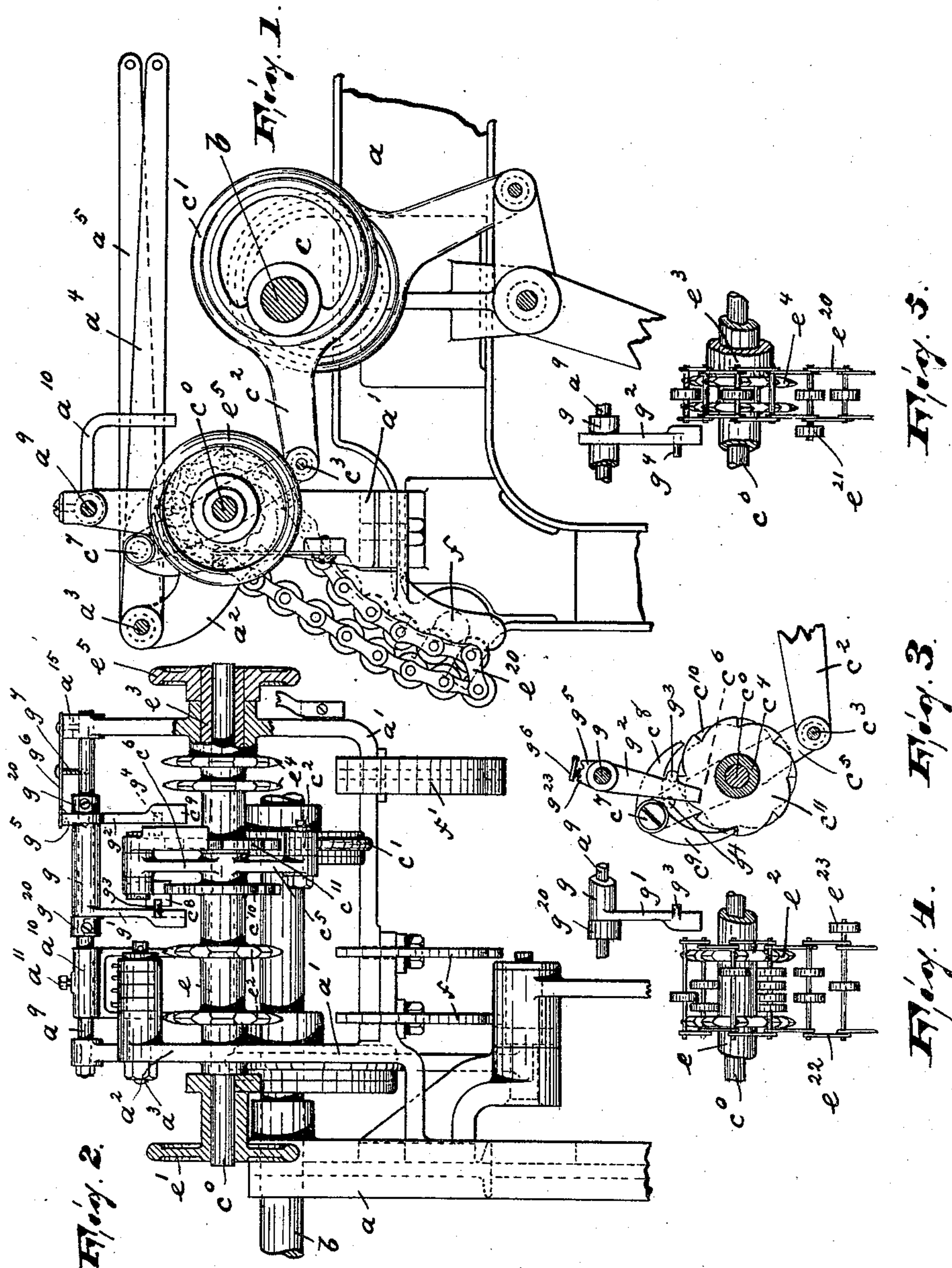


(No Model.)

A. F. DU FAUR.  
MULTIPLIER FOR LOOMS.

No. 572,250.

Patented Dec. 1, 1896.



WITNESSES:  
*Felicia Gartner*  
*Wm. Drrell.*

INVENTOR:  
*Adolf Faber Du Faur*

BY *Gartner & Co*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

ADOLF FABER DU FAUR, OF NEWARK, NEW JERSEY, ASSIGNOR TO ROBERT  
ATHERTON, OF PATERSON, NEW JERSEY.

## MULTIPLIER FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 572,250, dated December 1, 1896.

Application filed August 5, 1896. Serial No. 601,694. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLF FABER DU FAUR, a citizen of the United States, residing in Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Multipliers for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of my present invention is to provide a multiplier for box-loom, by means of which certain picks can be repeated without the use of a long and cumbersome pattern-chain, of simple, strong, and durable construction and reliable in operation.

The invention consists in the improved multiplier, its actuating and controlling mechanism, and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described and finally embodied in the clauses of the claim.

In the accompanying drawings, Figure 1 is a side elevation of my improved multiplier arranged on a portion of a loom-frame of ordinary construction; Fig. 2, a rear elevation thereof, the pattern and the auxiliary chain being removed; Fig. 3, a detail view of the sprocket-wheel actuating and controlling mechanism; and Figs. 4 and 5 detail views of the sprocket-wheels and of the pattern and auxiliary chains, respectively, carried thereby.

In said drawings, *a* represents a portion of a loom-frame, and *a'* a bracket-frame secured thereto, which latter furnishes the bearings for the shaft *c*<sup>0</sup>, which is arranged parallel to the main driving-shaft *b*, mounted in the loom-frame *a*. On the shaft *c*<sup>0</sup> is securely mounted a sleeve *e*, having integral therewith (or fixed thereon in any desired manner) the sprocket-wheel *e*<sup>2</sup> and ratchet-wheel *c*<sup>10</sup> and also the wheel *e'*, by means of which the shaft *c*<sup>0</sup> may be rotated by hand. On said shaft *c*<sup>0</sup> is also loosely mounted a sleeve *e*<sup>3</sup>, having integral therewith (or fixed thereon in any desired manner) the sprocket-wheel

*e*<sup>4</sup>, the ratchet-wheel *c*<sup>11</sup>, and the hand-wheel *e*<sup>5</sup>. The ratchet-wheels *c*<sup>10</sup> and *c*<sup>11</sup>, which have their teeth cut in opposite directions, are arranged in close proximity to each other and are separated by the sleeve *c*<sup>4</sup>, loosely mounted on the shaft *c*<sup>0</sup> and provided with the arms *c*<sup>5</sup> and *c*<sup>6</sup>. The free end of the arm *c*<sup>5</sup> is pivotally connected, as at *c*<sup>3</sup>, to the arm *c*<sup>2</sup>, projecting from the ring or rim *c*<sup>1</sup>, surrounding the eccentric *c*, which latter is secured on the main driving-shaft *b*. To the free end of the arm *c*<sup>6</sup> is secured the pin *c*<sup>7</sup>, on which are arranged—and on each side of the arm—the pawls *c*<sup>8</sup> and *c*<sup>9</sup>, adapted to engage the teeth of their respective ratchet-wheels *c*<sup>10</sup> and *c*<sup>11</sup>. (See Fig. 3.)

In the bracket-frame *a'*, and above and parallel to the shaft *c*<sup>0</sup>, is secured the rod *a*<sup>9</sup>, from which is adjustably suspended, by means of the set-screw *a*<sup>11</sup>, the forked bracket *a*<sup>10</sup>, serving as a guide for the levers *a*<sup>4</sup> *a*<sup>5</sup>, fulcrumed on the stub-shaft *a*<sup>3</sup>, which latter is secured in the projecting portion *a*<sup>2</sup> of the bracket-frame *a'*. Said levers are arranged above the sprocket-wheel *e*<sup>2</sup> and are adapted to be operated by the balls or rolls of the pattern-chain *e*<sup>22</sup>, Fig. 4, as will be manifest.

On the rod *a*<sup>9</sup> is loosely mounted the sleeve *g*, which is prevented from lateral motion by the collars *g*<sup>20</sup>, secured to said rod. Integral with the sleeve *g* or secured thereto in any desired manner are the depending arms *g*<sup>1</sup> and *g*<sup>2</sup>, carrying the horizontally-projecting pins *g*<sup>3</sup> and *g*<sup>4</sup>, adapted to engage the pawls *c*<sup>8</sup> and *c*<sup>9</sup>, respectively, in a manner hereinafter described. The sleeve *g* and its depending arms *g*<sup>1</sup> *g*<sup>2</sup> are held in operative position by means of the flat spring *g*<sup>6</sup>, secured with one end to the projecting portion *a*<sup>15</sup> of the bracket-frame *a'* and provided at its other end with teeth engaging the notches *g*<sup>23</sup>, arranged in lug *g*<sup>5</sup>, which latter projects from the sleeve *g*. (See Fig. 3.) The spring *g*<sup>6</sup> may be strengthened by the pin *g*<sup>7</sup>, secured with one end substantially in the center of the spring and with its other end to the rod *a*<sup>9</sup>, all as clearly shown in Fig. 2 of the drawings.

The pattern-chain *e*<sup>22</sup> is carried by the sprocket-wheel *e*<sup>2</sup> and rests with its depending portion on the slide or guide *f*, secured



to and projecting from the bracket-frame  $a'$ , while the auxiliary chain  $e^{20}$  is carried by the sprocket-wheel  $e^4$  and rests with its depending portion on the slide or guide  $f'$ , also secured to the bracket-frame  $a'$ .

On one or more of the rods of the pattern-chain  $e^{22}$  is arranged a ball  $e^{23}$  in alinement with the depending arm  $g'$  and adapted at certain intervals to engage the said arm, as afterward described. The auxiliary chain  $e^{20}$  is likewise provided with balls  $e^{21}$ , adapted at certain intervals to engage the depending arm  $g^2$ .

In operation a continuous oscillating motion is imparted from the main driving-shaft through the eccentric  $c$  and arms  $c^2$  and  $c^5$  to the arm  $c^6$ , arranged on the sleeve  $c^4$  and carrying the pawls  $c^8$  and  $c^9$ . The pawl  $c^9$  is normally held out of engagement with the ratchet-wheel  $c^{11}$  by means of the pin  $g^4$ , and thus prevents rotation of the sleeve  $e^3$  and the sprocket-wheel (carrying the auxiliary chain  $e^{20}$ ) connected therewith. The pawl  $c^8$ , whenever the arm  $c^6$  is oscillated from right to left, Fig. 3, moves the ratchet-wheel  $c^{10}$  and thus the pattern-chain  $e^{22}$ . The pattern-balls will thus come under and raise or operate the respective levers  $a^4$  or  $a^5$ , thereby actuating the respective parts of the shuttle-changing mechanism to bring the required box in position to throw its shuttle. The pattern-chain continues to revolve until one box is required for more than one pick, that is to say, one of the levers  $a^4$   $a^5$  is to be lifted and held in its raised position until the necessary picks or throws from the shuttle of the box, actuated from said lever, have been accomplished. At the required moment the ball  $e^{23}$  of the pattern-chain comes in contact with and throws or swings the depending arm  $g'$ , carrying the pin  $g^3$ , outward until the said pin, after engaging the pawl  $c^8$ , has thrown the latter out of engagement with the ratchet-wheel  $c^{10}$ . Simultaneously the depending arm  $g^2$ , carrying the pin  $g^4$ , is thrown or swung inward, thus clearing the pawl  $c^9$  and allowing the latter to engage the teeth of the ratchet-wheel  $c^{11}$ . The ratchet-wheel  $c^{11}$  is thus rotated in a direction opposite to the direction of the ratchet-wheel  $c^{10}$ , and as it is in fixed connection with the sprocket-wheel  $e^4$  the auxiliary chain  $e^{20}$  is revolved or operated. Said auxiliary chain continues to revolve until the respective pick has been repeated the required number of times. At that pick the ball  $e^{21}$  comes into contact with and throws or swings the depending arm  $g^2$ , carrying the pin  $g^4$ , outward until the said pin has thrown the pawl  $c^9$  out of engagement with the ratchet-wheel  $c^{11}$ , thus stopping the rotation of the latter. Simultaneously the depending arm  $g'$ , carrying the pin  $g^3$ , is thrown inward, thus releasing the pawl  $c^8$ , which latter again engages the teeth of the ratchet-wheel  $c^{10}$  and rotates the same. The depending arms  $g'$  and  $g^2$  are held in their respective positions by the flat spring

$g^6$ , as heretofore described. It will thus be seen that when the ball  $e^{21}$  of auxiliary chain  $e^{20}$  engages the depending arm  $g^2$  the said auxiliary chain is at rest, while the pattern-chain is rotated. On the other hand, when the ball  $e^{23}$  of pattern-chain  $e^{22}$  engages the depending arm  $g'$  the said pattern-chain is stopped in rotation and the auxiliary chain started in a manner heretofore described.

To remedy defective picks, the sprocket-wheels  $e^2$  and  $e^4$  may be operated by hand forward and backward by means of the wheels  $e'$  and  $e^5$ , respectively, as will be manifest.

I do not intend to limit myself to the precise construction shown and described, as various alterations can be made without changing the scope of my invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the pattern-chain and the levers operated thereby, of a shaft, a sprocket-wheel mounted on the shaft and carrying the pattern-chain, a sprocket-wheel loosely mounted on said shaft, an auxiliary chain on said sprocket-wheel, a ratchet-wheel for each of said sprocket-wheels, an oscillating arm loosely mounted on the shaft, two pawls fulcrumed on said oscillating arm and adapted to engage the teeth of their respective ratchet-wheels, means for oscillating said arm, and means for controlling the pawls in such a manner that when one pawl is brought into engagement with the teeth of its ratchet-wheel, the other pawl is brought out of engagement, substantially as and for the purposes described.

2. The combination with the pattern-chain and the levers operated thereby, of a shaft, a sprocket-wheel on said shaft and carrying the pattern-chain, a sprocket-wheel loosely mounted on said shaft, an auxiliary chain on said sprocket-wheel, a ratchet-wheel for each of said sprocket-wheels, an oscillating arm loosely mounted on the shaft, two pawls fulcrumed on said oscillating arm and adapted to engage the teeth of their respective ratchet-wheels, means for oscillating the arm, a rod arranged above the shaft and parallel thereto, two depending connected arms fulcrumed on said rod, a pin projecting from each of said arms and adapted to engage its respective pawl, and means for operating said depending arms, all said parts substantially as and for the purposes described.

3. The combination with the pattern-chain and the levers operated thereby, of a shaft, a sprocket-wheel on said shaft and carrying the pattern-chain, a sprocket-wheel loosely mounted on said shaft, an auxiliary chain on said sprocket-wheel, a ratchet-wheel for each of said sprocket-wheels, an oscillating arm loosely mounted on the shaft, two pawls fulcrumed on said oscillating arm and adapted to engage the teeth of their respective ratchet-wheels, means for oscillating the arm, a rod arranged above the shaft and parallel thereto, two depending connected arms fulcrumed on



said rod, a pin projecting from each of said arms and adapted to engage its respective pawl, an outwardly-projecting ball carried by the pattern-chain and adapted to engage one  
5 of said depending arms, and an outwardly-projecting ball carried by the auxiliary chain and adapted to engage the other depending arm, all said parts, substantially as and for the purposes described.

10 4. The combination with the pattern-chain and the levers operated thereby, of a shaft, a sprocket-wheel on said shaft and carrying said pattern-chain, a sprocket-wheel loosely mounted on said shaft, an auxiliary chain on  
15 said sprocket-wheel, a ratchet-wheel for each of said sprocket-wheels, an oscillating arm loosely mounted on the shaft, two pawls fulcrumed on said oscillating arm and adapted to engage the teeth of their respective ratchet-  
20 wheels, means for oscillating the arm, a rod arranged above the shaft and parallel thereto, a sleeve loosely arranged on said rod, two arms depending from said sleeve, a pin carried by each of said depending arms and  
25 adapted to engage its respective pawl, means carried by the pattern-chain to operate one of said arms, means carried by the auxiliary chain to operate the other arm, and means for holding said arms in operative position,  
30 all said parts, substantially as and for the purposes described.

5. The combination with a continuously-revolving shaft, and a shaft parallel therewith, of an eccentric on the revolving shaft,  
35 an arm carried by said eccentric, an oscillating arm loosely mounted on the parallel shaft and pivotally connected with the arm of the eccentric, a sprocket-wheel mounted on the parallel shaft, the pattern-chain on said  
40 sprocket-wheel, a series of fulcrumed levers operated by said pattern-chain, a sprocket-wheel loosely mounted on the parallel shaft, an auxiliary chain carried by said sprocket-

wheel, a ratchet-wheel for each of said sprocket-wheels, two pawls fulcrumed on the  
45 oscillating arm and adapted to engage the teeth of their respective ratchet-wheels, and means controlled by the pattern-chain and the auxiliary chain respectively to bring the  
50 pawls into and out of engagement with the teeth of said ratchet-wheels, substantially as and for the purposes described.

6. The combination with a continuously-revolving shaft and a shaft parallel therewith, of an eccentric on the revolving shaft,  
55 an arm carried by said eccentric, an oscillating arm loosely mounted on the parallel shaft and pivotally connected with the arm of the eccentric, a sprocket-wheel on the parallel shaft, a pattern-chain carried thereby, a se-  
60 ries of fulcrumed levers operated by said pattern-chain, a sprocket-wheel loosely mounted on the parallel shaft, an auxiliary chain on said sprocket-wheel, a ratchet-wheel con-  
65 nected with the pattern-chain-carrying sprocket-wheel, a ratchet-wheel, having its teeth cut in opposite direction, connected with the auxiliary-chain-carrying sprocket-wheel, a pawl for each of said ratchet-wheels  
70 fulcrumed on the oscillating arm, a rod above the parallel shaft, two depending connected arms fulcrumed on said rod, a pin carried by each of said depending arms and adapted to engage the pawls, and means carried by the  
75 pattern-chain for operating one of said depending arms, and means carried by the auxiliary chain for operating the other depending arm, all said parts, substantially as and for the purposes described.

In testimony that I claim the foregoing I  
80 have hereunto set my hand this 29th day of July, 1896.

ADOLF FABER DU FAUR.

Witnesses:

ALFRED GARTNER,  
WM. D. BELL.