

H.J. Ruggles.
Stone Channeling Mach.

No 70,123.

Fig. 1.

Patented Oct 22. 1867.

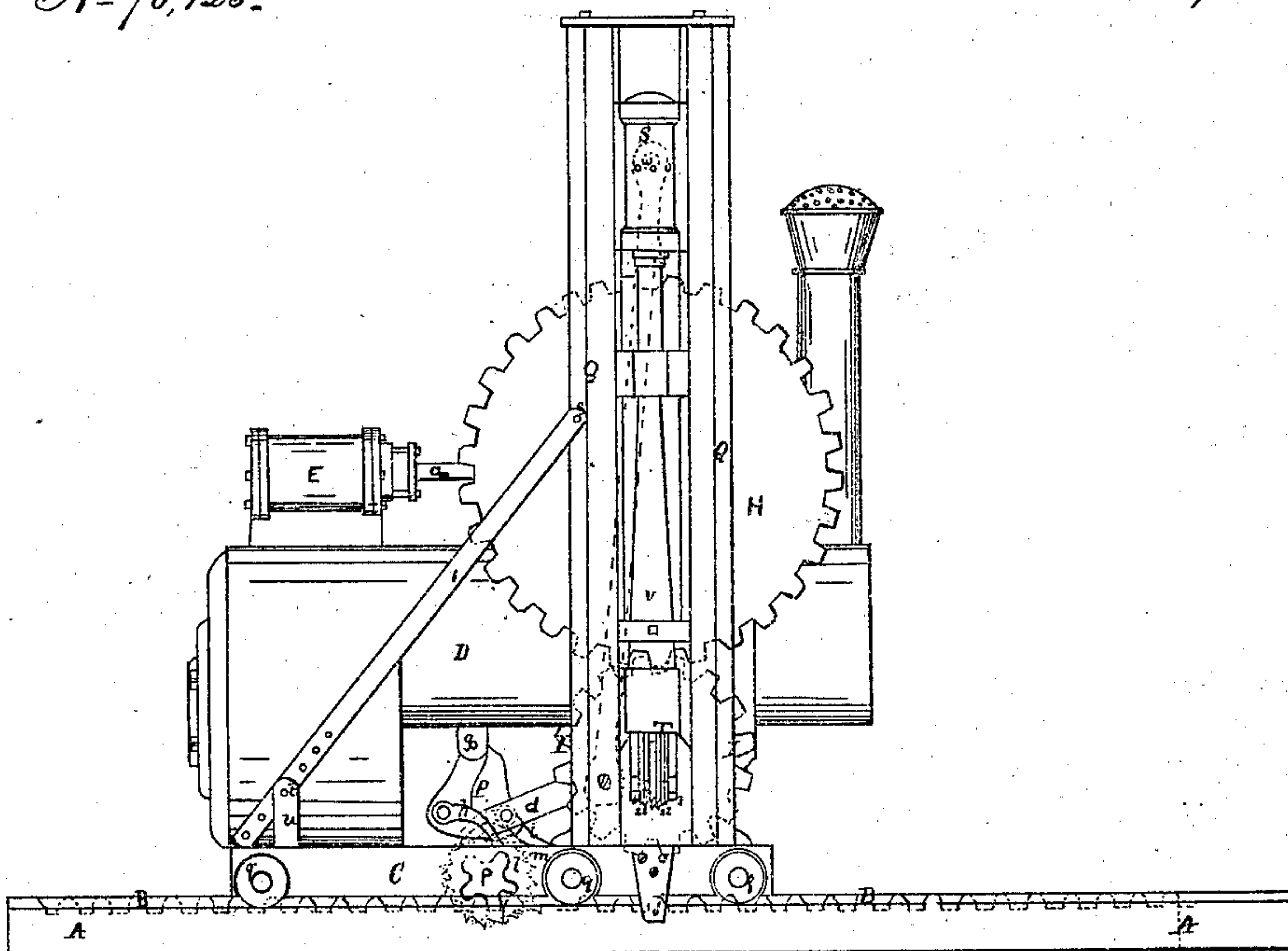


Fig. 2.

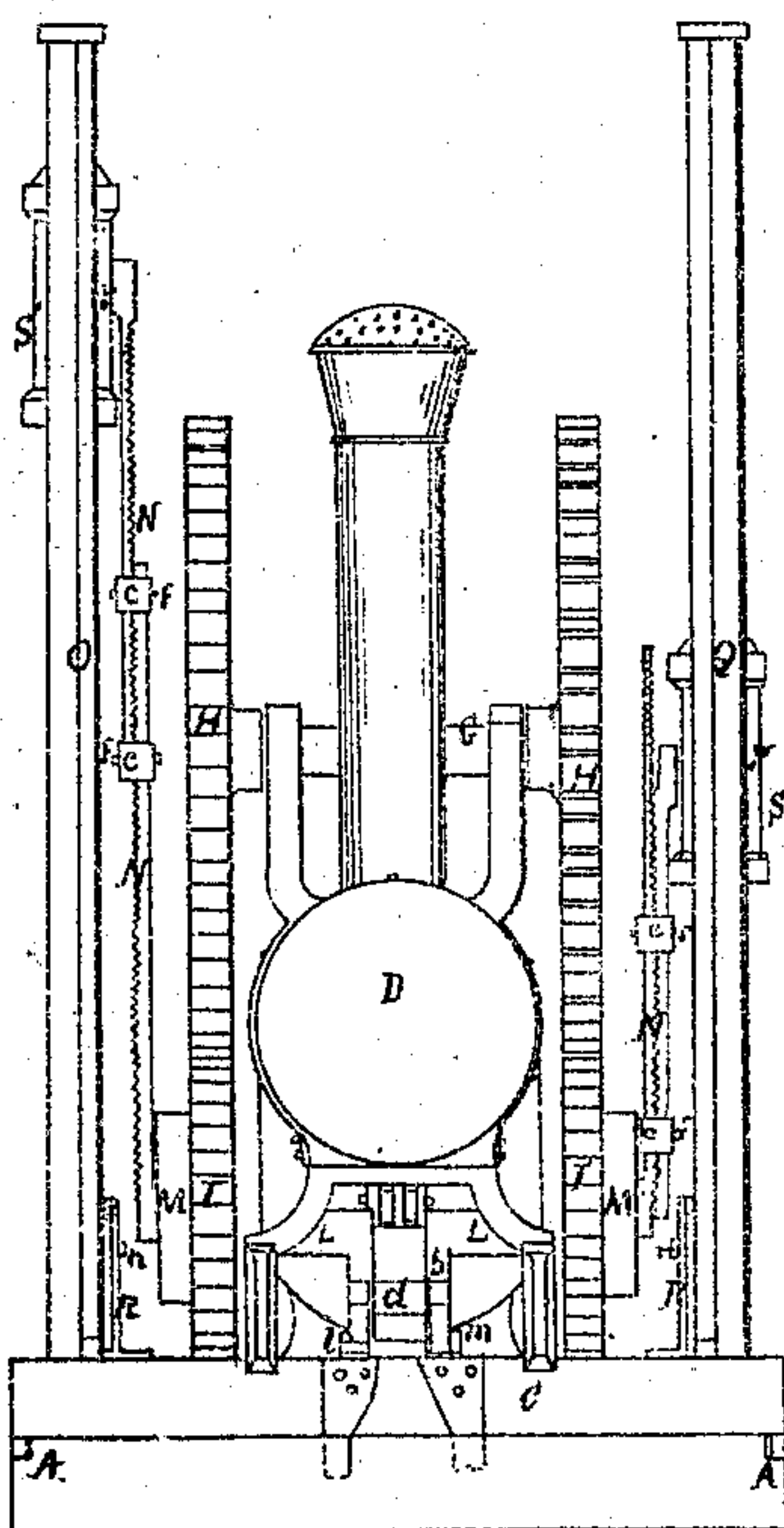


Fig. 3.

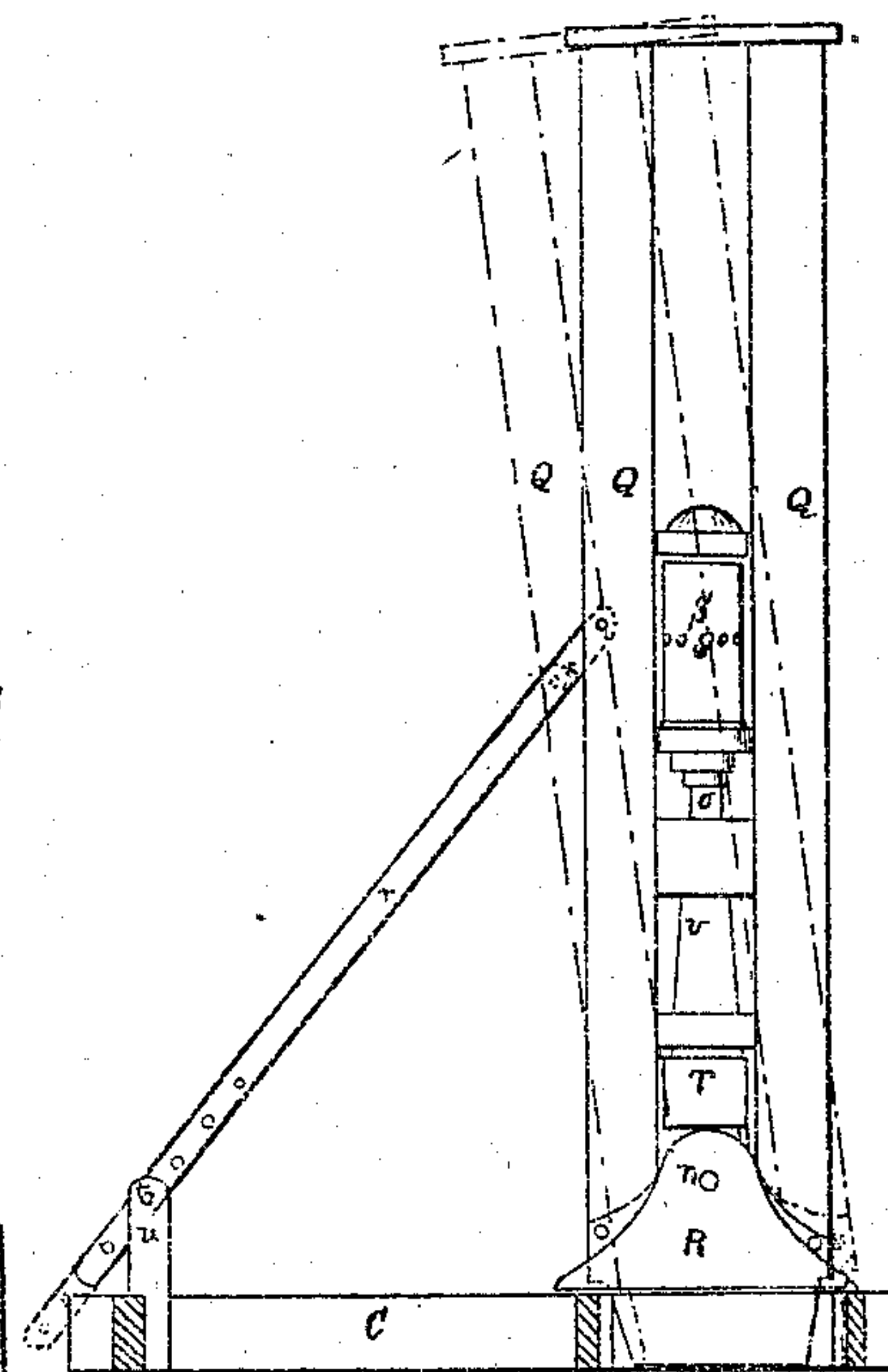
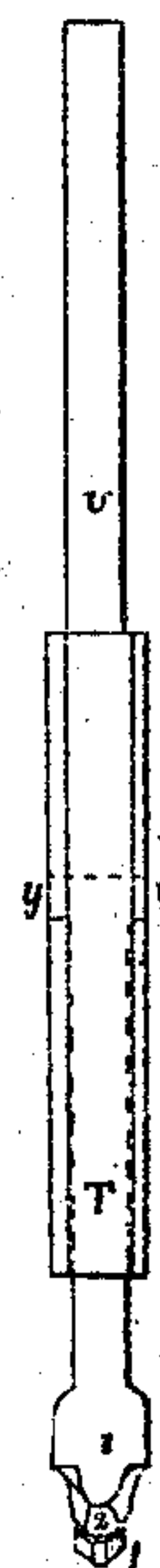


Fig. 4.



Witnesses.

Thos. S. Parker.
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Inventor

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By his atty.
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United States Patent Office.

HENRY J. RUGGLES, OF POULTNEY, VERMONT.

Letters Patent No. 70,123, dated October 22, 1867.

IMPROVED STONE-CHANNELLING MACHINE.

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, HENRY J. RUGGLES, of Poultney, in the county of Rutland, and State of Vermont, have invented an improved Stone-Channelling Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a side elevation of the machine.

Figure 2 an end elevation of the same.

Figure 3 a side elevation of a part detached.

Figure 4 an edge view, on an enlarged scale, of the case or gang of drills or cutters.

Like letters designate corresponding parts in all of the figures.

My invention consists in certain improvements in that class of stone-channelling machines in which a drill or gang of drills, operated by steam or other power, is situated on a truck, and made to move along automatically on a track, over the rock to be channelled or cut. The principal feature of my invention consists in the employment of an air-spring cylinder or cylinders, interposed between the steam or other power and the drills or cutters, in order to deliver and properly regulate and apply the force of the blows thereof upon the rock, either at the surface, or to any depth in the channel cut therein, substantially as herein described.

Let A represent a track situated and fastened upon the rock to be channelled, C a truck to run by casters or wheels *q q* upon the track, D a steam-boiler located and borne on the truck, and E a steam-cylinder mounted (conveniently but not necessarily) upon the boiler, and receiving steam therefrom for working the drills, and automatically feeding the truck and operating parts along. The piston-rod *a* turns by a crank the main driving-shaft G, upon which are secured two driving cog-wheels H H, and gear into two smaller wheels or pinions I I below. The pinions are secured to the same shaft L, on which also are two eccentric or crank balance-wheels, M M, at the ends, for communicating a reciprocating motion by pitmen or connecting-rods N N to the air-spring cylinders S S; and in the middle is a crank, *b*, which, by means of a connecting-rod, *d*, under the boiler, moves two pawls, *h i*, by one of which the truck is moved or fed along over the work in one direction, and by the other it is moved or fed along in the opposite direction. The two pawls are pivoted to a swinging-block, P, suspended at *g* from the boiler, and one works into a ratchet-wheel, *l*, so arranged as to turn its shaft in one direction, and the other pawl works a ratchet-wheel, *m*, on the same shaft, but so arranged as to turn it in the opposite direction. On this ratchet-wheel shaft is a pinion, *p*, (fig. 1,) which gears into a rack, B, secured to the track lengthwise thereof. Thus, when one pawl, *h*, works, the truck C is moved forward at regular intervals; and when the pawl *m* works, the truck is moved backward. When one pawl is operating, the other is thrown up or back out of working position, as indicated at *i* by black lines in fig. 1.

The pitmen N N, which transmit the motion from the crank or eccentric-wheels M M to the air-spring cylinders S S, are each made in two parts, arranged to lap by each other, and having their contiguous surfaces serrated, so that, when clamped together by bands *cc* and set-screws *ff*, or their equivalents, they will not slip one upon the other. By this means the pitmen can be adjusted to many different lengths simply by loosening the clamps, sliding the parts of the pitman upon each other as much as desired, and then securing them there by tightening the clamps again. The variation of the length of the pitmen varies the depth to which the drills descend, and this is repeated as the channel is cut deeper and deeper. The pitmen are pivoted to the air-cylinders S S by wrist-pins thereon at or near the middle.

The air-cylinders move up and down between ways Q Q, which are supported by and pivoted respectively to bearings R R, firmly secured upon the truck C, inside of the track A. The pivots *n n*, on which the ways turn, are centred in the same transverse vertical plane as the centre of the shaft L of the pitmen-cranks, so that the action of the pitmen shall be equal in both directions. On these pivots the ways are adjusted, and held either in a perpendicular position, as represented by black lines in the drawings, or in an inclined position, either forward or backward, in the line of the channel, as indicated by red lines in fig. 3. They are held and adjusted in these positions by guy-rods *r r*, which are pivoted to the ways at the upper end, as at *s*, and are provided at the lower end with a set of holes, through any one of which a pin, *t*, may pass, and through a stud or projection, *u*.

The air-cylinders S S have pistons inside, and the piston-rods *o o* extend downward through the lower heads

of the cylinders. The drills are suspended by those piston-rods, and move up and down with the air-cylinders, being guided in the same ways Q Q.

Around the middle of each cylinder S there are one or more holes, *w*, through the sides thereof, for the purpose of allowing air to flow freely into and out of the cylinder. Then, as the piston approaches either end of the cylinder, the air is compressed before it, while the air from the outside rushes in behind it, so that no vacuum is formed.

When the cylinders S S are forced downward by the power of the engine, the drills or gangs of drills are driven before them, and are caused to strike upon the rock with a force proportional to the degree of compression of the air produced in the air-cylinders; and this is adjusted, as the channel deepens, by shortening the pitmen N N in the manner above set forth. At the same time the force is elastic, and does not cause any considerable jarring of the machinery, which is so detrimental and difficult to prevent in machines heretofore used. The drills and their stocks may be made quite light, since the force of the blow does not depend on their weight. Thus the shaking of the machinery is thereby lessened, and the power ordinarily expended in lifting heavy drills is saved.

The compressed air in the upper end of each cylinder delivers the force to the descending drills, and that in the lower end thereof lifts the drills, doing this gradually and without shock.

The drills used are arranged in gangs, or rather in sets, composing a compound drill, since each drill has a different shape, and performs a different office from the others. There are one or more central drills, 1 1, in the middle, sharp at the points, and narrower than the others, so as to cut a leading channel with less labor; then on each side of these are one or more drills, 2 2, wider in the cutting part than the leading drills, and sharp on the side edges, for widening the channel; and, finally, at each side of these are one or more trimmers, 3 3, having blunt extremities, but cutting outer edges, which trim and dress the sides of the channel to the full width. Since these different forms of drills or cutters are arranged both ways from the centre of the stock, the gang or set works the same in either direction, as the truck is moved either forward or backward.

The drills are set side by side in a socket-clamp or stock T, one of the side plates of which is removable, for inserting and removing the drills, and is secured in place by screws or their equivalent. There is a cross-head, *y*, (fig. 4,) at the upper end of each drill, which fits into cross-grooves or slots in the side plates of the stock, and thus hold the drills securely in place, without being able to move in their socket or drop out.

The drill-stock T is made a little thinner than the channel cut by the drills, so that it will just go freely down therein. This enables the stock to descend lower, and allows the drill-shanks to be shorter, to go a given depth into the rock. The drill-stock also thereby serves as a guide to the drills in the channel itself, and supports them to a considerable extent.

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

1. The employment of an air-cylinder, S, in combination with drills or cutters, substantially as and for the purpose herein specified.
2. I also claim the combination of an air-cylinder or cylinders, one or more drills or cutters, and a truck or carriage, moved automatically over the rock or stone to be channelled or cut, substantially as herein specified.
3. I also claim the combination of an air-cylinder or cylinders, one or more drills or cutters, steam-engine or other motive power, a truck or carriage, on which the operating parts are mounted, and an automatic device for moving the truck along in either direction, substantially as herein set forth.
4. I also claim a drill or set of drills, composed of single drills of the different kinds of points or cutting parts substantially as and for the purpose herein specified.
5. I also claim, in combination with the drill, the drill-clamp or stock T, constructed substantially as described, so as to enter the channels and serve as a guide and support for the drills therein.
6. I also claim the arrangement of the ways Q Q, in which the air-cylinders and drills are guided, so as to be adjusted and set either vertically or inclined in the planes of the channels, substantially as herein set forth.

HENRY J. RUGGLES.

Witnesses:

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E. CLARK.