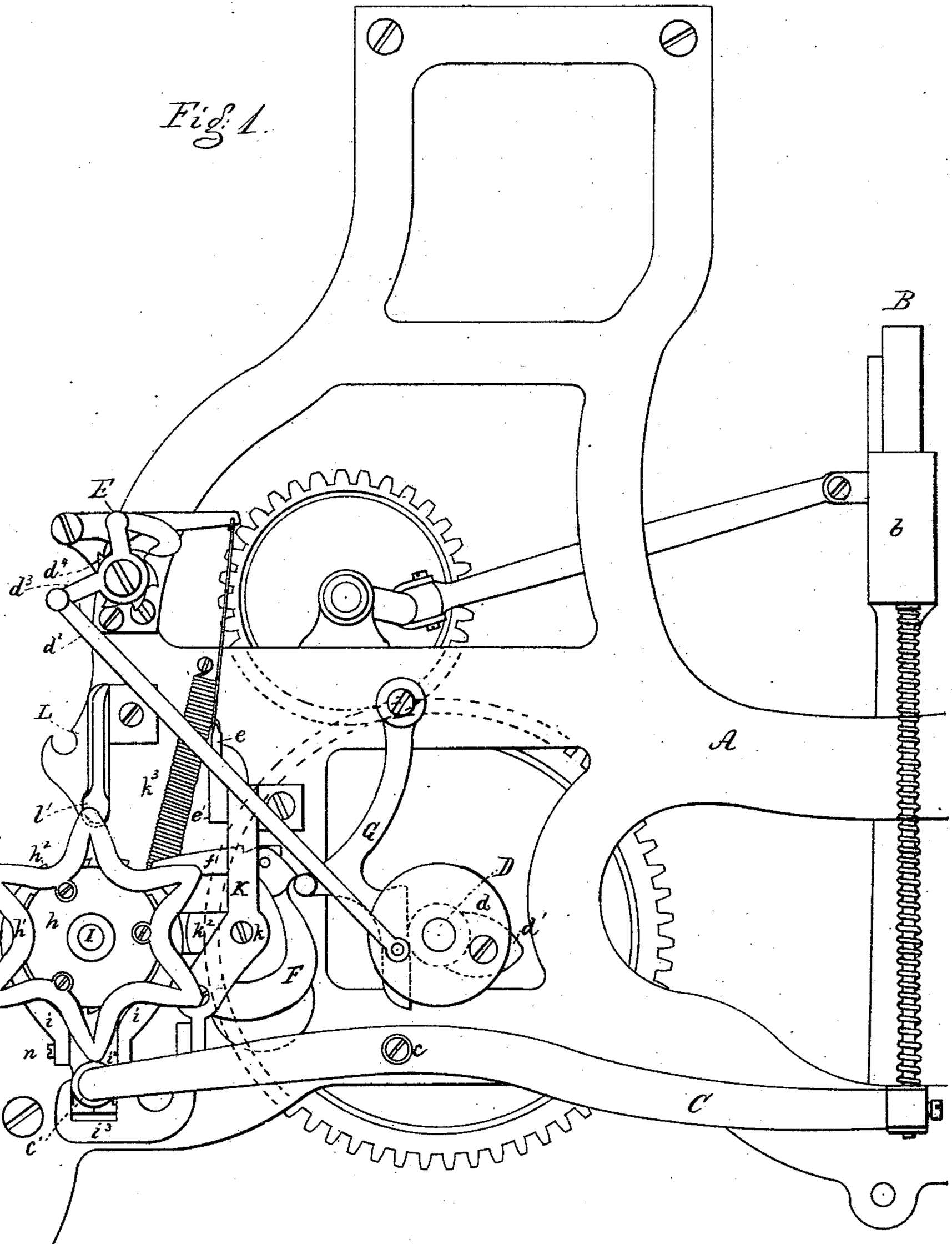
3 Sheets--Sheet 1.

G. CROMPTON.

Shuttle-Box Mechanism.

No. 161,488. Patented March 30, 1875.

Fig. 1.



Witnesses.
S. B. Kidder
M. W. Frothingham

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George Crompton
per Crosby & Gregory Atty's.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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Fig. 2.

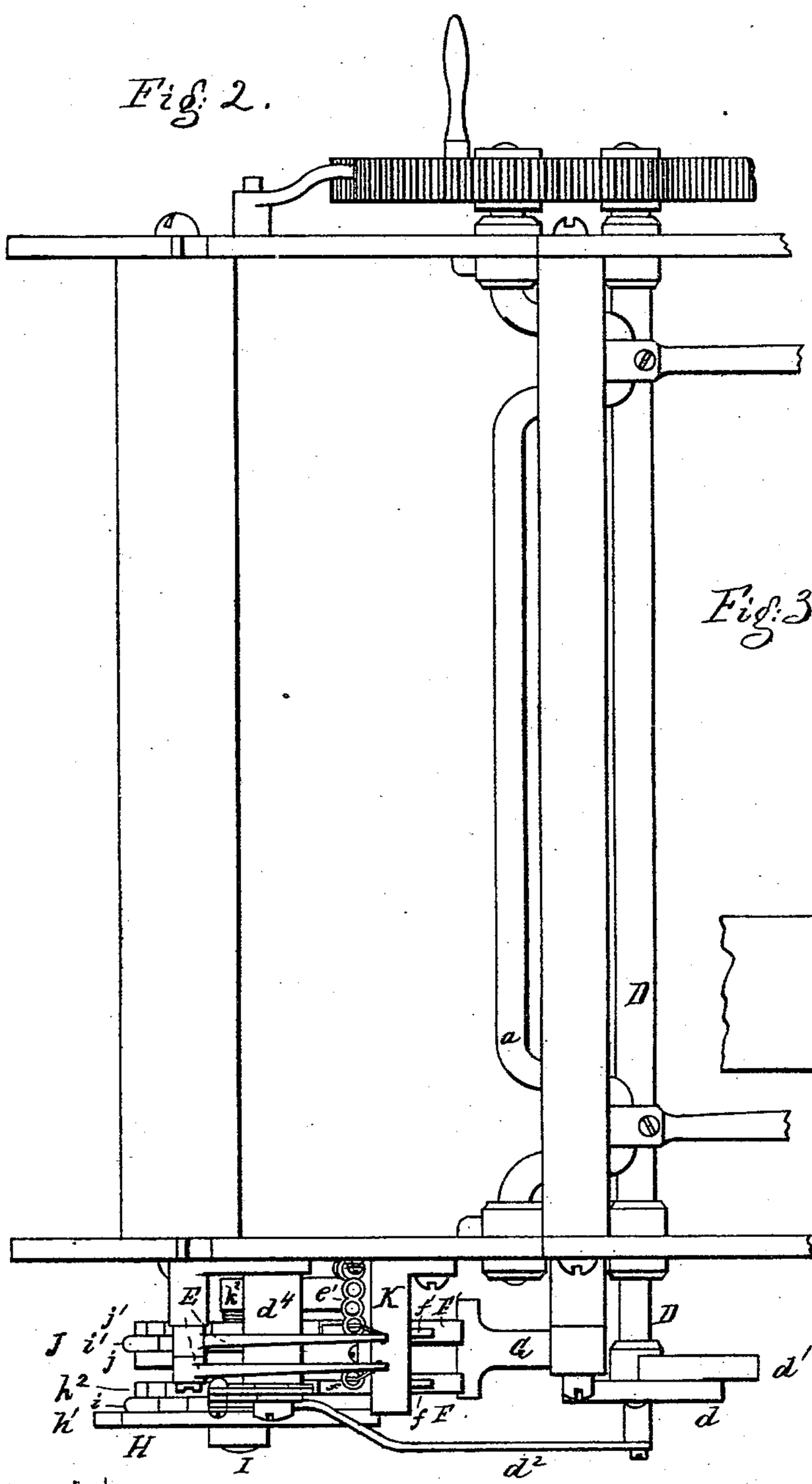

Fig. 3.

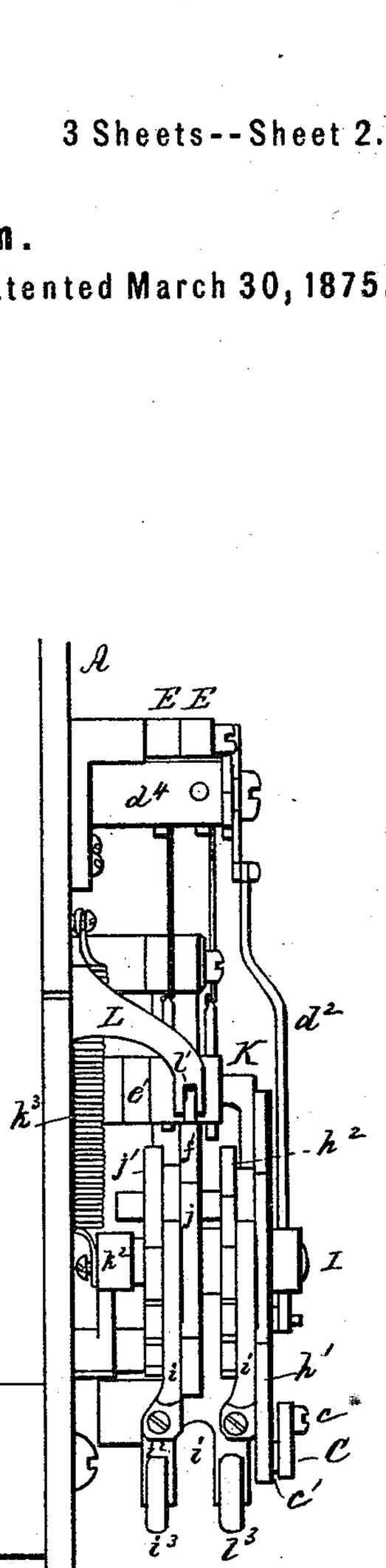

Fig. 4.

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3 Sheets--Sheet 3.

G. CROMPTON.

Shuttle-Box Mechanism.

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Fig. 6.

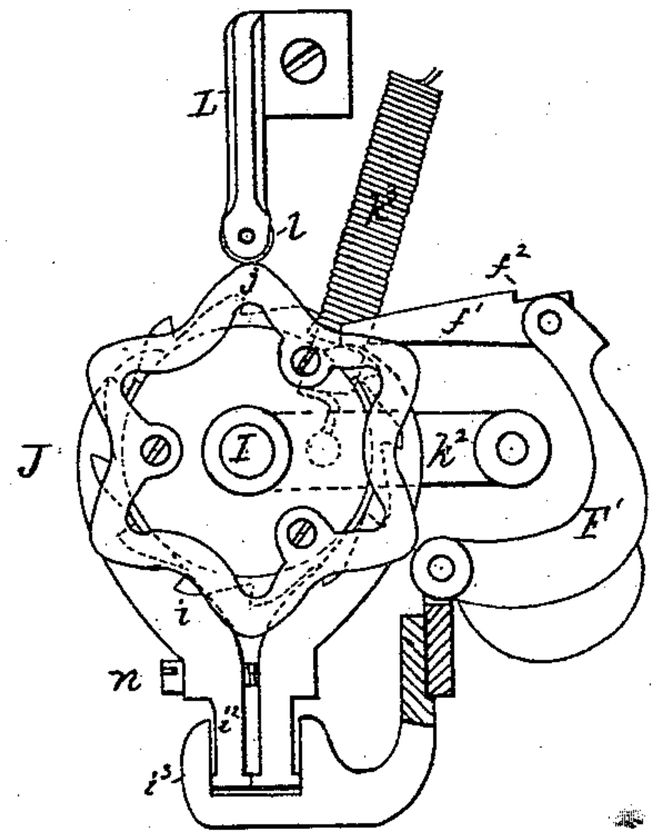
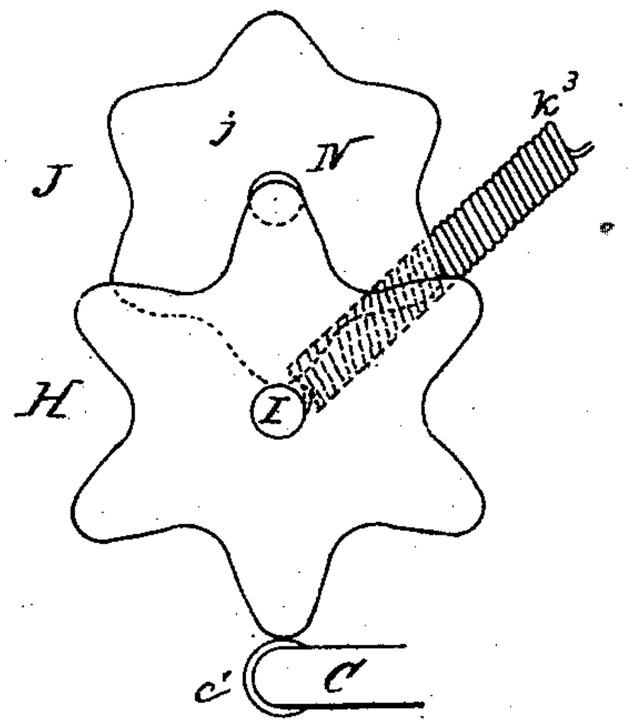


Fig. 5.



Witnesses.
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Inventor.
George Crompton
per Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

GEORGE CROMPTON, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN SHUTTLE-BOX MECHANISMS.

Specification forming part of Letters Patent No. **161,488**, dated March 30, 1875; application filed January 18, 1875.

CASE B.

To all whom it may concern:

Be it known that I, GEORGE CROMPTON, of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Shuttle-Box Mechanism for Looms, of which the following is a specification:

My invention relates to mechanism for operating shuttle-boxes in looms, and consists in a shuttle-box lever, a cam to move such lever, and a second cam that governs the position of the axis of the cam that moves the shuttle-box lever. Also, in two cams mounted on a common movable axis, a friction-roller or a stationary arm or support, and a shuttle-box lever, when adapted to move a series of shuttle-boxes, as hereinafter described. Also, in the combination with such devices of pattern mechanism, as hereinafter described.

Figure 1 is a side elevation of my loom, showing my invention. Fig. 2 is a top view, the breast-beam and lay being broken away. Fig. 3 is an end view of the cams for operating the shuttle-boxes. Figs. 4 and 5 are modifications hereinafter described, and Fig. 6 is a view of the inner cam J, showing its rim in contact with the friction-roller, and also showing the axle I and its support k^2 in detail.

In the drawing, A denotes the loom-frame, of any ordinary construction, and mounted thereon is the lay or crank-shaft *a*, that by a link moves the lay *b* in a well-known way. The lay carries a series of shuttle-boxes—in this instance, four—supported on a rod and connected with the shuttle-box lever C pivoted to the loom-frame at *c*, and having preferably at *c'* a friction-roller to be acted on by the cam for moving the boxes. A spiral spring, *m*, on the shuttle-box rod, keeps the shorter arm of the shuttle-box lever against the cam for moving it. The shuttle-boxes are to be provided with protectors and the lay with stopping mechanisms in any well-known way. Mounted at the side of the loom-frame is a pattern-cylinder, d^4, provided with pins in the usual manner, but any other well-known pattern-cylinder, chain, or cords used to determine or indicate patterns in looms may be used. This pattern mechanism is operated from a second rotary shaft, D, through a link, d^2, connecting a crank, *d*, on the shaft D, with an elbow-lever, d^3, having a pawl to engage, as usual, a notched wheel on the pattern-cylinder shaft. On shaft D is a cam or tappet, d^1, that actuates the radius-bar G, made broad enough to engage or strike the pivoted arms F F', pivoted to the bracket K, attached to the loom-frame. These pivoted arms have hinged or pivoted to them pawls $f f^1$, notched at f^2, and the arms are made heavy or weighted, so that they will fall back toward the radius-bar G when not held up by pistons or catches *e*, connected by means of cords or wires with arms resting on or moved by the pattern mechanism or its pins. These pistons or pins work through guides *e'* on the bracket K, and the pawls and arms that are not to be moved to turn the ratchets with which they engage are held up out of the reach of the radius-bar G by these pistons engaging notches in the pawls, but when an arm and pawl are to move a ratchet to select a shuttle-box, then the pattern mechanism, through its connections, lifts the piston, or it may be a catch, and allows the arm so liberated to fall back to be struck by the radius-bar G. A shaft or journal, I, is carried by an arm or lever, k^2, pivoted at *k*, to the bracket K. On this shaft are preferably two cam-wheels, H J, each composed of a ratchet-wheel, a cam-shaped rim, and annular portion secured together, or formed as a single piece. The cam-wheel H is composed of a ratchet, h^2, an annular disk, *h*, and a cam-rim, h^1, having a series of projections, 1, and depressions 2. The cam-wheel J is composed of a ratchet, *j'*, a cam-rim, *j*, and an annular disk. These cam-wheels are placed side by side on the shaft I, and the shaft and wheels are borne upward by the stress of a strong spiral or other spring, k^3, attached to it and to the loom-frame. Attached to the bracket K are forked guides i^3, to receive the lower ends i^2 of the friction-arms *i*, connected by screw *n*. These arms *i* embrace the annular disks of the cam-wheels, and prevent them from being moved when not positively and purposely actuated, and by means of the screw *n* their pressure on the disks may be regulated. Attached to the

loom-frame is an arm, L, having preferably at its lower end a friction-roller, *l*, against which the cam-rim *j* of the cam-wheel J is held by the action of the spring l^3. The cam-rim h^1 is arranged to act against the friction-roll on or against the shuttle-box lever C. These cam-wheels H J may be turned independently or together by the action of their pawls $f f^1$, and are moved, as the pawls are constructed, in but one direction, and their times of movement and rest are determined, as has been described, by the pattern mechanism.

To operate and properly select any one of a series of four shuttle-boxes, two cam-rims are used, and the depressions and elevations on one are such that a movement of the cam through a distance equal to the length of the arc between radial lines drawn from the shaft I, and passing through the lowest and highest points of the cam, will move the shuttle-box lever so as to skip a box, or from one box to a second box from it, and the depressions and elevations in the other cam-rim should be sufficient, with a like rotation of the cam-wheel, to move the shuttle-box lever a distance equal to one box, or from one box to another. The cam-wheel H is adapted to skip a box, and the cam-wheel J to move the shuttle-boxes a distance of one box.

The cam-wheel H is shown as acting on the shuttle-box lever; but, if preferred, the cam-wheel J might be so placed to act on the shuttle-box lever.

In Fig. 1 the shuttle-boxes are elevated, so that the lowest box of the series is in operative position; and with the shuttle-boxes so placed, one of the higher portions of the cam-rim *j* rests against the roller at the end of the arm L, and one of the higher portions of the cam-rim h' bears on the roller of the shuttle-box lever. The shaft I is at this time in its lowest position. If the cam-wheel J be now moved by its pawl one step, its projection will pass from under the roller on L, and the shaft I will be elevated by the spring, and the wheel H will rise with it, and the shuttle-box lever will be allowed to move far enough to lower the series of boxes one step. Should the cam-wheel H be moved one step from its position (shown in Fig. 1) by its pawl, and the cam-wheel J be unmoved, then the shuttle-boxes would descend two boxes, or skip a box; and should both wheels be moved together, then the shuttle-boxes would fall three boxes.

It will be readily seen by the action of these cam-wheels that they may be moved separately, and move the boxes up and down one or two boxes at a time; and also that, if the higher portions of the cams are in contact with the rollers l' or c', the boxes may be moved together and over a space equal to three boxes, or the sum of the movement of both wheels; and also that, if the high portion of one wheel is opposite the low portion of the other wheel, the movement of both will move the boxes one step, or a distance equal to the difference between the movement of one wheel and the other. In this way the action of one cam-wheel may be augmented or discounted by the other.

To operate shuttle-boxes at the opposite side of the loom, I propose to extend the shaft I across the loom, and mount another cam, H, on its other end, and the cam so placed at the other side of the loom will act on a second shuttle-box lever to move a series of shuttle-boxes at that side. Then, instead of mounting cam-wheel J on the shaft I, as now shown, I propose to mount it on a tubular shaft, surrounding shaft I. This tubular surrounding-shaft *p* (see Fig. 4) will be extended to the opposite side of the loom, where it will receive a second cam-wheel, J, which will be moved and act as does the cam-wheel J, already described. In this arrangement both series of boxes would be operated by one pattern mechanism.

If desired, the mechanism already described as actuating a series of shuttle-boxes on one side of the loom may be duplicated at the other side.

I also propose at times to arrange one cam-wheel, as J, on a stationary shaft, and allow it to act on the shaft supporting the cam-wheel H, that in turn acts on the shuttle-box lever. In this case the shaft of the cam-wheel H will be held up by a spring, as is shaft I.

In Fig. 5 I show such a modification, in part. Shaft I is to be supported as shown in Fig. 1, and is to carry the cam-wheel H, which is to act on the shuttle-box lever, as in Fig. 1, and the shaft I is to be raised or lowered by means of the elevations or depressions on cam-wheel J, mounted on a fixed shaft, N. The cam-wheels will be moved by a system of pawls, as shown in Fig. 1; but the shape of the pawl for the cam-wheel J must be adapted to the new position of J.

The cams or cam-rims may be shaped as in the well-known Brown loom, patented July 25, 1854; and, if desired, the pawls might be made double and the ratchets be duplicated, so as to reverse the cam-wheels. The cam-wheels may be provided with sectional or independent tappets, and of any shape common for moving shuttle-boxes in box-motion looms.

Having described my invention, I claim—

1. In combination with a shuttle-box lever, a cam to move the shuttle-box lever, and a cam to govern the position of the axis of the cam that moves the shuttle-boxes, substantially as described.

2. In combination, two cams mounted on a common movable axis, a friction-roller on a stationary arm or support, and a shuttle-box lever, all adapted to move a series of shuttle-boxes, substantially as described.

3. The combination of two cams—one actuating the shuttle-box lever, and the other controlling the position of the cam that actuates the shuttle-box lever—with a series of pawls and pattern mechanism, to govern the movement of the cams and the shuttle-boxes, substantially as described.

4. The combination of two cams, each having a series of elevations and depressions, sub-

stantially as described—one moving the shuttle-boxes through a distance equal to one box, and the other a distance equal to two boxes—with a movable cam-axis, a shuttle-box lever, and a series of shuttle-boxes having four operative cells, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. CROMPTON.

Witnesses:
G. W. GREGORY,
JNO. D. PATTEN.