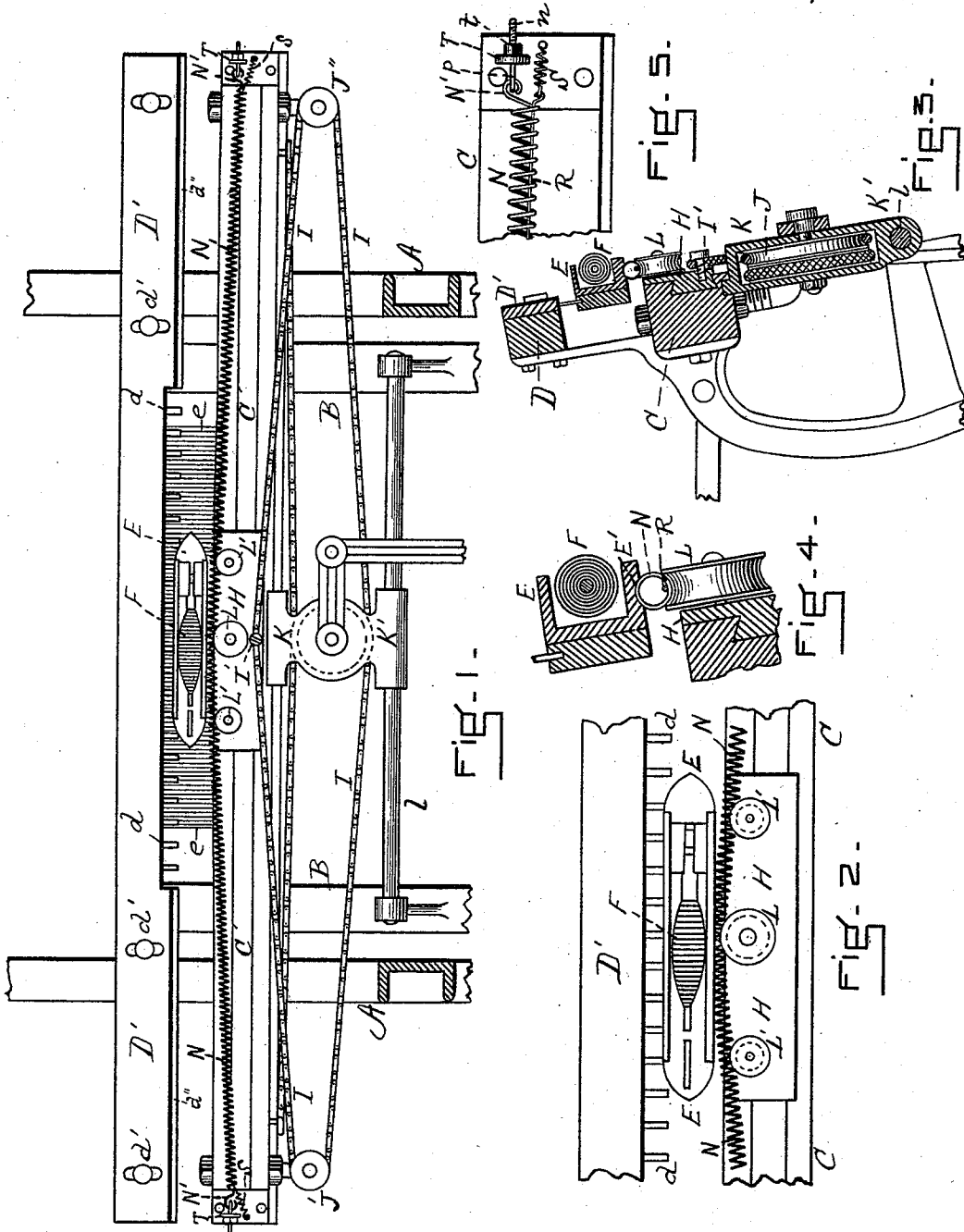


(No Model.)

E. H. GRAHAM.
POSITIVE SHUTTLE MOTION FOR LOOMS.

No. 527,783.

Patented Oct. 23, 1894.



WITNESSES
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POSITIVE SHUTTLE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 527,783, dated October 23, 1894.

Application filed April 21, 1894. Serial No. 503,453. (No model.)

To all whom it may concern:

Be it known that I, EDMUND H. GRAHAM, a citizen of the United States, residing at Biddeford, in the county of York and State of Maine, have invented a new and useful Improvement in Positive Shuttle-Motions for Looms, of which the following is a specification.

This invention is intended to be an improvement in positive shuttle-motions for looms of the general style illustrated and described in the Letters Patent of the United States No. 474,555, granted May 10, 1892, and No. 503,956, granted August 29, 1893, and is particularly an improvement upon the invention which is a subject of the latter named patent.

The principal object of my present improvement is to render the warp-threads less liable to break, such breakage being found, in practice, to sometimes occur by reason of the friction produced by the contact of the threads with the rack *g* illustrated in Letters Patent No. 503,956 above referred to.

In my improvement a spiral spring is employed extending substantially from one end of the lay to the other and over the traveler, such spring being held by the traveler up into a recess in the under side of the shuttle, and conforming to the shape of such recess, allowing the shuttle to be propelled by the traveler. The warp threads pass between the coils of the spring, with the effect that the friction, and hence the breakage of the threads, is reduced to a minimum.

In the accompanying drawings, in which similar letters of reference indicate corresponding parts,—Figure 1 is a front elevation of a sufficient portion of a loom to illustrate my invention, portions of the frame being shown in vertical section. Fig. 2 is an enlarged detail in front elevation, showing the shuttle, carrier, &c. Fig. 3 is an enlarged sectional view, taken vertically and centrally with the parts in the position shown in Fig. 1. Fig. 4 is an enlarged detail in cross vertical section taken on the line of the section shown in Fig. 3. Fig. 5 is an elevation and detail of one end of the lay and spring.

A represents portions of the frame of the

loom, B the lay-swords, and C the lay proper or lower rail of the lay.

D is the upper rail.

e is the reed.

E is the shuttle which runs between the two rails and is guided at its top by a row of pins *d* which project downward from the under side of a guide bar D' adjustably secured at *d'* to the upper rail.

d'' are tongues secured to the lower edge of the guide bar in line with the pins, both pins and tongues entering a groove in the upper side of the shuttle as it moves along.

F is the cop.

H is the traveler sliding in the lower rail, and provided with the screw I' by means of which the rope I is secured to said traveler, said rope imparting motion to the traveler through connection with a pulley J in the block K and with the pulleys J' J'' supported by the lay.

By means of the perforated lower extension K', the block slides horizontally on the rod *l* supported by the lay-swords.

The arrangement of the rope, and the arrangement and construction of all the parts above named are fully set-forth and described in the specification of Letters Patent No. 503,956 above referred to, and hence need no further detailed description here, except as they are affected by the nature and application of my improvement, which I will now proceed to describe. The rack *g* in said Letters Patent is omitted in my improvement, and no pinion is provided for the shuttle to be engaged with the rack.

The under side of the shuttle E is provided centrally with a recess E' (Fig. 4), and the traveler H is provided with say three guide rolls L L'. The axes of these rolls are on the same level, but the central roll L is of greater diameter than the end rolls L', for a reason below mentioned.

N is a long spiral spring which is stretched from one end of the lay to the other and has its ends secured by means of hooks N' and P to the opposite ends of said lay. This spring is stretched until it is quite taut and extends over the rolls L L', as shown. The

greater diameter of the roll L, which is secured centrally to the traveler, forces the spring up at that point in the recess E' formed in the under side of the shuttle. The result is that the effect of the traveler upon the shuttle is to impart motion to it and carry it in spite of or through the intervening spring which conforms to the shape of the recess above it and roll below it, so that the roll has practically the same effect upon the shuttle as it would have if it entered directly into the recess.

In order to impart a little additional support or rigidity to the spiral spring N and prevent it from sagging, a plain wire R (Figs. 3, 4 and 5,) is stretched through said spiral spring and has its ends secured by short spiral springs S to the opposite ends of the lay as shown.

In order that the tension of the spring N may be regulated and adjusted, the hooks P are screw-threaded at *n* and are adjustably held in eyes T by means of nuts *t*, said eyes being secured to the opposite ends of the lay.

The substitution of the spiral spring for the rack and pinion does away practically with the danger of breaking the threads, as the threads can pass safely and with little friction between the coils or folds of the spring, and rest on the wire R.

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

1. In a positive shuttle-motion for looms, the combination with the lay, the shuttle and traveler and means for reciprocating said traveler, of a spiral spring stretched substantially horizontal from end to end of and secured to the lay and interposed between said

shuttle and traveler, said traveler thereby imparting motion to the shuttle through said spiral spring, substantially as set forth.

2. In a positive shuttle motion for looms, the combination of the lay, the shuttle provided with a recess on its under side, the traveler provided with a roll corresponding with said recess, means for reciprocating said traveler, and a spiral spring stretched substantially horizontal from end to end of and secured to the lay and interposed between said shuttle and traveler and adapted to be pressed into said recess by said roll, substantially as described.

3. In a positive shuttle-motion for looms, the combination of the lay the shuttle E provided with the recess E', the traveler H provided with the rolls L L' L', the central roll L extending higher than the end rolls L', means for reciprocating said traveler and the spiral spring N stretched from end to end of and secured to said lay and interposed between said shuttle and traveler and being pressed into said recess by said central roll, substantially as set forth.

4. In a positive shuttle-motion for looms, the combination with the lay, the shuttle and traveler and means for reciprocating said traveler, of a spiral spring stretched from end to end of and secured to said lay and interposed between the shuttle and traveler, and a plain wire passed through the spiral spring for preventing its sagging, substantially as described.

EDMUND H. GRAHAM.

Witnesses:

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