April 15, 1952 E. A. BENDER 2,593,246

PORTABLE DERRICK

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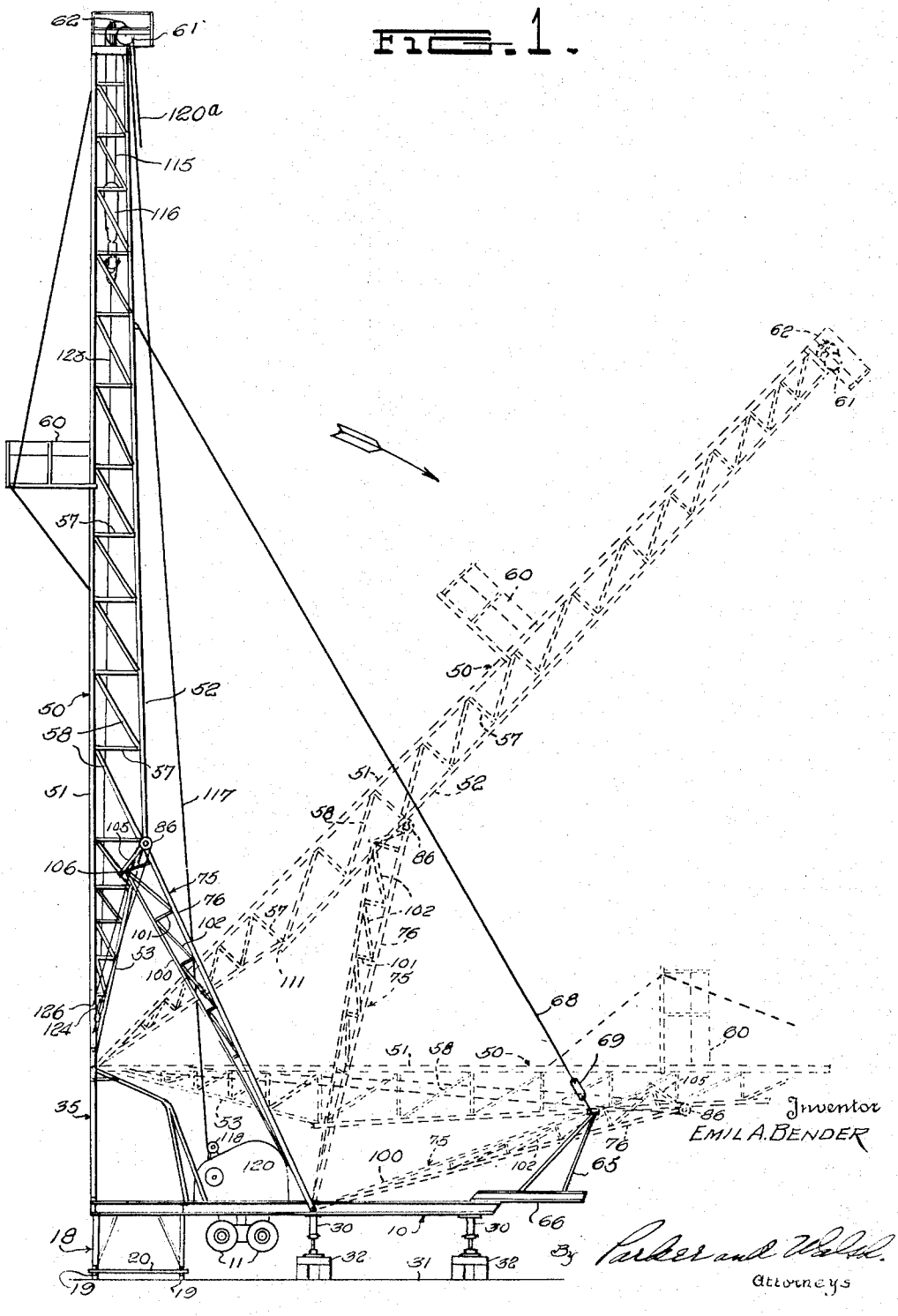
FIG. 1.



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PORTABLE DERRICK

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FIG. 2.

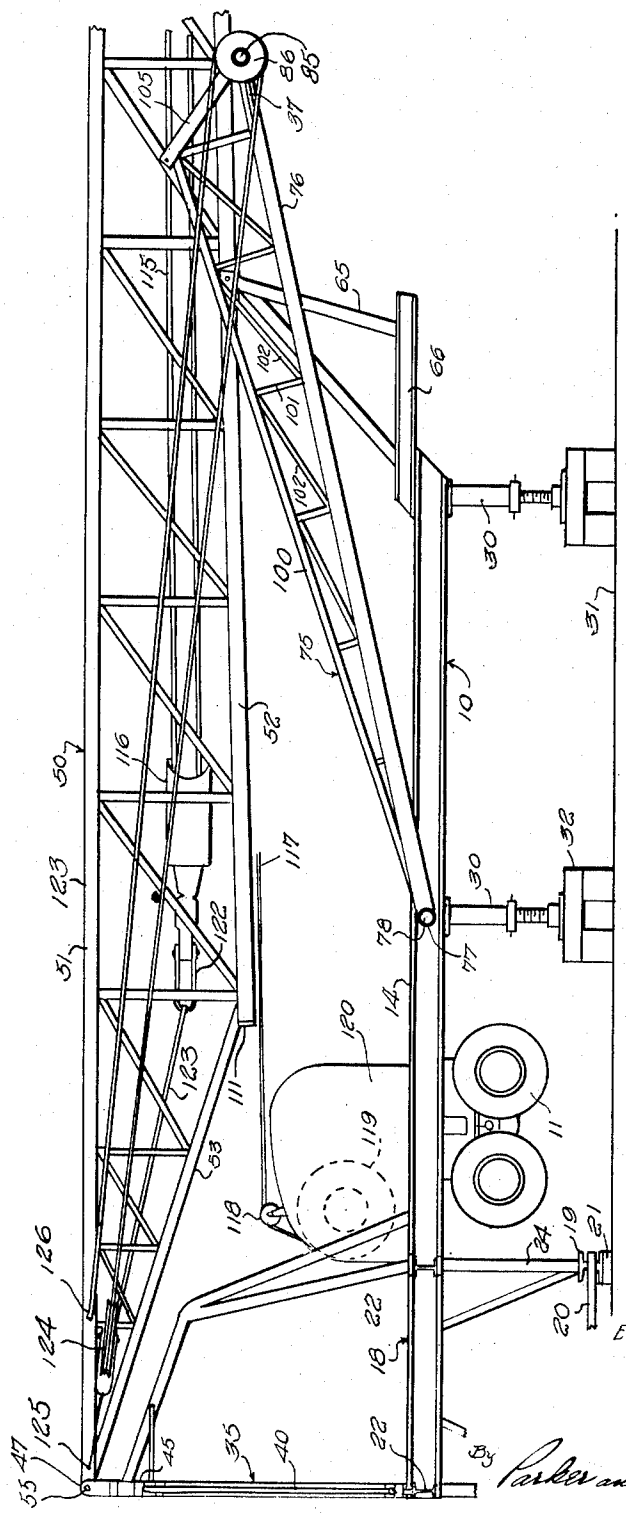

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FIG. 3.

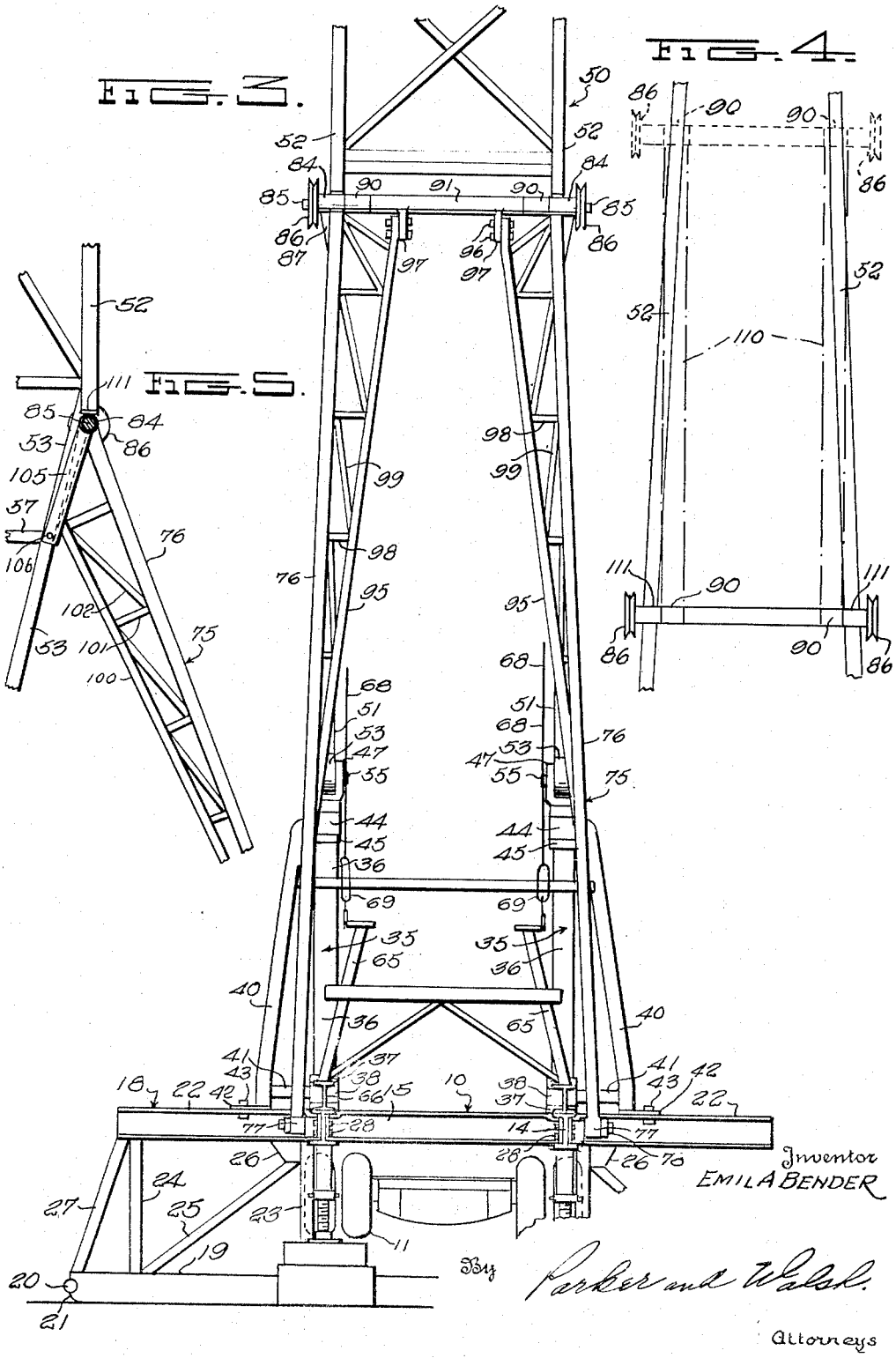

FIG. 4.

FIG. 5.

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FIG. 6

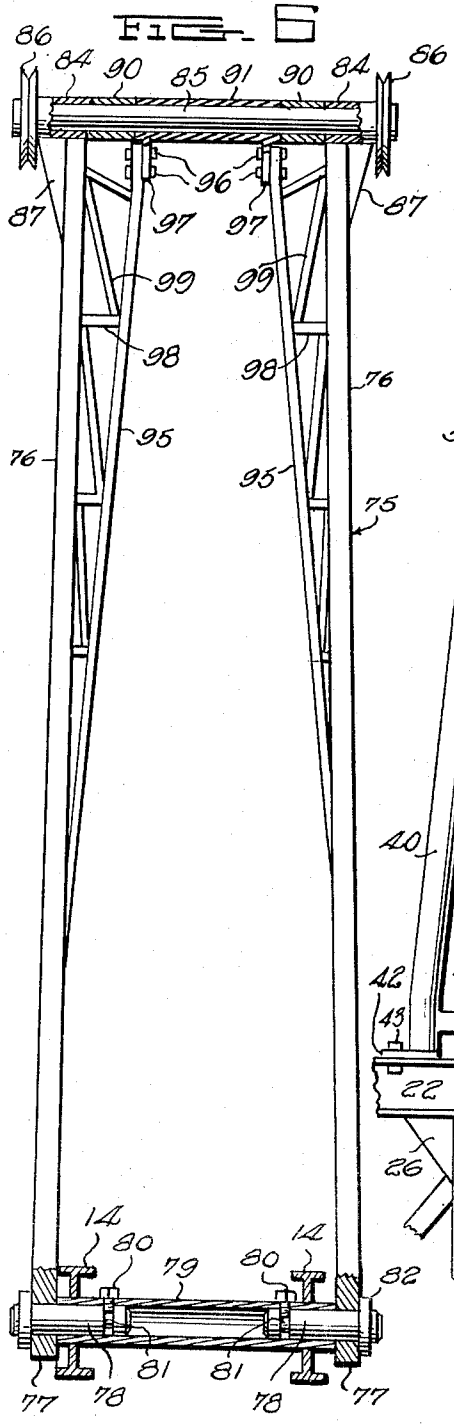

FIG. 7.

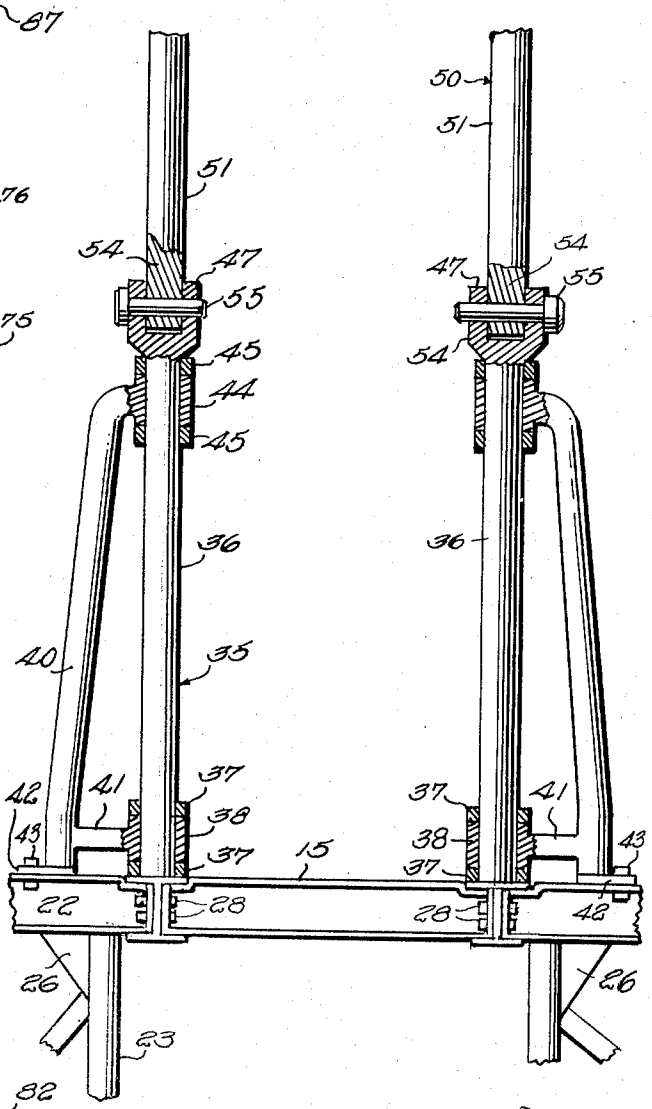

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FIG. 8.

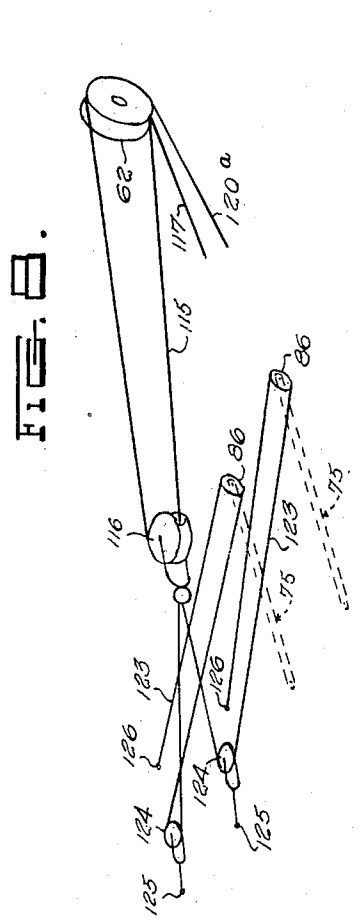

FIG. 9.

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2,593,246

UNITED STATES PATENT OFFICE

2,593,246

PORTABLE DERRICK

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Application August 9, 1948, Serial No. 43,268

12 Claims. (Cl. 189—16)

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This invention relates to portable oil drilling derricks, and more particularly to a portable derrick for use in drilling oil wells.

It has become the increasing practice in recent years to provide portable derricks for use in drilling oil wells as distinguished from the conventional stationary derrick fabricated for permanent installation at the site of operations. A number of such derricks have been found to be reasonably satisfactory in operation, for example the derrick shown in the prior patent to Robert E. McCarthy and Emil E. Bender, No. 2,413,149, granted December 24, 1946.

Wherever a portable derrick can be employed, its use is desirable since it can be put up as a temporary installation and transported from site to site, when needed. The disadvantages in the using of portable derricks lie in the complication involved in the means for raising the bodies of the derricks to operative position and the difficulties usually involved in transporting the structures.

An important object of the present invention is to provide a derrick structure which is more readily portable than prior structures of this general type, the structure being such as to meet state regulations governing road clearances, etc.

A further object is to provide a novel derrick of the portable type which may be much more quickly and easily placed in operative condition than is true of prior structures of this general type.

A further object is to provide a portable derrick which is transportable with the body of the derrick in a horizontal position and wherein the elevating means for the derrick becomes a part of the derrick itself when the body of the derrick has been raised to operative position.

A further object is to provide a portable derrick wherein the elevating means is in the form of a pivoted structure normally folded beneath the derrick and operable by a power source, such as the drawworks, for engaging the derrick to elevate it to its operative position, whereupon the elevating structure assumes an operative position relative to the derrick body to form a permanent part of the derrick structure until the derrick is to be lowered.

A further object is to provide such a structure wherein the elevating means includes rollers engageable with two legs of the derrick body to transmit an elevating force thereto, and wherein the rollers pass out of operation as the derrick body approaches operative position to bring into play another part of the elevating structure which thereupon engages and assists in supporting the

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derrick body, thereby becoming a part of the derrick structure.

A further object is to provide an apparatus of the character just referred to wherein the legs of the derrick body engaged by the rollers of the elevating structure converge toward the normally upper end of the derrick whereby, during the elevating operation, the rollers engage progressively wider portions of such legs, the distance between the roller-engaged legs at the lower extremities thereof being greater than the distance between the remote ends of the rollers whereby the rollers become disengaged from the legs as the latter approach their operative position to permit a separate and rigid portion of the elevating structure to engage and support the legs of the derrick referred to.

A further object is to provide such a structure wherein the roller-engaged legs of the derrick terminate in offset ends forming a stepped-in shoulder solidly engageable by a rigid portion of the elevating structure when the derrick body reaches operative position, whereupon the elevating structure becomes a solid supporting structure for the adjacent side of the derrick.

A further object is to provide a derrick structure of the character referred to wherein the side of the derrick opposite the elevating structure is hinged for swinging movement on a horizontal axis whereby it is free to swing between transportable and operative positions, and to provide novel means for supporting the hinged side of the derrick body including brace arms adapted to be swung out of operative position when the structure is being transported to provide necessary and desirable road clearances.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings, I have shown two embodiments of the invention. In this showing,

Figure 1 is a side elevation of the derrick shown in solid lines in operative position and in dotted lines in horizontal transportable position, and in an intermediate position,

Figure 2 is an enlarged fragmentary side elevation of a portion of the derrick elevating means and supporting base structure, the derrick body being shown in horizontal position,

Figure 3 is a fragmentary rear elevation of the same, the derrick being shown in operative position,

Figure 4 is a diagrammatic view of a portion of the derrick body illustrating the relative move-

ment of certain of the parts of the elevating means relative thereto,

Figure 5 is a detailed fragmentary elevation, parts being shown in section, showing the supporting connection between the derrick body and the elevating means therefor,

Figure 6 is a somewhat enlarged elevation of the elevating structure and associated supporting rails, parts being shown in section,

Figure 7 is an enlarged fragmentary front elevation of the derrick body pivotal supporting means and associated elements, parts being shown in section,

Figure 8 is a diagrammatic representation illustrating the cable lines employed for elevating the derrick, and

Figure 9 is a view similar to Figure 1 showing modified means for applying elevating power to the elevating structure, the derrick body being shown in solid lines in horizontal position and in dotted lines in operative position.

Referring to Figures 1 and 3, the numeral 10 designates the base of the derrick as a whole, and such base is provided with wheels 11 depending therefrom whereby the base with the derrick thereon, as described below, serves as a trailer for hauling the apparatus to and from the site of installation. The base and associated elements form per se no part of the present invention and need not be illustrated in substantial detail.

Generally speaking, the base comprises spaced parallel rails 14, and the spacing of these rails represents substantially the maximum width permitted by traffic regulations in most states which govern the transportation of apparatus of this character. The rails 14 are connected at spaced points by cross members 15, and the rails and cross members are preferably of I-beam section.

At its forward or front end, the base 10 is supported by a substructure indicated as a whole by the numeral 18. This substructure comprises lower spaced structural supporting elements 19 which may be formed of I-beam section and have their ends preferably connected by welded pipe section 20. The ends of the structural elements 19 are curved upwardly as at 21 (Figure 3) whereby the substructure may be skidded into position as referred to below.

The substructure further comprises upper spaced pairs of cross members 22, each pair comprising elements arranged in end to end alignment and preferably in alignment with one of the cross members 15. The members 22 of each pair are supported by vertical posts 23 and 24, the former of which are arranged in relatively close vertical alignment to the rails 14 to transmit vertical loads therefrom directly to the structural elements 19. From each post 24 an angular brace extends from each structural member 19 upwardly and inwardly as at 25. These braces, as is true of the posts 23 and 24, are preferably welded to the member 19. The upper end of each brace 25 may be similarly secured to a gusset plate 26. This plate is welded or otherwise secured to the associated post 23 and cross member 22. Additional outer braces 27 are connected between the ends of the cross members 19 and the associated cross members 22. The inner ends of the members 22 are bolted as at 28 to the rails 14 (Figure 3).

The back or rear side portions of the base 10 are supported on spaced jacks 30 of any desired type. These jacks may rest on the supporting surface 31 or on suitable blocks 32 as shown. Two of the jacks 30 are arranged beneath each side rail 14, and when the parts of the apparatus are in the inoperative or transporting position shown in Figure 2, the load will be wholly supported by the jacks 30 until the base 18 is arranged in position. The base 10 may be raised to elevate the wheels 11 and to lift the apparatus from the tractor bed by which the apparatus is hauled to the site, by proper operation of the jacks 30 whereupon the substructure 18 is skidded into position and the jacks lowered to bring the front end of the base 10 between the spaced ends of the cross members 15. These cross members are then bolted or otherwise secured to the side rails 14 as at 27 (Figure 3). The base 18 then will be properly placed to sustain the weight and principal operating loads of the apparatus when the derrick is elevated in a manner to be described. As stated, the specific base and substructure form no part per se of the present invention, and the same is true of the particular means for elevating the apparatus, such as the jacks 30.

At the forward end of the base 10, there is arranged a supporting structure for the derrick body to be described, such supporting structure being indicated as a whole by the numeral 35. This supporting structure is generally illustrated in Figs. 1, 2 and 3 and is illustrated in detail in Figure 7. Referring to Figure 7, the numeral 36 designates a pair of posts welded or similarly secured at their lower ends to the rail members 14. Near its lower end, each post member 36 carries spaced collars 37 between which is mounted a sleeve 38 adapted to turn on the associated post 36 and outwardly of each post 36 is arranged a rigid angular brace 40, the lower end of which is spaced from and connected to the sleeve 38 by a horizontal brace 41. The brace 40 is provided at its lower end with a foot 42 adapted to be bolted as at 43 to the adjacent cross member 22 when the device is assembled as described below. The upper end of each brace 40 turns inwardly for connection with a sleeve 44, similar to the sleeve 36 and adapted to turn on the associated post 36 between collars 45 fixed to such post. Each post 36 is provided at its upper end with a yoke 47 for a purpose to be described.

The apparatus is provided with a derrick body indicated as a whole by the numeral 50. This derrick comprises spaced front legs 51 (Figures 1, 2 and 7) and spaced rear legs 52 (Figures 1, 2 and 3). The front and rear legs are connected by a structural brace 53 at each side of the derrick. The lower end of each front leg 51 is provided with a bearing 54 arranged between the arms of the associated yoke 47 and a heavy pin 55 connects each front leg to its yoke 47 as shown in Figure 7. It will become apparent that the derrick body 50 is adapted to swing on the horizontal axis of the pins 55 between operative and inoperative positions. The legs of the derrick may be conventionally fixed with respect to each other by suitable girts and braces 57 and 58. The derrick body 50 is preferably provided with the usual fourble board 60 and platform 61. The top of the derrick is provided with any desired type of crown block assembly 62, and this assembly preferably is of the type shown in my prior Patent 2,440,427, granted April 27, 1948. With this type of crown block assembly, the live and dead lines may be arranged externally of the derrick.

The derrick is hauled to the site in the horizontal position shown in dotted lines in Figure 1. In such position, the body of the derrick is supported at one end by the pins 55 and at its opposite end by a cradle 65 supported on beam exten-

sions 66 secured to the rails 14 as shown in Figure 1. To this cradle is connected a pair of guy lines 68 having their other ends connected to the derrick body 50 as shown in Figure 1, each guy line being provided with a suitable turnbuckle 69 to tighten it after the derrick body has been elevated as shown in solid lines in Figure 1.

The elevating means for the derrick body is indicated as a whole by the numeral 75, and as will be described below, such means becomes a permament part of the derrick body to support the back side thereof when the derrick is in its operative position shown in solid lines in Figure 1. The elevating means is shown in detail in Figure 6 of the drawings. Such means comprises spaced legs 76, the lower ends of which have welded or otherwise secured thereto collars 77 rotatable on pins 78 mounted in a rigid cross tube 79 extending through and welded to the rails 14, as clearly shown in Figure 6. These pins are held in position by screws 80 threaded through the tube 79 and engageable in annular grooves 81 formed in the pins 78. These pins are provided with heads or collars 82 at their outer ends to prevent the spreading of the legs 76. At its upper end, each leg 76 has a sleeve 84 welded thereto. These sleeves are in axial alignment and receive a shaft 85 extending therethrough and provided at its ends with sheaves 86 rotatable thereon. Each sleeve 84 projects outwardly beyond the associated leg 76 and is braced relative thereto by a welded gusset plate 87. Adjacent the inner end of each sleeve 84 is arranged a roller sleeve 90 for a purpose to be described. These roller sleeves are spaced a substantial distance from each other as shown in Figure 6 and between them is arranged another sleeve 91 acting as a spacer for the roller sleeves. The sleeves 84 and 91 are preferably spot-welded or otherwise fixed to the shaft 85 to increase the rigidity of the structure.

Each leg 76 is provided with a brace leg 95 fitted and welded to the associated leg 76 at one end and diverging from the leg 76 towards the shaft 85 as clearly shown in Figure 6. These brace legs are bolted as at 96 to lugs or plates 97 welded to the sleeve 91. This materially assists in bracing and increasing the rigidity of the legs 76 and the spaces between each leg 76 and its brace leg 95 is provided with preferably welded girts and braces 98 and 99.

The legs 76 and their bracing elements 95, 98 and 99 lie in a common plane transversely of the derrick body and greatly increase the transverse rigidity of the derrick when the parts are assembled as will be described, under which conditions the elevating means 75 becomes in effect a part of the derrick. The legs 76 are further braced in planes parallel to each other by upwardly diverging brace legs 100 (Figures 1 and 2) diverging upwardly from the legs 76 and fixed relative thereto by girts and braces 101 and 102. At its upper end, each leg is provided with a structural member 105 (Figure 5) forming a rigid connection between such leg 76 and the associated brace leg 100. Each member 105 is welded to the associated brace leg 100 and to the associated sleeve 84, each member 105 lying slightly outwardly of the associated leg 76. When the parts are assembled, each member 105 will be engageable against the associated angle brace 53 of the derrick body and will be bolted thereto as at 106 (Figure 5) with the lower end of each derrick leg 52 resting squarely on the associated sleeve 84.

Attention is invited to the diagrammatic showing in Figure 4 in which the normal positions of the roller sleeves relative to the derrick legs 52 have been shown in dotted lines, that is, the positions in which the rollers 90 will engage the derrick legs 52 when the structure is brought to the site in the horizontal dotted line position shown in Figure 1. The rollers 90 and associated elements have been shown relative to the legs 52 in the positions they will occupy when the derrick is in the operative position shown in Figure 1. It will be noted that the legs 52 diverge toward their lower ends, and the rollers 90 are so spaced from each other that they squarely engage the rear faces of the legs 52 in the initial positions of the parts. As the derrick is elevated in the manner to be described, the rollers 90 move downwardly following the relative paths indicated by the broken lines 110 in Figure 4, the rollers moving inwardly relative to the legs 52 as the lower ends of the latter are approached and when the rollers 90 reach the operative positions of the parts the remote limits of the rollers will lie in positions coincident with or slightly inwardly of the adjacent limits of the legs 52. In such positions of the parts, the lower extremities 111 of the legs 52 (Figures 4 and 5) will form shoulders engageable with the sleeves 84 which, in turn, are rigid with the legs 76 and the structural elements connected thereto. As will be described below, this arrangement of the rollers is to reduce frictional engagement of the elevating means with the derrick body until the derrick approaches vertical position at which point frictional resistance to movement of the derrick by the elevating means approaches zero.

As previously stated, the derrick is provided with any desired type of crown block assembly 62 and the lines 115 are reeved around the sheaves of the crown block assembly and around the sheaves of a conventional traveling block 116. The live line 117 from the crown block assembly passes around a sheave 118 and thence around the drum 119 of a conventional drawworks 120, shown in the preferred form of the invention as being supported on the base of the apparatus. The sheave 118 is employed for the reason that the line 117 extends substantially horizontally in the initial derrick elevating operation, and the sheave 118 serves to protect the line 117 from injury by any part of the drawworks. The dead line 120a (Figure 1) passing from the crown block assembly is fixed to any suitable point on the base structure 10.

The traveling block 116 is provided with a yoke 122 to which is connected one end of each of a pair of lines 123. Each of these lines, as shown in Figure 2 and as shown in the diagrammatic perspective in Figure 8, passes around a sheave 124 anchored as at 125 to the main derrick body 50. From these sheaves 124, the lines pass along the sides of the derrick body and around the sheaves 86, which are carried by the elevating means 75 as previously described. From the sheaves 86, the line 123 passes back along the side of the derrick body 50 as shown in Figure 2 and is fixed to the derrick body as at 126 (Figure 2).

The modified form of the invention shown in Figure 9 is identical with the form previously described except for the means for reeling the live line 117. In the form of the invention previously described, the drawworks is arranged on the base 14. The apparatus is operative regardless of the means for winding the fast line. The drawworks may be employed and it may be arranged on the base 10. Alternatively, a draw-

works 128 may be employed and arranged beyond the base 10, in which case the live line 117 may be passed around a sheave 129 journaled coaxially with the pivot pins 55 (Figure 5), the arrangement of the sheave 129 being generally indicated in Figure 7.

Operation

The parts of the apparatus are hauled to the site in any suitable manner. Preferably, the base structure 10 with the derrick body 50 arranged horizontally thereover is employed as a trailer with the derrick overhanging and supported by the bed of a tractor. The sub-base and other elements of the apparatus can be transported on a separate vehicle.

The base 10 and associated elements are rolled into position at the site, whereupon the parts are raised by the jacks 30 to a position with the cross member 15 (Figure 3) and the adjacent ends of the rails 14 above the level of the cross members 22. The substructure is then skidded into position, the base structure lowered by the jacks to bring the cross member 15 into the position shown in Figure 3, whereupon the bolts 28 are applied. The base structure is transported with the braces 40 swung inwardly about the axes of the posts 36 to positions within these posts thus reducing the overall width of the structure to keep within road clearance limits. After the bolts 28 have been applied, the braces 40 are swung outwardly to the positions shown in Figure 7 and bolted to the cross members 22 as at 43.

The lines 117 and 123 are arranged as shown in the various figures, and the drawworks is started into operation to wind the line 117 on the drum 119. This winding operation obviously transmits force to the traveling block 116 to cause the latter to travel within the body of the derrick 50 toward the crown block assembly, thus pulling on the lines 123. These lines pass around the sheaves 124 and 86 and through the latter sheaves apply pulling forces to the elevating means to swing the latter around the axis of the pins 78 (Figure 6). The distance between the pulling forces of the lines 123 and the axis of the pins 78 perpendicular to the lines of pulling forces represents the moment arm of the lever represented by the elevating structure. Substantial forces are required during initial elevation of the structure 75, but these forces are much less than would appear and are well within practical limits.

The pulling forces thus applied swing the elevating structure 75 to move the free end thereof upwardly and elevating forces will be applied against the derrick legs 52 through the roller sleeves 90 which, during the initial operation, are squarely engaged against the legs 52 as indicated in dotted lines in Figure 4. The moment arm of the lifting lever obviously progressively increases as the derrick is swung upwardly, thus progressively reducing the elevating forces which must be applied to the derrick body. During a substantial portion of the initial movement of the derrick body, the roller sleeves 90 will remain in full engagement with the derrick legs 52. These roller sleeves substantially reduce frictional resistance to the elevating operation as will be apparent.

The roller sleeves 90 move in the parallel paths indicated by the broken lines 110 in Figure 4 while the derrick legs 52 diverge toward their lower ends. A progressively reducing portion of each roller sleeve 90 accordingly will contact with the legs 52, but adequate forces will be applied through the roller sleeves since the force necessary to raise the derrick is progressively reduced, as stated. However, it will be noted that as the roller sleeves 90 move relatively inwardly with respect to the derrick legs 52, the stationary sleeves 84 will come progressively into engagement with the derrick legs. As the vertical position of the derrick is approached, the rollers 90 will move completely out of engagement with the derrick legs and the final lifting operation, which requires little force and in which friction is of little consequence, will be effected by the stationary sleeves 84. When the derrick reaches vertical position, the sleeves 84 will slip beneath the shoulders 111 (Figure 5) thus placing the elevating structure 75 in a position to support the back side of the derrick. When this position is reached, the bolts 106 are applied and tightened as shown in Figure 5, thus fixing the structure 76 relative to the derrick body 50. Thus, the structure 76 becomes an integral part of the derrick, which is now ready for operation. The lines 123 are then disconnected and the crown block assembly and traveling block are used in their ordinary and intended manner to perform their regular function. Of course, the derrick body preferably will be guyed, for example, through the use of the guys 68, the turnbuckles 69 of which are tightened after the foregoing operations have been completed to assist in bracing the derrick against any forces applied thereto and to assist in holding the shoulders 111 firmly in engagement with the supporting sleeves 84.

The procedures described above may be employed in reverse order for lowering the derrick. The lines 123 will be hooked up and tightened, whereupon the bolts 106 (Figure 5) will be removed. The lines 123 will be slightly slacked off, whereupon the transmission of a pulling force to the upper portion of the structure 75 toward the rear side of the derrick will unseat the sleeves 84 from beneath the shoulders 111. The operator will then progressively unreel the line 117 from the drawworks and the derrick body 50 may be slowly lowered to its horizontal position. The remaining operations for dismantling the apparatus and transporting it from the site of operations will be obvious.

The operation of the apparatus shown in Figure 9 will be identical with the operation previously described, this form of the invention being shown merely to indicate how a source of power for effecting the derrick elevating operation may be applied from a point externally of the derrick and its base.

From the foregoing, it will be apparent that the present structure is of a novel and readily transportable type and is so designed that its transportation readily can be made to meet highway clearance requirements in any state. The derrick structure is very readily set up at the site and very easily operated to swing the derrick to and anchor it in its operative position. The apparatus requires no separate or extraneous means for elevating the derrick body, the means employed for elevating the derrick being left in position throughout the operation of the derrick since it serves as an integral part of the derrick in the operation thereof.

I claim:

1. A portable derrick structure comprising a base, an upstanding structure carried by the front end of said base, a derrick body having one side pivotally connected to said upstanding structure for swinging movement on a horizon-

tal axis, an elevating structure pivotally connected at one end to said base for swinging movement on a fixed horizontal axis parallel to and spaced from said first-named axis, said derrick body being movable between an inoperative substantially horizontal position and a substantially vertical operative position, and said elevating structure lying beneath the opposite side of said derrick body when the latter is in inoperative position, the other end of said elevating structure movably engaging said derrick body from said opposite side of said derrick body, and means having mechanical connection with said elevating structure for applying force to said elevating structure to swing it upwardly to move said derrick body to operative position, said opposite side of said derrick structure having a shoulder engaging said other end of said elevating structure when said derrick is in its operative position whereby said elevating structure serves as a support for said opposite side of said derrick body

2. A portable derrick structure comprising a base, an upstanding structure carried by the front end of said base, a derrick body having one side pivotally connected to said upstanding structure for swinging movement on a horizontal axis, an elevating structure pivotally connected at one end to said base for swinging movement on a fixed horizontal axis parallel to and spaced from said first-named axis, said derrick body being movable between an inoperative substantially horizontal position and a substantially vertical operative position, and said elevating structure lying beneath the opposite side of said derrick body when the latter is in inoperative position, the other end of said elevating structure having contact portions engaging said derrick body from said opposite side of said derrick body, a crown block assembly and a traveling block assembly carried by said derrick body, and means having mechanical connection between said traveling block assembly and said elevating structure transmitting motion from said traveling block assembly to said elevating structure to swing the latter and swing said derrick body to its operative position.

3. Apparatus constructed in accordance with claim 2 wherein said derrick body has a shoulder engaging said other end of said elevating structure when said derrick body is in its operative position whereby said elevating structure serves as a support for said opposite side of said derrick body.

4. Apparatus constructed in accordance with claim 2 wherein said derrick body has a shoulder engaging said other end of said elevating structure when said derrick body is in its operative position whereby said elevating structure serves as a support for said opposite side of said derrick body, said opposite side of said derrick body having legs diverging away from said crown block assembly, said contact portions comprising rollers engaging with said legs and through which lifting forces are transmitted to said derrick body, said rollers being axially aligned and having their remote limits spaced apart a distance slightly less than the distance between said legs at the shoulders of said derrick body whereby said rollers become disengaged from said legs and other portions of said supporting structure engage such shoulders when said derrick body reaches operative position.

5. A derrick structure comprising a horizontal base, a derrick body having one end thereof pivotally connected to said base for swinging movement on a horizontal axis between a substantially vertical operative and a substantially horizontal inoperative position in the latter of which the derrick body extends in one direction from its pivotal connection with said base, an elevating structure of fixed length pivotally connected at one end to said base for swinging movement on a fixed horizontal axis spaced in said direction from said first-named axis, said elevating structure lying beneath said derrick body when the latter is in its inoperative position and having its other extremity projecting in said direction and engaging said derrick body from the side thereof on which said elevating structure is pivoted, and means for swinging said elevating structure about its pivot axis to swing said derrick body upwardly to its operative position, said derrick body and said elevating structure swinging in the same direction about their pivot axes as said derrick structure moves toward its operative position, and means securing said other extremity of said elevating structure to said side of said derrick body when the latter is in its operative position, whereby said elevating structure becomes a fixed means for supporting said derrick body in its operative position.

6. A derrick body comprising a horizontal base, a derrick body having one end thereof pivotally connected to said base for swinging movement on a horizontal axis between a substantially vertical operative and a substantially horizontal inoperative position in the latter of which the derrick body extends in one direction from its pivotal connection with said base, an elevating structure of fixed length pivotally connected at one end to said base for swinging movement on a fixed horizontal axis spaced in said direction from said first-named axis, said elevating structure lying beneath said derrick body when the latter is in its inoperative position and having its other end projecting in said direction and engaging said derrick body from the opposite side thereof, and means for swinging said elevating structure about its pivot axis to swing said derrick body upwardly to its operative position, said derrick body and said elevating structure swinging in the same direction about their pivot axes as said derrick structure moves toward its operative position and said derrick structure having a portion supportingly engaged by said other end of said elevating structure when said derrick body is in its operative position, and means securing said other end of said elevating structure to said opposite side of said derrick body when the latter is in its operative position.

7. A derrick structure comprising a base, a derrick body having one side thereof pivotally connected to said base for swinging movement on a horizontal axis between a substantially horizontal inoperative position and a substantially vertical operative position, an elevating structure of fixed length pivotally connected at one end to said base for swinging movement on a fixed horizontal axis and occupying an inoperative position beneath the other side of said derrick body when the latter is in its inoperative position, means for transmitting power to said elevating structure to swing it upwardly from its inoperative position with its other end engaging said derrick body from said other side thereof to swing said derrick body to said opera-

tive position thereof, the pivot axis of said elevating structure being offset outwardly away from said other side of said derrick body when the latter is in its operative position whereby said elevating structure inclines upwardly and inwardly toward said derrick body, and means operative to releasably secure said other end of the elevating structure to said other side of the derrick body when said derrick body is in said operative position whereby said elevating structure becomes a permanent means for supporting said other side of said derrick body.

8. A derrick structure comprising a base, a derrick body having one side thereof pivotally connected at its lower end to said base for swinging movement on a horizontal axis between a substantially horizontal inoperative position and a substantially vertical operative position, the other side of said derrick having an element facing downwardly when the derrick body is in operative position, a rigid elevating structure of fixed length pivotally connected at one end to said base for swinging movement on a fixed horizontal axis parallel to said first-named horizontal axis, said elevating structure lying beneath said derrick body when the latter is in its inoperative position and having its other end engaging said derrick body from said other side thereof, and means for applying a force to said elevating structure to swing it upwardly and move said derrick body upwardly to its operative position, the pivot axis of said elevating structure being offset outwardly from said other side of said derrick body when the latter is in operative position whereby, when said elevating structure has swung said derrick body to its operative position, said elevating structure will incline upwardly and inwardly toward said derrick body, said elevating structure, when said derrick body is in said operative position, having a portion underlying said downwardly facing element to support said derrick body from said other side thereof.

9. An apparatus constructed in accordance with claim 8 wherein the second-named end of said elevating structure is provided with rollers engaged with said derrick body to elevate the latter.

10. An apparatus constructed in accordance with claim 8 wherein the means for applying a force to said elevating structure comprises sheaves carried by said other end of said elevating structure, and lines passing around said sheaves, each line having a dead end and a live end to which a pulling force may be applied to swing said elevating structure upwardly.

11. A portable derrick structure comprising a base, an upstanding structure carried by said base, a derrick body having one side pivotally connected to said upstanding structure for swinging movement on a horizontal axis, an elevating structure pivotally connected at one end to said base for swinging movement on a horizontal axis parallel to and spaced from said first-named axis on the opposite side of the derrick body, said derrick body being movable between an inoperative substantially horizontal position and a substantially vertical operative position, and said elevating structure lying beneath the opposite side of said derrick body when the latter is in inoperative position, said derrick body having a shoulder supportingly engaged by the other end of said elevating structure when said derrick body is in its operative position whereby said elevating structure serves as a support for said opposite side of said derrick body, said other end of the elevating structure having rollers engaging with portions of said derrick body and through which lifting forces are transmitted thereto.

12. A derrick structure comprising a base, a derrick body having one end thereof pivotally connected to said base for swinging movement on a horizontal axis between a substantially vertical operative and a substantially horizontal inoperative position in the latter of which the derrick body extends in one direction from its pivotal connection with said base, an elevating structure of fixed length pivotally connected at one end to said base for swinging movement on a fixed horizontal axis spaced in said direction from said first-named axis, said elevating structure lying beneath said derrick body when the latter is in its inoperative position and having its other extremity projecting in said direction and engaging said derrick body from the side thereof on which said elevating structure is pivoted, and means for swinging said elevating structure about its pivot axis to swing said derrick body upwardly to its operative position, said means including a sheave carried by said other end of the elevating structure, a further sheave carried by the derrick body, a line passing around said sheaves and having a dead end connected to said derrick body and a live end, and means mounted on said derrick body for applying a pulling force to said live end to swing said elevating structure upwardly, as aforesaid.

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