(No Model.) 2 Sheets—Sheet 1.

J. F. HOLLOWAY.

STONE CHANNELING MACHINE.

No. 382,528. Patented May 8, 1888.

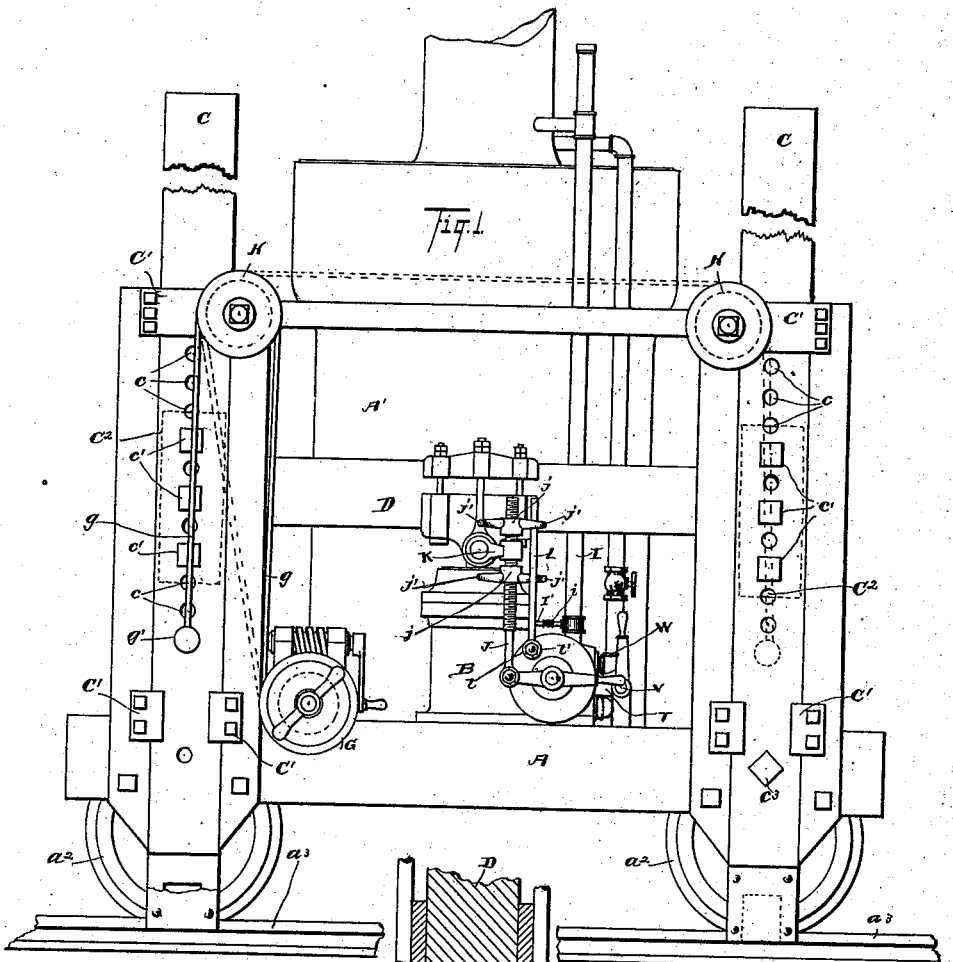

Fig. 1.

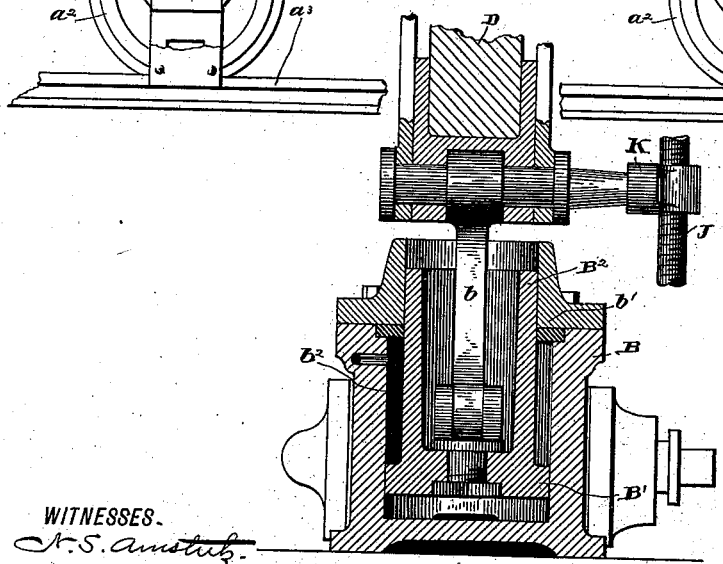

Fig. 2.

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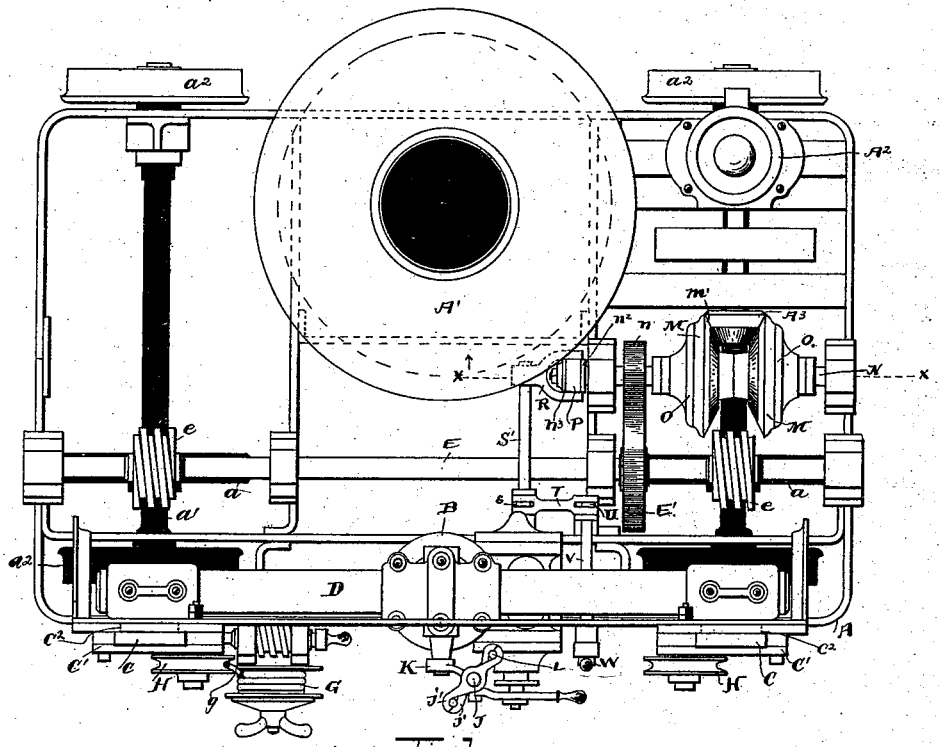

Fig. 3.

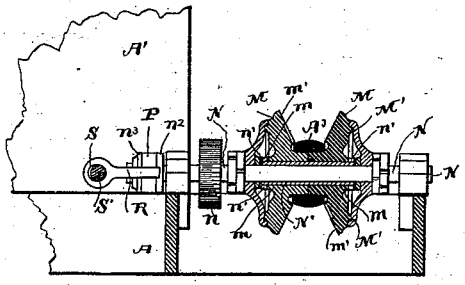

Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOSEPHUS F. HOLLOWAY, OF NEW YORK, N. Y.

STONE-CHANNELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 382,528, dated May 8, 1888.

Application filed September 21, 1887. Serial No. 250,313. (No model.)

To all whom it may concern:

Be it known that I, JOSEPHUS F. HOLLOWAY, of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Stone-Channeling Machines for Quarrying Stone; 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 pertains to make and use the same.

My invention relates to improvements in machines for quarrying stone, in which vertically-reciprocating channeling-bars, with cutting-tools attached, are operated by steam-cylinder of the trunk variety, substantially the same as commonly used with steam helved hammers for forging. A vibrating lever extends over the steam-cylinder, reaching from one channeling-bar to the other, and is connected near the ends thereof with the respective channeling-bars, the piston of the steam-cylinder being connected by a link with the lever midway between the channeling-bars. Provision is made for holding either channeling-bar stationary to provide a fulcrum for the lever in operating the other channeling-bar, the one channeling-bar or the other being operated, as may be required, in cutting the channel close to the banks of the quarry, to the end that both channeling-bars being operated from the one steam-cylinder a great reduction in initial cost is effected over machines with two steam-cylinders used for the purpose, as heretofore. Provision is also had for vertically adjusting the channeling-bar that for the time being is being used as the fulcrum, to the end that by adjusting this fulcrum of the lever the piston may be kept in proper position, with little clearance at the bottom of the steam-cylinder, to economize steam. An annular steam-space is had in the cylinder above the piston-head, into which space steam may be admitted to cushion the piston in its upward movement in case high speed or hard blows are required. The steam admitted above the piston having no exhaust, and its admission being controlled by a hand-valve, the desired results are attained without complication of mechanism, and without cost for the steam used. The rod that actuates the oscillating valve of the steam-cylinder slides through a collar that is connected with the aforesaid power-transmitting lever, said rod being screw-threaded and having abutment nuts or tappets, respectively above and below the collar, that are adjusted to give the desired movement to the valve by engaging the collar, these tappets being provided with laterally-projecting curved handles for adjusting and holding the same. A locking-bar for the tappets is pivoted below, with friction-disks at the pivotal point, by means of which latter the locking-bar is made to maintain its upright or working position, in which working position the locking-bar extends between the handles of the respective tappets and locks or holds the tappets from turning, while the handles of the said tappets in their reciprocations are sliding along the locking-bar, to the end that the locking-bar may be swung back, and the tappets readjusted, and the locking-bar returned to its place to lock the tappets without stopping the engine, and without the use of wrench or tools in the manipulation.

My invention also relates to the details of construction, hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front elevation. Fig. 2 is an enlarged side elevation in section of the steam-cylinder and connected mechanism. Fig. 3 is a plan. Fig. 4 is a side elevation. Fig. 5 is an elevation in section on line *x x*, Fig. 3.

A represents a supporting-platform, preferably made of plate or wrought metal to render the same strong and light. The platform is mounted on flanged wheels for traveling on track-rails, substantially as shown. On the platform are mounted a steam-generator, A′, an engine, A^2, for operating the feed mechanism, and steam cylinder B, for operating the channeling-bars C. Two channeling-bars, located at the extremes of the platform, as shown, are employed, but one of which is operated at a time, to the end that the channel may be cut close to the bank on either side of the quarry.

The channeling-bars C are long broad metal bars, usually weighing several hundred pounds each and having mortises in the bottom ends, (shown in dotted lines,) in which the cutting-

tools are fastened. The channeling-bars operate between ways C', that are arranged in pairs, as shown, and are rigidly secured to the supporting-platform. Each bar C has a series of holes, *c*, through which securing-bolts *c'* pass, that fasten the wrist-blocks C^2 to the rear side of the respective channeling-bars. These holes occur at equal intervals, so that the wrist-blocks may be adjusted lengthwise of the channeling-bars by changing the bolts in the different holes. The blocks C^2 are provided with rearwardly-projecting wrist-pins c^2, that are journaled in suitable boxes, D', the latter being secured to the respective ends of lever D. Lever D is connected by link *b* with piston B'. The one channeling-bar, by means of bolt c^3, is made fast to the platform A, and the wrist projecting from this (for the time being) stationary bar forms a fulcrum for the lever D in operating the other channeling-bar. By loosening bolt c^3 and moving it up or down the holes in the rim of the platform through which this bolt passes, or, if need be, by changing this bolt to a different hole, *c*, in the channeling-bar, the channeling-bar may be adjusted vertically to raise or lower the fulcrum, as may be necessary to give the piston only a slight clearance at the bottom of the steam-cylinder to economize steam. The channeling-bars operate quite loosely in the ways, having considerable lateral play, by reason of which no links are necessary in connecting the channeling-bars with the lever D, the lateral movement of the channeling-bars being sufficient to accommodate themselves to the sweep of lever D through the small arc that this lever moves. At first short cutting-tools are secured in the ends of the operative channeling-bar, and a channel a few inches deep is cut in the face of the rock, such channel usually extending several rods, and frequently from end to end of the quarry. Then longer cutting-tools are inserted, or the channel-bars are let down, and the channels cut deeper, and so on until the channel is of sufficient depth, being sometimes seven or eight feet deep, or even more. The cutting-tools are made in various forms; but are shaped, sharpened, and tempered at the quarry, and form no part of the machine proper, and are therefore not shown.

Heretofore channeling-bars or similar devices for channeling rock have been operated direct from a steam-cylinder, substantially in the same manner as an upright steam-hammer. The difficulty with such construction was that if the cutting-tool happened to be too long the piston sometimes had an excessive clearance of several inches from the bottom of the cylinder, and consequently the waste of steam in such cases was enormous. Long cutting-tools are soon reduced in length by wear and eventually become too short for further use in the machine. It is therefore not desirable to waste the steel by cutting off these tools to regulate the stroke of the piston in the cylinder. With my improved construction such tools at hand as are long enough for doing the work are inserted in the channeling-bar, and after each adjustment of the cutting-tool the wrist-block C^2 of the operative channeling-bar is adjusted, if necessary, to bring the parts as nearly as may be in the proper relative position with the lever D midway of its stroke in approximately a horizontal position, after which by raising or lowering the other channeling-bar the fulcrum thereof is brought to the necessary position to cause the piston to operate as near as may be at the bottom of the cylinder, leaving of course a slight clearance—say a fraction of an inch, (more or less.) In this manner steam is economized to the same extent as in other well-constructed engines. A windlass, G, has attached the cable *g*, that may be shifted to lead over either of the idle-sheaves H. The cable has attached at the outer end thereof a plug, *g'*, adapted to fit in the holes *c* of either of the channeling-bars. By this arrangement either channeling-bar in turn may be elevated by hand and held while changing the cutting-tool, and while changing the bolts *c'* to different holes up or down the channeling-bar, according as the latter is to be elevated or depressed.

The piston-head B' is somewhat larger in diameter than the hollow cylindrical part thereof, B^2, that extends out through the stuffing-box *b'*, leaving a small annular steam-space, b^2, above the piston-head. A branch-pipe, I', from the main induction steam-pipe I leads into this steam-space above the cylinder-head. The pipe I' is provided with a hand-valve, *i*, by means of which a limited amount of steam may be admitted above the piston-head to cushion the latter on its upstroke, by means of which a high speed may be attained—for instance, two hundred strokes per minute, more or less—and light or heavy blows may be given with the channeling-bar according as more or less steam is used to cushion the piston; or steam for such purpose may be omitted altogether. There is no exhaust from the chamber b^2, and consequently no material waste of steam from such source. An oscillating valve is employed substantially the same as described in United States Letters Patent No. 101,041, of December 13, 1870.

The rod J for operating the valves passes through a sleeve, K, the latter being pivotally connected with lever D in position substantially as shown. The upper portion of rod J is screw-threaded, the thread thereof having preferably a quick lead. Abutment-nuts *j*, commonly called "tappets," are mounted on the rod respectively above and below sleeve K for engaging the same and actuating the valve from the movements of lever D. These tappets are provided with curved handles *j'* for adjusting the same by hand, by means of which the tappets are set to give any desired movement to the valve and resultant length of stroke of the operative channeling-bar. The tappets are readily adjusted by hand when the engine is working at only a moderate speed. A locking-bar, L, is pivoted at *l* and has fric-

tion-disks l', provided on either side of the fulcrum, by means of which the locking-bar may be swung laterally by hand, but will maintain itself in an upright or working position when left so adjusted. After the tappets have been properly adjusted, the locking-bar is brought to an upright position between the handle j' of the tappets, locking the same, the handles of the tappets sliding on the locking-bar with the movements of rod J.

The feed mechanism is as follows: On the crank-shaft of engine A^2 is mounted a beveled gear, A^3, that engages twin bevel-gears M, these latter gears being journaled on sleeve N' that in turn is journaled on shaft N. The sleeve has external collars, n', screwed onto the threaded ends of the sleeve and usually locked with set-screws, these collars abutting the outer ends of hubs m of gears M, these hubs at their inner ends abutting each other, as shown in Fig. 5. The gears M and A^3 are shrouded externally, the shrouding engaging each other at m', when the teeth mesh to the pitch-line. With such construction the gears M, although free to revolve, are held in place endwise of shaft N and always properly engage the intervening gear. Each gear M has an outwardly-projecting rim, M', the latter having an external conical face and forms the male member of a friction-clutch, the female member being a disk, O, the latter having a rim with an internal conical bore adapted to fit the male member. The two disks O are rigidly secured to shaft N, and the shaft is moved endwise to render the one or the other of the friction clutches operative, these disks being set far enough apart to give slight clearance in each clutch when the shaft is midway of its end movement. A pinion, n, is mounted on shaft N, this pinion engaging a larger gear, E', that is mounted on shaft E, the latter having worms e, that engage worm-gears a. The latter are mounted on the axles a', these axles having flanged traction-wheels a^2 for traveling on track-rails a^3. On account of the slight end movement of the shaft N in operating the clutches, it would be well to make pinion n with a trifle broader face than gear E', so that the teeth of the latter will always have a full bearing on the teeth of the pinion. From the "back gearing" required to reduce the speed from the friction-clutches to the traction-wheels it will be obvious that the friction-clutches will have only light labor to perform, and will consequently be durable. For reciprocating shaft N in operating the clutches, I provide the following: Collar P is journaled on the reduced end of shaft N, the collar being held endwise between shoulders n^2 of the shaft and washer n^3, the latter being usually secured by jam-nuts. A forked link, R, is provided, the prongs of which embrace and are pivoted to the collar P. The head of the link is bored laterally to fit eccentric S, the latter being mounted on rock-shaft S'. This shaft has an upright rock-arm, s, attached, the free end of the latter being connected by link T with rock-arm U of rock-shaft V, this offset being necessary to avoid cylinder B. The forward end of shaft V is provided with a hand-lever, w, in position accessible at the front side of the machine. The engine B^2, being provided with a governor, is allowed to run, requiring no special attention. The operator, by means of lever W and the connected mechanism aforesaid, is enabled to stop, start, or reverse the feed mechanism without stopping or slowing the feed-engine.

It may be mentioned that the channeling-bars are of such great length that by changing bolts c' after each successive cut into holes c farther up the channeling-bars, the latter may be let down into the cut in the aggregate several feet, so that cutting-tools of only moderate length are required.

What I claim is—

1. The combination, with tilting lever and upright channeling-bars connected with the respective ends of the lever, of trunk-engine for operating the lever and channeling-bars, said engine being connected with the lever between the channeling-bars, and suitable means for holding stationary one channeling-bar while operating the other channeling-bar, substantially as set forth.

2. The combination, with tilting lever and channeling-bars connected with the respective ends of the lever, of wrists connected with the respective channeling-bars for attaching to the lever, said wrists being adjustable lengthwise of the channeling-bars, and a steam-cylinder for operating the lever, substantially as set forth.

3. The combination, with channeling-bars and trunk-engine located between the bars for operating the latter, of tilting lever, the latter being connected at the ends thereof with the respective channeling-bars and connected at the central portion of the lever with the engine for operating the same, and suitable means, substantially as indicated, for fastening the one channeling-bar to furnish a fulcrum for the lever in operating the other channeling-bar, substantially as set forth.

4. The combination, with upright channeling-bars, tilting lever, pivotally attached to the bars, a trunk-engine located midway of the bars for operating the device, of a series of holes in each channeling-bar made at equal intervals, and blocks with securing-bolts made to fit the holes in the channeling-bars to render the blocks adjustable lengthwise of the channeling-bars, said blocks having wrists attached for fastening to the tilting lever, substantially as set forth.

5. The combination, with steam-cylinder of the trunk variety, and a steam-space above the piston-head, of a steam-pipe and hand-valve for admitting steam above the piston-head to cushion the latter on its upstroke, the parts being arranged substantially as indicated, having no exhaust above the piston-head.

6. The combination, with steam-cylinder,

channeling-bars, and tilting lever, substantially as indicated, a sleeve connected with the lever, a valve-rod made to slide through the sleeve, said rod having tappets mounted thereon, respectively above and below the sleeve, of a locking-bar for the tappets, said locking-bar being pivoted at the one end and provided with friction-disks at the pivotal bearings, substantially as set forth.

7. The combination, with bevel twin gears and driving-pinion simultaneously engaging both gears, the system of gearing having shrouding to hold the twin gears to the pitch-line as against pressure from without, of shaft, sleeve journaled on the shaft, the twin gears being journaled on the sleeve, and collars mounted on the sleeve outside the twin gears to hold the latter from moving apart, substantially as set forth.

8. The combination, with gearing, shaft, sleeve, and collar, substantially as indicated, of friction-clutches mounted on the shaft and operated, respectively, by the twin gears, and mechanism, substantially as indicated, for moving the shaft endwise to operate the one clutch or the other, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 11th day of August, 1887.

JOSEPHUS F. HOLLOWAY.

Witnesses:
STILMAN H. STORY,
B. W. PIERSON.