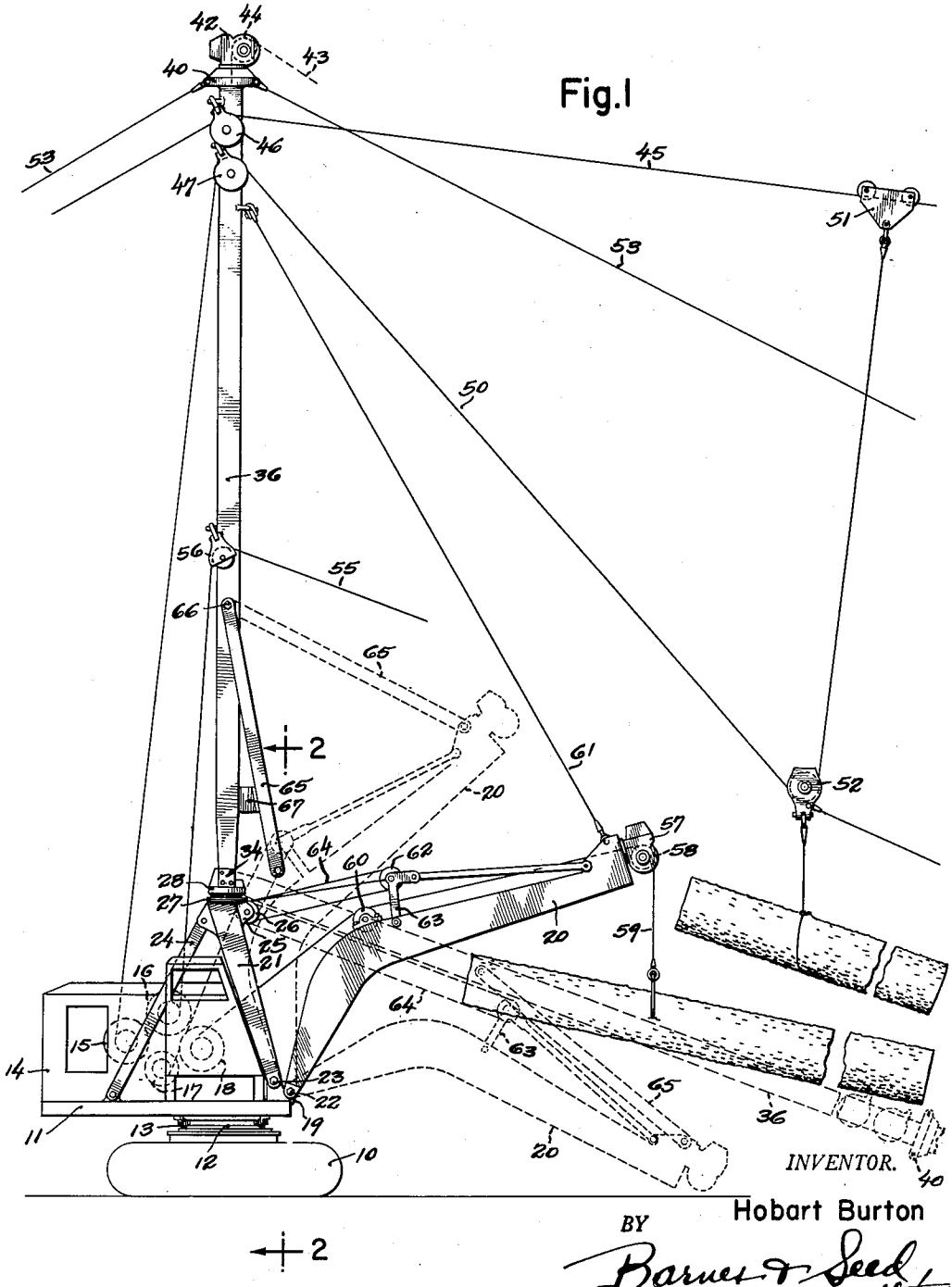
Feb. 14, 1956 H. BURTON 2,734,641

TOWER YARDER AND LOADER

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Fig.1



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TOWER YARDER AND LOADER

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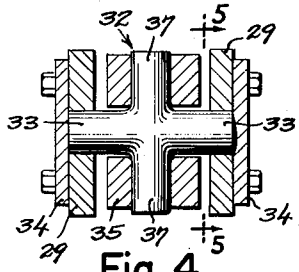


Fig. 4

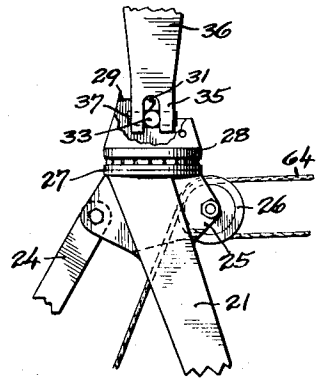


Fig. 3

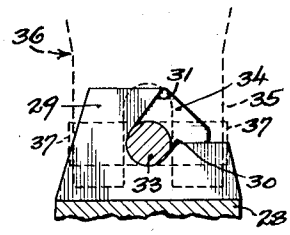


Fig. 5

Fig. 2

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TOWER YARDER AND LOADER

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Application April 11, 1952, Serial No. 281,861

15 Claims. (Cl. 212—7)

This invention relates to a tower yarding and loading assembly, one more especially which includes a loading boom in addition to the yarding spar, and for its general object aims to provide an assembly in which the erected spar is held substantially immovable while at the same time allowing the boom to swing freely about a vertical slueing axis so as to accommodate the loading boom to the performance of its loading function.

It is a further more particular object of the invention to provide a tower yarding and loading assembly in which the mounting given by the yarder to the yarding spar is a foot-step bearing placed so that the journal axis coincides with the slueing axis of the yarder, thereby completely relieving the spar of any turning stress as the yarder base partakes of the slueing movements called for in order that the boom can perform its loading office.

It is a yet further important object to provide a tower yarder in which the yarding spar adapts itself to use either in high-lead or sky-line logging, and particularly to provide a yarder having at the head end thereof alternatively employed blocks which peculiarly adapt themselves one said block to high-lead logging and other said blocks to sky-line logging.

The invention has the yet further and important object of providing a perfected tower yarding and loading assembly in which the loading boom is pivotally carried by the yarder and wherein means are provided by which the boom, when not in use, may be conveniently raised from a lowered operating position and secured in an out-of-the-way inactive elevated position.

A further object yet is to provide a tower yarder in which means are provided by which the spar, using the energy of a powered spooling drum provided by the yarder, may be raised into or lowered from an erected operating position with ease and expedition.

With additional and still more particular objects and advantages in view and which, with the foregoing, will appear and be understood in the course of the following description and claims, the invention consists in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a side elevational view of my perfected tower yarding and loading assembly.

Fig. 2 is a fragmentary front elevational view thereof drawn to an enlarged scale on line 2—2 of Fig. 1 so as to delete the boom.

Fig. 3 is a fragmentary detail side elevational view of the foot-step for the yarding spar.

Fig. 4 is a horizontal sectional view drawn to an enlarged scale on line 4—4 of Fig. 2; and

Fig. 5 is a fragmentary longitudinal vertical sectional view on line 5—5 of Fig. 4.

Referring to said drawings, the numeral 10 designates a crawler-type mobile bed, and 11 designates a machinery platform supported for slueing motion by said bed, the mounting therefor comprising the usual circular rail 12

serving as a track for load-equalizing carriages 13 carried by the base. The platform, which is or may be covered by a house 14, carries an engine together with a plurality of the usual spooling drums. I have illustrated four such drums, and denote the same by 15, 16, 17 and 18. The engine, in addition to driving the spooling drums, also serves as a power plant both for imparting sluing movements to the rotating base, and for driving the crawler treads.

Upon the front end of the base, and adjacent each side edge thereof, is a respective chair-bracket 19. These chair-brackets each present transverse eyes at the front and at the rear end thereof, and received through these eyes and giving pivotal support to a boom 20 and an A-frame 21 are pivot pins 22 and 23, respectively.

First considering the A-frame, the same slopes somewhat toward the rear and is made rigid with the base by complementing stiff-legs 24 which extend diagonally from the head end of the A-frame to the rear end of the base. Said A-frame, at the front and adjacent the upper extremity, presents spaced transversely apertured ears 25, and journaled between these ears is a multiple-groove block 26. The office of this block will be later described.

Upon the head end of the A-frame there is provided a plate 27, and stepped on this plate, preferably by a roller-bearing journal, so as to swivel about a vertical axis coinciding with the slueing axis of the machinery platform is a spar-base 28 integrally surmounted by spaced cheek-plates 29. Saddle notches 30 which are open to the top and have a rather high guarding lip 31 at the rear, all of which can be best seen from an inspection of Fig. 5, are formed in the cheek-plates at the upper ends thereof.

Associated with the foot-plate is the cross 32 of a simple universal. Two diametrically opposite arms 33 of said cross lodge as trunnions in the saddle notches, wherein they are held against end movement by retainers 34, and the other two arms 37 are journaled in a forked extremity 35 presented at the foot of the spar 36. The width of said forked foot is less than the span between the cheek-plates 29 so as to permit some transverse swinging motion of the spar about the center of said trunnion arms 33 as an axis.

Considering said spar in more particularity, there is provided at the head end thereof a guy-ring 40. An upstanding center-bored king-pin surmounts the head of the spar and swiveled upon this king-pin is a self-aligning fair-leader 42. The yarding facilities of the present invention admit of being used either for a high-lead or a slack- or tight-line skidder or carriage suspension system. The fair-leader 42 accommodates the high-lead operation, in which case the main line, here shown by dotted lines and designated 43, passes over a sheave 44 of the fair-leader, thence downwardly through the hollow center of the king-pin to a guide sheave (not shown) which is supported by the spar toward the head end thereof. From the guide sheave, said line carries downwardly to the spooling drum 15. When the facilities are being used for a skidder or carriage suspension system the fair-leader 42 is inactive. The sky-line 45 is then accommodated by a high-lead block 46 carried at the head end of the spar. A second block 47 is also carried by the spar immediately below said block 46. This lower block handles the main hauling line 50, which in the system here illustrated by full lines is anchored by one end to a carriage 51 working along the sky-line, extends therefrom to a fall block 52, and from the fall block passes through the block 47 and thence to the spooling drum 15. 53 designates the stabilizing guy lines, usually four or more in number, which connect with the guy-ring 40.

55 designates the haul-back line of the logging opera-

tion and carried by the spar to accommodate such line in its passage from the spooling drum **16** to the usual tail block (not shown) is a head trip block **56** positioned, by preference, at or about the mid-height of the spar.

The boom **20** which I employ desirably has the elbow shape shown in Fig. 1 and, as before stated, has its spread legs pivoted to the chair-brackets **19**. There is provided upon the outer end of such loading boom a self-aligning fair-leader **57**, and the sheave **58** of this fair-leader accommodates a loading tongs line **59** which passes from the sheave over a guide sheave **60** and thence through a front opening of the house **14** to the spooling drum **18**. Designated by **61** is a trace cable dropped to the outer end of the boom from the head end of the spar. For raising the boom from the operating position in which it is shown by full-lines in Fig. 1 there is carried upon the boom a multiple-groove block **62** and this block, which is elevated somewhat above the boom by a knee-bracket **63**, acts in complement with the block **26** to handle multiple turns of a tackle line **64** having one of its ends anchored to the block **62** and the other of its ends spooled on the drum **17**.

Said boom **20**, used in conjunction with a strut **65** detachably connected thereto and which strut connects with the spar by a pivot **66**, provides a means by which the spar can be easily raised into the erected operating position in which it is shown by full lines in Fig. 1 or lowered into the inactive position shown by dotted lines. When moving the spar into or out of such erected position said strut **65** is fastened to the boom. When the spar is in its lowered position, the boom underlies the same, occupying the lower of the two dotted-line positions shown in Fig. 1, in which position the strut **65** and the boom are in "jack-knifed" relation. Assume that it is desired to raise the spar. For this purpose it is only necessary that spooling drum **17** be powered so as to take up on the line **64**, whereupon the boom swings upwardly about its pivot **22** and transmits lift force to the spar through the strut. Tracing the motion of the strut as the spar rises and finally pushes the latter into an erect position, it will be apparent that the strut will have at that time moved into the upper of the two positions in which it is shown by dotted lines in Fig. 1, or which is to say into a position whereat the same lies approximately at right angles to a plane projected from said pivot point **22** through the strut's point of connection with the boom. When the spar has been thus erected the same is guyed in place and strut **65** is disconnected from the boom, being stowed against a spar-carried stool **67**.

It is thought that the invention will have been clearly understood from the foregoing detailed description of the preferred illustrated embodiment. It is apparent that minor changes in the details of construction can be resorted to without departing from the spirit of the invention and I accordingly intend that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation which the employed language fairly permits.

What I claim is:

1. In a tower yarding and loading assembly, a mount, a platform carried for slueing movements by said mount, spooling drums on said platform, a framework surmounting said platform and made rigid therewith, a spar rotatively mounted on said frame-work for swivel movement about a vertical axis coinciding with the rotary axis of the platform, guy lines bracing the head end of the spar, separate blocks carried by said spar for handling main and haul-back lines each powered by a respective one of said spooling drums, a loading boom attached by its root end to the platform so as to turn in concert with the slueing movements of the platform, and means on said loading boom for handling a tongs line powered by one of said spooling drums.

2. Structure according to claim 1 in which the recited blocks are located below the guy-line connections and wherein a surmounting self-aligning fair-leader is provided above said guy-line connections.

3. In a tower yarding and loading assembly, a vehicular mount, a platform having spooling drums thereon and carried for slueing movement by said mount, a framework surmounting said platform and made rigid therewith, a spar-base finding a roller-bearing journal upon the head end of the framework supporting the spar-base for swivel movement about a vertical axis coinciding with the slueing axis of the platform, a spar pivoted to said spar-base for swinging movement about a horizontal axis, means provided at the head end of the spar for connecting guy lines thereto, a loading boom attached by its root end to the platform so as to turn in concert with the slueing movements of the platform, and means carried by the spar for handling the working lines of a yarding operation.

4. In a tower yarding and loading assembly, a vehicular mount, a platform having spooling drums thereon and carried for slueing movement by said mount, a framework surmounting said platform and made rigid therewith, a spar-base finding a journal upon the head end of the frame-work supporting the spar-base for swivel movement about a vertical axis coinciding with the slueing axis of the platform, a spar pivoted to said spar-base for swinging movement about a horizontal axis, means provided at the head end of the spar for connecting guy lines thereto, a loading boom attached by its root end to the platform so as to turn in concert with the slueing movements of the platform, and means carried by the spar for handling the working lines of a yarding operation.

5. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, a frame-work surmounting said platform and made rigid therewith, a spar-base finding a journal upon the head end of the frame-work supporting the spar-base for swivel movement about a vertical axis coinciding with the slueing axis of the platform, a spar pivoted to said spar-base for swinging movement about a horizontal axis, means provided at the head end of the spar for connecting guy lines thereto, a loading boom attached by its root end to the platform so as to turn in concert with the slueing movements of the platform, and means carried by the loading boom for handling a tongs line.

6. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, engine-driven spooling drums on said platform, a frame-work surmounting said platform and made rigid therewith, a spar-base journaled upon the head end of said frame-work for swivel movement about a vertical axis coinciding with the slueing axis of the platform, said spar-base presenting upstanding cheek-plates, a universal cross having one pair of its diametrically opposite arms journaled as trunnions in the cheek-plates, a spar providing a bifurcated foot and having the produced fork-arms of said foot received between said cheek-plates and journaled upon the other two arms of the cross, means at the head end of the spar for receiving bracing guy lines, a self-aligning fair-leader mounted upon the spar above said guy-line means and swivelled to turn about a vertical axis, a plurality of blocks carried by the spar below said guy-line means, a loading boom having its root end attached to the front end of the platform, and a trace line dropped from the head end of the spar to the outer end of the loading boom.

7. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, engine-driven spooling drums on said platform, a frame-work surmounting said platform and made secure thereto, a spar-base journaled upon the head end of said surmounting frame for swivel movement about a vertical axis coinciding with the slueing axis of the platform, said spar-base presenting upstanding cheek-

plates, a universal cross having one pair of its diametrically opposite arms journaled as trunnions in the cheek-plates, a spar providing a bifurcated foot and having the produced fork-arms of said foot received between said cheek-plates and journaled upon the other two arms of the cross, a guy-ring at the head end of the spar, a self-aligning fair-leader swiveled upon the spar above said guy ring for turning movement about a vertical axis and adapted to accommodate the main line of a high-lead logging operation, a pair of vertically spaced blocks carried by the spar below said guy ring and adapted one to accommodate the sky-line and the other the main hauling line of a sky-line logging operation, said main line and said main hauling line being operated by one of said spooling drums and being alternatively employed, still another block carried by the spar for handling a haul-back line which is operated by another of said spooling drums, a loading boom having its root end pivoted to the front end of the platform, boom-sustaining means dropped from the head end of the spar to the outer end of the loading boom, and a loading line for the boom operated by yet another of said spooling drums.

8. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, engine-driven spooling drums on said platform, an upright A-frame having its foot pivotally supported by the platform adjacent the front end of the platform, a pair of stiff-legs attached by one end to the upper end of the A-frame and by the other end to the platform so as to rigidify the A-frame, a spar-base journaled upon the head end of the A-frame for swivel movement about a vertical axis coinciding with the slueing axis of the platform, said spar-base presenting upstanding cheek-plates, a universal cross having one pair of its diametrically opposite arms journaled as trunnions in the cheek-plates, a spar providing a bifurcated foot and having the produced fork-arms of said foot received between said cheek-plates and journaled upon the other two arms of the cross, a guy-ring at the head end of the spar, a self-aligning fair-leader swiveled upon the spar above said guy-ring for turning movement about a vertical axis and adapted to accommodate the main line of a high-lead logging operation, a pair of vertically spaced blocks carried by the spar below said guy-ring and adapted one to accommodate the sky-line and the other the main hauling line of a sky-line logging operation, said main line and said main hauling line being alternatively employed and being operated by one of said spooling drums, still another block carried by the spar below said mentioned blocks and adapted to accommodate a haul-back line operated by another of said spooling drums, a loading boom having its root end pivoted to the front end of the platform, a loading line for the loading boom operated by yet another of said spooling drums, means supporting the outer end of said boom, and a strut carried by the spar and arranged to be secured to the boom when the latter occupies its said elevated position for holding the boom inactive.

9. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, engine-driven spooling drums on said platform, an upright A-frame having its foot pivotally supported by the platform adjacent the front end of the platform, a pair of stiff-legs attached by one end to the upper end of the A-frame and by the other end to the platform so as to rigidify the A-frame, a spar-base journaled upon the head end of the A-frame for swivel movement about a vertical axis coinciding with the slueing axis of the platform, said spar-base presenting upstanding cheek-plates, a universal cross having one pair of its diametrically opposite arms journaled as trunnions in the cheek-plates, a spar providing a bifurcated foot and having the produced fork-arms of said foot received between said cheek-plates and journaled upon the other two arms of the cross, a guy-ring at the head end of the spar, a self-aligning fair-leader swiveled upon the spar above said guy-ring for turning movement about a vertical axis and adapted to accommodate the main line of a high-lead logging operation, a pair of vertically spaced blocks carried by the spar below said guy-ring and adapted one to accommodate the sky-line and the other the main hauling line of a sky-line logging operation, said main line and said main hauling line being alternatively employed and being operated by one of said spooling drums, still another block carried by the spar below said mentioned blocks and adapted to accommodate a haul-back line operated by another of said spooling drums, a loading boom having its root end pivoted to the front end of the platform, a loading line for the loading boom operated by yet another of said spooling drums, and means supporting the outer end of said boom.

10. In a tower yarding and loading assembly, a vehicular mount, a platform carried for slueing movement by said mount, engine-driven spooling drums on said platform, an upright A-frame having its foot pivotally supported by the platform adjacent the front end of the platform, a pair of stiff-legs attached by one end to the upper end of the A-frame, a spar-base journaled upon the head end of the A-frame for swivel movement about a vertical axis coinciding with the slueing axis of the platform, said spar-base presenting upstanding cheek-plates, a universal cross having one pair of its diametrically opposite arms journaled as trunnions in the cheek-plates, a spar providing a bifurcated foot and having the produced fork-arms of said foot received between said cheek-plates and journaled upon the other two arms of the cross, a guy-ring at the head end of the spar, a self-aligning fair-leader swiveled upon the spar above said guy-ring for turning movement about a vertical axis and adapted to accommodate the main line of a high-lead logging operation, a pair of vertically spaced blocks carried by the spar below said guy-ring and adapted one to accommodate the sky-line and the other the main hauling line of a sky-line logging operation, said main line and said main hauling line being alternatively employed and being operated by one of said spooling drums, still another block carried by the spar below said mentioned blocks and adapted to accommodate a haul-back line operated by another of said spooling drums, a loading boom having its root end pivoted to the front end of the platform, a loading line for the loading boom operated by yet another of said spooling drums, a trace line dropped from the head end of the spar to the outer end of the loading boom, block-and-tackle means for raising the loading boom from a lowered operating position into an elevated inactive position and operated by still another of said spooling drums, and a strut carried by the spar and arranged to be secured to the boom when the latter occupies its said elevated position for holding the boom inactive.

11. In a tower yarding and loading assembly, a yarder carrying spooling drums together with an engine for driving the drums, a spar hinged to the yarder for vertical swinging movement from a lowered approximately horizontal position into an upright position, a boom also hinged to the yarder for vertical swing movement in a plane approximately coinciding with the swing plane of the spar from a lowered to a raised position about an axis spaced well below the swing axis of the spar, an operative connection from the boom to the spar capable of being disconnected at will and acting by movement of the boom from its lowered to its raised position to impose lift force upon the spar and raise the latter from a lowered into an upright position, and a hoisting line connected to the boom and powered from one of the spooling drums for raising the boom, said operative connection from the boom to the spar comprising a strut having its connection with the boom in close proximity to the outer end thereof.

12. In a tower yarding and loading assembly, a base, a

platform mounted for rotation on said base, spooling drums on said platform, a loading boom having its root end so attached to the platform as to turn in concert with the turning movements of the platform, a spar, and a journal mounted on the platform for supporting the spar with the center line of the spar as a rotary axis and with said axis approximately coinciding with the rotary axis of the platform thereby permitting slueing movements of the platform with respect to both the base and the spar, and means on said loading boom for handling a line powered by one of said spooling drums.

13. A yarding and loading assembly according to claim 12 having an A-frame supported upon the platform, said journal being mounted on the head end of the A-frame, and said root end of the loading boom being located at the approximate foot of the A-frame.

14. A yarding and loading assembly according to claim 13 wherein both the boom and the spar have their lower ends pivoted for swinging movement of both the boom and the spar in a coinciding vertical swing plane, means being provided for raising and lowering the boom about its said pivoted lower end, and a strut which admits of being disconnected at will extending from approximately the outer end of the boom to approximately the mid-height of the spar, the spar having a height greatly exceeding the length of the boom.

15. In a tower yarding and loading assembly, a base, a platform mounted for rotation on said base, a loading boom having its root end so attached to the platform as to turn in concert with the turning movements of the platform, a spar, and a journal mounted on the platform for supporting the spar with the center line of the spar as a rotary axis and with said axis approximately coinciding with the rotary axis of the platform thereby permitting slueing movements of the platform with respect to both the base and the spar.

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