(No Model.) 2 Sheets—Sheet 1.

S. MONTGOMERY.

CAPSTAN.

No. 346,822. Patented Aug. 3, 1886.

Fig. 1.

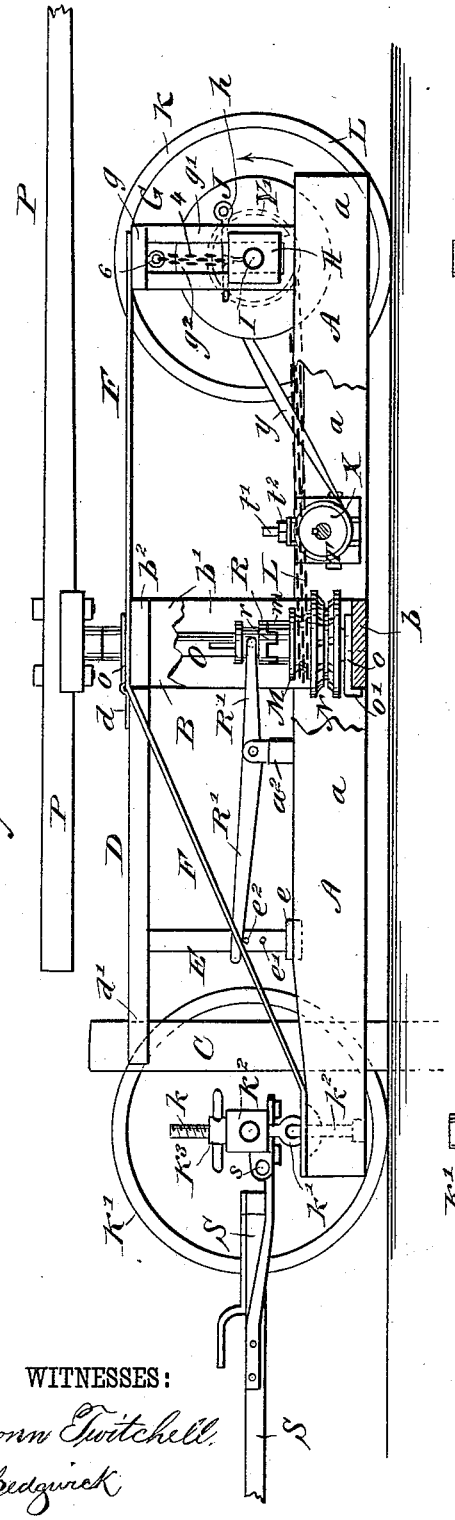
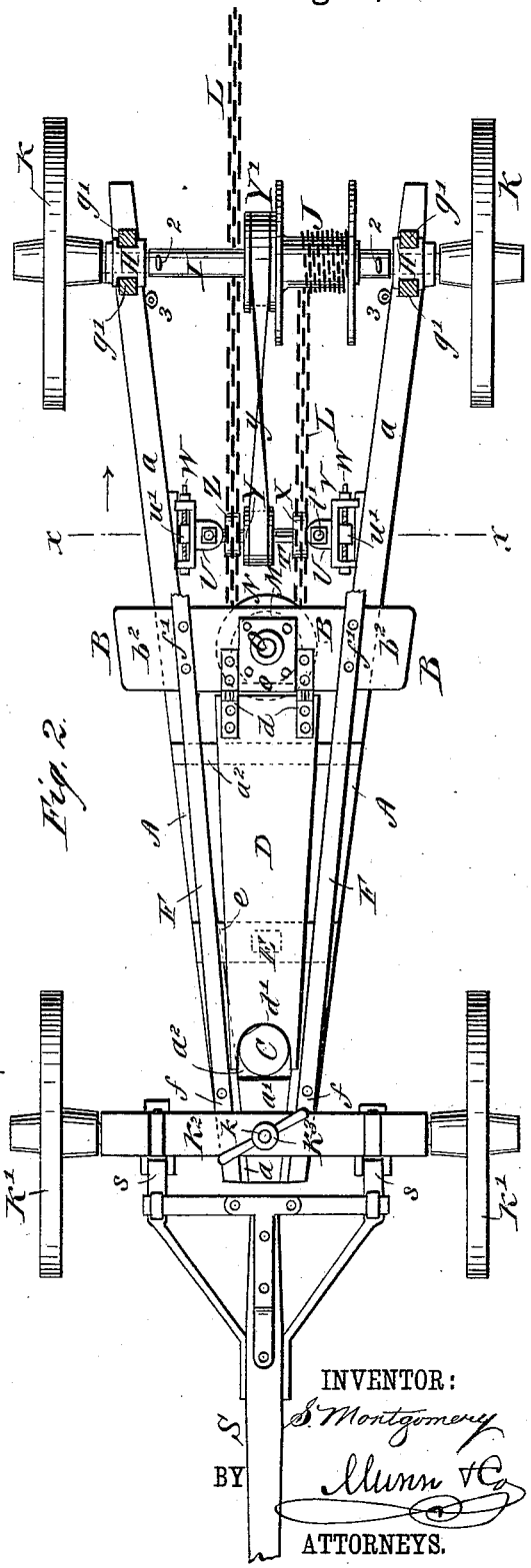


Fig. 2.



WITNESSES:

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C. Sedgwick

INVENTOR:

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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

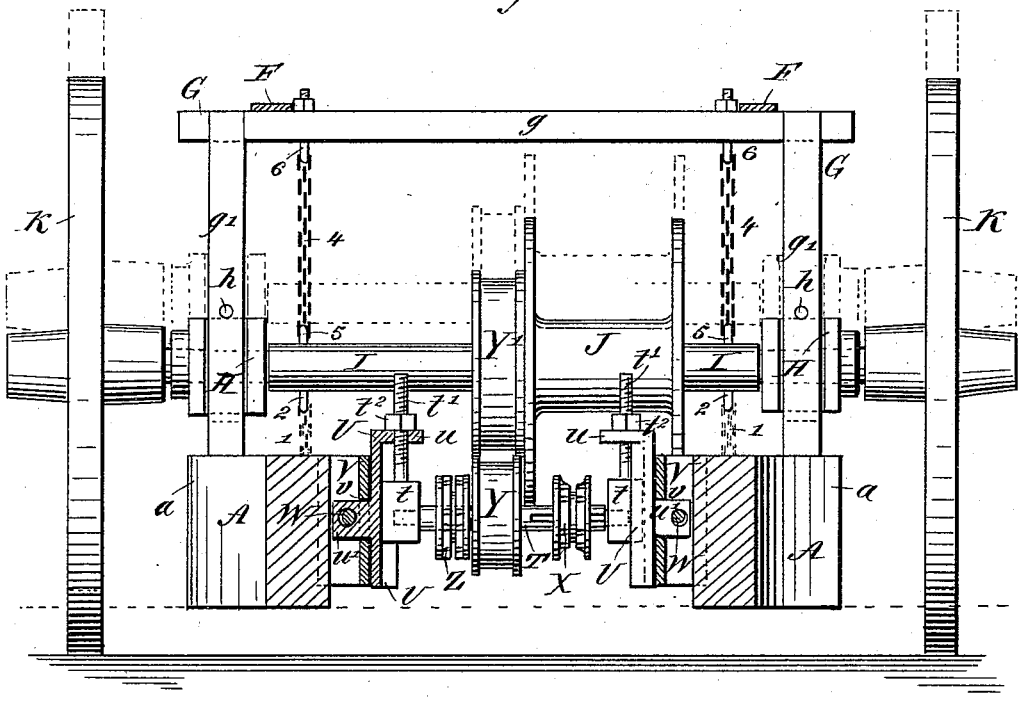
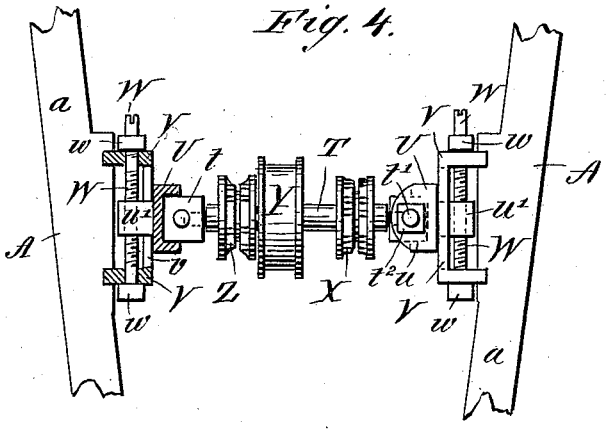


Fig. 4.



WITNESSES:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL MONTGOMERY, OF WEST TOLEDO, OHIO.

CAPSTAN.

SPECIFICATION forming part of Letters Patent No. 346,822, dated August 3, 1886.

Application filed March 6, 1886. Serial No. 194,271. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL MONTGOMERY, of West Toledo, in the county of Lucas and State of Ohio, have invented a new and Improved Capstan, of which the following is a full, clear, and exact description.

My invention relates to capstans adapted for operating a draft-chain for hauling a ditching-machine or heavy timber, or pulling stumps in clearing land, or for analagous uses, and has for its object to provide an inexpensive, durable, and effective machine of this character.

The invention consists in certain novel features of construction and combinations of parts of the capstan, all as hereinafter fully described and claimed.

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

Figure 1 is a sectional side elevation of the capstan mounted upon wheeled trucks and partly broken away. Fig. 2 is a plan view of the capstan with the power-sweep removed and parts broken away and in section. Fig. 3 is a cross sectional elevation of the capstan, taken on the line *x x*, Fig. 2, and drawn to a larger scale; and Fig. 4 is a sectional plan view of the parts shown in Fig. 3, drawn to the same scale.

The main base-frame A of the capstan consists of two side sills, *a a*, bolted at their forwards ends to an interposed narrow block, *a'*, from which the side sills diverge rearwardly, and about at the center of the base-frame these sills are bolted to the heavy bottom cross bar or timber, *b*, of an upright frame, B, the opposite side posts, *b'*, of which rise at the inner face of the sills *a a*, and are bolted thereto, and are connected at their tops by an upper cross-bar, b^2.

The space or recess a^2 immediately behind the front block, *a'*, and between the side sills, *a a*, gives room for the passage of a stout post, C, into a hole dug or bored into the ground, whereupon a heavy latch-bar, D, hinged by strong strap-hinges *d* to the top bar, b^2, of the frame B, will be swung down to rest on a standard, E, fixed to a cross-bar, *e*, fastened to the frame A, and a notch, *d'*, made at the outer end of latch-bar D, will inclose and abut the rear side of post C, while its forward side rests against the end block, *a'*, of the frame A, and whereby the entire capstan will be held or anchored securely to place while the draft-chain is being hauled in, with its load, by the sweep-chain wheels and chain, as presently described.

Brace-bars F F are bolted at *f* to the front ends of the side sills, *a a*, of frame A, and thence extend to and over the top of frame B, to which the bars are bolted at *f'*, and thence the bars extend rearward, and at their back ends are bolted to the top bar, *g*, of a frame, G, the side posts or standards, *g' g'*, of which are vertically slotted at g^2, and are made fast to the rear ends of the side sills, *a a*, of frame A.

The boxes H H, in which the shaft I of the chain-drum J is journaled, are fitted in the slots g^2 g^2 of posts G G, and the hind wheels, K K, of the capstan are fitted on the reduced ends of the shaft I, which form axle-arms having neither pitch nor gather, and on which the wheels may revolve, and which may revolve in the hubs of the wheels when the shaft I is rotated, as the chain-drum J is operated from the gearing on the shaft of the sweep to wind the slack of the chain L on the drum as the chain is drawn inward by either of the chain-wheels M N, which are mounted on an upright shaft, O, journaled in the cross-bars *b* b^2 of the frame B, and to the top of which shaft O the sweep P is connected. The metal plates *o o*, in which the shaft O is journaled, are fixed, respectively, to the top and bottom bars, b^2 *b*, of the frame B, and have flanges *o'* lapping on the front edges of said bars b^2 *b*, which prevent overstraining of the bolts holding the plates *o o* to the frame B, and make the whole strength of the frame cross-bars b^2 *b* available in holding back against the pull of the capstan-chain.

The chain-wheels M N, which may be formed together or in one piece, are loose on the shaft O, on which is fitted, by a spline or feather, a clutch-head, R, which must rotate with the shaft, but may be slid on the shaft by a lever, R', fulcrumed to a cross-bar, a^2, of frame A, to engage teeth *r* on head R with clutch-teeth *m* on chain-wheel M, to cause the chain-wheels M N to revolve with the shaft O when the sweep P is turned either to the right or left

hand, and when the clutch-head R is raised by the lever R′ the chain-wheels may freely revolve on the shaft as the chain is being payed out over one of them from the drum J to lie along the ground while the machine is being moved forward to another place, where it is to be anchored by the post C, as above explained, to continue the hauling of the load hitched onto the outer end of the chain L.

The forward end of the capstan is shown supported on wheels K′ K′, fitted loosely on the ends of an axle, K^2, through which passes freely a screw-bolt, *k*, the lower end of which is formed as an eye or hook, *k*′, which engages the hooked upper end of a king-bolt, k^2, which passes loosely through the block *a*′ of the frame A. Above the axle K^2 the bolt *k* receives a nut, K^3, which may be turned one way to raise the forward end of the frame A from the ground when the machine is to be moved forward, and by turning the nut K^3 the other way the forward end of the frame A may be lowered to the ground when the capstan is to be anchored by the post C and latch-bar D. The back end of the frame A may be lowered to the ground by operating the sweep to lift the hind wheels, K K, as hereinafter described.

The draft-tongue S has a pivotal connection at *s* with clips or lugs on the axle K^2.

Across the frame A, in rear of the chain-wheels M N, there is fitted a shaft, T, which is journaled at opposite ends in blocks *t t*, which are adapted to slide vertically between the opposite side flanges of yokes U, which each have a top flange, *u*, through which passes freely a screw-bolt, *t*′, which is fixed to the adjacent journal-block *t* of shaft T, and receives a nut, t^2, above the flange *u*, and whereby the shaft T may be lowered or raised by adjusting the nuts t^2 of the block-bolts *t*′ at opposite ends of the shaft. The yoke U also has at its rear side a lug, *u*′, which passes through the horizontal slot *v* in a metal frame or plate, V, which is bolted to the adjacent side sill *a* of frame A, and the lug *u*′ has a screw-threaded aperture to fit a screw, W, which is passed freely and horizontally through the frame V, and has fixed to it outside of the ends of the frame the collars *w w*, which prevent endwise movement of the screw and cause it, when turned, to move the yoke U either forward or backward for shifting the shaft T likewise. On the shaft T there is fitted by a key or feather a chain-wheel, X, which thus must turn with the shaft and may slide laterally along the shaft, and about at the center of the shaft is fixed a pulley, Y, over which a crossed belt, *y*, passes to a pulley, Y′, fast to the chain-drum J or its shaft I, and on the shaft T also is fitted a chain-wheel, Z, which may freely slip around and along the shaft T.

The chain L is attached at one end of the drum J and passes thence forward to either one of the chain-wheels M N, to the smaller one, M, for a heavy slow pull on the chain, or to the larger one, N, for a lighter quicker pull on the chain, and from the chain-wheel the chain passes rearward and along the ground to connect with the object to be moved by the capstan, which, for instance, may be a ditching-machine for cutting open or mole ditches, or a stump to be pulled, or heavy timber to be hauled.

To utilize the power of the sweep for raising the back and heavier end of the capstan from the ground to load it on the wheels, I have provided short chains 1 1, which are to be attached to the shaft I at 2 2, and at their other ends are to be fixed at 3 3 to the opposite sill-timbers *a a* of the frame A, whereby when the sweep P is turned to the right hand the chain-wheel M or N will draw on chain L and unwind it from the drum J, thereby turning shaft I to wind the chains 1 1 on it, and thereby lift the frame A as the slotted side posts, *g*′ *g*′, of rear frame, G, slip through the axle-boxes H, whereupon pins *h* may be passed through the posts *g*′ above the boxes H, to support the frame A on the wheels K K, and when the wheels are to be taken from the shaft I for oiling their hubs or the axle-arms on which they run short chains 4 4 may be connected at 5 6 at opposite ends to the shaft I, and the head-piece *g* of frame G, when the back end of frame A rests on the ground, and when the sweep P is turned to the right hand, the pins *h* being removed, the chains 4 4 will be wound on shaft I to lift it and raise the wheels from the ground, as will readily be understood, and as indicated in dotted lines in Fig. 3.

The operation is as follows: We will suppose that the loose end of chain L has been fixed to a ditching-machine, and the capstan-frame A is raised from the ground on the truck-wheels, and that the clutch-lever R′ is locked at its back end beneath a pin, *e*′, fixed in the standard E, to disengage the clutch from the chain-wheels M N. Now, when the capstan is hauled ahead by a team hitched to the tongue S the chain will be payed out from the drum along the ground for quite its full length, or not, as desired, and when the team stops it will be unhitched from the tongue, and will be hitched to the sweep, and the capstan will be anchored by the post or stake C and latch-bar D after the frame A has been lowered to ground by operating the nut K^3 and withdrawing the pins *h* from the frame G, the lever R′ being also operated to engage the clutch, and locked in this position by placing the lever over a pin, e^2, in the standard E, as shown in Fig. 1. All now being ready, the sweep P will be turned to the left hand, and the chain L will be drawn inward by the chain-wheel M or N, and the passage of the chain over the chain-wheel X will turn the latter, and thereby turn the shaft T and pulley Y, belt *y* and pulley Y′ to turn the drum J, and wind the hauled-in chain on the drum, the belt *y* slipping a little on the pulleys Y Y′ should the drum J tend to wind the chain up faster

than it is hauled in by the chain-wheel. The splining of the chain-wheel X to the shaft T allows slip of the wheel along the shaft to accommodate the passage of the chain, to it from either of the chain-wheels M N, or to accommodate the line of draft of the chain between the wheel X and the drum J. The loose wheel Z acts simply as a guide-sheave to lead the chain to the power-wheel M or N. The arrangement of the shaft T with the blocks *t*, yokes U, and screws and nuts *t' t²*, provides for raising or lowering the shaft and its chain-wheels X Z, accordingly as the draft-chain L is set in the high or low chain-wheel M or N, and the screw and nut *t' t²* nearest the chain-wheel X may be operated to shift said wheel more or less to accommodate the bulk of the chain wound on the drum J as the hauling in of the chain progresses, and whereby provision is made for controlling the pressure of the wheel X on the moving chain L, so that wheel X shall receive positive motion from the chain for winding the slack of the chain onto the drum by the aid of the belt and pulleys *y* Y Y'. The provision for forward and backward movement of the shaft T and chain-wheels X Z by the frames V and screws W allows the wheel X more especially to be set accurately to bring its chain-biting peripheral grooves and recesses into proper relation to the links of the chain L, and to maintain a proper tension between the chain-wheel M or N and said wheel X around whichever wheel, M or N, the chain may be passed. After the chain L has been moved up on the drum and the ditching-machine is hauled up as closely as desired to the capstan, the latch-bar D will be swung over backward, and the capstan-frame A will be raised, and the lever R operated to disengage the clutch at the chain-wheel M, and the capstan may then be drawn forward again as the chain L pays out from the drum ready for the next pull after the capstan has been anchored to place.

It is not necessary to lower the capstan-frame A to the ground when operating the sweep to haul in the chain L, as the wheels will support the frame during such time. Furthermore, the axles and wheels may be discarded, and the drum J then will be mounted on the frame A, which may be fitted with shoes or runners, allowing it to be drawn along the ground; but by using the wheels, as described, the entire weight of the drum J and the chain L wound on it will be sustained by the hind axle, and the frame A will be relieved from the shocks to which it would otherwise be subjected when drawing the machine over rough roads to and from the place of use.

The peculiar shape of the capstan-frame, made tapered toward its forward end, not only allows the machine to be turned in short curves, but, what is more important, it makes the whole strength of the main cross-sills *a a* of the frame available in anchoring the capstan by the stake C and the latch-bar.

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

1. A capstan made with a frame having a recess or notch, as at a^2, to receive a ground-post, and a latch-bar adapted to be set behind the post to anchor the capstan, substantially as herein set forth.

2. A capstan made with a frame having side sills, *a a*, converging toward its front end and connected thereat to provide a space, as at a^2, between them to receive a ground-post, and a latch-bar adapted to be set behind the post to anchor the capstan, substantially as set forth.

3. A capstan made with a frame having a recess or notch, as at a^2, to receive a ground-post, a latch-bar adapted to be set behind the post to anchor the capstan, a chain wheel or wheels mounted on a vertical shaft, a draft-chain, a chain-receiving drum, a wheel driven by the draft-chain, and a belt and pulleys operated therefrom to wind the slack of the hauled-in chain onto the drum, substantially as herein set forth.

4. A capstan made with a frame, chain-wheels mounted on a shaft journaled in the frame, a chain-receiving drum mounted on the axle of the hind wheels supporting the frame, and a belt and pulleys transmitting motion from the chain-wheel shaft to the drum-shaft, substantially as herein set forth.

5. The combination, in a capstan, of a supporting-frame, a shaft, O, journaled therein, a chain wheel or wheels on said shaft, a draft-chain, a sweep, P, on shaft O, a drum, as at J, receiving the draft-chain from the chain-wheel, a shaft, T, journaled on frame A, so as to be vertically adjustable, a chain-wheel, X, and pulley Y on shaft T, a pulley, Y', on drum J or on its shaft, and a belt connecting the pulleys Y Y', substantially as and for the purposes herein set forth.

6. The combination, in a capstan, of a supporting-frame, a shaft, O, journaled therein, chain-wheels M N, of different diameters, fitted loosely on said shaft, a clutch splined to the shaft and adapted to engage the chain-wheels, a sweep, P, on shaft O, a draft-chain, L, a drum, as at J, receiving the chain L from wheel M or N, a shaft, T, journaled on frame A, so as to be adjustable vertically, and also toward and from the wheels M N, a chain-wheel, X, and pulley Y on shaft T, a pulley, Y', on drum J or its shaft, and a belt connecting the pulleys Y Y', substantially as and for the purposes herein set forth.

7. The combination, in a capstan, of a supporting-frame, a shaft, O, journaled therein, chain-wheels M N, loose on said shaft, a clutch on the shaft, adapted to engage the chain-wheels, a draft-chain, L, a sweep, P, on shaft O, a drum, as at J, receiving the draft-chain, a shaft, T, journaled on frame A, so as to be adjustable vertically and toward and from the wheels M N, a chain-wheel, X, and pulley Y on shaft T, a shaft, I, forming the axle to the

hind wheels of the capstan, a drum, J, and pulley Y′ on shaft I, and a belt connecting the pulleys Y Y′, substantially as and for the purposes set forth.

8. In a capstan, the combination, with a supporting-frame, a shaft, as at O, a draft-chain, L, chain-wheels of different diameters on shaft O, and a drum adapted to receive the draft-chain from either chain-wheel, of a shaft, as at T, journaled on the frame and adapted for adjustment vertically, and also toward and from the chain-wheels, a chain-wheel, X, splined to shaft T, and with which the draft-chain is adapted to engage, a chain-receiving drum, J, and pulley and belt gearing connecting shaft T with the chain drum or its shaft, substantially as and for the purposes herein set forth.

9. In a capstan, the combination of a supporting-frame, a shaft, O, journaled thereon, chain-wheels M N on said shaft, a draft-chain, L, a shaft, T, journaled on the frame and adapted for adjustment vertically and toward and from the chain-wheels, a chain-wheel, X, splined to shaft T, a chain-guide wheel, Z, loose on said shaft, a chain-receiving drum, J, and pulley and belt gearing connecting the shaft T with the drum J or its shaft, substantially as herein set forth.

10. In a capstan, the combination, with a supporting-frame, of a shaft, O, chain-wheels M N, draft-chain L, shaft T, yokes U, having lugs u', blocks t, fitted in the yokes, and in which blocks the shaft is journaled, screws t', fixed to the block t, nuts t^2 on screws t', frames or plates V, having slots v, in which the yoke-lugs u' may slide, and screws W, fitted in frames V, and to which the lugs u' are threaded, substantially as and for the purposes herein set forth.

11. In a capstan, the combination, with the frames A and G, boxes H, fitted in frame G, a shaft, I, journaled in said boxes, and a chain-receiving drum, J, on shaft I, of pins, as at h, adapted to frames G, substantially as herein set forth.

12. In a capstan, the combination, with the frames A G, boxes H, fitted in frames G, a shaft, I, journaled in said boxes, and a chain-receiving drum, J, on shaft I, of short chains 1 4, adapted for connection to the shaft and to the frame A G, substantially as shown and described, whereby the back end of the frame A and the hind wheels of the capstan may be lifted from the ground, as and for the purposes set forth.

13. A capstan comprising a frame, A B G, a shaft, O, journaled therein, a sweep, P, connected to shaft O, chain-wheels on said shaft, a chain, L, adapted to said wheels, a chain-receiving drum, J, journaled in boxes H, adapted to slide vertically in the frame, pins h, hind wheels, K K, on shaft I, a shaft, T, journaled in the frame, a chain-wheel, X, thereon operated by the draft-chain, pulley and belt connections from the shaft T to the chain-drum or its shaft, forward wheels, K′ K′, supported on an axle, K^2, a screw, k, a king-bolt, k^2, in frame A, and a nut, K^3, on screw k, all substantially as and for the purposes herein set forth.

SAMUEL MONTGOMERY.

Witnesses:
HARRY L. ATWELL,
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