Dec. 12, 1967 D. DEMAGNY 3,357,608

SYSTEM FOR ASSEMBLING PLEATED FABRIC WITH OVERLAPPING INSET SHEETS

Filed April 26, 1965 2 Sheets-Sheet 1

Fig. 1.

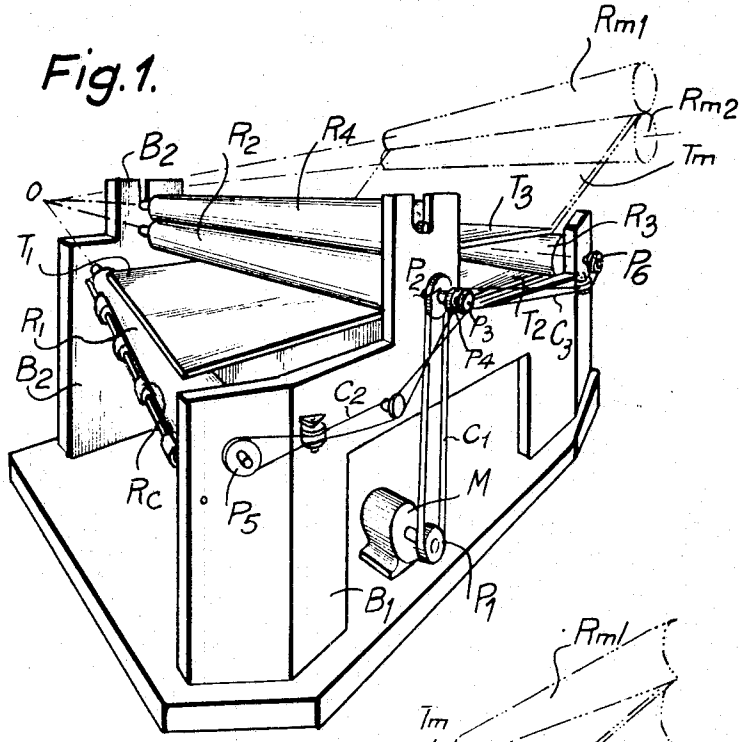
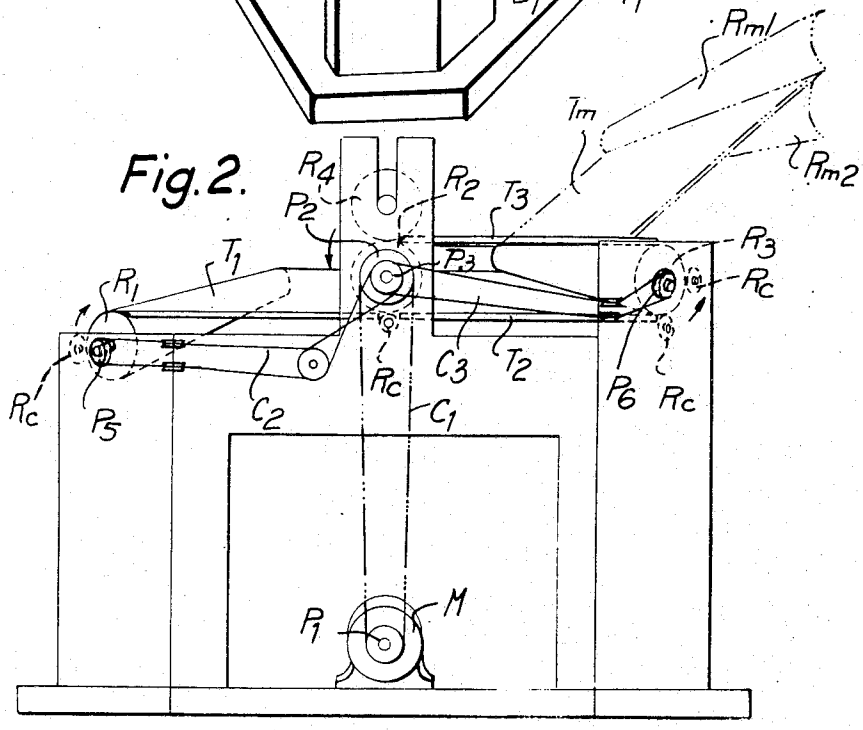


Fig. 2.



Daniel Demagny
INVENTOR.

BY Karl G. Ross
Attorney

Dec. 12, 1967 D. DEMAGNY 3,357,608

SYSTEM FOR ASSEMBLING PLEATED FABRIC WITH OVERLAPPING INSET SHEETS

Filed April 26, 1965 2 Sheets-Sheet 2

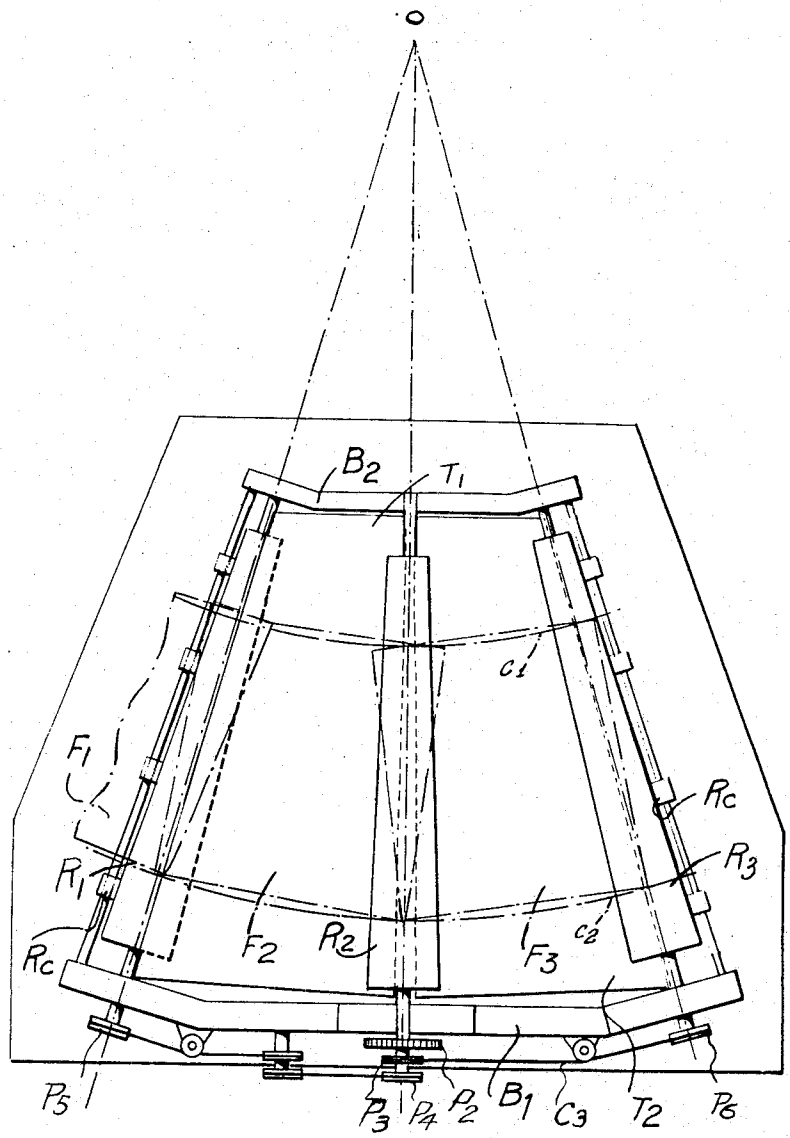


Fig. 3

Daniel Demagny
INVENTOR.

BY Karl G. Ross
Attorney

United States Patent Office 3,357,608
Patented Dec. 12, 1967

3,357,608

SYSTEM FOR ASSEMBLING PLEATED FABRIC WITH OVERLAPPING INSET SHEETS

Daniel Demagny, 62 Rue Tiquetonne, Paris 2, France

Filed Apr. 26, 1965, Ser. No. 450,914
Claims priority, application France, May 27, 1964, 976,036, Patent 1,405,349
4 Claims. (Cl. 223—30)

ABSTRACT OF THE DISCLOSURE

Frustoconical rollers (R1, R2, R3) and a frustoconical windup spool (R4), with axes converging at a common point (O), co-operate to feed a series of rectangular sheets (F1, F2, F3) in overlapping relationship, thereby forming a polygonal inset, and to juxtapose this inset with a pleated fabric of the same general configuration while winding the latter on the spool (R4).

It is known to insert a strip of paper or similar material between the various turns or windings, on a spool, of pleated fabrics.

However, this operation can be performed only with cylindrical spools.

In the case of conical spools intended for winding fabrics having flared pleats, the paper strips must have the shape of a circular sector, or better still a helical configuration if the fabric has a certain length.

Since strips of this character are not found in the trade it is the chief object of this invention to produce them from elements having rectilinear edges and to provide a device for carrying out this method which is adapted not only to produce this helical strip but also to wind same on a conical spool as an inset to a pleated fabric.

This invention is concerned more particularly with a device adapted to be coupled with a pleating machine for example of the type described and illustrated in my United States Patent No. 3,135,443, granted on June 2, 1964.

The method of manufacturing the inset strip according to this invention is characterized in principle in that this strip consists of separate elements disposed in succession so as to partially overlap one another with a view to constituting a curved assembly, and that this assembly is displaced in synchronism by pivoting same about its virtual center as a fresh element is added thereto.

Each element may be fastened to the preceding one through any known means, for example by gluing.

The device for carrying out this method is characterized in principle in that it comprises means for producing the synchronous angular displacement of all said elements.

According to a specific feature of this invention, the device comprises a table on which the shaped strip is adapted to travel, and a plurality of frustoconical rollers having convergent axes and driven at the same peripheral linear velocity.

According to a specific embodiment of this invention which applies more particularly to the winding of pleated fabrics produced by a machine as disclosed in the aforesaid United States Patent No. 3,135,443, the axes of the tapered rollers of said device converge to the same point in the space as the axes of the tapered rollers of the associated pleating machine.

Other features and advantages of this invention will appear as the following description proceeds with reference to the accompanying drawing given by way of example in order to afford a clearer understanding of the invention and of the manner in which the same may be carried out in practice. In the drawing:

FIG. 1 is a perspective view of a device for carrying out the method of this invention;

FIG. 2 is a side-elevational view of the same device; and

FIG. 3 is a plan view seen from above, the upper table of the device being removed.

As already explained, to constitute a strip adapted to act as an inset when a pleated fabric with flared pleats is wound on a spool, the unwound fabric being bounded by concentric arcuate edges as shown in any above-identified prior patent, separate elements for example of rectangular configuration are disposed in succession so as to slightly overlap one another with a view to constituting a curved assembly. The elements are joined to one another, for example by means of glue spots, either upon their juxtaposition or subsequently thereto.

In the case of a subsequent assembly step any two adjoining elements are disposed in the same relative angular position.

The device for carrying out this method comprises essentially a table formed by platforms T_1, T_2 on which the elements are laid one by one, these elements consisting for example of paper sheets F1, F2 and F3 . . ., and tapered rollers R1, R2 tangent to this table having their axes so disposed as to converge toward a point O. These rollers are driven for continuous rotation at the same peripheral linear velocity.

It will be readily understood that owing to the conical shape of these rollers each element will pivot about the vertical axis passing through the point of convergence O of the rollers. This pivotal movement permits of disposing each one of these elements askew in relation to the preceding one in order to constitute an assembly having the shape of an annular sector.

If the element are joined together for example by gluing their overlapping portions, the length of this assembly is limited only by the specific use for which it is intended. Therefore, this assembly may constitute an open annulus or a helical strip wound in a plurality of superposed turns.

However, considering the difficulties likely to arise from the storage and subsequent use of this inset strip, it is advisable to utilize this strip as it is produced by the machine.

To this end the above-described device is coupled with the pleating machine of the tapered presser roller type disposed at the output end thereof.

Since the problem then arising consists in producing an inset strip having the same curvature as the pleated fabric, the rollers forming part of the device must converge not only with one another but also toward the same point in space as the rollers R*m*1 and R*m*2 of the associated pleating machine which are tangent to each other and have a common generatrix lying in a horizontal plane.

The machine and the device of this invention are interconnected by means of an inclined table T*m* nearly tangent to the aforementioned common generatrix whereby the work can be transferred by gravity and slippage from the pleating machine to the strip-forming device, the latter having thus another function which is to coil up the pleated fabric on a spool.

Additional elements of a more elaborate device to be used in this case will now be described.

The complete device shown in the drawing comprises on the one hand a frame structure consisting of two vertical sidewalls B1, B2 forming in plan view, in the preferred embodiment illustrated, two parallel polygonal sections inscribed in circles having a common center O, and one the other hand three tapered converging rollers R1, R2 and R3 journaled in these sidewalls. Rollers R1 and R2 are tangent to platform T1; roller R1 lying below this platform whereas roller R2 lies above it; roll-

ers R2 and R3 are bridged by two platforms T2, T3 which are respectively tangent to their lowermost and their uppermost generatrices.

The device is completed by a tapered idler roller R4 constituting the spool on which the pleated fabric and the inset strip are to be wound. This idler roller R4 is tangent to roller R2 by which it is rotatingly driven and its axis converges with those of the other rollers towards the point O.

It will be noted that, owing to the necessity of disposing the device at a level below the horizontal plane containing the common generatrix of rollers R*m*1 and R*m*2 of the pleating machine and to the joint convergence of the various rollers, the point O lies on said horizontal plane; consequently, all the axes of the rollers of the device as well as the platforms T1, T2 and T3 must be inclined with reference to that plane.

Roller R2 is rotated from a motor M, for example by means of a transmission comprising pulleys P1, P2 and a belt C1, the shaft of this roller, which has the pulley P2 keyed thereon, carrying in addition a pair of pulleys P3, P4 transmitting through belts C2 and C3 the rotary motion to the pulleys P5 and P6 of rollers R1 and R2.

The rollers R2 and R3 overlying the path of the strip revolve in the same direction and at the same speed since they have the same diameter. On the other hand, roller R1 revolves in the opposite direction owing to its position under the platform T1. Each roller R1, R2 and R3 has associated therewith one or a plurality of small counterpressure rollers R*c* mounted for loose rotation on a shaft to keep the element or strip in contact with the corresponding main roller.

From the foregoing it is clear that if a rectangular sheet is inserted between the roller R1 and its companion counterpressure roller R*c* the rotation of R1, on account of its conicity, will cause this sheet to revolve in the plane of platforms T1 and T2 about an imaginary vertical axis passing through point O.

FIG. 3 shows successive positions of this sheet. As can be seen from this figure, the lateral edges of the sheet in positions F1, F2, F3 contact the feed rollers R1, R2, R3 along points which lie on an inner circle C1 and an outer circle C2 both centered on the point O. Thus, the roller diameters in the zones of contact must be proportional to the radii of these circles C1, C2 so that not only the axes but also the generatrices of the rollers converge toward point O as is likewise apparent from FIG. 3. This geometrical relationship, of course, also follows from the fact that point O lies on the level of supporting surface T1, T2 in which all the roller generatrices come to lie once per revolution of each roller.

It will be noted that by simply inserting a sheet between the roller R1 and its counterpressure roller R*c* this sheet, after one quarter of a revolution, will be received by table portion T1 in position F1 and at the end of the revolution in position F2; in this last position the sheet is engaged by the underside of roller R2 which, after a complete revolution, moves the sheet to position F3 in which it passes under the next roller R3.

Since the various sheets inserted in the device all move through the above-described positions it is possible to constitute an annulus by means of successive separate sheets which may be interconnected in their overlapping portions (for example by using glue spots). As already explained hereinabove, if a continuous process is resorted to the strip will constitute a helix by superposing a plurality of annuli but in the specific case of the device illustrated the pair of rollers R*c* associated with the final main roller R3 direct the strip back to the upper platform or table T3 until it engages the nip of rollers R2 and R4 and winds up on this last roller R4.

Now the work issuing from the pleating machine and sliding down the inclined table or ramp T*m* is received by this strip and entrained by it somewhat in the fashion of a conveyor. As the same curvature is imparted to the strip and to the pleated fabric interleaved therewith, their winding on roller R4 is not attended by any difficulty.

The device constituting the subject-matter of this invention is thus adapted not only to produce a curved strip but also to receive pleated fabrics from a conical pleating machine by winding the fabric on a spool in conjunction with an inset strip.

Of course, various modifications may be brought to the embodiment of the present invention shown and described without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A system for interleaving a constantly curved pleated fabric with an inset of like curvature composed of a series of overlappingly assembled rectangular sheets, comprising:

a pleating machine including a pair of coacting tapered presser rollers adapted to discharge a pleated fabric curved about an imaginery axis;

a supporting surface for rectangular sheets to be assembled into a polygonal inset centered on said imaginary axis, said surface forming a path curved about said axis and leading toward said presser rollers;

feed means for said sheets including a plurality of driven rollers of tapered configuration tangent to said supporting surface at peripherally spaced locations, said presser rollers and driven rollers having axes and generatrices all converging toward a common point on said imaginary axis on the level of said supporting surface;

drive means for rotating said driven rollers at like peripheral speeds and in a sense to advance a sheet along said path toward said presser rollers;

and a windup spool rotatable by said drive means for jointly coiling up a pleated fabric from said presser rollers and an inset consisting of a series of sheets advanced by said driven rollers, said windup spool being of frustoconical shape substantially converging toward said common point.

2. A system as defined in claim 1 wherein said supporting surface is substantially horizontal, said pleating machine being provided with a ramp descending from said presser rollers toward said supporting surface for guiding said pleated fabric toward said windup spool.

3. A system as defined in claim 2 wherein said spool overlies one of said driven rollers for rotary entrainment thereby, further comprising a platform extending from said ramp toward said spool above said supporting surface, said platform being tangent to another of said driven rollers at the end of said supporting surface.

4. A system as defined in claim 3 wherein said driven rollers further include a first roller disposed with its axis below said supporting surface, all other driven rollers having their axes above said supporting surface.

References Cited

UNITED STATES PATENTS

2,923,447	7/1960	Ezbelent	223—30
3,115,988	12/1963	Warnken	156—189 X
3,135,443	6/1964	Demagny	223—30

PATRICK D. LAWSON, *Primary Examiner.*

G. V. LARKIN, *Assistant Examiner.*