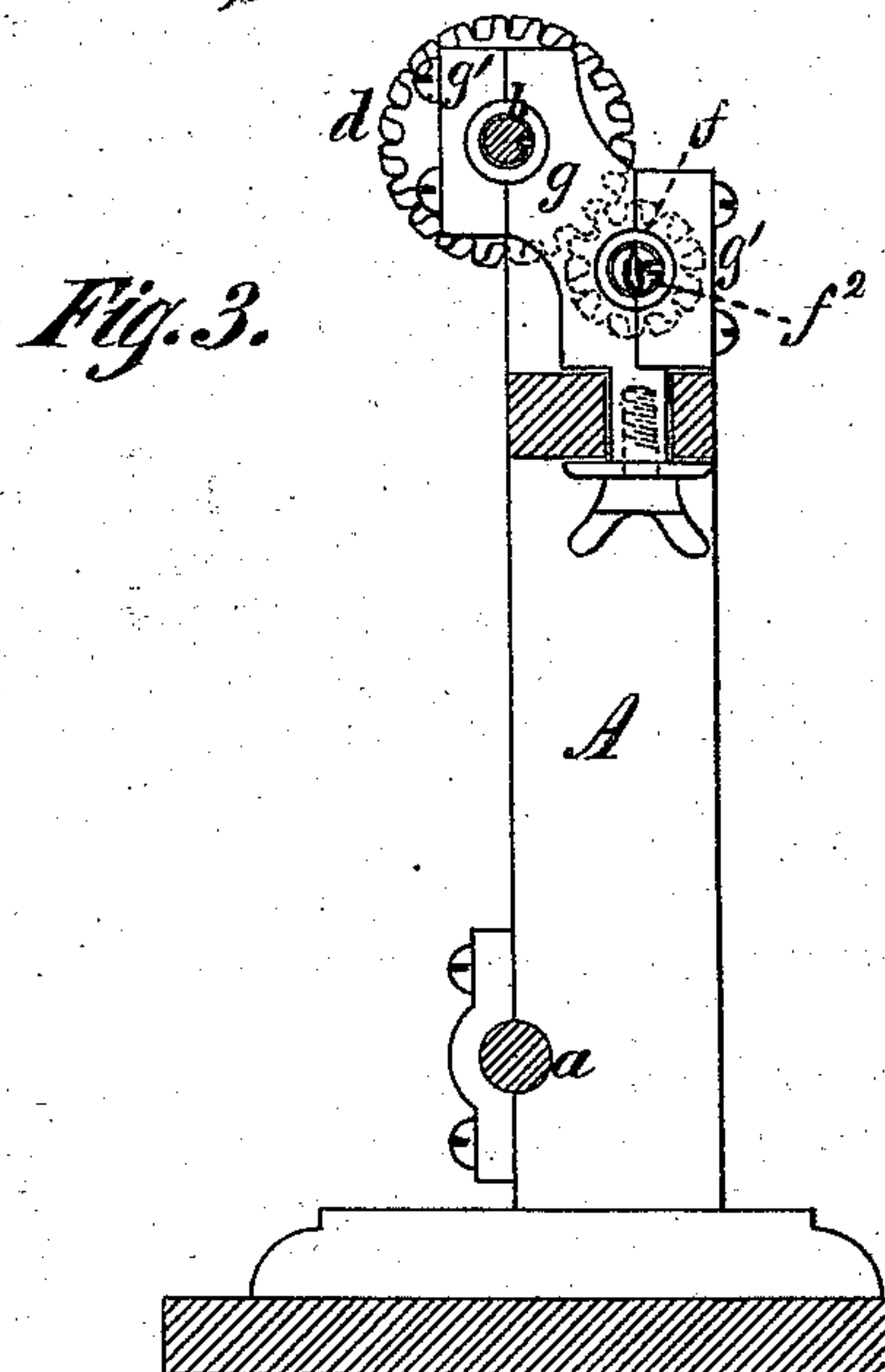
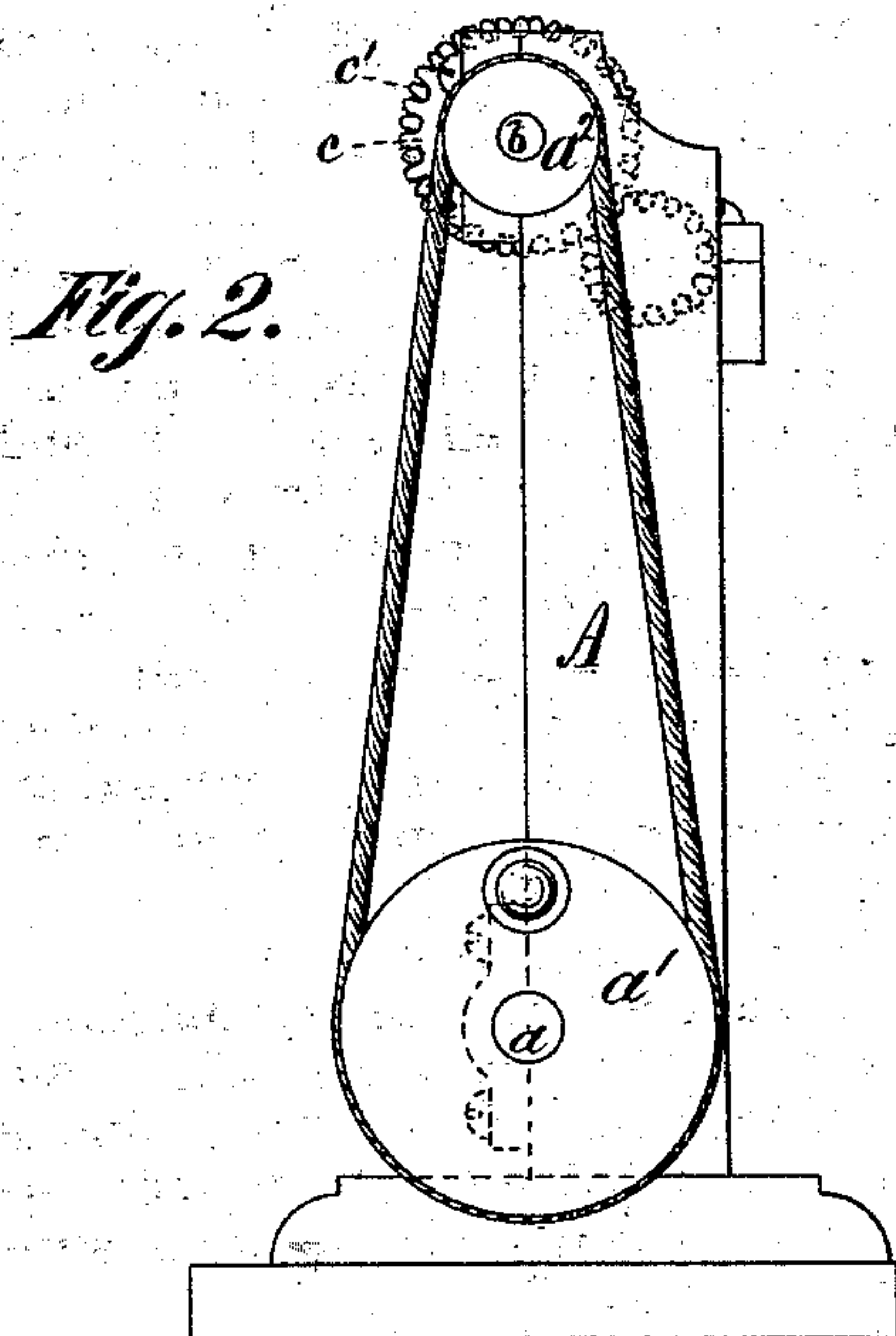
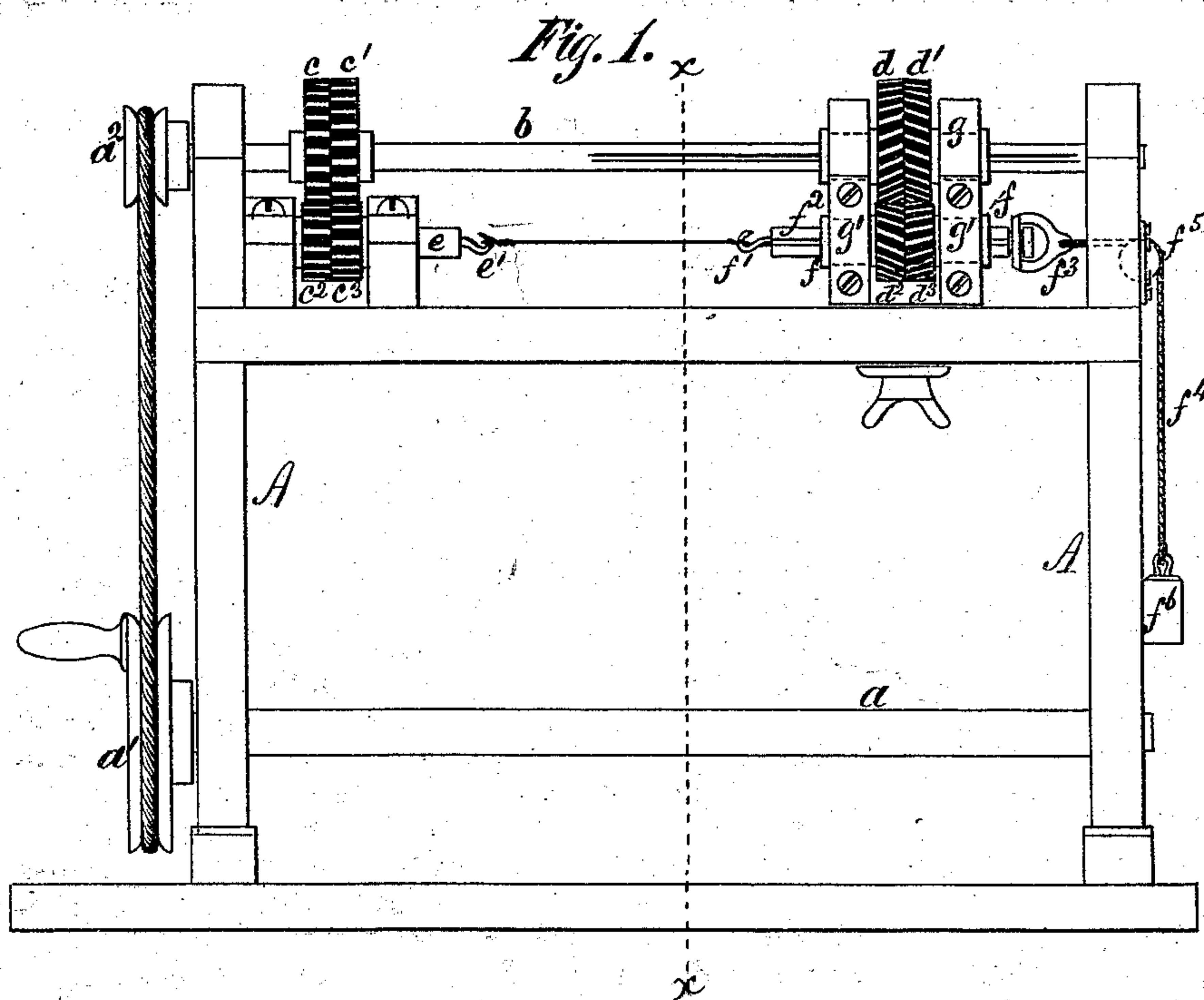


Machines for Covering Piano-Strings.

Patented Aug. 25, 1874.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES REINWARTH, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR COVERING PIANO-STRINGS.

Specification forming part of Letters Patent No. 154,342, dated August 25, 1874; application filed July 2, 1874.

To all whom it may concern:

Be it known that I, CHARLES REINWARTH, of New York, State of New York, have invented certain Improvements in Machines for Covering Piano-Strings, of which the following is a specification:

My invention relates to machines for winding wire around the steel wires used for piano-strings; and consists in devices for imparting steady and uniform motion to the revolving jaws or holders, in which the opposite ends of the piano-strings are secured during the covering process.

The drawings embrace Figure 1, a front elevation of my improved machine; Fig. 2, an end elevation of the same; and Fig. 3, a vertical transverse section thereof through line *x x* on Fig. 1.

The frame *A* supports a counter-shaft, *a*, carrying a large pulley, *a*¹, which is belted to the smaller pulley *a*² upon the intermediate shaft *b*. The latter is provided with two pairs of gears, *c* and *c*¹ and *d* and *d*¹, which engage, respectively, the smaller pinions *c*² and *c*³ and *d*² and *d*³ upon the jaw-shafts *e* and *f*. The shafts *e* and *f*—the axes of which coincide—are provided, respectively, with the jaws or hooks *e*¹ and *f*¹, for holding the opposite ends of the piano-string, so that it will be made to rotate upon its longitudinal axis. The shaft *f* is hollow, and the hook-rod *f*² is loosely keyed therein, and connected at its outer end, by means of the swivel-joint *f*³, with the cord *f*⁴, which passes over the guide-pulley *f*⁵, and is secured to the weight *f*⁶, the object of this mechanism being to keep the piano-string stretched tight during the operation of covering it.

It will be seen that each pair of gears and pinions are, respectively, keyed to their shafts, so that the teeth of one come opposite to the notches in the other. It will also be observed that the gears *d* and *d*¹ and the pinions *d*² and *d*³ have teeth cut diagonally across their peripheries, the object being to show two methods of accomplishing substantially the same purpose, to wit, imparting to the jaw-shafts a smooth, uniform, and like motion. The trains of gearing *d* and *d*¹ and *d*² and *d*³ are mounted in an adjustable frame or standard, for the purpose of adapting the machine to covering wires of different lengths.

In operation, the piano-string or steel wire is secured to the hooks and the covering-wire fastened to the string near the hook *e*¹, and the machine set in motion so that the jaw-shafts have a very high speed. As the string rotates, the covering-wire is led carefully in the direction of the hook *f*¹, and is thus wound closely around the string. The rotation of the string is perfectly steady, owing to the transmission of the motion by means of the double gears described.

Belts and pulleys are objectionable for imparting motion to the jaw-shafts, because a belt may slip, and a twist be thus given to the string. Single gears will not work well because of the jarring character of the motion derived from them, and because of their liability to have their teeth stripped from them if revolved very rapidly.

The more rapidly the string is rotated the more perfect is the product of the machine, and the more economical is its operation. The jaw-shafts should have a speed of upward of four thousand revolutions per minute; and to guard against vibration the trains of gearing should have their bearings arranged as shown at *g*—that is, the spur-wheels should have hubs long enough to act as journals, and the journal-boxes *g*¹ should be formed in the same standard or piece of metal, or in pieces so bolted together as to prevent the possibility of the springing apart of the centers. The gearing *c* and *c*¹ and *c*² and *c*³ is not mounted in the proper manner, and is exhibited merely as an illustration of a defective mode of construction.

I claim as my invention—

1. In a piano-string-covering machine, the combination, with the jaw-shafts *e* and *f*, each provided with two or more pinions, of the intermediate shaft *b*, having corresponding gears, arranged and operating substantially as described.

2. The hub-journals *g*¹ *g*¹ of the shafts *f* and *b*, arranged and boxed in the solid standard *g*, substantially as and for the purpose set forth.

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Witnesses:

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