembled or dismantled.

Assembly:

The assembly element is laterally fitted on to the tubular vertical upright, the pin having been released from one of the two half-rings;

The assembly element is brought to the desired level;

The assembly element is closed on to the corresponding relief patterns of the upright by bringing the pin into the position in which it is inserted into the two-half rings. In this position, the assembly element is locked to the relief patterns and the transverse and/or wind-bracing elements can be disposed against the upright and secured;

The assembly element is locked by moving the pin into the position in which it clamps together the two half-rings and thus locks them on to the upright and secures the transverse and/or wind-bracing elements.

Dismantling:

The pin is moved from the position where it clamps the half-rings to the position where the half-rings are closed and it is still inserted in the two half-rings (owing to its shoulder);

The transverse and/or wind-bracing elements can then be completely or partly withdrawn;

Next, the assembly element can be re-secured if it is only to be partly dismantled, or can be driven out so as to release one of the two half-rings. The pin remains attached to the other half-ring (owing to the abutment means) and the assembly element can open, thus releasing the upright.

Figs. 6 and 7 show the use of the invention for constructing scaffolding around a circular building 16.

The scaffolding comprises two rectangular towers 17 constructed from tubular uprights 2 and horizontal connecting longitudinal members 3, uprights 2 and members 3 being secured together by assembly elements 1 fitting on to relief patterns 14 on each upright 2.

The rectangular towers 17 have long longitudinal members and short longitudinal members. In order to connect the two towers 17, they can be attached via external members 3 which are identical with the long members 3 in each tower 17 and are secured to uprights 2 by assembly elements 1 mounted outside patterns 14, in order to join the uprights.

On the inner side, towers 17 are joined by a shortened horizontal member 3 which advantageously comprises a length-regulating device 18. The shortened member 3 is secured to uprights 2 by assembly elements 1 mounted outside patterns 14.

This example clearly illustrates the large number of assembly operations which can be performed using assembly elements according to the invention.

WHAT WE CLAIM IS:—

1. An assembly element, inter alia for scaffolding, used (a) for clamping a cylindrical element after engaging axially or laterally on the cylindrical element and (b) for securing one or more transverse elements on to the cylindrical element, characterised in that it comprises two half-rings interconnected by two pins, each half-ring having a deformable inner part adapted to bear against the surface of the cylindrical element and an outer part forming with the inner part a space adapted to receive the ends of one or more transverse elements, at least one of the two pins being adapted to tighten the half-rings when the or each pin is moved with respect thereto.

2. An assembly element according to Claim 1, characterised in that one of the two pins is constructed so that, when it is axially moved with respect to the two half-rings it comes loose from one of them so that the two half-rings can open by pivoting around the other pin.

3. An assembly element according to 130



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bond between the transverse connecting and/or wind-bracing element 3 and the upright 2, the end 3a of the transverse element bears on the inner part 4a or 5a of the half-ring 4 or 5 under consideration. To this end, end 3a has an abutment surface 3b co-operating with the upper edge of the inner wall 4a or 5a in question (Fig. 5).

An assembly element 1 constructed in the previously-described manner can always be secured outside the relief patterns 14 formed on upright 2, in which case element 1 can be secured at any required angle. The result is an axial locking action due entirely to clamping between the inner parts 4a, 5a and the surface of upright 2.

Alternatively element 1 mounted in the aforementioned manner can be placed just above another element 1 which in turn fits on to relief patterns 14.

To prevent pin 7 prematurely moving from the position in which the two half-rings 4, 5 are clamped and locked on to upright 2 (Fig. 4) to the position at which it releases half-ring 5 (Fig. 2), a shoulder 7f is disposed so that it hinders but does not prevent pin 7 from coming loose from half-ring 5. Shoulder 7f abuts the lower edge of the curved lug 5c of half-ring 5.

The following is a description of how an assembly element constructed in the aforementioned manner is assembled or dismantled.

Assembly:

The assembly element is laterally fitted on to the tubular vertical upright, the pin having been released from one of the two half-rings;

The assembly element is brought to the desired level;

The assembly element is closed on to the corresponding relief patterns of the upright by bringing the pin into the position in which it is inserted into the two-half rings. In this position, the assembly element is locked to the relief patterns and the transverse and/or wind-bracing elements can be disposed against the upright and secured;

The assembly element is locked by moving the pin into the position in which it clamps together the two half-rings and thus locks them on to the upright and secures the transverse and/or wind-bracing elements.

Dismantling:

The pin is moved from the position where it clamps the half-rings to the position where the half-rings are closed and it is still inserted in the two half-rings (owing to its shoulder);

The transverse and/or wind-bracing elements can then be completely or partly withdrawn;

Next, the assembly element can be re-secured if it is only to be partly dismantled, or can be driven out so as to release one of the two half-rings. The pin remains attached to the other half-ring (owing to the abutment means) and the assembly element can open, thus releasing the upright.

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WHAT WE CLAIM IS:—

1. An assembly element, inter alia for scaffolding, used (a) for clamping a cylindrical element after engaging axially or laterally on the cylindrical element and (b) for securing one or more transverse elements on to the cylindrical element, characterised in that it comprises two half-rings interconnected by two pins, each half-ring having a deformable inner part adapted to bear against the surface of the cylindrical element and an outer part forming with the inner part a space adapted to receive the ends of one or more transverse elements, at least one of the two pins being adapted to tighten the half-rings when the or each pin is moved with respect thereto.
2. An assembly element according to Claim 1, characterised in that one of the two pins is constructed so that, when it is axially moved with respect to the two half-rings it comes loose from one of them so that the two half-rings can open by pivoting around the other pin.
3. An assembly element according to

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Claims 1 or 2 characterised in that the inner part of the two half-rings is made easily deformable by an axial slot formed in the centre region of the aforementioned inner part.

4. An assembly element according to any of Claims 1 to 3, characterised in that the inner part of each half-ring is provided with apertures for engagement by relief patterns provided on the vertical element.

5. An assembly element according to any of Claims 2 to 4, characterised in that the pin which is adapted to come loose from one of the two half-rings has abutment means constructed so that the aforementioned pin cannot come out of its recess of the half-ring to which it belongs.

6. An assembly element according to any of Claims 2 to 4, characterised in that the pin which is constructed to come loose from one of the two half-rings has a shoulder disposed so as to prevent the pin coming accidentally loose from the half-ring.

7. An assembly element according to any of Claims 1 to 6, characterised in that the two half-rings are constructed from a steel band.

8. An assembly element according to Claims 3 and 7, characterised in that, on each side of the slot, the inner part of each half-ring has radially bent lugs which extend into notches formed in the facing region of the corresponding outer part.

9. An assembly element according to any of Claims 1 to 8, characterised in that the top edge of the inner part constitutes an abutment surface for the end of a transverse element engaged in the corresponding space.

10. An assembly element as herein described with reference to and as shown in the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1981.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.