(No Model.) 2 Sheets—Sheet 1.

J. E. HOWARD.

CENTERING APPARATUS.

No. 391,533. Patented Oct. 23, 1888.

Fig. 2.

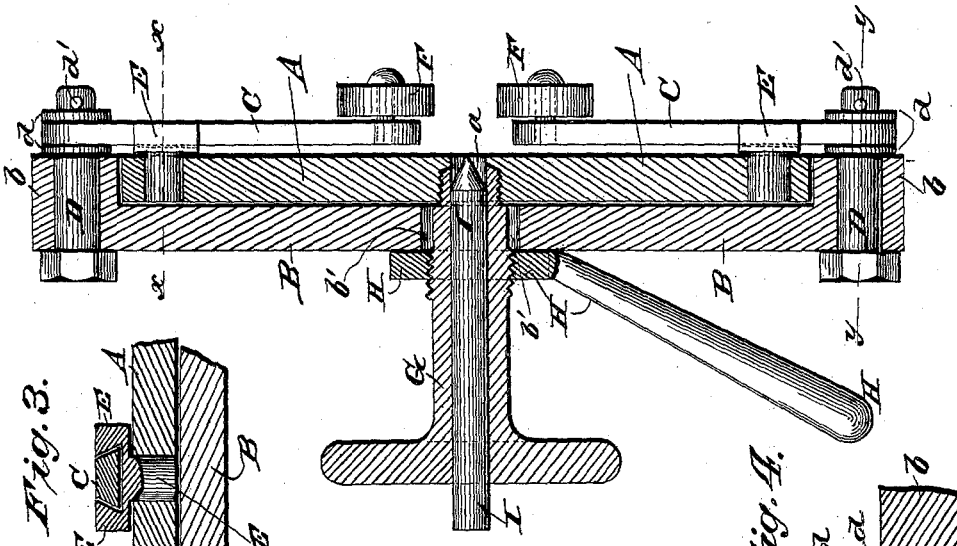


Fig. 3.

Fig. 4.

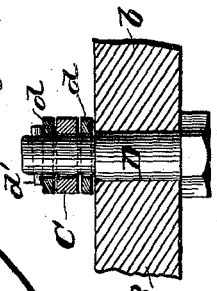
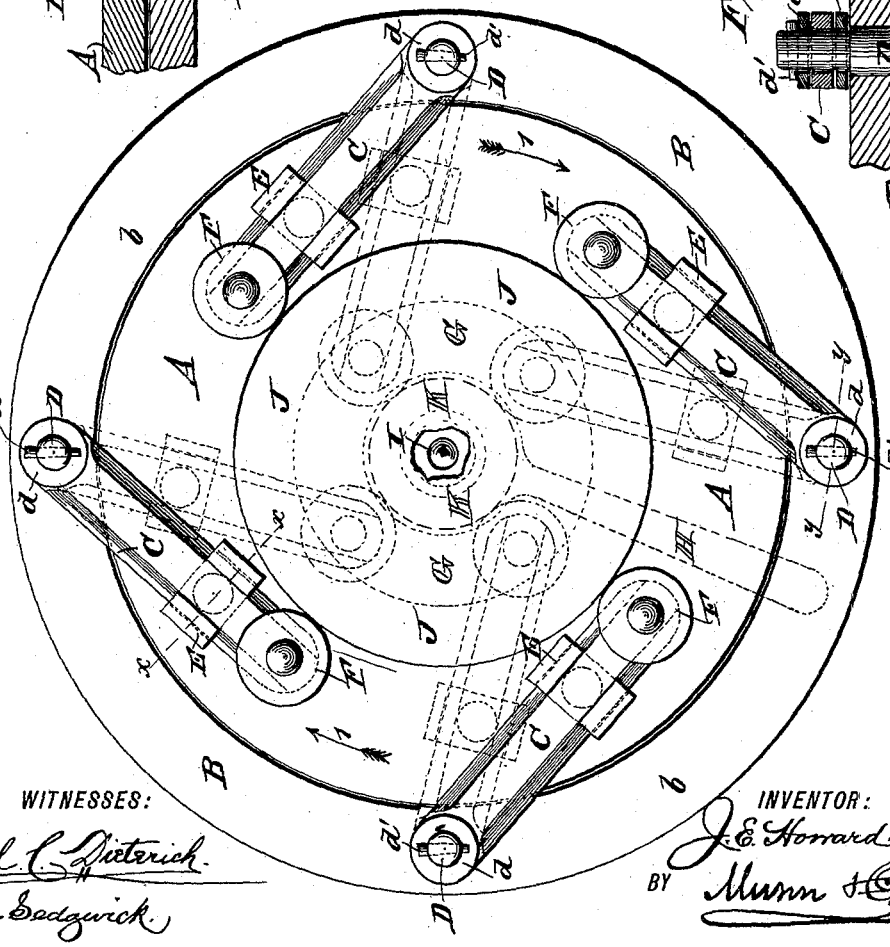


Fig. 1.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

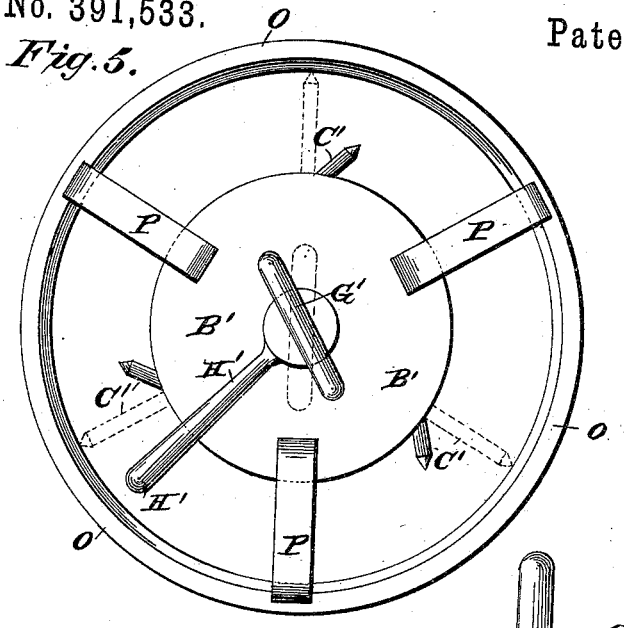


Fig. 7.

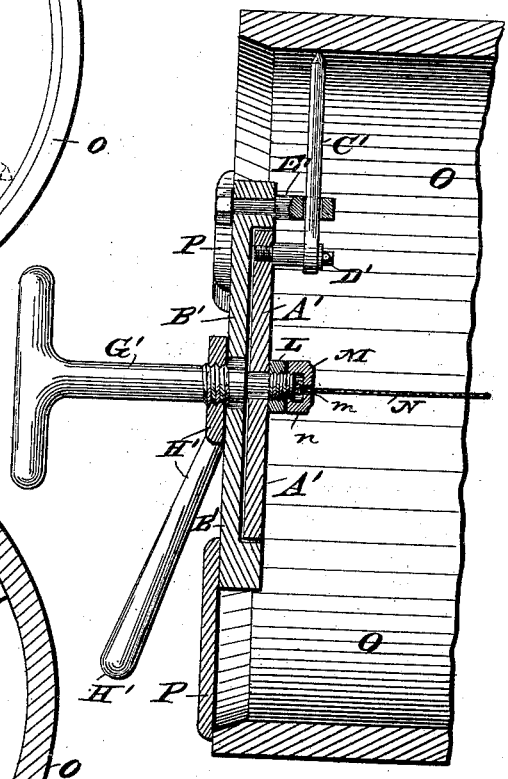


Fig. 6.

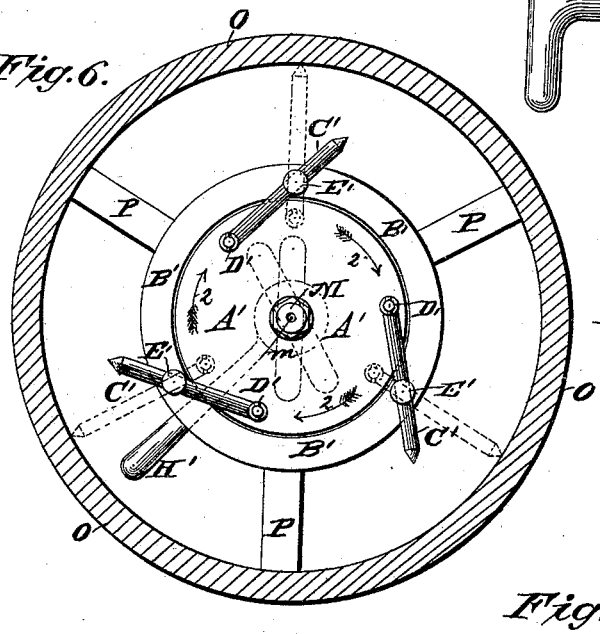
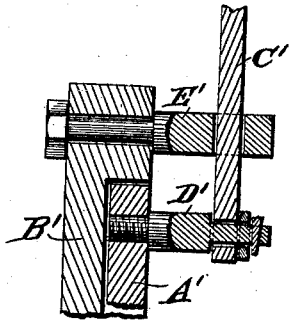


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN ELIOT HOWARD, OF ALTOONA, PENNSYLVANIA.

CENTERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 391,533, dated October 23, 1888.

Application filed August 2, 1888. Serial No. 281,720. (No model.)

To all whom it may concern:

Be it known that I, JOHN ELIOT HOWARD, of Altoona, in the county of Blair and State of Pennsylvania, have invented new and useful Improvements in Centering Apparatus, of which the following is a full, clear, and exact description.

My invention relates to apparatus for centering axles, shafts, cylinders, or other work to be operated on by tools in a lathe or other machine; and the invention has for its object to provide simple, inexpensive, an efficient apparatus of this character.

The invention consists in certain novel features of construction and combinations of parts of the centering apparatus, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation or face view of one form of my improved centering apparatus as adapted to centering axles, shafts, tubes, or other parts from their outside face. Fig. 2 is a central transverse sectional elevation thereof. Fig. 3 is a detail cross-section taken on the line *x x*, in Figs. 1 and 2, and Fig. 4 is a detail sectional view taken on the lines *y y* in Figs. 1 and 2. Fig. 5 is an outside face view of a modified form of centering apparatus as applied to use in getting the center of a cylinder or in holding a line at the center of a cylinder. Fig. 6 is a reverse face view of the same with the cylinder in transverse section. Fig. 7 is a central sectional side elevation of the centering apparatus and the end of the cylinder, and Fig. 8 is a detail sectional view drawn to a larger scale.

I will first describe the centering apparatus, as shown in Figs. 1, 2, 3, and 4 of the drawings, as follows:

The face-plate A, against or near which the shaft, rod, tube, or other part to be centered will be brought, is fitted to rotate within a recess made in the outer face of the bed-plate B. A series of arms, C, of which there may be three or four, (four being shown,) are pivotally connected by a bolt or pin, D, preferably having washers *d* and a retaining-pin, *d'*, with the outer portion, *b*, of the bed-plate, which preferably is flush with the face-plate. These arms C are each held by a sliding connection, and preferably by a dovetailed joint, to the head of a pivot-block, E, which is fitted to turn in the face-plate, while the arm slips along the pivot-block when the face-plate is turned in or on the bed-plate. The inner ends of the arms C may act directly on the article to be centered; but I prefer to provide them with hardened and truly-journaled antifriction rollers F, which with the arms constitute the centering-jaws of the apparatus.

Into the back and at the exact center of the face-plate A is tightly fitted by a screw or other joint the inner end of a handle, G, which passes through a hole, *b'*, in the bed-plate, and behind this plate the handle-stem is provided with a screw-thread, onto which is fitted a handle or jam-nut, H, which, when the face-plate is set to cause the jaws to center the work, will be tightened to hold or clamp the face-plate and bed-plate together, while a centering-punch, I, which is nicely fitted into a bore of the handle, is driven into the end of the work to mark its exact center, the face-plate having a central hole, *a*, through which the center-punch passes.

The operation of this device is very simple and effective and as follows: The clamp-nut H being loosened, the face-plate A will be placed about centrally onto the end of the axle shaft or other piece J, to be centered, and the face-plate will then be turned by the handle G in the direction of the arrows 1 in Fig. 1 of the drawings, and this will also pull around the pivot-blocks E, which then also turn a little in the face-plate, and thereby cause the rollers F to approach and come in contact with the axle J and center it truly between them, whereupon the nut H will be tightened to clamp the plates A B together and also clamp the centering-jaws to the axle, and the punch I will then be driven backward into the axle to truly center-punch or mark it, so it may be swung on true centers in a lathe or other machine while being operated upon by cutters or tools of any description. After the axle or piece J is centered it requires but a moment to loosen the nut H and turn the

face-plate backward a little by its handle G, and the centering apparatus may then be removed from one piece of work to another, which will be centered and punched in like manner and as above described.

Work of any diameter from about the diameter of the face-plate A to a small fraction of an inch in diameter may be centered by this apparatus. Smaller work only requires a further movement of the face-plate A in direction of the arrows than larger work, and as will be understood by the dotted positions of the centering-arms in Fig. 1 of the drawings for centering a smaller piece or shaft, K, which, when clamped, will be marked by the center-punch I. Hence work of any diameter within the capacity of the centering-jaws may be center-punched with facility and exactness, as will readily be understood.

In view of the aforesaid description the construction and operation of the cylinder centering form of the apparatus shown in Figs. 5, 6, 7, and 8 of the drawings will be made clear by a brief explanation, as follows: The face-plate A′ is arranged for rotation or partial rotation in a recess of the bed-plate B′; but the centering-arms C′, of which there are three, are pivoted at their inner ends by bolt-ends D′ to the face-plate A near its outer margin and the arms are adapted to slide through openings made for them in swivel bolts or blocks E′, which are fitted to the outer part of the bed-plate. The handle G′, which is provided with a clamping-nut, H′, is passed through a hole in the bed-plate and also through the face-plate, and in front of the face-plate is provided with a clamp-nut or collar, L, beyond which the handle has fitted to it a screw or other end cap, M, which has a central hole, *m*, through which a cord, N, is passed until its end knot, *n*, stops at the hole and within the cap. This cord may be run through a steam-engine or other cylinder, O, and exactly at the center of it, as is at times required in constructing or repairing engines or other machines using bored cylinders in which pistons operate. The bed-plate B′ is provided with a series of fixed radial arms, P, preferably three in number, and which will be set fairly against the truly-turned end of the cylinder which is to be centered by the cord.

The operation of this modified form of apparatus is as follows: When the centering-arm C′ are in the positions shown in full lines in Figs. 5 and 6 of the drawings, the radial arms P will be placed against the end of the cylinder O, and the face-plate A′ will be turned by its handle G′ in the direction of the arrows 2 in Fig. 6 until the shifting of the pivotal connections D′ of the arms relatively to their swiveled fulcrums and guides E′ will simultaneously project the tapered or pointed extremities of the arms against the inner surface of the cylinder, and as shown by the dotted lines in Figs. 5 and 6 and in full lines in Fig. 7, and when the nut H′ is tightened the cord N will then be held exactly at the center of the cylinder. The other end of the cord will be held at the other end of the cylinder by a similar apparatus, or it may be carried on through and past the other end of the cylinder and set in various ways.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in centering apparatus, of a bed plate or support, a rotatable face plate or head thereon, a series of centering-arms pivoted to one of said plates, and blocks or guides swiveled to the other plate and to which the arms are loosely fitted, substantially as herein set forth.

2. The combination, in centering apparatus, of a bed plate or support, a rotatable face plate or head thereon, a series of centering-arms pivoted to one of said plates, blocks or guides swiveled to the other plate and to which the arms are loosely fitted, a shaft or handle fitted to the movable plate, and a clamping nut or device binding the plates together when the centering-arms are set to the work, substantially as herein set forth.

3. The combination, in centering apparatus, of a bed plate or support, a rotatable face plate or head thereon, a series of centering-arms pivoted to one of said plates, blocks or guides swiveled to the other plate and to which the arms are loosely fitted, and a marking-punch fitted at the center of the plates, substantially as herein set forth.

4. The combination, in centering apparatus, of a bed plate or support, a rotatable face plate or head thereon, a series of centering-arms pivoted to one of said plates, blocks or guides swiveled to the other plate and to which the arms are loosely fitted, a handle on the face-plate, and a center-punch fitted in the handle, substantially as herein set forth.

5. The combination, in centering apparatus, of a bed plate or support, a rotatable face plate or head thereon, a series of centering-arms pivoted to one of said plates, blocks or guides swiveled to the other plate and to which the arms are loosely fitted, and a cord-holding cap held at the center of the face-plate, substantially as herein set forth.

JOHN ELIOT HOWARD.

Witnesses:
A. W. MECHIN,
J. M. WILSON.