T. GORDON.

PROCESS OF CURLING HAIR OR SIMILAR FIBROUS MATERIAL.

APPLICATION FILED AUG. 28, 1919.

1,353,337. **Patented Sept. 21, 1920.**

FIG. I.

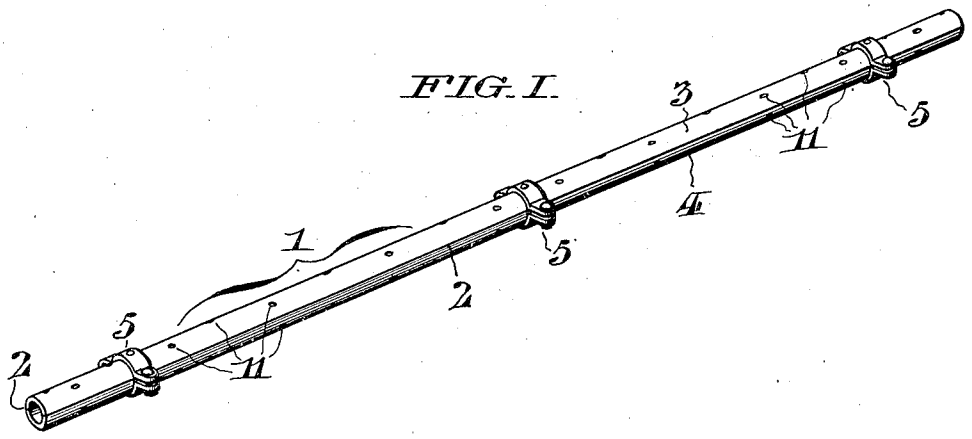


FIG. II.

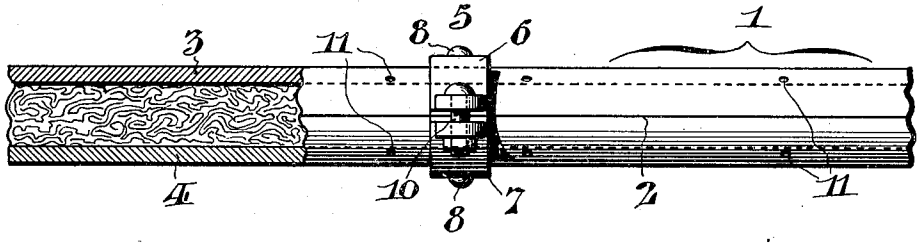
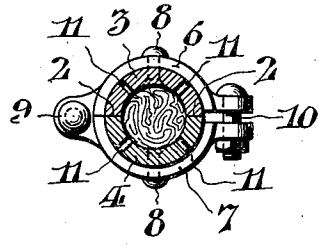


FIG. III.



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PROCESS OF CURLING HAIR OR SIMILAR FIBROUS MATERIAL.

1,353,337. Specification of Letters Patent. Patented Sept. 21, 1920.

Application filed August 28, 1919. Serial No. 320,430.

To all whom it may concern:

Be it known that I, THOMAS GORDON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Processes of Curling Hair or Similar Fibrous Material, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to the art of curling hair or similar fibrous material into a condition suitable for use as a stuffing or filling, as, for instance in connection with the manufacture of cushions, mattresses and other articles.

In the manufacture of such curled hair as heretofore practised, it has been usually customary to spin the hair into a strand of considerable length, which is then put through a horn and twisted tightly into rope form. It is then boiled in water and after removal is hung in a drying kiln where it is exposed to a heat of about 200° F., for a considerable time. After removal from the drying apparatus, and cooling off, the rope strands are opened out and separated by a machine adapted for the purpose, and are then run through another machine by which they are picked and gathered into mass form.

The purpose of the present invention is to afford a simpler method of accomplishing the same result and to dispense with various mechanical steps which were requisite in the ordinary practice. To that end, I compress the hair, etc., into a very compact mass, under conditions of confinement which result in curving or kinking the individual fibers or a preponderant percentage thereof, and I then perpetuate or "set" the curl thus impressed, by subjecting the confined mass to the action of heat, after which the mass, when cool, is picked apart. The appropriate conditions of confinement are best obtained by means of a receptacle which is of relatively small internal diameter and which has a curved inner surface, but which may be of any convenient length.

The preferred manner in which I effect this treatment and the apparatus which I prefer to employ will be best understood from the detailed description which follows. In the drawings, I have shown three illustrations of a simple form of apparatus, through the aid of which my improved process can be readily carried out. Of these illustrations, Figure I, is a perspective view of the device; Fig. II, is an elevation of a portion of the same on an enlarged scale; with certain parts in section, and Fig. III, is a cross sectional view. The structure comprises a hollow metallic element 1, which I will, for convenience, term a receiver. Said receiver is of relatively small internal diameter, and may be of any appropriate cross section. In the present instance, I have shown the cross section as being circular. In practice the internal diameter may vary somewhat depending upon the nature and length of the fibers which are to be curled. For example, if the material under consideration is long staple hog hair of two or four inch lengths, a cylinder having an internal diameter of one and a quarter to one and a half inch, answers the purpose very satisfactorily, while for the shorter lengths of such material, say from one and a half to two and a half inch lengths, a cylinder of one inch diameter is more advantageously employed.

The receiver may be made of any desired length, but for convenience of handling a four foot length has been found to be satisfactory. Said receiver is split longitudinally, as best shown at 2, 2, in Fig. I, its composite sections 3 and 4, being connected at intervals by hinged strap members 5, each comprising the counterpart elements 6, 7, secured to the corresponding receiver sections by rivets 8.

At one side, the parts 6 and 7, are connected by a hinge pin 9, and at the other by removable clamp bolts 10. By this construction, the receiver may be readily opened to permit the withdrawal of the material after the curling operation has been completed.

At intervals along its length, the receiver is preferably provided with perforations 11, which may be staggered as shown in Fig. I, and which serve to permit the escape of any moisture, which may have been in the material.

In practising my improved process, the receiver 1, closed and clamped as shown in Fig. I, is charged with the material, the latter being inserted into the ends and rammed in under heavy pressure, preferably hydraulic, so that it is packed as a solid dense mass. The receiver is then heated, to a temperature of about 200 degrees for four to six hours, the perforations

11, serving during this treatment, to permit the escape of any entrained moisture.

Thereafter the receiver is withdrawn from the heating means and the compressed charge is allowed to cool for several hours.

The receiver is then opened and the contents, which are now in a permanently curled condition, are removed and picked apart into a more or less open mass, such as the ordinary curled hair of commerce.

In order to facilitate the understanding of the general nature of my process, but without implying that the explanation about to be given is of the essence of the invention, I may state that I believe that the effect of heavy pressure applied upon hair when confined in a receptacle of relatively small internal area, and particularly when the internal surface of the vessel is curved, is substantially different from the effect of a similar pressure upon a mass of hair having relatively large cross sectional area.

Under the conditions first stated, the effect appears to be that the fibers tend to become disposed in curved form in their effort to adjust themselves to the general internal configuration of the cross sectional area, so that the distortion thus impressed (and subsequently set), is not merely localized, or limited to a small region.

While it is difficult to express, in exact terms, the factor of cross sectional area of the receptacle, particularly in view of the varying length of the staple of material to be acted upon, yet for enabling one skilled in the art to carry out the invention, it may be said that the relative dimensions above given in typical instances of the application of my process, will suffice to guide the operator for the material mostly used in practice and that with any given variety of fiber and length of staple, the factor of cross sectional area may readily be determined by tests of the behavior of that particular material, having in mind the stated object, *i. e.*, to impress the desired degree of curvature upon a sufficient percentage of the total material.

Having thus described my invention, I claim:

1. The nereinbefore described improvement in the art of curling hair or similar material, which consists in applying pressure to a mass of said material, confined within a receptacle having a cross sectional area so related to the length of staple as to be adapted to dispose said material substantially in a curved form under the displacement effected by pressure, and thereby impressing such form upon the material; and then heating the mass while still thus compressed and confined, whereby the impressed curvature is set, substantially as set forth.

2. The hereinbefore described improvement in the art of curling hair or similar material, which consists in applying pressure to a mass of said material, confined within a receptacle having a cross sectional area so related to the length of staple as to be adapted to dispose said material substantially in a curved form under the displacement effected by pressure, and thereby impressing such form upon the material; then heating the mass while still confined in said receptacle, whereby the impressed curvature is set, and finally permitting the material to cool while still in confinement under pressure.

3. The hereinbefore described improvement in the art of curling hair or similar material, which consists in applying pressure to a mass of the material, confined within a receptacle of relatively small cross sectional area in comparison with the length of staple, and of substantially curved contour, and thereby impressing a curved or kinked form upon a preponderant percentage of such material; and then heating the mass while still thus compressed and confined in said receptacle whereby the impressed curvature is set, substantially as set forth.

4. The process of curling hair or similar material which consists in compressing the material into a compact mass under confinement so restricted with reference to the length of staple as to cause deformation of the material into the desired curved form under the displacement effected by the pressure, and subjecting this compact mass of material while still thus compressed and confined to setting heat treatment, so as to perpetuate the curvature impressed on the material by the compression.

5. In the curling of hair or similar material, the method of impressing thereon the desired curved form which consists in compressing the material into a compact mass under confinement so restricted with reference to the length of staple as to cause deformation of the material into such curved form under the displacement effected by the pressure in a container of cross-sectional area.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this 26th day of August, 1919.

THOMAS GORDON.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.