No. 744,682. PATENTED NOV. 17, 1903.

G. GOODLINE.

BOX MOTION FOR LOOMS.

APPLICATION FILED DEC. 17, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

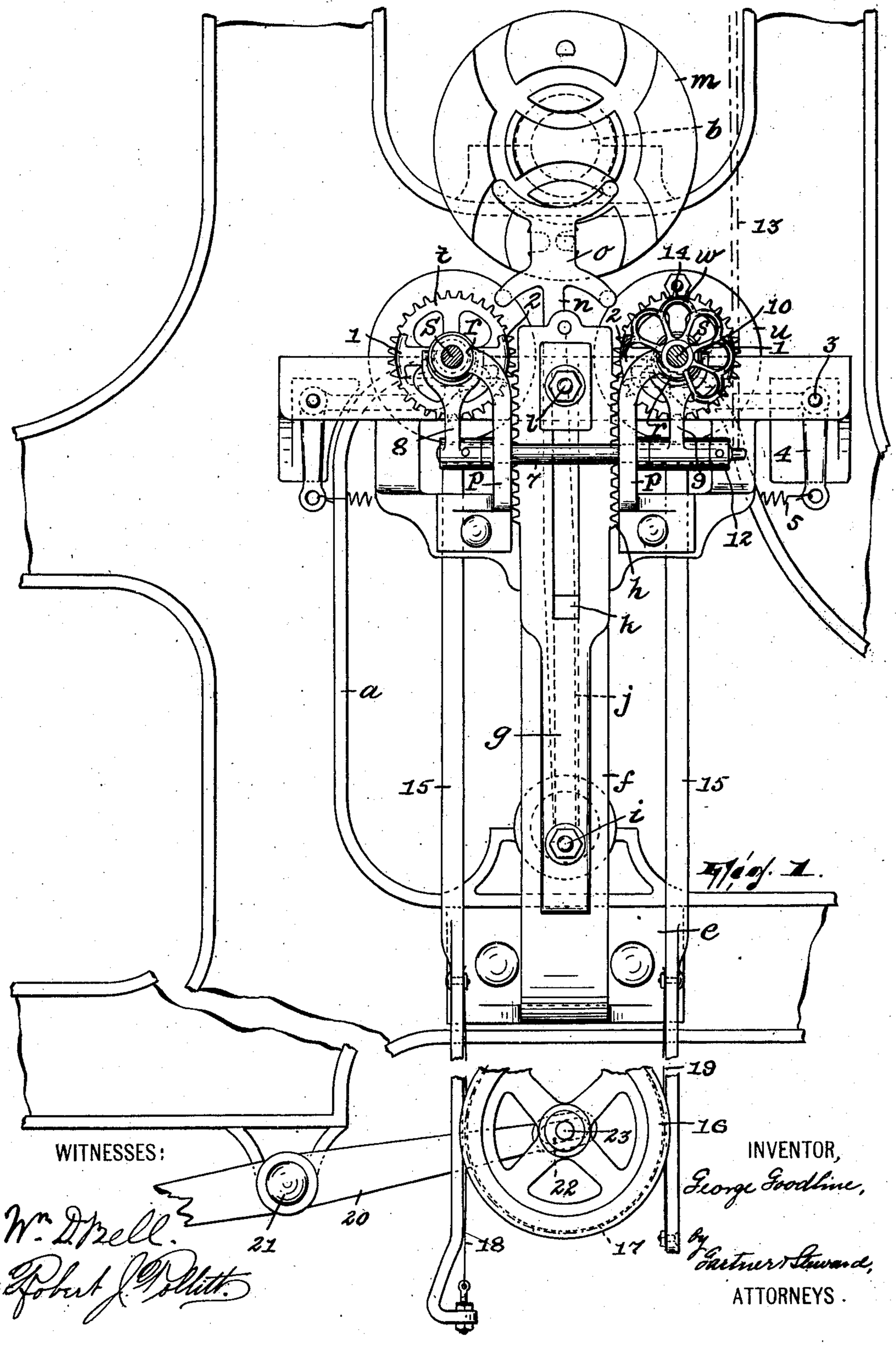

Fig. 1.

WITNESSES:

Wm. D. Bell.

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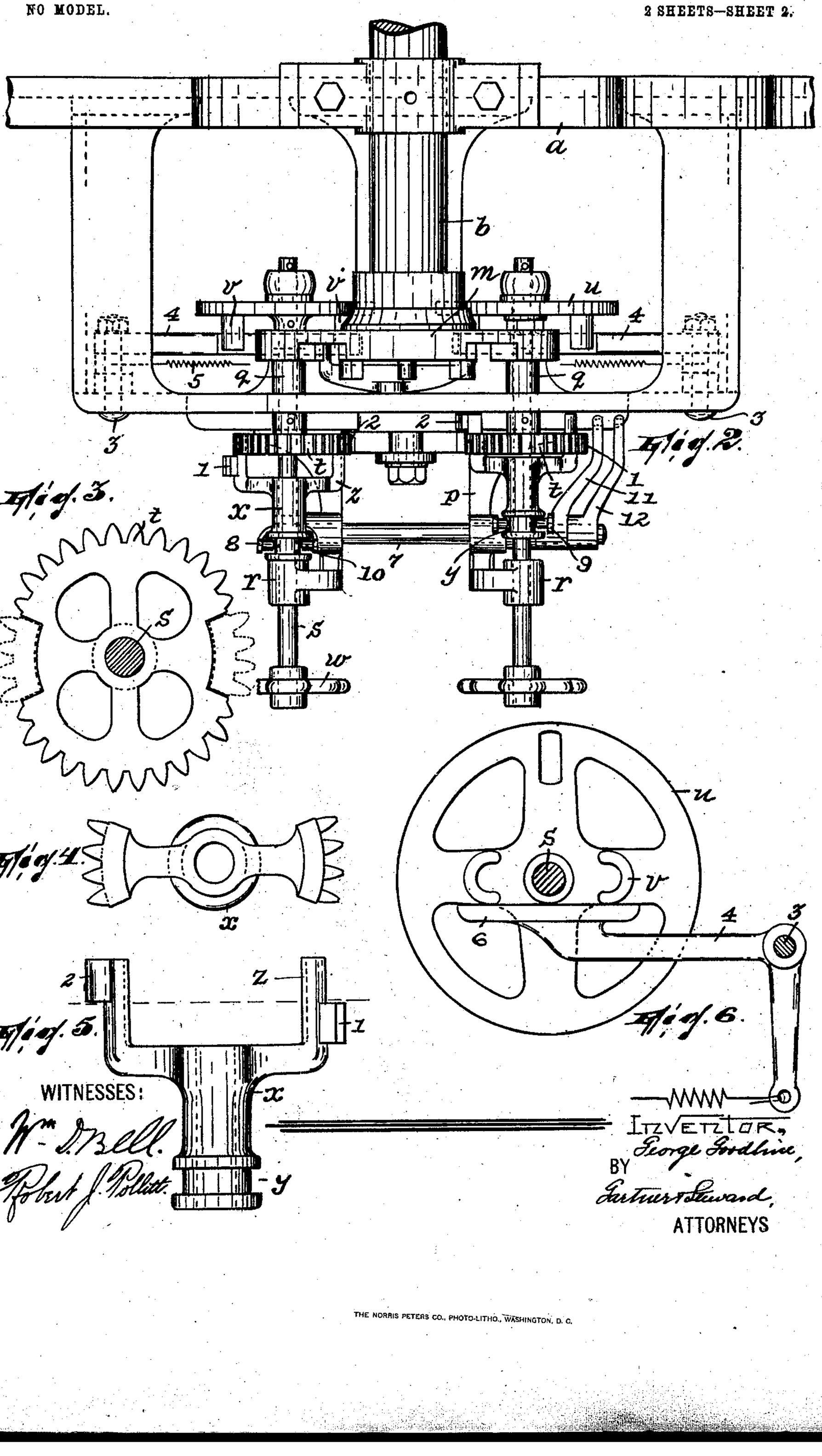

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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No. 744,682. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

GEORGE GOODLINE, OF PHILADELPHIA, PENNSYLVANIA.

BOX-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 744,682, dated November 17, 1903.

Original application filed December 10, 1901, Serial No. 85,306. Divided and this application filed December 17, 1902. Serial No. 135,515. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GOODLINE, a citizen of the United States, residing in Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Box-Motions for 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 characters of reference marked thereon, which form a part of this specification.

This invention relates to the construction of looms, and it has reference particularly to box-looms, having especially to do with that portion of the box-operating mechanism of such looms from which the selecting or "calling" of the boxes is directly accomplished.

The present application constitutes a division of an application filed by me December 10, 1901, Serial No. 85,306.

My invention will be found fully illustrated in the accompanying drawings, wherein corresponding characters of reference indicate like parts, and wherein—

Figure 1 is a side view of a box-loom provided with my improved box-operating mechanism. Fig. 2 is a top plan view of the said box-operating mechanism with the boxes, the box-rod, and the lever whereby motion is transmitted to the boxes removed; and Figs. 3, 4, 5, and 6 show one of the call-gears and its accessory parts.

In said drawings, *a* designates a loom side, and *b* is the crank-shaft of the loom.

e is a bracket or stand, which constitutes the main support for my improved box-operating mechanism and which is preferably bolted to the loom side *a*. Arranged to slide against the front face of the vertical part *f* of said stand *e* is a vertically-movable part *g*, which in its upper portion has its two side edges formed with teeth *h*, thus constituting a double rack. The lower end of this rack carries a stud *i*, which extends through a slot *j* in the part *f*, while the upper portion of said rack has a vertical slot *k*, which is penetrated by a stationary bolt *l*, extending from the stand *e*. These bolts and slots afford a guiding means for the rack.

In Letters Patent No. 685,420, dated October 29, 1901, I have described a mechanism whereby an alternating reciprocating and dwell motion may be imparted to the rack *g*. The parts of this mechanism are in the present case formed in a peripherally-grooved disk *m*, which is rigidly secured on, so as to turn with, the shaft *b*, and a connecting-rod *n*, which is provided at one end with a peculiarly-shaped claw *o*, adapted to engage the grooves of said disk and move through the same in accordance with a definite scheme, and having its other end pivoted on stud *i*. A full and clear description of the construction and operation of these parts is fully set forth in the said patent, and so it is not necessary herein. The motion capable of being derived from said parts being one which is positive and susceptible of variation, so as to secure different relative lengths of reciprocations and dwells, is one which is well adapted for actuating the rack *g*.

p designates a pair of auxiliary brackets, which are carried by the stand or bracket *e*, projecting outwardly therefrom. In alined bearings *q r* in the stand *e* and brackets *p*, respectively, is journaled a pair of horizontal shafts *s*. On each shaft is secured rigidly, so as to turn therewith, a call-gear *t*, which call-gear, being mutilated by having diametrically-opposed portions (each preferably comprising four teeth) removed, abuts with its hub against the stand *e*. On the inner end of each shaft *s* is rigidly secured a stop-disk *u*, each of said disks having two diametrically-opposed sectionally half-round lugs or projections *v* extending from one of the faces thereof. The outer end of each shaft *s* carries a hand-wheel *w*, whereby the shaft may be manually turned. Between the bearing *r* and each call-gear *t* is arranged to slide on the shaft *s* a sleeve *x*, having an annular groove *y* and carrying two arms *z*, formed so as to fit into the cut-out portions of the mutilated call-gears *t*, into which they extend. On the arms *z* are mounted toothed segments 1 2, which correspond to the sections of teeth removed from the call-gears. The segments

1 2 are not directly opposed to each other, but they are preferably arranged the one directly on one side and the other directly on the other side of a plane (indicated by the dotted line in Fig. 5) which is perpendicular to the shaft *s*, for a reason hereinafter pointed out. On fulcruming-studs 3, arranged in the upper portion of the stand *e*, is fulcrumed a pair of bell-crank levers 4, which I term "stop-levers," two of the corresponding arms of said levers being drawn toward each other by a spiral spring 5, while each of the other arms of said levers is formed with an integral shoe 6, adapted to take against the lugs or projections *v* of the stop-wheels *u*. By these co-acting stop-levers and stop-wheels the call-gears are adapted to be held positively and firmly between actuations. The brackets *p* afford bearings for a shaft 7, which carries forks 8 and 9, having diametrically-opposed pins 10, which engage the grooves *y* of the corresponding sleeves *x*. The fork 8 is rigidly secured on the shaft 7, while the other fork is arranged to turn thereon. To the fork 9 is secured a lever 11, and to the adjoining end of the shaft 7 is secured another and substantially similar lever 12. Thus one lever is adapted to actuate one fork, so as to move the corresponding sleeve, while the other lever, through the shaft, is adapted to actuate the other fork, so as to move its sleeve. By wires, rods, or other suitable means 13 these levers 11 12 are adapted to be connected to a pattern mechanism, such as a pattern-chain, &c., which moves them in one direction, gravity being depended upon to move them in the other direction.

From eccentrically-disposed pivots 14 on the stop-disks *u* are suspended rods 15, one for each disk. Between the lower ends of these rods is disposed a floating pulley 16, having a peripheral groove 17, which receives straps 18 and 19, extending, respectively, over and under the pulley and having their ends extending in opposite directions and secured to the rods, as shown in Fig. 1.

20 designates the box-rod lever, the same being in the present instance fulcrumed at a stationary point 21 on the loom side. One end of the lever has a slot 22, which receives a stud 23 at the center of the pulley, while its other end, it will be understood, is adapted to be connected in any suitable manner with the boxes.

The elements 14, *et sequa*, aforementioned are claimed *per se* in my aforesaid application, Serial No. 85,306, and in combination with the call mechanism constituting the subject-matter of the present application they are claimed in a copending application, filed by me December 17, 1902, Serial No. 135,516.

The mechanism operates as follows: The shaft *b* being rotated continuously, through the parts *m* and *n* is transmitted to the rack *g* an alternating reciprocating and dwell movement. It will be observed that the stop-levers and stop-disks normally hold the call-gears with their cut-out portions in the same horizontal plane, the arms *z* of the sleeves *x* being received by said cut-out portions of the call-gears. The toothed segments of said arms are likewise normally held in the horizontal position. If a previous actuation of the fork 8 (9) has moved the corresponding sleeve *x* so that the toothed segment which is next adjacent the rack *g* is thrown completely out of the plane of the call-gear, the reciprocation of the rack *g* will proceed idly with reference to the call-gear—*i. e.*, without turning it; but if the pattern so moves the fork through the connecting means 13 that the said segment is by said fork thrown back completely into the cut-out portion of the call-gear the rack will turn said call-gear through a half-revolution. The call-gear will not turn more than the half-revolution, because when one toothed segment was brought into the plane of the gear the other one was thrown out of said plane, thus producing a space corresponding to the other cut-out portion in said call-gear. Thereupon so long as the toothed segments are not again moved the rack will continue to reciprocate without effecting any further motion in the call-gear. In this way each rod 15 can be oscillated up and down with alternating dwells which are variable at will. It will be understood that the action of the pattern mechanism through the connecting means 13 and forks 8 and 9 in effecting the shifting of the toothed segments occurs between the movements of the rack. Hence the importance of having the rack so work that between its movements dwells occur, giving the pattern mechanism opportunity to act.

I have secured a very great advantage by having the segments 1 2 arranged on opposite sides of and close to a line drawn perpendicular to the axis of the sleeve *x*. By virtue of this arrangement the pattern from which the segments are controlled may be made to shift the segments so that half of each is received by the corresponding cut-out portion of the call-gear. The object of this is to render it possible to make the boxes work pick-and-pick with reference to any two boxes without having to resort to the pattern mechanism as an initial means for setting the two boxes involved each time each comes into use—*i. e.*, every alternate pick of the loom. Suppose, for instance, it is desired to work pick-and-pick boxes 1 and 3. Both rods 15 being up, both sleeves *x* are shifted until half of each of their segments is received by the cut-out portion of the corresponding call-gear. This position, it will be understood, is determined by some intermediate elevation of the pattern-chain or other form of call mechanism. The rack is then actuated, and the toothed outlines of the gears now being complete the rack turns the call-gears back and forth as it reciprocates, alternately lowering and raising both rods. Again, if it is desired to work the boxes pick-and-pick between, say, box 1 and box 2 (the calling of box 2 corresponding to

that position of lever 20 which is effected by lowering either rod 15 and maintaining the other one up) the sleeve for the call-gear of the rod which is down is moved so that its two segments project half-way into the cut-out portions of the call-gear, so as to complete the latter's outline, whereupon the segment adjacent to the rack *g* for the other call-gear having been moved out of the plane of said call-gear, and hence out of engagement with the rack, the call-gear for the rod which is down only will be operated. If it is desired to work the boxes pick-and-pick between boxes 2 and 3, it is accomplished in the same manner as is accomplished the pick-and-pick movement between boxes 1 and 2, with the exception that at the start both rods 15 are down.

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

1. In a mechanism for shifting a part to either of two positions between intervals of varying lengths, the combination, with the part to be shifted, of a rotary part operatively connected to said first-named part and having an endless way portions of which are movable to form recesses and a driving part adapted to engage said rotary part in the way thereof to drive the same, said movable portions being rotatable with the rotary part, movable as one, and being so arranged with reference to each other that when one is at one side of and close to one side line of the way of said rotary part the other will be on the other side of and close to said line, substantially as described.

2. In a mechanism for shifting a part to any of a plurality of positions between intervals of varying lengths, the combination, with the part to be shifted, of a rotary part operatively connected with said first-named part and having sections of its peripheral portion removed to form recesses, a driving part adapted to engage said peripheral portion of the rotary part to drive the same, and segmental devices rotatable with said rotary part, corresponding to and alined with the recesses thereof, and movable as one axially thereof, said devices being arranged one at each side of and contiguous to a plane perpendicular to the axis of said rotary part, substantially as described.

3. In a mechanism for shifting a part to any one of a plurality of positions between intervals of varying lengths, the combination, with the part to be shifted, of a peripherally-toothed rotatable gear operatively connected to said first-named part and having sections of its toothed portion removed to form recesses, a toothed driving part adapted to engage said toothed portion of the gear to drive the same, and toothed segmental devices rotatable with said gear, corresponding to and alined with the recesses thereof, and movable as one axially thereof, said devices being arranged one at each side of and contiguous to a plane perpendicular to the axis of said gear, substantially as described.

4. The combination of a peripherally-toothed rotary gear, having sections of its toothed portion removed to form recesses, each tooth next adjacent each cut-out portion of said gear being relatively short, a reciprocating rack adapted to engage and drive said rotary part, and an axially-movable part adapted to rotate with said gear and having arms projecting into the cut-out portions of said gear, said arms carrying toothed segments arranged one at each side of and contiguous to a plane perpendicular to the axis of said part so that when the inner portion of one segment is received by the gear the inner portion of the other segment may also be received by said gear and the toothed contour of said gear rendered complete, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of December, 1902.

GEORGE GOODLINE.

Witnesses:
ANDREW V. GROUPE,
RALPH H. GAMBLE.