

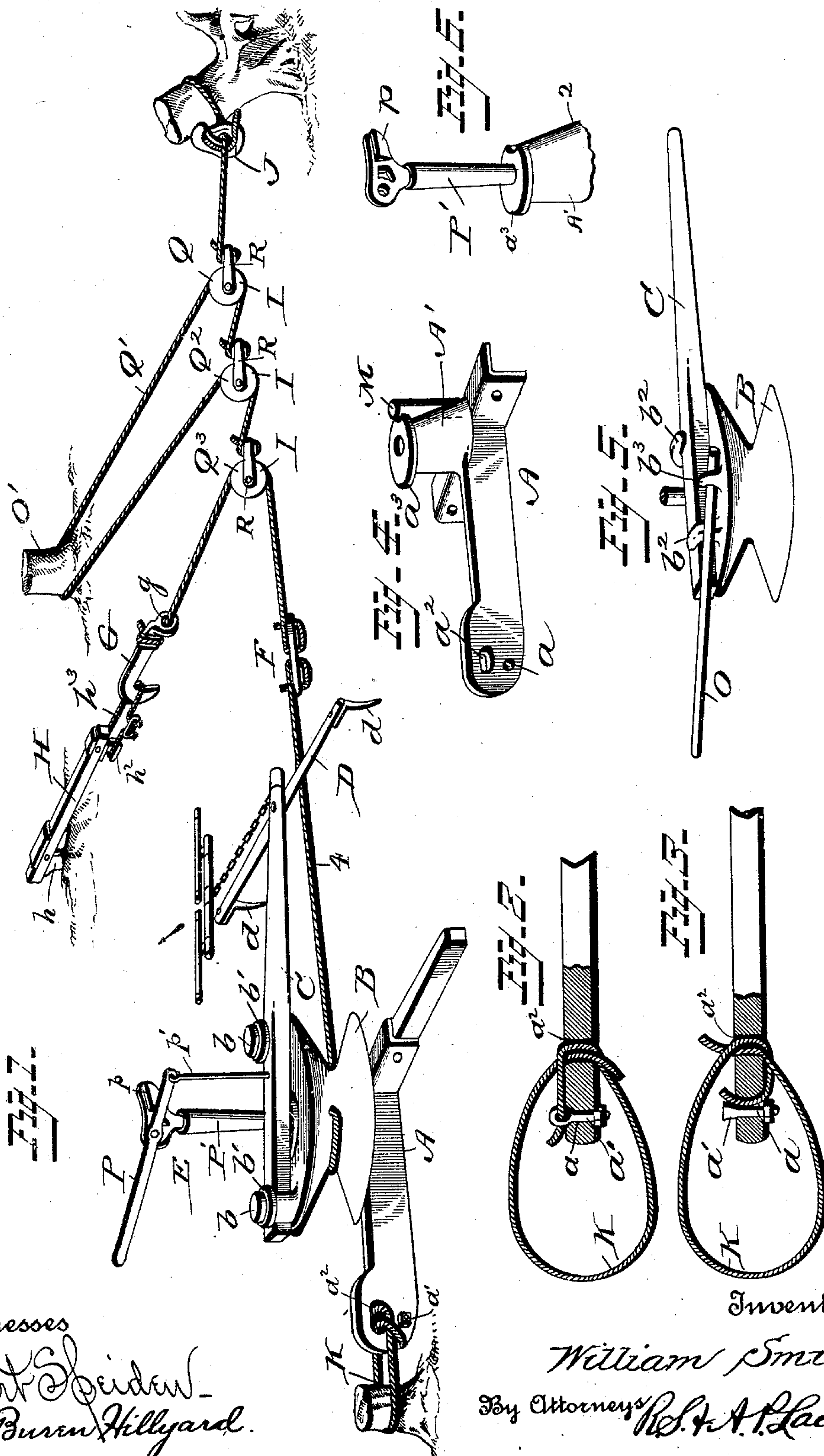
(No Model.)

2 Sheets—Sheet 1.

W. SMITH.
GRUBBING MACHINE.

No. 509,774.

Patented Nov. 28, 1893.



Witnesses
Albert Spiden.
Van Buren Hillyard.

Inventor
William Smith.
By Attorneys R. B. & A. T. Lacey

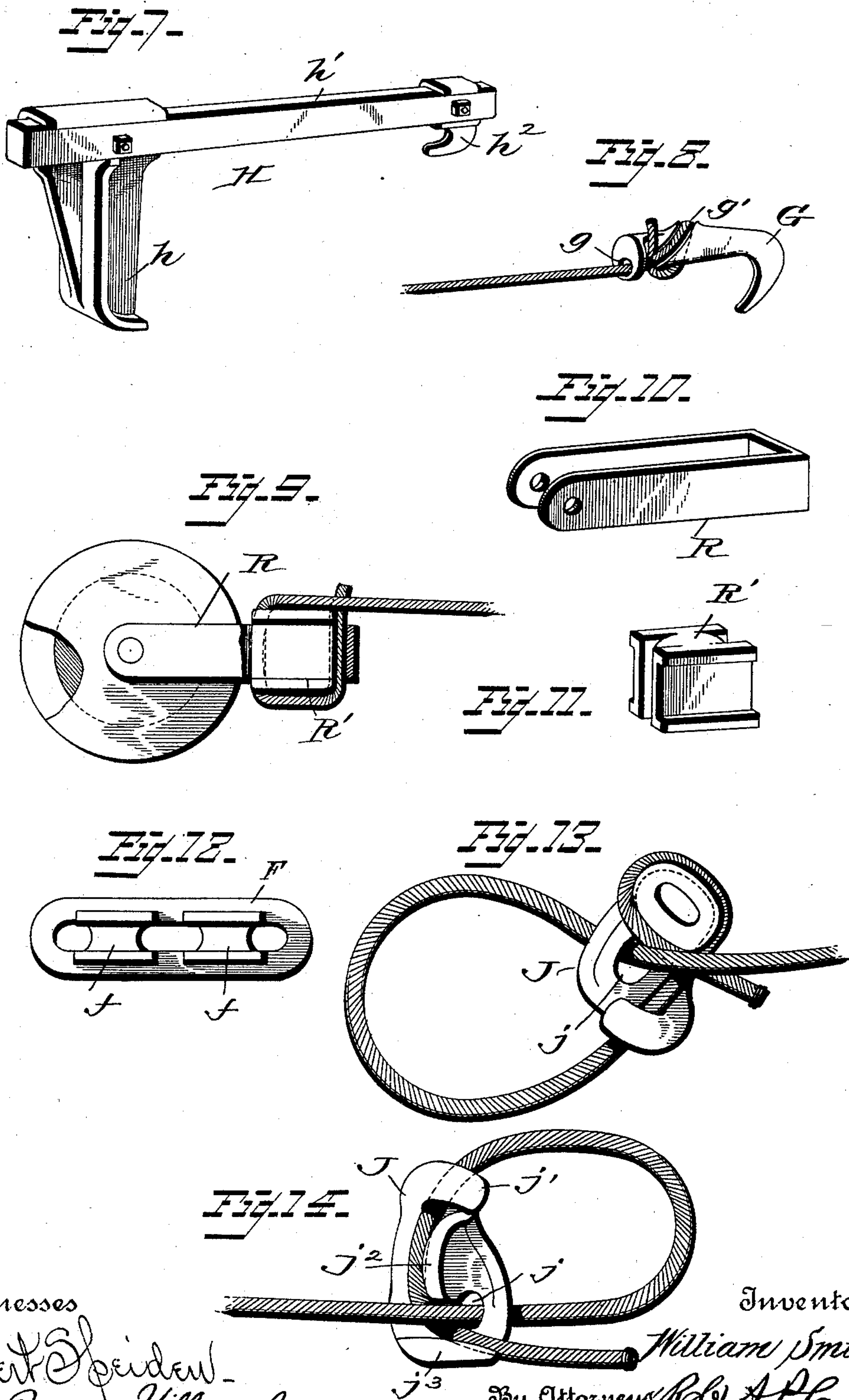
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UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF MYSTIC, IOWA.

GRUBBING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,774, dated November 28, 1893.

Application filed December 1, 1892. Serial No. 453,706. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SMITH, a citizen of the United States, residing at Mystic, in the county of Appanoose, State of Iowa, have invented certain new and useful Improvements in Grubbing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to stump pullers; or, as they are sometimes called, grubbing machines.

The objects of the invention are:—To enable the use of a single anchoring rope for attaching the machine to a large or small stump and admit of the machine being drawn up close to the said stump to prevent the flopping over and about of the machine which is incident to a too great length of anchoring rope, and to improve the general construction of this class of devices whereby their efficiency and usefulness are increased in an eminent degree.

The improvement consists of the novel features and the peculiar construction and combination of the parts which will be hereinafter more fully described and claimed and which are shown in the annexed drawings, in which—

Figure 1 is a perspective view of my invention showing its application for removing heavy stumps, and illustrating the different essential parts which adapt the device for use in various positions and under different conditions. Fig. 2 is a top plan view of the anchoring end of the base or casting showing the preferred manner of securing the anchoring rope thereto, a portion being broken away to show the relative disposition of the key and the opening, and showing the manner of arranging the rope. Fig. 3 is a view similar to Fig. 2 showing a modification in the means for securing the anchoring rope to the base or casting and showing a slightly different arrangement of the end of the said anchoring rope. Fig. 4 is a detail perspective view of the base or casting stripped of its operating parts and showing the filling piece or pin for holding the drum on the spindle in position. Fig. 5 is a detail view of a modified form of the drum, showing the sweep in operative re-

lation thereto and the hand lever for rotating the said drum backward to release or disengage the sweep therefrom. Fig. 6 is a detail view showing the standard which is mounted in the spindle of the base or casting and to which the sweep elevating lever is pivotally connected. Fig. 7 is a detail view of the anchor. Fig. 8 is a detail view of the grab hook showing the manner of attaching the rope thereto. Fig. 9 is a detail view of the single sheave pulley. Fig. 10 is a detail view of the clevis. Fig. 11 is a detail view of the sliding block which is used in connection with the clevis. Fig. 12 is a detail plan view of the coupling for connecting the ends of two ropes. Figs. 13 and 14 are detail views of a hitch or fastener for securing the rope after the same has been looped around a stump.

The component parts of the invention, as shown in Fig. 1, consist of a base or casting A, a drum B mounted on a spindle or axle provided on the base or casting, a sweep C to which the team is hitched for rotating the drum to wind up the rope, a stop or check D carried by the sweep to prevent the latter flying back in the event of a slack, an elevating mechanism for detaching the sweep from the drum and holding the same up out of the way during the time the drum is rotated to adjust the rope thereto, a coupling F for uniting the ends of two ropes, a grab hook G for securing the rope, an anchor H for fastening the end of the rope, or securing the base in the event of a stump not being within convenient reach, single sheave pulleys I to facilitate the arrangement of a block and tackle system to increase the force expended whereby sufficient power may be had for heavy work, and a hitch or grab J to enable slack in the rope being quickly taken up and the ready adjustment of the said rope to the stump to be removed.

The machine heretofore was usually anchored to a stump with a loop made of steel wire rope and as it is important that this anchor loop be made of proper length to anchor the machine close to the anchor stump to prevent the machine from flopping about and tipping over while in operation which it will do if the loop is too long, then it follows that the operator must carry several anchor loops of

different lengths, as the loop that will anchor the machine close to a large stump will be too long to anchor close to a small stump.

My improvement in anchoring the machine consists in fastening one end of anchor rope K to the rear end of the base of the machine or casting A by inserting one end of the rope through a hole a in the rear end of the base, then putting a fastening or bolt a' through from opposite direction in the same hole in place of a head on the bolt; it is wedge shaped so that as the nut is screwed up the wedge bolt is drawn in and clamps or wedges the end of the rope solid into a crease in the hole in the base. Then the other end of rope is passed through the upper hole a^2 and passed on around the anchor stump, then forward through hole a^2 again and under and inside of the rope already in the hole and pulled up tight until the machine is close to the stump. Then the harder the machine pulls the greater will be the pressure on the inside rope sufficiently to hold it from slipping and instead of the wedge bolt holding the end of the rope, it may be held by an eye bolt as shown in Fig. 2, or soldered in.

The spindle or axle A' is provided with an eccentric flange or cap a^3 on its upper end projecting toward the anchoring end of the base. That side of the spindle opposite the projection of the flange tapers from the base to the top of the flange or cap, so that the winding drum can be slipped down over the eccentric flange or cap and go back under the flange in its place on the spindle where it revolves, and the increasing projection 2 on the lower front side of the spindle or axle draws the drum forward under the cap or flange a^3 as the drum is pushed down, and though the pulling on the machine is all in one direction, with a tendency to always pull so as to keep the drum in under the cap or eccentric, yet with the machine setting on uneven ground under the motion of the lever the drum will wobble and work up over the cap and off the spindle or axle, and to prevent the drum from coming off after being placed in position on the spindle or axle a filling piece or round bolt M is secured to the base to come between the tapering side of the spindle or axle and the inner side or bore of the drum. This arrangement of placing the filling piece or round iron bar or iron pin M in the front of the tapering side of the spindle or axle shown in Fig. 4 to hold drum in place though cheap and simple is of great importance for without it the drum is liable at any time to fly off from the spindle while in operation and cause trouble. This pin, or key, may be made in other form.

When operating my improved machine the sweep C lies across the top of winding drum B between two upright standards $b b$ one on each side of the sweep extending upon opposite sides of the drum and cast solid therewith, and a ring b' is placed down on each standard on top of the sweep to hold it down

in place. When the sweep pulls up against the rings it only presses up on one side of the rings which latter grip the standard so firmly that they cannot slip for the greater the pressure upon one side of the ring the more firmly the ring will grip on the standard. The standards may be hook shaped and located one on each side of the sweep as shown at $b^2 b^2$ in Fig. 5; but I prefer standards, and rings as giving the best results. The winding drum having the hook shaped standards $b^2 b^2$ projecting up one on each side of the sweep when the latter revolves against the hook shaped standards the drum revolves with the sweep.

O is a hand lever placed under a small hook b^3 and when the operating lever is to be raised to allow the drum to revolve back to get rope off, the drum is turned forward by pulling on the hand lever O until the hook shaped standards are back enough to allow the sweep to be raised when the hand lever can be removed and drum revolved back.

The elevating mechanism for the sweep consists of an operating lever P and a center upright standard P' journaled in the spindle or axle. This standard P' extends upon one side of the operating lever and high enough for the operating lever P to hang in the top and arranged as shown hung on one side of the center standard and when the long arm of the operating lever is depressed, the short arm thereof rests on a shelf or shoulder p arranged to support it and hold the sweep high enough so that the drum can be revolved back to let off rope. The lever P is connected with the sweep by a rod p' .

The stop D secured to the outer end of the sweep is provided with prongs $d d$ which hold the sweep upon a level properly and if the lever gets loose while in operation the prongs will go in the ground and prevent the lever from flying back.

The anchor H consists of a cast iron foot h strengthened with flanges and bolted to one end of a wooden beam h' and a hook h^2 is bolted to the opposite end of the beam to which the base or the end of the rope may be fastened with the wire loop h^3 . This steel wire loop is formed by turning back the end of the wire on each end and then shrinking on rings as shown in my former patent, No. 457,798, dated August 18, 1891, and then by connecting the ends of the rope by slipping on an iron link.

In operating, a hole is bored in the ground with a post auger and the foot or metal part h of the anchor is dropped down in the hole and in the form which the anchor is made it cannot draw out if the foot is three feet long and the beam of proper length.

My improved arrangement of coupling two or more ropes on the end of pulling rope with my rope coupler to be used in pulling small close timber where the operator instead of waiting for one to be pulled out before hooking on another, is of great importance. It can be so easily attached to the pulling rope

and while pulling with one hitch the team must be stopped until the hitch is made to a stump, but in using the two or more hitches the team may continue to wind in the rope continuing to pull a stump all the time, for while one is being pulled the operator can be hitching on to another.

The grub hook G is made with a hole g through the end parallel to the hook through which the end of the rope is passed then around a spiral seat g' in the shank of the hook and back between the hook, and the rope forming a half hitch on the shank of the hook. This arrangement is necessary since open hooks or links will not stand the pressure unless made too heavy for use in coupling.

The improved arrangement of pulleys for pulling heavy stumps is shown in Fig. 1 the stumps farthest away from the machine being pulled first. This gives the inside stumps for anchors and I attach one pulley Q to the stump to be pulled. Then I use a rope Q' having a pulley on each end. The center of this rope is thrown over the nearest stump O' in line with the machine; one end of this rope pulls through the first pulley Q and the other end pulls through the second pulley Q² and the main pulling rope 4 on the machine pulls through the last or third pulley Q³. The other end of this rope is suitably fastened after having pulled the heaviest stumps, and by using my improved arrangement of fastening the pulleys to the ropes one of the pulleys can be easily dropped out and to pull smaller stumps two pulleys can be dropped out and where the pulling is light all the pulleys can be dropped off. With this arrangement of three pulleys the power applied for efficient work is about eight times the initial force or strain on the main pulling rope and under the enormous strain we could not build pulley blocks double strong enough to stand. Single pulleys can be made stronger. They have less friction and the single sheaves are much the handiest and cheapest.

The preferred form of single pulley is a cast steel sheave having the rope groove sunk down in deep enough to let the rope around the sheave inside of the outside rim of the sheave which does away with the necessity of a casing to keep the rope in place on the sheave and causes the friction of the sheave on the rope to come more equal on all the rope instead of all on one side of the rope. A clevis R is fitted to the sheave and inside of the clevis there is a sliding block R' to fasten the pulley to the rope, the end of the rope being passed between the sheave and sliding block then around the sliding block in a groove to the block and back between the sliding block and the lower end of the clevis. Now the harder the pull on the rope the more firmly it is held against the inside of the clevis by the pressure of the sliding block.

When it is required to couple pieces of steel wire rope together on the field a coupler

as F is used which is constructed on the same plan as the means for coupling rope to the single sheave pulley, and consists of two cast sliding blocks $f f$ with a groove around each block for the rope and also a groove around the opposite side so that the blocks will play and slide inside of an iron link. The rope is put through the center and is passed around the sliding block and back through between the sliding block and the link. This is a very handy arrangement to couple pieces of steel ropes on the field and very cheap and supplies a want long felt in my business.

The hitches or grabs heretofore used on the pulling rope to hitch the rope to a stump or tree, have always worked to a great disadvantage, while having a hitch or hook on the end of the pulling rope, when having pulled one stump or tree, then the operator had to wait until enough rope was wound in on the spool or drum, to bring the end of the rope in or forward to another stump.

My new hitch or grab J may be made in either plan shown. It consists of a small cast iron or steel with a hole j through the center with three hook-shaped or undercut extensions $j^1 j^2 j^3$ on one side of the casting. The pulling rope is put through the hole j in the grab, and around the tree or stump, then back on other side of stump and under the hook j^1 and then on under the hook j^2 and then up between the hook j^3 and the rope where it is firmly held by the pulling rope pressing it against the hook j^2 . By the use of this grab we can pull twice as many stumps in the same time as in the old way, for after having pulled a stump instead of waiting for team to wind in the rope to another stump we slide the grab forward on the rope to the next stump and fasten to it as before without losing any time.

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

1. In a grubbing machine the combination with the base or casting having openings $a a^2$, of an anchoring rope having its ends passed through opening a^2 in opposite directions, one end of the rope being held in the said opening by being passed under the other end, and a fastening bolt for securing the latter end, substantially as set forth.

2. In a grubbing machine, the combination with the base or casting having openings $a a^2$, of an anchoring rope having its ends passed through opening a^2 in opposite directions, one end of the rope being held in the said opening by being passed under the other end, and the latter end being passed through opening a , and a wedge shaped fastening bolt inserted in the said opening a , substantially as described.

3. In a grubbing machine, the combination with a base having a spindle, and having a portion projected forward from a side of the spindle, and having the rear side of the said spindle tapering and a drum adapted to be

mounted on the said spindle of a filling piece constructed to be applied to the tapering side of the spindle, substantially as and for the purpose described.

5 4. In a grubbing machine the combination of a sweep, a drum having two vertical standards to project on opposite sides of the sweep and having lateral extensions to extend over the top side of the sweep and retain the same
10 in place, and adapted to have a lever applied thereto to rotate the drum back, substantially as and for the purpose specified.

5. The combination with the drum having two standards projected vertically from the
15 top side at diametrically opposite points and on opposite sides of the sweep, of rings adapted to slide and bind on the said standards to retain the sweep in place, substantially as set forth.

20 6. The combination with a base having a spindle, and a drum adapted to receive a sweep, of a standard mounted in the said spindle, and a lever pivoted to the said standard and connected with the sweep, to elevate and
25 disengage it from the drum to permit of the latter being turned back, substantially as described.

7. The combination with a base having a spindle, and a drum having sweep engaging
30 projections, of a standard mounted in the said spindle, and having a shoulder or stop, and a lever pivoted to the said standard and adapted to be connected with the sweep to elevate the latter and disengage it from the said pro-
35 jections, substantially as described.

8. In a grubbing machine the combination with the drum having a sweep, of a stop consisting of a bar arranged approximately at right angles to the sweep and secured thereto

about midway of its ends, and having prongs depending from the ends of the said bar to ride upon the ground and support the outer end of the sweep and constructed to enter the ground and prevent the sweep turning back, substantially as set forth.

45 9. An anchor for grubbing machines consisting of a beam, a hook at one end, and a foot at the opposite end of the beam having lateral flanges midway of its front and rear edges, substantially as shown for the purpose
50 described.

10. In a grubbing machine the combination with a single sheave pulley Q anchored to the stump to be drawn, a rope Q' passed around a stump and having single sheave pulleys Q²
55 and Q³ at its ends, said rope passing around pulleys Q and Q² and the pulling rope passing around pulley Q³ and anchored at one end, and having the other end attached to the grubbing machine, substantially as set forth. 50

11. The herein shown and described hitch or grab composed of a casting having opening j, and having hooks j', j² and j³, substantially as set forth.

12. In a grubbing machine, the combination
65 with the base or casting having opening a², of an anchoring rope secured at one end to the said base or casting, and having portions passed through the said opening a² in opposite directions, the free end of the rope being
70 held in the said opening by being passed under the other end, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM SMITH.

Witnesses:

E. J. HUGHES,
F. R. SMITH.