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H. KEMPF

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DEVICE FOR MANUFACTURING ARTIFICIAL SILK

Filed Jan. 13, 1928

Fig. 1

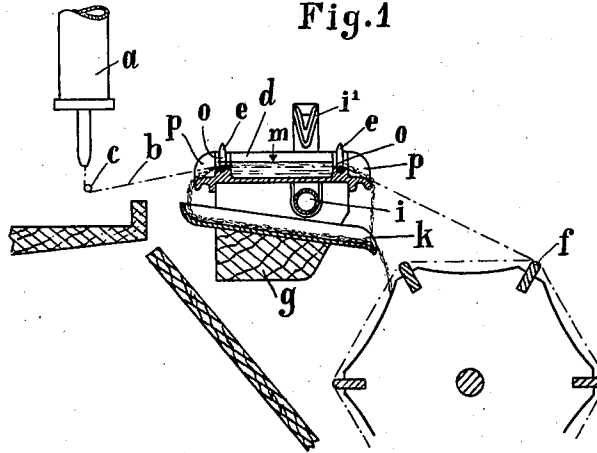


Fig. 2

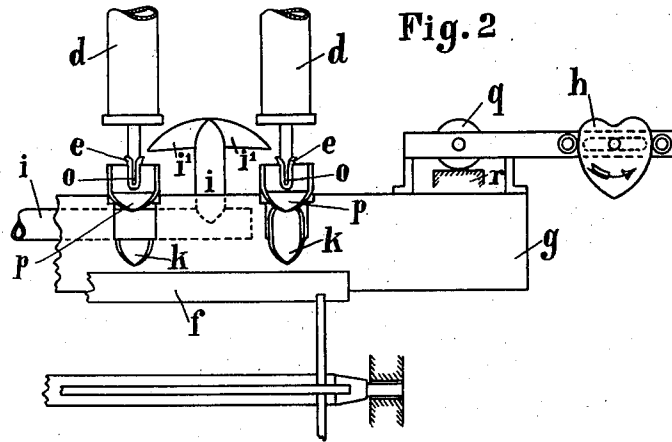


Fig. 3

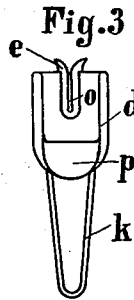


Fig. 4

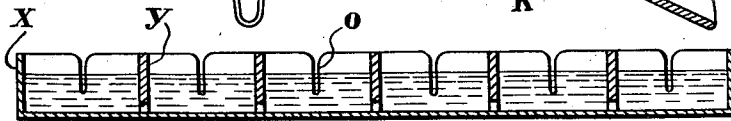
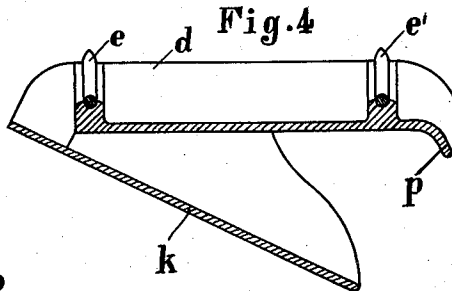


Fig. 5.

Inventor:  
Hubert Kempf  
by *Paul Schuler*  
Attorney

## UNITED STATES PATENT OFFICE

HUBERT KEMPF, OF BARMEN, GERMANY

DEVICE FOR MANUFACTURING ARTIFICIAL SILK

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The invention relates to a device for manufacturing artificial silk, in which the threads freshly spun are for the purpose of being consolidated conducted through a hardening liquid. There is already well known a device in which the hardening liquid is in a trough which is fixed in place and which extends throughout the entire length of the spinning machine, and which is provided in both side walls with narrow slots open above, through which the artificial threads are passed. A portion of the hardening liquid in the trough flows away continuously through these slots and is continually replaced by a suitable in-

jux. This well known contrivance has in general proved of value. It renders it necessary however to arrange in addition to the fixed trough a special thread guide which is movable transversely with regard to the threads. Such a disadvantage for instance is that owing to the relative displacement between thread guide and trough there will be caused at the points of motion-reversal sharp bends in the not yet fully hardened artificial filaments, which produce strong rubbing friction of the threads on the slot edges and consequent wear upon the tender threads, which greatly impairs the quality of the goods. According to the present invention this defect is avoided by the trough and thread guides being simultaneously reciprocated horizontally transversely with respect to the threads while at the same time precautions are taken to ensure that when the motion of the trough is reversed, the hardening liquid does not slop over the edge of the trough. For this purpose the trough may either be provided with transverse partition walls or better still be subdivided into a number of individual troughs, each of which suitably extends over only one bundle of threads and accordingly possesses only one narrow entrance slot and exit slot for the bundle of threads in question.

This subdivision into individual troughs provided with narrow passage-slots has in addition to the well-known advantages of the trough and of its slots the still further advantage that the mass to be reciprocated during the passage of the thread, particularly the

mass of the liquid is reduced and that moreover a saving of acid can be effected when parts of the machine are not running, since in some parts the influx of the hardening liquid (acid) may be stopped.

The hardening liquid passing out of the trough slots may moreover suitably be further utilized by being conducted after leaving the trough on to the reel or on to the threads of artificial silk situated thereon. For this purpose there is arranged for each individual trough and under its slots an overflow gutter or channel participating in the motion of the trough, the arrangement being such that the liquid passing out of the slots is conducted directly on to the wound up artificial threads in order thereby to effect additional subsequent hardening and removal of copper. In consequence of the lateral motion of the overflow gutter or of the channel, the whole width of the wound up artificial threads is thereby sprinkled. The formation of the trough-slots themselves may be effected either in the same manner as before that is, the slot-edges may consist of acid-resisting steel, but the employment of glass, porcelain, and other hard acid-resisting materials has proved suitable. The employment of glass, porcelain and the like is particularly advantageous when the slot-edges consist of the same material as the trough itself or even form an integral part of the trough.

For guiding the thread there may either be arranged behind the trough-slots special reciprocating thread-guides or on the other hand the trough-slots themselves may serve as thread-guides in which case care must be taken that sharp corners which might possibly injure the thread are avoided at the slots. When the trough is made with slot-edges of porcelain or glass this end, as can be readily be seen, can be attained in a simple and perfect manner.

Three constructional examples of the invention are represented in the drawing in which:—

Fig. 1 shows a vertical cross-section through the essential parts of the spinning device in the plane of the thread, and

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Fig. 2 an elevation from the side of the reel.

Figs. 3 and 4 show the construction of the trough and of the return channels appertaining thereto in a single piece.

Fig. 5 shows a vertical longitudinal section through a trough extending across the entire length of the spinning machine, subdivided into a number of individual troughs.

From the spinning apparatus *a* there runs the thread *b* via a guide rod *c* through a small trough *d* which is carried by beam *g* and is fed with acid by a pipe *i* and spout *i'* so that by these means the level of the liquid in the trough is kept at about the height indicated by the mark *m*. In the neighborhood of each of the ends of the trough there is to be found a narrow slot *o* which is bordered by the two shanks of an upright U-shaped piece *e* which in its turn is located in the wall of the trough *d*. The trough itself consists for its part advantageously of glass, porcelain or other acid-resisting material; likewise the piece *e* serving to form the edges of the slot. Said piece may nevertheless consist advantageously of acid resisting steel or of other suitable elastic material, and by virtue of its elasticity may be connected with the trough in such a manner as to be capable of being exchanged. On the other hand, if desired, the edges of the slot may be formed directly by the trough wall, the special piece *e* being dispensed with.

The slots *o* serve for the passage of the thread *b* while simultaneously also a portion of the hardening liquid flows away outwards through these slots. Outside and below these slots *o* the trough is provided at each end with a beak-shaped outlet *p* by means of which the escaping hardening liquid is conducted into a sloping channel *k*, which is situated under said outlets and which is embedded in the beam *g*, and from the latter on to the reel *f* or on to the thread wound thereon, so that there takes place an additional after-treatment of the thread on the reel.

The beam *g*, as is evident from Fig. 2, is mounted at its ends, with the aid of a roller *q*, on a fixed support *r* and is connected with a driving-cam *h* by means of which it can be reciprocated transversely with regard to the threads in a horizontal plane, in order thereby to effect with the aid of the trough-slots which serve as thread-guides the ordinary cross-winding of the threads on the reel.

By providing the thread guides on the trough, and thereby causing said thread guides to be reciprocated with the trough, wear upon the threads at the points they traverse the guides is prevented and a better grade of silk produced.

In Figs. 3 and 4 there is represented a second constructional form of the trough, the scale being somewhat larger. This constructional form is distinguished from the constructional form according to Figs. 1 and 2

merely by the under return-channel *k* together with the trough *d* consisting of a single piece.

Fig. 5 shows a trough *a* extending throughout the entire length of the spinning machine, subdivided into a number of individual troughs by means of transverse walls *y*, parallel with the threads. It will readily be understood that by subdividing the trough like this, an overflow of the hardening liquid at the ends of the trough, owing to the movement of the liquid in the directions indicated by the arrows, will be prevented. It is not necessary that the subdivisions of the trough should be separated from each other entirely, but merely as much as is needed to calm down the movement of the liquid, and to prevent it from overflowing. The subdivisions may communicate, as shown, thereby assuring for the liquid the same level in all parts of the trough.

#### Claims:

1. In a device of the character set forth for making artificial silk, a reciprocable trough for holding the hardening liquid adapted for horizontal reciprocation cross-wise of the thread travel, the front and rear cross-walls of the trough having slots for the overflow and discharge of the hardening liquid and serving also as guides for the thread or threads, and means for reciprocating said trough.

2. In a device of the character set forth for making artificial silk, a reciprocable trough for holding the hardening liquid adapted for horizontal reciprocation cross-wise of the thread travel, the front and rear cross-walls of the trough presenting combined thread slots and overflow gutters, means for feeding hardener to the trough, means for reciprocating the trough, and partition walls in the trough arranged cross-wise of the thread travel.

3. In a device according to claim 1, the feature that the reciprocable hardening trough is subdivided into a series of individual troughs, each one of which presents combined thread slots and overflows in its end walls, and cross walls throughout the series of troughs.

4. In a device according to claim 1 the feature that the end wall slots for the passage of the thread or threads are gutter-shaped and of less depth than the chamber of the trough.

5. In a device according to claim 1 the provision in the slotted end walls of the trough of readily removable and replaceable thread guides of acid-resisting material.

6. In a device of the character set forth, a reciprocatory trough for holding the hardener adapted for horizontal reciprocation transversely to the thread travel, the inner and outer end cross-walls of the trough presenting combined thread and overflow slots of less depth than the depth of the trough,

means for feeding hardener to the trough,  
and a gutter below the trough and reciprocable therewith, said gutter being arranged for receiving the hardener overflow from both ends of the trough and having an outlet at its  
5 outer end below and outwardly beyond the outer end of the trough for directing the liquid upon the reel-wound thread.

In testimony whereof I affix my signature.  
10 DR. HUBERT KEMPF.

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