S. Hagaman,

Polishing Slate.

No. 94,309. Patented Aug. 31. 1869.

Fig. 1.

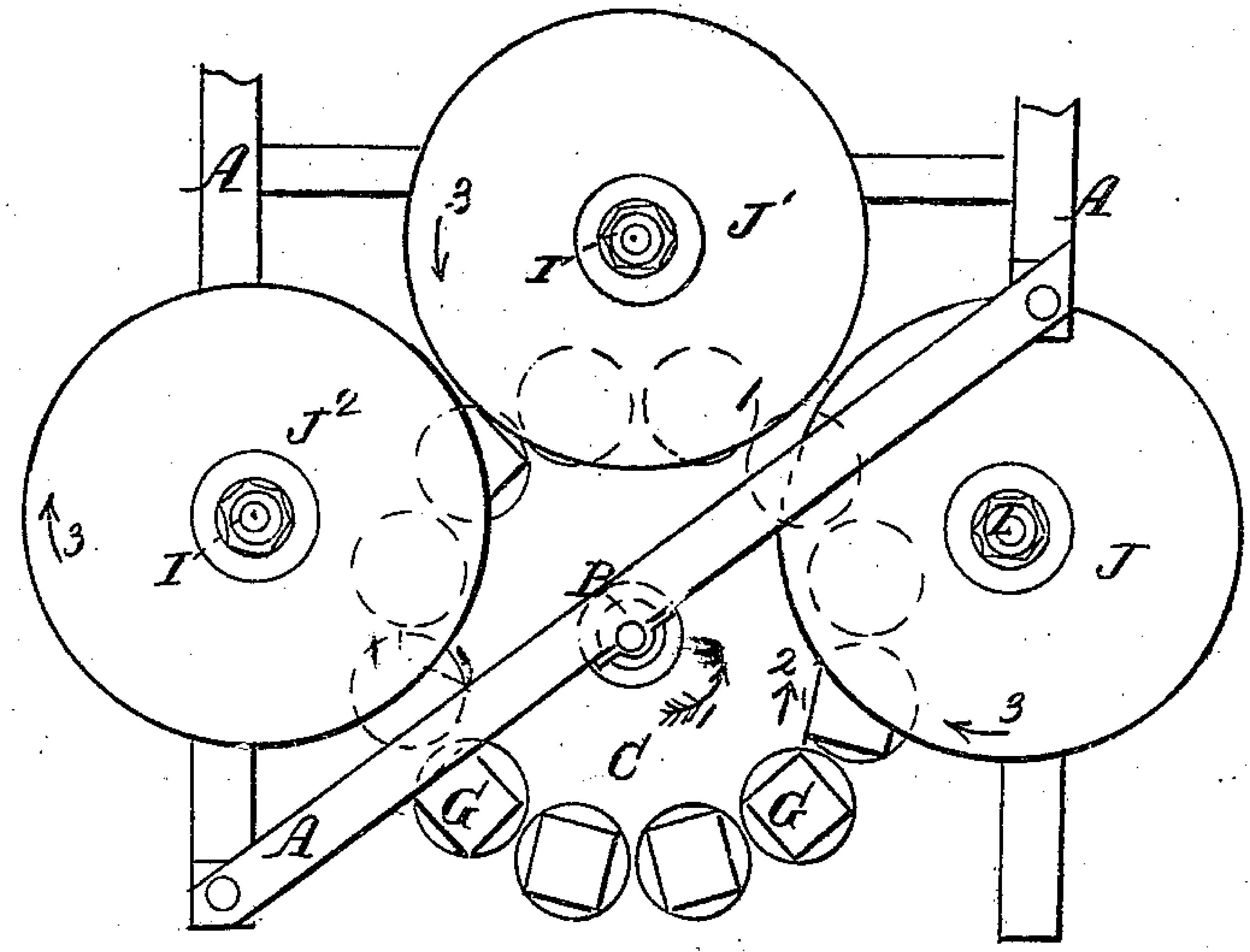


Fig. 2

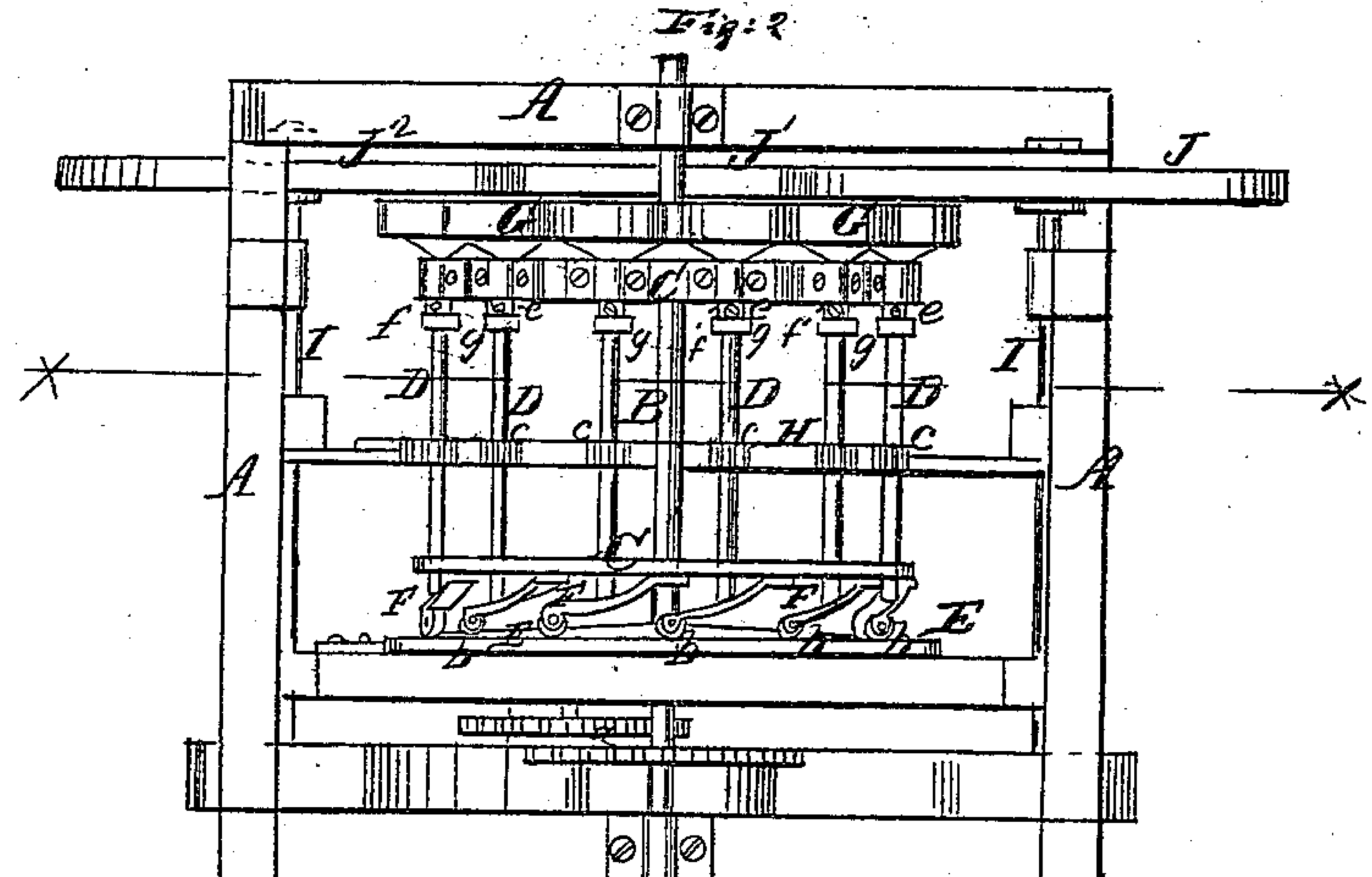
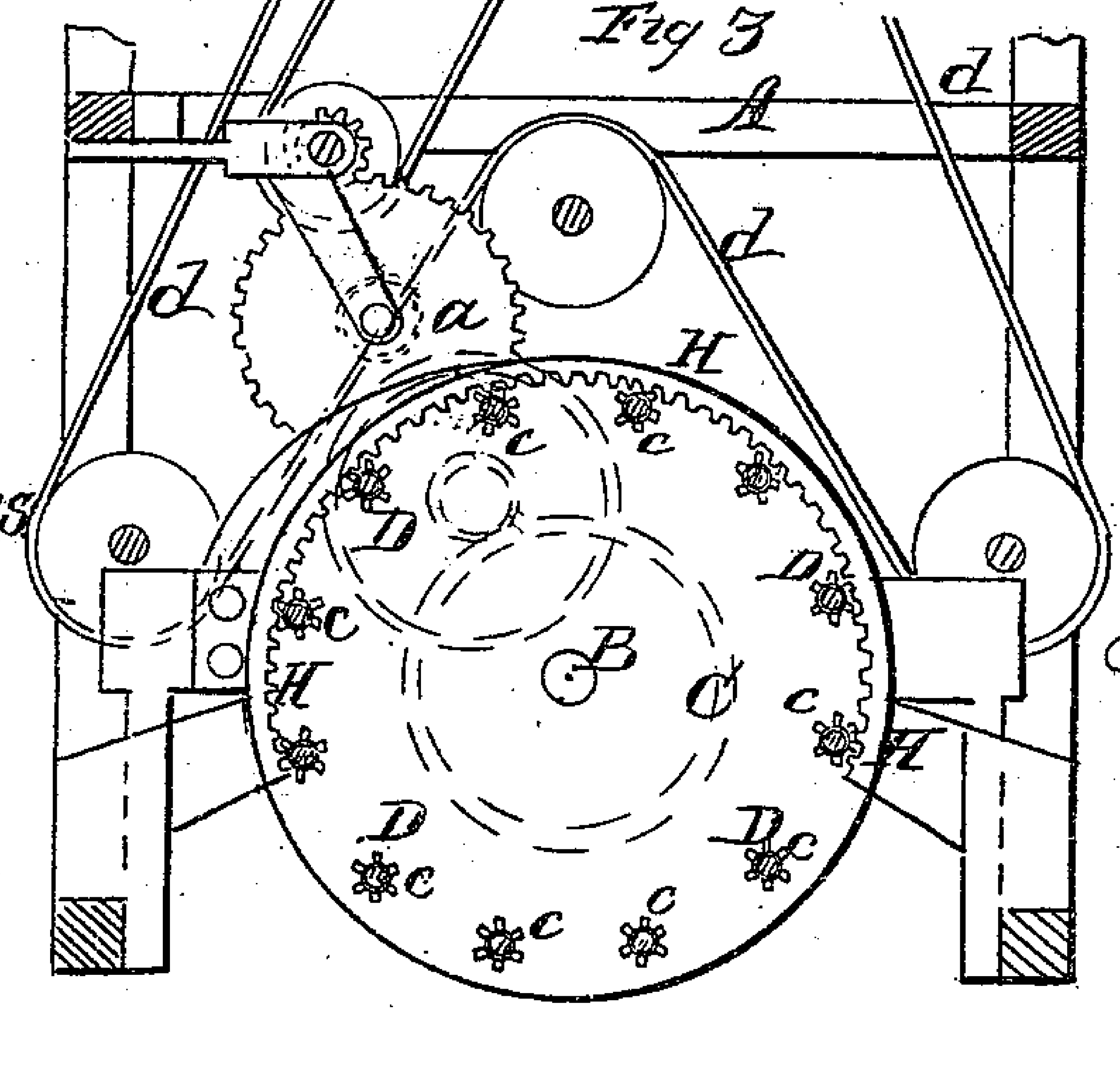


Fig. 3



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STINSON HAGAMAN, OF WEISSPORT, PENNSYLVANIA.

Letters Patent No. 94,309, *dated August* 31, 1869.

IMPROVED SLATE-POLISHING 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, STINSON HAGAMAN, of Weissport, Carbon county, Pennsylvania, have invented a new and improved Slate-Polishing Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a plan or top view of my improved slate-polishing machine.

Figure 2 is a side elevation of the same.

Figure 3 is a horizontal sectional view of the same, the plane of section being indicated by the line *x x*, fig. 2.

Similar letters of reference indicate corresponding parts.

This invention relates to a machine for grinding school-slates, in which grindstones of different grades of grit are arranged in such a manner that the slates can be ground to the required thickness, and then polished, and their faces smoothened under the various grindstones, without being taken out of the mould in which they are held.

The invention consists, first, in the manner of securing and moving the slates.

Ten (more or less) upright shafts have their bearings at equal distances from a central upright shaft, in disks which are secured to the latter.

The central shaft is made to revolve, and also those which are secured in the disks, each revolving around its own axis, and the latter shafts also around the axis of the central shaft, so that a sort of planetary motion is imparted to the slates, which are secured in disks that are mounted on top of the surrounding shafts.

The invention consists, second, in arranging two or more upright shafts at equal distances from the aforesaid central shaft, but beyond the slate-bearing shafts, and in mounting on each, disks or wheels, made or consisting of suitable grinding-material.

These grindstones, as I will hereafter term them, although they may be emery, hone, or other artificial or natural wheels, are arranged above the slates, and are revolved in an opposite direction to that in which the central shaft moves.

The invention consists, third, in the manner of hanging the aforesaid slate-carrying shafts in the disks that are secured to the central shaft.

The shafts pass loosely through boxes arranged for them in the said disks, and the lower end of each of them rests upon a spring, of which one end is secured to the under side of the lower disk, while its other end carries a friction-roller.

The latter moves (as the central shaft revolves) upon a stationary annular track, and the spring serves to gently press the slate against the grindstone.

By means of adjustable sleeves, arranged below one of the disks on each of the slate-carrying shafts, the latter can be set, so that the slate can only be ground to a certain required thickness.

A represents a rectangular or other frame, made of wood, or any other suitable material of sufficient strength to support and hold the other working-parts of this machine.

B is an upright shaft, having its bearings in the frame A, and received by means of gear-wheels *a*, which transmit slow motion to it from a driving-shaft, that is not shown in the drawings.

C C are two or more disks, mounted on the shaft B, so as to revolve with the same.

D D are ten (more or less) vertical shafts, which are fitted through the disks C, so as to slide loosely therein.

E is an annular track or plate, arranged stationary below the lower disk C.

F F are ten (more or less) springs, which are secured to the under side of the lower disk C, and which are provided at their free ends with friction-rollers *b*, that rest upon the track E. The lower ends of the shafts D rest upon these springs, as is clearly shown in fig. 2.

On the upper end of each shaft D is mounted a small disk, G, in the upper surface of which a suitable recess is provided, for holding the slate to be ground.

On each shaft D is mounted a small pinion, *c*, all of which pinions mesh into a stationary toothed segment, H, which is provided with internal gear, as clearly shown in fig. 3.

Thus, as the central shaft B is revolved in the direction of the arrow 1, in fig. 1, the shafts D and their appendages will be carried around the axis of the shaft B, but will also revolve around their own axis, in the direction of the arrow 2 in fig. 1.

I I are two or more upright shafts, arranged in the frame A, at equal distances from the shaft B, and outside of the disks C.

On the upper ends of these shafts are mounted the grinding wheels J, J^1, and J^2, which are of different grade of grit, the wheel J being the coarsest, and J^2 the finest.

Shafts I are revolved by means of bolts *d*, or otherwise, in the direction of the arrows 3, in fig. 1, with greater velocity than the shaft B.

The slates are pressed by the springs F against the grinding-surfaces of the wheels J.

e e are sliding sleeves, arranged on the shafts *d*, below one of the disks C, and can be secured in any position by set-screws *f*.

g are nuts, which are arranged around the shafts D, directly below the sleeves *e*, so that when the set-screw is loosened, the said sleeve can be very accurately adjusted up down, by means of these nuts.

Thereby the springs are prevented from pressing the slates too far against the grinding-wheels, and the

thickness of the slates can be regulated with the greatest accuracy.

The grinding-wheels may, if desired, be adjustable on their shafts I, in a similar manner, and for the same purpose.

The slates only revolve around their own axis as long as they are below the grinding-wheels, as the segment H only extends as far.

That portion of the track E which is below the grinding-wheels should be raised, as indicated in fig. 2, the raising being gradual, so that the slates may be gradually lifted to the grinding-wheels, and may not strike the edges of the same.

Having thus described my invention,

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

1. So constructing a machine for grinding and polishing school-slates that the slates are revolved around the axes of the shafts on which they are held, and around the axis of a central shaft, B, substantially as herein shown and described.

2. The annular track E, springs F, and friction-rollers *b*, when arranged in combination with the revolving disks C and shafts D, substantially as and for the purposes herein shown and described.

3. The stationary segment H, when provided with internal gear, in combination with the pinions *c*, on the shafts D, and with the central shaft B and disks C, substantially as and for the purpose herein shown and described.

4. The nuts *g* and sleeves *e*, when arranged on the shafts D, in combination with the springs F, disks C, and grinding-wheels J, all made and operating substantially as herein shown and described.

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