

No. 836,984.

PATENTED NOV. 27, 1906.

M. McCAIN.
WELL DRILLING MACHINERY.

APPLICATION FILED APR. 5, 1906.

3 SHEETS—SHEET 1.

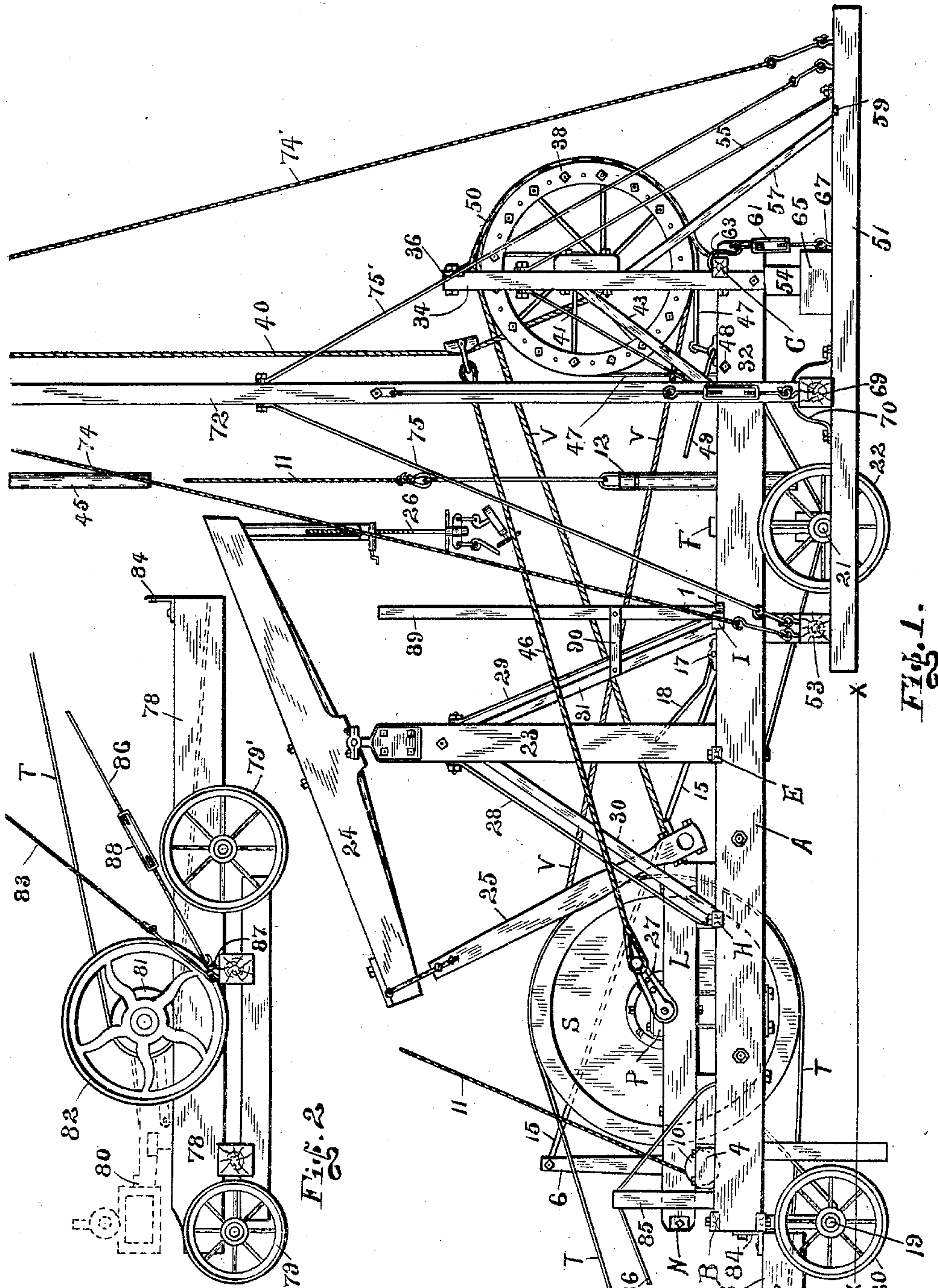


Fig. 1.

Fig. 2.

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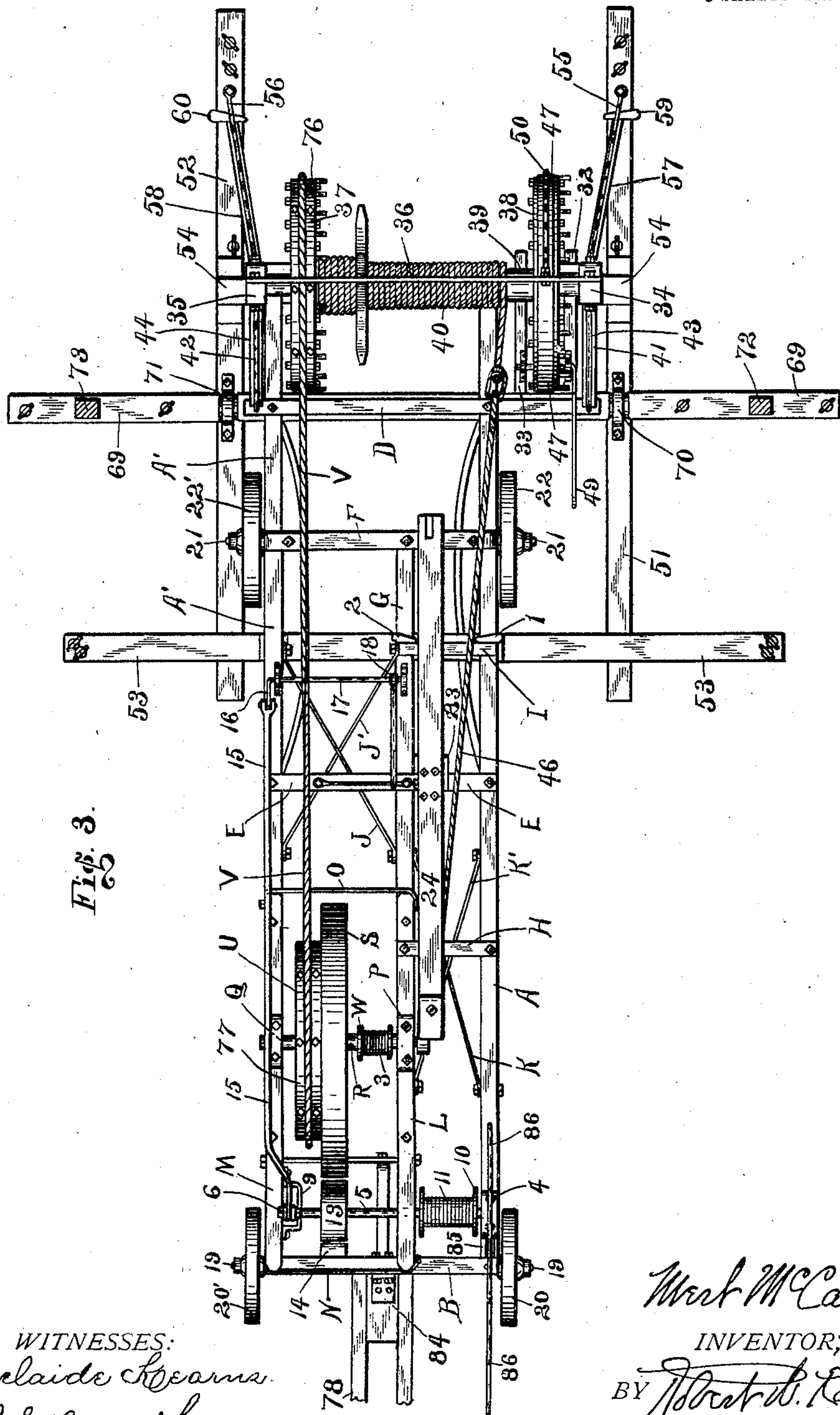


Fig. 3.

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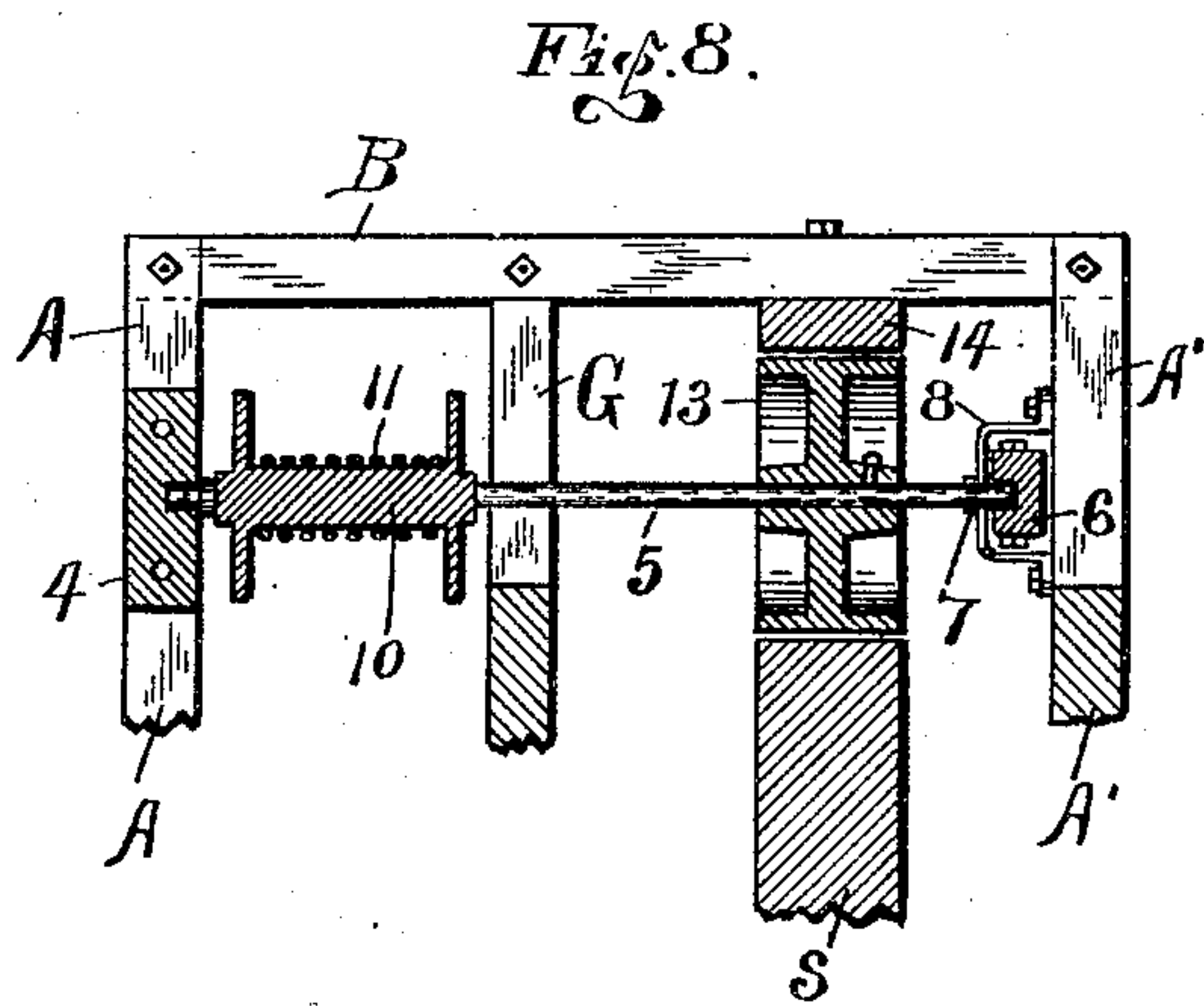
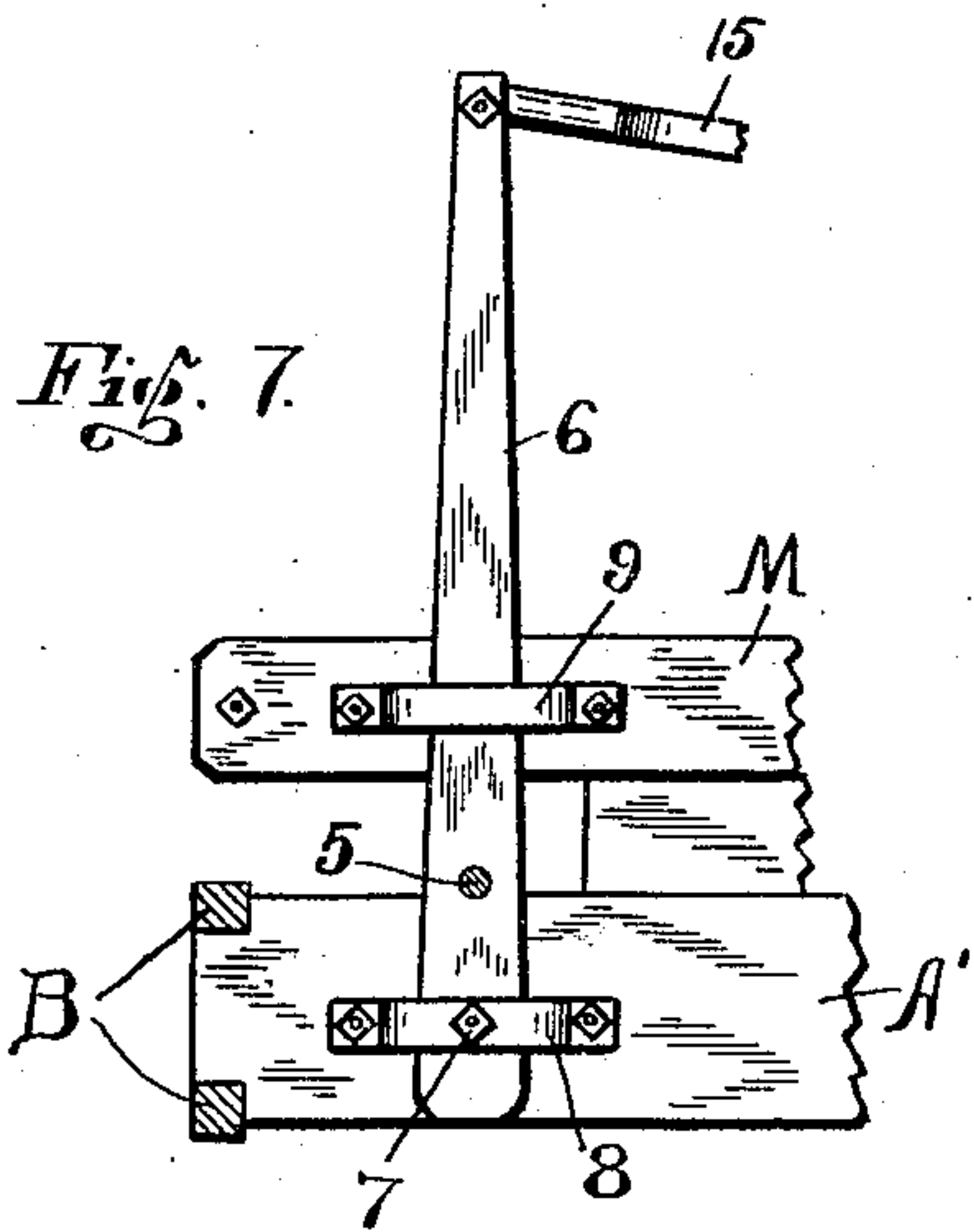
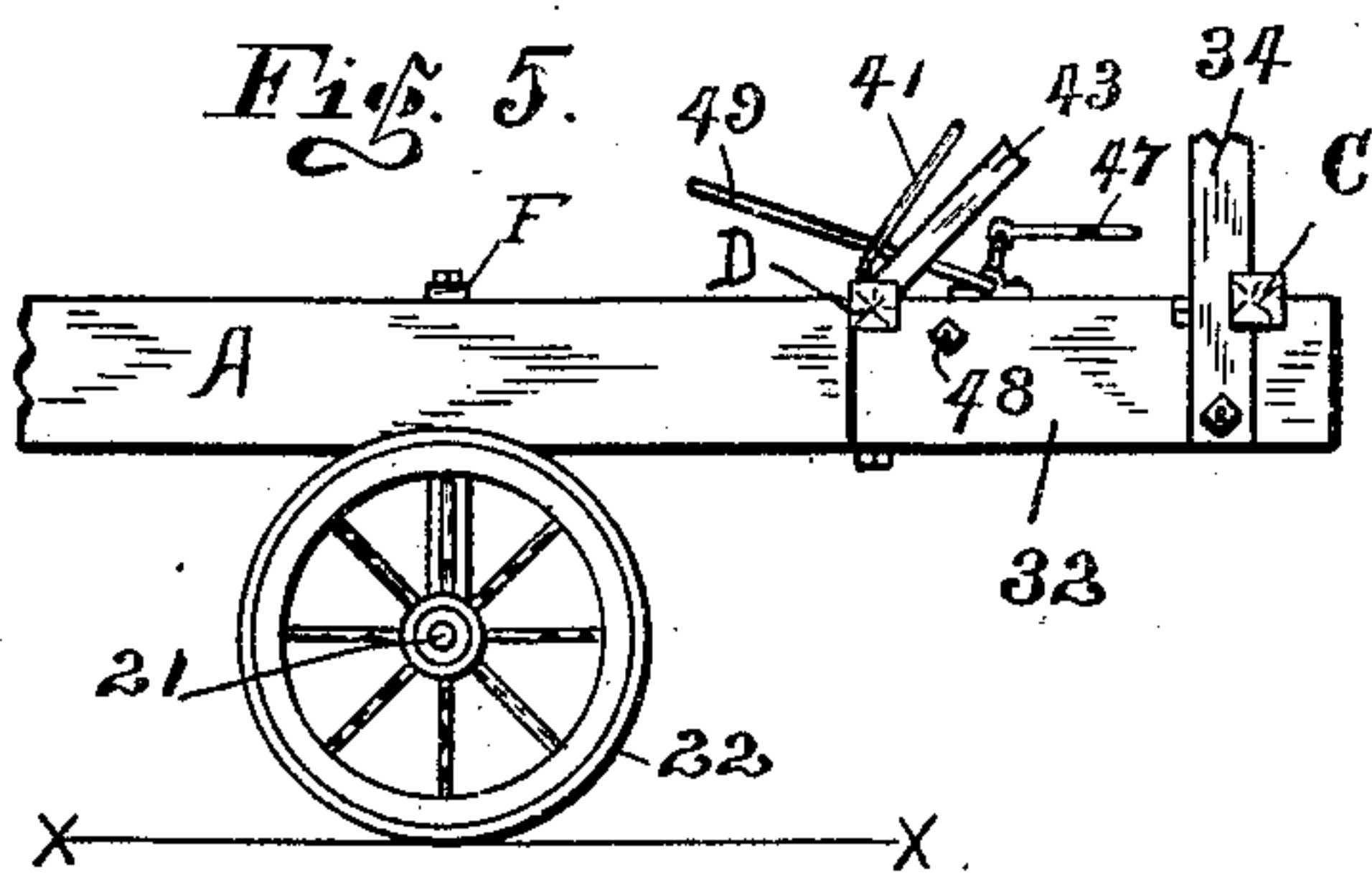
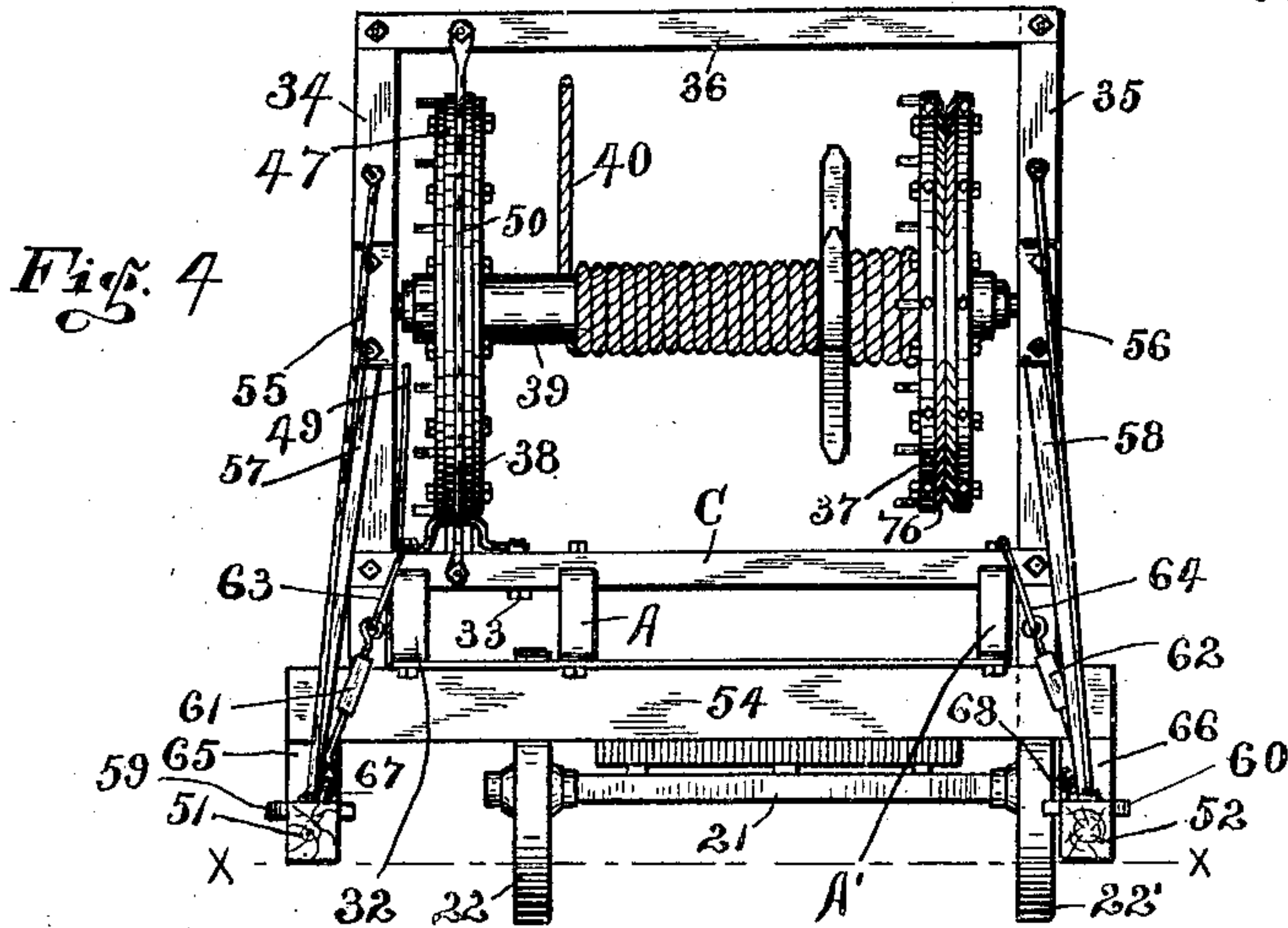
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3 SHEETS—SHEET 3.



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WELL-DRILLING MACHINERY.

No. 836,984.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed April 5, 1906. Serial No. 309,961.

To all whom it may concern:

Be it known that I, MERT McCAIN, a citizen of the United States, residing at Portland, in the county of Jay, and in the State of Indiana, have invented a new and useful Construction in Well-Drilling Machinery, of which the following is a full and complete specification, being such as will enable others skilled in the art to which it pertains to make and use the same.

In this present invention my object is the provision of new and useful and novel improvements in well-drilling machinery, intended more particularly for the formation of gas and oil wells of considerable depth, whereby the several parts will be strong and durable in construction, practical and efficient in operation, compact in its assembled relations, and which is adapted to perform the several functions and operations required with ease and absolute exactitude.

A further object is the provision of a well-drilling machine capable of producing wells of great depth, which machine may be easily and quickly transported from point to point without the necessity of disassembling heavy parts, thereby saving a great amount of time, labor, and deterioration of the parts and at the same time providing a machine which may be manufactured and sold at a comparatively low price.

Other specific objects and particular advantages will manifest themselves to one familiar with the art in the course of the ensuing specification, and the points which are new will be pointed out in the appended claims, which form the basis of this invention.

The preferred embodiment of my invention is most clearly visualized in the accompanying drawings, in which—

Figure 1 is a left-hand side elevation of the body or main portion of a machine constructed in accordance with my present invention and showing same in working condition. Fig. 2 is a left-hand side elevation of the engine-section of my machine. Fig. 3 is a top plan view of the main portion of my machine. Fig. 4 is a rear end elevation of the machine in operative position. Fig. 5 is a detail side elevation of the rear portion of the machine, showing same in condition ready to be moved or transported over the ground. Fig. 6 is a detail cross-sectional view of the bull-wheel tire or rim. Fig. 7 is a detail elevation of the lever for moving horizontally the sand-reel

and its pulley, and Fig. 8 is a horizontal sectional view of the sand-reel together with its shaft and pulley and connections.

Similar reference characters denote like parts throughout the several views of the three sheets of drawings.

In connection with the accompanying drawings I will now attempt to set forth the construction and operation of this invention and to point out the several features which are new and useful, which I will do as briefly and as compactly as I may.

In the drawings the characters A and A' designate the longitudinal main sills of the body of the machine. Said sills are connected together at their front ends by the cross-frame B and in the rear by the cross-beam C, which latter projects out to the left some distance from the sill A, as shown in Fig. 4, for the purpose presently appearing. A short distance forward of the beam C said sills A and A' are again connected by the cross-beam D, which latter also projects out to the left, as does the beam C, for the purposes which will presently be made clear. Near the center longitudinally of the sills A and A' they are again connected by the cross-beam E, and between the members E and D the said sills are again connected by the cross-beam F, as shown. Extending from the beam F to the cross-frame B and located to the left of the center longitudinally is the auxiliary sill G. Located at equal distances from the beam E, parallel therewith, are the minor cross-beams H and I, which connect the sills A and G, being gained into the upper edges thereof, as shown. All of said parts constituting the main frame are bolted together except the minor cross-beam I, which is securable by the wedges 1 and 2, the gains in the sills A and G therefor being longer than the width of the beam I, whereby the beam I may be moved slightly for the purpose presently appearing. The sills A and G are connected by a pair of crossing-braces J and J', and in like manner the sills A and G are connected by a pair of crossing-braces K and K', all of said braces being bolted to the inner opposing faces of the respective sills, as shown.

The band-wheel frame consists of the two parallel rails L and M, which extend from a line even with the cross-frame B to the rear a proper distance and located directly over and parallel with the respective members A' and G, above which they are supported by

spacing-blocks by which they are permanently connected to the sills A' and G by means of bolts. The front and rear ends of the rails L and M are connected by metal straps, (designated by the letters N and O, respectively.) Mounted on the central portion of the rails L and M are boxings P and Q, respectively, in which is mounted the band-wheel axle R.

The letter S denotes the band-wheel or main pulley-wheel, having the band or belt T, adapted to travel on its periphery. Permanently secured on the right-hand side of the band-wheel S is the channel-wheel U, which is concentric with the wheel S and is adapted to carry in its channeled face the cable-band V, which will presently be further referred to.

Also mounted on the axle R to the left of the wheel S is the reel W, adapted to have wound thereon the rope or cable 3. The objects of the said reel W and the rope 3 are to provide means for expeditiously raising the main cables to the top of the mast, for raising and lowering the mast, and for lifting other parts and tools to position. The rope 3 may be run up over a pulley in the mast or to the front or rear of the machine wherever its services are required for various purposes in the assembling, disassembling, or the operation of the machine.

Mounted on the front upper edge of the sill A is a boxing 4, in which is pivoted the left-hand end of the shaft 5, from which said shaft extends over the sill G to the right, and its right-hand end is pivoted in the lever 6, as indicated in Fig. 7. The lower end of the lever 6 is pivoted to the inner face of the sill A' by the bolt 7, which bolt is carried by the guard 8 and the sills A'. The lever 6 extends upward above the inner face of the rail M and then a considerable distance thereabove, as shown. The movements of the lever 6 back and forth are guided by the upper guard 9, which is secured therearound to the inner face of the rail M, as shown in Fig. 7. Mounted on the left-hand portion of the shaft 5 is the reel 10, carrying the rope or cable 11, which is adapted to be wound thereon, which rope may extend up over a pulley in the top of the mast and then down over the well-mouth, and it may have secured to this free end the sand-pump 12. Also mounted on the shaft 5 on a line with the band-wheel S is the friction-pulley 13, which is adapted to have its periphery contact with the periphery of the band-wheel S at the will of the operator. Secured to the inner face of the front frame B on a line with said pulley 13 is the brake-block 14, against which the face of the friction-pulley may contact. It should be noted that the distance between the brake-block 14 and the band-wheel S is only slightly greater than is the diameter of the pulley 13, which operates between them,

the centers of the brake-block 14, the pulley 13, and the band-wheel S being on a line horizontally. From the above it is notably apparent that if the upper end of the lever 6 be moved to the rear it will cause the friction-pulley 13 to contact with the band-wheel S, and if the latter be in motion circumferentially the reel 10 will be revolved thereby in a direction opposite to the rotation of the band-wheel. Now if the upper end of the lever 6 be moved forward then the pulley 13 will be moved away from contact with the wheel S and placed in immediate contact with the brake-block 14, which of necessity will hold the reel 10 and its load at that point, and then if the lever 6 be allowed to stand vertical the pulley 13 will be free, and consequently the reel 10 may freely revolve in either direction. By the above it is apparent that the reel 10 may be easily and positively controlled for the purpose of operating the sand-pump or for other purposes. In order that the above-stated operations may be controlled from the most advantageous point—that is to say, from where the operator is most likely to be located—I have provided the arm 15, having its forward end pivoted to the upper end of the lever 6 and its rear end pivoted eccentrically to the finger 16, which latter extends up at right angles to the shaft 17. Said shaft 17 is pivoted across on the upper edges of the sills A' and G and is secured at right angles thereto, and extending up therefrom is the operating-lever 18, by the movements of which the lever 6 is actuated in the manner set forth.

Carried directly below the cross-frame B and parallel therewith is the centrally-pivoted front axle 19, on the outer ends of which are mounted the ground-wheels 20 and 20'. A tongue (not shown) may be attached to the front axle 19 in any well-known manner.

Carried directly below the cross-beam F, parallel therewith, is the rear axle 21, on the outer ends of which are mounted the ground-wheels 22 and 22'. Said rear axle is secured relatively stationary, as shown.

The numeral 23 denotes the samson-post, which is secured at the lower end to the cross-beam E and contacting with the left face of the sill G, and it extends upward some distance, carrying pivotally on its apex the centrally-mounted walking-beam 24, which latter extends longitudinally of the machine and may be of any well-known construction. The forward end of the walking-beam carries the downwardly-extending pitman, and the rear end of the walking-beam is adapted to carry a string of tools—as, for instance, the tools 26—for various operations in producing a well.

Extending to the left from the axle R, beyond the face of the rail L and on a line with the pitman 25, is the wrist-crank 27, to which the lower end of the pitman 25 may be

pivotaly connected (not shown) for operating the walking-beam 24 in the usual manner for manipulating the tools or the like. Said wrist-crank carries a sheaf revolubly thereon, over which the lower end of the pitman may be secured by a key. Said pitman may be replaced by the jerk-line, as shown, which is looped around said sheaf.

The samson-post 23 is doubly braced by the rods 28 and 29, which extend from its upper front and rear sides at angles down to the respective minor cross-sills H and I and by the wooden braces 30 and 31, which are gained or mortised into the upper portions of the samson-post and extend down parallel with the brace-rods, and their lower ends are mortised to fit over the corners of the respective minor cross-beams H and I. By reason of the beam I being movable horizontally in the gains therefor in the sills A and G it is apparent that said braces may be loosened and tightened by means of said wedges 1 and 2, above referred to.

Extending up from the juncture of the short sill 32 and the cross-beam C is the post 34, with a corresponding post 35 extending up from the cross-beam C and the sill A', substantially as shown. The posts 34 and 35 are connected at their upper ends by the cross-tie 36, thereby forming the bull-wheel frame, as shown most clearly in Fig. 4. Mounted horizontally between the posts 34 and 35 are the bull-wheels 37 and 38, which are each securely connected on the spindle 39, common to both, said spindle and the bull-wheels forming the reel for the main cable 40, which is adapted to wind thereon, as indicated. The said bull-wheel frame is braced on the front by the rod-braces 41 and 42 and also by the wood braces 43 and 44, which extend from the upper portions of the respective posts 34 and 35 down at an angle to the cross-beam D. The braces for the rear of the bull-wheel frame will be referred to in another connection.

The main cable or rope 40 extends from the bull-wheel reel upward to the apex of the mast and then extends down on a line with the well, and to this lower end is usually attached the drill 45 or other tools. The drill 45 is operated by allowing it to extend to the bottom of the well, the said pump 12 being at this time displaced thereby and the cable-band V being removed, and the operation of the drill is accomplished by means of the jerk-line 46, one end of said jerk-line being looped on said sheaf of the wrist-pin of the crank 27 and the other end is slidably connected to the cable 40, near the reel therefor, as shown in Fig. 1. It is now evident that by revolving the band-wheel S the drill will be raised and dropped, and as it progresses downward the cable 40 may be let out from the reel sufficient to keep the cable taut. When it is desired to raise drill, then the jerk-line 46 is

removed and the band V extended from the bull-wheel 37 over the wheel U, and then by revolving the band-wheel S the cable will be wound on the bull-reel and the drill thereby be raised up to the point desired.

The bull-wheel reel is provided with a brake consisting of the friction-band 47, extending almost entirely around the periphery of the bull-wheel 38. One end of said band is permanently secured to the bolt 48, which bolt extends between the sills 32 and the tie 33. The opposite end of the band 47 is eccentrically mounted to be moved by the lever 49, whereby said band 47 may be clamped upon the periphery of the wheel 38, as shown. A rod-like guard 50 extends from the tie 36 to the rear over and corresponding to the curvature of the wheel 38, separated a slight distance from the band 47, with its lower end secured to the cross-beam C. This guard is for the purpose of preventing personal contact with the periphery of the wheel 36 and the band 47 to prevent injury in case the metal band 47 should break, but more particularly it is for providing an outer contact for the band 47 when it is loosened, thereby causing it to be at all points an equal distance from the periphery of the wheel, whereby it will not contact with the wheel at one point and be separated a considerable distance therefrom at another, it being understood that said band 47 is made, preferably, of sheet-steel or the like.

When positioned for work, the ground-wheels of the machine should be embedded in the earth to about one-third or more of their diameter, the line X X in Figs. 1 and 4 denoting the surface ground-line.

After the machine is positioned I then place the mudsills 51 and 52 in position longitudinally of the machine, disposing them on the surface of the ground, as indicated, at points slightly outside the ends of the bull-wheel frame. Across the front ends of the mudsills I then place the girder 53, extending it across underneath the machine at a point directly below the cross-beam I and blocking thereon up the sills A and A' in any preferred manner. Across underneath the bull-wheel frame I place the girder 54, blocking up thereon to support the bull-wheel mechanism and the rear extension of the main frame. The rod-like braces 55 and 56 are now extended from the upper portion of the posts 34 and 35 rearward at an angle down to the mudsills 51 and 52, respectively, and underneath the said braces are the wood braces 57 and 58, respectively, which are attached to the rear faces of the respective posts 34 and 35, and their lower ends are gained into the mudsills 51 and 52, respectively, where they may be tightened by wedges 59 and 60, substantially as shown.

The rear end of the main frame is held down in place, in connection with the mud-

sills, by clamps, as shown in Fig. 4, said clamps consisting each of a turnbuckle 61 and 62, respectively, each having the relatively large upper hook 63 and 64, respectively, to grasp over the cross-beam C, as shown, and having the downwardly-extending hooks 65 and 66, respectively, to engage in the eyes of the eyebolts 67 and 68, which extend up from the mudsills, as shown.

10 The numeral 69 designates the base of the mast, which extends across under the machine and resting on the mudsills 51 and 52, below and parallel with the beam D, and said base 69 is adapted to rotate on the mudsills 15 and is held in place by the straps 70 and 71, as shown.

The numerals 72 and 73 designate the upwardly and inwardly extending posts of the mast, and the mast is adapted to be supported vertically by suitable guy-lines, those on the left hand only appearing in the drawings. The guy-lines 74 and 74' extend from the upper portion of the mast forward and rearward, respectively, their lower ends being secured to the girder 53 and to the mudsill 51, respectively, as shown. In like manner the 25 guy-lines 75 and 75' extend down from a lower portion of the mast, and their lower ends are secured near aforesaid guy-lines, as shown. Further reference to the mast is unnecessary in this connection, as it is made the subject of a separate application for patent, filed simultaneously herewith.

The periphery of the bull-wheel 37 is provided with a metal tire or rim 76, having a V-shaped channel therearound, as shown in Fig. 6, for the cable-band V to travel in. The shape of said channel is such as to prevent the cable-band from slipping and also, 40 being of metal, it will be very durable. In like manner to the above the band-wheel U is provided with a metal tire or rim 77, disposed around its periphery, which is in all respects like said rim or tire 76 for the wheel 37.

45 Referring now more particularly to Fig. 2, the numeral 78 denotes the frame of the engine-section. This frame is mounted on suitable ground-wheels, as the wheels 79 and 79', the wheels on the opposite side not appearing. On the forward portion of the frame 78 is mounted the engine 80, which is adapted to revolve the belt-wheel 81 and the fly-wheel 82, the belt T operating over the wheel 81, extending, as previously stated, 50 from the band-wheel S. The numeral 83 denotes a guy-line secured to the engine-section and extending to the upper end (not shown) of the mast. Secured on the rear end of the frame 78 is an angle-plate 84, which when the machine is assembled in working condition may also be secured to the cross-frame B, whereby the engine-section and the machine-section may be coupled together.

65 Resting on the front end of the sill A is a

removable post 85, provided with a channel across its upper end. The numeral 86 denotes a truss-rod which is secured at one end in the sill A to the rear of the post 85, from which it extends up over said post, resting in 70 said channel thereof, and from there it extends forward and downward, and its forward end is hooked in the eyebolt 87, which latter is secured in some stationary part of the frame 78. At some convenient point in the 75 length of the rod 86 there is interposed the turnbuckle 88, whereby the length of the rod 86 may be adjusted. The object of the arrangement just described is to provide means for counterbalancing the pull of the band or 80 belt T and to assist in retaining the engine-section and the machine-section in their proper working relations to each other.

The numeral 89 refers to a post adapted to support the rear portion of the walking-beam 85 when it is out of commission or more particularly to prevent the rear end of the walking-beam from dropping down when released, and thereby endangering the operator who may be thereunder, and it also serves to retain the walking-beam at the point most accessible when it is desired to place it in commission. Said post is secured at its lower end to the minor cross-beam I, and it may also be supported by the tie 90, connecting it to the 95 brace 31, as shown in Fig. 1.

I desire that it be understood that my machine may be made and operated without the ground-wheels, in which case the various parts may be disassembled and carried on 100 wagons or trucks, or it may be made with the ground-wheels and the ground-wheels may be removed when the machine is being set up; but I prefer that the ground-wheels be a permanent fixture of the machine, and when the 105 machine is brought to the operating site the ground-wheels be let into the ground, as indicated in Fig. 1, in which the ground-line is represented by the line X X.

I have in the foregoing endeavored to describe what I consider the preferred construction of my invention; but those skilled in the art to which the invention pertains will readily comprehend that various changes and modifications of the details of the invention may be made without affecting the utility or advantages of the machine. I therefore reserve to myself the right to all such structural changes and modifications as may be made without departing from the 120 spirit and scope of this invention.

Having now fully described my invention and the best exemplification of the principles thereof to me known at this time, what I claim, and desire to secure by Letters Patent 125 of the United States, is—

1. In combination with a well-drilling machine having a main section composed of a plurality of main sills and cross-sills, including the cross-frame B, and an engine-section, 130

including the frame 78, ground-wheels for carrying the main section and the engine-section, a post rising from one of the forward corners of the main section, a truss-rod extending over said post with one end secured to the main section and the other end secured to the engine-section, an angle-plate secured to the frame 78 and detachably secured to the cross-frame B, all substantially as specified.

2. In combination with well-drilling machinery, a main section, carrying-wheels for the main section, an engine-section, carrying-wheels for the engine-section, an engine mounted on the engine-section, an angle-plate detachably connecting the two sections tandem, a bull-wheel reel including two bull-wheels, a frame for supporting the bull-wheel reel on the rear portion of the main frame, a shaft carried above the forward portion of the main frame, means for supporting said shaft, a band-wheel carried on said shaft, a channel-wheel attached concentric with the band-wheel to said shaft, a cable-band connecting said channel-wheel with one of the bull-wheels of the bull-wheel reel, a reel W also mounted on said shaft, a cable extending from the last-named reel and adapted to be wound thereon, a band connecting said band-wheel with the engine, a brake-block 14 against which said band-wheel may engage, a truss-rod connecting the main section and the engine-section and adapted to counterbalance the pull of said band which extends from the band-wheel to the engine-section, and a post over which said truss-rod extends, all substantially as shown and described.

3. In well-drilling machinery, comprising in combination, a main section, supporting-wheels for the main section, an engine-section,

supporting-wheels for the engine-section, an engine mounted on the engine-section, an angle-plate for centrally connecting the two sections tandem, a band-wheel mounted on the main section, a band connecting said band-wheel to the engine and extending longitudinally to one side of the center of the sections, a truss-rod extending longitudinally and connecting the sections on the side opposite from said band, a post over which said truss-rod is disposed, and means for adjusting the length of said truss-rod, all substantially as shown and described.

4. In well-drilling machinery, comprising in combination, a main section, carrying-wheels for the main section, an engine-section, carrying-wheels for the engine-section, an engine mounted on the engine-section, means for centrally connecting the two sections tandem, a band-wheel carried on the main section, a band connecting said band-wheel and the engine, a truss-rod connecting the two sections and adapted to counterbalance the said band, a post mounted on the forward portion of the main section over which said truss-rod is disposed, means for adjusting the length of said truss-rod, a mast adapted to be erected over the main section, and means for supporting the mast and the main section independent of the carrying-wheels, all substantially as shown and described.

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

MERT McCAIN.

Witnesses:

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R. E. RANDLE.