

(No Model.)

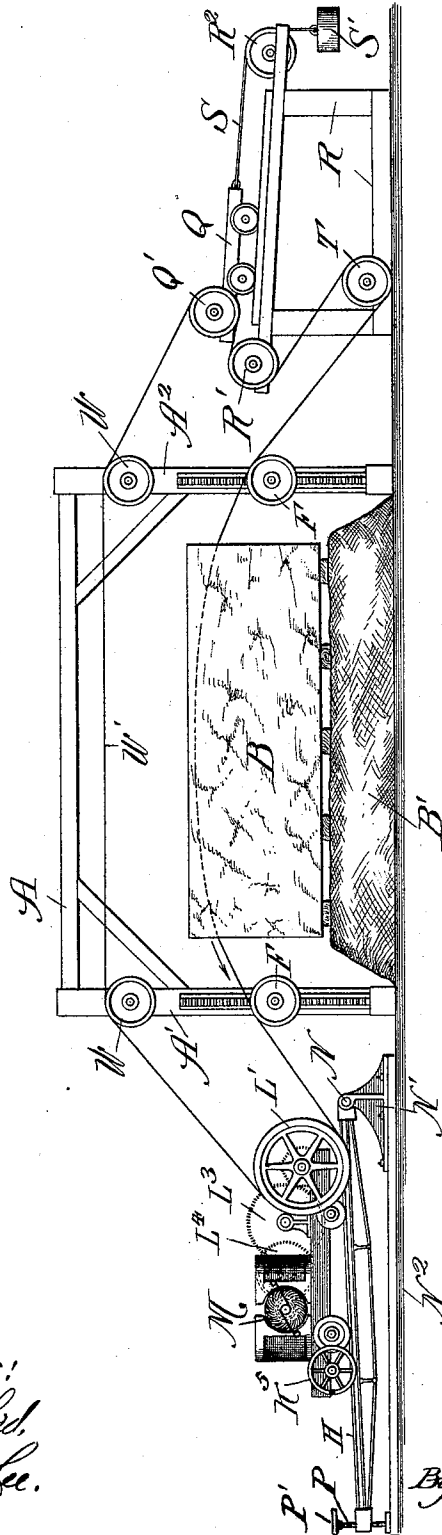
3 Sheets—Sheet 1.

F. KNOBEL.
STONE SAWING MACHINE.

No. 594,542.

Patented Nov. 30, 1897.

Fig. 1.



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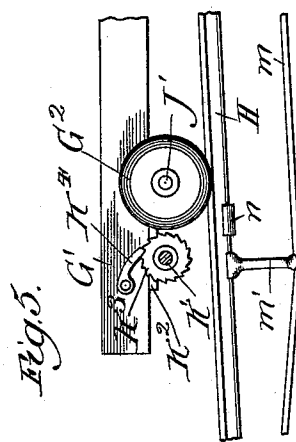
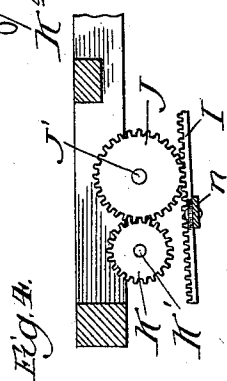
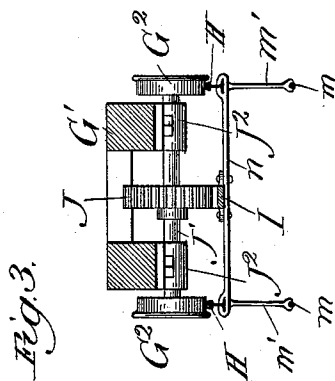
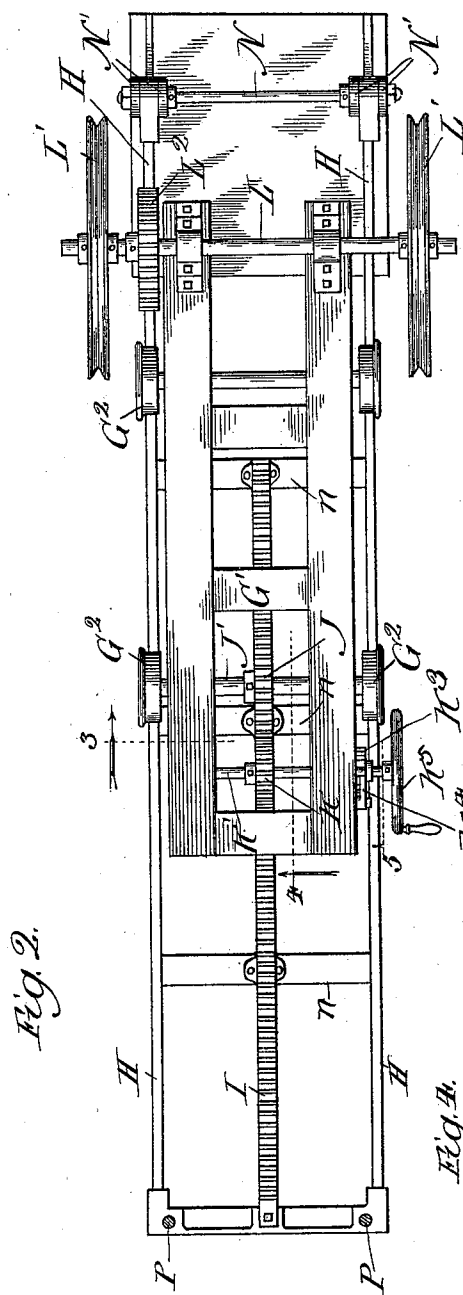
(No Model.)

3 Sheets—Sheet 2.

F. KNOBEL.
STONE SAWING MACHINE.

No. 594,542.

Patented Nov. 30, 1897.



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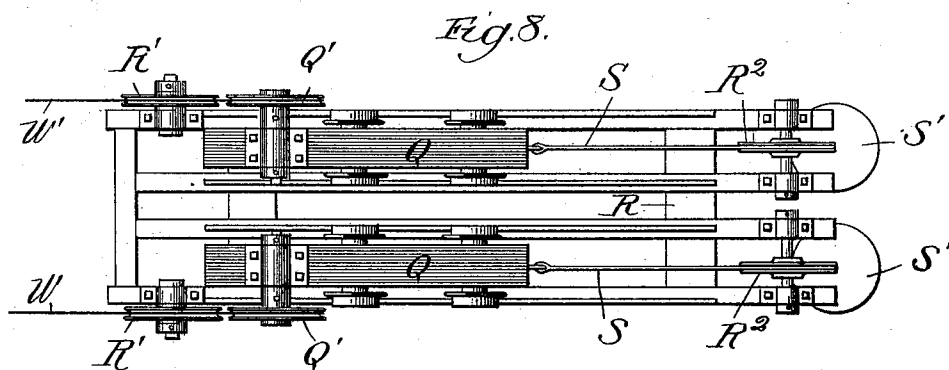
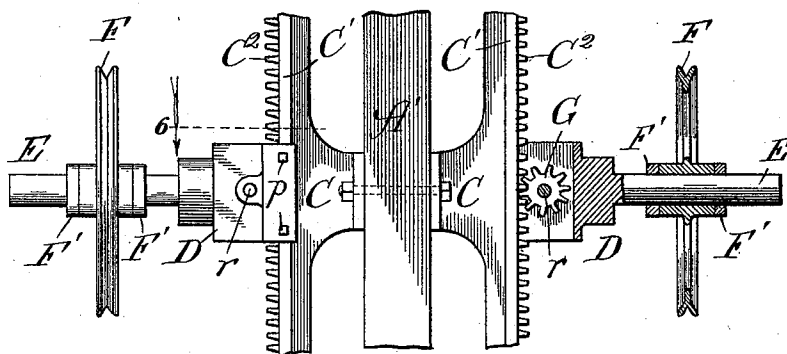
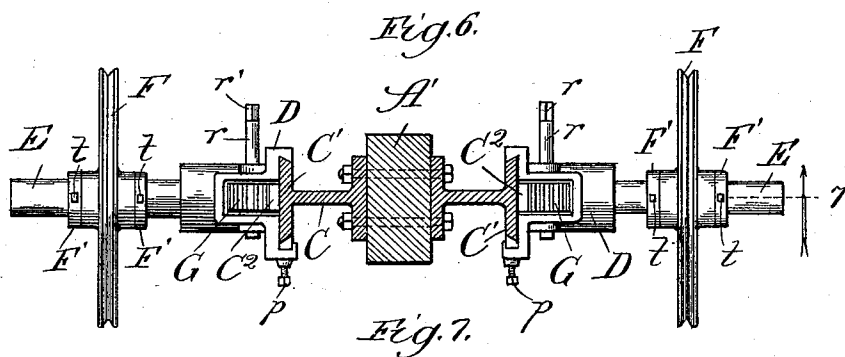
(No Model.)

3 Sheets—Sheet 3.

F. KNOBEL.
STONE SAWING MACHINE.

No. 594,542.

Patented Nov. 30, 1897.



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UNITED STATES PATENT OFFICE.

FRANK KNOBEL, OF BEDFORD, INDIANA.

STONE-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 594,542, dated November 30, 1897.

Application filed July 6, 1897. Serial No. 643,564. (No model.)

To all whom it may concern:

Be it known that I, FRANK KNOBEL, a citizen of the United States, residing at Bedford, in the county of Lawrence and State of Indiana, have invented a new and useful Improvement in Stone-Sawing Machines, of which the following is a specification.

My invention relates to an improvement in stone-sawing machines of the type employing an endless cable as a cutting means, and, more particularly, my invention relates to means for automatically keeping the cutting-cable taut during the sawing operation and for rendering the machine more portable in its nature. Other points of novelty serving to render the machine of generally improved construction will be pointed out.

My invention involves the use of a suitable frame for carrying the guide-sheaves which support and direct the cable across the stone to be sawed, a drive-pulley over which the cable passes connected with a suitable motor, and a truck mounted upon an inclined track and carrying an idler over which the cable passes, the truck serving as a means for automatically adjusting the idler to compensate for the slack produced by the sinking of the cable into the stone.

My preferred way of accomplishing the above object is by mounting the driving-motor upon a truck carried by an inclined track provided with means for adjusting the inclination to vary the tension on the cable, in which case the idler mentioned above may be dispensed with. In some instances, where two or more cables are driven by the same motor, it is advisable to employ independent tensioning mechanism for each cable, and this may be provided for by arranging supplementary tensioning devices, one for each cable, at the side opposite where the motor is located.

In the accompanying drawings, Figure 1 is a view in side elevation of my improved stone-sawing machine provided with two cutting-cables and having the supplementary tensioning devices mentioned; Fig. 2, a plan view of the truck upon which the driving-motor is mounted and the inclined track therefor; Fig. 3, a section taken on line 3 of Fig. 2; Fig. 4, a broken section on line 4 of Fig. 2, exposing the pinion and rack through the medium of

which the truck may be moved to the upper end of the track; Fig. 5, a broken view showing a ratchet and pawl controlling said pinion and operating to prevent the motor from being jerked up the incline by any sudden strain upon the cutting-cable; Fig. 6, a horizontal section of one of the supporting-frame posts, showing the means for raising and lowering the lower guide-sheaves, the section being taken on line 6 of Fig. 7; Fig. 7, a broken view, in end elevation, (referring to the machine,) of one of the supporting-posts and the raising and lowering mechanism for said guide-sheaves; and Fig. 8, a plan view of the supplementary tensioning devices which are in some cases employed. The sections are viewed as indicated by the several arrows.

In carrying out my invention the construction will vary somewhat, according to the kind of work for which the machine is designed, the size of the machine, &c.

A represents a supporting-frame for guide-sheaves, having supporting-posts A' and A^2 , which should be high enough and widely separated enough to allow any ordinary-sized stone B (say from five to fifty feet in length) to be placed in the path of the lower cutting-cable.

Figs. 6 and 7 show a supporting-post and the raising and lowering device for the lower sheaves. Projecting laterally from each post and extending longitudinally thereof (say a distance of ten feet for a large-sized machine) are brackets C, provided with beveled flanges C' and on their outer faces with racks C^2 . The flanges C' afford guides for slides D, which embrace the beveled edges and project outwardly, terminating in shafts E. Upon the shafts E are journaled guide-sheaves F, secured in place by means of collars F' , adjustably held in place by set-screws t . The slides D are of the yoke shape shown and have journaled in them pinions G, which mesh with the racks C^2 . These pinions are provided with projecting shafts r , having squared ends r' for the reception of operating-handles, (not shown,) while the slides D are provided with set-screws p for fastening them rigidly in place after they have been raised to the desired height by means of said operating-handles.

Figs. 1 to 5, inclusive, show a motor and

truck for the same mounted upon an inclined track. The truck comprises a frame G' , mounted upon truck-wheels G^2 , which rest upon an inclined track comprising rails H , joined by ties n , and truss-rods m , supplied with braces m' . Between the rails and supported by the cross-ties n is a rack I , which is engaged by a pinion J , carried by a shaft J' , journaled in boxes J^2 , depending from the side beams of the truck-frame G' . With the pinion J meshes a gear K , carried by a shaft K' , journaled in brackets K^2 , similarly supported by the frame. Toward one end the shaft K' carries a ratchet-wheel K^3 , which is engaged by a pawl K^4 , pivoted to the frame G' . This pawl is arranged to permit the truck to slide freely down the incline, but to prevent its return without first lifting the pawl. At its extreme end the shaft K' is provided with a hand-wheel K^5 , by means of which the truck may be forced up the incline. At the upper end of the truck-frame is journaled a shaft L , carrying at its ends grooved drive-pulleys L' and between its ends a pinion L^2 . Toward its lower end the truck is provided with an electric motor M , operatively connected with the pinion L^2 by an intermediate train of gears $L^3 L^4$, &c. This motor may be replaced by any suitable mechanism.

The rails H are pivotally supported at one end by a shaft N , mounted in pillow-blocks N' , secured to a base N^2 . The opposite end is vertically adjusted by means of screws P , provided with hand-wheels P' . The base N^2 may be staked or anchored to the ground in any suitable manner.

At the rear of the main frame A are supplementary tensioning devices comprising two trucks Q , (one for each cable,) mounted upon tracks, preferably inclined, carried by a common supporting-frame R . At each side of the inner and upper end of the frame R is journaled a guide-sheave R' , while upon the upper ends of the trucks Q are idlers Q' . At the rear end of the frame R are journaled pulleys R^2 , over which pass cables S , joined to the rear ends of the trucks Q and to weights S' . Toward the lower inner end of the frame R are journaled strain-resisting pulleys T . The arrangement of these several pulleys may be varied and some of them may be dispensed with; but it is essential that there be some strain-resisting pulleys over which the loops of the cutting-cable back of the supporting-sheaves W on the supporting-post A^2 shall pass. It is important that these last-described trucks be supplied with means for preventing upward jerking under a sudden strain, and for this purpose the trucks may be supplied with racks and pinions in all respects similar to those described in connection with the motor-truck. The trucks are shown without this equipment to avoid unnecessary proximity. Toward the tops of the supporting-posts A' and A^2 of the main frame are journaled supporting-sheaves W , over which pass

the cutting-cables W' after leaving the pulleys L' , and from thence the cutting-cables pass over the sheaves Q' , thence over R' and T , thence over pulleys F , thence across the stone, and finally over the other pulleys F and to the driving-pulleys.

The operation is as follows: The machine is first set up, as shown in Fig. 1, the various parts being properly staked or anchored in place and care being had to properly align the guide-sheaves and pulleys over which the cables pass. A stone B is placed in position upon a mound B' between the uprights A' and A^2 . The guide-sheaves F are raised through the medium of the pinions G and racks C^2 till the tops thereof are nearly on a level with the top of the stone. If now the motor be started the cable gradually works its way into the stone, the cutting process being aided in some instances by feeding into the groove sand and water, hardened shot, crushed steel, or the like. It is very necessary to raise the sheaves F before beginning the cutting operation to cause the cable to start with a straight cut; but once the cable has cut its way clear across the stone the sheaves are of no further use and are dropped to the bottom of the racks. As the cable cuts into the stone a slackness is produced, and it is the office of the tensioning devices described to take up this slack. The tension will of course depend upon the weight carried by the trucks and the inclination of the tracks upon which they rest. As stated, the ratchets and pawls operate to allow the trucks to descend freely, but to prevent their returning under any sudden strain, thus preventing jumping. This is of the highest importance as contributing to the smooth and efficient operation of the machine.

It will be understood that while the double tensioning device probably gives a better result because of producing a more equal tension throughout the cable than the single tensioning device does and in some instances is rendered particularly desirable because of the reasons given above, yet the supplementary tensioning device is by no means indispensable, and it may be replaced by sheaves mounted simply in a stationary or adjustable pillow-block, which would be equivalent to dispensing with all of the supplementary tensioning devices except the sheaves T and their supports.

The feature involving driving-pulleys journaled in a truck mounted upon an inclined track is one of great importance in the production of a practical portable machine. These machines as constructed for the ordinary trade are not usually very large, and they are usually provided with but one cutting-cable. In this case the supplementary tensioning device may readily be dispensed with. In the larger and less portable machines, where two or more cutting-cables are employed, these supplementary tensioning

devices should be retained, or some equivalent independent controlling means for the several cables should be supplied.

A great variety of changes in details of construction and arrangement of parts may be made without departing from the spirit of my invention. Hence I wish to be understood as intending no limitation by the particular description given above, except as shall appear from the appended claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a stone-sawing machine, the combination with an endless cutting-cable and sheaves regulating the path of said cable of a driving and automatic tensioning device for the cable, comprising, in combination, an inclined track, a truck thereon carrying a journaled driving-pulley over which the cable passes, and a motor upon the truck and connected with said driving-pulley, substantially as and for the purpose set forth.

2. In a stone-sawing machine, the combination with an endless cutting-cable, and sheaves regulating the path of said cable, of an automatic tensioning device, comprising a track, a gravity-moved truck mounted thereon, a pulley journaled in the truck-frame about which the cable passes, a rack attached to the track, a pinion engaging therewith carried by a shaft journaled in the truck-frame, and a ratchet and pawl controlling said pinion operating to permit movement of the truck to take up the slack in the cutting-cable, but to prevent a return of the truck under an added strain upon the cable, substantially as and for the purpose set forth.

3. In a stone-sawing machine, the combination with the main frame, endless cutting-cables, and sheaves directing the path of said cables, of driving and tensioning means for

the cables, comprising, in combination, an inclined track at one side of the frame, a movable truck mounted thereon, driving-pulleys journaled in the truck-frame about which said cables pass, a motor on the truck connected with said pulleys, and supplementary tensioning devices at the opposite side of the main frame comprising gravity-operated trucks, one for each cutting-cable, and each carrying a pulley about which the cable passes, substantially as and for the purpose set forth.

4. In a stone-sawing machine, the combination with two endless cutting-cables and a motor for driving the same, of supporting-posts A' and A^2 located between said cables at some distance apart, two laterally-projecting brackets on each of said posts, and extending longitudinally thereof, movable slides upon said brackets, and supporting-sheaves for the cables journaled in the slides, substantially as and for the purpose set forth.

5. In a stone-sawing machine, the combination with two endless cutting-cables and a motor for driving the cables, of supporting-posts A' and A^2 located between said cables at some distance apart, two laterally-projecting, longitudinally-extending, brackets C on each of said posts provided with flanges C' and on their outer faces with racks C^2 , slides D engaging said flanges, pinions G journaled in the slides and engaging the racks, shafts E carried by the slides, guide-sheaves F upon said shafts, and means for adjusting said sheaves laterally for proper alinement, substantially as and for the purpose set forth.

FRANK KNOBEL.

In presence of—

MICHAEL WALLNER,
DAVID TORPHY.