

March 18, 1952

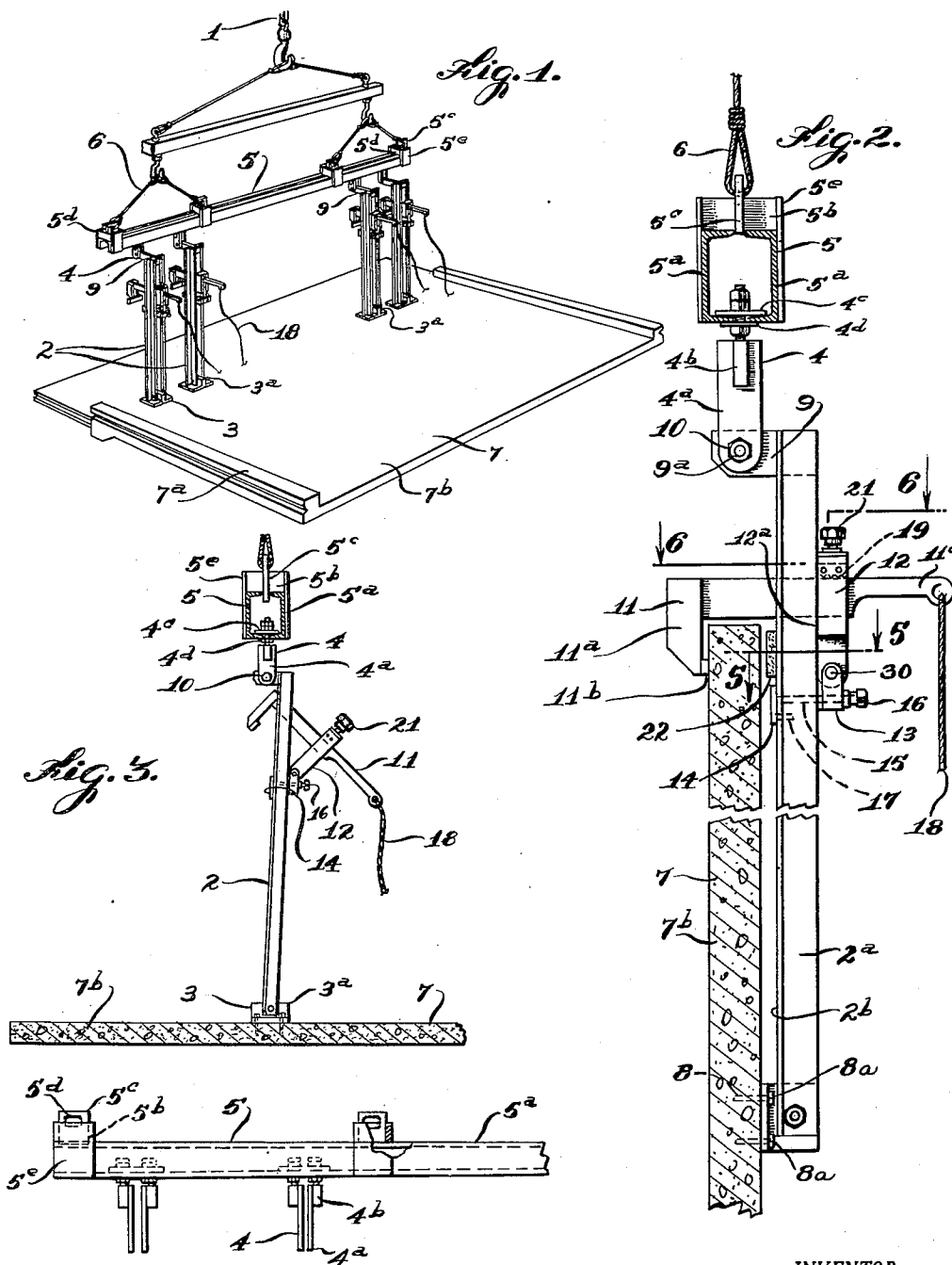
W. P. NEIL

2,589,954

LIFTING APPARATUS

Filed Oct. 15, 1949

2 SHEETS—SHEET 1



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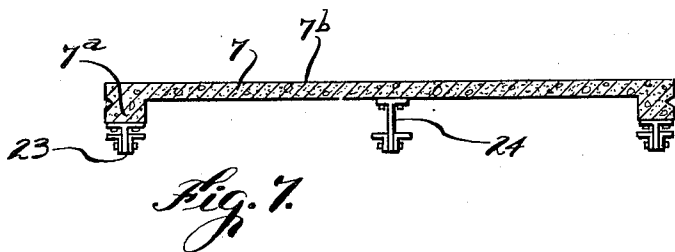
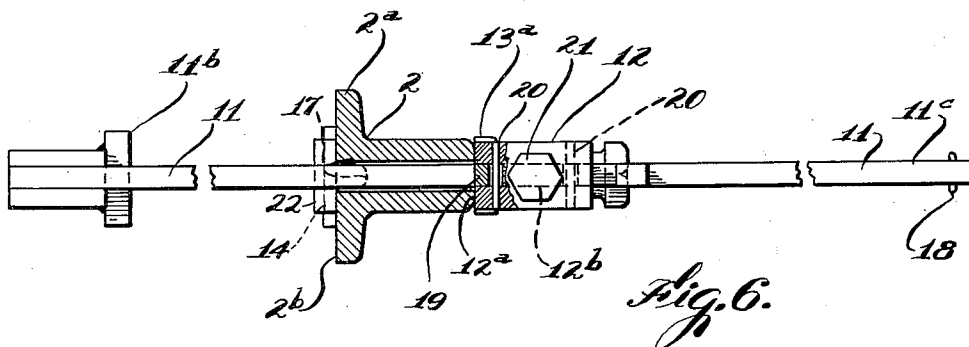
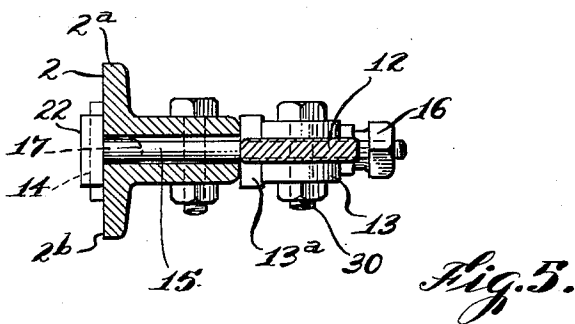
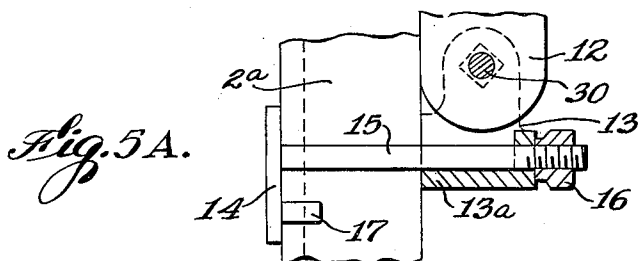
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LIFTING APPARATUS

Filed Oct. 15, 1949

2 SHEETS—SHEET 2



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2,589,954

LIFTING APPARATUS

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Application October 15, 1949, Serial No. 121,621

13 Claims. (Cl. 294—81)

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My invention relates to a lifting apparatus, and to one particularly adapted for lifting and conveying or moving concrete wall slabs, and the like.

One of the principal objects of this invention is to provide a novel apparatus of this class whereby a concrete or similar wall slab may be readily raised from a flat or horizontal to a substantially upright position.

An important object also of this invention is to provide a lifting apparatus of this class whereby a concrete or similar slab, when raised to an upright position, may be raised and readily manipulated so that it may be placed where and as desired.

Another important object of this invention is to provide a lifting apparatus of this class which may be easily and quickly secured to the concrete slab, or other object to be raised, and as easily and quickly removed therefrom.

A further important object of this invention is to provide a lifting apparatus of this class which may be readily and effectively operated for performing the desired results.

Still another important object of this invention is to provide a lifting apparatus of this class which is simple and economical of construction, and durable, and which is particularly designed and constructed for raising and efficiently manipulating and placing slabs for constructing building walls.

With these and other objects in view, as will appear hereinafter, I have devised a lifting apparatus having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail, and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a perspective view of my lifting means in a position for raising a concrete wall slab;

Fig. 2 is a side elevational view thereof with the slab in a horizontal or lying position;

Fig. 3 is a side elevational view thereof with the slab in a vertical position;

Fig. 4 is an enlarged fragmentary elevational view of the principal lifting means or cross-boom of my apparatus;

Fig. 5 is a sectional view, taken through 5—5 of Fig. 3;

Fig. 5A is a vertical sectional view, taken on line 5A—5A of Fig. 5;

Fig. 6 is a partial plan and partial sectional view, taken through 6—6 of Fig. 3; and

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Fig. 7 is a transverse sectional view of my apparatus in a slightly modified form of construction.

My lifting apparatus, shown in the drawings, is particularly designed for handling concrete wall slabs and in placing the same in the construction of a concrete building wall.

The structure shown consists of a lifting rig suspended by means of a cable 1, or the like, from a crane or derrick (not shown). The rig shown comprises essentially two or more normally upright supports 2, four being shown in Fig. 1. The lower end of each support is secured by a bracket 3 to the slab, or other object to be lifted. The upper end of each support is suspended from an arm 4, one for each support. Each arm depends from a cross-boom 5 suspended by secondary cables 6, directly or indirectly, from the cable 1 above mentioned.

The brackets 3, as shown, consist of T-shaped members, and are secured, with their cross-flanges fiatwise to one side of the wall slab 7 which is to be lifted. Such side of the wall slab, in the disclosure, is the normally outer side thereof.

The drawing shows the slab as having column portions 7^a at its opposite edges, these column portions extending upwardly from the same face of the slab portion 7^b to which the brackets 3 are secured.

The back faces of the brackets 3, that is, the cross-flanges thereof, are positioned against the outer face of the slab portion 7^b, the brackets being secured to the face of the slab by means of bolts or studs 8, the inner ends of which are anchored within the slab. Nuts 8^a are screwed onto the outer ends of the studs 8 to detachably secure the brackets 3 against the slab, this structure being more fully described in my copending application, Serial No. 121,622, filed October 15, 1949.

The brackets 3 have webs 3^a which extend at right angles from the face of the slab and parallel to the column portions 7^a, in such a manner that they are positioned vertically when the slab is raised. The lower ends of the supports 2 are pivotally connected to these webs of the brackets.

The upper ends of the supports 2, which, as shown in the drawings, consist of laterally spaced structural angles 2^a, have laterally extending arms 9 which provide lifting portions for the supports, these arms being secured at their inner ends between the angle members 2^a. The arms 9 have holes 9^a positioned at the same sides or faces 2^b of the supports 2 as the faces of the securing brackets 3, when considered from the

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operative position of the rig, shown in Fig. 3. The lower ends of the depending arms 4, referred to above, are pivotally connected through the holes 9^a of the lifting portions 9 by bolts 10.

The upper ends of the arms 4 depend from the cross-boom 5, but are adjustable thereon longitudinally with respect to the cross-boom so as to accommodate the rig to various horizontal spacings of the brackets 3 on the slab 7.

The specific and preferred construction of the boom is shown best in Figs. 3 and 4, and it consists principally of a pair of opposed vertically positioned horizontal channels 5^a. These channels are horizontally spaced apart with the channel portions at their inner sides. They are secured together in such position by pairs of vertically extending transverse plates 5^b between which are secured boom lifting plates 5^c having eyes 5^d. The edges of the plates 5^b are secured to the outer sides of the channels 5^a by plates 5^e. All of these members are preferably welded together as shown.

Two of such securing units, including the lifting plates, are arranged in horizontally spaced relation at each end of the boom. In the space between them are two depending arms 4, as aforementioned, each being adjustable as units longitudinally of the boom.

Each arm, as shown, consists of a pair of spaced flat bars 4^a, each of which depends from a bolt 4^b. The two bolts of each arm extend through and depend from a pair of clamp plates 4^c and 4^d. The lower flange of each channel 5^a is clamped between the plates 4^c and 4^d.

Near the upper ends of the supports 2 are provided latch members 11 which consist of arms pivotally mounted on bolts 30 intermediate their ends near the upper portions of the support 2. The pivotal axes 30 of the latch members 11 are spaced from the pivotal connections of the supports with the brackets 3, approximately equal to the distance of the horizontal axes of the brackets from the normally upper edge of the slab, as shown in Fig. 3. Since this distance may vary considerably, the pivotal axes 30 of the latch members are adjustable with respect to the lower ends of the supports 2, or the pivotal connections of the supports to the brackets 3.

The latch members 11 have pivot members 12 which pivotally support the latch members on brackets 13, the latter carrying the pivot bolts 30. These brackets are adjustably secured intermediate the ends of the supports 2.

The securing of each bracket is effected by a frictional clamping action of the opposite sides of the support between the front side 13^a of the bracket and a plate 14, the latter being drawn toward the bracket by a bolt 15, extending through the bracket, and a nut 16 screwed onto the bolt, see Fig. 5A. The bolt is positioned between the two members or angles 2^a of the support. The plate 14 may also have a pin 17, freely extensible, to prevent turning of the plate. With such mounting of the brackets 13, they may be readily attached to other supports of various sizes.

One end of each of the latch members, has a hook or latch portion 11^a having a face 11^b which, when the latch member is in a horizontal position, as shown in Fig. 3, is positioned parallel to the face 2^b of the support 2, but is spaced outwardly therefrom a distance greater than the thickness of the slab portion 7^b. To the end 11^c of the latch member 11, which extends backwardly from the face of the support, is connected a lanyard 18 for

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manually tilting the latch member and raising the jaw portion, as shown by solid lines in Fig. 2.

The pivot members 12, above mentioned, for supporting the latch members 11, are also adjustably mounted on the shanks of the latch members, that is, the latch members are longitudinally adjustable on or extensible from the front sides 12^a of the pivot members for receiving or embracing slabs of various thicknesses. As shown, the intermediate portions of the latch members 11 extend through slots 12^b at the upper portions of the pivot members, and they may be firmly secured therein by a serrated saw member 19 loosely carried on pins 20, the jaw member being adapted to be forced against the upper edge of the latch member 11 by a screw 21.

On the face of each of the supports 2, and immediately below the latch members 11, may be provided resilient bumpers or pads 22, which are preferably positioned opposite the faces 11^b of the latch portions.

When desiring to raise a slab from a horizontal position, as shown in Fig. 1 to the vertical position illustrated in Fig. 2, the brackets are secured to the outer faces of the slab portions 7^b. As the slab is raised to a vertical position and swung slightly therebeyond, by the drawing upwardly of the cable 1 of the crane or derrick, the latch members 11 are manually tilted upwardly by means of the lanyards 18, to the position shown in Fig. 3, to allow the upper portion of the slab to swing against the bumpers 22 on the faces 2^b of the supports 2. The tension of the lanyards 18 is then immediately released to allow the latch portions of the latch members to drop over the opposite or inner face of the slab, it being observed by reference to Fig. 2 that sufficient clearance is provided between the bumper 22 and the latch portions 11^a to permit such downward movement of the latter.

The vertical plane passing through the bolts 10 of the lifting portions or arms 9 is located between the faces of the latch portions 11^b and the faces of the brackets 3, and, in the arrangement shown in Figs. 1, 2, and 3, it lies substantially equidistant between these two faces. When so arranged, the slab lies substantially in a vertical position so that it may be readily placed when constructing a wall.

As shown in Figs. 1 and 4, two, three, or four supports 2 may be employed, and they may be variously adjusted relative to each other.

In the structure shown in Fig. 7, a slightly modified form is adapted. Here, the lower ends of these supports are pivotally connected to brackets, similar to those described above, but a short bracket, designated 23, is secured to the outer face of the column portions 7^a and a third bracket 24 is secured at the median portion of the outer face of the slab portion 7^b. The web of the bracket 24 is shown considerably longer or deeper than the securing webs of the brackets 23, the difference being the distance of the outer face of the column portion from the outer face of the slab portion.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A lifting apparatus for lifting a slab, comprising: a support having lifting means at one end and one side thereof, a bracket pivotally connected to the other end of the support and

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adapted to be detachably secured against a side of the slab at a point spaced from the edges of the slab, the bracket being positioned at the same side of the support as the lifting means, and a latch member pivotally mounted on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion located at the same side of the support as the bracket and adapted to overlie an edge of the slab.

2. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned adjacent a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end and at said side of the support and provided with means for detachably securing the bracket against said face of the slab, and a latch member pivotally mounted intermediate its ends on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket.

3. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned adjacent a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end of the support and provided with a face detachably securable to said face of the slab to be lifted, said bracket being positioned at the same side of the support as said lifting means, and a latch member pivotally mounted intermediate its ends on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket, said latch portion overlying an edge of the slab and engaging the opposite face of the slab.

4. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned alongside a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end of the support at said side thereof and provided with means for detachably securing the bracket to the slab to be lifted, said bracket being positioned at the same side of the support as said lifting means, and a latch member pivotally mounted intermediate its ends on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket and overlying an edge of the slab, the vertical plane of said lifting portion extending between the adjacent portions of the latch portion and the bracket and being coextensive with the plane of the slab.

5. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned alongside a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end of the support and provided with means for detachably securing the bracket against said face of the slab to be lifted, said bracket being positioned at the same side of the support as said lifting means, and a latch mem-

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ber pivotally mounted intermediate its ends on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket and overlying an edge of the slab, the vertical plane of said lifting portion extending between the adjacent portions of the latch portion and the bracket and being coextensive with the plane of the slab, said latch member having means at the end opposite said latch portion by which the latch member can be pivoted.

6. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned alongside a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end of the support and securable against said face of the slab to be lifted, said bracket being positioned at the same side of the support as said lifting means, and a latch member pivotally mounted intermediate its ends at the upper end of said support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket, said latch portion overlying the upper end of the slab and engaging the opposite face thereof, the vertical plane passing through the lifting portion and parallel to said pivotal axes being located substantially equidistant between the inner side of the latch portion and said side of the bracket.

7. A lifting apparatus for lifting a slab, comprising: a relatively long, normally vertical support having a side adapted to be positioned alongside a face of the slab to be lifted and provided at its upper end and at said side with lifting means, a bracket pivotally connected to the lower end of the support and detachably securable to said face of the slab to be lifted, said bracket being positioned at the same side of the support as said lifting means, and a latch member pivotally mounted intermediate its ends on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member having a latch portion also located at the same side of the support as said bracket, said latch portion overlying the upper end of the slab and engaging the opposite face of the slab, the vertical plane passing through the lifting portion and parallel to said pivotal axes being located substantially equidistant between the inner surface of the latch portion and of the bracket, said latch member having flexible means at its end opposite said latch portion for tilting the latch member.

8. A lifting apparatus for lifting a slab, comprising: a support having lifting means at one end and one side thereof, a bracket pivotally connected to the other end of the support and provided with means for detachably securing the bracket to the slab to be lifted, the bracket being positioned at the same side of the support as the lifting means, a latch member pivotally mounted on the support below said lifting means and on an axis parallel to the pivotal axis of the bracket, said latch member overlying an edge of the slab and having a latch portion located at the same side of the support as the bracket, and a resilient bumper on the support opposite the latch portion.

9. A lifting apparatus for lifting a slab, comprising: a cross-boom, normally vertical, rigid

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supports having lifting means at their normally upper ends by which said supports are suspended from said cross-boom, a bracket pivotally connected to the lower end of each of said supports and detachably secured to a face of the slab to be lifted, and a latch member pivotally mounted on each of the supports adjacent the upper end thereof and on axes parallel to the pivotal axes of the brackets, each of the latch members having a latch portion located at the same side of the support as the bracket and engageable with the opposite face of the slab.

10. A lifting apparatus for lifting a slab, comprising: a cross-boom, normally vertical supports, means for suspending said supports from said cross-boom in a vertical plane laterally offset from the vertical plane of the cross-boom, a bracket pivotally connected to the lower end of one side of each of said supports and detachably secured to a face of the slab to be lifted, a clamping means mounted on each of the supports and adjustable longitudinally thereon, and a latch member pivotally mounted on each of the clamping means on axes parallel to the pivotal axes of the brackets, each of the latch members overlying the upper edge of the slab and having a latch portion located at the same side of the support as the bracket.

11. A lifting apparatus for lifting a slab, comprising: a cross-boom, normally vertical supports pivotally suspended from said cross-boom and disposed in a common vertical plane offset laterally from the plane of the cross-boom, a bracket pivotally connected to the lower end and at one side of each of said supports, each of said brackets being detachably secured to one face of the slab to be lifted, a clamping means adjustably mounted on each of the supports, and a latch member pivotally mounted on each of the clamping means at the opposite side of said supports and on axes parallel to the pivotal axes of the brackets, each of the latch members overlying the upper edge of the slab and having a weighted latch portion arranged in a plane located at the same side of the support as the brackets and adjustable transversely of said support and the slab, said latch portion being engageable against the other face of the slab.

12. A lifting apparatus for lifting a large, heavy construction slab from a horizontal to a vertical position, comprising: at least two brack-

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ets detachably securable to the upper face and near an edge of the slab when the slab is in horizontal position and resting upon a surface, a support member pivotally connected at one end to each of said brackets and pivotal from a horizontal to a vertical position, a latch member pivotally mounted intermediate its ends adjacent the other end of each support member, the pivotal axes of said latch members being parallel to the pivotal axes of said support members, each latch member having a latch portion at one end spaced from and normally extending parallel to a side of the support members, a flexible element connected to the other end of each latch member, a cross-boom pivotally connected to and extending between the free ends of said support members, said cross-boom being operable upon upward movement to pivot said edge of the slab upwardly through the medium of said supporting members with the opposite edge of the slab remaining at rest upon said surface, said brackets pivoting with respect to said support members which remain in vertical position, pivotal movement of the slab to vertical position causing said support members to lie alongside said face of the slab and extend beyond its free edge, said latch members being adapted to be pivoted by means of the flexible elements to an inoperative position to allow said slab to move to a fully vertically position and slightly therebeyond, said latch members being thereafter releasable to cause their latch portions to overlie said free end of the slab and engage against the opposite face of the slab so as to latch said slab and said support members against relative pivotal movement.

13. A lifting apparatus as defined in claim 12, in which said support members are adjustable longitudinally along said cross-boom so as to vary the spacing between the support members.

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REFERENCES CITED

The following references are of record in the file of this patent:

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