To all whom it may concern:

Be it known that I, THOMAS PERKS, a subject of the King of Great Britain, and resident of Keighley, in the county of York, England, have invented a certain new and useful Improvement in Picking or Shuttle-Actuating Mechanism for Looms, of which the following description, having reference to the accompanying sheets of drawings, is a specification.

My invention relates to the type or class of picking or shuttle actuating mechanism for swivel or small ware looms wherein the shuttles are moved positively in both directions by mechanical devices which are continuously in motion but which without the employment ofcams or cam surfaces move the reciprocating bar which carries said shuttles and cause same to rest or remain stationary for the desired time in manner well known, and the object of my present invention is the production of said actuating mechanism of such a character that without the employment of cam surfaces we reciprocate the said bar which carries the shuttles and cause same to rest or remain stationary at each end of its path of motion for equal or approximately equal periods of the desired length while still keeping the said actuating mechanism continuously moving.

In this type or class of picking or shuttle actuating mechanism in order to change the rotary motions of one or other of the loom's shafts into a reciprocatory motion for actuating the shuttle without the employment ofcams, rotary cranks have been made use of, and in the employment of this type of mechanism when the crank is moving through one portion of its path, a certain period of rest is given to the shuttle at one side of the fabric while the motions of the same crank at the other period of its path are increased in speed to such an extent that the period of rest of the shuttle on the opposite side of the fabric is very much shorter than that at the former, and this is rectified by my present invention.

Figure 1 is an end elevation of sufficient of a loom to show the application thereto of my improved parts.

Fig. 2 is a front elevation of parts shown by Fig. 1.

Fig. 3 is a plan of the parts shown by Figs. 1 and 2.

Figs. 4 and 5 illustrate modifications of the shuttle actuating mechanism as seen from within the loom or in the opposite direction to that shown by Fig. 2.

A indicates one of the end frames of the loom, B one of the layords of said loom, and C the shuttle race.

In carrying my invention into effect I make use of a reciprocating bar 2 which is actuated by being connected to the vertical lever 3 by the connecting rod 4, which rod 4 is pivoted to said lever 3 at 4° and to the bar 2 at 4°. The bar 2 is supported in its horizontal path by grooved bowls or runners 5, 5°. The lever 3 is pivoted at 3° upon the rail 6 known as the "swing rail" upon which the layords B are fixed. The said lever 3 is connected by an adjustable connecting rod 7 to a bell crank lever 8, its points of connection being at 7° to the former and 7° to the latter. The bell crank lever 8 is pivoted at 8° to the layord B.

The horizontal arm of said lever 8 has connected to it a connecting rod 9 which couples it to the horizontal lever 10 and this horizontal lever 10 is pivoted at 10° upon a bracket fixed to the end frame A.

According to one of my arrangements the lever 10 is connected by the rod 11 to the eccentric wheel 12, its points of connection to the former being 11° and to the latter 11°. The eccentric wheel 12 is mounted to rotate on the shaft or stud 13 carried by the bracket 14 fixed to the end frame A, while said eccentric wheel 12 is made to mesh or gear with an eccentric wheel 15 fixed or keyed upon the shaft 16 supported by the framework of the loom.

Upon the same shaft 16 is also fixed an elliptical wheel 17 which meshes or gears with another eccentric wheel 18 fixed or keyed upon the shaft 19 which is one of the motor shafts of the loom. The eccentric wheels 12 and 15 are of equal diameters so that one revolution of the wheel 15 transmits one revolution to the wheel 12, while the wheel 17 is double the diameter of the wheel.
10 so that two revolutions of the wheel 18 are required to effect one revolution of the wheel 17.

As the eccentric wheel 12 (which may be termed the crank wheel since it carries the crank pin 11\(^\text{b}\) for operating the connecting rod 11) rotates, during the time that it is carrying the crank pin 11\(^\text{b}\) over what may be termed the "top center" as shown in broken lines Fig. 1, that portion of the arc of a circle c in which it travels and as represented by the radii a, and b is so near coincident with the arc of a circle d struck from the center 11\(^\text{a}\) shown in broken lines of said Fig. 1, that no appreciable or effective motion is at that time transmitted to the lever 10, hence a certain amount of rest or "dwell" occurs in the movement of the bar 2 at such time. When the wheel 12 is carrying the crank pin 11\(^\text{b}\) through the lower portion of the arc of a circle as illustrated in full lines by Fig. 1, at such time comparatively little rest or "dwell" occurs in the motion of this crank pin as the curvature of two arcs c and d theoretically only are coincident in a point, consequently provided the motions of the bar 2 relied on this irregularity in the movement of the crank pin 11\(^\text{b}\) as produced by the wheel 12 had such wheel to revolve regularly, would be irregular; that is to say, it would rest or "dwell" at one extreme part of its movements, while at the other part it would return quickly.

To counteract or avoid this irregularity I rotate the wheel 12 as hereinbefore stated by the eccentric wheel 15 so that instead of the wheel 12 being rotated at a regular speed it has a quick and slow motion transmitted to it in each revolution, the slow motion being when the lever 10 and consequently the crank pin 11\(^\text{b}\) are in their lowest positions as shown in full lines Fig. 1, while the quicker motion of said wheel 12 is when the lever 10 and the lever 10 are in their highest positions. Still, however, I do not obtain sufficient rest or "dwell" by these means alone so that to secure more or one for a long period we make use of the elliptical wheel 17 and eccentric wheel 18, the former being double the size of the latter and of such shape as to give rest or "dwell" to the latter at two parts of each revolution, and these two parts are arranged to be so that said rest or dwell shall occur when the lever 10 is in its highest position and its lowest position respectively, at which time the key-swords B are moved into the position shown by Fig. 1, which position is as is well known that which they occupy when the reed is beating up the weft, and when the shuttles have to be at rest.

The shuttle operating or sliding bar 2 is preferably of wood or some light material, and the projecting pins 20 and 20\(^\circ\), which are for engagement with the shuttles, are made to slide in a vertical direction from said bar 2 upon which they are mounted in appropriate guiding pieces 21, 21\(^\circ\) fixed upon said bar 2 in order to keep said pins 20 and 20\(^\circ\) in their proper positions while being moved to engage with and be disengaged from the shuttles in manner well known. Extending laterally from the parts carrying the pins 20 and 20\(^\circ\) are other pins 22 and 22\(^\circ\) upon which runners 23 and 23\(^\circ\) are mounted to take into a cam groove 24\(^\circ\) formed in a cam rail 24 which is fixed upon or so as to travel with the shuttle race C, thus each pin 20 and 20\(^\circ\) is operated independently of its neighbor and at such time as is determined by the cam groove 24\(^\circ\) in the rail 24.

In cases where it is found advantageous to be able to adjust the pins 20 and 20\(^\circ\) nearer together or farther apart according to the size of the shuttle that may be employed, I then make use of levers 25 for actuating said sliding pins and mount these levers upon the sliding bar 2 so that they may engage with sliding parts carrying said pins at one end and with a crank pin 26 projecting from a partly toothed crank wheel 26 at the other end, said crank wheel 26 being mounted to rotate upon the said bar 2. These crank wheels 26 are for engagement with their respective racks 27 which are fixed upon a stationary bar 28 so that by reciprocating the bar 2 on the wheels 26 engaging with the racks 27, the necessary motion is transmitted to the pins 20 and 20\(^\circ\) to enable these latter to engage with the shuttle as is above stated. The blank portions of the crank wheels 26 are for engaging with the blank part on the bar 28 in order to retain said crank wheels 26 in their proper positions when not being notched upon the teeth 27 of the racks. By this arrangement of rack devices I am enabled to place said operating racks 27 closer together or farther apart as occasion may require, the crank wheel 26, levers 25 and supports for the sliding pins 20 also being adjustable in order that their operations closer together of farther away may be effected.

Instead of the levers 25 intervening between the crank wheels and the sliding parts carrying the pins 20, I may dispense with these levers and mount the partly toothed crank wheel 29 upon the bar 2 so that its crank pin 29\(^\circ\) may take through a slot in the sliding part carrying the pin 20, while I again make use of the racks 27 and the bar 28 for carrying same.

Such being the nature and object of my said invention, what I claim is:

1. In shuttle actuating or picking mechanism for looms, an eccentric wheel, an elliptical wheel gearing therewith, an eccentric wheel fixed upon the same shaft as said elliptical wheel, an eccentric wheel gearing with the last named eccentric wheel, a crank pin
carried thereby, and means actuated by said
crank for operating the shuttles.

2. In shuttle actuating or picking mecha-
nism for looms, an eccentric wheel, an ellip-
tical wheel gearing therewith, an eccentric
wheel fixed upon the same shaft as the lat-
ter, an eccentric wheel gearing with said ec-
centric wheel, a crank pin carried by the
latter eccentric wheel, a lever operated by
said crank pin, lever and rod connections 10
from said lever for actuating the shuttles,
and means for engaging, disengaging and
guiding said shuttles.

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