(No Model.)

G. W. STAFFORD.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 455,772. Patented July 14, 1891.

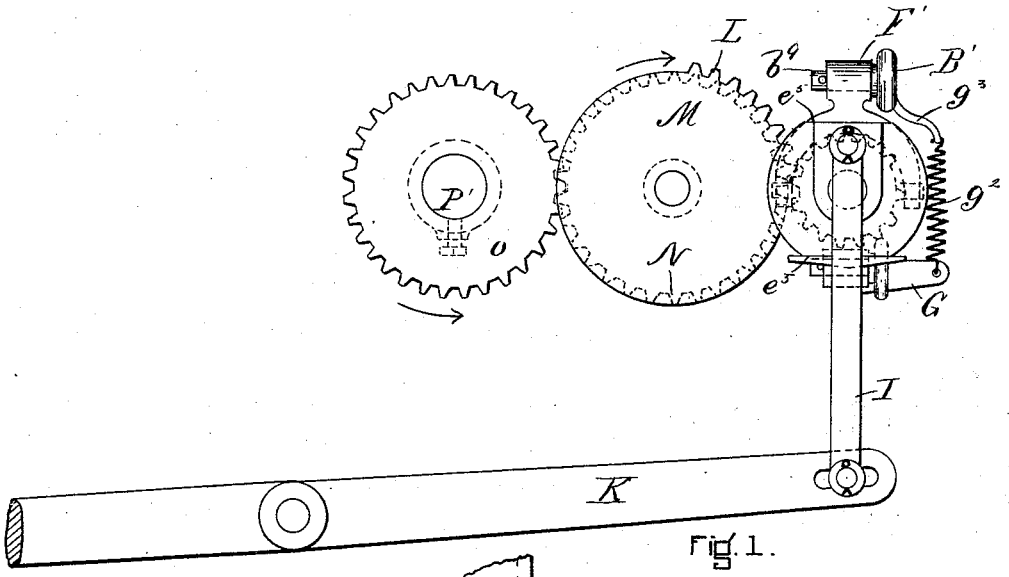

Fig. 1.

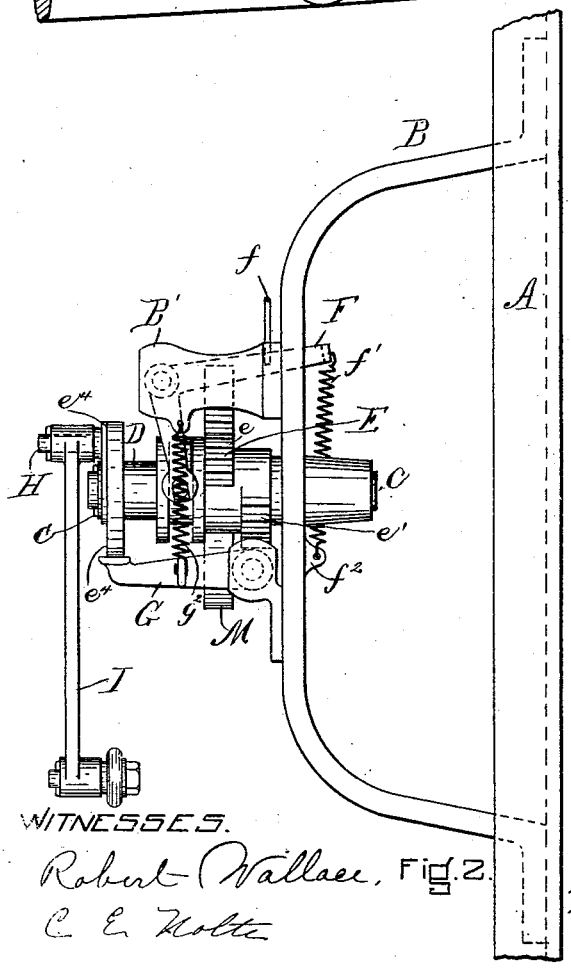

Fig. 2.

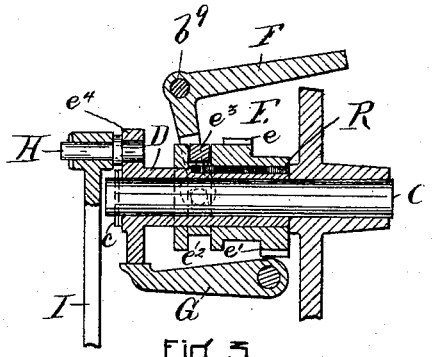

Fig. 3

WITNESSES.

Robert Wallace.

C. E. Mott

INVENTOR.

George W. Stafford.

by Macleod, Calver & Randall

his attys

UNITED STATES PATENT OFFICE.

GEORGE W. STAFFORD, OF PROVIDENCE, RHODE ISLAND.

SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 455,772, dated July 14, 1891.

Application filed April 27, 1891. Serial No. 390,557. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. STAFFORD, of Providence, in the county of Providence and State of Rhode Island, have invented an Improvement in Shuttle-Box-Operating Mechanisms for Looms, of which the following is a specification.

My invention relates to that class of box-motions for looms in which the shuttle-boxes are in operative connection with a crank or eccentric which has imparted to it at predetermined times a movement of semi-rotation for the purpose of moving the shuttle-boxes in one direction or the other and changing the cell thereof, which is presented in line with the shuttle-race of the lay. One type of box-motions pertaining to this general class has in operative connection with the crank or eccentric a toothed gear or pinion, which at certain times—that is, when it is desired to impart a movement of semi-rotation to the crank or eccentric—is caused to become engaged by a moving toothed surface, and thereby is rotated to the necessary extent.

My invention pertains more particularly to this type; and it consists in an improved construction and arrangement of parts, which first will be described with reference to the accompanying drawings, and then will be particularly pointed out in the claim at the close of this specification.

The object of my invention is to secure a box-motion having the characteristics of compactness, simplicity, rigidity, and durability.

In the drawings, Figure 1 is a view in side elevation of sufficient of a box-motion for looms to illustrate my invention. Fig. 2 is a view in rear elevation of the same, including a portion of the loom-frame and a supporting-bracket, which are not shown in Fig. 1, and omitting part of the operating-gearing shown in Fig. 1. Fig. 3 is a view in longitudinal central section of a portion of the devices shown in Fig. 2.

A is a portion of the frame of a loom, and B is a bracket of convenient shape, &c., in which is fixed rigidly the stud C, on which is mounted to rotate the sleeve D, the said sleeve being held on the stud by a pin *c*, passing through the end of the stud, as shown. A disk e^4 on the outer end of the sleeve carries a crank-pin H, which is in operative connection with the box connector or connections. In the drawings I show a rod I, which at one end is fitted to the crank-pin and at the other is pivotally connected with the rear end of the box-lever K.

On the sleeve D is mounted a gear E, the said gear being free to move endwise along the sleeve, but being caused to rotate in unison therewith by a spline R, or its equivalent, the gear being grooved circumferentially at e^2 for the reception of a yoke e^3, which is pivotally connected with the forked vertical arm of a bell-crank shifting-lever F, which is pivoted on a stud b^9, carried by an arm B′ on the bracket B, the said shifting-lever being in practice actuated from pattern devices of any suitable known kind through a connection *f*, and having connected therewith one end of a spring *f*′, the other end of which is connected with the lug f^2 on the bracket B.

Gear E has teeth disposed in two segmental series *e e*′, which are located on opposite sides diametrically of the gear and out of line latreally with relation to each other—that is, in different parallel planes. These series of teeth are intended to become engaged, respectively, with a moving series of teeth L, in order that through such engagement a movement of partial rotation may be given to the sleeve D and its connected crank, and that the shuttle-boxes thereby may be shifted up or down. Herein I have represented the moving series of teeth L as arranged in the form of a segment upon the disk M, which is connected with the toothed wheel N, the teeth of which are in mesh with those of the toothed wheel O, mounted on the cam-shaft P′ of a loom.

G is a pivoted arm having a broadened end, the flat side of which is drawn by a spring g^2, which at one end is engaged with a lug on the arm G, and at the other is engaged with lug g^3 on arm B′ against the periphery of the disk e^4 on sleeve D, so as by contact with the opposite flattened faces e^5 e^5 of the said disk to check the sleeve from overrunning or from being accidentally shaken or dislodged from proper position. In the drawings the gear E is shown as having been moved to the right in consequence of lever F having had the horizontal arm thereof drawn upward, as by the presence of a ball or pin on the pattern-chain, and segment *e* is in line with the moving se-

ries of teeth L and about to be engaged thereby. The continued movement of the series of teeth L in the direction of the arrow in Fig. 1 will cause the gear to make a semi-rotation, at the end of which the crank-pin H will have been shifted to a position which is the opposite of that which is now represented, and the segment *e* will be placed out of the reach of the moving series of teeth L. Segment *e'* will now be uppermost, and so long as balls or pins appear on the successive links of the pattern-chain to hold the lever F raised the gear E will remain in its new position. When, however, a space on the chain unoccupied by a ball or pin presents itself under the pattern-lever with which connection *f* is connected, then spring *f''* will become operative to move lever F and thereby shift gear E along sleeve D to the left, and segment *e'* will be placed in position to be engaged by the moving series of teeth L, whereupon the sleeve will be given another movement of partial rotation.

In lieu of the crank shown in the drawings, the sleeve may have applied thereto an eccentric.

I am aware that heretofore it has been proposed to employ in box-motions for looms sliding or shifting gears of the character of the sliding gear herein shown and described, and I do not herein lay broad claim to such gear or to its combination with a crank or eccentric for working the shuttle-boxes of looms. Mounting the shifting-gear upon a sleeve which surrounds a pin fixed to a part of the loom-framing, as shown in the accompanying drawings, results in a rigid and durable, simple and compact box-motion.

When desired, more than one group of the devices shown in Fig. 3 may be employed in the box-operating mechanism of a loom.

I claim as my invention—

The combination, with the box-connector and a fixed supporting-stud, of a sleeve mounted to rotate on said stud and carrying a crank operatively connected with the said connector, a double segmental gear mounted on the exterior of the said sleeve with capacity to move longitudinally thereof, but connected with the sleeve so as to be compelled to rotate in unison therewith, and having the teeth of the segments out of line with each other laterally, and a moving series of teeth co-operating with the said pinion, substantially as described.

GEO. W. STAFFORD.

Witnesses:
CHAS. F. RANDALL,
C. E. WALTE.