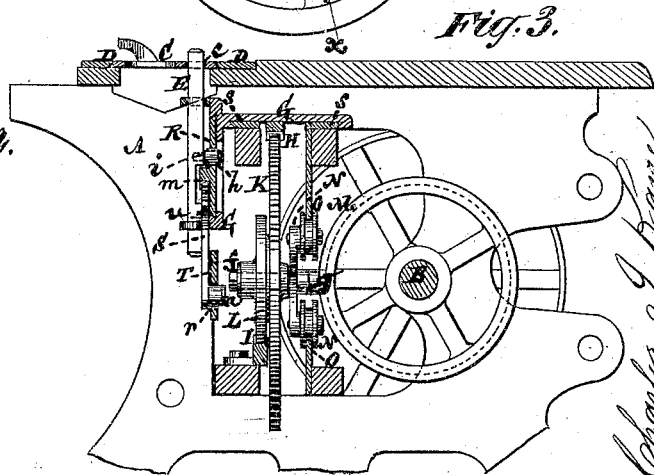
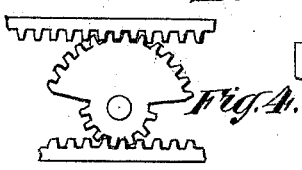
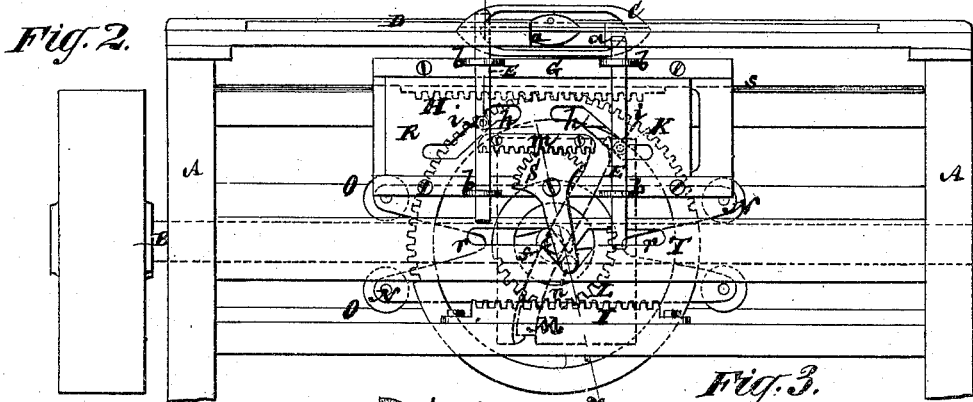
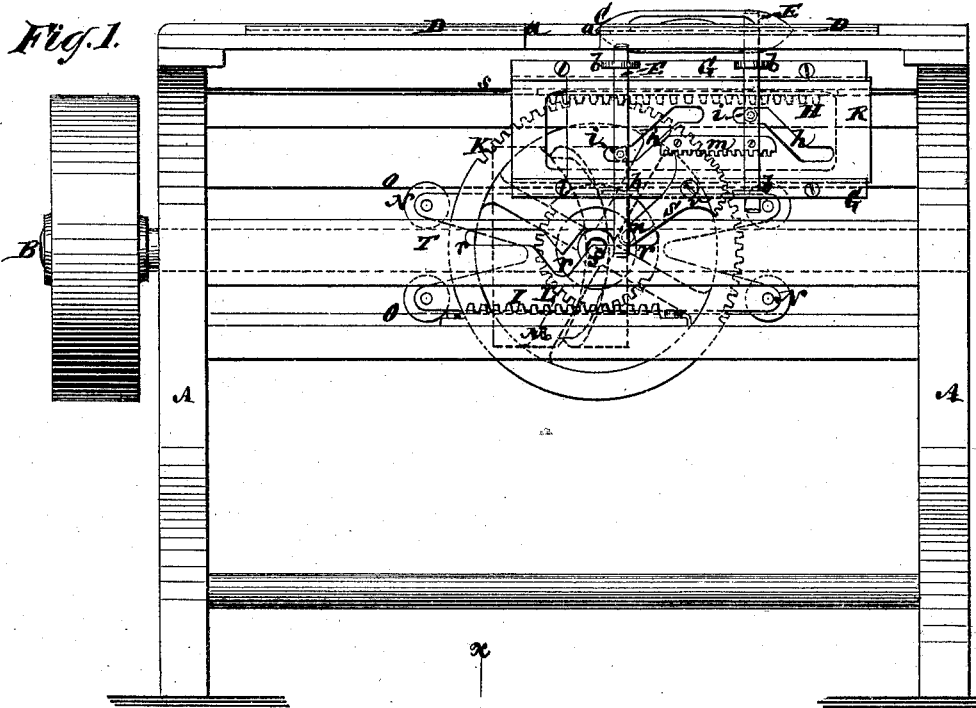


C. I. KANE.  
Shuttle-Driving Mechanism for Looms.  
No. 212,707.      Patented Feb. 25, 1879.



*Witnesses*  
*John Becker.*  
*Fred. Noyne*

*Charles J. Kane*  
*by his Attorney*  
*Chas. W. Brown & A. W. Allen*

# UNITED STATES PATENT OFFICE.

CHARLES I. KANE, OF NEW YORK, N. Y., ASSIGNOR TO THE NEW YORK SILK MANUFACTURING COMPANY, OF SAME PLACE.

## IMPROVEMENT IN SHUTTLE-DRIVING MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. 212,707, dated February 25, 1879; application filed November 14, 1877.

To all whom it may concern:

Be it known that I, CHARLES I. KANE, of the city and State of New York, have invented certain new and useful Improvements in Shuttle-Driving Mechanisms for Looms, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention is more particularly designed for narrow-ware looms; and its principal object is to obtain an accelerated motion for the shuttle-carrier and its shuttle from a reciprocating device, driven by a cam or otherwise, and having a slower motion than said carrier.

To this end the invention principally consists in certain combinations of means, including a stationary rack, a rack connected with the shuttle-carrier, and an intervening gear arranged to roll over or along the stationary rack, and to actuate the movable rack of the shuttle-carrier.

One part of the invention includes an intervening gear in duplicate, of different diameters, or a single gear of different radius on opposite sides of a common axis, to impart an increased accelerated motion to the shuttle-carrier, as hereinafter described.

The invention also consists in a novel and advantageous means for operating the fingers by which motion is communicated to the shuttle, and for securing the passage of the latter through the shed without interference with the warp by the fingers.

Figure 1 represents a front view of a narrow-ware loom having my invention applied; Fig. 2, a similar view of the same, in part, with the working devices in a different position; and Fig. 3, an irregular vertical section on the line *xx* in Fig. 2. Fig. 4 is a diagram illustrating a modified construction of the intervening rolling gear between the stationary rack and the movable rack of the shuttle-carrier.

A is the frame of the loom, and B a driving-shaft carried by said frame. C is the shuttle, and D the shuttle-race, intersected by a central space, *a a*, to provide for the passage and shedding of the warp. E E are the driving-fingers of the shuttle. These fingers are arranged to slide up and down within or through

guides *bb* on the "shuttle-carrier," as the frame G, carrying said fingers, may be termed, and said fingers are operated so that they alternately engage with and disengage from the shuttle at its opposite ends by passing in and out of apertures *c* in the shuttle.

The shuttle-carrier G is constructed to reciprocate on or along ways *s s*, and has attached to its under face a rack, H. Between this rack and a lower stationary rack, I, is a curvilinearly-reciprocating toothed gear having a rolling action over and along the fixed rack I, and actuating on the opposite side of its axis the movable rack H of the carrier G. The travel of said intervening toothed gear over and along the stationary rack I, coupled with its rotation about its axis, gives an accelerated motion to the shuttle-carrier G. This accelerated motion of the shuttle-carrier may be still further increased by employing duplicate intervening rolling gear of different diameters, or a single rolling gear of shorter radius on that side of its axis on which it engages with the stationary rack I than on the opposite side of its axis, on which it engages with the movable rack H of the shuttle-carrier G, as shown in Fig. 4.

The construction or combination of parts shown in Figs. 1, 2, and 3 is substantially the same, only that independent toothed wheels or sectors K and L, fast on the same arbor *f*, gear with the racks H and I—that is to say, the wheel or sector K, which is of larger radius, gears with the movable rack H of the carrier, and the wheel or sector L, which is of lesser radius, gears with the stationary rack I. Such duplicate gears virtually form but a single gear of different radius on opposite sides of its axis.

When a lesser accelerated shuttle-motion is required, a single intervening rolling gear of equal radius on opposite sides of its axis to gear with the racks H and I may be used.

This rolling intervening gear, whether made single or double, and of equal or unequal radius on opposite sides of its axis, may have its motion imparted to it substantially as follows: On the shaft B is a grooved cam, M, which engages with a roller or stud, *g*, on a roller-frame, N, that is free to reciprocate along or

between ways O O. This roller-frame N carries on its one side or face the arbor *f*, on which are the wheels K L, constructed to rotate together. As the wheel L rolls over the stationary rack I, it serves to secure for the movable rack H a certain accelerated velocity relatively to the roller-frame N; and as the larger wheel K imparts motion to the movable rack H, this accelerated velocity is increased in proportion to the difference in diameters of the wheels K and L. Thus from a comparatively slow driving motion of the cam a highly-accelerated velocity is obtained for the shuttle. Instead of the driving-cam, a crank applied either directly or otherwise might be employed to reciprocate the rolling gear over the stationary rack; or when a cam is used it may be applied indirectly to reciprocate the bar or frame which carries the rolling gear; or any other equivalents may be used for the same purpose.

In the face of the shuttle-carrier G is a longitudinally-sliding plate, R, which has cam-slots *h h* in it. These slots receive rollers or studs *i i* on the fingers E E, for the purpose of actuating the latter as the plate R moves to and fro, so that as one finger approaches the warp it is disengaged from the shuttle by its controlling cam-slot *h*, and the other finger continues the motion of the shuttle until the disengaged finger has passed the warp, when it, in its turn, is made to again engage with the shuttle, and the remaining finger is withdrawn from its aperture in the shuttle to provide for the passage of the heel of the latter out of the warp. The sliding plate R is reciprocated at intervals to give the requisite in-and-out motion of the fingers to the shuttle as said fingers are reciprocated in common with the shuttle-carrier G. This is done by means of a toothed sector, S, pivoted to the

carrier G at *v*, and gearing on one side of its axis with a rack, *m*, on the sliding plate R, and controlled by a slotted fixed bar, T, on the opposite side of its axis, a roller or stud, *n*, on said side of it entering within a guiding-slot, *r*, in the stationary bar T. This secures a very steady and reliable action for the fingers, which are guided by the loops or guides *b b*, both above and below the operating connection of said fingers with the sliding plate R.

I claim—

1. The combination, with the stationary rack I and the shuttle-carrier having an attached rack, H, of an intervening rolling gear, arranged to engage with both of said racks, and mechanism for actuating said gear, substantially as specified.
2. The combination, with the stationary rack I and the shuttle-carrier having a rack, H, of an intervening rolling gear, of unequal radius on opposite sides of its axis, and arranged to engage with both of said racks, essentially as and for the purpose herein set forth.
3. The combination, with the stationary rack I, the shuttle-carrier having a rack, H, and the interposed rolling gear, of a cam, M, applied to act directly upon a stud or projection in axial relation with the rolling gear, substantially as specified.
4. The combination, with the shuttle C and fingers E, of the shuttle-carrier G, having guides *b b* for the fingers, and mechanism for reciprocating said carrier, the sliding plate R, provided with rack *m*, and having cam-slots *h h*, to receive studs or rollers carried by the fingers, the toothed sector S, and the slotted bar T, substantially as specified.

CHARLES I. KANE.

Witnesses:

HENRY T. BROWN,  
FRED. HAYNES.