(No Model.) 2 Sheets—Sheet 1.

A. HITCHON & W. E. DUCKWORTH.

APPLIANCE FOR CARDING ENGINES.

No. 568,197. Patented Sept. 22, 1896.

Fig. 1.

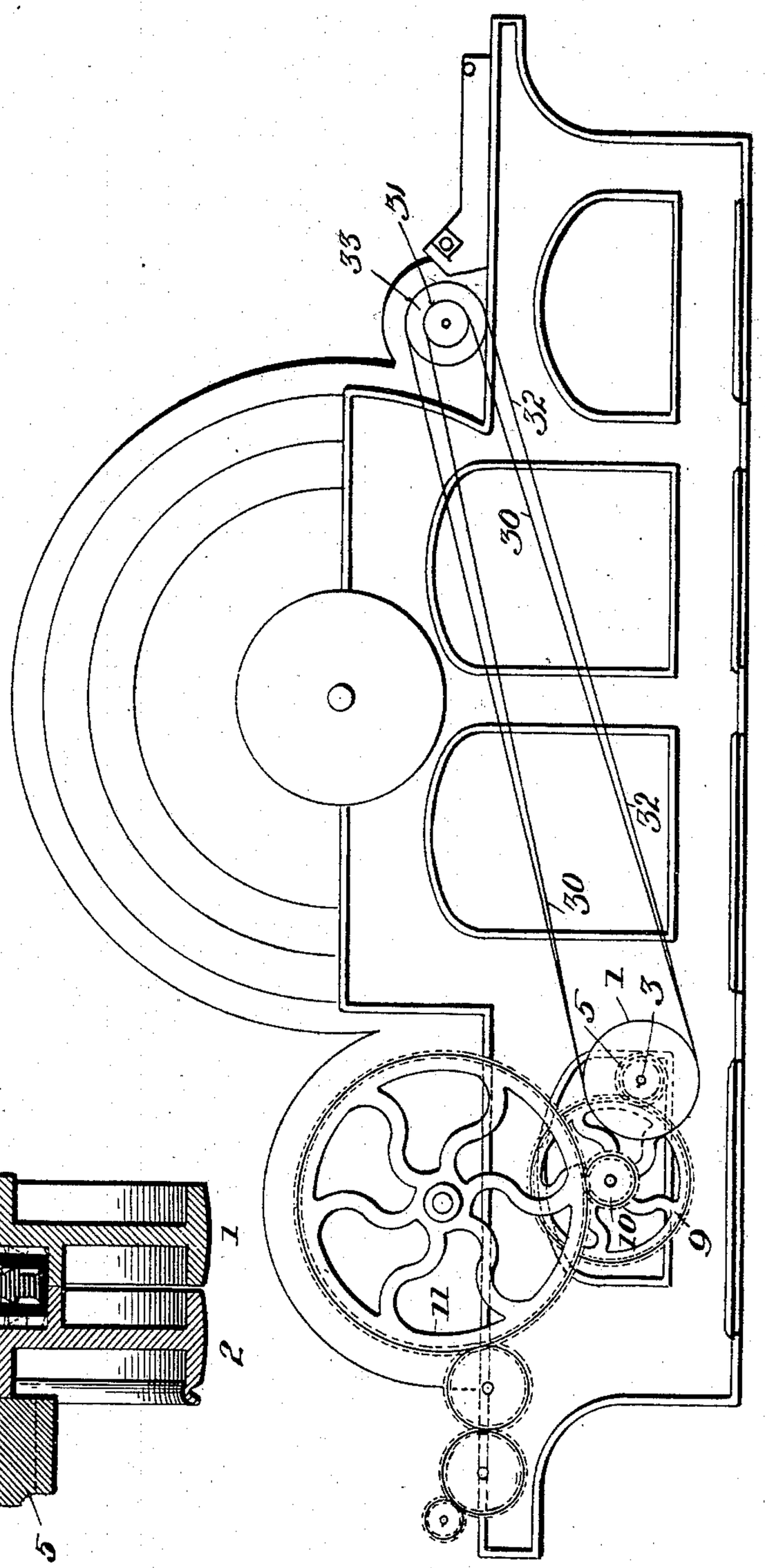
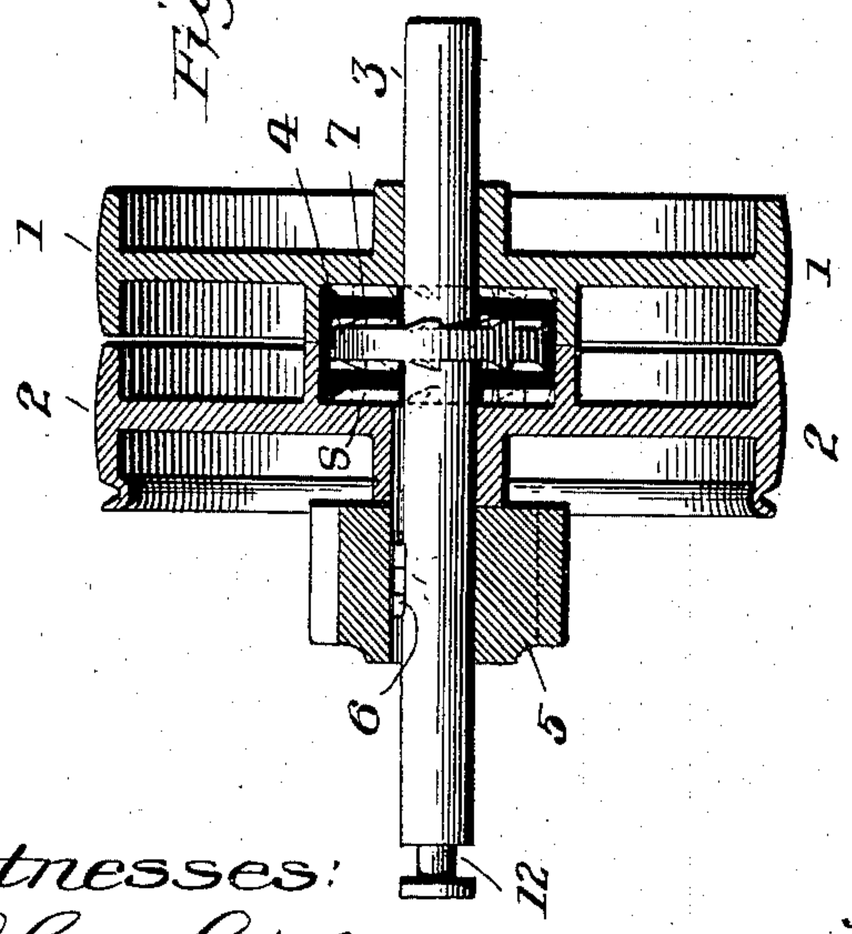


Fig. 4.



Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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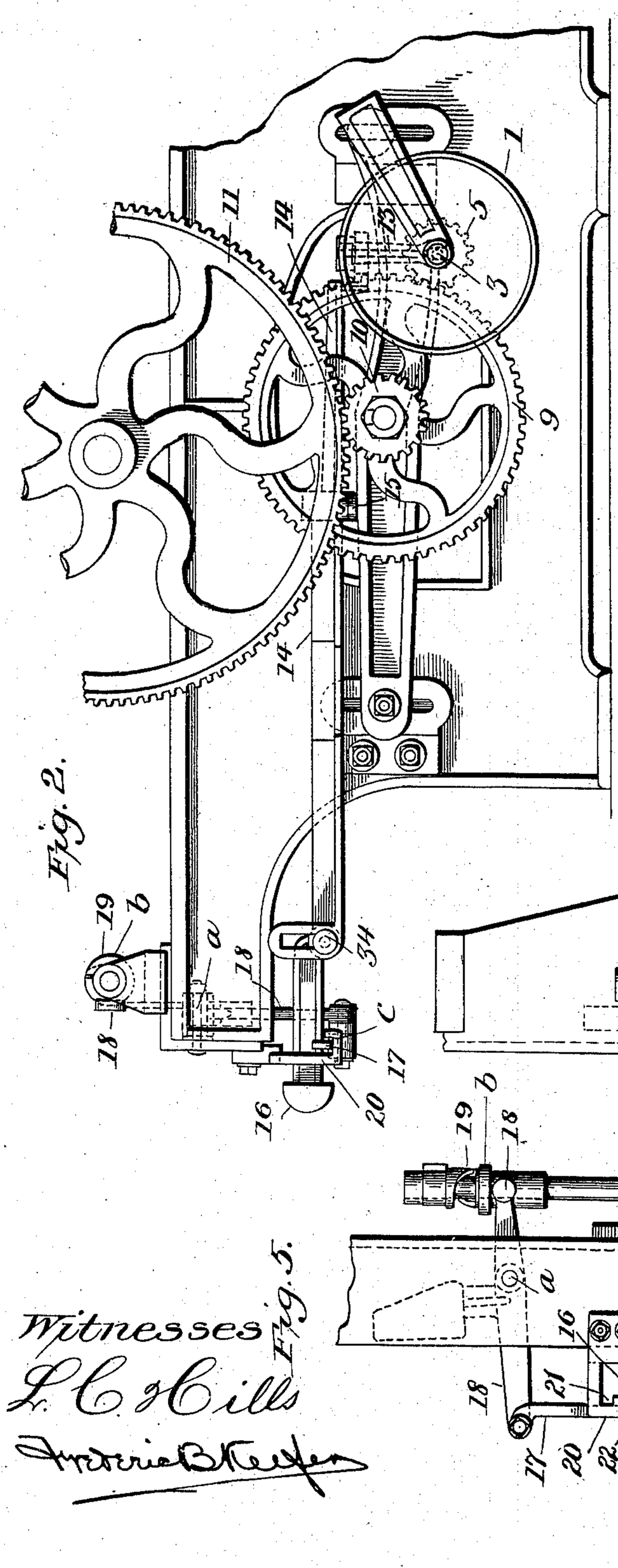

Fig. 2.

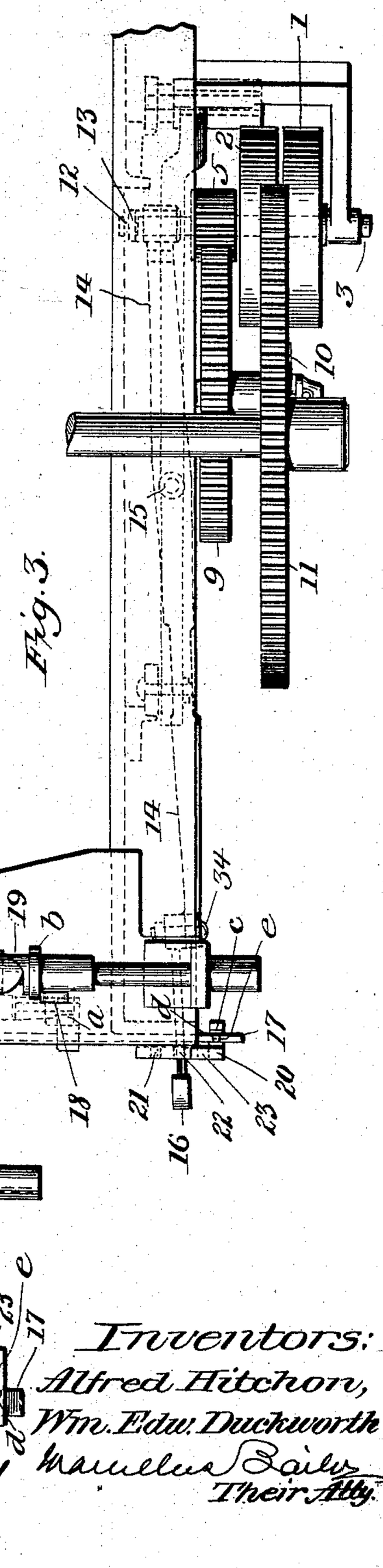

Fig. 3.

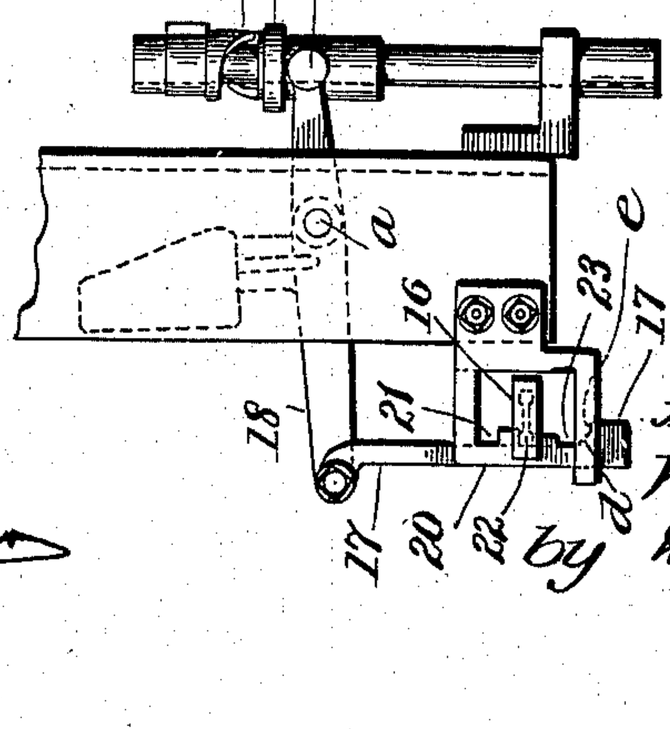

Fig. 5.

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UNITED STATES PATENT OFFICE.

ALFRED HITCHON AND WILLIAM EDWARD DUCKWORTH, OF ACCRINGTON, ENGLAND; SAID DUCKWORTH ASSIGNOR TO THE HOWARD & BULLOUGH, LIMITED, OF SAME PLACE.

APPLIANCE FOR CARDING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 568,197, dated September 22, 1896.

Application filed February 7, 1896. Serial No. 578,316. (No model.)

To all whom it may concern:

Be it known that we, ALFRED HITCHON and WILLIAM EDWARD DUCKWORTH, of Accrington, England, have invented certain new and useful Improvements in Appliances for Carding-Engines, of which the following is a specification.

This invention relates to that portion of the driving mechanism of carding-engines which gives motion to the doffer. It is customary in mechanism of this kind to provide means by which the doffer may be stopped and restarted. It has been the usual practice, so far as we are informed, to attain this result by driving the large toothed wheel on the shaft of the doffer by means of a smaller power-driven toothed wheel or pinion which is movable to and from the "doffer-wheel," so as to be thrown into and out of gear with the same. Under this arrangement when the doffer is restarted there is a sudden strain upon the gearing which is injurious in its effect and results not infrequently in breaking or otherwise damaging the mechanism.

The object of our invention is to lessen and mitigate this strain, as well as to provide a convenient means for both varying the speed of the doffer and arresting its movement at will, whereby the resulting product of the engine can be altered or stopped altogether. The arrangement also is such as to permit of convenient connection with an automatic stop-motion, such, for example, as described in British Letters Patent, granted to Vaughan and others, No. 11,716 of 1889.

In carrying our invention into effect we mount a pair of pulleys loosely on a shaft or bush capable of an endwise-sliding motion independently of said pulleys. The pulleys are driven from the feed motion of the carding-engine and revolve at different speeds—the one intended to impart full speed and the other slow motion to the doffer. Each pulley is provided with a keyway or clutch-like boss for separately engaging with a key or hub-clutch fast on the shaft on which the pulleys are mounted, this shaft carrying a toothed pinion that engages the gearing for driving the doffer. When the shaft is slid the extreme in one direction, it engages one of the pulleys—say the full-speed pulley. When moved to the extreme in the other direction, it engages the slow-motion pulley, and in its intermediate position it is out of engagement with both pulleys. In this way the doffer can be driven at full speed, at reduced speed, or can be stopped, as desired.

In the accompanying drawings, to which we shall now refer for a more complete understanding of our invention, Figure 1 is a side elevation of a flat carding-engine, showing the connections between the driving-pulleys of the doffer-actuating mechanism and the feed motion of the engine. Fig. 2 is a side elevation, on enlarged scale, of the doffer-actuating mechanism at the delivery end of the engine. Fig. 3 is a plan of the same. Fig. 4 is an enlarged sectional elevation of the driving-pulleys and clutch devices, the plane of section being axial with the shaft on which the pulleys are mounted. Fig. 5 is a front elevation of the connections between the pulley-shaft and an automatic stop-motion, such as described in British Letters Patent No. 11,716 of 1889.

The two pulleys hereinbefore referred to are shown at 1 and 2. They are mounted and run loosely on the clutch-shaft 3, and on their interior opposite faces they are provided with clutch members 7 and 8 to engage an intermediate double-clutch member 4, fast on shaft 3. Upon the shaft 3 is a pinion 5, which, through the intermediaries 9 10, drives the large toothed wheel 11, fast on the shaft of the doffer.

Clutch-shaft 3 is capable of an endwise movement in its bearings independently of the pulleys 1 2, as well as of the pinion 5, which latter has a float-key or spline-and-groove connection with the shaft, so that it will always revolve with the shaft, while at the same time the latter is free to slide endwise independently of it. When the clutch-shaft 3 is moved to the extreme in one direction, its clutch member engages the corresponding member of one of the pulleys—say the pulley 2, which is the fast-motion pulley. Like movement in the other direction will throw the clutch-shaft into engagement with the slow-motion pulley 1. In its intermediate

position the clutch-shaft is out of engagement with either pulley. It is represented in this position in Fig. 4.

The pulleys 1 2 are actuated from the feed motion of the engine, as indicated in Fig. 1 the slow-motion pulley 1 by a belt 30 and small pulley 31, the fast-motion pulley 2 by a belt 32 and larger pulley 33.

Endwise movement of the clutch-shaft 3 is effected through the instrumentality of a fork 13, which straddles the shaft and is so formed that its legs will enter the annular groove 12, formed in said shaft. The fork is attached to an operating-lever 14, pivoted upon a vertical axis 15, so that it may vibrate in a direction to impart, through the fork, endwise movement to the clutch-shaft. At the outer end of the lever is a handle 16, hinged at 34 to the lever, so that it can be lifted and dropped to permit it to enter and quit either one of the three notches 21 22 23, formed in the plate or bracket 20—these notches being in the positions respectively occupied by the handle when the lever is in either one of its three positions for fast motion, stop, or slow motion, respectively.

When the clutch-shaft is in intermediate position, (for stop,) the handle is in the middle notch 22.

To impart fast motion or full speed to the doffer, the handle 16 is lifted from notch 22 and is moved over into notch 23. By this movement the lever 14 will be swung in a direction to draw the clutch-shaft into engagement with the fast-motion pulley 2.

Movement of the handle 16 to the other notch 21 will put the clutch-shaft 3 into engagement with the slow-motion pulley 1.

In order to connect the mechanism to the stop-motion so that, when the latter operates, the doffer, &c., will be stopped also, we proceed as follows: The movable clutch member of the stop-motion is shown at 19. When the stop-motion mechanism acts, this clutch member is moved outwardly. Pivoted at *a* to the frame of the machine is a vertical lever 18, the upper end of which rests against the outer face of a collar *b* on the clutch member 19, so that when the latter is thrust outwardly it will tilt the lever 18 correspondingly, thus drawing back or inwardly the lower end of said lever. To the lower end of the lever 18 is jointed a bar or rod 17, which lies in a guideway *c* in bracket 20, and has on its outer end a cam or incline *d* and shoulder *e*, which when the lower end of the lever 18 is drawn back (with the effect of retracting bar 17) will, as to the cam part *d*, come under and lift the handle 16 from the fast-motion notch 23, and by the shoulder *e* will force the handle over and into register with the stop-notch 22, into which notch the handle will drop. The movement of the bar 17 is just sufficient to lift the handle 16 from the fast-motion notch and carry it along to the stop-notch.

In case provision for slow motion is not desired, the pulley 1 and notch 21 can be omitted.

Having described our invention, what we claim as new herein, and desire to secure by Letters Patent, is as follows:

1. The combination with the doffer, of the endwise-movable clutch-shaft, the driving-pulley 2 loose thereon and provided with a clutch member to engage a corresponding clutch member on the clutch-shaft, the pinion mounted on and revolving with said shaft-nut not moving endwise therewith, motion-transmitting gearing between said pinion and the doffer, the clutch-shaft-operating lever provided with a fork to engage and move endwise the clutch-shaft, a bracket having stop-notches 22, 23, and a handle on said lever to engage said notches, as and for the purposes hereinbefore set forth.

2. The combination of the doffer; the endwise-movable clutch-shaft; the fast and slow motion driving-pulleys, having clutch members to engage a clutch member on the clutch-shaft, and revolving at different speeds; the pinion mounted on and revolving with said clutch-shaft but not moving endwise therewith; motion-transmitting gearing between said pinion and the doffer; the operating-lever provided with a fork to engage and move endwise the clutch-shaft into either fast motion, stop or slow motion position as desired, and means for holding said lever in either one of said positions, substantially as and for the purposes hereinbefore set forth.

3. The combination with the doffer, the clutch-shaft 3, motion-transmitting gearing between said shaft and the doffer, the driving clutch-pulley 2 thereon, the operating-lever 14, of an automatic stop-motion and connections substantially as hereinbefore described between the stop-motion and said operating-lever whereby the said lever is actuated from the stop-motion to effect the disengagement of shaft 3 from the driving-pulley 2, at the time and in the manner substantially as hereinbefore set forth.

In testimony whereof we have hereunto set our hands this 21st day of January, 1896.

ALFRED HITCHON.
WILLIAM EDWARD DUCKWORTH.

Witnesses:
ARTHUR C. HALL,
JOHN W. THOMAS.