H. SAWYER.

ROCKING BOOM CRANE.

APPLICATION FILED AUG. 6, 1913.

1,111,102. **Patented Sept. 22, 1914.**

2 SHEETS—SHEET 1.

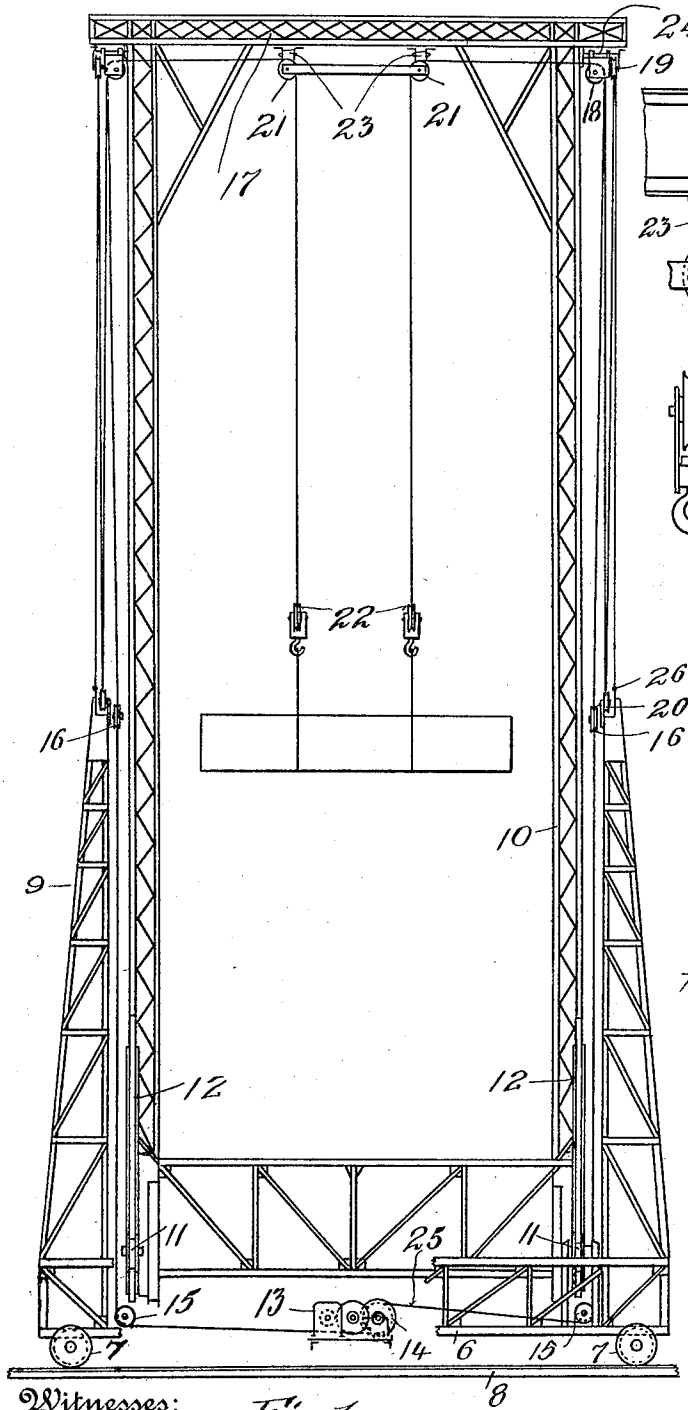


Fig. 1.

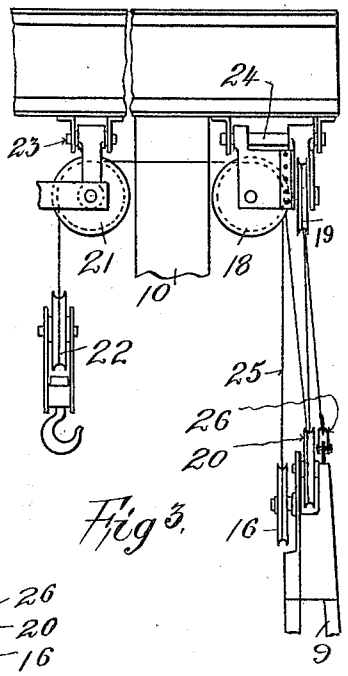


Fig. 3.

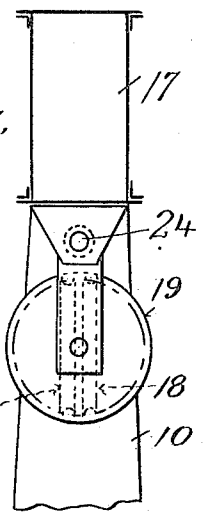


Fig. 5.

Witnesses:
W. W. Benjamin
W. A. Darby.

Inventor
Harry Sawyer
By his Attorney
Samuel Edgarby

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

H. SAWYER.

ROCKING BOOM CRANE.

APPLICATION FILED AUG. 6, 1913.

1,111,102.

Patented Sept. 22, 1914.

2 SHEETS—SHEET 2.

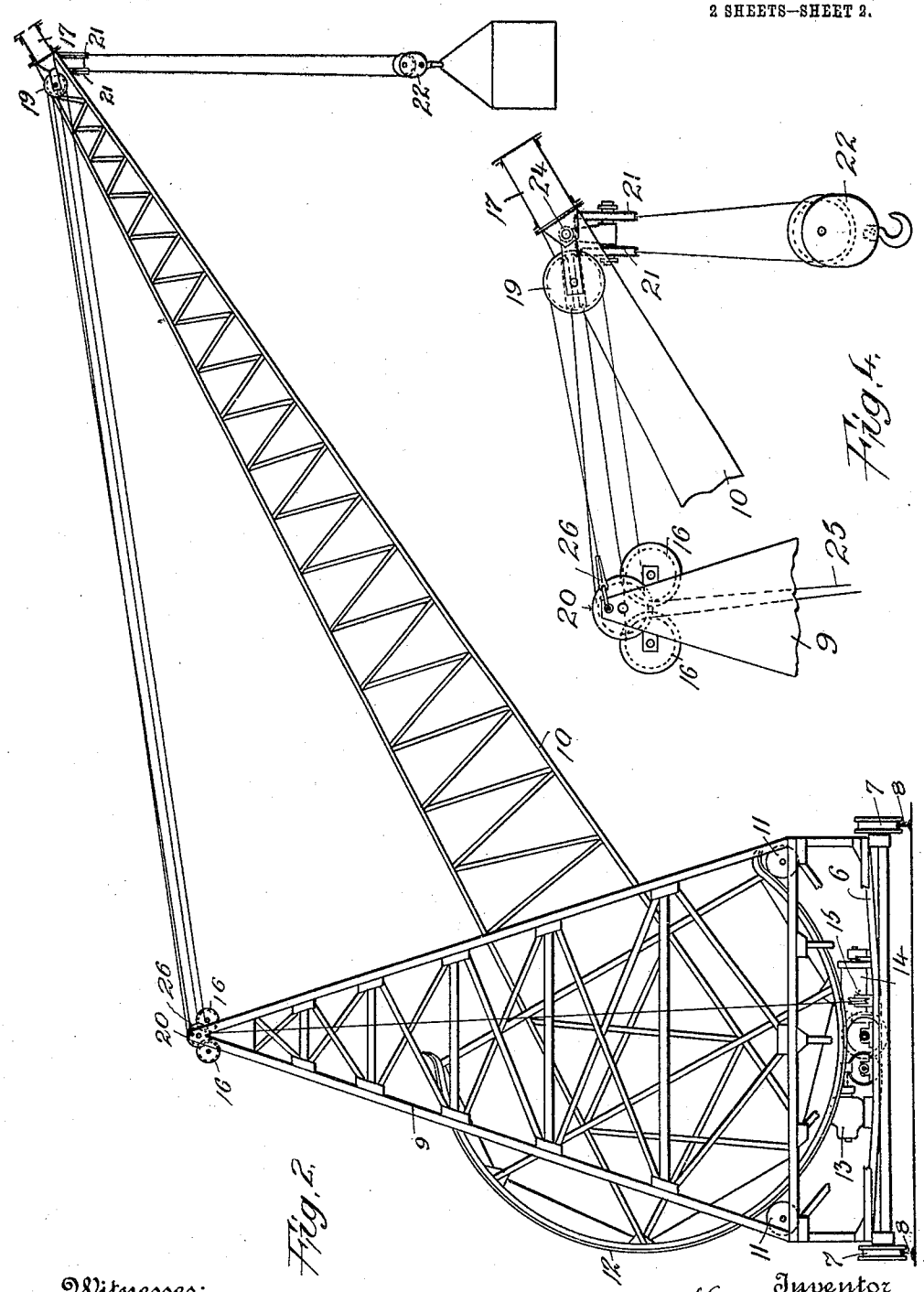


Fig. 2.

Fig. 4.

Witnesses:
H. W. Benjamin
W. A. Darby.

Inventor
Harry Sawyer
By his Attorney
Samuel E. Darby.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HARRY SAWYER, OF MUSKEGON, MICHIGAN.

ROCKING-BOOM CRANE.

1,111,102. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed August 6, 1913. Serial No. 783,384.

To all whom it may concern:

Be it known that I, HARRY SAWYER, a citizen of the United States, residing at Muskegon, in the county of Muskegon, State of Michigan, have made a certain new and useful Invention in Rocking-Boom Cranes, of which the following is a specification.

This invention relates to cranes of the type in which the boom swings vertically from side to side of a supporting frame.

The object of the invention is to provide a crane structure of the type referred to which is simple in construction and efficient in operation.

A further object is to provide a crane of the nature referred to wherein the hoisting drums are located on the supporting frame or base in which the boom swings.

A further object is to provide a crane of the nature referred to wherein the use of pivot trunnions for the rocking boom are avoided.

A further object is to provide a novel and efficient reaving for the hoisting cables whereby to secure automatically a compensation for the overhang of the load in proportion to the extent of rocking movement of the boom.

Other objects will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference signs appearing thereon:—Figure 1 is a view in front elevation of a rocking boom crane structure embodying the principles of my invention. Fig. 2 is a side view of the same showing the boom rocked into inclined position. Figs. 3 and 4 are broken detail views, somewhat diagrammatic in front and side elevation, respectively showing the reaving of the hoisting cables. Fig. 5 is a similar view in side elevation, of the upper end of the rocking boom.

The same part is designated by the same reference numeral wherever it occurs throughout the several views.

In my application Serial No. 778,424 filed July 11, 1913 I have shown, described and claimed broadly a construction of crane of the vertically swinging boom type, and wherein automatic compensation of the overhang of the load is accomplished through a peculiar method of reaving the hoisting cables with relation to the base or frame structure and the boom. The present invention relates to a crane structure of the same general type. In the specific embodiment disclosed in my said application which was selected for the purpose of illustrating the invention therein claimed, the swinging boom was carried on trunnions which were supported in bearings on vertical tower portions of the base or supporting frame, and the hoisting motor was shown as mounted on the swinging boom at the base thereof where it also served the purpose of a counterweight for the swinging boom. It is among the special purposes of the present invention to provide a structure of crane of the type set forth wherein trunnion supports for the swinging boom are dispensed with and wherein the hoisting motor is mounted on the base frame instead of on the base of the swinging boom. It is also among the special purposes of my present invention to provide a somewhat simplified hoisting cable reaving.

In the accompanying drawings, reference numeral 6 designates a base frame which may be of any suitable construction or type. In the form shown, to which, however, my invention is not to be limited or restricted, this base frame carries supporting wheels 7 which operate along track rails 8 whereby said base frame may be shifted from one position to another along said rails, the wheels 7, if desired, being propelled by a motor in any convenient or well known manner. Erected at the sides of the base frame are the tower portions 9, between which the vertically swinging boom 10 is mounted to rock from side to side of the base frame. The rocking boom 10 is provided at its base with circular tracks which are concentric with the geometric axis about which the boom swings. These circular tracks are supported and operate upon wheels 11, mount-

ed at the bases of the tower portions 9. I have not attempted to show in detail the power operated means for rocking or swinging the boom as the same forms no part of my present invention. I may say, however, that any suitable or convenient construction may be employed for this purpose, as, for instance, the construction shown in my application above referred to. The hoisting motor 13, for operating the hoisting cable drums 14, is shown as being mounted on the base frame 6, and preferably centrally thereof. By this arrangement of hoisting motor upon the base frame instead of upon the rocking boom the motor can be fitted with ring oil bearings. At the base of each side tower portion is mounted a guide sheave 15, and at the upper end of each tower portion 9 two guide sheaves 16 are mounted with their axes adjacent and parallel to each other and the sheaves in the same vertical plane parallel with the direction of swing of the rocking boom. The upper ends of the side portions of the rocking boom 10 are connected by a cross member 17, the ends of which overhang the side portions of the rocking booom. On each of the overhanging end s of cross member 17, are mounted a pair of sheaves 18 arranged side by side in parallel planes at right angles to the plane of rocking movement of the boom. Also mounted on the overhanging portion of each end of cross member 17 is a sheave 19, arranged in a plane at right angles to the plane of the sheaves 18. A third sheave 20 is mounted at the upper end of each tower portion 9, which is arranged in the same vertical plane with the sheaves 19. At convenient points between the upper ends of the rocking boom side portions and carried by the cross member 17, are the guide sheaves 21. These are arranged in pairs as clearly shown. The lower hoisting block sheaves are shown at 22. If desired, and as shown, the sheaves 21 are pivotally supported upon an axle 23, see Fig. 3, which is parallel to the axis upon which the rocking boom swings. Similarly, the sheaves 18 and 19 are pivotally suspended from an axle 24, so as to rock on an axis parallel to the axis upon which the boom 10 swings.

The hoisting cable 25 is shown as leading from the hoisting drums 14, toward the sides of the base frame. A description of the reaving of one of the hoisting cables will suffice for both. From the drum 14, this cable passes horizontally to and around the sheave 15 and thence upwardly passing between the pair of sheaves 16 one or the other of which forms a bearing fulcrum for said cable when the boom is rocked in one direction or the other. From the sheaves 16 the cable passes upwardly and around one member of the pair of sheaves 18, thence inwardly and horizontally around one member of the pair of sheaves 21, thence downwardly to and around the sheave 22 of the lower hoisting block, thence upwardly, thereby forming a bight in which the lower hoisting block is suspended to and around the other member of the pair of sheaves 21, thence outwardly and horizontally to and around the other member of the pair of sheaves 18, thence downwardly to and around the sheave 20, at the upper end of the tower portion 9, thence upwardly to and around the sheave 19 and thence downwardly to the tower where it is anchored at 26.

The operation is simple and will be readily understood. As the boom rocks from the vertical toward the inclined position shown in Fig. 2, the bight of the cable which carries the lower block is shortened automatically and in substantial proportion to the extent of rocking movement of the boom. Similarly, if the boom is rocked from an inclined toward a vertical position the bight of the cable which carries the lower block is in like manner and similar proportion lengthened. This action takes place whether said boom rocks toward or from either side of the base frame. This action effects an automatic compensation for the varying degrees of overhang of the load and consequently the load is carried in substantially a horizontal line even though the boom may swing from one extreme limit of incline at one side of the base frame, to the other extreme limit on the opposite side of the base frame.

Having now set forth the objects and nature of my invention, and a construction embodying the principles thereof, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:—

1. In a crane, a supporting base, a vertically swinging boom having circular track segments at its lower end arranged to rest and to be supported on said base, load supporting devices carried by said boom, and means mounted on said base to operate said load supporting devices.

2. In a crane, a supporting base having circularly arranged guides, a vertically swinging boom having circular track segments at the lower end thereof arranged to rest upon said guides and forming a support for said boom, load carrying devices mounted on said boom, and means for operating said load carrying devices.

3. In a crane, a supporting base, a boom having circular track segments at its lower end resting upon said base and forming supports for said boom, said boom mounted to rock vertically from one side to the other of said base, load carrying devices suspended from the free end of said boom, and

means for operating said load carrying devices.

4. In a crane, a supporting base having circularly arranged supporting guides, a boom having segment tracks at its lower end and arranged to rest on said guides to support said boom thereon, load carrying devices mounted on the boom, and a motor mounted on the supporting base to operate said load carrying devices.

5. In a crane, a boom having circular track segments at the base thereof circular guides upon which said segments rest for rocking movement thereon, load carrying devices suspended from said boom, means for operating said load carrying devices, said boom mounted to rock upon said guides.

6. In a crane, a supporting base, a rocking boom having circular track segments at its lower end, and vertically arranged in the plane of rocking movement of said boom, said track segments resting upon said supporting base, load carrying devices suspended from said boom, and means mounted on the supporting base for operating said load carrying devices.

7. In a crane, a supporting base having an upright or tower portion, a boom supported upon said base below said tower portion to rock or swing in a vertical plane, load carrying devices suspended from said boom, a guide carried by said upright or tower portion, having engagement with said load carrying devices and means mounted on the base for operating the load carrying devices.

8. In a crane, a supporting base having vertically extending tower portions spaced apart from each other, a boom having circular track sections, to rest and swing upon said base at a point below the tower portions, load carrying cables suspended from the free end of said boom, guides for said cables, said guides carried by the upper ends of the tower portions, and means for operating said cables.

9. In a crane, a boom having circular track sections at the base thereof, on which said boom is supported and swings in a vertical plane, a load carrying cable suspended from the free end of said boom, a fixed guide over which said cable operates, and forming a fulcrum for said cable when the boom swings, and means for operating said cable.

10. In a crane, a boom having circular track sections at the base thereof on which said boom is supported and swings in a vertical plane, a vertical tower portion having guiding devices at its upper end, a hoisting cable suspended from the free end of the boom and engaging said guiding devices, and means for operating said cable.

11. In a crane, vertical tower portions spaced apart from each other and having guiding devices at their upper ends, a boom positioned between said tower portions to rock or swing in a vertical plane, and having circular track sections at its base to form a support for the same, load carrying cables suspended from the free end of the boom and respectively engaging the guiding devices at the upper ends of the tower portions, and means for operating said cables.

12. In a crane, a boom composed of side members and having circular supporting track sections upon which said members are supported to rock in a vertical plane, means connecting the free ends of said members, load carrying devices suspended from said connecting means, and a motor for actuating said load carrying devices.

13. In a crane, a boom having circular track segments at its base forming a support therefor to permit the same to swing in a vertical plane, a load carrying cable suspended from the free end of said boom, means for operating said cable, and means to cause the load to move in a substantially horizontal line as the boom swings in a vertical plane.

14. In a crane, a boom having circular supporting track segments at its base, to permit the same to swing in a vertical plane from one side to the other of a vertical line, a load carrying cable suspended from the free end of the boom, means for operating said cable and means for varying the length of the load carrying portion of the cable as the boom swings from one side to the other.

15. In a crane, a boom having circular supporting track segments at its base, to permit said boom to swing in a vertical plane from one side of a vertical line to the other, a cable having a load carrying bight portion suspended from the upper end of the boom and means for automatically varying the length of the load carrying bight of the cable as the boom swings from one side to the other.

16. In a crane, a vertical tower portion having guide devices at its upper end, a boom having circular track supports at the base thereof and positioned alongside said tower portion to permit said boom to swing in a vertical plane upon said supports, a hoisting cable having a load supporting bight portion suspended from the free end of said boom, said cable arranged to engage said guide devices, and means for operating said cable.

17. In a crane, a supporting base, a boom having circular supporting track sections to rest upon said base and form a support for said boom, to permit said boom to swing upon said base and in a vertical plane, a vertical tower portion past which said boom is positioned to swing, a hoisting cable se-

cured at one end to said tower portions, guide sheaves carried respectively by the free end of the boom and said tower portion over which said cable operates, and a motor carried by said supporting base for operating said cable.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses, on this 31st day of July A. D., 1913.

HARRY SAWYER.

Witnesses:
NORMAN W. WHICHELLO,
JOHN L. HAGA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."