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F. VOLAND & A. MARCHAND.

MACHINE FOR BIASING CLOTH.

APPLICATION FILED OCT. 26, 1905.

Fig. 1

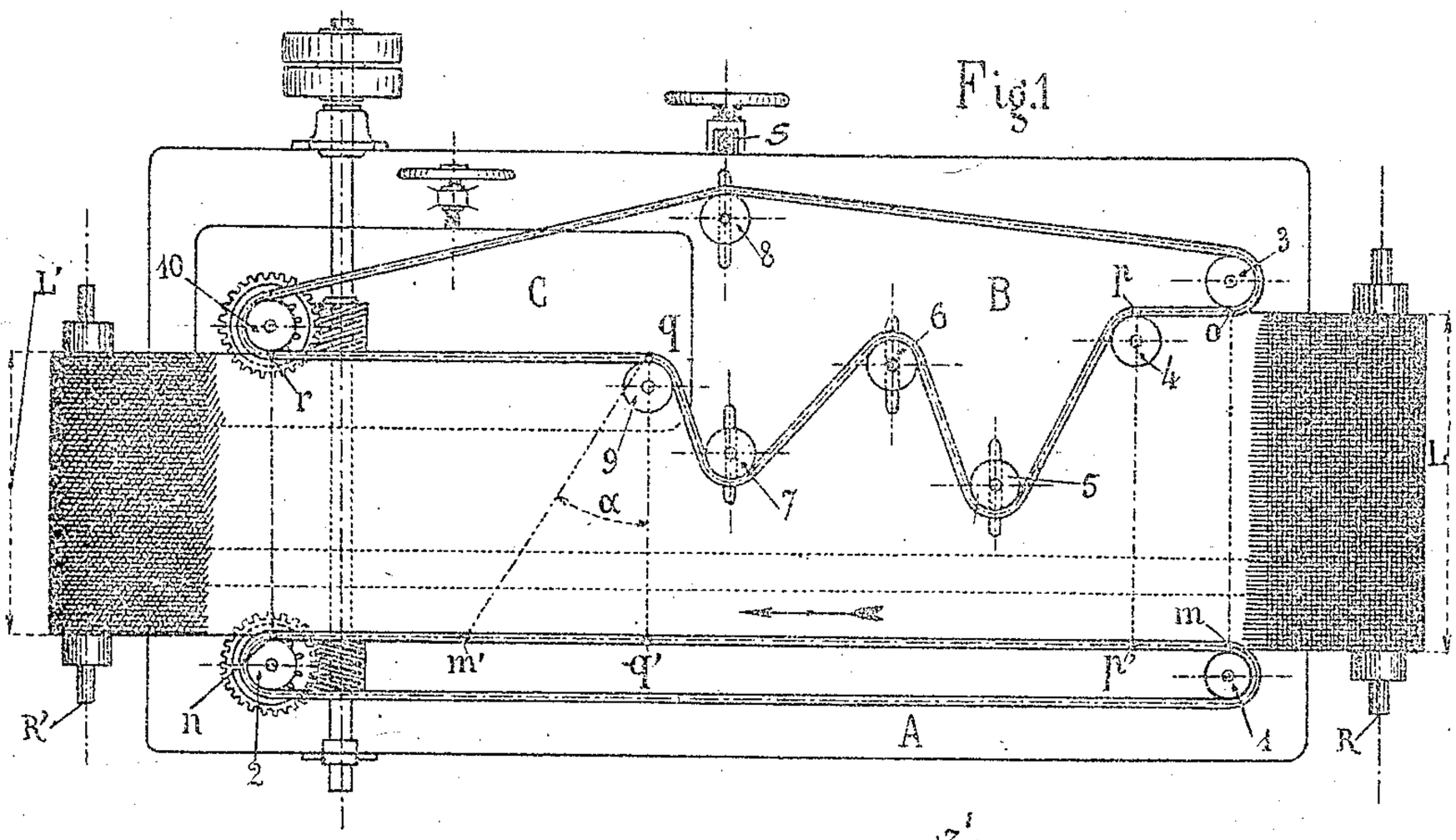


Fig. 2

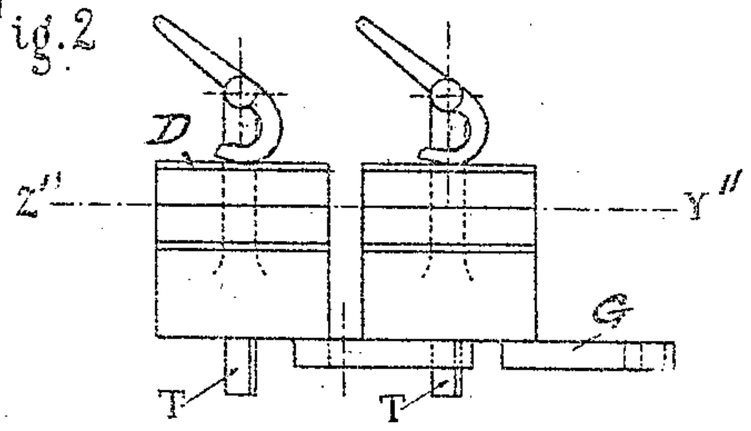


Fig. 3

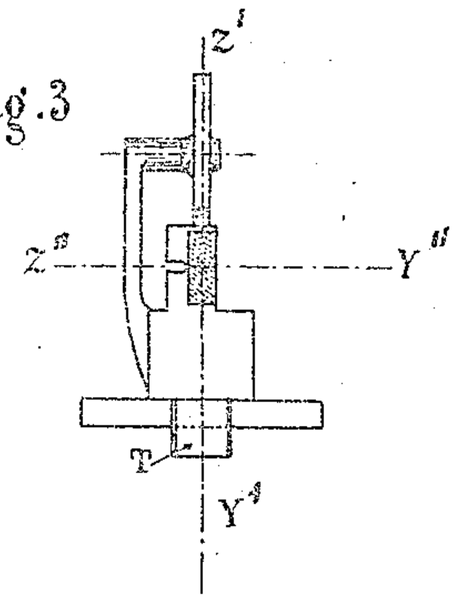


Fig. 4

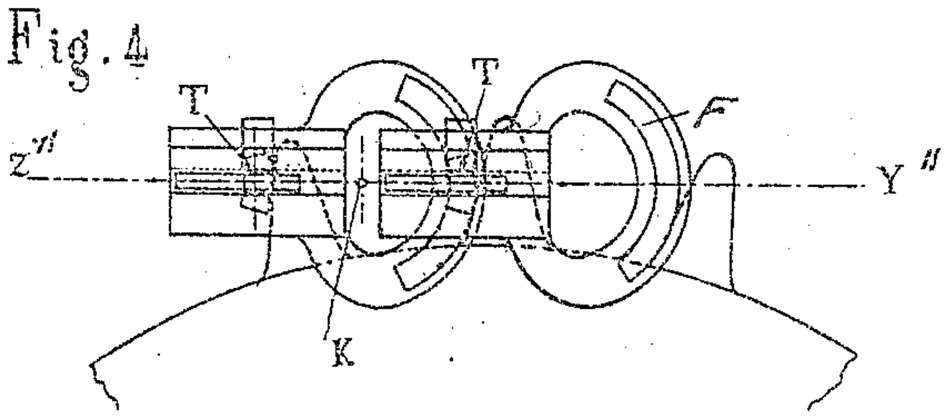


Fig. 5

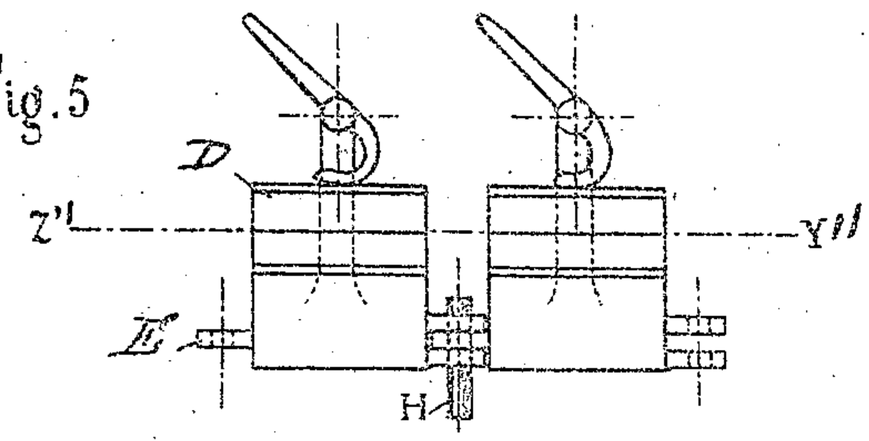
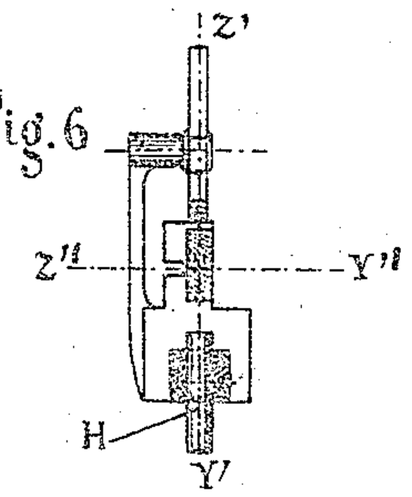


Fig. 6



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UNITED STATES PATENT OFFICE.

FRANCISQUE VOLAND AND ALBERT MARCHAND, OF LYON, FRANCE, ASSIGNORS TO G. R. DE MONTLORD, OF NEW YORK, N. Y.

MACHINE FOR BIASING CLOTH.

No. 848,416. Specification of Letters Patent. Patented March 26, 1907.

Application filed October 26, 1905. Serial No. 284,504.

To all whom it may concern:

Be it known that we, FRANCISQUE VOLAND and ALBERT MARCHAND, citizens of the French Republic, both residing at Lyon, France, have invented certain new and useful Improvements in Machines for Biasing Cloth, of which the following is a specification.

In certain machines for tentering or otherwise treating fabrics the weft-threads are temporarily displaced in such a manner that they are inclined with regard to the warp-threads.

The present invention relates to apparatus for the purpose of obtaining a new fabric the weft-threads of which are not only temporarily inclined with regard to the warp-threads, but remain permanently in an inclined or oblique direction, so that a fabric is obtained all the weft-threads of which while remaining parallel to each other are at an angle other than ninety degrees with regard to the warp-threads. This is effected by means of two series of interconnected grippers adapted to grip the edges of a web of woven fabric, the said series of grippers forming, as it were, two endless conveyer-chains which are caused to travel in such a manner that one of them is retarded with regard to the other in its movement between two given points. By this means the weft-threads which were originally at right angles with regard to the warp-threads are drawn into an inclined or angular position, the width of the web being, of course, at the same time reduced.

The invention is illustrated in the annexed drawings, in which—

Figure 1 is a diagrammatic plan view of the apparatus. Figs. 2 to 7 illustrate two methods for interconnecting the grippers referred to.

The apparatus comprises a frame A, supporting at one side two vertical pulleys or guide-rollers 1 and 2, around which passes an endless chain consisting of a series of grippers which will be described hereinafter. In the construction shown both the inner and outer runs of said gripper-chain move in a straight line; but it is not essential that the outer run should have such a movement. The apparatus also comprises a frame B, supporting guide-rollers 3, 4, 5, 6, 7, and 8. A third frame C is transversely displaceable with regard to the frames A and B and supports two guide-rollers 9 and 10.

The frames A and B are adapted to be moved toward each other or apart while remaining parallel, this displacement being effected by known means—for instance, by means of an adjusting-screw *s*. This arrangement allows of using the machine for cloth webs of various widths.

In the form of construction illustrated an endless chain, which is similar to the one already referred to and the path of which is indicated in Fig. 1 by lines connecting the points *o*, *p*, *q*, *r*, and *o*, passes over the rollers 3, 4, 5, 6, 7, 8, 9, and 10. The rollers 3 4 are arranged in such a manner that the direction of the chain between *o* and *p* is parallel to the direction of the chain extending from *m* to *n* between the rollers 1 and 2. The rollers 9 and 10 on the frame C are arranged in such a manner that the line connecting *q* and *r* is also parallel to the path *m n*.

The rollers 5, 6, and 7 are arranged on the frame B in slots and are adjustable with respect to the other guide-rollers, so that the length of the sinuous or zigzag chain path or run between *p* and *q* can be increased or reduced at will. The length of the inner or gripping run of the last-named chain is always substantially greater than that of the inner run of the other chain, though the distances traversed by said gripping-runs of the chains in the direction of movement of the cloth are the same. The roller 8, which is also arranged in a slot on the frame B, is a tensioning-roller, which allows of taking up the slack in the return-path of the chain on the left-hand side of the rollers 3 and 10.

R is a beam or roller from which the web of fabric to be treated is unwound, and R′ is an analogous beam or roller on which the said web is wound up after the weft-threads have been drawn into the inclined or diagonal position desired.

At *m* and *o* the fabric is engaged by two grippers belonging to the two endless chains referred to. The distance between *m* and *o* is substantially equal to the original width of the web less the width of margin gripped. Engaged by said grippers, the fabric travels without modification from *o* and *m* to the right (of the drawing) to *p* and *p′*, the linear velocity of the two chains being equal. Beyond the point *p*, however, the path of the

chain on the left-hand side of Fig. 1 becomes sinuous, so that when the gripper on the left-hand side has reached *q* the corresponding gripper on the right-hand side is already at *m'*, the chain-path *m m'* on the right-hand side being equal to the sinuous chain-path *o p q*. Moreover, *m' q* is equal to *m o*, since the length of the weft-threads does not vary. It is obvious that by this means the web is distorted, the weft-threads being drawn into a diagonal or inclined position with regard to the warp-threads, which latter remain parallel to the line *m n*. The purpose of the apparatus is thus achieved. Beyond *m'* and *q* the paths of the two grippers are parallel, so that no further displacement of the weft-threads takes place, but the latter remain inclined with regard to the warp-threads.

At *n* and *r* the grippers are caused by known means to release the fabric, and the latter is thereupon wound upon the roller R'.

The apparatus is regulable for various widths of web and for different angle of inclination to be imparted to the weft-threads. Given a web of a certain original width L, the edges of the said web are gripped at *m* and *o*, so that the distance *m o* is equal to the width L. This is effected by adjusting the frame A with regard to the frame B. If α is the angle of inclination to be imparted to the weft and L' the width of the web with inclined weft-threads, then L' L cos. α. L' being known, it is sufficient to adjust the frame C so that *n r* is equal to L'. It is known that *m' p'* is equal to the sinuous chain-path *p q*, and it is obvious that *q' m'* represents the difference between the length of the sinuous path *p q* and the projection *p' q'* of the latter on the line *m n*. The length of *q' m'* varies according to the width of the fabric and the angle of inclination to be imparted to the weft-threads, but is equal to L sin. α. For each apparatus constructed a table can therefore be prepared stating the values L' and *q' m'* for any given width of web and angle of inclination. It is therefore in each case only necessary to adjust the guide-rollers 5, 6, and 7 in such a manner that the length of the sinuous chain-path is of a certain known value.

The rollers 2 and 10 are provided with teeth adapted to drive the gripper-chains, the said rollers being of equal diameter and revolving with equal velocity, so that they impart equal linear movement to the two chains. However, although the linear movement of the chains is the same, they move at different speeds in the direction of movement of the cloth at the point where one chain is sinuous, as will be understood.

Since the grippers traversing the sinuous path are alternately on the right-hand and left-hand sides of the respective guide-rollers, it is essential that the pivotal axes about which the grippers rotate should be in the same vertical plane as the straight line which connects the points at which the fabric is gripped before the grippers enter the sinuous path. If this were not the case, the fabric would be liable to be torn during the passage of the grippers through the sinuous path. Figs. 2 to 7 of the annexed drawings illustrate two methods for interconnecting the grippers in such a manner that the desired effect is obtained. The more simple method is illustrated in Figs. 5 to 7. In this case the grippers D are provided with lugs E, in which holes are made, so that the grippers can be pivotally interconnected by means of pins H. The longitudinal axes Z' Y' of the latter are in the same vertical plane as the line Z'' Y'', which connects the operative parts of the grippers D when said grippers are in a straight line, each axis Z' Y' being, moreover, situated midway between two grippers.

In the construction shown in Figs. 2 to 4 each gripper is provided with a lateral plate G, adapted to support the next gripper in the series, an arcuate slot F being formed in said plate about a center K, situated midway between the two grippers. A downward projection T of suitable cross-section extends from the supported gripper through said slot and is horizontally slidable in the latter. The lower ends of the projections T are adapted to be engaged by the teeth by means of which the chain or series of grippers is moved.

It is obvious that the apparatus cannot only be used for transforming rectangular texture into diagonal texture, but also for the opposite purpose—that is to say, for transforming diagonal texture into rectangular texture. It can also serve for imparting a greater or smaller degree of inclination to weft-threads which are already inclined with regard to the warp-threads of the fabric.

The endless chain of grippers which passes over the rollers 1 and 2 need not necessarily travel in straight lines from one of the said rollers to the other, but there must be inequality between the projections of the two chain-paths at opposite sides of the web.

What we claim is—

1. In a machine for biasing cloth, coöperating gripper-chains the gripping portions of which are of different lengths but traverse the same distance in the direction of movement of the cloth.

2. In a machine for biasing cloth, coöperating endless gripper-chains the gripping-runs of which are of different lengths though traversing the same distance in a longitudinal direction.

3. In a machine for biasing cloth, coöperating gripper-chains the gripping-runs of which are of different lengths though traversing the same distance in longitudinal direction, one of said gripping-runs being partially sinuous.

4. In a machine for biasing cloth, a gripper-chain the gripping-run of which is disposed throughout its length in a right line, and a second gripper-chain, to coöperate with the first, having a sinuous gripping-run.

5. In a machine for biasing cloth, a gripper-chain having its gripping portion disposed throughout its length in a right line, and a second gripper-chain, to coöperate with the first, having a gripping portion which initially moves in a right line and then sinuously.

6. In a machine for biasing cloth, a gripper-chain the gripping-run of which lies in a right line throughout its length, and a coöperating gripper-chain having a gripping-run one end portion of which lies in a right line parallel to said first-named gripping-run, and which is sinuous intermediately of its length.

7. In a machine for biasing cloth, coöperating gripper-chains and means to drive said chains so that their gripping portions move at different speeds in the direction of movement of the cloth.

8. The combination, with coöperating gripper-chains the gripping portions of which are of different lengths but traverse the same distance in the direction of movement of the cloth, of means to drive said chains so that their gripping portions move in such direction at different speeds.

9. In a machine for biasing cloth, gripper-chains, and means to drive said chains so that their coöperating gripping portions, during a part only of their movement, move at different speeds in the direction in which the cloth is moved.

10. The combination of two coöperating gripper-chains, and means to drive said chains so that their gripping portions move at the same speed in the direction of movement of the cloth during the initial part of their movement and then move at different speeds in such direction.

11. The combination of two coöperating gripper-chains of which the gripping portion of one is partially parallel with that of the other and partially out of parallelism therewith, and means to drive said chains so that the gripping portions thereof when parallel move at the same speed in the direction of movement of the cloth, and move at different speeds in such direction when out of parallelism.

12. In a machine for biasing cloth, a gripper-chain having a straight gripping portion, a gripper-chain having a sinuous gripping portion to coöperate with said straight portion, and mechanism for driving said chains so that said sinuous gripping portion moves in the direction of movement of the cloth at a slower rate than said straight portion.

13. In a machine for biasing cloth, an endless gripper-chain having its gripping portion throughout movable in a straight line, and a second endless gripper-chain the gripping portion of which is movable partly in parallelism and partly out of parallelism with said first-named portion.

14. In a cloth-biasing machine, an endless gripper-chain the gripping-run of which lies in a straight line throughout the length of the same, and a second endless gripper-chain the gripping-run of which is partially sinuous or zigzag, said gripping-runs extending the same distance in the direction of movement of the cloth.

15. In a cloth-biasing machine, a gripper-chain having a straight gripping-run, and a second gripper-chain having a gripping-run of variable sinuosity.

16. In a machine for biasing cloth, a gripper-chain having a straight gripping-run, and a second gripper-chain movable over rollers which are so disposed as to impart a sinuous run to said last-named chain, said rollers being adjustable to vary the sinuosity of said run.

17. In a cloth-biasing machine, the combination of a frame, an endless gripper-chain arranged longitudinally of said frame at one side thereof and having a straight gripping-run, a second gripper-chain at the other side of the machine, and rollers over which the intermediate portion of the gripping-run of the last-named chain travels; said rollers imparting a zigzag movement to such run and being adjustable transversely of said frame.

18. In a machine for giving an oblique lie to the weft of a cloth web, the combination of two main frames adjustable toward and away from each other, an auxiliary frame adjustable in the same direction upon one of said frames, an endless gripper-chain mounted on one of said main frames and having a straight inner run, rollers mounted on said auxiliary frame, rollers mounted on the other main frame, and a gripper-chain guided by all of said rollers, those on said auxiliary frame guiding said last-named gripper-chain so that a portion of its inner run is parallel to the inner run of said first-named chain, and the rollers on the other main frame being so disposed as to impart a zigzag movement to another portion of the inner run of said last-named chain.

In witness whereof we have signed this specification in the presence of two witnesses.

FRANCISQUE VOLAND.
ALBERT MARCHAND.

Witnesses:
MARIN VACHON,
PAUL VEYRE.