3 Sheets—Sheet 1.

H. WYMAN.

SHEDDING-MECHANISM FOR LOOMS.

No. 195,686. Patented Sept. 25, 1877

Fig: 1.

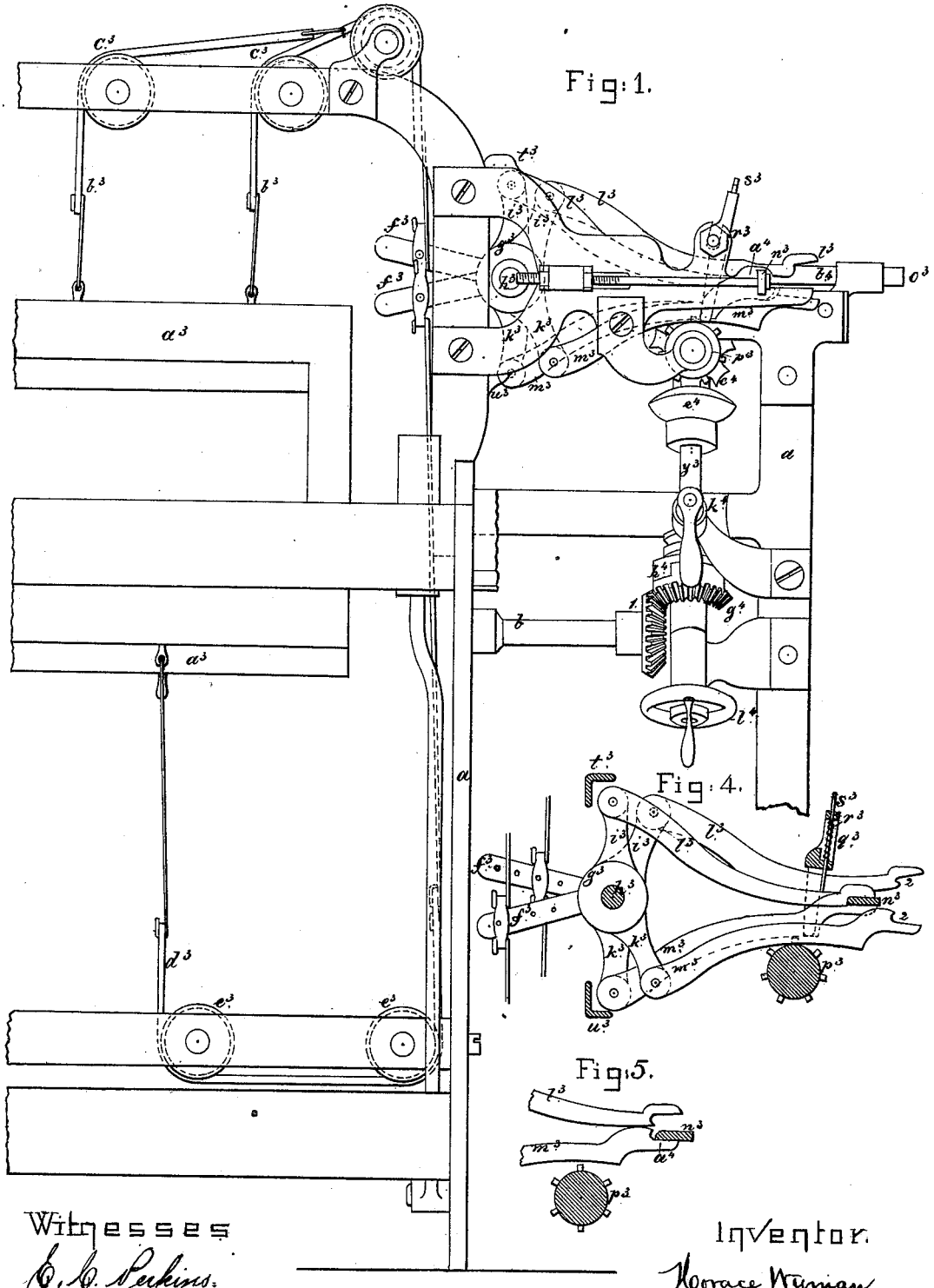

Fig: 4.

Fig: 5.

Witnesses

C. C. Perkins.

W. J. Pratt.

Inventor.

Horace Wyman

by Crosby & Gregory Attys

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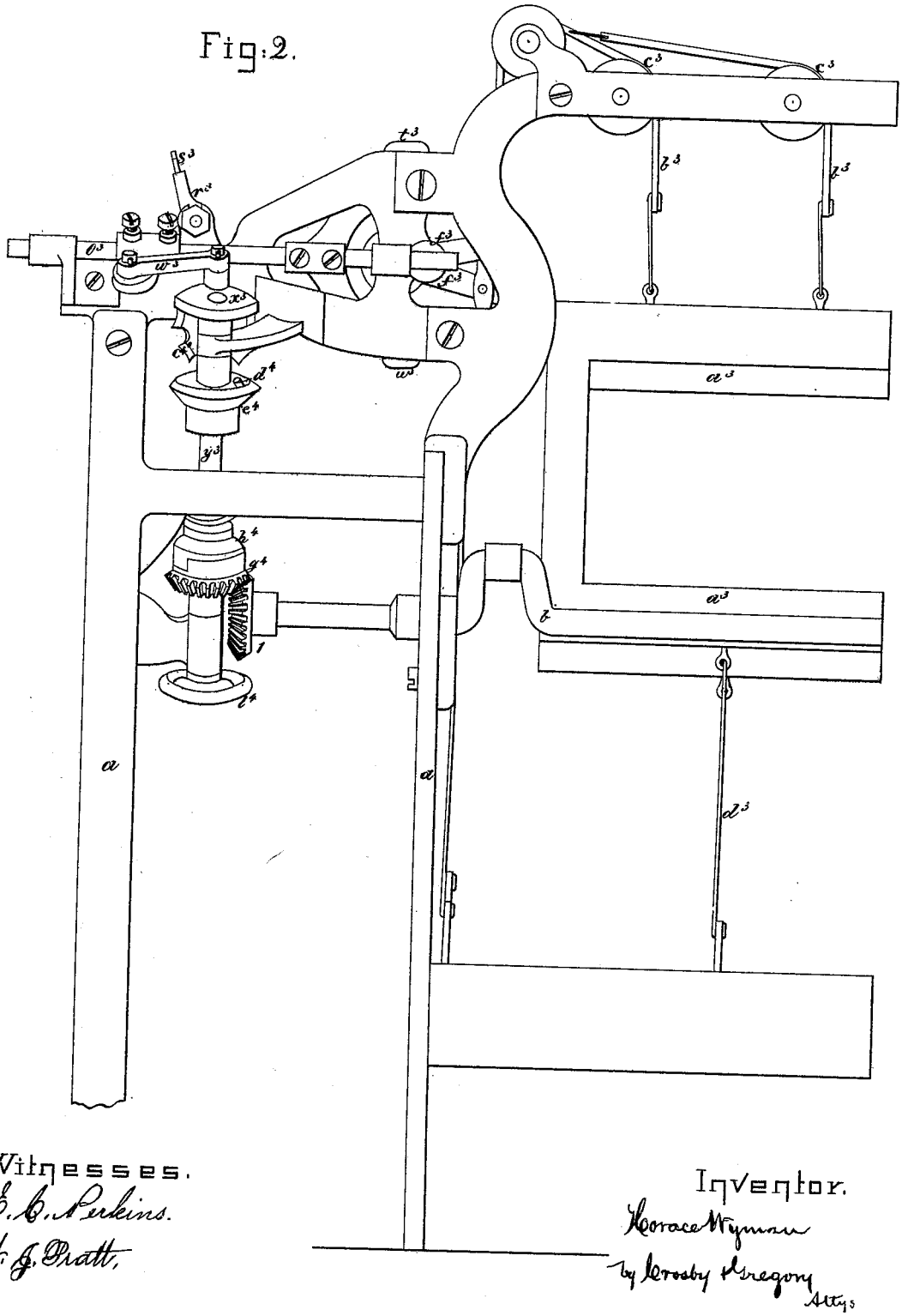
Fig. 2.



Witnesses.
E. C. Perkins.
W. J. Pratt.

Inventor.
Horace Wyman
by Crosby & Gregory
Attys

3 Sheets—Sheet 3.

H. WYMAN.

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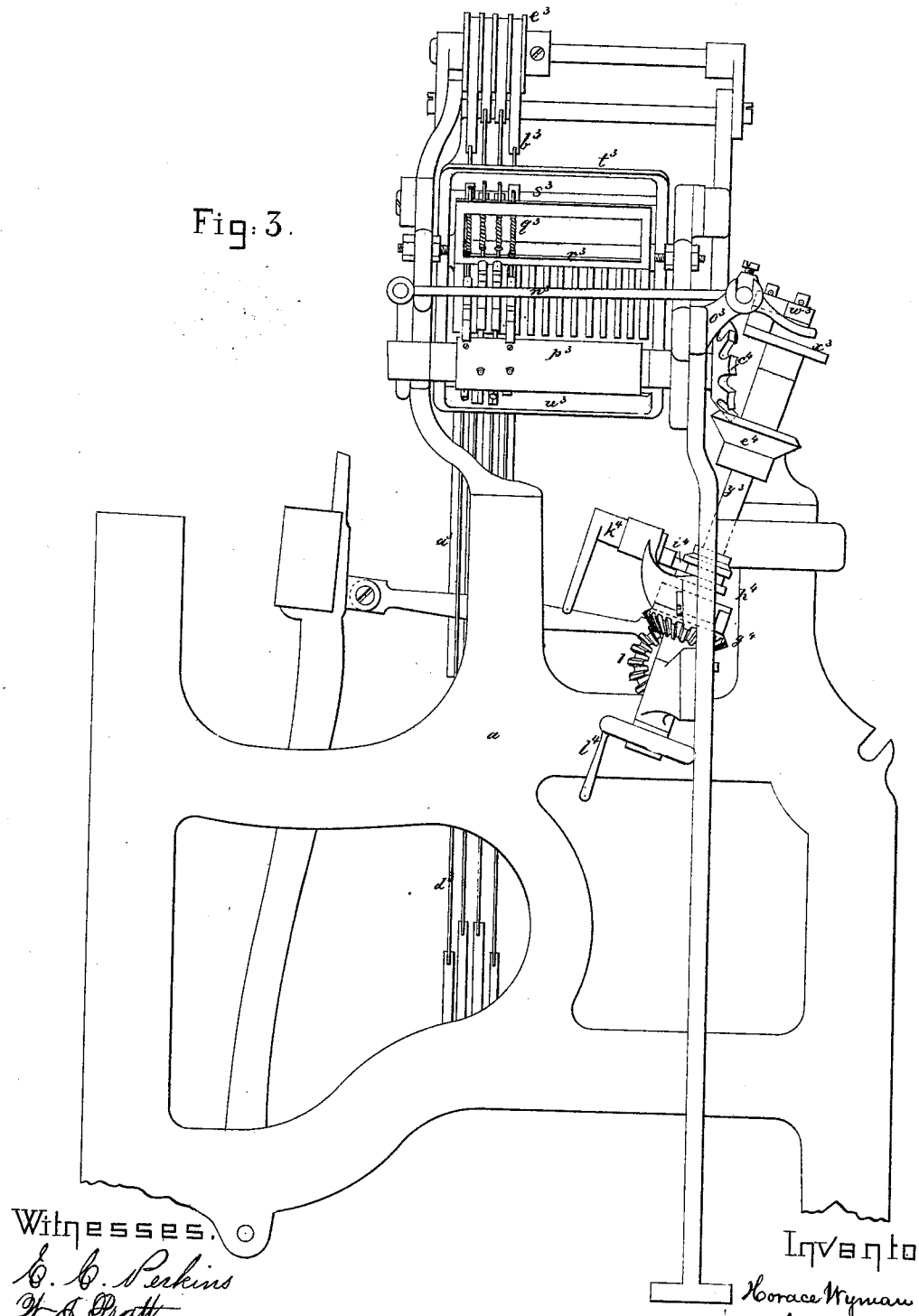
Fig. 3.



Witnesses.
C. C. Perkins
W. J. Pratt.

Inventor.
Horace Wyman
by Crosby & Gregory
Attys

UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN SHEDDING MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **195,686,** dated September 25, 1877; application filed September 17, 1877.

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Looms, of which the following is a specification:

This invention relates to looms, and has for its object such an organization of mechanism as will enable the shedding-shaft, which operates the pattern-surface and shed-forming devices in connection therewith when the loom is in regular operation and weaving, to be disconnected from the crank-shaft, in order that the pattern-surface may be reversed to any desired extent, according to the distance of the true shed from the shed where the mispick occurred, and in order at the same time that the shedding mechanism then in operative connection with the pattern-surface may be actuated automatically in unison with it to form sheds regularly and in succession according to the protuberances on the reversing pattern-surface until the true shed is formed.

In weaving, it often happens that the weft-thread breaks or runs out. When this occurs the loom must be stopped; but it cannot always be stopped when the shed in which the imperfections in weaving occurred is opened, and consequently the loom sometimes moves far enough to make several picks without leaving a thread. On connecting the broken thread or resupplying the shuttle or substituting a new one, the weaving cannot be continued from that point, as the fabric so woven would be imperfect as to pattern; consequently when, for any reason, these or other imperfections in weaving occur, it is necessary to reverse or otherwise move the pattern-chain until the true shed, or that in which the imperfection occurred, is reached, and then, the fault being corrected, the loom may be started and the pattern be properly wrought.

To persons skilled in weaving it is obvious that as the sheds are formed to correct a mispick, or to pick out a mispick, the shuttle must not be moved across the warps to lay a thread, and that the shedding devices and pattern-surface must operate to form sheds just as when weaving regularly. To insure this proper and regular maintenance of the relative positions of the shed-forming devices and pattern-surface, I have connected them together, so that when the latter is reversed the former must also be moved in unison with it and form sheds. This, in this instance of my invention, I accomplish by means of a single shaft provided with a gear and a link, they engaging and moving both the pattern-surface and shed-forming devices. This shaft, from which the shed-forming devices and the pattern-surface derive motion, is adapted to be connected with, or to be disconnected from, the crank-shaft whenever it is desired to form sheds to correct any imperfections in weaving, and during this time the crank-shaft is allowed to remain at rest, and the picking operation is consequently suspended.

In order to produce a fabric in perfect accordance with the pattern indicated by the pattern-surface, it is necessary to introduce the weft into the shed predetermined to receive it, and if this order is changed or varied the fabric is also varied, so that when there are imperfections in the weaving, such as a broken weft or a mispick, the loom is stopped and the action or motion of the shed-forming pattern-surface is reversed, the shedding mechanism forming sheds while the lay is at rest, thereby enabling the weaver to remove mispicks or any imperfections in weaving, the process continuing until a true shed, or one containing a perfectly-laid weft, is reached, when, the weft being properly connected, the loom is started, the clutch being previously re-engaged, so as to operate the shedding from the crank-shaft.

This invention is applicable to any well-known fancy loom, and in this instance the loom described operates substantially as the well-known Crompton loom.

Figure 1 is a front view of the loom, showing the shed-forming mechanism. Fig. 2 represents the rear side of the loom; Fig. 3, an end view; and Figs. 4 and 5, details, showing construction of the jack mechanism.

The frame-work *a* supports the crank-shaft *b*, connected with and operating the lathe in any ordinary manner.

The harness-frames a^3 are connected with the jack-levers g^3 by cording b^3 d^3 passing over sheaves c^3 e^3, the connections as herein shown

being with the inner ends of arms f^3 of the jack-levers, shown as composed of three arms, f^3 i^3 k^3, suitably supported by a rod, h^3. The jacks, adapted to be engaged by a lifter and depressor so as to move the jack-levers, are connected, jack l^3 with arm i^3, and jack m^3 with arm k^3. The jacks for each jack-lever are placed one above another, and are so bent that they come together near their outer ends, and the extreme ends pass, the one above and the other below a lifter-bar, n^3, actuated by a horizontal slide-rod, o^3.

The rotary pattern cylinder or surface p^3 is placed below, and the lower jacks rest upon the cylinder, while the upper jacks rest on the jacks below them; and, consequently, any lower jack raised by a pin on the pattern-surface will also raise the upper jack resting upon it. The ends of the jacks of each pair are passed through a guide-slot in a frame, r^3, and a pin, s^3, acted on by a spring, q^3, presses upon the upper jack, and holds it and the lower jack down when not lifted positively by a pattern-pin. A yoke attached to the slide-rod o^3 carries two evener-bars, t^3 u^3, adapted to meet the upper ends of arms i^3 k^3. A pinion, 1, at the end of the crank-shaft b, engages a bevel-gear, g^4, forming one part of a clutch adapted to engage the latter shaft with or disengage it from the control of the crank-shaft. The gear g^4 is loose on the shaft, and the other part, h^4, of the clutch is keyed to, but free to be moved longitudinally on, the shaft by means of a shipper, k^4, having a finger, i^4, adapted to engage a groove in the part h^4, and, when h^4 is disengaged from g^4, the shaft y^3 may be moved by a suitable crank or wheel, l^4, while the crank-shaft remains at rest. This shaft y^3 has a pinion, c^4, with a single tooth, d^4, that engages teeth in a star-wheel, c^4, on the end of the shaft of the pattern-surface, p^3, and moves the latter one step at each rotation of the shaft, and it is provided at its end with a crank and link, w^3, connected with the slide-rod o^3, to which are attached the lifter and depressor and eveners that move the jacks and jack-levers to form sheds lifting the harness-frames according to the exigencies of the pattern, and, with the devices connected as described, it is apparent that the shed-forming mechanism and its pattern may be turned in unison in either direction and form perfect sheds.

The inner edge of the lifter n^3 is made V-shaped, as shown at a^4, and the notches in the jacks to be engaged by the lifter are also V-shaped, as shown in Figs. 1 and 4, and by this construction it will be obvious that the jacks will certainly be engaged and held in engagement if the points 2 of the jacks l^3 or m^3 (see Fig. 4) are below or above the edge a^4 of the lifter, and it will also be obvious that, owing to this construction, the distance through which the ends of the jacks need to be raised or lowered is reduced.

If the jacks m^3 are not lifted by the pins of the pattern-surface, their notched portions will pass under the lifter when the latter is moved toward the loom-frame; but the notched part of jack l^3, resting on the jack m^3, not lifted, will be engaged by the lifter, and it will therefore be obvious that the lifter will act at one portion of its length on some of the jacks l^3 and on some of the jacks m^3, and some of the jack-levers will be moved to raise and others to depress their connected harness-frames.

After the shed is formed, and before another shed is made, the eveners on the reverse motion of the slide-rod act against the jack-levers and even the shed.

The shipper is near the front of the loom and readily accessible, and so is the wheel or pulley l^4, by which the shaft y^3 is operated, and, as shown, the pattern-surface and lifter, (which at times is also a depressor,) and the jacks, are all at one end of the loom, and from this compact arrangement of parts, and their construction, but little strength is required to form sheds.

The arms f^3 are provided with cord-holders, and perforated to vary the angle of the shed.

I denominate the shaft y^3 the shed-forming shaft, because it is connected with and operates the shed-forming devices, and it also operates the pattern-surface for the shed-forming mechanisms.

In this application I have described a shedding-shaft, a pattern-surface, a crank-shaft, and a clutch to free the shedding-shaft from the control of the crank-shaft, in order that the pattern-surface may be capable of being reversed and sheds be opened to find a mispick; but I desire it to be understood that I do not herein broadly claim such devices, for they form the subject of claim in another application filed by me October 27, 1874. In this application such devices are claimed only when they are so combined that the shedding devices and pattern-surface operate together automatically and in unison equally well, whether the pattern-surface is being turned forward or backward.

I claim—

1. A pattern-surface, shedding devices, and mechanism for connecting the one with the other both when the pattern-surface is being turned forward and when it is being reversed, in combination with the shedding and crank shafts, and devices between the shedding and crank shafts to connect or disconnect them, whereby, when the crank and shedding shafts are disconnected the pattern-surface may be reversed, and the shedding devices in operative connection therewith be actuated for any desired number of sheds in accordance with the protuberances of the reversely-moving pattern-surface to form and perfect sheds until the true shed is reached, substantially as described.

2. A crank-shaft, a shedding-shaft, driving and disconnecting mechanism to engage or disengage them, a pattern-surface, lifter and depressor, shed-forming devices, and mechanism for holding the latter in operative connection with the pattern-surface, in combination with

a single crank, whereby, when the shedding-shaft is disconnected from the crank-shaft, the pattern-surface may be reversed and turned backward by means of the single crank for any desired number of sheds until the true shed is found, and the shedding devices may be operated in unison with the pattern-surface to form sheds, substantially as described.

3. In a fancy-loom, a rotating pattern-surface, and a lifter and depressor, in combination with shedding devices, and connecting mechanism, whereby, by means of a single crank, the pattern mechanism may be reversed after the completion of any shed, and the shedding devices be automatically operated in unison with it to form and complete the sheds indicated by the protuberances of the reversely-moving pattern-surface, substantially as described.

4. The shedding-shaft connected with and adapted to move the pattern-surface in either a forward or backward direction, and a lifter and depressor to form sheds, in combination with the crank-shaft, and driving and disconnecting mechanism to engage or disengage the shedding and crank shafts, substantially as and for the purpose described.

5. The crank-shaft, and a shedding-shaft connected with and adapted to operate a pattern-surface, and eveners, and lifter and depressor, all at one end of the loom, in combination with a clutch to disengage the shed-operating devices from operative connection with the crank-shaft, to form sheds when the crank-shaft is at rest, substantially as described.

6. A crank-shaft, in combination with a shedding-shaft, a clutch to disconnect the shedding-shaft from the control of the crank-shaft, lifter and depressor, a crank and link connected with the shedding-shaft to operate the lifter and depressor, and a wheel or pulley, all located at the same end of the loom, substantially as described, whereby the lifter and depressor may be operated without moving the crank-shaft, for the purpose set forth.

7. The lifter-bar provided with a V-shaped edge, in combination with the pattern-surface and the upper and lower jacks l^3 m^3, notched as described, and arranged with relation to each other to be operated by the lifter, substantially as shown and described.

8. The shedding-shaft, and its crank and link, adapted to operate the lifter and depressor, and its toothed pinion adapted to move the pattern-surface, in combination with a clutch adapted to engage or disengage the crank and shedding shafts, substantially as and for the purpose described.

9. The three-armed jack-levers and jacks arranged in pairs one above and upon the other, in combination with the pattern-surface, and lifter adapted to pass between and engage and move the jacks, and jack-levers and their connected harness-frames, and with eveners to move the jack-levers, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE WYMAN.

Witnesses:
G. W. GREGORY,
W. J. PRATT.