G. J. Wardwell,

Stone-Channeling Machine.

No. 40,584. Patented Nov. 10, 1863.

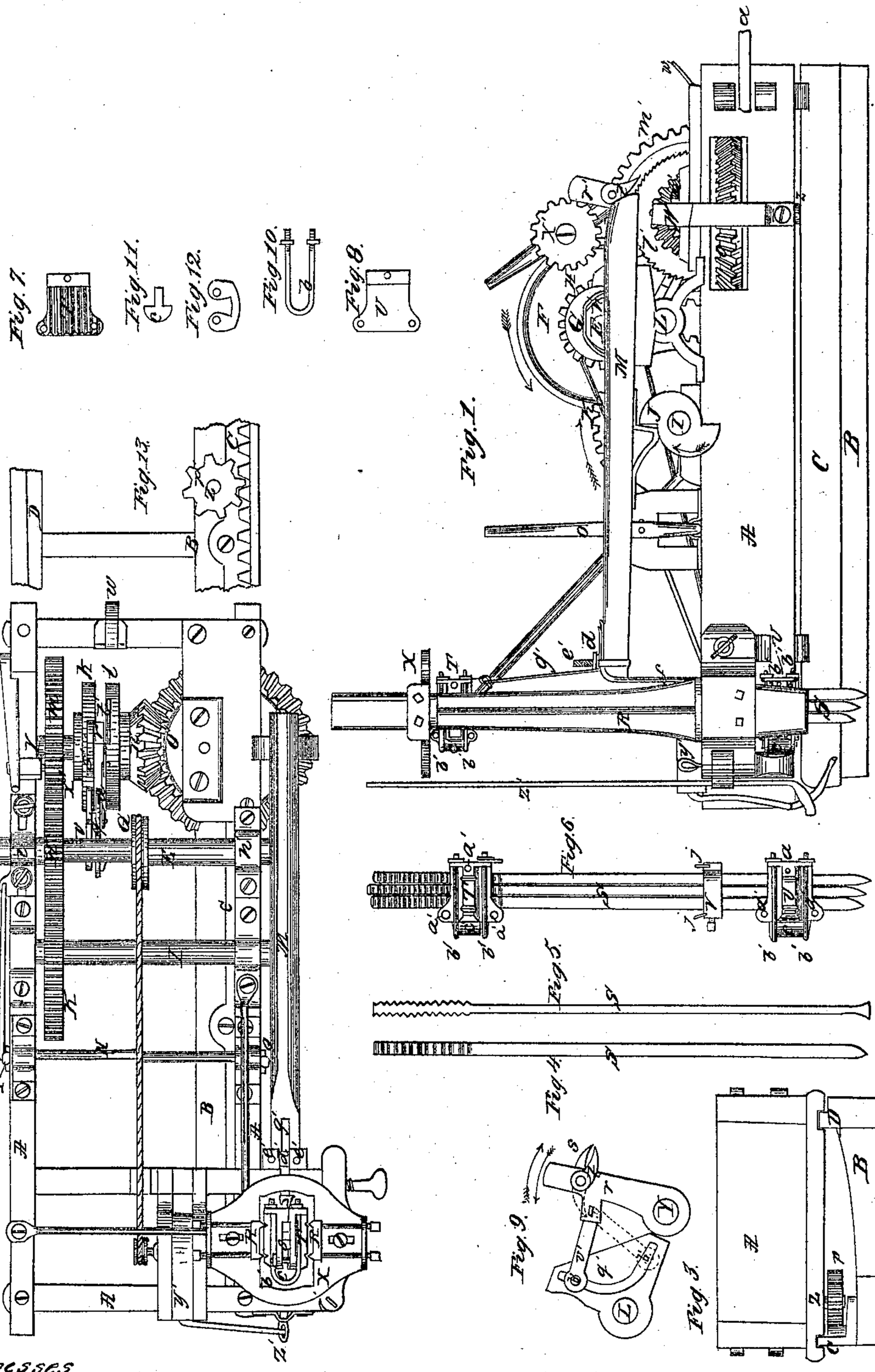

Fig. 2.

Fig. 1.

Fig. 12.

Fig. 11.

Fig. 10.

Fig. 8.

Fig. 7.

Fig. 6.

Fig. 5.

Fig. 4.

Fig. 3.

Fig. 9.

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IMPROVED STONE-CUTTING MACHINE.

Specification forming part of Letters Patent No. **40,584**, dated November 10, 1863.

To all whom it may concern:

Be it known that I, GEO. J. WARDWELL, formerly of Andover, in the county of Oxford and State of Maine, but now of Coaticook, in the county of Stanstead and Province of Canada, have invented a new and useful improvement on a Machine for Cutting Stone; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a front side elevation. Fig. 2 is a vertical view. Fig. 3 is an elevated rear end section. Fig. 4 is a side view of cutter or drill. Fig. 5 is an edge view of the same. Fig. 6 is a side view of the gang of cutters or drills, with clamps and guide-blocks. Fig. 7 is a view of inside surface of head-guide block. Fig. 8 is a view of inside surface of foot-guide block. Fig. 9 is a side view of slotted feed-plate, connecting-rod, vibrating lever, and its feed-fingers.

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

A is the frame of machine.

B is the bed-frame, to which the rails or track is secured for the machine to move on.

C is the feed-rail, furnished with a toothed rack on the inside.

D is the off rail.

E is the main driving-shaft, one end of which is hung in a pivot box or bearing, *h'*. Said driving-shaft carries a pulley, F, on outside of frame and back side of machine. Said shaft also carries a pulley, G and pinion H on inside.

I is the cam-shaft, situated forward and lower than main shaft, carrying cam J on outside and gear-wheel K on inside of frame, which receives motion from main-shaft by means of pinion G.

N is a small shaft, situated forward of cam-shaft, to the ends of which are attached the levers O and P. The lever P is connected with the sliding bearing *i'* of main shaft by the rod Q. The object of these levers and connecting-rod is to throw main shaft into and out of gear with cam-shaft.

R are two standards, each furnished with two V-shaped guides on their inner surfaces, on which the guide-blocks T and U, with the gang of cutters or drills S, move. Said standards are situated near forward end of machine, one of which is permanently attached to outside of frame, while the other is made adjustable, and after removing cap-plate X can be swung from its position for putting in or taking out a gang of drills, and for making any other changes with drills that may be required in operating the machine. The top ends of each cutter or drill S have their sides corrugated crosswise, as represented in Figs. 4 and 5. The guide-blocks T at head of cutters or drills have a portion of their inner surfaces corrugated to correspond with the corrugations on side of drills. (See Fig. 7.) The outside of said guide-blocks are furnished with grooves that work on the V-shaped guides on the standards. A guide block is placed on each side of the drills, and bolted together by means of the three bolts *a'*. They are then firmly compressed edgewise by means of the two clamp-rods or bolts *b'* and packing-block *c'*. The foot-guide blocks U have no corrugations on their inner surfaces, but in other respects are like the head-blocks, being bolted and clamped together in the same manner as represented in Fig. 6.

The object of corrugations in side of drills and the corresponding ones on the inner surface of the head-guide blocks is to prevent the drills from changing their position relative to each other when the gang of drills have been properly adjusted. At the same time it does not limit any one drill to a particular place in the gang, as each can be turned round, transposed, or made shorter by sharpening and repairs, thereby allowing drills of different lengths to be used in any place in the gang.

The number of drills is not necessarily limited to three, as any other number may be used, as the size or capacity of the machine may require.

The drills are intended to be so arranged in relation to each other that the cutting-point of each shall be lower than the one preceding it.

The foot-guide blocks are intended to be used as near the lower end of the standards as may be, and are to be loosened and secured higher as the drills work deeper in the "cut" or "trench."

V is a clasp that embraces the drills, and

occupying a place above the foot-guide blocks and below the end of beam M, and is secured in position by a set-screw or bolt. Said clasp is furnished with a ring, *j'*, at each end, and is connected with the forward end of beam by the strap *f'*, which passes up over the end of the beam, and is secured to the same by the plate *d'* and bolts *e'*.

L is rocker-shaft, to which is attached the beam M on outside.

W is a rubber spring, situated under rear end of beam, back of rocker-shaft, for giving additional force to the fall of the drills.

g' is a strap, one end of which is attached to the head-guide blocks, and the other end passes under the plate on end of beam, and is secured with strap *f'* for raising the drills. The object of the strap *g'* is to communicate the force of the rubber spring to the drills.

Y is the feed-shaft, situated near rear end of machine, carrying the ratchet-wheels *k'* and I, gear-wheel *m'*, and beveled pinion *n'*.

Z is a vertical shaft carrying the beveled gear-wheel *o'* at top end and pinion P' at lower end. Said pinion works in the teeth of rack on side of rail or track.

q' is a slotted plate, attached to rocker-shaft, for giving motion to the ratchet-wheels, and is what I term a "double-acting feed arm or plate."

r' is a vibrating lever, the lower end working loosely on feed-shaft between the ratchet-wheels. The upper end of said lever is furnished with two fingers, *s'* and *t'*, each intended to work in the teeth of their respective ratchet-wheels, as occasion may require.

w' is a connecting rod or bar, one end of which is attached to a projection on edge of vibrating lever, and the other end to a stud or bolt, *b''*, secured in the slot of the double-acting feed arm or plate. (See Fig. 9.)

v' is a stay-finger, hung loosely on rocker-shaft, and works in the teeth of ratchet-wheel *k'*.

w' is a stay-finger attached to rear end of frame, and is intended to work in teeth of ratchet-wheel I. Each of said stay-fingers is used as occasion may require.

x' is a gear-wheel attached to a lever on back side of machine, and is thrown into gear with pinion G on main shaft and gear-wheel *m'* on feed-shaft, when it is desirable to run the machine back without working the drills after having made a forward run.

y' is a revolving fan at forward end of machine, driven by pulley H on main shaft. Said fan is for blowing chips and dust from under the drills.

z' is a rod in front of drills, with an eye or loop in lower end for receiving the nozzle of wind-pipe and giving direction to the same. Said rod is raised or lowered as the depth of the trench may require.

The machine is driven by a steam-engine mounted on the same track, and attached to the rear end of machine, and moves with it. The engine is connected to machine by bars *a''*, as shown in Fig. 1, or in any other convenient way.

The operation of the machine is as follows: After the machine and engine are properly mounted on the track or rails, with a belt extending from engine to the pulley F on main shaft of machine, the pinion G is thrown into gear with the gear-wheel K on cam-shaft, the feed and stay fingers *s'* and *v'* are placed on the face of ratchet-wheel I', the engine is started, causing the main shaft E to revolve, and by means of the pinion G and gear-wheel K motion is communicated to cam-shaft I, causing the same with the cam J to revolve, the forward part of beam M resting on the face of the cam is raised, together with the drills S, guide-blocks T and U and clasp V, at the same time the rubber spring W under rear end of beam is compressed, the rocker-shaft L, with the double-acting feed arm or plate *g'*, makes a partial revolution, the motion of which is communicated to vibrating lever *r'* with its feed-fingers *s'* and *t'*, the end of feed-finger *s'* catching in the teeth of ratchet-wheel I' causes the same with the feed-shaft Y, vertical shaft Z, with its pinion P', working in teeth of rack on side of rail C, to make a partial revolution, thereby causing the machine, with the engine, to move forward on the track or rails. After the drills have been raised to their highest elevation, they are immediatly forced downward by the action of the rubber spring W, thereby bringing the lower ends or cutting-points of drills S in contact with the stone or surface to be cut. As the drills are rising the wind created by the revolving fan *y'* removes the chips and dust from the cutting-surface. These motions are repeated until the machine has traveled the required distance. The machine is stopped by throwing the pinion G out of gear.

In order to adjust the machine for cutting in the opposite direction, the cap-plate X is removed, the outside standard *s* is swung from its position, the straps *g'* and *f'* are loosened, and the gang of drills turned so as to hold an opposite position. The straps, standard, and cap-plate are then properly adjusted, the feed and stay fingers *s'* and *v'* are raised off the ratchet-wheel *k'*, and the feed and stay fingers *t'* and *w'* are placed so as to work in the teeth of ratchet-wheel I', the stud or bolt *b''* in the slot of double-acting feed arm or plate is loosened and moved to the lower end of slot, which will reverse the motion of vibrating lever *r'*, (see Fig. 3 in red.) The machine can now be started, the feed-finger *t*, working in teeth of ratchet-wheel I', causes the feed and vertical shafts Y and Z, with their gears and pinions *m' n' o' p'*, to make a partial revolution and the machine to move (while drills are being raised) in an opposite direction.

The nature of my invention consists in the peculiar construction of a machine for cutting trenches in stone-quaries, such work having

been done heretofore by hand, and in its present stage of development, I have been able to do the work of eleven men per day, at a great saving of expense, while the sides of the trenches cut by my machine are straight and smooth as a sawed surface, thereby effecting a saving in stock as compared with trenches cut by the hand process. Its advantages over machines intended to do the same work consist in being able to cut the wall-trenches by operating the cutters or drills on the outside of the frame of machine and track on which it moves, also the convenience of changing the cutters or drills by allowing the outside standard to swing from its position, and being so arranged as to allow the machine to cut both ways, thereby keeping the machine more dilligently at work.

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

1. The guide-blocks T and U, packing-blocks C′, bolts *a′*, clamp rods or bolts *b′*, arranged and combined as herein specified.

2. The corrugations on side of cutters or drills S, and corresponding corrugations on the inner surfaces of head-guide blocks T, packing-block C′, bolts *a′*, clamp-rods or bolts *b′*, as arranged and combined for effecting the objects specified.

3. The double-acting feed arm or plate *q′*, connecting-rod U′, vibrating-lever *r′*, combined and arranged in the manner and for the purpose herein described.

4. The standards R, arranged on outside of frame A, in the manner and for the objects specified.

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Witnesses:

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