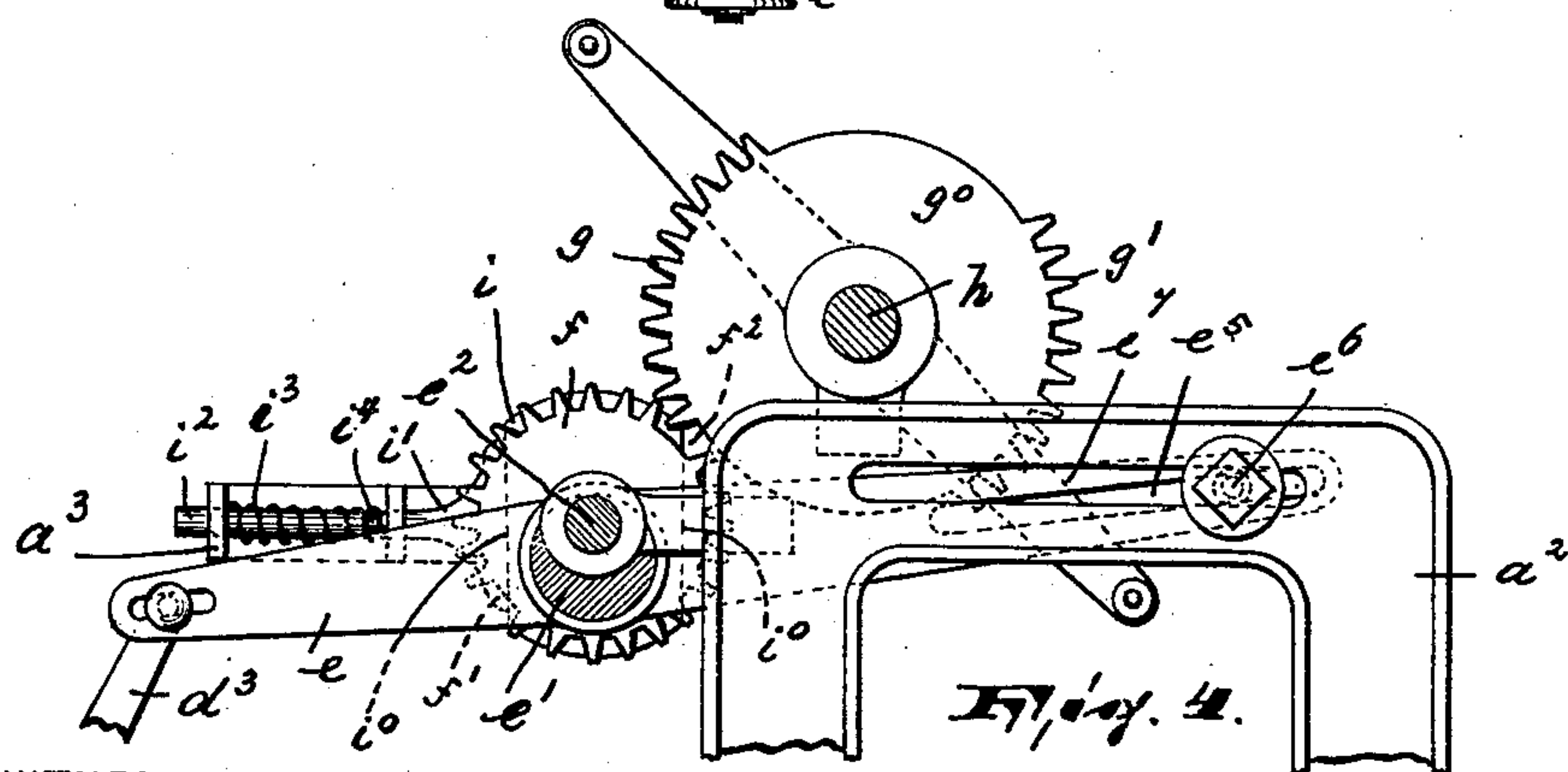
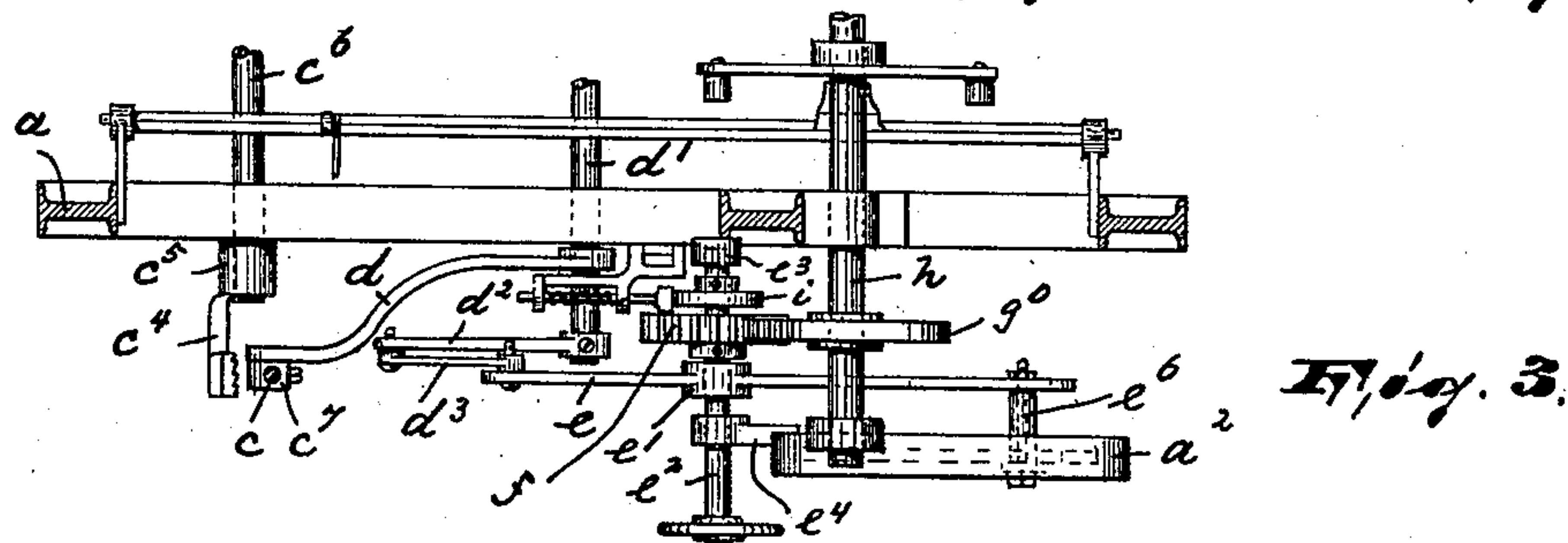
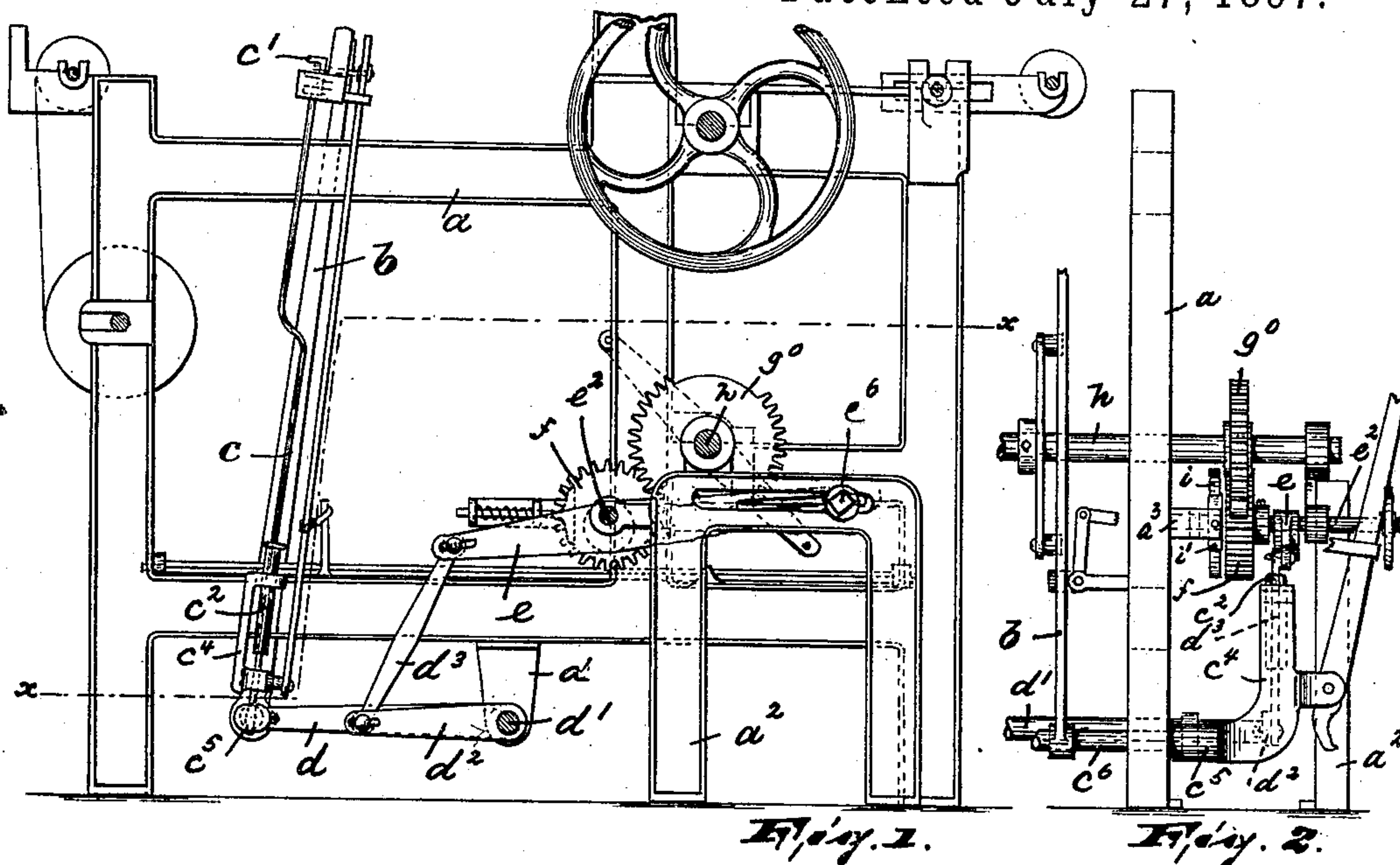


(No Model.)

T. BIRCHALL.
SHUTTLE BOX MOTION FOR LOOMS.

No. 587,086.

Patented July 27, 1897.



WITNESSES:

Wm D. Bell.
Duncan M. Robertson.

INVENTOR:

Thomas Birchall

BY *Partners & Co* ATTY'S.

UNITED STATES PATENT OFFICE.

THOMAS BIRCHALL, OF PATERSON, NEW JERSEY, ASSIGNOR TO ROBERT
ATHERTON, OF SAME PLACE.

SHUTTLE-BOX MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 587,086, dated July 27, 1897.

Application filed February 9, 1897. Serial No. 622,679. (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.

This invention relates to improvements in looms, and has reference to mechanism for operating the shuttle-boxes in looms especially adapted and designed for weaving pick-and-pick fabrics.

The object of my invention is to secure a box-motion of simple, strong, and durable construction, reliable in operation, and not liable to get out of order.

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; Fig. 2, a detail front elevation of Fig. 1, only those parts of the loom being shown which are necessary to fully illustrate the nature of my said invention; Fig. 3, a sectional view on the line *xx* of Fig. 1, and Fig. 4 an enlarged detail side elevation of the shuttle-box-operating mechanism.

In said drawings, *a* represents a loom-frame; *b*, a lay-sword fulcrumed on the shaft *c*⁶ and receiving its motion in the usual manner, and therefore not illustrated in the drawings. The shuttle-boxes (two compartment boxes) *c*¹ are supported by the rods *c*, guided in the tube *c*², secured to the bracket *c*⁴, which latter is fulcrumed by means of its sleeve *c*⁵ on the said shaft *c*⁶, all of well-known construction. To a block *c*⁷, arranged at or near the lower end of the rod *c*, is pivoted one end of

arm *d*, the other end of which is securely mounted on shaft *d*¹, 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. The shaft *d*¹ has its bearings in brackets *a*¹, projecting downward from the loom-frame *a*, as clearly shown. On the shaft *d*¹ is also secured one end of the arm *d*², the other end of which is adjustably and pivotally connected, through link *d*³, with the forwardly-projecting end of a lever *e*, eccentrically mounted, as at *e*¹, on the shaft *e*², having its bearings in the bracket *e*³ and the projection *e*⁴ of the auxiliary frame *a*². The rear end of lever *e* is provided with an elongated slot *e*⁵, penetrated by the pin *e*⁶, adjustably arranged in the elongated horizontal slot *e*⁷ of the auxiliary frame *a*². On the shaft *e*² is also secured a gear-wheel *f*, stripped of two teeth diametrically opposite, as at *f*¹ and *f*², and is adapted to be engaged and operated by the toothed segmental sections *g* and *g*¹ of the gear *g*⁰, which latter is in the same plane as the gear-wheel *f* and about twice its diameter, and is mounted on the picker-shaft *h*, receiving its motion through a train of gears on the opposite end of the loom, as in the usual manner, and therefore omitted from the drawings.

On the shaft *e*², the outer end of which is provided with a hand-wheel, is secured a brake-wheel or disk *i*, having its periphery flattened at opposite sides, as at *i*⁰ *i*⁰, adapted to be engaged by the flat brake-block *i*¹, arranged on and projecting from the horizontal rod *i*², guided in the bracket *a*³ and controlled by a spiral spring *i*³. Said spiral spring surrounds the said rod and bears with one end against the outer portion of the bracket *a*³ and with its other end against a pin *i*⁴, secured to the said rod *i*², as clearly illustrated.

The relative position of the brake-wheel *i* and of the gear-wheel *f* is such that the flattened portions *i*⁰ of said brake-wheel are in alinement with the respective stripped portions *f*¹ and *f*²—that is to say, when the gear-wheel *f* is at rest one, the flattened portions *i*⁰, is in engagement with the brake-block *i*¹.

In operation when the picker-shaft *h* is rotated one of the toothed segmental sections *g* or *g*¹ of the wheel *g*⁰ engages the teeth of

the gear-wheel f and rotates the same one-half of one revolution, when they get out of mesh on account of their stripped portions. As the shaft e^2 is thus rotated the eccentric e' of the lever is operated—that is to say, the forward end of the lever e is raised—and through its link d^3 and arm d^2 operates the shaft d' , which latter in turn, through arms d , raises the boxes and their supporting-rods the required distance. After the shuttles have been thrown in the usual manner said boxes are again lowered. The other toothed segmental portion g' or g engages the teeth on the other half of the gear-wheel f , and thus rotates the same and also the shaft e^2 , causing the forward end of the lever e to be lowered. The pin e^6 , penetrating the elongated slot e^5 in the rear portion of the lever e , serves as a fulcrum for said lever. It will be manifest that by adjusting said pin in the elongated slot e^7 of the auxiliary frame a^2 the movement of the lever e is easily regulated.

I do not intend to limit myself to the precise construction shown and described, as various alterations can be made without changing the scope of my invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel on said shaft 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, and in the plane of the gear-wheel and adapted to be operated by its toothed segmental sections, a lever eccentrically arranged on said crank-shaft, a rocking shaft parallel with the revolving 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, and means connecting said rocking shaft with the shuttle-box-supporting rods, substantially as described.

2. The combination with a revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel on said shaft 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 and in the plane of the gear-wheel and adapted to be operated by its toothed segmental sections, a lever eccentrically arranged on said crank-shaft, a rocking shaft parallel with the revolving 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, and a longer crank-arm also secured on said rocking shaft and having its free end pivotally connected with the shuttle-box-supporting rod, substantially as described.

3. The combination with a revolving shaft and with the shuttle-box-supporting rods, of

a gear-wheel on said shaft 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 and in the plane of the gear-wheel and adapted to be operated by said toothed segmental sections, 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 brake-wheel on the crank-shaft, and a spring-controlled brake-block controlling said brake-wheel, 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 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 and in the plane of the gear-wheel and adapted to be operated by said toothed segmental sections, 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, a rocking shaft parallel with the revolving shaft, means connecting the other end of the lever with said rocking shaft to operate the same, and means connecting said rocking shaft with the shuttle-box-supporting rods, substantially as described.

5. The combination with a revolving shaft and with the shuttle-box-supporting rods, of a gear-wheel on said shaft 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 and in the plane of the gear-wheel and adapted to be operated by said toothed segmental sections, 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, a rocking shaft parallel with the revolving shaft, means connecting the other end of the lever with said rocking shaft to operate the same, means connecting said rocking shaft with the shuttle-box-supporting rods, a brake-wheel on the crank-shaft, and a spring-controlled brake-block for controlling said brake-wheel, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of February, 1897.

THOMAS BIRCHALL.

Witnesses:

ALFRED GARTNER,

DUNCAN M. ROBERTSON.