May 18, 1937. W. SCHRAMEK ET AL 2,080,635

DEVICE FOR MERCERIZING CELLULOSE FIBERS OF ALL KINDS

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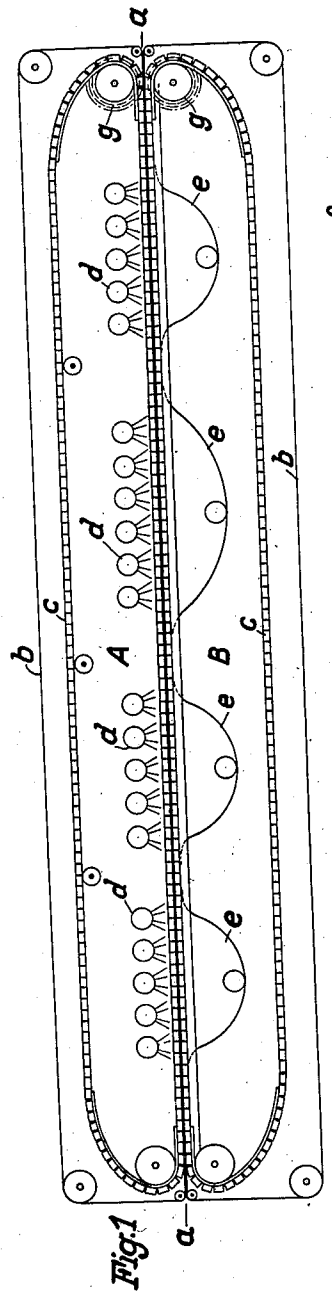


Fig.1

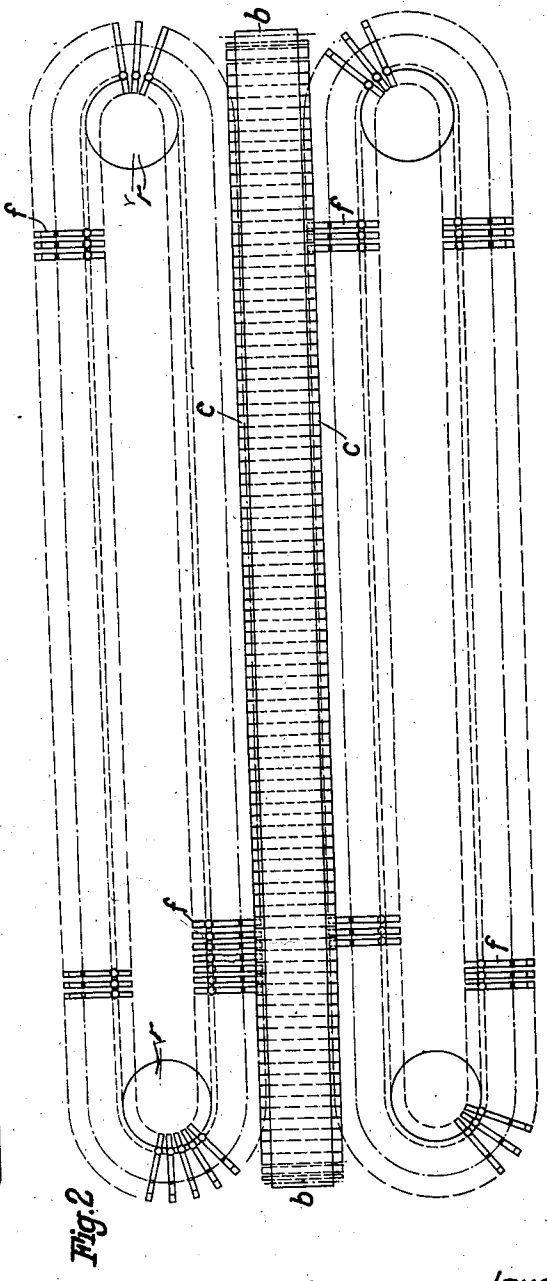


Fig.2

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Fig.3a

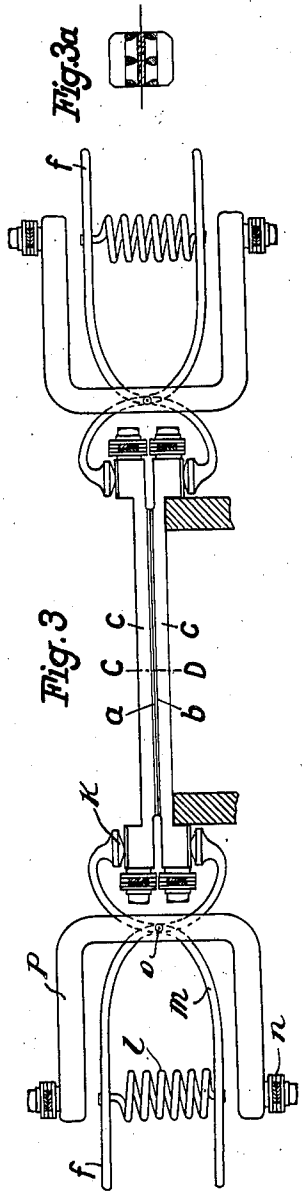


Fig.3

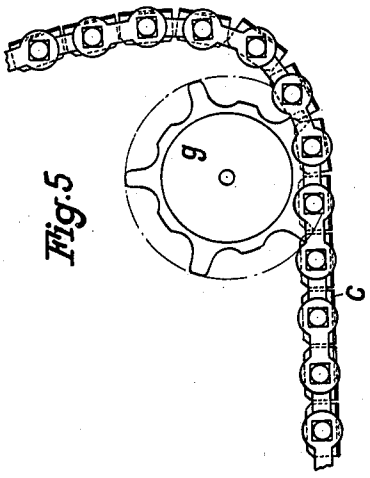


Fig.5

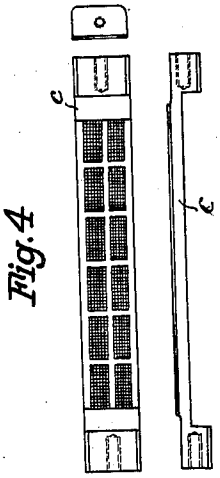


Fig.4

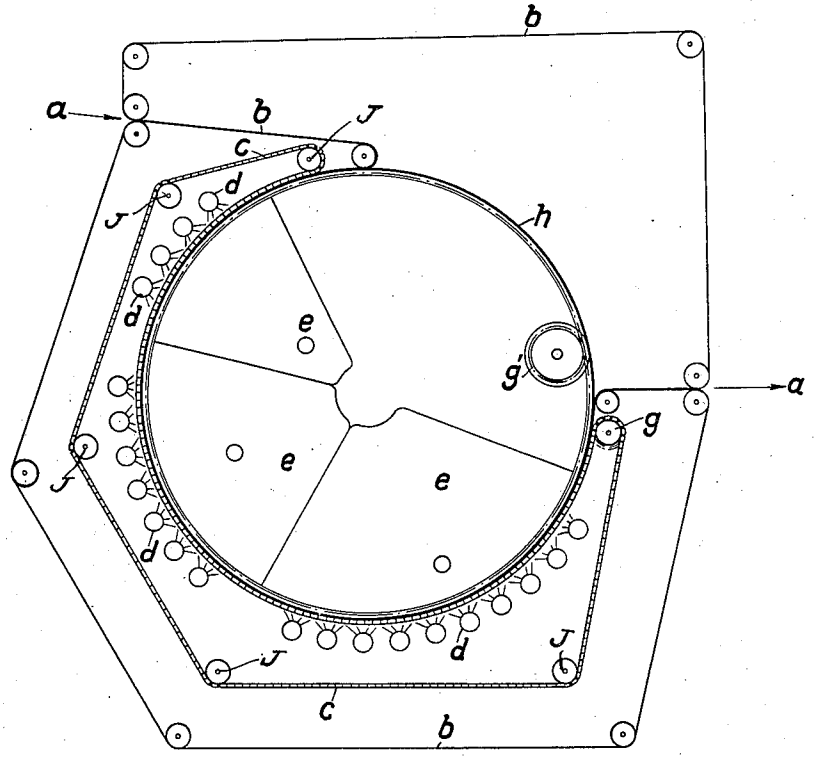
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Fig. 6



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DEVICE FOR MERCERIZING CELLULOSE FIBERS OF ALL KINDS

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2 Claims. (Cl. 8—16)

This invention relates to a device for mercerizing cellulose fibers of all kinds in loose form as well as in all transitional states up to and including finished threads and fabrics and other structures produced from yarns or twisted yarns.

When mercerizing loose cellulose fibers, such as card slivers, drawing frame slivers or softly twisted slubbing, as well as finished threads, twisted yarns, fabrics and similar structures it is of decisive importance for attaining the highest possible silky luster that during impregnation with mercerizing liquid or liquids and the subsequent washing step each individual fiber is firmly clamped over its entire length and kept tight.

It has been the practice hitherto to attain this object by arranging the loose fibrous material between two permeable fabrics, such as metal cloths or sieve bands which were guided like belts around one or several revolving screens, or by extending the two permeable fabrics nearly rectilinearly at the places where they hold the material to be worked between them and by guiding them over rolls to provide for tension and compression.

The pressure of the two sieve bands against each other, which was required for clamping the fibers and which had to be considerable in view of the very great contraction, was produced by longitudinal tensioning of the bands.

It has been found, however, that the sieve bands are subjected to extraordinary mechanical wear by the requisite very great longitudinal tension and, furthermore, that exact clamping of each fiber by such means is possible only under great difficulties.

According to the invention, this drawback is overcome by pressing the two sieve bands or metal cloths firmly together either by guiding them between two conveyor bands which may be constructed as sieve chains whose links are firmly pressed together in pairs by clamps or by passing the sieve bands around a rotating drum and pressing them firmly against the latter by means of a conveyor band consisting of a plurality of links. The pressure of this conveyor band against the drum may be produced by imparting to it sufficient longitudinal tension or by pressing it firmly against the drum or drums by means of embracing clamps. It is further possible to replace the sieve bands by sieve chains.

By way of example, two forms of the invention are illustrated in the accompanying drawings, in which Figure 1 is a diagrammatic side view of a device according to the invention; Fig. 2, a section on the line *a*—*a*, of Fig. 1; Fig. 3, a section on the line A—B, of Fig. 1; Fig. 3*a*, a section on the line C—D, of Fig. 3; Fig. 4, a detail view of a sieve chain; Fig. 5, a view of the drive for the sieve chain; and Fig. 6, a side view of another embodiment of the invention.

Referring to the drawings, *a* is the cellulose material to be mercerized, which is carried by the sieve bands *b* held between the sieve chains *c* and firmly compressed by them. The sieve chains *c* are driven by sprocket wheels *g* and guided by rollers *j*. *d* designates the spraying nozzles for sprinkling the cellulose material *a* with mercerizing and washing liquor. *e* are suction boxes for drawing the liquids sprinkled upon the cellulose material *a* through the latter. *f* (Fig. 2) are clamps for compressing pairs of superposed links of the chains *c*. As Fig. 3 shows, two superposed links of the chains *c* move on slide rails and hold between them the sieve bands *b* and the cellulose material *a*, the entire structure being held in position by the laterally engaging clamps *f*. Each of these clamps consists of a pair of ball faced jaws *k* engaging above and below the side edges of the chains *c* so as to press the latter together. This pressure is caused by a tension spring *e* acting between the clamp shanks *m*. The hinge *o* of the clamp is pivoted in a U-shaped member *p* which is supported by endless belts *n* which are carried around drums *r* revolving on vertical axes, so that the clamps, one for each pair of superimposed links, travel at the same speed with the supporting chains along a path parallel therewith. On account of the great length of the clamp shanks *m* as compared with the jaws *k*, measured from the hinge point *o*, the ends of the shanks *m* will contact while the jaws are still partly open. Accordingly the clamps with their jaws partly open will, upon their endless belt *n* being turned around the drum *r*, advance toward the straight length of the sieve chains *c* and gradually engage the adjacent ends of the chain links

Fig. 4 shows a single link of a sieve chain as seen from the running face and from the side.

The drive of the sieve chains *c* is effected by means of a toothed wheel *g* (Fig. 5) of special shape which engages a chain constructed like the flat chains used in cotton cards.

In the construction shown in Fig. 6 the sieve bands *b* are firmly pressed against a drum *h* by means of a sieve chain *c*. *a* is the cellulose material and *d* are spraying nozzles for applying the mercerizing and washing liquid to the cellulose

material. *e* are suction chambers and *g'* driving gears.

The device operates as follows:

Several slivers or fibrous webs *a* are introduced between the two endless and fine-meshed metal sieve bands *b* which insure exact clamping of each fiber. The two sieve bands *b* with the interposed fibrous material *a* are then caught between the two sieve chains *c* (Fig. 1) which are pressed against each other to the necessary degree by embracing clamps *f* which are automatically applied and automatically released when the material *a* leaves the bands *b*. While the fibrous material *a* is pressed between the sieve bands *b* it is impregnated with mercerizing liquid or liquids and subsequently washed out in known manner with preferably hot washing waters without any release in the pressure of the bands.

The device according to Fig. 6 functions as follows:

Cotton in the form of several parallel drawing frame or card slivers or as loosely twisted slubbing or in the form of yarn or fabrics *a* is caught between the two endless and permeable metal sieve bands *b* and passed around one or several drums *h* which may be constructed as revolving screens to facilitate the penetration of the fibers by the impregnating and washing liquids which are drawn into or pressed out of these screens. By means of a rotating sieve chain *c* the bands *b* are pressed against the drum or drums *h* so as to keep each fiber immovably in position, the chain *c* being automatically pressed against the drum or drums *h* at the point where it enters the drums by the clamps *f* and automatically released when it leaves the drums. While the fibrous material is in this position it is treated with mercerizing liquid and in connection therewith washed out in known manner.

We claim:—

1. A device for mercerizing cellulose fibers of all kinds in loose form and all transitional stages including finished threads and fabrics and other structures made from yarn and twisted yarns comprising, in combination, endless fine-meshed sieve bands for carrying the cellulose fibers, conveyor sieve chains for holding said bands between them, a toothed wheel drive for said chains, clamps for compressing superposed links of said chains in pairs, said clamps adapted to engage said links when the cellulose fibers enter said bands and releasing said links and bands when the cellulose fibers are discharged.

2. A device for mercerizing cellulose fibers of all kinds in loose form and all transitional stages including finished threads and fabrics and other structures made from yarn and twisted yarns, comprising, in combination, endless fine-meshed sieve bands for carrying the cellulose fibers, conveyor sieve chains for holding said bands between them, a toothed wheel drive for said chains, clamps for compressing superposed links of said chains in pairs, said clamps adapted to engage said links when the cellulose fibers enter said bands and releasing said links and bands when the cellulose fibers are discharged, spraying nozzles for sprinkling the cellulose with mercerizing and washing liquids while it is held immovably in position by said chains and clamps, and suction boxes for drawing the liquids through the cellulose fibers.

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