

(No Model.)

H. WYMAN.
SHUTTLE BOX MECHANISM FOR LOOMS.

No. 561,467.

Patented June 2, 1896.

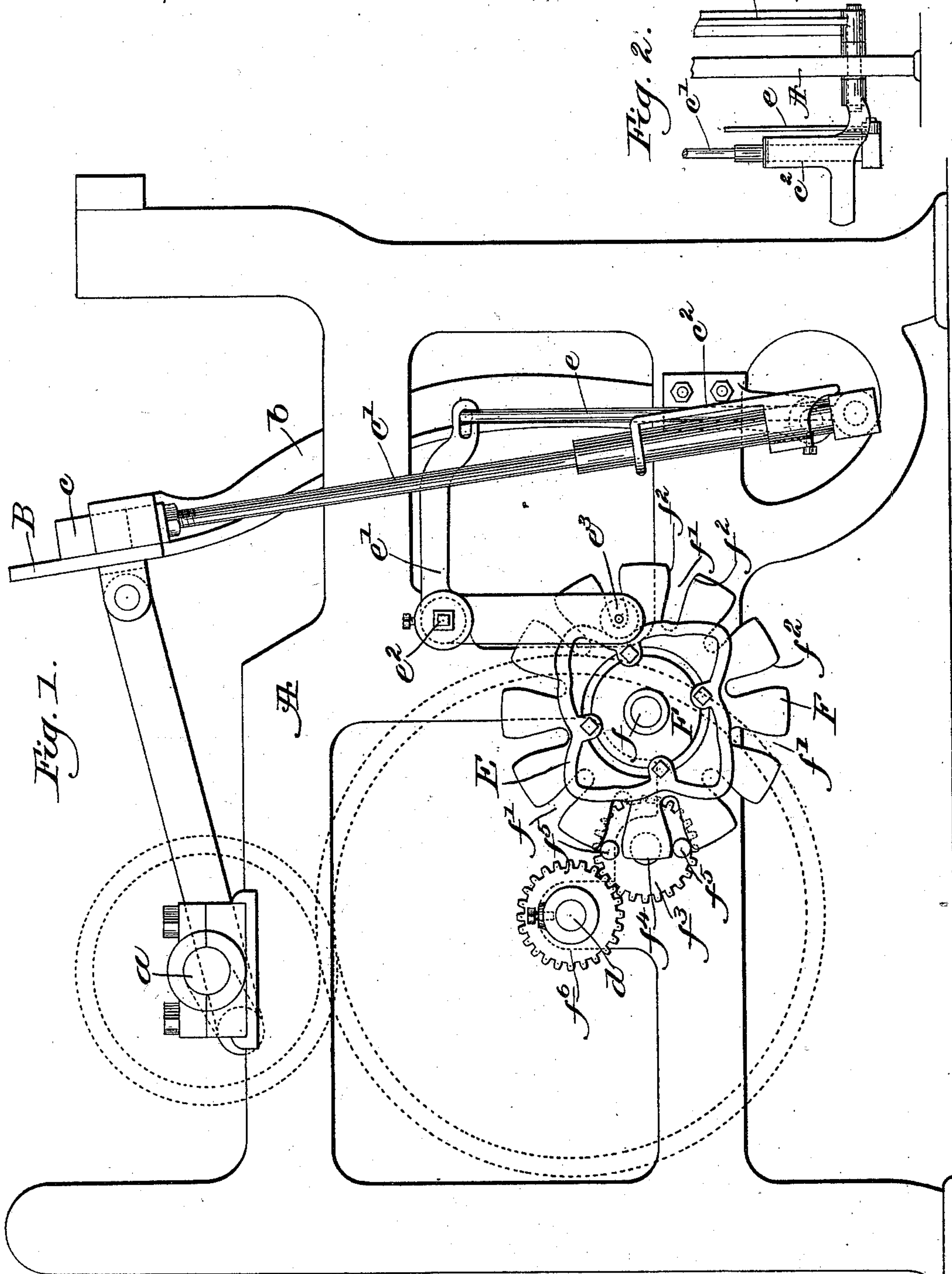


Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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

SHUTTLE-BOX MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 561,467, dated June 2, 1896.

Application filed January 11, 1896. Serial No. 575,095. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Shuttle-Box 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.

This invention relates to mechanism for changing or shifting the shuttle-boxes of a loom.

In the operation of a modern loom the time in which the shuttle-boxes must be shifted is very short, and the box mechanism must act quickly and with precision.

Frequently the boxes and their connections are of considerable weight, and the shafts, wheels, and other parts required to move the same must necessarily be heavy and strong, so heavy, in fact, that difficulty is found in operating them at the speed and with the accuracy desired.

My present invention has for its object to provide an improved and novel box mechanism wherein the number and speed of operation of the several parts are reduced to a minimum.

In accordance with my invention the box operating or shifting member is actuated by a cam, as heretofore, said cam, however, being in my invention rotated by a wheel provided with a plurality of slots or notches to enable it to be intermittently rotated by a driving-wheel provided with a plurality of projections adapted to enter said slots or notches.

In the preferred embodiment of my invention the slotted or notched wheel will be of considerable diameter and provided with a large number of slots in order that each step-by-step or rotative movement of the wheel may be as slight as possible.

By my invention a continuously-rotating wheel may be made to engage the notched wheel for nearly one-half of each rotation of the former, yet act through only about one-quarter of each rotation to actually move the said notched or slotted wheel and its cam, so that a quick intermittent cam movement may be obtained from a continuously and relatively slow rotating driving-wheel.

In the drawings, Figure 1, in end elevation, shows a sufficient portion of a loom to enable my invention to be understood, Fig. 2 being a detail to be referred to.

In the particular embodiment of my invention illustrated in the drawings the frame, (indicated at A,) the crank-shaft *a*, connected with and to vibrate the lay B, the lay-swords *b*, the shuttle-box *c*, its lift-rod *c'*, the swinging bracket or frame *c''*, connected with and vibrated with the lay and in which the lift-rod *c'* slides, and the main or driving shaft *d*, geared to and operating the crank-shaft, are and may be of suitable or usual construction and operation, and need not be herein described in detail.

In the present instance of my invention the shuttle-box lift-rod *c'* is connected by a link *e* (see Fig. 2) with one arm of the bell-crank lever or shifting member *e'*, fulcrumed at *e''* on the frame and having its other arm provided in the present instance with a suitable roller-stud *e'''*, held in operative contact with the cam E by the weight of the shuttle-box on its lift-rod, or a suitable spring may be employed, if desired.

The cam E, as herein shown, is provided with a plurality (shown as four) of projections or tappets, of the same or, as herein shown, of different heights, to impart the desired movement to the shuttle-box, ranging from its highest to its lowest position, and these tappets or projections are preferably so formed or shaped, as shown, as to reduce so far as possible all unnecessary movement of the cam, and also of such shape as to most quickly shift the box when the cam is changed. For instance, the depression between two tappet projections is of a size nearly or quite fitting the roller *e'''*, so that the initial movement of the cam will act to move the roller and partially lift the shuttle-box, and the highest portion of the projection is made as pointed as is practicable in order that no unnecessary movement of the cam shall take place when the roller has reached the highest point on any projection.

The cam E, as herein shown, is bolted or otherwise secured to the face of a wheel F, loosely mounted upon a stud *f*, or it may be made fast upon a shaft, if desired, so long as

it is free to be rotated. This wheel F, as herein shown, is provided with a large number of radial slots or notches f' , the entrances to which are made preferably slightly flaring, as at f^2 , said wheel being driven by the driving-wheel f^3 , fast on a shaft, or it may be loosely mounted upon a stud f^4 on the frame and provided with a plurality, preferably two, projections or pins f^5 , adapted to enter the slots f' in the wheel F to drive the latter.

The driving-wheel f^3 may be geared to and driven by a mating wheel f^6 , fast on the main or driving shaft d of the frame.

In the present instance of my invention the shaft d rotates once for each two picks of the loom, and a corresponding rotation is imparted to the driving-wheel f^3 , as the two wheels are of substantially the same diameter. At each rotation of the driving-wheel f^3 one of its pins f^5 enters a notch or slot f' in the slotted wheel F and turns the latter a distance represented by the distance between two slots on the wheel.

In the drawings one of the pins is shown as just entering a slot and the other pin as just leaving another slot, and starting from this position of the driving-wheel the uppermost pin f^5 will rotate for nearly one-eighth of a rotation of the driving-wheel before it will begin to move the slotted wheel F. It will then move the wheel through substantially one-quarter of its rotation and will then permit the said slotted wheel to stand at rest for another one-eighth of a rotation before its pin leaves the slot in the wheel, and, therefore, since the slotted wheel is held against movement during an eighth of a rotation before a pin leaves a slot, and after a pin leaves a slot for another one-eighth of a rotation, while the other pin is entering a new slot, the wheel is held against movement for one-quarter of a rotation of the driving-wheel f^3 , is then moved for a distance represented by one-quarter of the rotation of the said driving-wheel and again rested for another one-quarter of a rotation of said wheel, and so on. The slotted wheel F therefore is given an intermitting rotary movement by and from a continuously-rotating driving-wheel, the slotted wheel having two movements and two periods of rest, all of substantially the same duration, during each rotation of the driving-wheel.

The driving-shaft d and driving-wheel f^3 rotate at a relatively slow speed, and the slotted wheel F, being of relatively large diameter with a large number of slots f' , receives only a comparatively short movement for each shifting of the shuttle-box, so that the wear and tear of the parts is reduced to a minimum, and the high speed heretofore necessary in operating the parts of the box mechanism is entirely overcome. Furthermore, the pins working in the slots start the slotted wheel easily and without shock, thereby differing from pawl-and-ratchet or other mechanism

for imparting a relative intermitting motion to the cam-wheel.

It will be noticed that in the mechanism shown embodying my invention the axis of the driving-wheel f^3 lies inside of the peripheral line of the driving-wheel F. Hence one of the pins f^5 enters its slot at the top of the driving-wheel before the other pin leaves its slot at the bottom of said wheel, so that the driving-wheel F is always under the direct control of at least one of the pins f^5 , whereas if the axis of the said driving-wheel was outside the peripheral line of the driving-wheel one of the pins must necessarily leave its slot before the other pin can fully enter its slot, thereby leaving the driving-wheel for at least two periods in each rotation of the driving-wheel without any means of holding it in position, except some means independent of the pins be provided to retain it positively in position during the periods when it is not engaged by one or the other of the pins.

My invention is not limited to the particular shape and construction of parts herein shown, for it is evident the same may be varied without departing from the spirit and scope of my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a box mechanism for looms, the combination with a box-shifting member and a rotatable cam to actuate the same, of a slotted wheel connected with and to actuate said cam, and a driving-wheel provided with two diametrically opposite projections to enter the slots in and impart an intermitting rotation to said slotted wheel, one of said projections entering its slot before the other projection leaves its slot, whereby said projections serve to retain said slotted wheel against movement between successive intermitting movements, substantially as described.

2. In a box mechanism for looms, the combination with a box-shifting member and a rotating cam, provided with tappet-like projections of different height to shift the said shifting member into different positions, of a slotted wheel connected with and to actuate said cam, and a driving-wheel provided with a plurality of projections to enter the slots in and impart an intermitting rotation to said slotted wheel, one of said projections entering its slot before another projection leaves its slot, whereby said projections serve to retain said slotted wheel against movement between successive intermitting movements, substantially as described.

3. In a box mechanism for looms, the combination with a box-shifting member and a rotatable cam provided with a plurality of tappet-like projections, of a wheel connected with and to rotate said cam, and provided with a plurality of slots, and a driving-wheel having a plurality of projections to enter the slots in and to impart an intermitting rota-

tion to said slotted wheel, said driving and
slotted wheels being arranged to cause one
driving projection to enter its slot before
another leaves its slot, whereby said slotted
5 wheel is always under the direct control of
said driving-wheel, substantially as described.

4. In a box mechanism for looms, the com-
bination with a box-shifting member and a
rotatable cam to actuate the same, of a wheel
10 connected with and to actuate said cam, and
provided with a plurality of slots having
flaring entrances thereto, and a driving-wheel
provided with a plurality of projections to en-

ter the slots in and to impart an intermitting
rotation to said slotted wheel, the axis of said 15
driving-wheel being inside the peripheral
line of said slotted wheel, substantially as
described.

In testimony whereof I have signed my
name to this specification in the presence of 20
two subscribing witnesses.

HORACE WYMAN.

Witnesses:

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EMMA J. BENNETT.