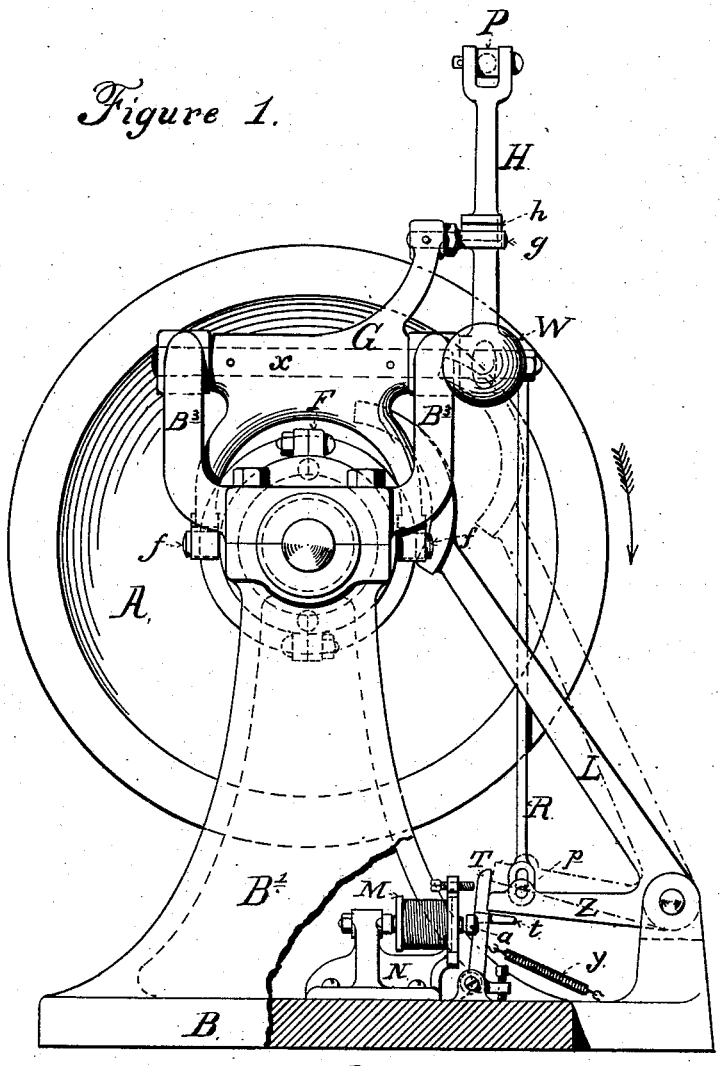
(No Model.) 3 Sheets—Sheet 1.

W. F. DURFEE.

APPARATUS FOR STARTING AND STOPPING MACHINERY.

No. 260,175. Patented June 27, 1882.

Figure 1.



WITNESSES.
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George Tuck

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(No Model.) 3 Sheets—Sheet 2.

W. F. DURFEE.

APPARATUS FOR STARTING AND STOPPING MACHINERY.

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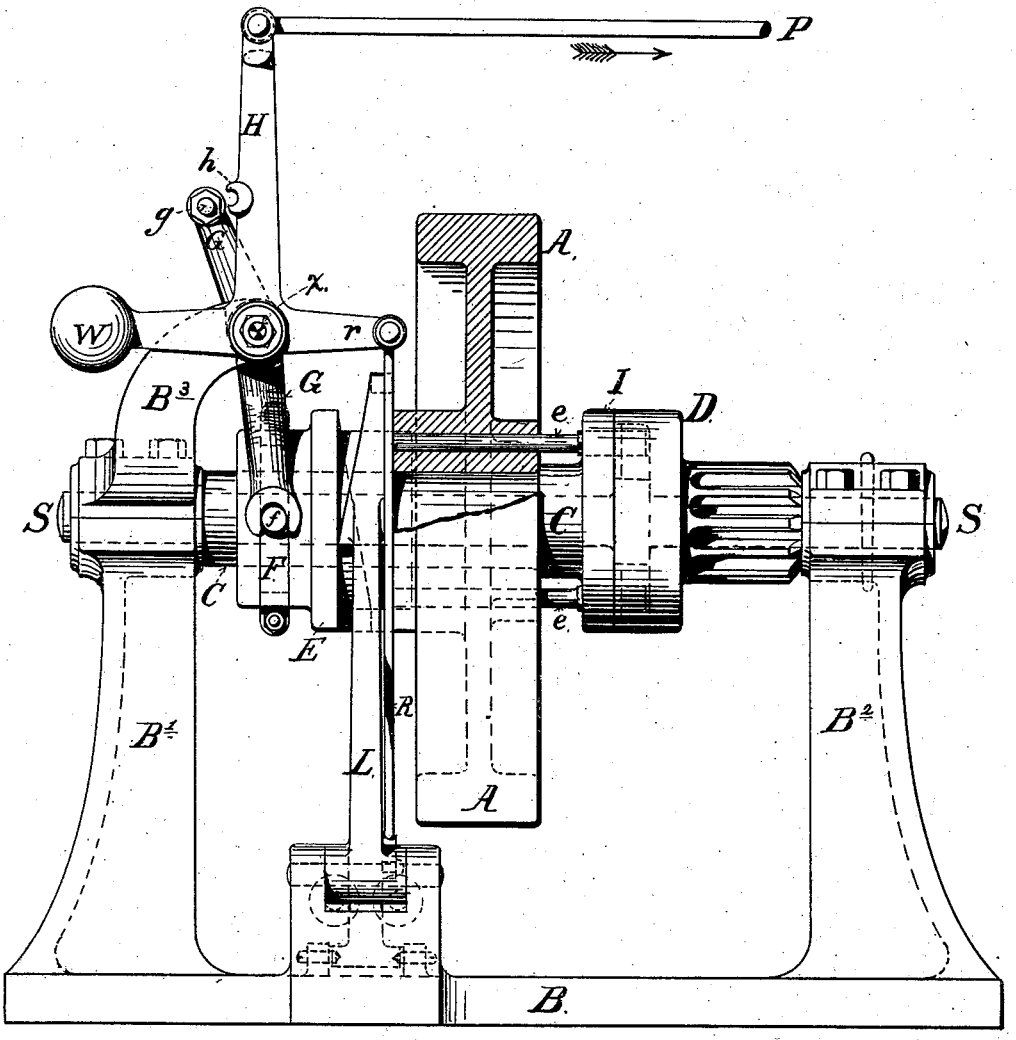
Figure 2.



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(No Model.) 3 Sheets—Sheet 3.

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APPARATUS FOR STARTING AND STOPPING MACHINERY.

No. 260,175. Patented June 27, 1882.

Fig. 6.

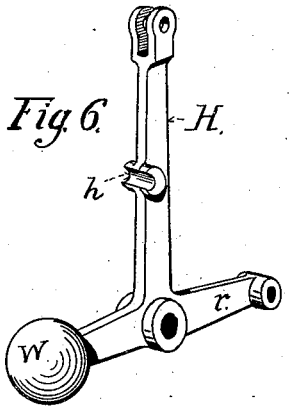


Fig. 4.

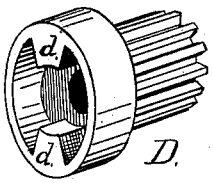


Fig. 5.

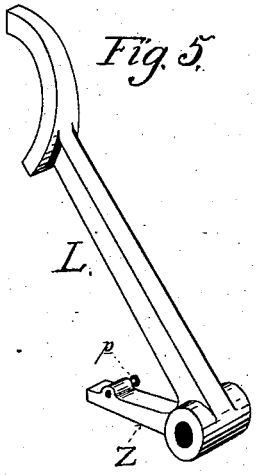
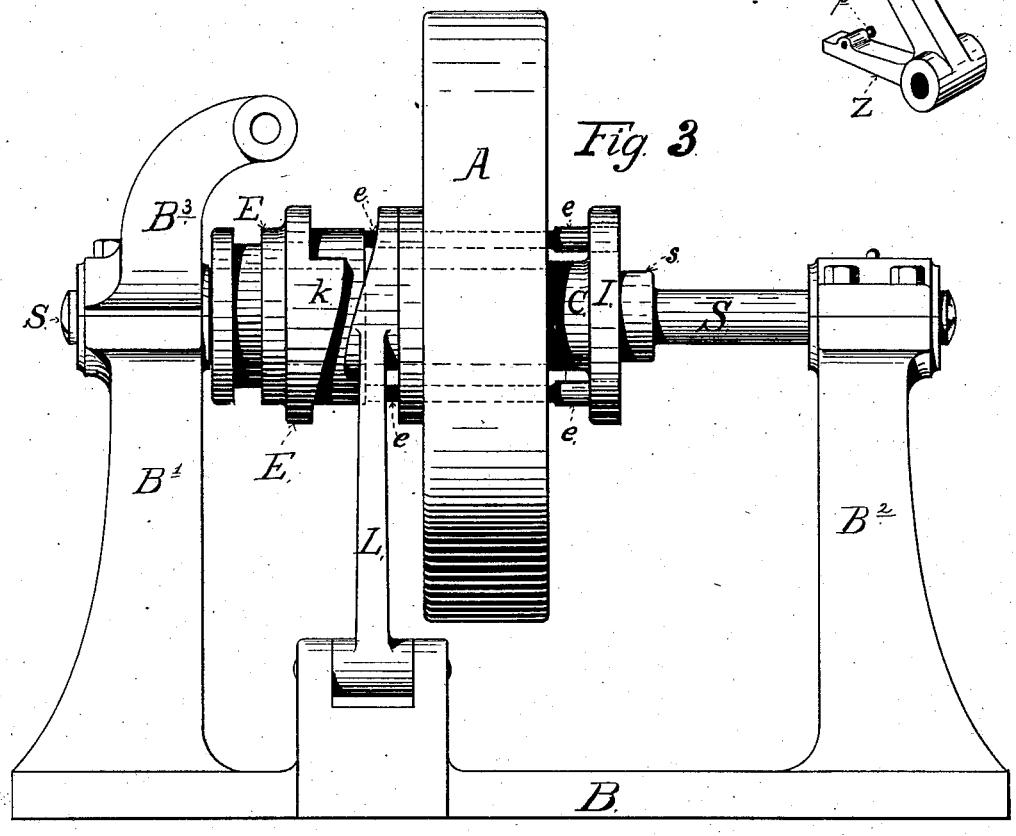


Fig. 3.



WITNESSES,
Albert R Lacey
Lewis Perry

INVENTOR,
William F Durfee

UNITED STATES PATENT OFFICE.

WILLIAM F. DURFEE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

APPARATUS FOR STARTING AND STOPPING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 260,175, dated June 27, 1882.

Application filed November 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. DURFEE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Starting and Stopping Shafting and other Machinery, of which the following is a specification, reference being made to the accompanying drawings for a fuller and clearer understanding of the same, in which—

Figure 1 represents an end elevation of the apparatus, with the lower corner of the standard B′ broken away to show the electrical stop-motion. Fig. 2 shows a side elevation of the same apparatus as viewed from the right-hand side of Fig. 1, with a segment of the balance-wheel broken away. Fig. 3 is a side elevation, with some of the parts removed, and serves to illustrate the position of clutch-block E and locking-bars *e e* relative to the balance-wheel immediately after the lever L has operated upon the clutch-block E. Fig. 4 is a perspective view of the flanged pinion D shown in Fig. 2. Fig. 5 is a perspective view of the lever L. Fig. 6 shows the bell-crank lever H of Figs. 1 and 2 in perspective.

Similar letters of reference indicate like parts in the several views.

A is a balance-wheel, to which motion is communicated by means of a belt or its equivalent operating on its periphery.

C is a revolving bushing or sleeve, to which said wheel A is rigidly attached, and is free to rotate about stationary shaft S, between the standard B′ and the collar *s* of the shaft. (See Fig. 3.)

E is a cylindrical clutch-block, which may be made to slide horizontally along the bushing C, and which has the cam-shaped projection *k* on one of its sides. This projection *k* is shown clearly in Fig. 3.

e e are bars, which are free to slide horizontally through openings in the hub of the wheel A, and are parallel with the axis of said wheel, one end of said bars being connected to the clutch-box E aforesaid, thereby causing the same to rotate, while their opposite extremities are carried by and guided in openings formed in the flange I of the bushing C.

D is a flanged pinion, which receives, through the medium of the flange I, in a way to be hereinafter described, the power communicated to the wheel A, and transmits the same to any machinery to which this invention is applied, and is more clearly shown in the detached perspective view, Fig. 4, wherein are distinctly illustrated the internal projections, *d d*, which, when the pinion D is revolving, engage with the enlarged ends of the bars *e e*, before described.

S is a stationary shaft, which sustains the rotating parts already described, and is supported at its extremities by the standards B′ and B^2, which are attached to the base-plate B.

The series of links and levers sustained by the cap B^3 of the standard B′ serve to operate the apparatus in the following manner, to wit: In Figs. 1 and 2 the various parts of the mechanism are illustrated in the positions which they occupy while the motion given to the balance-wheel A, as aforesaid, is being imparted to the flanged pinion D, and thence to any machinery.

If it is desired to disconnect the pinion D, and thereby stop its rotation while the motion of the wheel A continues, the horizontal starting-bar P, Fig. 2, is moved in the direction indicated by the arrow, which causes the extremity of the upper branch of the bell-crank lever H (which lever moves freely about one extremity of the pin *x* as a fulcrum, and is more perfectly illustrated in the detached perspective view, Fig. 6) to move in the same direction, while the extremity of the horizontal branch *r* thereof moves downward and forces the vertical link R attached thereto in the same direction until the lower slotted extremity of said link R, whose slotted end engages with the pin *p* at the side of the short arm Z of the lever L, (see Figs. 1 and 5,) is brought to bear against the projection *t* at the side of the upright latch-lever, T, whose lower extremity is pivoted in bearings attached to the base B, and, acting on said projection, forces the upper extremity of said latch away from the end of the short arm Z, thereby releasing it and permitting the upper wedge-shaped extremity of the lever L to fall against the clutch-block E, which, as it continues to revolve, engages its cam-shaped projection *k* with the curved wedge-shaped upper extrem-

ity of the lever L, and thereby forces itself along the bushing C toward the standard B′ until it arrives in the position shown by Fig. 3. This movement of the clutch-block E will draw the bars *e e* in the same direction, and thereby disengage their enlarged extremities from the projections *d d* (see Fig. 4) on the face of the flange of the pinion D, after which the motion of said pinion will cease, while the balance-wheel A and clutch-block E continue to revolve.

A ring, F, having the projecting trunnion-pins *f f* on its periphery, is fitted and held into a circumferential groove in the clutch-block E in the ordinary manner, the trunnions aforesaid engaging with the forked extremities of the pendent lever G, secured to and moving with the pin *x*, (which is capable of a partial rotation in the arms of the bracket,) so that when the clutch-block E is moved by the action of the lever L, as hereinbefore described, in the direction toward the standard B′ the forked lever G will change its position in accordance therewith, which will move the projecting stud *g* (carried by the upper extremity of the said forked lever) toward the notch *h* in the side of the vertical arm of the bell-crank lever H, before mentioned. (See Figs. 1, 2, and 6.)

If it is desired to cause the pinion D to resume its rotations about its axis S, the operation is substantially as follows, to wit: The horizontal starting-bar P is moved in the direction opposite to that indicated by the arrow until the lever L is raised (by means of the link R) to the position represented by the dotted lines in Fig. 1. In the course of this movement the latch-lever T is drawn by the spring *y* against the end of the arm Z, as represented in the drawings, immediately after which the notch *h* of the lever H comes in contact with the projecting stud *g* of the forked lever G, and so remains until the end of the movement, thus forcing the clutch-block E to its nearest proximity to the wheel A, which action engages the enlarged ends of the rods *e e* with the projections *d d* on the face of the flange of the pinion D, thereby causing said pinion to rotate in unison with the wheel A aforesaid. If, at this juncture, the operator ceases to control the horizontal bar P, the lever L (being so constructed and placed as to overcome the weight W) falls until the outer extremity of its lower arm, Z, comes in contact with and is stopped by a slight projection near the upper end of the latch-lever T, thus bringing the several parts of the apparatus into the positions shown by the full lines in the drawings, Figs. 1 and 2.

In addition to the means hereinbefore described for stopping the communication of power from the balance-wheel A to the pinion D, I have provided an electrical tripping apparatus which operates in connection with the latch-lever T, and which is constructed and actuated substantially in the following manner:

An electro-magnet of ordinary construction is mounted in the frame N, which is secured to the base of the machine in such a position that the cores of said magnet may act upon the armature *a*, which is attached to the vertical latch-lever T, hereinbefore described. The wires from said electro-magnet, communicating with a chemical battery or any other generator of electricity, are connected to the mechanism to which my invention is applied in such a way that when said mechanism is operating in a proper and satisfactory manner the flow of the electric current in said wires is interrupted; but when from a failure to supply the material being operated upon to the mechanism, or from any derangement of parts of said mechanism or imperfect action of the same, or from any cause whatever, the electric current is established, the electro-magnet aforesaid is rendered active and immediately attracts the armature *a* attached to the latch-lever T, which results in the fall of the lever L, and therefore the stoppage of the mechanism, in the manner hereinbefore described.

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

1. The combination, with the fixed shaft S and the flanged pinion D, adapted to revolve thereon and provided with internal projections, *d d*, of the sleeve or bushing C, provided with flange I, the wheel A, fixed to said sleeve, and the clutch-block E, adapted to slide horizontally on the sleeve, and provided with bars *e e*, that pass through the wheel A and flange I, and are adapted to engage with the projections in the interior of the flanged pinion, substantially as and for the purpose described.

2. The combination of the grooved clutch-block E, ring F, provided with trunnions *f f*, lever G, having bifurcated arms adapted to engage with said trunnions, and provided with a pin, *g*, at its upper end, and the bell-crank lever H, having notch *h*, adapted to engage with the pin *g*, all substantially as and for the purpose described.

3. The combination of the clutch-block E, having cam-projection *k*, ring F, provided with trunnions *f f*, lever G, engaging therewith, bell-crank lever H, having weight W and arm *r*, lever L, having arm Z, and provided with a wedge-shaped end adapted to engage with the cam *k*, link R, connecting the levers H and L, and the latch-lever T, provided with projection *t* and spring *y*, all substantially as and for the purpose described.

4. The combination, with the clutch-lever L, having arm Z, and the latch-lever T, provided with projection *t*, spring *y*, and armature *a*, of an electro-magnet adapted to operate said latch-lever, and thereby permit the clutch-lever to act upon the clutch, substantially as shown and described.

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Witnesses:
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