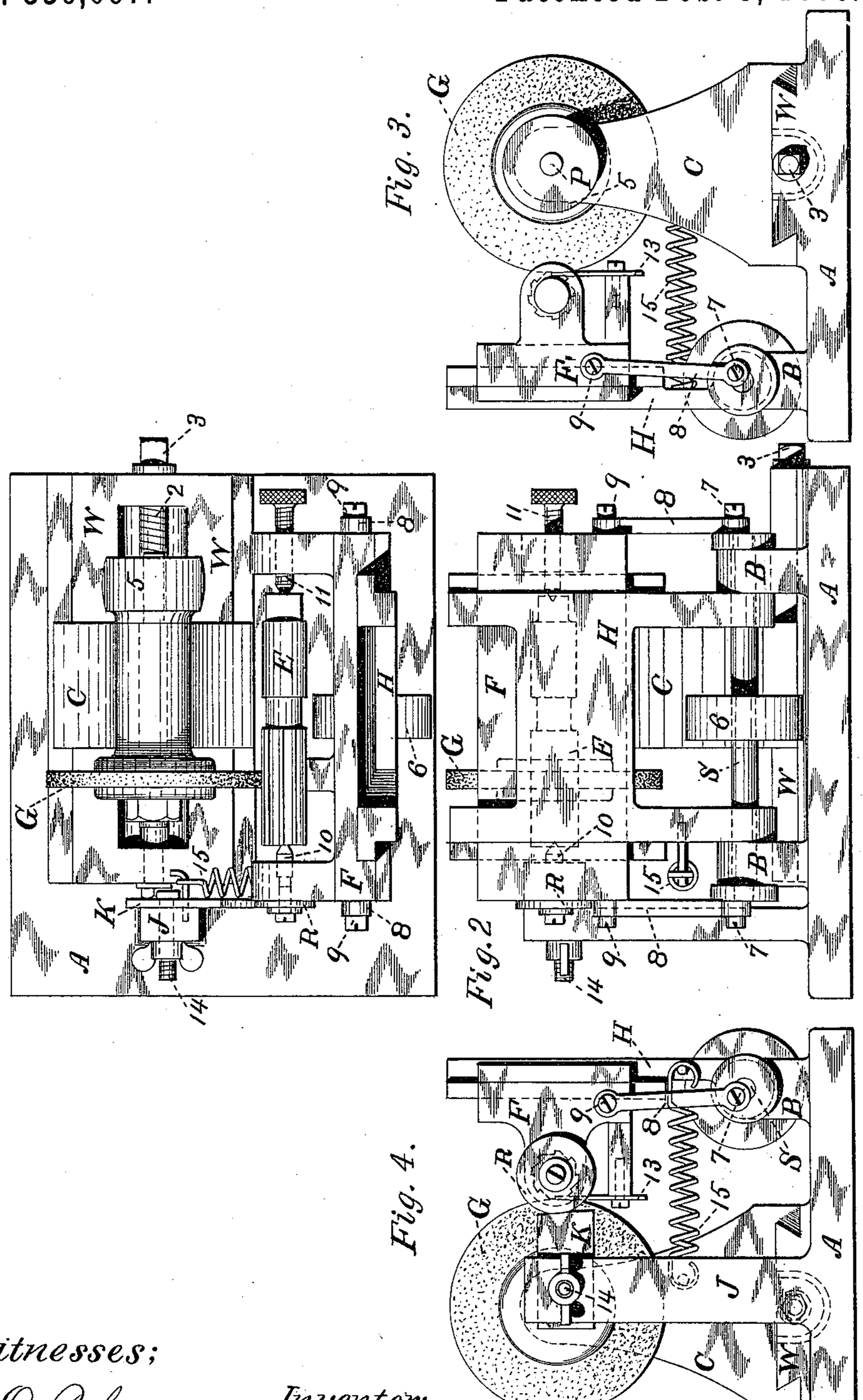
(No Model.)

F. H. RICHARDS.

REAMER RELIEVING MACHINE.

No. 336,067. Patented Feb. 9, 1886.



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REAMER-RELIEVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 336,067, dated February 9, 1886.

Application filed January 31, 1885. Serial No. 154,580. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Reamer-Relieving Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to machines for relieving the cutting-edges of reamers, or those of other similar tools, either before or after hardening, by means of any suitable grinding devices.

It has for its object to furnish such a machine, which shall be adapted to relieve the cutting-edges of a tool by reducing each "land" or surface between the grooves of the same to a shape conforming to a pattern that constitutes a part of said machine.

For the attainment of this object, my invention consists in certain combinations of mechanism, which are hereinafter first described in connection with the drawings, and afterward pointed out in the claims.

Referring to the drawings, Figure 1 is a top view of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is an elevation of the end at the right hand in Fig. 2. Fig. 4 is an elevation of the end at the left hand in Fig. 2. Fig. 2 is drawn in projection to Fig. 1, and Figs. 3 and 4 are in projection with Fig. 2.

Similar characters designate the same parts in all the figures.

A designates a suitable bed-plate, which, together with the parts formed thereon, constitutes the frame-work of the machine. The bed-plate has formed thereon ways W, on which a carriage, C, is fitted to be traversed by a screw, 2, or its equivalent, in the usual manner. The carriage has a nut (not shown) to which the screw is fitted, and the screw may be turned by hand-power by means of a handle applied to head 3; or it may be operated automatically by any of the devices usually employed for such purposes. Said carriage is fitted to support a spindle, P, for carrying the grinding-wheel G, which is driven by a pulley, 5.

Forward of the aforesaid grinding device a reamer-holding fixture, F, is arranged to have a vertically-reciprocating motion on a frame, H, which has a lateral movement toward and from said grinding device. As a convenient mode of supporting said frame H, it is pivoted on the driving-shaft S, which shaft is supported in bearings B, formed on the bed-plate. This shaft is driven by means of pulley 6, fixed thereon, and on either end it has a crank, 7, connected, by connecting-rods 8, to pins 9 on the fixture. The radius of the two cranks being the same, and situated in the same direction, the rotation of shaft S will obviously impart a vertically-reciprocating motion to fixture F. For holding the reamer, the fixture is furnished with a fixed center, 10, and an adjustable center, 11, and a stop, 13, is so arranged on said fixture as to rest against the tooth being relieved. Any other suitable means may of course be employed for holding the reamer--as, for instance, such as described in United States Patent No. 308,669, dated December 2, 1884, to which reference may be had.

K designates a cam or pattern adjustably secured to post J by bolt 14, which controls the aforesaid lateral movement of frame H by its contact with roller R or equivalent on fixture F. A spring, 15, or equivalent, serves to hold the said frame and fixture as far toward the grinding-wheel as the cam will permit, so that by suitably constructing this cam the lateral movement of the fixture relative to its vertical movement may be made such as required for properly relieving the teeth of any reamer not beyond the capacity of the machine. The methods for so making said cam as to cause the machine to produce the proper relief of the reamer-teeth will be fully understood by mechanics familiar with machinery in which forms are reproduced from a model or pattern, so that a particular description of the same is here unnecessary.

The operation of my improved reamer-relieving machine will be readily understood from the drawings and preceding description, being substantially as follows: The several parts of the machine having been suitably constructed and adjusted to receive and operate upon a reamer, said reamer is fixed, substantially as explained, in the fixture, so that one of its

teeth is presented to wheel G. Pattern K being now moved on post J toward the left hand in Fig. 4, to bring the reamer-tooth against said wheel, shaft S is set in motion, directly causing the vertical and indirectly the lateral or relief movement of the fixture. While thus operating the fixture by means of screw 2, the grinding-wheel is traversed to and fro against the tooth until it is ground to a shape conforming to pattern K. These operations are then repeated until all the teeth are relieved.

Having thus described my invention, I claim—

1. In a reamer-relieving machine, the combination of a suitable frame-work, a laterally-movable frame, a reamer-holding fixture, a grinding device, mechanism, substantially as described, for reciprocating said fixture on said frame, and a pattern for controlling the lateral movement of said frame toward said grinding device, combined and arranged substantially as described, and for the purpose set forth.

2. The combination of a frame-work, as A, having post J and bearings B, shaft S, having cranks 7, frame H, fixture F, connections from the cranks to said fixture, cam K, spring 15, and a grinding device, substantially as described.

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