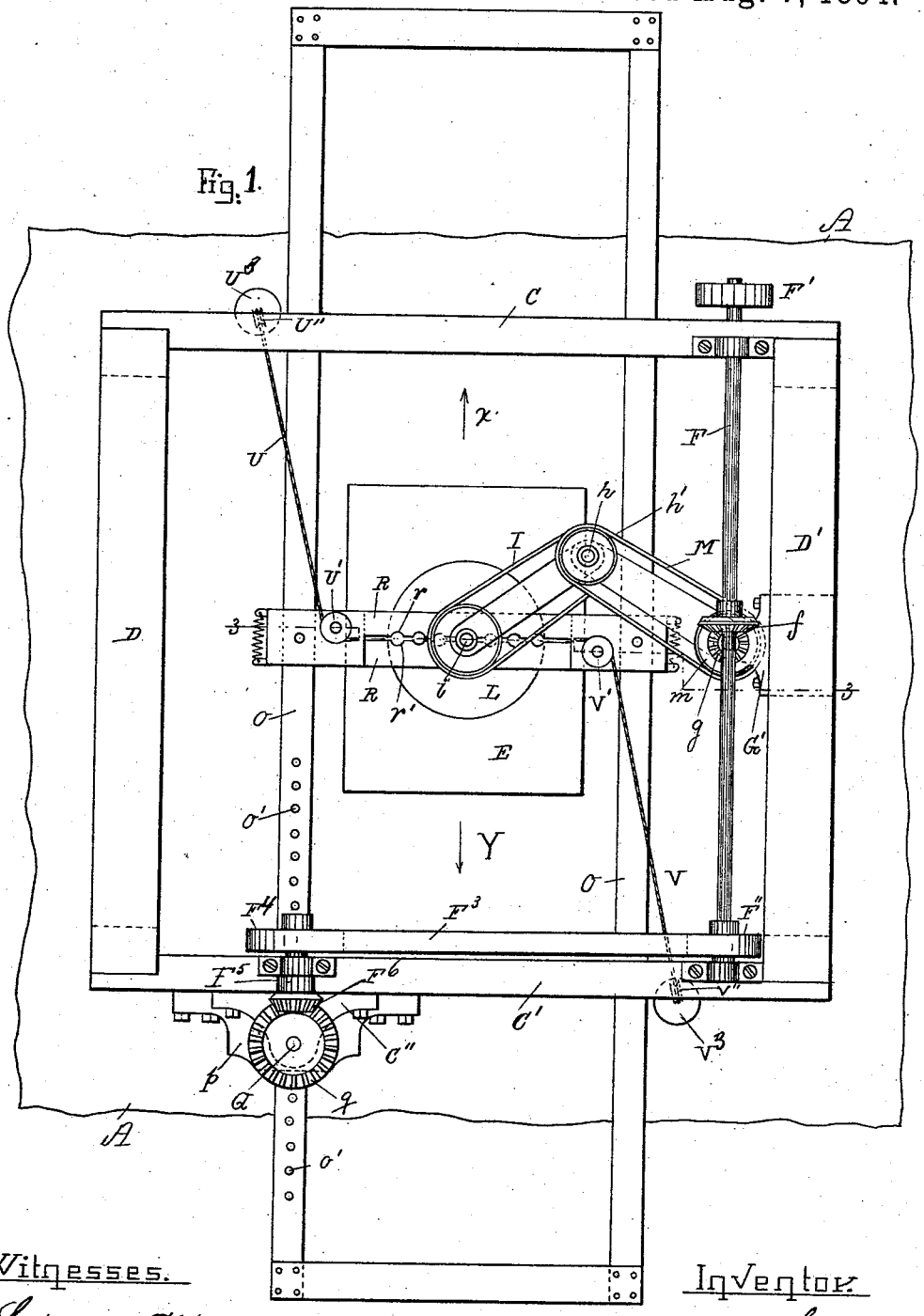
(No Model.) 3 Sheets—Sheet 1.

J. LAVERS.

STONE GRINDING OR POLISHING MACHINE.

No. 524,091. Patented Aug. 7, 1894.

Fig. 1.



Witnesses.

Lairitz N. Möller

Kitty M. Hanson

Inventor

John Lavers

by Albert Lindsey

his atty.

(No Model.) 3 Sheets—Sheet 2.

J. LAVERS.

STONE GRINDING OR POLISHING MACHINE.

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Fig 2.

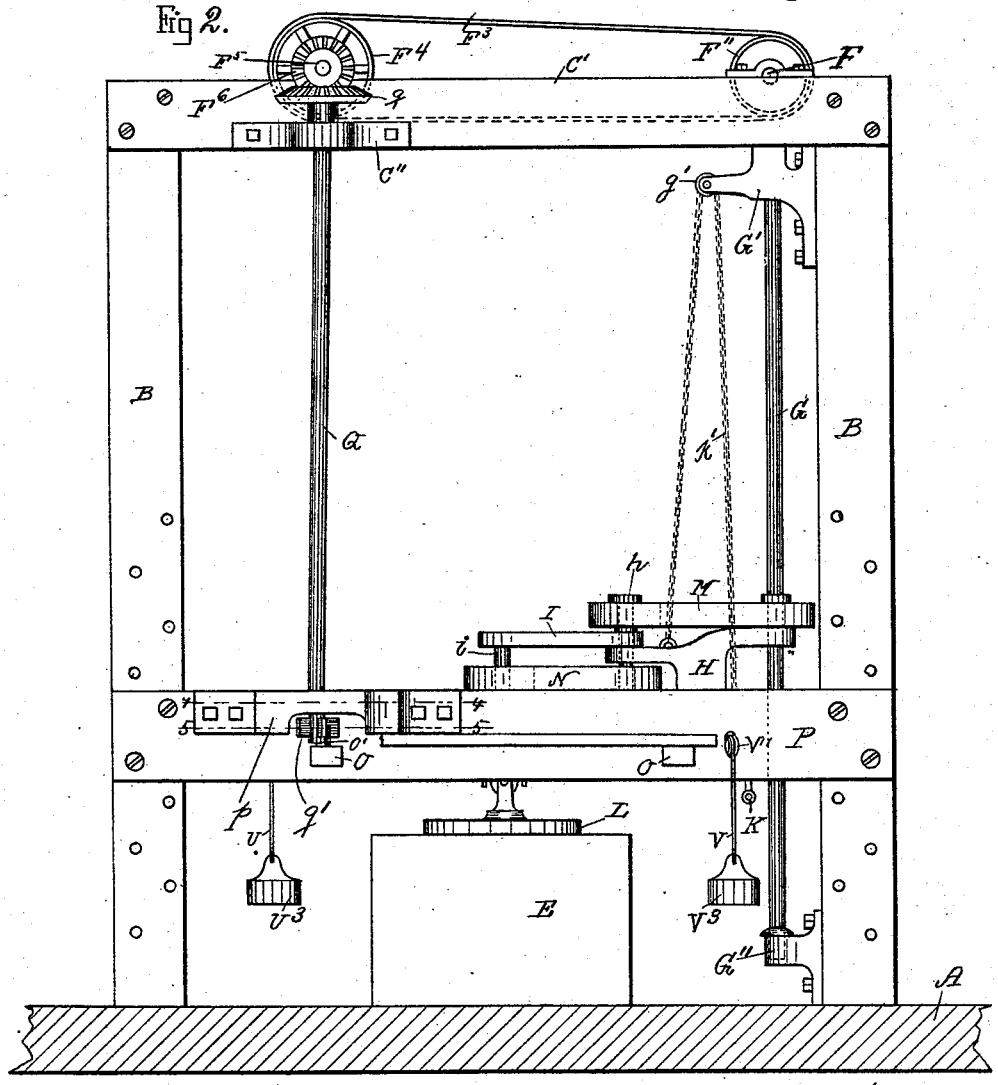


Fig. 4

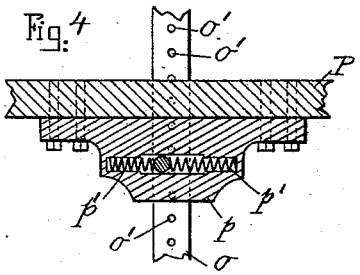


Fig. 6.

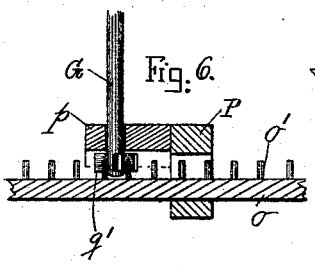
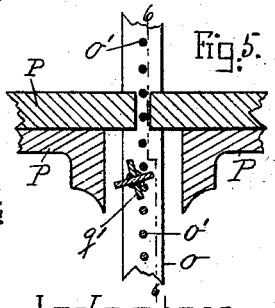


Fig. 5.



Witnesses.

Laurits N. Boller

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(No Model.) 3 Sheets—Sheet 3.

J. LAVERS.

STONE GRINDING OR POLISHING MACHINE.

No. 524,091. Patented Aug. 7, 1894.

Fig. 3.

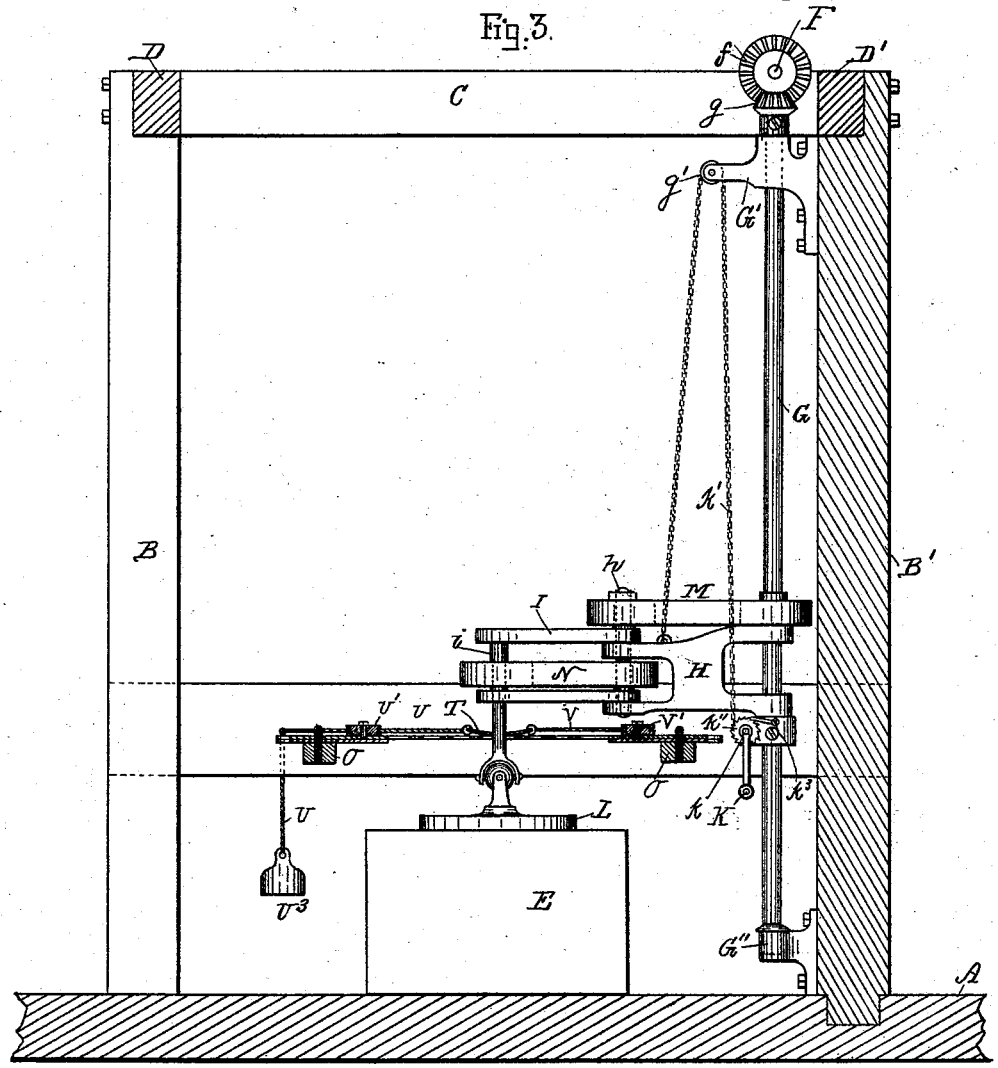


Fig. 8

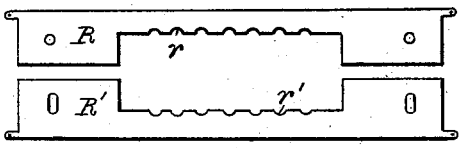
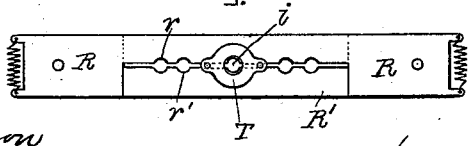


Fig. 7.



Witnesses.

Laurits N. Möller.

Kittie M. Hanson.

Inventor.

John Lavers

by Albert Gridley

his atty.

UNITED STATES PATENT OFFICE.

JOHN LAVERS, OF QUINCY, MASSACHUSETTS.

STONE GRINDING OR POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,091, dated August 7, 1894.

Application filed May 18, 1894. Serial No. 511,639. (No model.)

To all whom it may concern:

Be it known that I, JOHN LAVERS, a citizen of the United States, and a resident of Quincy, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Stone Grinding or Polishing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in stone grinding and polishing machines and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1, represents a top plan view of the invention. Fig. 2, represents a side elevation of the same. Fig. 3, represents a cross section on the line 3—3 in Fig. 1 partly shown in elevation. Fig. 4, represents a detail longitudinal section on the line 4—4 shown in Fig. 2. Fig. 5, represents a detail longitudinal section on the line 5—5 shown in Fig. 2. Fig. 6, represents a detail section on the line 6—6 shown in Fig. 5. Fig. 7, represents a detail top plan view of the expansive yielding guide plates for the grinder shaft; and Fig. 8, represents a similar top plan view of said guide plates shown as separated from each other.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

A represents a suitable base or floor of the building in which the grinding and polishing machine is located and B, B, represent the upright portions of the frame work of the machine secured at the top by means of suitable stays or braces C and C′ D and D′ as shown in the drawings.

E represents the stone block that is to be ground or polished.

In bearings in the upper part of the frame work of the machine is located the driving shaft F which may be set in rotary motion preferably by belt power applied to a pulley F′ thereon as shown in Fig. 1.

To the shaft F is secured a bevel gear f the teeth of which mesh in a bevel gear or pinion g secured to the vertical shaft G which is journaled in suitable bearings G′ and G″ secured to a post or standard B′ that forms part of the frame work of the machine as shown in Fig. 3. On said vertical shaft G is journaled the frame or link H that is pivoted by means of a pin or shaft h to another frame or link I as is common in stone grinding or polishing machines.

The frame or link H is vertically adjustable in the shaft G according to the thickness of the stone E that is being ground or polished and this may be done by means of a crank K secured to a shaft k having a chain k' attached to it which is carried over a roller g' on the bearing G′ and attached to the frame or link H as shown in Fig. 3.

To the shaft k is secured a ratchet wheel k'' provided with a pawl k^3 for the purpose of holding the link or frame H at any desired elevation as is common in machines of this kind.

In the outer end of the link I is journaled the grinder shaft i to the lower end of which is universally jointed the rotary grinder disk L of a construction as is common in stone grinding and polishing machines and need therefore not herein be described in detail.

The grinder shaft i is set in a rotary motion from the shaft G by means of a belt M leading from a pulley m on the shaft G to a pulley h' on the spindle h as shown.

From the spindle h the rotary motion is conveyed to the grinder shaft i by means of a belt N carried on pulleys secured to shafts h and i as shown in Figs. 1, 2 and 3.

I use in connection with the above described machine an automatic feeding mechanism which is constructed as follows: The grinder L is automatically fed forward and back in direction of arrows X and Y shown in Fig. 1 by means of a traversing reciprocating frame O which is guided in suitable bearings in cross bars P which are vertically adjustable relative to the uprights B, B, according to the height of the stone that is to be ground or polished. On the driving shaft F is preferably a pulley F″ from which leads a belt F^3 to a pulley F^4 secured to a shaft F^5 and on said shaft is secured a bevel gear F^6 the teeth of which mesh in the teeth of a bevel gear q secured to a shaft Q journaled in its upper end in a stationary bearing C″ secured to the upper cross bar C′ as shown in Figs. 1 and 2. The lower end of the shaft Q is guided preferably in a slotted bearing p secured to the vertically adjustable brace P and provided

preferably with springs p' p' for normally holding the lower end of said shaft Q in a central vertical position. To the lower end of the said shaft Q is secured a small pinion q' the teeth of which are made to engage in pegs o' o' o' of a rack on the reciprocating frame O as shown in Figs. 1, 2, 5, and 6. As the shaft Q rotates the teeth of its lower pinion q' engage on one side of the pins or rack O' until the end of the latter is reached when the pinion swings round to the opposite side of the rack by the action of the springs p' p' causing the motion of the frame O to be reversed thus causing a reciprocating motion to be automatically imparted to said frame O as long as the shaft Q continues to rotate. On the reciprocating frame O is secured a cross bar R having a series of notches r, r, and to said notched bar is adjustably secured a similar expansive or yielding bar R' having notches r' r' corresponding in position to the notches r, r, on the stationary bar R as shown in Figs. 1, 3, 7 and 8.

In practice I prefer to hold the notched bars R R' yieldingly connected by means of springs S, S, shown in Figs. 1 and 7.

I have described one bar R as rigid on the frame O and the other R' yielding relative to the stationary bar but this is not essential as both bars may be yielding to and from each other without departing from the essence of my invention.

On the grinder shaft i is loosely slipped a ring or collar T to which are connected the chains, ropes or cords U and V and guided on suitable pulleys U' U'' and V' V'' and provided at their ends with the respective balance weights U^3 V^3 as shown in Figs. 1, 2 and 3.

The operation is as follows: By the mechanism described the rotary grinder shaft i is automatically moved forward and back in the direction of the arrows X and Y shown in Fig. 1. As it is being moved to the end of its stroke in direction of the arrow X the weight V^3 comes in contact with the cross bar P or other abutment by which the cord V is tightened causing the grinder shaft i to be moved toward the right into another set of notches on the yielding grinder shaft supports R R' and causing it to be held in such new notches during the return stroke of the frame O. As the rotary grinder shaft i is being moved to the end of its stroke in the direction of the arrow Y in Fig. 1, the weight U^3 comes in contact with the opposite cross bar P or other abutment by which the cord U is tightened causing the grinder shaft i to be moved toward the left into another set of notches on the yielding grinder shaft support R R' thus imparting to the grinder shaft an automatic motion in the direction of the arrows X and Y Fig. 1, but also causing it to be moved automatically in a direction at right angles to said arrows as herein above described. By adjusting the lengths of the ropes or chains U, V, any desired lateral automatic adjustment of the grinder shaft may be provided; and it will thus be seen that the rotary grinder or polishing tool is automatically moved during its rotation forward and back, and right and left so as to reach all parts of the surface of the stone that is being ground or polished; and in this manner a great saving in time and labor is obtained as the machine will take care of itself after once being set in operation until the stone is evenly ground or polished as the case may be, and as it needs no special supervision one and the same man may tend any desired number of machines.

What I wish to secure by Letters Patent, and claim, is—

1. In a stone grinding and polishing machine a horizontally and vertically adjustable rotary grinder and polisher tool combined with an automatic reciprocating frame for guiding the tool forward and back relative to the stone that is being operated upon substantially as and for the purpose set forth.

2. In a stone grinding and polishing machine a horizontally and vertically adjustable rotary grinder and polisher tool combined with an automatic reciprocating frame for guiding the tool forward and back relative to the stone that is being operated upon and automatic mechanism substantially as described for guiding the rotary tool at a right angle to the path of the reciprocating frame as and for the purpose set forth.

3. In a stone grinding and polishing machine a horizontally and vertically adjustable rotary grinder and polisher tool combined with an automatic reciprocating carrying frame for guiding the tool forward and back relative to the stone that is being operated upon and a pair of notched spring pressed bars R, R', arranged upon said reciprocating frame and weights U^3 V^3 connected by means of cords or chains to the rotary tool shaft substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of May, A. D. 1894.

JOHN LAVERS.

Witnesses:
ALBAN ANDRÉN,
KITTIE M. HANSON.