

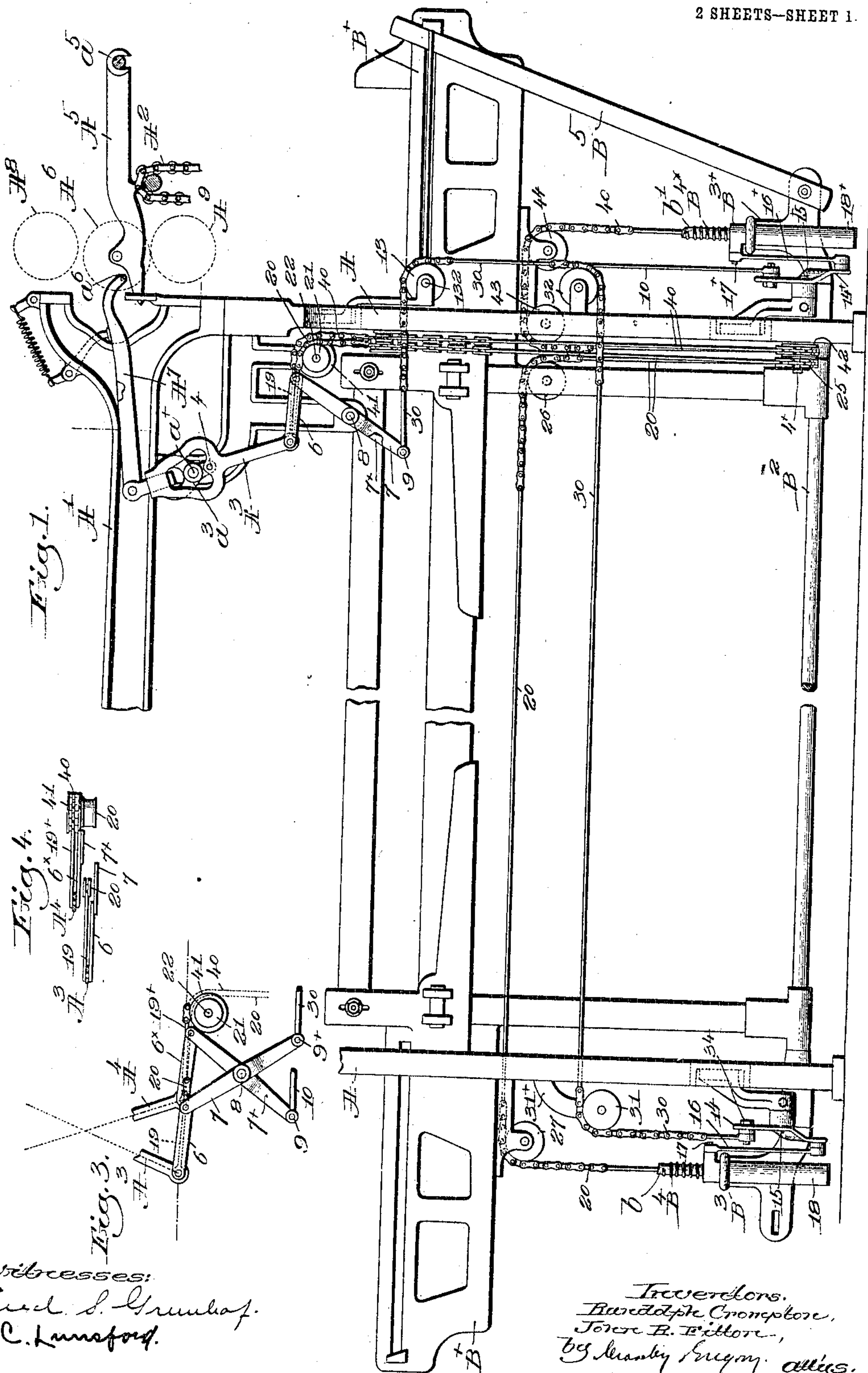
No. 837,284.

PATENTED DEC. 4, 1906.

R. CROMPTON & J. R. FITTON.
SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

APPLICATION FILED JULY 28, 1905.

2 SHEETS—SHEET 1.



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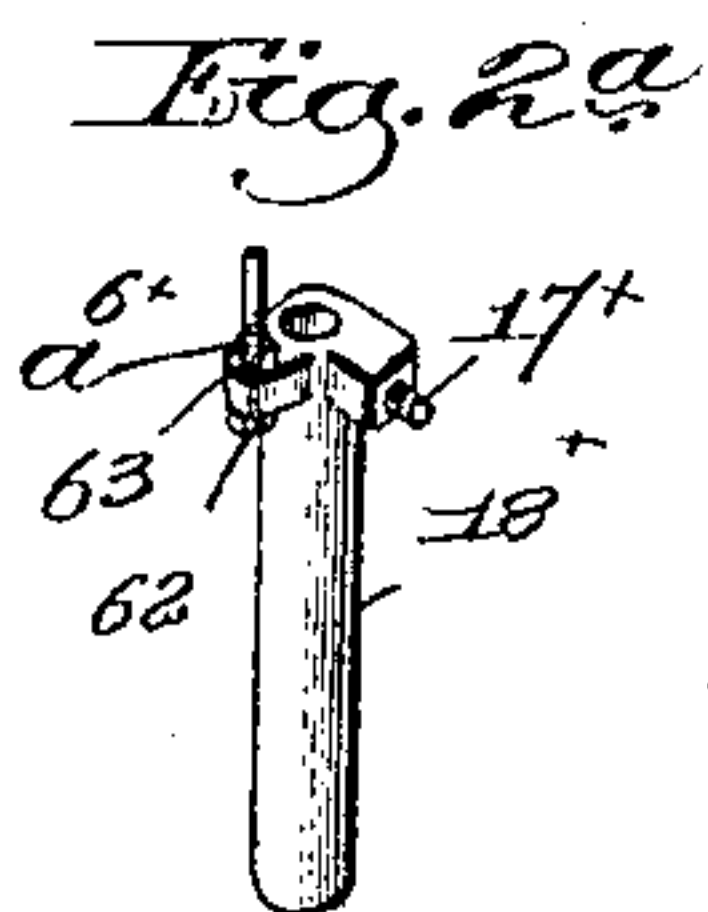
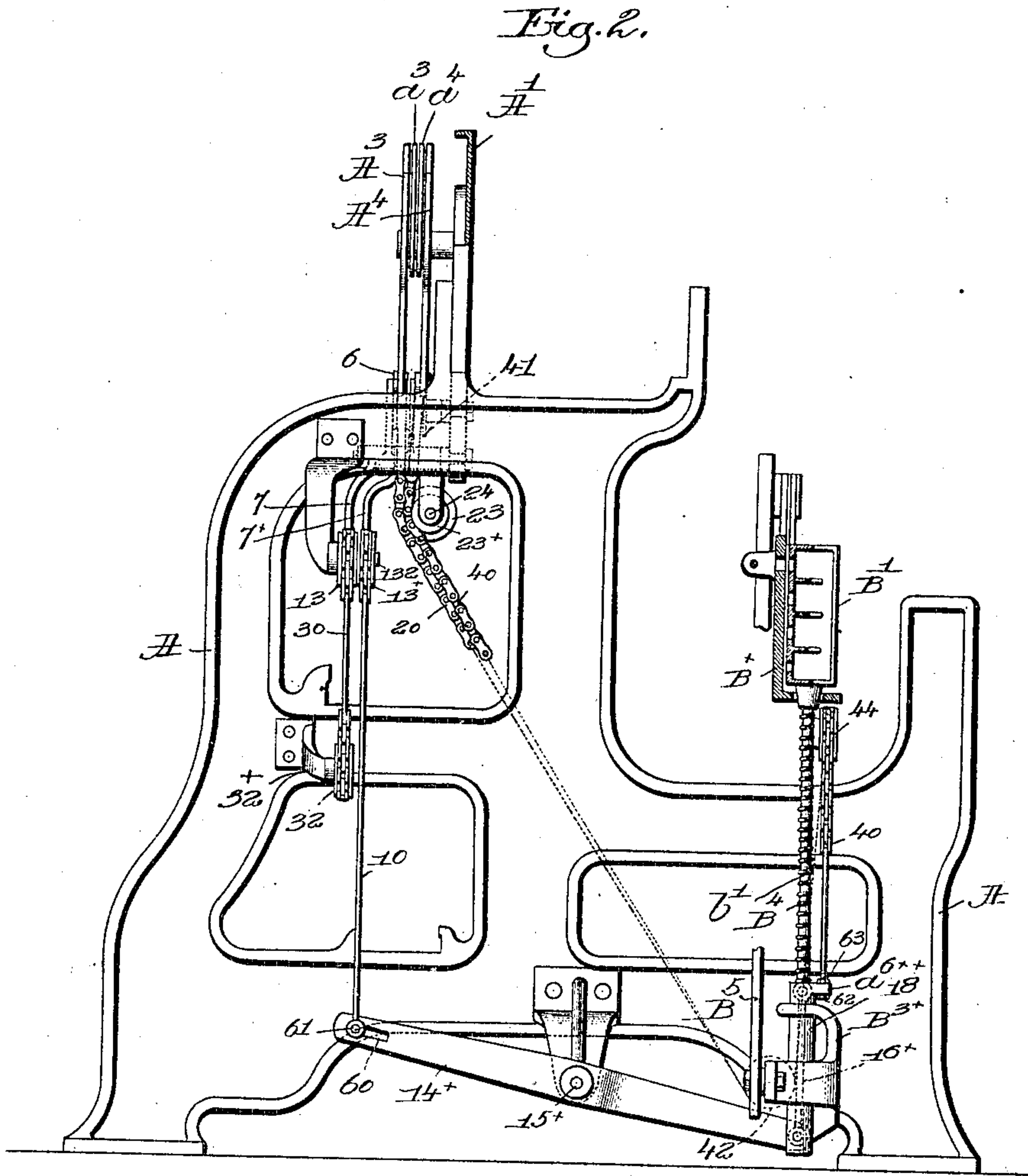
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE.

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SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

No. 837,284.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed July 26, 1905. Serial No. 271,310.

To all whom it may concern:

Be it known that we, RANDOLPH CROMPTON and JOHN R. FITTON, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Shuttle - Box - Operating Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention, relating to shuttle-box-operating mechanism for looms, has for its object such construction of parts between the shuttle-boxes and whatever form of prime or compound lever used that the shuttle-boxes may be raised and lowered positively when being moved from one into another position.

We have illustrated our invention as applied to the type of loom represented in United States Patent No. 134,992, dated January 21, 1873, where a compound lever is illustrated, as the shuttle-box contains more than two cells; but our invention is applicable to looms where the shuttle-box contains but two cells, in which case a single rather than a compound lever is used.

By the flexible connections herein shown and to be described it becomes possible to move from levers mounted at one end of a loom a set of shuttle-boxes carried by both ends of the lay.

Figure 1 is a rear end view of a loom of the character referred to with our improvements added, but with the shuttle-boxes omitted. Fig. 2 shows a left-hand side elevation of the loom, together with the compound levers, the usual actuating mechanism for said levers partially shown in Fig. 1 being omitted; Fig. 2^a, a detail of the box-rod sleeve 18. Fig. 3 shows the lower ends of two compound levers of usual construction joined with equalizer-levers, one of said levers being moved to occupy its extreme position; and Fig. 4 is a plan view of the parts shown in Fig. 3.

Referring to the drawings, which show only such parts of a loom of the class described that appear to be necessary to enable our invention to be understood, the loom-frame A, the head-frame A' rising therefrom, the shuttle-box pattern A², the compound or prime levers A³ a³ and A⁴ a⁴, the vibrator-lever A⁵, pivoted at a⁵, the vibrator-gear A⁶,

pivoted on said vibrator-lever and having a crank-pin a⁶, the connector A⁷, that is jointed to said crank-pin, and the two rotary-cylinder gears A⁸ A⁹ are and may be all as represented in said patent, it being understood that there are two vibrator levers, gears, and connectors for each compound lever, a connector being jointed to each part A³ a³ and A⁴ a⁴, as provided for in said patent, two such compound levers being herein illustrated for controlling more than two shuttle-boxes at opposite ends of the lay.

The lay B, provided at its opposite ends with suitable shuttle-box guides B^x, and the shuttle-box B', (shown only in Fig. 2,) there being in practice two such shuttle-boxes, one at each end of the lay and sustained by the box-rods b b', (partially shown in Fig. 1,) are and may be all as usual.

The rod B², constituting the lay-pivot, the like guides B³ B^{3x} for the shuttle-box sleeves 18 18^x, the box-rods having springs B⁴ B^{4x}, with the exception that the said sleeves are constructed to have attached to them a double line of connections, as will be described, and the picker-stick B⁵, one at each end of the lay, but one such stick being, however, shown in the drawings, are and may be all as common in looms.

In accordance with our invention we have added to the usual parts of a loom of the character described means deriving movement from any suitable prime or shuttle-box lever—either a compound lever or a lever of the usual kind commonly employed in a shuttle-box mechanism of looms—whereby said lever when moved for different distances by usual lever-moving mechanism in accordance with the requirements of the pattern-surface to move any box of the series at one movement in the position opposite the race of the lay may, through a system of suitable flexible connections intermediate said sleeves and levers, move positively the shuttle-boxes at both ends of the lay both when raising and when lowering said boxes.

Both compound levers are alike, and the ends of the parts A³ A⁴ of said levers are employed to actuate flexible connections differing in length, as some of the connections are carried to one and others to the other end of the loom to actuate the shuttle-boxes at opposite ends of the lay.

Referring to Fig. 1, showing the rear side of the loom and where both compound levers are in line, the compound lever $A^3 a^3$ is visible, and it will be understood that the part A^3 of said lever is moved by the connectors A^7 , while the part a^3 is moved by the connector next to it, said connector being partially shown by breaking out the connector A^7 . The lever a^3 is pivoted on a stud a^x and is provided with a stud or fulcrum 4, on which is pivoted the member A^3 of the compound lever, said member being attached to the connector A^7 , all as provided for in United States Patent No. 134,992, so that one or both of said levers may be moved in the same direction or in opposition one to the other, that any of the four cells of the shuttle-box shown in Fig. 2 may be brought into operative relation to the race of the lay, according to the direction of movement of the respective parts of said compound lever.

The lower end of the parts $A^3 A^4$ of each compound lever have jointed to them, respectively, like links $6 6^x$, that are attached at their opposite ends to the upper ends of two like equalizing-levers $7 7^x$. These levers 7 and 7^x have at their lower ends studs $9 9^x$. The stud 9^x of the lever 7 has attached to it a flexible connection 30, composed of rods and chains, the chain parts being employed where the connections are sustained by and move over sheaves to be described. The connection 30 is shown as passed over a sheave 13, mounted on a stud 132, thence down and under a sheave 32, mounted on a stud of a stand 32^x , across the loom and over a sheave 31, sustained by a stand 31^x , thence led down and attached at its end to a stud 34 at the rear end of a side lever 14, pivoted at 15 at the right-hand end of the loom, the front end of said lever having jointed to it a link 16, attached, as shown, at its upper end to a stud 17, projecting from the upper end of the usual box-rod sleeve 18, the latter receiving the lower end of the box-rod b , surrounded by the usual give-away spring B^4 and connected with the drop shuttle-boxes (not shown) at the end of the loom opposite where is located the levers $A^3 A^4$. The lower end of the equalizing-lever 7^x has united to it a like flexible connection 10, that is passed over sheave 13^x (see Fig. 2) on the stud 132, that sustains the sheave 13, and the end of said connection is attached directly to the rear end of a side lever 14^x , pivoted at 15^x , the front end of said lever having a link 16^x , that embraces a stud 17^x , extended from the upper end of the box-rod sleeve 18^x , which is fitted to the usual stand B^{3x} . The side levers $14 14^x$ their pivots and links attached to the sleeves 18 or 18^x are just alike. The sleeve 18^x receives the rod b' , that carries the shuttle-boxes B' , (shown only in Fig. 2,) said rod in turn having the usual give-away spring B^{4x} .

The lower end of the lever A^3 also moves a flexible connection 20, that is passed around a sheave 21, (shown best in Fig. 1,) mounted on a stud 22, and thence around a sheave 23, mounted on a stud 24, and then around a sheave 25, (see Fig. 1), mounted on a stud 24^x , sustained by the loom-frame, and up over a sheave 26 on the lay, across the same, and over a sheave 27 at the opposite end of the lay, and thence downwardly, where the lower end of said flexible connection is attached to a projection a^6 (see Fig. 2^a) at the front side of the box-sleeve 18, said projection being the same as the projection a^{6x} . (See Fig. 2.) The lever A^4 also moves a second flexible connection 40, that is passed over a sheave 41 on the stud 22, thence down under a sheave 23^x on stud 24 (see Fig. 2) and under sheave 42 alongside of sheave 25 on stud 24^x , (see Fig. 1,) up over sheave 43, carried by the lay, and outwardly (see Fig. 1) over a sheave 44, said connection being then led down and attached to stud a^{6x} of the box-rod sleeve 18^x .

The side levers 14 and 14^x , attached to the box-rod sleeves, lower said sleeves and their box-rods, while the connections attached to the projections $a^6 a^{6x}$ of said sleeves raise them and their box-rods.

We are not aware that a box-rod sleeve receiving a box-rod provided with a give-away spring has ever had joined with it two connections one of which might be moved positively in a direction to raise the box-rod, while the other might be moved positively to lower said sleeve and its shuttle-box rod.

In the drawings the levers $A^3 a^3$ and $A^4 a^4$ are shown in line, and in such position it will be supposed that the shuttle-boxes at both ends of the lay are down, so that the upper cell of each shuttle-box occupies a position at the level of the race of the lay. Now as the lower end of lever A^3 is moved to the left from the position Fig. 1 into the position Fig. 3 the upper end of the opposing lever 7 will follow it and the connection 20, attached to the projection a^6 of the sleeve 18, that receives the box-rod b , carrying the shuttle-boxes at the right-hand end of the lay, said rod being shown at the left in Fig. 1, as that figure is a rear side view of the loom, and will raise said box-rod, and at the same time slack is afforded in the connection 30 to permit the rear end of lever 14 to descend and its front end to rise with said sleeve, so that link 16, attached to projection 17, rises with the sleeve and box-rod. When the lower end of lever A^3 is being moved from the full-line position Fig. 3 into the full-line position Fig. 1, the connection 30 causes the sleeve 18 and box-rod b to be depressed positively, and at the same time the connection 20 is moved in a direction to permit said sleeve 18 and box-rod b to descend. In a similar manner when the lever A^4 is moved from the position Figs. 130

1 and 3 into the position of lever A^3 , Fig. 3, the equalizing-lever 7^x in its movement will, through the flexible connection 40, attached to said lever at one end and to the projection a^{6x} of the sleeve 18^x , lift the shuttle-box rod b' and its shuttle-boxes B' , and at the same time the flexible connection 10, attached to the rear end of the side lever 14^x , will give up slack, so that the link 16^x , attached to the projection 17^x , will rise in unison with said sleeve. As the lever A^4 is returned from the position of the lever A^3 , Fig. 3, into the position Fig. 1 the equalizing-lever 7^x will draw the flexible connection 10 and through the lever 14^x and link 16^x will raise positively the sleeve 18^x , the shuttle-box rod b' and its shuttle-box, and at the same time the flexible connection 40 will be moved to let the end of said connection attached to the projection a^{6x} descend.

From the foregoing it will be understood that the boxes in being raised or lowered cannot travel in any increment of their motion any faster than the connection with the end of the said levers A^3 A^4 will permit and that there is a positive control of the motion of the boxes by means of the mechanism referred to.

To take up any slack in the flexible connections and so adjust the same as to accurately position the shuttle-boxes when a lever is moved, we have slotted the rear ends of the side levers, as at 60, Fig. 2, and have made the stud 61, with which the rod 10 is connected, adjustable in said slot and have applied to the screw-threaded ends of the rods forming part of the flexible connection that unites with the projections a^6 and a^{6x} , of the box-rod sleeves two nuts 62 63, that may be turned when necessary.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a loom, two box-rod sleeves, one at opposite sides of the loom, a shifting shuttle-box rod in each sleeve, a prime lever, means for moving the same, a connected equalizing-lever, and connecting means between said prime lever and one of said box-rod sleeves, and other connecting means between one end of said equalizing-lever and the other of said box-rod sleeves.

2. In a loom, two box-rod sleeves one at opposite sides of the loom, a shifting shuttle-box rod in each sleeve, a side lever and link at each end of the loom and joined to said sleeve, two prime levers at the same end of

the loom, an equalizing-lever, and means to connect said levers with said prime levers, connections between said prime levers and projections of said box-rod sleeves, and other connections between the free ends of said equalizing-levers and the ends of said side levers whereby said box-rod sleeves and their boxes may be raised and lowered positively. 65

3. In a loom, two box-rod sleeves one at opposite sides of the loom, a shifting shuttle-box rod in each sleeve, a side lever and link at each end of the loom and joined to said sleeve, two prime levers at the same end of the loom, an equalizing-lever, and means to connect said levers with said prime levers, connections between said prime levers and projections of said box-rod sleeves, other connections between the free ends of said equalizing-levers and the ends of said side levers whereby said box-rod sleeves and their boxes may be raised and lowered positively, and give-away springs on each box-rod. 70

4. In a loom, two box-rod sleeves one at opposite sides of the loom, a shifting shuttle-box rod in each sleeve, a side lever and link at each end of the loom and joined to said sleeves, two prime levers at the same end of the loom, two equalizing-levers, and means to connect said levers with said prime levers, connections between said prime levers and projections of said box-rod sleeves, other connections between the free ends of said equalizing-levers and the ends of said side levers, and sheaves carried by the loom-frame and the lay for sustaining said connectors, whereby said box-rod sleeves and their boxes may be raised and lowered positively. 75

5. In a loom, two prime levers, two equalizing-levers, connections between each of said equalizing-levers and said prime levers, shuttle-box rods, sleeves sustaining the same, side levers mounted at the ends of the loom, links uniting said side levers with said box-rod sleeves, and flexible connections interposed between the free ends of said equalizing-levers and the free ends of said side levers to positively lower the shuttle-boxes. 80 85 90 95 100 105

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

RANDOLPH CROMPTON.
JOHN R. FITTON.

Witnesses:

WILLIAM H. REDDING,
WILLIAM B. SCOFIELD.