July 10, 1928. 1,676,645

J. E. FUNK

DREDGER FRAME CONSTRUCTION

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Fig. 1

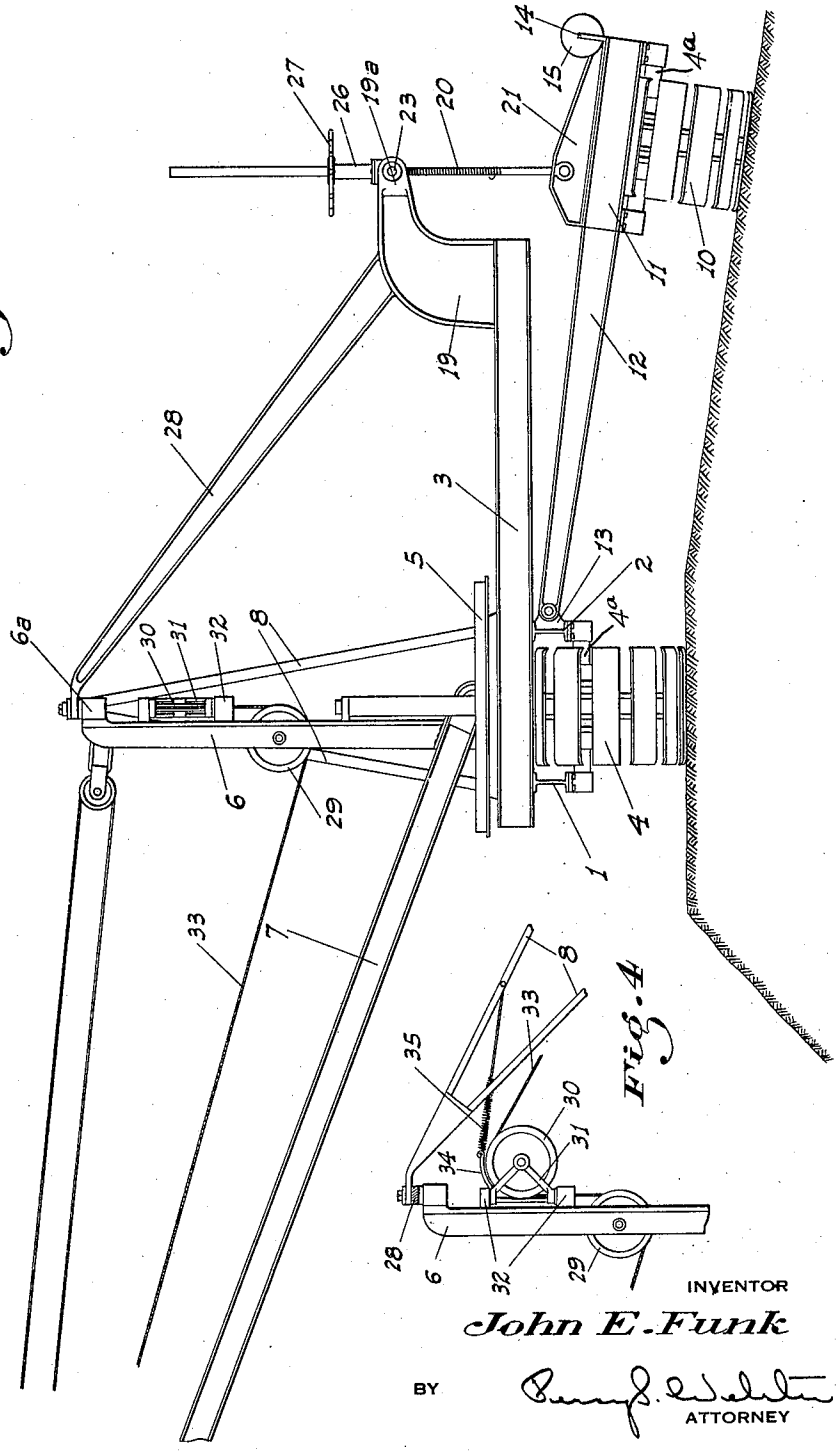


Fig. 4

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BY

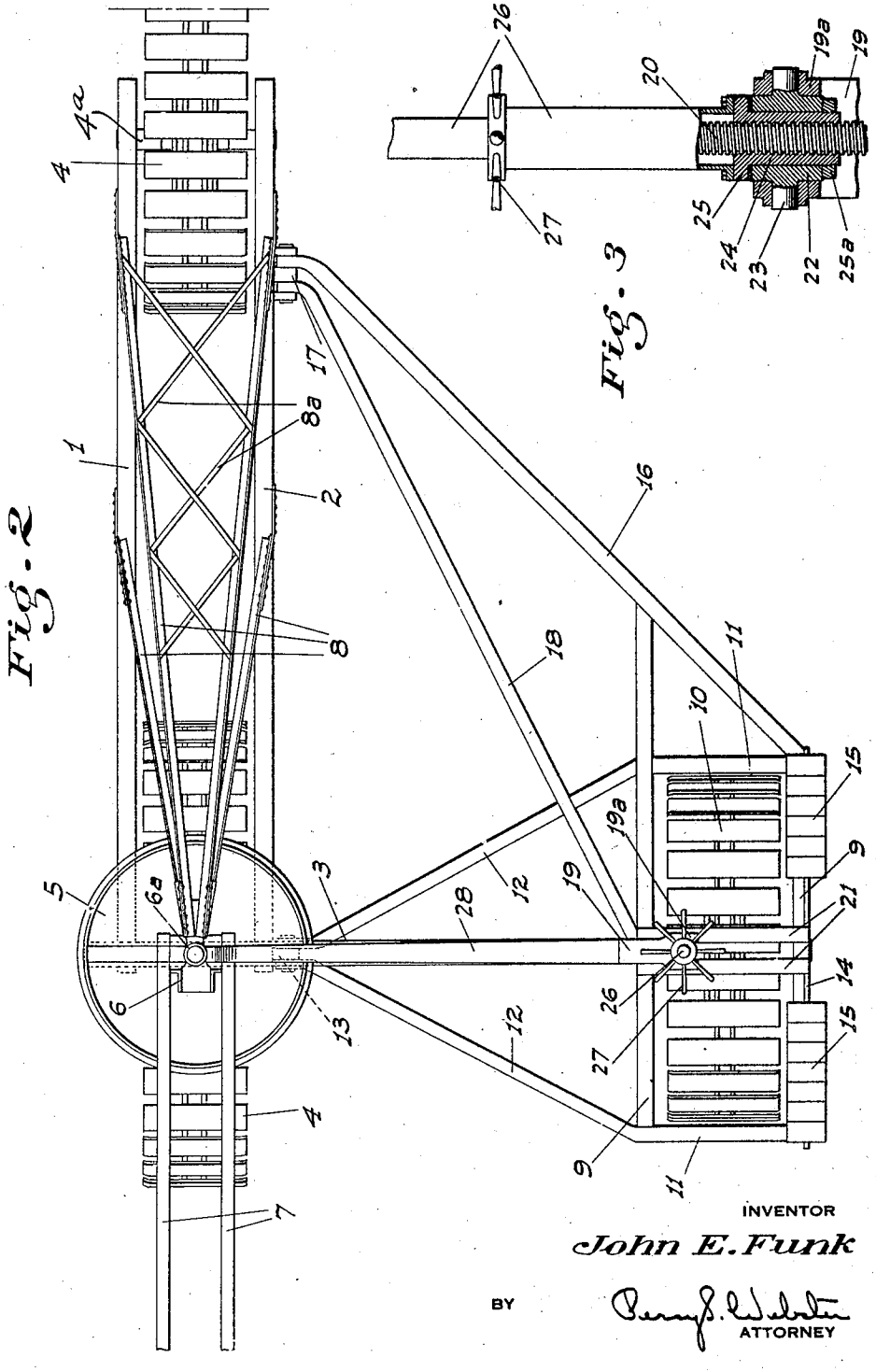
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DREDGER FRAME CONSTRUCTION

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UNITED STATES PATENT OFFICE.

JOHN E. FUNK, OF STOCKTON, CALIFORNIA.

DREDGER-FRAME CONSTRUCTION.

Application filed January 24, 1927. Serial No. 163,251.

This invention relates to improvements in dredgers of that type which are supported from the land as differentiated from those floating on water, and particularly represents improvements in the supporting structure of a dredger of the above named general character which includes a swinging boom on the outer end of which is mounted the grabs or bucket. Such dredgers are frequently used in dredging out canals and ditches, the dredger then resting on and moving along the bank.

Unless the mast from which the boom is supported is maintained in a true vertical position transversely of the dredger, requiring of course that the main frame is in a corresponding level horizontal position, the boom has a tendency to swing too freely to one side or the other, which places uneven and hard strains on the clutches, engines and all working parts which function with the swinging of the boom and its load. It frequently happens however that the ground on which the dredger rests is in the form of a levee having sloping sides, so that the ordinary rigid dredger frame, resting on the sloping ground causes the mast to have the above named objectionable tilt.

The principal object of my invention therefore is to construct the frame structure of the dredger in such a manner that the main frame on which the mast and boom are mounted is maintained in a level position transversely on uneven and sidehill ground, so that the mast is likewise maintained in a true vertical position, enabling the mast and boom to be revolved more easily and with less exertion and wear on the operating mechanisms than is otherwise the case, as above pointed out. This enables the machine to be made lighter, while enabling the same to be more readily handled even with a long boom and a heavy load. By thus enabling the main frame to be maintained on the level, uphill work in operating the boom is entirely eliminated and in fact the machine can be so adjusted on sidehill work as to make the direction in which the load is being moved to be slightly downhill. This favors the direction in which the load is being carried and still does not put any undue strain on the structure when the boom is being swung back slightly uphill with an empty bucket. I have found from actual practice that this is a considerable improvement over the present construction, as on a long swing of the boom, the boom-cable control clutch can be released and the boom with its load will travel, after once being started, faster (when the clutch is released) than when the clutch is engaged. This free swinging movement may be easily checked and reversed at the end of the travel of the boom so that a few seconds in time is gained with each swing of the boom, over the present manner of operation. A machine built according to my invention, and its frame adjusted as above stated, makes the labor in connection with the operation of the various control levers of the dredger much easier on the operator, as at no time do the clutches need to be set up tight to cause the boom to swing—an operation which repeated constantly throughout a day's work is very tiring to the operator.

This object is carried out by mounting an adjustable wing frame in connection with and to one side of the main frame, of such a nature, that it may be easily adjusted to lie at an angle to the main frame, so that while the latter will be held on a horizontal transverse level, the wing frame may rest on and be supported from a sloping surface, and the entire structure will be properly and evenly supported at a number of separated points.

A still further object of the invention is to construct the frame structure as a whole so that the proper rigidity is insured regardless of the swinging of the boom one way or the other.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a front end elevation of my improved dredger frame structure, the boom being swung to one side.

Fig. 2 is a top plan view of the same.

Fig. 3 is a fragmentary vertical section of the wing frame adjusting screw mechanism.

Fig. 4 is a fragmentary view of the mast showing the mounting of a set of cable-sheaves.

Referring now more particularly to the

characters of reference on the drawings, the main frame of the dredger comprises a pair of longitudinal and transversely spaced side beams 1 and 2 on which the dredger propelling and hoisting mechanisms (not shown) are mounted. The beams 1 and 2 are connected at their forward ends by a rigid transverse beam 3 disposed on top of said beams 1 and 2 and extending a considerable distance to one side of the beam 2. The main frame is supported from the ground at longitudinally spaced points by endlesss track trucks 4 of suitable character, each truck being disposed between the beams 1 and 2 and being pivotally connected centrally of their length to said beams, as by cross shafts 4ª between said beams and truck frames.

Turnably mounted on the main frame at the front and centrally of the width thereof and in transverse alinement with the beam 3 is a turntable 5. On this turntable is mounted, slightly forward of the center thereof, a vertical mast structure 6 of suitable height. A forwardly extending boom 7 is also mounted on the turntable, to turn therewith, the outer end of the boom being supported from the top of the mast in the usual manner. A plurality of longitudinal braces 8 extend from pivotal connections with a lug 6ª on the top of the mast and in vertical alinement with the axis of the turntable to the beams 1 and 2 at different points in their length. Said braces are rigidly connected to the sides of the beams and certain ones of the transversely spaced braces are in turn braced to each other by a cross bar arrangement indicated at 8ª in Fig. 2.

It will therefore be seen that the mast, braces and main beams form a rigid structure so that no weaving movement therebetween in a longitudinal plane is possible.

Disposed adjacent the outer end of the beam 3 is a wing frame comprising a pair of longitudinal and transversely spaced beams 9, considerably shorter than the main frame and extending an equal distance forwardly and rearwardly of the beam 3. Between the beams 9 and pivotally supported therefrom centrally of its length is an endless track truck 10, the pivotal connection of the truck 10 and that of the corresponding truck 4 on the main frame being in common transverse alinement.

The beams 9 are connected at their ends by cross beams 11 rigidly secured thereto, radius bars 12 extending from the ends of the beams 11 nearest the main frame beam 2, to pivotal connections with an ear 13 on said beam under the beam 3. The outermost beam 9 of the wing frame carries a horizontal bar 14 on which a number of counter-weights 15 may be mounted. Another rigid radius bar 16 is rigidly connected to the rear end of the outermost beam 9 and extends thence rearwardly to a pivotal connection with ears 17 mounted on the main frame beam 2 near its rear end. Also pivotally connected to said ears is another radius bar 18 which extends thence to a connection with the inner one of the beams 9 substantially central of its length, said last named bar intersecting the rear bar 12 which is rigidly connected to the bar 18. The ears 13 and 17 are in common longitudinal and vertical alinement so that it will be evident that the wing frame can freely swing up or down about the ears on the main frame as pivots without disturbing said frame. At the same time the wing frame is adequately braced against longitudinal movement relative to the main frame, and both frames are rigidly braced to each other so that transverse deflection or warping is positively prevented. It will also be seen that a three point suspension from the ground is had for the entire frame structure so that it may follow inequalities in the ground surface without any distortion of the structure being had. This proper and even supporting of the structure is aided of course by the pivotal mounting of the endless track trucks themselves.

Means for vertically adjusting the wing frame relative to the main frame and for holding the wing frame in any position is provided as follows:

Projecting upwardly from the outer end of the transverse beam 3 and practically forming a unitary part thereof is an extension 19, the upper and outer end 19ª of which is forked and overhangs the wing frame somewhat. This extension forms a support for a vertical adjusting screw 20, the lower end of which is pivotally connected in a longitudinal plane to rigid saddles 21 which rest on the beams 9. While the screw may be connected to the extension member in various ways, I preferably use the following arrangement.

Disposed between the forks 19ª is a sleeve 22 having trunnions 23 turnably mounted in said forks, the axes of said trunnions being longitudinally of the frame structure. Turnably mounted in the sleeve 22 is a sleeve nut 24 through which the screw passes in threaded engagement. The sleeve member 24 has a top overhanging flange 25 which rests on the sleeve 22 (with a gasket between) and a nut 25ª on its lower end which bears against the lower end of the sleeve 22. Secured to and projecting upwardly from the flange 25 in spaced relation to the screw is a rigid housing 26 in which the upper portion of the screw is completely enclosed. Intermediate its ends a hand wheel 27 is rigidly fixed to the housing so that it and consequently the sleeve 24 may be rotated. This rotation of course will cause the extension 19 and beam 3 to be raised or

lowered with a consequent transverse leveling of the main frame carrying the boom and mast. The latter is of course thereby adjusted to a proper vertical position.

In order to brace the mast against lateral deflection and to also aid in preventing vertical deflection of the beam 3 a heavy brace beam 28 extends from the top of the lug 6ª of the mast to the extension 19 adjacent the top thereof, to which said brace is rigidly secured by welding or other suitable means. The entire frame arrangement and the mast are therefore adequately braced to each other and held against any tendency to warping or deflection had with the swinging of the boom or due to uneven ground; the tendency of the frame to tilt laterally is offset by the counter-weighted wing frame; and the main frame may be set at and maintained in a proper horizontal position regardless of the slope of the surface on which the structure is supported. The necessary operating mechanisms may therefore be rigidly mounted on the main frame without danger of the misalinement of any part of the mechanism developing; wear and tear on all parts will be largely eliminated; the physical exertion of the operator will be considerably lessened, and dredging operations as a whole greatly facilitated and enabled to be speeded up.

In connection with the turning mast, I have provided a special form of sheave arrangement to carry the cables from the drums fixed on the main frame, to the bucket at the outer end of the boom, so as to prevent the cables possibly binding in or leaving the sheaves with the swinging of the boom and the turning of the mast.

One set of such sheaves is shown in Fig. 4, and the arrangement is as follows:

Journaled directly onto the mast structure is a vertical sheave 29, disposed in a plane longitudinally of the boom. Above and to the rear of this sheave is another sheave 30, disposed so that the adjacent edges are tangential in a vertical plane. The sheave 30 is journaled in a vertical yoke frame 31 which is pivotally supported at both ends in bearing lugs 32 projecting from the mast, these lugs being in vertical alinement with the axis of rotation of the mast. The lower lug 32, and the adjacent portion of the frame 31, are hollow, so as to provide a guide means for the cable 33 passing over and between the tangentially disposed faces of the sheaves.

To maintain the frame 31 and sheave 30 in longitudinal alinement with the main frame of the machine regardless of the turning of the mast, an extension 34 projects rearwardly from the frame 31 over the sheave, to which a tension spring 35 is connected. the other end of said spring being secured to the brace structure 8. The extension 34 also serves as a guide for the cable as it initially engages the top of the sheave, and acts to prevent the cable from jumping the sheave at any time.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A frame structure for a dredger including a main frame comprising transversely spaced beams, and a transverse beam connecting said beams and extending some distance to one side of the same; a wing frame parallel to the main frame disposed adjacent and under the outer end of the transverse beam, means pivotally connecting the wing frame to the adjacent main-frame beam, means between the outer end of the transverse beam and the wing frame for vertically adjusting the beam relative to the wing frame, and ground bearing means mounted on said frames.

2. A frame structure for a dredger including a main frame comprising transversely spaced beams, and a transverse beam connecting said beams and extending some distance to one side of the same; a wing frame parallel to the main frame disposed adjacent and under the outer end of the transverse beam, beams rigidly connected to the wing frame extending thence transversely in converging relation to each other toward the main frame, means pivotally connecting said last named beams to the adjacent main frame beam, other beams rigidly connected to the wing frame at transversely spaced points and extending thence rearwardly toward the main frame in converging relation to each other, pivotal connection means between said last named beams and the adjacent main frame beam, both said pivotal connection means being in common longitudinal alinement, and means between the main transverse beam and the wing frame for supporting the wing frame and adjusting the beam vertically.

3. A frame structure for a dredger includig a main frame comprising transversely spaced beams, and a transverse beam connecting said beams and extending some distance to one side of the same; a wing frame parallel to the main frame disposed adjacent and under the outer end of the transverse beam, means for supporting the wing frame from the outer end of the trans-

verse beam, a mast mounted on the main frame adjacent the transverse beam, brace members from the top of the mast to the main frame beams, and an additional brace member from the top of the mast extending transversely to a rigid connection with the transverse beam adjacent the outer end thereof.

4. A frame structure for a dredger including a main frame comprising transversely spaced beams, and a transverse beam connecting said beams and extending some distance to one side of the same; a wing frame parallel to the main frame disposed adjacent and under the outer end of the transverse beam, means pivotally connecting the wing frame to the adjacent main-frame beam, an upstanding extension at the outer end of the transverse beam overhanging the wing frame, a vertical bar connected at one end to the wing frame, and means between said extension and the bar for supporting the bar and vertically adjusting the extension relative thereto.

In testimony whereof I affix my signature.

JOHN E. FUNK.