

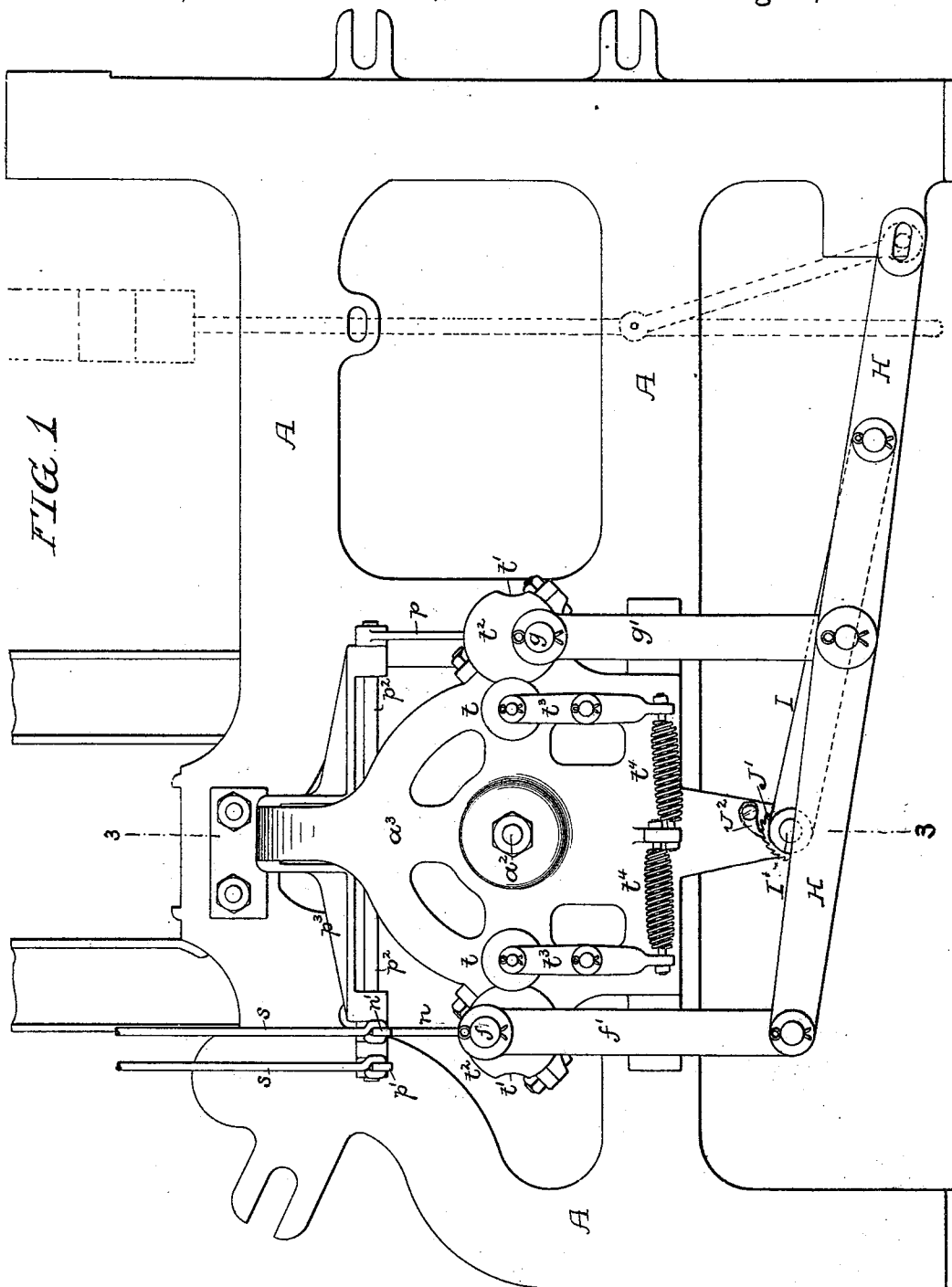
(No Model.)

3 Sheets—Sheet 1.

E. INGRAHAM.
DROP BOX MECHANISM FOR LOOMS.

No. 544,229.

Patented Aug. 6, 1895.



Witnesses:
Fried. b. Benner
W. D. Goodwin

Inventor:
Edmund Ingraham
by his Attorneys
Howson & Howson

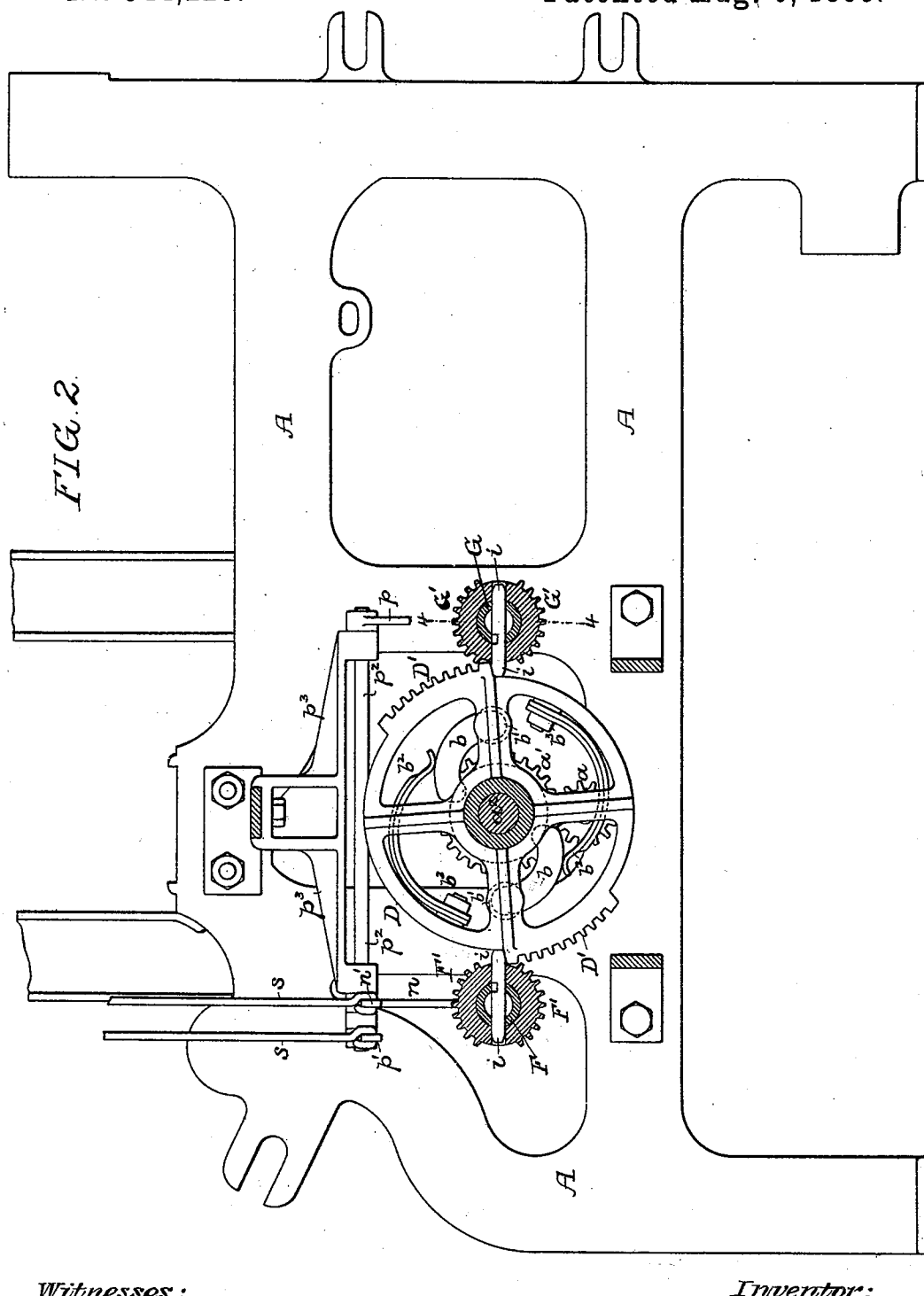
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3 Sheets—Sheet 2.

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Patented Aug. 6, 1895.



Witnesses :

F. C. Bunker
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UNITED STATES PATENT OFFICE

EDMUND INGRAHAM, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO THE FAIRMOUNT MACHINE COMPANY, OF SAME PLACE.

DROP-BOX MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 544,229, dated August 6, 1895.

Application filed December 26, 1894. Serial No. 532,952. (No model.)

To all whom it may concern:

Be it known that I, EDMUND INGRAHAM, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Drop-Box Mechanism for Looms, of which the following is a specification.

The object of my invention is to construct a simple, positive, and efficient drop-box motion for looms, the boxes, when adjusted, being effectually locked against vertical displacement in either direction. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of sufficient of a loom to illustrate my improved drop-box motion. Fig. 2 is a similar view with some of the outer parts removed and some in section in order to show internal construction. Fig. 3 is a transverse section on the line 3 3, Fig. 1. Fig. 4 is an enlarged section on the line 4 4, Fig. 2. Fig. 5 is a view, partly in elevation and partly in section, on the line 5 5, Fig. 4. Fig. 6 is a transverse section on the line 6 6, Fig. 4; and Fig. 7 is a side view illustrating a modification of my invention.

A represents one of the side frames of the loom, having a bearing for the shaft B, which has a spur-pinion a , meshing with a spur-wheel a' , which is free to turn on a stud a^2 , secured to a hood or casing a^3 , attached to the side frame A. On said stud a^2 also turns a drum D, between which and the hub of the spur-wheel a' there is a frictional clutch connection consisting in the present instance of fingers b , hung to studs b' on the drum and engaging at their free ends with notches in the hub of the spur-wheel a' , the fingers being retained in engagement with said notches by means of springs b^2 bearing upon the fingers and secured to studs b^3 on the drum. On the periphery of the drum D are formed two toothed segments D' , these toothed segments being diametrically opposite each other, and on each side of the drum is suitably mounted a hollow shaft, that on one side of the drum being represented at F and that on the opposite side at G. At the outer end of the shaft F is a crank-pin f , which is connected by a link f' to one arm of a lever H, the latter being ful-

crumed midway of its length to the lower end of a link g' , depending from the crank-pin g of the shaft G, the forward end of the lever H being constructed for connection to the drop-box rod in the usual manner.

Connected to the drop-box lever H is an arm I, which is hung to a stud I' on a depending portion of the hood a^3 , said arm I being connected to one end of a spring J, tending to lift it, and the tension of the spring being regulated by the adjustment of a ratchet-wheel J' , to which the other end of said spring is attached, back movement of the ratchet-wheel being prevented by a pawl J^2 . This spring-actuated arm serves to counterbalance the weight of the drop-boxes, and thus permits the easy elevation of the same and prevents uneven strain upon the operating mechanism for the drop-box lever.

The throw of each of the crank-pins f and g is equal to the height of one of the boxes. Hence the construction shown is adapted for application to a four-box loom. When the parts are in the position shown in Fig. 1, the boxes will be fully depressed, the top box will be in line with the shuttle-race, the crank-pin f being at the top limit of and the crank-pin g at the bottom limit of its throw. If it is desired to raise the boxes to the extent of one box, a half turn is imparted to the shaft F, so as to carry its crank-pin to the lowest limit of its throw, and thereby operate the lever H, so as to raise the boxes to the desired extent, the lever H fulcruming upon the link g' . If it is desired to raise the boxes from the lowest position to the extent of two boxes, the shaft F is permitted to remain stationary and the shaft G has a half turn imparted to it. This imparts motion to the link g' , and as the latter is connected to the lever H at a point midway of the length of the lever, and the inner end of the latter is fulcrumed upon the lower end of the link f' , the movement of the outer end of the lever H, which is connected to the drop-box rod, will be doubled. Consequently the boxes will be lifted to the extent of two boxes. If it is desired to effect a three-box lift, both shafts F and G are given a half turn from the positions shown in Fig. 1, the operation of the shaft G resulting in a lift of two boxes and the operation of the shaft F resulting in a

further lift of one box. The boxes can be lowered in like manner to the extent of one, two, or three boxes by the operation of either or both of the shafts F and G. In fact it will
 5 be readily understood that as the operation of the shaft F provides for a movement of the boxes in either direction to the extent of one, box, and the operation of the shaft G provides for a movement of the boxes in either direc-
 10 tion to the extent of two boxes, any desired operation of the boxes can be effected by moving either or both shafts. When both shafts are operated, the movement due to the operation of the shaft F is added to or subtracted
 15 from the movement due to the operation of the shaft G.

The desired half turns are imparted to the shafts F and G in the following manner: Each shaft has diametrically-opposite toothed
 20 segments F' and G', and sliding transversely through each shaft is a bolt i , which has in one of its faces an inclined groove i' , engaging with a pin i^2 , projecting inwardly from a
 25 finger i^3 , formed upon the inner end of a sliding rod m , which is guided in the hollow shaft F or G, and is prevented from turning there-
 30 in by a screw-pin m' , which engages with a groove m^2 formed in one side of said sliding rod. The outer end of the rod m is grooved
 35 for the reception of the forked lower end of an arm, that used in connection with the rod of the shaft F being lettered n , while the arm used in connection with the rod of the shaft
 40 G is lettered p . The arm n turns loosely upon a rock-shaft p^2 , which is adapted to suitable bearings in a bracket p^3 , secured to the hood or casing a^3 , the arm p being rigidly secured to said shaft. Attached to the arm n is an
 45 arm n' , and secured to the shaft p^2 is an arm p' , and both of these arms are connected by cords or wires s to suitable pattern mechanism at the top of the loom, whereby either rod
 50 m may be thrust into or withdrawn from its respective shaft.

The opposite ends of each of the sliding bolts i constitute the initial teeth of the segments of the shaft in connection with which
 55 said bolt is used, and the operation of either of the shafts F or G by a segment D' of the drum D depends upon whether the bolt i is projected so as to engage with the primary tooth of such segment D'. Thus it will be
 60 observed on reference to Fig. 2 that the fixed teeth of the segments of the shafts F and G, when said shafts are in position of rest, clear the teeth of the segments D'. Hence so long as the bolt i of either shaft is retracted there will be no operation of said shaft; but when
 65 the bolt is projected so as to engage with the initial tooth of the segment D' the shaft will be turned thereby, so as to bring the fixed teeth of the segment into mesh with the teeth of the segment D', the segments of the drum D and of the shafts F and G being so proportioned that each movement of either shaft will be to the extent of half a turn. Each of the

shafts is locked in position after each movement by means of a roller t engaging with a notch t' in a disk t^2 , formed on the shaft, the roller t being carried by a lever t^3 , hung to the
 70 hood a^3 and acted upon by a spring t^4 .

In the event of any obstruction to the movement of the boxes in either direction, such as would prevent the turning of the shafts F G or either of them, the arrest of movement of
 75 the drum D causes the ends of the clutch-fingers b to leave the notches in the hub of the spur-wheel a' , so that the continued forward movement of the latter is not interfered with, and breakage of the teeth or other parts of
 80 the box-operating mechanism is thereby prevented.

A modified plan of attaining the same result is shown in Fig. 7, and consists in the use
 85 of two levers H' and H², the latter being fulcrumed upon the lever H', and being connected at one end to the link g' and constructed at the other end for connection to the drop-box rod, the link f' being connected to the rear end of the lever H'. The pivot w of
 90 the lever H² is confined between a fixed jaw w' and a yielding jaw w^2 upon the lever H', the yielding jaw being acted upon by a spring w^3 , the tension of which is overcome when the movement of the boxes is unduly obstructed,
 95 so that the jaw w^2 yields and the pivot w is permitted to move either upward or downward, as required.

It will be observed that as each of the crank-pins of the shafts F and G is on the dead-center
 100 when said shaft is at rest, the boxes are positively locked in position after each adjustment so far as concerns any derangement by pressure upon the boxes themselves. Hence the construction of the frictional
 105 clutching device shown in Figs. 1 to 3 is preferred to that shown in Fig. 7, in which the yielding element is interposed between the boxes and the crank-pins.

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

1. The combination of a hollow box-operating crank shaft having a toothed segment, a transversely sliding bolt, the end of which
 115 constitutes the initial tooth of said segment, a rod adapted to slide longitudinally in said hollow shaft and having a pin and slot connection with said bolt, whereby the longitudinal movement of the rod causes transverse
 120 movement of the bolt, and means for reciprocating said rod, substantially as specified.

2. The combination of a hollow box-operating crank shaft having a toothed segment, a transversely sliding bolt, the end of which
 125 constitutes the initial tooth of said segment, a rod adapted to slide longitudinally in said hollow shaft and having a pin and slot connection with said bolt, whereby the longitudinal movement of the rod causes transverse
 130 movement of the bolt, means for reciprocating said rod, and a pin carried by the hollow

shaft and adapted to a groove in the rod so as to prevent turning of the latter in the shaft, substantially as specified.

5 3. The combination in drop box mechanism for looms, of the drop box lever, the drum having toothed segments, the crank shafts having segments with movable initial teeth, means for advancing and retracting said movable teeth, devices for rotating the drum, connections between the crank pins of the crank shaft and the drop box lever, and a yielding clutch element whereby the arrest of the drop box operating mechanism is permitted without interfering with the continued movement
10 of the driving shaft, substantially as specified.
15

4. The combination of the drop box lever, shafts having crank pins connected to said lever, means for operating said shafts, a supporting arm for the lever, a spring for lifting said arm, a ratchet wheel connected to said spring and a retaining pawl for said ratchet wheel, substantially as specified. 20

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

EDMUND INGRAHAM.

Witnesses:

WILL. A. BARR,

JOSEPH H. KLEIN.