5 Sheets—Sheet 1.

I. W. BRADBURY.

MACHINE FOR CUTTING STONE INTO SLABS, BARS, &c.

No. 185,072. Patented Dec. 5, 1876.

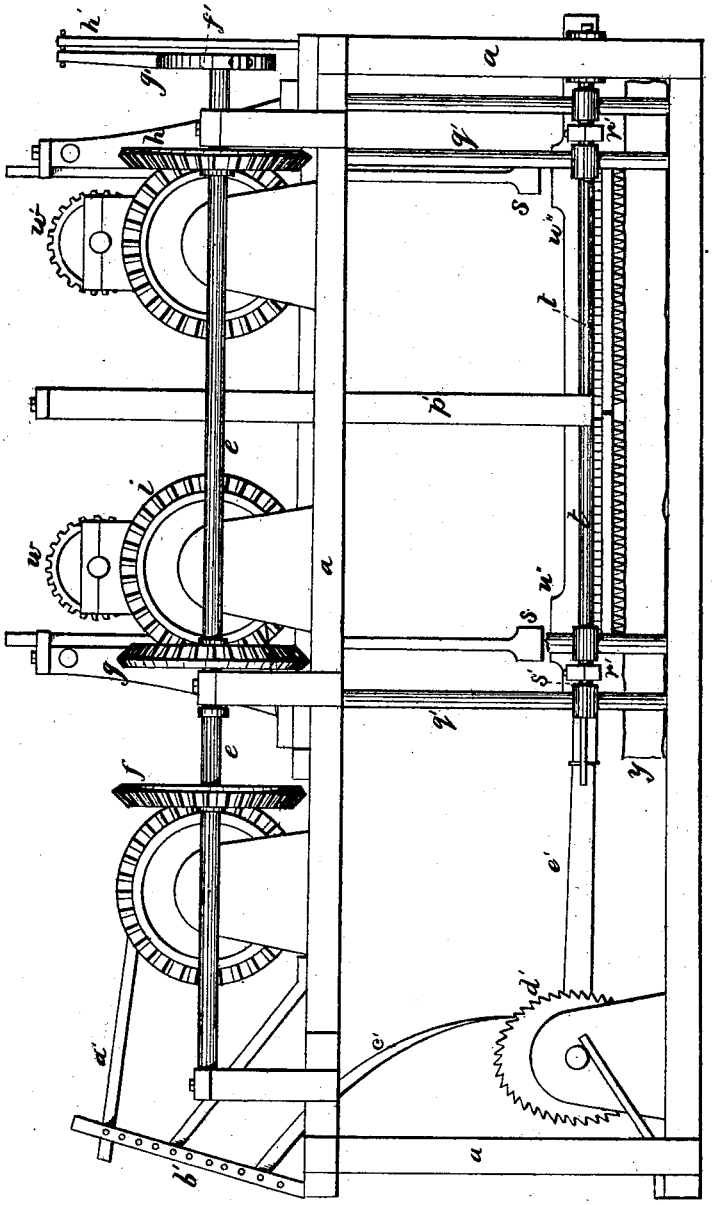

Fig. 1.

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Edgar S Brown

Inventor:

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5 Sheets—Sheet 2.

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Fig. 2.

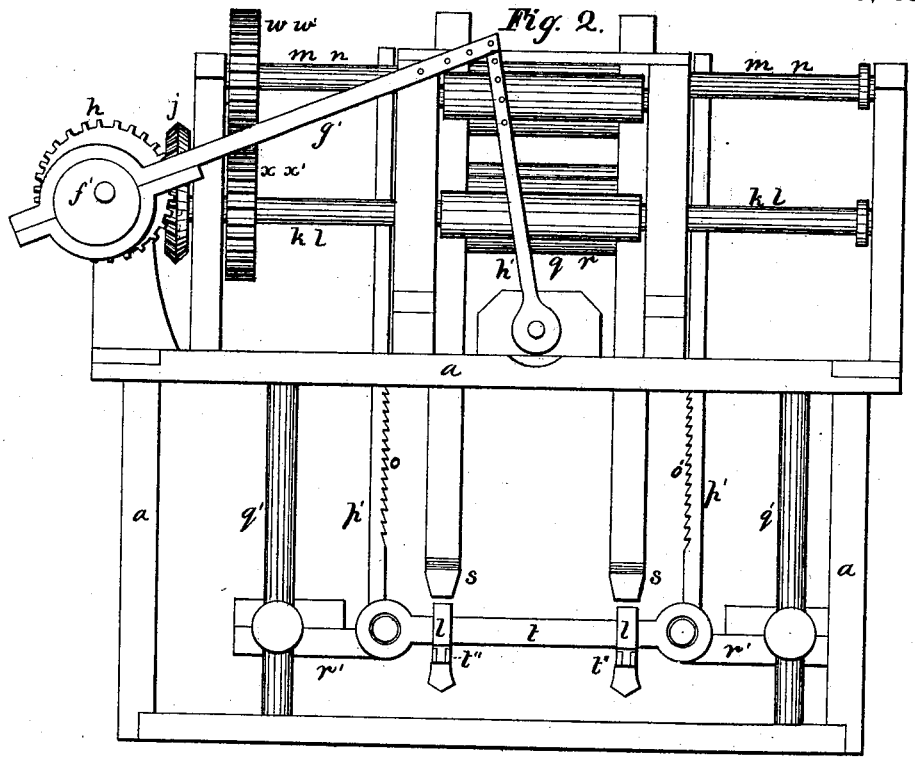

Fig. 3.

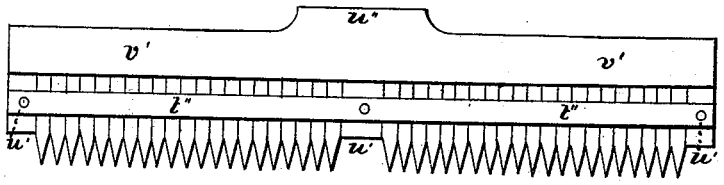

Fig. 4.

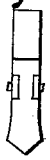

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Fig. 5.

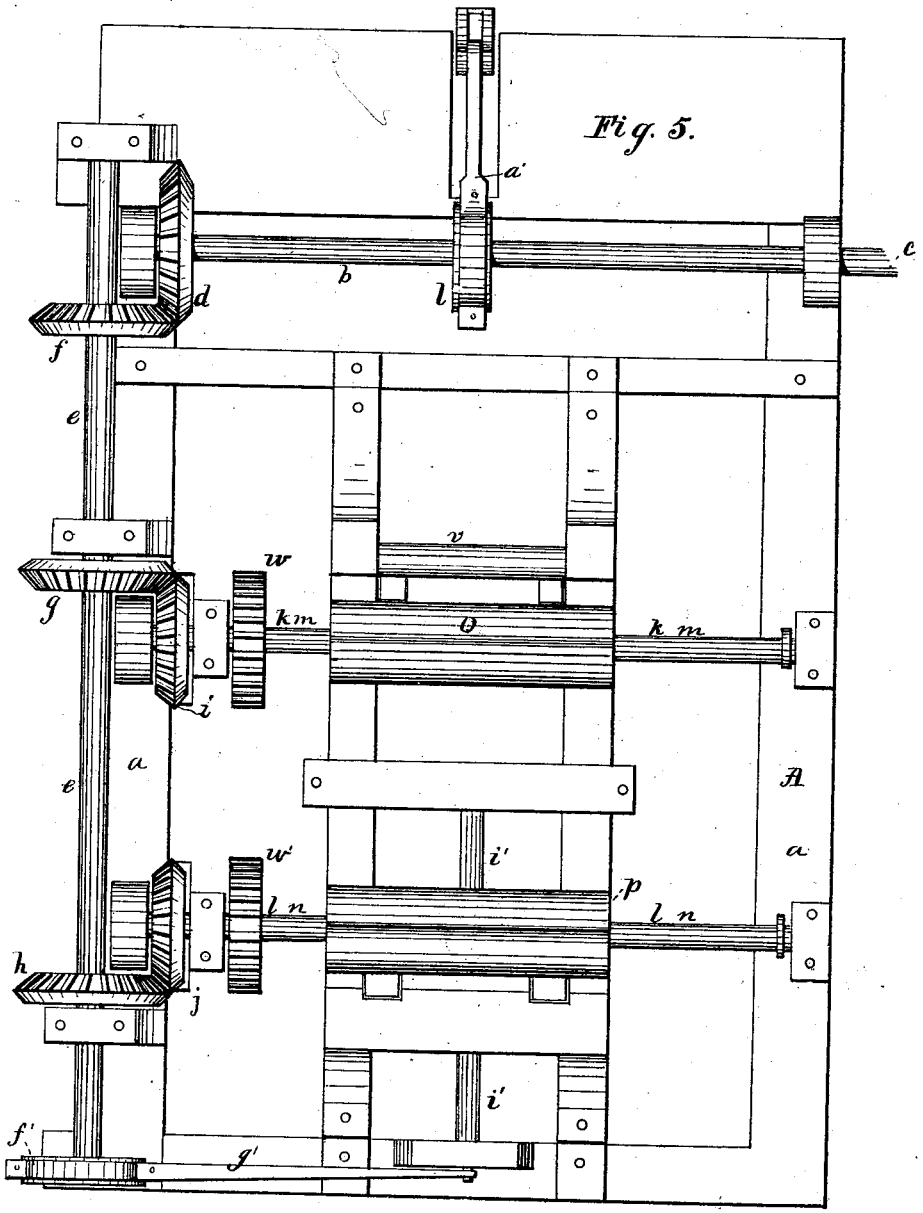

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Fig. 6.

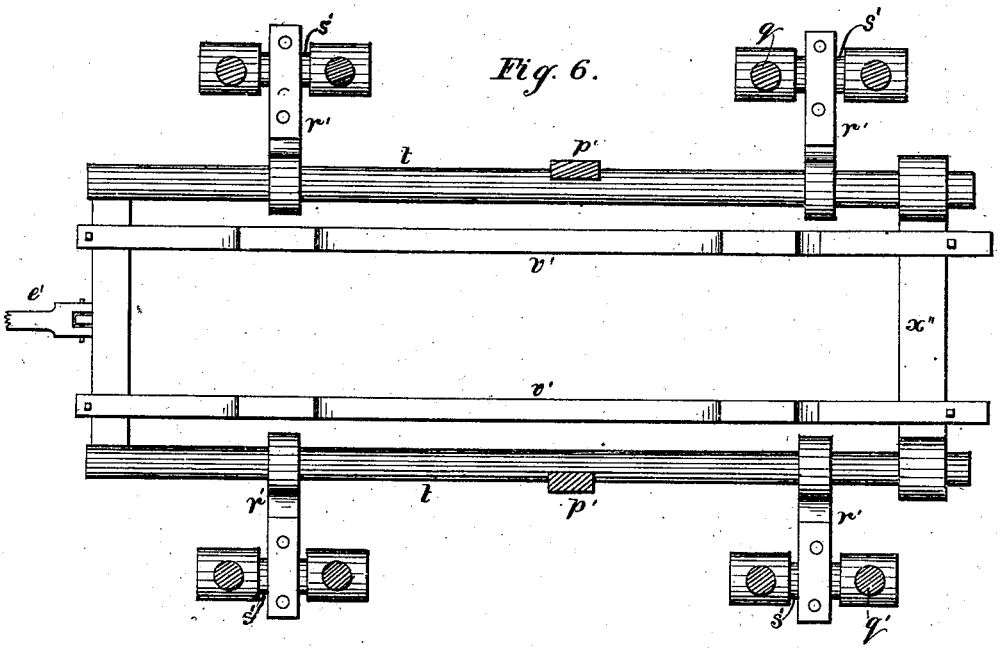

Fig. 7.

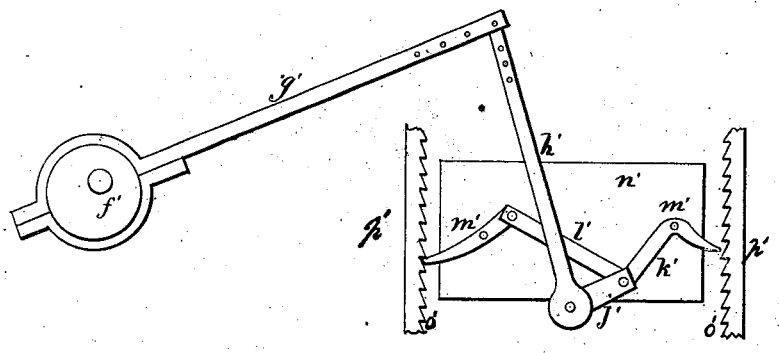

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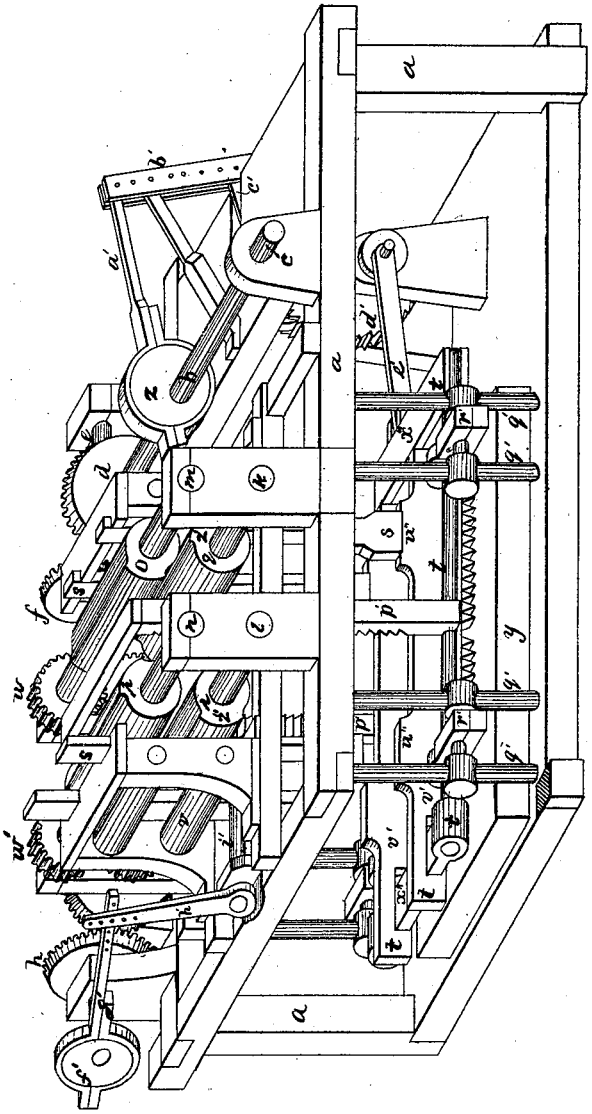
Fig. 8.



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UNITED STATES PATENT OFFICE.

ISAAC W. BRADBURY, OF HOLLIS, MAINE.

IMPROVEMENT IN MACHINES FOR CUTTING STONE INTO SLABS, BARS, &c

Specification forming part of Letters Patent No. **185,072**, dated December 5, 1876; application filed July 10, 1876.

To all whom it may concern:

Be it known that I, ISAAC W. BRADBURY, of Hollis, in the county of York and State of Maine, have invented certain new and useful Improvements in Machine for Cutting Stone; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side view of the machine, showing shaft and beveled gear. Fig. 2 is an end view of the machine. Fig. 3 shows the arrangement of the drills or cutters. Fig. 4 is an end view of Fig. 3. Fig. 5 is a top plan of the machine. Fig. 6 is a top plan of the frame for holding the drills or cutters. Fig. 7 shows the device used for lifting the frame. Fig. 8 is a perspective view of the machine.

Like letters show like parts.

The object of my invention is to provide a machine for cutting stone into slabs, bars, and other forms. It consists of the combination of a number of devices for operating the drills or cutters, and working the hammers.

a is the frame of the machine. *b* is the driving-shaft, impelled at *c*, and having the beveled gears *d*. *e* is a shaft, at right angles to *b*, and carrying the beveled gears *f*, *g*, and *h*. The gear *d* meshes with *f*, and this gives a rotation to the shaft *e*, to which it is rigidly attached. The gear *g* meshes the beveled gear *i*. The beveled gear *h* meshes the gear *j*. These two gears *i* and *j* are rigidly set on shafts *k* and *l*. Over *k* and *l* are the two shafts *m* and *n*. On these two shafts *m* and *n* are constructed rollers, having friction-surfaces *o* and *p*. On the shafts *k* and *l* are the friction-rollers *q* and *r*, having friction-surfaces *z' z''*. *s* shows hammers, designed to strike on the top of the cutter or drill frame *t*, to force the cutters to chip the stone.

The operation of the friction-lifters, the rolls, and the hammers is as follows: When the shafts *k l m n* are caused to revolve, as described, the lower pair, or *k* and *l*, bring their friction-surfaces against the sides of the stocks or shanks of the hammers *s*, and so lift them, in order that, in falling, they may strike the cutter or drill frame *t*, and so produce a cutting on the stone beneath them. In order to insure their falling, and also to add, perhaps, somewhat of force to their blow, the upper pair of rolls, or *m n*, bring their friction-surfaces against the hammer-shanks just as they are about to fall, thus rendering it certain that they do fall. The friction-surfaces of these two rolls *m* and *n*, not being very wide, do not, except for a brief period of time, interfere with the full fall of the hammers. On the opposite sides of the shanks of the hammers from the friction-rolls and lifters are loose rolls *v*, for the hammer-shanks to play against. The friction and loose rolls are set in convenient bearings, as illustrated in the drawings. The upper rolls *m* and *n* are caused to revolve by having pulleys *w w'* meshing pulleys *x x'* on the rolls or shafts *k* and *l*. This gives to the upper two an opposite revolution from that of the lower two, and thus enables them to accomplish the work above described. *y* is to represent the stone to be cut.

It is manifest that gears could be employed instead of the friction-rolls *k l m n*. Racks would then be placed on the shanks or stocks of the hammers.

The drill-frame has a vibratory movement over the stone, to improve its efficiency. The devices to produce the movement are the eccentric *z* on the driving-shaft *b*. This eccentric moves the arm *a'*, which forces backward and forward the pivoted upright lever *b'*. At the lower end of this lever is the pitman *c'*, operating the toothed eccentric or oval *d'*. From a crank on the shaft of eccentric *d'* extends the arm *e'* to the drill-frame *t*. To this it is fastened by a bolt, eye, and socket. The form of the wheel or oval *d'* imparts an intermittent motion to the frame *t*, thus allowing the drills time to make their cuttings on the top of the stone, and also to move over the whole length of the stone. When thus moved backward and forward over the stone, the drill-frame is slightly elevated and lifted from the surface of the stone.

I will now describe the means of effecting this movement. *f'*, Figs. 7 and 8, is an eccentric on the shaft *e*. The arm *g'*, connected with the periphery of the eccentric by a loose hoop, is moved by said eccentric. This arm

is pivoted to the rocking lever h', rigidly connected at its lower end with the horizontal shaft i', set on the top of the frame a in a proper bearing. At the inner end of this shaft is attached the short arm j'. This moves as the shaft is rocked by the lever h'. The upper end of the short arm j' is pivoted to two bell-crank levers, k' and l', pivoted at m' to plate n'. The outer ends of these bell-cranks work in racks o' on the upright p'. These uprights are fastened at their lower ends to the drill-frames t.

Thus it is evident that, as the shaft is rocked by the lever h', the drill-frame is first raised and then lowered. It is so raised to admit of its being moved over the surface of the stone, and when the blows of the hammers are struck the drills are, of course, in contact with the surface of the stone, the frame being lowered. q', Figs. 2, 6, and 8, are guide-rods, to make the up-and-down movement of the frame even. r' are projecting pieces from the frame, and s' are horizontal rods permitting the vibratory motion of the frame.

The drills or cutters are arranged in rows, as illustrated in Fig. 3. They are recessed on each side, and into the recess is a steel clamp or binder, t'', fastened to the frame at w'. The clamp or binders are screwed onto the frame, so that the drills or cutters may be removed with ease for the purpose of repairing and sharpening. The drills or cutters may also be so placed that their cutting-edges shall stand at various angles. The top ends of the cutters bear up against the frame-work v'. Upon v' the hammers fall at raised points w''. The frame can be extended to any desired length; the end pieces x'' are removable with that view. Then the frame-work v' can be made as long as the piece of stone to be cut.

With this machine blocks of stone can be cut into slabs of any desired thickness, or into beams or bars.

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

1. The combination of the shaft b, gears d, shaft e, and gears f g h with the rolls k l m n, their friction-surfaces, and hammers s, as herein described.

2. The combination of the shaft b, eccentric z, arm a', upright pivoted lever b', pitman c', toothed eccentric d', arm e', and drill-frame t, as and for the purposes described.

3. The drill-frame t, with its drills or cutters and steel clamp or binders, made and operating as herein described.

4. The combination of the shaft b, with its gear-shaft e, eccentric f', arm g', lever h', shaft i', arm j', bell-crank k' l', racks o', and frame t, as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ISAAC W. BRADBURY.

Witnesses:
H. G. BRIGGS,
H. M. SYLVESTER.