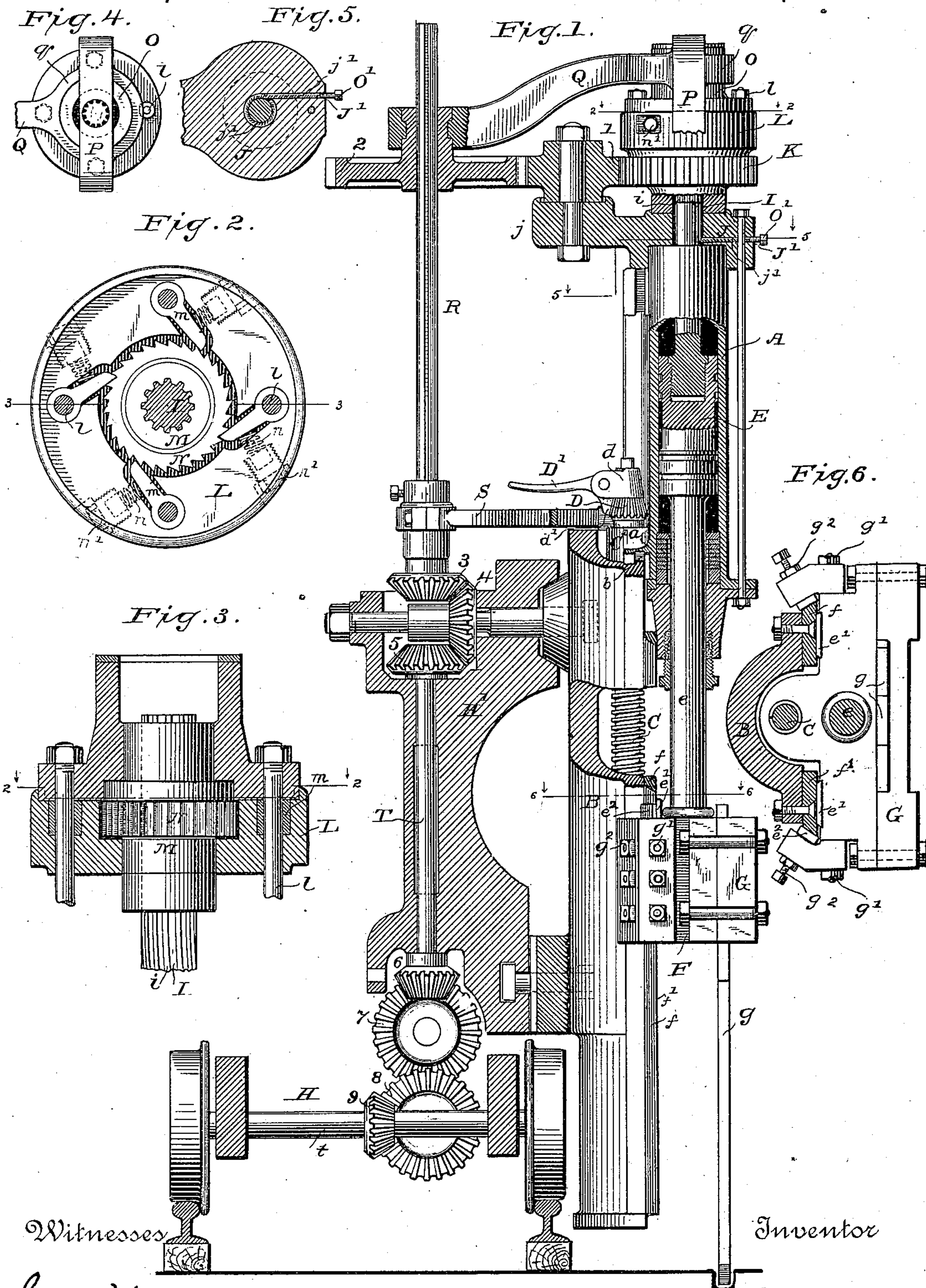


(No Model.)

W. L. SAUNDERS.
STONE CHANNELING MACHINE.

No. 350,604.

Patented Oct. 12, 1886.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM L. SAUNDERS, OF NEW YORK, N. Y.

STONE-CHANNELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 350,604, dated October 12, 1886.

Application filed April 6, 1886. Serial No. 198,009. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. SAUNDERS, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Stone-Channeling Machines, of which the following is a description.

My invention relates to improvements in stone-channeling machines of the type referred to in Letters Patent No. 299,093, granted to me May 20, 1884; and it consists in an improved method of mounting and operating the rifle-bar by which motion is transmitted from the piston of the drilling-engine to the wheels of the carriage upon which the apparatus is mounted, and also to improvements in the means for operating the feed-screw by which the height of the drilling-engine from its work is regulated and adjusted as the work progresses.

It further refers to sundry details of construction and arrangement, all of which will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is an elevation, partly in section, showing a stone-channeling machine embodying my invention. Fig. 2 is a horizontal section through the rotating head of the drilling-engine on the lines 2 2 of Figs. 1 and 3. Fig. 3 is a section of a part of the upper portion of the drilling-engine on the lines 3 3 of Fig. 2, showing the ratchet and the upper portion of the rifle-bar in full lines. Fig. 4 is a top plan view of the rotating head. Fig. 5 is a transverse section on the line 5 5 of Fig. 1. Fig. 6 is a transverse section on the line 6 6 of Fig. 1.

Similar letters denote like parts throughout.

A represents the cylinder of the drilling-engine.

B is the shell upon which the engine is supported, said shell being concave at its front side and formed with internally-extending guides *b*, between which is supported a cross-head, *a*, formed integral with or in any suitable manner secured to the shell A.

C is the feed-screw, which is supported at its lower end within the shell B, and passes through a suitable extension of the cylinder-shell, within which is fixed a nut, *C'*, thereby supporting the drilling-engine at any desired

height or point within the shell B. Near the upper end of the screw C is secured a pinion, D, and above this is placed a block, *d*, which is free to rotate on the upper end of the screw-shaft, and has hinged to it at one side a hand-lever, *D'*, which extends outward therefrom, and is provided with a single tooth, *d'*, extending at right angles thereto and arranged to engage the teeth of the pinion D, being normally held thereagainst by the weight of the lever *D'*. Whenever the lever *D'* is raised, the tooth *d'* is released and the lever can be moved radially in either direction, when, by depressing it, the tooth passes between the teeth of the pinion, and the feed-screw C may be turned by means of the handle *D'*, enabling the operator to intermittently rotate said feed-screw in either direction, and thereby adjust the height of the drilling-engine with respect to the work. From the lower end of the piston E extends the piston-rod *e*, to the extremity of which is rigidly secured the cross-head F, working upon guides *f f'*, formed upon or secured to the shell B. The cross-head F is provided with two complete sets of adjustable gibs bearing against the said guiding-surfaces, one set, *e'*, being parallel with and bearing against the face-guides *f*, while the second set, *e''*, are fixed obliquely thereto and bear against the second guides *f'*, which are at an oblique angle to the guides *f*, and act in conjunction therewith to hold the cross-head and piston-rod in a central position against any and all strains, and more especially against those in the direction of the cut, which in a machine of the present character are most severe and injurious. The gibs *e' e''* are adjusted by means of set-screws *g' g''* acting thereagainst in any suitable or well-known manner.

The clamp G, carrying the drills *g*, is secured to the front side of the cross-head F, as shown.

H is a truck mounted upon a suitable track and carrying the frame *H'*, against the outer side of which the shell B is pivotally secured, and which also carries the gearing by which the intermittent motion of the piston, in the operation of drilling, is communicated to the wheels of the truck H, and the apparatus moved in the direction of the work.

The upper cylinder-head, I, is formed with

an extension, *i*, upon which is pivotally mounted an idle-wheel, *i'*.

In my previous patent above referred to the rifle-bar, by which the reciprocations of the piston are converted into rotary motion, and then transmitted to the wheels of the truck upon which the device is supported, is pivotally mounted in the upper head of the drilling-engine, the nut by means of which the said rifle-bar was rotated being fixed to the piston. This caused much strain upon the sides of the piston, and placed the point of greatest friction—viz., the rifle-nut—in a position almost wholly inaccessible to lubricants, the result being great wear upon the piston and cylinder, and consequent rapid destruction of the parts. I obviate these difficulties in the present instance by securing the rifle bar directly to the upper end of the piston, and causing it to play upward through the rifle-nut, which is fixed to a ratchet mounted in a rotating head placed above the back head of the steam-cylinder, and to the exterior of which is fixed a gear-wheel, by which motion is transmitted to the truck H.

I is the bar, which at its upper end is formed with rifle-grooves *i*, and this bar is formed with a left-hand screw-thread at its lower end, and screwed into or otherwise firmly connected to the upper end of the piston E. The lower portion of the rifle-bar, being smooth, plays through the upper cylinder-head, J, which is provided with suitable packing, *j'*, to prevent the escape of steam, said packing being introduced through an aperture, *J'*, in the upper cylinder-head, J, and forced into position around the smooth portion of the rifle-bar by means of an adjusting-screw, C'.

Above the upper cylinder-head, and resting thereon, is placed a ratchet-cylinder or rotating head, which is in the form of a drum provided with a gear-wheel, K, on its exterior surface. The rotating head is composed of several parts, in order to render its exterior readily accessible, to wit: the gear-wheel K, which is provided with a central extension resting upon the top of the upper cylinder-head, J, a central portion or ratchet-holder, L, which is internally recessed to receive the rifle-nut M, and ratchet N, which, by means of a left-hand screw, is detachably connected thereto. The holder L is formed with radial recesses for the reception of pawls *m*, which are held against the teeth of the ratchet with the desired degree of force by means of springs *n*, suitably secured within adjusting-screws *n'*, projecting through the periphery of the holder L. A hood or cap, O, fits over the ratchet-holder L, and holds the pawls, ratchet, and rifle-nut in position, and prevents them from being forced upward by the movement of the bar. The cap, ratchet-holder, and gear-wheel K are securely fastened together by bolts *l*, which pass through all three and firmly unite them together to form what I have called the "ratchet-cylinder" or "rotating head," and they also

pass through and form pivots for the pawls *m*. The ratchet-cylinder is held in position by means of an annular brace or guide, *q*, formed on the end of the arm Q, which, surrounding the head or cap O, affords it the necessary support. A yoke, P, is secured to or formed integral with the guide *q*, and passes down outside of and without touching the sides of the rotating head, and is firmly secured to the upper cylinder-head, J, holding the ratchet-cylinder firmly in position, while at the same time it is free to be rotated by the rifle-bar acting through the nut and ratchet upon the cylinder.

The upper cylinder-head, J, is formed with an extension, *j*, upon which is pivoted an idle-wheel, 1, meshing with the gear K on the rotating head. From the yoke P extends an arm, Q, to the extremity of which is secured a gear-wheel, 2, meshing with the idle-wheel 1. A vertical shaft, R, passes through the center of the wheel 2 and its support, and is provided with a continuous slot engaging a projection on the interior of the hub of the wheel 2, by means of which the wheel 2 and arm Q are rotatively connected, and at the same time the wheel 2 is enabled to be moved freely up and down the shaft R without interruption to its rotative movement. The shaft R is pivoted within a yoke, S, secured to the shell B, and is provided at its lower extremity with a bevel gear-wheel, 3, meshing with a similar wheel, 4, mounted upon the frame H', and from thence is connected, through the wheel 5, shaft T, and gears 6, 7, 8, and 9, to the axle *t* of the truck H, the whole forming a train of gearing leading directly from the rotating ratchet cylinder or head to the wheels upon which the entire structure is supported. By the present method of mounting the rifle-bar all side strains are removed therefrom and from the piston, and both the rifle-bar and nut are accessible for inspection and lubrication, which, in view of the great strains to which they are subjected, is frequently required.

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

1. In a stone-channeling machine, the combination, with the piston of the drilling-engine, of a spirally-formed or rifle bar fixed to the upper end of the piston, substantially as shown and described.

2. In a stone-channeling machine, the combination, with a drilling-engine, a carriage therefor, and suitable mechanism for imparting motion thereto, of a rifle-bar secured to the upper end of the piston and extending through the back head of the drilling-engine, and connections between the rifle-bar and the carriage-actuating mechanism, whereby the reciprocations of the piston and rifle-bar are communicated to the gearing for propelling the carriage, substantially as shown and described.

3. The combination of a drilling-engine and carriage therefor, a frame mounted upon said carriage, a shell adjustably mounted upon the

frame and provided with a feed-screw, upon which the drilling-engine is vertically adjusted, a beveled pinion secured to the upper end of the feed-screw, and a pivoted hinged lever provided with a tooth for engaging the pinion and operating the feed-screw, substantially as shown and described.

4. The combination of a drilling-engine, a carriage for supporting said engine and moving it in the direction of the cut, a frame secured to the carriage, a shell radially adjustable upon the frame and provided with a feed-screw, upon which the drilling-engine is vertically adjusted, a beveled pinion secured to the upper end of the feed screw, and a pivoted hinged lever provided with a tooth for engaging the pinion, and pivoted upon the upper end of the feed-screw, and laterally moving thereon for operating said screw, substantially as shown and described.

5. In a stone-channeling machine, the combination, with a drilling-engine, of a suitable support, a feed-screw secured within said support and connected to the drilling-engine and provided at its free end with a beveled gear, D, and operating-lever D', provided with a tooth, d', engaging the pinion, and a pivoted support, d, within which said lever is hinged, whereby it is adapted to engage the pinion from either direction, substantially as shown and described.

6. The combination of a gang of drills, a detachable clamp in which said drills are secured, a cross head to which the clamp is rigidly attached, said cross-head being provided with adjustable gibs, fixed guides, and means, as described, for reciprocating the cross-head and drills.

7. In a stone-channeling machine, the com-

bination of a drilling-engine and support therefor, provided with vertical guides, a cross-head to which the piston-rod is directly attached at about its center, and which is provided with adjustable gibs located at its rear side and working in said guides, and a detachable clamp carrying the drills and secured to the front side of the cross-head, substantially as shown and described.

8. In a stone-channeling machine, the combination, with a gang of drills, of a piston to which said gang is attached, mechanism for imparting reciprocating motion thereto, a spirally-formed or rifle bar fixed to the upper end of said piston, a nut corresponding with the bar and mounted within a rotating head located in the path of the reciprocating rifle-bar, the guide-arm, annular head-guide, and yoke P, and suitable train of gearing extending therefrom to the wheels of the truck upon which the structure is supported, substantially as described.

9. In a stone-channeling machine, the combination, with a suitable drilling-engine, a gang of drills secured thereto and operated thereby, and a train of gearing connected to the piston of said engine and to the wheels of its supports for propelling it therealong in the direction of the cut, of a yoke; P, guide g, and arm O, for supporting and connecting the upper portion of said train of gearing and the drilling-engine, substantially as described.

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

WILLIAM L. SAUNDERS.

Witnesses:

JOSEPH ENRIQUE,
J. CUYAS.