(No Model.)

F. H. EASBY.

MECHANISM FOR PRODUCING INTERMITTING MOTION.

No. 436,755. Patented Sept. 16, 1890.

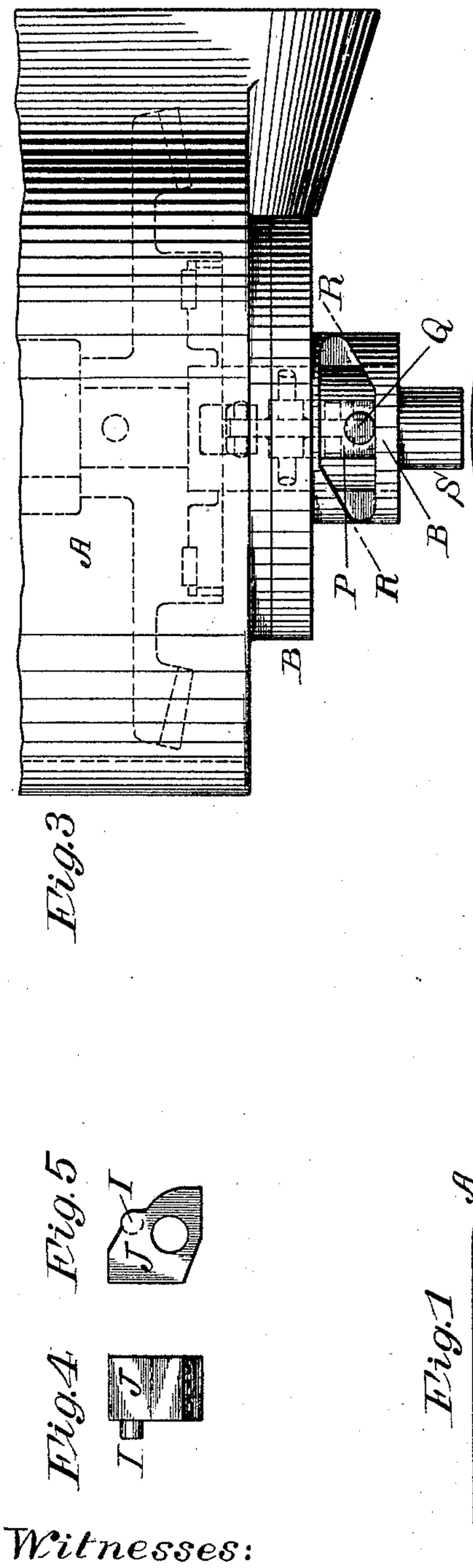

Fig. 3

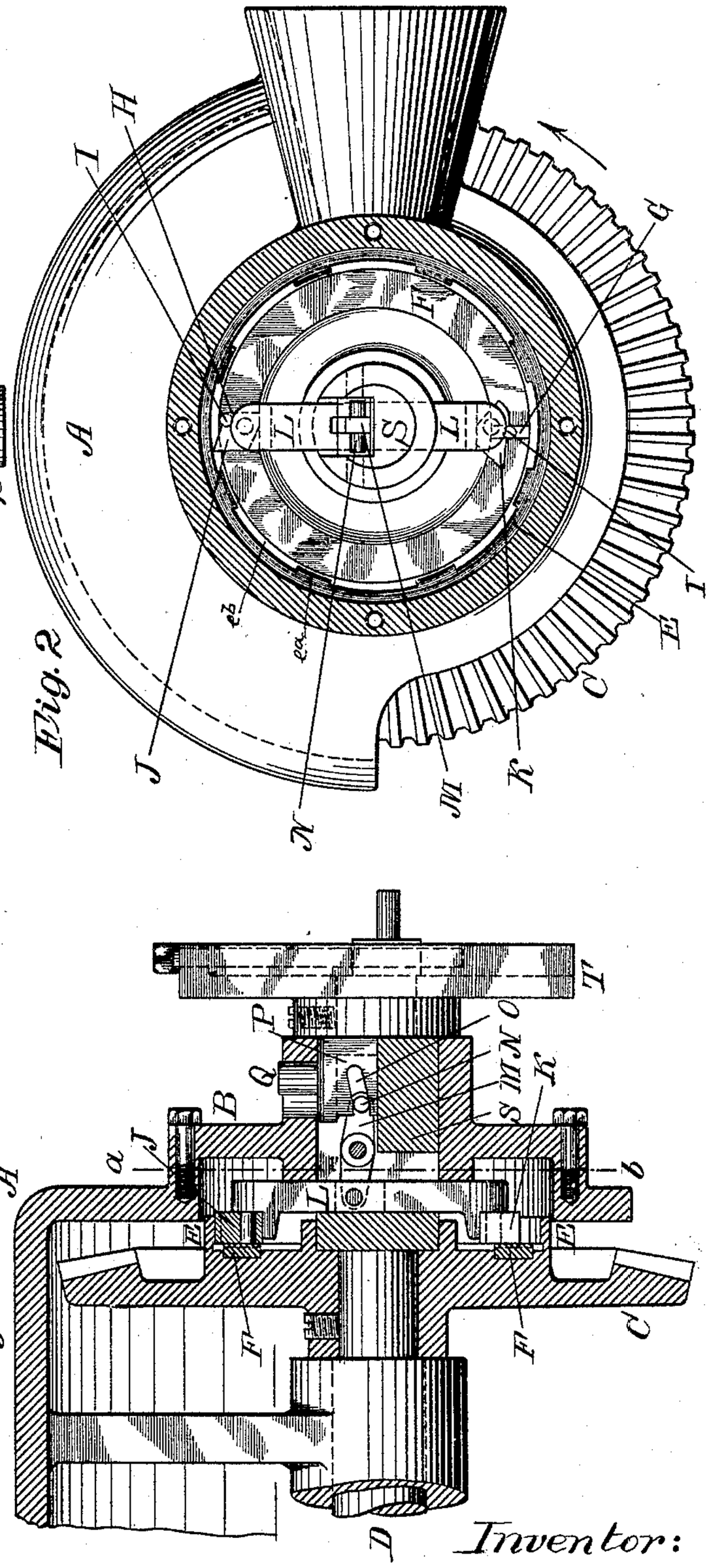

Fig. 2

Fig. 1

Fig. 5

Fig. 4

Witnesses:

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MECHANISM FOR PRODUCING INTERMITTING MOTION.

SPECIFICATION forming part of Letters Patent No. 436,755, dated September 16, 1890.

Application filed June 7, 1890. Serial No. 354,570. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. EASBY, of Wilmington, Delaware, have invented a new and useful Mechanism for Producing Intermitting Motion, of which the following description and claims constitute the specification, and which is illustrated by the accompanying sheet of drawings.

This invention consists in a peculiar mechanism for producing an intermitting motion by means of a clutching-surface and a clutching device, either of which may be the driver and the other the driven, and the clutching-surface and the clutching device being so arranged that they are engaged or disengaged by means of mechanism hereinafter described, and that when so engaged motion is transmitted from one to the other until disengagement occurs.

This invention is applicable, with some changes in constructive detail, to produce intermitting motion from a variety of drivers—as, for example, where the motion of the driver is rotary and continues in one direction, or where the motion of the driver is rectilinear and continues in one direction, or where the motion of the driver is rotary and alternating in opposite directions, or where the motion of the driver is rectilinear and alternating in opposite directions, and in any such case the driven may be moved intermittingly in the direction of the driver, and the clutching-surface and the clutching device may be operated by similar mechanism, either automatically or by hand; but the most commonly-occurring case is where the motion of the driver is rotary and alternating in opposite directions, and the accompanying drawings show the application of the invention to such a case.

Figure 1 is a central vertical section of the apparatus. Fig. 2 is a vertical section looking to the left from the line *a b* of Fig. 1. Fig. 3 is a plan view of what is shown in Fig. 1 minus the disk at the right-hand end of that figure. Figs. 4 and 5 are views of each of two counterpart pawls, hereinafter described.

The letter A indicates the stationary case inclosing the apparatus and fixed to the frame of the machine to which the apparatus is applied, while the letter B indicates a cover, which is fixed to the casing A by bolts or otherwise. The bevel-wheel C is keyed to the shaft D, and is provided with the annular flange-like clutching-surface E, and the interior of that clutching-surface is composed of a series of alternating projections *e a* and recesses *e b*, as shown in Fig. 2. The ring F is loosely fitted in an annular recess on the face of the bevel-gear C inside of the annular clutching-surface E, and this ring is provided with two diametrically-opposite radial slots G and H for the reception of the pins I of the pawls J and K. One of those pawls is pivoted to each end of the slide L, adjacent to one of the inward projections of that slide, and that slide is pivoted, not far from its middle, to one end of the lever M. The other end of that slide is provided with the double stud N for engagement with the cam-track O in the block P, and that block is provided with the stud Q for engagement with the inclined sides of the cam-track R, which is cut in the upper side of the cover B. The slide L, the lever M, and the block P and their appurtenances are all carried by the shaft S, and that shaft turns in a bearing in the cover B on an axis coincident in line with the axis of the shaft D. The shaft S may be provided with the disk T for transmitting its intermittent motion to other mechanism; but that disk is not a part of the present invention.

The function of the invention, as shown in the drawings, is to give a short intermittent rocking motion in opposite directions to the shaft S by means of rotary motion, alternating in opposite directions, of the shaft D. In performing that function the mode of operation is as follows: The shaft D is caused, by means not shown in the drawings, to revolve and to carry the bevel-gear C with it in the direction indicated by the arrow in Fig. 2. After a number of revolutions the direction of revolution of the shaft D and bevel-gear C is reversed, and that reversal causes a corresponding movement of the ring F, and that ring, by means of the engagement of its slot H with the stud I of the pawl J, raises the point of that pawl into the position shown in Fig. 2. The point of that pawl soon engages with the adjacent projection of the clutching-surface E, and that projection forces the pawl J and the slide L and the shaft S to revolve

with the shaft D until the stud Q reaches and rides upon the outer inclined side of the cam-track R; but when that occurs the stud Q is forced inwardly by that side of that cam-track, and carries with it the block P. The cam-track O in the block P operates upon the stud N to raise the outer end of the lever M and to depress the inner end thereof and thus to depress the slide L. That depression carries the pawl J out of contact with the clutching-surface E without carrying the pawl K into contact with that clutching-surface. Thus the revolution which was communicated to the shaft S from the shaft D is discontinued, and the shaft S remains stationary until the direction of the revolution of the shaft D is again reversed and turned in the direction of the arrow in Fig. 2. When that event occurs the ring F is made to participate in that motion and to carry the point of the pawl K into engagement with the clutching-surface E by means of the slot G in the ring F and the stud I on the pawl K. That engagement causes the pawl K, the slide L, and the shaft S to revolve with the shaft D until the stud Q reaches and rides upon the inner inclined side of the cam-track R. When that occurs, the stud Q and the block P are forced outwardly again to their positions shown in Fig. 1, and thus operate to depress the outer end of the lever M and to raise its inner end, and to raise also the slide L. That raising disengages the pawl K from the clutching-surface E without engaging the pawl J therewith. Thus the movement of the shaft S is stopped, and remains so until the next reversal of the direction of the revolution of the shaft D causes another engagement of the pawl J with the clutching-surface E. Thus a short rocking motion is given to the shaft S at the beginning of each reversal in direction of the revolutions of the shaft D, and the length of that rocking motion is limited by the length of the cam-track R, and that length may be made adjustable by making the inclined sides of that cam-track in the form of separate and adjustable blocks or in the form of adjustable stops.

The friction between the ring F and the recess in which it is placed is sufficient to turn the pawls J and K upon their pivots upon the ends of the slide L, but is not sufficient to move the slide L and the shaft S and the other parts appurtenant to that shaft; and the friction-ring F also serves to hold the pawls J and K out of contact with the clutching-surface E when the shaft D is revolving and the shaft S is stationary, and thus serves to obviate the noise which might otherwise be caused by contact between that clutching-surface and those pawls.

The clutching-surface shown in the drawings is in the form of a ratchet flange or wheel, and the clutching devices are pawls; but other devices known to skilled mechanics can be used in their places, and friction-clutches are examples thereof. The mechanism shown in the drawings to move the slide L consists of a system of cams; but that mechanism can be replaced by a system of stops and levers or other devices of like character known to skilled mechanics.

I do not confine myself to constructive details in the parts of my invention; but

I claim as my invention—

1. The described devices to obtain intermitting motion, consisting of a clutching-surface and clutching device combined with an intermittingly-shifting slide and a lever, substantially as set forth.

2. The combination of the shaft D, alternately revolving in opposite directions, the shaft S, intermittingly rocked thereby in opposite directions at the beginnings of those alternations, and the intermediate mechanism, substantially as described, for connecting and disconnecting the two shafts, all substantially as described.

3. The combination of the shaft D, the clutching-surface E, carried by that shaft, the shaft S, and the slide L, carried by that shaft and provided with the pawls J and K for engagement and disengagement with that clutching-surface, all substantially as described.

4. The combination of the shaft D, the clutching-surface E, carried by that shaft, the friction-ring F, the shaft S, and the slide L, carried by that shaft and provided with the pawls J and K for engagement with that clutching-surface and with that ring, all substantially as described.

5. The combination of the shaft S, the slide L, the lever M, the block P, provided with the cam-track O and the stud Q, and the cover B, provided with the cam-track R, all substantially as described.

6. The combination of the slide L, the pawls J and K, and the ring F, all substantially as described.

7. The combination of the shaft D, the clutching-surface E, the ring F, the pawls J and K, the slide L, the lever M, and the block P, all substantially as described.

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Witnesses:
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