

(No Model.)

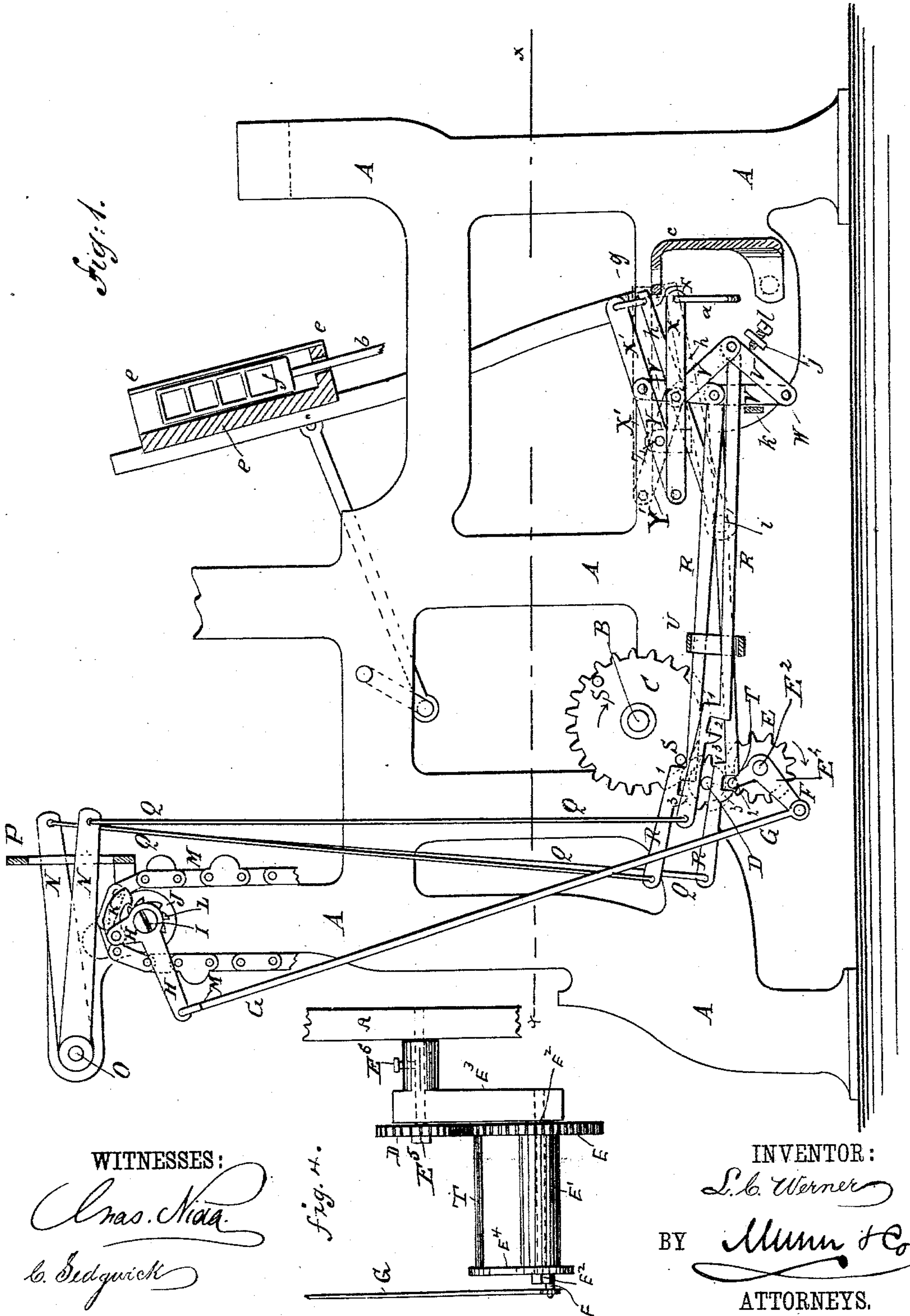
3 Sheets—Sheet 1.

L. C. WERNER.

SHUTTLE BOX MOTION FOR LOOMS.

No. 315,683.

Patented Apr. 14, 1885.



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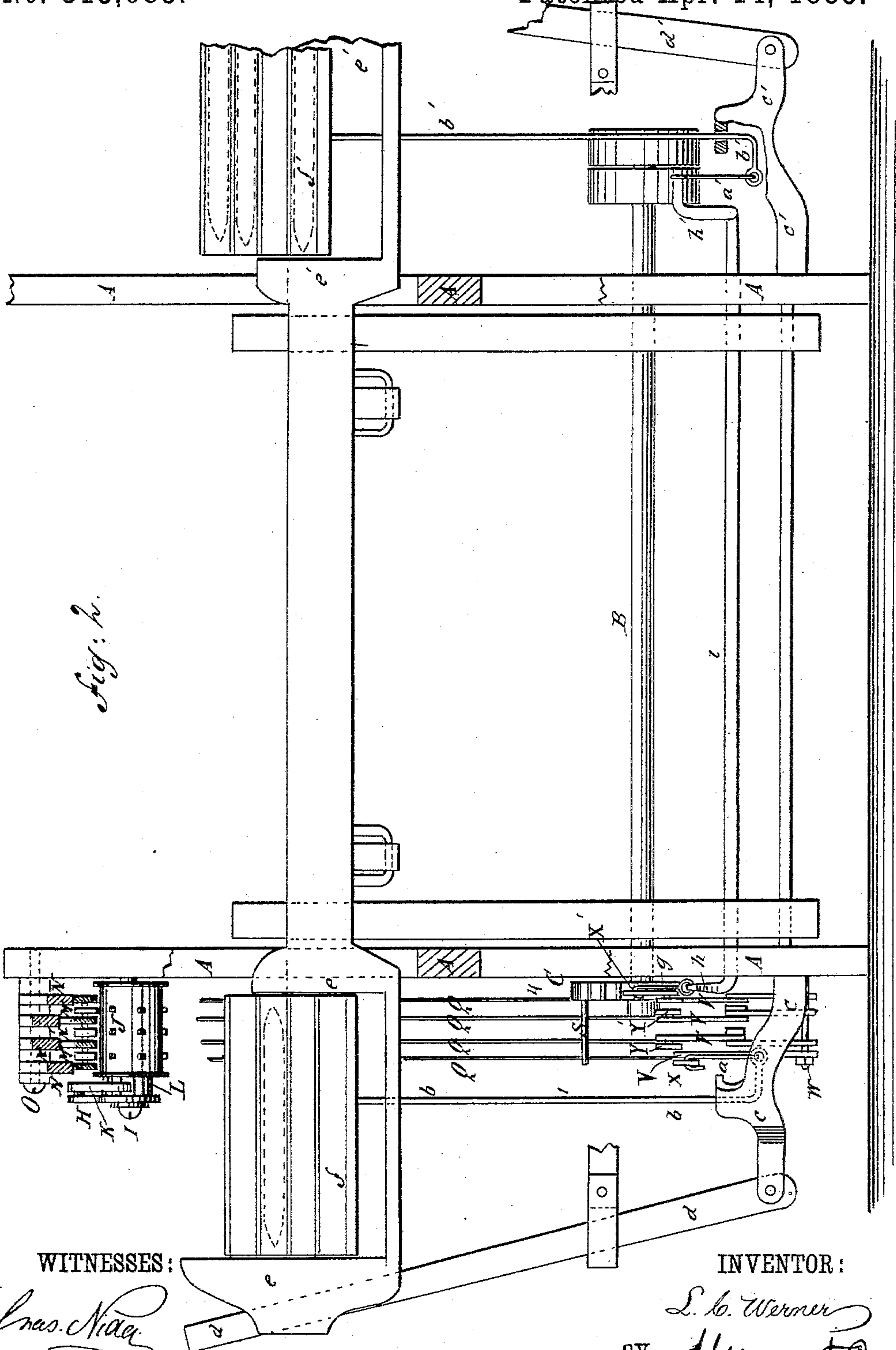
3 Sheets—Sheet 2.

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WITNESSES:

INVENTOR:

Mrs. Vider
C. Sedgwick

L. C. Werner
BY *Munn & Co*
ATTORNEYS.

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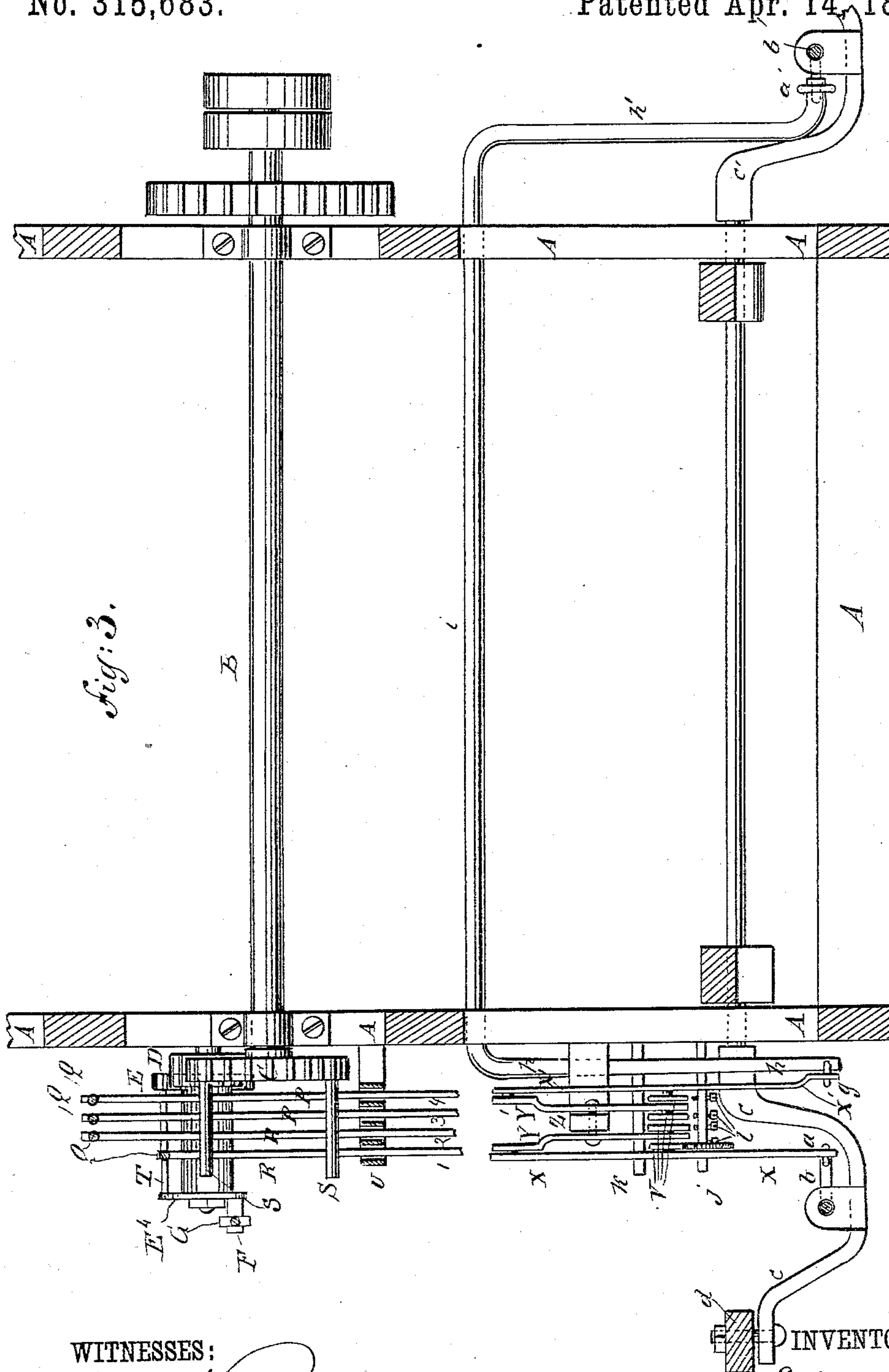
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Chas. Nider
C. Sedgwick

INVENTOR:

L. C. Werner

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

LOUIS CHARLES WERNER, OF BROAD BROOK, CONNECTICUT.

SHUTTLE-BOX MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 315,683, dated April 14, 1885.

Application filed October 8, 1883. (No model.)

To all whom it may concern:

Be it known that I, LOUIS CHARLES WERNER, of Broad Brook, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Shuttle-Box Motions for Looms, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a side elevation, partly in section, of a loom to which my improvements have been applied. Fig. 2, Sheet 2, is a front elevation of the same, partly in section, and parts being broken away. Fig. 3, Sheet 3, is a sectional plan view of the same, taken through the line *x x*, Fig. 1. Fig. 4, Sheet 1, is an enlarged detail view.

The object of this invention is to provide an improved mechanism for automatically operating shuttle-boxes, constructed in such a manner as to adapt it to be applied to old looms, and which shall be simple in construction and reliable in operation.

The invention consists in the peculiar construction and combinations of parts hereinafter fully described, and pointed out in the claims.

A represents the frame of the loom. B is the driving-shaft, which revolves in bearings in the lower rear part of the frame A, and to which power is applied by a belt and pulleys, either directly or to a short shaft connected with the said driving-shaft by suitable gearing.

To one end of the shaft B is attached a large gear-wheel, C, the teeth of which mesh into the teeth of the small intermediate gear-wheel, D, pivoted to the frame A. The teeth of the intermediate gear-wheel, D, mesh into the teeth of the small gear-wheel E. The gear-wheel E is provided with a hub, E', and revolves on the stud E², projecting from the casting E³, which in turn is secured on the stud E⁵, projecting from the frame, and on which the gear-wheel D revolves. The casting E³ is secured on the stud E⁵ by a set-screw, E⁶, passing through its hub and bearing on the said stud, as clearly shown in Fig. 4. By securing the casting to the stud by a set-screw, should the parts get caught and cease to operate, the friction of the screw against the stud will be

overcome and the casting be turned on said stud, thereby obviating all liability of breakage. To the outer end of the hub E' is attached a two-armed plate, E⁴, to one arm of which is attached a crank-pin, F, to which is pivoted the lower end of a connecting-rod, G. Attached to the other arm of the plate E⁴ and to the gear-wheel E, between the two, is a bar or rod, T, the purpose of which will be presently described. The upper end of the connecting-rod G is pivoted to the long arm of a small elbow-lever, H, which is pivoted at its angle to the stud I, upon which the cylinder J revolves. To the short arm of the lever H is pivoted the hook-pawl K, which engages with the ratchet-wheel L, attached to or formed upon the end of the said cylinder J, so that the said cylinder will be revolved intermittently by the vibratory movements of the said pawl K, the long arm of the lever H being made so much longer than the crank F that the revolution of the said crank F will only rock the said elbow-lever H, and thus vibrate the said pawl K. The cylinder J is provided with pins or teeth to engage with and move the pattern-chain M, the projections of which operate the levers N at the proper time. The levers N are pivoted at their outer ends to a pin, O, attached to the frame A, and their forward parts pass through the slots of a guide-rack, P, attached to the said frame, to keep the said levers from contact with each other, and to cause each lever to vibrate in its own vertical plane.

To the forward ends of the levers N are pivoted the upper ends of the connecting-rods Q, the lower ends of which are pivoted to the rear ends of the jacks R, so that the said rear ends of the jacks will be raised and lowered as the projections of the chain M come in contact with and leave the levers N. Upon the upper sides of the rear parts of the jacks R are formed shoulders 1, to be struck when the said jacks are raised by one or the other of the two pins S, attached to the side of the gear-wheel C.

Upon the lower sides of the rear parts of the jack R are formed shoulders 2, to be struck when the said jacks are lowered by the bar or rod T, carried by the gear-wheel E.

Upon the lower sides of the jacks R, a little in the rear of the shoulders 2, are formed pro-

jections 3, to come in contact with the bar or rod T, and prevent the said jacks from being carried forward by the mechanism connected with their forward ends faster than the movement of the said pin T, thus securing a uniform rate of movement. The rear sides of the projections 3 are beveled or rounded to permit the bar or rod T to pass the said projections into the notches formed by the said projections and shoulders 2 without carrying the jacks forward. The jacks R are kept parallel with each other and out of contact by a guide-rack, U, through which the middle parts of the said jacks pass, and which is attached to the frame A. The forward end of each jack R is pivoted to the adjacent ends or joint of two short bars, V, which operate as toggle-bars, and are called by me "lifters." The lower ends of the lower bars V are pivoted to a pin, W, attached to the frame A, or to a support secured to the said frame. The upper ends of the first and fourth lifters V, counting from the left, are pivoted to the middle parts of the long levers X X', the rear ends of which are pivoted to the rear ends of the short levers Y Y'. The short levers Y Y' are pivoted at their middle parts to the opposite sides of the upwardly-projecting end of the arm Z, attached to the frame A. The forward ends of the short levers Y Y' are pivoted, respectively, to the upper ends of the second and third lifters V.

To the forward end of the long lever X is pivoted the upper end of a short connecting bar or link, a, the lower end of which is pivoted to the inwardly-projecting lower end of the rod b. The rod b passes up through a guide-hole in the bracket c, to which the lower end of the picker-staff d is hinged, and which is secured to the lay rock-shaft. The rod b passes up through the bottom of the shuttle-box carrier e, and its upper end is attached to the shuttle-boxes f, so that the shuttle-boxes will be raised and lowered by the upward and downward movements of the said rod b.

To the forward end of the long lever X' is pivoted the upper end of the short bar or link g, the lower end of which is pivoted to the end of the arm h, formed upon or rigidly attached to the end of the shaft i. The shaft i rocks in bearings in the frame A, and to its other end is attached, or upon it is formed, an arm, h', to the end of which is pivoted the upper end of a short connecting-rod, a'. The lower end of the rod a' is pivoted to the inwardly-projecting lower end of the rod b', which passes up through a guide-hole in the bracket c', to which is hinged the lower end of the right-hand picker-staff d'. The rod b' passes up through a hole in the bottom of the right-hand shuttle-box carrier, e', and its upper end is attached to the shuttle-boxes f', so that the right-hand shuttle-boxes will be raised and lowered by the upward and downward movements of the said rod b'.

It will be observed that the first and sec-

ond jacks operate the left-hand shuttle-boxes, and the third and fourth jacks operate the right-hand shuttle-boxes. With this construction, when the second jack R is raised into contact with a pin, S, and the first jack lowered into contact with the bar or rod T, the second left-hand shuttle-box f will be brought into line with the race, as shown in Figs. 1 and 2.

When the first lever N is operated to raise the first jack R into position to be struck by one of the pins S, and the second lever N is operated to lower the second jack R into position to be operated by the bar or rod T, the left-hand shuttle-boxes f will be operated to bring the third shuttle-box f into line with the shuttle-race.

When the first and second jacks R are both raised into contact with a pin, S, the fourth left-hand shuttle-box f will be adjusted into line with the race; and when the said first and second jacks R are both lowered into contact with the bar or rod T the first left-hand shuttle-box f will be brought into line with the race. When the third and fourth jacks R are both lowered into contact with the bar or rod T, the first right-hand shuttle-box f' will be brought into line with the race. When the third jack R is raised into contact with one of the pins S and the fourth jack R is lowered into contact with the bar or rod T, the second right-hand shuttle-box f' will be brought into line with the race. When the fourth jack R is raised and the third jack R is lowered, the levers X' Y' will assume the position shown in dotted lines, Fig. 1, and the third right-hand shuttle-box f' will be brought into line with the race; and when the third and fourth jacks R are both raised, the fourth right-hand shuttle-box f' will be brought into line with the race. The forward and rearward movements of the jointed bars V are limited by stop bars or arms j k, attached to the frame A or to a support attached to the said frame.

l are set-screws inserted in screw-holes in the forward stop, j, in such position as to be struck by the upper parts of the lower bars V, so that the forward movements of the said jointed bars V can be limited separately.

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

1. The combination, with the jacks R, the rod b, carrying the shuttle-boxes and the pattern M, of the toggle-bars V, the long levers X, the short lever Y, the levers N, connecting-rods Q, and means for operating the jacks and pattern, substantially as herein shown and described.

2. The combination, with the jacks R, the rod b', carrying the shuttle-boxes f' and the pattern M, of the toggle-bars V, the long lever X', the short lever Y', the shaft i, having arms h h', the levers N, the connecting-rods Q, and means for operating the jacks and pattern, substantially as herein shown and described.

3. The combination, with the cylinder J, the wheel L, the pattern-chain M, the levers N, the rods Q, and the jacks R, provided with the shoulders 2, of the elbow-lever H, provided
5 with the pawl K, the gear-wheel E, the two-armed plate E⁴, the rod G, connecting one arm of the said plate to the elbow-lever, the rod T, adapted to engage the shoulders of the jacks, and means for operating said gear-wheel, substantially as herein shown and described.
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4. The combination, with the cylinder J, the pattern-chain M, the levers N, the connecting-rods Q, and the jacks R, provided with the shoulders 1 2, of the elbow-lever H, provided
15 with the pawl K, the connecting-rod G, the

gear-wheel E, provided with the crank F and bar T, the intermediate gear-wheel, D, the gear-wheel C, having pins S, the shuttle-boxes *ff'*, and intermediate mechanism for communicating the motion of the jacks to the shuttle-boxes, substantially as herein shown and described.
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5. The combination, with the frame A and the toggle-bars V, of the stops *j k* and the set-screws *l*, substantially as herein shown and described.
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LOUIS CHARLES WERNER.

Witnesses:

FREDERICK C. WERNER,
FREDERICK WERNER, Jr.