3 Sheets, Sheet 1.

G. J. Wardrell,

Stone-Channeling Machine.

No. 69,282. Patented Sep. 24, 1867.

Fig. 1.

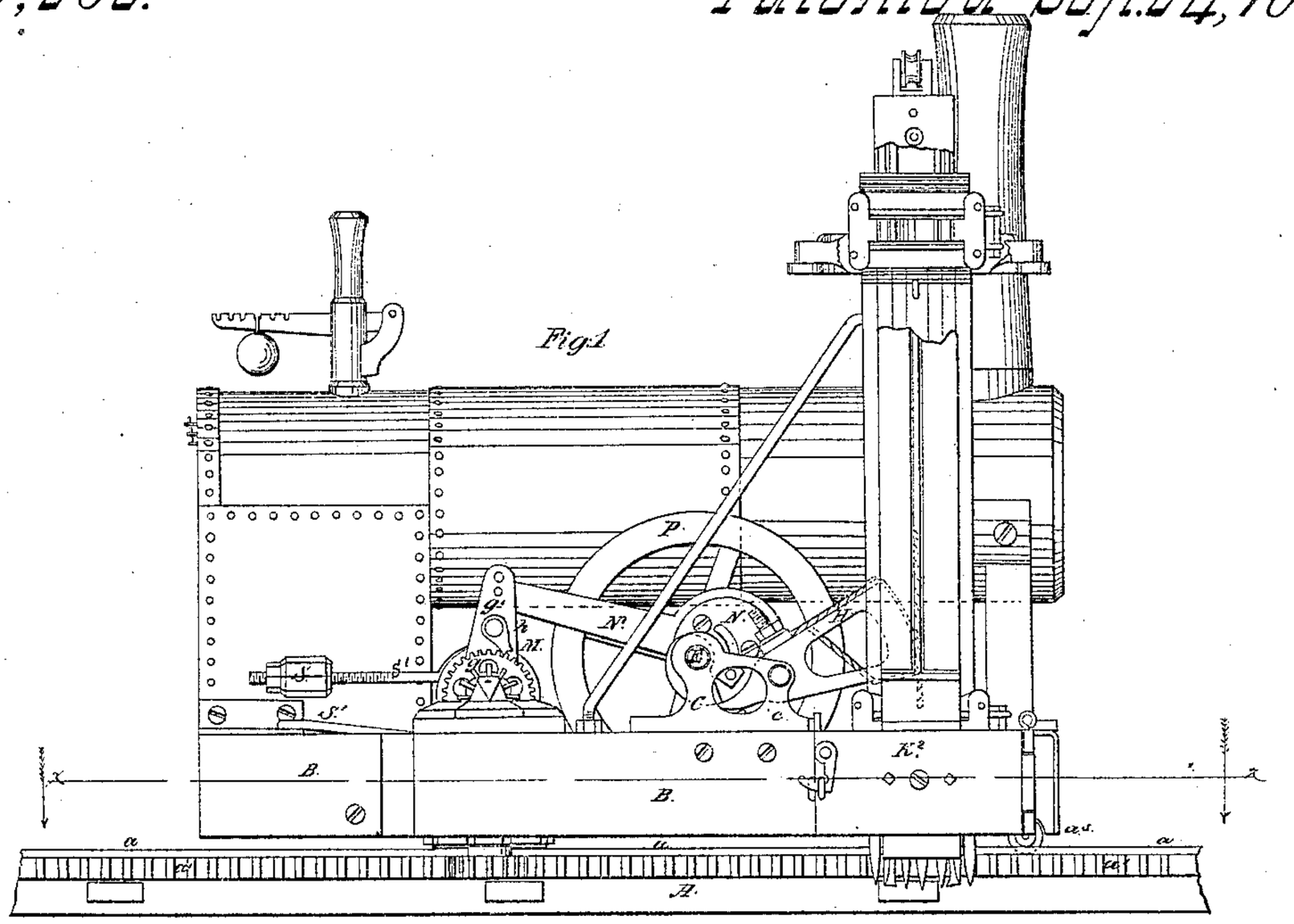
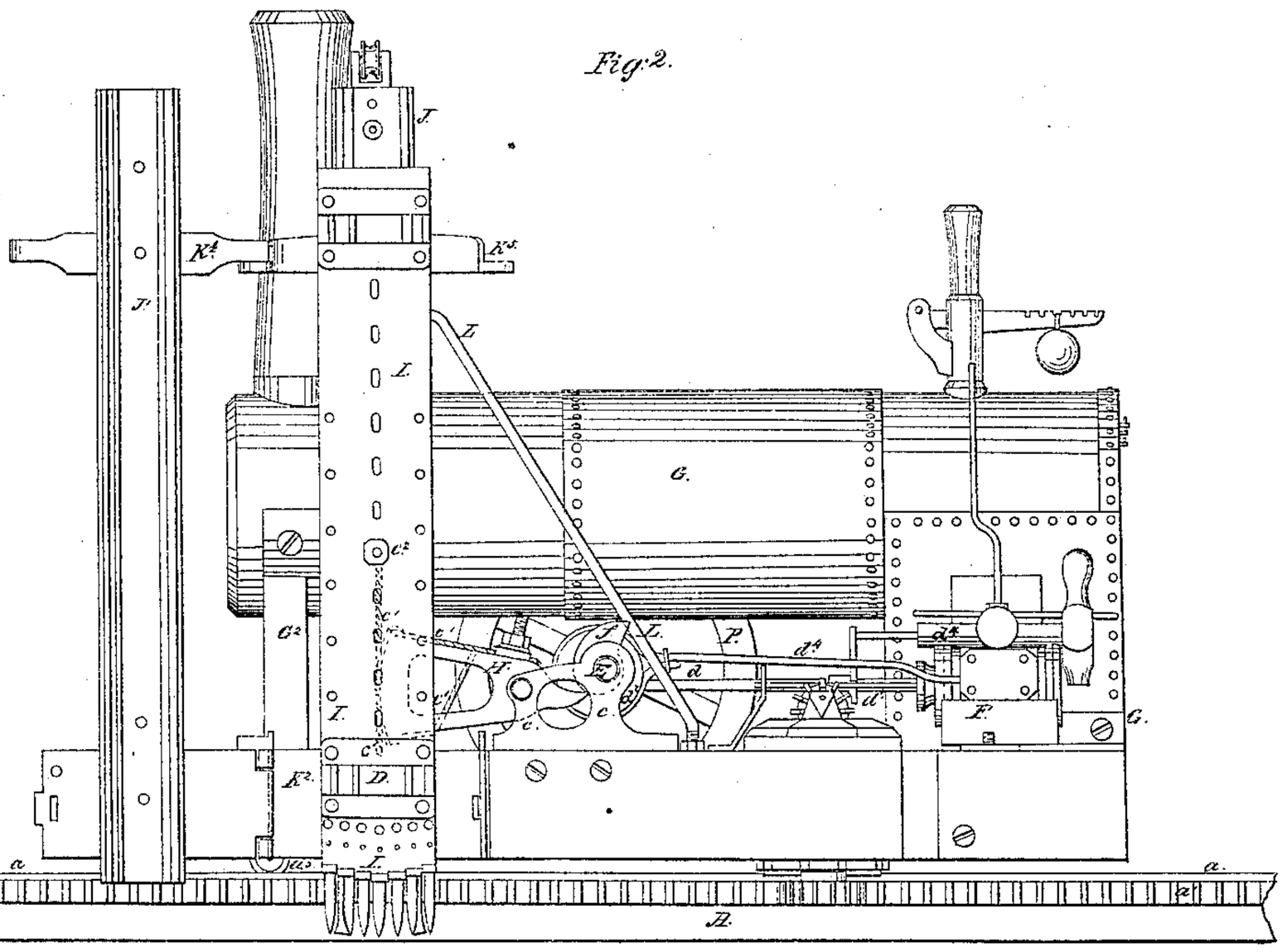


Fig. 2.



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by Mason Fenwick & Lawrence
Agents

3 Sheets, Sheet 2.

G. J. Wardwell,

Stone-Channeling Machine.

No. 69,282. Patented Sep. 24, 1867.

Fig. 3.

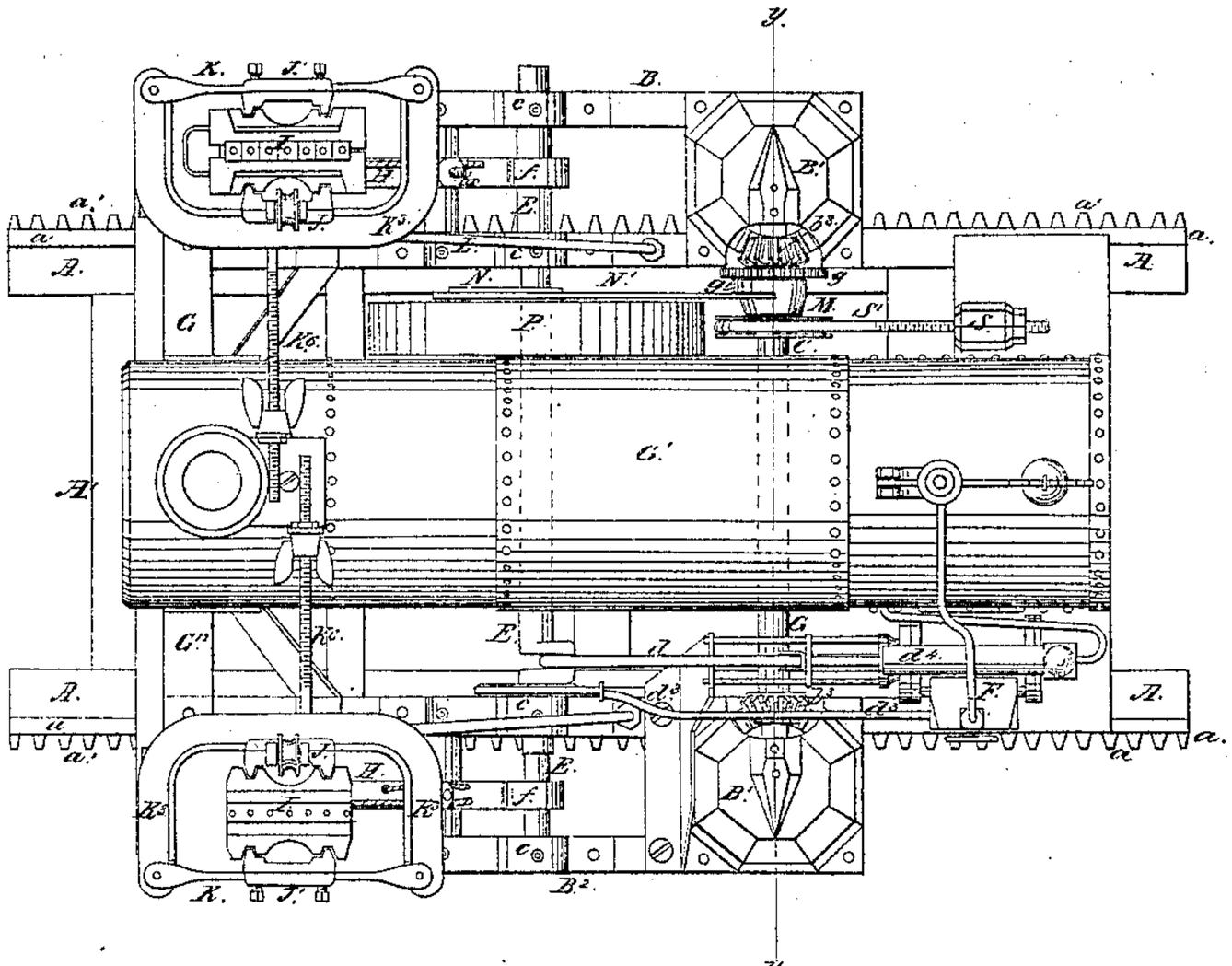
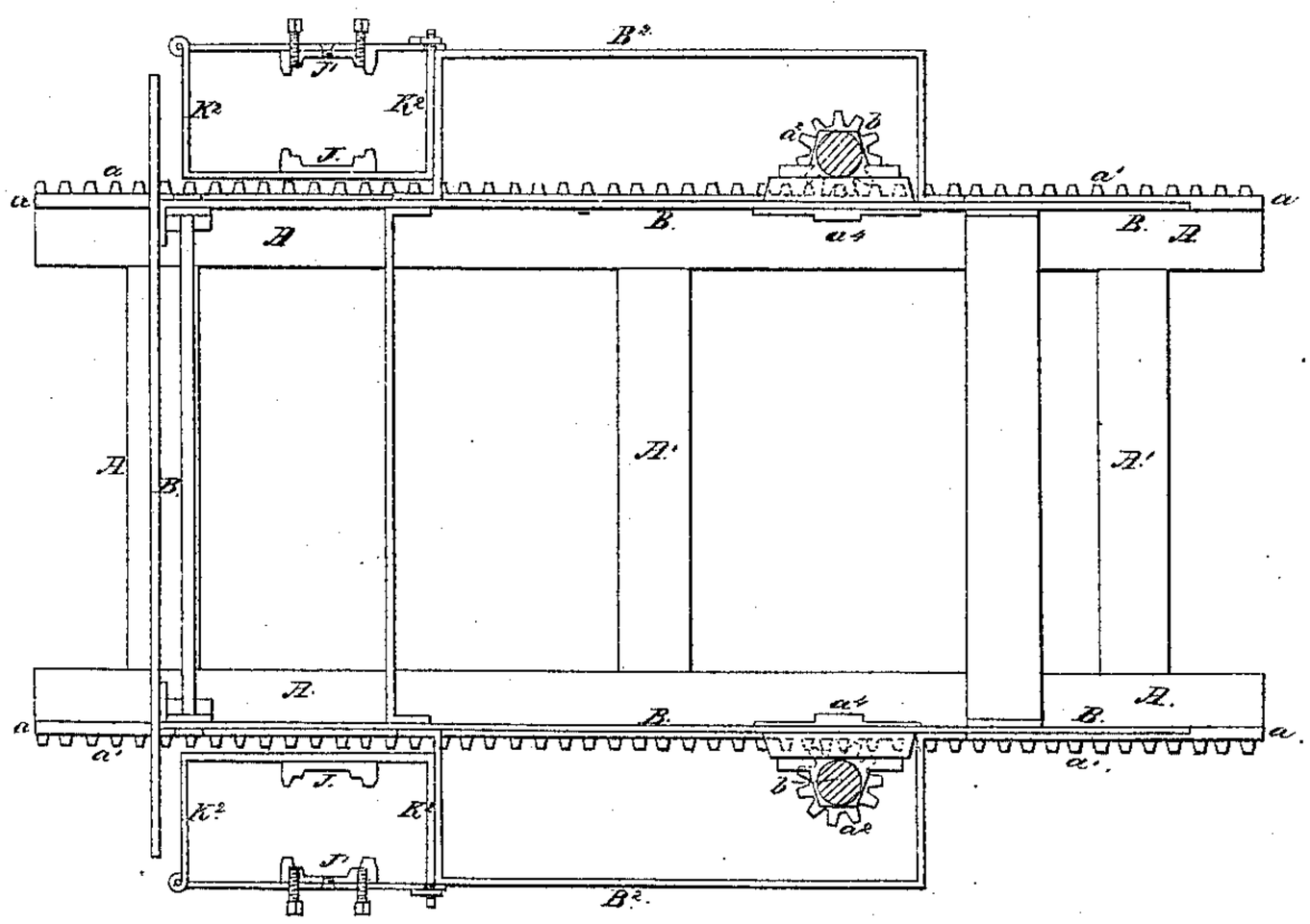


Fig. 4.



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3 Sheets, Sheet 3.

G. J. Wardwell,

Stone-Channeling Machine,

No. 69,282. Fig 5. Patented Sep. 24, 1867.

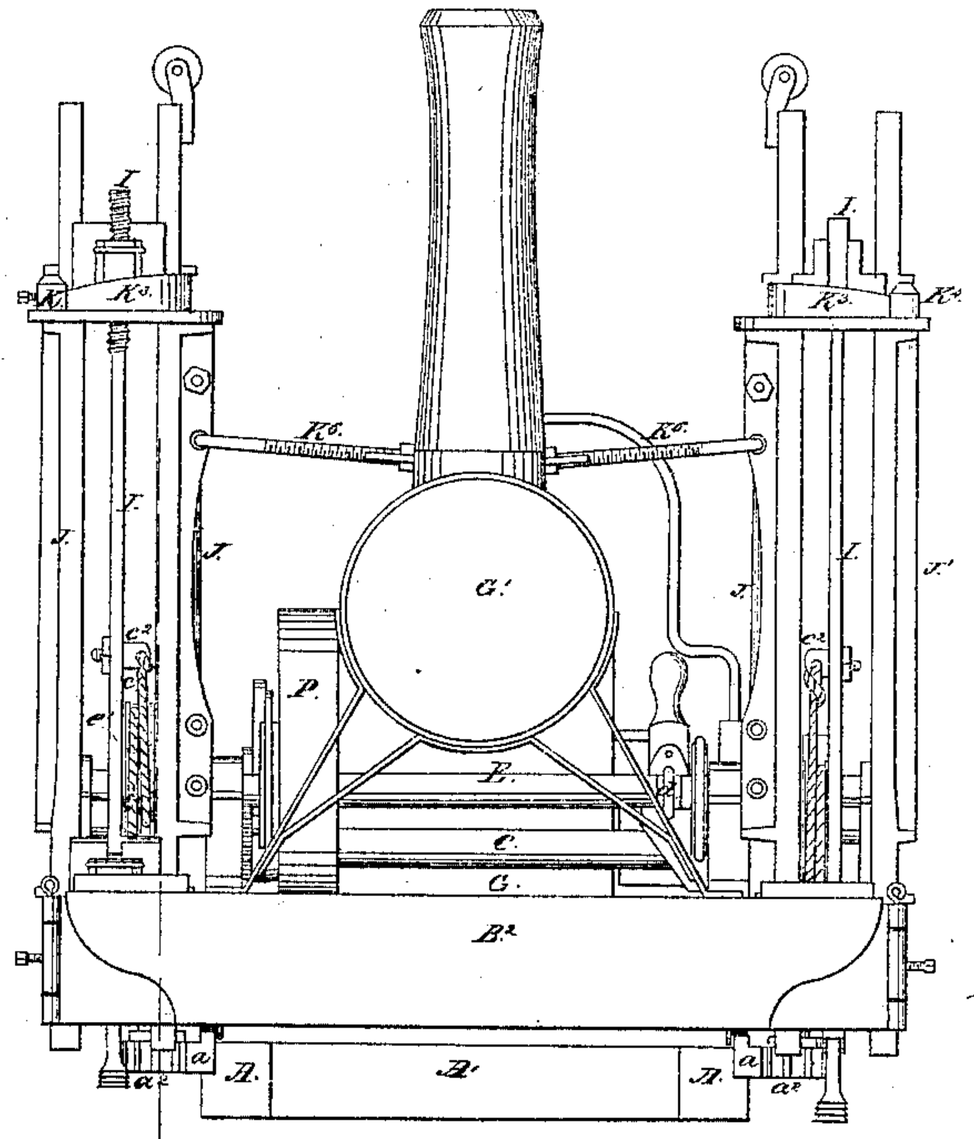


Fig. 6.

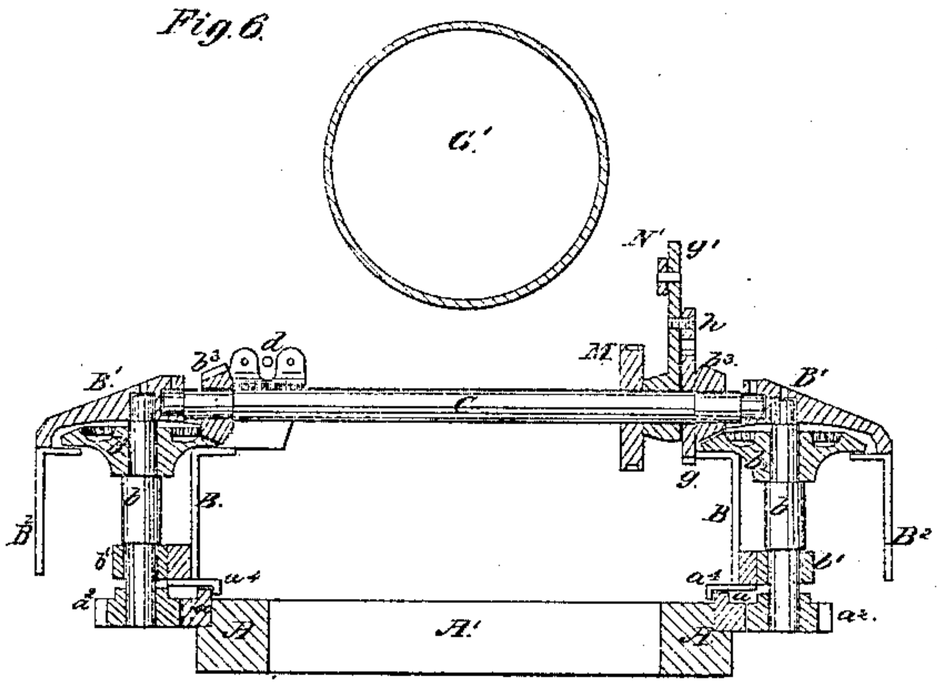


Fig. 7.

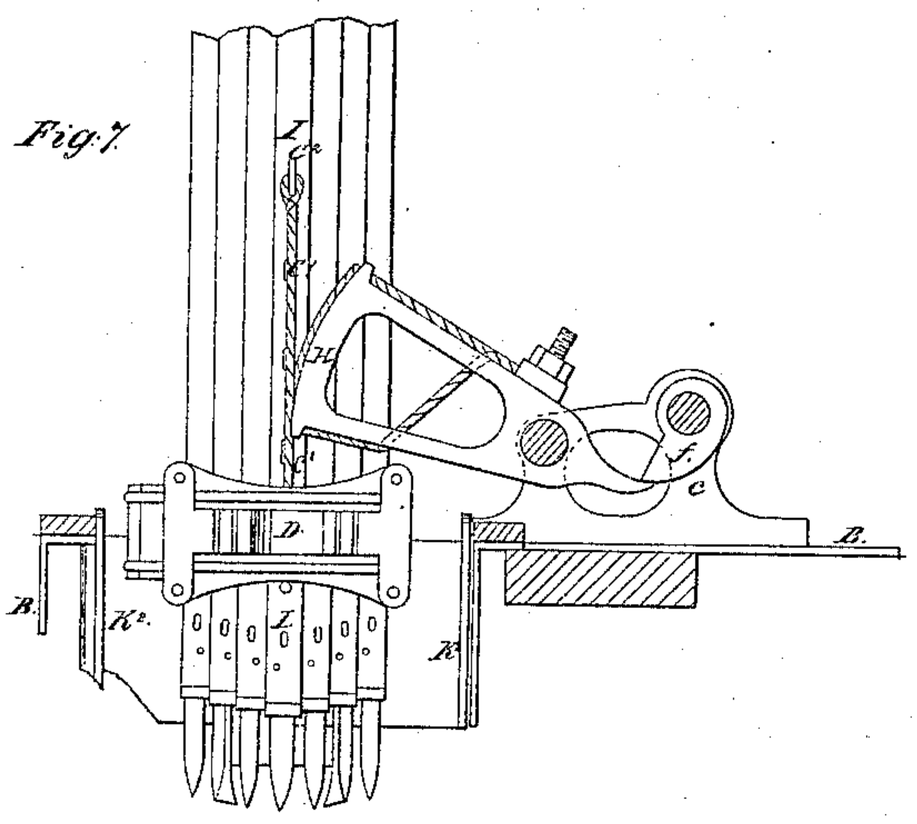


Fig. 8.

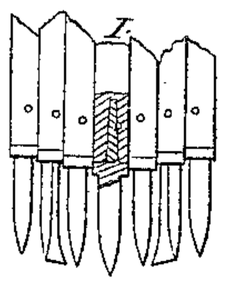
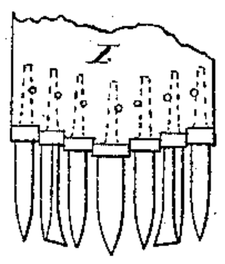


Fig. 9.



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United States Patent Office.

GEORGE J. WARDWELL, OF RUTLAND, VERMONT.

Letters Patent No. 69,282, *dated September* 24, 1867.

IMPROVED MACHINE FOR QUARRYING STONE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE J. WARDWELL, of Rutland, in the county of Rutland, and State of Vermont, have invented certain new and useful improvements in Machinery for Quarrying Stone; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, sheet 1, is an elevation of the right-hand side of the improved machine.

Figure 2 is an elevation of the left-hand side of the machine.

Figure 3, sheet 2, is a top view of the machine.

Figure 4 is a section through the machine, taken in the horizontal plane indicated by the line *x x* in fig. 1.

Figure 5, sheet 3, is a front elevation of the machine.

Figure 6 is a transverse section, taken through the machine in the vertical plane indicated by *y y* in fig. 3.

Figure 7 is an enlarged view in detail, showing the manner of connecting the chisel-stocks to the vibrating levers.

Figures 8 and 9 show the manner of applying the chisels or bits to solid and sectional chisel-stocks.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on the stone-cutting machinery which is described in my Letters Patent, numbered respectively 40,584, 51,271, and 51,272, and also in my reissues, numbered 2,087, and 2,088, and designed for cutting vertical or inclined channels or kerfs in the beds of quarries preparatory to cutting under and separating the blocks of stone. In said patents a machine is described which is operated by a steam engine located behind the cutter-carrying carriage or frame, and moving upon the same track therewith. Under some circumstances this arrangement of the driving power and the cutting mechanism upon different frames is objectionable, particularly for want of compactness and portability, where a quarry is small and economy in working it is desired. To remedy this objection, in a measure, the steam engine and boiler have been supported at one end upon the frame which carries the feeding and cutting mechanism, and at the other end upon a separate frame. This plan renders the machine more compact than the one described by me in the aforementioned Letters Patent, but it does not overcome the objection to having two independent sustaining frames.

The object of my invention is to support the steam-boiler, the engine, the stone-cutting devices, and the feed mechanism upon a single frame or carriage, which is mounted upon and adapted to travel on a rail track; said frame or carriage being constructed in a rigid and substantial manner, so as to afford a firm, unyielding bed or support for the said machinery, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, A A represent the parallel sleepers of the track, upon which the machine which I am about to describe is caused to move backward and forward. These sleepers are firmly connected together by cross-ties A, which also serve as braces for preserving the parallelism of the sleepers, and preventing lateral displacement thereof. On the outside of the sleepers A A, rails *a a* are firmly secured, so that their upper surfaces project above the surfaces of the sleepers, and serve as guides for the machine during its reciprocating movements. The outer vertical surfaces of the said rails have spur-teeth formed on them, as shown at a^1, with which two pinion spur-wheels a^2 a^2 engage. The track thus constructed is firmly secured upon the quarry-bed at the point desired to cut or channel the same, and the length of the track will be regulated by the length of the channels which it is desired to cut. The pinion spur-wheels a^2 a^2 are keyed on the lower ends of vertical shafts *b b*, which are arranged on the outside of the frame or carriage B, as shown in fig. 6, and which have their bearings in journal-boxes b^1 b^1 projecting from the sides of frame B, and also in cap-plates B^1 B^1, which are bolted firmly upon this frame. Upon the upper ends of the vertical shafts *b b* bevelled spur-wheels b^2 b^2 are keyed, which engage with and are driven by bevel pinion spur-wheels b^3 b^3 that are keyed on a horizontal transverse shaft C. This shaft C has its end bearings in the cap-plates B^1 B^1, and carries the vibrating feed-arm, the feed-spur, and brake, as will be hereinafter described. The frame or carriage B is constructed of plates of iron firmly bolted together, and braced so as to afford the required strength and rigidity to sustain the several parts employed in the work of channelling stone. This frame should be made sufficiently

strong to admit of its being moved about bodily without straining or deranging the mechanism upon it. Upon both sides of the frame or carriage B offsets B^2 B^2 are applied, which form housings for the spur-wheels above described, and also supports for the standards of the chisel-stocks, as will be hereinafter described. The rear part of the frame or carriage B is sustained upon the rails *a a* by means of flanged shoes or slides a^1 a^1, which embrace said rails and prevent lateral displacement of the carriage at this point. The front end of the carriage is sustained upon the rails *a a* by means of flanged wheels a^5 a^5, which prevent lateral displacement at this point. In front of the feed-shaft C is the engine-shaft E, through which motion is communicated to the channelling devices and the feed mechanism. This shaft E extends transversely across the top of frame or carriage B, and is supported upon pillow-blocks *c c*, which are firmly bolted upon the longitudinal sides of frame or carriage B, and also upon the offsets B^2 thereof. To the crank of shaft E a pitman-rod, *d*, is attached, the rear end of which is pivoted to the piston-rod d^1 of the engine F. The slide-valve of this engine receives its movements from the shaft E, through the medium of an eccentric, d^2, and pitman-rod, d^3. The pump d^4, which is on top of the steam-cylinder of the engine, is operated by a rod connecting with the cross-head of the pitston-rod d^1, as shown in figs. 2 and 3. The engine may be constructed in the manner represented in the drawings, or in any other suitable manner. The steam-boiler is constructed somewhat like that of a locomotive or portable steam engine. The fire-box G is firmly secured centrally between the longitudinal sides of the carriage B, and the forward end of the cylindrical boiler G^1 is sustained by striding braces G^2, which are rigidly bolted to the said carriage, as shown in the drawings, sheets 1 and 3. Near the ends of the main driving-shaft E, cams or toes *f f* are keyed upon it in such manner as to operate alternately upon the shortest arms of segment levers H, and thus give a vibrating motion to them. These levers vibrate in vertical planes, and have their fulcra in the pillow-blocks *c c*. Their longest arms are connected by means of lifting and pulling-down ropes or chains c^1 c^1 to the chisel-carrying blades I I, so as to reciprocate these blades vertically in their standard-guides J J′. The front ends or segment faces of said levers H are grooved, so as to receive and keep in place the ropes or chains c^1 c^1, one of which latter is carried upward and attached to an eye, c^2, upon the chisel-stock, and the other is carried downward and attached to the lower clamp of the chisel-stock. The ropes or chains should be attached to their respective stocks I at such points as will cause the levers II to lift and pull down these stocks without any tendency to tilt them or cause them to bind in their guides; therefore I locate the said points of attachment in the middle of the width of the stocks. The eyes c^2 are removable, and they can be attached nearer to or further from the upper ends of their respective stocks, as circumstances may require, a number of holes being made through the stocks for this purpose. The clamps D, to which the lifting-ropes are attached, are also movable, so as to be capable of attachment at different points to their stocks. The chisel-carrying stocks I I may be made solid, as shown in figs. 2 and 9, or they may be made of longitudinal sections, clamped together in any suitable manner. These stocks are guided and kept in place in their vertical reciprocating movements by means of the standard-guides J J′, which have shouldered tenons formed on their inner parallel faces that fit into corresponding grooves formed in the clamps D D, which are applied to the stocks I, as shown in fig. 3. The standard-guides J, which are on the inner sides of the chisel-stocks, are secured rigidly at their lower ends to oscillating boxes K^2, which are sustained by forward and rear trunnions, bearing upon the frame or carriage outside of the rail track. The upper ends of said guides J have horizontal yokes K^3 secured to them, as shown in the drawings. The outer standard-guides J′ are secured to the outer side plates of the boxes K^2, which plates are hinged, as shown in the drawings, so as to allow the said standards to be swung open for removing the chisel-carrying stocks, as shown in fig. 2. The upper parts of the standard-guides J′ are hinged to the yokes K^3 by means of horizontal bars K^4. The standard-guides are all constructed so as to be reversible, that is to say, they can be turned end for end by detaching them from their oscillating boxes and the yokes K^3, for the purpose of preventing unequal wear of the clamps upon the guiding tenons. The standard-guides are held firmly in the desired position by means of transverse braces K^6 K^6, which are connected by joints to the ribs on the inner standards J, and by means of nuts to a plate, K, upon the boiler G^1. By turning the nuts on the ends of the rods the standard-guides may be adjusted and set at any required angle with respect to the frame or carriage to which they are applied, so that should the carriage incline, the chisel-stocks can be set to work in vertical planes. The standard-guides are also braced by inclined rods L L, which are secured to the inner standards, and which extend backwards and are secured to the carriage frame, as shown in figs. 1 and 2. The feed-shaft C has a toothed wheel, *g*, keyed to it, into the teeth of which a reversible pawl or dog, *h*, engages. This pawl is pivoted to an arm, *g′*, which is applied so as to vibrate loosely upon the shaft C, and which receives its vibrations from an eccentric, N, upon the crank-shaft E, through the medium of a connecting-rod, N′, as shown in figs. 1 and 3. The eccentric N is constructed in such manner, and so secured to the balance-wheel P, that it can be adjusted for shortening or lengthening the strokes of the lever-arm *g′*, so as to increase or diminish the forward or backward movements of the machine upon its track. On the inside of the vibrating arm *g′*, and keyed on the feed-shaft C, is a brake-wheel, M, having an annular groove formed in its periphery. This brake-wheel is acted upon by a weight, S, upon one end of a spring-brake, S′, which is secured at its other end to the frame or carriage B in front of the shaft C, as shown in figs. 1 and 3. The weight S is adjustable upon the brake-arm for increasing or diminishing the friction or resistance offered to the rotation of shaft C, at pleasure. The pawl *h* is pivoted to the vibrating feed-arm in such manner that it can be reversed at pleasure, so as to cause the frame or carriage to move forward or backward without reversing or stopping the engine or its shaft E.

I am aware that it is not new to sustain stone-channelling devices upon a truck which also sustains one end of a steam-boiler, the opposite end of such boiler being sustained upon a separate and independent truck, and therefore I lay no claim to such an arrangement.

In the operation of the machine which I have above described, the balance-wheel P upon the crank-shaft E will equalize the movements of the feeding and channelling mechanism, and also the engine, without in any manner interfering with the arrangement of the cutters in close proximity to the walls of the quarry. Such wheel being arranged between the longitudinal sides of the carriage will also operate with less strain upon its shaft than would be the case if it were applied outside of the carriage upon one extreme end of this shaft. The cutting devices may be constructed as described in my Letters Patent aforementioned, and these cutters with their stocks may be clamped and guided as therein shown.

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

Arranging the steam-boiler, the steam engine, the feeding mechanism, and the channelling devices, all upon a single carriage, B, substantially as described.

GEORGE J. WARDWELL.

Witnesses:

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C. CLARK.