

Dec. 1, 1931.

C. G. SCHMID

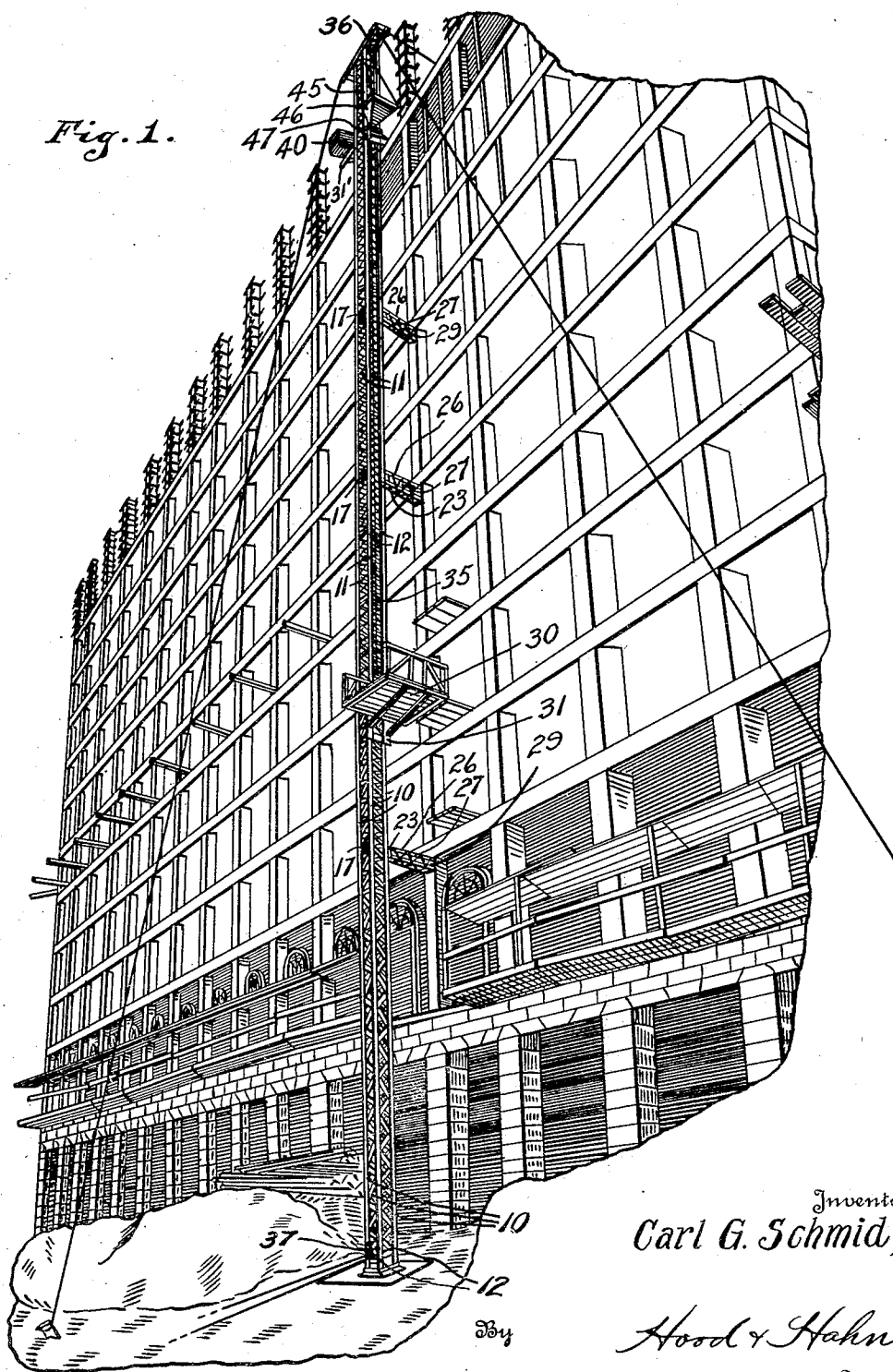
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MAST HOIST

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5 Sheets-Sheet 1

Fig. 1.



Inventor
Carl G. Schmid,

Hood & Hahn,

Attorneys

Dec. 1, 1931.

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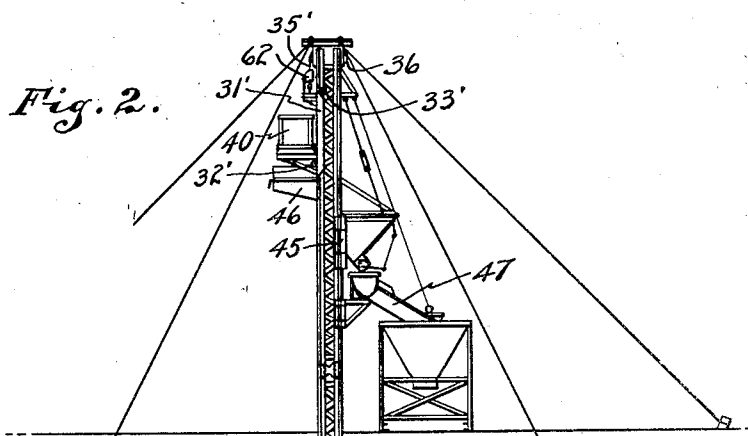


Fig. 11.

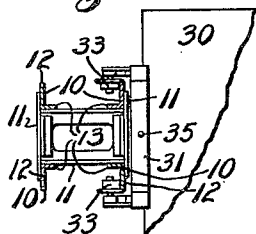


Fig. 12.

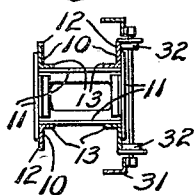
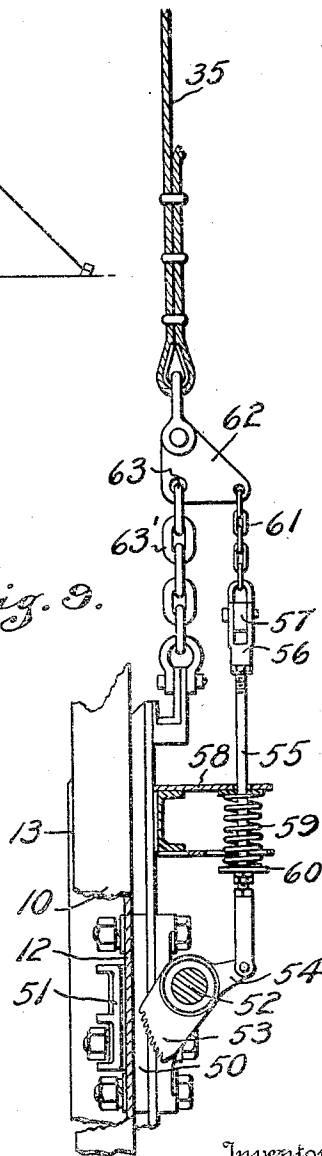


Fig. 9.



Inventor

Carl G. Schmid,

Hood & Hahn.

Attorneys

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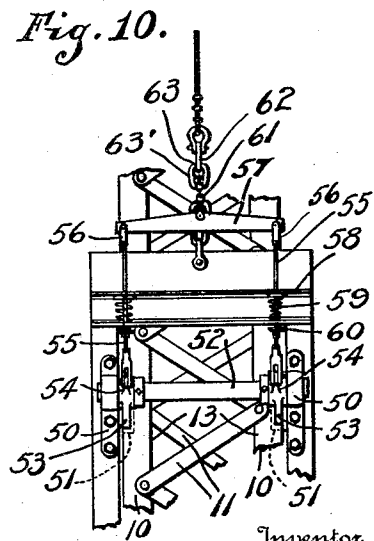
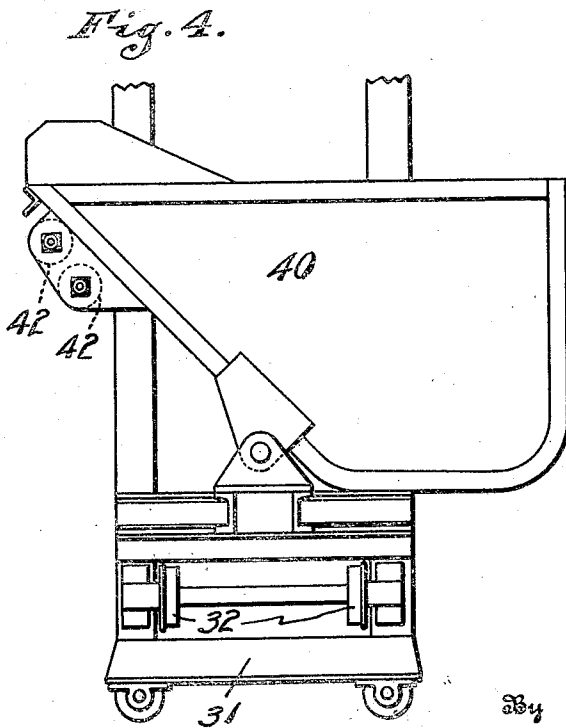
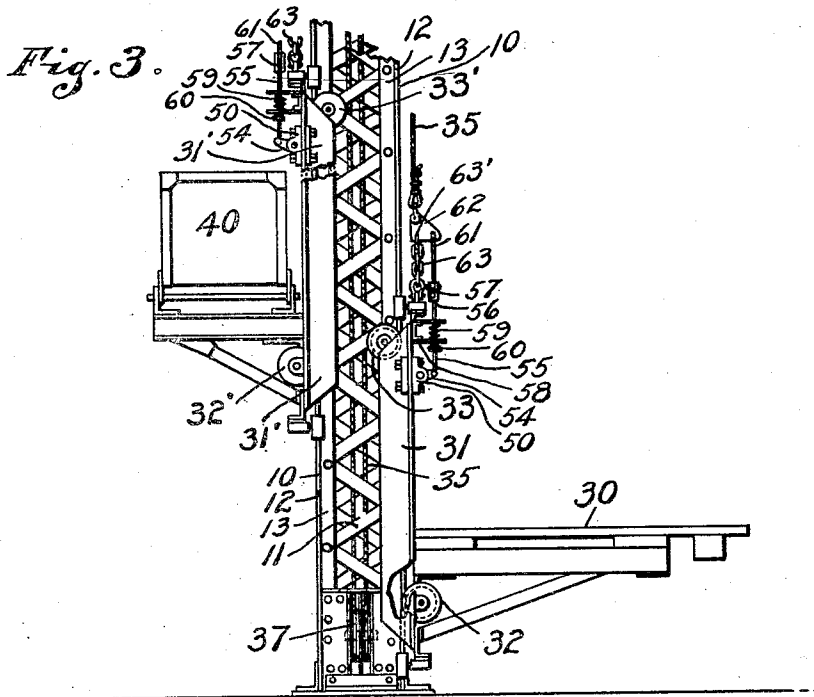
C. G. SCHMID

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Inventor
Carl G. Schmid,

Hood & Hahn.

Attorneys

Dec. 1, 1931.

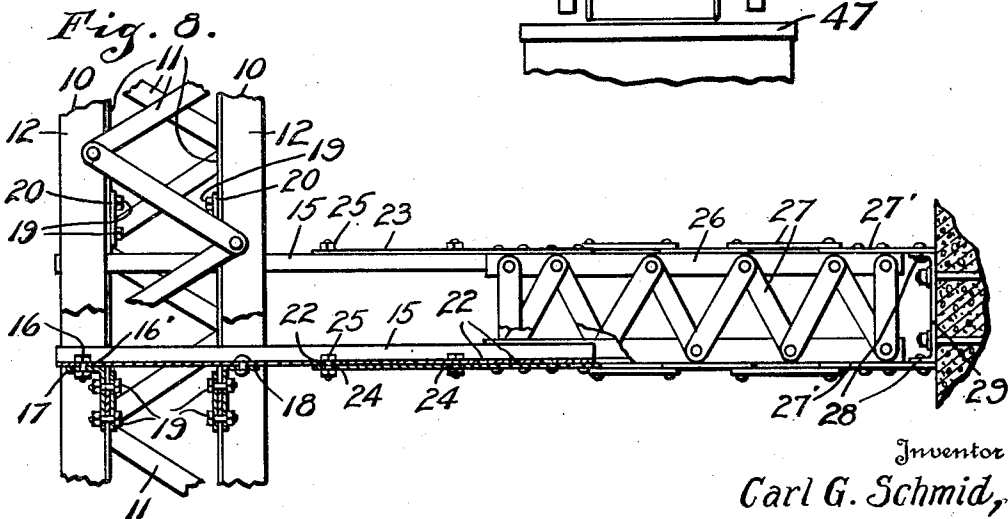
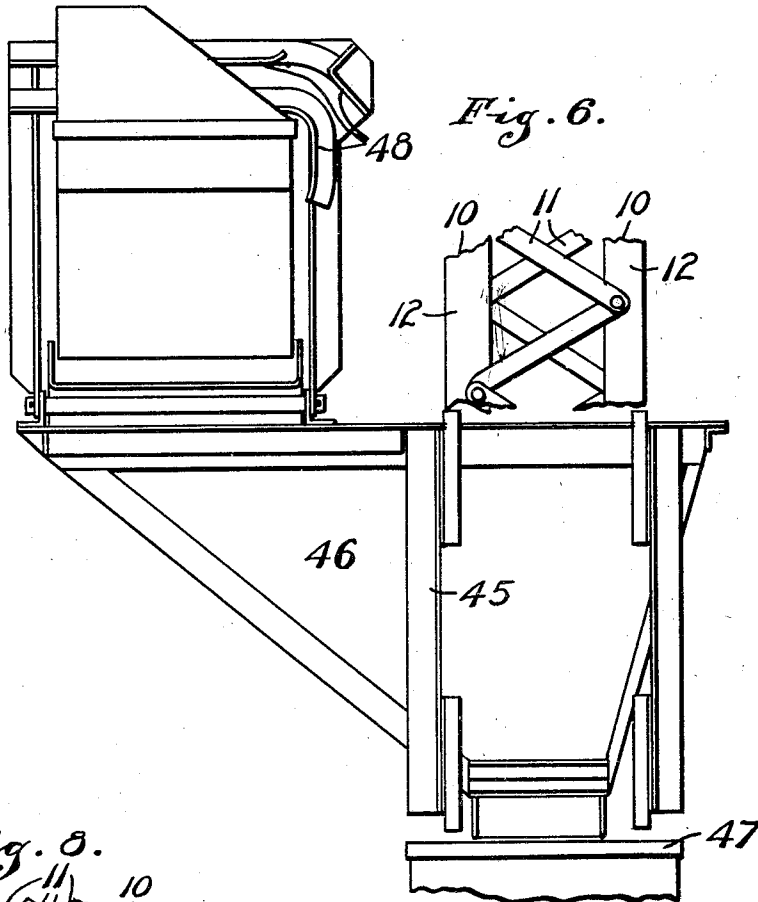
C. G. SCHMID

1,834,652

MAST HOIST

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Inventor
Carl G. Schmid,

334

Hood & Hehn.

Attorneys

Dec. 1, 1931.

C. G. SCHMID

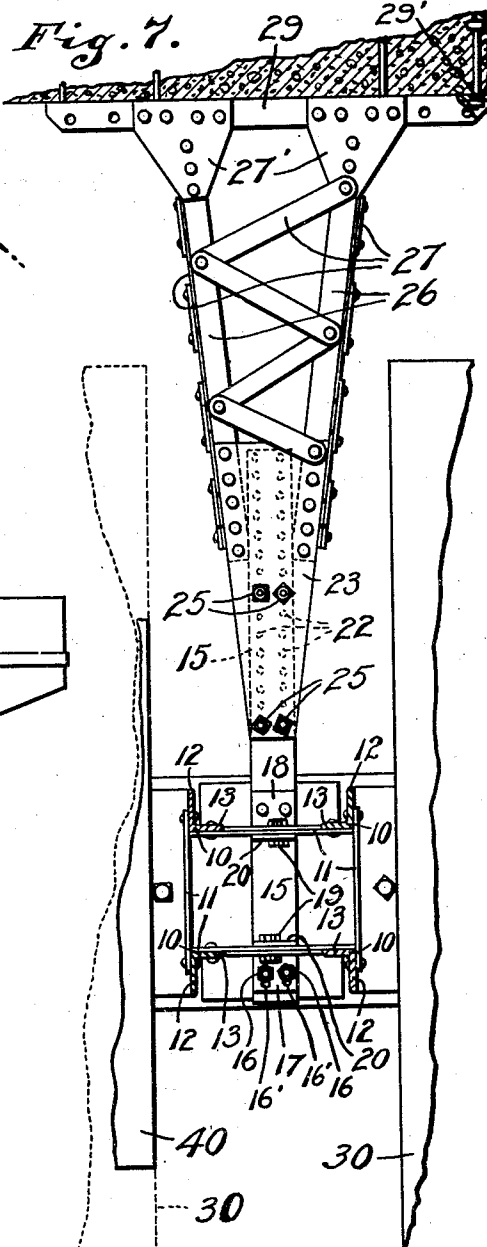
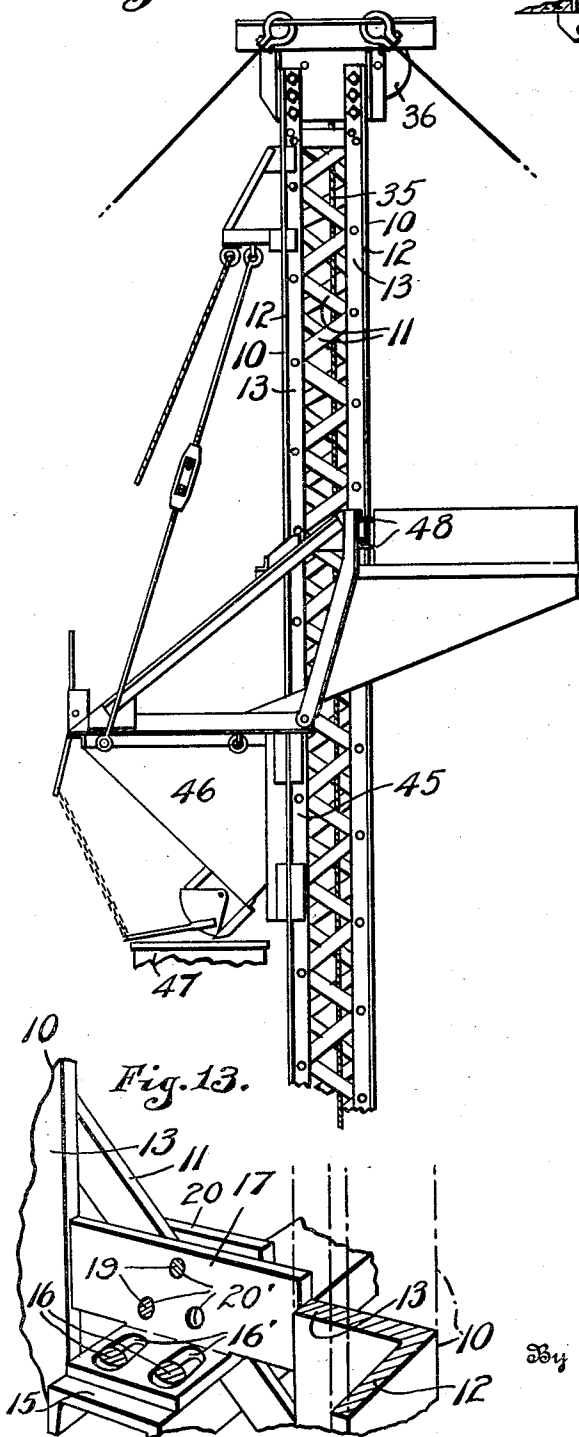
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Fig. 5.



Inventor
Carl G. Schmid,

Hood & Hahn.

Attorneys

UNITED STATES PATENT OFFICE

CARL G. SCHMID, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO INSLEY MANUFACTURING COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA

MAST HOIST

Application filed December 12, 1927. Serial No. 239,381.

The object of my invention is to produce a mast hoist of such character as to be capable of use in conjunction with a building, under course of fabrication, in handling materials to be used in the course of the fabrication of successive buildings of considerable heights.

By mast hoist I mean a structure which, fundamentally, comprises a mast run-way or guide of comparatively small cross section, in practice in the neighborhood of 18 inches square, upon the exterior of which is slidably mounted one or more material-handling elements.

The accompanying drawings illustrate my invention.

Fig. 1 is a perspective view of my improved apparatus in conjunction with a building under course of fabrication.

Fig. 2 is a front elevation.

Fig. 3, a front elevation of the lower end of the structure showing two material-handling elements.

Fig. 4, a side elevation of a dumping bucket forming a material-elevating element of satisfactory character for handling mush concrete as a part of my apparatus.

Fig. 5, an elevation of the upper end of my mast and a vertically slidable hopper structure of a character to receive material automatically from the dumping bucket structure shown in Fig. 4.

Fig. 6, an elevation of the parts shown in Fig. 5 in a plane at right angles thereto.

Fig. 7, a horizontal section, in plan, of a bracing means by which the mast, which would otherwise be laterally too limber, is braced from the building under course of fabrication and also showing in the plan the material-handling elements.

Fig. 8, a side elevation of Fig. 7.

Fig. 9, a side elevation in detail, in partial vertical section, of a safety clutch designed to prevent too rapid dropping of a material-handling element as, for instance, in case of breakage of the hoisting cable.

Fig. 10, an elevation of the parts shown in Fig. 9 in a plane at right angles thereto.

Fig. 11, a section, on line 11—11 of Fig. 2, on a larger scale, and

Fig. 12, a section, on line 12—12 of Fig.

2, on a larger scale, and Fig. 13 a fragmentary detail of the brace clamp.

In the drawings 10, 10, 10, 10, indicate four parallel angle bar members secured together by four series of lattice braces 11 to permit the construction of a mast section of convenient length (in practice about 25 ft.) and of comparatively small cross section, as stated above.

The arms 12 of the angle bars 10 are arranged in pairs in parallel laterally separated vertical planes with their edges projecting beyond the ends of the lattice bars to form two vertical run-ways for receiving and guiding the material-handling elements.

The arms 13 of angle bars 10 are arranged in two pairs in two parallel planes at right angles to the planes of arms 12, the arms 13 of each pair projecting toward each other and spaced from each other in such manner as to permit the insertion, therebetween, of the brace elements.

Each brace comprises a pair of laterally spaced channels 15 perforated with their flanges preferably facing each other. Secured by bolts 16 to the outer faces of the webs of each channel are two short angle sections 17 and 18, the angle section 17 having slotted holes 16' through which the adjacent bolts 16 pass so that there may be a relative adjustment between the two angle sections 17 and 18.

Associated with the upwardly projecting flanges of the angles 17 and 18, which are of proper length to fit between corner posts 10 and perforated at 20' to receive bolts 19, and so spaced that any one of the lattice braces 11 may be straddled by bolts 19 are clamping plates 20 firmly clamped by bolts 19.

In order to adjustably support the channels 15 I provide a base frame comprising the upper and lower plates 23 which, at their outer ends have a width substantially equal to the desired distance between the outer faces of the two channels 15 and at their inner ends are considerably wider. These plates are perforated with two pairs of perforations 24, 24 capable of registry with perforations 22 arranged in two parallel series

in the webs of channels 15 and adapted to receive clamping bolts 25. Secured to the opposite edges of each plate 23 and projecting from the inner end thereof are angle bars 26 which are connected and braced, both horizontally and vertically by lattice bars 27 and connected at their inner ends to the horizontal flanges 28 of a channel 29 by means of plates 27'. The channel 29 forms a footing for the brace structure adapted to be secured to the building in course of erection, most conveniently by bolts embedded in the structure of the building and adapted to be projected through perforations 29' in the web of the channel 29.

By means of a plurality of the brace structure just described the lower sections of the mast may be braced at a desired, and adjustable, distance from the face of the building being fabricated, the channels 15 being projected through the body of the mast between its lattice work and plates 20 clamping the lattice braces 11. By projecting the channels 15 of the brace structure through the mast, the mast is not only firmly supported laterally relative to the building but is also braced against twisting stresses which may be developed by any unbalanced loads carried by the material elevating elements.

For convenience of description, the two faces of the mast which lie at right angles to the building, parallel to the brace structures, will be referred to as the faces of the mast because it is upon these faces that the material elevating elements are slidably mounted.

The precise character of the vertically slidable material-handling elements, or elevators may, of course, be modified as desired in accordance with the character of material to be handled, etc.

Most conveniently, one of these elements should comprise a horizontal platform 30 of sufficient extent to accommodate an ordinary construction wheel barrow and a workman and is supported by a carriage 31 vertically slidably associated with one face of the mast preferably having rollers 32 at its lower end to engage the outer faces of one pair of flanges 12 of corner post 10, and at its upper end rollers 33 engaging the inner faces of said flanges 12. A lifting cable 35 is attached to the upper end of carriage 31 and thence carried upwardly to and over a pulley 36 supported at the upper end of the upper section of the mast, passing thence downwardly to the foot of the mast under a pulley 37 and thence to a hoisting drum.

If desired two of the material-handling structures just described may be provided, one to be mounted upon each face of the mast, the two structures of this character being useful for the rapid handling of building materials especially in the later stages of fabrication of the building.

If the building to be fabricated requires

considerable quantities of plastic, such as mush concrete or fire proofing material, it is desirable in the early stages of building fabrication to provide a material hoisting structure comprising a vertically slidable frame 31' having rollers 32' and 33' and a hoisting cable 35' similar to the parts 31, 32, 33, and 35 respectively and mounted upon this sliding frame is a dumping bucket 40 capable of handling the plastic.

In the drawings I have shown this bucket as a tilting bucket normally held by gravity in load carrying position upon the frame 31' and provided near its mouth with a pair of rollers 42, 42 for a purpose which will appear.

Slidably associated with that face of the mast which is opposite the face upon which the dumping bucket carriage is slidably mounted is a hopper carriage 45 which may be clamped or bolted at any desired elevation near the top of the upper mast section. This carriage 45 carries a hopper structure 46 so formed that its receiving end will be in position to receive material dumped into it from bucket 40 and with a discharge portion so placed as to deliver into the upper end of a chute system 47 by means of which the plastic may be delivered by gravity to desired portions of the building.

Conveniently, the hopper structure, near its receiving end, is provided with a guide 48 adapted to so coact with the rollers 42 that, as the bucket is brought to its upper position said rollers will enter the guide and tilt the bucket to its dumping position and then be capable of leaving the guide during a further upward movement of the bucket carrying frame so that the dumping position of the bucket may be approached at high speed and the bucket carried beyond the dumping position freely, thus avoiding undesirable stresses and avoiding the necessity of careful approach of the bucket to dumping position.

The hopper carrying frame may be raised and lowered either by temporarily attaching one of the hoisting cables 35 or 35' or by providing a separate hoisting cable therefor.

In order to avoid the possibility of an accidental dropping of one of the carriages 31 or 31' I provide the construction shown in Figs. 9 and 10. Carried by each carriage 31 or 31', at a point preferably just below its upper end, at each side is a casting 50 having a finger 51 overlying the inner face of an adjacent flange 12 of a corner post 10. Journalled in the two castings is a cross shaft 52 to which are secured two clutch cams 53, 53 each arranged to cooperate with a finger 51 in such manner as to firmly clamp a flange 12 of a corner post to prevent downward movement of the carriage. Each clamping cam 53 is provided with an arm 54 to which is attached a rod 55 provided at its upper end with an adjustable yoke 56. The two yokes 56 are

connected to an equalizer bar 57 to the middle of which is secured a chain 61 and bell crank 62 pivoted at 63 to a short chain 63' connected to the carriage 31. The hoisting cable 35 is attached to bell crank 62. Surrounding each rod 55 below the upper cross bar 58 of the carriage is a compression spring 59 which at one end abuts the cross bar and at the other end abuts an adjustable collar 60 on rod 55, the arrangement being such that the weight of the carriage, against the supporting cable, will place the spring 59 under compression and hold cams 53 out of engagement with the flanges 12 of the corner posts 10 and such that, upon breakage of the hoisting cable or any sudden and undesirable slackness thereof, springs 59 will drive 53 into engagement with said flanges 12 so that they may bite into the flanges and restrain the carriage from further downward movement.

The apparatus is used in the following manner. The first section of the mast is erected at the desired point and its foot firmly bolted to a suitable foundation. Other sections, one or two, are then erected, in succession and the mast thus formed is temporarily braced by guy wires so placed as not to interfere with the desired vertical movement of the material elevating frames 31 and/or 31' and the hopper frame 45.

As the fabrication of the building progresses the described brace structure will be placed in position at desired intervals and it is then necessary to guy support only the upper section of the mast from its top two of the guy wires conveniently passing to the ground and the other two passing to upper portions of the building structure.

I claim as my invention:

1. A mast hoist comprising a mast of comparatively small cross section composed of corner posts having outwardly projecting flanges forming two pairs of run-ways, a material-handling carriage slidably associated with one pair of said run-ways, a pair of fingers carried by said carriage and overlapping the run-way flanges of adjacent corner posts, a pair of flange gripping cams associated with said fingers, means pivotally supporting said cams on the carriage, an equalizer bar, a hoisting cable attached to said equalizing bar, connections between said equalizing bar and the cams, and means acting upon the cams, in opposition to the hoisting cable, tending to drive said cams into flange engaging positions.

2. The combination with a building under process of fabrication, of a mast of comparatively small cross-section erected alongside said building composed of corner posts connected together by lattice braces, and bracing means for said mast comprising vertically spaced arms extending through said mast and connected to the same fore and aft and a pair of diverging arms connected at one end

to said first mentioned arms, and at their opposite ends to the building.

3. The combination with a building under the process of fabrication, of a mast of comparatively small cross-section erected alongside said building and comprising corner posts connected together by lattice braces, and bracing means for said mast comprising vertically spaced arms extending through said mast and connected to the same fore and aft, and a pair of diverging arms adjustably connected at one end to said first mentioned arms and at their opposite ends to the building.

4. The combination with a building under process of fabrication, of a mast of comparatively cross section erected alongside said building comprising corner posts connected together by lattice braces, and bracing means for said mast comprising vertically spaced arms extending through said mast and connected to the same fore and aft and a pair of diverging arms connected at one end to said first mentioned arms and at their opposite ends to the building, each of said diverging arms comprising a pair of angles connected together by lattice braces and lattice braces for connecting each pair of arms.

In witness whereof, I, CARL G. SCHMID have hereunto set my hand at Indianapolis, Indiana, this 10th day of December, A. D. one thousand nine hundred and twenty seven.

CARL G. SCHMID.