

No. 816,161.

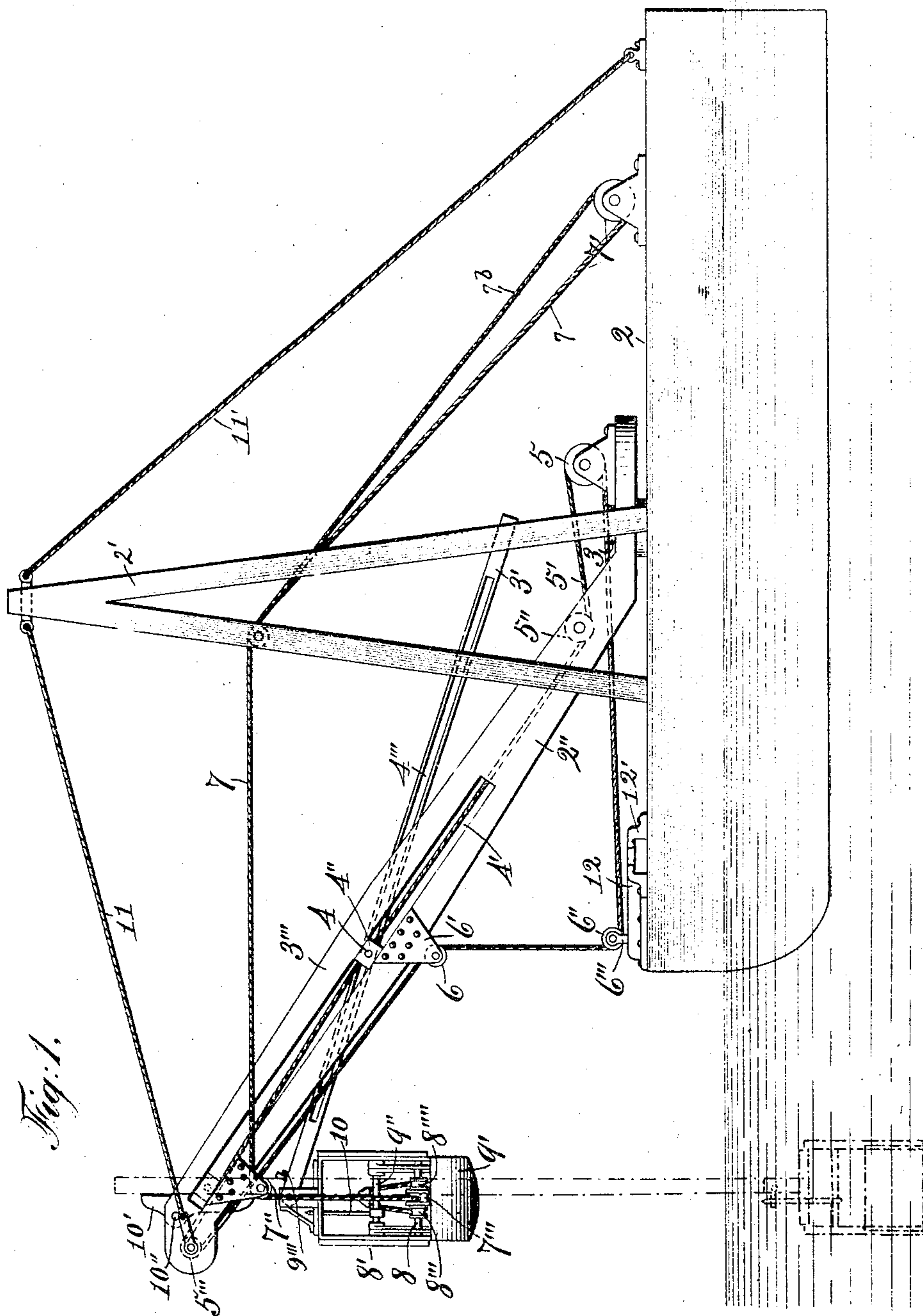
PATENTED MAR. 27, 1906.

J. HAMILTON.

## DREDGING APPARATUS.

APPLICATION FILED FEB. 6, 1905.

3 SHEETS—SHEET 1.



Witnesses  
Max B. Doring  
C. W. King

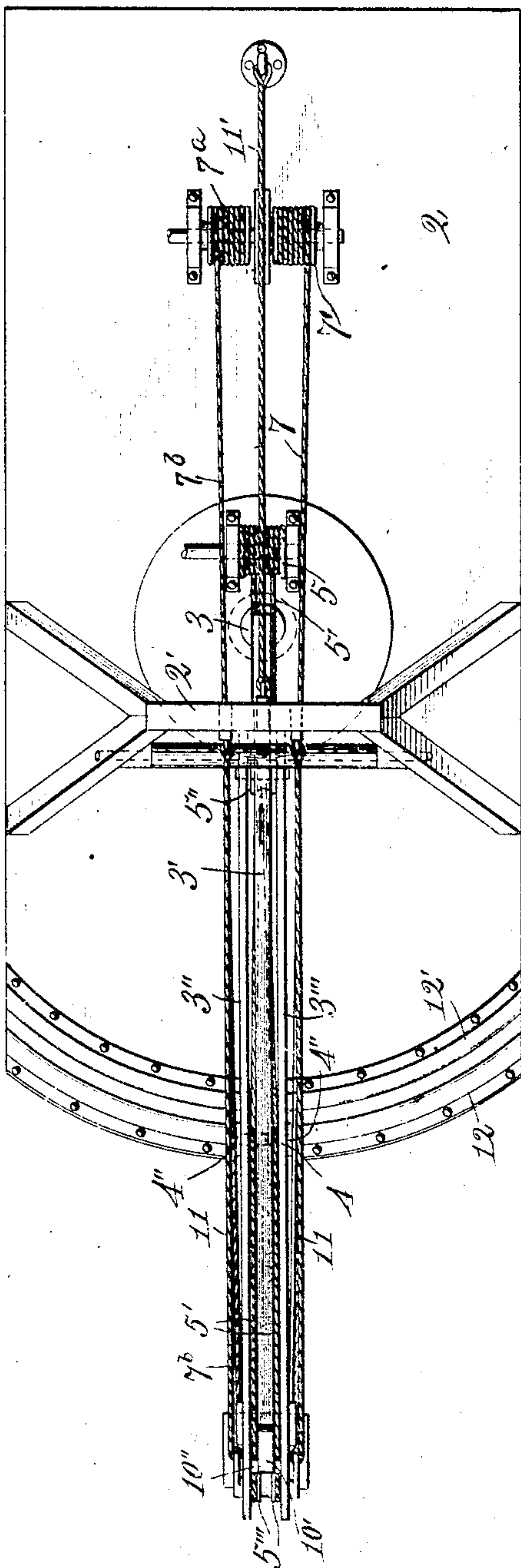
By his Attorney *James Hamilton* Inventor  
*Albert C. Turner*

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3 SHEETS—SHEET 2.



Witnesses  
Max B. Loring.  
A. V. Kurz

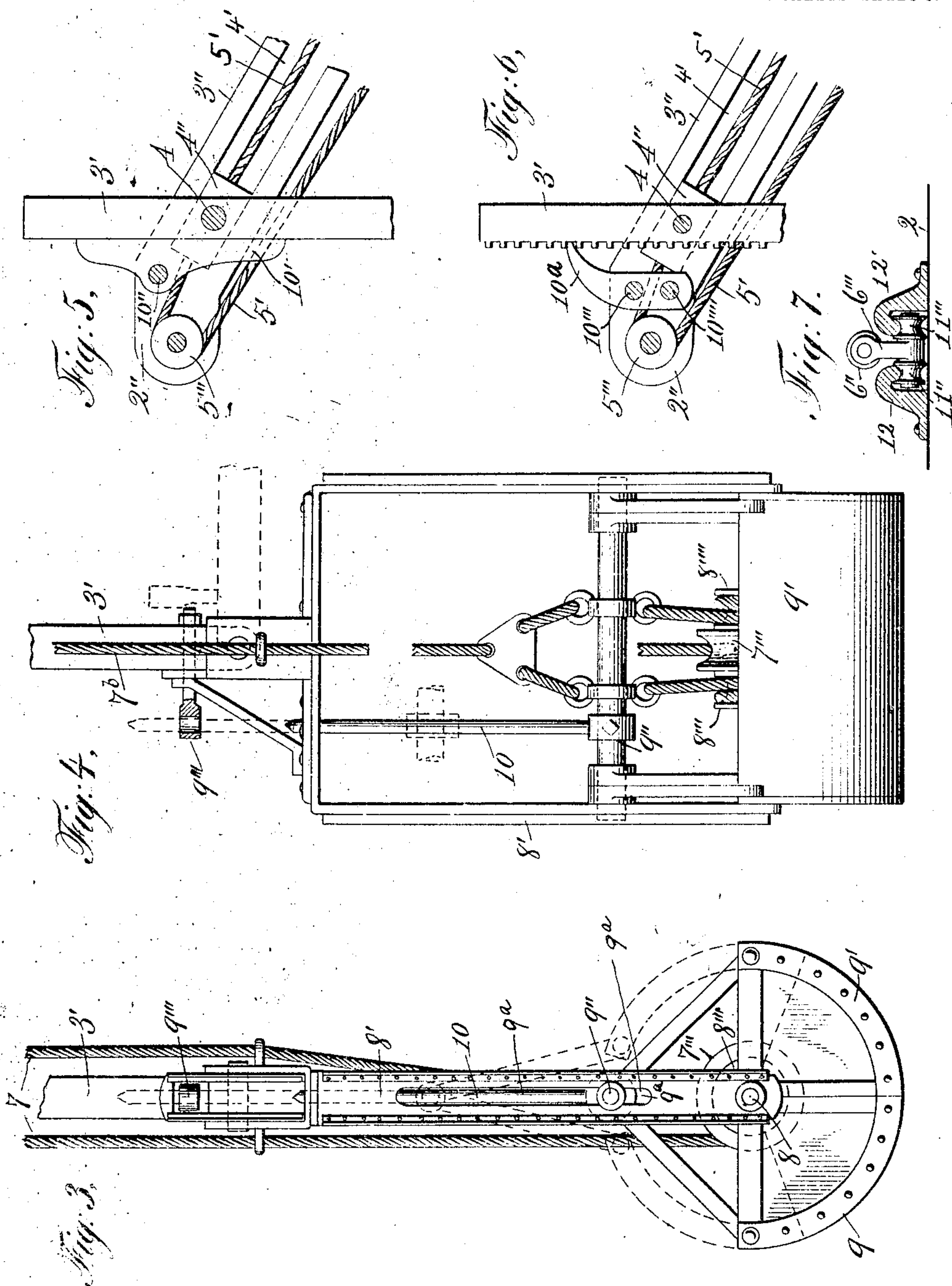
Inventor  
James Hamilton,  
By his Attorney Albert C. Tanner.

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3 SHEETS—SHEET 3.



Witnesses  
Mar. B. A. Doring.  
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# UNITED STATES PATENT OFFICE.

JAMES HAMILTON, OF NEW YORK, N. Y.

## DREDGING APPARATUS.

No. 818,161.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed February 6, 1905. Serial No. 244,351.

*To all whom it may concern:*

Be it known that I, JAMES HAMILTON, a citizen of the United States, residing at New York, Brooklyn borough, in the county of Kings and State of New York, have invented certain new and useful Improvements in Dredging Apparatus, which improvements are fully set forth in the following specification.

10 This invention relates to improvements in constructions of that class employed for excavating purposes, chiefly along the bottoms of rivers and other bodies of water, and commonly known as "dredging apparatus."

15 The objects of this invention are to provide a dredging apparatus which shall embody certain novel features of construction whereby, primarily, the apparatus is rendered particularly well adapted for dredging or excavating so-called "hard bottoms," and, secondarily, the main operating parts are under certain conditions interlocked and stayed, and hence brought well under the control of the operator, which shall be simple and comparatively inexpensive in construction, durable, efficient, and reliable in practical service, convenient in its application to practical purposes, and which shall possess certain well-defined advantages over prior analogous constructions.

20 The invention consists in the novel disposition and relative arrangement of the various cooperating parts thereof whereby the attainment of the foregoing objects is rendered practicable, in certain combinations and in certain details of construction, all of which will be more specifically hereinafter referred to, and set forth in the appended claims.

25 The invention is clearly illustrated in the accompanying drawings, wherein similar reference characters denote corresponding parts throughout the several views.

30 In said drawings, Figure 1 is a side elevation of a dredging apparatus embodying my said improvements, the same being shown as mounted on a scow afloat in a body of water and the returned position of the spud being shown in full lines, while the interlocked or vertical position thereof is indicated in dotted lines. Fig. 2 is a plan view of the entire construction shown in Fig. 1. Fig. 3 is an enlarged detail view showing the free end of the boom, the spud in its interlocked position with respect thereto, and certain adjacent cooperating parts. Fig. 4 is an enlarged detail side elevation of the construction shown

in Fig. 3. Fig. 5 is an enlarged detail side elevation showing more clearly the preferred means employed for securing a locking effect between the boom and the spud when the latter occupies its vertical position. Fig. 6 is a view similar to Fig. 5, showing slightly-modified details of the construction. Fig. 7 is a detail sectional view of the boom-staying traveler and cooperating parts which I make use of.

In dredging apparatus having a boom and a spud shiftable to and fro therealong it is desirable that the spud when shifted to its operative or vertical position be temporarily interlocked with said boom, since thereby, the boom being duly stayed against an upward tilting movement, the double-acting scoops forming the bucket are held more effectively to their work, and this is particularly essential where the strata to be excavated constitute what is commonly known as a "hard bottom." Again, where a rocking action exists between the spud and the bucket-frame availed of it is further desirable that the joint permitting this rocking action be rendered rigid for a prescribed period during the operation of the apparatus, any tendency on the part of the bucket to cant, and which would detract from its efficiency in service, being thereby obviated. Still further, it is desirable that flexible means be provided whereby a positive control of the operative parts in all their various relative adjustments is assured. I attain the foregoing ends and each of them by the mechanisms, parts, and combinations which will now be specifically described.

35 Having reference to the accompanying drawings, 2 denotes the deck of a scow or other appropriate vessel, from which rises a standard 2' of any approved construction.

2'' denotes the laterally-swinging boom projecting at an upward inclination from the deck 2 and having its axis of movement at the enlarged stud or pivot 3, as in common practice.

3' is the spud, supported primarily by and slidable bodily to and fro along the boom 2'' and also capable of undergoing a combined endwise and swinging movement, its axis of swinging movement being varied according to the degree of the endwise movement thereof. In this connection the boom 2'' is here shown as being provided with a central vertical longitudinal slot forming opposing side members 3'' 3''', between which operates the



spud 3' and the slide 4, the latter preferably working in slots 4', formed, respectively, in the side members 3'' 3'''. Specifically, the slide 4 consists of a pin serving to connect  
 5 end pieces 4'', said pin passing through a longitudinal slot 4''', formed in the spud 3', and the latter accordingly operating thereon. It will be understood that a duplicate of the slot 4', which latter is clearly shown in Fig. 1 as  
 10 being formed in the side member 3''', is also formed in the side member 3'', and, further, that a duplicate of the end piece 4'', also clearly shown in Fig. 1, is arranged to operate in the slot which corresponds to 4', formed in  
 15 the side member 3''.

5 denotes a rotatable drum mounted at or adjacent to the axis of movement of the boom 2'', operable in opposite directions by power taken from any appropriate source and controlled by a friction-brake or other suitable means, all as in common practice.

5' denotes a flexible connection, practically endless, the same encircling a number of times the drum 5 and in such a manner that  
 25 when either of the runs thereof is wound onto said drum the other run thereof is delivered therefrom, and in this instance the upper run of said flexible connection leads from drum 5 to and along the under side of the  
 30 idler or sheave 5'' and from thence to and in connection with the slide 4. Then it leads from the latter to and around the idler or sheave 5''' at the free end of the boom 2'', where it merges into the lower run of said  
 35 connection, and the latter leads from the idler or sheave last referred to to and along the upper side of the idler or sheave 6, arranged to operate in a hanger 6', depending from the boom 2'', from thence downwardly and partially around the idler or sheave 6'', carried  
 40 by the boom-staying traveler 6''', and from thence to and for a coiling relation with respect to the drum 5. Hence it will be seen that if drum 5 be rotated in the direction to  
 45 wind, say, the lower run of the flexible connection 5' onto said drum slide 4 will be moved forwardly along or in the direction of the free end of the boom 2'', and if this operation of drum 5 be duly continued, the bucket-controlling connection 7 being duly and simultaneously eased away, spud 3' will be brought  
 50 to its vertical position, as indicated by dotted lines in Fig. 1, while if the drum 5 be duly operated in the reverse direction—that is, in a manner to wind the upper run of flexible connection 5' thereon—slide 4, connection 7 being duly taken in, will be returned along the boom 2'' as to the position indicated in full lines in Fig. 1.

60 Attention may be here particularly called to the fact that when the slide 4 is at the limit of its travel outwardly along or in the direction of the free end of the boom 2'', and the spud 3' is accordingly brought, as for  
 65 practical purposes, to its vertical position,

upon power being duly applied to the drum 5 in a manner to hold the lower run of the connection 5' taut or under marked tension boom 2'' is effectually stayed and held  
 70 against any upward tilting movement thereof as at its free end, and this desirable effect, through the medium of the traveler 6''', may be continued at the will of the operator and irrespective of the positions which may be assumed by said boom throughout its plane of  
 75 swinging action, the traveler aforementioned being movable along the deck 2 beneath the boom 2'' and along a course concentric to the axis of movement of the latter, as will be more particularly hereinafter explained. 80

In the rear of the pivot of the boom is mounted a pair of hoisting-drums 7' and 7<sup>a</sup>, said drums being located side by side and operated and controlled as specified in connection with drum 5. The bucket-controlling  
 85 ropes or connections 7 and 7<sup>b</sup> are wound at their rear ends on the drums 7' and 7<sup>a</sup>. These drums are adapted to be independently operated as is usual in the ordinary practice. The closing and hoisting connection 7 runs  
 90 from the drum 7' over the sheave 7'' near the free end and at one side of the boom 2'', thence downward to and connecting with the sheave 7''', which is fast on the bucket-actuating shaft 8. The other connection 7<sup>b</sup> is  
 95 wound at its rear end on the drum 7<sup>a</sup> and leads from said drum to and over an idler or sheave 8'', arranged in opposition to the sheave 7'' at the opposite end of the boom 2'' and then from sheave 8'' downwardly, terminating in branches which respectively lead to  
 100 and in connection with the small sheaves 8''' 8''', said sheaves being fast, respectively, on the shaft 8, one on each side of the sheave 7'''. This connection serves as the opening and  
 105 lowering rope. The connections 7 and 7<sup>b</sup> are so relatively arranged with respect to the several sheaves on shaft 8 that scoops 9 9', forming the usual so-called "clam-shell" bucket, and which respectively have a swing-  
 110 ing opening and closing movement, one with and the other on the shaft 8, as in common practice, are opened and closed upon said connection-runs being alternately tightened and relaxed, and which, as will be readily understood, may be accomplished by accordingly alternating the direction of rotation of  
 115 the drum 7' and 7<sup>a</sup> in action.

9'' denotes an adjustable shaft linked to the respective scoops 9 9' and having a vertical sliding relation with respect to the  
 120 bucket-frame 8', as by working in slots 9<sup>a</sup>, formed in the side members of said frame. The run of the connection 7<sup>b</sup>, which under tension opens the scoops 9 9', is preferably terminated at and in connection with the shaft  
 125 9'', and from thence its branches aforementioned extend downwardly to and respectively cooperate with the sheaves 8''' 8''', fast on said shaft 8. Hence said connection 7<sup>b</sup> opens the  
 130



scoops by lifting shaft 9'', and this operation results through the medium of the branches aforementioned in shaft 8 being rotated so as to wind the connection 7 somewhat on the sheave 7'', all as in common practice.

The bucket-frame 8' is pivotally connected to the lower end of spud 3', and hence said frame is liable to cant in practical service, and thereby interfere with the proper operation of the bucket-scoops. To obviate this defect, I provide means whereby the joint between said bucket-frame and the spud is rendered practically rigid during the closing action of said bucket-scoops, said means consisting, in this instance, of an eye 9'', projecting laterally from the spud 3' somewhat above its point of connection with the bucket-frame 8' and a pin 10, secured to shaft 9'', projecting upwardly therefrom through the top piece of frame 8' and registering with the eye 9'' when the spud 3' occupies its vertical position. Therefore upon shaft 9'' being elevated, as from its position indicated in full lines in Fig. 4 to its position indicated in dotted lines in the same view, pin 10 engages and passes through the eye 9'', and accordingly serves to give rigidity to the joint aforementioned.

The construction last referred to constitutes an important feature of my present invention.

For enhancing the interlocked relation of the spud 3' and boom 2'' at the free end of the latter and when said spud occupies its vertical position I provide a keeper 10', preferably movable as on a pivot or shaft 10'', disposed at the free end of the boom 2'', and, further, by preference, having a frictional face whereby may be had an extensive frictional grasp on the spud 3' when adjusted as last stated. It is obvious, however, as indicated in Fig. 6, that the spud may be provided with a rack to be engaged by a keeper 10'', fixed at the free end of the boom 2'', as by means of bolts 10''' 10'''' I prefer, however, as stated, the construction shown in Fig. 5, since this more readily permits a degree of rocking action on the part of the spud 3', as on the slide 4, and this even when the spud is held firmly in engagement with the frictional keeper 10'.

The construction whereby the spud 3' may be interlocked with the boom 2'' constitutes also an important feature of my present invention.

I prefer that the connection 5 comprise a single strand for coöperating with the sheaves 5'' 6'' and drum 5, and opposite branches, one for coöperating with the sheaves 5'' 6'', as herein explained, and the other for coöperating with like sheaves arranged at the opposite side of the boom 2'', and it will be understood that the various flexible connections herein referred to may each consist of a suitable length or lengths of chain, cable, rope, or

the like and that suitable guys, as 11 11', may be availed of for staying the free end of the boom 2'' against a downward tilting movement and holding the upper end of the standard 2' against a forward tilting movement, respectively, as indicated in the drawings and as is customary in this class of apparatus. In this connection the traveler 6'' is shown, Fig. 7, as being mounted on or between track-wheels 11'' 11''', which engage underneath and roll along the opposing 2-rails 12 12', secured to the deck 2 at the forward end thereof and forming a trackway which conforms to an arc of a circle whose center is the axis of movement of the boom 2''. It will be understood, however, that these details may be materially varied without evasion of my invention, since an important feature of my present invention is the providing of means whereby a staying effect is had on the boom 2'' against an upward tilting movement thereof during the closing action of the bucket-scoops in service and universally throughout the plane of swinging movement of said boom, as on its axis of movement 3. When brought to the position indicated in full lines in Fig. 1, the rear end portion of the spud 3', particularly when duly weighted, serves to counterbalance the bucket-frame 8' and parts conjoined therewith, thereby relieving the connection 7 from needless strain.

The operation of my improved dredging apparatus will be clearly apparent from the foregoing description thereof, and it will be seen that the same may be modified to a considerable extent, particularly as regards the form of the keeper availed of in the operation of interlocking the spud and the boom, the means employed for staying the boom against an upward tilting movement, and the means employed for giving rigidity to the joint between said spud and the bucket-frame without departing from the spirit and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon for a lateral swinging movement; and means accompanying, and whereby said boom is stayed, at all positions assumed thereby in its swinging movements, against an upward tilting movement at its free end, substantially as herein specified.

2. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon for a lateral swinging movement; and a flexible connection, said connection accompanying said boom in its swinging movements, extending therefrom and shifably engaging said base or vessel-deck, and accordingly connecting said base or vessel-deck and said boom, and whereby the latter is stayed, at



all positions assumed thereby in its swinging movements, against an upward tilting movement at its free end, substantially as herein specified.

5 3. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon and having an axis of lateral movement; a trackway on said base or vessel-deck and arranged concentric to the axis of movement of said boom; a traveler movable to and fro along said trackway; and a connection between said traveler and said boom, whereby the latter is stayed at all points or positions assumed thereby in its movements with respect to its axis of movement, against an upward tilting movement at its free end, substantially as herein specified.

4. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon and having an axis of lateral movement; a trackway on said base or vessel-deck and consisting of opposing rails arranged concentric to the axis of movement of said boom; a traveler, mounted on track-wheels which engage and roll to and fro along said rails; and a connection between said traveler and said boom, whereby the latter is stayed, at all positions assumed thereby in its movements with respect to its axis of movement, against an upward tilting movement at its free end, substantially as herein specified.

5. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon and having an axis of lateral movement; a trackway on said base or vessel-deck and consisting of opposing Z-rails arranged concentric to the axis of movement of said boom; a traveler, provided with a sheave and mounted on track-wheels which engage underneath and roll to and fro along said rails; and a flexible connection between the sheave carried by said traveler and said boom, whereby the latter is stayed, at all positions assumed thereby in its movements with respect to its axis of movement, against an upward tilting movement at its free end, substantially as herein specified.

6. A dredging apparatus comprising a boom; a spud shiftable along said boom to and from its free end; and means for interlocking said boom and spud, when the latter shall have been shifted to the free end of said boom, substantially as herein specified.

7. A dredging apparatus comprising a boom; a spud shiftable along said boom to and from its free end; means for holding said spud interlocked with said boom when thus shifted; and a keeper for engaging said spud while being held interlocked with said boom, and whereby the interlocking effect between said boom and said spud is enhanced, substantially as herein specified.

8. A dredging apparatus comprising a boom; a spud shiftable along said boom to and from its free end; means for holding said

spud interlocked with said boom when thus shifted; and a rocking keeper for engaging said spud while being held interlocked with said boom, and whereby the interlocking effect between said boom and said spud is enhanced, and the spud is permitted, at the same time, to undergo a rocking movement, substantially as herein specified.

9. A dredging apparatus comprising a boom; a spud shiftable along said boom to and from its free end; flexible means for holding said spud interlocked with said boom when thus shifted; and a rocking keeper having a frictional face for engaging said spud while being held interlocked with said boom, and whereby the interlocking effect between said boom and said spud is enhanced, and the spud is permitted, at the same time, to undergo a rocking movement, substantially as herein specified.

10. A dredging apparatus comprising a boom; a slide carried by, and shiftable to and from the free end of, said boom; a spud engaging said slide and movable endwise independently thereof; and flexible means for urging the slide, and accordingly the spud engaging the same, to the free end of said boom and holding it there, whereby said spud and boom are interlocked, substantially as herein specified.

11. A dredging apparatus comprising a boom; a slide carried by, and shiftable to and from the free end of, said boom; a spud engaging said slide, and having a rocking movement thereon and an endwise movement independently thereof; and flexible means for urging the slide, and accordingly the spud engaging the same, to the free end of said boom and holding it there, whereby said spud and boom are interlocked, substantially as herein specified.

12. A dredging apparatus comprising a boom; suitably-distributed sheaves carried by said boom; a flexible connection operating on said sheaves; a slide secured to said connection, carried by said boom, and movable to and from the free end thereof; a spud engaging said slide, and having a rocking movement thereon and an endwise movement independently thereof; and means for operating said flexible connection, whereby the slide, and accordingly the spud engaging the same, is urged to the free end of said boom and held there, for interlocking said spud with said boom, substantially as herein specified.

13. A dredging apparatus comprising a base or vessel-deck; a boom mounted thereon; a plurality of sheaves carried by, and suitably distributed along, said boom; a flexible connection operating on said sheaves and engaging said base or vessel-deck beneath said boom, and whereby the latter is stayed against an upward tilting movement at its free end, upon said flexible connection being



duly actuated or tensioned; and means for thus actuating or tensioning said flexible connection, substantially as herein specified.

14. A dredging apparatus comprising a  
5 base or vessel-deck; a boom mounted thereon for a lateral swinging movement; a plurality of sheaves carried by, and suitably distributed along, said boom; a flexible connection operating on said sheaves and shiftably  
10 engaging said base or vessel-deck beneath said boom, and whereby the latter is stayed, at all positions assumed thereby in its swinging movements, against an upward tilting movement at its free end, upon said flexible  
15 connection being duly actuated or tensioned; and means for thus actuating or tensioning said flexible connection, substantially as herein specified.

15. A dredging apparatus comprising a  
20 boom slotted longitudinally to form opposing side members; a longitudinally-slotted spud disposed to operate between said side members; a pin-like slide extending through the slot with which said spud is provided, and  
25 slidably engaging the respective side members aforementioned, said spud, accordingly, being movable endwise independently of said slide and being, at the same time adapted to rock thereon; and flexible connections for  
30 actuating and controlling said slide and said spud, respectively, substantially as herein specified.

16. A dredging apparatus comprising a boom; a spud cooperating therewith; a

bucket-frame loosely jointed to said spud; 35 and means for giving rigidity, temporarily, to the joint between said spud and said bucket-frame, substantially as herein specified.

17. A dredging apparatus comprising a 40 boom; a spud cooperating therewith, shiftable into and out of a vertical position, and having an eye projecting laterally therefrom; a bucket-frame loosely jointed to said spud, said bucket-frame carrying a pin, movable 45 vertically endwise; and a flexible connection whereby, when said spud shall have been shifted into its vertical position, said pin may be duly moved and caused to engage and pass through the eye aforementioned, and there- 50 by temporarily give rigidity to the joint between said spud and said bucket-frame, said pin registering with said eye, when the spud specified occupies its vertical position, substantially as herein specified. 55

18. A dredging apparatus comprising a boom; a spud cooperating with said boom and shiftable to and away from the free end thereof; means for interlocking said boom and said spud when the latter shall have been 60 shifted to the free end of the former; and means for staying said boom against an upward tilting movement at its free end, substantially as herein specified.

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Witnesses:

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