April 12, 1938. T. S. DIETLE 2,114,215

COLLAPSIBLE DERRICK

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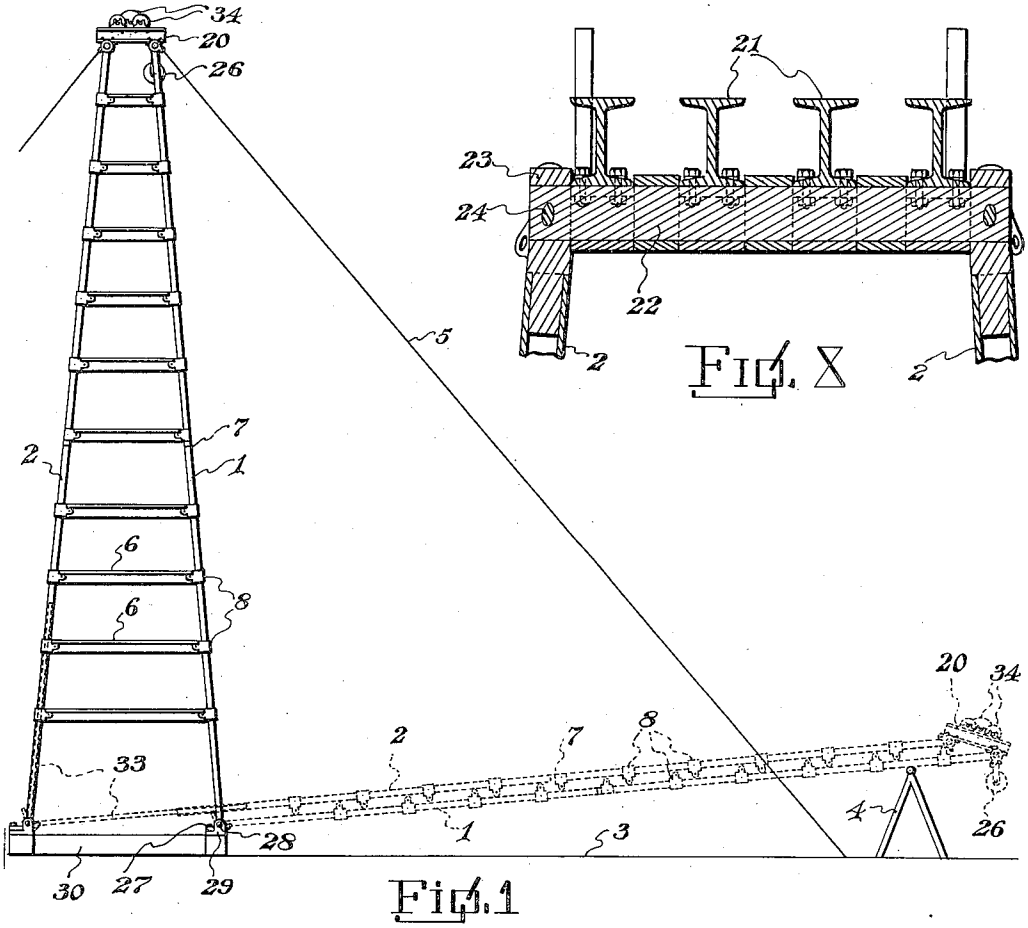


Fig. 1

Fig. X

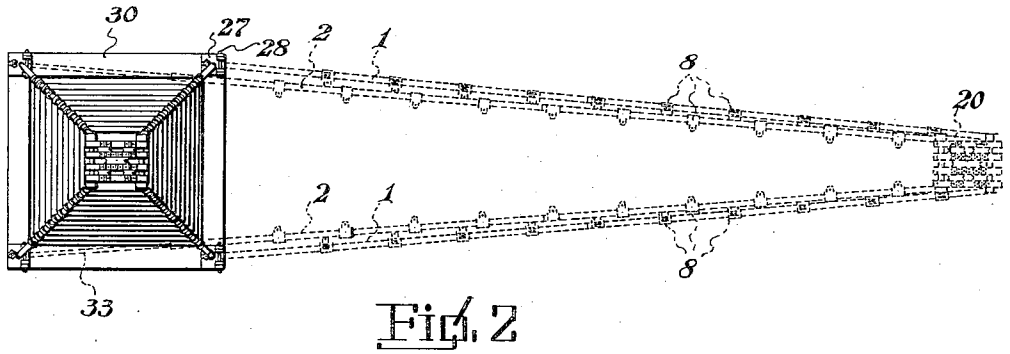


Fig. 2

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Fig. 3

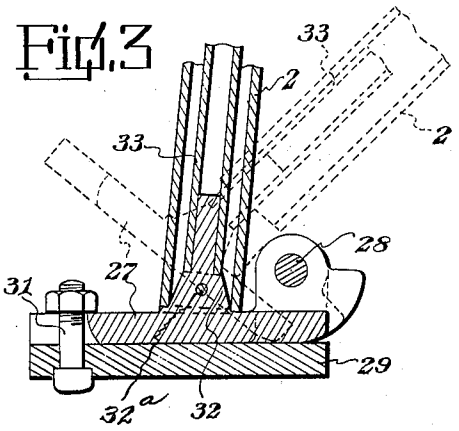
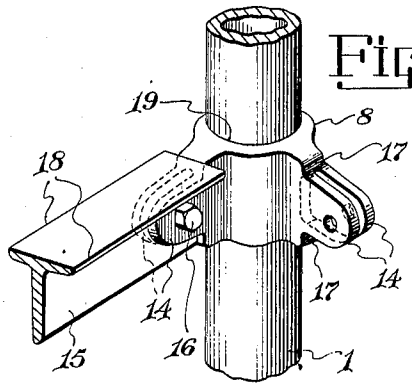


Fig. 4



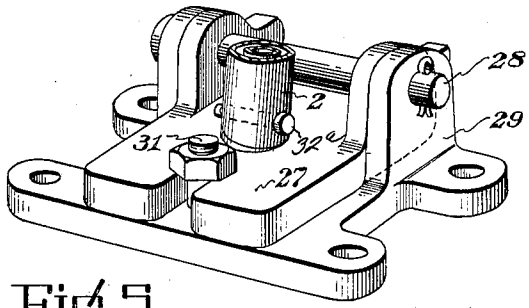


Fig. 5

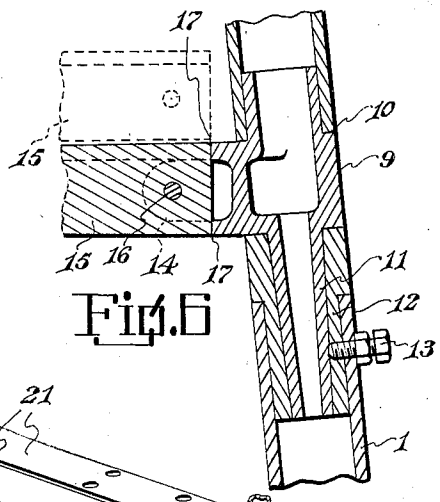


Fig. 6

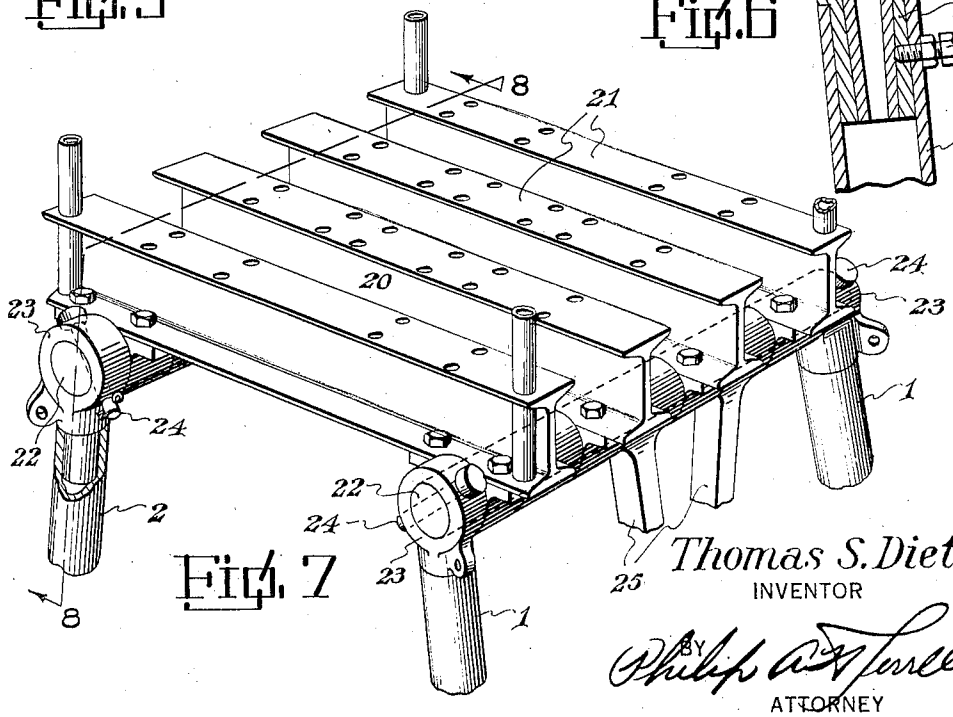


Fig. 7

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Patented Apr. 12, 1938 2,114,215

UNITED STATES PATENT OFFICE

2,114,215

COLLAPSIBLE DERRICK

Thomas S. Dietle, Pawhuska, Okla.

Application June 28, 1937, Serial No. 150,847

6 Claims. (Cl. 189—16)

The invention relates to collapsible derricks and has for its object to provide a device of this character constructed in a manner whereby its uprights and crown block may be assembled on the ground, or adjacent the ground and then the structure forced to a vertical position thereby spreading the lower ends of the uprights on the base on which the derrick is mounted and allowing the uprights to be tied together by girders.

A further object is to provide the uprights, at one side of the derrick, with telescopic connections pivoted to the base and forming means whereby, when the uprights are in lowered position adjacent the ground, they will assume positions adjacent each other, and when forced to an upright position the telescopic connections will guide their uprights to proper position.

A further object is to guide the lower ends of the uprights having the telescopic connections whereby said lower ends are guided onto bosses carried by hinged plates forming supporting means for the uprights.

A further object is to connect the lower ends of the uprights to hinged plates carried by the derrick base, which plates are provided with bosses extending into the upright ends and holding means for anchoring said hinged plates against movement when the uprights are in raised position.

A further object is to hingedly connect the upper ends of the uprights to the crown block, and the lower ends of the uprights to the base whereby the structure without the girders may have a substantial parallel collapsing movement when the derrick is lowered or assembled, and an open or extended movement when the derrick is raised.

A further object is to form the uprights from a limited number of sections or connections thereby preventing weakening of the uprights by use of a plurality of short sections connected together by sleeves to which the ends of the girders are connected.

A further object is to provide the uprights with fittings having spaced ears, between which the vertical flanges of the girder ends are received and held, against spaced shoulders.

A further object is to provide a collapsible derrick formed from uprights hingedly connected to a base at their lower ends and to a crown block at their upper ends, and adapted to be assembled on the ground and moved to a vertical position, and to provide the uprights with fittings adapted to receive the girder ends for forming a rigid structure and obviating the danger, time and labor now necessary in building derricks piece by piece from a base upwardly.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawings, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:

Figure 1 is a side elevation of the derrick, showing the same assembled in full line and in collapsed condition in dotted lines.

Figure 2 is a top plan view of the derrick showing the derrick collapsed in dotted lines.

Figure 3 is a vertical longitudinal sectional view through one of the hinged anchoring plates and a portion of one of the telescopic upright ends.

Figure 4 is a detail perspective view of one of the spaced girder holding sleeves.

Figure 5 is a perspective view of one of the hinged base plates for one of the telescopic upright ends.

Figure 6 is a vertical transverse sectional view through one of the upright joints.

Figure 7 is a perspective view of the upper end of the derrick showing the crown block.

Figure 8 is a vertical transverse sectional view taken on line 8—8 of Figure 7.

In derricks heretofore constructed the various uprights have been formed from a plurality of short pipe sections having connecting fittings, to which the horizontal girders are attached, however this multiplicity of joints weakens the derrick, particularly when it is high for instance eighty or a hundred feet, and the derrick as a whole has to be built up piece by piece which involves considerable labor and time, which is dangerous, as many of the parts are heavy and are handled under great difficulty.

In the present device the uprights 1 and 2 of the derrick are assembled adjacent the ground level 3, and preferably on a supporting member 4, and after so assembled the uprights are pulled to a vertical position in any suitable manner, preferably by guy lines 5, and after which the connecting girders 6 are placed in position.

Each of the uprights 1 and 2 is formed from a plurality of sections joined together at 7, for instance in two sections, thereby preventing weakening of the joints and structure as a whole. The uprights are also provided with girder supporting sleeves 8 at spaced intervals. The joints

7, referring to Figure 6, are preferably formed from connector members 9 having their upper ends welded or otherwise secured at 10 in one of the upright sections, and their lower tapered ends 11 held in the tapered sleeve 12 in the upper end of the lower upright section and securely held therein by a set bolt 13, therefore it will be seen that a rigid braced joint is formed. The connector members 9 are provided with spaced ears 14, which receive therebetween a vertical flange 15 of one of the girders 6, and said girder ends are securely held in place by bolts 16 extending through the ears 14 and the flanges. It will be noted that the connector members 9 are provided with inwardly offset shoulders 17 engaging the girder ends.

By inwardly offsetting the shoulders 17, it will be seen the girders can be lowered into position between the ears 14, for instance from the dotted line position shown in Figure 6, and by providing spaced shoulders 17, they will engage the girder ends at spaced points and insure a positive holding thereof. The horizontal flanges 18 of the girders overlie the upper sides of the ears 14 as clearly shown in Figure 4. In Figure 4 is shown the girder supporting sleeves 8, which are welded at 19 to the uprights, however they are provided with spaced ears 14 and shoulders 17, similar to those shown in Figure 6 for the reception of girder ends. All of these parts are assembled while the uprights 1 and 2 are in the position shown in dotted lines in Figure 1.

After assembling of the uprights 1 and 2 in the dotted line position shown in Figure 1, the crown block 20 is placed in position. The crown block 20 comprises a plurality of transversely extending I beams 21, having their ends rockably mounted on transverse shafts 22, which extend beyond the sides of the crown block and are rockably mounted in sleeve fittings 23 carried by the upper ends of the uprights 1 and 2. To maintain the sleeve fittings 23 on the shaft ends, pins 24 are provided, which extend through the sleeves and shaft ends, thereby preventing displacement of the sleeve and allowing the I beam ends to rock on the shafts during the derrick raising or lowering operation. Extending downwardly from one of the shafts 22 are pivotally mounted arms 25, between which is rotatably mounted a sand sheave 26, over which conventional derrick rigging extends. The lower ends of the uprights 1 are connected to hinged plates 27, hingedly mounted at 28 on brackets 29 carried by the derrick base 30, similar to the plates shown in Figure 5 for supporting uprights 2.

Hinged plates 27 are rigidly held against hinged movement by means of holding down bolts 31, as shown in Figure 5 and Figure 3. When the device is lowered the nuts are removed from these bolts to allow the hinged plates 27 to hingedly move so the uprights may assume the dotted line position shown in Figure 1, or the vertical position when being raised. All of these plates are similarly constructed, however the plates 27 carried by the uprights 2 are provided with upwardly tapered portions 32 having secured thereon inner telescopic members 33, which are preferably tubular and of smaller diameter than the inner diameter of the lower ends of the uprights 2. It will be noted that by providing this play movement relative to the difference in size of uprights 2 and inner telescopic member 3, the telescoping action will be a free one and when the derrick is raised the lower ends of the uprights 2 will slide over the upwardly tapered portions 32 into engagement with the plates 27, and will be held against lateral displacement by the tapered portions 32. After the raising operation the holding down bolts 31 are tightened for holding the plates 27 against pivotal movement.

After the raising operation the girders 6 are assembled in the various fittings carried by the uprights thereby forming a rigid derrick structure, and one which may be quickly assembled and disassembled with the minimum amount of labor, time and cost. The crown block 20 may support the usual mechanism, for instance the crow's nest and various pulleys 34.

From the above it will be seen that a collapsible derrick structure is provided which can be entirely assembled with the exception of the girders, while in a collapsed position adjacent the ground and easily and quickly raised for the reception of the bracing girders.

Referring to Figure 3, it will be seen that a tapered pin 32*a* is provided which is passed through the uprights 2 and conical portion 32 for positively holding the device against retrograde movement after it is erected. This pin is also shown in Figure 5.

The invention having been set forth what is claimed as new and useful is:

1. A collapsible derrick comprising a base, upwardly extending corner uprights hingedly connected to the base, a crown block to which the upper ends of the corner uprights are hingedly connected, girders detachably connecting the uprights, the lower ends of the uprights at one side of the derrick having an extensible connection to the base and forming means whereby when the girders are removed and the uprights are hingedly collapsed towards the ground, said uprights will assume positions adjacent each other and when raised all of the uprights will be practically the same length and the crown block substantially horizontally disposed.

2. A device as set forth in claim 1 wherein the lower ends of the uprights are connected to hinged plates carried by the base and means for holding said hinged plates against hinged movement when the uprights are in raised positions.

3. A device as set forth in claim 1 including hinged plates carried by the base and to which the lower ends of the uprights are connected, the hinging point of the plates being disposed to one side of the uprights and means for holding said hinged plates from movement when the uprights are in raised position.

4. A device as set forth in claim 1 wherein the extensible connections comprise a loosely mounted member extending into the lower ends of uprights, hinged plates on which said loosely mounted members are rigidly held, said hinged plates being hingedly connected to the base.

5. The combination with a derrick having corner uprights, the uprights at one side thereof having telescopic connection to a base, said connection comprising a hinged plate, an upwardly extending member loosely mounted in the lower end of the uprights and a conical portion carried by the plate and forming means for centering the uprights when they are in raised position.

6. The combination with a device as set forth in claim 5, of means for anchoring the hinged plates to the base when the uprights are in raised positions.

THOMAS S. DIETLE.