

L. J. KNOWLES.  
SHUTTLE BOX MECHANISM FOR LOOMS.

No. 246,319.

Patented Aug. 30, 1881.

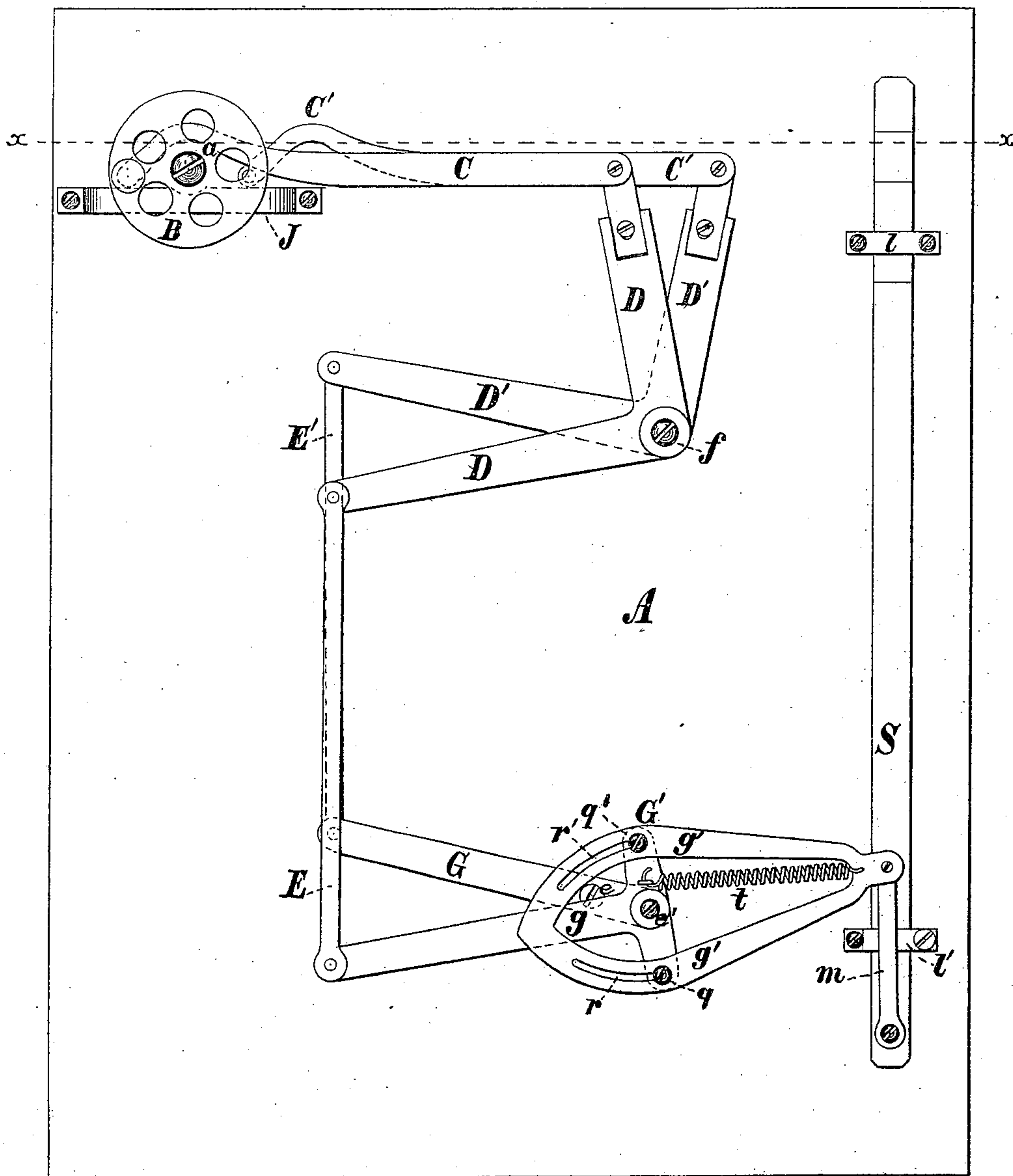


Fig. 1.

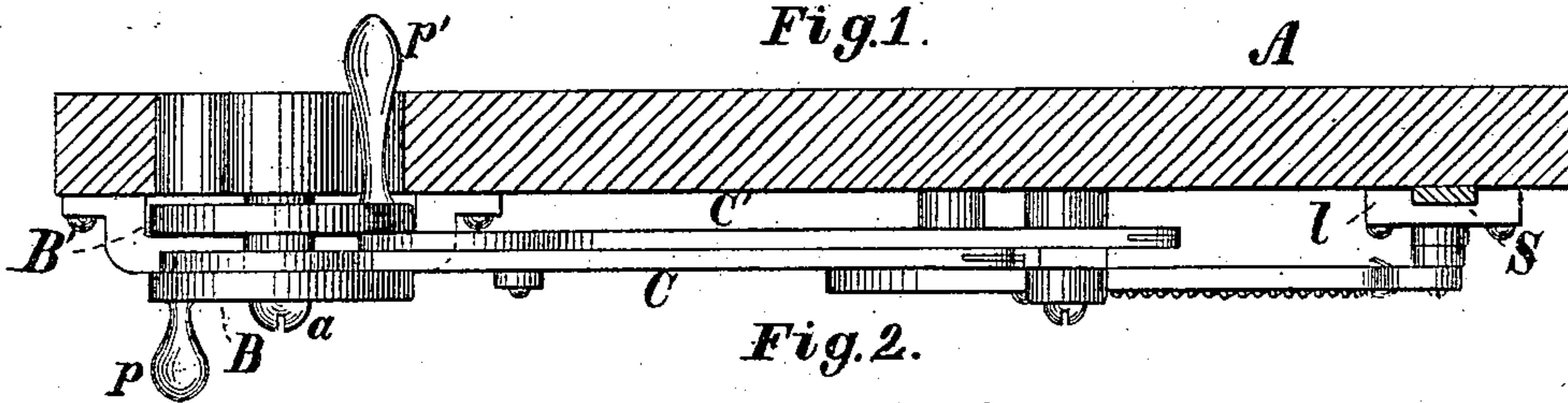


Fig. 2.

Witnesses.

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# UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS.

## SHUTTLE-BOX MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 246,319, dated August 30, 1881.

Application filed October 31, 1879.

*To all whom it may concern:*

Be it known that I, LUCIUS J. KNOWLES, of Worcester, in the State of Massachusetts, have invented a new and useful Improvement in Shuttle-Box Mechanism for Looms, of which the following is a specification.

The present invention consists in a peculiar construction of a compound lever used as a part of mechanism controlling the movements of the shuttle-boxes positively in both directions.

I have applied the invention to a modification of the drop-shuttle-box mechanism described in the patent to me bearing date January 21, 1873, and numbered 134,992, by which a positive motion is given to the tier of shuttle-boxes in either direction; but the invention is applicable to any positive drop-shuttle-box mechanism of which a compound lever may form a part.

I can best describe the invention by representing the manner in which I have used it in my own looms. It is, however, unnecessary for me to here describe the general features of my looms, since they are well known to those skilled in the art. Yet it will be well to say that I make use of a pattern-barrel, two vibrating gears, and two cylinder-gears, as described in my said Patent No. 134,992.

In the drawings I have, for convenience, represented the vibrating gears as two wheels, having each an independent movement, although upon a common shaft, of about half a revolution. These wheels and the mechanism operated by them which embodies my present invention are shown as mounted upon a panel in place of the loom-frame.

Figure 1 is a side elevation of such a panel and the mechanism attached to it. Fig. 2 is a cross-section on line *xx* of Fig. 1.

The panel is marked A, and will hereinafter be referred to as the loom-frame.

B B' are the two wheels, taking the place of vibrating gears, which in the loom as actually constructed correspond to the vibrating gears H of my said Patent No. 134,992, and are operated by the means there shown and in the manner there described. As here shown, however, the two wheels B B' turn upon a common axis, *a*, it being unnecessary, for the purpose of illustrating this invention, that their axes should be independent of each other and

have shifting positions under the control of the pattern-barrel. The two wheels will hereinafter in this specification bear the name of the gears whose office they fill—viz., vibrating gears. They are here represented as turned by crank-pins *p p'*; but in actual construction the vibrating gears are operated by the cylinder-gears, as described in my said Patent No. 134,992.

C C' are two connecting-rods, or, as they are termed by persons using my looms, the "connectors." They are attached at one end to the crank-pins *p p'* in the vibrating gears B B', and near these ends they are bent, that they may not interfere with the half-revolutions of the vibrating gears. The other ends of the two connectors are pivoted respectively to two bell-crank levers, D D', which have a common fulcrum, *f*, and whose corresponding arms are of the same length, as shown.

J is a bracket, serving as a stop to limit the vibrations of the vibrating gears to about half-revolutions.

G is the short arm of a compound lever, pivoted to the frame at *e*; and G', the long arm, pivoted to the short arm at *e'*. They are respectively connected, by connecting-rods E E', with the bell-crank levers D D', and the arm G' at its free end is connected by a connecting-rod, *m*, with the shuttle-box rod S, which is represented as carrying a tier of four shuttle-boxes and as having its path determined by two brackets, *l l'*, the upper surface of the bracket *l* being supposed to be at the level of the race. The arm G' is formed in two sections, as shown—one a T-shaped piece, *g*, having near the extremity of each short arm of the T a pin, *q* or *q'*, as shown, the other a somewhat oval-shaped frame, *g'*, having two circular slots, *r r'*, through each of which passes one of the pins *q q'*. A spiral spring, *t*, draws the part *g'* back upon the part *g*, so that the normal positions of the two pins *q q'* are at the forward end of their respective slots *r r'*, which form each an arc of a circle having the opposite pin as a center. The part *g'* of the arm G', to which the connecting-rod *m* is attached, is thus doubly hinged to the part *g*, and can turn in either direction, in one case turning on pin *q* and in the other on pin *q'*. The spiral spring *t* is strong enough to make the two parts *g g'* of the arm G' act as if they were one continuous piece when the appara-

tus runs smoothly and performs its usual work; but it is so weak that if the shuttle-box rod sticks or stops for any cause in its movement, either upward or downward, the  
5 arm G' readily cripples or turns on one of the pins *q q'*, as the case may be, and the other operative parts of the loom are not interfered with.

I claim—

10 In shuttle-box mechanism for looms, the

combination of a compound lever and suitable mechanism for operating the same with a tier of drop shuttle-boxes, the free arm of said compound lever being jointed, provided with a spring, and positively connected with a tier  
15 of shuttle-boxes, substantially as described.

LUCIUS J. KNOWLES.

Witnesses:

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