May 15, 1923. 1,455,048

F. C. HALL ET AL

LOOM

Filed Dec. 21, 1920 3 Sheets-Sheet 1

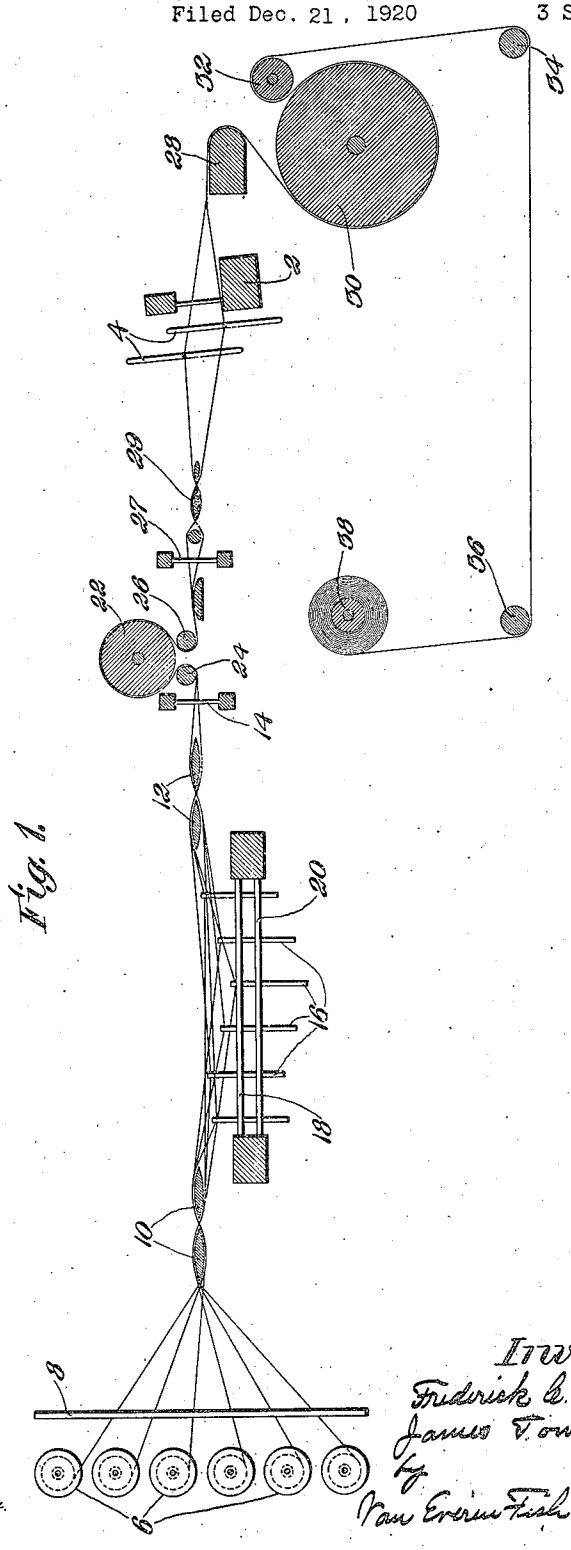


Fig. 1.

Witness:

Alfred H. McGlinchey

Inventors

Frederick C. Hall

James Townson

by Van Everen Fish Hildreth & Cleary

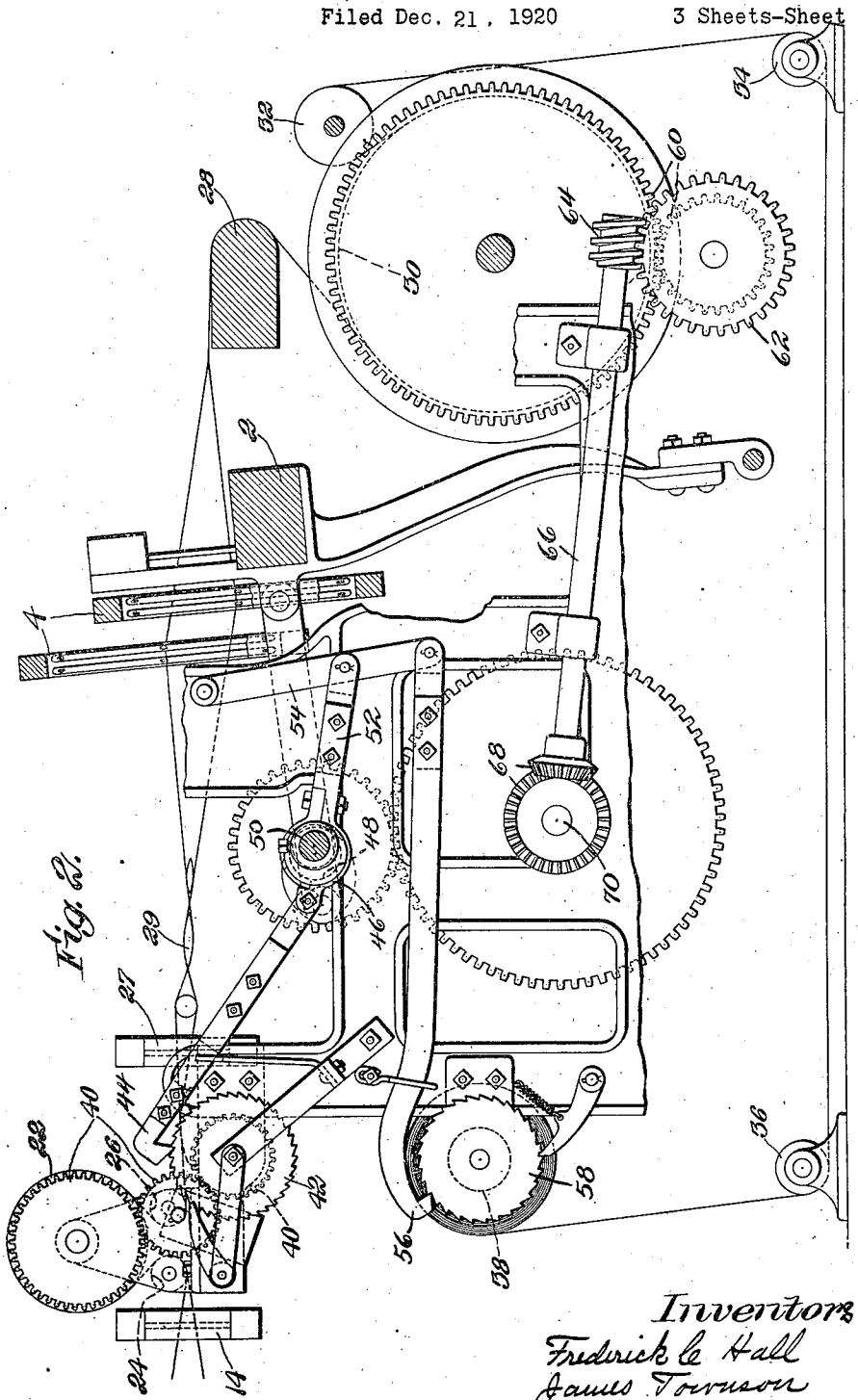
Attys

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F. C. HALL ET AL

LOOM

Filed Dec. 21, 1920 3 Sheets-Sheet 2



Inventors
Frederick C. Hall
James Torrison
By Van Etten Fish Hildreth & Cary
Attys

Witness:
Alfred H. McGlinchey.

May 15, 1923. 1,455,048

F. C. HALL ET AL

LOOM

Filed Dec. 21, 1920 3 Sheets-Sheet 3

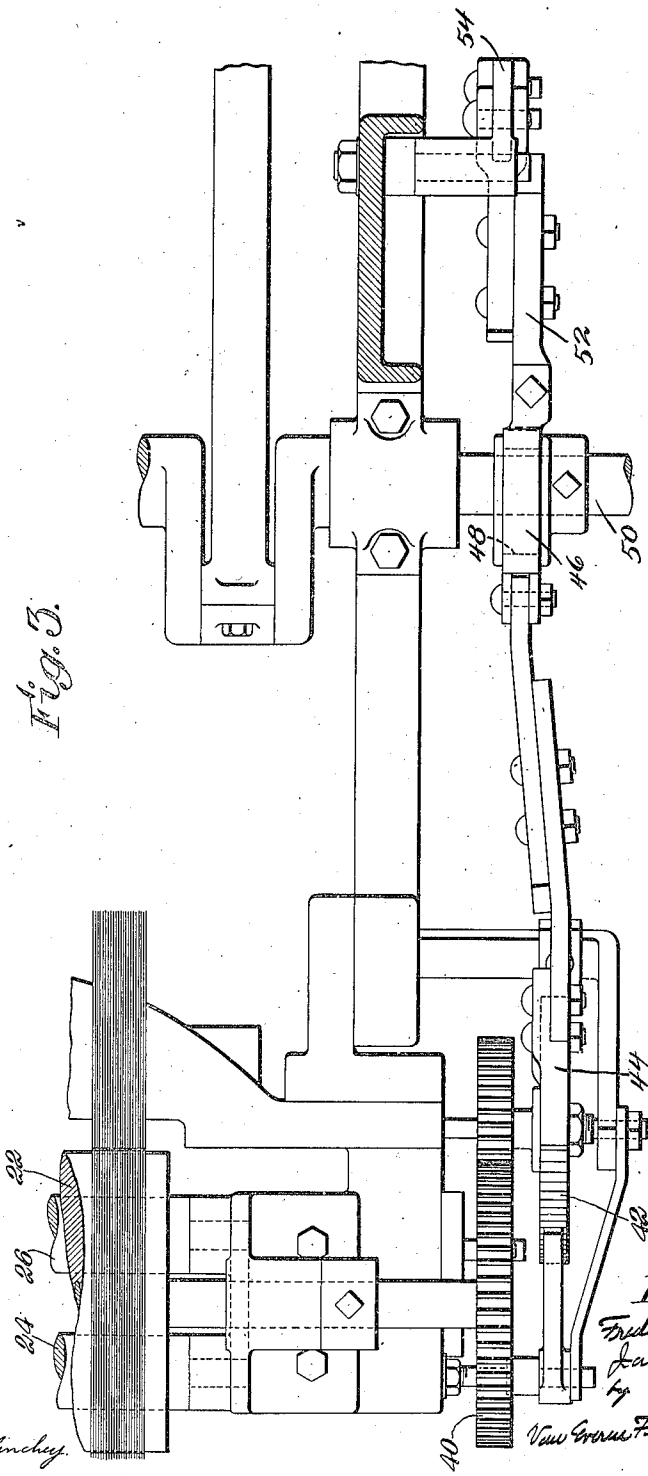


Fig. 3.

Witness:
Alfred H. McGlinchey.

Inventors
Frederick C. Hall
James Townsend
by
Van Sverus, Fish, Holdbrook & Cary
Attys

Patented May 15, 1923. 1,455,048

UNITED STATES PATENT OFFICE.

FREDERICK C. HALL AND JAMES TOWNSON, OF PAWTUCKET, RHODE ISLAND, ASSIGNORS TO JENCKES SPINNING COMPANY, OF PAWTUCKET, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

LOOM.

Application filed December 21, 1920. Serial No. 432,255.

To all whom it may concern:

Be it known that we, FREDERICK C. HALL and JAMES TOWNSON, citizens of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Looms; and we 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.

The invention relates to looms for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by very fine, weak and widely spaced filling threads which serve merely to retain the cords in close parallel relation.

In rubberizing the fabric of the above character preparatory to incorporating it in tires, it is subjected to the action of heavy calender rolls to which it is fed under comparatively heavy tension. Owing to the weakness and wide spacing of the fine filling threads, the action of the rolls causes any comparatively loose cords or series of cords to creep along the fabric and bank up at the point where the fabric enters the rolls until sufficient slack accumulates to cause a fold which enters the rolls and causes a rupture of the fabric at this point. It is the object of the present invention to weave a cord tire fabric of the above character which shall be free from such objectionable loose cords or series of cords. This is accomplished by maintaining a practically uniform and regulated tension on each warp cord throughout the weaving. The means for securing this result comprises mechanism for positively feeding in to the harness, during each cycle of the loom, a definite and uniform length of each warp cord which is properly proportioned with relation to the length of the fabric taken up by the fabric take-up mechanism to secure a uniform stretch of each cord in successive sheds, and equalizing devices for maintaining a uniform tension on the cords leading to the feeding-in mechanism. Since the feeding-in mechanism feeds in the same length of cord for each shed, and since a uniform tension is maintained on each cord leading to the feeding-in mechanism, each cord will be under the same tension in successive sheds and a uniform fabric will be produced.

The feeding-in mechanism preferably comprises a feeding-in roll or drum over which the warp threads pass side-by-side and about which they wrap to a sufficient extent to prevent any slipping over the surface of the roll. The equalizing devices preferably comprise a take-up in the form of a weight suspended on each warp cord or thread and acting to automatically take up any slack in the cord and to maintain a uniform light tension on it as it leads to the feeding-in roll. By the use of take-ups of uniform weight an equal, as well as a uniform, tension on all of the warp cords leading to the feeding-in mechanism may be insured.

The proper arrangement of the threads side by side on the roll may be, and preferably is, secured and continually maintained by thread spacing separators in the form of a reed through which the threads lead to the roll. The thin plates of the reed separate the different threads and accurately space them as they are drawn forward by the roll so that there is no danger of one thread riding on another and thus causing variations in the tension on the threads. To further guard against any tendency of the threads to influence or vary the tension or pull on adjacent threads between the feeding in roll and the harness thread spacing, separators in the form of a reed may be, and preferably are, arranged in front of the feeding in roll. The thin plates of this reed separate and space the threads and overcome any tendency of the threads to ride or cling on one another on their way to the harness in such manner as to modify or vary the tension of such threads. The warp threads are led to the equalizing and feeding in mechanisms from individual spools, each of which carries a single warp thread supply.

A preferred form of the invention is illustrated in the accompanying drawings in which Fig. 1 is a vertical sectional view illustrating the invention somewhat diagrammatically, Fig. 2 is a side elevation partly in section showing so much of a loom as is necessary to illustrate the application of the invention thereto and Fig. 3 is a plan view showing the mechanism for actuating the feeding in roll.

In the drawings the invention is shown applied to a loom having the usual lay 2

and harness 4, and also provided with the usual shuttle and operating mechanisms which are not shown. As shown in Fig. 1 the warp threads are supplied to the loom from spools 6 which are supported in creels of usual construction, and which may be provided with the usual tension devices. The threads lead from the spools through suitable guides in eye-boards or reeds 8, from which they pass alternately over and under a set of lease rods 10 and are thus brought into position side by side. From the lease rods 10 the threads pass to a second set of lease rods 12 and thence between the thin plates of the reed 14 which keep them properly separated and spaced and direct them side by side to the feeding in mechanism.

The devices for maintaining a uniform tension on the warp threads leading to the feeding in mechanism are located between the two sets of lease rods 10 and 12 and consist of take-up weights 16 suspended on the threads. The weights are in the form of wires or rods which are provided with eyes for the passage of the thread and are guided in holes in the guide plates 18 and 20. The rods play freely through the guide plates, thus taking up any temporary slackness which might otherwise occur between the supply spools and the feeding in mechanism and maintain a uniform light tension on each of the threads. The threads are, therefore, uniformly taut when engaged by the feeding in mechanism and will be uniformly acted on thereby.

The feeding in mechanism shown comprises a feeding in roll 22 which may be covered with sand or otherwise roughened to prevent slipping of the threads thereon and two cooperating guide rolls 24 and 26 which causes the threads to wrap nearly around the roll. The threads lead from the reed 14 to the roll 24, and from the roll 26 to the harness. On the way to the harness the threads pass through a reed 27 which serves to maintain them in proper spaced relation and to prevent such contact between adjacent threads as would tend to influence or modify the tension thereon. The threads also pass through the usual lease rods 29. From the harness the threads pass through the lay to the previously woven fabric which passes over the breast beam 28, around a fabric take-up drum 30, over guide rolls 32, 34 and 36 to the cloth roll 38, upon which it is wound. The feeding in roll is positively driven to feed forward a definite length of each warp thread and its actuating mechanism is so timed and proportioned with relation to the actuating mechanism for the fabric take-up drum that the warp threads are held under the desired pre-determined tension between the feeding in roll and the already woven fabric during each cycle of the loom. Since the warp threads are uniformly taut as they come to the feeding in roll, and are positively held and controlled thereby, each of the threads will be under a pre-determined tension between the woven fabric and the feeding in roll, depending upon the relation between the movements given to the feeding in roll and to the fabric take-up drum.

The rotation of the feeding in roll is preferably intermittent and so timed that there is no feed of the threads during the passage of the shuttle through the sheds formed by the harness. As shown the feeding in roll is connected through gearing 40 with a ratchet wheel 42, which is engaged and actuated by a pawl 44 connected with the eccentric strap 46 engaging an eccentric 48 carried by the lay operating shaft 50. The eccentric strap is formed on the end of a link 52 connected to the lever 54, which carries the pawl 56 for actuating the ratchet wheel 58 on the end of the cloth shaft 38. The fabric take-up drum 30 is continuously driven through gearing 60 connecting the drum with a worm wheel 62, which is engaged by a worm 64 on a shaft 66 driven through beveled gears 68 from the cam shaft 70 of the loom. The worm and worm wheel drive insures a uniform pull on the fabric and also positively holds the drum against reverse movement under the tension on the fabric and warp threads.

While it is preferred to employ the specific construction and arrangement of parts shown and described in embodying the invention in a loom for weaving tire fabric and adapted to take the warp threads directly from the creels, it will be understood that this construction and arrangement is not essential to the broader features of the invention and may be varied or modified without departing therefrom.

What is claimed is:

1. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads the combination with the harness and lay of mechanism from which the warp threads lead to the harness for feeding in an unvarying length of each warp thread during each cycle of the loom, and means for equalizing the tension on the threads leading to the feeding in mechanism.

2. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads the combination with the harness and lay of feeding in mechanism from which the warp threads lead to the harness, fabric take-up mechanism, means for equalizing the tension on the threads leading to the feeding in mechanism, and mechanism for actuating the feeding in mechanism and the fabric take-up

mechanism to feed in a definite length of each warp thread and to take up a definite length of fabric during each cycle of the loom.

3. In a loom the combination with the harness and lay of a feeding in mechanism from which the warp threads lead to the harness, fabric take-up mechanism, devices for equalizing the tension on the threads leading to the feeding in mechanism, thread separating and spacing devices acting on the threads between the equalizing devices and the feeding in mechanism, and between the feeding in mechanism and the harness, and mechanism for actuating the feeding in mechanism and the fabric take-up mechanism to feed in a definite length of each warp thread and take up a definite length of fabric during each cycle of the loom.

4. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads, the combination with the harness and lay of an individual supply from which each warp thread is drawn, a feeding in mechanism between the thread supplies and the harness for positively controlling all the warp threads throughout the weaving, separate take-ups for the threads for keeping them taut as they come to the feeding in mechanism, and mechanism for actuating the feeding in mechanism to feed in an unvarying length of each warp thread during each cycle of the loom.

5. In a loom the combination with the harness and lay of a feeding in roll to which the warp threads lead from the warp thread supply and from which they lead to the harness, a fabric take-up drum, mechanism for continuously rotating the take-up drum, and mechanism for intermittently rotating the feeding in roll.

6. In a loom the combination with the harness and lay of an individual supply from which each warp thread is drawn, two sets of lease rods through which the threads lead, take-up wires suspended on the threads between the two sets of lease rods, guide plates through which the wires play, and devices through which the threads are directed from the last set of lease rods to the harness.

7. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads, the combination with the harness and lay of a feeding in roll by which all the warp threads are positively held throughout the weaving, means for equalizing the tension on the warp threads and directing them side by side to the roll, means for directing the threads from the roll to the harness and for maintaining them side by side, mechanism for actuating the roll to feed in a definite length of each warp thread during each cycle of the loom, and mechanism for taking up a definite length of fabric during each cyle of the loom.

8. In a loom the combination with the harness and lay of means for equalizing the tension on the warp threads comprising two sets of lease rods, take-up wires suspended on the threads between the two sets of rods, and guide plates through which the wires play.

9. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads, the combination with the harness and lay of feeding in mechanism to which all the warp threads lead from the warp thread supply and from which they lead to the harness, mechanism for actuating the feeding in mechanism to feed in an unvarying length of each warp thread during each cycle of the loom, and means for maintaining a substantially uniform tension on each warp thread delivered to the feeding in mechanism.

10. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads, the combination with the harness and lay of an individual supply from which each warp thread is drawn, a feeding in mechanism for positively holding all the warp threads between the thread supply and the harness throughout the weaving, mechanism for actuating the feeding in mechanism to feed in a definite length of each warp thread during each cycle of the loom, means for maintaining each thread under substantially uniform tension between the corresponding supply and the feeding in mechanism.

11. In a loom for weaving cord tire fabric consisting of comparatively heavy warp threads or cords bound together by fine and widely spaced filling threads, the combination with the harness and lay of feeding in mechanism to which all the warp threads lead from the warp thread supply and from which they lead to the harness, means for maintaining each thread leading to the feeding in mechanism under substantially uniform tension, fabric take-up mechanism, and mechanism for actuating the feeding in and fabric take-up mechanisms to feed in a definite length of each warp thread and to take up a definite length of fabric during each cycle of the loom.

FREDERICK C. HALL.
JAMES TOWNSON.