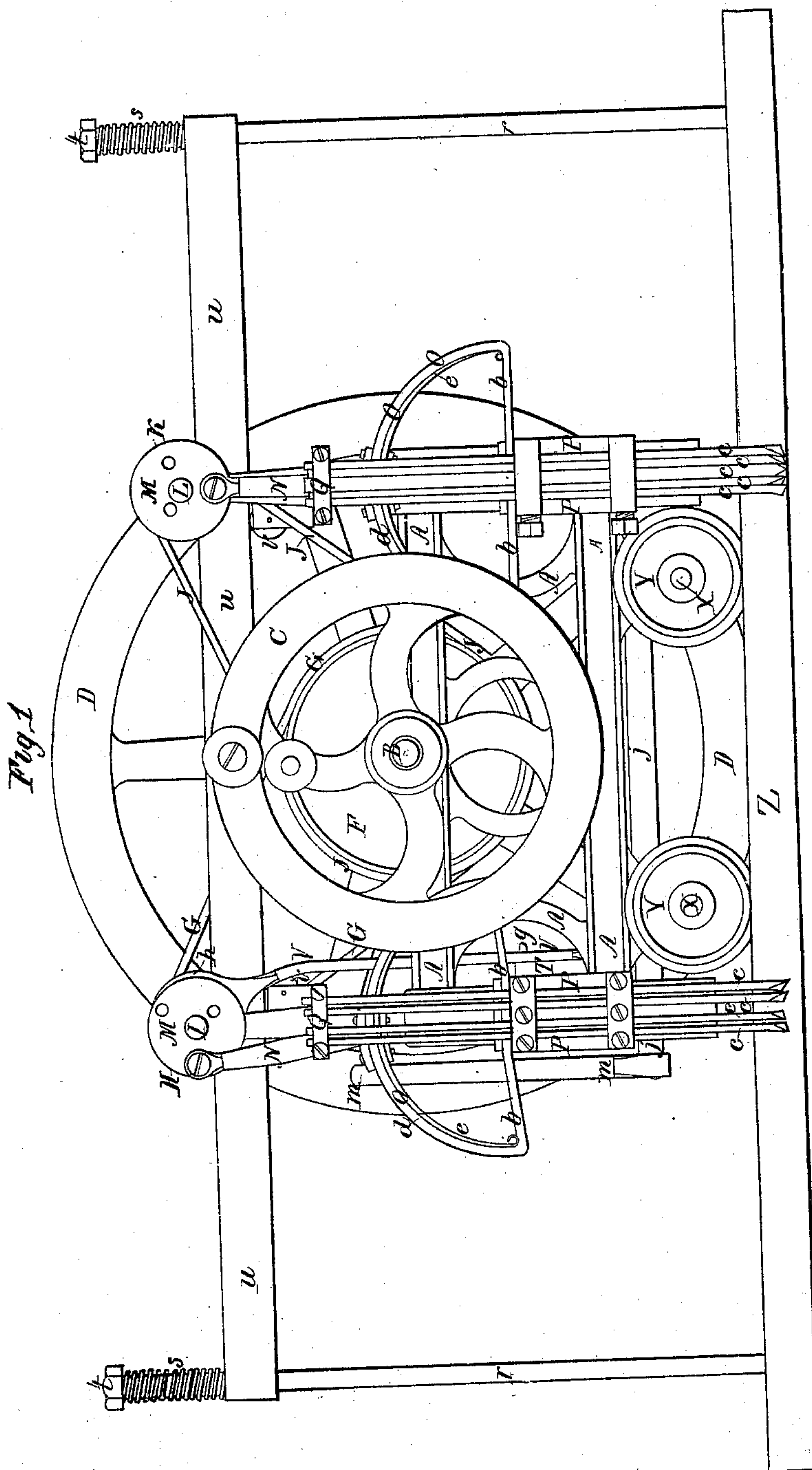


E. G. Lamson.

Stone Channelling Mach.

N^o 58,435.

Patented Oct. 2, 1866.



Witnesses
J. D. Patten.
D. G. Chamberlain.

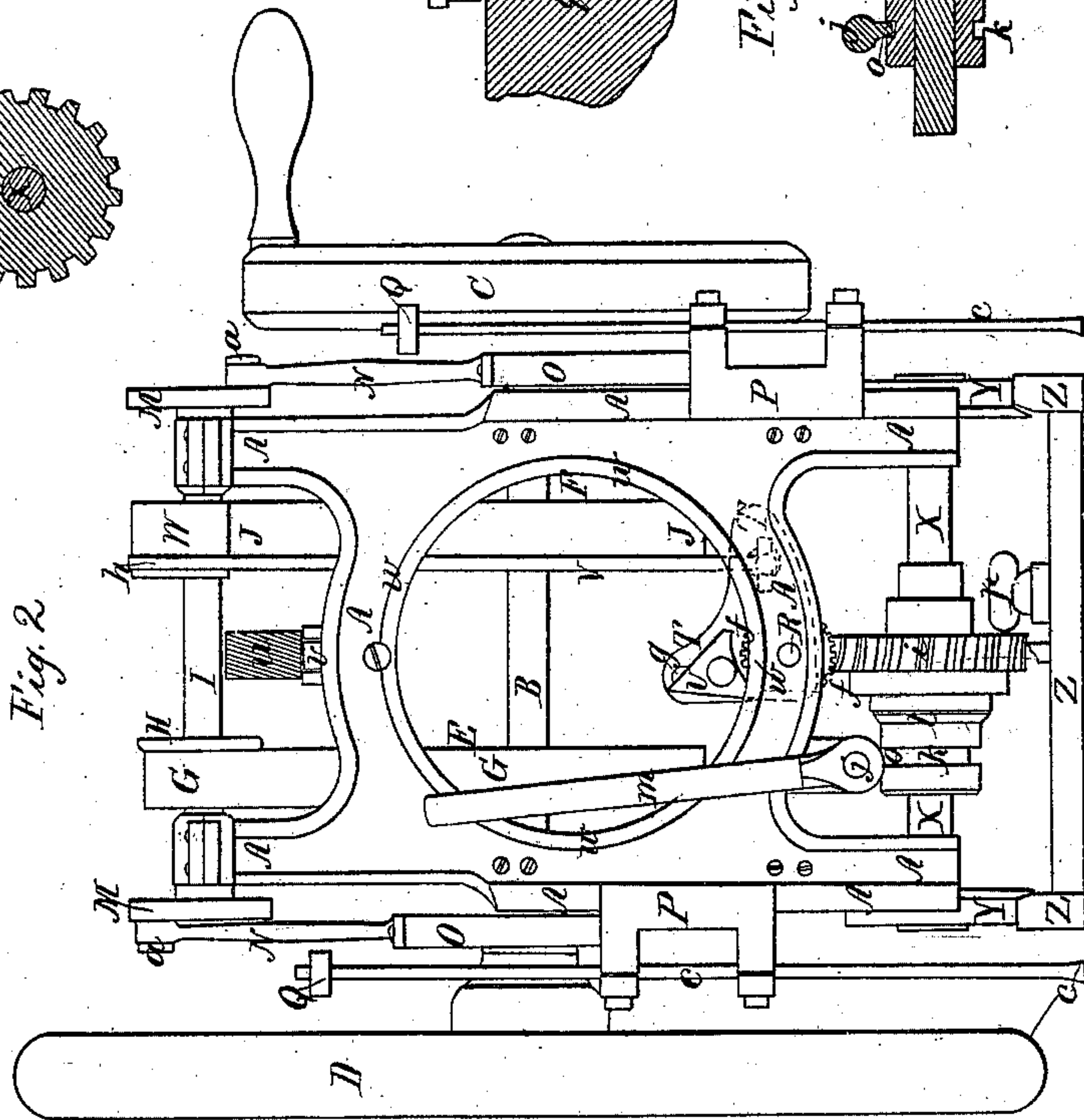
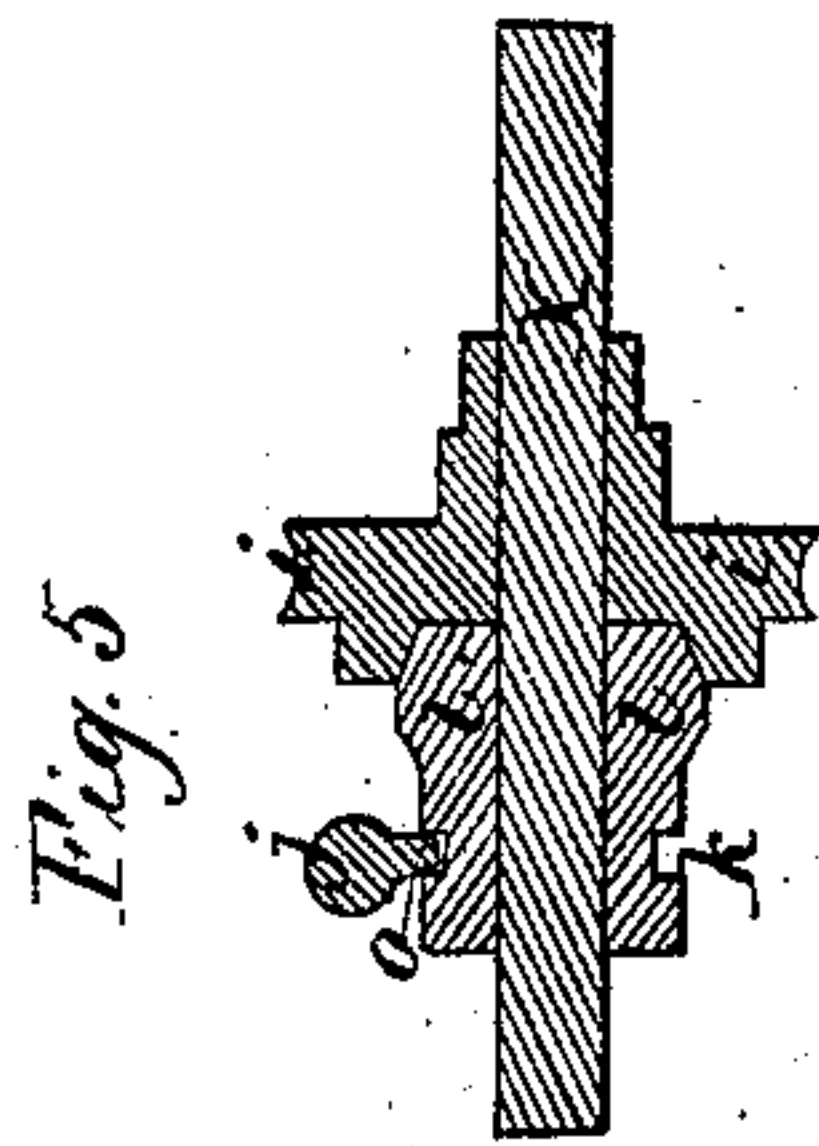
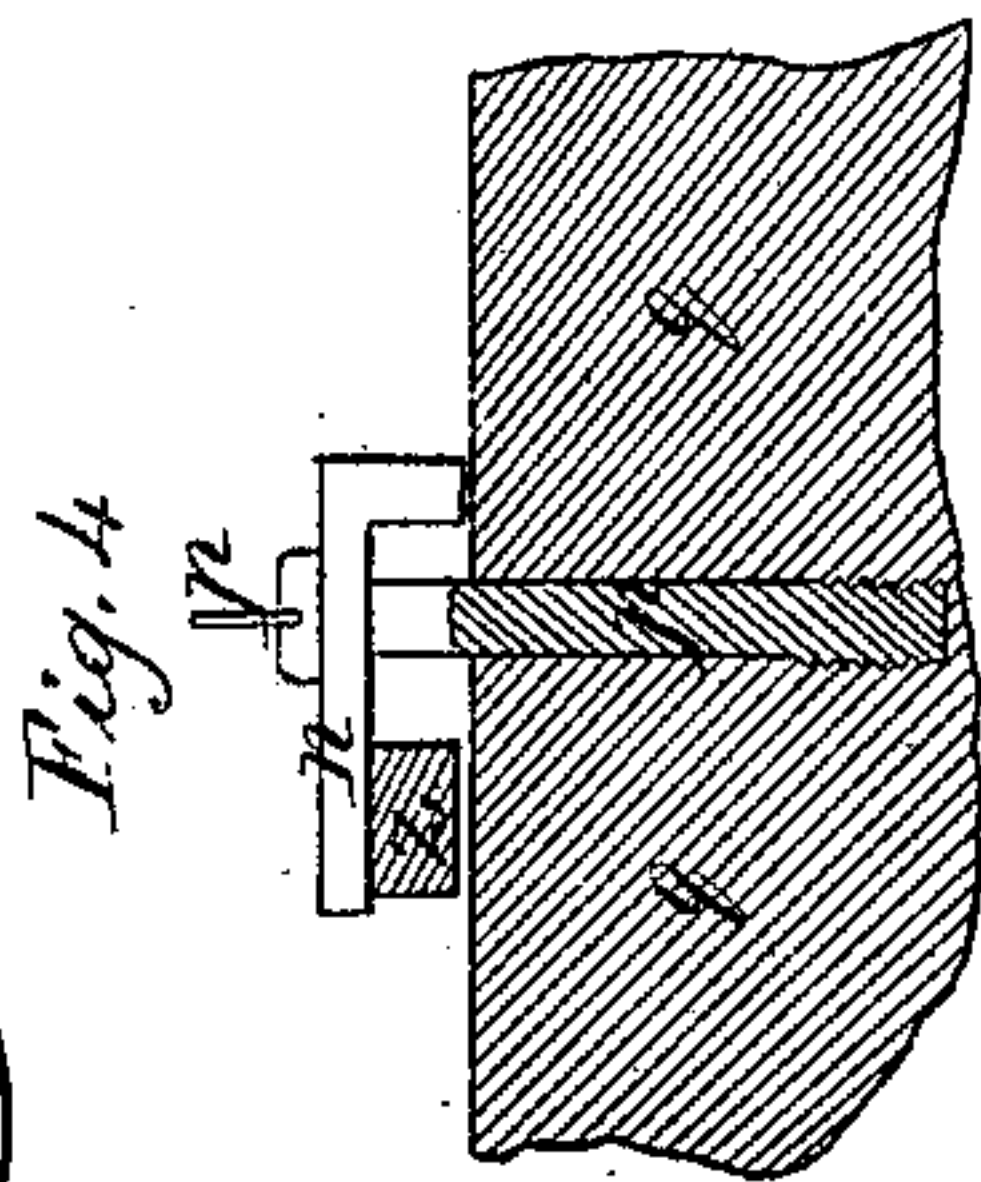
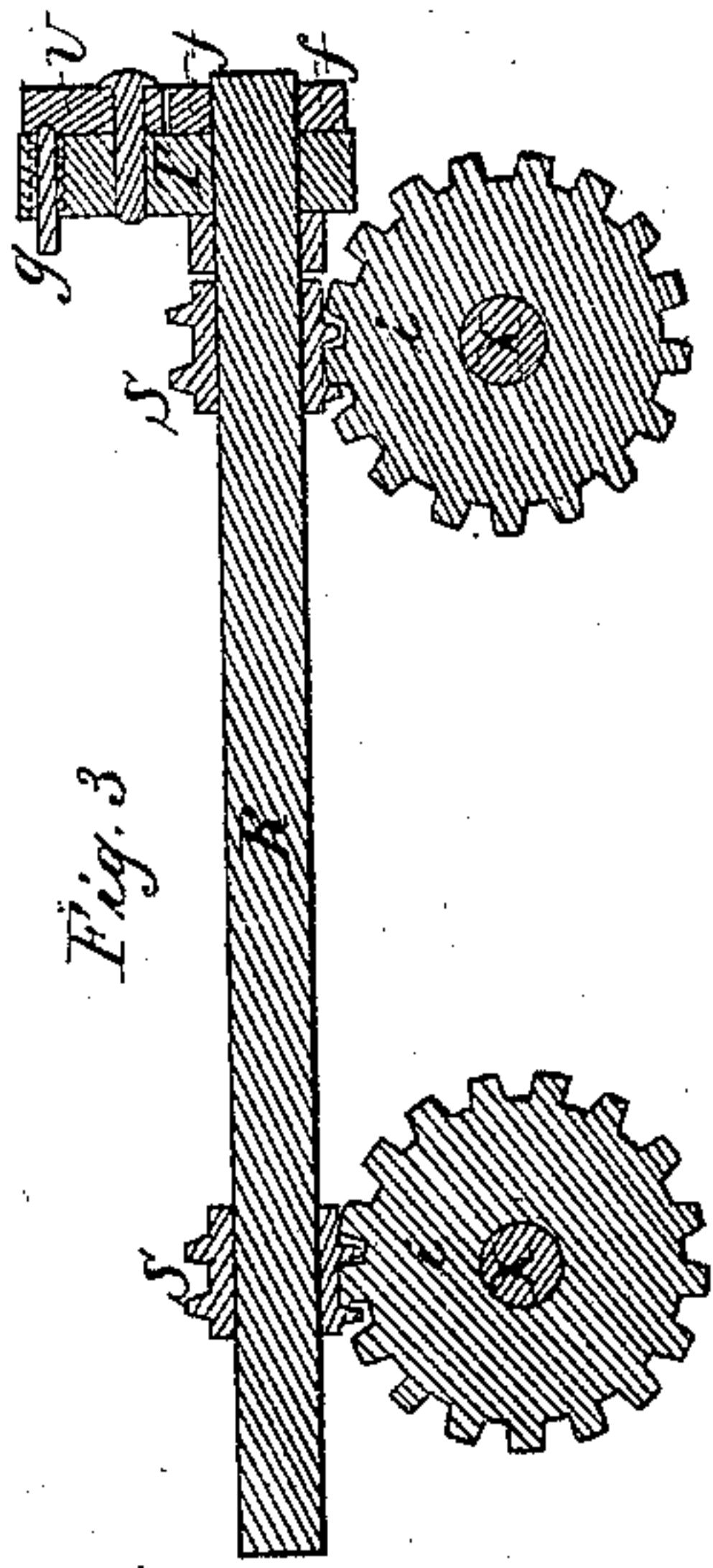
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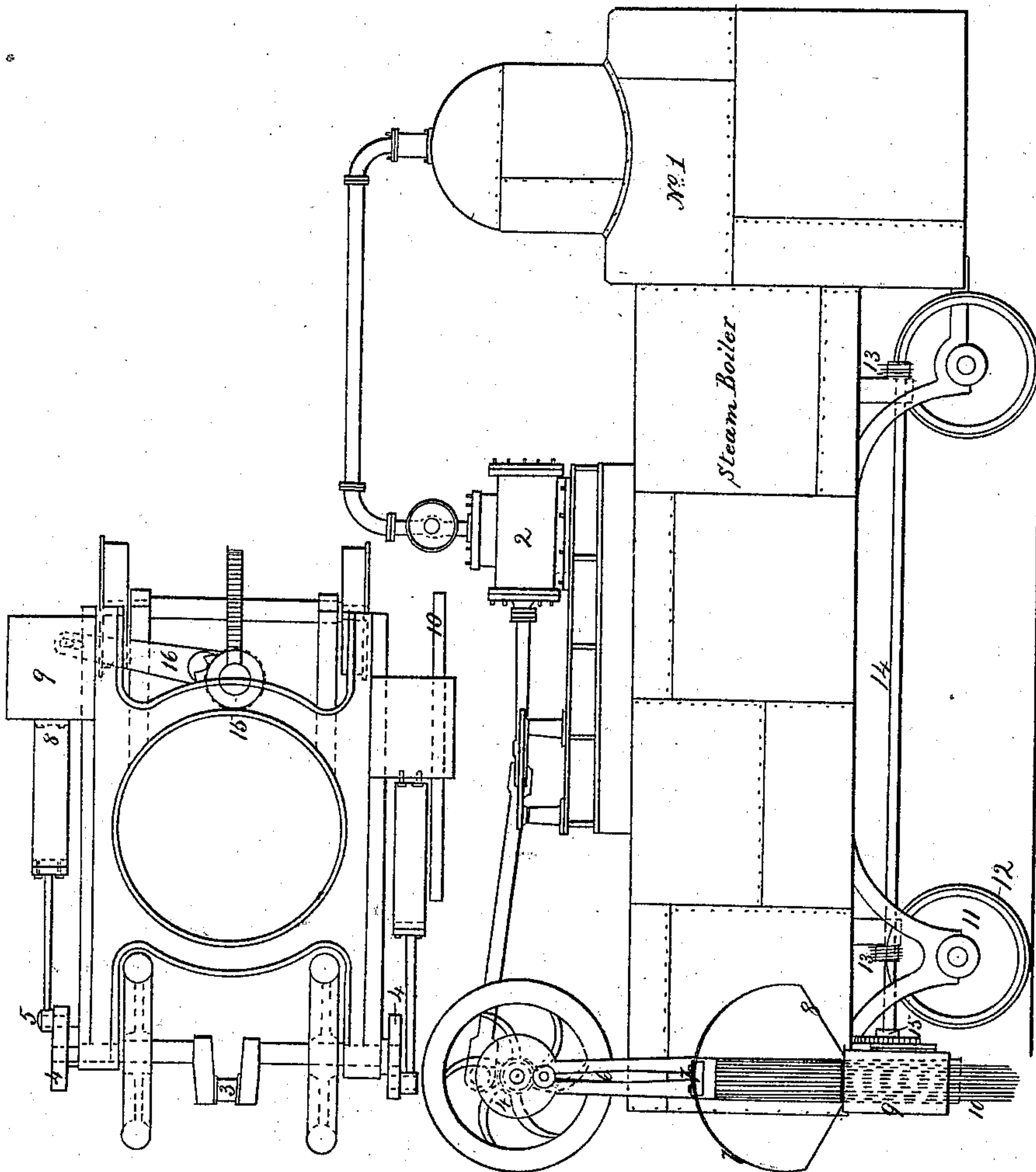
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UNITED STATES PATENT OFFICE.

EBENEZER G. LAMSON, OF SHELBURNE FALLS, MASSACHUSETTS.

IMPROVEMENT IN DRILLING AND QUARRYING STONE, &c.

Specification forming part of Letters Patent No. 58,435, dated October 2, 1866.

To all whom it may concern:

Be it known that I, EBENEZER G. LAMSON, of Shelburne Falls, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Machines for Cutting, Channeling, Tunneling, or Quarrying Rock; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an elevation of one of the sides of the machine, the opposite side being substantially similar to that shown in this figure. Fig. 2 represents an elevation of one of the ends of the machine. Fig. 3 represents a section through the feeding mechanism. Fig. 4 represents the manner of clamping the ways or track upon which the machine moves to the stone or rock to be wrought upon. Fig. 5 represents a section through one of the friction-clutches that connect with the feed mechanism.

Similar letters of reference, where they occur in the several figures, denote like parts of the machine in all the drawings.

When drills or cutting-tools are thrown against stone or rock by the reaction of a compressed spring solely, it is very destructive upon the cutting-edges, and, besides, springs thus used become weakened, and as the chisels or drills reduce or cut away the stone, they have a constant varying motion in speed and force, and no certain regularity of action. When a positive motion is given to drills, chisels, or such other cutting or abrading instruments by cams, cranks, or crank-wheels, the distance between the throw of the cams or cranks and the surface of the rock or stone wrought upon varies with the surface removed; and this, too, makes irregular working, unless a very nice feed-motion is combined with it. But the positive motion is more certain and regular, and less destructive upon the cutting-edges than the spring motion, while the latter is more simple.

Each plan, therefore, has its advantages and disadvantages; and my object has been to avail myself of the advantages of both plans, and at the same time obviate their disadvantages; and to this end I combine the positive motion with a peculiar spring mo-

tion, and thus obtain the object, as will be explained.

My invention consists in operating the drills, chisels, or cutters of a stone-cutting, channeling, quarrying, or tunneling machine by a combined positive and spring motion, whereby I avoid a complicated feed-motion to said tools, preserve their cutting-edges for a longer period of time, and produce more uniform and regular cutting with less power or labor.

My invention further consists in the clutch and feed motions, by which the machine is moved along on its track or ways and traversed back and forth, as will be explained.

In suitable bearings upon a substantial cast-iron or other frame, A, is placed the drive-shaft B, having upon one of its ends a crank or belt wheel, C, and upon the other end a balance or fly wheel, D. Upon this drive-shaft B is placed two driving-pulleys, E F, the belt G of the pulley E passing over and around a pulley, H, on a shaft, I, on the top and at one end of the frame A, and the belt J of the pulley F passing over and around a pulley, K, on a shaft, L, on top of and at the opposite end of the frame, and through these belts G and J the shafts I and L receive their motion.

Upon each of the ends of the shafts I L are placed crank-wheels M M M M, to wrist-pins *a* in which are connected, severally, the pitmen N, the lower ends of which are attached to the crowns of the strapped bow-springs O, and to the strap or cord *b* of said bow-springs is secured the block P, that carries the series of drills or cutters *c c c*, there being one series or set of such drills at each of the corners of the machine.

The drills or cutting tools, it will thus be seen, are raised by means of the strap, while the bow-spring, which it surrounds or is connected to, takes off the suddenness of the rising motion; and when the cutters or chisels, which are raised and lowered by the crank-wheels and pitmen, (or by a positive, as contradistinguished from a spring motion,) rebound or react, they do so against said strap, and if with any very great degree of force, then the strap is eased by the spring of the bow, of which it is a part. By the use of this strap and spring-bow connection the throw of the crank-wrist, without being changed, will allow the cutters to cut a channel or reduce a

surface to the extent of one or two inches, and still maintain a uniformity of blow or force. The bow-springs *e* are of steel, while the strap *d* may be of stout leather.

When the chisels or cutters are worked in gangs, as shown in Fig. 1, their edges may stand at different angles, and thus cut a cleaner channel and without forming ridges or lands. And to keep the tools which may have round or square shanks in proper working position, they may be clamped at their tops, as at *Q*, and to the blocks or guide-heads *P*, which move upon suitable ways on the frame.

To the lower or under part of the frame, and at or near the center thereof longitudinally, is placed a shaft, *R*, which has two worm-gears, *S S*, upon it; and upon this shaft, also, there is loosely placed an arm, *T*, which arm has upon it a double-pivoted pawl, *U*, that works in a ratchet-wheel, *f*, fastened on said shaft *R*, said pawl being capable of working on either side of the shaft, and held in its adjusted, and, for the time being, working position, by a spring bolt, *g*.

The arm *T* is vibrated on the shaft *R* by a rod, *V*, connected to it, the upper end of which rod is attached, by a yoke, *h*, to a cam, *W*, on the shaft *I*. This rod *V* can be adjusted on the arm *T*, as shown by dotted lines in Fig. 2, so as to vary the motion of the arm, and, consequently, of the pawl that moves (through certain parts, to be presently described,) the machine along upon its track or ways.

Underneath the machine are two supporting-axes, *X X*, which have upon their journals, at each end, flanged wheels *Y Y*, that rest and move upon rails or a track, *Z*; and upon these axes *X X* are placed the gears *i i*, into which the worms *S* upon the shaft *R* work, and by which these axes and their wheels are turned, and the whole machine moved steadily along on its track, and in the direction for which the pawl *U* may be set.

A second shaft, *j*, is placed at the under side of the machine, and parallel with the one, *R*, and has upon it projections *o*, which take into grooves *k* made in a sleeve or semi-clutch, *l*, that moves on each one of the shafts or axes *X*, by means of a lever, *m*, on one end of said shaft.

The gears *i i* are fast on the axes *X*, and their hubs are dished or hollowed out, as seen in Fig. 5, and the end of the semi-clutch *l* turned off to fit said dished or hollowed-out portion. When the semi-clutch is moved away from the gears *i i*, the gears, axes, wheels, and entire machine will move along regularly on the ways or track; but if the semi-clutch *l* be jammed into the recesses in the gears, by turning the shaft *j*, the machine will remain

stationary. Thus the machine may be fed along in either direction or stopped, while the cutters or chisels continue at work.

By means of clamps *n* and screws *p* the track *z* is held down firmly to the rock or stone *q* that is to be dressed; and if found necessary, the machine may be still further held to the work by rods *r r*, extending upward from the track, and holding, by springs *s* and nuts *t*, a horizontal bar, *u*, that bears upon friction-rolls *v* on the machine, and thus holds it to the work, without undue friction to impede its motion back and forth on the track. Full-sized machines will have weight enough to hold themselves steadily against the working of the cutters. Lighter machines may not have.

The machine herein represented is constructed to be driven by power at a distance from it, or by hand.

The circular openings *w* in the ends of the frame are to show how a steam-boiler, with an engine attached, may be supported and carried along with the machine, so as to be very compact and very efficient. Or it may be driven by steam brought from a distance.

I contemplate the use of this machine for channeling the pavements of city streets, where, from use, they have become so smooth as to prevent horses from drawing heavy loads without liability of falling and great injury to themselves. In such cases, to prevent the danger of fires or of great noise, which might frighten horses, I propose to work the machine by compressed air, which can be brought in hose or pipes from the place where it is compressed to the machine.

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

1. Connecting the chisels, drills, or other cutting instruments for working in or on stone to the crank-wheel, or its equivalent raising and lowering mechanism, through the intervention of a bow-spring and strap, substantially as and for the purpose described.

2. In combination with a stone cutting, channeling, tunneling, or quarrying machine that is moved along upon a track or ways while operating upon the rock or stone, a reversible pawl, the worm-gear, and clutch, so that it may be moved along in either direction upon the track, or stopped thereon at will, while the cutters or tools continue to operate, substantially as described.

E. G. LAMSON.

Witnesses:

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