

Dec. 2, 1941.

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2,265,111

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Filed July 6, 1940

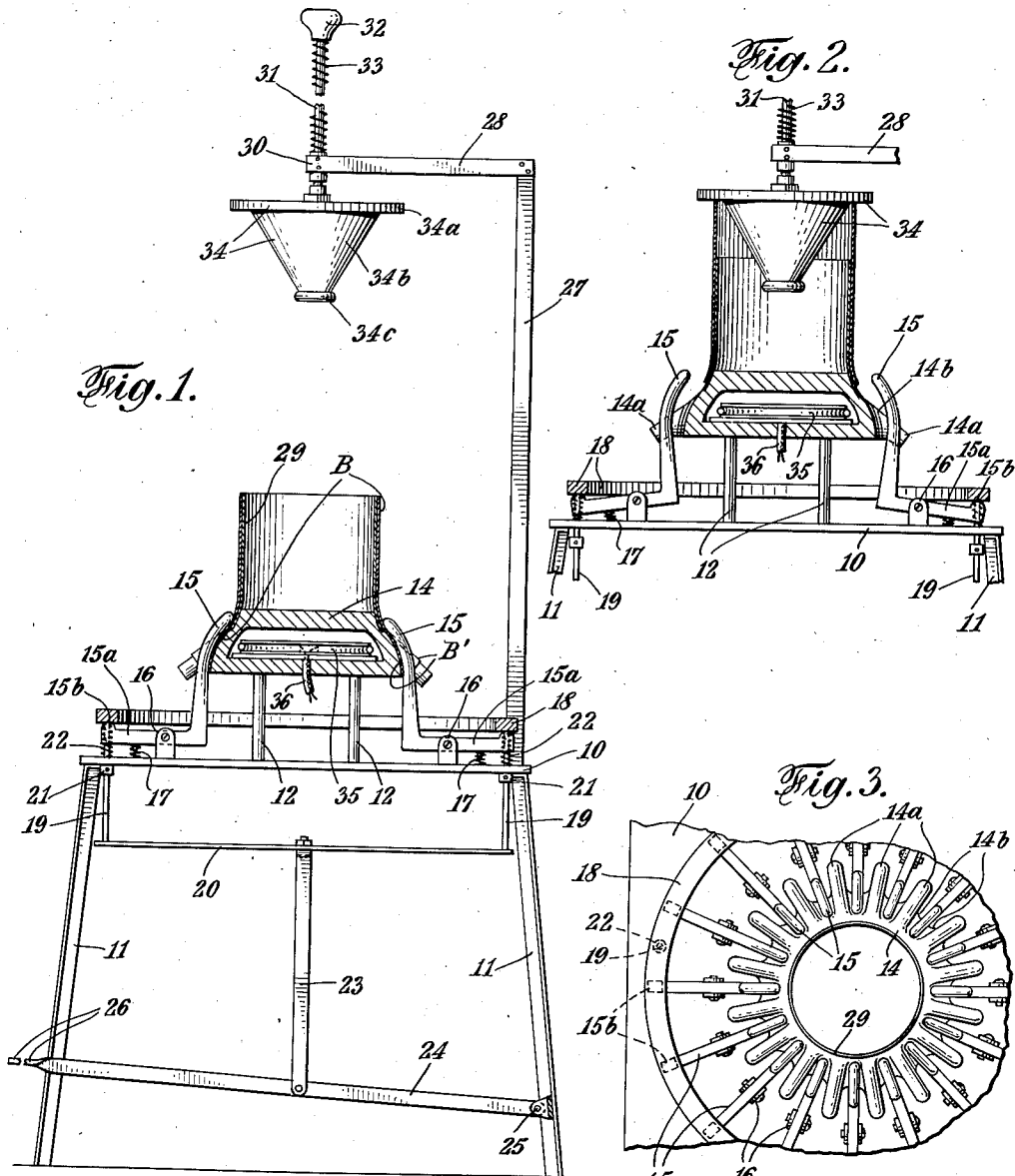


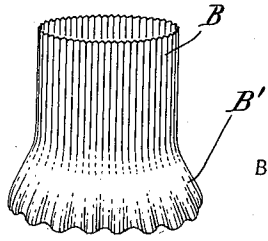
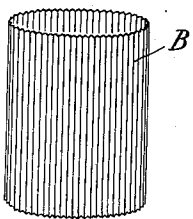
Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.



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# UNITED STATES PATENT OFFICE

2,265,111

## FABRICATION OF LAMP SHADES AND THE LIKE

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Application July 6, 1940, Serial No. 344,203

5 Claims. (Cl. 18—19)

This invention relates to the fabrication of lamp-shades and the like, and has been made particularly with the idea of providing a new and improved method of and apparatus for performing rapidly, economically and perfectly an operation which heretofore has been somewhat of a problem in the art of lamp-shade making and especially in making lamp-shades of the so-called wall-bracket or boudoir-lamp type.

Accordingly, the invention will be explained in connection with lamp-shades of the kind just named, although there is no reason why the invention would not be of equal value in the making of shades for floor-lamps or other shades of fairly large size.

Thus, in herein referring to a lamp-shade, there is meant either the lamp-shade proper of a frame-carrying lamp-shade, that is, the canopy-like covering spread or supported by an interior skeletal frame generally of bent wire and familiar in the art of shades for floor-lamps, or a lamp-shade which is made from a tubular blank, with the tube made from one or a plurality of pieces suitably joined together, by forming or shaping the tube and at the same time giving a certain treatment whereby the shade will be wholly or partially self-sustaining or more or less set for retention of the contours to which it was formed or shaped. As will be understood, such a permanently and more or less rigidly shaped tubular blank lamp-shade is adapted to rest on rather than be held to shape by a bent wire or other internal support; and, as will also be understood, this support can be of the kind which is so simply and cheaply constructed that it can rest on the upper part of an upstanding electric light bulb.

The present invention is of prime utility where the lamp-shade is of the type last-described, and the invention will be explained as applied to performing certain operations in making the same.

These operations are those whereby, with the tubular blank of Celluloid, cellulose acetate, or some other material which is a cellulosic derivative, or of some other material suitable for pleating and extensible after pleating, without loss of its pleated form, and with this tubular blank pleated all around by pleats running lengthwise of the tube, the tube can be rapidly, economically and perfectly ruffled all around such end, to adapt the said end to be the bottom of a more or less bell-shaped lamp-shade.

By the present invention, this ruffling is done simultaneously at all points of ruffle-curvature

all around the lamp-shade bottom, and without destroying the pleated formations except that, naturally, the latter are made shallower at the points of maximum undulation of the ruffling and are less and less thus shallowed from the line of the points last-mentioned, that is, from the bottom edge of the lamp-shade, up along the latter to the points of merging of the upper ends of the ruffles with the unruffled periphery of the pleated tubular blank.

An important feature of the invention, as the same is preferably carried out, is that during the ruffling operation as above, the lower end of the tubular blank, all around the same, is held tubular and to a generally downward outward flare. By this feature, there is no chance of forming undesired crease-lines, of disturbing the pleatings in a way unintended, or of having different portions spaced circumferentially around the tube subjected to the heat and pressure step of the invention while said portions are in face to face-contact.

The heat and pressure step just mentioned is a step which is used in carrying out the method of the invention in the now approved way.

The method, when carried out with heat and pressure, or otherwise, and the entire invention, will be clearly understood from the following description, taken in connection with the accompanying drawing.

The annexed drawing illustrates a form of apparatus as now preferred and as successfully operated over a number of months, for facilitating the practice of the method of the invention. In this drawing:

Fig. 1 is a view mainly in side elevation, but partially in section, of said apparatus or machine, showing a tubular blank in place, but with the machine only preliminarily adjusted for a ruffling operation on said blank;

Fig. 2 is a similar view, showing certain of the parts in Fig. 1, with the machine in a later adjustment;

Fig. 3 is a fragmentary plan view, looking down on the parts as shown in Fig. 1, and in the direction of the arrow 3 of that view, but with the blank removed;

Fig. 4 is a perspective view of the pleated tubular blank before subjection to the machine; and

Fig. 5 is a similar view showing the ruffled product.

Referring first to the details of construction of the machine illustrated, the same includes a table-top 10, supported on legs 11. Carried by

and above the table by means of standards 12, is a shaping block 14 having downward outward flared, radially extending fingers 14a. The tops of these fingers are convexly rounded, and the portions 14b of the upper surface of the outer peripheral zone of the block 14 which alternate with the fingers are concavely rounded. These convex and concave roundings, regularly alternating around the block 14, combine to establish on the block 14 what may be called the male member of a pair of squeezing or pressing dies. The complementary die equipment is comprised of a circumferential series of radially extended presser-fingers 15, the bottom portions of which are convexly rounded so as to conform to the concave roundings of the portions 14b of the block, or, rather, sufficiently to conform to the roundings of the portions 14b to coact with the latter in ruffling the lower end of a blank B, as indicated at B', when said blank is arranged as in Fig. 1, and the fingers 15 are forced down tight against the flared lower portion of the blank, as indicated at B''.

The fingers 15 are pivotally mounted as indicated at 16, and they have radial horizontal extensions 15a beyond their pivots terminally bossed at 15b. All the fingers are urged toward the position shown in Fig. 1 by expansible coil springs 17. Overlying all the bosses 15b of the fingers 15 is a ring 18 connected at a plurality of points around its periphery, and by draw rods 19, to a floating horizontal frame 20. Rods 19, below the ring 18, pass through suitable openings in table-top 10; below which openings the rods have stop-collars 21 fixed thereon, and above which openings the rods are sleeved by expansible coil springs 22.

From the floating frame depends a link 23 connected at its lower end to a lever 24 pivoted to the table at 25 and carrying a treadle 26.

Rigidly upstanding from the top of the table is a framing 27 of gibbet type, the top beam 28 of which carries, in vertical alinement with the longitudinal center line of a metal tube 29 mounted as shown on block 14, a bearing 30 for a vertical slide-rod 31. The top of this rod is provided with a knob 32, and between the beam 28 and said knob rod 31 is sleeved by an expansible spring 33. This spring is desirably of considerable length, and is under comparatively weak tension. As to the length of the spring, it is pointed out that with the parts as arranged in Fig. 1, that is, with the cone-device 34 on the lower end of the rod where the latter projects below the beam 28, the knob 32 must be high enough above the beam 28 so that said beam will not be interferent with full or considerable compression of the spring 33, when the rod 31 is lowered to the extent required not only to cause descent of the cone-device 34 to the position shown in Fig. 2 (where it first engages the top of the blank), but to a point still lower, that is, low enough to force the lower part of the tube B to the spread shown at B' in Fig. 1.

As, as has already been stated, it is preferred to use heat as well as pressure (thus to avoid the use of a solvent or an added adhesive; in other words to work according to the invention on a pleated tube B which is made of a thermoplastic material); and a means for heating the block 14 by radiation, and for also heating the fingers 15 by conduction from the block before the first ruffling operation, and for maintaining the fingers properly heated by heat conducted from the block 14 during the times between successive

ruffling operations, is shown at 35. In the present case this means is illustrated as a resistance element raised to the proper temperature by electricity; the leads for maintaining the same in circuit being indicated at 36.

The cone-device 34 comprises an upper circular horizontal plate 34a, a cone 34b, and a bottom disk 34c.

#### Operation:

With the parts arranged as in Fig. 1, a blank, such as the blank B of Fig. 4, is distended to rotundity, and in the present case, in view of the fact that the tube or mandrel 29 is cylindrical, to circular distension, and then one end, or a particularly decorated end, of this blank, is endwisely advanced toward the top of the mandrel sufficiently to mount the blank on the upper end of the mandrel with sufficient overlap at the upper end of the mandrel to hold the upper end of the blank to a substantially circular distension.

Then, by means of the knob 32, the cone-device 34 is lowered until the cone-device 34b enters the upper end of the blank and the under-surface of the plate or disk 34a engages the upper circumferential edge of the blank. Hand pressure on the knob 32 is continued until the blank has been forced down first to the position shown in Fig. 2 and then to the fully flared position shown in Fig. 1, meanwhile the fingers 15 having been thrown to the positions shown in Fig. 2, by foot pressure applied to the treadle 26.

Now, upon manual release of the knob 32, the spring 33 returns the rod 31 and the parts carried thereby to the positions shown in Fig. 1.

Foot pressure on the treadle 26 is released, and the fingers 15 return to the positions illustrated in Figs. 1 and 3; the pressure now being applied to the lower flared portion B'' by conjoint action of the fingers 15 and the complementary former portions 14b of the block 14, being, as has been found preferable, rather high. In other words, the springs 17 are fairly powerful ones.

A feature of the invention, as the same is preferably carried out, is that both the sets of former units 14b and 15 are heated during the operation of ruffling an end of the blank. Another feature of the invention, in this connection, is that the heating means employed, for instance, the electric resistance element 35, need be only a single such element, with the latter so adjacent one of the sets of said units, as to heat said set. The most practical set to select for receiving heat from the heat source employed, is the set of units 14b of the block 14, since all these parts are components of a unitary structure. It has been found that in such case, since the fingers 15, even when the apparatus is idle, normally contact the block 14, but a very short period of time is required to have the fingers 15 heated to an ideal temperature, in preparation for working on the first blank of a day's run of operation of the machine. As will be understood, the fingers 15 are heated by conduction from the block 14.

It will be obvious to those skilled in the art, after understanding my invention as embodied in the illustrative structure shown in the accompanying drawing, that various changes and modifications may be made therein, without departing from the spirit and true scope of my invention. Parts of the improvements may be used without others. The scope of protection contemplated is to be taken from the appended claims, interpreted as broadly as is consistent with the prior art.

What I claim as new, and desire to protect by Letters Patent of the United States, is:

1. The method of ruffling and belling an end of a longitudinally pleated tube of elastic and thermoplastic material, said method consisting of moving an end of the pleated tube over an element of gradually increasing diameter from one end thereof toward the other provided with spaced longitudinally extending depressions in the periphery thereof, the small end of said element having a diameter substantially equal to the internal diameter of said tube, and said element being heated sufficiently to render the material of said end plastic whereby said end is expanded, maintaining the remainder of the tube at its original diameter and applying inwardly acting pressures to the exterior of said end of the tube at points around said tube end corresponding with the depressions in said element.

2. The method of ruffling and belling an end of a longitudinally pleated tube of elastic and thermoplastic material, said method consisting of first belling one end of the tube by moving the tube to present one end thereof to a ruffling and belling station having spaced longitudinally extending depressions, applying heat at the station sufficiently to render the material of said end plastic whereby said end is belled during movement into position at the ruffling and belling station, retaining the remainder of the tube at its original diameter, and then ruffling said belled end of the tube by applying inwardly acting pressures to the exterior of said belled end of the tube at points around said belled end corresponding with the depressions in said station.

3. In apparatus for ruffling and belling an end of a longitudinally pleated tube, the combination with a die block of substantially conical shape having spaced longitudinally extending depressions in the periphery thereof, of presser fingers each complementary to and individually pivoted for swinging movement into and out of a particular one of said depressions, each of said fingers being pivoted on an axis at an angle to the axis of pivoting of the adjacent finger whereby all the fingers move in radial paths with respect to the axis of the die block, a mandrel of substantially the same diameter as the smaller end of the conical block fixed to the smaller end of said block for supporting the tube during endwise advance thereof to bring the tube end to the block end of lesser diameter, said block being shaped to bell said tube, and controlled heating means associated with the die block for rendering the end of the tube surrounding the block plastic.

4. In apparatus for ruffling and belling an end of a longitudinally pleated tube, the combination

with a die block of substantially conical shape having spaced longitudinally extending depressions in the periphery thereof, of presser fingers each complementary to and individually pivoted for swinging movement into and out of a particular one of said depressions, each of said fingers being pivoted on an axis at an angle to the axis of pivoting of the adjacent finger whereby all the fingers move in radial paths with respect to the axis of the die block, a mandrel of substantially the same diameter as the smaller end of the conical block fixed to the smaller end of said block for supporting the tube during endwise advance thereof to bring the tube end to the block end of lesser diameter, said block being shaped to bell said tube, controlled heating means associated with the die block for rendering the end of the tube surrounding the block plastic, a thrust member movable against the other end of the tube to advance the same over the mandrel, guiding means for the thrust member, independent means for forcing said thrust member sufficiently to overcome the elastic resistance of said pleats, and cooperating means carried by said member and mandrel for limiting the extent of thrust of said member.

5. In apparatus for ruffling and belling an end of a longitudinally pleated tube, the combination with a die block of substantially conical shape having spaced longitudinally extending depressions in the periphery thereof, of presser fingers each complementary to and individually pivoted for swinging movement into and out of a particular one of said depressions, each of said fingers being pivoted on an axis at an angle to the axis of pivoting of the adjacent finger whereby all the fingers move in radial paths with respect to the axis of the die block, a mandrel of substantially the same diameter as the smaller end of the conical block fixed to the smaller end of said block for supporting the tube during endwise advance thereof to bring the tube end to the block end of lesser diameter, said block being shaped to bell said tube, controlled heating means associated with the die block for rendering the end of the tube surrounding the block plastic, a thrust member movable against the other end of the tube to advance the same over the mandrel, guiding means for the thrust member, independent means for forcing said thrust member sufficiently to overcome the elastic resistance of said pleats, and cooperating means carried by said member and mandrel for limiting the extent of thrust of said member, said mandrel being hollow and said thrust member having a reduced portion shaped to telescope within the mandrel during advance of the tube along the mandrel.

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