

No. 861,796.

PATENTED JULY 30, 1907.

H. BICKEL.
PULLING MACHINE.
APPLICATION FILED APR. 10, 1907.

3 SHEETS--SHEET 1.

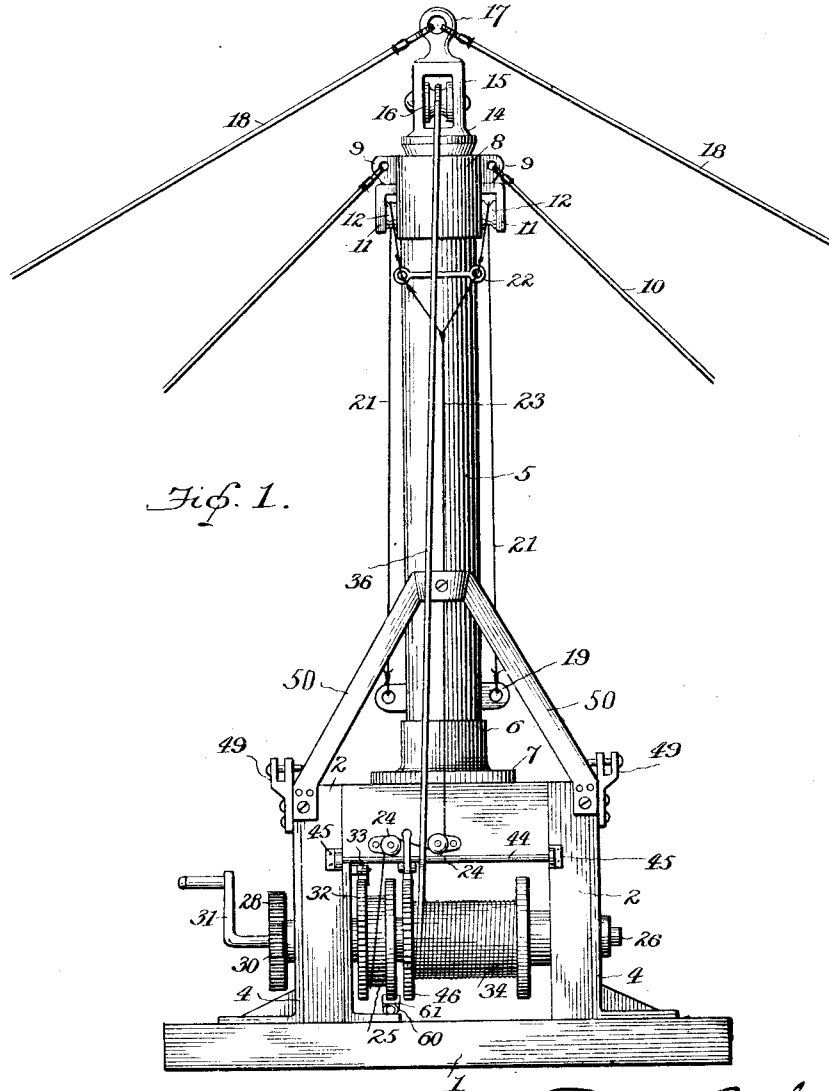


Fig. 1.

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3 SHEETS-SHEET 2.

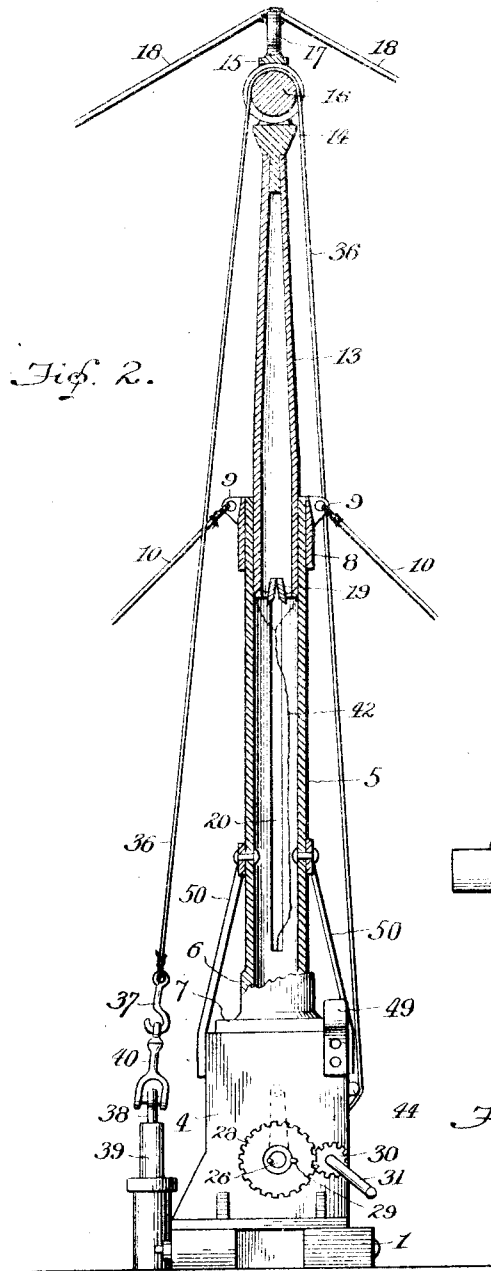


Fig. 2.

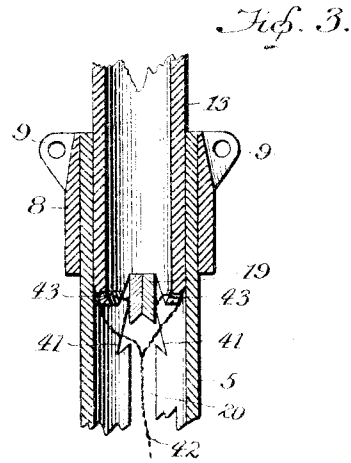


Fig. 3.

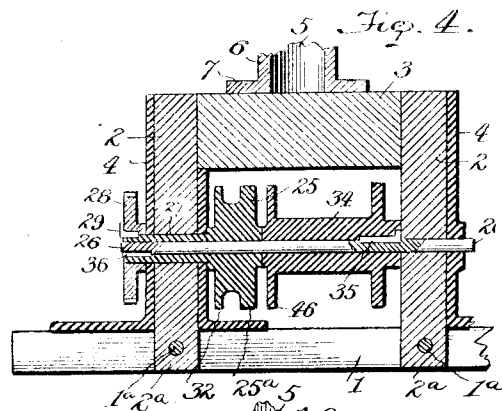


Fig. 4.

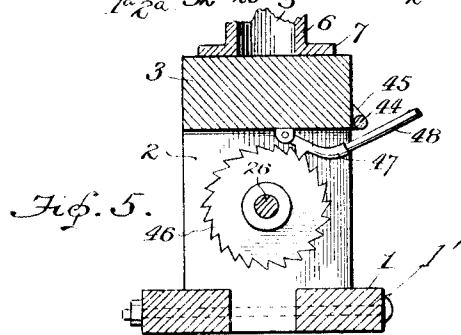


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 6.

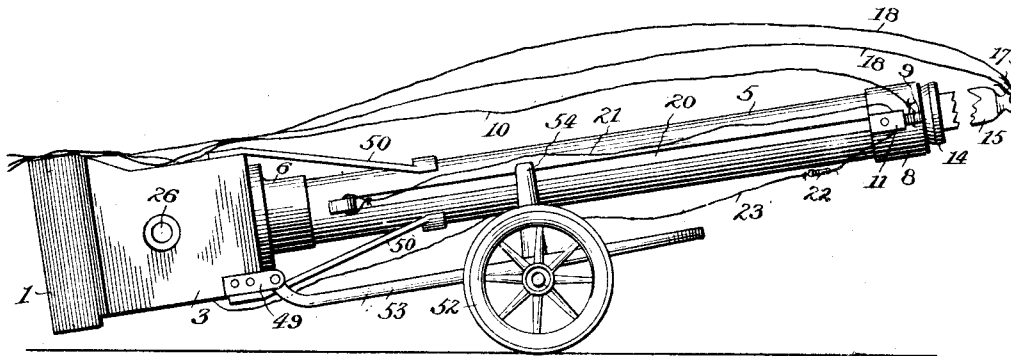


Fig. 7.

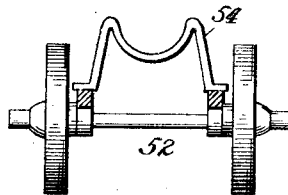


Fig. 8.

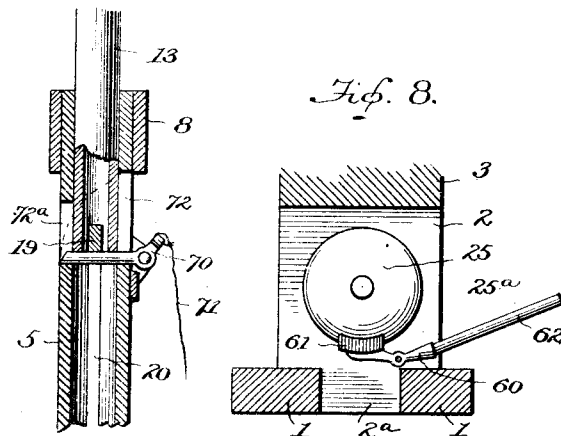


Fig. 9.

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UNITED STATES PATENT OFFICE.

HARMON BICKEL, OF FRANKLIN, PENNSYLVANIA.

PULLING-MACHINE.

No. 861,796.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed April 10, 1907. Serial No. 367,381.

To all whom it may concern:

Be it known that I, HARMON BICKEL, a citizen of the United States, residing at Franklin, in the county of Venango and State of Pennsylvania, have invented certain improvements in Pulling-Machines, of which the following is a specification.

The primary object of this invention is to provide a portable pulling machine or hoisting apparatus which is especially adapted for pulling casings, tubings and rods from Artesian and oil wells, and so constructed that it may be readily operated by either hand or horse power and conveniently moved from place to place.

The invention contemplates the construction of a pulling machine or hoisting apparatus of such construction that when in use it will provide a tall mast over a sheave at the upper end of which the hoisting cable passes from a drum in the supporting frame or base, so that a considerable length of the rod or casing may be pulled at a single operation, and in which the said mast is adapted to collapse or telescope so as to reduce its length for convenience in moving the machine from place to place on a truck or carriage which is adapted to be attached thereto.

In the following specifications I have entered into a detail description of the construction, operation and practical advantages of my invention, and what I claim as new and desire to secure by Letters-Patent is more specifically set forth in the appended claims.

In the accompanying drawings, which form a part of this specification:—Figure 1 is an end elevation of a pulling machine constructed in accordance with my invention, and showing the upper section of the mast lowered or telescoped within the lower section. Fig. 2 is a sectional view of the machine, slightly reduced in size, and showing the mast extended to its full length. Fig. 3 is an enlarged detail sectional view through the upper part of the lower section of the mast, to show one manner of supporting the upper section therein. Fig. 4 is a sectional view through the supporting frame of the machine, and showing the manner of connecting the drums to the operating shaft. Fig. 5 is a transverse sectional view on the line 5-5 of Fig. 4. Fig. 6 is a side view showing the pulling machine supported on the truck for transportation from place to place. Fig. 7 is a detail view of the truck. Fig. 8 is a view showing the application of the brake for the operating drums and shaft. Fig. 9 is a detail sectional view showing a modification of the means for supporting the upper section of the mast.

Like numerals of reference indicate like parts in all the figures of the drawings.

Though my improved pulling machine, hereinafter particularly described, is designed especially for pull-

ing out tubes and rods from Artesian and oil wells, as shown in the drawings, it will be obvious, however, that the said machine may be employed for all kinds of pulling or hoisting work where a tall mast or upright is desired so that the article or material to which the cable is attached may be elevated to a considerable distance above the ground or platform upon which the machine is placed, and in which the machine is required to be moved from place to place.

In carrying out my invention I provide in the first instance a supporting frame which is strongly built and comprises the two sill pieces 1 1, the opposite side pieces or standards 2 2, and the upper cross-piece or platform 3, the latter being rigidly secured between the upper ends of the side pieces or standards. Two sill pieces are preferably employed, and the side pieces or standards are cut away to receive the same as shown at 1' in Fig. 5, and are bolted to said side pieces by means of long bolts 1^a, said bolts extending through the sill pieces and through the portions 2^a of the side pieces, as illustrated in Fig. 4 of the drawings. This frame is braced by means of metal plates 4, which are secured to the sides of the side pieces or standards, and in addition to bracing the structure also provide bearings for the operating shafts hereinafter referred to.

Mounted upon the top or platform 3 of the supporting-frame is the lower section 5 of the upright or mast, the lower end of said section being provided with a reinforcing collar 6 having a wide base-flange 7 by which it is securely stepped and bolted upon the frame. This section 5 is a metal tube, and may be either round or polygonal in cross-section, and is preferably of the same diameter throughout its length. The upper end of the section 5 has secured thereon a collar 8 provided with perforated ears 9 to receive the guy-ropes 10, and with brackets 11 in which are journaled grooved rollers or pulleys 12, the purpose of which will be hereinafter explained.

Suitably mounted within the tubular section 5 of the mast is an extension section 13, the lower end portion of which is adapted to fit closely within said section 5, while the upper portion thereof is preferably tapered and at its upper end has secured therein a casting 14 shaped to form a housing 15 for a grooved guide-pulley or sheave 16, the said casting terminating in an eye 17, to provide the means of attachment for the guy-ropes 18. The lower end of this casting 14 is tapered or conical-shaped, so that when the section 13 is lowered into the section 5 said casting will fit tightly therein.

To provide for raising and lowering the extension-section 13 it is provided at its lower end with a cross-bar 19, the ends of which project through vertical

slots 20 in the tubular upright or lower mast section 5, and connected to the projecting ends of said cross-bar are ropes 21, which pass upward and over the guide-pulleys 12 and are brought downward for connection to a spreader-bar 22. To the spreader-bar is also attached a rope 23, which passes downward and around suitable guide-pulleys 24 on the supporting frame and extends to a drum 25, to which it is detachably connected, and by means of which drum the rope 23 and connections are operated to raise and lower the upper mast section 13. Said drum is also utilized in connection with a rope or cable for operating the machine by horse-power, as hereinafter explained. This drum is loosely mounted on the shaft 26, and is provided at one side with a hub 27 which passes through the adjoining standard 2 and is provided at its outer end with a gearwheel 28 connected thereto by a key 29. The gearwheel 28 is in mesh with a pinion 30, and to the latter is attached a crank-handle 31, said pinion being suitably journaled in a bearing attached to the supporting frame. However, instead of employing a pinion, as shown, I may in some instances attach the crank-handle directly to the gearwheel 28, and this may be done where it is desired to more rapidly turn the drum; but where greater power is required in turning the drum the pinion will, of course, be used.

One of the heads of the drum 25 may be formed into a ratchet-wheel 32, while the other head forms a brake-wheel and is engaged by a brake-shoe 61 (Fig. 8), said brake shoe being carried by a lever 60 having a socket in which is placed a removable handle 62. The ratchet-wheel 32 is engaged by a pawl 33, to prevent backward rotation of said drum, and more particularly when it is employed for raising the upper section of the mast, it being understood that for this purpose the drum may be turned independent of the larger drum or bull-wheel hereinafter described. Upon the shaft 26 is also mounted a large drum or bull-wheel 34, which is connected to turn with said shaft by means of a key 35, and the shaft extends through the hub of the drum 25 and is provided with a key-way 36 adapted to register with a similar key-way in said hub, and so that the said shaft and hub may be connected together by the insertion of a key. The hoisting and lowering cable 36 passes from the drum or bull-wheel 34 up and over the sheave 16 at the top of the mast, and to the end of said cable is attached a hook 37 by which it is connected to a suitable grappling device. However, the end of the cable may be provided with any other device for connecting it to the tube, rod or other object it is desired to pull upon. In the present instance the machine is shown as employed for pulling a rod, as 38, from an oil well tube 39, and there is employed an interposed yoke-bar 40, which is connected to the rod and is provided at its upper end with an eye with which the aforesaid hook 37 engages, as shown in Fig. 2 of the drawings.

For the purpose of supporting the extension mast-section 13 in its extended position I provide any suitable form of catch, for instance as shown in Figs. 3 and 9. In the form shown in Fig. 3 the cross-bar 19 is com-

posed of two plates which normally lie side by side and are provided at their outer ends with aligning apertures by which the ropes 21 are attached thereto, and which ropes tend to hold the plates together. These plates are seated in oppositely beveled recesses in the lower end of the section 13, and are adapted to be spread apart at their lower edges so as to engage into notches 41 at opposite sides of the slot 20 near the upper end of the latter. The lower walls of said notches are beveled to receive the correspondingly beveled edges of the plates and so that the latter will be held securely therein when the weight of the upper section 13 of the mast is upon the cross-bars or plates 19. For the purpose of spreading the plates at their lower edges, to thereby insure their engagement with the notches, said plates are connected to a pull-cord 42, the branched upper end of which passes through apertures in the lower end of the mast section 13, while the cord extends down through the lower mast section 5 and out through the slot 20 therein. The upward movement of the telescopic section 13 is limited by the cross-bars or plates 19 engaging the upper end of the slot 20, which terminates at the lower edge of the collar 8, and the notches are located a sufficient distance below said collar so as to permit the plates to be spread outward for engagement with said notches. This operation will be readily understood by reference to Fig. 3 of the drawings, for the upper mast section 13 being raised by the ropes 21 and their operating means until the plates 19 abut against the upper end of the slot or lower edge of the collar 8, the cord 42 is then drawn upon to separate the lower edges of the cross-bars or plates so that they will engage into the notches when the said upper mast section is lowered a short distance. When it is desired to lower the upper mast-section into the lower mast section 5, to the position shown in Fig. 1 of the drawings, the ropes 21 are drawn upon to first lift said upper section until the cross-bars or plates disengage the notches, and the said cross-bars or plates being drawn together by the connection of the ropes 21 therewith the said cross-bars or plates will then be confined to the slot 20 when the section 13 is lowered.

In Fig. 9 I have illustrated another device for supporting the upper section 13 in its extended position, and in this form a pivoted latch-bar 70 operates in opposite slots 72 and 72^a in the lower mast section 5, and to said pivoted latch-bar is attached a pull-cord 71 for operating the same. In the operation of this form of supporting means the section 13 of the mast is first raised to the limit of its upward movement and the latch-bar 70 is then permitted to swing down until it extends across the lower section 5 resting at the base of the slots 72 and 72^a. The said mast section 13 is then lowered until the cross-bar 19 rests upon said latch bar and so that the section will be supported by the latter. In lowering the upper section it is first raised until it is out of the path of the pivoted latch-bar, and the latter is then swung upward so as to be out of the path of said section.

In order to reduce friction at the point when the hoisting and lowering cable 36 passes under the upper cross-piece or platform 3 of the supporting frame I provide a roller 44, journaled at its ends in suitable brack-

ets 45. However, in some instances the supporting frame will be made narrower than shown in the drawings, and in this instance the larger drum or bull-wheel will extend sufficiently so that the cable will clear the frame.

To prevent backward rotation of the larger drum or bull-wheel 34 during the operation of hoisting or pulling one of the heads of said drum or bull-wheel is formed into a ratchet-wheel 46 with which engages a gravity pawl 47, the latter being provided with a removable handle-bar 48 for moving it out of engagement.

The mast is braced by means of inclined brace-bars 50, which are attached at their lower ends to the supporting frame and at their upper ends are secured to the lower section 5 of said mast.

For the purpose of connecting the carrying truck to the machine the supporting frame is provided at opposite sides with castings 49 presenting ears in which the side bars 53 of the truck are connected by bolts, (as shown in Fig. 6), the said truck also having a raised cross-bar 54 which is curved to receive the mast. In addition to the side bars 53 and raised cross-bar or support 54, the truck comprises a shaft or axle and ground wheels 52. The front ends of the cross-bars 53 are joined and form a handle by which the said truck is pushed.

The operating of the machine will be readily understood from the foregoing description, in connection with the accompanying drawings, for after the machine has been placed in position and the mast extended to its full height by operating the drum 25, the latter is then connected to the shaft, and after removing the cord 23 the drum 34 may be turned manually by means of the crank-handle 31, and the hoisting cable being wound upon the drum 34 will pull upon the tube or rod to which the cable is attached. If it is desired to operate the drum 34 by horse power the drum 25 is first disconnected from the shaft by removing the pin 29, and a rope is wound backward around said drum by turning the crank-handle; then after inserting the pin or key 29 and attaching a horse to the rope the latter may then be pulled upon to turn the drum 25 and drum 34. In the operation of the drum in pulling upon the cable the pawl 47 is placed in engagement with the ratchet-wheel 46 of the drum so as to prevent backward rotation of said drum. After the rod or tube has been pulled, and it is desired to lower the same to the ground the pawl 47 is disengaged from the ratchet-wheel 46, and the brake 60 is applied so as to gradually lower the tube or rod. It will be seen, therefore, that I provide a simple, compact and easily operated portable machine for pulling tubes and rods, and which may be readily moved from place to place and quickly set up for work.

Having thus described my invention I do not wish to be limited in my patent protection to the precise construction and arrangements of parts as herein shown and described, as it is obvious that changes may be made in the construction of the machine without departing from the spirit and scope of my claims and without sacrificing any of the advantages of the machine.

Having thus described my invention, I claim:

1. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a tubular mast sec-

tion secured thereon, and having slots in its opposite sides an extensible mast-section telescoping within the aforesaid section, and having a cross-bar at its lower end extending through the aforesaid slots, means for raising and lowering said extensible section connected to the ends of the cross-bar, and means for supporting the extensible section in a raised position; together with a drum or bull-wheel supported in the supporting frame, a crank-handle for operating said drum, and a cable extending from the drum up and over a sheave at the upper end of the mast, substantially as shown and described.

2. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a tubular mast section secured thereon, an extension section telescoping within the aforesaid section, and means for raising and lowering the extension section and for supporting the same in raised position; together with a shaft journaled in the supporting frame, a large drum keyed to the shaft, a smaller drum loosely mounted on the shaft and having an extended hub, a removable key for connecting the last mentioned drum to the shaft, an operating wheel secured to said hub, and a crank-handle connected to the operating-wheel, substantially as shown and for the purpose set forth.

3. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a tubular mast section secured thereon, an extension section telescoping within the aforesaid section, a cross-bar secured to the lower end of the extension section and extending through slots in the lower section, ropes connected to said cross-bar for raising and lowering the extension section, and a pivoted latch-bar 70 working in slots in the lower section and adapted to support the upper section in raised position; together with drums journaled in the supporting frame and around one of which the hoisting and lowering cable passes, a ratchet-wheel formed on said drum, a pawl adapted to engage the ratchet-wheel, and operating-wheel and crank-handle secured to the shaft on which the drums are mounted, substantially as shown and described.

4. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a tubular mast section secured thereon, an extension section telescoping within the aforesaid section, a cross-bar at the lower end of the extension section and projecting through vertical slots in the lower section, ropes connected to said cross-bar for raising and lowering the extension section, and a pivoted latch-bar working in slots in the lower section and adapted to support the upper section in raised position; together with a shaft journaled in the supporting frame, drums mounted on said shaft side by side and provided with ratchet-wheels, pawls engaging said ratchet-wheels, a brake engaging one of the drums, and an operating-wheel and handle connected to the shaft, substantially as shown and described.

5. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a mast section secured thereon, a section telescoping within said mast section, a shaft journaled in the supporting frame, drums on said shaft and means for operating the latter; together with the plates 49, and a truck connected to said plates and having a raised cross-bar curved to receive the mast, substantially as shown and described.

6. In a pulling machine for the purposes set forth, the combination, of a supporting frame, a tubular mast section secured thereon, an extension mast section telescoping within the aforesaid section, a cross-bar at the lower end of the extension mast section and projecting through slots in the lower mast section, ropes secured to the ends of the cross-bar and extending upward and over guide-pulleys carried by the lower mast-section, a spreader-bar to which said ropes are secured, and a rope connected to the spreader-bar for raising and lowering the extension mast section; together with a latch-bar pivoted to move in slots in the lower mast-section and adapted to extend across said section to support the extension section in a raised position, substantially as shown and described.

7. In a pulling machine, the combination, of a supporting frame, a mast section secured thereon, an extension

4
5 mast section telescoping in the aforesaid section, guy-ropes secured to the upper ends of the sections, a cross-bar at the lower end of the extension section projecting through slots in the lower mast-section, ropes connected to said cross-bar for raising and lowering the extension section, and means for supporting the extension section in raised position; together with a shaft journaled in the supporting frame, a bull-wheel keyed to the shaft, a drum loosely mounted on the shaft and connected thereto by a

removable key, and an operating-wheel and crank-handle 10 connected to said drum, substantially as shown and described.

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

HARMON BICKEL.

Witnesses:

MARY E. ECKERT.

BRYAN H. OSBOENE.