

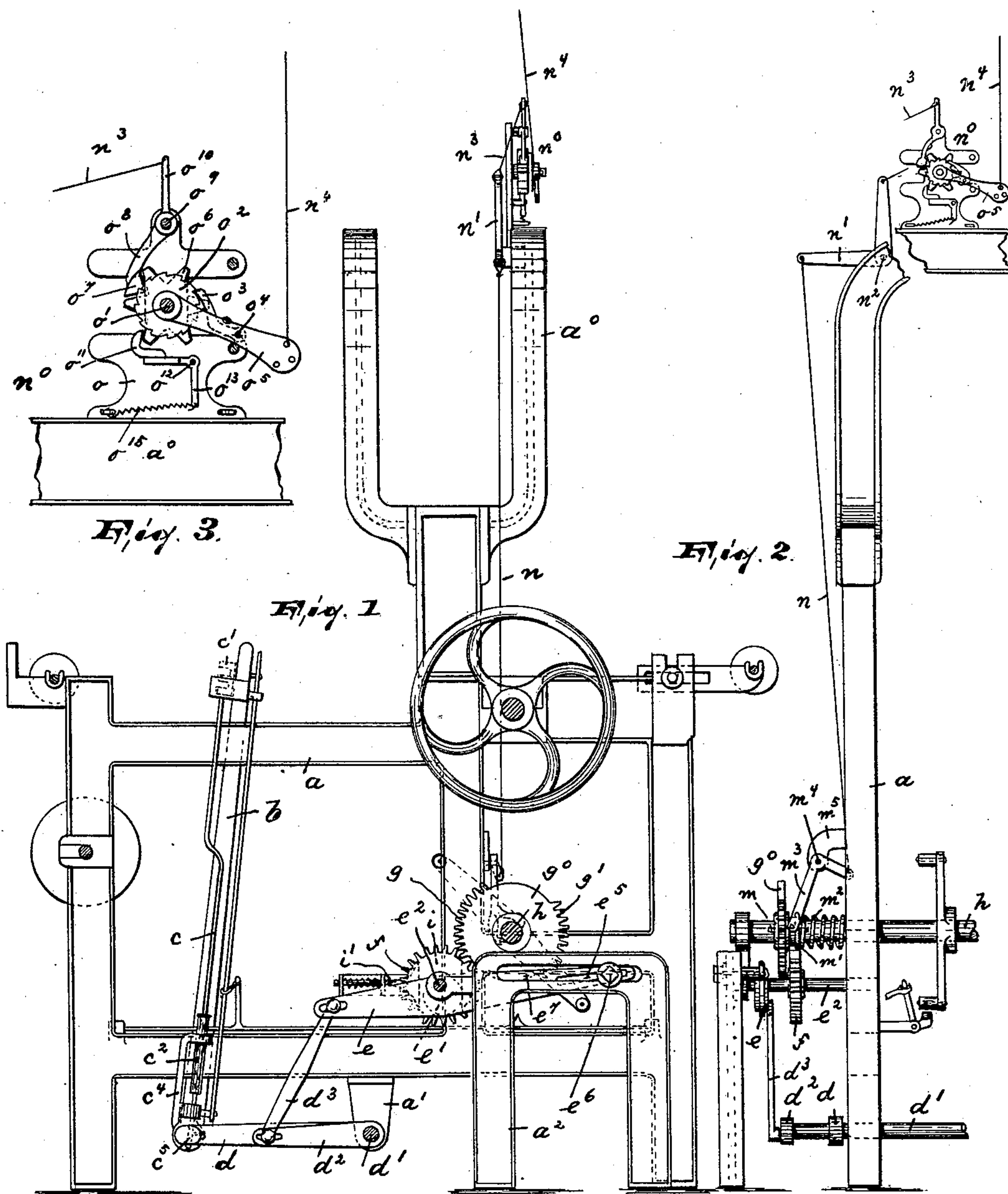
(No Model.)

T. BIRCHALL.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 587,087.

Patented July 27, 1897.



WITNESSES:

Wm. S. Bell.
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INVENTOR:

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UNITED STATES PATENT OFFICE.

THOMAS BIRCHALL, OF PATERSON, NEW JERSEY, ASSIGNOR TO ROBERT
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SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 587,087, dated July 27, 1897.

Application filed April 28, 1897. Serial No. 634,223. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BIRCHALL, a citizen of the United States, residing in Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Box-Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention is an improvement on the box-loom as covered by my application for Letters Patent, Serial No. 622,679, filed February 9, 1897. Its object is to provide a loom of the character above referred to with means for controlling the boxes from a dobby, jacquard mechanism, multiplier, &c., whereby the boxes can be operated in regular or irregular intervals, according to the design of fabric to be woven.

The invention consists in the improved shuttle-box-operating mechanism and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a side elevation of a loom provided with my improved shuttle-box-operating mechanism, only those parts of the loom being shown which are necessary to fully illustrate the nature of my said invention; Fig. 2, a detail rear elevation of a portion of Fig. 1, and Fig. 3 an enlarged detail view of a certain box-lever controlling and operating mechanism hereinafter more fully described.

In said drawings, *a* represents a loom-frame, and *b* the fulcrumed lay-sword, which latter receives its motion in the usual and well-known manner and therefore not illustrated in the drawings. The rod *c*, which carries at its upper end the shuttle-boxes (two compartment boxes) *c'*, is guided at its lower portion in a tube *c²*, secured to the fulcrumed bracket *c⁴*. To the lower portion of the rod *c* is pivotally secured, as at *c⁵*, one end of the arm *d*, the other end of which is securely mounted on a shaft *d'*, extending across the loom and connected with

the shuttle-box rod on the other side of said loom in precisely the same manner, as will be manifest, and of the usual and well-known construction.

On the shaft *d'*, which has its bearings in the downwardly-projecting brackets *a'* of the loom-frame *a*, is secured one end of the arm *d²*, the other end of which is adjustably and pivotally connected, through link *d³*, with the forwardly-projecting end of the lever *e*, eccentrically mounted on the shaft *e²*, suitably supported and carrying a gear-wheel *f*, which is stripped of two teeth diametrically opposite. The rear end of the lever *e* is provided with an elongated slot *e⁵*, penetrated by a pin *e⁶*, adjustably arranged in the elongated horizontal slot *e⁷* of the auxiliary frame *a²*.

On the picker-shaft *h* is arranged a gear-wheel *g⁰*, connected with said shaft by a key-and-feather arrangement *m*, by means of which latter the gear-wheel *g⁰* can be laterally moved or shifted on the shaft *h*.

The gear-wheel *g⁰*, which is provided with two segmental sections *g* and *g'*, is also provided with a grooved collar *m'*, surrounding the shaft *h* and held in normal position by means of the spiral spring *m²*, as clearly shown in Fig. 2 of the drawings.

The grooved collar *m'* is engaged by pins arranged in the forked end of the angle-lever *m³*, fulcrumed, as at *m⁴*, to a bracket or projection *m⁵* of the loom-frame *a*. The other end of said angle-lever is connected, through a cord or wire *n*, with angle-lever *n'*, which latter is fulcrumed, as at *n²*, to the top or connecting brace *a⁰* of the loom-frame.

In the bracket or frame *o*, projecting from the cross-brace *a⁰*, is arranged a shaft *o'*, on which are securely mounted the ratchet-wheel *o²* and the star-wheel *o⁶*. The notches in the star-wheel *o⁶* are adapted to be engaged by a block *o⁷*, carried by the pawl *o⁸*, fulcrumed as at *o⁹* and provided with an arm *o¹⁰*, connected through a cord or wire *n³* with the angle-lever *n'*, above described.

The ratchet-wheel *o²* is adapted to be engaged by a pawl *o³*, pivotally secured, as at *o⁴*, to the link *o⁵*, loosely mounted with one end on the shaft *o'* and having its other end connected through a cord or wire *n⁴* with a dobby, Jacquard mechanism, multiplier, &c., in the usual and well-known manner, and therefore not illustrated in the drawings.

The star-wheel o^6 is held in position by the hooked end o^{11} of an angle-lever o^{13} , which is fulcrumed, as at o^{12} , to the frame o and is controlled by a spiral spring o^{15} , as clearly shown in Fig. 3 of the drawings.

The gear-wheel g^0 is normally held out of engagement with the gear-wheel f , and whenever a shuttle is called for the said gear-wheel g^0 is shifted on the shaft h into the plane of the gear-wheel f and thus into engagement with the same, whereby the latter is operated.

For the above-stated purpose the cord or wire n^4 is pulled upward by the mechanism above referred to, thus causing the pawl o^3 to rotate the ratchet-wheel o^2 and, through the shaft o' , the star-wheel o^6 .

The block o^7 is forced out of its respective notch of said star-wheel, causing the cord or wire n^3 to operate the angle-lever n' , and the latter, through the cord or wire n , the angle-lever m^3 . When the block o^7 again engages the next following notch of the star-wheel o^6 , the pull on the cords or wires n^3 and n is released and the gear-wheel g^0 by action of the spiral spring m^3 is returned to its normal position, as will be manifest.

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

1. The combination with the picker-shaft and the shuttle-box-supporting rods, of a gear-wheel slidingly arranged on said picker-shaft, a crank-shaft parallel with the picker-shaft, a gear-wheel securely mounted on said crank-shaft, a lever eccentrically arranged on said crank-shaft, a rocking shaft parallel with the picker-shaft, a crank-arm securely mounted on said rocking shaft, a link adjustably connecting one end of said lever with the free end of said crank-arm, means connecting said rocking shaft with the shuttle-box-supporting rods, and means for shifting the gear-wheel on the picker-shaft into and out of engagement with the gear-wheel on the crank-shaft, substantially as described.

2. The combination with the picker-shaft and with the shuttle-box-supporting rods, of a gear-wheel slidingly arranged on said picker-shaft and provided with a grooved collar, a fulcrumed angle-lever engaging said grooved collar, a spiral spring surrounding said picker-shaft for holding said gear-wheel in normal position, a crank-shaft parallel with the picker-shaft, a gear-wheel securely mounted on said crank-shaft, a lever eccentrically arranged on said crank-shaft, a rocking shaft parallel with the picker-shaft, a crank-arm securely mounted on said rocking shaft, a link adjustably connecting one end of said lever with the free end of said crank-arm, means connecting said rocking shaft with the shuttle-box-supporting rods, and means for operating the angle-lever, substantially as described.

3. The combination with the revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel slidingly arranged on said re-

volving shaft, a crank-shaft parallel with the revolving shaft, a gear-wheel securely mounted on said crank-shaft, a lever eccentrically arranged on said crank-shaft and provided at one end with an elongated slot, a stationary part, a pin adjustably arranged in said stationary part and penetrating said elongated slot, means connecting the other end of said lever with the shuttle-box-supporting rods, and means for shifting the gear-wheel of the revolving shaft into and out of engagement with the gear-wheel on the crank-shaft, substantially as described.

4. The combination with a revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel on said shaft and slidingly arranged thereon, and provided with two oppositely-arranged toothed segmental sections, a crank-shaft parallel with the revolving shaft, a mutilated gear-wheel securely mounted on said crank-shaft, a lever eccentrically arranged on said crank-shaft and provided at one end with an elongated slot, a stationary part, a pin adjustably arranged in said stationary part and penetrating said elongated slot, means connecting the other end of said lever with the shuttle-box-supporting rods, a grooved collar carried by the gear-wheel on the revolving shaft and surrounding the same, a spiral spring controlling said grooved collar, a fulcrumed angle-lever engaging said grooved collar, an intermediate fulcrumed angle-lever connected with said first-mentioned angle-lever, and means for operating said intermediate angle-lever, all said parts, substantially as and for the purposes described.

5. The combination with the revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel slidingly arranged on said shaft, a grooved collar carried by said gear-wheel and surrounding the revolving shaft, a fulcrumed angle-lever engaging said collar, an intermediate fulcrumed angle-lever connected with the first-mentioned angle-lever, a shaft suitably supported and at right angles to the angle-levers, a ratchet-wheel securely mounted on said shaft, a link loosely mounted on said shaft, a pawl pivotally arranged on said link and adapted to operate said ratchet-wheel, a star-wheel also securely mounted on said shaft, a fulcrumed arm carrying a block, adapted to be engaged and operated by said star-wheel, a cord or wire connecting said fulcrumed arm with the intermediate angle-lever, means for operating the fulcrumed link, and means controlled by said sliding gear-wheel for operating said shuttle-box-supporting rods, all said parts, substantially as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of April, 1897.

THOMAS BIRCHALL.

Witnesses:

ALFRED GARTNER,
EDWIN B. HINDLEY.