

Sept. 3, 1940.

M. KOGA

2,213,316

METHOD AND APPARATUS FOR MANUFACTURING FEATHER COTTONS

Filed Jan. 12, 1939

Fig. 2

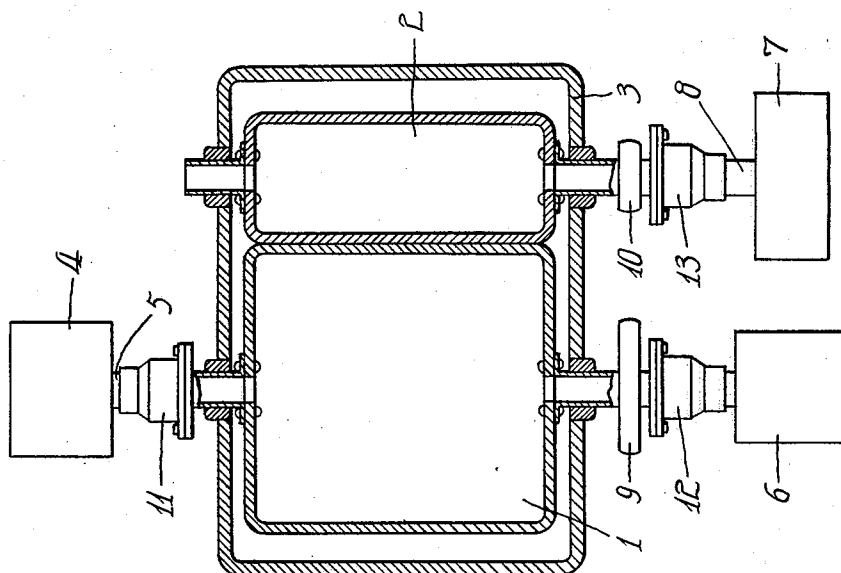
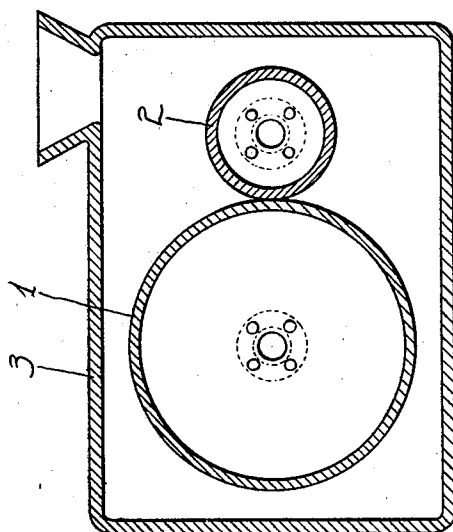


Fig. 1



Michio Koga ^{Inventor}
By Binger
Attorney

UNITED STATES PATENT OFFICE

2,213,316

METHOD AND APPARATUS FOR MANUFACTURING FEATHER COTTONS

Moichiro Koga, Tokyo, Japan

Application January 12, 1939, Serial No. 250,661
In Japan August 22, 1938

6 Claims. (Cl. 19-4)

My invention relates to a method of and an apparatus for manufacturing feather cottons adapted for use as cushions and mattresses, and has for its object the provision of soft, bowed, elastic, flexible and expansible feather cottons of superior quality, which are free from worms and have sufficient durability and moisture-proof nature necessary for feather cottons.

It is another object of my invention to produce feather cottons from all sorts of feathers of land-fowls, particularly chickens. Chicken feathers are not sufficiently waterproof as compared with feathers of water-fowls and are liable to absorb moisture and to loose the elasticity and expansibility and other necessary properties so that the feathers of chickens do not show full advantages as feather cottons.

The principal object of my invention is to improve the manner in which the feathers are treated so as to be provided on one hand with a permanent curl which insures the durability of elasticity and expansibility and on the other hand with a sufficient moisture-proof nature without damaging the structure of the feather.

An apparatus for practicing the method of my invention is shown in the accompanying drawing in which:

Fig. 1 shows a sectional elevation of the feather curling machine.

Fig. 2 shows a partial sectional plan view of the same.

In the drawing: 1 represents a roller cylinder, adapted to cooperate with a smaller roller cylinder 2. Both cylinders are rotatably supported in bearings mounted on opposite walls of a casing 3. 4 is a hot fluid source, for instance a steam generator or a hot air generator. 5 is a pipe which conducts the hot fluid into the cylinder 1. 6 is a waste fluid receiver, for instance a condenser. 7 is a cold water source. 8 is a pipe which conducts cold fluid into the cylinder 2. 9 and 10 are driving pulleys and 11, 12, 13 represent stuffing boxes respectively. The two cylinders 1 and 2 have different peripheral speed so that a certain degree of slip is caused between the outer surfaces.

According to my invention the feathers are longitudinally fed between hot and cold rollers and pressed into a curved shape by heating one side and simultaneously cooling the other side. By this procedure a certain small amount of gelatinous substance inherent in the feathers melts and spreads out and by cooling the feather with the small roller cylinder, the gelatinous fluid again solidifies and serves as cementing agent

for retaining the curved shape of the feather. The curled feathers are then treated with a spray of a solution containing gelatine, glycerine and formalin. This solution soaks into the structure of the feather owing to the latter's lack of moisture proof nature. The mixture of gelatine and glycerine adds to the feather the desired flexibility and toughness. By the same procedure formalin enters into the structure of the feather, thereby thoroughly disinfecting the feather to prevent the hatching of worms. On the other hand the gelatine and formalin, absorbed on the surfaces of the feather, forms a moisture-proof film over the exterior surface of the feather so that the feather becomes moisture-proof without damaging the toughness and strength or durability of the feather. This procedure increases the permanence of elasticity and expansibility to a remarkable extent.

If the present method is applied to the feathers of water-fowls, more perfect feather cottons will, of course, be produced.

In processes, in which an artificial resin film is formed for making the feathers moisture-proof by utilizing the gelatinous substance inherent in the feather, the feather is liable to become so brittle as to be easily crushed or destroyed making the permanent and effective utilization of feather cottons impossible. In my present invention, however, only a very small amount of inherent gelatinous substance is employed as the cementing agent for the curving of the feather and the most part of the agent for forming the waterproof film is supplied externally and prevents the feathers from becoming brittle and undurable. In addition to this characteristic, the mixture serves to increase the softness and elasticity of the feather.

A manner of carrying out my invention will be explained in the following:—

The roller cylinder 1 is previously heated over 100 degrees C. and the smaller roller cylinder 2 is cooled below 10 degrees C. The feathers are first washed, disinfected and partially dried by ordinary method, and then are longitudinally passed between the hot roller 1 and the cold roller 2 to be pressed and flattened. Here the feathers are heated on one side by the larger roller and are cooled on the other side by the smaller roller 2 and are curved or warped according to the curvature of the cold roller 2 and the stem of the feather loses the stiffness and becomes elastic and flexible. After such treatments the feathers are put in a closed chamber and subjected to a temperature of about 100 de-

grees C. for about thirty minutes, and then a mixed solution containing 1200 grams of water, 30 grams of gelatine, 60 grams of glycerine and 30 grams of 40% formalin is sprayed over the feathers so as to be absorbed by the same, and forming the desired film as above mentioned. Thus the finished feather cottons maintain the permanent elasticity, expansibility, durability and toughness and are free of worms and from brittleness.

I claim:

1. A method of curling feathers used as filling for cushions and mattresses which consists in subjecting the feathers while moving the same lengthwise to direct pressure between two oppositely curved surfaces of different radius of curvature and at the same time heating one side of the feathers and cooling the other side.

2. A method of curling feathers used as filling for cushions and mattresses, which consists in subjecting the feathers while moving the same lengthwise to direct pressure between two oppositely curved surfaces of different radius of curvature and at the same time heating the curved surface having the greater radius of curvature and cooling the curved surface having the smaller radius of curvature.

3. In an apparatus for curling feathers used as filling for cushions and mattresses, a pair of rotatable rollers having cylindrical circumferential surfaces, said rollers being arranged with their periphery adjacent each other so as to subject feathers introduced between said rollers to pres-

sure, means for heating one of said rollers, and means for cooling the other roller.

4. In an apparatus for curling feathers used as filling for cushions and mattresses, a pair of rotatable rollers having cylindrical circumferential surfaces, said rollers being arranged with their periphery adjacent each other so as to subject feathers introduced between said rollers to pressure, means for heating one of said rollers, means for cooling the other roller, and means for rotating each roller independently of the other.

5. In an apparatus for curling feathers used as filling for cushions and mattresses, a pair of rotatable rollers having cylindrical circumferential surfaces, said rollers being arranged with their periphery adjacent each other so as to subject feathers introduced between said rollers to pressure, one of said rollers having a greater diameter than the other, means for heating the roller having the larger diameter, and means for cooling the other roller.

6. In an apparatus for curling feathers used as filling for cushions and mattresses, a pair of rotatable rollers arranged with their periphery adjacent each other so as to subject feathers introduced between said rollers to pressure, one of said rollers having a greater diameter than the other, means for heating the roller having the larger diameter, means for cooling the other roller, and means for rotating the smaller roller with a higher peripheral speed than the larger roller.

MOICHIRO KOGA.