(No Model.) 2 Sheets—Sheet 1.

H. WYMAN.

SHEDDING MECHANISM FOR LOOMS.

No. 411,753. Patented Sept. 24, 1889.

Fig. 3.

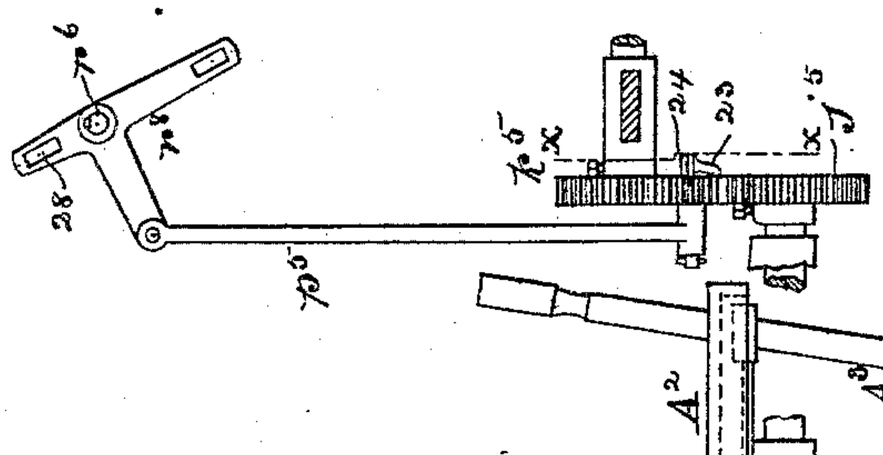


Fig. 4.

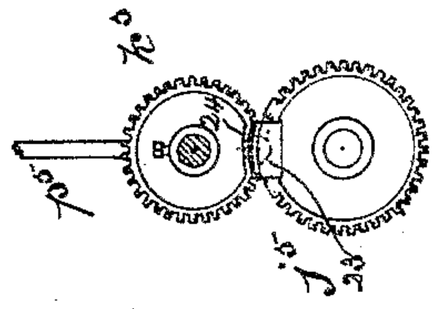


Fig. 2.

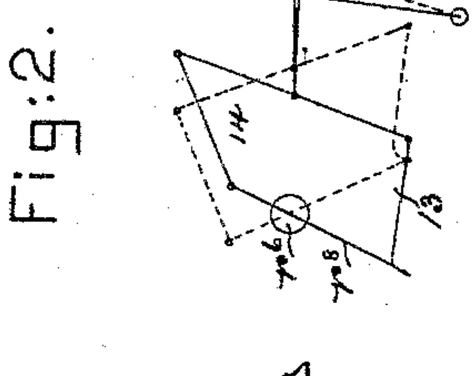


Fig. 1.

Fig. 5.

Witnesses:
Edgar A. Goddin.
Francis L. Emery.

Inventor:
Horace Wyman
by Crosby & Gregory attys

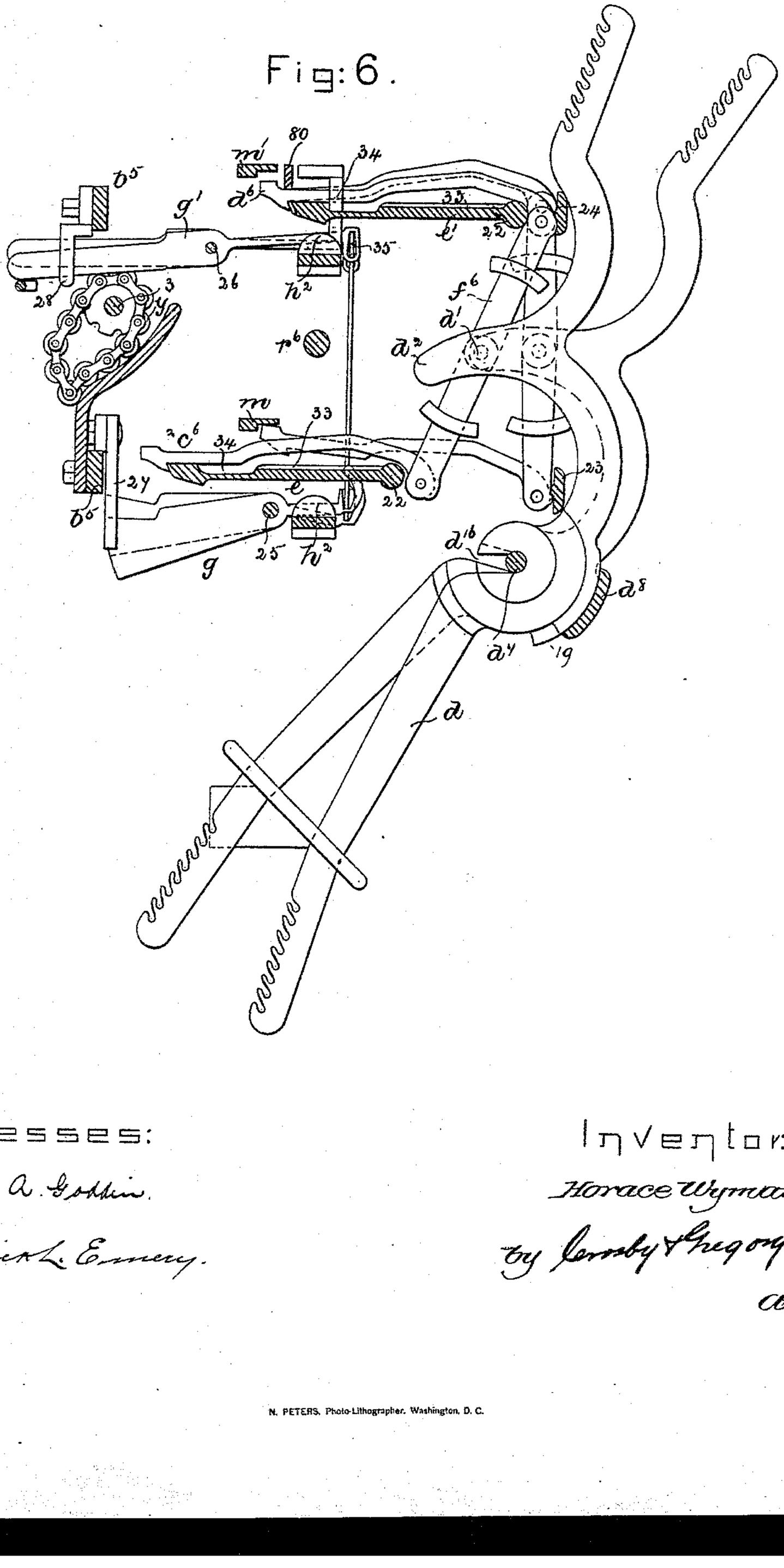
(No Model.) 2 Sheets—Sheet 2.

H. WYMAN.

SHEDDING MECHANISM FOR LOOMS.

No. 411,753. Patented Sept. 24, 1889.

Fig: 6.



Witnesses:

Edgar A. Goddin.

Frederick L. Emery.

Inventor:

Horace Wyman

by Crosby & Gregory.

Attys.

UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE CROMPTON LOOM WORKS, OF SAME PLACE.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 411,753, dated September 24, 1889.

Application filed July 12, 1888. Serial No. 279,753. (No model.)

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 Shedding Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

One object of this invention is to improve the so-called "dobby-looms"—such, for instance, as represented in my application, Serial No. 243,399, in such manner that the harness-frames may be actuated to form what is known as a "closed-shed" movement rather than an "open-shed" movement, as heretofore. To accomplish this I have arranged means to actuate the reversely-moving lifters at every pick or rotation of the crank-shaft, rather than at every other pick or rotation, as heretofore, and I have provided means by which the movement of one of the said lifters is reduced, so that it acts thereby to raise from the bottom portion of each shed to the central or closed plane of the shed all the harness-frames which were left down at the opening of the shed immediately preceding, the shed being thus closed previous to each distribution of the warp for the passage of the weft.

As herein shown, the uppermost lifter is the one having the shorter stroke, it being moved for but about one-half the distance of the lowermost lifter, and the hooks engaged with the said uppermost lifter having least movement always remain in engagement and are moved back and forth with it.

In my invention the lowermost lifter having the usual full stroke takes with it all the jacks co-operating with those harness-frames to be lifted for that shed, the particular jacks to be engaged by the said lifter at any outward movement being determined by the pattern-surface, all as usual, and a shed having been formed and weft inserted, the lowermost or longer moving lifter in its inward movement lowers the harness-frames just lifted, while the reversely-moving lifter having the shorter stroke lifts to the center or closed line of the shed those harness-frames which were not lifted at the last stroke, all the harness-frames being thus brought to their middle line of movement to form a closed shed. While in this middle position the hooks on the lowermost lifter are redistributed by the pattern-chain, it selecting and leaving in the path of movement of the said lifter as it again starts out, the hooks co-operating with the harness-frames to be lifted, while the remaining harness-frames are, through the inward movement of the uppermost lifter, lowered to the lower side or plane of the shed. The hooks can be retained on the lifter making only the half traverse by a bar placed above them all to prevent their being raised by the fingers.

Figure 1, in front elevation partially broken out, shows sufficient portion of a dobby-loom to enable my invention to be understood, the driving-pulley and part of the shipping mechanism being omitted. Fig. 2 is a diagram to be referred to; Fig. 3, a detail of devices used at the left of the loom shown in Fig. 1; Fig. 4, a partial view of Fig. 3 in the dotted line *x*; Fig. 5, a detail of the gears j^5 k^5, and Fig. 6 a sectional detail of the main parts of the loom instrumental in moving the harness-levers.

The frame-work *a* of the loom, the notched harness-levers *d*, the connectors f^6, pivoted thereon, the hooks or jacks d^6 and c^6, jointed to the said connectors, the locking-bars *m m'*, the reversely-reciprocating lifters or carriages *e e'*, the links 13 14, connected to the said lifters, the rock-shaft r^6, the arms or levers attached thereto, the fingers *g g'*, the rods extending from the inner ends of one to the inner ends of the other set of fingers, the guides 27 28 for the outer ends of the said fingers, the pattern surface or chain *y*, the shaft 3, carrying the notched plates, over which the chain is extended, the link p^5, the lay or crank shaft k^2, the harness-frames d^5, the cording connecting them with the harness-levers, and the sheaves over which the said cording runs are all substantially as in my application, Serial No. 243,399, filed July 5, 1887.

In the loom described in the said application the carriages or lifters have a movement back and forth reversely at every other or alternate pick or rotation of the crank-shaft, and the warps are manipulated on what is

called the "open-shed" principle; but in this present invention, wherein it is desired to work the loom with what is known as a "closed shed," it is necessary to move the lifters or carriages reversely at every pick or rotation of the crank-shaft. To effect this change in the loom shown in the said application, I have removed from the crank-shaft the gear commonly found thereon and have replaced it with a gear j^5 of substantially twice the size of that employed in the loom described in the said application, it engaging and rotating a toothed gear, as k^5, having a crank-pin over which is fitted one end of the link p^5 referred to.

The gear j^5, as herein represented, contains spaces corresponding in size with and to receive the smaller or narrower teeth of the gear k^5, and the latter gear has a broad tooth 20 and two spaces at its sides, (see the detail, Fig. 5, showing parts of the said gears j^5 k^5,) into which spaces at each rotation of the gear j^5 enter the large teeth 21 of the gear j^5, the one broad or isolated tooth 20 entering the blank space between the teeth 21 21 on the gear j^5. The gear j^5 has a projection, as 23, at one side of it which is extended outwardly beyond the periphery of the gear k^5, and is convexed at its periphery to enter a concavity in a projection or flange 24, carried by the gear k^5. With the gears described the gear j^5 will rotate the gear k^5 once during each rotation of the crank-shaft, and owing to the broad teeth and spaces referred to on the respective wheels, and the projections 23 24, which act as a locking device to temporarily restrain the rotation of the gear k^5 for short intervals of time during each rotation of the crank-shaft, it results that the shed is held open a little longer than it would otherwise be during the movement of the lay, such holding open of the shed giving the shuttle a little longer time to pass through the shed. Further, in the changes which I have herein made in order to adapt the loom herein described to work with closed shed, I have provided the upper part of each arm or lever r^8, attached to the opposite ends of the rock-shaft r^6, with a slot, as 28, nearer to the said shaft than the point where the link 13 is connected to the arm r^8, and by connecting the link 14, jointed to the lifter or carriage e', to the said arm r^8 by a suitable pin or stud in the slot 28 it is possible to give to the carriage e' a movement of only substantially one-half that of the lifter or carriage e, and by moving these lifters or carriages twice as fast, and moving one of them only half as far as in the application referred to, it is possible to weave after the closed-shed method.

If it is desired with the same loom to weave upon the open-shed method, it may be done by connecting the links 14 with the arms or levers r^8 at equal distance from the rock-shaft r^6 and changing the gears j^5 k^5, so that the gear k^5 shall be substantially twice as large as the gear j^5. In the loom herein described, when to work with closed shed, the upper hooks or jacks d^6 are always in engagement with the lifter or carriage e', they being retained down by a holding-bar 80; but the hooks or jacks e^6 are engaged by the lifter or carriage e during its outward movement only when the harness-frame, co-operating with the particular jack engaged with the lifter, is to be raised into the upper half of the shed, the distribution of the jacks by or through the pattern-surface and the fingers g g' and the rods between the said fingers taking place when the lifter or carriage e is at its inward stroke and the lifter or carriage e' in its outward stroke, this stroke being, however, shorter, as has been described, and at the time this distribution of the jacks c^6 takes place all the harness-frames are at the middle position of the movement, or with the shed closed, as will be understood from the foregoing description by those conversant with the art of weaving.

In the diagram Fig. 2 I have shown part of one harness-lever with its attached connector and links 13 14 and one of the levers r^8, the said lever being shown, however, as having its upper end the shortest, which, it is obvious, it may have in practice, provided it is not desired to in the same loom change from open to closed shed.

The breast-beam A', the notched holding-plate A^2 for the shipper-handle A^8, and the lay B^2 are and may be all as usual.

The pattern-surface in practice is operated as in the application referred to.

When the loom is to be used for closed-shed weaving, the locking-bar m' is not needed, so I apply to the loom a holding-bar 80, (shown in Figs. 1 and 6,) which meets the hooked jacks d^6 and keeps their hooks in engagement with the carriage e', for otherwise the pattern-chain, acting on the fingers, would lift said jacks d^6.

I do not desire to limit my invention to that construction wherein the pattern-chain acts upon the upper set of fingers, for it is obvious that the said pattern-chain might act on the lower set of fingers, as in United States Patent No. 217,589. In Fig. 6 it will be noticed that the inner upturned ends of the fingers g' are cut off, so as not to strike the upper jacks d^6; but in case it is desired to operate with the usual open shed, then the fingers g' can have their inner ends upturned, as in the said application, so as to meet and lift the hooked jacks d^6, and the usual pin t, in the slot 28, by which the link 14 is joined to the lever r^8, will be placed in the slot t'. (Shown in Fig. 1 as located at the upper end of the arm farthest from the center of the shaft r^6.)

I have herein shown a series of harness-frames, harness-levers, cording connected to the tops and bottoms of the said levers, connections mounted on the said harness-levers, hooked jacks attached to the opposite ends of the said connections, a pattern mechanism to

select which of the said jacks shall be next engaged and moved, locking-bars to engage with the said hooked jacks when at one extreme of their movement and while held by the pattern mechanism out of engagement with the lifters, lifters to engage the said hooked jacks, and means to operate the said lifters, and devices acting positively to carry the ends of the connections back into their normal positions and place the hook-jacks so that they may engage with the said bars; but I do not claim the same specifically, as the same are shown and made the subject of claim in my application, Serial No. 243,399, filed July 5, 1887.

I claim—

1. The harness-levers, harness-frames, cording to connect the said levers and frames, two hooked jacks in operative connection with each harness-lever, two reversely-moving lifters, a rock-shaft having arms or levers, and means to connect the said lifters and arms at different distances from the center of the rock-shaft to thereby move said lifters over unequal distances, as described, and a pattern device whereby the harness-frames are moved to bring all the warps into the same plane before the formation of each shed, substantially as described.

2. The shaft k^2, the gear j^5, having two teeth 21, with a space between them, and a projection 23, and the gear k^5, having an isolated tooth 20, and two spaces, one at each side, a flange 24, combined with the harness-frames, harness-levers, connected cording, connected hooked jacks, lifters, and means between the said gear k^5 and lifters to reciprocate them, the said gear and lifters having a slight dwell during each rotation of the crank-shaft to afford more time for the passage of the shuttle through the shed, 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,

F. L. EMERY.