

(No Model.)

2 Sheets—Sheet 1.

C. E. ROBERTS.

EMERY BELT GRINDING MACHINE.

No. 377,212.

Patented Jan. 31, 1888.

Fig. 1.

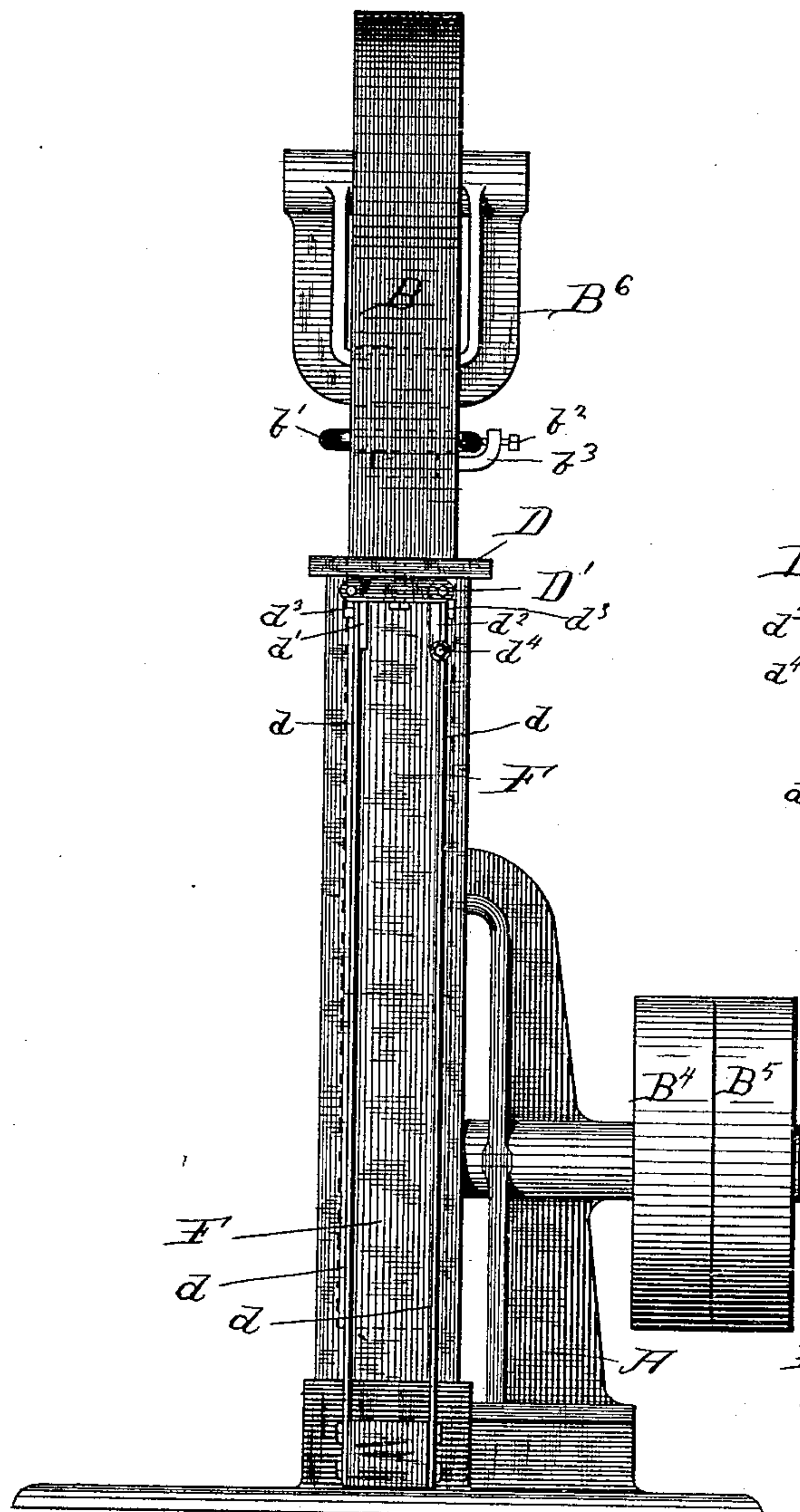
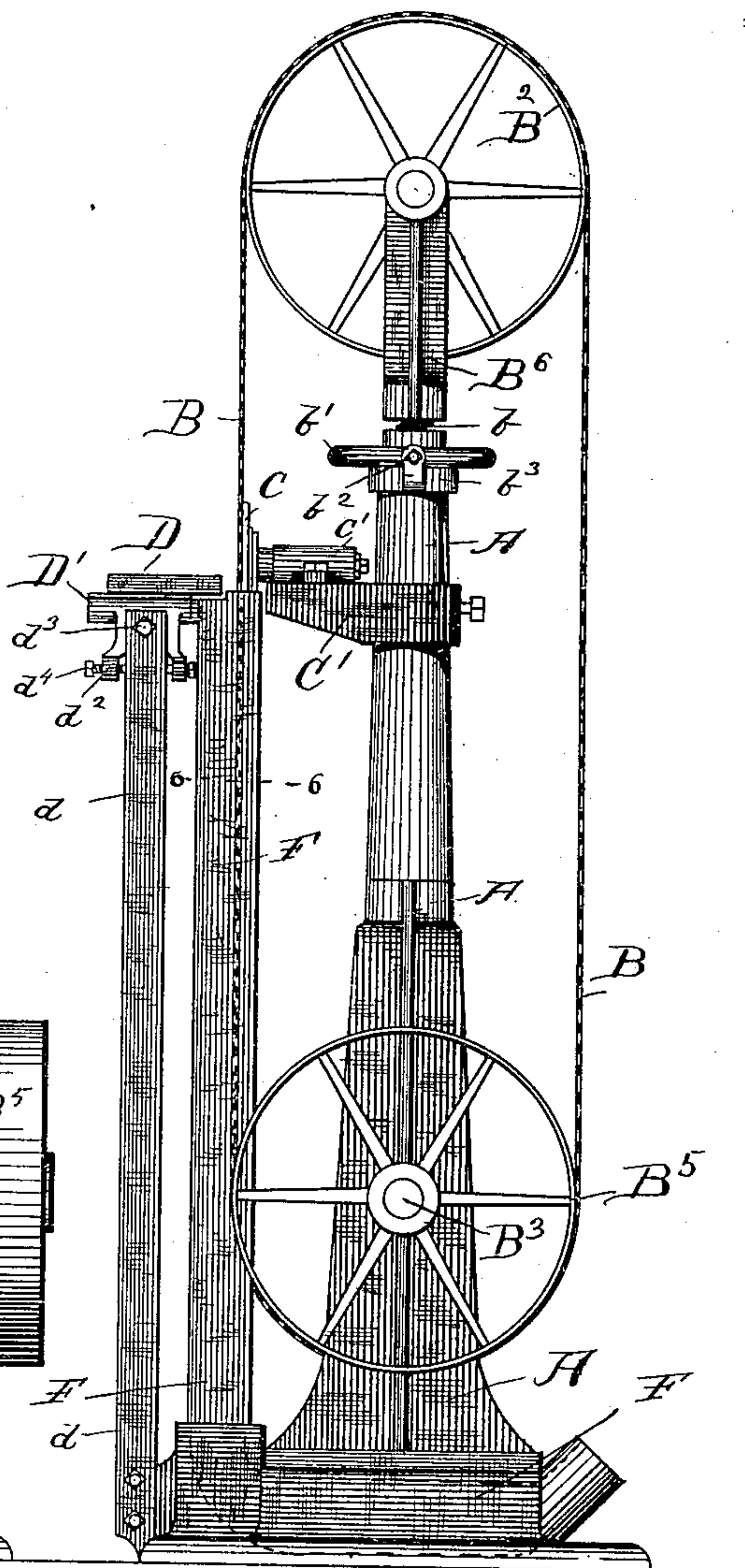


Fig. 2.



Witnesses:

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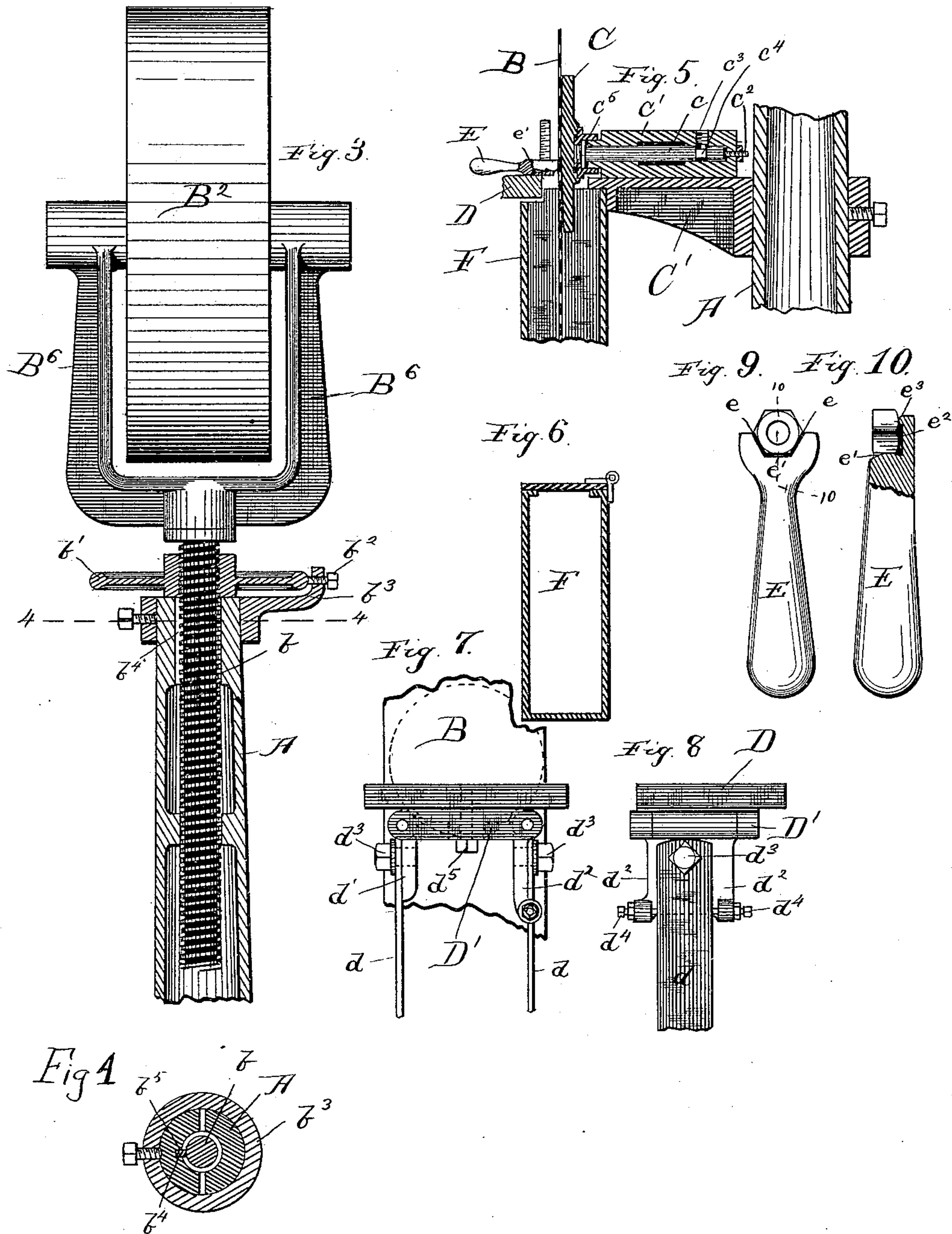
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UNITED STATES PATENT OFFICE.

CHARLES E. ROBERTS, OF CHICAGO, ILLINOIS.

EMERY-BELT GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 377,212, dated January 31, 1888.

Application filed November 23, 1886. Serial No. 219,586. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. ROBERTS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Emery-Belt Grinding-Machines, of which the following is a specification.

This invention relates to improvements in emery-belt grinding-machines.

The object of my invention is to provide an efficient and durable emery-belt machine of a simple construction.

Heretofore in grinding or polishing the flat sides, for example, of hexagonal-headed bolts and other articles upon an emery-belt difficulty has been experienced in presenting and holding the sides of the bolt-head flat and true against the belt, especially where the bolt is made from rolled bars, which ordinarily are not perfectly true hexagons or other shape; and especially is this difficult where any attempt is made to move the bolt laterally across the face of the moving belt, as the grinding is being done, to prevent wearing the belt in one place. This lateral moving of the article being ground across the face of the belt is, however, very essential, in order to cause the belt to wear equally, and as a consequence, also, to grind equally throughout its width or face, and tends to greatly increase its efficiency and durability. Heretofore, also, in emery-belt machines used for grinding flat faced or sided articles it has been customary to employ a stationary flat plate or backing to support the belt and keep its surface flat and true at the points where the article being ground is pressed against the belt, and this rubbing or grinding of the back face of the belt against a stationary surface tends to wear it out and materially lessens its durability.

In my invention I employ a laterally-swinging table in front of the belt, supported, preferably, on a pair of flat flexible springs, one attached at each end or side of the table, so as to maintain the table always parallel to itself and at right angles to the belt, while at the same time allowing for perfect freedom of lateral movement to enable the operator to swing or move the work back and forth across the face of the belt without in any way disturbing or altering the position or relation of

the work to the belt. To support the belt where the work is applied I employ a rotary plate or disk, which turns in one direction or the other, according as the work is pressed against the moving belt to one side or the other of the axis of the disk. The bolt, nut, or other article to be ground or polished is held in a holder having a socket with a rounded or curved face, in or against which the bolt-head or nut fits somewhat loosely, and as such socket bears against the flat back face of the bolt-head or nut centrally and only at a few points, when the opposite flat face of the bolt or nut is forced against the flat belt the bolt or nut may automatically turn or adjust itself in its socket or holder in case it should not be presented flat and true to the belt. This greatly facilitates the operation of the machine and increases its capacity, as the face to be ground is by this means always presented flat and true to the belt; so no unnecessary grinding need be done, as is always the case where the face of the bolt or nut happens to be presented slightly askew to the belt. As the motion of the belt in one direction and its friction against the nut or bolt held in the socket or holder tends somewhat to draw or tip the bolt more or less downward, or in the direction the belt is moving, and thus grind the face of the same more at the upper edge, I overcome this tipping tendency by making the bearing point of the holder-socket nearer its lower edge.

My invention also consists in the novel devices and novel combinations of parts or devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a front view of a machine embodying my invention. Fig. 2 is a side elevation. Fig. 3 is an enlarged detail sectional view of the upper-pulley holder. Fig. 4 is a cross-section on line 4 4 of Fig. 3; Fig. 5, a central vertical section showing the belt-supporting rotary plate or disk. Fig. 6 is a cross-section on line 6 6 of Fig. 2. Fig. 7 is an enlarged front view of the work-supporting table. Fig. 8 is a side view of the parts shown in Fig. 7, and Figs. 9 and 10 are detail views of the holder.

In said drawings similar letters of reference indicate like parts.

A represents the frame of the machine; B, the emery-belt; B', the lower pulley, and B² the upper and adjustable pulley.

B³ is the driving-shaft, and B⁴ B⁵ the fast and loose pulleys thereon for the driving-belt. The upper pulley, B², of the emery-belt is journaled in a yoke or frame, B⁶, having a screw-threaded stem, b, which fits in a suitable socket in the standard or frame A, and the yoke is adjusted up and down to keep the requisite tension upon the emery-belt by means of a threaded hand wheel or nut, b'. A set-screw, b², in the bracket b³ serves to fix the adjusting-wheel b' in place.

C is the rotary belt-supporting flat plate or disk at the back of the belt B to support the same at the place where the articles to be ground or polished are pressed against the belt. This disk has a shaft, c, journaled in suitable bearings, c', on the bracket C', secured to the standard A. The journal for the shaft of this disk is arranged at right angles to the face of the belt and, preferably, centrally with the belt. When a nut, bolt, or other article is pressed against the belt near one edge, the disk C will turn in one direction, and when pressed against the belt near its other edge the disk will of course revolve in the opposite direction. The shaft c is furnished with a set-screw, c², which may be adjusted endwise to bring the same in proper relation to take or receive the end-thrust of said shaft. A screw, c³, the end of which fits in a groove, c⁴, in the shaft c, serves to keep the shaft from slipping out, as the adjusting-screw c² only acts against the end-thrust of the shaft. To protect the bearings of the shaft c from emery-dust, I provide the disk C with a hub or sleeve, c⁵, which fits over the bearing, as indicated in Fig. 5.

D is the laterally parallel swinging table upon which the operator supports the work when pressing it against the emery-belt. This table is hinged or pivotally connected at or near each end through its base-piece D' with a pair of laterally-swinging supports, d d, preferably flat steel springs, secured at their lower ends to the frame or base of the machine, so that the table may swing or move laterally across the face of the emery-belt and always preserve its parallelism to itself. By making the supports d d of flat springs they will right or return themselves to their normal or central position, no separate springs being required for such purpose, and they may thus be bolted directly to the frame or base-block of the machine without the interposition of any hinges or pivots. The flat springs d d also allow perfect freedom of lateral movement, and thus facilitate the swinging or moving of the article being ground across the face of the emery-belt. The base-piece D' of the table is pivotally connected to the springs d d through the hinge arms or straps d' d², which are secured to the springs d d by screw-bolts d³ d³. The arm d² is provided with a pair of adjusting-screws, d⁴ d⁴, at its lower end, which fit against the edges of one of the springs d,

as indicated in Figs. 7 and 8, for the purpose of leveling or adjusting the table in relation to the emery-belt.

The table D or its base-piece D' is connected to the flat springs or supports d d through the pivot-bolts d³. By turning one of the screws d⁴ in and the other screw d⁴ out, the base D' may be rocked on its pivots d³ d³ in one direction or the other until it is leveled or brought into proper adjustment. This adjusts the table one way. Its adjustment at right angles depends upon the relative length of the supports or springs d d. The length of the supports d d is, however, not subject to much change.

The table D is adjustably secured to the base-piece D' by means of a bolt, d⁵, which passes through a slot in the base-piece D', so that the table D may be adjusted to or from the emery-belt. The slot in the base-piece D', through which the bolt d⁵ passes, I have not shown in the drawings, as it is covered up by other parts. The construction, however, is the well-known and familiar one where two plates are secured together by a bolt passing through a slot in one plate, so that one of the two plates may be slipped or adjusted on the other, and will be readily understood without specific illustration. The table D may thus be adjusted to or from the emery-belt, and also by rocking the same on the bolts d³ d³ as pivots it may be adjusted to bring its surface at right angles to the plane of the emery-belt, or in other desired relation thereto.

E is a bolt or nut holder, having a socket, e, to receive the bolt, nut, or other article to be ground or polished. The socket e, as shown in the drawings, is designed to receive a hexagonal-shaped nut or bolt-head. It will of course be understood that the socket of the holder will conform in shape to the article to be ground or polished. The socket is made slightly larger than the bolt-head or nut which fits in it, and the back wall, e', of the socket is rounded or curved, so that the flat face of the bolt will touch the same only centrally, and thus permit the opposite side of the nut or bolt-head to adjust itself to the flat face of the emery-belt. To overcome the tendency of the friction of the emery-belt to turn or tip the nut vertically downward in its holder, I also curve or round the back wall, e', of the socket E on a vertical line, so that the holder will exert pressure against the nut or article near the lower edge thereof, as indicated clearly in Figs. 5 and 9.

F is a hollow box or conduit for conveying off the dust or grindings. The upper end or mouth of this conduit extends to near the point where the grinding is done.

In operation, the workman places the nut, bolt-head, or other article in the socket of the holder E, and, while resting said holder upon the laterally-swinging table D, presses one face of the nut or bolt against the emery-belt, and at the same time swings the table laterally upon its pivotal supports d d, so as to carry

the nut or article laterally across the face of the emery-belt while it is being ground. The stem *b* of the yoke *B*⁶ is prevented from turning in the standard *A* by means of a feather or key, *b*⁴, secured in the standard *A*, and which fits in a longitudinal groove, *b*⁵, cut in the screw-stem *b*. By this means the pulley *B*² is kept parallel with the pulley *B*¹. The bottom *e*² of the socket *e* of the holder *E* is also slightly curved or rounded, and its bearing-point *e*³ is located near the front edge of the socket, to better prevent any tendency of the bolt-head or nut tipping, owing to the friction of the emery-belt thereon. The holder *E* is preferably made of wood.

I claim—

1. The combination in an emery-belt grinding-machine, of the emery-belt and its supporting-pulleys, with a rotatable plate or disk for supporting the belt at the place where the article is pressed against it, the flat face of said disk fitting against the inner surface of the belt and the axis of revolution of the disk being at right angles to the plane of the belt, substantially as specified.

2. The combination, with an emery-belt, of a rotatable back plate or support having a shaft journaled at right angles to the plane of the belt and midway between the edges of the belt, so that the belt will lie equally on each side of the axis of the disk, substantially as specified.

3. The combination, with an emery-belt, of a rotatable flat disk for supporting its back, the axis of the disk being at right angles to the plane of the belt, and means for adjusting the same to and from the belt, substantially as specified.

4. The combination, with an emery-belt, of a laterally-swinging table for supporting the work and moving it laterally across the face of the belt, and a pair of swinging supports for holding said table level as it swings to and fro across the face of the belt, substantially as specified.

5. The combination, with an emery-belt, of a table and a pair of laterally-swinging supports hinged or pivotally connected to said table at different points, whereby the table is held level or at right angles to the belt as it

swings to and fro across the face of the belt, substantially as specified.

6. The combination, with an emery-belt, of a table and a pair of laterally-swinging supports hinged or pivotally connected to said table, said supports consisting of flat springs, substantially as specified.

7. The combination, with an emery-belt, *B*, of table *D*, and flat springs *d d*, pivotally connected at one end to the opposite ends or sides of said table and at their lower ends rigidly connected to the frame of the machine, substantially as specified.

8. The combination, with an emery-belt, *B*, of table *D*, base-piece *D'*, springs *d d*, and hinge-arms *d' d'*, secured rigidly to said springs *d d* and pivotally to said base-piece *D'*, substantially as specified.

9. The combination, with an emery-belt, *B*, of table *D*, base-piece *D'*, springs *d d*, and hinge-arms *d' d'*, secured rigidly to said springs *d d* and pivotally to said base-piece *D'*, said table *D* being secured to said base-piece *D'*, substantially as specified.

10. The combination, with an emery-belt, *B*, of table *D*, and laterally-swinging supports *d d*, pivotally connected to said table near its opposite ends, said table having also pivots *d*³, for the purpose of adjusting the table at right angles to the belt, substantially as specified.

11. The combination, with an emery-belt, *B*, of table *D*, supports *d d*, hinge-arms *d' d'*, bolts *d*³ *d*³, and set-screws *d*⁴, for turning or adjusting said table on the pivots *d*³ *d*³, substantially as specified.

12. The combination, with emery-belt *B*, of pulleys *B*¹ *B*², hollow standard *A*, yoke or frame *B*⁶, having screw-stem *b*, provided with longitudinal groove *b*⁵, key *b*⁴, and threaded adjusting-wheel *b*⁷, substantially as specified.

13. The combination, with an emery-belt and its pulleys, of the rotary disk *C* and laterally-swinging table *D*, and means for holding said table at right angles to said disk as it swings to and fro, substantially as specified.

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Witnesses:

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