(No Model.) 2 Sheets—Sheet 1.

E. H. GRAHAM.

POSITIVE SHUTTLE MOTION FOR LOOMS.

No. 466,851. Patented Jan. 12, 1892.

Fig. 1.

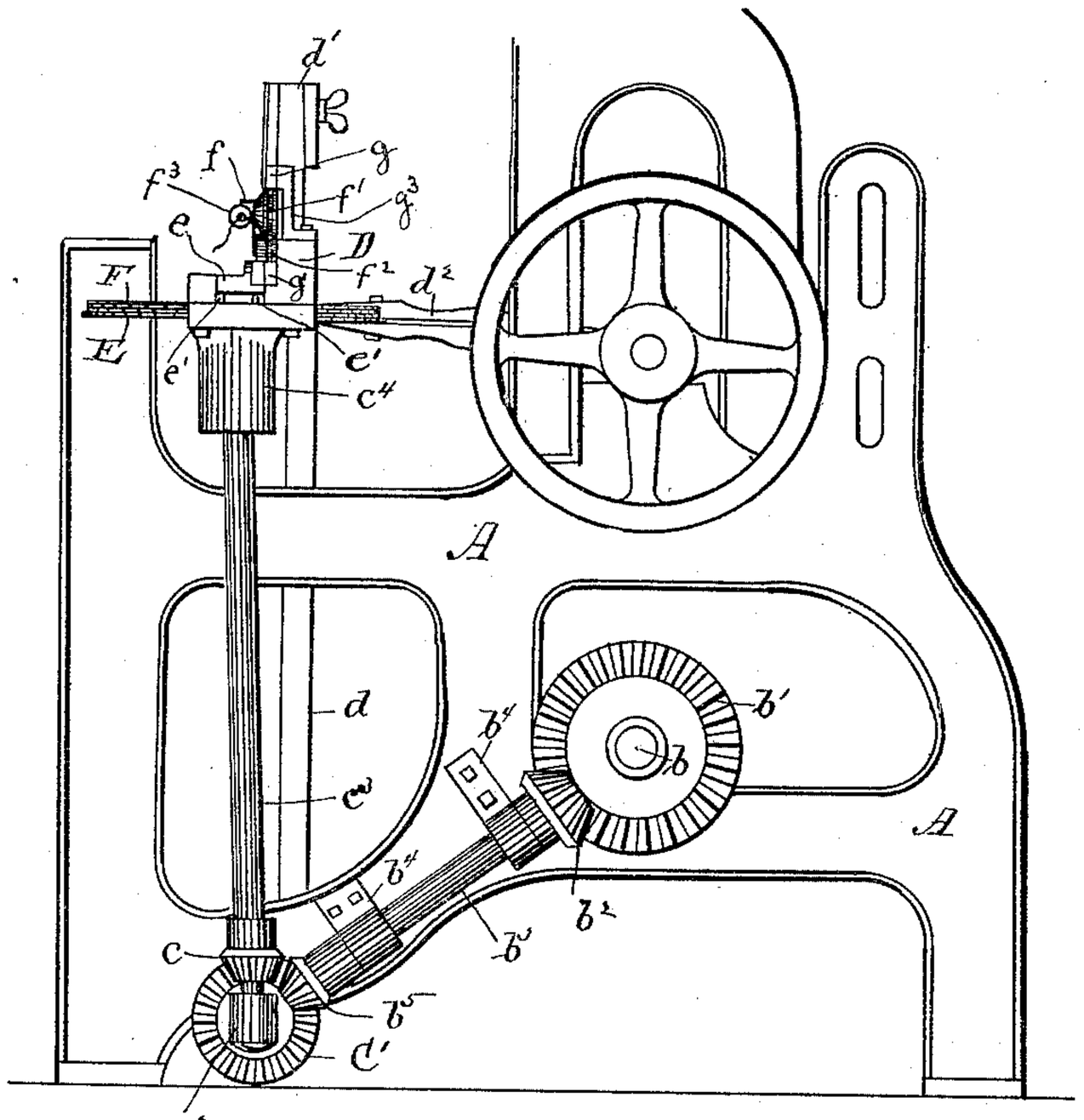


Fig. 2.

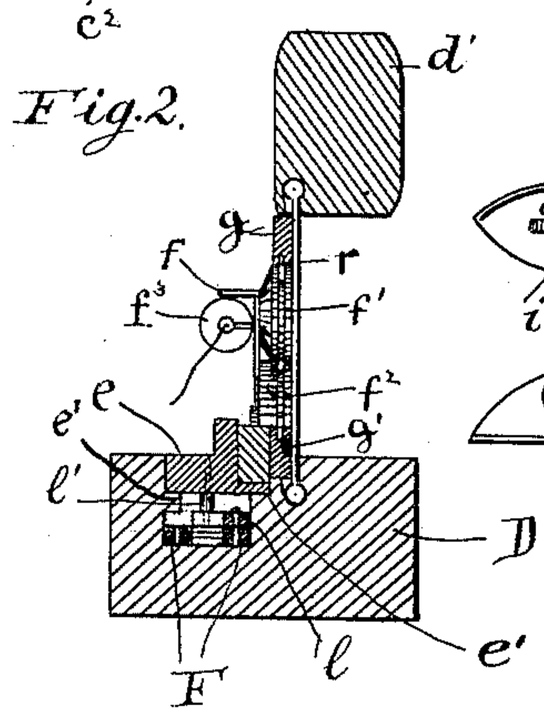
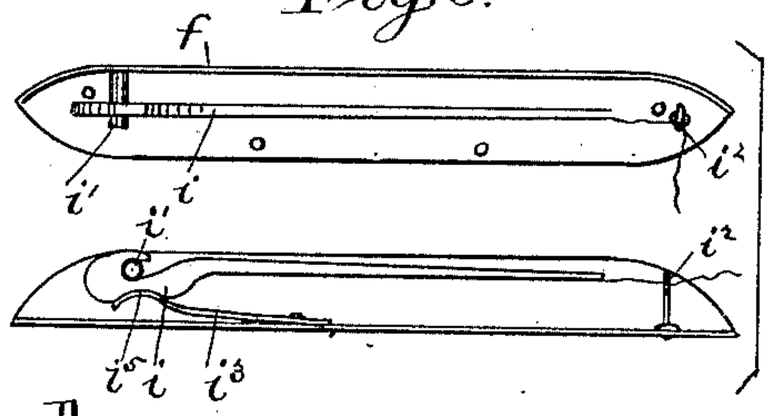


Fig. 3.



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J. B. D. Ay

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

E. H. GRAHAM.

POSITIVE SHUTTLE MOTION FOR LOOMS.

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Fig. 4.

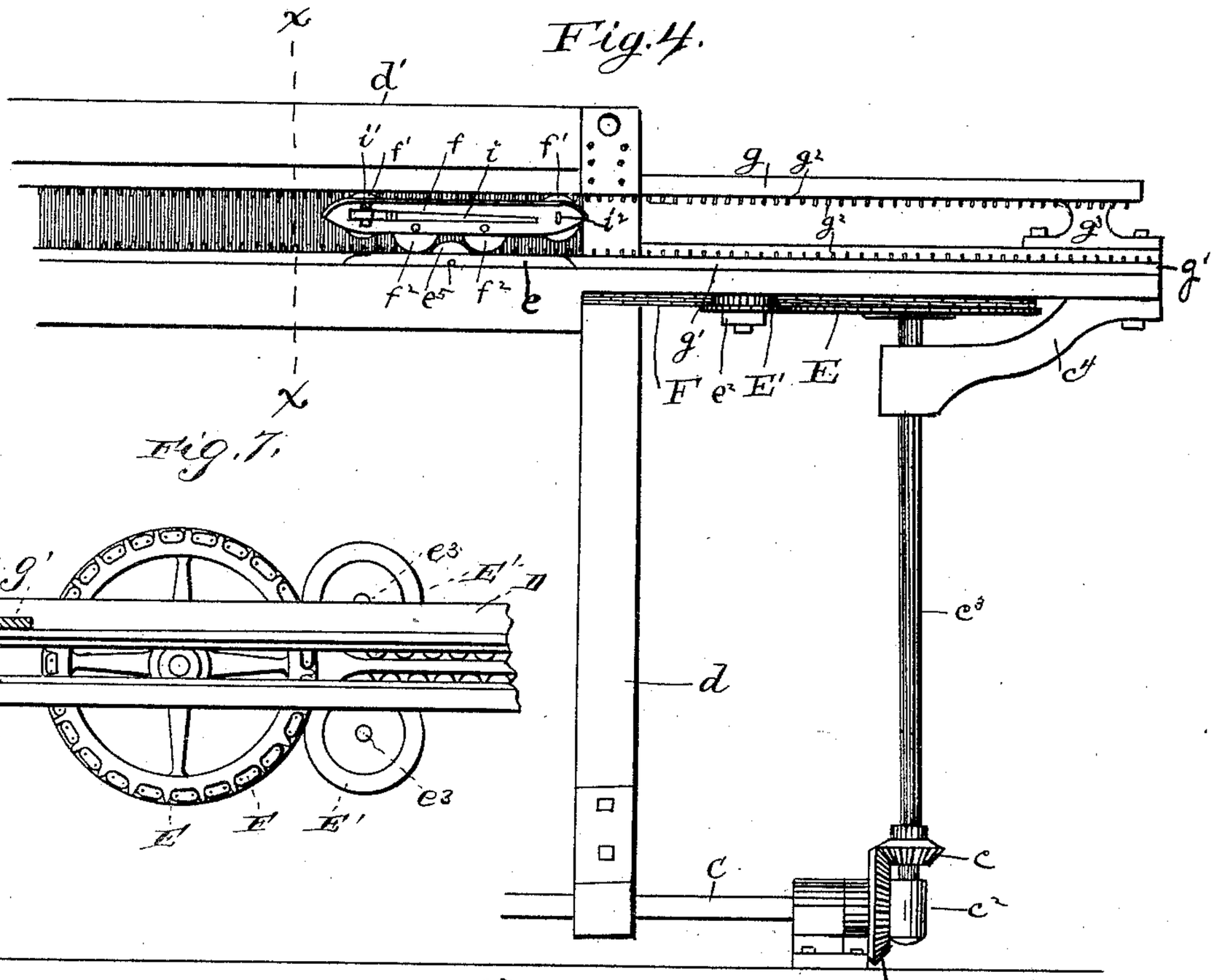


Fig. 7.

Fig. 5.

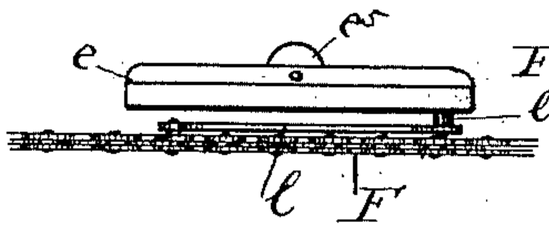
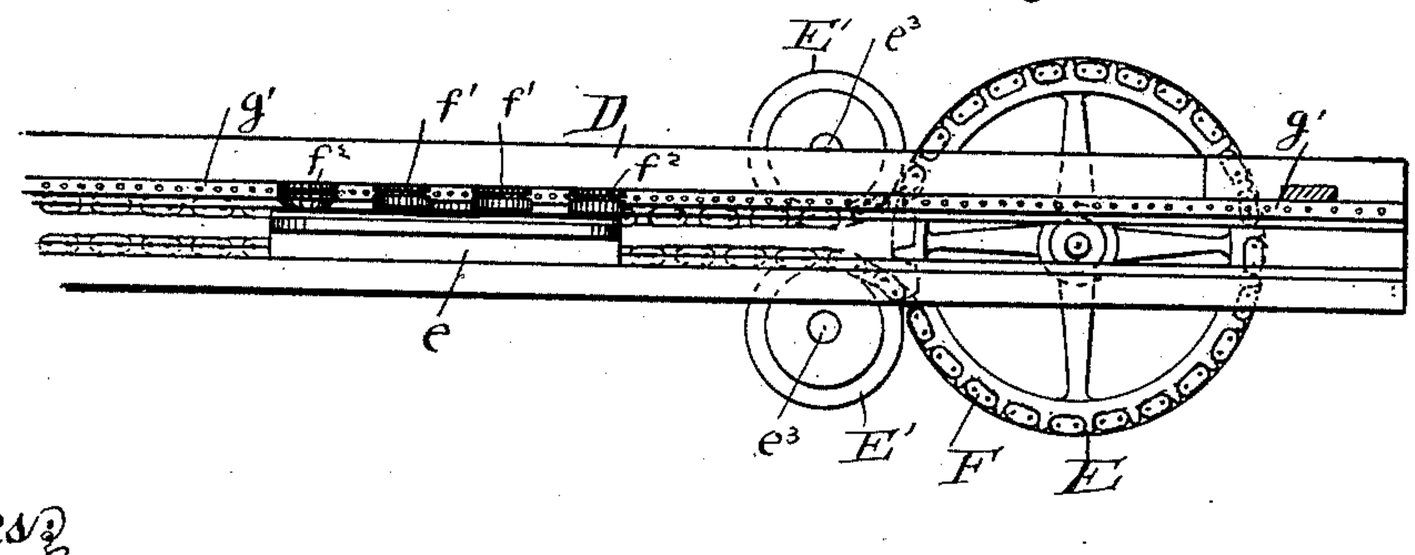


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDMUND H. GRAHAM, OF BIDDEFORD, MAINE, ASSIGNOR OF ONE-HALF TO LEVI WOODBURY, OF WASHINGTON, DISTRICT OF COLUMBIA.

POSITIVE SHUTTLE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 466,851, dated January 12, 1892.

Application filed September 10, 1890. Serial No. 364,507. (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 certain new and useful Improvements in Positive Shuttle-Motions for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of looms having a positive shuttle-motion or a shuttle fed by positive mechanism as distinguished from looms wherein the shuttle is shot from side to side.

The object of my present invention is to improve the construction of that class of positive shuttle-motion looms wherein the shuttle-driver is moved by an endless chain, to which it is connected by a link. In these looms as hitherto constructed the sprocket-wheels at the ends of the lay were of small diameter and the channel in which the chain ran was the same width as the sprocket-wheel, thereby making the upper part of the lay wide and heavy. In my loom I narrow up the channel in which the chain runs, increasing the diameter of the sprocket-wheels, and I confine the chain within its channel by means of guide-wheels.

A further object of my invention is to provide guides on which the shuttle can run which shall be independent of the reed and which shall yet allow the threads of the warp to pass through. This I accomplish by securing two rails to the lay directly in front of the reed, one above and one below, and having pins projected from the edges of the said rails on which the grooved wheels of the shuttle may run, but which will allow the warp-threads to pass.

I have illustrated in the accompanying drawings a loom having my shuttle-motion in the form which I prefer to use, although I do not wish to limit myself to the exact details herein shown.

In the drawings, Figure 1 represents the end view of a loom or so much thereof as is necessary to understand my invention. Fig. 2 is a transverse section of a part of the loom on the line $x\,x$ of Fig. 4. Fig. 3 shows two views of the shuttle proper with rolls omitted. Fig. 4 is a front view of one end of the lay. Fig. 5 is an elevation of the traveler, showing method of attaching it to the chain. Fig. 6 is a plan or top view of top of a portion of the lay with the hand-rail removed. Fig. 7 represents the opposite end of the lay from that shown in Fig. 6, the parts being duplicated.

A is the frame of the loom; b, the cam-shaft; C, the lay rocker-shaft; D, the lay; d, the lay-sword; r, the reed, and d' the hand-rail. These parts are all well-known parts of the loom and need no further description.

In the top of the lay is a longitudinal groove extending the entire length of the lay, which is elongated at each end to support shuttle-operating mechanism hereinafter to be described. A traveler or slide e is adapted to run in this groove on guide e'. The traveler is reciprocated by means of an endless band or sprocket-chain F, which extends through the groove in the lay below the guide e'. The chain F passes around sprocket-wheels E, one of which is located at each end of the lay. In the drawings I have shown but one end of the lay; but the opposite end is a duplicate of the end shown. Two guide-wheels E′ are provided, one on each side of the chain near the sprocket-wheel, by which the chain is confined within the narrow limits of the groove. These wheels are pivoted to studs on cross-pieces e^2, which are bolted to the under side of the lay. The traveler is connected with the chain by means of a link l, (see Fig. 5,) which is pivoted to a stud in one of the links and to a stud l', projecting from the under side of the traveler.

Motion is imparted to the shuttle f by means of an anti-friction wheel or truck e^5, which is pivoted to the traveler. The shuttle f is mounted on grooved rolls f' f' f^2 f^2, the first two above and the others below. The upper rolls f' run on the guide-pins g^2 of the guide-rail g, which pins g^2 fit the grooves of the rolls, and the lower rolls f^2 run on a similar line of pins fixed in the guide-rail g'. The roll e^5, which is pivoted to the traveler, plays between the rolls f^2 of the shuttle and serves to impart the motion of the traveler to the

shuttle. The cop is held on a spindle i, removably attached to the shuttle. The spindle is formed with a hook-shaped end, which is hooked over the pin i', secured to the shuttle-body for this purpose. (See Fig. 3.) The spindle is held in place by means of a spring i^3, attached to the shuttle-body and having a curved portion i^5, which fits a depression in the hook-shaped end of the spindle directly opposite the pin i'. The shuttle is threaded by passing the yarn through the eye i^2.

The sprocket-wheel E is supported on the upper end of a shaft c^3, which is rotated continuously by mechanism which I will now describe. The shaft c^3 is journaled in a bearing c^4, attached to the under side of the lay, and its lower end is stepped in a bearing c^2, secured to the end of the rocker-shaft C, which is extended for that purpose. On the lower end of the shaft c^3 is a pinion c, which engages a connecting-gear C', which turns loosely on the rocker-shaft. A pinion b^5 also engages the gear C', this pinion being fixed on the lower end of a shaft b^3, the upper end of which has a pinion b^2, which engages a gear b', placed on the end of the cam-shaft. The shaft b^3 is journaled in bearings b^4 b^4, bolted to loom-frame. It will thus be seen that the motion of the cam-shaft is transmitted through a train of gearing to the sprocket-wheel E and a continuous motion imparted to the sprocket-chain. The relative size of the gear b' will determine the speed of the sprocket wheel and chain, and consequently of the shuttle.

The operation of my shuttle-motion is evident from its construction. As already shown, a continuous rotary motion is imparted to the sprocket-chain by which the traveler is moved from end to end of the lay. When it reaches the end, the link travels around the sprocket-wheel, leaving the traveler stationary, after which the motion is reversed. It will thus be seen that by reason of the continuous motion of operative parts of the device the shuttle may be moved with great rapidity without producing that jar which is occasioned by suddenly reversing the motion of heavy bodies. The traveler and the shuttle are the only parts which are reciprocated, and hence the shock of reversing will be very slight. The threads of the warp as the shuttle traverses the lay will easily pass between the rolls e^5 and f^2, the pins g^2 allowing them to lie close to the rail and out of reach of the grooves of the rolls.

While guides for the grooved rolls composed of pins allow the warp to lie flat on the rail, I do not wish to limit myself to the use of pins for this purpose, as other forms of guides may be used with good results, dispensing with the pins.

I claim—

1. In a positive shuttle-motion for looms, a reciprocating shuttle, grooved rolls between which said shuttle is mounted, and guide-rails on which said rolls run, provided each with a row of pins adapted to enter the grooves of said rolls, in combination, substantially as shown.

2. In a positive shuttle-motion for looms, a reciprocating traveler, a reciprocating shuttle, grooved rolls on which said shuttle is mounted, guide-rails on which said grooved rolls run, said guide-rails having a row of pins adapted to fit the grooves of said rolls, and an anti-friction roll pivoted to said traveler and adapted to play between two of said grooved rolls and to impart the motion of said traveler to said shuttle, in combination, substantially as shown.

3. In a positive shuttle-motion for looms, the combination of a lay, two guide-rails attached to the said lay, between which guide-rails the warp passes, and a reciprocating shuttle mounted on rolls adapted to run between and be guided by said guide-rails, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND H. GRAHAM.

Witnesses:

C. H. LEAVITT,

S. W. BATES.