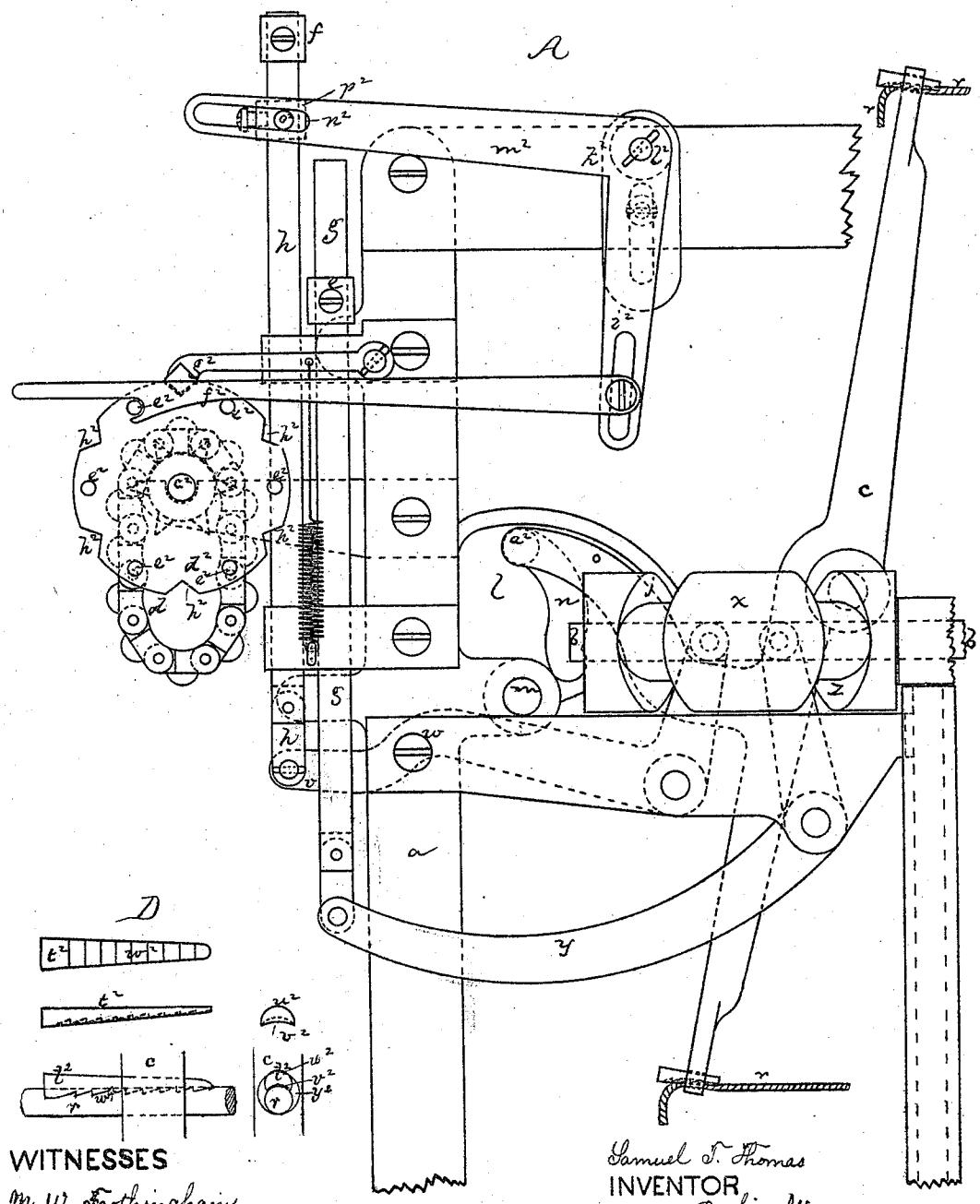
3 Sheets--Sheet 1.

S. T. THOMAS.

Looms.

No. 134,572. Patented Jan. 7, 1873.



WITNESSES

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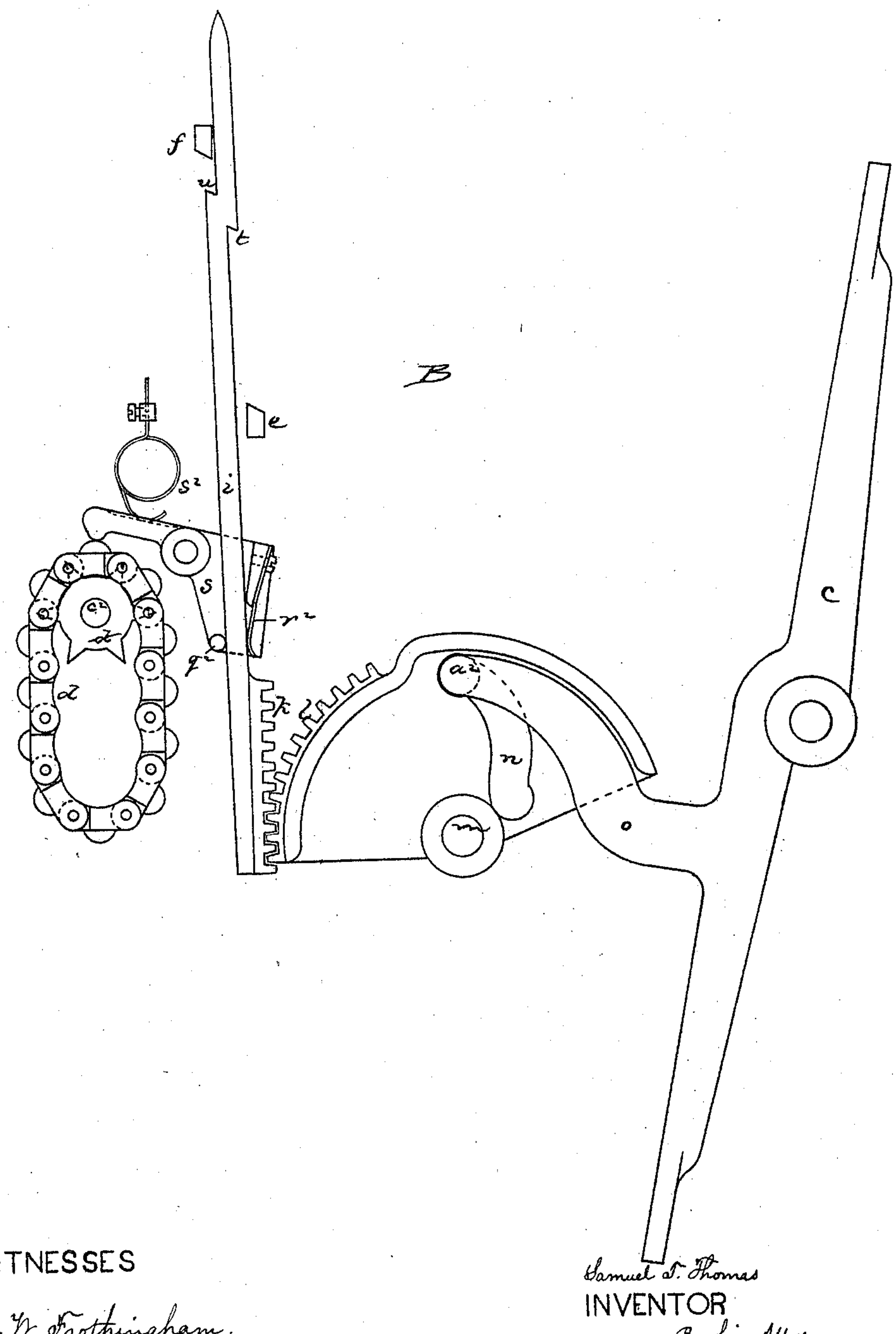

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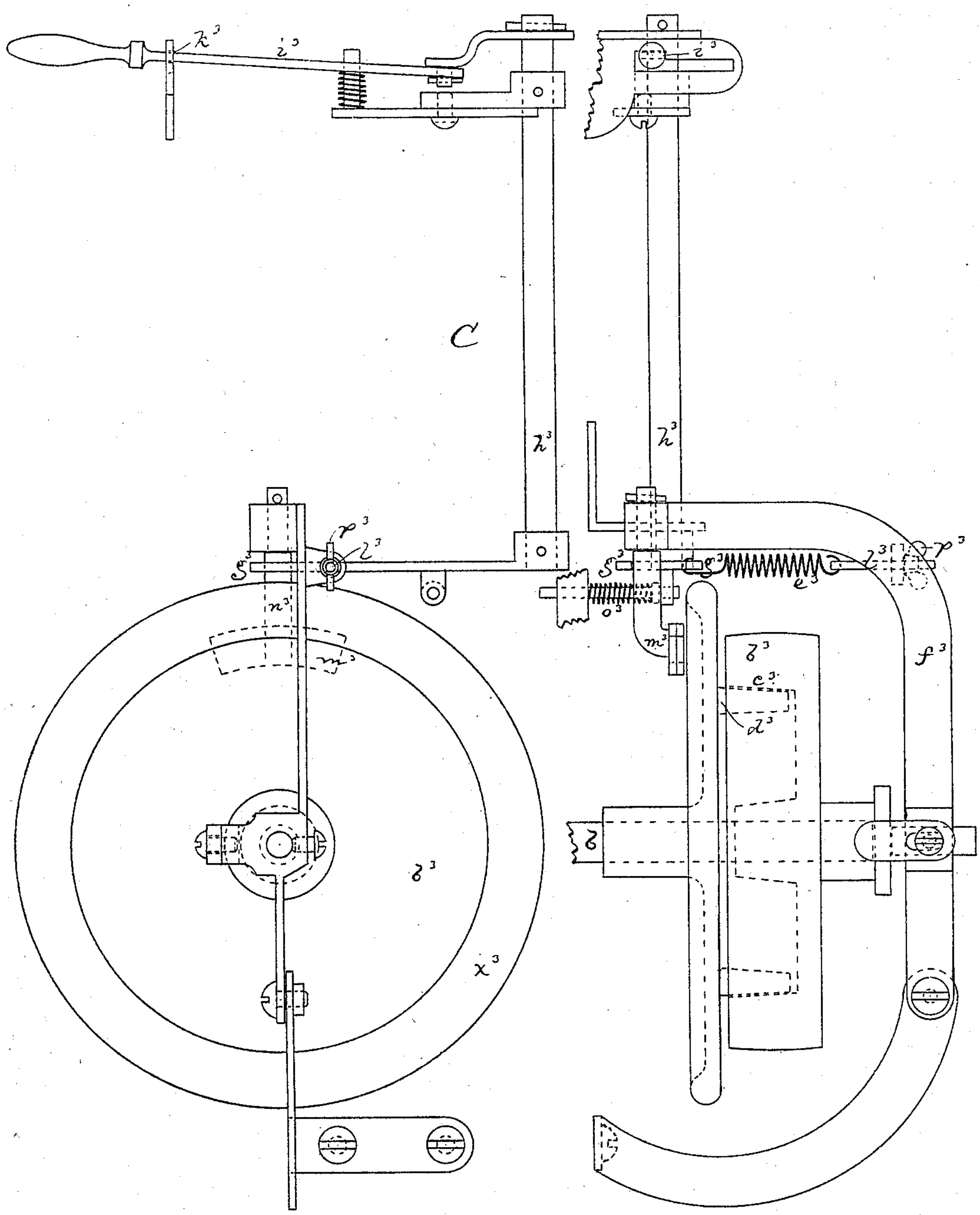

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UNITED STATES PATENT OFFICE.

SAMUEL T. THOMAS, OF GILFORD, NEW HAMPSHIRE.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **134,572**, dated January 7, 1873.

To all whom it may concern:

Be it known that I, SAMUEL T. THOMAS, of Gilford, in the county of Belknap and State of New Hampshire, have invented certain Improvements in Looms; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention relates to details of construction of fancy looms, and more particularly to that class of looms termed "open-shed," in which only such part of the warp-yarns are moved by the harness after each pick as are required to be moved to form the next shed.

In United States Letters Patent No. 13,187, dated July 3, 1855, granted to me for improvements in looms, (which improvements relate particularly to open-shed looms,) I employ, in combination with vertical jacks that operate the elevator and depressor bars, gear-sectors having teeth meshing into teeth on the jack-bars, each of these sectors having a cam-groove, into which extends a roll turning on a pin projecting from an arm of the corresponding harness-lever, the movements of the sectors effected by the rise or fall of the jack-bars operating the harness-lever to change the warps and form the shed.

In my present arrangement the vertical slide-rods that actuate the elevator and depressor bars are connected at their lower ends to the outer ends of two rocker-levers, having at their inner ends pins which carry rolls entering into cam-grooves in a cam-cylinder on the driving-shaft, the rotation of the shaft causing these levers and the slide-rods to be directly actuated from the cam and driving-shaft without intervening gearing; and from the depressor-bar projects a pin extending into a slot in one arm of a bent lever, whose other arm has jointed to it the pawl that actuates the shaft of the pattern cylinder or chain, each upward motion of the depressor-bar, after a shed is formed and the shuttle is thrown, raising the lever-arm, pressing forward the pawl, and actuating the pattern mechanism. Thus the depressor-bar not only aids in forming the shed, but also actuates the pattern mechanism. It is in this arrangement of the pattern and harness operating mechanism that the invention primarily consists.

The drawing represents a loom, or parts of a loom, embodying my invention.

A shows the mechanism in side elevation. B is a side view of the chain, one of the lifter and depressor jack-bars, and the cam-slotted gear-sector and harness-lever connected therewith. C is a view of the driving and clutch wheel mechanism. The views at D show the key by which the harness-cording is fastened.

a denotes the loom-frame; *b*, the driving-shaft; *c*, the harness-levers; *d*, the pattern-chain; *e f*, the elevator and depressor bars; *g h*, the vertical slide-rods, to which these bars are fixed; *i*, the vertical jack-bars operated by the elevator and depressor bars, the bars *i* having gear-racks *k* meshing into and turning gear-sectors *l*. The sectors *l* are mounted on a stationary pin or shaft, *m*, and each has a cam-slot, *n*, into which extends a roll on a pin projecting from an arm, *o*, of a vertical rocker-lever, *c*, these levers *c* being the harness-levers and turning on a stationary shaft or pin, *q*, and carrying the harness-levers, which are fixed to the harness-cords *r;* all of this mechanism being arranged substantially as shown in my said patent No. 13,187. Each jack-bar is connected with and actuated by a lever, *s*, the front arm of which is pressed toward the links of the pattern-chain by a spring, the normal position of these levers causing them to hold the jack-bars back, where their hooks or shoulders *t* will be in the path of movement of the elevator-bar *e*, and the position to which either lever is brought when its arm is thrown up by a pin or button of the pattern-chain, causing the lever to throw forward its jack-bar, bringing its front hook or shoulder *u* into the path of downward movement of the depressor-bar *f*. The slide-rod *h* that actuates the depressor-bar is jointed to the outer end of a rocker-lever, *v*, turning on a fulcrum-pin, *w*, and having extending from its inner arm a pin, carrying a roll which enters into a cam-groove, *j*, of a cam-cylinder, *x*, on the driving-shaft *b*, and the slide-rod *g* that actuates the elevator-bar is jointed to the outer end of another lever, *y*, turning on another pin, w^3, and having extending from its inner arm a pin carrying a roll which enters a cam-groove, *z*, on said cam-

cylinder x, the rotation of the cam-shaft actuating the slide-rods and their elevator and depressor bars, and raising and lowering such jacks as are brought to position to be distributed or raised and lowered by the pattern-chain and the levers s, the harness-levers not changed remaining stationary, kept in position by the presence of the pins a^2 in their cam-slots n, and the levers carrying the harness-warps to be changed being actuated by the action of their pins upon the cam-slots of their gear-sectors, which sectors are operated by the rise or fall of the jack-bars to which they are connected. The pattern-chain is hung upon and operated by a shaft, c^2, at the end of which is a feed-wheel, d^2, having pins e^2 driven by an impelling-pawl, f^2, the wheel being held in stationary position while the pawl slides back by a detainer-pawl, g^2, the tooth of which engages with stop-notches h^2 on the periphery of the wheel d^2. The pawl f^2 is jointed to one arm, i^2, of a lever, k^2, fulcrumed at l^2; the other arm m^2 of this lever having a slot, n^2, into which extends a pin, o^2, extending from the slide-rod h, or from a collar, p^2, fixed to and adjustable upon said rod. While the shed is forming, the pattern-chain is held stationary by the detainer-pawl g^2, and when (after the shed has been formed and the shuttle thrown) the elevator and depressor bars are, respectively, moved up and down, the upward movement of the slide-rod h of the depressor-bar causes the pin o^2 of said rod to throw up the lever-arm m^2, thereby throwing forward the other arm i^2 and the pawl-lever f^2 jointed thereto, causing the pawl to act against one of the pins e^2 of the feed-wheel, and carry forward the pattern-chain, bringing it with certainty into position to set the jack-bars (to be set) by the same mechanism that carries the elevator and depressor bars into position to raise or lower the bars so set. Each jack-bar passes between a pin, q^2, extending from the vertical arm of the lever s that actuates it, and a spring, r^2, extending from the lever, and the outer arm of the lever is pressed down to the pattern-chain by a spring, s^2. When the lever-arm is raised by one of the pins or buttons of the chain the jack-bar is thrown forward by the spring r^2, but its movement is limited by the pin q^2, the spring r^2 keeping the bar against the pin, while the spring s^2 keeps the pin from advancing beyond the movement effected by the rise of the lever-arm by the chain. At all times when any jack-lever is not raised by the pattern-chain, the spring s^2 holds it down and causes the pin q^2 to hold the jack-bar back, the pressure of the jack in both directions being thus effected by the respective springs, the two sets of springs maintaining the bars in their normal position, and the spring r^2 pressing the jack slightly against the pin q^2, thus insuring accurate movements of the jack and harness mechanism at very rapid speed of the loom, and guarding against such damage to the mechanism as is liable to occur if the jack-bars are positively moved. For straining and holding the cords or bands of the harness-leaves, I use a key, as shown at D in side view, bottom view, and end view, and as extending through the harness-lever. The key is made as a long tapering piece, t^2, preferably with a cylindrical upper surface, u^2, and a concave lower surface, v^2, and with ratchet-teeth w^2 on the under surface, the inward inclination of these teeth being toward the point of the key. The cord r being drawn through the hole y^2 in the harness-lever and strained, the key is slipped through in the opposite direction, and, being pressed in, any strain upon the cord toward the harness will only draw the key further in, thereby tending to tighten it upon the cord, while any strain to tighten the cord, it (the cord) can only slip under the teeth of the key. The shaft b is driven by a friction-clutch and band-pulley, b^3, having a friction-surface, c^3, that encompasses a friction-cone, d^3, on the wheel x^3 of the driving-shaft, the wheel b^3 being thrown in to bind upon the wheel d^3 by a spring, e^3, connected at one end to a lever, f^3, and at the other end to a fork, g^3, this fork extending from a shaft, h^3, having at its other end an arm, i^3, which is secured in a notch, k^3, when the loom is running, the fork being then held in such position that the stress of the spring keeps the pulley upon the cone. To secure just friction enough to cause the wheel d^3 to be driven, the spring is connected to the lever f^3 by an adjusting-screw, l^3, by turning a nut, p^3, upon which the stress of the spring may be graduated so as to vary the frictional contact of the wheels in accordance with the power required to drive the loom. The same pressure that draws in the lever f^3 throws from the wheel d^3 a brake, m^3, directly connected to the lever by an arm, n^3, and when the arm l^3 is thrown from its notch the stress of a spring, o^3, throws the brake into contact with the wheel, so as to instantly stop the loom, the lever f^3 being simultaneously released from the stress of the spring e^3, and freeing the wheel x^3 from the pressure of the wheel b^3.

I claim—

1. In combination with the jack-setting levers s positioned by the chain, and the jack-bars operated by the levers s, the springs r^2 s^2, the spring s^2 throwing down the lever-arm and causing the pin q^2 to throw back the jack-bar, and the spring r^2 throwing the bar forward and keeping it against the pin q^2, all substantially as shown and described.

2. In combination with the gear-sectors l and their slots n for positively moving the jack-bars and harness-levers and locking them in open-shed position, the mechanism for locking the jack-bars in position laterally, so that each is held in position relatively to the lifter or depressor bar, except when moved by the pattern-chain.

3. In combination with the gear-sectors l and their slots n for positively moving the jack-bars and harness-levers and locking them in open-shed position, the pawl-actuating lever k^2 operated by the pin o^2, extending from the slide-rod h of the depressor-bar f, substantially as shown and described.

4. In combination with the driving-shaft b and its pulleys b^3 x^3, and fork g^3, and brake m^3, the adjusting-screw l^3, and spring e^3, for regulating the friction of the wheels, substantially as shown and described.

S. T. THOMAS.

Witnesses:

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M. W. FROTHINGHAM.