

【DESCRIPTION】

【Invention Title】

SCAFFOLD-TIGHTENING APPARATUS AND METHOD

【Technical Field】

5 The present invention relates to a scaffold-tightening apparatus and to a scaffold-tightening method, and more particularly, to an apparatus and method for tightening a scaffold capable of tightening a gap increased between the scaffold and a structure when various scaffolds or temporary stands are raised and lowered to positions of desired height at construction sites, cargo bases, or the like.

10 【Background Art】

 In lifting a heavyweight temporary construction or construction material to a position of a desired height at a construction site or conveying a heavyweight scaffold to a position of a desired height at a cargo base, a lift apparatus is necessarily used.

 For example, upon construction of a building structure, a mold is installed at an
15 outer wall of the structure. At this time, in order to smoothly perform a task at the outer wall of the structure, a scaffold acting as a kind of temporary stand is installed at the outer wall of the structure. Such a scaffold is additionally installed upward according to an increase in stair number of the structure. In a related art, when a high-rise building structure is constructed, a lift-type scaffold entirely lifted upward by a
20 crane has been used. However, use of the crane increases time and cost consumed for the work, causing delay of the construction. For this, the applicant of the present invention proposed a technique capable of performing a lift operation of a scaffold using a lift member configured to raise and lower a profile in a stepped manner, with no use of a crane, disclosed in Korean Patent Registration No. 0704720, entitled

“Temporary Stand Lifting Apparatus and Temporary Stand Lifting Method Using the Same.”

The registered patent is characterized in that the lift member is hooked by hooking projections formed at predetermined intervals in a vertical direction of the profile of the temporary stand to raise and lower the profile in a stepped manner. In particular, the lift member moves forward or backward through a configuration of a hydraulic cylinder and a hook according to a lifting direction to be selectively hooked by any one of the hooking projections of the profile. Accordingly, the temporary stand can be safely and easily raised and lowered to a target height in a stepped manner.

However, when various temporary stands or scaffolds are raised and lowered to positions of desired height, a gap between the temporary stand and the structure is consequentially increased, and for this, a method of dividing the temporary stand may be provided to solve the problem. However, since the method requires much experience and high costs, there is an urgent need for a novel method that is simple and convenient.

【Disclosure】

【Technical Problem】

In order to solve the foregoing and/or other problems, it is an aspect of the present invention to provide an apparatus and method for tightening a scaffold capable of tightening a gap increased between the scaffold and a structure to an operable state such that various scaffolds or temporary stands can be safely and easily raised and lowered at construction sites, cargo bases, or the like, where various scaffolds are used.

【Technical Solution】

The foregoing and/or other aspects of the present invention may be achieved by

providing a scaffold-tightening apparatus to reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer wall of the structure and having a plurality of latches disposed at predetermined intervals, including: a first latch member having a hook shape; a second latch member
5 having a hook shape in a direction opposite to the first latch member; and a shaft member configured to connect the first latch member and the second latch member, and in which a bolt member and a nut member are axially connected to adjust a gap spaced from each other between the first latch member and the second latch member.

In addition, the present invention provides a scaffold-tightening apparatus to
10 reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer wall of the structure, including: the profile having a plurality of latches disposed in a longitudinal direction thereof; a lift operating means having a stopper latched by the latch and configured to support a lower side of the latch to raise and lower the profile; and a lift driving means coupled to the lift
15 operating means to provide a lift driving force, wherein the lift operating means includes: a pair of left and right guide frames having guide grooves formed in a direction perpendicular to a lift direction of the profile; support frames configured to support the guide frames, and facing and spaced apart from each other; guide channels obliquely installed at the support frames to provide a moving path of the stopper such
20 that the stopper is raised along an oblique path by the latch when the profile is raised and the stopper is lowered by its own weight after the latch passes; the stopper installed between the support frames such that the stopper contacts the latch to move straight upward along the guide channels when the profile is raised and the stopper is latched by the latch to support a lower side of the latch to raise and lower the profile when the

profile is lowered; and a pair of left and right guide arms configured to slide along the guide grooves formed in the guide frames to be opened or closed, wherein the tightening apparatus includes: a first latch member having a hook shape; a second latch member having a hook shape in a direction opposite to the first latch member; and a shaft member configured to connect the first latch member and the second latch member, and in which a bolt member and a nut member are axially connected to adjust a gap spaced from each other between the first latch member and the second latch member.

The first latch member may include: a pair of first latch plates each having one hook-shaped end, and facing and spaced apart from each other; and a pair of first connecting plates configured to connect the latch plates and each having a through-hole formed therein, and wherein the second latch member may include: a pair of second latch plates each having one hook-shaped end, and facing and spaced apart from each other; and a pair of second connecting members configured to connect the latch plates and each having a through-hole formed therein.

The shaft member may include: a bolt member passing through through-holes of the first connecting plates of the first latch member and the second connecting members of the second latch member; and a nut member installed at one end of the bolt member and rotated to adjust a gap between the first latch member and the second latch member.

In addition, another aspect of the present invention may be achieved by providing a method of tightening a scaffold to reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer wall of the structure and having a plurality of latches disposed at predetermined intervals, including: installing a first latch member having a hook shape provided in a

tightening apparatus at a coupling pin of the lift operating means, and installing a second latch member having a hook shape provided in the tightening apparatus at a tightening pin of the profile; rotating a nut member of the tightening apparatus to move the second latch member along a bolt member connecting the first latch member and the second latch member to reduce a gap between the first latch member and the second latch member; and sliding a pair of left and right guide arms, which are slid along guide grooves formed in guide frames of the lift operating means to be opened or closed, in a direction perpendicular to a lift direction of the profile to surround a flange of the profile.

10 **【Advantageous Effects】**

According to the present invention, by using a scaffold-tightening apparatus having a simple structure and durability, a gap between the scaffold and the structure can be safely and easily reduced.

In addition, according to the present invention, since the gap between the scaffold and the structure can be simply tightened using the apparatus for tightening the scaffold, with no need to divide the scaffold as in the related art, time and costs consumed for a scaffold lift operation can be reduced to remarkably reduce a construction period and costs consumed for the total construction.

15 **【Description of Drawings】**

20 The above and other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of exemplary embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a perspective view of a scaffold-tightening apparatus in accordance

with an exemplary embodiment of the present invention, showing a state in which a bolt member and a nut member configured to connect first and second latch members and adjust a gap between the latch members, which are spaced apart from each other, are axially connected to each other;

5 FIG. 2 is a bottom perspective view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention;

FIG. 3 is a top perspective view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention;

10 FIG. 4 is a top cross-sectional view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention;

FIG. 5 is a side cross-sectional view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention;

FIG. 6 is a front cross-sectional view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention;

15 FIGS. 7 and 8 are views showing an embodiment in which a lift operating means is mounted on a structure;

FIGS. 9 and 10 are views showing an embodiment in which the scaffold-tightening apparatus is mounted on a lift operating means and a profile to rotate a nut member to reduce a gap therebetween;

20 FIG. 11 and 12 are views showing an embodiment in which the scaffold-tightening apparatus is mounted on the lift operating means and the profile to rotate the nut member to reduce the gap between the lift operating means and the profile so that a guide arm can be fastened to the profile;

FIGS. 13 and 14 are views showing an embodiment in which, after the gap

between the lift operating means and the profile is reduced, the guide arm is fastened to surround a flange of the profile;

FIG. 15 is a perspective view showing a state in which the lift operating means is fastened to the profile;

5 FIG. 16 is a perspective view showing a state in which the guide arm of the lift operating means is open; and

FIG. 17 is an exploded perspective view of the guide arm of the lift operating means.

<Description of Major Reference Numerals>

10	1: Structure	10: First latch member
	11: First latch plate	12: First connecting plate
	20: Second latch member	21: Second latch plate
	22: Second connecting member	30: Shaft member
	31: Bolt member	35: Nut member
15	100: Profile	200, 300: Lift operating means
	210, 310: Stopper	220, 230: Guide frame
	222, 232: Guide arm	238: First guide groove
	239: Second guide groove	240: Support frame
	244: First guide pin	246: Second guide pin
20	252: Bracket	400: Lift driving means

【Mode for Invention】

Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings. However,

it will be apparent to those skilled in the art that the following embodiments can be readily understood and modified into various types, and the scope of the present invention is not limited to the embodiments. Like reference numerals designates like elements throughout the invention.

5 FIG. 1 is a perspective view of a scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention, showing a state in which a bolt member and a nut member configured to connect first and second latch members and adjust a gap between the latch members, which are spaced apart from each other, are axially connected to each other, FIG. 2 is a bottom perspective view showing the
10 scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention, FIG. 3 is a top perspective view showing the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention, FIG. 4 is a top cross-sectional view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention, FIG. 5 is a side cross-sectional view of
15 the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention, and FIG. 6 is a front cross-sectional view of the scaffold-tightening apparatus in accordance with an exemplary embodiment of the present invention.

 In addition, FIG. 15 is a perspective view showing a state in which the lift operating means is fastened to the profile, FIG. 16 is a perspective view showing a state
20 in which the guide arm of the lift operating means is open, and FIG. 17 is an exploded perspective view of the guide arm of the lift operating means.

 As shown in FIGS. 1 to 6, the present invention provides an apparatus for tightening a gap between a profile 100 installed at a side facing an outer wall of a structure 1 and having a plurality of latches 140 disposed at predetermined intervals,

and a lift operating means 200 installed at the outer wall of the structure 1. Specifically, the apparatus includes a first latch member 10 having a hook shape, a second latch member 20 having a reverse hook shape to correspond to the first latch member 10, and a shaft member 30 configured to connect the first latch member 10 and the second latch member 20 and in which a bolt member 31 and a nut member 35 are axially connected to adjust a gap spaced therefrom.

Here, as shown in FIGS. 7 to 17, an apparatus for lifting a scaffold includes a profile 100 installed at a side facing an outer wall of a structure 1 and having a plurality of latches 140 disposed at predetermined intervals, lift operating means 200 and 300 configured to raise and lower the scaffold, and lift driving means 400 coupled between the lift operating means 200 and 300 to provide a lift driving force to the lift operating means 200 and 300 to drive the scaffold upward. Hereinafter, “lift” will be used to include the meanings “raise” and “lower.”

The lift operating means 200 and 300 are disposed over and under the lift driving means 400 to form a pair. The lift operating means 200 is installed at the outer wall of the structure 1 to be fixed thereto. Hereinafter, a case in which the lift operating means 200 is fixed to the outer wall of the structure 1 formed of concrete will be described as an example.

A through-hole 270 through which a coupling pin 242 is inserted is formed to fix a lower end of the lift driving means 400 inserted between a pair of fixing frames 241 using the coupling pin 242. The fixing frames 241 may project rearward from support frames 240 (in a direction opposite to a profile-tightening direction) to be integrally formed with the support frames 240. Accordingly, the lift operating means 200 is coupled to the lift driving means 400 as the coupling pin 242 is inserted into the

through-hole 270 formed at an upper side of the fixing frames 241 in a state in which a lower end of the lift driving means 400 is inserted between the pair of fixing frames 241.

In addition, the lift operating means 200 includes guide arms 222 and 232 configured to be closed or opened to partially surround the profile 100. As shown in FIG. 15, the guide arms 222 and 232 can partially surround a flange 120 of the profile 100 to smoothly raise and lower the profile. The guide arms 222 and 232 include an upper guide arm 222, a lower guide arm 232, and support members 234 configured to connect the guide arms. The upper guide arm 22, the lower guide arm 232 and the support members 234 are disposed at left and right sides of a stopper 210 to form a pair. The guide arms 222 and 232 may further include guide channels 236 configured to guide a web 110 of the profile 100. The guide channels 236 function to guide the web 110 of the profile 100 when the profile 100 is raised or lowered, suppressing lateral movement of the web 110. The guide channels 236 may have a flat plate shape with a width smaller than that of the web 110 of the profile 100.

As shown in FIG. 16, one ends of the guide arms 222 and 232 are installed to partially overlap an upper guide frame 220 and a lower guide frame 230 to be engaged therewith. One end of the upper guide arm 222 is installed to be disposed under the upper guide frame 220, and one end of the lower guide arm 232 is installed to be disposed over the lower guide frame 230.

The upper guide frame 220 and the lower guide frame 230 include guide grooves 238 and 239, which function as moving paths of the guide arms 222 and 232. The guide arms 222 and 232 are slid to be opened or closed along the guide grooves 238 and 239 formed of through-grooves and having a certain length in a direction perpendicular to a lift direction of the profile 100. The guide grooves 238 and 239, having a

structure in which the guide arms 222 and 232 are horizontally moved straight and then rotated along a path (arc) in an oblique direction with respect to the straightly moved path, are formed in the upper guide frame 220 and the lower guide frame 230. The upper guide arm 222 and the lower guide arm 232 are connected to each other through a first guide pin 244 and a second guide pin 246 passing through the guide grooves 238 and 239. When the guide arms 222 and 232 move along the guide grooves 238 and 239, the first guide pin 244 is only moved horizontally and straight, and the second guide pin 246 is moved horizontally and straight and then rotated about the first guide pin 244, which functions as a rotational center axis, along the oblique path (arc) with respect to the straightly moved path. When the guide arms 222 and 232 are closed, the guide arms 222 and 232 are fixed by the first guide pin 244 and the second guide pin 246 to prevent movement thereof.

The second lift operating means 300 having a configuration similar to the lift operating means 200 is coupled to an upper end of the lift driving means 400 to raise and lower the profile 100.

In addition, as shown in FIG. 17, the apparatus for lifting a scaffold may further include a bracket 252 configured to fix the lift operating means 200 to the outer wall of the structure 1. The bracket 252 is installed to partially overlap side surfaces of the fixing frames 241 or the support frames 240, and includes a pair of panel frames 254b facing and spaced apart from each other and a connecting frame 254a configured to connect the panel frames 254b. The support frames 240 and the panel frames 254b may be fastened to each other through a coupling fixing pin 258. Through-holes 264 through which the coupling fixing pin 258 passes are formed in the fixing frames 241 or the support frames 240 and the panel frames 254b. The coupling fixing pin 258 has a

structure of a cylindrical rod and a protrusion 259 projecting from the cylindrical rod in a longitudinal direction thereof. The through-hole 264 has a complex structure of an insertion groove 264'' through which the protrusion 259 is inserted and a circular shape 264' to correspond to the structure of the coupling fixing pin 258. When the coupling
5 fixing pin 258 is inserted into the through-holes 264 and then rotated, the coupling fixing pin 258 is prevented from separating from the through-holes 264 due to the protrusion 259 formed at the cylindrical rod. A through-hole 266 configured to fix the lift operating means 200 to the structure 1 is formed in the connecting frame 254a, and a bolt is inserted through the through-hole 266 to fix the lift operating means 200 to the
10 structure 1.

Meanwhile, as shown in FIGS. 2 to 6, the first latch member 10 includes a pair of first latch plates 11 each having one hook-shaped end to be latched by the coupling pin 242 of the lift operating means 200, and facing and spaced apart from each other. The first latch plates 11 are cast to be connected to each other through a pair of first
15 connecting plates 12 having through-holes formed therein.

The second latch member 20, which is to be hooked by a fastening pin 101 of the profile 100, includes a pair of second latch plates 21 each having one hook-shaped end, and facing and spaced apart from each other, and a second connecting member 22 configured to connect the latch plates to each other and having a through-hole formed
20 therein.

Here, the shaft member 30 includes a bolt member 31 and a nut member 35. The bolt member 31 passes through through-holes of the first connecting plate 12 of the first latch member 10 and the second connecting member 22 of the second latch member 20, and the nut member 35 is installed at one end of the bolt member 31 to be

rotated, adjusting a gap between the first latch member 10 and the second latch member 20, which are spaced apart from each other.

Hereinafter, a method of tightening a scaffold in accordance with the present invention will be described with reference to the accompanying drawings.

5 FIGS. 7 and 8 are views showing an embodiment in which a lift operating means 200 is mounted on a structure 1, FIGS. 9 and 10 are views showing an embodiment in which a scaffold-tightening apparatus is mounted on the lift operating means 200 and the profile 100 to rotate a nut member 35 to reduce a gap therebetween, FIG. 11 and 12 are views showing an embodiment in which the scaffold-tightening apparatus is
10 mounted on the lift operating means 200 and the profile 100 to rotate the nut member 35 to reduce the gap between the lift operating means 200 and the profile 100 so that guide arms 222 and 232 can be fastened to the profile 100, and FIGS. 13 and 14 are views showing an embodiment in which, after the gap between the lift operating means 200 and the profile 100 is reduced, the guide arms 222 and 232 are fastened to surround a
15 flange 120 of the profile 100.

The method of tightening a scaffold in accordance with the present invention relates to a method of tightening a gap increased between the profile 100 installed at a side facing an outer wall of a structure 1 and having a plurality of latches disposed at predetermined intervals, and the lift operating means installed at the outer wall of the
20 structure 1. First, a first latch member 10 in accordance with the present invention is installed at a coupling pin 242 of the apparatus 200 for lifting a scaffold, and a second latch member 20 of the tightening apparatus is installed at a fastening pin 101 of the profile 100.

Next, the nut member 35 of the tightening apparatus is rotated to reduce the gap

increased between the first latch member 10 and the second latch member 20.

Here, rotation of the nut member 35 is performed by a specific rotating tool (for example, a spanner) so that the second latch member 20 can be moved along a bolt member 31 installed from the first latch member 10 to the second latch member 20 to
5 reduce the gap increased between the first latch member 10 and the second latch member 20.

A pair of left and right guide arms 222 and 232 configured to slide along guide grooves 238 and 239 formed in guide frames 220 and 230 of the lift operating means 200 to be opened and closed are slid in a direction perpendicular to a lift direction of the
10 profile 100 to surround the flange 120 of the profile 100. That is, the pair of left right guide arms 222 and 232 moving along the guide grooves 238 and 239 formed in the pair of left and right guide frames 220 and 230 are closed.

When the guide arms 222 and 232 are closed to surround the flange 120 of the profile 100, guide channels 236 of the lift operating means 200 function to guide a web
15 110 of the profile 100 when the profile 100 is raised and lowered, suppressing lateral movement thereof.

When a gap between the lift operating means 200 and the profile 100 (a gap between the structure and the scaffold) is reduced and the guide arms 222 and 232 of the lift operating means 200 surround the flange 120 of the profile 100, the nut member
20 35 of the scaffold-tightening apparatus is rotated in a direction opposite to a rotational direction when the gap between the first latch member 10 and the second latch member 20 is reduced, the second latch member 20 is moved along the bolt member 31 to increase the gap between the latch member 10 and the second latch member 20, and then, the first latch member 10 is attached/detached to/from the coupling pin 242 of the

lift operating means 200 and the second latch member 20 is attached/detached to/from the fastening pin 101 of the profile 100.

The foregoing description concerns an exemplary embodiment of the invention, is intended to be illustrative, and should not be construed as limiting the invention.

- 5 The present teachings can be readily applied to other types of devices and apparatuses. Many alternatives, modifications, and variations within the scope and spirit of the present invention will be apparent to those skilled in the art.

【CLAIMS】

【Claim 1】

A scaffold-tightening apparatus to reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer
5 wall of the structure and having a plurality of latches disposed at predetermined intervals, comprising:

a first latch member having a hook shape;

a second latch member having a hook shape in a direction opposite to the first latch member; and

10 a shaft member configured to connect the first latch member and the second latch member, and in which a bolt member and a nut member are axially connected to adjust a gap spaced from each other between the first latch member and the second latch member.

【Claim 2】

15 A scaffold-tightening apparatus to reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer wall of the structure, comprising:

the profile having a plurality of latches disposed in a longitudinal direction thereof;

20 a lift operating means having a stopper latched by the latch and configured to support a lower side of the latch to raise and lower the profile; and

a lift driving means coupled to the lift operating means to provide a lift driving force,

wherein the lift operating means comprises:

a pair of left and right guide frames having guide grooves formed in a direction perpendicular to a lift direction of the profile;

support frames configured to support the guide frames and facing and spaced apart from each other;

5 guide channels obliquely installed at the support frames to provide a moving path of the stopper such that the stopper is raised along an oblique path by the latch when the profile is raised and the stopper is lowered by its own weight after the latch passes;

the stopper installed between the support frames such that the stopper contacts
10 the latch to move straight upward along the guide channels when the profile is raised and the stopper is latched by the latch to support a lower side of the latch to raise and lower the profile when the profile is lowered; and

a pair of left and right guide arms configured to slide along the guide grooves formed in the guide frames to be opened or closed,

15 wherein the tightening apparatus comprises:

a first latch member having a hook shape;

a second latch member having a hook shape in a direction opposite to the first latch member; and

a shaft member configured to connect the first latch member and the second
20 latch member, and in which a bolt member and a nut member are axially connected to adjust a gap spaced from each other between the first latch member and the second latch member.

【Claim 3】

The scaffold-tightening apparatus according to claim 1 or 2, wherein the first

latch member comprises:

a pair of first latch plates each having one hook-shaped end, and facing and spaced apart from each other; and

a pair of first connecting plates configured to connect the latch plates and each
5 having a through-hole formed therein, and

wherein the second latch member comprises:

a pair of second latch plates each having one hook-shaped end, and facing and spaced apart from each other; and

second connecting members configured to connect the latch plates and each
10 having a through-hole formed therein.

【Claim 4】

The scaffold-tightening apparatus according to claim 3, wherein the shaft member comprises:

a bolt member passing through through-holes of the first connecting plates of
15 the first latch member and the second connecting members of the second latch member;
and

a nut member installed at one end of the bolt member and rotated to adjust a gap between the first latch member and the second latch member.

【Claim 5】

20 A method of tightening a scaffold to reduce a gap between a lift operating means installed at an outer wall of a structure and a profile installed at a side facing the outer wall of the structure and having a plurality of latches disposed at predetermined intervals, comprising:

installing a first latch member having a hook shape provided in a tightening

apparatus at a coupling pin of the lift operating means, and installing a second latch member having a hook shape provided in the tightening apparatus at a fastening pin of the profile;

rotating a nut member of the tightening apparatus to move the second latch
5 member along a bolt member connecting the first latch member and the second latch member to reduce a gap between the first latch member and the second latch member;
and

sliding a pair of left and right guide arms, which are slid along guide grooves formed in guide frames of the lift operating means to be opened or closed, in a direction
10 perpendicular to a lift direction of the profile to surround a flange of the profile.