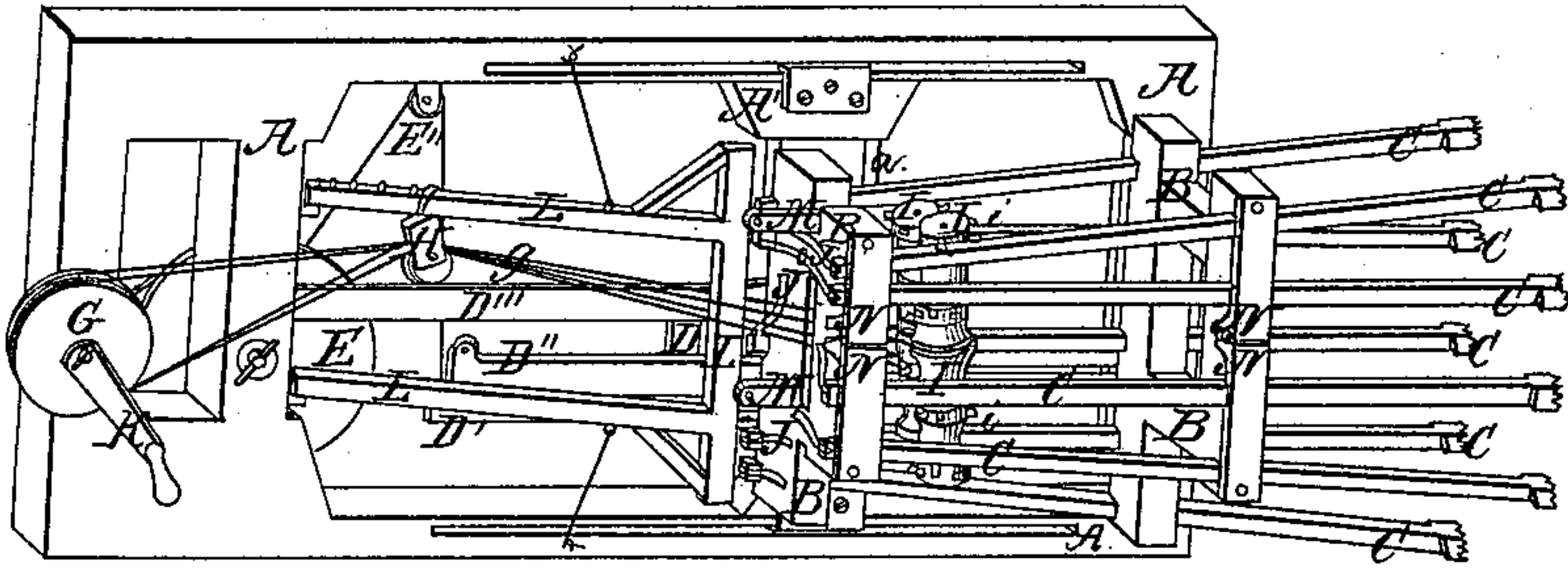


*I. Merrill,*  
*Stone Drill.*

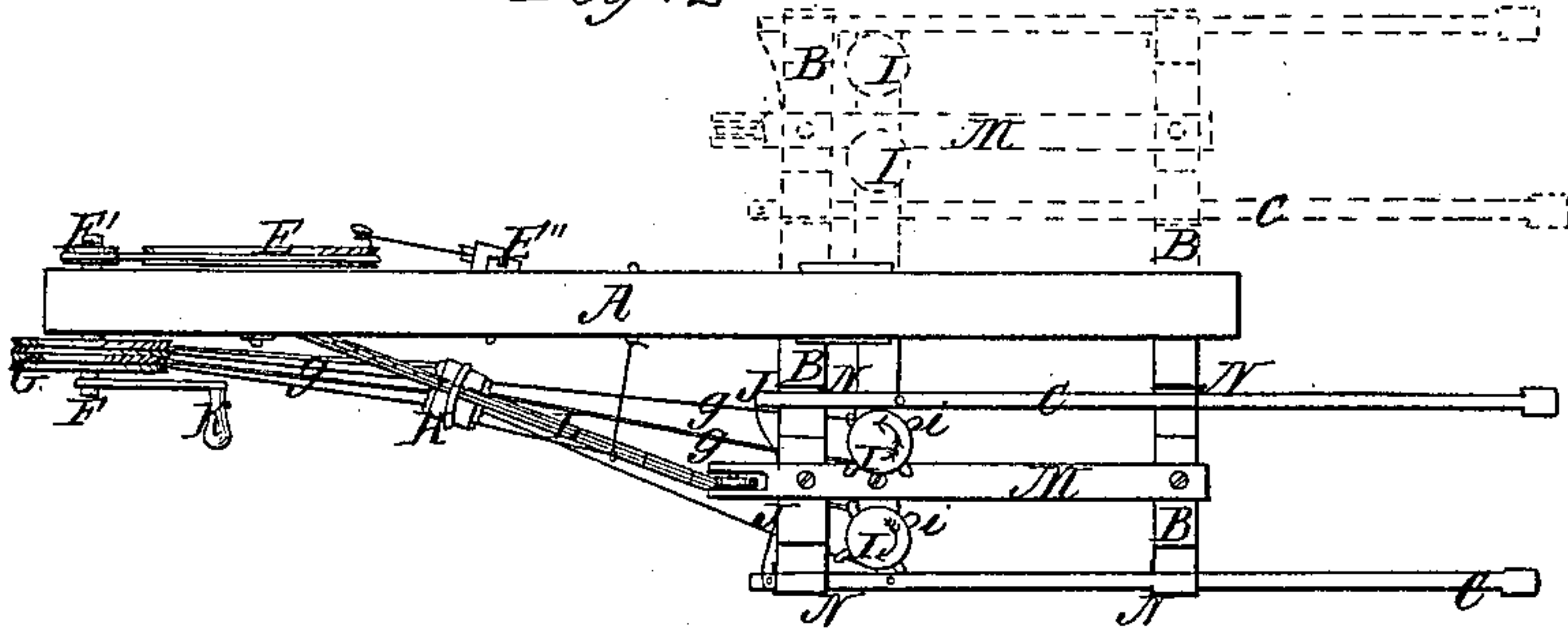
*N<sup>o</sup> 14,755.*

*Patented Apr. 22, 1856*

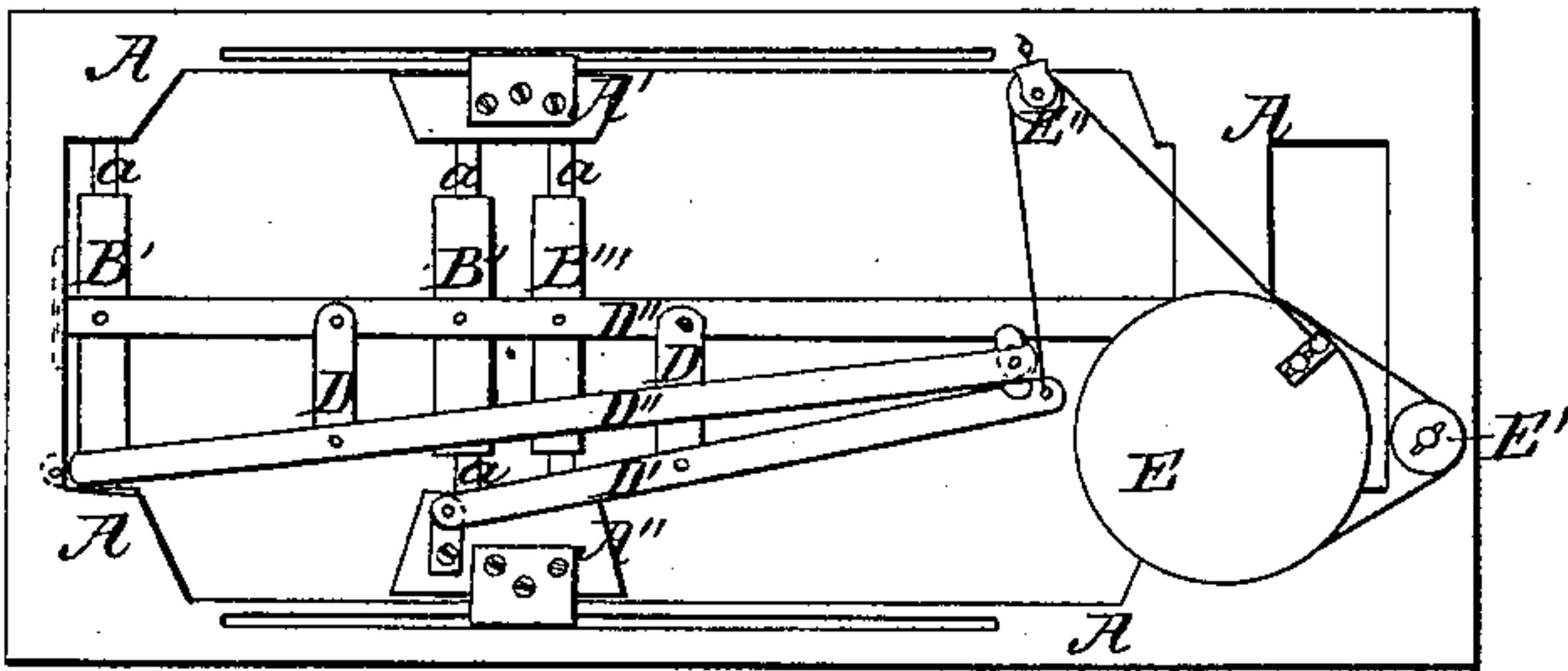
*Fig: 1.*



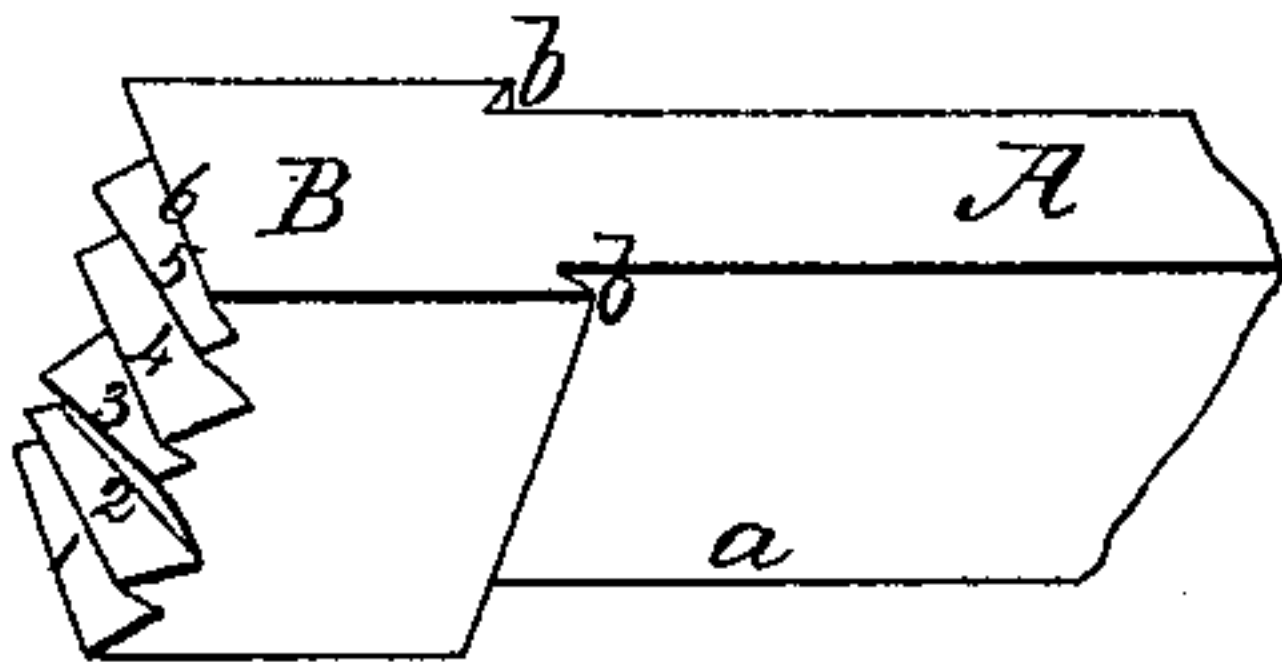
*Fig: 2*



*Fig: 3.*



*Fig: 4*





# UNITED STATES PATENT OFFICE.

IRA MERRILL, OF SHELBURNE FALLS, MASSACHUSETTS, ASSIGNOR TO IRA MERRILL AND ARTHUR MAXWELL.

## MACHINE FOR TUNNELING AND QUARRYING.

Specification forming part of Letters Patent No. 14,755, dated April 22, 1856; Reissued December 19, 1865, No. 2,129.

*To all whom it may concern:*

Be it known that I, IRA MERRILL, of Shelburne Falls, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Machines for Tunneling and Quarrying Rock; and I do hereby declare that the following, referring to the accompanying drawings as forming a part hereof, is a full and exact description thereof, the said improvements appertaining to and constituting a part of a machine for cutting grooved channel-ways in rock by means of series of chisels which are thrown forward upon the rock by springs as often as they are withdrawn by revolving cams.

A represents the principal frame of heavy timbers, to be supported in a vertical position with one end directed toward the rock, by temporary or movable stays and braces.

B is a secondary frame supporting the chisels C, C, &c., and attached to the principal frame A by means of the vertical slide rods *a*, which also admit the vertical elevation and depression of the secondary frame B carrying therewith the chisels C, and all fixtures attached to said frame B. Attached to the posts B' B'' B''' of this secondary frame, are the proportionate levers D' D'', and the cross bar D''' connected by the vertical bars D; which being operated by the cord or chain passing from the crank wheel E over the sheave E'' and connecting with the lower lever D', cause at each revolution of the crank wheel E, an alternate elevation and depression of the said secondary frame B with the attached fixtures, as aforesaid.

Motion is communicated to the crank wheel E, by belt from the smaller pulley E' upon the driving shaft F. Upon the driving shaft F is placed the pulley G from which pass the round belts *g*, *g*, over the four sheaves H and around the pulleys of the cam shafts I, I, communicating to them the rotary motion required to bring the cams *i*, *i*, against the pawls upon the shafts of chisels C, and withdraw the said chisels from the rock with which they have been placed in contact. The cams *i* *i* on passing said pawls, release the chisels alternately from their action when each is thrown violently forward by the springs J against the

rock cutting the same at each successive stroke of each separate chisel, and as the entire series of chisels are regularly elevated and depressed by the operation of the levers D' D'', upon the secondary frame, regular parallel channelways are cut in said rock, from the highest to the lowest points reached by the upper and lower of said chisels. The cams *i* *i* are so arranged upon their shafts, that no two chisels shall strike the rock at the same instant, but successively, in rapidity corresponding to the speed of the cam shafts, as driven by the bits *g* *g* from the pulley G, operated by the crank K, or other suitable mover. This grooving is thus continued, while the principal frame A, is forced forward, (by a jack screw placed in its rear) as the work progresses, until the grooves or channel ways are cut to the entire depth to which the chisels project beyond the frame A, when the machine is backed from the rock, withdrawing the chisels therefrom. The chisels are then removed from their positions in the secondary frame (by first removing the keepers N, which confine them to the frame). The crossties M, which are secured to the secondary frame B; with the levers D' D'' with their several connections are all removed from the machine, when by sliding the bearing blocks A' A'' toward the rear of the machine, the entire secondary frame B is swung to the opposite side of the principal frame A, and all the several parts rearranged in position for operation upon the opposite side from its former cutting, as shown in Fig. 2 by dotted lines. It is here in readiness to cut another complete series of grooves, while workmen are employed in driving into those already formed, suitable wedges, and thus breaking down the cores between the said grooves, and removing the same for use in laying block work wall or superstructure, two faces of each portion removed having been dressed by the said grooving, both plane and parallel. Thus as alternate series of grooves or channel ways are cut, and the intervening cores removed, the machine is forced forward, and "tunneled avenues" formed or rock quarried and removed of convenient and finished form for use.

Other series of chisels may be arranged, with proper cam shafts and fixtures, to form horizontal grooves across the top or bottom of the cutting, when desired, but this being  
5 a secondary consideration, is not represented in the drawings.

I do not claim the working of rock in quarries or "tunneled avenues" by means of serial grooving; nor the construction of  
10 a machine for such purpose; nor the cutting

of duplicate grooves by the rearrangement of the working parts of such machine upon each side of its principal frame, alternately.

I only claim as my invention—

The arrangement of the proportionate le- 15  
vers as and for the purpose mentioned.

IRA MERRILL.

Witnesses:

GUY H. HUBBARD,  
ARTHUR MAXWELL.

[FIRST PRINTED 1912.]