(No Model.)

F. J. FULLER.

MACHINE FOR CUTTING CYLINDRICAL COLUMNS FROM STONE, &c.

No. 306,477. Patented Oct. 14, 1884.

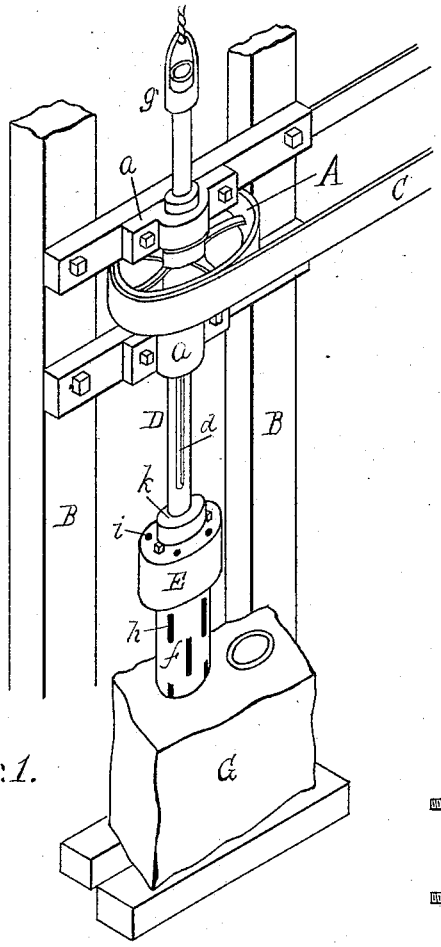


Fig. 1.

Fig. 3.

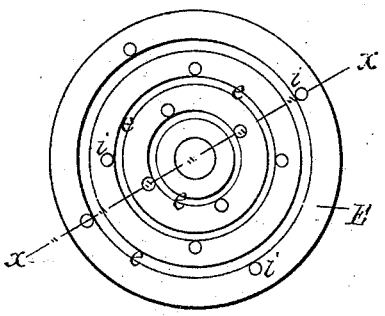


Fig. 4.

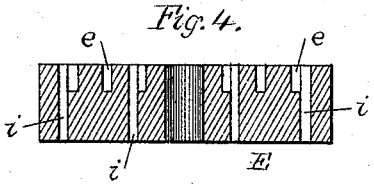


Fig. 2.

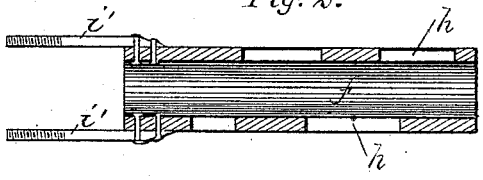
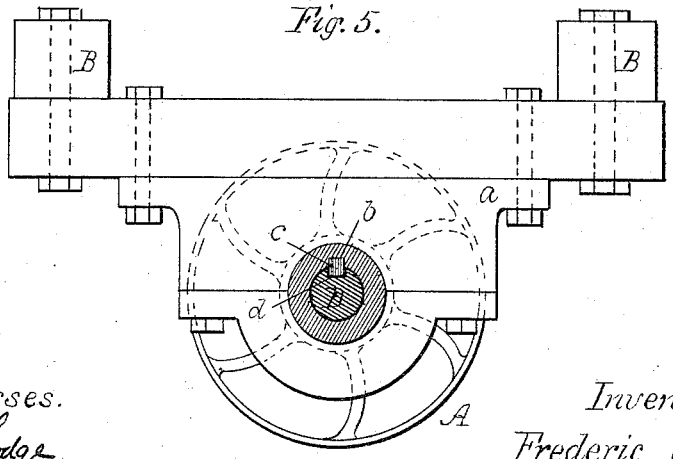


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR CUTTING CYLINDRICAL COLUMNS FROM STONE, &c.

SPECIFICATION forming part of Letters Patent No. 306,477, dated October 14, 1884.

Application filed January 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC JOSEPH FULLER, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Cutting Cylindrical Columns from Stone or other Analogous Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to means for cutting columns from stone or other analogous material for monumental, architectural, or other purposes; and it consists of a hollow soft-metal tube with a smooth internal periphery, while its side wall or body is provided with a series of openings for admitting the cutting or abrading material to said tube while in operation. The shaft, suitably loaded, to which the tube is secured, is driven by proper mechanism at a high rate of speed.

Other minor details and features of the machine containing my invention will be hereinafter more fully and completely described.

The drawings accompanying this specification represent, in Figure 1, an isometric view of a machine containing my invention. Fig. 2 is a longitudinal section of a cutting-tube, while Fig. 3 is an under side view of the tool-carrier, and Fig. 4 a section of same on line *x x*. Fig. 5 is a cross-section through the hub and driving-shaft.

In the drawings, Fig. 1, I have shown a horizontally-revolving pulley, A, mounted in suitable bearings, *a a*, firmly bolted to a strong upright frame or standard, B B, and driven by the belt C. This pulley is provided with a keyway, *b*, and key *c*. The latter tightly fits *b*, and hence is integral and moves with the hub of the pulley, into which it fits.

Through the bore of the pulley B is introduced a long shaft, D, vertically adjusted in the present case, and of a diameter slightly smaller than the bore of said pulley. Further, this shaft has a spline or keyway, *d*, running its entire length, which receives a portion of the key *c* mentioned above. Consequently the key *c* unites the pulley B and shaft D, and compels the latter to rotate with said pulley, while the keyway *d* allows vertical play of the shaft, by which a downward vertical feed movement of the tool is effected. The lower extremity of the shaft D is provided with a circular head or tool-carrier, E, firmly affixed thereto, while the under face of said head is provided with a series of concentric annular grooves or depressions, *e e*, &c. Each depression or groove is of the same width and diameter as the tool or tube *f* to be introduced into it. To the upper extremity of said shaft is secured a swivel, *g*, to which is attached a rope for the purpose of lifting the shaft D, and with it the tool *f*, when a column has been cut, in order to be placed in a proper position to cut a second, the core remaining in the tube constituting the column, which can easily be taken out after the cutter and shaft have been lifted up.

The tool or cutter consists of a soft-metal tube, *f*, of brass, iron, or other analogous material of uniform diameter its entire length, the internal diameter being slightly larger than the column to be cut, to allow for polishing and finishing afterward. The side wall or body of said tube is provided with a series of orifices or openings, *h h*, &c., which are cut entirely through the metal, and arranged, as shown in Figs. 1 and 2, for the purpose of introducing the cutting material, which may consist of sand, emery, hardened iron "globules," so called, or other suitable material, into the interior of the tube as well as to the exterior. The openings *h* are arranged to overlap one another, so that as the tube enters the stone the surface of the latter will always bisect one or more of the said openings, and the abrading material will be properly supplied to the interior of the cutter as well as to the exterior thereof.

To attach this tube or cutter *f* firmly and easily to the head or tool carrier E, or in adjusting others of different sizes, I form long bolts *i' i'*, &c., with a flattened head, which is securely bolted to the upper outer extremity of the tube, and about two inches, or thereabout, from its end. The end of the tube is inserted into the groove *e*, to which it is fitted, while the bolts, screw-threaded at their ends, are passed into the holes *i i*, &c. These holes

may be three, four, or more in number, and correspond to the number of bolts attached to the tube *f*. The nuts are then inserted upon the ends of the bolts, which extend through the head or tool-carrier D, and, being screwed down, draw the bolts and the cutter *f*, to which they are attached, up into the groove *e*, adapted for it, where it is firmly retained and ready for operation. This tool-carrier or head D may contain three or four grooves *e e*, &c., arranged in concentric circles, each individual one being employed for cutters of different sizes. There may be as many grooves on any one head as its strength will permit of without impairing its usefulness. Provided the operator desires a tube of a different diameter from any contained in the head at the time in use, the latter is detached and another substituted.

In cutting large columns the tube must correspond in size, and to accomplish the maximum amount of work in a given time I find it necessary to load the shaft D by placing a movable weight, *k*, upon the head E. Suppose the machine has been employed in cutting a large column and it is desired to temporarily cut a few small ones, it will be evident that the weight necessary to give the desired feed motion to the large cutter will be excessive for the small one, and I therefore attach compensating weights upon the rope attached to the swivel *g*, instead of removing the load upon the head E.

I do not wish to be limited to a vertical shaft and cutting-tool, as the same may be employed in a horizontal position with equal efficiency, the weight on the head D being substituted by a feed-screw, and the openings *h h*, instead of being straight, would be formed spirally upon the periphery of the tube, which shape would feed the grinding material toward the active portion of the tube within the stone or other material to be cut.

The operation of my machine is as follows: The stone G from which the columns are to be cut having been properly adjusted and secured, the shaft D is lifted up by means of the rope attached to the swivel *g*, the tube or cutter firmly fastened to the head E, and the shaft again lowered with the cutter in its proper place upon the stone. The pulley is then put in rotation and the cutting at once commences. The hard grinding material being added as the tube *f* feeds into the stone, said particles embed themselves into the softer material of the tube wherever the latter comes in contact with the stone, thereby forming a rough or rasping surface, and rapid cutting of the stone ensues.

The employment of the tube enables very small columns to be cut, as the core of stone hereafter forming said columns is firmly supported by the internal periphery of the cutting-tool and prevented from breaking in the process of cutting from the block proper.

Various devices have been hitherto made for cutting columns, and I consider my invention to consist, essentially, of a smooth soft metal tube provided with openings, and furnished with a hard grinding material while it is in rotation, whereby the said material is set into the metal and cutting of the stone effected both by the internal as well as external periphery of the tube.

I claim—

1. In a machine for cutting columns, the combination of the shaft herein described with the weighted cutter-head, and the soft-metal tube provided with overlapping openings *h* in its side wall for the admission of abrading material to the interior of said cutter, as and for purposes stated.

2. The cutter-head E, provided with the annular grooves *e e*, &c., holes *j j*, &c., to receive the bolts *i i*, attached to the tubes *f f*, &c., whereby the latter may be securely fastened to the head.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERIC JOSEPH FULLER.

Witnesses:
A. F. HAYDEN,
H. E. LODGE.