J. R. McGIFFERT.

SWINGING BOOM.

APPLICATION FILED DEC. 10, 1906.

907,631.

Patented Dec. 22, 1908.

3 SHEETS—SHEET 1.

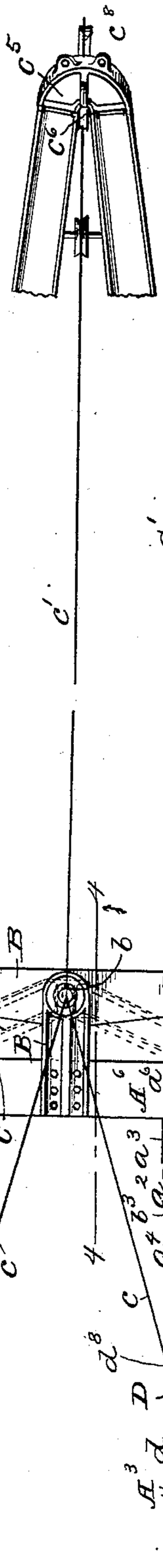

Fig. 1.

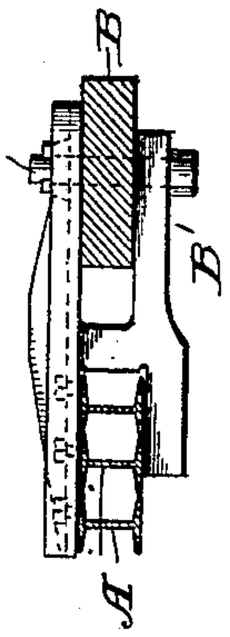

Fig. 4.

Witnesses

E. L. Buck

Jno. F. Oberlin

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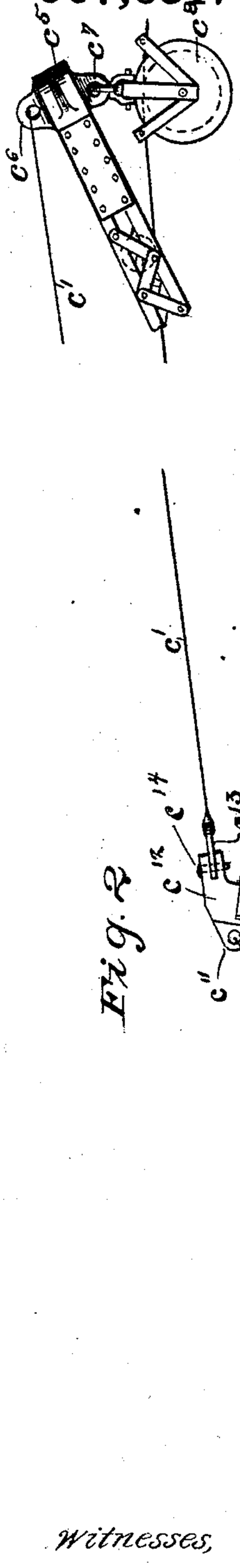

Fig. 2.

Witnesses,

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3 SHEETS—SHEET 3.

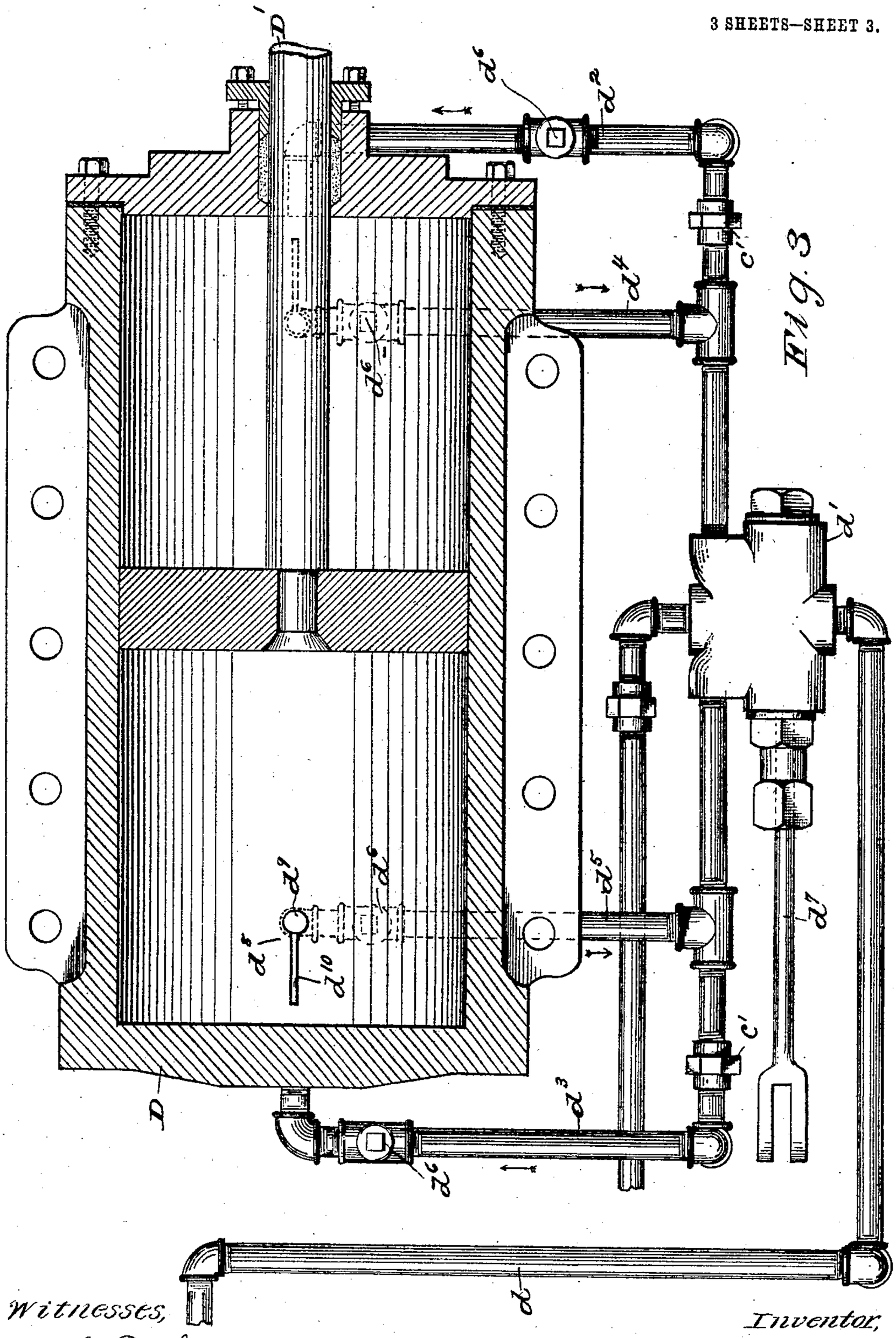

Fig. 3

Witnesses,
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UNITED STATES PATENT OFFICE.

JOHN R. McGIFFERT, OF DULUTH, MINNESOTA, ASSIGNOR TO CLYDE IRON WORKS, OF DULUTH, MINNESOTA, A CORPORATION OF MINNESOTA.

SWINGING BOOM.

No. 907,631. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed December 10, 1906. Serial No. 347,026.

To all whom it may concern:

Be it known that I, JOHN R. McGIFFERT, a citizen of the United States, resident of Duluth, county of St. Louis, and State of Minnesota, have invented a new and useful Improvement in Swinging Booms, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to loading mechanism, and has regard particularly to the design and construction of derrick booms intended for use in connection with such mechanism.

The service chosen for the purpose of exemplifying the peculiar difficulties which it is desired to overcome and the manner in which I overcome the same in this my present invention is that of the loading of logs upon cars incidentally to transporting them from the forests where they are cut to the mills. For the purpose of handling logs in this manner a variety of devices, generally transportable and in certain examples automobile in their character, have been devised. The ordinary type of derrick, comprising a rotatable mast from which the boom is supported or else a boom pivotally secured to a fixed mast, is not well adapted to withstand the very heavy side strain and racking to which it would be subjected in the raising of logs from first one side then the other of the railway track onto a car standing thereon; such type is still less adapted to "skidding" logs, a use sometimes made of a loading machine. Hence, a mast rigidly mounted upon the loader frame has generally been preferred. Obviously, however, certain advantages are to be secured in having the boom mounted so as to be capable of even a limited amount of swinging movement, and it is with the object in view of providing such a swinging boom structure that will be at the same time adapted to the certain severe demands of the service described that I have devised the means hereinafter fully described and particularly pointed out in the claims as constituting my invention.

The annexed drawings and the following description set forth in detail certain means embodying the invention, such disclosed means, however, constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is a plan view of my improved derrick construction as installed on a particular type of log loading machine; Fig. 2 is in part a side elevation of the same and in part a vertical cross-section taken on the line 2—2, Fig. 1, certain details including buffers a^3 being omitted in order to avoid confusion; Fig. 3 is a longitudinal central cross section through a cylinder and piston together with certain parts appertaining thereto which form a feature of such derrick construction; and Fig. 4 is a cross section on line 4—4, Fig. 1, showing more clearly a detail of such derrick construction.

The particular log loader in connection with which I have chosen to here illustrate my improved boom construction belongs to what is known to the trade as the "McGiffert" type of machine. The general form of this type of machine has been disclosed in United States Letters Patent No. 715,840 issued to me December 16, 1902. For my present purpose it is not necessary to further describe such machine than to state that it embodies primarily a transportable frame that, when in use, is adapted to straddle a railway track and permit cars to pass underneath and through the same. Upon a deck borne by such frame is mounted suitable hoisting mechanism whereby logs may be raised and placed upon such cars as they emerge from underneath the loader.

In the several figures of the drawings only the forward and upper portion of the loader frame is represented, while the hoisting mechanism appears in diagrammatic form merely. Referring then to Figs. 1 and 2, A is the front girder of the loader deck upon which the hoisting mechanism, including the boom is supported. Such girder is preferably composed, as shown, of several I-beams placed side by side and extends across between the forward legs A′ of the machine, which are similarly constructed. The I-beams of which girder A and legs A′ are composed, are joined together by plates riveted thereto as will be understood by those familiar with the art, and a desirable degree of stiffness is secured for the structure by means of braces *a*, preferably of angle iron, fitted in the corners between such girder A and the portions of the legs A′ that extend above the level of the deck. The deck proper is made up of lateral longitudinal

beams A^2 having their ends secured to legs A', and of two pairs of intermediate longitudinal beams A^3 which are riveted to the underside of the I-beams forming cross girder A. Suitable flooring (not appearing in the drawings) is laid upon beams A^2 and A^3. Such intermediate beams A^3 extend at their forward ends some distance beyond girder A, as shown, Fig. 1, so as to form a support for an oscillating beam B that is pivoted to a casting B' centrally secured to girder A. The general form of this casting appears in Fig. 4, upon an inspection of which it will be noted that such casting is provided with two jaws, one of which receives the aforesaid girder to which it is securely riveted, the other of which receives oscillating beam B which is held in place by means of a king bolt *b*.

Rigidly mounted upon girder A, which it has been seen, lies directly in the rear of oscillating beam B, is a mast in the form of an A-frame or shears C, which is held in position by means of guys *c c* that extend backwardly and are attached to the rear end of the loader frame. Frame or mast C is shown in dotted outline in Fig. 1 merely to avoid confusing it with the representation of the parts lying beneath. The guys *c c* are secured to an eye c^{11} of a casting c^{12} on the top of the A-frame C. In the front part of the casting is a jaw formed to receive a plate c^{13}. Such plate is pivotally secured to the jaws by a pin c^{14} and has a hole in its forward end through which another guy line *c'* is run. Such guy *c'* extends from the top of A-frame C to the outer end of the A-shaped boom C', the inner lower end of which is mounted on oscillating beam B. For this purpose the ends of its legs are provided with castings c^2 which are hinged by means of pins c^3 to complementary castings c^4 on such beam. The outer ends of these legs are joined together by means of another casting c^5 to an upper eye c^6 in which is attached the aforesaid guy *c'* leading from the top of A-frame C. From a lower eye c^7, with which casting c^5 is also provided, depends a loading block c^8 through which passes the hoisting cable c^9. The latter, in addition, passes through an intermediate block c^{10}, that is hung between the legs of the A-frame C. The purpose of this latter block c^{10} is to guide the line properly to the drum of the engine despite the oscillations of the boom C'.

A strap b^5 is secured to the lower side of oscillatory beam B, near either end, and extends around and underneath the corresponding pair of beams A^3. The beam B is by this means prevented from tipping up off such supporting beam A^3. Near the respective extremities of oscillating beam B there are further pivotally attached by means of pins b^2 yokes B^2 of general U-form, Figs. 1 and 2. These yokes, attached in the manner stated to the beam, embrace the girder A above and below and slide backward and forward on the same and between the members of the respective pairs of intermediate beams A^3 when the beam is swung or oscillated. On the back side of girder A are secured intermediately of the same and yokes B^2, buffer plates a^2 bent as shown in Fig. 1, and designed to be engaged by said yokes when the latter are drawn forwardly by the oscillation of the beam B. These buffer plates a^2 are suitably cushioned by means of nests of spiral springs or other resilient members a^3 interposed between the same and the girder. The object of the particular conformation of the plates is to allow the use of longer springs than could otherwise be employed, thereby giving increased flexibility since the sliding yokes B^2 do not come into contact with the buffer plates until the beam has nearly approached the limit of its swing to the one side or the other.

At the rear end of one of the yokes B^2, in the structure in hand the one on the right, viewing the machine as disposed in Fig. 1, are double flanges b^3 which form a cross head. Such cross head is designed to slide on guides consisting of plates a^4 secured to the adjacent intermediate deck beams A^3. The rear end of this same yoke is connected by means of a vertical pin a^5 with the outer end of a piston rod D' reciprocably mounted in a longitudinally disposed cylinder D also supported upon said deck beams. From this construction it will be seen that the oscillation of the beam B will effect the reciprocation of such piston and vice versa.

Steam for cylinder D is furnished from the boiler, not shown, regularly utilized in supplying power for the hoisting mechanism, such boiler being ordinarily supported upon the deck of the loader adjacent to such hoisting mechanism. The steam is conducted through the pipe *d* into the valve *d'*, Figs. 1 and 3. This valve *d'* which may be any one of various approved constructions of valve for this purpose, and hence not shown in detail is so arranged that by moving the valve stem d^7 in or out the steam may be led either through the steam pipe d^2 into the forward end of the cylinder or through steam pipe d^3 into the rear of the cylinder. Corresponding with these two steam inlet pipes are two exhaust pipes d^4 d^5 leading from the under side of the cylinder near the respective ends of the same and connected with pipes d^2 d^3, as shown. Inlet pipes d^2 d^3 are respectively provided with check valves d^6, as are also exhaust pipes d^4 d^5 whereby the passage of steam therethrough is, in each instance, permitted in one direction only, such direction being indicated in the figure by arrows. It is therefore evident that when the valve is moved into position to allow the steam from the boiler to pass to the forward end of the

cylinder such steam must necessarily pass through inlet pipe d^2 proper and not through exhaust pipe d^4, with branches therefrom, on account of the action of the check valves in such pipes, respectively. When on the contrary the valve is so positioned that the steam passes into the rear end of the cylinder, the steam being exhausted from the forward end thereof, such exhausted steam can only escape through the pipe d^4 therefor designed, as the check valve in the pipe d^2 prevents it getting out through the end of the cylinder. Since, however, the exhaust ports are located a short distance from the cylinder end the piston on its approach to such end of the cylinder, will evidently cut off the exhaust port before reaching the limit of its stroke. By thus preventing the entire escape of the exhausted steam a cushion is formed in the end of the exhaust cylinder which deadens the force of the stroke. In order that such cushion be required to overcome the momentum of the moving parts only, it is desirable that the pressure of the live steam back of the piston be reduced at this juncture. This result I secure by the particular form of exhaust port d^8 which I employ, Fig. 3. As will be noted from an inspection of the figure of reference, such exhaust port is of elongated form, decreasing in area towards the proximate cylinder end, such port being formed in practice by boring a circular hole d^9 into the cylinder and then sawing a very narrow slit d^{10}, leading therefrom. Hence, as the piston moves towards the exhaust port it will cut off the greater part of the exhaust when it has moved over the hole which forms the larger portion of such port. The exhaust steam passing through the narrow slit, however, allows a continuation of the piston's movement in the same direction although at a reduced speed. Such continued movement, however, is terminated and the stroke simultaneously cushioned when the slit which leads from such hole is also covered by the piston. Incidentally, with the attainment of this last result the large hole is opened back of the piston and thus just as the stroke is cushioned, the pressure of the live steam back of the piston is released and an unnecessarily heavy shock to the cylinder end thus avoided.

Movement of the valve stem d^7, whereby the operation just described is controlled, is effected by means of a lever, not shown, suitably pivoted on a bracket in the floor of the machine, and extending upwardly above such floor into position to be conveniently operated by the person having charge of the hoisting mechanism.

In the horizontal portions of the U-shaped yokes are provided holes which are designed to register, when the boom is in its central position, with similar holes in transverse girder A. Thus when it is desired to use the boom in the rigid position or when such use becomes necessary, in case of breakage of any part of the oscillating mechanism, pins a^6 may be inserted through the aforesaid holes and the boom thus locked in its central position. It is thus seen that my improved form of boom may be readily adapted for use as a rigid boom when conditions are encountered to render such use advantageous as occasionally occurs. In its normal and more general use as a swinging boom, the advantages which are sought in this form of construction are not negatived by a corresponding loss of power or strength in the structure. At the same time, the U-shaped yokes, in combination with the resiliently mounted buffer plates, prevent the boom from unduly racking the frame of the machine when swung rapidly from one side to the other. They also serve to reduce the strain on the jaw in which oscillating beam B is pivotally mounted, which beam, as has been previously pointed out, is subjected along with the boom and its attachments to a very heavy side strain when a log is being drawn up from one side or the other, whereby the successful employment of any other type of boom than that rigidly mounted in the loading machine frame has heretofore been prevented. In addition to the cushioning effect of the buffer plates that of the steam cylinder is also provided whereby the violent movement of the boom at the extreme limits of its oscillation is entirely prevented. Such steam cylinder in discharge of its normal function, that of positively swinging the boom in the manner described, is connected to effect the operation with the least expenditure of energy, and involves neither in its construction or in its connections any such complexity of parts such as is a frequent occasion for mishaps and irksome delay in machines of the class under consideration.

Having thus described my invention in detail, that which I particularly point out and distinctly claim, is:

1. In mechanism of the class described, the combination of a derrick boom mounted upon a substantially vertical axis, and normally freely oscillatory thereabout resilient means adapted to limit such oscillation, and fluid-pressure actuated means connected with such boom and adapted to control such oscillation within the limits imposed by said resilient means.

2. In mechanism of the class described, the combination of a derrick boom mounted so as to be oscillatory about a substantially vertical axis, resilient means adapted to limit such oscillation, a horizontally disposed cylinder, a piston reciprocable therein and connected with said boom, and connections for admitting fluid under pressure into each end of said cylinder as desired.

3. In mechanism of the class described,

the combination with a supporting frame, of a pivotally mounted beam transversely disposed in front of said frame, and a boom borne by said beam.

4. In mechanism of the class described, the combination with a supporting frame including a transverse girder, of a pivotally mounted beam located in front of said girder and substantially parallel therewith, and a boom borne by said beam.

5. In mechanism of the class described, the combination with a supporting frame including a transverse girder, of a beam pivotally mounted in front of said girder, and substantially parallel therewith and an A-shaped boom mounted upon said beam, the legs of said boom being pivotally secured thereto.

6. In mechanism of the class described, the combination with a supporting frame including a transverse girder, of a member projecting forwardly from the central portion of said girder, a beam supported by said member and pivotally secured thereto, and an A-shaped boom borne by said beam.

7. In mechanism of the class described, the combination with a supporting frame including a transverse girder, of a casting centrally secured to said girder and projecting forwardly from the same, the outer end of said casting terminating in a pair of jaws, a transverse beam supported between said jaws, and pivotally secured thereto, and an A-shaped boom borne by said beam.

8. In mechanism of the class described, the combination of a supporting frame, a transversely disposed beam pivotally secured to said frame, an A boom borne by said beam, and means adapted to limit the oscillation of said beam about its pivotal axis.

9. In mechanism of the class described, the combination of a supporting frame, a transversely disposed beam pivotally secured to said frame, an A boom borne by said beam, and resilient means adapted to limit the oscillation of said beam about its pivotal axis.

10. In mechanism of the class described, the combination of a supporting frame, a pivotally mounted beam transversely disposed in front of said frame, an A boom borne by said beam, means adapted to limit the oscillation of said beam about its pivotal axis, and fluid-pressure actuated means adapted to control such oscillation within the limits imposed by said means.

11. In mechanism of the class described, the combination of a supporting frame including a transverse girder, a beam pivotally mounted in front of said girder and substantially parallel therewith, an A-shaped boom mounted upon said beam, the legs of said boom being pivotally secured thereto, resilient means adapted to limit the oscillation of said beam about its pivotal axis, and fluid-pressure actuated means adapted to control such oscillation within the limits imposed by said means.

12. In mechanism of the class described, the combination with a frame including a transverse girder, of a beam pivotally mounted in front of said girder, yokes embracing said girder and attached to said beam near the respective ends of the latter whereby the oscillations thereof are limited, and an A-shaped boom borne by said beam.

13. In mechanism of the class described, the combination with a frame including a transverse girder, of a beam pivotally mounted in front of said girder, yokes embracing said girder and attached to said beam near the respective ends of the latter, whereby the oscillations thereof are limited, resilient means interposed between said yokes and said girder, and an A-shaped boom borne by said beam.

14. In mechanism of the class described, the combination with a supporting frame including a transverse girder, a beam pivotally mounted in front of said girder, yokes embracing said girder and pivotally attached to said beam near the respective ends of the latter, whereby the oscillations thereof are limited, buffer plates interposed between said yokes and said girder, resilient means cushioning said buffer plates, and an A-shaped boom mounted upon said beam.

15. In mechanism of the class described, the combination with a supporting frame including a transverse girder, a beam pivotally mounted in front of said girder, yokes embracing said girder and pivotally attached to said beam near the respective ends of the latter, whereby the oscillations thereof are limited, buffer plates interposed between said yokes and said girder, each of said plates comprising an inwardly curved portion adapted to receive the corresponding yoke and lateral outwardly curved portions, resilient means for cushioning said plates mounted between said outwardly turned portions of the same and said girder, and an A-shaped boom mounted upon said beam.

16. In mechanism of the class described, the combination with a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, of a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, and a boom mounted upon said transverse beam.

17. In mechanism of the class described, the combination with a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, of a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, and an A-shaped boom mounted upon

said transverse beam, the legs of said boom being pivotally secured thereto.

18. In mechanism of the class described, the combination of a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, a boom mounted upon said transverse beam, and resilient means adapted to limit the oscillation of said beam.

19. In mechanism of the class described, the combination of a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, an A-shaped boom pivotally mounted upon said transverse beam, resilient means adapted to limit the oscillation of said beam, and fluid-pressure actuated means adapted to control such oscillation within the limits imposed by said means.

20. In mechanism of the class described, the combination of a supporting frame, a mast, and an A boom, the latter being pivotally mounted independently of the former.

21. In mechanism of the class described, the combination of a supporting frame, a mast, and an A boom, the latter being mounted independently of the former and having a limited oscillatory movement with respect thereto.

22. In mechanism of the class described, the combination of a supporting frame, a mast, an A boom pivotally mounted independently of said mast, and resilient means limiting the oscillation of said boom.

23. In mechanism of the class described, the combination of a supporting frame, a mast, an A boom pivotally mounted independently of said mast, resilient means limiting the oscillation of said boom, and fluid-pressure actuated means adapted to control such oscillation within the limits imposed by said means.

24. In mechanism of the class described, the combination with a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, and a boom mounted upon said transverse beam.

25. In mechanism of the class described, the combination with a supporting frame including a transverse girder and longitudinal beams located beneath and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally attached to said girder, and an A-shaped boom mounted upon said transverse beam, the legs of said boom being pivotally secured thereto.

26. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a member projecting forwardly from the central portion of said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to said member, an A-shaped boom mounted upon said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

27. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a casting centrally secured to said girder and projecting forwardly from the same, the outer end of said casting terminating in a pair of jaws, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally held between said jaws, an A-shaped boom mounted upon said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

28. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder and attached to said beam near the respective ends of the latter whereby the oscillations thereof are limited, an A-shaped boom borne by said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

29. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder and attached to said transverse beam near the respective ends of the latter whereby the oscillations thereof are limited, resilient means interposed between said yokes and said girder, an A-shaped boom borne by said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

30. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of

an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder and pivotally attached to said transverse beam near the respective ends of the latter, whereby the oscillations thereof are limited, buffer plates interposed between said yokes and said girder, resilient means cushioning said buffer plates, an A-shaped boom mounted upon said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

31. In mechanism of the class described, the combination with a supporting frame including a girder and longitudinal beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder, and pivotally attached to said transverse beam near the respective ends of the latter, whereby the oscillations thereof are limited, buffer plates interposed between said yokes and said girder, each of said plates comprising an inwardly-curved portion adapted to receive the corresponding yoke and lateral outwardly curved portions, resilient means for cushioning said plates mounted between such outwardly turned portions of the same and said girder, an A-shaped boom mounted upon said beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

32. In mechanism of the class described, the combination with a supporting frame including a transverse girder and two pairs of longitudinal deck-beams secured to and extending beyond the same, of an A-frame rigidly mounted upon said girder, a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder and pivotally attached to said transverse beam near the respective ends of the same, each of said yokes slidably lying between the members of one of said pairs of said longitudinal beams, resilient means interposed between said yokes and said girder, an A-shaped boom mounted upon said transverse beam, and a guy connecting the end of said boom with the top of aforesaid A-frame.

33. In mechanism of the class described, the combination with a supporting frame including a transverse girder and two pairs of longitudinal beams secured to and extending beyond the same, of a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, yokes embracing said girder and pivotally attached to said transverse beam near the respective ends of the same, each of said yokes slidably lying between the members of one of said pairs of longitudinal beams, reciprocable pressure-actuated means operatively connected with one of said yokes, and an A-shaped boom mounted upon said transverse beam.

34. In mechanism of the class described, the combination with a supporting frame including a transverse girder and a pair of longitudinal beams secured to and extending beyond the same, of a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, a yoke embracing said girder and pivotally attached to said transverse beam near one end of the same, said yoke slidably lying between said pair of longitudinal beams, a cylinder mounted upon said beams, a piston reciprocably mounted in said cylinder and pivotally connected with the rear end of said yoke, and an A-shaped boom mounted upon said transverse beam.

35. In mechanism of the class described, the combination with a supporting frame including a transverse girder and a pair of longitudinal beams secured to and extending beyond the same, of a transverse beam resting upon the projecting portions of said longitudinal beams and pivotally secured to the front of said girder, a yoke embracing said girder and pivotally attached to said transverse beam near one end of the same, said yoke slidably lying between said pair of longitudinal beams, guides on said beams forming a slideway, flanges on the rear end of said yoke forming a cross-head engaging said slideway, a cylinder mounted upon said beams, a piston reciprocably mounted in said cylinder and pivotally connected with such rear end of said yoke, and an A-shaped boom mounted upon said transverse beam.

36. In mechanism of the class described, the combination with a derrick boom mounted so as to be oscillatory about a substantially vertical axis, of fluid-pressure actuated means for swinging said boom, said means being likewise adapted to cushion the oscillations of said boom.

37. In mechanism of the class described, the combination of a derrick boom mounted so as to be oscillatory about a substantially vertical axis, means limiting the oscillation of said boom, and fluid-pressure actuated means for swinging said boom, said last-named means being likewise adapted to cushion the oscillations of said boom as the limits imposed by said first-named means are approached.

38. In mechanism of the class described, the combination of a supporting frame, a transversely disposed beam pivotally secured to said frame, a boom borne by said beam, and fluid-pressure actuated means for swinging said beam, said means being likewise adapted to cushion the oscillations of said beam.

39. In mechanism of the class described,

the combination of a supporting frame, a transversely disposed beam pivotally secured to said frame, a boom borne by said beam, resilient means limiting the oscillations of said beam, and fluid-pressure actuated means for swinging said beam, said last-named means being adapted to cushion the oscillations of said beam as the limits imposed by said first-named means are approached.

Signed by me, this 3rd day of December, 1906.

JOHN R. McGIFFERT.

Attested by—
N. M. NELSON,
C. A. LUSTAR.