No. 810,691. PATENTED JAN. 23, 1906.

J. S. ALLEN, JR.

DERRICK.

APPLICATION FILED MAR. 24, 1905.

3 SHEETS—SHEET 1.

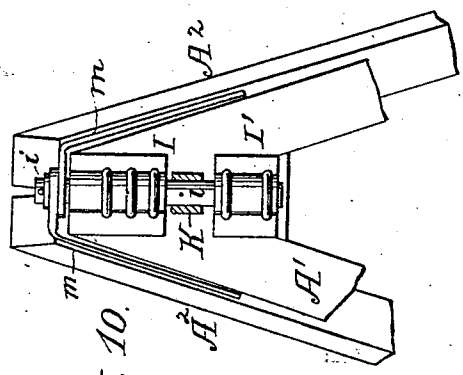


Fig. 10.

Fig. 1.

Witnesses:
Walter F. Ballinger
Titus Nelson

Inventor:
Jacob S. Allen, Jr.
by his Attorneys.
Howson & Howson

AIR TRAVERSING HOISTS.

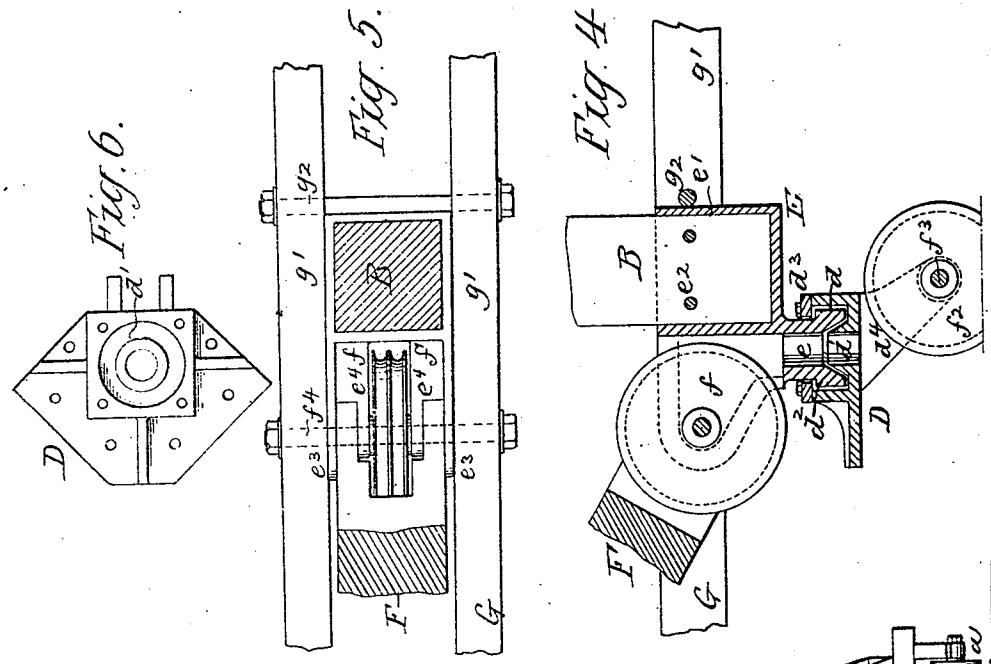
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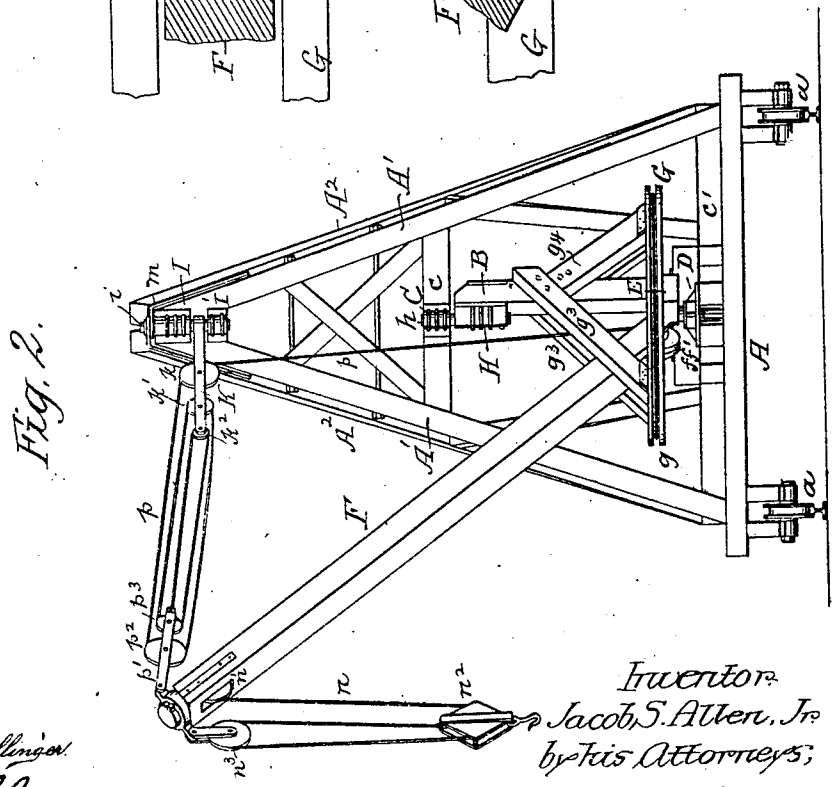
J. S. ALLEN, JR.

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3 SHEETS—SHEET 2.





Witnesses:
Walter J. Pullinger.
Titus Hebron.

Inventor:
Jacob S. Allen, Jr.
by his Attorneys;
Howson & Howson

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3 SHEETS—SHEET 3.

Fig. 11.

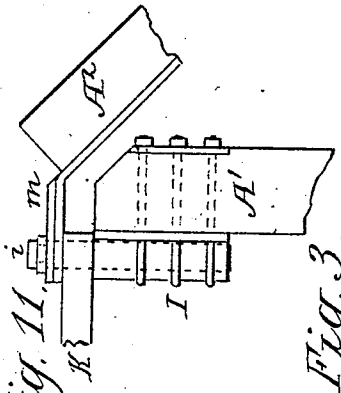


Fig. 3.

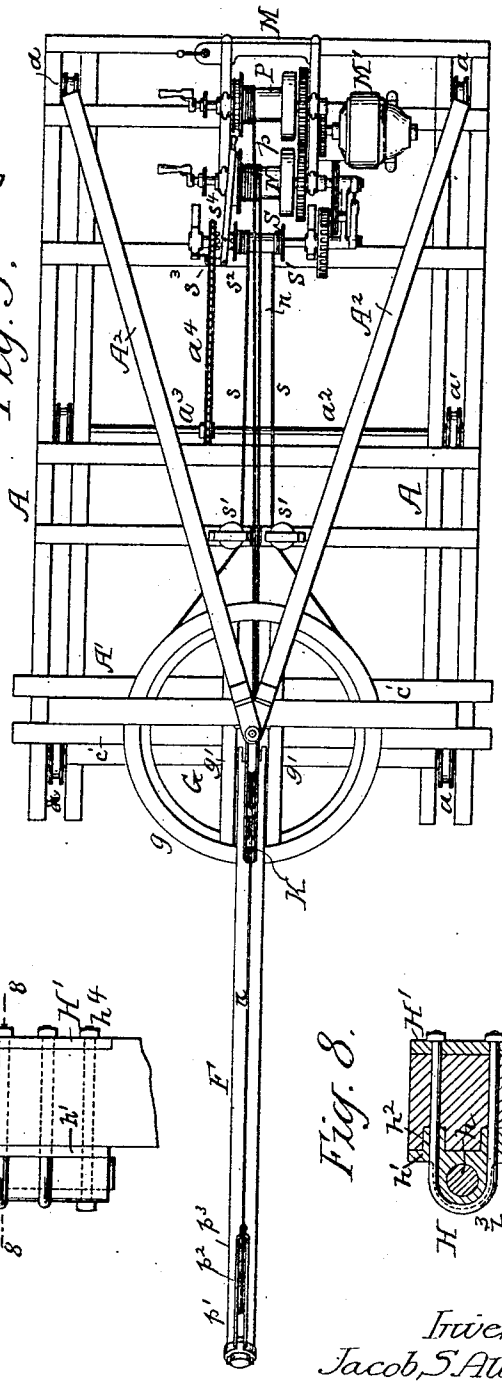


Fig. 9.

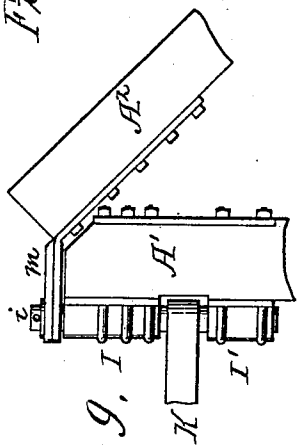


Fig. 7.

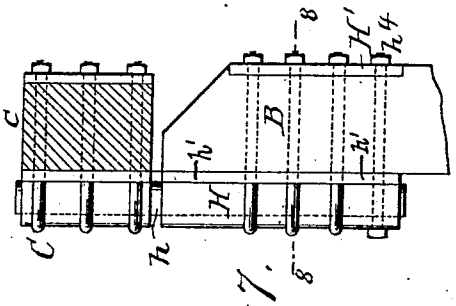


Fig. 8.

Witnesses:
Walter J. Pellinger.
Titus Hevans

Inventor
Jacob S. Allen, Jr.
by his Attorneys.
Howson & Howson

UNITED STATES PATENT OFFICE.

JACOB S. ALLEN, JR., OF PHILADELPHIA, PENNSYLVANIA.

DERRICK.

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No. 810,691. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed March 24, 1905. Serial No. 251,841.

To all whom it may concern:

Be it known that I, JACOB S. ALLEN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Derricks, of which the following is a specification.

The main object of my invention is to construct a derrick of the A-frame type with a short mast to bring all the pivot-points in alinement and to properly support the bull-wheel and the boom.

A further object of the invention is to provide a step-bearing for the mast which can be kept lubricated at all times; and a still further object is to provide simple and effective means for shifting the derrick on its tracks.

These objects I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved derrick. Fig. 2 is an end view. Fig. 3 is a plan view. These views are illustrated with the flooring and the house structure removed for the purpose of showing the mechanism. Fig 4 is a detailed sectional view of the step-bearing for the mast. Fig. 5 is a plan view of Fig. 4. Fig. 6 is a plan view of the step illustrated in Fig. 4. Fig. 7 is a side view illustrating the upper bearing of the mast. Fig. 8 is a section on the line 8 8, Fig. 7. Fig. 9 is a side view of the upper portion of the A-frame. Fig. 10 is an end view of the upper portion of the A-frame, and Fig. 11 is a view of a modification of the connection between the A-frame and the strut-legs.

A is the main frame of the derrick supported by suitable wheels $a\,a'$, which are mounted on the usual tracks. These wheels in the present instance are double-flanged, and the end wheels have trunnions mounted in boxes carried by the said frame A. The central wheels a' are the driving-wheels and are mounted on a transverse shaft a^2, which carries a sprocket-wheel a^3, around which passes a chain a^4 from a sprocket-wheel on the hoisting mechanism of the structure, which will be described hereinafter.

A′ is the vertical frame, mounted at the forward end of the main frame A and is supported by struts A^2, which extend to a point at the rear of the frame A, as illustrated in Fig. 1. This type of derrick is known as an "A-frame" derrick. The A-frame in the present instance has a cross-beam c about midway of its height, and between this cross-beam c and the beams c' at the base of the A-frame is mounted the short mast B.

Referring to Fig. 4, D is the step for the foot-block E of the mast B. This step has a cavity d for the reception of the pivot e of the foot-block and has an internal upwardly-projecting flange d', which in the present instance has a conical outer surface fitting the conical opening in the end of the pivot of the foot-block. The step, as well as the pivot, has an open center for the passage of the ropes for operating the boom and the bucket. The lower portion of the pivot is enlarged, forming a shoulder d^2 near the upper end over which extends a cap-plate d^3, bolted to the step in any suitable manner. The pivot, as will be noticed in Fig. 4, does not snugly fit the step-block, but there is sufficient play to allow it to accommodate itself to the movement of the boom. This loose fit allows a sufficient quantity of the lubricant to be retained in the step, so as to thoroughly lubricate the pivot at all times, the internal projecting flange d' preventing the escape of lubricant and the cap-plate d^3, which extends entirely around the pivot, prevents access of dust or dirt to the bearing, thus keeping the bearing comparatively clean. The cap-plate d^3 also tends to hold the pivot in place in the step-bearing. The mast B is mounted in a pocket e' in the foot-block E and is secured therein by transverse bolts e^2. The foot-block has four projecting bearings—two outer bearings e^3 e^3 and two inner bearings e^4 e^4. Between the two inner bearings are mounted the sheaves $f\,f'$, one for the boom-rope and the other for the bucket-rope. These ropes pass around sheaves f^2, mounted on a spindle f^3, carried by brackets d^4, projecting from the under side of the step D. From these sheaves the ropes pass to the drums described hereinafter. The lower end of the boom F is cut away, so as to accommodate the bearings e^4 and the sheaves $f\,f'$, the projecting portions of the boom fitting between the inner bearing e^4 and the outer bearing e^3. A pivot-pin f^4 not only acts as a pivot for the boom, but also for the sheaves $f\,f'$, as illustrated clearly in Fig. 5. Carried by the foot-block E is the bull-wheel G. The body of this bull-wheel is made in the ordinary manner, having a groove trim g, which is connected to the foot-block by beams g'. The beams are secured to the foot-block by the pivot-pins f^4, which act as a pivot for the boom, and by a bolt g^2,

which passes through the beams directly back of the foot-block, as illustrated in Fig. 4; but it will be understood that other means of fastening the bull-wheel to the block may be used without departing from my invention. Extending from the rim of the bull-wheel G to the mast are diagonal braces g^3 and g^4. These braces are secured to the bull-wheel by angle-plates (illustrated in Fig. 2) and bolted to the mast in any suitable manner. The braces g^3 extend on each side of the boom F and not only form a brace for the bull-wheel, but act mainly as guides for the boom, relieving the pivot of the strain incident to the turning of the mast and boom when a load is being elevated and carried by the boom.

I construct the pivot for the upper portion of the mast in the manner clearly shown in Figs. 1, 2, 7, and 8, in which h is a vertical pivot mounted in a socket H, secured to the upper end of the mast B and arranged to rotate in a bearing C, carried by the cross-beam c. The socket H is made with side flanges h', which rest against the face of the boom, and has a series of projections h^2, which enter cavities in the mast, as illustrated in Fig. 8. The socket is grooved and perforated for the passage of U-shaped bolts h^3, which pass through the mast and through a plate H' at the back of the mast. Nuts on these bolts securely attach the parts together. The lower bolt h^4 is a straight bolt which passes through the pivot-pin h, as well as through the socket H, so as to prevent the turning of the pivot-pin in the socket. This pivot is in line with the pivot e of the foot-block E, and the bearing C, being mounted on the face of the A-frame, enables the boom to swing almost a complete half-circle. I preferably form the connection between the upper portion of the A-frame and the strut-legs A^2 somewhat in the same manner as the upper pivot for the mast.

I I' are sockets for a vertical pin i. These two sockets are secured to the A-frame by U-shaped bolts in a similar manner to the socket H on the mast, and they are spaced a sufficient distance apart, as illustrated in Figs. 1, 9, and 10, to allow for the reception of the strap K, carrying the sheaves k k' k^2. To the upper end of each strut-leg A^2 is secured a gooseneck m, which is bent and has a hole for the reception of the pin i. This pin projects a sufficient distance above the socket I to pass through both goosenecks, thus rigidly connecting the struts A^2 and the A-frame A'. In some instances the pin i may extend to such an extent that the strap K can be placed between the socket I and the goosenecks, as illustrated in Fig. 11, in which case the lower socket I' is dispensed with.

Referring now to the driving mechanism, M is the frame carrying the said mechanism, having bearings for the hoisting-drum N, the ropes n n from which pass around the sheaves f f^2 on the foot-block to the sheave n' on the end of the boom, around the pulley n^2, and around the sheaves n^3, and attached to the pulley-block in the present instance, which is provided with a hook to engage the load.

P is the boom-drum, having its bearings mounted in the frame M, and the rope p from this drum passes around one of the sheaves f, around the sheave f', both carried by the foot-block, then passes around the sheaves k k' k^2 on the strap K, and around sheaves p^2 p^3 on the strap p', to which the said rope is attached, this strap being pivoted to the end of the boom, and when the drum is operated the boom can be raised and lowered.

S is the bull-wheel-rope drum. The rope s passes around the bull-wheel G and the guide s', and both ends of this rope are attached to the drum S.

M' in the present instance is an electric motor, and there is clutch mechanism between each one of the drums N, P, and S and the motor, so that any one or all of the drums can be thrown into gear with the motor. This mechanism is common to this type of derrick.

The drum S is mounted loosely on the shaft S' and is locked to the shaft by a clutch-sleeve s^2, operated by a lever s^4. This clutch-sleeve is double-faced, and one face has teeth which mesh with the drum, while the other face has teeth which mesh with teeth on the sprocket-wheel s^3, around which passes the drive-chain a^4, leading to the sprocket-wheel a^3, carried by the shaft a^2, so that when the clutch-lever s^4 is thrown so that the sprocket-wheel s^3 is locked to the shaft S' motion will be imparted to the axle a^2 and will cause the entire derrick-frame to travel on the tracks. When the clutch is thrown out, however, the hoisting mechanism can be operated without traversing the derrick.

It will be seen by the above description that I am able to construct a very simple and effective derrick of the A-frame type, using a very short mast and so bracing the bull-wheel and the mast as to make them perfectly rigid, at the same time utilizing the braces as a guide and support for the boom, also to provide means for keeping the lubricant in the step-bearing and to provide a simple and substantial pivot for the mast and a substantial connection between the A-frame and the strut-legs. Furthermore, I provide means by which the derrick-frame can be shifted by throwing the wheels into and out of gear with the hoisting mechanism, as desired.

I claim as my invention—

1. The combination of a base-frame, an A-frame and struts supporting said A-frame, a step, a relatively short mast supported in the plane of the A-frame, a foot-block carrying

the mast and mounted in the step, a pivot by which the upper end of the mast is secured to the A-frame, a bull-wheel carried by the mast, braces extending from the bull-wheel to the mast, and a boom pivoted to the foot-block and mounted between the braces, substantially as described.

2. The combination in a derrick, of a base-frame, an A-frame carried thereby, a step, a short mast, a foot-block having its pivot mounted in the step and secured to the mast, a boom pivoted to the foot-block, a bull-wheel secured to the foot-block for turning the mast, a socket secured to the upper end of the mast, a pin in the socket and projecting above the mast, a bearing secured to the A-frame into which the pin projects, the pin being in line with the pivot of the foot-block and the mast being out of line, substantially as described.

3. The combination in a derrick, of a base-frame, an A-frame carried thereby, strut-legs extending from the upper portion of the A-frame to the rear of the main frame, a socket at the upper end of the A-frame, a pin mounted in the socket and projecting above the end of the A-frame, gooseneck carried by each strut-leg and having an opening for the passage of the pin, a cross-bar on the A-frame, a short mast mounted between the cross-bar and the base of the frame, a step-bearing for the lower portion of the mast, a pivot for the upper portion of the mast, and a boom, substantially as described.

4. The combination in a derrick, of a base-frame, an A-frame, strut-legs extending from the upper portion of the A-frame to the rear of the base-frame, a step-bearing mounted between the legs of the A-frame, a foot-block having a pivot mounted in the step-bearing, the step-bearing and the foot-block having an open center for the passage of the hoisting-ropes, a boom carried by the foot-block, the step-bearing having an internal upwardly-projecting flange forming an annular cavity for the reception of the pivot and for the accumulation of a lubricant so that the step-bearing will be lubricated at all times, substantially as described.

5. The combination in a derrick, of a mast pivoted at the upper end to the frame and having a foot-block at its lower end, a hollow pivot projecting from the under side of the foot-block, a step-bearing having an open center and having an annular internal flange forming an annular cavity into which the pivot of the foot-block extends, said pivot having a shoulder near its upper end, and a cap secured to the foot-block and extending over the shoulder of the pivot, forming a dust-guard for the bearing, substantially as described.

6. The combination in a derrick, of a pivot, a mast, a boom hung from the mast, a step-bearing for the lower end of the mast, a socket secured to the upper end of the mast, a pin mounted in the socket, U-shaped bolts extending through the socket and through the mast, and a bearing on the frame for the reception of the pivot-pin, substantially as described.

7. The combination in a derrick, of a frame, a mast, a boom pivoted to the mast, a step-bearing for the lower end of the mast, a socket at the upper end of the mast, said socket having a vertical opening, a pivot-pin mounted in the opening, U-shaped bolts securing the socket to the mast, said socket having projections surrounding each bolt and entering the mast, and a bearing secured to the frame of the derrick by U-shaped bolts, said bearing arranged to receive the projecting pivot of the mast, substantially as described.

8. The combination in a derrick, of a mast, an A-frame, strut-legs, a socket secured to the A-frame, U-shaped bolts securing the socket to the said frame, a pin projecting above the A-frame, goosenecks carried by the strut-legs through which the said pin passes, the pin also acting as a support for the sheave-strap at the upper end of the A-frame, substantially as described.

9. The combination in a derrick, of a main frame, wheels supporting the said frame, one set of wheels being the driving-wheels, hoisting mechanism carried by the frame and geared to the said driving-wheels, an A-frame at the forward end of the derrick, strut-legs leading from the upper portion of the A-frame to the rear of the main frame, a transverse beam on the A-frame, a short mast pivoted to the said beam, a foot-block secured to the lower end of the mast having a pivot, a step-bearing for the pivot, said step-bearing and foot-block having an open center, sheaves carried by the foot-block and by the step-bearing, a boom pivoted to the foot-block, an upwardly-extending internal flange in the step-bearing projecting up into the opening in the pivot and forming an annular cavity for retaining a lubricant, a plate forming a dust-guard secured to the foot-block, a socket at the upper end of the mast and secured thereto by U-shaped bolts, a pivot-pin mounted in the socket and projecting above the mast, a bearing in the cross-bar of the main frame for the reception of the pivot, the upper and lower pivots of the mast being in line, a bull-wheel carried by the mast, and braces extending from the mast to the rim of the bull-wheel, the said boom extending between the braces, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB S. ALLEN, JR.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.