

June 19, 1923.

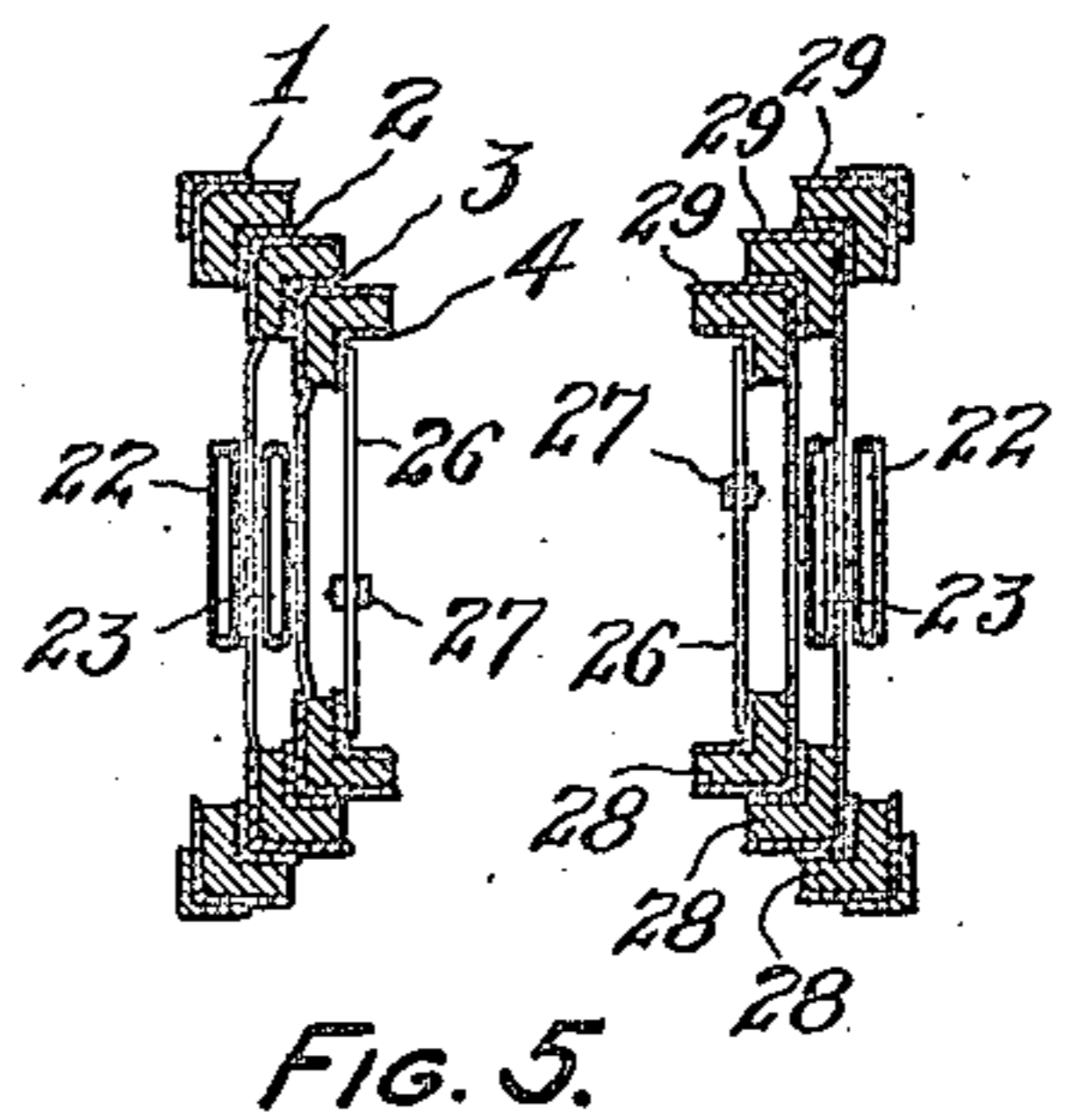
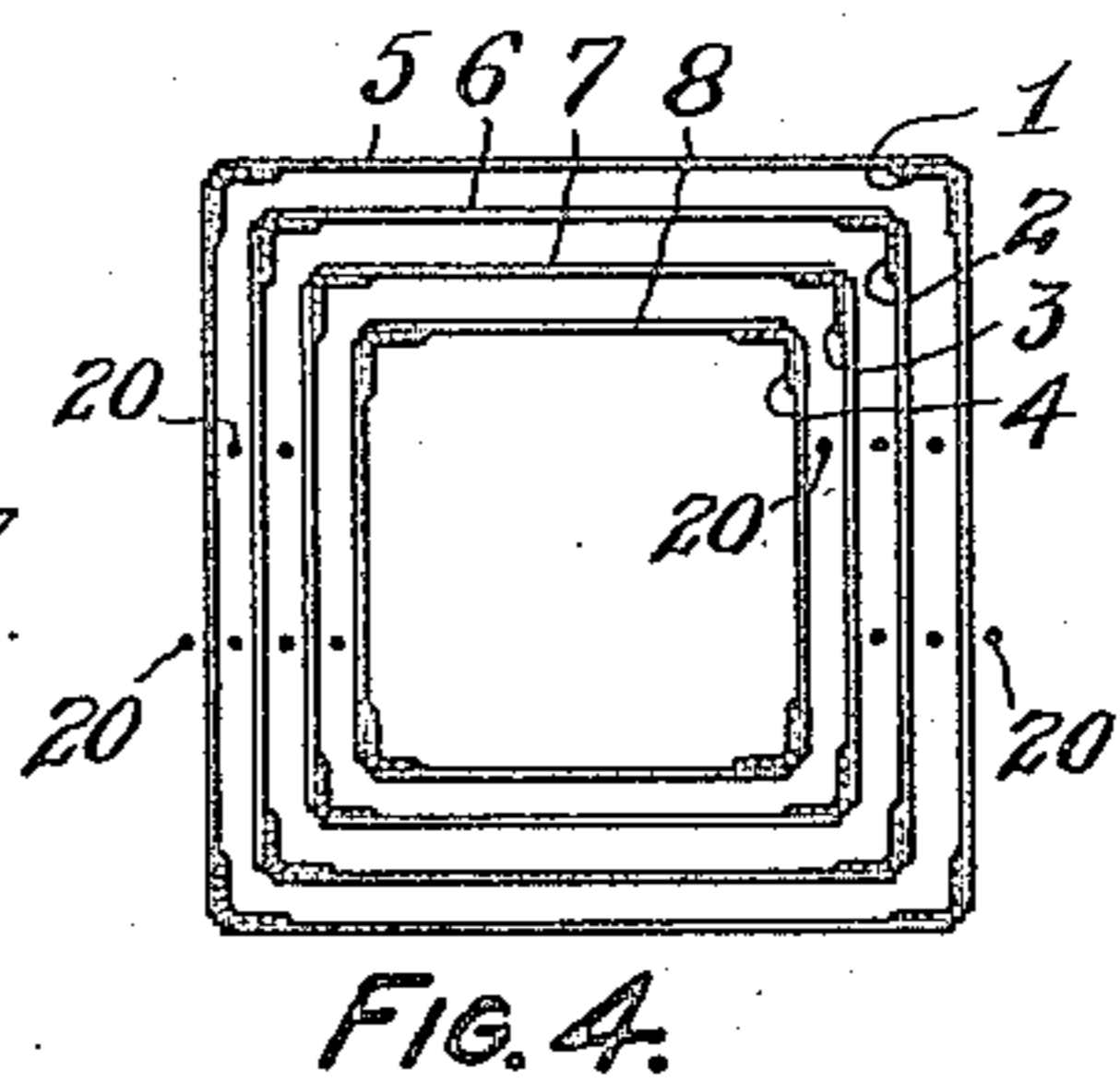
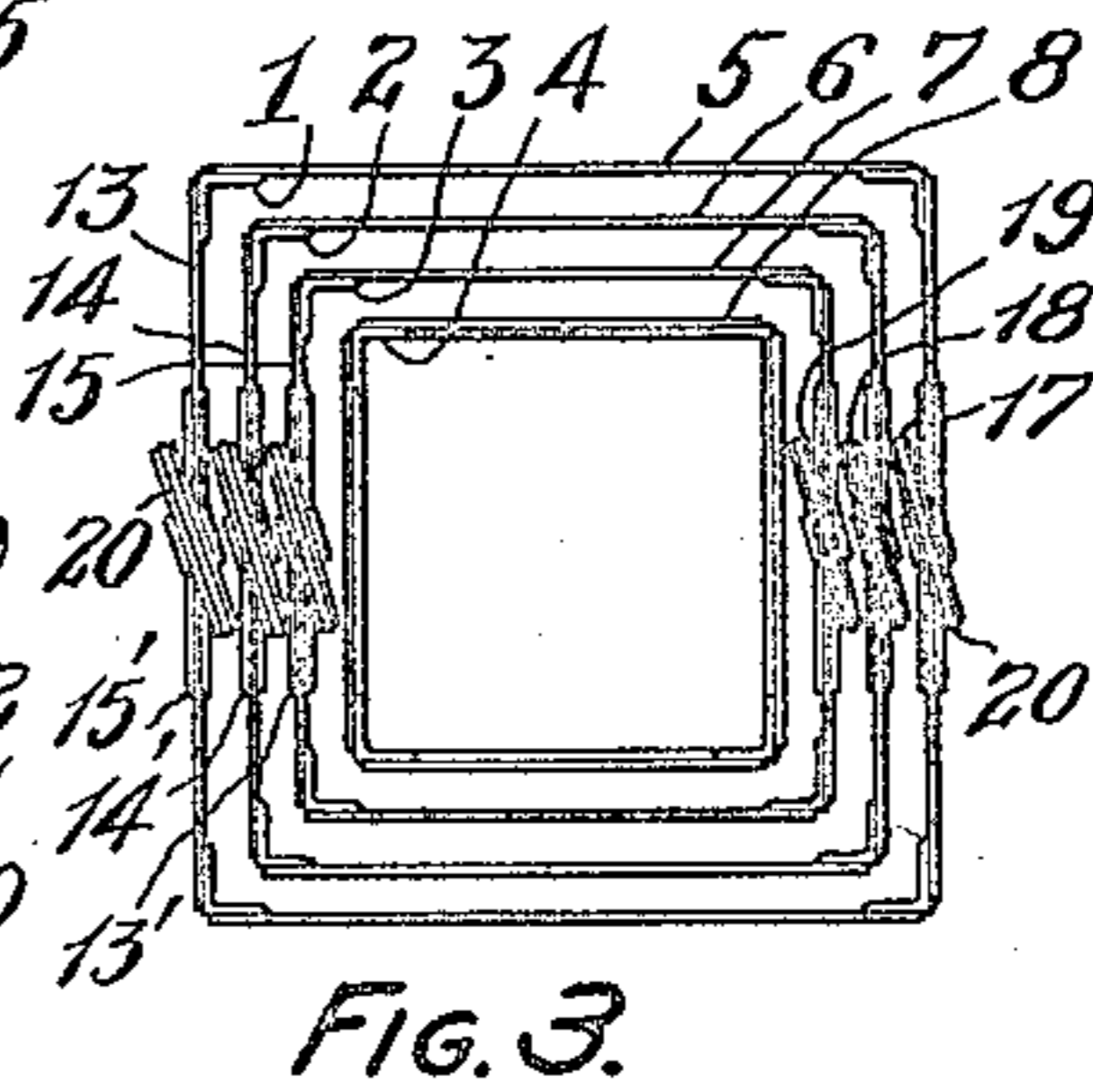
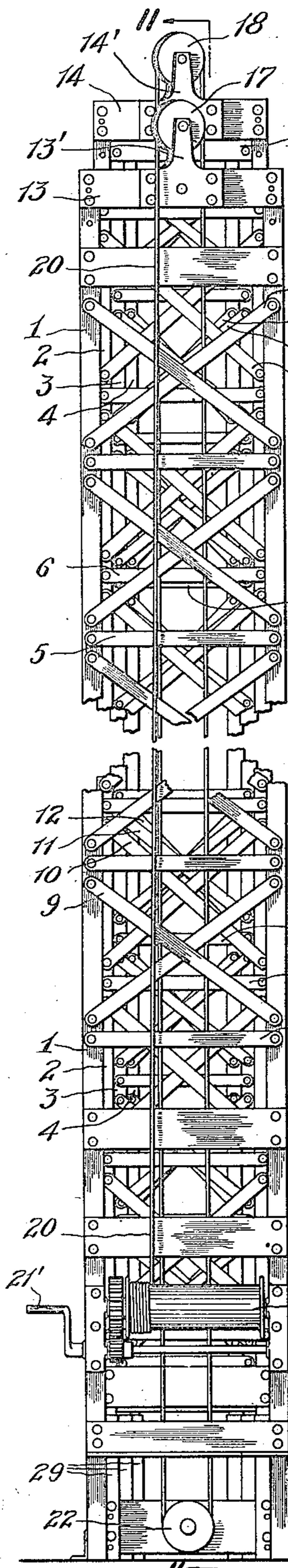
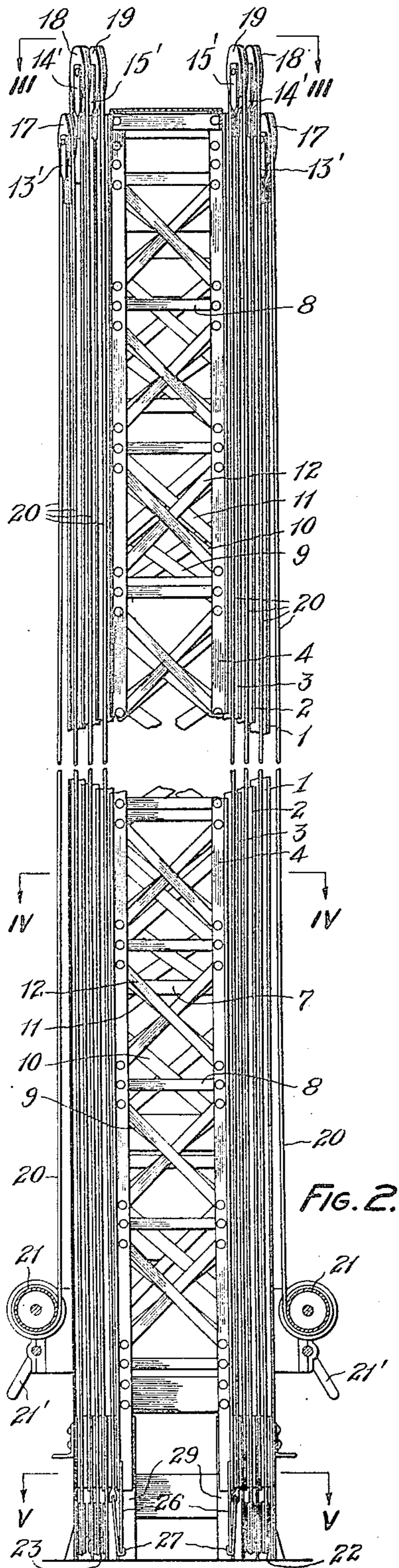
1,459,123

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HOIST TOWER FOR BUILDING OPERATIONS

Filed May 7, 1921

6 Sheets-Sheet 1



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HOIST TOWER FOR BUILDING OPERATIONS

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6 Sheets-Sheet 2

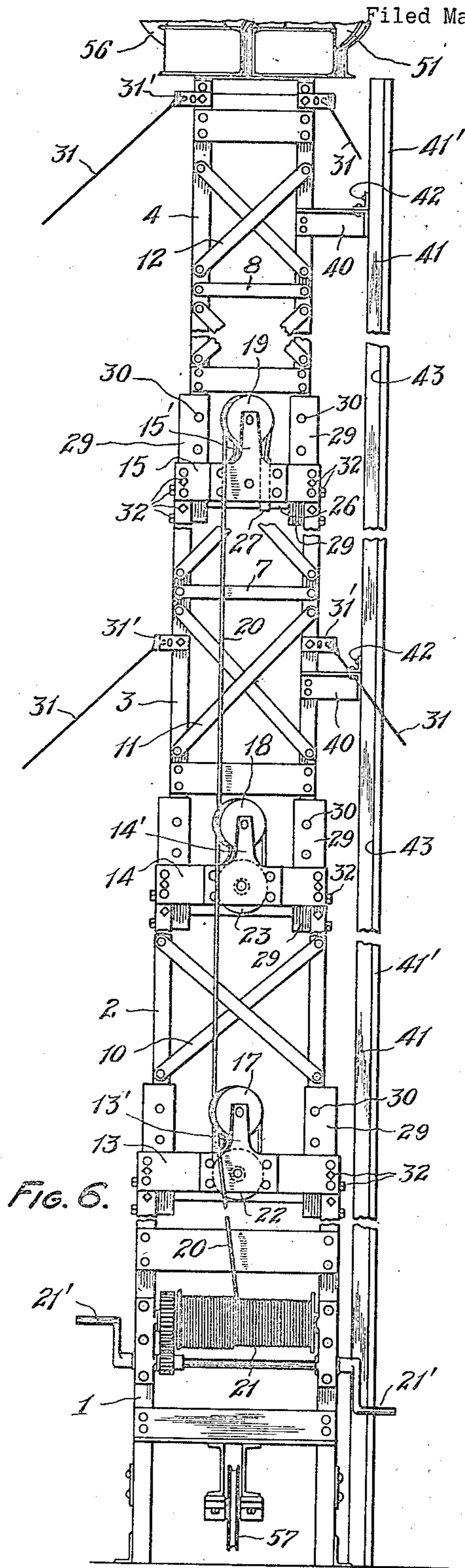


FIG. 6.

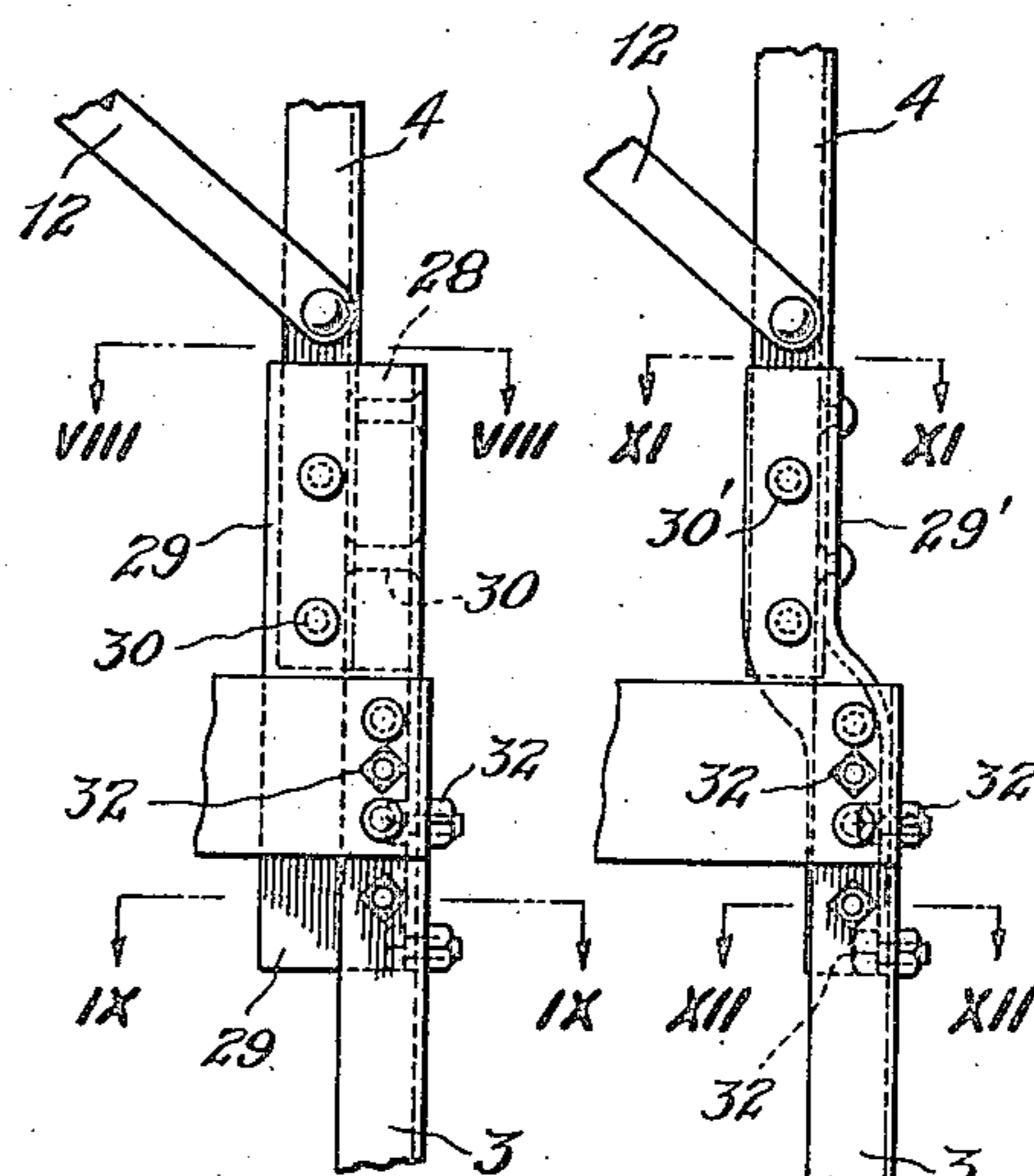


FIG. 7.

FIG. 10.

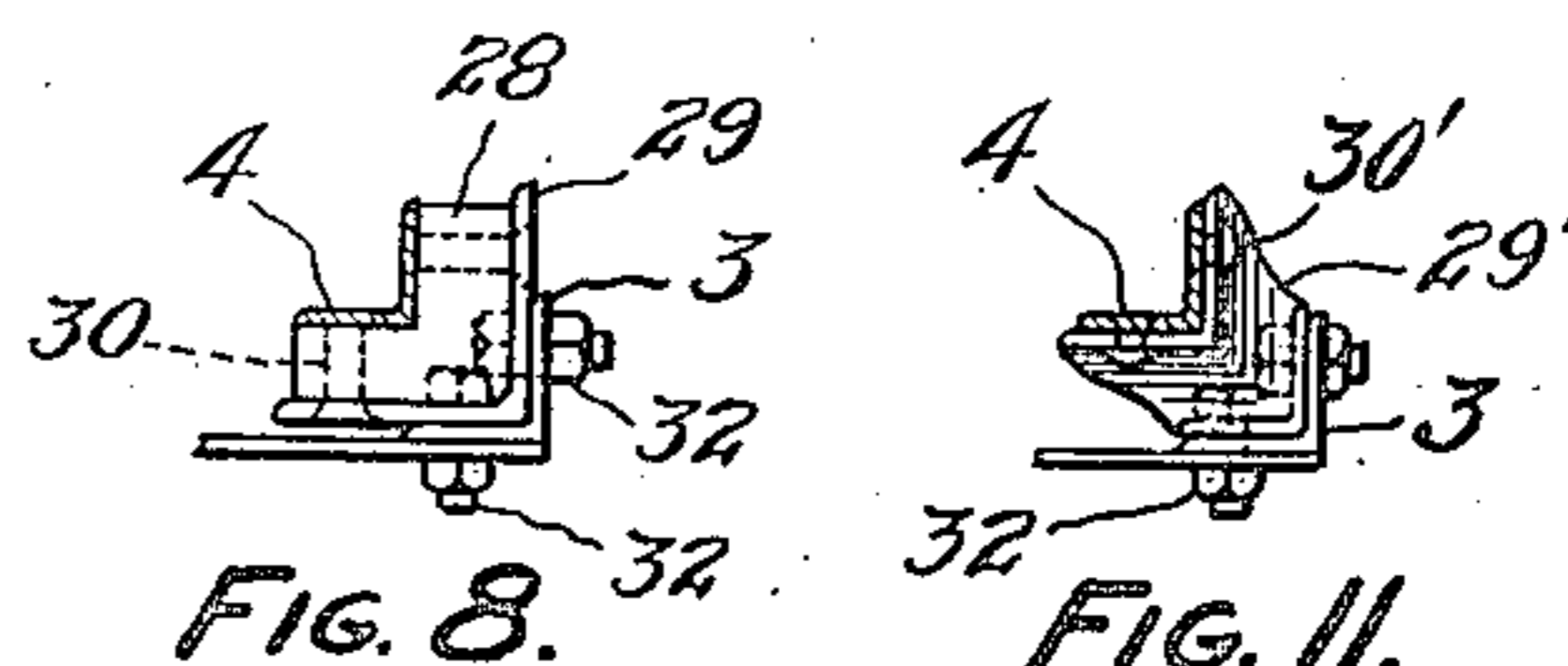


FIG. 8.

FIG. 11.

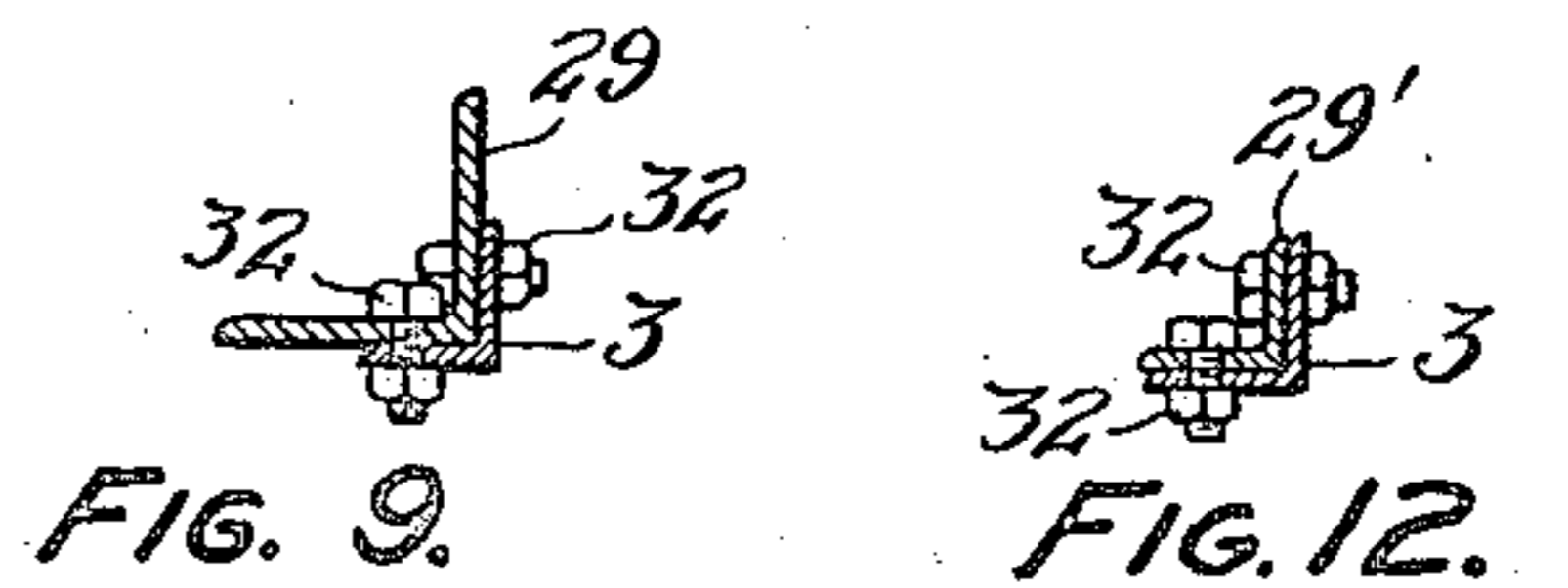


FIG. 9.

FIG. 12.

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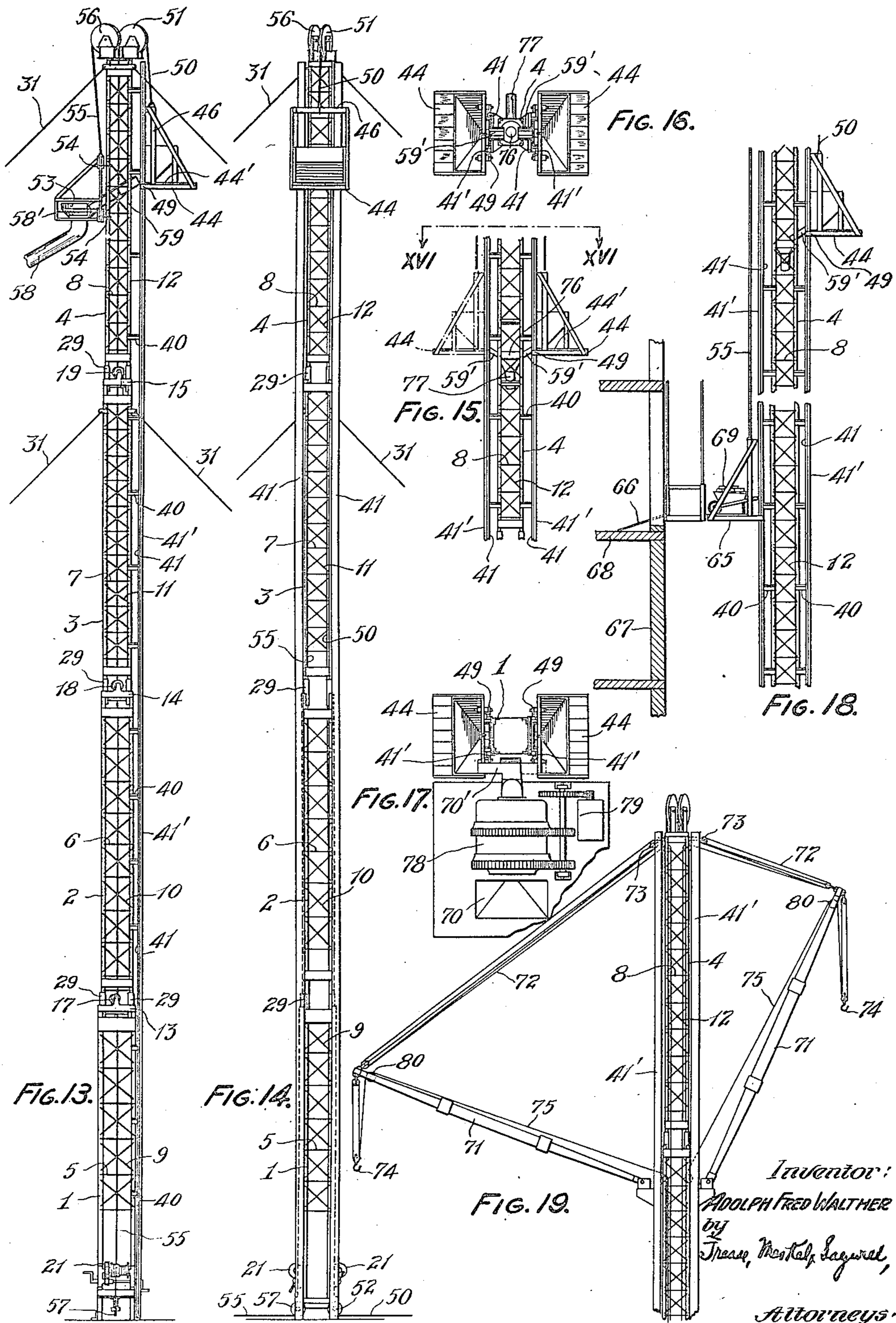
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HOIST TOWER FOR BUILDING OPERATIONS

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6 Sheets-Sheet 3



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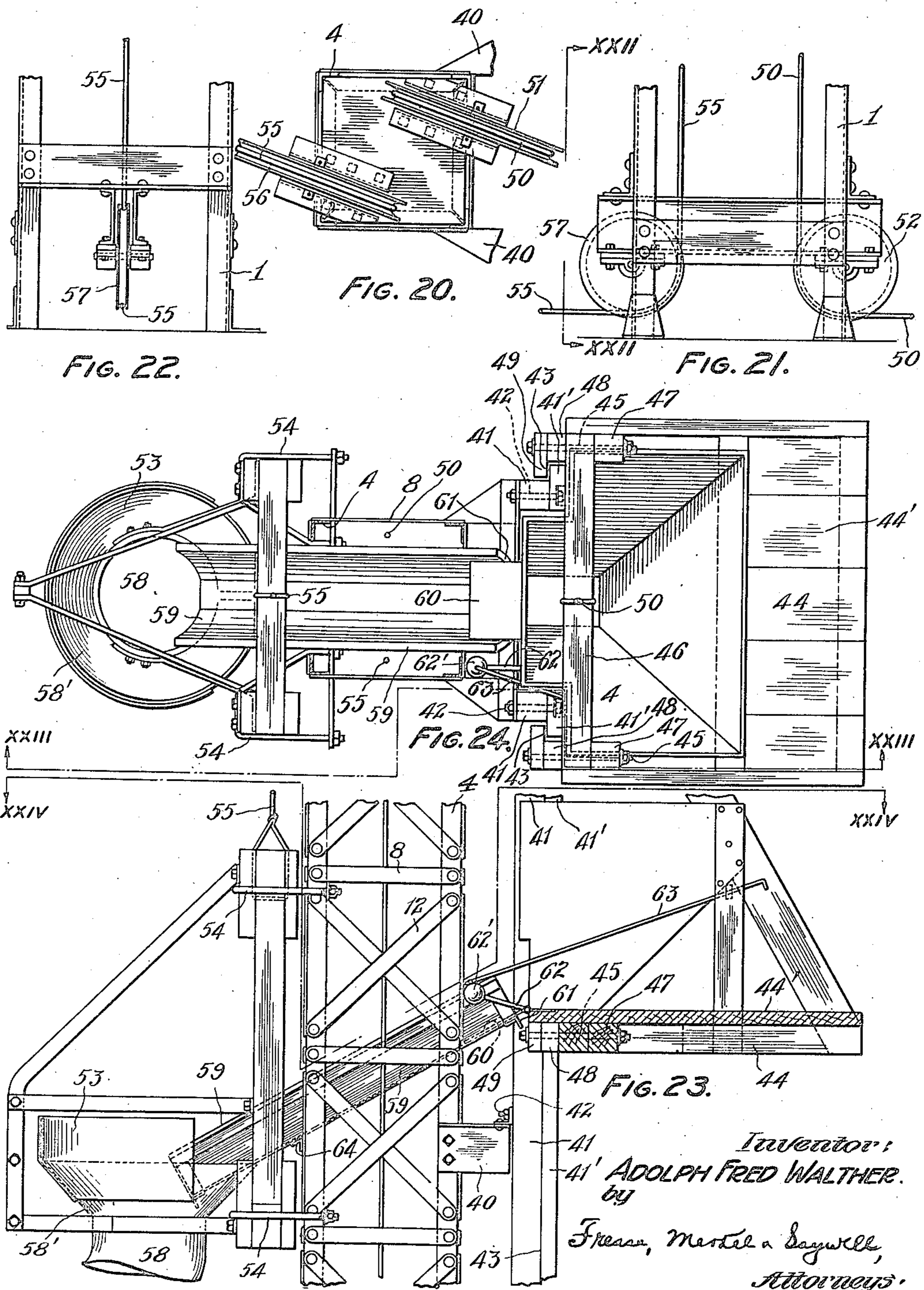
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HOIST TOWER FOR BUILDING OPERATIONS

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June 19, 1923.

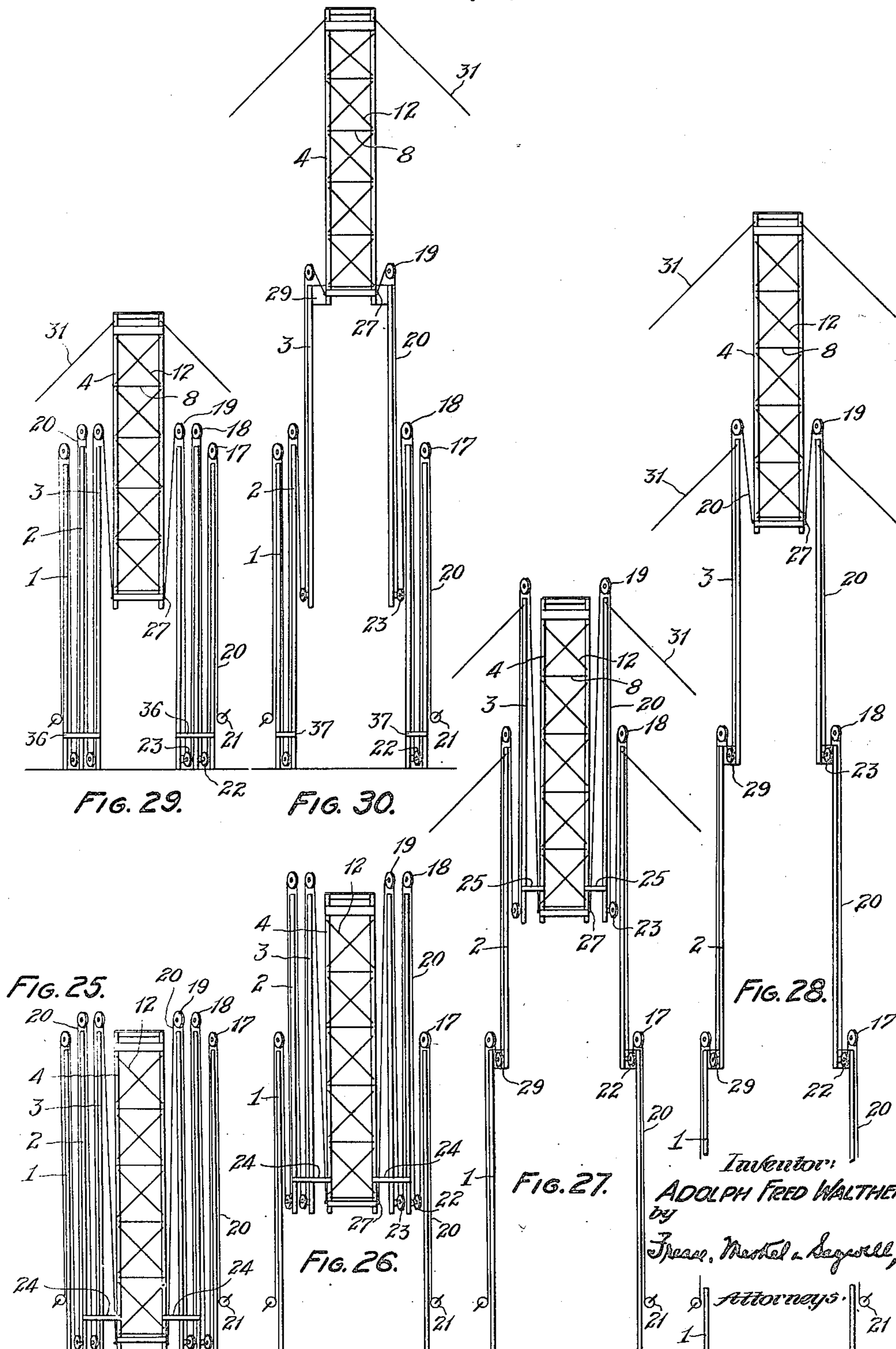
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## HOIST TOWER FOR BUILDING OPERATIONS

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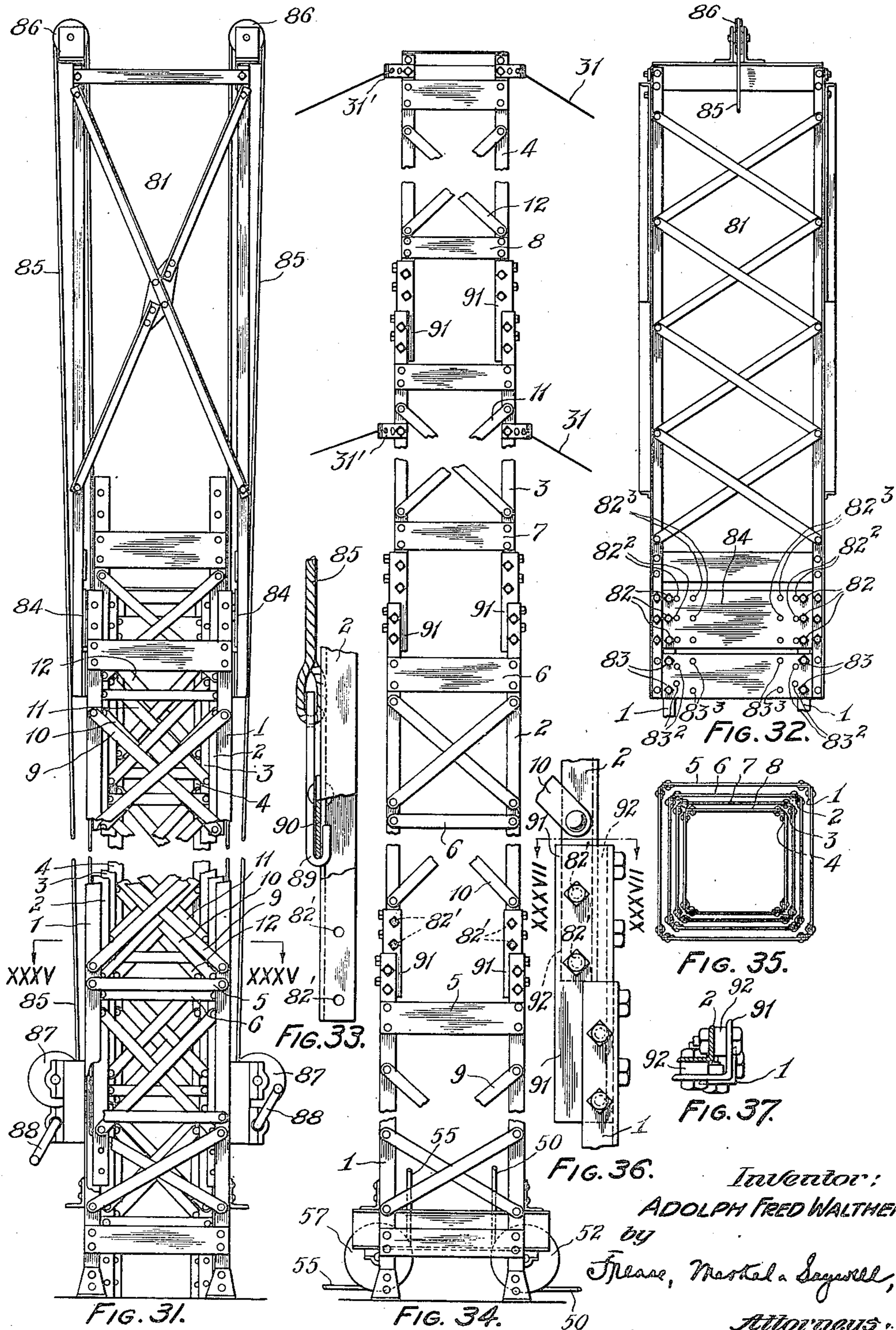
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HOIST TOWER FOR BUILDING OPERATIONS

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6 Sheets-Sheet 6



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# UNITED STATES PATENT OFFICE.

ADOLPH FRED WALTHER, OF CLEVELAND, OHIO, ASSIGNOR TO LOUIS H. HEISTER, JR.,  
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## HOIST TOWER FOR BUILDING OPERATIONS.

Application filed May 7, 1921. Serial No. 467,742.

*To all whom it may concern:*

Be it known that I, ADOLPH FRED WALTHER, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented new and useful Improvements in Hoist Towers for Building Operations, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to hoist towers and particularly to structures of this character utilized in building operations. More particularly, the invention relates to hoist towers including a telescoping tower.

The annexed drawings and the following description set forth in detail certain means embodying my invention, the disclosed means, however, constituting but one of the various mechanical forms in which the principle of my invention may be applied.

In said annexed drawings;

Figure 1 represents a broken elevation of my improved tower in its telescoped or knockdown condition;

Figure 2 represents a vertical section, taken in the plane indicated by the line II—II, Figure 1;

Figure 3 represents a plan view, taken from the plane indicated by the line III—III, Figure 2;

Figures 4 and 5 represent plan sections, taken in the planes indicated by the lines IV—IV, and V—V, respectively, Figure 2;

Figure 6 represents a broken elevation of my improved tower, in its extended condition, disclosing also, elevator ways and elevator and distributor operating means secured thereto.

Figure 7 shows, upon an enlarged scale, an elevation of the means utilized to secure the lower end of one section to the upper end of the adjacent outer section, for the purpose of detachably assuring the extended condition of the sections.

Figures 8 and 9 are fragmentary plan sections, taken in the planes indicated by the lines VIII—VIII and IX—IX respectively, Figure 7.

Figure 10 is a view, similar to Figure 7, of a modified form of the section-connecting means.

Figures 11 and 12 are fragmentary plan sections, taken in the planes indicated by the lines XI—XI and XII—XII, respectively, Figure 10.

Figures 13 and 14 are elevations, at right angles one to the other, upon a reduced scale, of the tower in the extended condition, showing also an elevator, elevator ways, a material distributor, operating means, etc.

Figure 15 is a fragmentary elevation, similar to Figure 13, except that two oppositely disposed elevators are shown and, consequently, a different relative arrangement of the distributor.

Figure 16 is a plan view, taken from the plane indicated by the line XVI—XVI, Figure 15.

Figure 17 is a plan view of a double elevator tower, in combination with a concrete mixer, disclosing the method of filling the elevator hoppers alternately from the mixer.

Figure 18 is a broken fragmentary elevation showing a double elevator tower in combination with a portion of a building wall, and a platform by means of which material is transferred from the elevator to the building on a level with any desired floor of the latter.

Figure 19 is a fragmentary elevation, disclosing the use of the tower in the operation of a boom.

Figure 20 is a plan view, upon an enlarged scale, showing the pulleys and co-operating cables for operating the elevator, distributor, etc.

Figure 21 is a fragmentary elevation of the lower portion of the tower showing the lower set of pulleys which cooperate with the cables just mentioned.

Figure 22 is a fragmentary elevation, taken from the plane indicated by the lines XXII—XXII, Figure 21.

Figure 23 is an enlarged fragmentary elevation of the top of the tower, as shown in Figure 13, and taken from the planes indicated by the line XXIII—XXIII, Figure 24.

Figure 24 is a plan section, taken from the

planes indicated by the line XXIV—XXIV, Figure 23.

Figures 25, 26, 27 and 28 represent diagrammatically different stages in the extending, by my improved method, of the telescoped tower sections to form the raised operative tower.

Figures 29 and 30 show diagrammatically a couple of stages in the extending and raising of the sections by a modified method of erection.

Figure 31 is a broken elevation of the tower, in a telescoped condition, showing also a breast-derrick temporarily secured to the top of the outer section and utilized in the extension and erection of the sections by another modified method.

Figure 32 is an elevation of the breast-derrick, taken at right angles to Figure 31 and showing particularly the method of securing the breast-derrick temporarily to the tops of the several successive sections.

Figure 33 is an enlarged fragmentary elevation, showing the method of attaching the elevating cable to the section about to be raised.

Figure 34 is a broken elevation of the tower as erected by means of the breast-derrick.

Figure 35 is a plan section, taken upon the plane indicated by the line XXXV—XXXV, Figure 31.

Figure 36 is an enlarged fragmentary elevation, showing the method of detachably securing a section to the adjacent inner section after the latter has been raised by the breast-derrick, and

Figure 37 is a fragmentary plan, taken upon the plane indicated by the line XXXVII—XXXVII, Figure 36.

Referring to the annexed drawings, it will be noted that my improved tower consists of a plurality of telescoping rectangular sections, each consisting of corner angles and connecting braces and trusses. For the purposes of illustration, I have shown 4 of these sections, the same consisting of corner angles 1, 2, 3 and 4, respectively; trusses 5, 6, 7 and 8, respectively; and braces 9, 10, 11 and 12, respectively. Secured adjacent the tops of the sections 1, 2 and 3 are plates 13, 14 and 15, respectively, upon upward extensions of which, 13', 14' and 15', are mounted sheaves 17, 18 and 19, respectively. Lifting cables 20 adapted to be wound on drums 21 by means of operating mechanisms 21' are secured at one end respectively by means of hooks 27 to plates 26 secured to the inner section 4, Figure 2. Secured adjacent the bottom of the sections 2 and 3 are sheaves 22 and 23 respectively. By my preferred method of erecting the tower, the cable 20 co-operates with the sheaves 17, 18, 19, 22 and 23, and the sections 2, 3 and 4 are temporarily secured to-

gether by clamps 24, Figures 25 and 26, and the sections 3 and 4 temporarily secured together by clamps 25, Figure 27. It will be evident that the winding operation of the power mechanisms 21' will, the sections being telescoped and connected as shown in Figure 25, result in the lifting of sections 2, 3 and 4 in the manner shown in Figure 26 until the bottom of the section 2 is adjacent the top of section 1. Sections 1 and 2 are then detachably secured together by means hereinafter fully described. Then, clamps 24 being removed, the continued operation of the power mechanisms 21' results in the lifting of sections 3 and 4 in the manner illustrated in Figure 27 until the bottom of section 3 is adjacent the top of section 2. Sections 2 and 3 are then detachably secured together. Clamps 25 are then removed and the continued operation of the power mechanisms 21' results in the lifting of section 4 until its lower end is adjacent the top of section 3. Sections 3 and 4 are then detachably secured together.

During the erection guy ropes 31 secured to guy clamps 31' are utilized in any necessary and practicable manner. For the purpose of securing sections 1 and 2, 2 and 3, and 3 and 4, respectively, together the sections 2, 3 and 4 are provided with leg portions 29, hereinafter called splice angles, plainly shown in Figures 2 and 5, and it is the provision of these leg portions that makes sections 2, 3 and 4 appear in Figures 1 and 2 to be higher than section 1. The sections are detachably secured together by means of bolts 32, Figures 7, 8 and 9. The bolts 32 do not directly connect the sections 1 and 2, 2 and 3, and 3 and 4, but the innermost section, in each instance, is provided with a splice angle 29 and a filler 28 adapted to fill the space between the adjacent sections, said splice angles 29 and fillers 28 being permanently secured to the respective inner sections by means of countersunk rivets 30.

A modified form of section-connecting means is shown in Figures 10, 11 and 12, wherein the spacing members or filler 28 are omitted and there is utilized in lieu thereof, bent splice-angles 29'. The last described means obviates the necessity of countersinking the rivets 30' on the outside, saves weight and dispenses with the sharp corners of the connecting means shown in Figures 7, 8 and 9.

Referring to Figures 29 and 30, a modified method of erection is therein diagrammatically illustrated, by means of which the innermost section 4 alone is first lifted, sections 1, 2 and 3 being temporarily fastened together by clamps 36; clamps 36 are then removed and sections 3 and 4 are lifted, sections 1 and 2 being temporarily fastened together by clamps 37; then clamps 37 are

removed and sections 2, 3 and 4 are lifted. This method of erection does not give the stability obtainable by the method illustrated in Figures 25, 26, 27 and 28, nor allow for as efficient a use of the guys 31 as the preferred method.

Upon the erected tower, shown in Figures 13 and 14, are secured laterally extending brackets 40 forming supports for elevator ways comprised of the members 41 and 41', Figures 23 and 24. The members 41 are secured to the brackets 40 by means of the bolts 42, the members 41' being laterally extended to form an inner confined sliding surface 43 for an elevator 44. By means of bolts 45 and spacing members 47 and 48, guide shoes 49 adapted to slide upon the surfaces 43 are secured to the rear vertical frame member 46 of the elevator car 44. The latter is lifted and lowered by means of an elevator cable 50 adapted to play over an upper sheave 51 mounted upon the top of the tower section 4, said cable 50 extending down to and playing around a sheave 52, Figures 14 and 21, secured adjacent the bottom of the tower section 1 and then running to an engine (not shown) by means of which it is operated.

Referring to the form of tower shown in Figures 13 and 14, it will be noted that upon the side thereof, opposite the car 44, is provided a hopper 53, Figures 23 and 24, adapted to be fixed to the tower at any desired height by means of clamps 54. This hopper 53 is raised and lowered by means of a power cable 55 playing over an upper sheave 56 secured adjacent to the top of the tower section 4, the cable extending downwardly and playing around a lower sheave 57 secured adjacent the lower tower section 1, said cable then running to a winch (not shown) by means of which it is operated. This hopper 53 forms a support for a distributor pipe 58, Figures 13 and 23, which is supported by an upper conical mouth 58' so as to be rotatable about its own axis.

It will be plainly seen in Figures 23 and 24 that means are provided for passing material from the car 44 to the distributor 58. The back wall 46 of the car 44 is formed with a gate 60 adapted, when open, to rest upon the end 61 of a trough 59. This gate can be closed by means of a lateral arm 62 provided at its outer end with a counterweight 62' and operated by means of an actuating bar 63. The end of trough 61 also will close the gate 60, if inadvertently the latter is left open when the car 44 commences to descend. A passage for material through the tower from the car 44 to the distributor 58 is provided by means of said trough 59, the same being temporarily secured and positioned by any suitable holding means such as the angle 64. When it is desired to change the height of the hopper

53, the trough 59 is temporarily shoved upon the platform 44' of the car 44.

Referring to Figures 15 and 16, it will be noted that therein are shown elevator cars upon two sides of the tower. This renders it necessary to provide means for transferring material from an elevator to the distributor, different from the means shown in Figures 23 and 24. In Figures 15 and 16 I show two troughs 59' adapted to convey material from the respective cars 44 to a common hopper 76 disposed centrally of the tower and from which the material may be drawn through a discharge member 77 to a distributor (not shown) mounted upon one side of the tower between the cars 44. In Figure 17, two elevator cars 44 are shown in conjunction with a concrete mixer 78 disposed adjacent the bottom of the tower. The mixture of materials is furnished to the hopper 70, whence they pass to the mixer 78 operated by the mechanism 79. Then the prepared mixture is discharged through a spout 70' to either desired car 44. The spout 70' is rotatably mounted upon the side frame of the mixer 78 so that said spout can be turned to discharge upon the platform of either of the cars 44.

Referring to Figure 18, one of the elevator cars is therein indicated as a platform 65 upon which to lift loads of brick 69, for instance. By means of a suitably supported intermediate gang-way 66, the brick is deposited upon any desired floor 68 of a building 67. It will be noted, of course, that the material is taken from the platform 65 at substantially the level of the floor upon which it is desired to dump the material.

Referring to Figure 19, a use of my improved tower with booms 71 is therein disclosed. Operating cables 72 serve to raise and lower the outer ends of the booms, the same playing over sheaves 73, secured adjacent the top of the tower; and operating cables 75 playing over sheaves 80 secured adjacent the outer ends of the boom 71 serve to raise and lower the grab-hooks 74. The booms 71 are mounted upon the elevator guideways 40 and 41 and may be used either to swing the distributing chutes or for transferring building material to different parts of the building.

It will be understood, of course, that only two or three of the sections 1, 2, 3 and 4 need be set up if a tower of such a height will serve the purpose; and, also, a tower of a height intermediate two successive multiples of a single section height can be erected and utilized for many purposes by simply holding the sections at the desired height by means of the cable 20, the sections in this event not being secured together by the usual splice angle.

Referring to Figures 31 to 37 inclusive, a modified form of tower-erecting means is

therein shown in which a special derrick 81, styled a breast-derrick, is utilized. This breast-derrick 81 is adapted to be detachably mounted upon the several tower sections 1, 2 and 3, all of the sections in this form of apparatus being shown as of the same height. The means which are utilized for mounting the breast-derrick 81 upon the several sections are the same means which are utilized for detachably connecting together the several sections, when the tower is erected, said connecting means being, in each instance, in multiple so that said means can be used in common for both purposes at the same time. This detail will now be fully described. The connecting means consists of a series of bolts 82 and 83. Bolts 82 pass through a lower strengthening plate 84 disposed adjacent the bottom of the breast-derrick 81. It will be plainly seen in Figure 31, that pulleys 86 are mounted adjacent the top of the breast-derrick 81, over which pass an operating cable 85 adapted to be wound upon a drum 87 secured adjacent the lower end of the tower section 1, suitable power means 88 being provided. The operating cable 85 is furnished with a hook 89 adapted to engage the lower end 90 of the tower section 2 proper. It will be noted that the tower section 2, for instance, is provided with bolt holes 82' adjacent the bottom thereof. These bolt holes 83' are adapted to align with the upper two bolt holes of a splice angle 91, this splice angle having in addition two lower holes which register with the holes of the upper two bolts 82 of the breast-derrick plate 84, Figure 32. It will be evident that, the breast-derrick 81 having been manually lifted to the top of the tower section 1 and mounted thereon by means of bolts 82 and 83, the operation of the power means 88 will result in the lifting of the tower section 2. When the section 2 is raised sufficiently so that the bolt holes 82' will align with the upper holes in the splice angle 91 when the lower holes in this splice angle register with the holes of the upper two bolts 82, the bolts of the latter, as well as the lower adjacent bolt, are removed, and the plate 84 taken off. The bolts 82 are then utilized to fasten the sections 1 and 2 together, the splice angle 91 and single bar fillers 92 being utilized, Figures 36 and 37. This connection of the sections 1 and 2 serves to hold the same together, after which the lowermost bolts 83 are removed, thus wholly freeing the breast-derrick from the section 1. The breast-derrick is then manually lifted to the top of section 2 where it is again detachably mounted by means of the holes 82<sup>2</sup>, and the foregoing operation repeated, whereby section 3 is mounted upon section 2. Then section 4 is lifted to the top of section 3, holes 82<sup>3</sup> being utilized this time, and thus the tower is erected.

By the means hereinbefore described, hereinafter claimed, and shown in the accompanying drawings, I am enabled to quickly and easily erect a tower adaptable for use in building operations, of sufficient height adequately to serve all the necessities of such operations; and, also, enabled to quickly and easily knock down the tower to a height at which it can be practicably transported to the site of other building operations.

What I claim is:

1. A hoist tower for distributing material in building operations, comprising the combination of a plurality of telescopic sections; means for actuating said sections to assume their extended position; detachable means for rigidly securing said sections in such extended position; a guideway secured to the exterior of said sections when extended; an elevator car adapted to travel upon said guideway; and means for operating said elevator car on said guideway.

2. A hoist tower for distributing material in building operations, comprising the combination of a plurality of telescopic sections; means for actuating said sections to assume their extended position; detachable means for rigidly securing said sections in such extended position; laterally extending supports secured to said sections; a guideway secured to said supports; an elevator car adapted to travel upon said guideway; and means for operating said car on said guideway.

3. A hoist tower for distributing material in building operations, comprising a series of telescopically connected tower sections; means for extending the sections and for holding them in extended position; a vertical guideway rigidly but detachably connected to a plurality of said sections exteriorly thereof; a hoisting device carried by said tower; and a material conveying device mounted for movement along said guideway and connected to said hoisting device.

4. A hoist tower for distributing material in building operations, comprising a plurality of telescoping sections; means for extending the sections; means for holding the sections in an extended condition; elevator guides secured to the extended tower; an elevator and means for operating the same; a material distributor secured to the tower; and means for conveying material through the tower from said elevator to said distributor.

5. A hoist tower for distributing material in building operations, comprising a plurality of telescoping sections; means for extending the sections; means for holding the sections in an extended condition; elevator guides secured to the extended tower; an elevator and means for operating the same; a material distributor; means for detachably securing the distributor to the tower, said distributor being rotatable about its own

axis; means for moving the distributor longitudinally of the tower; and means for conveying material through the tower from said elevator to said distributor.

5 6. A hoist tower for distributing material in building operations, comprising a plurality of telescoping sections; means for extending the sections; means for holding the sections in an extended condition; elevator  
10 guides secured to the extended tower upon opposite sides thereof; a pair of elevators and means for operating the same; a material distributor secured to the tower upon  
15 a side between the elevators; a hopper secured interiorly of the tower; means for conveying material from each elevator to the hopper; and means for conveying material from the hopper to the distributor.

7. A hoist tower for distributing material  
20 in building operations, comprising a plurality of sections; means for mounting the sections one upon the other; means for holding the sections in a built-up condition; an elevator secured exteriorly of the tower; a  
25 material distributor mounted exteriorly of the tower; and means for conveying material

through the tower from said elevator to said distributor.

8. A hoist tower for distributing material in building operations, comprising a plurality  
30 of extensible sections; means for extending the sections; means for holding the sections in an extended condition; an elevator associated with and secured to said extended tower exteriorly of the latter; a material dis-  
35 tributor secured to the tower; and means for conveying material through the tower from said elevator to said distributor.

9. A hoist tower for distributing material in building operations, comprising a plu-  
40 rality of extensible sections; means for extending the sections; means for holding the sections in an extended condition; elevators secured exteriorly of the tower upon oppo-  
45 site sides thereof; and a mixer associated with said tower and disposed intermediate said elevators, said mixer being provided with means adapted to discharge upon either desired one of said elevators.

Signed by me this 22nd day of April, 1921. 50

A. FRED WALTHER.