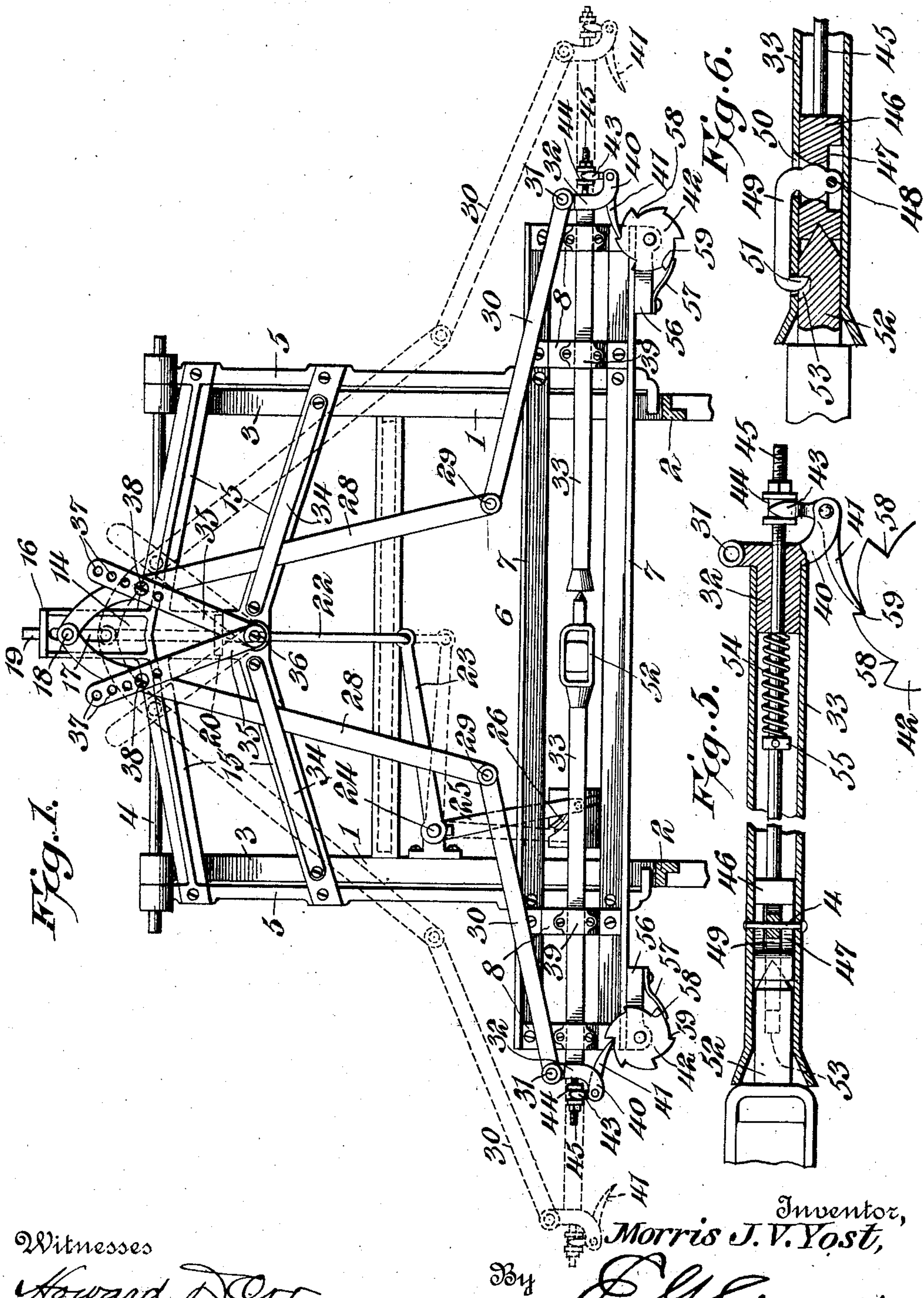


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APPLICATION FILED APR. 23, 1910.

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2 SHEETS—SHEET 1.



Witnesses

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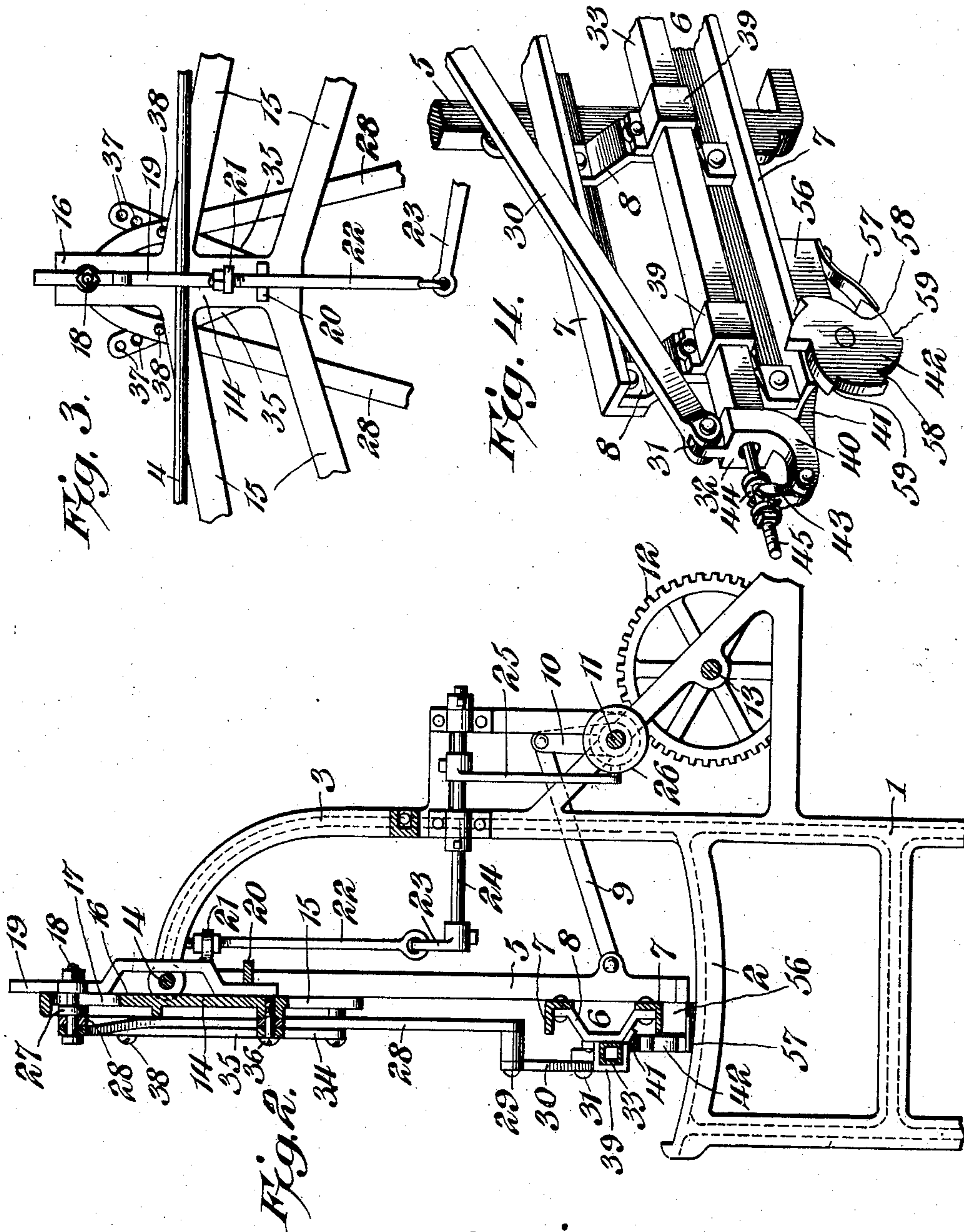
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# UNITED STATES PATENT OFFICE.

MORRIS JACOB VALENTINE YOST, OF HANOVER, PENNSYLVANIA.

SHUTTLE-MOTION FOR LOOMS.

994,295.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed April 23, 1910. Serial No. 557,208.

*To all whom it may concern:*

Be it known that I, MORRIS J. V. YOST, a citizen of the United States, residing at Hanover, in the county of York and State of Pennsylvania, have invented a new and useful Shuttle-Motion for Looms, of which the following is a specification.

This invention relates to looms and has particular reference to that type of looms in which the shuttle is given a positive movement on the lay and carried partly across the lay between the warp threads by one carrier and drawn the balance of the distance by another similar carrier to which it is transferred at the center of the lay.

One object of my invention is to provide means whereby the shuttle carrier will be operated positively and in a simpler manner than has heretofore been done, and another object of the invention is to provide novel means for releasing the shuttle from one carrier and engaging it in the other carrier. These objects, and such other minor objects as will hereinafter incidentally appear, are attained in the use of the mechanism illustrated in the accompanying drawings, and the invention consists in certain novel features which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the annexed drawings, which illustrate the preferred embodiment of my invention, Figure 1 is a front elevation of so much of a loom as is necessary to a proper understanding of my improvements. Fig. 2 is a side elevation of a portion of a loom with my improvements applied thereto. Fig. 3 is an enlarged rear elevation of the upper portion of the mechanism. Fig. 4 is a perspective view of a portion of one of the shuttle carriers and the means for releasing the shuttle therefrom. Fig. 5 is a detail vertical longitudinal section of one shuttle carrier. Fig. 6 is a detail horizontal section of the inner end of a shuttle carrier.

The frame of the loom consists of a pair of side plates or frames 1 having forwardly projecting curved arms 2 and upwardly-extending standards or side arms 3, the upper extremities of which are curved forward and have a transverse rod 4 secured therein. Upon this rod 4 is pivotally hung a pair of oscillatory arms or hangers 5, to the lower ends of which is secured the lay 6 which, in this instance, is shown as composed of a pair of angle irons 7 connected near their outer

ends by brackets 8 and extending transversely across the loom to project beyond the sides of the same, as will be readily understood on reference to Fig. 1. The arms 2 of the frame are curved about the rod 4 as a center and the hangers 5 are vibrated back and forth over the said arms 2 by a link or pitman 9 extending rearward to a crank arm 10 on a shaft 11 journaled in the frame and actuated by a gear wheel 12 on a driving shaft 13 which may be connected in any desired manner with any suitable motor. The hangers 5 are connected at and near their upper ends by a head or casting 14 having outwardly and downwardly-extending arms 15 secured to the front sides of the hangers and provided with a central vertical body projecting above the rod 4, as shown at 16. This upwardly-projecting portion of the head or casting is provided with a vertical slot 17 through which passes a bolt 18 secured in a slide 19 fitted against the back of the body or head 14 and held to the same by a keeper 20 near its lower end and by the said bolt 18 at its upper end. This slide 19 is bent outward between its ends so as to clear the rod 4, and on the back of the said outwardly-disposed portion, at the lower end of a connecting rod 22 having its lower end pivotally attached to a lever 23, which lever is secured to the front end of a rock shaft 24 journaled in suitable bearings on the main frame and connected by a lever 25 with a cam 26 on the shaft 11 in order that the rock shaft 24 will be vibrated simultaneously with the oscillations of the hangers 5.

The bolt 18 carries a collar 27 which bears against the front face of the body or head 14 and thereby serves to hold the slide 19 against the said body, and on the front end of the said bolt 18, I pivotally mount the upper ends of levers 28 which diverge from the said bolt and extend downward to points near the lay, where they are connected by pivots 29 with links 30 extending out beyond the ends of the lay and pivotally attached, at 31, to plugs 32 in the outer ends of the shuttle carriers 33. The levers 28, it will be readily noted, play in front of the branches 15 of the head 14 and are held to the said branches 15 by keepers 34 on the front side of the said branches which pass across the levers 28, as clearly shown in Fig. 1. In order to impart steadiness to the movement of the levers 28 and to cause their lower ends



to move outward when the slide 19 is moved downward, I employ the toggles 35 which are pivoted at their lower ends on the lower end of the head 14, as indicated at 36, and  
 5 are provided in their upper portions with longitudinal series of perforations 37 through any one of which a pin or screw 38 may be inserted to pivotally attach the said toggles to the levers 28 and thereby regu-  
 10 late the throw of the said levers.

The shuttle carriers 33 are angular tubes moving through and guided by the angular offsets or guides 39 on the front sides of the brackets 8, and a plug 32 is fitted tightly in  
 15 the outer end of each carrier and is provided with a depending outturned arm 40, to the extremity of which I pivot a dog or pawl 41 adapted to engage a star wheel 42 in the operation of the loom and having an up-  
 20 standing yoke 43 engaging a grooved collar 44 on the outer end of a rod 45 which extends through the plug and is equipped with a slide 46 at its inner end. The slide 46 is provided in its front side with a recess 47 to  
 25 accommodate a pin 48 secured in the shuttle carrier 33, and upon this pin 48 is pivotally mounted a latch 49 which extends through an opening 50 in the slide so as to project through the rear side of the carrier. The  
 30 latch in rear of the carrier is bent sharply inward so as to extend toward the inner end of the carrier and terminates in a hook 51 projecting through the side of the carrier to engage the shuttle 52, as shown most clearly  
 35 in Fig. 6, the shuttle being provided with a notch 53 in its end to receive the hooks 51 whereby the shuttle will be locked within the carrier. The rod 45 carrying the slide 46 is normally held in its innermost position  
 40 so as to maintain the latch 49 in engagement with the shuttle by a spring 54 which is coiled around the rod 45 between the plug 32 and a collar or other stop 55 on the said rod, as clearly shown Fig. 5.

45 On the underside of the lay, at the ends of the same, are secured bearing blocks 56 on which the star wheels 42 are journaled, springs or other detents 57 being secured to the blocks 56 so as to engage the said star  
 50 wheels and prevent retrograde movement thereof. These star wheels 42 serve to actuate the pawls or dogs 41 to move the rods 45 and thereby actuate the slides 46 so as to trip the latches 49 and release  
 55 them from engagement with the shuttle so as to permit the transfer of the shuttle from one carrier to the opposite carrier. In order to effect this operation, the star wheels are provided with teeth 58 which  
 60 are of considerable depth and alternate with teeth 59 which are of much less depth, and the two star wheels are so disposed that when the pawl 41 at one side of the machine engages a deep tooth on its star wheel, the  
 65 pawl at the opposite side of the machine will

engage a shallow tooth on its respective star wheel.

Having thus made known the construction and arrangement of the several parts of my improved loom, the operation of the  
 70 same will, it is thought, be readily understood. As the driving shaft 13 is rotated, motion will be imparted to the cam shaft 11, and from the said shaft motion will be transmitted to the hangers 5 so as to move  
 75 the lay back and forth above the arms 2 of the frame. At the same time, the slide 19 will be caused to reciprocate vertically and the motion of the slide will be transmitted directly to the bolt 18 so that the upper ends  
 80 of the levers 28 will likewise move up and down within the limits of the slot 17 through which the said bolt 18 passes. The movement of the levers 28 in a vertical direction, received from the bolt 18, will be trans-  
 85 formed into an oscillatory movement toward and from the sides of the machine by reason of the connection of the said levers with the toggles 35, and this in and out vibration of the levers 28 will be transmitted  
 90 through the links 30 to the plugs 32, and the carriers 33 consequently caused to move toward each other, as shown in full lines in Fig. 1, or to recede from each other, as  
 95 shown in dotted lines in said figure. As the shuttle carriers move inward, the pawls or dogs 41 carried thereby will move into engagement with the star wheels 42 and will strike against teeth on the said star wheels, as will be readily understood. The inward  
 100 movement of the carriers will rotate the wheels, and the wheels are so disposed that the dog or pawl on that carrier to which the shuttle is locked will engage a deep tooth, while the pawl on the other carrier  
 105 will engage a shallow tooth. As a result of this arrangement, when the outward movement of the carriers commences, that pawl which has been in engagement with a deep tooth will be forced to clear the extreme  
 110 radius of the star wheel so that it will be swung upon its pivotal connection with the arm 40 and the yoke 43 of the said dog will consequently act through the collar 44 to push the rod 45 outward in opposition to  
 115 the spring 54 and thereby move the slide 46 so that it will swing the latch 49 upon its pivotal connection with the shuttle carrier and thereby release the said latch from its engagement with the shuttle. The latch on  
 120 the opposite carrier will automatically engage the shuttle so that the shuttle will then move outward with the carrier from which it had previously been disengaged. It will be understood that the inward movement  
 125 of the carriers causes the dogs 41 to swing against the radial shoulders presented by the teeth of the star wheels and thereby rotate the said wheels so as to cause the upper portions of the wheels to move toward the cen-  
 130



tral line of the machine. By reason of this rotation of the star wheels, that dog which engages a deep tooth will describe an arc of small radius during the inward movement of the shuttle and, consequently, will not be affected by the rotation of the wheel, and on the outward movement of the carrier the said dog will ride upon practically a horizontal surface so that it will remain inactive and the shuttle will not be affected thereby. The carrier at the opposite side of the machine, however, will have its pawl or dog in engagement with a shallow tooth and this dog will thereby be caused to follow an arc of greater radius so that there will be a tendency to actuate the said dog against the tension of the spring 54 so that the latch 49 will be released from the shuttle, owing to the fact that the greater arc described by the free end of the dog will swing the said dog upon its pivot so that the yoke 43 acting on the collar 44 will slide the rod 45 outward and thereby bring the slide 46 slightly toward the outer end of the carrier, the result being that the latch 49 will be swung on its pivot 48 and the hook 51 will be released from the notch 53 in the shuttle and, consequently, on the reverse movement of the carriers the shuttle will be transferred to the carrier at the opposite side of the machine and will then be moved by said carrier. As soon as the pawl has cleared the star wheel on the outward movement of the carrier, the spring 54 will return the parts to their initial positions, thus bringing the latch into position to be automatically engaged by the shuttle on the next movement of the carriers. In order to effect this automatic engagement, the end of the shuttle is preferably beveled so as to ride easily against the end of the latch, as will be readily understood.

My improved mechanism is of a very simple character and is positive and certain in its operation. The shuttle will be transferred from one carrier to the other carrier automatically and with precision so that the operation of the loom will be uninterrupted. The peculiar arrangement of the operating mechanism devised by me permits of a very compact arrangement of the driving parts, inasmuch as the movement derived from the driving cam 26 is multiplied through the action of the connected levers and toggles and, consequently, a wide fabric may be traveled by the shuttle without requiring the provision of a complicated driving gearing which will occupy a great amount of space in the work room. Furthermore, the parts are open so as to be readily accessible for the purposes of cleaning or repairing and are of such a character that repairs can be quickly made without necessitating the dismantling of the entire loom.

My loom is intended for use more particu-

larly in the manufacture of wire cloth but it may, of course, be employed in the weaving of other material.

The advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a shuttle motion for looms, a lay, shuttle carriers thereon, and means for operating the shuttle carriers comprising levers having means for imparting reciprocatory movement to one end of the levers, and pivot supports for and movable with the levers for augmenting the throw of the ends of the levers remote from the actuated ends.

2. In a shuttle motion for looms, shuttle carriers, and means for imparting motion to said shuttle carriers comprising levers each having connections at one end to a respective shuttle carrier with means for imparting reciprocatory movement simultaneously to the other ends of the levers, and a pivoted member constituting a fulcrum for each lever and carrying the latter at a distance from the pivot support of said member.

3. In a shuttle motion for looms, shuttle carriers, and means for imparting motion to said shuttle carriers comprising levers each having connections at one end to a respective shuttle carrier with means for imparting reciprocatory movement to the other ends of the levers, and a fulcrum support for each lever in turn pivotally supported at a distance from its connection with the lever, said fulcrum support having means for the increase or decrease of the effective distance between the lever and the support for said pivot member.

4. In a shuttle motion for looms, a shuttle carrier, a lever having at one end connections to said shuttle carrier, means connected to the other end of the lever and movable to impart to the lever reciprocatory motion, and a movable fulcrum for said lever participating in its movement of reciprocation.

5. In a shuttle motion for looms, a shuttle carrier, a lever and connections between one end of the latter and the shuttle carrier, means for imparting to the other end of the lever a reciprocatory movement in a right line perpendicular to the movement of reciprocation of the shuttle carrier, and a fulcrum for the lever movable in an arc, where- by the movement of the end of the lever



connected to the shuttle carrier is the sum of the movements imparted to the lever by its actuating means and the movement of the fulcrum.

5 6. In a shuttle motion for looms, reciprocable shuttle carriers, a reciprocable slide, means for actuating said slide, a pair of levers having at one end a common pivotal connection with the slide, links connecting  
10 the other ends of the levers to respective shuttle carriers, and toggles each pivotally supported at one end and at a distance from the pivotal support pivotally connected to and constituting the fulcrum of a respective  
15 one of the pair of levers.

7. The combination of a lay, oppositely-reciprocating shuttle carriers mounted thereon, a slide, means for actuating the said slide, a pair of levers having a common pivotal connection with the slide, links connecting the levers with the outer ends of the shuttle carriers, a pair of toggles mounted between the levers, and an adjustable pivotal connection between each of the toggles  
25 and one of the levers.

8. The combination with a supporting frame, of a pair of hangers mounted thereon, a casting having a central head or body and diverging arms secured to the said hangers, the central head or body being provided with a longitudinal slot, a slide mounted on the rear side of said body, means for actuating said slide, a bolt carried by the said slide and projecting through the  
30 slot in the body, a pair of levers having their upper ends pivotally hung on said bolt, links pivoted to the lower ends of said levers, shuttle carriers having their outer ends connected to the outer ends of said  
40 links, a lay secured to the lower ends of the hangers and provided with guides supporting the said shuttle carriers, toggles pivotally mounted on the head between the levers and each pivotally connected with one  
45 of the levers, and keepers secured on the front side of the casting and passing over the levers.

9. In a shuttle motion for looms, reciprocable shuttle carriers, a reciprocable slide, means for actuating said slide, a pair of levers having at one end a common pivotal connection with the slide, links connecting the other ends of the levers to respective shuttle carriers, and toggles each pivotally supported at one end and at a distance from the pivotal support pivotally connected to and constituting the fulcrum of a respective one of the pair of levers, each toggle having a longitudinally disposed series of perforations for varying the distance between the pivotal support of the toggle and its connection with the respective lever.  
60

10. In a shuttle motion for looms, reciprocable shuttle carriers, and an actuating  
65 means therefor comprising a pair of levers,

a slide to which both levers are connected at one end, link connections between the other end of each lever and the respective shuttle carrier, toggle members each pivoted at one end to a fixed portion of the structure and at a distance therefrom pivotally connected to a respective lever and constituting a movable fulcrum therefor, a rock shaft, angle arms projecting therefrom, a link connection between one of the angle arms and the slide, and a cam member connected to and actuating the other arm on the rock shaft. 70 75

11. The combination with a lay, of star wheels mounted on the ends of the lay and provided with radial peripheral teeth, the alternate teeth being of different depth, shuttle carriers mounted on the lay, latches mounted within the carriers and adapted to engage a shuttle, slides mounted within the carriers and engaging said latches, and pawls pivotally mounted on the carriers and connected with the said slides and adapted to engage the said star wheels and be thereby moved to control the latches. 80 85

12. In a shuttle motion for looms, reciprocable shuttle carriers, means for moving them simultaneously in opposite directions, shuttle engaging means at one end of each carrier, and means for actuating the shuttle engaging means of the carriers in alternation comprising a pawl at the end of each carrier remote from the shuttle engaging means, and pawl engaging means in the path of each pawl and actuated by the pawl, said pawl engaging means being shaped to actively move the pawl to actuate the shuttle engaging means at every other movement of the respective shuttle carrier. 90 95 100

13. The combination with a lay, of oppositely-reciprocating shuttle carriers mounted thereon, shuttle-engaging latches at the inner ends of the carriers, means supported by the carriers for controlling said latches including pawls at the outer ends of the carriers, and star wheels mounted at the ends of the lay in the path of said pawls to actuate the same, said star wheels having teeth, the alternate teeth being of different depth. 105 110

14. In a shuttle motion for looms, a shuttle carrier having at one end engaging means for a shuttle, a pawl at the other end of the shuttle carrier, connections between the pawl and the engaging means for the shuttle, and a pawl engaging means in the path of and actuated by said pawl and provided with alternately arranged members all engaged by the pawl in order and respectively active and inactive to the pawl to cause the latter to actuate the shuttle engaging means. 115 120

15. In a shuttle motion for looms, a reciprocable shuttle carrier, a latch mechanism at one end of the shuttle carrier for engaging a shuttle, a rod extending therefrom through the other end of the shuttle carrier, said rod being constrained to maintain the 125 130



latch mechanism in the active position, a  
pawl on the end of the shuttle carrier remote  
from the latch and engaging the rod, and a  
toothed wheel in the path of the pawl, said  
5 toothed wheel having alternate teeth of dif-  
ferent depths and provided with a back stop.  
In testimony, that I claim the foregoing

as my own, I have hereto affixed my signa-  
ture in the presence of two witnesses.

MORRIS JACOB VALENTINE YOST.

Witnesses:

JOHN E. NACE,  
C. E. MELHOM.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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