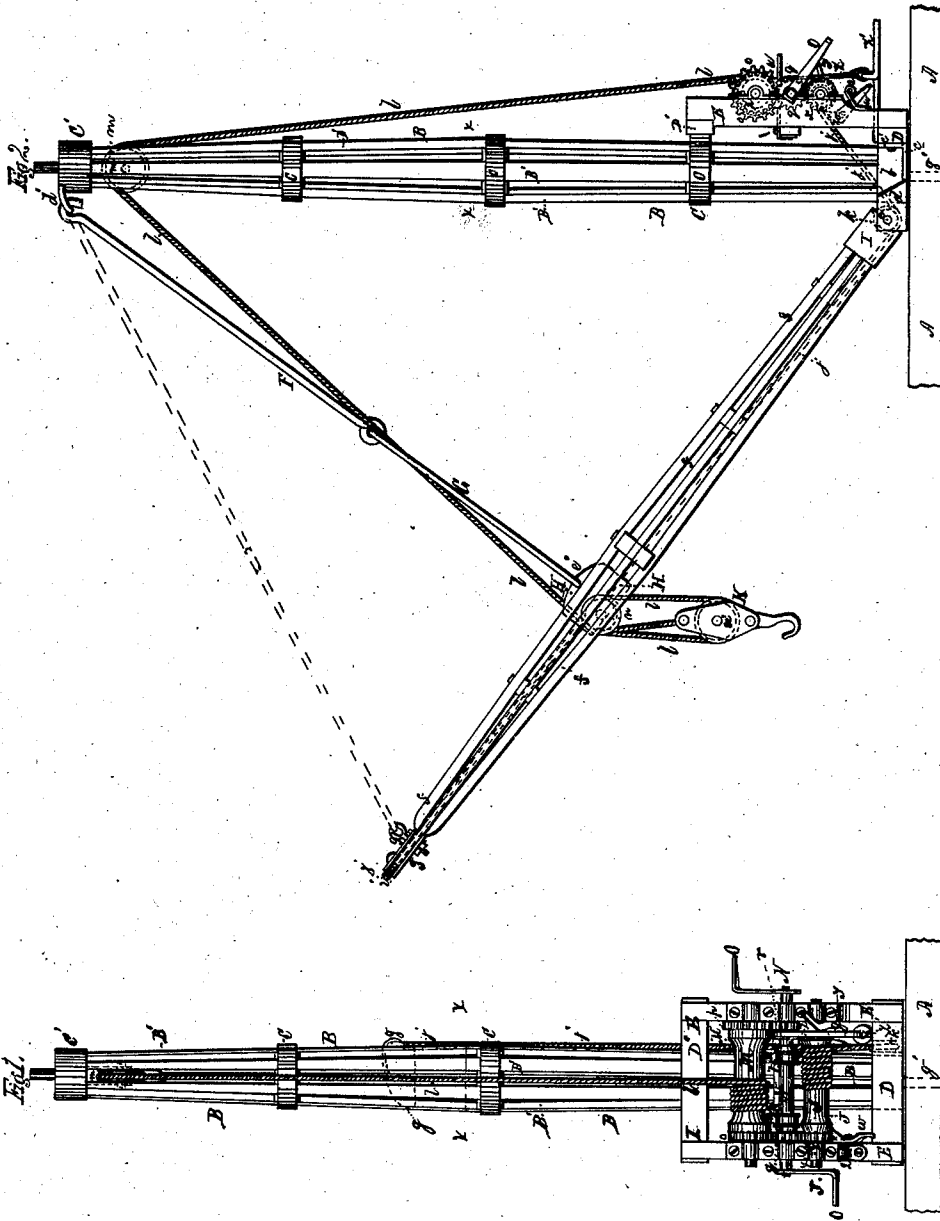


L. E. TRUESDELL.
Derricks.

No. 155,776.

Patented Oct. 6, 1874.



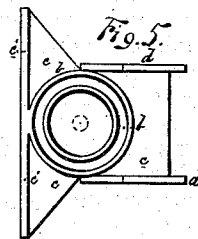
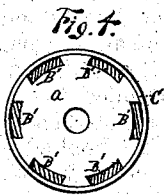
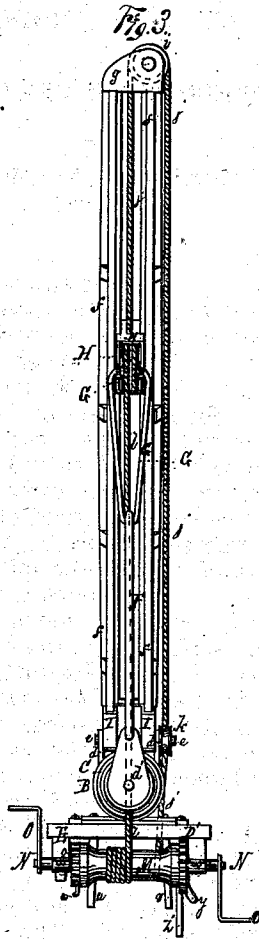
Witnesses.
A. McCallum
S. G. Stuart

Inventor.
Lucius E. Truesdell
per P. Hannon
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UNITED STATES PATENT OFFICE.

LUCIUS E. TRUESDELL, OF WARREN, MASSACHUSETTS.

IMPROVEMENT IN DERRICKS.

Specification forming part of Letters Patent No. 155,776, dated October 6, 1874; application filed July 22, 1874.

To all whom it may concern:

Be it known that I, LUCIUS E. TRUESDELL, of Warren, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Derricks; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a rear elevation of a derrick having my improvements applied thereto; and Fig. 2, a side elevation of the same; Fig. 3, a plan, and Fig. 4 a cross-section, of the mast through line *x x* of Fig. 1. Fig. 5 represents a plan of the lowest ring of the mast with its attachments, as detached from mast and boom.

My invention relates to a new and improved mode of constructing a derrick, whereby the weights to be raised can be raised and placed through the instrumentality of the same mechanism; and it consists, first, in making the boom in two parts, suitably connected together at their ends, and combining therewith a sliding block to which the operating tackle is to be attached. Secondly, in combining therewith certain devices for drawing the sliding block outward toward the outer end of the boom, so as to bring the body to be lifted over the point or place at which it is to be set or laid. Thirdly, in combining therewith certain other devices by means of which, when the body raised has been set in place, the sliding block is released and allowed to descend to its normal position, ready for a new lift. Fourthly, it consists in a novel construction of the mast, whereby it can, while combining the requisite strength, be made much lighter and more easy to handle than heretofore.

To enable others skilled in the art to make, construct, and use my invention, I will now proceed to describe its parts in detail.

The bed-plate or supporting-frame A may be made in the usual manner. The mast B, however, instead of being made out of a solid spar, is made of a number of strips, B', of wood or metal, clamped together in the manner of

the staves of a barrel by means of rings C, each stave or strip fitting into a notch formed in the periphery of a disk, *a*, Fig. 3, which is arranged immediately opposite the rings C. Of the rings C and disks *a*, two or more may be used for the purpose between the ends of the mast; three are shown in the drawings. Each end of the mast is also fitted with a ring, the lower one, *b*, being cast on or otherwise secured to a plate, *c*, on which is formed an upright flange, *c'*, to which is secured the lower rail D of the frame E, on which are mounted the drums around which the ropes or chains are wound that operate the blocks. The front side of plate *c* is also provided at its sides with two lugs, *d*, which project in front of the mast. In these lugs are formed the bearings of the pin *e*, on which the lower end of the boom is hinged or pivoted. The ring C, immediately above this, is also provided with lugs to which the upper rail D' of the frame E is firmly secured by bolts and nuts. To the under side of plate *c* is secured a pivot, *g'*, on which the mast rests and turns, and which fits into a step formed in the bed-plate A. The top of the mast, as before stated, is also provided with a ring, C', which I term a cap-ring, on the front of which is formed an ear, *d'*, provided with an opening for the attachment of the hooked end of a link-rod or chain, F. Instead of one link-rod several may be used, the lower end of the lower one of which is intended to be loosely connected to the upper end of a loop, G, the two lower ends of which are hooked into lugs *e'*, formed on the upper side of the traveling sheave-block H, which slides back and forth on guide-tongues formed on the inner side of the two parts or halves, *f*, which form the boom. These tongues take into grooves formed on either side of the traveling or race block H. The boom, as before stated, is composed of two halves, *f*, connected together at their lower ends by means of a stout frame-piece, I, on each side of which is formed a socket for the reception of the two pieces, *f*, which form the boom. This frame-piece I is mounted near its lower end upon a pivotal pin, *e*, which passes through it and through the lugs *d*, formed on the front side of the plate *c*, which carries the ring *b* and pivotal pin *g'*, on which

the mast turns. The upper ends of the two side pieces, *f*, which form the boom, are connected to each other by means of two plates, *g*, through which screw-bolts pass for that purpose. The plates are made wider at one end than at the other, to make room for the reception of a flanged sheave-wheel, *i*, around which passes a rope or chain, *j*, which operates the race-block H, and to the front end of which, for this purpose, it is suitably attached or secured. The other end of rope *j* is made to pass around a sheave-wheel, K, loosely mounted on the pivotal pin *e*, on which the lower end of the boom turns, and thence passes around a drum, J, which is mounted in suitable bearings made fast to the frame E before referred to. The traveling or race block H consists of a metallic frame in which is secured the pivotal pin of two or more sheave-wheels, *n*, around which the rope or chain *l* is made to pass, and thence around the sheave or sheaves *n'* of the traveling-block K, in the usual manner of reeving blocks.

The other end of rope or chain *l* passes over a sheave-wheel, *m*, which turns on a pin mounted in hangers secured to the upper capping C' on the top of the mast, and thence around a drum, M, arranged to turn in suitable bearings made fast to the frame E at a point some distance above drum J. Intermediate between drums M and J is interposed a windlass, N, mounted in suitable bearings secured to the frame E, each end of which is fitted with crank-handles O. At either end of drum M, and firmly keyed to its shaft, is secured a pinion, the one, *o*, at the one end being smaller than the other, *p*, at the other, for a purpose to be hereafter described. The windlass N is also provided with a pinion at each end, the one, *q*, of which is made larger than the other, *r*, both being loose on the shaft. The larger one, *q*, is arranged to gear with the smaller pinion *o* of the drum M, and the smaller one, *r*, with the larger one, *p*, of the same drum. The inner face of each of the pinions *q* and *r* is provided with one or more teeth, which are intended to engage or mesh with notches cut in the outer faces of two slide-clutches, *s* and *t*, the notches of clutch *s* being intended to engage with the teeth of pinion *q*, and those of *t* with the teeth of pinion *r*. Each of these clutches is provided with a spline, which slides in a groove longitudinally cut in the periphery of the shaft of the windlass N. Each of these clutches around their periphery is provided with a deep groove, into which fits the sides of a lever—the one, *u*, for clutch *s*, and the other, *v*, for clutch *t*. A weighted pawl, *w*, is arranged to mesh into the teeth of the pinion *x*, which is made fast to the shaft of the drum J, so as to stop its motion whenever required. Pinion *x* is intended to mesh with the teeth of the pinion *q* of the windlass N. Drum J is so made as to slide back and forth on the pin or shaft on which it is mounted so as to throw it in and out of gear with the pinion *q* whenever re-

quired. When thrown into gear with pinion *q* it is held in place by means of a pivoted stay-lever, *y*, secured to the inner face of the right-hand standard of frame E. A brake-strap, *z*, is made to pass around the stem of pinion *r*, its lower end being attached to a foot-brake lever, *z'*, for a purpose to be hereafter described. The other end of the brake-strap *z* is made fast to cross-piece 1, which binds the standards of the frame E together at or near their middle. To the upper edge of this same cross-piece 1 the levers *u* and *v* are pivoted, which operate the clutches *s* and *t* of the windlass N.

Thus constructed, the operation is as follows: The race-block H is lowered until the traveling-block K hangs vertically above the weight or body to be moved. The latter is then lowered by allowing the drum M to turn until its hook can be fastened into the loops, which pass around the body to be raised.

The lowering of block K is effected in the following manner: Drum J is made to slide along its shaft until its pinion *x* is fairly out of gear with the pinion *q* of the windlass N. Slide-clutches *s* and *t* are then moved out of gear with their respective pinions, *q* and *r*, and so held by their shipping-levers *u* and *v*. This, then, leaves drum M free to turn, so as to furnish the necessary amount of slack to allow block K to descend. As drum M turns, its pinions *o* and *p* also revolve, turning pinions *q* and *r* of windlass N; but they, being out of gear with their respective clutches, and with the pinion *x* of drum J, simply turn loosely on the shaft of the windlass. The block thus hooked to the body to be raised, if the latter lies in a vertical plane with the place at which it is to be deposited, then drum J is allowed to remain with the pinion *x* disconnected with the pinion *q* of the windlass, when, if the weight is great, the clutch *t* is thrown into gear with the teeth of pinion *r* of the windlass, and there held by its shipping-lever *v*. The apparatus is then ready to raise the body to the height required to place it in proper position by simply turning windlass N, and is then lowered, as in the case of the ordinary derrick.

If, however, the body to be raised is not very heavy, instead of throwing the clutch *t* of pinion *r* into gear, the clutch *s* is thrown into gear with pinion *q*, and then raised, as before, only much faster, by turning the handles O of the windlass N in the ordinary way, as before. Should the body to be raised, however, not lie in the same vertical plane with the spot at which it is desired to place it, then drum J is made to slide along its shaft until the teeth of its pinion *x* mesh with the teeth of the pinion *q* of the windlass. This done, its stay-lever *y* is then raised behind its end, so as to keep it in place.

At this stage, the question is then to be considered whether it has to travel farther in a horizontal or in a vertical plane in order to reach the point at which it is to be placed. If

it has to be raised much higher than it has to be moved horizontally, then clutch *s* is thrown into gear with pinion *q*, otherwise clutch *t* with pinion *r*. This done, the hands man the windlass, when drum *M* will raise block *K* and the weight, through its rope or chain *l*, and drum *J* simultaneously therewith, through its rope or chain *j*, drag outward race-block *H*, carrying therewith block *K* and the weight in a horizontal direction. This operation will continue until the block is either high enough to deposit the body or far enough outward to be in a vertical plane with the place at which it is to be deposited, or both. If the last, the boom is turned until the body is directly over the place at which it is to be deposited, and gradually lowered to its place in the usual manner. If the weight is great, the brake-strap *z*, through its treadle *z'*, is brought to bear on the face of pinion *v*, in order to arrest its too sudden descent, and thus aid the hands at the windlass; but if it is carried out faster, so as to reach the vertical plane in the line of which it is to be deposited, then drum *J*, with its pinion *x*, is thrown out of gear with pinion *q*, and pawl *w* made to engage with one of the teeth of pinion *x*, so as to hold drum *J* in that position, while traveling-block *K* is still farther raised through the action of the windlass *N* and one of its pinions on the corresponding pinion of drum *M*. It now being sufficiently high, and in a vertical plane with the spot at which it is to be deposited, the boom is then turned in and the body lowered as before. A derrick thus made and operated possesses great advantages over the ordinary derrick, as will be apparent to any one at all conversant with their operation; and can be managed by much fewer hands than is absolutely required by the latter for raising and placing large and heavy bodies, and in less than half the time; and it is also to be observed that, while the primary action of drum *J* on race-block *H* is to draw the latter outward, in a horizontal direction, it, at the same time, through the action of the link-rod *F*, as attached to the block *H*, also serves to assist in raising the weight, inasmuch as link-rod *F*, it being pivoted to the top of the mast, and to the race-block, acts as a radial arm, and, consequently, as block *H* moves outward, correspondingly raises the boom, and with it the weight. The body once deposited, and block *K* detached therefrom, the blocks *H* and *K* will, by virtue of their own gravity, then descend by simply detaching the pawl *w* from

the teeth of pinion *F*, for which purpose its weighted end may be raised and held in that position by means of a pivotal supporting-arm, 2, attached to the front of the left-hand standard of the frame *E*, pinion *x*, for this purpose, being also disengaged from the pinion *q* of the windlass. Instead of connecting the chain or link rod *F* directly to the race-block *H*, it may, if desired, be entirely detached therefrom, and directly attached, by means of eye-bolts secured to the outer end of the boom, as shown in dotted lines in Fig. 2. By this plan, (and it may be so made as to be interchangeable—that is to say, the link-rod or chain may be so made as to be hooked at its lower end either to the race-block or to the eye-bolts on the end of the boom,) the race-block may be moved outward to the end of the boom in an inclined plane, and not in a curved line, as it otherwise would be if attached directly to the race-block. Moreover, link-rods of different lengths, or chains with removable hooks, may be used, so as to vary the inclination of the boom, as required, according as the work progresses.

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

1. The combination of the boom of a derrick, made in two parts, *ff*, each of which is provided with a tongue or groove, with a race-block, *H*, correspondingly constructed, so as to slide or move therein, in the manner substantially as and for the purposes set forth.
2. The combination of a race-block, *H*, rope or chain *j*, sheave-wheels *i* and *k*, and drum *J*, substantially as and for the purpose set forth.
3. The combination of traveling-block *K*, chain or rope *l*, and drum *M*, with race-block *H*, chain or rope *j*, drum *J*, and windlass *N*, substantially as set forth.
4. The combination of the sleeve-clutches *s* and *t*, pinions *q* and *r*, and windlass *N*, with pinions *o* and *p*, of drum *M* and sliding drum *J*, as and for the purpose set forth.
5. The mast of a derrick, when made of a number of strips or slats *B'*, clamped together by means of rings *C* and disks *a*, in the manner and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

LUCIUS E. TRUEDELL.

Witnesses:

D. G. STUART,
P. HANNAY.