Dec. 29, 1925. 1,568,020

J. N. GRIFFITH

MARQUISETTE OR CROSS WEAVING LOOM

Filed Oct. 6, 1924 2 Sheets-Sheet 1

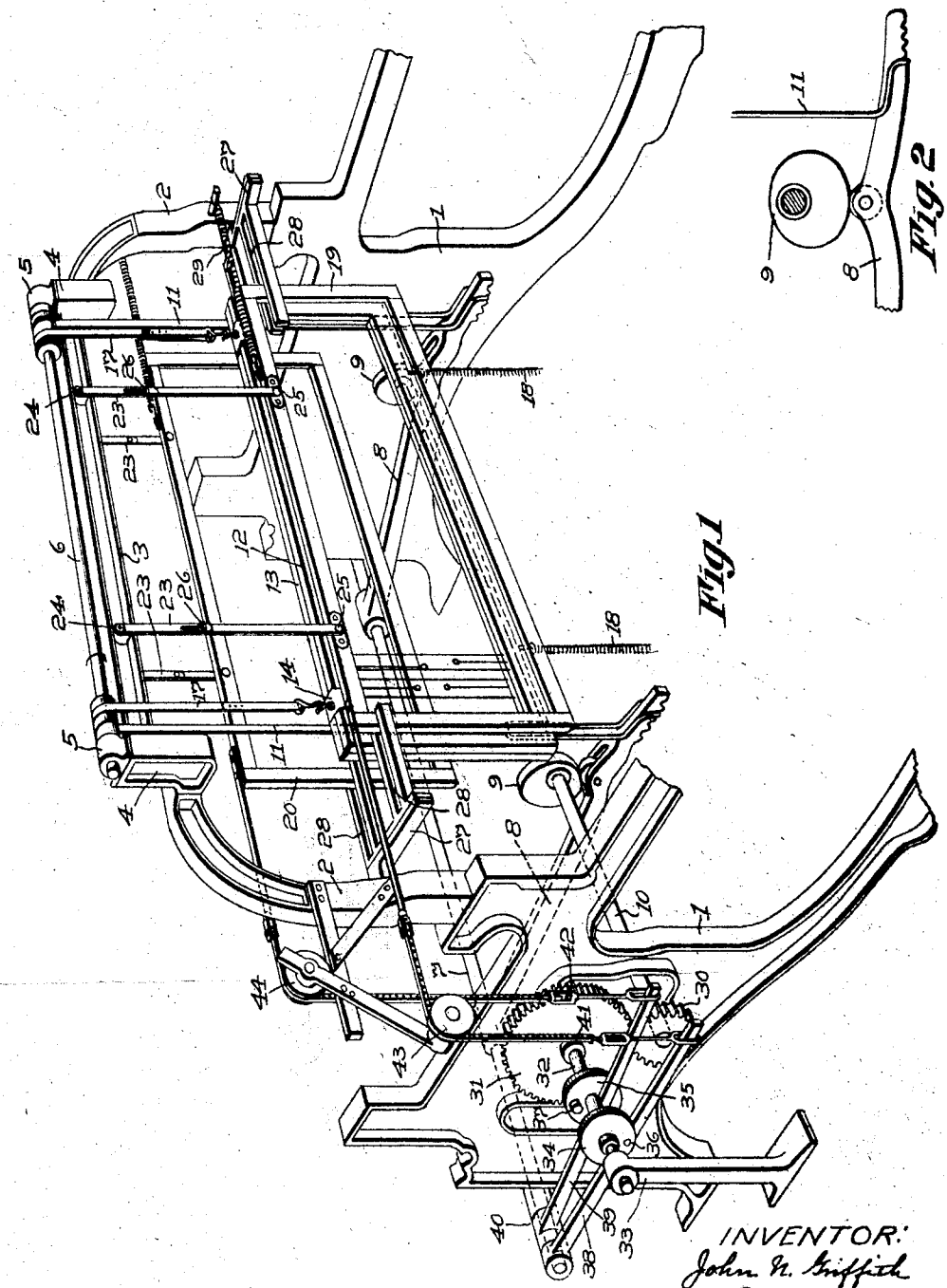

Fig. 1

Fig. 2

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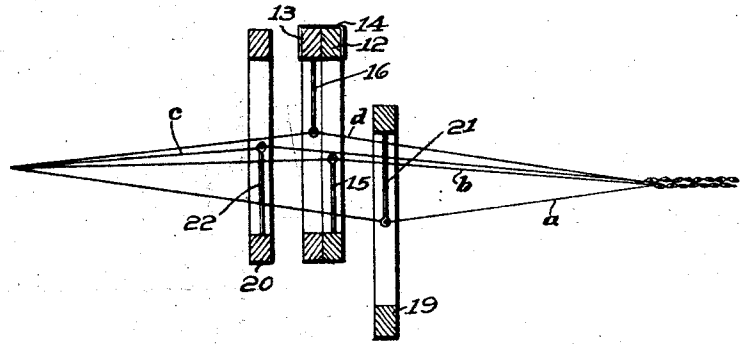

Fig. 3

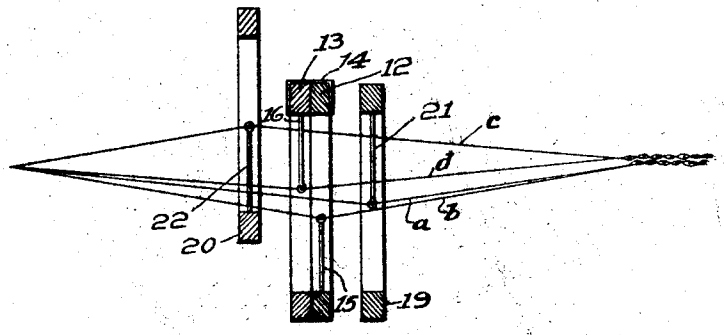

Fig. 4

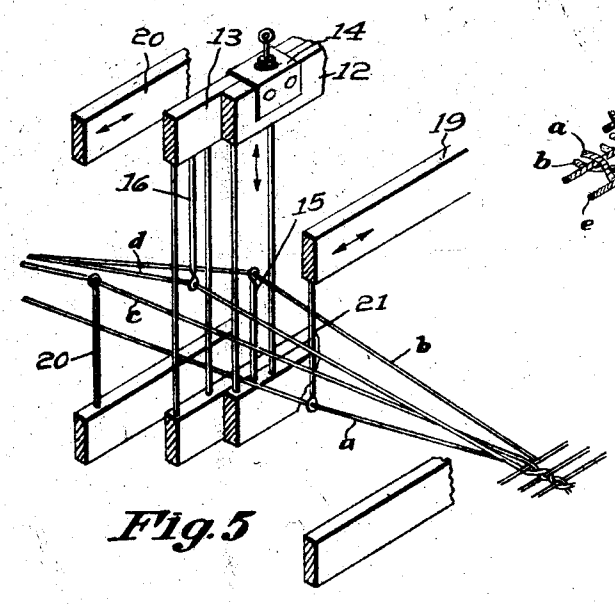

Fig. 5

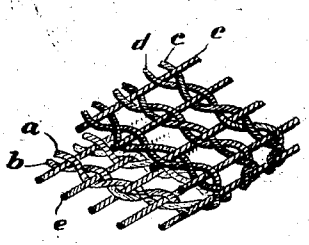

Fig. 6

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Patented Dec. 29, 1925. 1,568,020

UNITED STATES PATENT OFFICE.

JOHN N. GRIFFITH, OF SCOTTDALE, GEORGIA, ASSIGNOR TO DRAPER CORPORATION, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

MARQUISETTE OR CROSS WEAVING LOOM.

Application filed October 6, 1924. Serial No. 741,864.

To all whom it may concern:

Be it known that I, JOHN N. GRIFFITH, a citizen of the United States, residing at Scottdale, in the county of De Kalb and State of Georgia, have invented an Improvement in Marquisette or Cross Weaving Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to looms and more particularly to marquisette or cross-weaving looms for the production of tubular cross-woven fabrics.

In accordance with the present invention, means are provided for forming separate sheds, one of which is utilized in the production of one ply or portion of the tubular fabric and the other of which is utilized in the production of the other ply of the fabric, and imparting to certain of the warp threads the lateral movement for the crossing of the warp threads, so that as the shuttle passes alternately back and forth, first through one shed and then through the other, a tubular cross-woven or marquisette weave results.

One of the objects of the present invention is to simplify the loom construction and to provide simple and effective means for producing in the continuous operation of the loom a tubular fabric formed of marquisette or cross-weave.

The various features of the invention and new combination of parts will best be made clear from the following description and the accompanying drawings of one good form thereof.

In the drawings:

Fig. 1 is a perspective view of the main portions of a loom embodying the present invention;

Fig. 2 is an enlarged detached detail, showing means for actuating certain of the heddle frames;

Fig. 3 is a longitudinal section from front to rear, showing the relation of the shedding mechanism and the warp threads in the production of one ply of the tubular fabric;

Fig. 4 is a similar view showing the parts reversed for the production of the other ply;

Fig. 5 is an enlarged detail, partly broken away, showing the relation of the shedding and cross-weaving mechanism and the warp threads controlled thereby; and

Fig. 6 is a perspective view on an enlarged scale of a portion of the tubular cross-woven fabric which results from the loom operation.

The loom frame may be of usual construction and comprises the side frames 1 from which rise the portions 2 connected overhead by an arch or beam 3.

Connected to the arch of the loom are the brackets 4 in which are formed bearings 5 for a rock shaft 6 to which rocking movement may be imparted in the formation of sheds by suitable form of shedding mechanism, that shown in the present instance comprising cam actuated treadles.

Mounted for rocking movement on the dead shaft 7 are the treadles 8, one at each side of the loom, as shown in the present instance of the invention. Each of the treadles 8 is actuated by an associated cam 9 secured to the under or cam shaft 10. The end portion of each of the treadles 8 is connected to the rock shaft 6 by a flexible connection 11, the construction being such that upon depression of the treadles 8 the rock shaft will be rocked in its bearings and impart rising and falling movements to the heddle frames, now to be described.

In the present instance of the invention, there are two heddle frames 12 and 13, which are rigidly connected together as by the cap pieces 14. Extending upwardly from the heddle frame 12 are the needle eyes 15 through which certain of the warp threads pass, and extending downwardly from the companion heddle frame 13 are the needles 16 having eyes through which other warp threads pass. The heddle frames 12 and 13 are suspended from the rock shaft 6 by the connections 17 and the lower portions of the heddle frames 12 and 13 are under the influence of springs 18 which normally act upon the heddle frames 12 and 13 to pull them downwardly. The described construction forms one good and practical means for raising the two connected heddle frames 12 and 13, but if desired the connected heddle frames may be positively raised and lowered by heddle

mechanism, both forms of heddle actuating means being well-known and needing no further description.

At each side of the heddle frames 12 and 13, which have only an up and down movement, are the needle heddles 19 and 20, one of which as 19 has a series of downwardly extending needle eyes 21, and the other of which has a series of heddle eyes 22 expanding upwardly, as best shown by Figs. 3, 4 and 5. Each of the needle heddles 19 and 20 is suspended from the overhead beam or arch 3 by flexible hangers 23, one end of each of which is secured at 24 to the arch 3 and the other end of which is secured to one of the needle frames as at 25, Fig. 1, the construction being such that the needle frames 19 and 20 are hung from the overhead beam or arch 3 by the hangers 23 and have no rising and falling movement but are permitted to swing laterally.

The hangers 23 are preferably made adjustable, as shown in Fig. 1, by means of a pin and slot connection 26, so that the vertical position of each of the needle frames may be adjusted to place the warp threads controlled thereby in proper position for the shed formation in connection with the heddle frames 12 and 13.

Extending inwardly from the loom frame are the guides 27, each of which is formed with guideways 28 for directing the movements of the needle frames 19 and 20 in a lateral direction, it being understood that the needle frames 19 and 20 may swing in a lateral direction by virtue of the hangers 23 which suspend them from the overhead beam or arch 3.

Each of the needle frames 19 and 20 is under the influence of a spring 29, Fig. 1, whereby each of the needle frames 19 and 20 is normally pulled laterally towards the side of the loom, as indicated in Fig. 1. The opposite lateral movement which is desired to be imparted to the needle frames alternately in order to effect proper crossing of the warp threads is secured by flexible connections with each of the needle frames actuated from cam operating treadles.

In the present instance of the invention, the under or cam shaft 10 is provided with a gear 30 which may be conveniently located on the outside of the loom frame and is operatively connected to a pinion 31 secured to a shaft 32 extending outwardly from the loom frame and having its outer end portion supported as by the riser 33. Between the riser 33 and the pinion 31 are the disks 34 and 35, each of which has a pin 36, 37 and in effect constituting cams for actuating the treadles. The treadles 38 and 39 are mounted for rocking movement at 40 adjacent the rear portion of the loom, and their frontwardly extending ends are engaged by the flexible connections 41 and 42 which are themselves joined respectively to the needle frames 19 and 20.

The flexible connections 41 and 42 are guided in their movements between the treadles and the connected needle frames by means of suitable guides, in the present instance the guides comprise the rollers or sheaves 43, 44 about which pass the flexible connections 41 and 42. Each of the guides 43 and 44 is positioned laterally with respect to its connected needle frame, it being understood that the needle frames are supported by their hangers in different vertical positions.

The warp threads are passed through the needle eyes of the heddles 13 and 14 and through the needle eyes of the needle heddles in alternation, that is to say, the warp threads *a* and *b* which form the lower ply or lower fabric are controlled by the needle frame 19 and heddle frame 12. The warp thread *a* passes through the downwardly extending eye 21 of the needle frame 19 and the warp thread *b* extends through the upwardly projecting needle eye 15 of the heddle frame 12. The warp threads *c* and *d* which form the upper ply or portion of the tubular fabric are controlled by the heddle frame 13 and the needle frame 20. The warp thread *c* passes through the upwardly extending eye 22 of the needle frame 20 and the warp thread *d* passes through the downwardly extending eye 16 of the heddle frame, as indicated in Figs. 3, 4 and 5.

When the heddle frames 12 and 13 are down, the needle frame 19 is shifted laterally by the treadle and cam actuated flexible connections hereinbefore described, and the warp threads are crossed. When the heddle frames 12 and 13 are up, the needle frame 20 is shifted laterally through the treadle and cam mechanism and flexible connections hereinbefore described, to cross the warp threads forming the upper ply of the fabric. The result is that as the shuttle passes back and forth through the respective sheds thus formed, a tubular cross-woven fabric, substantially as indicated in Fig. 6, is produced. In Fig. 6 the warp threads *a* and *b* which form the lower portion of the tubular fabric are locked in their crossed relation by the weft threads *c*, while the warp threads *c* and *d* in the upper portion of the tubular fabric are tied or locked by the weft threads *e*, and at the edges of the fabric the weft or filling thread passes from one ply to the other, as indicated in Fig. 6, thereby forming the tubular cross-woven fabric.

What is claimed is:

1. In a loom for weaving tubular fabrics, the combination of the loom frame having an overhead beam, an overhead rock shaft, two heddle frames rigidly secured together and having needle eyes extending in opposite directions, flexible connections for sup-

porting the heddle frames from the rock shaft and adapted to raise and lower the frames as the shaft is rocked, needle frames one in front and the other in the rear of the heddle frames, flexible hangers for supporting the needle frames from the overhead beam for lateral movement, guides at the opposite sides of the loom for guiding the lateral movement of the needle frames, springs normally acting to move the needle frames in one direction, and cam actuated flexible connections for moving these frames in the opposite direction.

2. In a loom for weaving tubular fabrics, the combination of two needle frames having eye pointed needles extending in opposite directions, a heddle frame having eye pointed needles extending in opposite directions, means for moving the heddle frame in the formation of sheds, a fixed overhead support, flexible connections between the overhead support and the needle frames that the latter may swing laterally from said support, springs normally acting to move the needle frames laterally in one direction, and cam operated flexible connections for moving the needle frames laterally in opposition to the said springs, the springs and cam operated connections being arranged to pull the needle frames back and forth.

3. In a loom for weaving tubular fabrics, the combination of the loom frame, an overhead rock shaft, two heddle frames having needle eyes extending in opposite directions and connected to the rock shaft to be lifted together thereby, cam actuated treadles for operating the heddle frames, a needle frame in front and a second needle frame in the rear of the heddle frames, flexible hangers for suspending the needle frames for swinging lateral movement, springs normally acting to move the needle frames laterally in one direction, and cam actuated flexible connections for moving the needle frames in the opposite direction for crossing adjacent warp threads.

4. In a loom for weaving tubular fabrics, the combination of two heddle frames secured together to prevent relative movement therebetween and having needle eyes extending in opposite directions, two needle frames having needle eyes extending in opposite directions, means for raising and lowering the two connected heddle frames together in the formation of the shed, and means for moving the needle frames alternately in opposite directions to cross the warp threads in the upper and lower fabrics and comprising springs normally acting to move the needle frames laterally in one direction, cam actuated treadles for moving the needle frames alternately in the opposite direction, a flexible connection between each treadle and its associated needle frame, and guides for the flexible connections.

5. In a cross-weaving loom for weaving tubular fabrics, the combination of two rigidly connected heddle frames having a rising and lowering movement only and provided with oppositely directed needle eyes, two independent needle frames having alternate lateral movements only, guides at the opposite sides of the loom for guiding the lateral movement of each needle frame, flexible hangers for supporting the needle frames, springs for moving the needle frames laterally in one direction, cam actuated levers, and flexible connections between the levers and needle frames for moving the needle frames laterally in the opposite direction for crossing the warp threads.

6. In a cross-weaving loom for weaving tubular fabrics, the combination of two rigidly connected heddle frames having a rising and lowering movement only and provided with oppositely directed needle eyes, two independent needle frames having alternate lateral movements only, means at the opposite sides of the needle frames for guiding their lateral movement, flexible hangers for supporting the needle frames, springs for moving the needle frames laterally in one direction, a cam actuated lever and flexible connections between said lever and one of said needle frames for moving the connected needle frame laterally when the heddle frames are lowered to form the lower cross-woven portion of the tubular fabric, a cam actuated lever and flexible connection with the other of the needle frames for moving the needle frame laterally to cross the warp threads when the heddle frames are raised to form the upper portion of the tubular fabric.

7. In a loom for weaving tubular fabrics, the combination of the loom frame, an overhead rock shaft, two heddle frames having needle eyes extending in opposite directions and connected to the rock shaft, cam actuated treadles for operating the heddle frames, a needle frame in front and a second needle frame in the rear of the heddle frames, flexible hangers for suspending the needle frames for swinging lateral movement, means for adjusting the length of the flexible hangers to position the needle frames for the formation of the upper and lower plies of the tubular fabric, springs normally acting to move the needle frames laterally in one direction, and cam actuated flexible connections for moving the needle frames in the opposite direction for crossing adjacent warp threads, the springs being connected to one side of the needle frames and said flexible connections to the opposite side to pull the frames back and forth.

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

JOHN N. GRIFFITH.