(No Model.)

J. SARVER.

PORTABLE DERRICK.

No. 545,731. Patented Sept. 3, 1895.

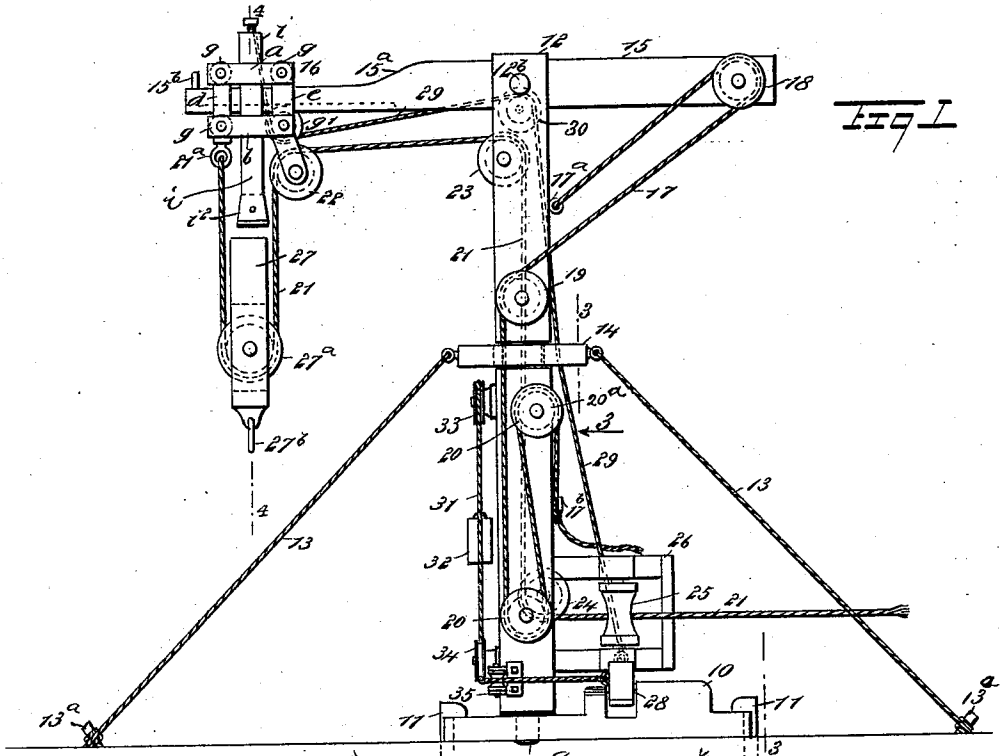

Fig 1

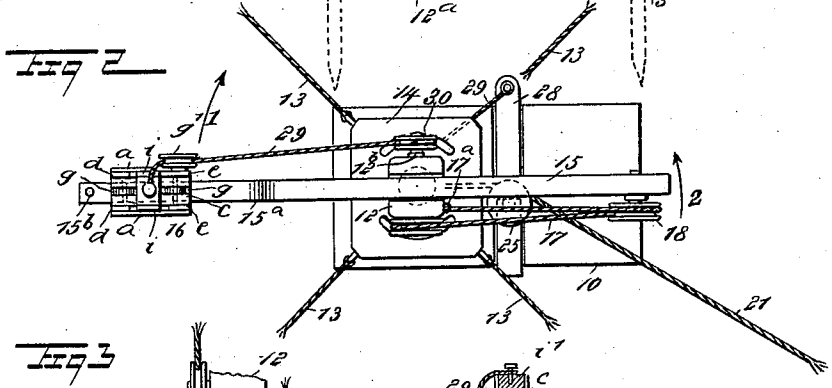

Fig 2

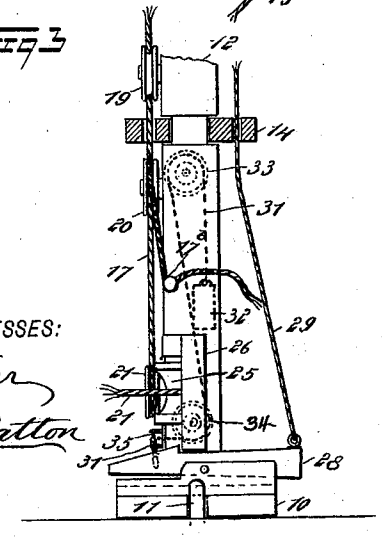

Fig 3

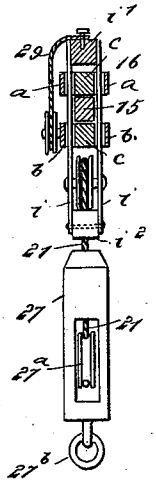

Fig 4

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PORTABLE DERRICK.

SPECIFICATION forming part of Letters Patent No. 545,731, dated September 3, 1895.

Application filed May 9, 1895. Serial No. 548,744. (No model.)

To all whom it may concern:

Be it known that I, JACOB SARVER, of La Junta, in the county of Otero, State of Colorado, have invented a new and Improved Portable Derrick, of which the following is a full, clear, and exact description.

This invention relates to an improved portable derrick, that is particularly well adapted for the elevation and proper disposition of forkfuls of hay or straw that are to be handled for the formation of such material into stacks.

The object of the invention is to provide a novel simple device of the indicated character, which may readily be transported to a desired point, and erected for use, be operative by horses or other power, and that in service will be adapted to automatically swing its load-carrying arm laterally for the deposition of said load and then automatically return the arm to its normal position for engagement of the fork with another quantity of material that is to be moved.

The invention consists in the construction and combination of parts, as hereinafter described, and indicated in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a side view of the improved derrick erected for use. Fig. 2 is a plan view of the machine, having some of the minor details broken away. Fig. 3 is a partly-sectional rear view of the lower portion of the derrick substantially on the line 3 3 and in direction of arrow 3 in Fig. 1, and Fig. 4 is a transverse sectional view of parts of the derrick substantially on the line 4 4 in Fig. 1.

For the stable support of other portions of the derrick a base-block 10, having suitable dimensions, is provided, the said block that may be of wood or metal, being preferably elongated and notched at the ends to receive the bodies of headed stakes 11, which, when driven into the soil, will secure the base-block temporarily in place where the derrick is to be stationed for service. The block 10 is vertically perforated to produce a socket or otherwise adapted to loosely receive the journaled lower end 12^a of the derrick-post 12, which post is afforded a proper height to adapt it for effective service when in an erect position on the base-block, as shown in Fig. 1. The post 12 is maintained upright by guy-ropes or other flexible connections 13, that extend from a radial flange or guy-ring 14, on the post to stakes in the ground, the said flange being preferably adapted to swivel on the post at a proper distance from the base-block 10, so that the guy-ropes having their upper ends attached thereto may be projected therefrom in any desired direction to have their outer ends attached to the stakes 13^a, which are firmly driven into the soil, so as to render the wire ropes 13 taut and preserve the post upright but free to turn on its pivot and in the loose guy-ring 14.

On the upper end of the post 12 an elongated carrier-arm 15 is pivoted to rock, and this may be effected by the loose insertion of the arm in a vertical slot of the post, as shown in Fig. 2, so as to permit the arm and post to be loosely connected by a pivot-bolt 12^b, or by any other available means which will adapt the arm to receive a rocking movement on the post. The point of pivotal connection of the arm 15 and post 12 is intermediate of the ends of said arm, and the thickness of what may be termed the "front end portion" of the arm is preferably reduced between the upper and lower sides of the same for a correct distance from the front terminal of the arm, producing an inclined shoulder, as at 15^a, and the use of which will be hereinafter described.

On the reduced forward portion of the arm 15 the traveling frame 16 is mounted, which is constructed to loosely embrace the sides of the arm, and its upper portion is adapted to rest on top of the latter. While the frame 16 may be formed in several ways to adapt it for longitudinal movement on the carrier-arm 15 it is preferred to construct it as shown, and it comprises two upper side bars *a* and two similar lower side bars *b*, these bars being spaced apart at their ends by two blocks *c*, that are respectively located above and below the arm 15, the said spacing-blocks having such a relative thickness that when the frame 16 is completed it may receive a longitudinal movement on the arm. Four link-plates *d e* are members of the frame 16, these being

introduced between the side bars *a* and blocks *c* and are thereto secured, the rear plates *e* having greater length than the front plates *d*.

To facilitate the sliding movement of the frame 16, the antifriction-rollers *g* may be introduced and pivoted in slots produced to receive them in the ends of the spacing-blocks *c*, as indicated by dotted lines, there being three of said rollers having the same diameter, and a fourth larger roller *g'*, which is to serve as a pulley and is located at the rear and lower corner of the traveling frame. Two of the rollers *g* are adapted to have contact with the upper side and one with the lower side of the arm 15, so as to reduce frictional contact of the frame 16 with the said arm when longitudinally moved thereon.

The larger roller or pulley *g'* is pivoted at the side of the traveling frame, as shown in Fig. 3 and 4, for a free engagement with a pulling-rope, as will be hereinafter described, to freely rotate at any point of longitudinal adjustment given to the traveling frame. Two similar lifting-bars *i* are introduced between the side bars *a* and arm 15, the said lifting-bars being located intermediate of the slide-plates *d* and *e*, and the lifting-bars are spaced apart at their ends so as to be held parallel and free to work in a vertical plane by a filling-block *i'*, introduced and secured at their upper ends, and the buffer-block 1^2 at the lower ends of said lifting-bars, as clearly shown in Fig. 4.

It is essential that the carrier-arm 15 be furnished with means for rocking it on the pivot-bolt 12^b and retaining the outer end of the arm at any desired inclination with regard to the post 12. To this end a rope or other flexible connection 17 is secured at one end on the rear of the post 12 a short distance below the arm 15, as at 17^a in Fig. 1, and thence extends up and over the grooved pulley 18, that is pivoted on the side of the carrier-arm near its rear end. From the pulley 18 the rope 17 is returned to the post 12 for an engagement with the grooved pulley 19, which is pivoted on the post on the same side of the derrick as the pulley 18 and below the point of connection 17^a of the rope on said post. The rope 17 trends from the pulley 19 through a slot in the guy-ring 14 down to and beneath a similar pulley 20 pivoted on the same side of the post as the pulley 19, and after passing from the pulley 20 extends upward over a pulley 20^a and thence downward and is fastened by its remaining end on the post, as at 17^b, and should be in a taut condition when the arm 15 is horizontal, or nearly so. It will be seen that if the rope 17 is pulled downwardly the rear end of the arm 15 will be correspondingly depressed, and if weight is hung on the front end of said arm and the rope 17 is slackened that arm will be downwardly inclined in front of the post 12 at any desired angle thereto, and the frame 16 will be prevented from leaving the arm 15 by a stop-pin 15^b.

On the front portion of the traveling frame 16, one end of the hoisting-rope 21 is secured at 21^a and thence hangs in a loop from the loose pulley 22, which is pivoted between the lower ends of the link-plates *e*. From the pulley 22 the hoisting-rope trends toward and has contact with the upper surface of the pulley 23 that is pivoted on the post 12 near the arm 15, and thence extends down in the post to contact with the lower pulley 24 on its lower edge and thence rearwardly over an idler-pulley 25, which is rotatably supported on a bracket-frame 26 that projects from the rear side of the post when the latter is in normal position. The hoisting-rope 21 is afforded sufficient length to permit its attachment at the end which projects from the pulley 25 to a source of power and progressive movement, which may be an animal or any other motive force that can be conveniently applied to draw on the rope, and also to slacken it, as occasion may require.

In the loop or bight of the hoisting-rope 21, which is provided between its secured end 21^a and pulley 22, a sheave-block 27 is hung, and grooved sheave 27^a of said block resting on the looped portion of said rope, as indicated in Fig. 1. The upper end of said block is level, and may have contact with the buffer-block i^2—that is, the lower end of a sliding jack, which is composed of the bars *i*, filling-block *i'* and buffer-block i^2, the use of which jack will presently be explained. A link or ring 27^b is loosely secured in the lower end of the sheave-block 27, and to the link any preferred style of hay-fork which is adapted to grapple, hoist, and release a quantity of hay or straw is hung, and as this is not a part of the invention it is omitted from the drawings.

One feature of the improvement comprises means to hold the carrier-arm 15 extended directly forward to allow the hay or straw on a wagon or on the ground below the arm to be lifted by a fork hung from the block 27, and after the loaded fork is elevated a sufficient distance by draft on the hoisting-rope 21 to automatically release the arm and swing it laterally by the pull of the hoisting-rope so as to transfer the lifted forkful of hay to a point at one side of the derrick where a hay or straw stack is to be formed.

The preferred means for effecting the locking of the post 12 and arm 15 in the position indicated in Fig. 2 and its automatic release as well as lateral swinging movement in direction of arrow 1 in said figure comprises the following-described parts and method of operation: A latch-piece 28 is pivoted in a transverse slot or other support on the base-block 10, so that one end which has most weight will project at the side of the derrick toward which the arm 15 is to swing, the opposite end portion of the latch-piece being reduced on the upper side to provide a latching-shoulder thereon. From said shoulder of the latch 28 toward the lighter end of the latter an incline is formed on the upper sur-

face thereof, which will adapt the said latch to have a latched engagement with the lower bar of the bracket-frame 26 when said frame is swung toward the shoulder mentioned or in direction of arrow 2 in Fig. 2. On the upper end of the sliding jack that is mounted in the traveling frame 16 one end of the arm-pulling rope 29 is secured, and thence extends down under the loose pulley g', from which the said rope trends toward and over the pivoted pulley 30 that is on the side of the post nearer the heavy end of the latch-piece 28, toward which the rope 29 is drawn, first passing through a slot in the guy-ring 14, the lower end of the pulling-rope being secured to the weighty end of the latch-piece, as shown clearly in Fig. 3. For efficient action the pulling-rope 29 should be adjusted without slackness, when the latch-piece 28 is depressed at its heavy end and the sliding jack to which one end of said rope is connected is in pendent condition. It will be seen that the application of draft force on the lower end of the hoisting-rope 21 will first raise the sheave-block 27 and its load until a nearly sufficient height is attained, and at this elevation of the block it contacts with the buffer-block i^2 of the jack, which latter will then commence to move upwardly, drawing on the rope 29, so as to release the bracket-frame 26. When the latching end of the latch 28 is fully depressed and is arrested by contact with base-block 10, the continued pull of rope 21, acting on the jack i to further slide it upward, will pull on rope 29 and cause the arm 15 to swing in direction of arrow 1 until a correct point of lateral movement is reached, when the load on the sheave-block 27 may be dropped.

In operating the derrick it is of considerable advantage to provide for the automatic return of the carrier-arm 15 to its normal position after having been swung laterally to deposit a load on a stack that is being built at one side of the derrick. To effect such a return movement a rope 31 is furnished, having a weight 32 attached to one of its ends. This rope passes over the grooved pivoted pulley 33, which is located on the front side of the post 12 below and near the guy-ring 14. The rope 31 trends down to the grooved pulley 34 that is also pivoted on the front of the post 12, and after passing under and upon the said pulley 34 the rope 31 is drawn over the idler-pulley 35 on post 12, and thence is extended to the latch-piece 28, whereon this end of the weighted rope is preferably secured.

It will be evident that if by operation of the hoisting apparatus, as previously described, the arm 15 has been laterally swung in direction of arrow 1 in Fig. 2 and the hoisting-rope 21 is slackened after a load has been dropped from a fork on the sheave-block 27, the weight 32 that has been carried around to face the stack which is being formed and is elevated by the swinging movement of the arm 15 toward said stack, will now by its gravity draw on the rope 31, which will in turn press on the upper pulley 33, whereby the stress of the rope named will swing the post 12 and arm 15 back to normal position for reception of another load, the weight moving down as the post resumes the position indicated in Fig. 2, and the latch-piece 28 has engagement with the frame 26, so as to retain the arm 15 forwardly extended until a proper elevation is given to the load on the fork. (Not shown.)

As the building of a stack of hay or straw requires that the increments of such material be deposited in different positions so as to give proper form to the stack, it will be seen that the provision for inclining the arm 15 is of advantage, as if the front end of said arm is depressed below a horizontal position the traveling frame 16, with the load suspended from it, will move toward the forward extremity of said carrier-arm, and by elevating the front end of the latter, so as to incline the arm rearwardly, the traveling frame will automatically move toward the post 12 until arrested by the inclined shoulder 15^a, which prevents the suspended fork and its load from contacting with the guy-ropes 13.

The construction of the improved portable derrick enables its convenient use at any desired point, whereby hay or straw is to be formed into stacks in a field or other place; and as the device may be dismembered so as to pack the post and carrier-arm closely on a wagon, the derrick can be easily moved to place for use or be taken to a shed and stowed away for preservation from the elements when not needed for service.

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

1. In combination with the swinging arm of a derrick, a traveling carriage comprising a frame, anti-friction rollers carried by the frame to engage the upper and lower sides of the derrick-arm, the jack comprising bars movable with relation to the carriage, the buffer block between the lower ends of said bars, a sheave block adapted to engage said buffer, a latch for securing the derrick post and a flexible connection between said latch and jack substantially as specified.

2. In a portable derrick, substantially as described, the combination with an upright rotatably supported post, of an automatically operated locking device for the post, a carrier arm pivoted on said post intermediate of the ends of said arm, a flexible connection adapted to change the inclination of the arm and hold it as adjusted, a traveling frame on the forward part of the arm which will change position as the arm is inclined, a hoisting rope on the said frame and post, and a sheave block engaging a bight of the hoisting rope below the traveling frame, as specified.

3. In a portable derrick, substantially as described, the combination with an upright rotatably supported post, a carrier arm pivoted on the upper end of the post between the

ends of said arm, and a flexible connection between the rear end of the carrier arm and post, adapted to alter the inclination of the arm, of a traveling frame on the forward part of the arm, a jack slidable vertically on the said frame, a hoisting rope hung from the frame to produce a bight in said rope, and thence extended over pulleys on the frame and post, a sheave block in the bight of the hoisting rope, and a pulling rope extending from the top of the jack to a latching device at the base of the post, as specified.

4. In a portable derrick, substantially as described, the combination with an upright rotatable post, a pivoted arm thereon, and means to sustain the arm and incline it from a horizontal plane, of a latching device adapted to hold the arm on the post forwardly extended, and a device adapted to release the latching device, comprising an upwardly slidable jack on a traveling frame that is on the forward part of the arm, and a normally taut rope extending from said jack to the latching device, and adapted to release said latching device so that the arm may be swung laterally, as specified.

5. In a portable derrick, substantially as described, the combination with an upright rotatably supported post, a pivoted arm thereon, means to hold the arm forwardly extended, and a device adapted to release said arm and laterally swing it, of a device to automatically return the arm from a laterally swung position, comprising a pulley pivoted on the front side of the post, another pulley near the lower end of the post, an idler pulley at right angles to the lower pulley and also supported on the post, a flexible connection engaging said pulleys and fast at its lower end on a fixture at the base of the post, and a weight hung at the other end of the flexible connection, as specified.

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