July 4, 1967 H. C. STEVENS 3,328,859

APPARATUS FOR ERECTING WALL PANELS

Filed Jan. 13, 1965 3 Sheets-Sheet 1

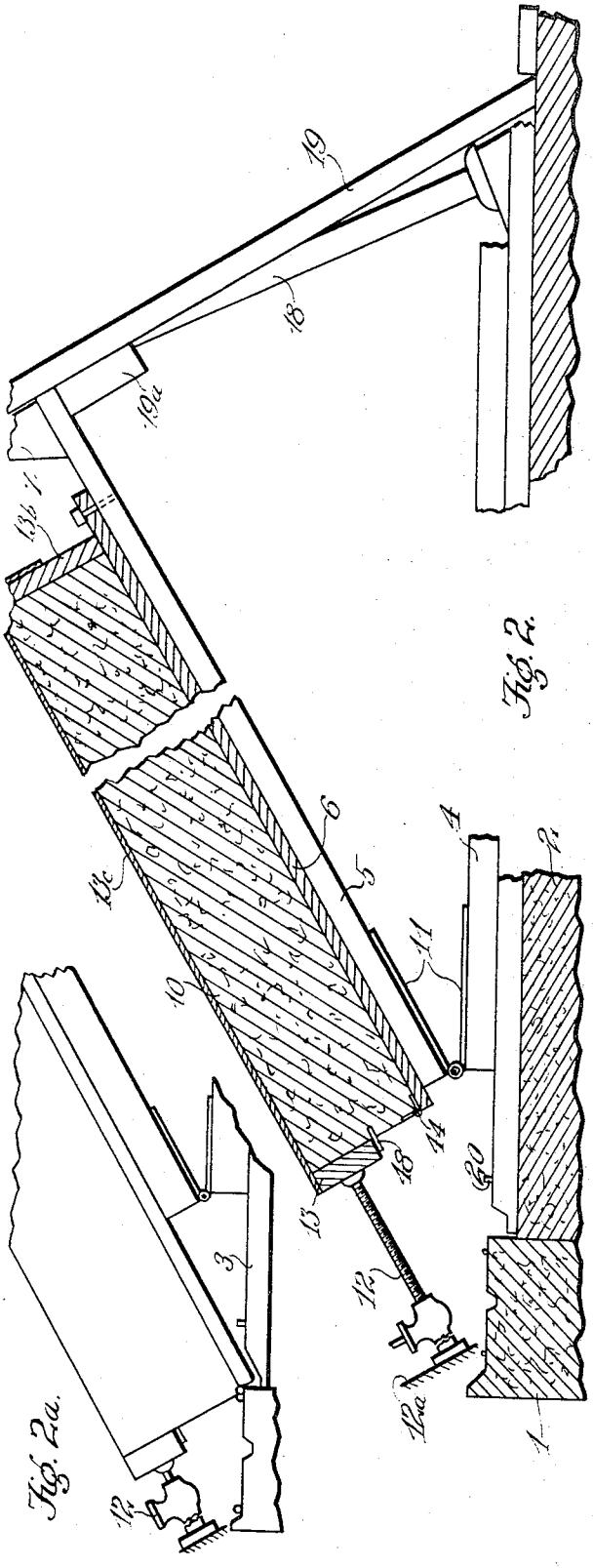


Fig. 2.

Fig. 2a.

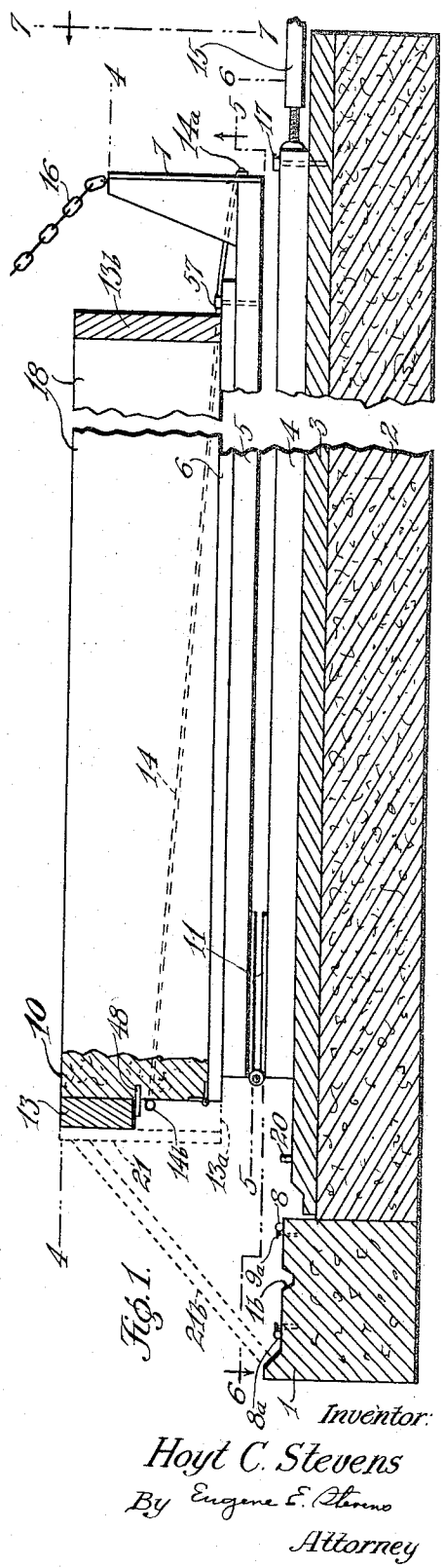


Fig. 1.

Inventor:
Hoyt C. Stevens
By Eugene E. Stevens
Attorney

July 4, 1967 H. C. STEVENS 3,328,859

APPARATUS FOR ERECTING WALL PANELS

Filed Jan. 13, 1965 3 Sheets-Sheet 2

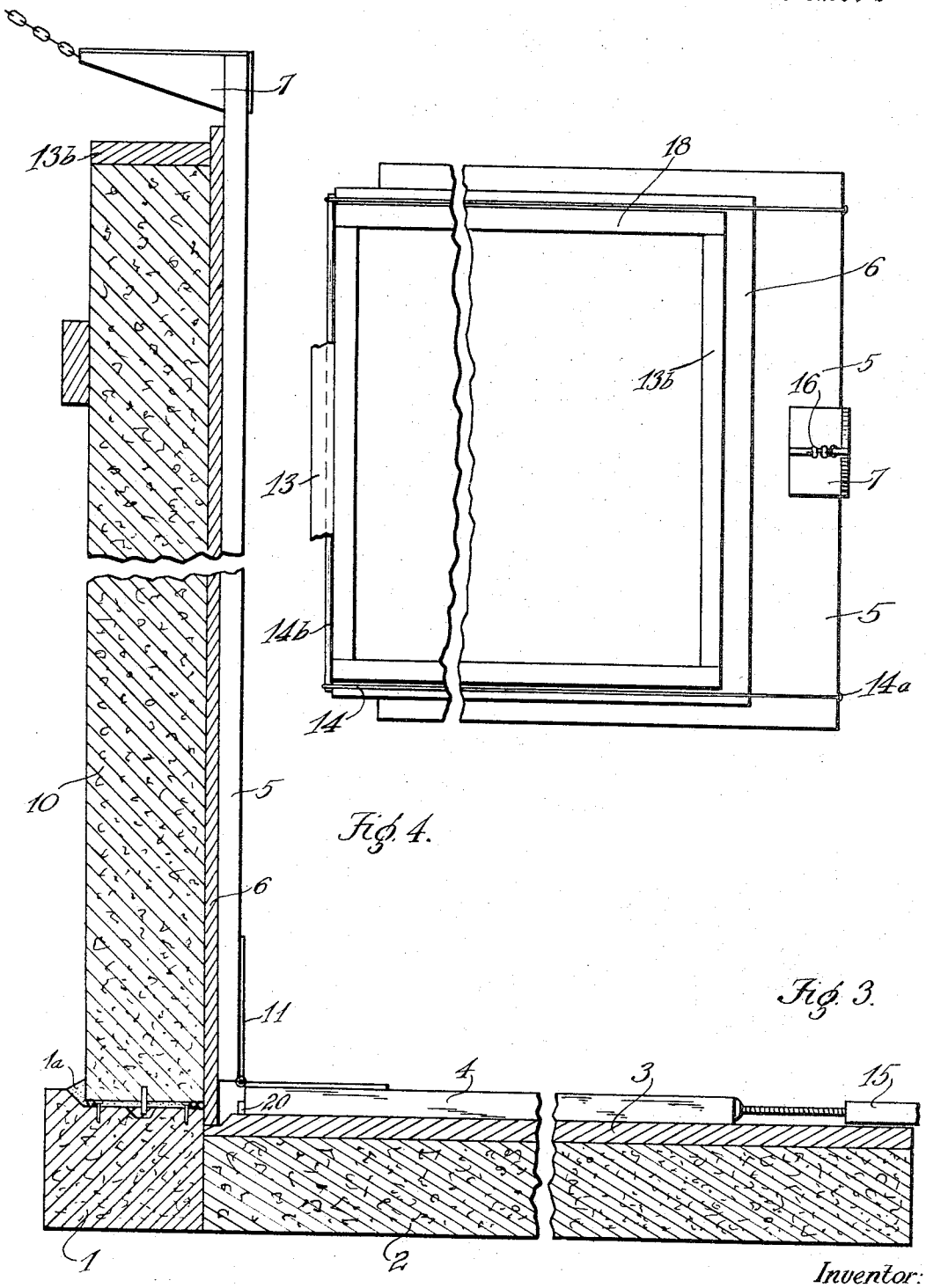


Fig. 4.

Fig. 3.

Inventor:
Hoyt C. Stevens
By Eugene E. Stevens
Attorney

July 4, 1967 H. C. STEVENS 3,328,859

APPARATUS FOR ERECTING WALL PANELS

Filed Jan. 13, 1965 3 Sheets-Sheet 3

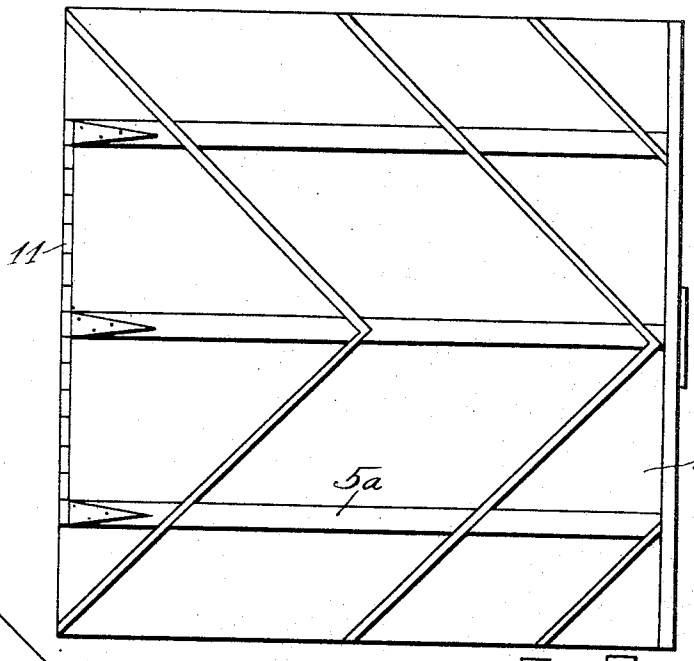


Fig. 5.

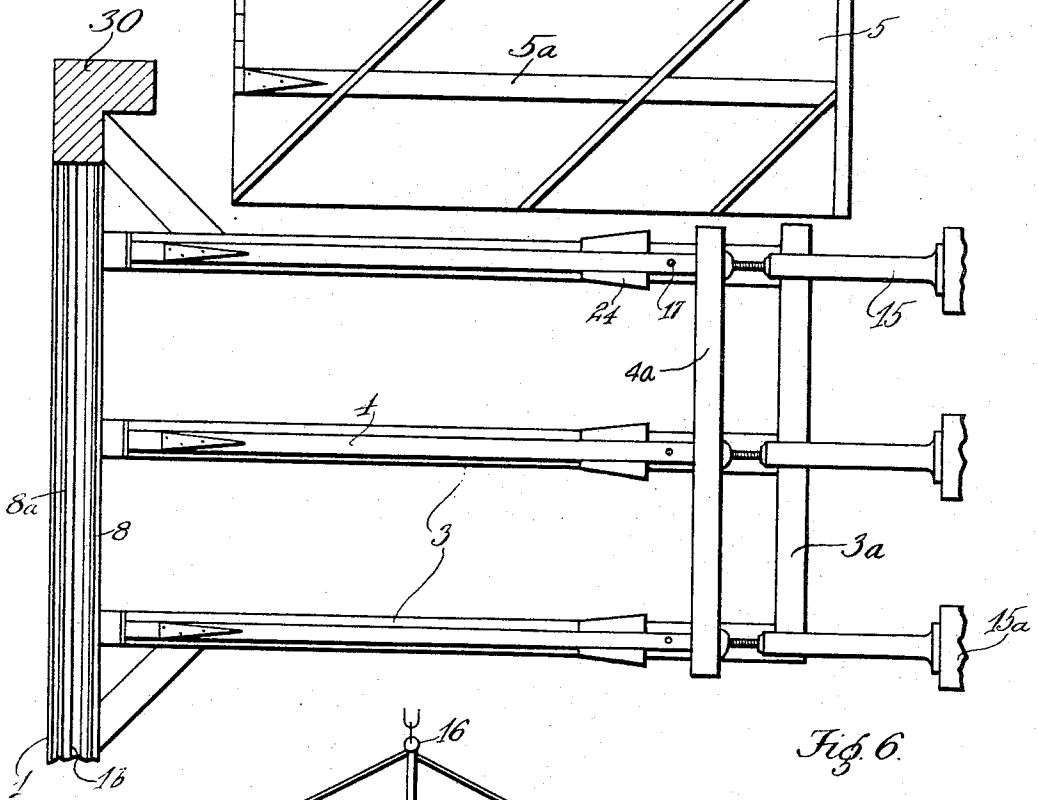


Fig. 6.

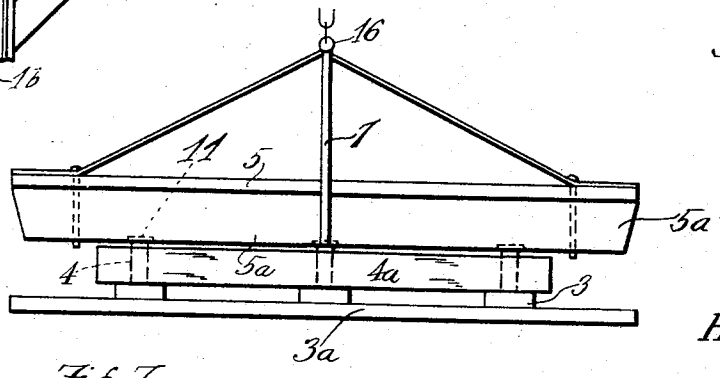


Fig. 7.

Inventor:
Hoyt C. Stevens
Eugene E. Stevens
By
Attorney

United States Patent Office 3,328,859 Patented July 4, 1967

3,328,859

APPARATUS FOR ERECTING WALL PANELS

Hoyt C. Stevens, 2327 Hamilton Lane, Grants Pass, Oreg. 97543

Filed Jan. 13, 1965, Ser. No. 425,356
11 Claims. (Cl. 25—1)

ABSTRACT OF THE DISCLOSURE

Apparatus for pouring and erecting a wall member on a footing or the like in which the apparatus includes a track bed reciprocably supporting a two part, pivoted lifting frame upon which the slab is disposed and means retaining the lifting frame against relative reciprocable movement on the track bed, and a sliding bed reciprocably supported on the lifting frame upper portion and retained thereon against relative reciprocable movement, and means for progressively lowering the slab onto a footing whereafter it is pivoted into a vertical position on the footing.

My invention relates to the erection of wall panels in homes and other buildings of the single story type, with the possibility of adapting the method to buildings of the multiple-story type. More particularly, the present project deals with small dwellings designed for erection by owners or people of limited skill or lacking heavy duty equipment. Accordingly, one object of the invention is to make possible the use of means readily available and familiar to persons of average skill to erect wall panels wherever required.

A further object is to lend a permanent quality to the building of the wall panel by casting the same from concrete and/or other masonry which will produce a solid and fireproof panel.

Another object of the invention is to afford the advantage of a masonry wall panel and the speed of erecting it like a pre-fabricated wall.

An additional object is to depart from the common practice of building-up a masonary wall with the need of lateral vertical forms and safeguards, by first casting the wall panel in horizontal position at the location of the building, and then applying various forces to set the panel up in a vertical and accurately-aligned position.

A still further object is to employ a method for setting up the panel which minimizes stresses arising during the erection of the same.

Another object is to set the panel up in a manner suitable for fitting between inter-panel and end pillars, and for the application of trim and other means for blending with the plan of the premises.

A still further object is to provide means for readily fabricating masonry wall panels incorporating such desirable properties as good thermal insulation and vapor sealing, with adaptability for a variety of inner and outer finish treatments.

Since panels of the type herein considered are not usually of monolithic concrete, an important object is to provide an apparatus which employs extreme care during the movement of the panel from the place of casting to the final aligned vertical position, whereby to accomplish the gentle and accurate placement of the panel.

A better understanding of the invention may be gained by reference to the accompanying drawings, in which—

FIG. 1 is a longitudinal section of the apparatus partly in elevation and showing a fragment of the panel at the left;

FIG. 2 is a similar view of the apparatus after a panel raising movement;

FIG. 2*a* is a similar fragmental view of a panel sliding operation;

FIG. 3 is a similar fragmental view of the apparatus after a final panel erecting movement; and

FIGS. 4 to 7 are sections on a reduced scale on the lines 4—4 to 7—7 of FIG. 1.

Broadly considered the invention resides in a group of supports erected on a sub-floor, or on the ground if the floor is to be laid at a later time. The first support is a track bed, the second a lifting bed, the third a sliding bed, and the fourth a casting frame. One end of the track bed meets a foundation footing on which the wall panel is to be erected. The casting frame has the sliding bed for its bottom; and the first operation is to pour a filling of concrete—with such other components as may be desired—into the casting frame. The second operation is to raise a hinged upper portion of the lifting bed from the end opposite from the foundation footing—while the sliding bed, the fabricated panel and the top front members of the casting frame are retained from sliding along such portion—so that the cast panel assume the proper sliding angle to attain a correct pivoting position in relation to the foundation footing when allowed to slide with a decline toward the same. Finally, a further angular pivoted lift is imparted simultaneously with a final co-ordinated push, in order to maintain constant contact between the sliding bed and the lifting bed, and so join the mortared footing as the panel swings toward its final vertical position and correct alignment. The constant contact minimizes stresses during the co-ordinated angular lift.

To described the basic and accessory instrumentalities involved in the above apparatus, it is noted in FIG. 1 that the foundation footing is marked **1**, while the sub-floor is indicated at **2**. These parts are preferably of concrete—as marked—and the track bed **3** is lower than the footing primarily to allow the sliding bed to bear against the rear face of the footing in its final position.

As indicated in FIGS. 6 and 7, the track bed is composed of a number of rails **3**—such as of 2 x 6 size—joined by a cross-bar **3***a* endwise for rigidity and support on the sub-floor **2**. The lower section of the lifting bed is composed of longitudinally-directed rails **4** which are joined at the rear by a cross-bar **4***a*. The rails **4** rest on the rails **3** of the track bed.

The lifting bed has an upper section **5** which receives cross-bars **5***a* on the under side for strengthening. The section **5** is made of plywood plies which cross grain-wise; and the upper surface of the plywood is smooth and waxed, or coated with slushing oil. The two sections of the lifting bed are connected at the ends proximate to the footing **1** by a hinge **11** or a series of hinges; and the track bed **3** has side guides **24** to keep the section **4** of the lifting bed in alignment when moved toward or from the footing **1**.

The sliding bed is denoted by the numeral **6**, and is laid on the upper section **5** of the lifting bed. The sliding bed is also made of plywood surfaced with press board, or in any suitable combination of wood and metal; and the surface of the sliding bed can be coated with slushing oil or wax.

While the track bed **3** is designed as a stationary member, and the lifting and sliding beds as shiftable from front to rear, the lower section **4** of the lifting bed is normally checked against sliding movement from rear to front until the fabricated panel on the sliding bed has been allowed to slide to the pivoting position by a transverse series of pins **17** inserted into the track bed **3**; and the sliding bed is locked against shifting on the section **5** by a similar series of pins **57** inserted into the same, a panel holding device checking the panel from sliding on the sliding bed **6** until a jack **12** is in place for controlling the sliding movement of the panel.

FIG. 1 shows the casting frame **18** ready for the pouring of the panel. The frame includes frontal sections **13**

and 13*a*, and also an external brace 21, held in place by props 21*b*. A small section of the cast panel 10 is seen in the front end of the casting frame; and the frame section 13*a*, brace 21 and props 21*b* are indicated by dotted lines because they are removed as soon as the panel has set after being cast. The frontal frame section 13 and a rear section 13*b* remain, the latter becoming the permanent top plate of the erected panel. The frame section 13 remains resting on top of a horizontal key strip 48, and is stabilized with temporarily nailed wooden strips 13*c* laid across the top of the panel during the first lift. These strips are fastened to the rear section 13*b* and removed when the jack 12 is set against the abutment 12*a* for controlling the speed at which the panel slides. A holding device consisting of side cables 14 is provided for the panel, the cables being secured at 14*a* to the rear edge of the lifting bed, and tied to a cross-bar 14*b* in front of the panel.

The first operation mentioned above involves the lifting of the section 5 from its rear or free edge to a predetermined proper sliding angle, such as depicted in FIG. 2. Since the section 5 is weighted by the heavy panel 10 and the sliding bed 6, care must be taken to check and control the speed of the slide in forward direction. For this purpose the jacks 12—mentioned above and extended to full length—are applied to the frontal cross-bar 13 of the casting frame, the jacks being braced by a suitable buttress 12*a*, as seen in FIG. 2. Now the panel holding device is no longer needed, and is therefore removed. It may now be pointed out that the position of the pin 17 must vary with the angle of slide desired or determined.

The next step in the operation is to slide the panel, resting on the sliding bed, in the direction of the footing with a view to establishing a connection for pivoting the panel on the footing. The sliding of the panel is procured by removing the pins 57 and gradually contracting the jacks 12, so that the panel and sliding bed 6 slide to the position indicated in FIG. 2*a*.

The pivoting connection referred to above employs a steel rod 8 laid along the top of the rear or receiving edge of the footing 1, the rod being held in position by a series of nails 9*a* driven into the footing before it sets; and a companion rod 8*a* is set in the same manner near the frontal edge of the footing. A metal key 48 and pivoting bead 44 are cast in the panel 10, as seen in FIGS. 1 and 2.

With a connection established between the pivoting bead 44 and the pivoting edge 8, the jack 12 and casting frame cross-bar 13 are no longer needed, and are therefore removed. Now a layer of mortar 1*a* is poured on the footing, and a chain hoist 16 co-ordinated with a horizontal push by a set of jacks 15 used to swing the panel to the vertical position shown in FIG. 3, where it becomes permanently secured to the footing. To lend the panel greater stability on the footing, it is cast with the metal key 48 mentioned above, which fits in a matching groove 1*b* of the footing when the panel closes on the same. The jacks 15 may be backed by suitable blocking 15*a* which could extend to a wall footing located further back.

FIG. 2 shows a jack 18—with which a suitable lifting pulley may be used—for procuring the initial lift of the panel in case the reach of the chain hoist 16 places it to a disadvantage. Thus, when the first lift to the sliding angle has been accomplished, propping bars 19 carrying shelf blocks 19*a* are applied to hold the lifted assembly at the correct angle for the sliding operation of the panel to the pivoted position.

It will now be apparent that four forces are applied for the erection of the wall panel. The first force is used for lifting the upper member of the lifting bed to the predetermined proper sliding position, while the wall panel and sliding bed are held from sliding. The second force is a controlling one and regulates the speed with which the wall panel and sliding bed are allowed to slide to the pivoting position. The third force procures the final pivoting movement or the raising of the panel to the vertical position; and the fourth force gives the panel the final forward push—in co-ordination with the lift of the third force—to place the lower lifting bed section against the pre-located stop on the track bed. This coordination is necessary in order to maintain constant close surface contact between the wall panel, the sliding bed and the lifting bed, minimizing stresses during the erection of the panel. It is further apparent that the novel apparatus contains simple means and safeguards against stresses within the panel for lifting and advancing the cast panel to a point where it secures an accurate aligned position with the footing; and FIG. 3 shows that the alignment of the panel is further insured by the descent of the sliding bed 6 to a position of contact along the rear surface of the footing. This positioning is regulated by correct placement of the interval stops 20. Inter-panel and corner pillars are preferably erected before the wall panels, and FIG. 6 shows the application of the panel to a corner pillar 30. Finally, the controls employed are of a nature to be adjusted with accuracy by any person handy with jacks or other types of lifting devices.

I claim:

1. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed on the track bed, panel-supporting means on the lifting bed, a portion of the latter being liftable from the end remote from the footing to raise the panel to a sliding angle in the direction of the footing, other means inducing the continued swing of the panel to vertical position and pushing the lifting bed in co-ordination with said swing, whereby to pivot the panel relative to the footing into said upstanding position, a key securing the lifting bed against movement over the track bed, horizontal-jack means for moving the lifting bed in the direction of the footing on the removal of said key in order to push the panel as stated, and a stop on the track bed for limiting the advance of the lifting bed in keeping with said co-ordination.

2. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed with a lower portion on the track bed and an upper portion hinged at a point near the footing to the lower one, a sliding bed on said upper portion for supporting the panel, such upper portion being liftable from the end remote from the footing to raise the panel to a sliding angle in the direction of the footing and with the sliding bed as a backing, and other means inducing the continued swing of the panel to vertical position and pushing the lifting bed in co-ordination with said swing, whereby to pivot the panel relative to the footing into said upstanding position, the sliding bed meeting the back of the footing as an aligning stop when the panel assumes said upstanding position.

3. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed on the track bed, panel-supporting means on the lifting bed, a portion of the latter being liftable from the end remote from the footing to raise the panel to a sliding angle in the direction of the footing, a cross-bar in front of the panel, side cables from the cross-bar tied to the rear end of said upper portion for preventing sliding of the panel during the lift to said sliding angle, and other means inducing the continued swing of the panel to ver-

tical position and pushing the lifting bed in co-ordination with said swing, whereby to pivot the panel relative to the footing into said upstanding position.

4. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed on the track bed, panel-supporting means on the lifting bed, a portion of the latter being liftable from the end remote from the footing to raise the panel to a sliding angle in the direction of the footing, jack means applicable to the front of the panel and retracted gradually to allow the sliding of the panel of itself in the direction of the footing, and other means inducing the continued swing of the panel to vertical position and pushing the lifting bed in coordination with said swing, whereby to pivot the panel relative to the footing into said upstanding position.

5. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed on the track bed, a sliding bed on the lifting bed, an upper portion of the latter liftable from the end remote from the footing to raise the panel and the sliding bed to a sliding angle in the direction of the footing, jack means applicable to the front of the panel and retractable gradually to allow the sliding of the panel and the sliding bed in the direction of the footing, and other means inducing the continued swing of the panel and the sliding bed as a backing for the same to vertical position and pushing the lifting bed in co-ordination with said swing, whereby to pivot the panel and the sliding bed relative to the footing into said upstanding position.

6. Apparatus for erecting a wall panel over a sub-floor or the like comprising a footing for the panel, a track bed laid on the sub-floor behind the footing, and means over the track bed for casting the panel in horizontal position and moving it to an upstanding position supported by the footing, said means including a lifting bed on the track bed, panel-supporting means on the lifting bed, a portion of the latter being liftable from the end remote from the footing to raise the panel to a sliding angle in the direction of the footing, and other means inducing the continued swing of the panel to vertical position and pushing the lifting bed in co-ordination with said swing, whereby to pivot the panel relative to the footing into said upstanding position, said other means including a pivoting bead in the bottom of the panel, and a rod over the rear of the footing engaged by said bead to define the pivoting between the panel and the footing.

7. Apparatus for erecting a horizontally disposed wall member on the upper surface of a footing or the like comprising:

a horizontally disposed track bed;

a lifting frame reciprocably supported on the upper surface of said track bed;

said lifting frame comprising upper and lower portions hingedly connected at an adjacent edge, said upper portion normally overlying said lower portion;

first means detachably engagably retaining said lower lifting frame portion against reciprocable movement along said track bed;

a sliding bed reciprocably supported on the upper surface of the upper portion of said lifting frame;

second means detachably retaining said sliding bed against reciprocable movement along the upper portion of said lifting frame;

lift means connectable to the upper portion of said lifting frame remote from the hinged connection between the upper and lower portions thereof for disposing said upper portion in angular relation relative to said lower portion; and

force transmitting means engageable with the lower portion of said lifting frame for moving said lifting frame horizontally relative to said track bed.

8. The structure as claimed in claim 7 in which said track bed includes stop means normally spaced from the hinged connection of said lifting frame and disposed in the reciprocable path of movement of the lifting frame lower portion.

9. The structure as claimed in claim 7, including prop means detachably engageable with the upper portion of said lifting frame remote from said pivotal connection.

10. The structure as claimed in claim 9, including a wall member reciprocably supported on the upper portion of said sliding bed, and means detachably engageable with said wall member adjacent said hinge connection between the upper and lower portions of said lifting frame and including means for progressively lowering said wall member while the upper portion of said lifting frame is in angular relation with respect to the lower portion of said lifting frame and the sliding bed is reciprocable thereon.

11. The structure as claimed in claim 10 in which said wall member includes an integral bead in a lower edge portion thereof and adjacent said hinge connection for aiding in orienting said wall member on a footing for subsequent pivotal movement thereon.

References Cited

UNITED STATES PATENTS

1,023,349	4/1912	Aiken	52—122 X
1,668,300	5/1928	Aiken	25—1

FOREIGN PATENTS

102,778	1/1938	Australia.
980,940	5/1951	France.
1,060,682	11/1953	France.
1,238,437	7/1960	France.

JOHN E. MURTAGH, *Primary Examiner.*