(No Model.) 2 Sheets—Sheet 1.

W. TUCKER.

SHUTTLE MOTION FOR LOOMS.

No. 397,823. Patented Feb. 12, 1889.

Fig. 1.

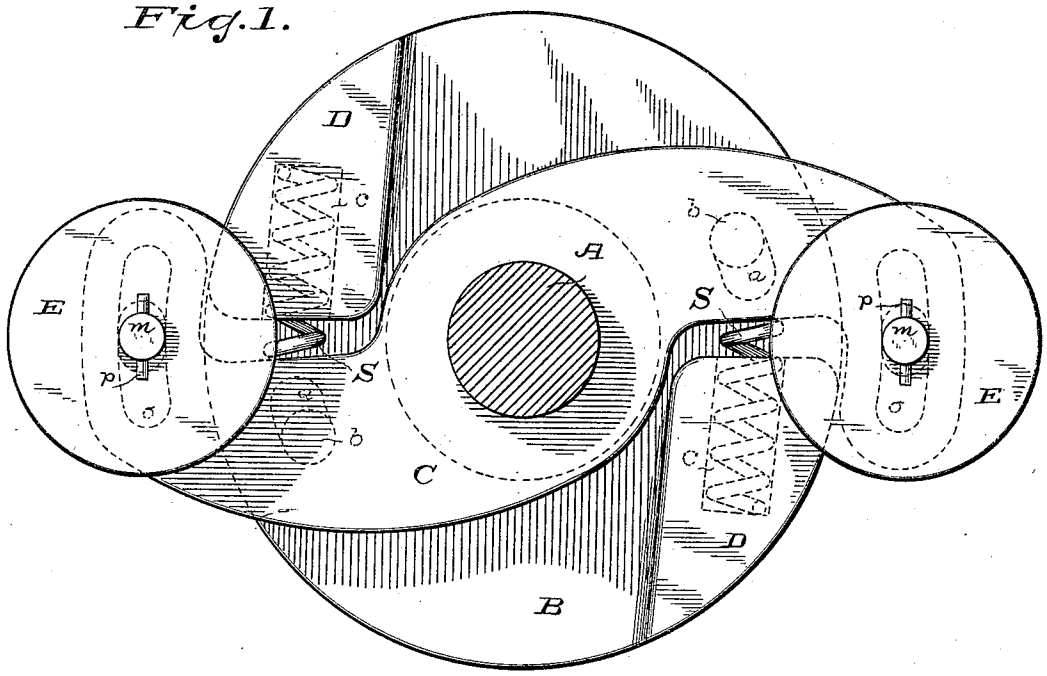
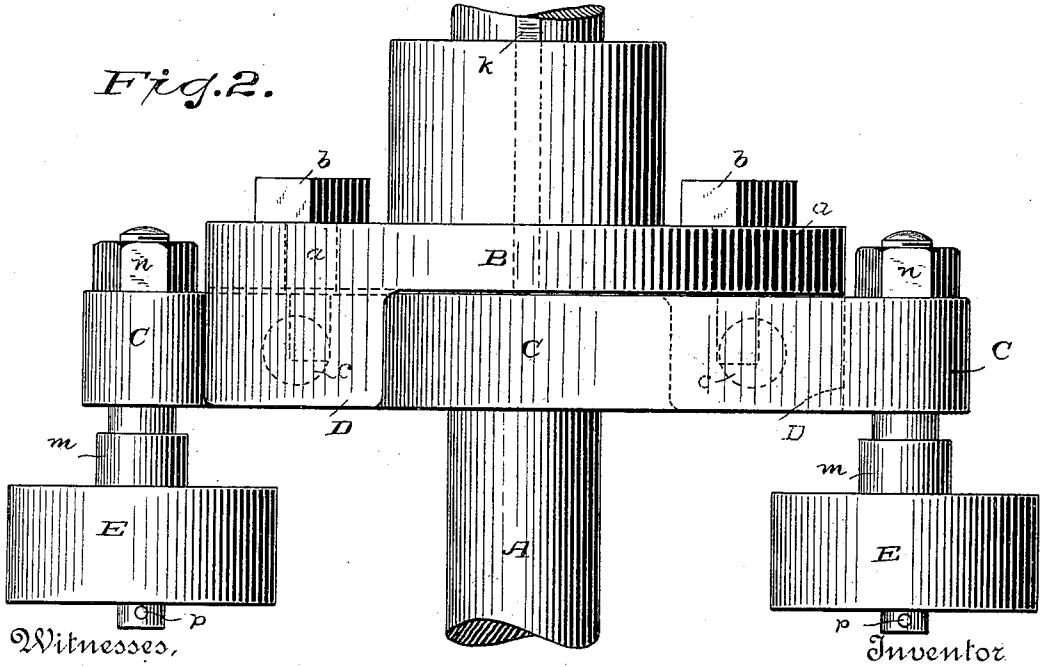


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

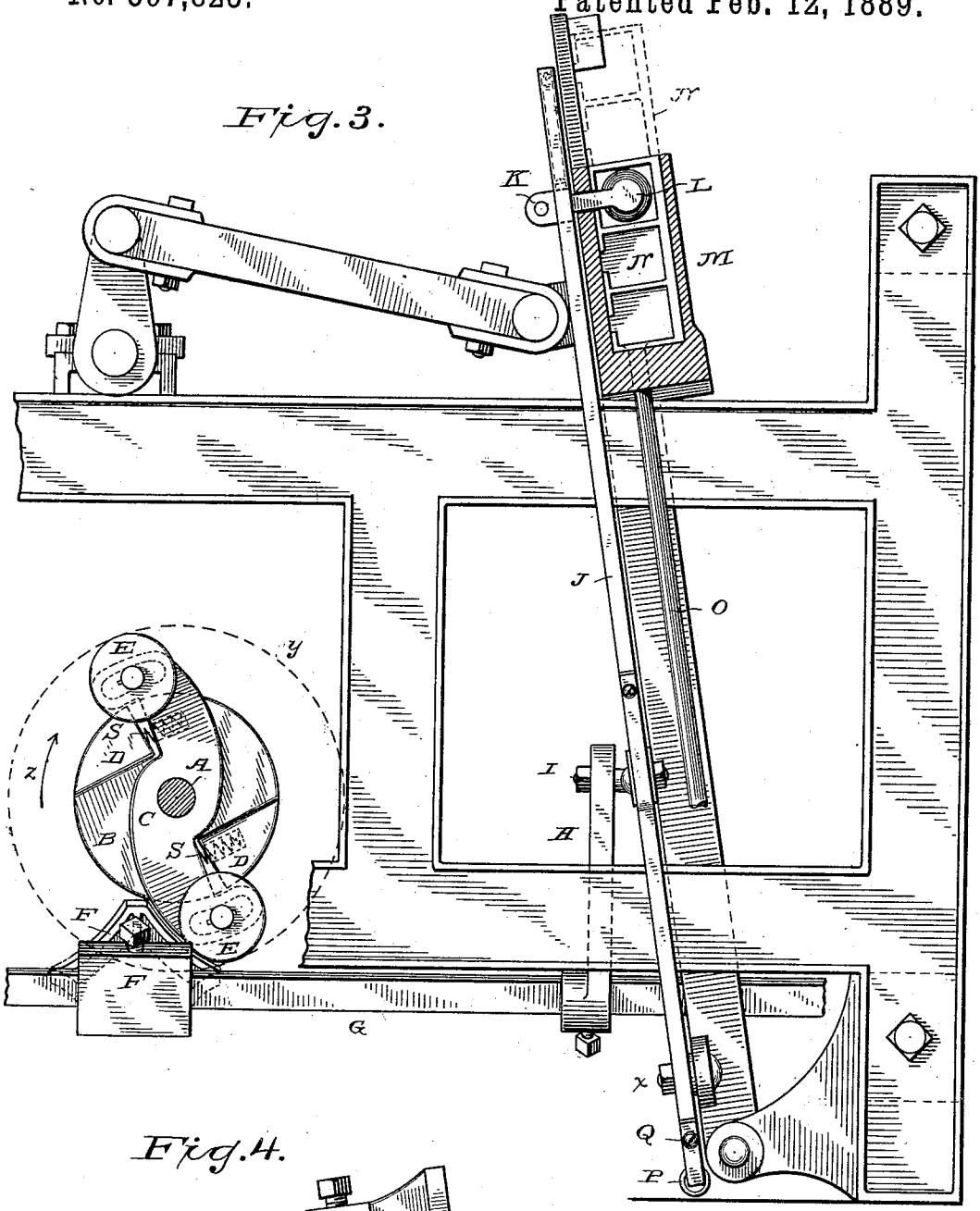
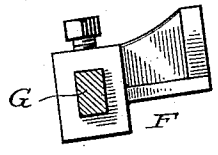


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM TUCKER, OF EAST BROOKFIELD, MASSACHUSETTS.

SHUTTLE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 397,823, dated February 12, 1889.

Application filed August 1, 1888. Serial No. 281,678. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TUCKER, a citizen of the United States, and a resident of East Brookfield, in the State of Massachusetts, have invented a new and useful Improvement in Shuttle-Motions for Looms, of which the following is a specification.

This invention relates to the pick-roll arms and plates or the carriers of pick-rolls in looms.

Formerly the pair of pick-arms most commonly employed at each end of a loom were made in one piece, having a hub by which it was keyed to the shaft; but owing to the numerous breakages from the heavy blows of the pick-rolls upon the pick-shoes and the long delays for repairs so occasioned such arms were and are now commonly made in three parts—namely, a plate or hub which is keyed to the shaft, and two pieces, forming the arms proper, which are divided at a line passing through the center of the shaft, so that a new piece or pieces may be readily bolted on in place of either or both when a break occurs.

My present invention consists in certain novel combinations of parts, as hereinafter set forth and claimed, whereby the pick-roll arms become practically free from liability to be accidentally broken, and at the same time the noise of the pick-motions is materially reduced, durability in other respects is insured, and a better clearance of the pick-rolls from the shoes is effected.

Two sheets of drawings accompany this specification as part thereof.

Figure 1 of the drawings represents a face view of an improved pick-motion device illustrating this invention. Fig. 2 represents a top view of the same as seen in Fig. 1. Fig. 3 represents a fragmentary end view, partly in section, of a loom provided with my improved pick-motion devices; and Fig. 4 represents a front view of the pick-shoe seen in Fig. 3.

Like letters of reference indicate corresponding parts in the several figures.

The customary longitudinal rotary shaft, A, is provided near each end with a face-plate, B, made fast thereon by a key, *k*, Fig. 2, and a double-ended arm-piece, C, on the outer side of the face-plate, which arm-piece is preferably a single casting, having an eye at mid-length, within which the shaft A forms a fulcrum and keeps the arms axially in position.

The arm-piece C of each pick-motion is loose angularly on the shaft A, and is held longitudinally of the shaft against the face-plate B by shouldered tap-bolts or screws *b b*, which pass through slots *a a* in the face-plate concentric with the shaft into tapped holes in the arm-piece C, and are wrenched up to their shoulders against the arm-piece, leaving just room enough between shoulder and head for the free play of the arm-piece angularly in contact with the face-plate, longitudinal displacement being prevented and said angular movement limited by said screws *b* and slots *a*. Diagonally-opposite bosses D D on the same face of the plate B project to a thickness about equal to that of the arm-piece, and are provided in their driving-surfaces opposed to the rear edges of the respective arms with drilled chambers *c c*, forming spring-abutments, and spiral springs S S, seated in these chambers and projecting therefrom, act against the respective arms to push them from the bosses as far as said screws *b* and slots *a* will allow.

The extremities of the arm-piece C are provided, as in other pick-motions, with suitably-shouldered roll-studs *m m*, fastened by screw-nuts *n n* at effective points within slots *o o*, the latter being concentric with the shaft A, and the studs flattened where they pass through the slots, as shown in Fig. 1. The pick-rolls E E rotate freely on the protruding ends of the roll-studs *m*, being secured against escape by pins *p*, for example; and an ordinary pick-shoe, F, Figs. 3 and 4, to coact with each pair of rolls, is bolted fast in effective position on a rock-shaft, G, at right angles to said shaft A, in customary manner.

Motion may be transmitted from the rock-shafts G to the shuttle or shuttles in customary manner, as illustrated by Fig. 3—that is to say, by a lever-arm, H, fast on each rock-shaft, through connections I to the picker-staff J at its end of the loom, and from the latter through connections K to its picker L within the lay M, and shuttle box or boxes N. Fig. 3 represents a loom with several boxes at each end, each set being movable vertically by an ordinary box-motion, represented by its rod O, to bring any box with its shuttle into

line with the pickers at will. The picker-staff J is pivoted, as at *x*, Fig. 3, to the lay-frame; and both pickers are retracted and both pick-shoes re-elevated through the respective picker-staffs and connections by the customary pick-spring, P, near the floor, which is connected with both picker-staffs by a strap, Q, at each end thereof.

The loom is represented in Fig. 3 in position for a shuttle to fly. The dotted circle *y* represents the path of the outermost or acting surfaces of the pick-rolls, and the arrow *z* the direction in which they revolve. At the contact of a roll, E, with the shoe F there is a little lost motion, as the springs S yield more readily than the shoe and shuttle, with the added inertia of the intermediate parts aforesaid and the resistance of the picker-spring P. The strain and noise are thus reduced, as aforesaid, and the shuttle is started by "persuasive force," so to speak, instead of by a sudden blow. After the shuttle is started the springs S, tending to recover their normal length, accelerate the revolving motion of the rolls, and at the last end of the driving-stroke of each roll "clear" it from the shoe F, so as to permit the latter to rise and the picker to be retracted with the utmost rapidity. In this operation the advance motion of the recoiling springs is superadded to the constant advance motion of the shaft A. To secure these advantages in perpetuity, the elastic medium through which the force is transmitted must possess a considerable range of elasticity. Spiral springs of tempered steel wire are found to have this large range of action when rightly constructed, and in each of my devices the elasticity of two such springs is utilized in connection with the action of each pick-roll.

As looms are often constructed now with as many as seven shuttle-boxes, N, at each end, and shuttle after shuttle must be sent from the same end of a loom running at one hundred revolutions per minute, or thereabout, it becomes a matter of great importance to attend to the question of time. With so many boxes, each of which must come to the proper level on time within a fraction of a second, with the vertical movement possible from one extreme to the other, as represented by dotted lines in Fig. 3, the clearance of the pick-rolls becomes of vital importance, as the shoe cannot rise faster than the movement of the escaping-roll, the picker cannot be fully retracted until the shoe rises, and the boxes cannot be shifted until the retraction of the picker is completed. My improved pick-motions provide, as aforesaid, for expediting the completion of all these movements, and this without complication of parts and with reduced liability to breakage and reduced noise.

I have described a pair of pick-rolls for each end of the loom because this arrangement is now usually employed. With a single roll at each end of the loom one of the springs S, with one of the bosses D, could be omitted at each end, but the duplex arrangement would preferably still be used, omitting only the extremity of the second arm beyond the perimeter of the face-plate at each end of the loom.

Having thus described my said improvement in pick-motions, I claim as my invention and desire to patent under this specification—

1. The combination, with the rotary shaft, rock-shaft, and shoe, of a face-plate fast on said rotary shaft and provided with spring-abutments, an arm-piece carrying a pick-roll or pick-rolls and movable angularly on said shaft, and an interposed spring or springs acting in the direction of the revolution of said roll or rolls at each end of the loom, substantially as hereinbefore specified.

2. The combination, with the rotary shaft A, the rock-shaft G, a shoe, F, and a pick-roll or pick-rolls, E, of a face-plate fast on said shaft and having diagonally-opposite bosses provided with chambers in their driving-surfaces to form spring-abutments, a pair of spiral springs in said chambers, an arm-piece provided with roll-studs for said rolls and movable angularly upon said shaft as a fulcrum, means for adjusting said roll-studs, and means for preventing the longitudinal displacement of said arm-piece and for limiting its angular movement, substantially as hereinbefore specified.

3. In combination with a picker, a pick-shoe, means for re-elevating said shoe, its rock-shaft, and suitable connections, as those ordinarily employed at each end of the loom, the rotary shaft A, having at each end a face-plate, B, fast thereon and provided with spring-abutments, an arm-piece, C, movable angularly on said shaft and provided with roll-studs which carry the pick-rolls, and springs S, interposed between said abutments and the pick-arms and acting in the direction of the revolution of the pick-rolls, substantially as hereinbefore specified, whereby the clearance of the shoe by each pick-roll after each driving stroke may be more expeditiously effected, as set forth.

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