

No. 848,304.

PATENTED MAR. 26, 1907.

J. S. HINES.
SECTIONAL DERRICK.
APPLICATION FILED DEC. 3, 1906.

7 SHEETS—SHEET 1.

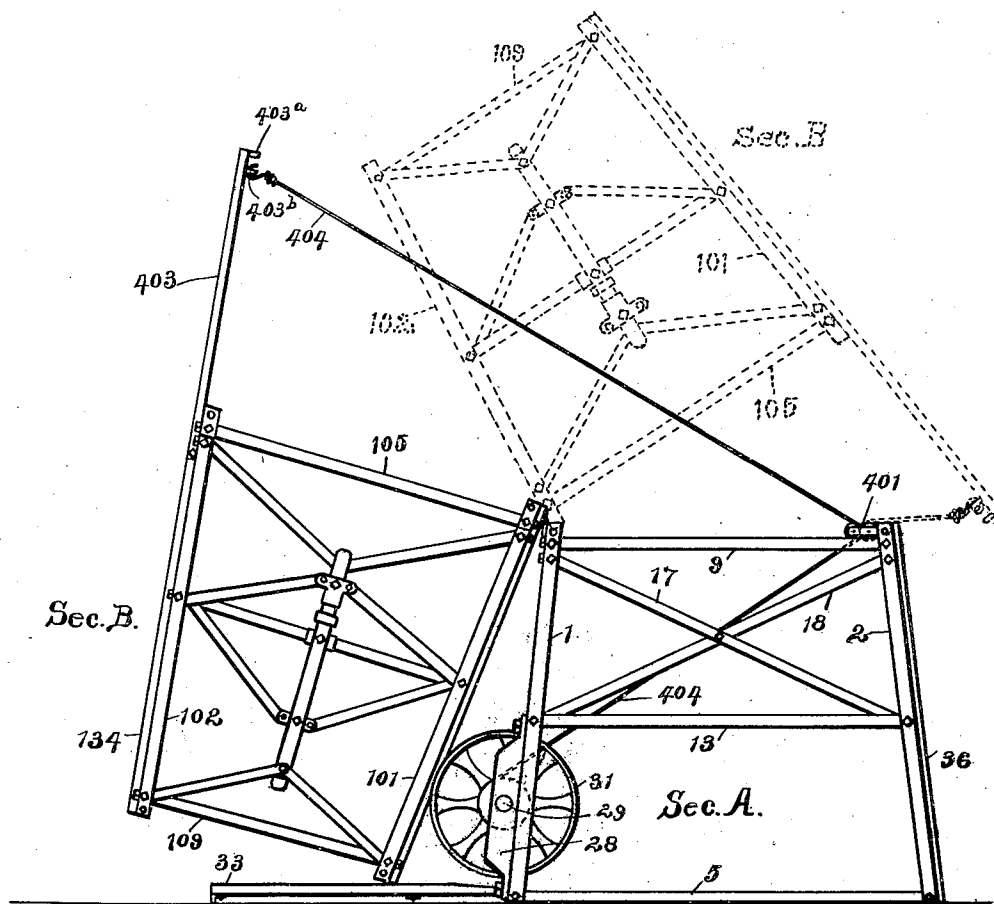


Fig. 1.

Witnesses:

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By Inventor:
W. B. Randle
Attorney

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7 SHEETS—SHEET 2.

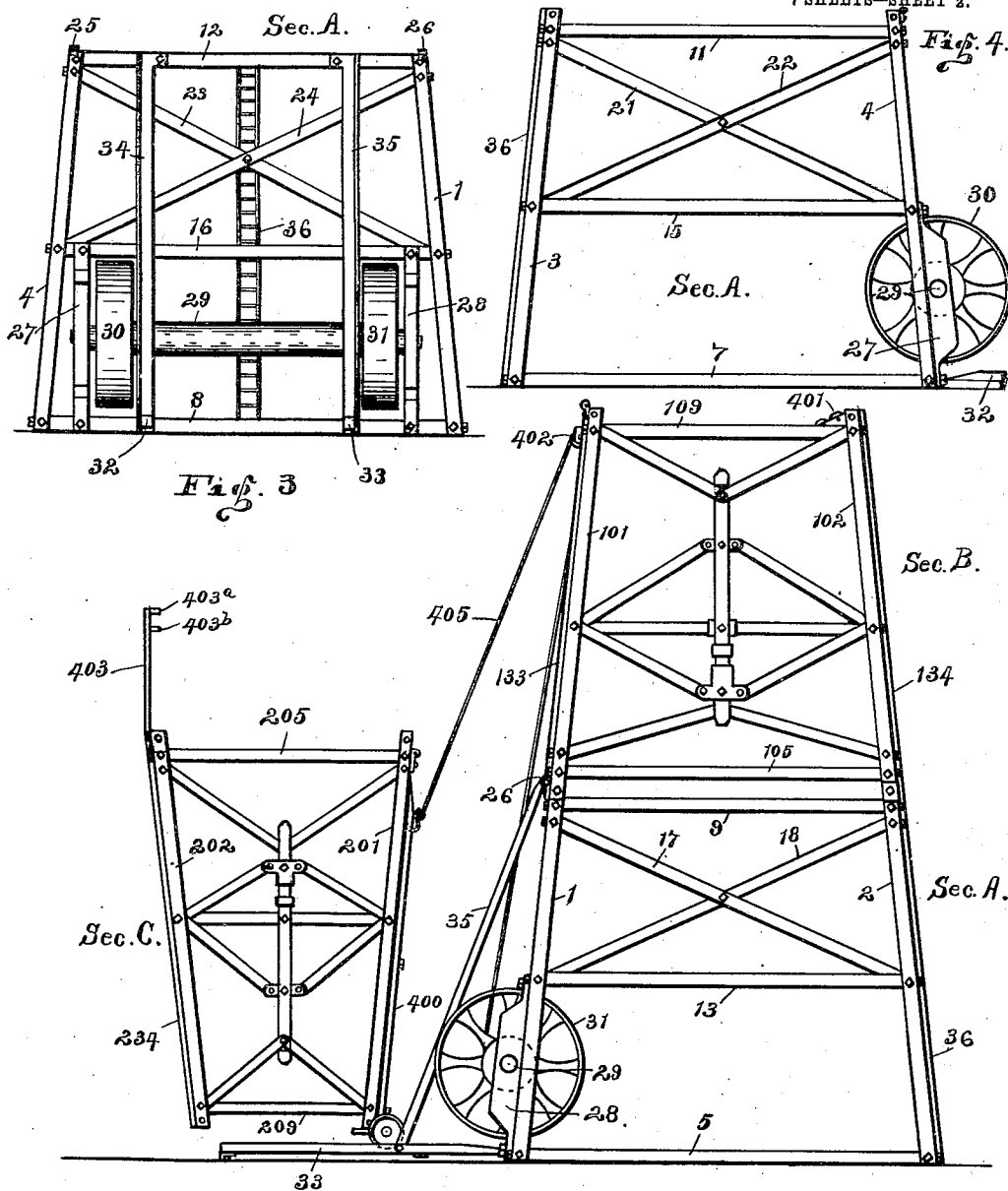


Fig. 2.

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7 SHEETS—SHEET 3.

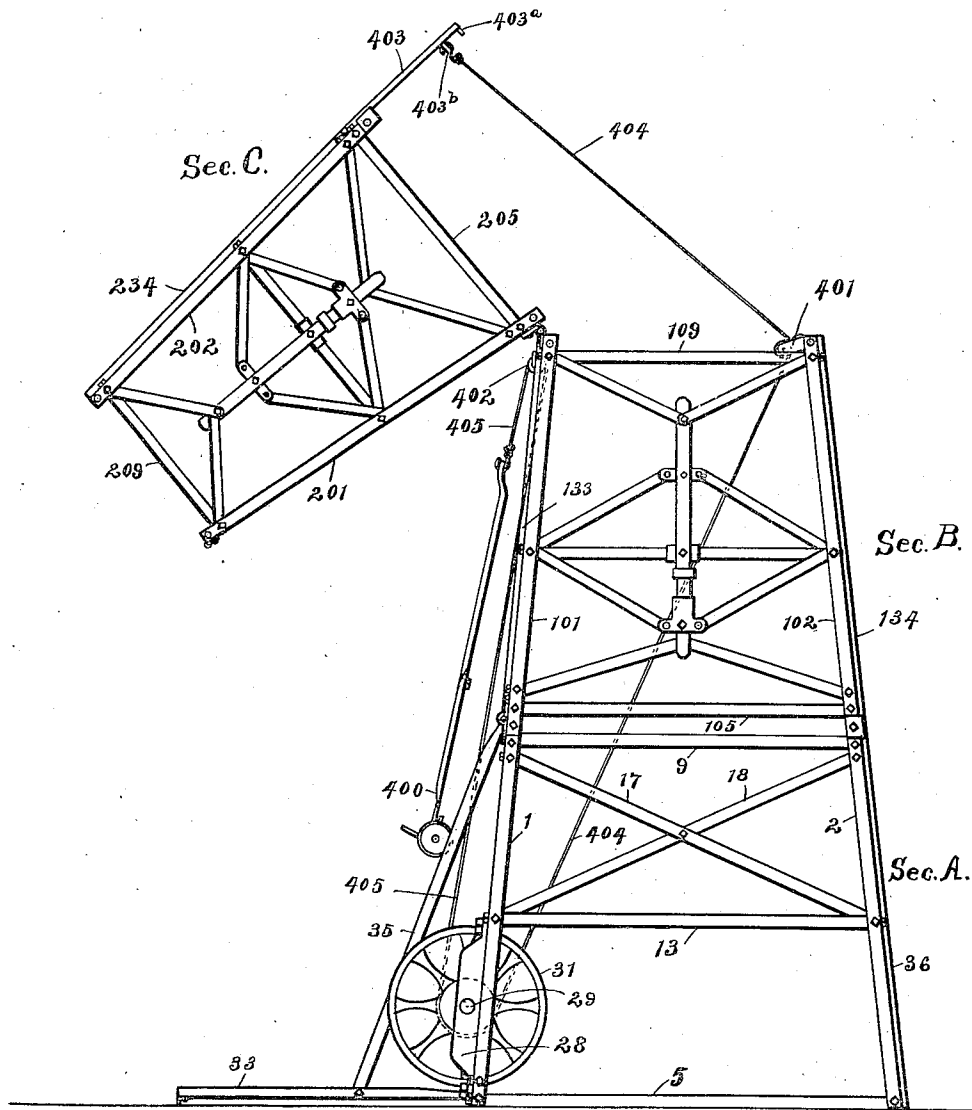


Fig. 5.

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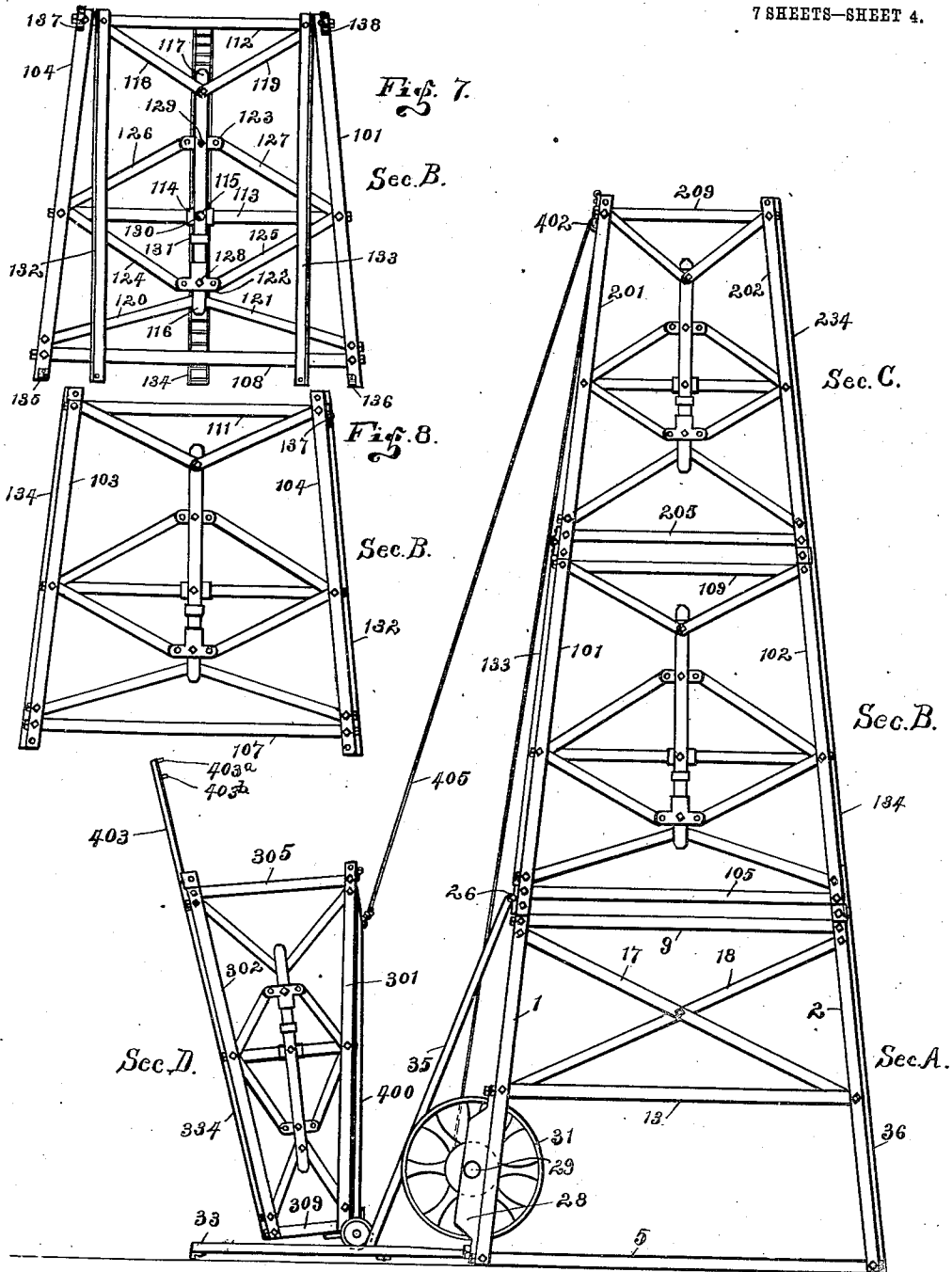
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7 SHEETS—SHEET 4.



Witnesses:

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Fig. 6.

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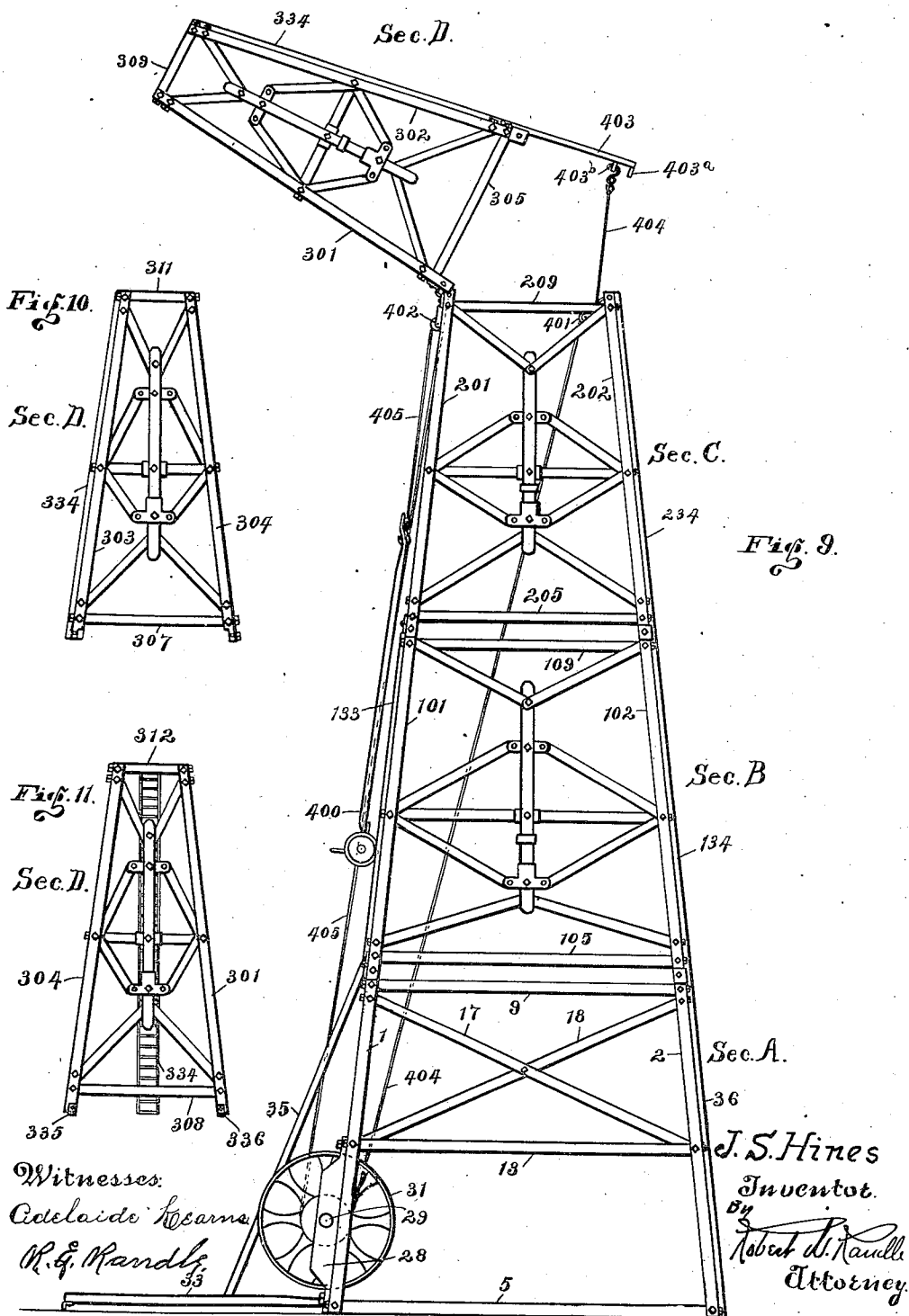
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7 SHEETS—SHEET 6.

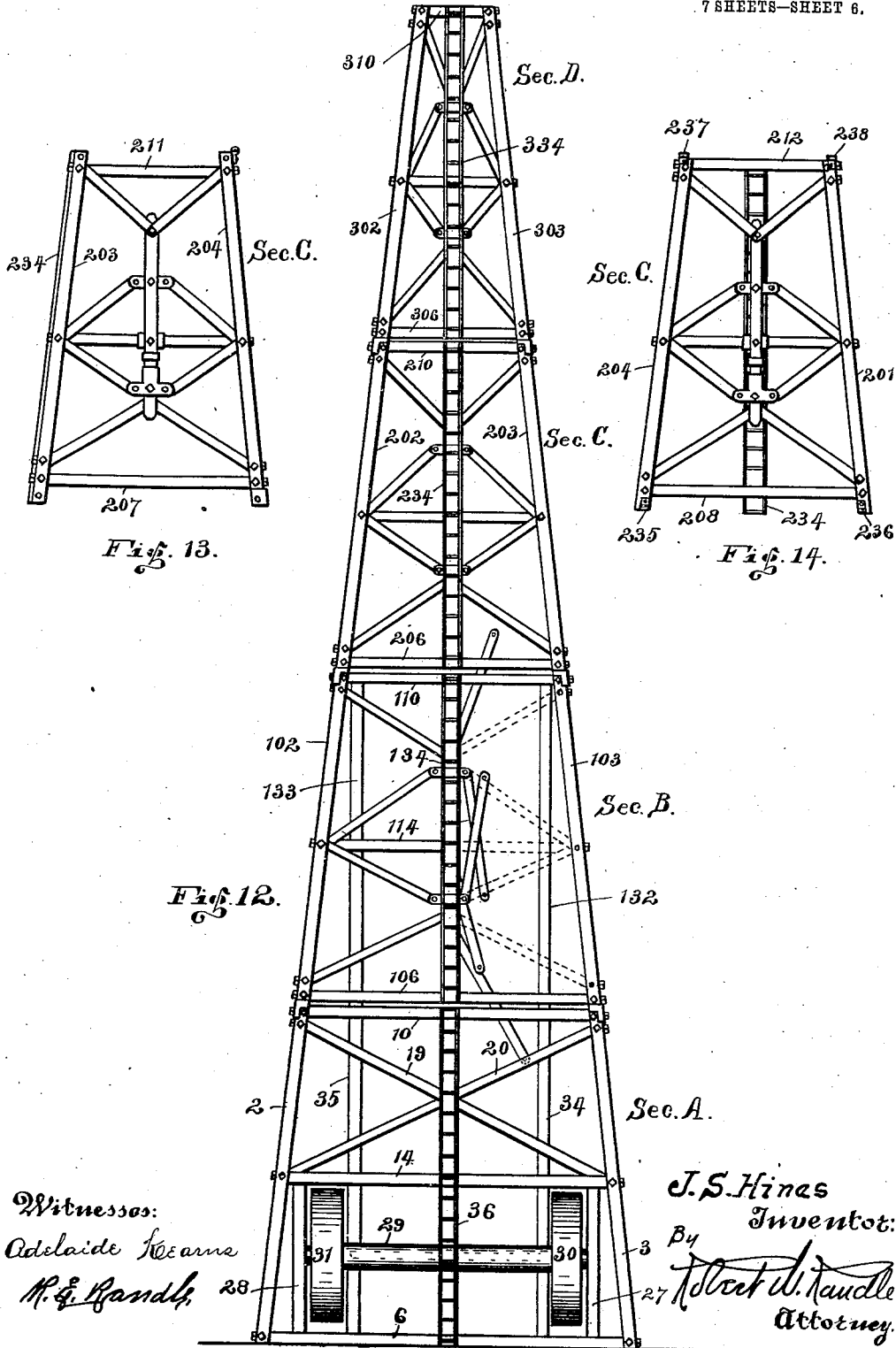


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7 SHEETS—SHEET 6.



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7 SHEETS—SHEET 7

Fig. 15.

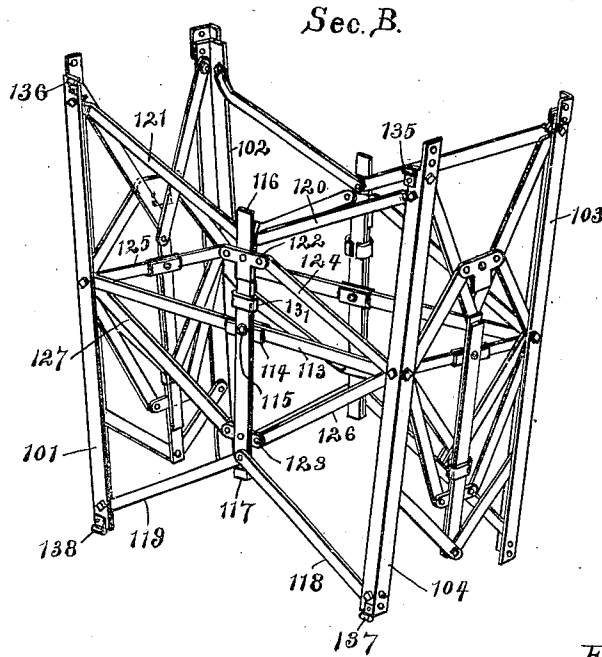


Fig. 16.

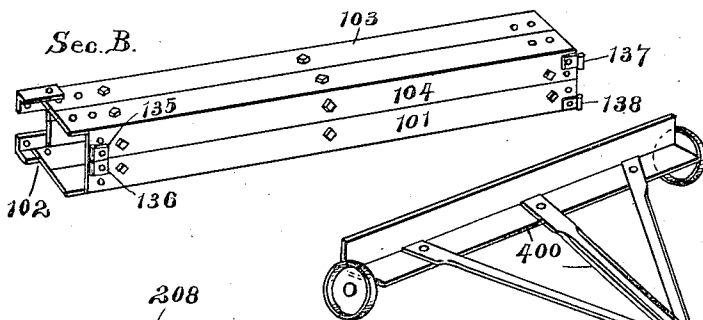


Fig. 18.

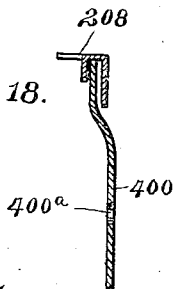


Fig. 17.

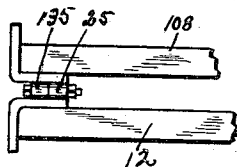
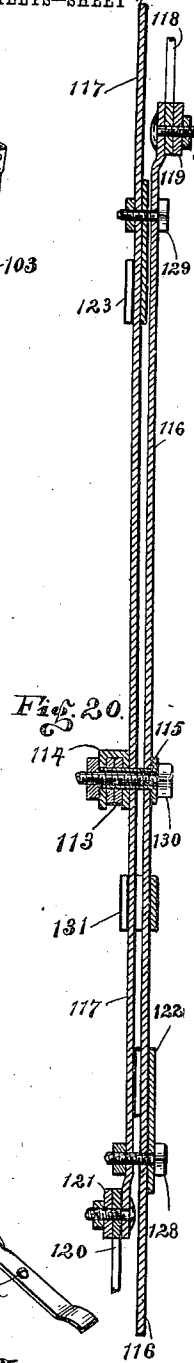


Fig. 20.



Witnesses:
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Fig. 19.

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Inventor

UNITED STATES PATENT OFFICE.

JOHN S. HINES, OF PORTLAND, INDIANA.

SECTIONAL DERRICK.

No. 848,304.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed December 3, 1906. Serial No. 346,069.

To all whom it may concern:

Be it known that I, JOHN S. HINES, a citizen of the United States, residing in the city of Portland, in the county of Jay and State of Indiana, have invented a new and useful Construction for Derricks and Means for Raising Them into Position, which invention I denominate a "sectional" derrick, of which the following is a full and comprehensive specification and exposition, being such as will enable others skilled in the art to which it appertains to make and use the same with absolute exactitude.

My invention relates to sectional derricks designed more particularly for use in connection with deep-well drilling, same to form a part of what is known in the vernacular of the trade as a "standard rig."

The object of this my present invention, broadly speaking, is the provision of an improved construction of the class stated designed to give a maximum of mechanical efficiency with a minimum of expense and in which the item of maintenance will be practically *nil*.

More specifically stated, my object is to provide a derrick formed, preferably, entirely of metal and which is composed of a plurality of sections of upwardly-decreasing dimensions, the sections being capable of being easily collapsed or folded into a compact space and when assembled together to form a rigid practically indestructible and ornate structure and at the same time being economically efficient and forming a standard derrick both in efficiency and general appearances, and, finally, other objects are to provide a derrick which may be easily assembled and disassembled, easily transported from place to place, which may be stored in a small compass of space, and which will not materially deteriorate through wear, usage, or inclemency of the weather.

Other detail objects and particular advantages of my invention will be brought out and accentuated in the course of the ensuing specification, and the operation thereof will be fully explained and visualized.

Probably the best exemplification of the possibilities and advantages of my invention are shown most clearly in the accompanying seven sheets of drawings, forming a part of this specification, in which—

Figure 1 shows a side elevation of the first or lower section in position, also the second

section ready to be raised to position, and in dotted lines the latter is shown as almost in position. Fig. 2 shows the first and the second sections in position and the third section ready to be raised to position. Fig. 3 shows a rear face elevation of the first section. Fig. 4 shows a side elevation of the first section. Fig. 5 shows the first and second sections in position and also the third section in the second stage of its movement to position. Fig. 6 shows the first, second, and third sections in position and the fourth section ready to be raised to its position. Fig. 7 shows a rear elevation of the second section. Fig. 8 shows one side elevation of the second section. Fig. 9 shows the first, second, and third sections in position and also the fourth section in the last stage of being positioned. Fig. 10 shows one side elevation of the fourth section. Fig. 11 shows a rear elevation of the fourth section. Fig. 12 shows the derrick complete with all of the sections in position. Fig. 13 shows one side elevation of the third section. Fig. 14 shows the rear elevation of the third section. Fig. 15 shows one of the sections in perspective and partly dismembered and as being folded. Fig. 16 shows one of the sections folded. Fig. 17 shows a perspective view of the truck I employ in connection with raising certain of the sections. Fig. 18 is a detail section showing the manner of securing the tongue of the truck to the section being raised. Fig. 19 is a detail showing one of the hinge-joints, and Fig. 20 is a longitudinal sectional view of one of the folding mechanisms.

Similar indices denote and refer to like parts throughout the several views of the drawings.

In order to render the construction and operation of my invention still more facile, I will now take up a detail description thereof, in which I will describe the construction and the operation thereof as briefly and as compactly as I may.

My invention comprises a plurality of separable sections divided from each other horizontally and constructed convergently upwardly, each section being substantially of same dimensions at its base as is the next lower section thereto at its apex. In this instance I provide four distinct sections, (designated, for convenience of description, by letters A, B, C, and D, counting from the lower section upwardly.)

Section A.—This section is preferably distinctly different from the others in details of bracing and support, although it may be made like the other sections, if desired. This section comprises four corner-posts, which are designated by numerals 1, 2, 3, and 4. Said posts are formed of angle-iron in order to give them the desired strength with a minimum of height. Said posts are connected at their lower end portions by the four lower end ties, (designated by the numerals 5, 6, 7, and 8.) At their upper ends said posts are connected by the four upper end ties 9, 10, 11, and 12, the latter set of ties being shorter than the former in order to give the proper shape to the section. Near their centers said posts are again connected by the four horizontal ties, (designated by the numerals 13, 14, 15, and 16,) which are parallel with the aforesaid ties. Extending between the posts 1 and 2 and located between the ties 9 and 13 are the crossing braces 17 and 18. Extending between the posts 2 and 3 and located between the ties 10 and 14 are the crossing braces 19 and 20. Extending between the posts 3 and 4 and located between the ties 11 and 15 are the crossing braces 21 and 22, and extending between the posts 4 and 1 and located between the ties 12 and 16 are the crossing braces 23 and 24. All of said ties should be formed of angle-iron, as shown. All of the various parts of Section A are detachably secured together by bolts, as shown, thereby completing the framework of this section, as shown in Figs. 1, 2, 3, 4, 5, 6, 9, and 12.

Accessory parts of section A.—Secured to the rear faces and extending slightly above the upper ends of the posts 4 and 1 are hinge members 25 and 26, respectively. (For detail of hinges see Fig. 19.) Extending between the ties 8 and 16 are the vertical hanger-posts 27 and 28, which carry revolvably the bull-wheel reel, which is composed of the spindle 29 and the two bull-wheels 30 and 31. Said reel may be operated in any well-known manner either by power or by hand, and it is adapted to rotate in either direction. Extending back from the tie 8 parallel with the ties 5 and 7 and between the wheels 30 and 31 are the angle-iron track-bars 32 and 33. Extending downward and rearwardly at an angle from the tie 12 and connected to and aligned with the track-bars 32 and 33, respectively, are the track-bars 34 and 35, which are for purposes hereinafter stated. Extending up the front side of Section A from the center of the tie 6 to the center of the tie 10 is the ladder-section 36.

Section B.—The numerals 101, 102, 103, and 104 designate the four corner-posts of this section, which posts are substantially the same length and of same size and formed in same manner as the posts of Section A. Said posts of Section B are connected to-

gether at their lower ends by the four lower end ties 105, 106, 107, and 108, and at their upper ends said posts are connected by the four upper end ties 109, 110, 111, and 112, this latter set of ties being shorter than the former, but sufficient to give the same converging inclination to Section B as is given to said Section A, all substantially as shown in the drawings. This Section B is made folding or collapsible, as shown in Fig. 16, and the means for accomplishing this feature I will now describe, and as the construction thereof is the same between each two of the four corner-posts I will now describe the rear side, as shown in Figs. 5 and 15, and the same description will apply to the other three sides of this section.

Folding means.—Connecting the posts 104 and 101 near their centers is the two-part tie 113, the members of which overlap each other in the center, where they are held together by an inverted-U-shaped clip, (denominated by the numeral 114.) Passing centrally through the sides of the clip 114 and extending across the space between the sides thereof is an eyelet 115, (shown in Fig. 20,) there being an aperture through the end portion of the members of the tie 113, by which said members are pivotally mounted on said eyelet. The numerals 116 and 117 denote two contacting vertical bars located parallel with each other. To the upper end of the bar 116 are pivoted the inner overlapping ends of the downwardly and inwardly extending arms 118 119, and to the lower end of the bar 117 is pivoted the inner overlapping ends of the upwardly and inwardly extending arms 120 121. The outer ends of said arms 118 119 and 120 121 are pivotally secured to the corner-posts 104 and 101, as indicated. Slidably mounted around the lower portion of the bar 116 is a winged clip 122, and in like manner mounted around the upper portion of the bar 117 is a winged clip 123. Pivoted to the wings of the winged clip 122 are the inner ends of the arms 124 and 125, with their outer diverging ends pivoted to the respective posts 104 and 101 by same bolts which secure the ends of the tie 113 to said posts. Pivoted to the wings of the winged clip 123 are the inner ends of the arms 126 and 127, with their outer ends pivoted to the respective posts 104 and 101 by same bolts which secure the ends of the tie 113 to said posts. The numeral 131 denotes a band-clip slidable over and slidably contacting the two bars 116 and 117. When opened out in its assembled position, as in Fig. 7, I insert a bolt 128 through corresponding apertures therefor in the center of the winged clip 122 and through corresponding apertures in the bars 116 and 117. Also a bolt 129 is inserted through corresponding apertures therefor in the winged clip 123 and the bars 116 and 117, and the bolt 130 is inserted through corresponding

apertures therefor in the bars 116 and 117 and through the eye of said eyelet 115, and therefore through the members of the tie 113.

The operation of said parts is as follows:

5 The device being right end upward, as in Fig. 7, but partially dismantled, as in Fig. 15, it will be apparent that if the clip 114 be pressed upward then the posts 104 and 101 may be brought toward each other, in which move-
10 ment the bar 116 will slide forward in the winged clip 122, and the bar 117 will slide upward in the winged clip 123, the arms 118 and 119 folding together and the arms 120 and 121 folding together, all of said arms
15 finally coming parallel with the posts 104 and 101, and all of said parts being inclosed within the angles of the posts 104 and 101, as in Fig. 16.

The above-described folding means is identically the same between the posts 101 and 102, 102 and 103, 103 and 104, same as it is between the posts 104 and 101, and therefore a description of said parts is not necessary, as the construction is shown most clearly in the
25 drawings.

If now Section B is constructed as just described, the section being assembled as shown in Figs. 2, 7, 8, and 12, which together show all four sides of this Section B, and the section
30 may be collapsed by first removing the lower ties 105, 106, 107, and 108 and the upper ties 109, 110, 111, and 112, then removing the bolts 128, 129, and 130 from the four sides of the section. After the above the four posts
35 101, 102, 103, and 104 may be brought together as in Fig. 16, with all of said folding means contained in the space formed by the angles of said posts.

It is not to be understood that I limit myself to the specific form of folding means above described, as it is apparent that other means may be employed for same purpose. Detachably secured on the rear side of Section B are the two track-bars 132 and 133,
45 adapted to unite and be alined with the track-bars 34 and 35 of Section A.

The numeral 134 denotes the ladder-section for the Section B, which extends centrally up the front of Section B and is alined
50 with the ladder-section 36 of Section A.

Secured to the rear face of and extending slightly below the lower ends of the posts 104 and 101 are the hinge members 135 and 136, respectively, which are adapted to be pivotally secured in contact with said hinge mem-
55 bers 25 and 26, respectively, of Section A. Also secured to the rear faces of and extending slightly above the upper ends of the posts 104 and 101 are the hinge members 137 and 138, respectively, which will presently be
60 further referred to in connection with Section C.

Section C.—The four sides of this section are shown clearly in Figs. 2, 5, 6, 13, and 14. Section C comprises in its construction the

four corner-posts 201, 202, 203, and 204, which rise convergently upward, as shown in said views of the drawings. Said posts are of substantially the same length and of same form and construction as are the corresponding posts of said Sections A and B. Said
70 posts of Section C are connected together detachably at their lower ends by the four lower end ties 205, 206, 207, and 208, and at their upper ends said posts are connected detachably by the four upper end ties 209, 210,
75 211, and 212, this latter set of ties of course being shorter than the former, whereby said posts will incline inwardly at same inclination as do the corresponding posts of Sections A and B therebelow. The folding means for Section C is in every essential particular like the folding means described in relation to Section B, and therefore a repetition thereof would add more to prolixity than to
85 clearness of comprehension, as it can be readily understood from the drawings. The numeral 234 denotes the ladder-section of Section C, which extends up the front of this section and is alined with the ladder-section of Sections A and B, as shown in Fig. 12. Secured to the rear faces of and extending slightly below the lower end of the posts 204 and 201 are the hinge members 235 and 236,
95 respectively, which are adapted to be pivotally secured in contact with said hinge-sections 135 and 136, respectively, of Section B. Also secured to the rear faces of and extending slightly above the upper ends of the posts 204 and 201 are the hinge members 237 and 238, respectively, which will presently be further referred to in connection with Section D.

Section D.—The four sides of Section D are shown in Figs. 12, 9, 10, and 11. This section includes in its framework the four corner-
105 posts 301, 302, 303, and 304, which rise convergently upward, as shown in the drawings. Said posts are of substantially the same length and of same form and construction as are the corresponding posts of Sections A, B, and C. Said posts of this Section D are detachably connected together at their lower end by the four lower end ties 305, 306, 307, and 308. The upper ends of said posts are detachably connected by the four upper end
115 ties 309, 310, 311, and 312. This latter set of ties are shorter than the former in order to give said posts the same inclination as the corresponding posts of Sections A, B, and C. The folding means of Section D is in every essential particular like the folding means described in relation to Section B, and therefore a repetition of the description thereof is not necessary, as it would add nothing to clearness of comprehension, as the description of one can be taken as the description of the other, the parts being shown in the drawings.

The numeral 334 denotes the ladder-section of Section D. Said ladder extends up
130

the front of this section and is alined with the ladder-section of Sections A, B, and C, as shown in Fig. 12.

Secured to the rear faces of the lower ends of the posts 304 and 301 and extending slightly above the ends thereof are the hinge members 335 and 336, respectively, which are adapted to be detachably and pivotally secured in contact with said hinge members 235 and 236, respectively, of Section C.

By reason of the construction of Section B, for instance, it will be seen that by removing the bolt which secures one end of a central horizontal tie—for instance, the tie 113—and the two angularly-disposed arms to a corner-post that the ends of said tie and arms may be turned up and down, as in Fig. 12, in order to provide a comparatively large opening in the side of the derrick, through which a drill-stem (not shown) may be taken within the inclosure of the derrick.

Generalities.—Section A is adapted to rest on the ground or on mudsills or in any other manner as may be deemed advisable. Section B is adapted to rest on Section A. Section C is adapted to rest on Section B, and Section D is adapted to rest on Section C, all as shown in Fig. 12. The corner-posts of each of the sections above Section A are adapted to rest on the corresponding corner-posts of the section next below. The corner-posts 1, 101, 201, and 301 are adapted to be detachably secured together by bolts or the like, as indicated in the drawings. In like manner the posts 2, 102, 202, and 302 are secured together, and in like manner the posts 3, 103, 203, and 303 are secured together, as are also the posts 4, 104, 204, and 304. The lower end of each of said posts above Section A has secured to it a downwardly-extending flange or reinforcing-shoe which extends down over the upwardly-projecting portion of the post next below with corresponding apertures to receive retaining-bolts, as indicated in some of the views. Said flanges also serve to retain the abutting ends of the posts in alinement with each other and to break the joints between the posts. In this construction all parts of each of the sections is made entirely of metal, as has been intimated.

I would call attention to the fact that the ladder-sections when assembled extend from the base to the apex of the derrick, as shown in Fig. 12, each ladder-section being removably connected to its derrick-section. The track formed by the track-bars extends from some distance in the rear of the derrick only to the top of Section B, said track being for the purpose which will presently be explained. The working tools for manipulating a well may be suspended inside the derrick from the top of Section D in any well-known manner.

The numeral 400 denotes a truck having

supporting-wheels mounted on the ends of an L-shaped or angle-iron axle, with a tongue extending centrally out from said axle and secured by suitable braces, all substantially as shown in perspective in Fig. 17.

Numeral 401 designates a pulley-block containing two pulley-wheels arranged tandem, with their concave faces opposite to and almost in contact with each other. Said pulley-block 401 is provided with a hook at one end, whereby it may be hooked into an aperture therefor located in the center of the ties 10, 110, and 210, where said pulley will occupy the positions indicated in Figs. 1, 2, 5, and 9.

The numeral 402 refers to a single pulley-block which is provided with a hook at one end, whereby it may be attached in an aperture therefor located in the centers of the ties 112 and 212, as indicated in Figs. 2, 5, 6, and 9.

The numeral 403 designates a lever formed of channel-iron or the like, adapted to be detachably secured to the ladder-sections of the Sections B, C, and D and to extend a considerable distance therebelow, or rather to extend upward when said sections are inverted, and said lever is shown in Figs. 1, 2, 5, 6, and 9. Extending out at right angles from the outer end of the lever is an eyepiece 403^a for the purpose presently appearing, and located a short distance from the end of the lever and from said eyepiece is a second eyepiece 403^b for the purpose presently appearing.

The numeral 404 denotes a cable or the like adapted to be wound on the spindle 29, extending from thence through the pulley-block 401 and provided on its outer end with a hook to engage in either of said eyepieces of the lever 403, as is shown in the drawings.

The numeral 405 denotes a cable or the like adapted to be wound on the spindle 29, extending from thence through the pulley-block 402, and provided on its outer end with a hook to engage in an aperture formed in the outer end portion of the tongue of the truck 400, as shown in Figs. 2, 5, 6, and 9.

Operation of positioning the sections.—As before indicated, Section A is assembled in the position where it is to be employed. The other sections are to be erected up end down to the rear of and near Section A. For example, Section B is erected on the track 32 with its rear side next the rear side of Section A, after which the lever 403 is attached to the ladder 134 and projected upward, as shown in Fig. 1. The cable 404 is then extended from the spindle 29 through the pulley-block 401, and the hook on the end of said cable is attached in the eyepiece 403^b. Then the spindle 29 is revolved to wind thereon and tighten the cable 404 sufficient to tip Section B and bring its hinge members 137 138 in alinement and contact with the hinge

members 25 26 of Section A, and at this time bolts are inserted to join said hinge members, thereby forming a complete hinge of the members 26 and 136 and another hinge of the member 25 and 135. After said hinges are formed, as stated, then the spindle 29 is revolved, as before, thereby turning and raising Section B, and after it has turned on its hinges to the position shown in dotted lines in Fig. 1 the cable will engage the opposite wheel in the pulley-block 401, and the operation of the spindle 29 is reversed, which will eventuate in lowering Section B down gradually into the position it should occupy, as shown in Fig. 2. After Section B is positioned as above stated then the meeting ends of all of the corner-posts of Sections A and B are bolted together, as stated. The remaining sections to be positioned are raised as follows: Referring now to Fig. 2, the truck 400 is now placed on the track which extends back from Section A, with the tongue thereof extending upward, as shown. Section C being now assembled and inverted, its rear upper end is rested in the channel of the axle of said truck and the upper point of the tongue of the truck is placed inside—that is, against the inner face of the tie 208, for which a notch may be provided, as is shown in Fig. 18. The cable 405 is now extended upward from the spindle 29 through the pulley-block 402, and the hook on the outer end of said cable is attached in the aperture 400^a in the outer portion of the tongue of the truck. Now if the spindle 29 be revolved it is manifest that Section C will be elevated, being carried on the truck, the wheels of the truck traveling up the tracks until the hinge members 235 and 236 are alined and contacted with the respective hinge members 137 and 138 of Section B. Pivot-bolts are then inserted to join said respective pairs of hinge members, and thereby complete the hinges, as in Fig. 5. After the above the cable 404 is brought into play, the hook of said cable being attached in the eyepiece 403^b, as in Fig. 5, and the lower portion of the cable 404 is attached on the spindle 29 and adapted to be wound thereon, reversely from the winding thereon of the cable 405. Now at this point the spindle 29 is revolved oppositely to its last rotation, to wind thereon the cable 404, which of course will unwind the cable 405, which will eventuate in turning Section C on its hinges, as shown in Fig. 5, and simultaneously with the turning and raising of Section C the truck will be lowered—that is, it will travel down the track, Section C coming to its upright position synchronously with the truck, reaching the horizontal portion of the track ready for a new load. The lower ends of the posts of Section C are now secured to the upper ends of the posts of Section B, as indicated in Fig. 6. The cables are now unwound from the spindle 29 and the pulley-blocks 401 and 402 are

moved up to the top of Section C, being secured in same manner as before to corresponding parts of the last-named section. Section D is now placed on the truck, as in Fig. 6, the cable 405 being then attached as before, and Section D is raised, and its hinge members 335 and 336 are pivotally connected to the hinge members 237 and 238, as in Fig. 9, and the Section D is then raised and the truck lowered in same manner as before stated in relation of Section C, after which the lower ends of the posts of Section D are secured to the upper ends of the posts of Section C, which will complete the derrick ready for its employment in the usual manner. After the derrick has been assembled as above set forth then the pulleys 401 and 402 may be removed. Also the lever 403 is removed, and, if desired, the said cables may be removed, or they may be employed for other purposes, all to again be brought into employment in dismembering the derrick.

Dismembering.—Desiring now to dismantle and remove the derrick, the reverse operation is taken in lowering the sections, the only difference being that the hook on the cable 404 is to be attached in the eyepiece 403^a in place of the eyepiece 403^b, the object in this being to top the section either forward or backward beyond the point of balance or equipoise, (see Fig. 1,) depending on whether the section is being positioned or removed, respectively. After all the sections have been taken down from pyramidal contact they are each (except Section A) collapsed and folded, as shown in Figs. 15 and 16. It is intended that Section A should be entirely dismembered, after which all of the parts may be loaded in a small compass of space and transported to a new location.

While I have shown and described the best means to me known at this time for carrying out the objects of my invention in a practical manner, I desire to have it distinctly understood that I do not restrict myself to the exact details of construction shown and described, but hold that any changes or variations therein as would suggest themselves to an ordinary mechanic would clearly fall within the limits and scope of my invention.

The terms "upward," "downward," "horizontal," "vertical," and other similar terms are used for convenience of description, and it is not intended by the use of such terms to limit my invention to the relative positions indicated thereby.

Having now fully shown and described my invention and the best means for its construction and operation to me known at this time, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A sectional derrick formed entirely of metal, comprising a base-section and a plurality of collapsible sections extended and arranged one above the other in pyramidal

form, means for raising and lowering the upper sections to and from said positions, hinges for connecting the sections together on one side and means for connecting the sections together on the side opposite said hinges whereby when the sections are all connected they form a complete unit, all substantially as shown and described.

2. A sectional derrick formed of metal, comprising in combination, a base-section adapted to be taken apart and assembled, a plurality of collapsible sections extending upward and arranged one above the other and disposed upon said base-section, means for raising the collapsible sections to position by power, means for allowing a drill-stem to be taken within the derrick after the sections are assembled, and means for hinging and securing all of the sections rigidly together to form a complete unit, all substantially as shown and described and for the purposes set forth.

3. A standard derrick comprising a base-section to be assembled at the point where it is intended to rest, a plurality of upwardly-extending collapsible sections resting on the base-section and disposed one above the other, means for hinging all of the sections together, means for detachably securing all of the sections together, means for raising and positioning the upper sections which means, when reversed, provide the means for disassembling and lowering the upper sections, all substantially as shown and described.

4. A standard-rig derrick composed of a plurality of upwardly and convergently constructed sections each section being of substantially the same dimensions at its base as is the next section therebelow at its apex, means for elevating the sections into position, and means for collapsing the sections for storage or transportation, all substantially as shown and described and for the purposes set forth.

5. A standard-rig derrick formed of sections of upwardly-decreasing dimensions, the corner-posts of each section being securable to the corresponding corner-posts of the adjoining section to form practically rigid corner-posts from bottom to top of the derrick, a plurality of ties and braces extending between each two of the corner-posts of each section, means whereby the four corner-posts of each section may be brought together to collapse the section, and means for detaching an end of certain of said ties and braces whereby they may be turned to one side to form a comparatively large aperture for taking in a drill-stem whereby it may be suspended inside the derrick, all substantially as described.

6. A standard-rig derrick formed of a plurality of metal sections, comprising Section A, Section B, Section C, Section D, the for-

mer being composed of four corner-posts arranged convergently upward and connected together by removable ties and crossing braces, and each of the other sections being formed of four corner-posts arranged convergently upward and connected by removable ties and means whereby the four corner-posts may be brought together to occupy a small amount of space, means for arranging the sections one above the other, and means for disassembling the sections, all substantially as described.

7. A standard derrick comprising in combination, a base-section, a plurality of upper sections of upwardly-decreasing dimensions placed one upon the other and all supported by the base-section, means for rigidly securing the sections together, means for detaching the sections one from the other, a pair of hinges for connecting each two of the sections together, means for turning the upper sections back on their hinges, means for lowering the upper sections after being turned back, and means whereby the upper sections may be folded, all substantially as shown and described.

8. A standard derrick composed of Sections A, B, C and D placed one upon the other in pyramid form, means for detachably hinging together Sections A and B, B and C, C and D, and means for collapsibly assembling each of the Sections B, C and D before they are placed in position, all substantially as shown and described and for the purposes set forth.

9. A deep-well derrick composed of a plurality of metal sections divided horizontally one from the other with means whereby they may be secured together at their corners, hinges for connecting the sections together detachably and independent of the said securing means, a ladder for each of said sections with the members of the ladder arranged in alignment with each other, a track extending from the rear of the base-section inwardly and thence upwardly and secured to certain of the sections, a truck for operating on said track, means for operating the truck, means for carrying certain of the sections on said truck, and means for inverting certain of the sections into operative position after having been raised by the truck, all substantially as shown and described.

10. A derrick composed of a number of separable sections of substantially the same height and of upwardly-decreasing horizontal dimensions, means for collapsing the sections into a space equal to the combined space occupied by their respective corner-posts, a detachable ladder extending from the base to the apex of the derrick, a track extending up a portion of the way on one side of the derrick, a truck for operating on said track, means for raising and lowering the truck, means for elevating certain of the sec-

tions by said truck, means for inverting certain of the sections whereby each will rest on the section next below and at same time lowering the truck, all substantially as shown and described.

11. A derrick comprising in combination, a base-section, a plurality of upper sections constructed identical with each other but of upwardly-decreasing horizontal dimensions, means for detachably assembling the base-section in the position it is to occupy for service, means for hinging the second section to the base-section after the former has been assembled in an inverted position, means for turning the second section on its hinges whereby it will rest on the base-section, means for locking the base-section and the second section together, means for elevating the assembled and inverted third section, hinges for connecting the second and the third sections, means for turning the third section on its hinges whereby it will rest on the second section, means for locking the second section and the third section together, means for elevating the assembled and inverted fourth section, hinges for connecting the third and fourth section, means for turning the fourth section on its hinges whereby it will rest on the third section, and means for locking the third and fourth sections together, all substantially as shown and described.

12. In combination with a derrick composed of a plurality of sections, a track extending up one side of the derrick and also extending outward from the base thereof, a truck adapted to travel on said track, and means for operating the truck on said track, all substantially as set forth.

13. A derrick comprising a base-section, a plurality of collapsible sections, a track connected to certain of the sections and extending out from the lower portion of the base, a truck adapted to travel on said track, means for assembling certain of the sections in an inverted position on said truck, means for connecting certain of the sections to said truck, means for moving the truck to bring the sections contained thereon up even with the section on which it is to rest, means for turning the last-mentioned section to an upright position on top of the preceding section and at same time lowering the truck, all substantially as set forth.

14. In combination, the base-section, a horizontal bull-wheel reel mounted to the base-section, a second section to be assembled in an inverted position at the side of the base-section, hinges for connecting said sections together, a lever extending up from the inverted section, a double pulley-block attached to the upper part of the base-section, a cable extending from around said bull-wheel reel through said pulley with its free end attached to said lever to provide means

whereby as the bull-wheel reel is turned the cable will draw said lever upward thereby turning the second section on said hinges and bringing it to an upright position on top of the base-section, and means for securing said sections together.

15. In combination, the base-section, the second section positioned thereon, a reel mounted to the base-section, a track extending down one side of the base-section and then outward, a truck mounted on said track, a third section of the derrick to be assembled in an inverted position on said truck, means including a cable for elevating said truck to bring the base end of the third section even with the upper end of the second section, hinges for connecting the second and third sections, a lever extending up from the inverted third section, a pulley attached to the upper part of the second section, a cable extending from the outer end of said lever through said pulley and thence to the reel on which it is wound reversely from that of the first-named cable whereby as the reel is revolved reversely to that by which the third section was elevated the third section will be turned on its hinges to an upright position on top of the second section and at same time the truck will be lowered, all substantially as shown and described and for the purposes set forth.

16. In combination, the base-section, the second section positioned on the base-section, the third section positioned on the second section, a track extending down one side of the second and the base sections and then outward, a truck mounted on the outwardly-extending portion of said track, a pulley attached in the upper portion of the third section, a cable attached to said truck from which it extends through said pulley and then down to said reel, a fourth section assembled in an inverted position on said truck, hinges for connecting the third and fourth section, after the fourth section has been elevated to a point even with the upper end of the third section, a lever extending up from the inverted section, a second pulley attached to the upper part of the third section, a cable extending from the outer end of said lever through said second pulley and then to the reel on which it is wound reversely from that of the first-named cable whereby as the reel is revolved reversely to that by which the third section was elevated the third section will be turned on its hinges to an upright position on top of the second section and at same time the truck will be lowered, all substantially as described.

17. A base-section adapted to be assembled in an upright position, a plurality of collapsible sections adapted to be assembled each independent of the others and in an inverted position, a lever adapted to be attached to either of the upper sections, a reel

revolvably mounted in the base-section, a pulley adapted to be attached to the upper portion of either of the sections, a cable extending from said reel through said pulley to said lever, a track secured to the side of the base-section and extending out therefrom, tracks secured to certain of the upper sections, and connecting with the track of the base-section, a truck operable on said track, a pulley attachable to the upper portion of either of the upper sections, a cable extending from said reel through the second-named pulley to said truck, and means for detachably hinging the sections together.

15 18. In a derrick comprising a plurality of collapsible metal sections disposed one above the other and all supported by a disassemblable base-section, means for hinging all of the sections together, means for securing all of the sections together, means for positioning all of the sections above the base-section, means whereby all of the sections may be disassociated, and means for packing the several parts of the derrick into a comparatively small space, all substantially as set forth.

19. A derrick having a plurality of collapsible sections, each consisting of four corner-posts formed of angle-irons, end ties for connecting the four posts at their upper and lower ends whereby said posts will be an equal distance apart, folding means connected between each two of said posts which folding means is operable only when said end ties are removed whereby the four posts may be brought together parallel with each other, all substantially as set forth.

20. In combination with a derrick formed of a plurality of metal sections, the four angle-iron corner-posts for each section, and removable end ties for connecting said posts, a folding means attached between each two of

the said posts and comprising in combination: the two-part tie 113 connecting each two of the posts near their centers, an inverted-U-shaped clip for holding together the overlapping inner portions of said two-part tie, an eyelet passing centrally across the space between the sides of said clip, means for pivotally mounting the inner end portions of the tie 113 on said eyelet, the contacting vertical bars 116 and 117 located parallel with each other, the downwardly and inwardly extending arms 118 119 to which the upper end of the bar 116 is pivoted, the upwardly and inwardly extending arms 120 and 121 to which is pivoted the lower end of the bar 117, means for pivotally securing the outer ends of said arms 118 119 and 120 121 to the corner-posts, a winged clip 122 slidably mounted around the lower portion of the bar 116, a winged clip 123 slidably mounted around the upper portion of the bar 117, the arms 124 and 125 pivoted to the wings of the winged clip 122 and to the corner-posts, the arms 126 and 127 pivoted to the wings of the winged clip 123 and to the corner-posts, a band-clip slidable over and contacting the bars 116 and 117, means for retaining the folding means extended, and means whereby said folding means may be contained in the space formed by the corner-posts when they are brought together after having first removed the end ties, all substantially as shown and described.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

JOHN S. HINES.

Witnesses:

W. E. HEADINGTON,
IDA R. HINES.