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PATENTED JAN 31 1871

HORACE WYMAN'S

IMPROVEMENT IN LOOMS

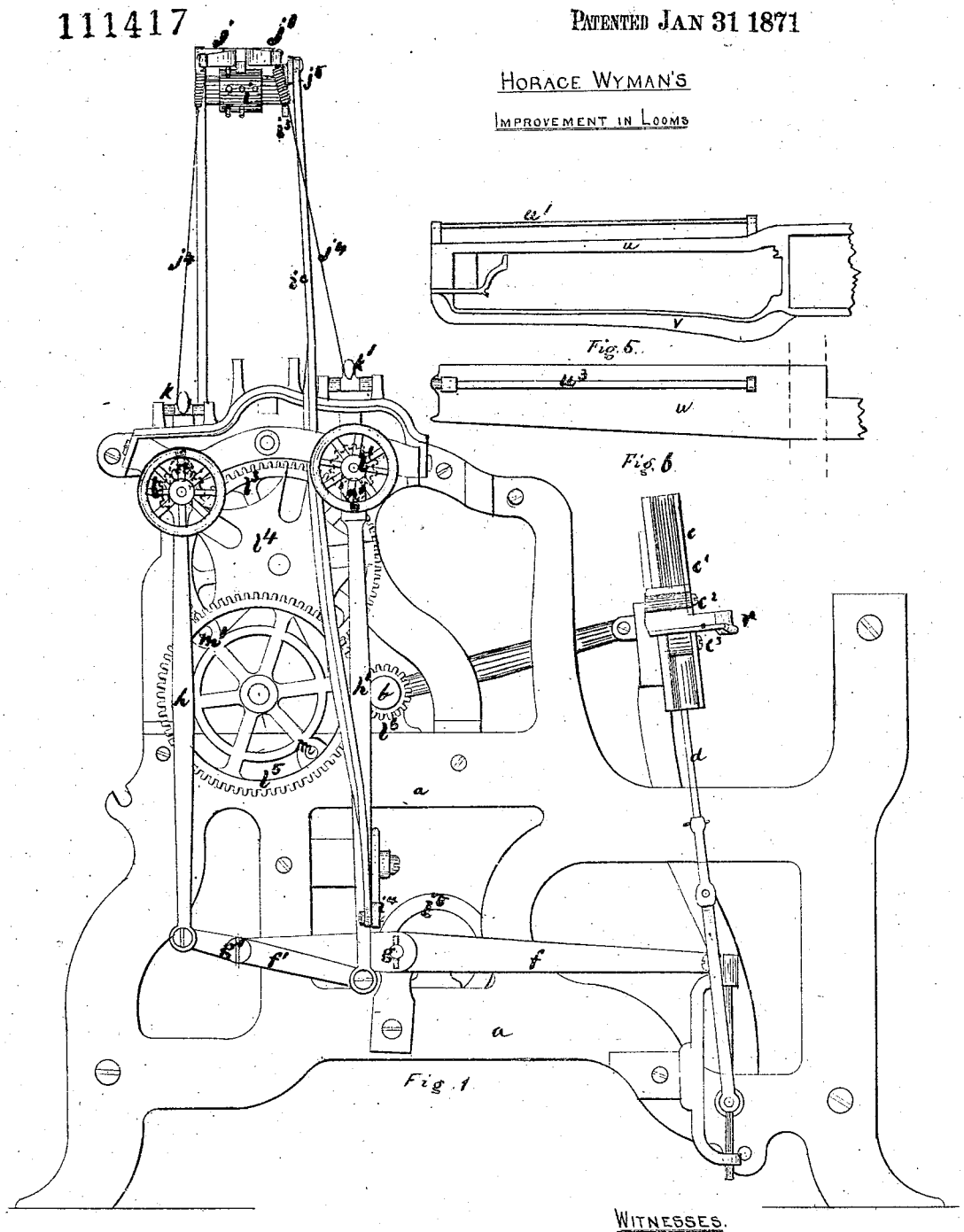

Fig. 1

Fig. 5.

Fig. 6

WITNESSES.

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H. A. Howard

INVENTOR Horace Wyman

Sheet 2.

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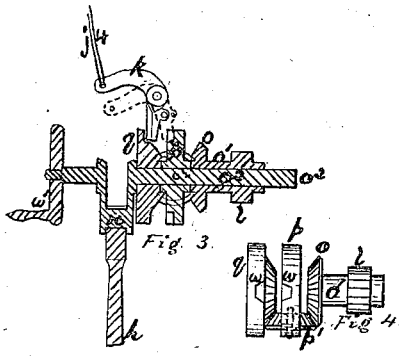

Fig. 3.

Fig 4

Fig 2

Fig 7

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HORACE WYMAN, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 111,417, dated January 31, 1871.

IMPROVEMENT IN BOX-OPERATING MECHANISMS FOR LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

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 a certain new and useful 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.

The invention relates to the box-changing mechanism of fancy looms, the object of the invention being a provision for effecting from a pattern-cylinder or chain the change from any one box to any other in a series of four or more; the transfer, whether from one box to an adjacent one, or to one most remote from it, being effected in the same time, and the operation of the mechanism being always reliable.

Referring to the drawing—

Figure 1 is a side elevation.

Figure 2 is a front elevation.

Figure 3 is a sectional elevation of one of the component parts of the box-operating mechanism.

Figure 4 is a plan of a part of the same.

Figure 5 is a plan of the end piece of lathe supporting the boxes.

Figure 6 is a back elevation of fig. 5, showing the slot for picker, with picker-rod removed.

Figure 7 is a side view of arrangement for adjusting the boxes with the race.

a is a loom-side.

b, a crank-shaft.

c c^1 c^2 c^3, the series of shuttle-boxes, supported on a vertical rod, *d*, which latter is attached by links *e* to the outer extremity of a box-lever, *f*, hung at *g*.

f^1 is a secondary lever hung at g^1 on the opposite extremity of box-lever *f*. It is by means of the oscillation of these compound-levers on their centers *g* and g^1 that the requisite shuttle-box is brought opposite to the shuttle-race.

By the upward or downward motion of the connecting-rods *h* and h^1, commanded by the pattern-chain *i*, suspended on a shaft, i^1, intermittent rotary motion is transmitted to the pattern-chain by the connecting-rod i^2, ratchet-wheel i^3, bell-lever i^4, by means of the side cam i^5.

Rotation of the pattern-chain causes the elevation or the depression of two fingers, *j* and j^1, hung on a common center, j^2, and from the extremity of each of these levers or fingers a wire, j^3, unites them with the horizontal arms of bell-crank levers *k* and k^1, the other extremities of which are obliged by the pattern-chain to assume one or the other of the positions indicated by dotted and by full lines in fig. 3.

Intermittent rotary motion is imparted to the two pinions (shown by dotted lines at *l* and l^1, in fig. 1) by the large gear l^2, keyed on the same shaft as the star-wheel l^3, which is actuated by the two studs *m* and m^1 on the wheel l^5, (which may be denominated the stud or spur-wheel,) receives its motion from the pinion l^7 on crank-shaft *b*.

The proportions of the gears *l* l^1 l^2 are such that one intermittent movement of l^7 imparts exactly one revolution to the pinions *l* and l^1.

When the bell-crank levers *k* and k^1, above referred to, are in the position indicated in dotted lines, fig. 3, the pinion *l* revolves without carrying with it the cranks *n* and n^1, and, when, on the contrary, it is in position indicated by the full lines, the rotation of the pinion causes the cranks to make exactly one-half of a revolution.

The cranks *n* n^1 are also set in such a manner that they assume, ultimately, but two positions, one raised, as at *n*, or the other lowered, as at n^1.

The mechanical parts effecting this result are more clearly shown in figs. 3 and 4, consisting,

First, in the pinion *l*, united with the bevel-wheel *o* by a sleeve, o^1, and running loosely on a shaft, o^2;

Secondly, in the disk *p*, keyed on the shaft o^2, and containing the small bevel-pinion p^1, gearing with bevel-wheel *o* and turning freely on its axis within the said disk;

Thirdly, in the disk-plate and bevel-wheel *q* cast in one and running loose on the shaft o^2; and

Fourthly, in the crank *n*, formed on the shaft o^2.

When, during the rotation of *l* and *o*, the bell-crank lever *k* is in the position indicated in full lines, the disk *q* being thereby held stationary, the wheel *o* will communicate rotary motion to *p* and *q*, but the shaft o^2 and its crank *n* will remain stationary. When, on the contrary, the lever *k* is locked in the loose disk *q*, as shown in full lines, the disk *q* will not be rotated; but the fast disk *p* and the shaft o^2 will be turned exactly one-half a turn.

k^3 k^3 are springs attached to the bell-crank levers *k* and k^1, and to the framing of the loom for the purpose of engaging the bell-crank levers with the disk *p* when not raised by the pattern-chain.

It will thus be seen that the pinions *l* l^1 are constantly rotating intermittingly, (at each turn of the crank-shaft, or every second turn if boxes are on one side only,) but that it depends on the position of the bell-crank levers *k* k^1, which are under command of the pattern-chain, whether they rotate the cranks *n* n^1 and thereby either elevate or depress the series of shuttle-boxes *c* c^1 c^2 c^3.

I will now describe how the elevation or the depression of the connecting-rods *h* h^1, by the cranks *n* n^1, act on the box-lever *f* in such a manner as to

ring the requisite shuttle-box of the series opposite the shuttle-race. It is the box c^1 which is shown in line with the shuttle-race.

If, in the first place, it is the crank n^1 which is reversed by its half revolution upward, then each rod r^1 acting on the compound or auxiliary lever f^1 forces it to assume a horizontal position; and since this lever is articulated on the box-lever f at g^1 it depresses the front end of said lever f to the extent of one box, thus bringing c opposite the shuttle-race.

In the second case if the crank n is caused to reverse its position the boxes will be moved two divisions, thus bringing c^2 opposite the shuttle-race, the crank n remaining in position, as shown in fig. 1.

In the third case, if the cranks n n^1 being in the same position, either up or down, are both reversed simultaneously, the boxes will be moved three divisions, the boxes being at c will move to c^3.

In the fourth case, one crank being up and the other down, and both being reversed simultaneously, the series will be moved one compartment, c^1 being in line with the shuttle-race, the movement bringing c^2 into that position.

It will thus be seen that by the combined action of these cranks any of the four compartments of the shuttle-boxes can at any time be brought opposite the race.

It will also be further understood that by multiplying these cranks and their concomitant parts any increased range of compartments may be used and each compartment raised or lowered by a positive motion, all their motions beginning and ending at the same period with regard to the rotative operation of the crank-shaft of the loom.

In the disks p and q the mortises by which they are locked or held from rotating by the lever k are made with beveled or inclined sides w w, fig. 4, as is also the lower end of k, the lever being held in the recess of disk p by the spiral spring k^3, or in the recess of the disk q by the wire j^4 and spiral spring j^5, as required by the pattern-chain.

It will thus be seen that the cranks can be turned and the boxes adjusted by hand by the wheel w^2; the inclined sides w forcing the springs (j^5 or k^3, as the case may require,) to give way. The inclined sides in disk q will also force the spring j^5 to give way if any unusual resistance comes upon the boxes while in the act of moving such, as the shuttle partly entering the boxes, the picker remaining in the boxes instead of retiring to the outer end, &c., thus preventing any breakage of parts during the running of the loom.

In figs. 2 and 7 the vertical rod d is shown with a continuation, r, provided with a slot, r^1, in which the stud in the lower end of the connector e is fitted so that the part r, and with it the boxes c c^1 c^2 c^3, may be adjusted vertically by the screw s and there be securely clamped by the screw and nut t of the stud.

It will thus be seen that by the combined action of s and t the series of shuttle-boxes may be accurately adjusted, vertically, with the race-board of the lathe.

In figs. 5 and 6 is shown detached views of the frame or support for the series of shuttle-boxes with the usual back u to support the picker-rod u^1 and slot u^3, for picker to move in, but from the outer end it is provided with a return-piece, v, in front of the boxes, returning to and connected with the front of the lathe, leaving it entirely open at the bottom, thus giving increased strength to the frame or support, and also allowing any number of boxes to be used with a comparatively light frame or support.

I claim as of my own invention—

1. The pinion-and-spur or stud-wheel, the star-wheel and all the gearing therefrom, which operate the cranks through the government of the pattern-chain and its connections, when all are constructed and combined with the connectors and compound-levers to actuate the shuttle-boxes, as described.

2. The combination of the disks p and q, the bell-crank levers k and k^1, and springs k^3 j^5, as and for the purpose described.

HORACE WYMAN

Witnesses:
J. A. WARE,
F. A. HOWARD.