

Dec. 4, 1928.

1,694,254

O. A. FREDERICKSON

CIRCULAR LOOM

Filed June 5, 1925

2 Sheets-Sheet 1

Fig 1

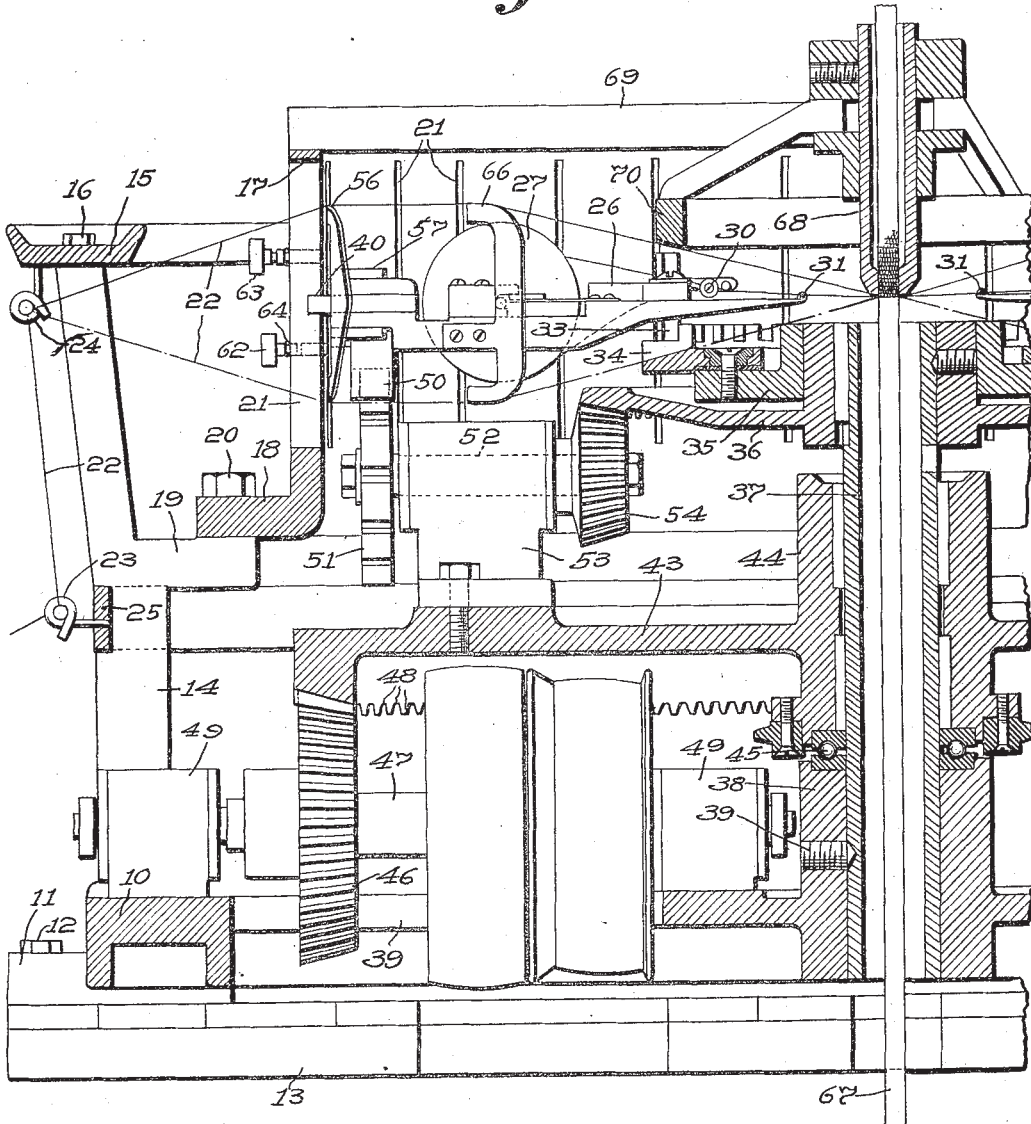
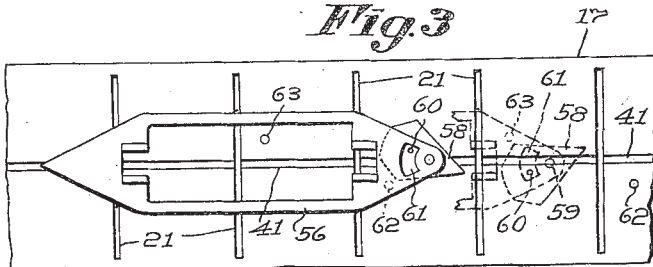


Fig 3



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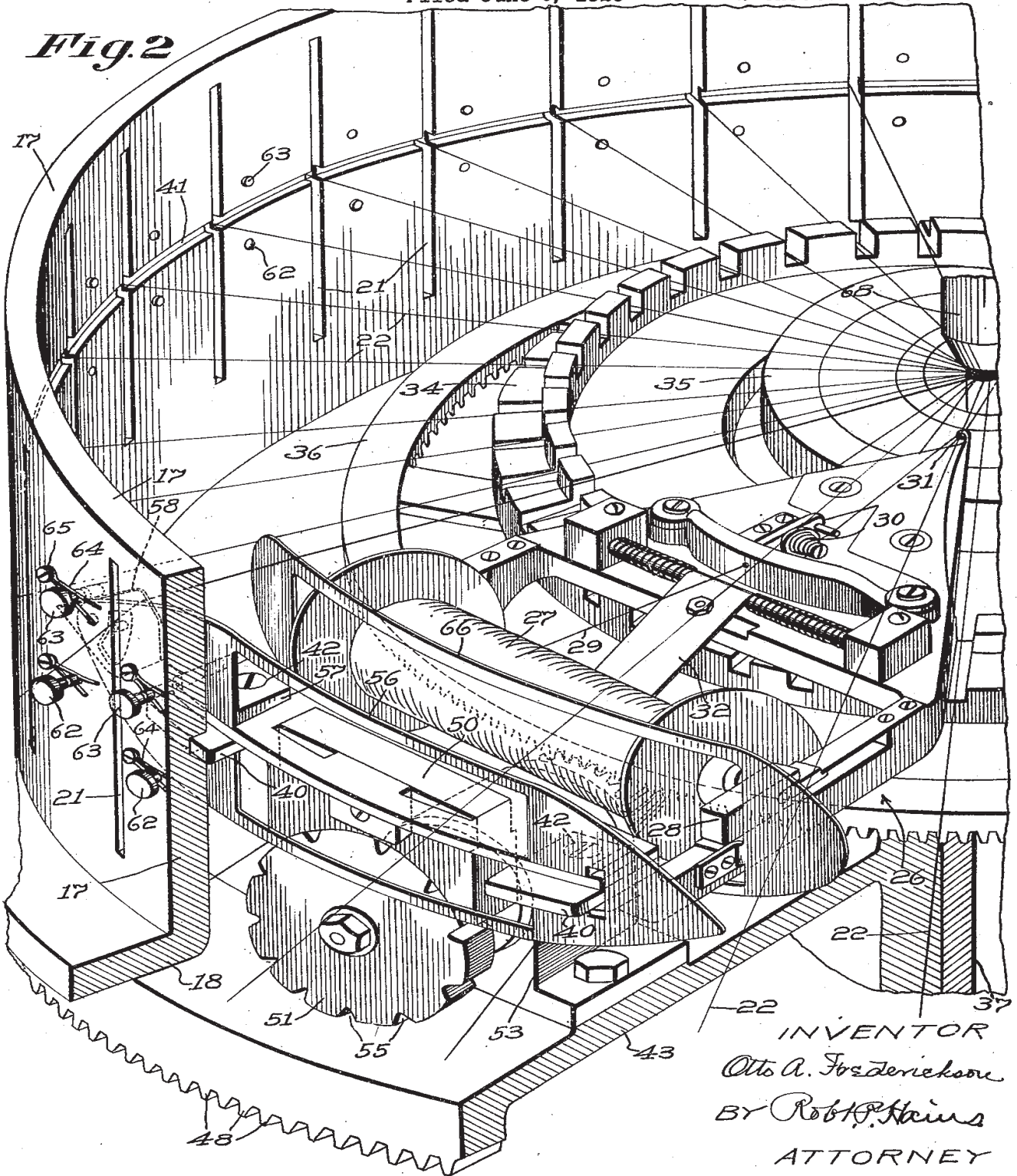
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2 Sheets-Sheet 2

Fig. 2



UNITED STATES PATENT OFFICE.

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CIRCULAR LOOM.

Application filed June 5, 1925. Serial No 35,101.

This invention relates to circular looms, and more particularly to novel means for opening the shed for the passage of the shuttle thru the shed.

5 Heretofore heddles have been employed for shifting the different warp threads to open the shed for the passage of the shuttle.

In accordance with the present invention the shifting heddles are replaced by an extremely simple construction adapted to engage the threads of a closed shed and deflect them so that the shuttle may pass either under or over the different threads.

The primary object of the present invention is to increase the speed of the circular loom and reduce the original and maintenance cost by reducing the number of operating parts and eliminating reciprocatory mechanism.

20 One important feature of the present invention resides in a tilting nose mounted upon the leading side of the shuttle, and in means for shifting the nose to direct the warp threads either over or under the shuttle.

25 In performing different weaving operations, it may be desirable to vary the order in which the warp threads are shifted. Another feature of the invention therefore resides in adjustable means for shifting the tilting nose and which may be readily moved to and from the nose operating position to shift the threads of the shed in any desired order. The means for shifting the nose may comprise pins that are supported adjacent each warp thread to engage and tilt the nose to the desired position, just before it engages the warp thread, and by moving different pins to and from the operative position, the order in which the warp threads are shifted may be varied as desired.

40 Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings which illustrate a good practical form of the invention.

In the drawings:—

Fig. 1 is a vertical sectional view thru a portion of a circular loom constructed in accordance with the present invention.

50 Fig. 2 is an enlarged perspective view of parts shown in Fig. 1; and

Fig. 3 is a diagrammatic view of the inner face of the fixed drum showing the shuttle in full lines in a position it occupies when

its nose is tilted down, and in dotted lines in a position it occupies when its nose is tilted up.

The means of the present invention for opening the shed for the passage of the shuttle between the warp threads may be employed in various different types of circular looms, and it will be understood that the present invention is not limited in its use to shuttles that are supported and driven in the particular manner shown.

In the construction shown the loom frame is provided with a lower ring 10 having lugs 11 that may be secured by bolts 12 to the table or supporting bed 13. Secured to the lower ring 10 of the loom frame are the uprights 14 positioned in spaced relation to each other about the ring, and the upper ends of the uprights are secured to the upper ring 15 by bolts 16.

The circular loom illustrated is provided with a fixed drum 17 in which the shuttle or shuttles may travel, and the drum 17 is supported by a laterally extending flange 18 that rests upon projections 19 extending inwardly from the uprights, and the flange 18 is secured to the projections 19 by bolts 20. The fixed drum 17 is provided with a number of vertical slots 21 thru which the warp threads 22 extend to the weaving point. The various warp threads are led from a creel (not shown) thru suitable tension means, and then thru the lower guide eyes 23 upwardly to the upper guide eyes 24. The upper guide eyes 24 are secured to the upper ring 15 while the lower guide eyes 23 are conveniently secured to a ring 25 that surrounds the uprights 14 and lies in a notch formed in their outer face.

The shuttle 26 for the most part may have any preferred or well known construction and is shown as comprising a hollow frame having a large central opening in which the spool 27 of weft thread is mounted, the spool being supported by a spindle the ends of which are held by the blocks 28. The weft thread 29 passes from the spool 27 thru a tension device 30 and guide 31 at the inner end of the shuttle to the weaving point, and a spring actuated plate 32 resting against the thread upon the spool prevents the weft thread from unwinding too freely.

The inner end of the shuttle 26 is supported by a bearing block or shoe 33 that rests upon the raceway formed upon the upper face of

the notched fixed ring 34. This ring is mounted upon an annular flange plate 35 that is rigidly secured to the hub of the fixed gear 36, and this fixed gear is rigidly secured to the upper end of the fixed hollow post 37. The lower end of this post is mounted in the hub 38 and is rigidly secured therein by the set-screw 39, and the hub 38 is secured to the ring 10 by the spokes or laterally extending arms 39.

The shuttle shown is provided with shoes 40 at its outer end that extend into and slide in the annular groove 41 formed in the inner face of the fixed drum 17, and the shoes are secured to the shuttle frame by screws 42.

The means shown for driving the shuttle 26 consists of a driving frame 43 having a hub 44 that is journaled upon the fixed central shaft 37, and the weight of the driving frame is supported by the antifriction bearing 45. The driving frame 43 is driven by a pinion 46 secured to the main shaft 47 and the teeth of this pinion mesh with the teeth 48 of the driving frame. The ends of the shaft 47 are journaled in bearing brackets 49 and the shaft is provided with a fast and loose pulley that may be driven by a belt passing upwardly thru the supporting table 13.

The shuttle 26 has a driving block 50 secured to its frame and this block has a lower concave face adapted to receive the driving disk 51. The disk 51 is secured to a rotating shaft 52 journaled in a bearing block 53 secured to the driving frame 43. A bevel gear 54 secured to the inner end of the shaft 52 meshes with the teeth of the fixed gear 36. As the driving frame 43 is rotated by the means described the driving disk 51 travels around the axis of the loom to drive the shuttle, and at the same time it is positively rotated by the bevel gear 54 to facilitate the passage of the lower warp threads 22 between the block 50 and driving disk, and the disk 45 is preferably provided with notches 55 which form a clearance space for the warp threads.

The mechanism so far described constitutes one good practical form of circular loom that is adapted to receive the novel shed forming means which will now be described, but it will be understood that the present invention is not limited in its application to the type of loom described.

In accordance with the present invention the outer end of the shuttle 26 is provided with a guide plate 56 which may have a central opening to receive the end of the shuttle frame, and the guide plate 56 may be supported upon the shuttle frame by laterally extending ears 57 adapted to receive the securing bolts 42. The guide plate 56 is preferably pointed at its ends and upon its leading end is pivotally mounted the tilting nose 58 that is secured to the plate by the pivot pin 59. The rocking movement of the tilt-

ing nose may be limited by a pin 60 secured to the nose and which extends into a slot 61 formed in the plate 56. The construction of the tilting nose is such that if it is tilted upwardly it will direct the warp threads under the shuttle, and if it is tilted downwardly it will direct the warp threads over the shuttle.

Various means might be provided for shifting the tilting nose, and in the construction shown the nose is shifted by pins that project inwardly from the inner wall of the fixed drum 17 into the path of travel of the nose. The pins 62 disposed below the slot 41 serve to tilt the nose down while the pins 63 mounted above this slot tilt the nose up. The pins are so positioned relatively to the vertical slots 21 thru which the warp threads pass that they insure the nose being tilted to the desired position as the point of the nose passes each slot, as will be apparent from Fig. 3 wherein the shuttle is shown in full lines in a position it occupies when its nose 58 is tilted down by one of the lower pins 62, and the forward portion of the shuttle is shown in dotted lines in a position it occupies when the nose is tilted up by one of the upper pins 63. The opposite edges of the nose 58 that engage the pins 62 and 63 are given sufficient length to positively hold the nose in its tilted position as the point of the nose approaches the adjacent slot 21 to thereby insure that the nose will be properly positioned with respect to each slot.

It may be desirable to vary the order in which the warp threads are directed over and under the shuttle, and this is readily accomplished in accordance with the present invention by providing two pins for controlling the position of the tilting nose at each slot 21, these pins being adjustable so that either may be held in the operative or inoperative position. As a result of this construction, if the nose is to be tilted up as it passes a particular slot, one pin may be moved to the operative position, while if the nose is to be tilted down, the other pin will be placed in the operative position. The pins 62 and 63 may be readily held in either position by slidably mounting them in holes in the drum 17, and by providing spring clips 64 on the outer face of the drum having spaced resilient legs adapted to engage either notch of the pins. These resilient clips may be secured in place by screws 65.

The guide plate 56 is sufficiently wide to support the warp threads out of engagement with the mechanism at the outer end of the shuttle, and if desired a second guide plate 66 may be secured to the shuttle near the spool 27 to hold the warp threads out of engagement with the spool and warp guiding mechanism. The flexible core 67 about which the woven tube is to be formed may pass upwardly through the hollow shaft 37, and thru the guide sleeve 68, the lower end of which de-

finer the weaving point. The sleeve is supported by a bracket 69 extending inwardly from the fixed drum 17. The bracket 69 may serve also to support the ring 70 that prevents the shuttle from jumping off its inner race-way 34.

The warp threads are necessarily more or less elastic and are kept under such tension that while they may be displaced laterally by the shuttle guides to permit the shuttle to pass thru the shed, they will return to the normal straight line position as soon as they are released by the shuttle.

From the foregoing description when read in connection with the drawings, it will be seen that thru the use of the tilting nose of the present invention much mechanism heretofore required upon circular looms may be omitted, and that the tilting nose constitutes a simple and satisfactory device for forming the shed. It will also be seen that the operation of the tilting nose may be readily varied as desired to change the weaving operation by simply changing the position of the operating pins 62 and 63.

What is claimed is:—

1. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a shuttle supported by said frame to travel in a circular path about the axis of the loom, means for driving the shuttle, a tilting nose mounted upon the shuttle, and means other than the warp thread and which is supported in a fixed position along the path traveled by the shuttle for shifting the nose to cause it to selectively direct the warp threads over and under the shuttle.

2. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a shuttle supported by said frame to travel in a circular path about the axis of the loom, a tilting nose mounted upon the shuttle, and projections supported by a fixed portion of the loom to project into the path of travel of the nose to shift the nose and cause it to direct the warp threads over and under the shuttle.

3. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a fixed drum having vertical slots for the passage of the warp threads forming the shed and having a race-way for the outer portion of the shuttle, means for driving the shuttle, a tilting nose supported at the leading side of the shuttle, and means supported at one side of each of the slots for actuating the nose so that it will direct the warp threads alternately over and under the shuttle.

4. In a circular loom, in combination, a main frame provided with means to support the warp threads to form a closed shed, a shuttle supported by the frame to travel in a circu-

lar path about the axis of the loom, means for driving the shuttle, a yarn guide plate upon the shuttle, a tilting nose mounted upon the guide plate, and pins supported to project into the path of travel of the nose to engage and shift the nose so that it will direct the warp threads over and under the shuttle.

5. In a circular loom, in combination, a main frame provided with means to support the warp threads, a shuttle supported by the frame to travel in a circular path about the axis of the loom, means for driving the shuttle, a tilting nose mounted upon the shuttle, pins supported to engage and shift the tilting nose so that it will direct the warp threads over and under the shuttle, and means for supporting the pins in different positions to vary the order in which the nose is shifted and thereby vary the weaving operation of the loom.

6. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a fixed drum having a shuttle race-way, a shuttle supported to travel in a circular path about the axis of the loom, means for driving the shuttle, a tilting nose mounted on the shuttle for swinging movement to direct the warp threads over and under the shuttle, and pins extending inwardly from a wall of the drum to shift said nose and movable to and from the nose operating position to vary the weaving operations.

7. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a shuttle supported by said frame to travel in a circular path about the axis of the loom, means for driving the shuttle, a guide plate mounted upon the shuttle to spread the warp threads, rocking means mounted upon the guide plate for selectively directing the warp threads over and under the shuttle, and means supported in a fixed position for positively tilting the rocking means.

8. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a shuttle supported by said frame to travel in a circular path about the axis of the loom, means for driving the shuttle, a pair of guide plates mounted upon the shuttle in spaced relation to each other and at different distances from the axis of the loom to hold the shed open, and means upon one of said guide plates for directing some warp threads over the shuttle and others under the shuttle.

9. In a circular loom, in combination, a main frame provided with means for supporting warp threads, a shuttle supported by said frame to travel in a circular path about the axis of the loom, means for driving

the shuttle, a guide plate mounted upon the shuttle to spread the warp threads; means mounted upon the guide plate for selectively directing the warp threads over and under the shuttle, and adjustable means for varying the order in which the warp threads are directed over and under the shuttle.

10. In a circular loom, in combination, a main frame provided with means for supporting warp threads to initiate the formation of a shed, a shuttle supported by said

frame to travel in a circular path about the axis of the loom, means for driving the shuttle, a tilting nose mounted upon the shuttle, and projections mounted along the shuttle path at the opposite sides of said path and arranged to shift the nose back and forth to cause it to selectively direct the warp threads to the opposite sides of the shuttle. 15

In testimony whereof, I have signed my name to this specification. 20

OTTO A. FREDERICKSON.