G. J. Wardwell, 4. Sheets. Sheet. 1.

Channeling Stone.

No. 105,391. Patented July 12. 1870.

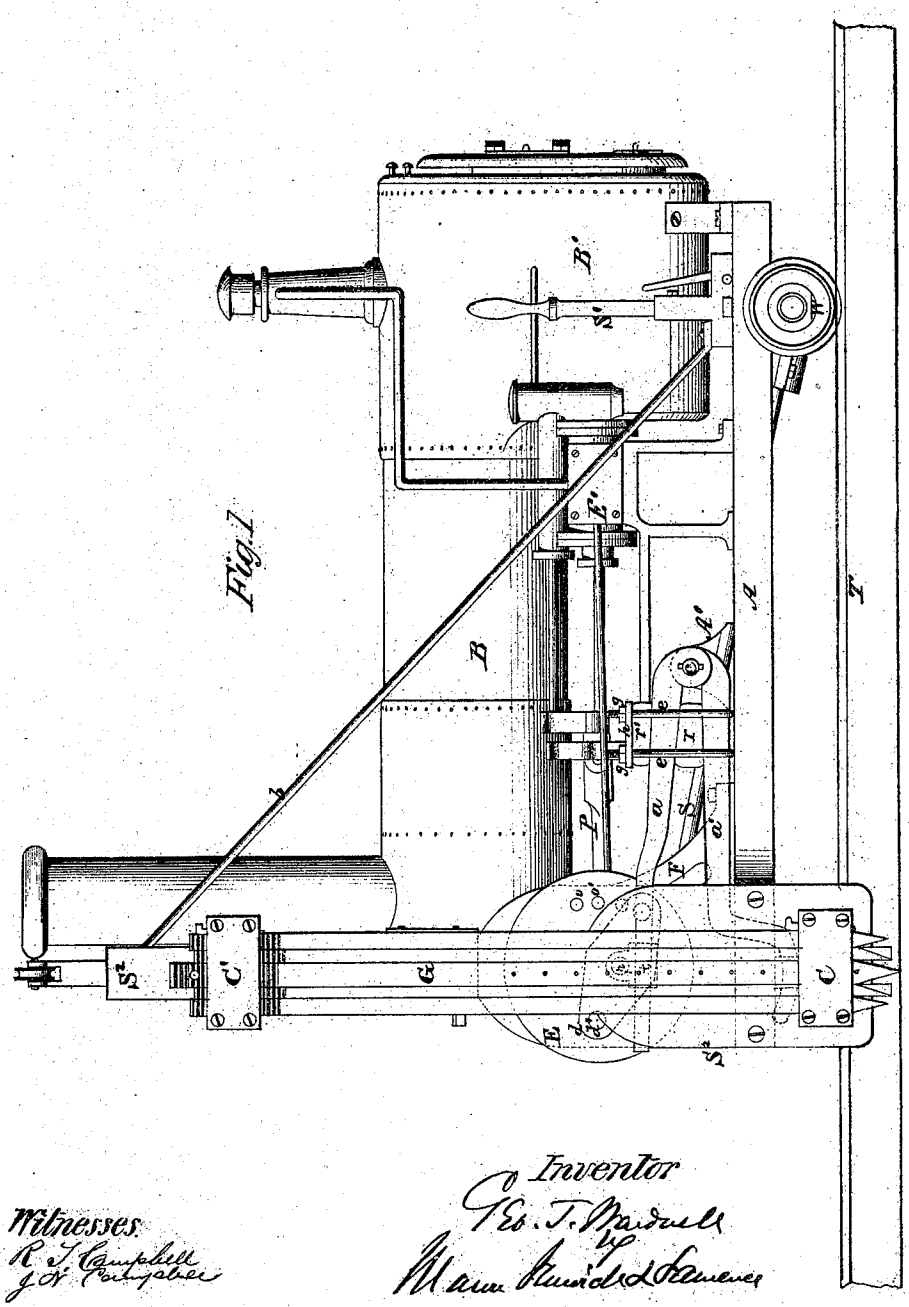

Fig. 1

Witnesses.
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G. J. Wardwell, 4 Sheets. Sheet. 2.

Channeling Stone.

No. 105,391. Patented July 12. 1870.

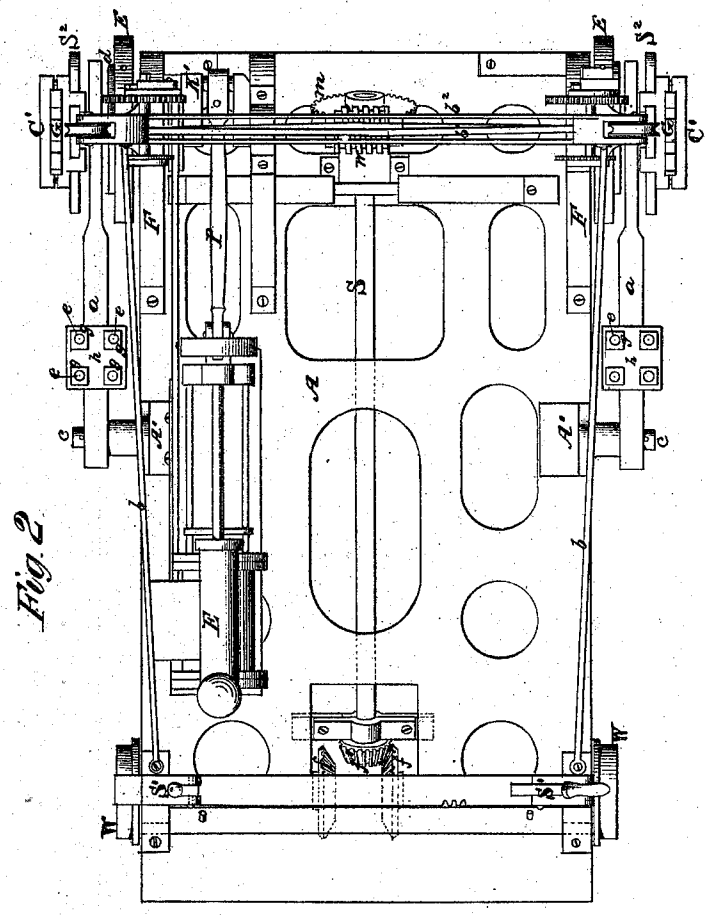

Fig. 2

Witnesses.
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G. J. Wardwell,

4 Sheets, Sheet 3.

Channeling Stone.

No. 105,391. Patented July 12. 1870.

Fig. 4

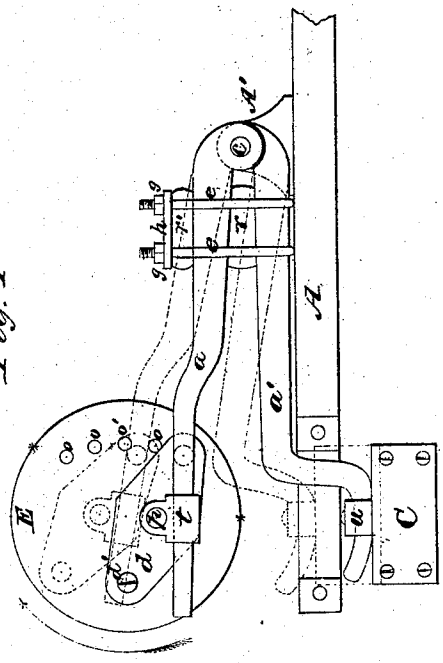
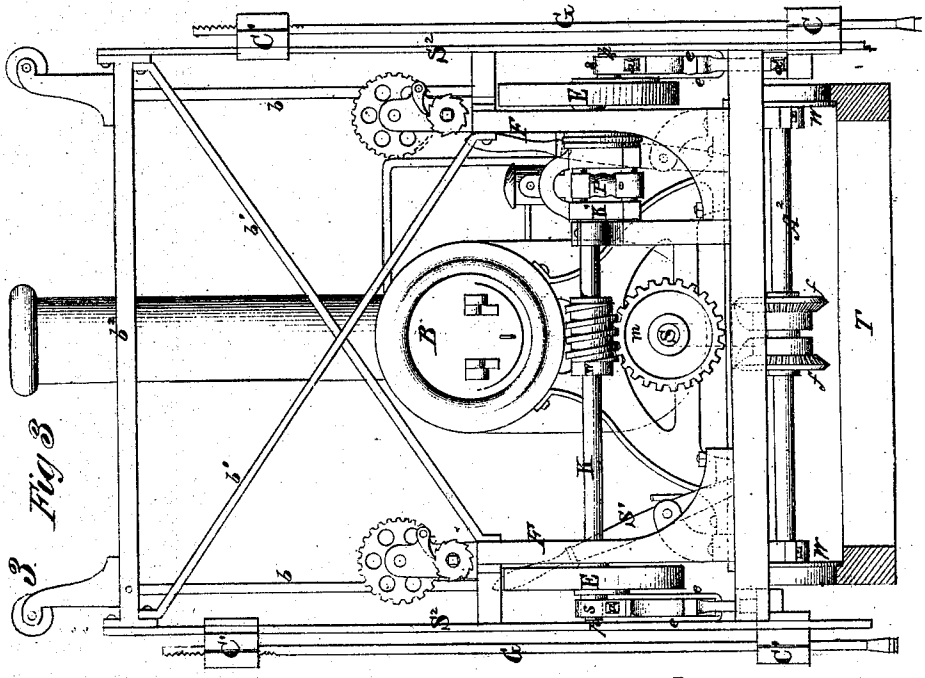


Fig. 3



Witnesses.
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G. J. Wardwell, 4. Sheets. Sheet. 4.

Channeling Stone.

No. 105,391. Patented July 12. 1870.

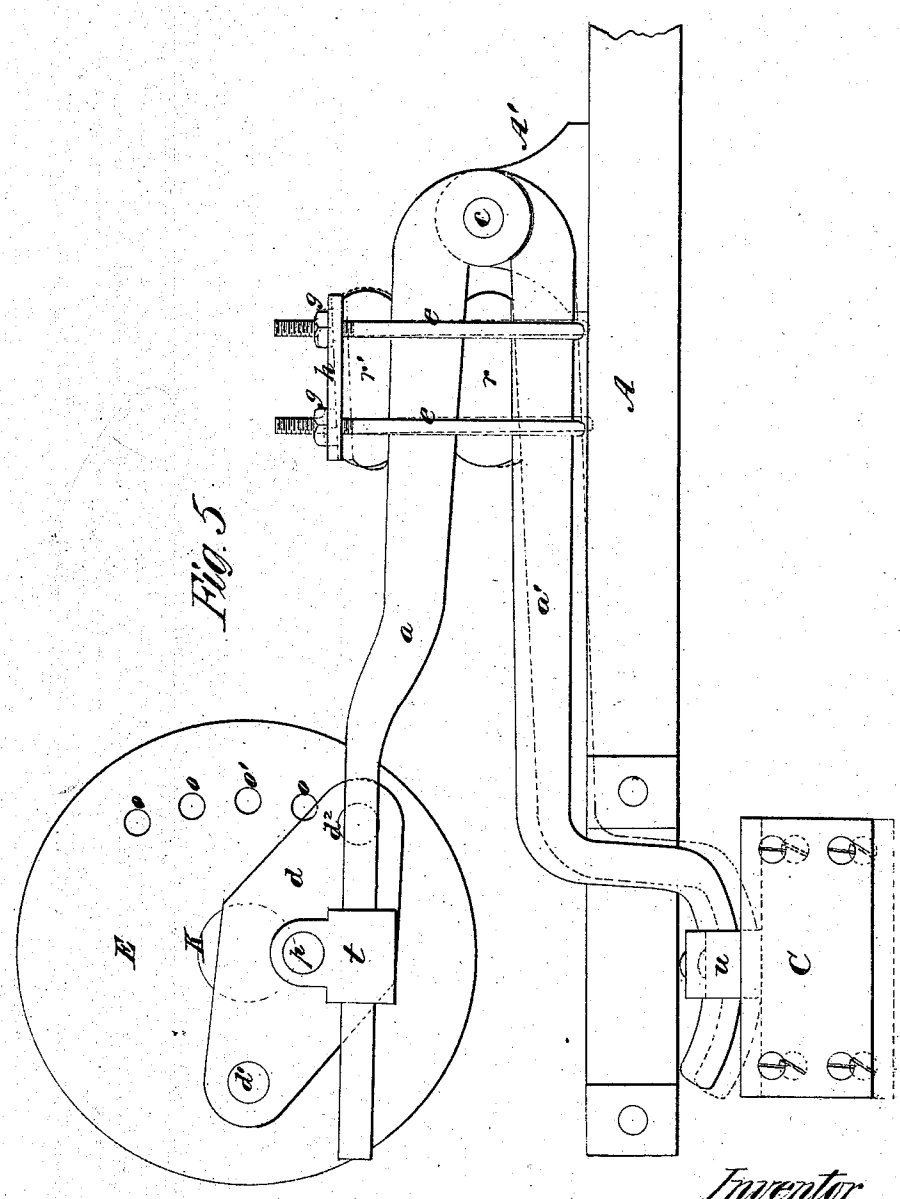

Fig. 5

Witnesses.
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Attorneys

UNITED STATES PATENT OFFICE.

GEORGE J. WARDWELL, OF RUTLAND, VERMONT.

IMPROVEMENT IN STONE-CHANNELING MACHINE.

Specification forming part of Letters Patent No. **105,391**, dated July 12, 1870.

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 relating to the Channeling of Stone; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1, Plate 1, is an elevation of one side of a stone-channeling machine mounted upon a track and having my improvements applied. Fig. 2, Plate 2, is a top view of the machine without the boiler. Fig. 3, Plate 3, is a front elevation of the machine complete. Fig. 4, Plate 3, is a side view of the improved device by which motion is transmitted from the crank-plates to the gangs of cutters. Fig. 5, Plate 4, is an enlarged view of the device shown by Fig. 4, indicating in dotted lines the positions of the parts at the instant of giving the blow.

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

This invention relates to improvements on machinery which is designed for cutting channels in quarry-beds preparatory to the removal of blocks of stone therefrom, and more particularly the invention relates to improvements on the method of communicating motion from a driving-power to the channeling-chisels set forth in Letters Patent of the United States granted to me on the 10th day of November, 1863.

In the machine for which Letters Patent were granted to me, as aforesaid, motion was transmitted to a gang of chisels from a driving-shaft operating through the medium of a single vertically-vibrating lever which had its fulcrum on the carriage-frame, and which was connected by straps to the gang of chisels. Beneath the rear end of said lever a spring was applied.

Instead of employing a single lever, as above stated, I now employ a double compound or bifurcated lever, which consists of two arms, which are connected together and pivoted to the frame of the carriage at their rear ends. One of these arms is connected loosely to the driving-power, and the other is similarly connected to the chisel-gang; and, instead of using a single spring applied directly upon the frame of the carriage beneath the rear end of a single vibrating lever, I now employ two springs, one of which is applied between the two arms and the other on top of the upper arm of the bifurcated lever, and held in place by an adjusting-stirrup, which connects together the two arms.

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

Before describing the invention herein claimed, I will briefly describe those parts of a stone-channeling machine to which the invention is represented in the accompanying drawing as being applied.

A is a horizontal bed or frame, which is mounted upon flanged wheels W, adapted to move upon a track, T. B is a steam-boiler, and B′ the fire-box thereof for supplying an engine, E′, with its motive power. P is a pitman, which communicates rotary motion to a horizontal crank-shaft, K, which shaft extends transversely across the front part of the carriage, and has its bearings in standards F F. W is a worm-wheel, which engages with the teeth of a tangent spur, *m*, and thus gives a slow motion to a longitudinal shaft, S, on the front end of which the spur-wheel *m* is keyed. The shaft S extends backward and downward through suitable bearings, and carries a beveled pinion, *f′*, on its rear end. The pinion *f′* is intended to give rotary motion to either one of two laterally-sliding wheels, *f f*, which are on the axle A^2 of the rear truck-wheels W W. The wheels *f f* are moved into and out of gear by means of hand-levers S^1 acting through the medium of a sliding rod and pusher. In this way the machine is moved on its track either forward or backward, and, by disengaging both wheels *f f* from their pinion *f′*, the progressive and retrogressive motion will cease, although the rotary motion of the shaft K may be continued.

On each end of the shaft K a crank or crank-plate, E, is keyed, to the outer side of which a plate, *d*, is pivoted, at d^1 and again attached to the crank-plate at d^2. A wrist-pin, *p*, is fixed to each plate *d* in such manner that,

by removing the fastening d^2 and adjusting this plate d so as to insert the fastening into the hole O′ in crank-plate E, the axis of said wrist-pin will exactly coincide with the axis of the crank-shaft K. When this is done, it is obvious that the wrist-pin will cease to operate with a crank motion. The holes O in the crank-plate are for receiving the pin d^2, for adjusting the length of strokes of the wrist-pin. Between each gang G of chisels and the crank-plate E nearest to it is a standard-guide, S^2, which is secured at its lower end to the outer side of the carriage-frame A and to the standard-bearings F, and at its upper end to the horizontal cross-head b^2 and braces b b^1. To each guide S^2 a gang, G, of stone-channeling chisels is applied by means of two clamps, C C′, which allow the gang to be moved up and down. These clamps C C′, I prefer to construct substantially as described in Letters Patent granted to me on the 18th day of May, 1869.

I will now proceed to describe my improved mode of transmitting motion to the gang or gangs of chisels, as the case may be, so that the shocks incident to the repeated sudden contact of the chisels with the stone which is being channeled by them will not be transmitted to the machinery used to operate them.

On each side of the machine, if two gangs of chisels are used, I apply the following described device: t is a stirrup, which is applied on the wrist-pin p, and which has a passage through it for receiving the arm a of a compound lever. On the inner plate of the lower clamp C of each gang G of chisels a loop, u, is constructed, through which passes freely the free end of the lower arm, a', of the said compound lever. The compound lever consists of two arms or levers, as above shown, which are both pivoted to a fulcrum, c, which extends out from a standard, A^1, fixed to the frame A of the carriage. Both arms vibrate together, and to some extent independently of one another, about said fixed pin c. These arms are connected together at a point between their fulcrum or pivot c and their connections to the chisel-gang G and wrist-pin p by means of straps e e, a plate, h, and nuts g g, and between the two arms, and also between the upper arm and the plate h springs r r' are interposed, as clearly shown in Figs. 1, 4, and 5. It will thus be seen that an adjustment can be made which will give more or less compression to the springs, as may be desired.

When the fulcrum or pivot pin c is located as high as represented in the drawing, the lower arm, a', will be bent downward, and terminated in the curved portion represented in Figs. 4 and 5, which portion is allowed to play freely through the loop u; but in practice I prefer to locate the fulcrum or pivot-pin c in or nearly in a horizontal plane, which would represent the middle of the full stroke given to the chisel-gang. By this arrangement of the said pin the lower arm, a', will not be so much bent, and the driving crank-shaft K can be arranged lower than is shown in the drawing, and obtain the same length of strokes of the chisel-gang.

By reference to Figs. 4 and 5 of the drawing, the operation of my invention will be understood. It will be seen that the free ends of arms a a' both rise and descend with the wrist-pin p and chisel-gang clamp C.

In Fig. 4 the full lines indicate the position of the parts when at the termination of the downstroke of the chisel-gang, and the dotted lines represent the position of the same parts when at the termination of their upstroke.

The crank-plate E is rotated in the direction indicated by the arrow in Fig. 4, and makes about three-fifths of a revolution during the act of lifting the chisel-gang from the termination of its downstroke to the termination of its upstroke, as indicated by the stars in Fig. 4. The other two-fifths of a revolution of plate F effect the downstroke of the chisel-gang. Thus it will be seen that the lifting operation of the chisel-gang is effected by a comparatively slow movement, while the descending strokes of the gang are much more rapid. The reason of this variable motion is that the stirrup t slides upon the upper arm, a, and during a portion of the ascending strokes moves farther from the fulcrum c, thus lengthening the leverage and lifting slower, while during part of the descending strokes the leverage is shortened, and the motion thereby accelerated.

It will be seen that the weight of the bifurcated or compound lever is partly sustained by the fulcrum-pin c, thus relieving the wrist-pin and diminishing friction thereon; also, that there will be very little downward draft or strain on the wrist-pin when the chisel-gang is arrested at the completion of its downstroke, as this draft or strain is almost wholly received upon the fulcrum-pin c on the frame of the machine.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A bifurcated or compound lever the arms of which are suitably held together, and which is pivoted to and supported by the frame of the carriage, and connected at its free ends to the driving-power and gang of chisels, substantially as described.

2. Springs r r', applied to the bifurcated lever, so as to operate substantially as described.

3. An adjusting-clamp applied to the compound lever for connecting together the two arms thereof, and also admitting the adjustment of the springs r r', substantially as described.

4. The swivel-stirrup t, applied to the wrist-

pin *p* as a means of connection between one of the arms of the compound lever and the said wrist-pin, substantially as described.

5. In a stone channeling or cutting machine, a lever-connection between the crank-shaft or face-plate and the cutters, when the lever is so connected to the crank-shaft or to the face-plate as to produce a variable up-and-down movement of the cutters, substantially as described.

GEO. J. WARDWELL.

Witnesses:

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GEO. E. ROYCE.