

LIFT STANDING APPARATUS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a standing apparatus serving as a work
5 platform for high level operation, and more particularly to a lift standing apparatus.

Description of the Prior Art

A conventional temporal standing apparatus used in construction of large
buildings is arranged along the buildings for serving as the work platform in the high
level operation. Normally, the temporal standing apparatus is assembled in advance
10 of the construction of the buildings and then disassembled after the construction of
the buildings is completed.

The temporal standing apparatus is made of steel pipes or locking metal
elements and are manually assembled. Therefore, the larger the number of the
assembling elements is, the more time and labor to assemble or reassemble the
15 standing apparatus are required. Since the temporal standing apparatus will be
disassembled after the construction of the buildings is completed, the temporal
standing apparatus must be reassembled in the next construction, leading to much
convenience in use. In addition, when the to-be-constructed building is relatively
high, such as high-rise building, it requires a large number of the elements to form
20 the desired temporal standing apparatus, thus leading to increase in the material cost.

The present invention has arisen to mitigate and/or obviate the
afore-described disadvantages.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a lift standing apparatus comprising:

a base part;

5 a tower part vertically disposed on the base part, the tower part including plural frame elements that are superposed one upon another;

a lift part disposed on the tower part and allowed to move up and down;

a horizontally-moving portion disposed on the lift part and allowed to move horizontally in a front-rear direction;

10 a foldable standing portion extending from both left and right sides of the horizontally-moving portion in a horizontal direction; and

an extending-retracting standing portion arranged with respect to the foldable standing portion and allowed to extend and retract at both sides of the foldable standing portion.

15 The lift standing apparatus of the present invention further comprises:

a lifting motor disposed on the lift part;

a toothed rack extending along an up-down direction of the lift part; and

a smaller gear installed on a rotating shaft of the lifting motor and engaged with the toothed rack, the toothed rack and the smaller gear being driven by the
20 lifting motors to move the lift part up and down.

In the lift standing apparatus of the present invention, the lift part is provided with a locking mechanism capable of fixing the lift part at any positions of the tower part.

In the lift standing apparatus of the present invention, the locking mechanism includes:

housings arranged inside the lift part and each formed with an oblique surface facing inwards;

5 gears arranged in the housings; and

cam elements arranged between the oblique surfaces of the housings and the toothed rack, each of the first and the second cam elements is rotatably and movably installed on an installing shaft, the installing shafts are eccentrically disposed on the respective gears, the respective cam elements are formed with an abutting surface
10 sliding smoothly on the respective oblique surfaces and an engaging portion to be engaged with an engaging portion of the toothed rack.

In the lift standing apparatus of the present invention, the horizontally-moving portion is provided with a folding mechanism for folding the foldable standing portions.

15 In the lift standing apparatus of the present invention, the foldable standing portion and the extending-retracting standing portion each are provided with an armrest.

The lift standing apparatus of the present invention further comprises:

a support portion disposed along the tower part and allowed to move up and
20 down;

a moving base disposed on an upper surface of the support portion and allowed to move between a central position of the tower part and a retraction position; and

a hoist mechanism rotatably disposed on the moving base.

The lift standing apparatus of the present invention further comprises:

a flat deck structure laid on the ground; and

a fastening mechanism fastening the base part onto the flat deck structure.

5 When in use, the lift part moves up and down along the tower part to adjust the height of the standing portions according to the operation height. When the side standing parts at both sides of the lift part are extended, the length of the side standing parts can be adjusted in left-right direction. Therefore, work platform can be arranged at any positions along the building, thus reducing the operation cost
10 without assembling and disassembling of temporal standing apparatus.

In addition, when the lift standing apparatus of the present invention is used, the toothed rack and the smaller gear are driven by the lifting motors to move the lift part along the tower part, thus ensuring smooth movement of the lift part while simplifying the whole configuration of the present invention.

15 Additionally, after the lift part is adjusted at a predetermined height, the locking mechanism can assuredly and stably fix it in that position, preventing the lift part from falling unexpectedly while enhancing the operation safety.

 Additionally, since the lift standing apparatus of the present invention is provided with the locking mechanism, when the lift part is moving down (which is
20 caused the slide motion of the respective oblique surfaces with respect to the abutting surfaces of the wedge-shaped first cam element and second cam element, and the sliding of the oblique surfaces and the abutting surfaces is accompanied by the engagement of the engaging portion of the first cam element with the toothed

rack, and the pressing of the second cam element against the toothed rack), it can be stably fixed to the tower part, thus enhancing the operation safety.

Additionally, since the side standing parts can be folded in the front-rear direction, the whole storage space of the lift standing apparatus can be greatly reduced, thus miniaturizing the standing apparatus of the present invention for facilitating the transport operation. On the building site, the side standing parts can also be unfolded from the front-rear direction toward the left-right direction, thus reducing the preparation time of assembling the standing apparatus while enhancing the operation efficiency.

Additionally, since the lift standing apparatus of the present invention is provided with the hoist mechanism, it can perform the hoisting operation. In the assembly of the lift standing apparatus, the hoist mechanism can be moved to the retraction position to use the hook to suspend a new frame element. Additionally, a new frame element can be moved and arranged on the superposed frame elements.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view of a lift standing apparatus in accordance with the present invention;

Fig. 2 is a schematic view showing the position relation of the toothed rack and the smaller gear in accordance with the present invention;

Fig. 3 is a top view of the lift standing apparatus of Fig. 1;

Fig. 4 is a front view showing an operation state of the lift standing apparatus in accordance with the present invention;

Fig. 5 is a top view of the lift standing apparatus of Fig. 4;

Fig. 6 is a top view showing another operation state of the lift standing apparatus in accordance with the present invention;

Fig. 7 is an exploded view of the locking mechanism in accordance with the present invention;

5 Fig. 8 is a partially enlarged view of the locking mechanism of Fig. 7;

Fig. 9 is another partially enlarged view of the locking mechanism of Fig. 7;

Fig. 10 is a top view showing the operation state of the lift standing apparatus in accordance with the present invention;

10 Fig. 11 is a partially front view showing that the tower part of the lift standing apparatus in accordance with the present invention is provided with a hoist mechanism;

Fig. 12 is a partially front view of the lift standing apparatus of Fig. 11;

Fig. 13 is a partially front view of another lift standing apparatus in accordance with the present invention; and

15 Fig. 14 is a partially enlarged view of the lift standing apparatus of Fig. 13.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 The present invention will be clearer from the following description when viewed together with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment in accordance with the present invention.

Figs. 1-10 show a lift standing apparatus in accordance with a preferred embodiment of the present invention. The standing apparatus is used as an aerial work platform during construction of a tall building.

Referring to Fig. 1, the lift standing apparatus in accordance with the preferred embodiment of the present invention comprises a base part 1 standing on the ground G to support (carry) the standing apparatus. The base part 1 is approximately plate-shaped and provided with multiple moving wheels 2, plural jack mechanisms 3 and a projecting beam mechanism 4.

The moving wheels 2 are used to move the standing apparatus to a predetermined position in the building site.

The respective jack mechanisms 3 are arranged at corners of the base part 1 for maintaining the base part 1 horizontal by adjusting height.

10 The projecting beam mechanism 4 consists of plural elements radially extended from the base part 1. The projecting beam mechanism 4 includes an arm portion 4a having a first end fixed on the base part 1 and a jack portion 4b fixed on a second end of the arm portion 4a.

15 A tower part 5 is vertically disposed on the base part 1 along an up-down direction Y. The tower part 5 is formed by connection of plural frame elements 6. The respective frame elements 6 are roughly in the form of a cubic frame. The frame elements 6 are superposed one upon another on a center portion of the base part 1. In an inner space of the respective frame elements 6 is installed a toothed rack 7. The toothed rack 7 is elongated and extends along the up-down direction Y. The toothed
20 rack 7 is formed with an engaging portion on a side surface, and the engaging portion is engaged with a smaller gear. The toothed racks 7 are linearly connected when the frame elements 6 are superposed one upon another.

A lift part 8 is disposed on the tower part 5. The lift part 8 can move up and

down on the tower part 5 along the up-down direction Y to move the side standing parts 14 serving as work platforms up and down. The lift part 8 is roughly in the form of a cubic frame extending in the up-down direction Y. The lift part 8 can move up and down along the outer surfaces of the frame elements 6 by means of guiding
5 rollers (not shown).

The lift part 8 is provided with two lifting motors 9 for driving the lift part 8 to move up and down. As shown in Fig. 2, each of the lifting motors 9 has a rotating shaft 9a provided with a smaller gear 10 which is engaged with the toothed rack 7 installed on the frame elements 6. The toothed rack 7 and the smaller gear 10 are
10 driven by the lifting motors 9 to move the lift part 8 along the tower part 5.

A front-rear direction Z and a right-left direction X are two directions vertical to each other and to the up-down direction Y. The lift part 8 is provided with a front standing portion 11 in the front-rear direction Z, and the front standing portion 11 is trapezoidal when viewing from the top. The front standing portion 11 is
15 formed with a floor structure 11a which is made of plate material and serves as the work platform. The front standing portion 11 is further provided around the circumference thereof with an armrest 12 for preventing fall of the operator.

On the lift part 8 is provided a horizontally-moving portion 13 capable of horizontally moving in the front-rear direction Z (namely, a direction along which
20 the lift part 8 moves toward and away from the building wall surface N). The horizontally-moving portion 13 is used to make the side standing part 14 move in the front-rear direction Z. As shown in Fig. 6, the horizontally-moving portion 13 is in the form of a cubic frame extending in the front-rear direction Z. The

horizontally-moving portion 13 can move smoothly along the guiding rollers (not shown) through the moving mechanism (not shown).

The horizontally-moving portion 13 is provided at each of two opposite sides thereof with the side standing part 14 extending in the left-right direction X.

5 Each of the side standing parts 14 includes a foldable standing portion 15 and an extending-retracting standing portion 16. The horizontally-moving portion 13 is provided with an assist standing portion 17 below the front standing portion 11, and the assist standing portion 17 is connected to the respective foldable standing portions 15, as shown in Fig. 3.

10 The foldable standing portion 15 and the extending-retracting standing portion 16 are both in the form of a cubic frame.

The extending-retracting standing portion 16 is, as shown in Figs. 4 and 5, installed in such a manner that it can extend and retract with respect to the foldable standing portion 15. The foldable standing portion 15 is provided with guide rails
15 (not shown) at corners of the bottom surface thereof. The extending-retracting standing portion 16 can extend and retract along the guide rails by means of a driving mechanism such as an electric winch.

The foldable standing portion 15, the extending-retracting standing portion 16, the assist standing portion 17 and the front standing portion 11 each are provided
20 with a floor 18, and the floors 18 serve as the work platform made of plate material. Furthermore, the foldable standing portion 15, the extending-retracting standing portion 16 and the assist standing portion 17 each are provided with an armrest 19 for preventing the drop of the operator.

The armrest 19 of the extending-retracting standing portion 16 can be inserted into the armrest 19 of the foldable standing portion 15, so that the extending-retracting standing portion 16 together with its armrest 19 can extend and retract with respect to the foldable standing portion 15 in the left-right direction X.

5 In the lift part 8, as shown in Figs. 7-9, is provided a locking mechanism 20. The locking mechanism 20 is used to fix and maintain the lift part 8 at any positions. The locking mechanism 20 includes two housings 21, a first cam element 22, and a second cam element 23.

 The respective housings 21 are disposed at both sides of the toothed rack 7.
10 The first cam element 22 and the second cam element 23 are arranged between the respective housings 21 and the toothed rack 7.

 The respective housings 21 are installed inside the lift part 8 by bolts (not shown). On each of the housings 21 is vertically disposed a vertical portion 24, 25. The first and the second cam elements 22, 23 are clamped between the respective
15 vertical portions 24, 25 and the toothed rack 7. The respective vertical portions 24, 25 are formed with an oblique surface 24a, 25a at one side thereof adjacent to the respective cam elements 22, 23.

 Two gear shafts 26, 27 are centrally installed in two gears 28, 29, respectively, and the two gears 28, 29 are engaged with each other. One end of the
20 gear shaft 26 is used to fasten a wrench shaft of a wrench. Each of the gears 28, 29 is further eccentrically provided with an installing shaft 30, 31. The first and the second cam elements 22, 23 which are roughly in the form of a triangular prism are rotatably and movably installed on the respective installing shafts 30, 31 so that

when the user rotates the gear shaft 26 by using the wrench, the two gears 28, 29 will rotate in opposite directions.

The first and the second cam elements 22, 23 each are formed with a slidable abutting surface 22a, 23a opposite to the respective oblique surfaces 24a, 25a of the vertical portions 24, 25. Furthermore, the first cam element 22 is formed with an engaging portion 22b to be engaged with the engaging portion of the toothed rack 7.

When the gear shaft 26 serving as the wrench shaft is rotated by the wrench (not shown), as shown by arrowheads in Fig. 9, the installing shaft 30 will rotate in a counterclockwise direction, thereby, the abutting surface 22a of the first cam element 22 will slip on the oblique surface 24a while the first cam element 22 moves toward the toothed rack 7, and the engaging portion 22b of the first cam element 22 will be engaged with the engaging portion of the toothed rack 7. Meanwhile, the gear shaft 27 rotates in a direction opposite the rotating direction of the gear shaft 26, thereby, the installing shaft 31 will rotate in a clockwise direction, and the abutting surface 23a of the second cam element 23 will slip on the oblique surface 25a while the second cam element 23 moves toward the toothed rack 7 to press against the back surface of the toothed rack 7. Therefore, the lift part 8 can be stably fixed with respect to the tower part 5.

Additionally, in such a fixed state, when the gear shaft 26 is rotated in an opposite direction by the wrench, the abutting surface 22a of the first cam element 22 will slip on the oblique surface 24a while the abutting surface 23a of the second cam element 23 slips on the oblique surface 25a, so that the first and the second cam

elements 22, 23 can continually move away from the toothed rack 7 by rotating around the respective installing shafts 30, 31. Therefore, the engaging portion 22b of the first cam element 22 will disengage from the toothed rack 7, and the second cam element 23 won't press against the back surface of the toothed rack 7. Thereby, the lift part 8 is released from the tower part 5 and allowed to move up and down.

After the lift part 8 moves to a predetermined position, the locking mechanism 20 can assuredly and stably fix it in that position, preventing the lift part 8 from falling unexpectedly while enhancing the operation safety.

In addition, when the lift part 8 is moving down (which is caused the slide motion of the respective oblique surfaces 24a, 25a with respect to the abutting surfaces 22a, 23a of the wedge-shaped first cam element 22 and second cam element 23, and the sliding of the oblique surfaces 24a, 25a and the abutting surfaces 22a, 23a is accompanied by the engagement of the engaging portion 22b of the first cam element 22 with the toothed rack 7, and the pressing of the second cam element 23 against the toothed rack 7), it can be stably fixed to the tower part 5, thus enhancing the operation safety.

The side standing parts 14 can be folded with respect to the horizontally-moving portion 13 by a folding mechanism (not shown) provided on the horizontally-moving portion 13, that is, the side standing parts 14 can be converted between a state extending in the left-right direction X and a state extending in the front-rear direction Z (as shown in Fig. 10). The side standing parts 14 can be folded and unfolded freely by disassembling an insert pin (not shown), and the insert pin will be engaged on the connecting portions 32 formed on the horizontally-moving

portion 13.

Additionally, in the above standing apparatus, the side standing parts 14 can be folded in the front-rear direction Z by the horizontally-moving portion 13, that is, the folding mechanism of the horizontally-moving portion 13 can fold the foldable
5 standing portions 15 of the side standing parts 14 in the front-rear direction Z. The side standing parts 14 can also substitute for the horizontally-moving portion 13 at the side of the building wall surface N while a standing plate is disposed at the side of the building wall surface N along the side standing part 14.

Next, the assembling method of the standing apparatus will be described.
10 The standing apparatus of the present invention can be transported to the building site after being disassembled into the base part 1, the side standing parts 14, the tower part 5 and other assembling elements. Under this situation, the tower part 5 is disassembled into plural frame elements 6 for facilitating transporting while the side standing parts 14 are folded for facilitating transporting, as shown in Fig. 10.

15 After being transported to the building site, the base part 1 will be moved to a predetermined position through the moving wheels 2, and then the jack mechanisms 3 will be used to adjust the horizontal height of the base part 1. After that, the base part 1 will be fixed on the ground G by the projecting beam mechanism 4, and the plural frame elements 6 will be superposed on the tower part 5
20 one upon another by the bolts (not shown). And, the side standing parts 14 will be unfolded into the state of extending into the left-right direction X from the folded state.

The tower part 5 consists of the plural frame elements 6 capable of being

disassembled smoothly, so that the transporting operation is quite easy by disassembling the tower part 5 into the plural frame elements 6. In addition, the corresponding assembling operation is also quite easy, thus greatly reducing the operation cost. Furthermore, the height of the tower part 5 can be adjusted by
5 adjusting the number of the frame elements 6, so that the tower part 5 is applicable to any operation heights.

When the lifting motor 9 is actuated, the lift part 8 can move up or down along the tower part 5 through the toothed rack 7 and the smaller gear 10. Thereby, the side standing parts 14 can be arranged at the predetermined height with respect to
10 the building N for the operator to carry out the high level operation at the above predetermined height.

When the extending-retracting standing portion 16 is moved with respect to the foldable standing portion 15, the side standing parts 14 are arranged at the predetermined position (in the transverse direction) with respect to the building N as
15 shown in Fig. 4, so that the operator can carry out the high level operation at the above predetermined position without moving the standing apparatus in the transverse direction, greatly enhancing the operation efficiency.

When the horizontally-moving portion 13 moves with respect to the lift part 8 in the front-rear direction Z, the horizontally-moving portion 13 is arranged at a
20 position adjacent to the building N as shown in Fig. 6. Therefore, during the construction of the outer wall of the building N for example, the horizontally-moving portion 13 can move away from the wall and then moves up or down and can finally be fixed close to the outer wall of the building N again even if

the building N has eaves or outward projections, and thus the clearance between the side standing parts 14 and the outer wall can be reduced as much as possible, enhancing the safety as well as the operation efficiency.

Furthermore, the side standing parts 14 can be folded in the front-rear direction Z by the folding mechanism (not shown), therefore, in the transport of the standing apparatus, as shown in Fig. 10, the side standing parts 14 can be folded from the left-right direction X toward the front-rear direction Z. Thereby, the storage space of the standing apparatus of the present invention can be reduced, thus miniaturizing the standing apparatus of the present invention for facilitating the transport operation. On the building site, the side standing parts 14 can also be unfolded from the front-rear direction Z toward the left-right direction X, thus reducing the preparation time of assembling the standing apparatus while enhancing the operation efficiency.

Moreover, the tower portion 5 can also be provided with a hoist mechanism 33, as shown in Figs. 11 and 12. More specifically, the tower part 5 is provided with a support portion 34 which can move up and down through guiding rollers (not shown), and the support portion 34 is used to support and move the hoist mechanism 33. The support portion 34 is also formed into a roughly cubic frame shape, like the above lift part 8.

On the upper surface of the support portion 34 is disposed a guiding portion 35 for moving the hoist mechanism 33. The guiding portion 35 is provided with a moving base 36 capable of moving thereon. The moving base 36 is driven by a moving motor 37 to move between a reference position as shown in Fig. 11 and a

retraction position as shown in Fig. 12.

The moving base 36 is provided on an upper surface thereof with a rotating portion 38 which can be rotated through a rotating motor not shown. The rotating portion 38 is provided on an upper surface thereof with a lifting winch 40 for lifting
5 a hook 39. The rotating portion 38 is further provided on the upper surface thereof with a pitching winch 42 to swivel a pitching arm 41 up or down.

When in use, the rotating portion 38 is arranged at the reference position as shown in Fig. 11 or the retraction position as shown in Fig. 12, under such a situation, the standing apparatus of the present invention can be used to pile up the objects S.
10 Moreover, in the assembling operation of the standing apparatus of the present invention, the rotating portion 38 can be moved to the retraction position, and the hook 39 can be used to hoist and move a new frame element 6 to superpose it on the corresponding frame element 6.

Figs. 13 and 14 illustrate a lift standing apparatus in accordance with a
15 second embodiment of the present invention. In the second embodiment, the base part 1 is provided with a flat deck structure B, a fastening mechanism 43 and a jack mechanism 44 which substitute for the moving wheels 2 and the projecting beam mechanism 4 in the above embodiment. The flat deck structure B is laid on the ground G, and the base part 1 is arranged on the flat deck structure B through the
20 fastening mechanism 43 and the jack mechanism 44.

More specifically, as shown in Fig. 14, the fastening mechanism 43 includes a fastening assembly 45 and a fixing element 46.

The fastening assembly 45 is used to fasten the fixing element 46. The

fastening assembly 45 includes a main body 45a, a lower support plate 45b and an upper support plate 45c. The main body 45a extends in the up-down direction Y, and the lower support plate 45b extends at the lower end of the main body 45a in the left-right direction X. The upper support plate 45c extends in the left-right direction X from a central portion of the lower support plate 45b. The fastening assembly 45 is clamped into the flat deck structure B by the lower support plate 45b and the upper support plate 45c. Thereby, the fastening assembly 45 supports and fixes the fixing element 46.

The fixing element 46 is supported by the locking element and fixes the base part 1. The fixing element 46 is U-shaped in cross section and extends in a predetermined direction. The fixing element 46 is installed on the fastening assembly 45 by a pivot bolt 46a. The base part 1 is fixed on the upper surface of the fixing element 46 by the installation bolts 46b.

The base part 1 is formed with a projecting portion 1a at each of four corners thereof. At each of the projecting portions 1a is disposed the jack mechanism 44. The jack mechanisms 44 can press against the upper surface of the flat deck structure B. The respective jack mechanisms 44 include a bolt 44a extending in the up-down direction Y and a pressing plate 44b fixed on a lower end of the bolt 44a. The pressing plate 44b can move in the up-down direction Y. The base part 1 will be opened with respect to the flat deck structure B by moving the pressing plate down.

When in use, the flat deck structure B is clamped between lower support plate 45b and the upper support plate 45c while the pressing plates 44b of the jack mechanisms 44 press against the upper surface of the flat deck structure B, therefore,

the base part 1 and the flat deck structure B can be integrally connected by the fixing element 46. The base part 1 can be separated from the flat deck structure B by using the jack mechanisms 44 to disconnect the pressing plate 44b from the upper surface of the flat deck structure B.

5 By such an arrangement, the base part 1 can be fastened on the flat deck structure B laid on the ground G through the fastening mechanism 43. Thereby, the flat deck structure B and the base part 1 are integrally connected, and the flat deck structure B serves as a stabilization element for suppressing the necessity of assembling the projecting beam mechanism and can support the whole lift standing
10 apparatus of the present invention, enhancing the safety.

Furthermore, the present invention is not limited to the above embodiments and can be modified within the scope of the present invention. For example, the tower part 5, the lift part 8, the horizontally-moving portion 13 and the side standing parts 14 can be modified as desired.

15 Additionally, the standing apparatus of the present invention can also be provided with two parallel-arranged tower parts 5 supporting the side standing parts 14.

WHAT IS CLAIMED IS:

1. A lift standing apparatus comprising:

a base part;

5 a tower part vertically disposed on the base part, the tower part including plural frame elements that are superposed one upon another;

a lift part disposed on the tower part and allowed to move up and down;

a horizontally-moving portion disposed on the lift part and allowed to move horizontally in a front-rear direction;

10 a foldable standing portion extending from both left and right sides of the horizontally-moving portion in a horizontal direction; and

an extending-retracting standing portion allowed to extend and retract with respect to the foldable standing portion.

2. The lift standing apparatus as claimed in claim 1 further comprising:

a lifting motor disposed on the lift part;

15 a toothed rack extending along an up-down direction of the lift part; and

a smaller gear installed on a rotating shaft of the lifting motor and engaged with the toothed rack, the toothed rack and the smaller gear being driven by the lifting motors to move the lift part up and down.

20 3. The lift standing apparatus as claimed in claim 1, wherein the lift part is provided with a locking mechanism capable of fixing the lift part at any positions of the tower part.

4. The lift standing apparatus as claimed in claim 3, wherein the locking mechanism including:

housings arranged inside the lift part and each formed with an oblique surface facing inwards;

gears arranged in the housings; and

cam elements arranged between the oblique surfaces of the housings and the toothed rack, each of the first and the second cam elements is rotatably and movably installed on an installing shaft, the installing shafts are eccentrically disposed on the respective gears, the respective cam elements are formed with an abutting surface sliding smoothly on the respective oblique surfaces and an engaging portion to be engaged with an engaging portion of the toothed rack.

5. The lift standing apparatus as claimed in claim 1, wherein the horizontally-moving portion is provided with a folding mechanism for folding the foldable standing portions.

6. The lift standing apparatus as claimed in claim 1, wherein the foldable standing portion and the extending-retracting standing portion each are provided with an armrest.

7. The lift standing apparatus as claimed in claim 1 further comprising:

a support portion disposed along the tower part and allowed to move up and down;

a moving base disposed on an upper surface of the support portion and allowed to move between a central position of the tower part and a retraction position; and

a hoist mechanism rotatably disposed on the moving base.

8. The lift standing apparatus as claimed in claim 1 further comprising:

a flat deck structure laid on the ground; and

a fastening mechanism fastening the base part onto the flat deck structure.

9. The lift standing apparatus as claimed in claim 1, wherein the base part is plate-shaped and provided with multiple moving wheels, plural jack mechanisms
5 and a projecting beam mechanism, the moving wheels are allowed to move the standing apparatus to a predetermined position, the respective jack mechanisms are disposed at corners of the base part for adjusting a height of the base part to maintain the base part horizontal, the projecting beam mechanism consists of plural elements radially extended from the base part, the projecting beam mechanism includes an
10 arm portion having a first end fixed on the base part and a jack portion fixed on a second end of the arm portion.

10. The lift standing apparatus as claimed in claim 2, wherein the toothed rack is disposed in the respective frame elements of the tower part.

11. The lift standing apparatus as claimed in claim 4, wherein the respective
15 housings are disposed at both sides of the toothed rack, the number of the gears is two, and the two gears are disposed in the respective housings parallel to each other, the cam elements are a first cam element and a second cam element, the first cam element and the second cam element are arranged between the housings and the toothed rack, on each of the housings is vertically disposed a vertical portion, the
20 respective vertical portions are formed with the oblique surface at one side thereof adjacent to the respective cam elements, two gear shafts are centrally installed in the two gears, and the two gears are engaged with each other, an end of one of the two gear shafts is used to fasten a wrench shaft of a wrench, each of the gears is

eccentrically provided with an installing shaft, the first and the second cam elements which are in the form of a triangular prism are rotatably and movably installed on the respective installing shafts, the first and the second cam elements each are formed with a slidable abutting surface opposite to the respective oblique surfaces of the vertical portions, the first cam element is formed with an engaging portion to be engaged with the engaging portion of the toothed rack.

12. The lift standing apparatus as claimed in claim 8, wherein the fastening mechanism includes a fastening assembly and a fixing element, the fastening assembly includes a main body, a lower support plate and an upper support plate, the main body extends in the up-down direction, and the lower support plate extends at the lower end of the main body in the left-right direction, the fastening assembly is clamped into the flat deck structure by the lower support plate and the upper support plate, the fixing element is U-shaped in cross section and extends in a predetermined direction, the fixing element is installed on the fastening assembly by a pivot bolt, the base part is fixed on the upper surface of the fixing element by installation bolts,

the base part is formed with a projecting portion at each of four corners thereof, at each of the projecting portions is disposed a jack mechanism, the jack mechanisms are allowed to press against an upper surface of the flat deck structure, the respective jack mechanisms include a bolt extending in the up-down direction and a pressing plate fixed on a lower end of the bolt.