No. 810,681. PATENTED JAN. 23, 1906.

E. H. RYON.

SHUTTLE OPERATING MECHANISM.

APPLICATION FILED APR. 24, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

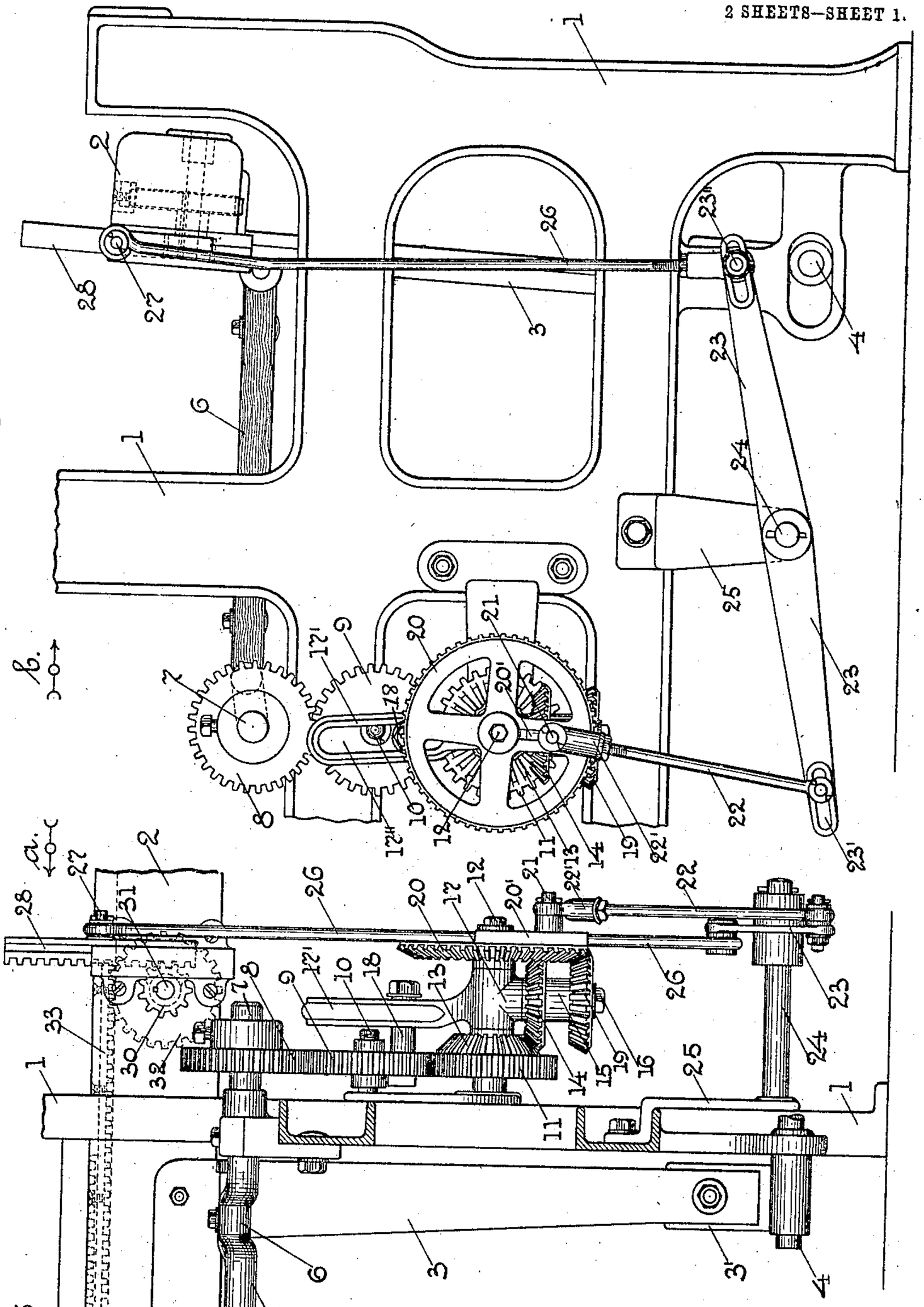

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

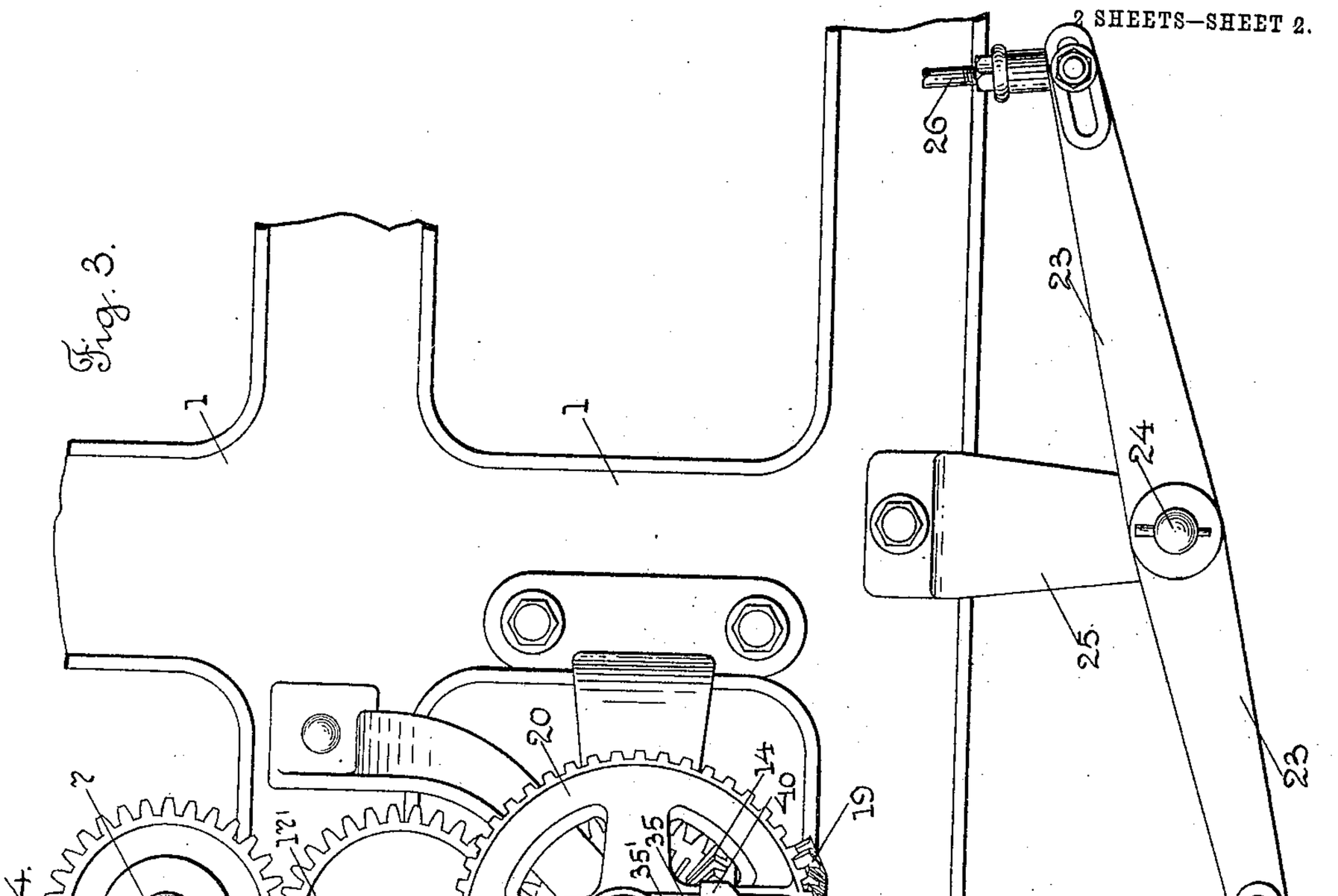
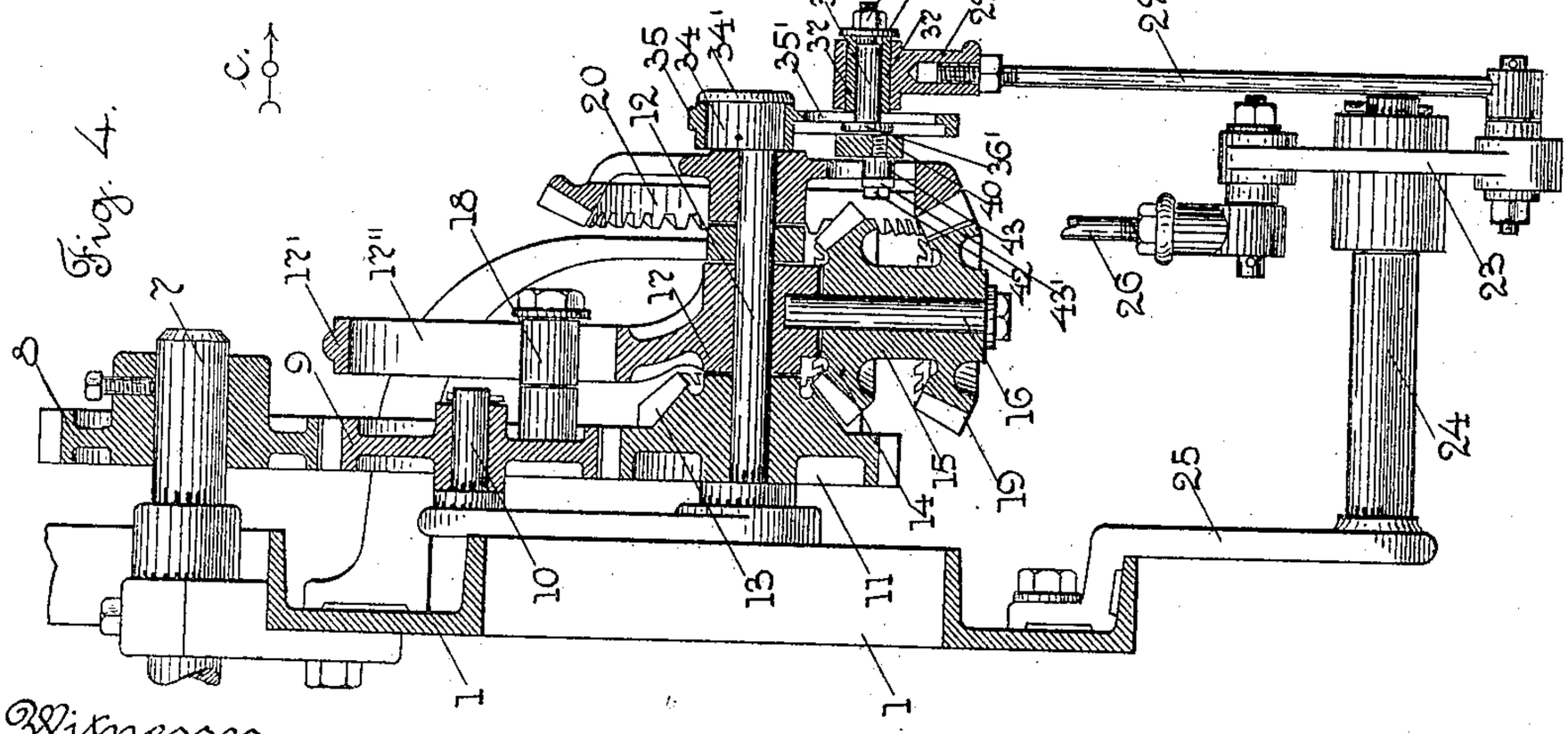


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SHUTTLE-OPERATING MECHANISM.

No. 810,681. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed April 24, 1905. Serial No. 257,058.

To all whom it may concern:

Be it known that I, EPPA H. RYON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Operating Mechanism, of which the following is a specification.

My invention relates to shuttle-operating mechanism, and particularly to shuttle-operating mechanism for narrow-ware looms or looms for making ribbon, tape, &c., on which a series of shuttles are used, ordinarily arranged in a single row and adapted to have a reciprocating movement, first in one direction and then in the opposite direction, as the loom operates, and at the end of each movement of the shuttles there is a dwell as the lay beats up.

The object of my invention is to provide an improved shuttle-operating mechanism for looms of the class referred to of simple construction and operation and in which the mechanism is located at one end of the loom outside of the loom-frame, and no straps or pulleys are employed, as is customary, but a rigid connection intermediate the shuttle-rack and a crank-pin on a rotary gear.

My invention consists in certain novel features of construction of my improvements, as will be hereinafter fully described.

I have only shown in the drawings a detached portion of a narrow-ware loom of ordinary construction with my improvements in shuttle-operating mechanism combined therewith sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings, Figure 1 is an end view of a shuttle-operating mechanism embodying my improvements looking in the direction of arrow *a*, Fig. 2. Fig. 2 is an end view of the parts shown in Fig. 1 looking in the direction of arrow *b*, same figure. Fig. 3 corresponds to Fig. 1, but shows a modified construction of some of the parts of my shuttle-operating mechanism; and Fig. 4 is a sectional view of the parts shown in Fig. 3, taken at a point indicated by line 4 4, Fig. 3, looking in the direction of arrow *c*, same figure.

In the accompanying drawings, 1 is the loom side or frame; 2, the lay-beam supported on the lay-swords 3, which have shoes 3′ (see Fig. 2) attached to their lower ends and mounted on a rock-shaft 4 in the ordinary way. The lay-beam 2 carries a longitudinally-moving reciprocating rack 5, (indicated by broken lines in Fig. 2,) which through pinions (not shown) operates a series of shuttles (not shown) in the ordinary and well-known way. The lay-beam 2 has a swinging movement communicated thereto through a crank-connector 6 to the crank-shaft 7 in the usual way.

I will now describe the parts shown in the drawings Figs. 1 and 2, which are more particularly connected with my improvements. Fast on the outer end of the driven crank-shaft 7 is a pinion 8, which meshes with and drives a pinion 9 on a stud 10. The pinion 9 meshes with a pinion 11, loosely mounted on a stud 12. The pinion 11 has on its outer face and preferably made integral therewith bevel-teeth forming a bevel-pinion 13, which meshes with the bevel-pinion 14 on the inner end of a sleeve 15, loosely mounted on a stud 16, secured to a hub 17, mounted on the stud 12. (See Fig. 4.) The hub 17 has the slotted arm 17′ extending up therefrom, with a slot 17″ therein to receive a bolt 18, secured to the pinion 9. (See Fig. 4.) On the outer end of the sleeve 15 is a bevel-gear 19, meshing with a bevel-gear 20, in this instance loosely mounted on the stud 12. The bevel-gear 20 has one of its arms or webs 20′ slotted (see Fig. 1) to adjustably receive a crank-pin 21, upon which is pivotally mounted the upper end of the head 22′ on the upper end of the connector 22. The lower end of the connector 22 is adjustably secured in a slot 23′ in a lever 23, centrally pivoted on a stud 24 on a bracket 25. The opposite end of the lever 23 is also slotted and has a bolt 23″ adjustably attached thereto, to which is pivotally connected the lower end of a connector 26. The upper end of the connector 26 is pivoted to a stud 27, secured in the outer edge of a vertically-moving rack 28, secured to the lay-beam 2 near its end. The teeth on the rack 28 mesh with and rotate the pinion 30, fast on a shaft 31, and also rotates the shaft 31, suitably mounted. A gear 32, fast on the shaft 31, meshes with the teeth of a rack 33, which is connected with the rack 5, (see broken lines, Fig. 2,) which meshes with and operates pinions, (not shown,) which pinions operate swivel-shuttles, (not shown,) all in the usual and well-known way.

The operation of the mechanism shown in Figs. 1 and 2 and above described will be readily understood by those skilled in the art. The rotation of the driven crank-shaft 7 will rotate the pinion 8, and through said pinion the pinion 9, pinion 11, bevel-gear 13, bevel-gear 14, and bevel-gear 19 the bevel-gear 20 will be rotated. The arrangement of the gearing is such that a complete rotation of the crank-shaft 7 during the forward and backward movement of the lay will communicate a half-rotation to the bevel-gear 20 to carry the crank-pin 21 thereon from one extreme position (shown in Fig. 1) to its opposite extreme position and to communicate, through connector 22, lever 23, connector 26, vertically-moving rack 28, pinion 30, shaft 31, gear 32, and racks 33 and 5, movement to the shuttles (not shown) in one direction. At the end of said movement the continued rotation of the crank-shaft 7, through pinion 8 and pinion 9, carrying the stud 18, extending into the slotted end 17″ on the arm 17′ on the hub 17, which carries the stud 16, on which is mounted the sleeve 15, carrying the bevel-gears 14 and 13, communicates an oscillating movement to said hub and gears without moving the gear 20, leaving said gear and the connections intermediate said gear and the shuttle-racks 33 and 5 substantially at rest or cause it to dwell after each half-revolution of said gear 20, as will be well understood.

In Figs. 3 and 4 is shown a modified construction of the crank-pin connection to the bevel-gear 20. The figures of reference used in Figs. 1 and 2 are used for similar parts in Figs. 3 and 4 and it will only be necessary to describe the modified construction of the crank-pin connection to the bevel-gear 20. The stud 12 has on its outer end an eccentric 34, (see Fig. 4,) which receives loosely one end of the crank 35, which is held on the eccentric 34 by the enlarged end or head 34′ thereon. The crank 35 has an elongated slot 35′ therein to receive a stud 36, which has a headed end 36′ to extend over the inner sides of the slot 35′. (See Fig. 4.) The stud 36 extends through a collar 37 and has a threaded end thereon to receive a washer 38 and nut 39. The turning up of the nut 39 presses the washer 38 against the end of the collar 37 and binds the head 36′ on the stud 36 against the sides of the slot 35′ in the crank 35 (see Fig. 4) to hold the stud 36 in its adjusted position. The connector 22 has on its upper end the head 22″, which has a hub which extends loosely over the collar 37 on the stud 36 and is held thereon by the washer 38. An adjustable sliding block 40 extends upon the rear side of the crank 35 and is recessed to receive said crank. The edges of the recess in the block 40 are beveled or undercut to receive the bevel edges on the crank 35 and to attach the parts together. A set-screw 41 holds the block 40 in its adjusted position on the crank 35. (See Fig. 3.) The bevel-gear 20 is connected with the block 40 and the crank 35, in this instance, by a bolt 42, which is screwed at its inner end into a threaded hole in the block 40 and extends through a collar 43, which extends loosely through a slot in one of the arms or webs of the bevel-gear 20 to have a sliding movement therein with the block 40 and is held from longitudinal movement by a head 43′ thereon.

The operation of the crank attachment 35, above described and shown in Figs. 3 and 4, will be readily understood by those skilled in the art. The revolution of the gear 20 will, through the bolt 42 and block 40, communicate a rotary motion to the crank 35 and a reciprocating motion to the connector 22 and a rocking motion to the lever 23, connected therewith. By means of the stationary eccentric 34, on which is pivotally supported the crank 35, the position of the point of attachment of the inner end of the connector 22 will vary relative to the gear 20. When the crank-stud 36 of the connector 22 is in one extreme position, as shown in Figs. 3 and 4, it will be farther away from the axis of the gear 20, and when it is in its opposite extreme position by reason of its eccentric pivotal support it will be nearer the axis of the gear 20, as will be well understood. In this way a reciprocating motion of the crank-bolt 36 and the connector 22 is obtained, which is the same from its central position to each extreme position and which in the use of the shuttle-operating mechanism will be advantageous.

The several parts of the crank-motion are made adjustable for different lengths of crank-connectors and for varying the amount of the reciprocating motion as may be desired.

It will be understood that the details of construction of my improvements may be varied, if desired.

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

1. In a shuttle-operating mechanism of a narrow-ware loom, a shuttle-rack, a gear having a crank-pin thereon, means to rotate said gear to cause it to dwell at the end of each half-rotation thereof, and rigid connections intermediate said crank-pin and said shuttle-rack, said connections comprising a connector to a central pivoted lever, and said lever, and a connector therefrom to a vertically-moving rack, and said rack, and gears intermediate said rack and the shuttle-rack, substantially as described.

2. In a shuttle-operating mechanism of a narrow-ware loom, a shuttle-rack, a gear having a crank-pin thereon, means to rotate said gear to cause it to dwell at the end of each half-rotation thereof, and rigid connections intermediate said crank-pin and said shuttle-rack, substantially as described.

3. In a loom of the class described, a crank-gear, an oscillating arm having thereon a hub, and two bevel-gears connected with said hub, one of said gears meshing with said crank-gear, and the other meshing with and driven by a gear, and said gear, and means to cause said hub to oscillate, substantially as described.

4. In a loom of the class described, a shuttle-rack, rigid connections to a crank-gear, and said crank-gear, an oscillating arm having thereon a hub, and two bevel-gears connected therewith, one of said gears meshing with said crank-gear, and the other meshing with and driven by a gear, and said gear, and means to cause said hub to oscillate, substantially as described.

5. In a shuttle-operating mechanism, the combination with a gear, a crank, an eccentric pivotal support for said crank, and connections intermediate said crank and gear, of connections intermediate said crank and the swivel-shuttle rack for operating the swivel-shuttles, substantially as described.

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