Sept. 23, 1930. C. CARLSON 1,776,414

HOISTING APPARATUS

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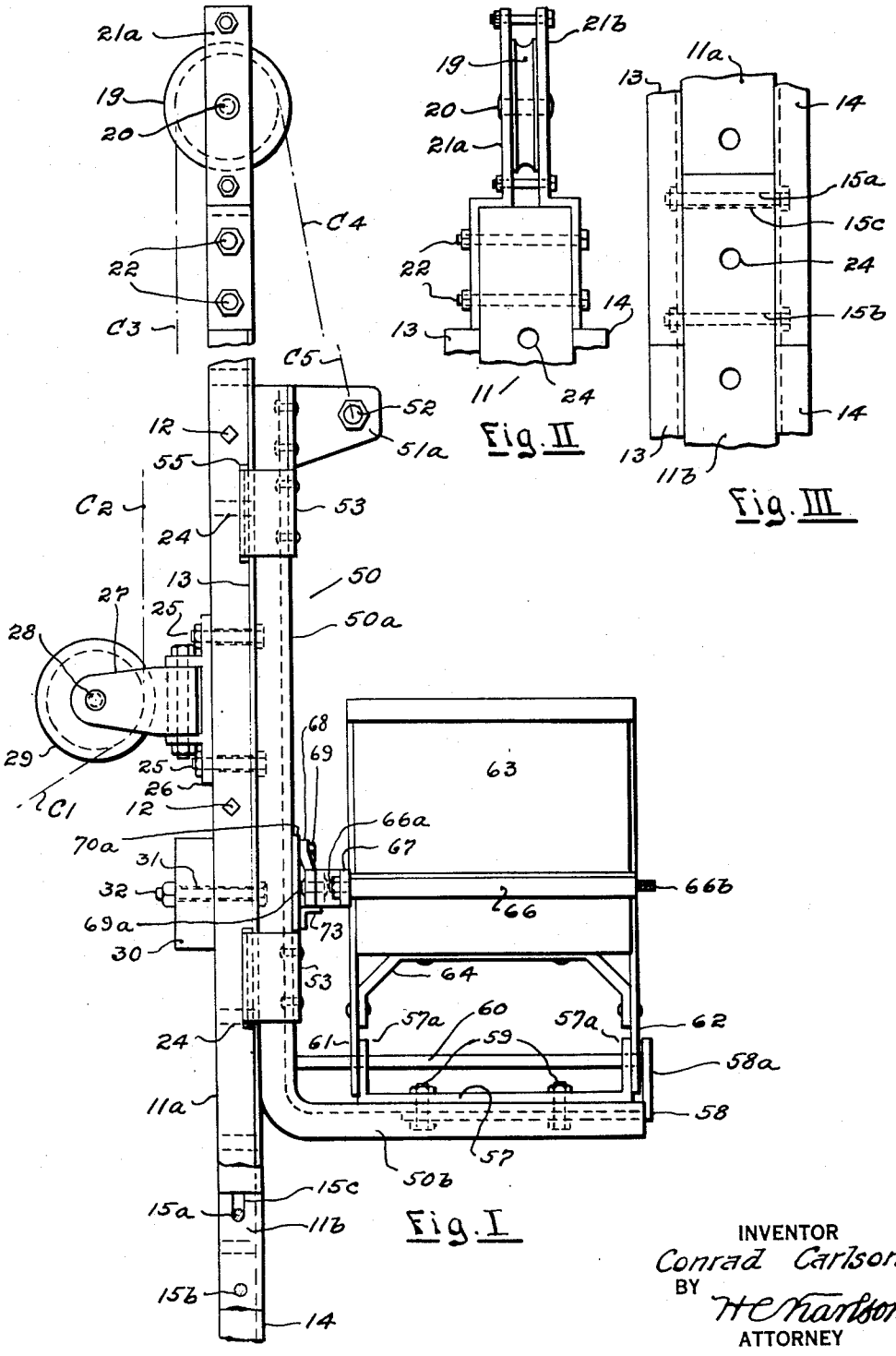


Fig. II

Fig. III

Fig. I

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HOISTING APPARATUS

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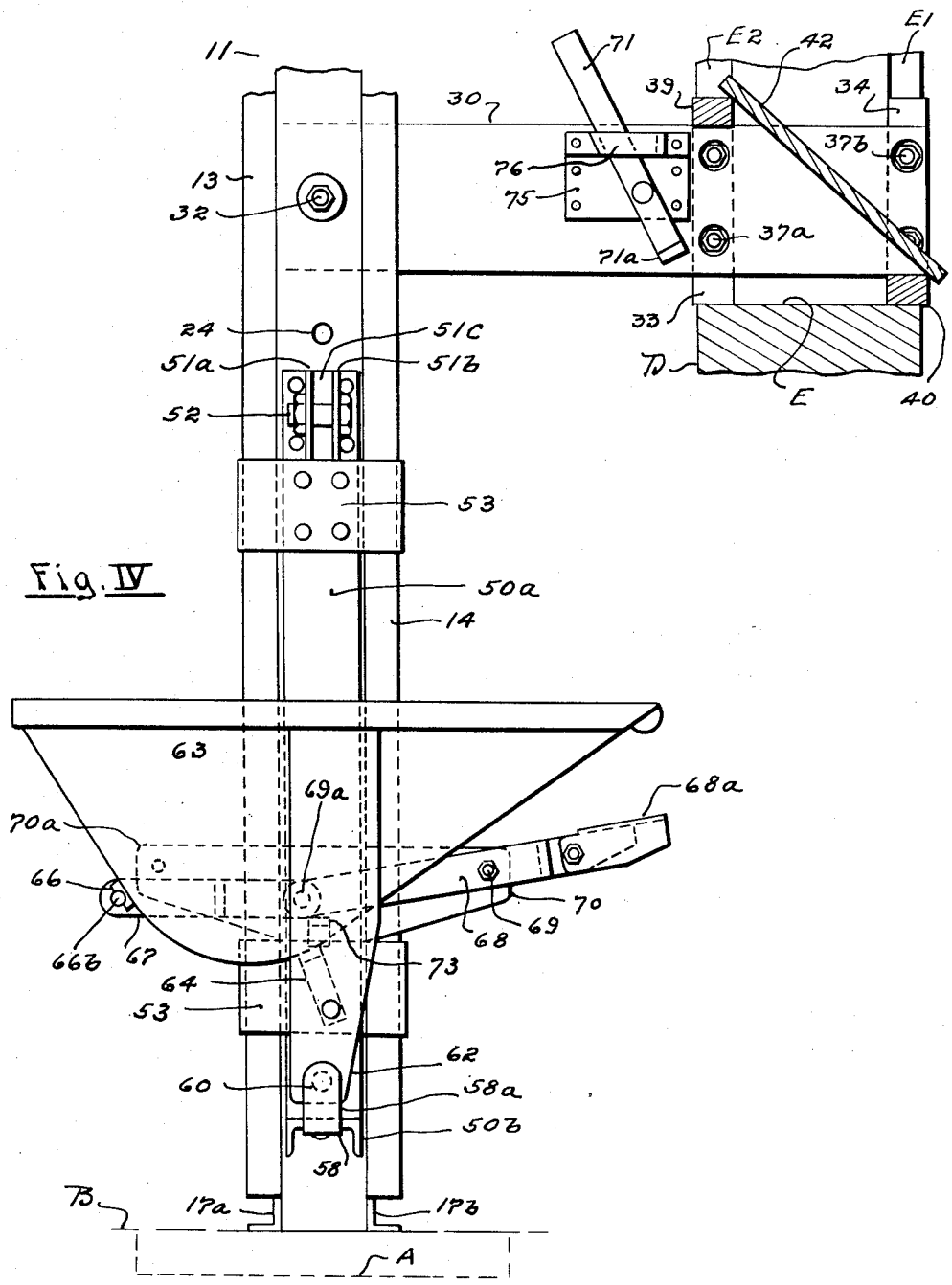


Fig. IV

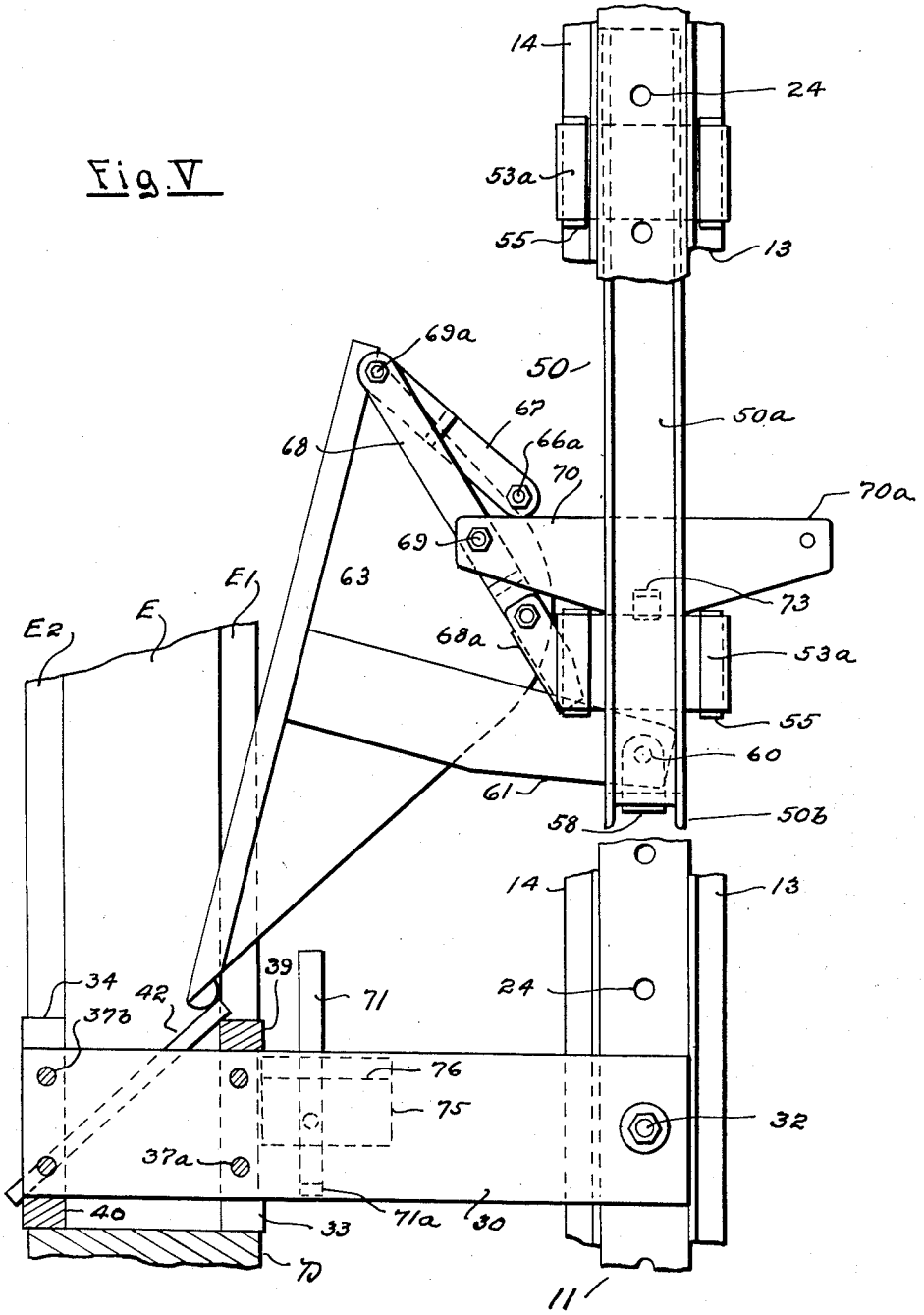
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HOISTING APPARATUS

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Fig. V



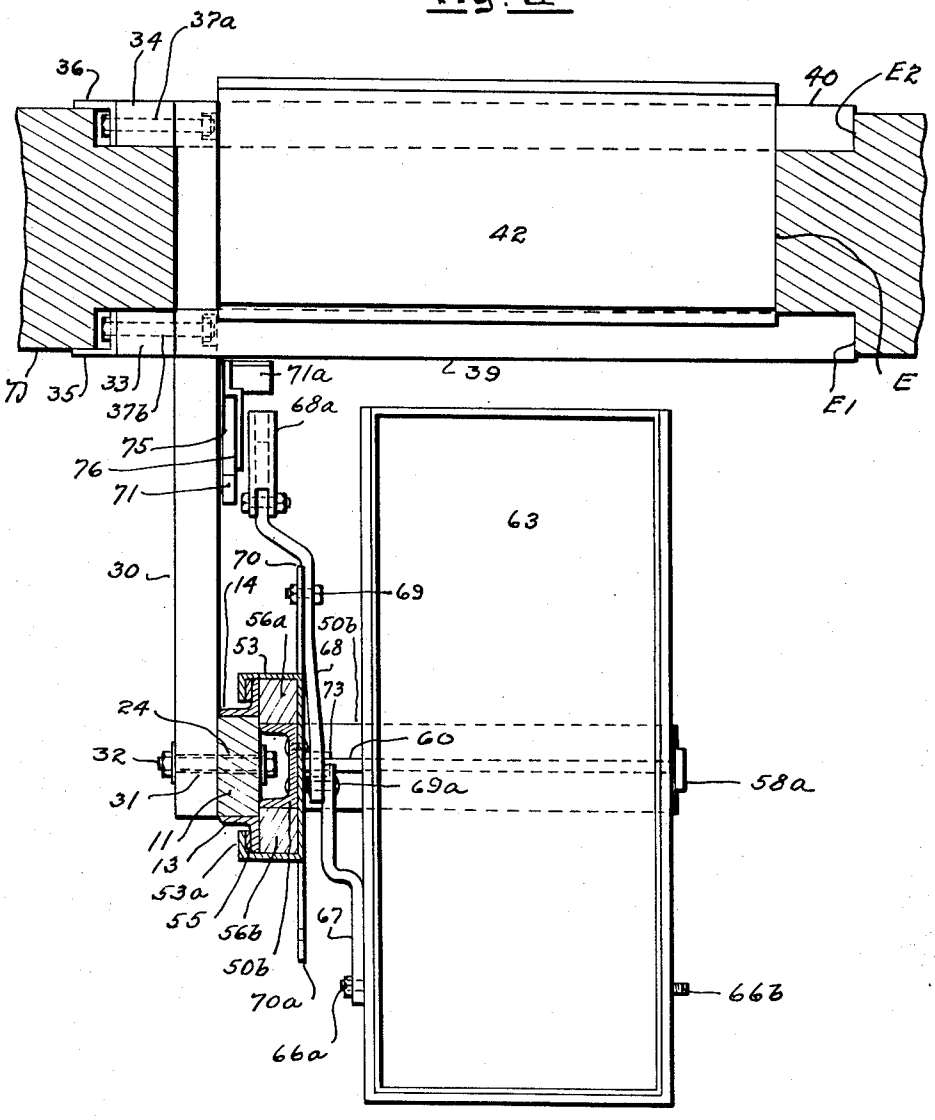
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Fig. VI



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HOISTING APPARATUS

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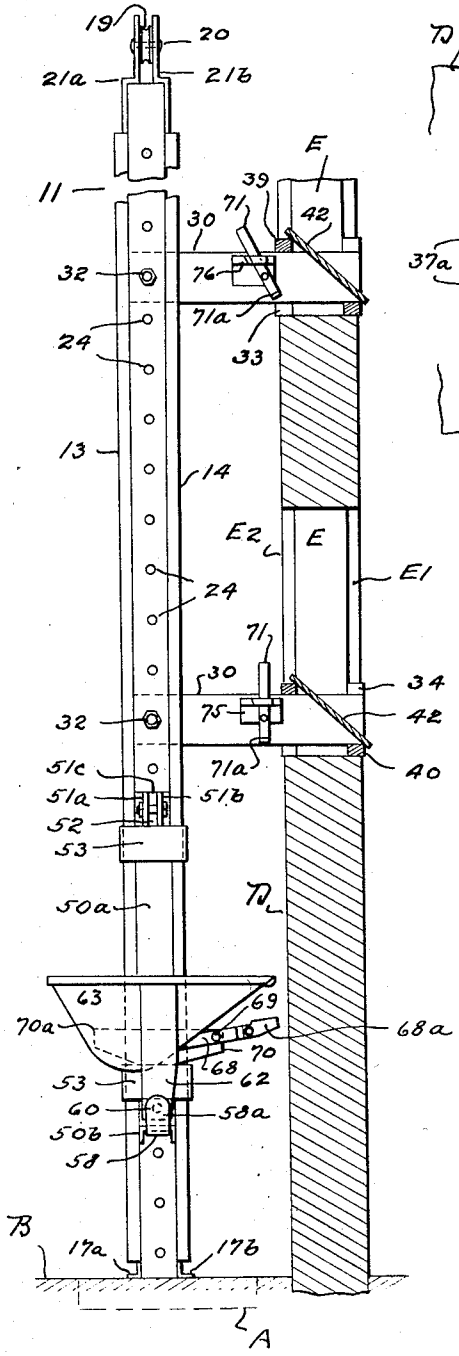


Fig. VII

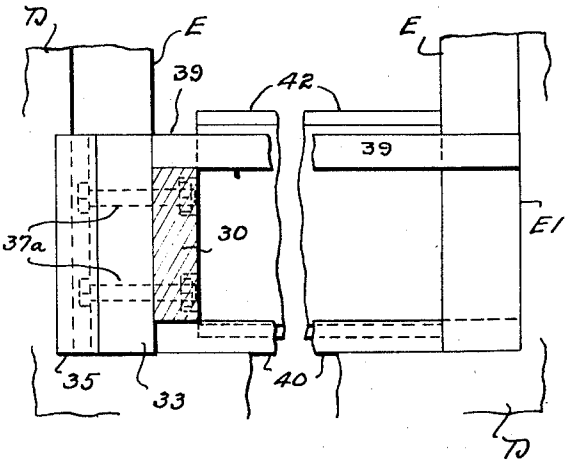


Fig. VIII

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UNITED STATES PATENT OFFICE

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HOISTING APPARATUS

Application filed October 3, 1928. Serial No. 309,956.

The present invention has reference to hoists placed on the outside of a building, and it relates more especially to a bucket elevator for handling concrete, plaster and the like.

Primarily the object of this invention is to produce an improved apparatus of the class aforesaid, particularly adapted for buildings of medium height and capable of raising from the ground, a bucket load of material and to deliver the same automatically through a window opening at a desired level.

A secondary object is to provide an apparatus of the nature mentioned wherein a carrier for the material containing bucket is guided along a solitary mast or upright, and arranged to leave free access to the bucket from two sides thereof.

Another object is the provision in an apparatus of the type set forth of single braces reaching out from one side of a window opening at each floor level, for holding the upright guide in vertically aligned position.

A further object is the production of an apparatus of the character disclosed having cooperating tripping devices respectively connected up with the bucket carrier and the mast holding braces, the arrangement being such as to cause the device on the carrier to tip the bucket for discharging its contents thru selective window openings.

A special object is to supply an apparatus of the kind referred to, which shall be reversible in order that the mast, braces, and the bucket with its tipping device may be placed along either side of a vertical row of window openings and the hoisting cable conveniently led in one direction or another away from the mast.

A general object is to furnish an apparatus for the purpose stated, which shall be composed of few, simple and light, but strong parts; quickly erected or taken down; convenient and efficient to operate; durable and easily maintained in working order, and capable besides, of being economically manufactured.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists of the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims and illustrated on the annexed drawings, wherein like parts are designated by the same reference characters throughout the several views.

A practical embodiment of the invention is illustrated on the drawings hereto annexed and wherein

Figure I is a front view of this improved hoisting apparatus, parts being omitted;

Fig. II is a fragmentary side view of the upper portion of Fig. I, looking from right to left thereof;

Fig. III is a fragmentary side view of the middle portion of Fig. I, looking from the right to the left thereof, parts being omitted;

Fig. IV is a fragmentary side view of the lower portion of Fig. I, looking from the right towards the left thereof, certain parts being shown in section and other parts omitted;

Fig. V is also a fragmentary side view of the lower portion of Fig. I, but looking from left to right thereof, parts being shown in changed position;

Fig. VI is a plan view partly in section and looking down from the top of Fig. I, certain parts being left out;

Fig. VII is a side view corresponding to Fig. IV, on a reduced scale, showing a greater portion of the structure; and

Fig. VIII is an elevation of the parts shown at the upper right hand portion of Fig. IV, looking from left to right thereof.

Generally described, the invention under consideration, includes in its organization, a single upright that is disposed in parallel spaced relation with respect to one side of the window openings thru a building wall. Braces which engage the sides of the walls adjacent the windows, reach therefrom to the mast and serve to hold the same in upright position. Means interposed between the oppositely located sides of the window openings and the inner ends of the braces, retain the last named elements in place. A carrier to which is pivoted a tipping bucket is slid-

ably guided along the mast on which are also mounted sheaves for the cable that leads to the hoist and controls the travel of the carrier. A linkage jointedly connecting the latter with the bucket locks the same from tipping. Trips sustained from the braces are capable of being set to release the linkage and thereby cause dumping of the bucket at a predetermined level. A chute supported upon the brace retaining means delivers the contents dumped thereon from the bucket thru the window opening selected therefor.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in the one and same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, upon becoming conversant with the details thereof, that the same may be incorporated in several different constructions. The accompanying drawings, therefore, are submitted merely as showing the preferred exemplification of the invention.

Referring now to the before mentioned views for a detailed description of this improved hoisting apparatus, the same comprises a mast or upright 11. The latter may be composed of one or more pieces 11^a, 11^b made of stout timbers preferably of rectangular section and joined end to end. This mast is intended to reach a height somewhat above the level of the top window of a six story building which is about the highest structure contemplated to be served by an apparatus of the nature shown on the annexed drawings. To both of the narrower, front and rear sides of mast 11, are fastened as for instance by lag-screws 12, lengths of rails 13, 14, which as shown, may be of angular cross-section, having the legs on one side thereof turned outwardly and disposed flush with the wide, inner and according to Fig. VI, the right hand side of the upright 11.

Upon inspection of Fig. III, it will be observed that at the places division of the mast sections occur, the angle iron rails 13, 14, on one of the sections 11^a, overlap or extend beyond the joint or where the other piece 11^b abuts the one first named. In said Fig. III and also at the lower portion of Fig. I, bolts 15^a, 15^b are illustrated as employed to clamp the rails and the mast sections together. At the meeting or abutting ends of said sections, the first mentioned bolt 15^a which is sustained by the rails 13, 14, a short distance below the lower extremity of the upper section 11^a, is adapted to enter a groove 15^c formed in the upper end of the adjacent lower section 11^b. This is of material import because the shank or body portion of said bolt 15^a, acts as a leader or feeler in finding its way into the crosswise disposed groove 15^c, when the section or mast-piece 11^a is stepped into place on top of the other section 11^b, during the erection of the upright 11. It is comparatively easy after the bolt 15^a has entered the groove 15^c, to push the companion bolt 15^b thru the combined rails 14, 15, and the lower section 11^b, subsequently to which both bolts are tightened up to firmly connect and align the parts 11^a and 11^b. It will be understood that as many joints and sections of the mast are used, as are needed to build it up to the required height. By virtue of the sectional features of the mast, taken in conjunction with the ease with which coupling together of is joints can be effected, considerable saving of time is afforded during erection, dismantling, as well as handling thereof incidental to its transportation.

Figs. IV and VII indicate that the foot portion of the mast 11 is provided at opposite sides and at right angles to the rails 13, 14, with clips 17^a, 17^b, consisting of short pieces of angle iron. Spikes or lag-screws (not shown) are driven thru holes in these clips into an underlying heavy piece of timber, platform A, or the like, laid upon or set into the ground B, so as to constitute a basal support for the said mast.

Surmounting the upper extremity of mast 11, is a rope-sheave 19 which is revolvably supported on a pin 20 carried across the top portions of a frame, composed of similar but reversely disposed members 21^a, 21^b. The lower extremities of these members which terminate above the upper ends of rails 13, 14, clasp around the same sides of the mast, as the rails, being held thereto, as for instance by thru bolts 22 (see Figs. I and II). Upon inspection of the various views on the accompanying drawings, it will be perceived that the mast therein represented, is furnished with a series of spaced apart apertures 24, aligned in a vertical row centrally thru the mast's thinner part. Or, stated in other words, the apertures referred to, are disposed at right angles to the plane in which the sidewise projecting free legs of the angular rails are situated. One of the purposes of apertures 24 is to receive bolts 25 by means of which a bracket 26 is affixed to the wider, rear or outer face of the mast 11. A double jawed arm 27 is pivotally connected by its inner end to bracket 26, in such a manner as to have a lateral swinging movement therefrom. Between the jaws of arm 27 is carried a pin 28 whereon is revolubly mounted a sheave 29. The hoisting cable indicated by broken or dot-and-dash lines in Fig. I, bears the reference letters C^1, C^2, C^3, C^4 and C^5 so as to be easily traceable. The swivelable arrangement of the sheave carrying arm, enables the hoist (rope-winding drum and prime-mover, not shown) to be placed in any suitable position relatively to the mast, and

the cable led to sheave 29 from a point where most convenient.

In the various views, the reference letter D denotes the outside face of a building wall, and E window openings therein at different levels or stories. From one side of these openings, shown on the drawings as being the one on the left, braces 30 reach out to meet the mast 11, for which a relatively heavy plank or piece of lumber may be employed. By way of suitable openings 31, bored transversely across the outer ends of these braces, one for each brace or outrigger as the same may also be termed, are passed bolts 32, as well as thru those of the apertures 24 in the mast which happen to be in nearest alignment therewith. It is a comparatively easy matter, in order to bring the aforementioned openings and apertures into register, to block or shim up the inner or window engaging ends of the braces. To the last named ends of said braces, are attached cleats 33, 34, and to the outer faces of the same, clips 35, 36, which are coextensive therewith, respectively. The clips just above referred to, may conveniently consist of short lengths of angle iron having one set of their legs turned outwardly so as to take around the inner and outer faces of the wall adjacent a window opening, thus locating the braces with respect to the building wall, and consequently also maintaining the mast in alignment therewith. It can clearly be seen from Figs. IV and VIII, that the cleats spoken of, are somewhat longer than the depth of the braces, being held thereto by means of bolts 37^a, 37^b, passing thru the clips 33, 34 as well, to secure them to the said cleats.

The means for retaining the mast holding braces in their assigned positions within the window openings, comprise preferably, pairs of struts 39, 40, of substantially equal lengths. Said struts are disposed in diagonal offset relation with respect to the braces 30 and the opposed inner sides of the openings E. As will be observed from Figs. IV, VI and VIII, each of the struts 39 is interposed between an outer cleat 33 on top of one of the braces, and the usual exterior offset E^1 formed in walls on the outside, adjacent to a window opening. The other strut 40 extends intermediate the inner cleat 34, underneath the same brace, and an interior offset E^2 ordinarily occurring in walls on the inside, in proximity to the window opening. Both struts are forced, as by driving or hammering them into their respective places, so as to preclude said struts from becoming loose and relieve the crowding or binding action exerted against the braces wherewith they coact. When it is desired to remove the braces 30, incidental to taking down the mast sections 11^a, 11^b, all that is necessary, is to knock the struts 39, 40, from between their abutments, namely, the cleats 33, 34 and the wall offsets E^1, E^2, whereupon the said braces can be readily lifted out, after the bolts 32 have been disconnected therefrom.

At 42 is indicated a plate or a series of boards nailed or otherwise affixed to the vertical and horizontally offset upper and inner corners of the struts 39, 40, so as to obtain a downward inclination from the outside to the interior of the building. The sloping plane thus afforded serves as a chute for material dumped thereon, as will be more fully hereinafter referred to.

Upon the inner, or the side of the mast or upright that faces a vertical plane passing centrally thru the window openings, is slidably mounted a carrier 50 of substantially L-shape formation. In the preferred construction shown, this carrier consists of a one-piece channel-iron, including a vertical portion 50^a, disposed as represented in Figs. IV and VI, in parallelism with the righthand side of the mast 11, and a horizontal outwardly extending leg 50^b. The flanges of said channel are turned towards the mast so as to leave a clearance space therebetween for the heads or nuts of the bolts 32, when carrier 50, passes over them. A pair of arms 51^a, 51^b, spaced apart so as to leave a gap 51^c, intermediately thereof, are secured by rivets or the like, in overhanging relation and in close adjacency to the upper inner extremity of the carrier's vertical web portion 50^a. To a pin or bolt 52 bridging gap 51^c is anchored in any suitable way, the terminal C^5 of the hoisting cable.

From the front face of the channel's web portion, project first sidewise, thence rearwardly, and finally inwardly towards the mast, keepers 53 which are located at fixed distances below the cable-anchorage arms and above the carrier leg 50^b, respectively. The inwardly bent portions of these keepers, designated 53^a, are arranged to overlie the outwardly turned legs of the angle iron rails 13, 14, and lodged between the opposed faces of said rail legs and said portions 53^a, are gibs 55 attached to the latter, which gibs may be exchanged for new ones when worn out. The last named portions of the keepers prevent disassociation of the carrier 50 relatively to the mast rail guides 13, 14. Wooden blocks 56^a, 56^b, saturated with oil, are inserted into the interstices between the angular guides 13—14, the channel flanges of the carrier vertical member 50^a, and the outer sides of the keepers 53, being by preference secured to the latter. These blocks not only function as wipers and lubricators, but prevent also the flanges of the portion 50^a from rubbing on the adjacent face of the mast.

It will be noticed with particular reference to Fig. I, that bracket members 57, 58, coact respectively with the top and bottom faces

of the web portion pertaining to the carrier's leg 50[b], being removably held thereto thru the agency of bolts 59. In ears 57[a] rising from opposite extremities of bracket 57, is supported a rod 60. A single ear 58[a] formed with the outer end of the other member 58, holds rod 60 from shifting axially.

Upon said rod 60 is hinged the lower lobe-like terminals of straps 61, 62, fastened to the flat, longitudinal sides of a scoop-shaped bucket 63. For the purpose of imparting rigidity to the aforesaid straps, they are tied to the bottom of bucket 63, by an inverted bail-like brace 64. The inner, or the side of this bucket which faces the window openings, is formed on the order of a straight nosed spout. To the opposite, transverse and curved side of the bucket, turned outwardly or away from the wall, is secured at a level about two-thirds down from the top of said bucket, a bar 66, having screw-threaded shanks 66[a], 66[b], at the extremities thereof. At such times as the bucket is used in conjunction with a mast disposed at the left hand side of a row of vertically aligned window openings, as shown, shank 66[a], at the corresponding side of the said bucket, has hingedly connected thereto, one terminal of a link 67. The latter has a similar connection with the adjacent end of a lever 68 pivoted at 69 intermediate its extremities, to the inner branch of a double armed support 70, affixed to the carrier's member 50[a], directly above the lower one of the keepers 53. The middle portion of link 67 as well as the inner extremity of lever 68, i. e. the part thereof which reaches inwardly towards the wall D, are both offset laterally in order to bring these elements in close adjacency, respectively to the upright member 50[a] of the carrier, and to the vertical plane wherein the mast-braces 30 are situated (Fig. VI). Swivelly attached to the mast facing sides of the last named elements, in proximity to the window engaging ends thereof, are trips 71. Each one of these trips can be swung independently of the others so as to bring a toe 71[a] wherewith the lowermost extremity thereof is provided, into or out of the path of the free terminal of the lever 68, when the same travels past one or the other of the trips, incidental to hoisting or lowering of the carrier 50 and the thereon mounted bucket 63.

As seen most advantageously from Figs. IV and VI, there is hinged to the free end of said lever 68, a latch-like extension 68[a], which is so constructed and arranged as to remain rigid with the said lever when it encounters an obstruction, namely, toe 71[a], during upward travel of the bucket carrier. But which, at such times as the latter is lowered, will permit the latch in striking the toe mentioned, to yield or fold upwardly, enabling the lever 68 to idly or unaffectedly pass by. The overweighted condition of latch 68[a] causes the same to immediately resume its normal alignment with the said lever, as soon as the former has passed the obstruction referred to. Obviously, if the toe 71[a] is placed in non-tripping position, i. e., swung out of reach of the latch 68[a], the last mentioned instrumentality will remain inoperative while the carrier is moved either up or down.

At such times, as one of the elements 71 is placed in tripping position, as indicated in Fig. V and also at the middle portion of Fig. VIII, the bucket 63 is timed to tip over and discharge its contents upon the chute 42. The operator in charge of the hoisting motor or engine, naturally stops and holds the latter as soon as the bucket arrives at the position depicted by Fig. V, to permit the material contained in the bucket to flow out, as well as to enable a workman stationed at the window opening, thru which the delivery takes place, to scrape out, if necessary, such of the plaster or concrete that may adhere to the bucket's interior. Upon being lowered, the inner or spout pointed end of the bucket, in striking against the top strut 39, swings the bucket back into horizontal position. And, after the bucket rests on or near the surface of the ground (Fig. IV), the person who does the charging, sees to it that the bucket is locked in the level position thereof, represented by the figure last referred to. It will also be noticed from this figure, that a bolt 69[a] which affords a toggle joint and couples the adjoining extremities of link 67 and lever 68, stands below the other pivotal connections 66[a] and 69, thus locking the joint mentioned until the same is positively raised by depressing the latched end of the said lever 68. In order to limit the drop of the toggle joint, there is provided beneath the same, a clip 73 which is secured to the front or inner face of the carrier's upright member 50[a], and whereon rests the adjacent end of the lever 68 when in its lowermost position. Even if the location of mast 11 is reversed, from the one illustrated, that is, disposed on the right hand side of the window openings, with the lever 68 fulcrumed at the other or opposite arm 70[a] of the support 70, the said lever 68 will in its depressed position contact with clip 73.

As represented in the upper right hand portion of Fig. IV, the trip lever 71, instead of being fulcrumed direct to the wooden brace 30, can advantageously be pivotally mounted on a plate 75 which is secured to the window facing or deeper side of the said mast brace. The portion of the trip lever that is oscillatable above its pivotal centre, by preference, is guided by a strap 76 overlying the same and having the ends thereof fastened to said plate 75. This strap may be arranged to bear frictionally on the side

of the trip-lever so as to retain the latter in adjusted position.

From the foregoing it will be understood that a light, easily put-up hoisting apparatus is produced. With such an apparatus the different floors of medium high buildings can conveniently be served from the outside to deliver thru the various, aligned window or other openings therein, small quantities at one time, of plaster, sand, cement and the like, required for the interior finishing of the structure during completion of its erection. By reason of the fact that the hoisting bucket has two of its adjacent sides exposed or unobstructed, the ready mixed or dry plaster, or cement or mortar can be quickly filled into the bucket by the attending workmen either by hand shovelling or direct from a mixing machine. The raising, dumping and returning of the bucket to charging position, can be accomplished in but a few seconds of time, by the one man in control of the hoisting engine, thus effecting a great saving of time and reducing the cost of handling material to a minimum. The apparatus hereinbefore described, is designed for rapid dismantling and transportation from one building job to another and is therefore made in sections, comparatively light in weight and of small size for convenience of carrying by a couple of men. The component parts of the mast and braces are proportioned for ample strength and durability for the maximum loads contemplated to be imposed thereon. The mere swinging of a tripping lever from inclined to straight position will cause the bucket to deposit its charge at a predetermined floor level.

While a certain preferred embodiment of this device has been shown and described, it will be understood that changes in the form, arrangements, proportions, sizes and details thereof may be made, without departing from the scope of the invention as defined by the appended claims.

Having described my invention, what I desire to secure by Letters Patent and claim is:—

1. A hoisting apparatus for use with buildings under erection including a sectional mast disposed adjacent and parallel to a wall of the building having window openings therein, guides fastened to said mast serving to hold the sections thereof together, an element slidable along said guides, braces extending from the mast to one side of said openings, and means interposed between the other side of the latter and said braces keeping the same in their assigned positions.

2. A hoisting apparatus including a sectional mast, guideways along the sides thereof, and bolts extending between said guideways and thru the sections of said mast, an end of each of said sections having a groove adapted to receive one of said bolts, the latter assisting in aligning the sections.

3. A hoisting apparatus for use with buildings under erection including a sectional mast disposed adjacent and parallel to a wall of the building having window openings therein, said mast being of rectangular cross-section, guides secured to the opposed narrow sides of the mast holding its sections aligned together, an element slidably engaging said guides from one of the mast's wider faces, braces extending from the latter's other face to one side of said openings, and means coacting with the opposite side of the window openings and said braces anchoring the same in position.

4. A hoisting apparatus for use with buildings under erection including a mast disposed adjacent and parallel to a wall in the building having window openings therein, said mast being composed of separate elements rectangular in cross-section, guideways arranged on both of the narrow sides of the mast, bolts extending intermediately of said guideways and thru said elements fastening the same together, each of the latter having an end thereof provided with a groove adapted to receive one of said bolts to assist in aligning the said sections, an element slidable along the guideways from one of the wider faces of the mast, braces reaching from the opposite face of the said mast to one side of the window openings, and removable means lodged between the other side of said openings and said braces holding them in their assigned positions.

5. A hoisting apparatus including a mast disposed adjacent and parallel to the wall of a building under erection, angular guides fastened with one set of their legs to the sides of said mast, said guides having the other set of legs flush with the face of the mast at one side thereof, an element slidably engaging the ends and rear faces of said second set of legs.

6. A hoisting apparatus including a mast disposed adjacent and parallel to the wall of a building under erection, guideways composed of angularly arranged legs fastened to said mast, said guideways having one set of legs flush with the face of the mast at one side, an element adapted for movement along the said mast having sliding engagement with said set of legs, and gibs interposed between the said legs and said element.

7. A hoisting apparatus for use with buildings under erection including a mast disposed adjacent and parallel to a wall in the building having window openings therein, braces reaching from said mast to said openings, means on said braces engageable with one side of the window openings, and struts extending between said means and the opposite side of the said openings serving to anchor the braces therein.

8. A hoisting apparatus for use with buildings under erection including a mast disposed adjacent and parallel to a wall in the building having window openings therein, braces extending from said mast to said openings, cleats on said braces adapted to engage both faces of the wall at one side of the window openings, and struts interposed between said cleats and the opposite side of the said openings capable of holding the braces in their assigned positions therein.

9. A hoisting apparatus for use with buildings under erection including a mast disposed adjacent and parallel to a wall in the building having window openings therein, braces reaching out from the latter to said mast, cleats on said braces spaced to engage the outer and inner faces of the wall at one side of said openings, struts arranged in horizontal and vertical offset relation one to the other intermediately of said cleats and the opposite side of the window openings, and means tying said struts laterally together extending on a downward slope across the same.

10. A hoisting apparatus for use with buildings under erection including a single mast disposed adjacent and parallel to a wall of the building having an opening therein, a brace extending from the latter to said mast, cleats on said brace spaced to engage the outer and inner faces of the wall at one side of said opening, clips constituting extensions to said cleats fastened to the far sides thereof, a strut jammed between the near side at the top of the outer cleat and the opposite side of the opening, another strut forced intermediate the same side at the bottom of the inner cleat and said opposite side of the said opening, and means lodged on said struts in an inwardly downward inclination serving to protect and tie them together.

11. A hoisting apparatus including a sectional mast disposed adjacent and parallel to the wall of a building under erection, an element capable of slidably engaging said mast, and guides fastened to the inner and outer sides of the latter relative to the building wall, said guides serving to hold the mast sections together and to guide said element therealong.

12. A hoisting apparatus for use with buildings under erection including a single mast disposed adjacent and parallel to a wall of the building having window openings therein, said mast being formed with apertures spaced thruout its height, braces reaching out from a side of said openings to one face of the mast, said braces being provided with holes capable of registering with one or the other of said apertures, and bolts passing thru the latter and said holes serving to anchor the braces to the said mast.

13. A hoisting apparatus for use with buildings under erection including a single mast disposed adjacent and parallel to a wall of the building having window openings therein, said mast being of rectangular cross-section and provided with apertures spaced thru the wider faces thereof, braces extending from one of said faces to said openings, said braces being formed with holes adapted to register with one or the other of said apertures, bolts entered by way of the latter and said holes fastening the braces to the mast, a swivel-block carrying-bracket engageable with the mast's opposite face, said bracket having orifices alignable with the apertures, and other bolts passed thru the same and said orifices securing the bracket to the said mast.

14. A hoisting apparatus for use with buildings under erection including a single mast disposed adjacent and parallel to a wall of the building, said mast being substantially rectangular in cross-section, guides fastened to its narrow sides, an element slidable along said guides, braces extending from the building wall to the mast's other face, a hoisting-rope sheave disposed substantially central over the mast, and members surmounting the top of the said mast secured to the same sides thereof as the guides serving to support said sheave.

15. A hoisting apparatus for use with buildings under erection including a mast disposed adjacent to one side of an opening in a wall of the building, guideways on the far and near sides of said mast relative to said wall, an element slidably engaging said guideways and means for tying the mast to the building, said means having opposite faces thereof in apposition respectively to said one side of said wall opening and to one side of the mast.

16. A hoisting apparatus for use with buildings under erection including a mast disposed in close adjacency to one side of a window opening in a wall of the building, guides on opposite sides of said mast, an element slidably engaging said guides, and braces extending from the mast to said side of the window opening leaving the front of said opening unobstructed, each of said braces having a face at the inner end and an opposite face at the outer end thereof in apposition to said one side of said opening and to the mast, respectively.

17. A hoisting apparatus for use with buildings under erection including a mast disposed along one side of the opening in the wall of the building, guides at the far and near sides of said mast relative to said wall, an element slidably engaging said guides, a brace having a face thereof at the inner end and an opposite face at the outer end thereof in apposition to said one side of said opening and to the mast, respectively, and means above and below said brace for securing the same in the said window opening.

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