April 27, 1926. 1,582,415

F. B. MANLEY

METHOD OF WEAVING

Filed June 30, 1922

Fig. 1.

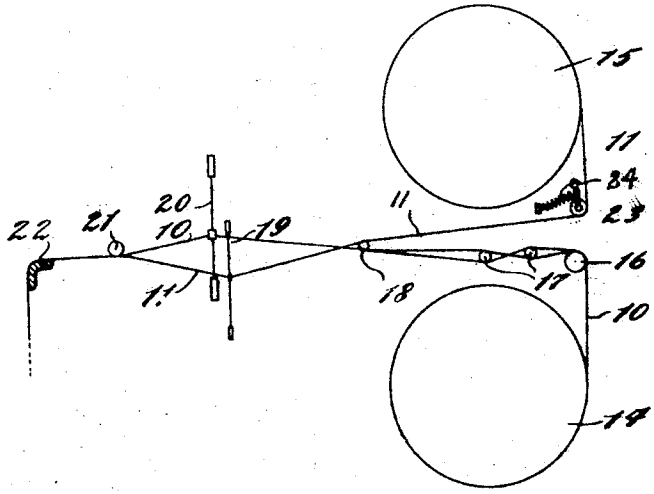


Fig. 2.

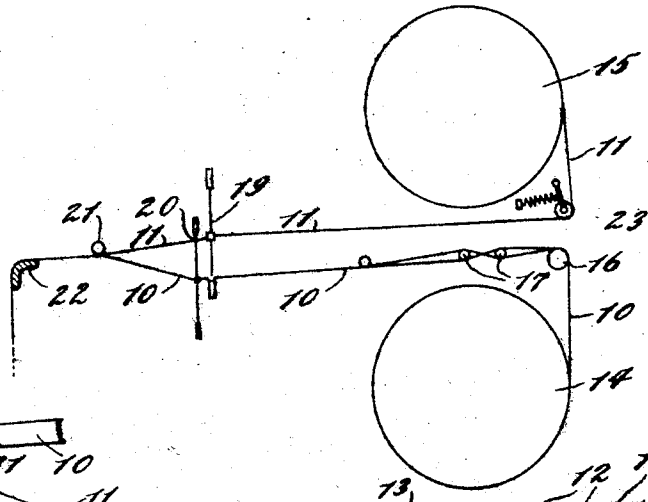


Fig. 6.

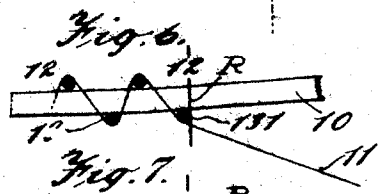


Fig. 7.

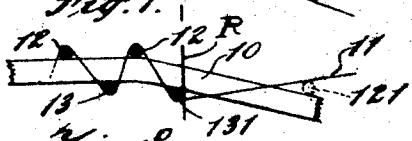


Fig. 8.



Fig. 9.

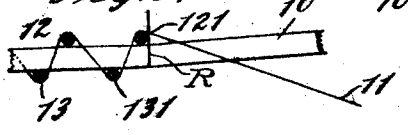


Fig. 3.

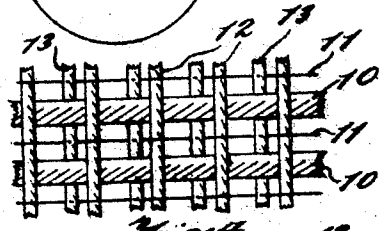


Fig. 5.

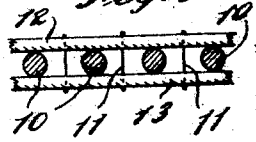
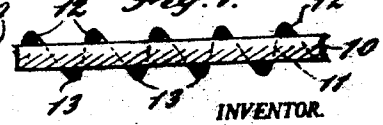


Fig. 4.



INVENTOR.

Fred B. Manley

BY Jacob Liberman

his ATTORNEY.

Patented Apr. 27, 1926. 1,582,415

UNITED STATES PATENT OFFICE.

FRED B. MANLEY, OF PATERSON, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO TEXTILES DEVELOPMENT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

METHOD OF WEAVING.

Application filed June 30, 1922. Serial No. 571,350.

To all whom it may concern:

Be it known that I, FRED B. MANLEY, a citizen of the United States of America, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Methods of Weaving, of which the following is a specification.

My present invention relates to certain improvements in methods of weaving fabrics, and particularly fabrics in which there is a warp preferably made up of a heavy and a light yarn and in which the weft or filling strands are laid across the heavy warp alternately on opposite sides thereof, the weft strands being held in position by the supplemental warp strands. In producing fabric of this character, it is desirable for certain uses of the fabric, as for instance in cord tires, that the main or cord threads of the warp shall extend in straight lines and not be forced into undulations in the weaving, and to this end, it is desirable that the supplemental threads of the warp shall not draw the weft threads down between the main warp threads so as to cause waves in the main warp threads.

By my present method, I am enabled to weave such a fabric as has been described or any similar fabric without difficulty and without distorting the main warp threads or the weft threads out of their planes.

One form in which my invention may be carried out is illustrated in the accompanying drawings, in which Figure 1 is a more or less diagrammatic representation of a loom set up to operate in accordance with my invention;

Fig. 2 is the same as Figure 1, with the parts in a different position;

Figures 3, 4 and 5 are respectively plan, section side elevation and sectional end elevation of a fabric which I am enabled to weave by my method and which is the fabric which I have chosen for purposes of illustration in connection with the description of my method, and

Figures 6, 7, 8 and 9 are diagrammatic illustrations of steps in the weaving.

Like reference characters indicate like parts in the accompanying drawings.

In the following description, I will describe the weaving of the fabric shown in Figs. 3, 4 and 5 to illustrate my invention, but it will be understood that my invention is not limited to the weaving of fabric of that specific kind.

Referring first to the fabric shown in Figs. 3, 4 and 5, 10 are the main warp strands, 11 the supplemental warp strands and 12 and 13 the weft or binder strands. As illustrated in these views, it will be seen that the main or cord strands 10 have the weft strands 12 and 13 lying across the strands 10, with the supplemental warp strands 11 passing alternately over the binder strands 12 and 13, but without drawing the strands 12 and 13 down between the cords 10 and 11, and therefore without exerting any pressure which would distort the cord strands 10. Yet, the supplemental strands 11 are drawn sufficiently tight to hold the binder strands 12 and 13 in position.

Referring now to Figs. 1 and 2, which show diagrammatically a loom set up to weave the fabric just described, 14 is the warp beam for the main warp or cord strands 10 and 15 is the warp beam for the supplemental warp strands 11. From the warp beam 14, the cord strands 10 pass over a roller or rod 16 and around lease rods 17 and finally under the rod 18 and through the harness represented by the heddles 19 and 20 into the fell of the cloth which begins at about the position of the rod 21, the cloth finally passing over the cloth beam 22 and being taken up by the usual rollers. Similarly, the supplemental warp strands 11 pass from the beam 15 under a roller or rod 23 through the harness and into the fell of the cloth. The rod 21 rests on the cloth to hold it down when the heavy shed is up.

In carrying out my method, I preferably take up the cloth only at every other pick, and the parts in Fig. 1 are shown in the position which they occupy during the pick when the cloth is not taken up.

Figure 2 is like Fig. 1 except that the parts are shown in the position which they occupy during the pick when the cloth moves forward.

Comparing the parts in the position shown in Figs. 1 and 2, it will be seen that in Fig. 1, the cord strands 10 extend nearly horizontally from the fell of the cloth to the heddles 20 and then extend downwardly at an

angle to pass under the rod 18. The supplemental warp strands 11 pass at an angle downward from the rod or roller 23 through the eyes of the heddles 20 and then through an angle to the fell of the cloth. The opening between the strands 10 and 11 forms the shed through which the weft strand 13 is passed, with this weft strand extending below the cord strands 10. The position of the heddles in the harness is now shifted to that shown in Fig. 2, and now it will be seen that the supplemental warp strands 11 extend substantially horizontally from the rod or roller 23 to the fell of the cloth while the cord strands extend at an angle from the fell of the cloth to the heddles 20. A shed is formed between the supplemental warp strands 11 and the main warp strands 10 and a weft strand 12 is now passed through this shed to lie above the cord strands 10 of the warp. It is during this pick that the cloth is moved forward.

In Fig. 1, it will be noted that the supplemental warp strands 11 extend in an angle from the rod or roller 23 to the fell of the cloth, by reason of the position of the heddles 19. On the other hand, in Fig. 2, there is substantially a straight line between the fell of the cloth and the rod 23. Consequently, the length of yarn from the rod 23 to the fell of the cloth is longer in Fig. 1 than in Fig. 2. On the other hand, because of the relative positions of the rods 18 with the fell of the cloth in connection with the positions of the eyes of the heddles 20 as they move up and down, the tension on the main strands 10 will remain substantially constant.

As the supplemental warp moves from the position shown in Fig. 2 to the position shown in Fig. 1, the warp will be drawn from the beam 15 to give the increased length which the warp strands 11 occupy in Fig. 1. When the harness is reversed and the strands 11 are carried to the position shown in Fig. 2, slack will be formed or the tension relieved between the fell of the cloth and the roller 23, and it is this forming of slack, preferably with the taking up of the cloth at alternate picks, which enables me to weave a fabric such as shown in Figs. 3, 4 and 5. If desired, the roller 23 may be provided with a spring, as 24, which will normally move it to the right in Figs. 1 and 2. This spring provides a slight amount of tension on the strands 11 between the roller 23 and the fell of the cloth, so that as the slack is produced by moving from the position shown in Fig. 1 to the position shown in Fig. 2, the strands will not become snarled, since the spring 24 will move the rod 23 to keep the strands 11 taut. It will be understood, of course, that roller 23 may have a fixed position, if desired.

Referring now to Figs. 6, 7, 8 and 9, the preferred steps are shown by which the fabric shown in Figs. 3, 4 and 5 is produced, which fabric is described in my Patent No 1,433,467 dated October 24, 1922. In Fig. 6, the shed is formed as in Fig. 1. The weft thread 131 is now inserted, the cloth not being taken up on this pick. The harness then reverses its position so that the main warp threads 10 are carried down to the position shown in Fig. 7 and the supplemental warp threads are carried up to the position shown in that figure. It will be remembered, however, that in moving from the position shown in Fig. 6 to the position shown in Fig. 7, no tension is on the threads 11, since at this time, slack is being formed between the roller 23 and the fell of the cloth. Consequently, there is no drawing of the supplemental threads 11 against the weft strand 131. In the position shown in Fig. 7, the weft strand 121 is now inserted and forced to the position shown in Fig. 8 by the reed R when the strand 121 is beaten up. It will be noted that in Fig. 8, the strands 121 and 131 are substantially in the same vertical plane, because the cloth not having been taken up between these two picks, the reed will locate strands 121 and 131 in substantially the same vertical plane. Now, the harness again reverses to carry the warp into the position shown in Fig. 9, and, at the same time, the cloth is taken up, so that by reason of the angles at which the supplemental strands 11 are now drawn, the weft strand 121 moves slightly along the cord strands 10 into the position shown in Fig. 9, when the cycle is ready to begin again. It will be noted that in Fig. 7, when the weft strand 121 is moved from the position in that figure to the position shown in Fig. 8, the strands 11 are under no tension, and, in fact, are provided with a slight amount of slack, so that this beating up of the strand 121 does not produce a tension on the strands 11 between the strands 121 and 131. Consequently the latter are not drawn down between the strands 10, as would be the case if slack were not provided at this time in the strands 11.

While I have described my method in connection with the weaving of cloth having a warp formed of threads of considerable difference in size, it will be understood that this is immaterial so far as my method is concerned, and that the relative size of the yarn in the several strands can be varied as desired. It will also be understood that while, preferably, I regulate the amount of slack in the supplemental warp strands 11, so that there is no tendency to draw the weft strands 12 down between the main warp strands, nevertheless a slight amount of tension may be provided and the amount of this tension can be predetermined by shifting the positions of the eyes of the

heddles 19, so that the difference in the length of the strands between the rod 23 and the fell of the cloth in the position shown in Fig. 1 as compared with that in Fig. 2 may be varied. For instance, if the position of these eyes were raised somewhat in Fig. 1, then it would be obvious that in Fig. 2, the threads 11 would make an angle between the roller 23 and the fell of the cloth, but if this angle were not as great as the angle of the same threads in the position shown in Fig. 1, it is obvious that some slack will be formed.

Because the weft strands are woven without being distorted from a straight line or substantially without such distortion, I find it unnecessary to use the usual temples, and I have found that a plain rod, such as is shown at 21, is sufficient to hold the cloth in position.

While preferably I provide the slack in the supplemental warp by changing the angles thereof between two fixed points, it is obvious that other means may be used to provide such slack or to relieve the tension on such supplemental warp, such as any suitable let-off mechanism, which may be arranged to release and apply tension to such strands. For some purposes, the cloth may be taken up at each pick, the tension on the supplemental warp being released for each pick.

I claim:

1. The method of weaving a fabric of the class described comprising the formation of a shed between the main warp threads and the supplemental warp threads with the main warp threads substantially horizontal between the fell of the cloth and the harness and the supplemental warp threads making an angle between the fell of the cloth and a point adjacent the supplemental warp beam, inserting a filling thread and beating it up, reversing all the warp threads and bringing the supplemental warp threads into a substantially straight line between the fell of the cloth and said point, whereby tension on the supplemental warp threads is relieved, inserting a second filling thread, beating it up and taking up the cloth the space of two picks.

2. The method of weaving a fabric of the class described comprising the formation of a shed between the main warp threads and the supplemental warp threads, with the supplemental warp threads making an angle between the fell of the cloth and a point adjacent the supplemental warp beam, inserting a filling thread in the shed and beating it up, reversing all the warp threads and bringing the supplemental warp threads into a substantially straight line between the fell of the cloth and said point, whereby tension on the supplemental warp threads is relieved, inserting a second filling thread, beating it up and taking up the cloth the space of two picks.

3. The method of weaving a fabric of the class described comprising the formation of a shed between the main warp threads and the supplemental warp threads, with the main warp threads substantially horizontal and the supplemental warp threads making an angle thereto, inserting a filling thread in the shed and beating it up, reversing all the warp threads in the shed and simultaneously relieving the tension on the supplemental warp threads, inserting a second filling thread in the shed, beating it up and taking up the cloth the space of two picks.

4. The method of weaving a fabric of the class described comprising the formation of a shed between the main warp threads and the supplemental warp threads, inserting a filling thread in the shed and beating it up, reversing the warp threads in the shed and simultaneously relieving the tension on the supplemental warp threads, inserting a second filling thread in the shed, beating it up and taking up the cloth the space of two picks.

5. The method of weaving a fabric of the class described comprising the formation of a shed between the main warp threads and the supplemental warp threads, reversing the positions of the warp threads in the shed for each pick and relieving the tension on the supplemental warp threads at each alternate reversal, inserting a filling thread for each reversal of the warp threads in the shed and taking up the cloth the space of two picks at each alternate pick and when the tension on the supplemental warp threads is relieved.

6. The method of weaving a fabric of the class described comprising inserting the filling threads between the main threads and the supplemental warp threads with the supplemental warp threads alternately on opposite sides of the filling threads, providing slack in the supplemental warp threads for each alternate pick and taking up the cloth the space of two picks at each alternate pick and when the supplemental warp threads are slack.

7. The method of weaving a fabric of the class described comprising inserting the filling threads between the main threads and the supplemental warp threads with the supplemental warp threads alternately on opposite sides of the filling threads, and providing slack in the supplemental warp threads to relieve the tension in the supplemental warp threads as the cloth is taken up and insure tension in the main warp threads.

Signed at New York, in the county of New York, and State of New York, this 27 day of June 1922.

FRED B. MANLEY.