Sept. 17, 1935. T. GRAUER 2,014,681

RECEIVER FOR MATERIALS, SUCH AS ARTIFICIAL SILK

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Fig. 10

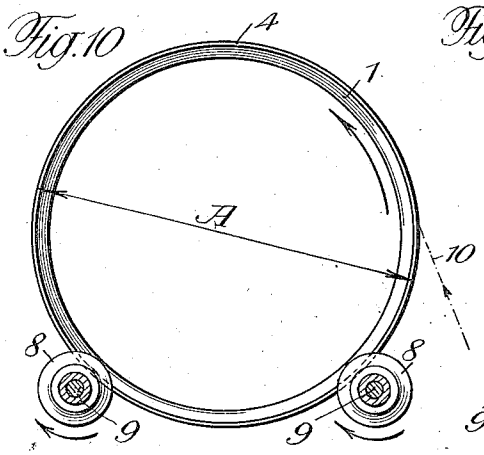
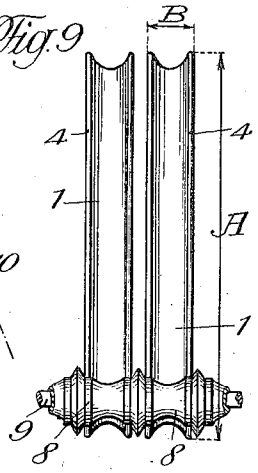


Fig. 9



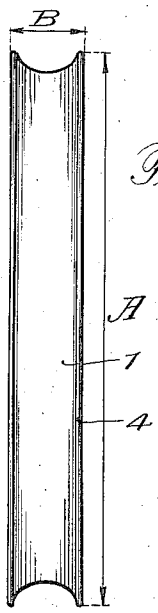


Fig. 8

Fig. 1

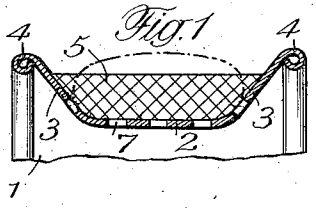


Fig. 7

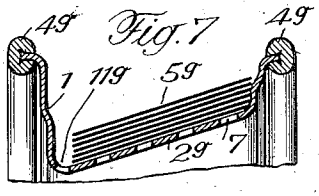


Fig. 2

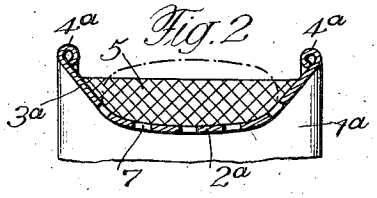


Fig. 3a

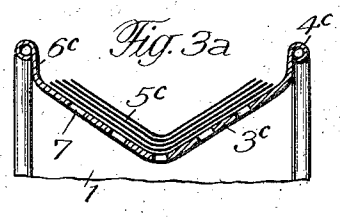


Fig. 3

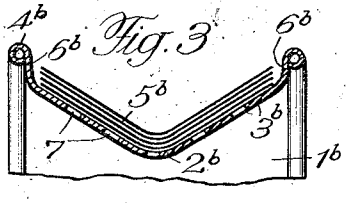


Fig. 4

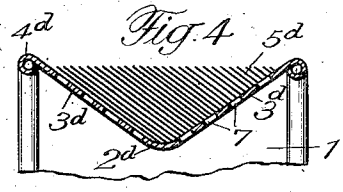


Fig. 5

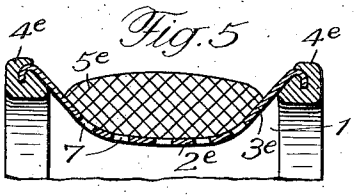


Fig. 6

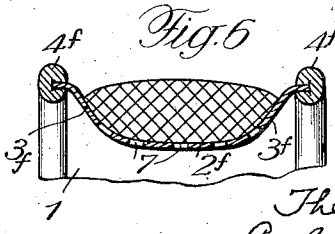


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Fig. 11

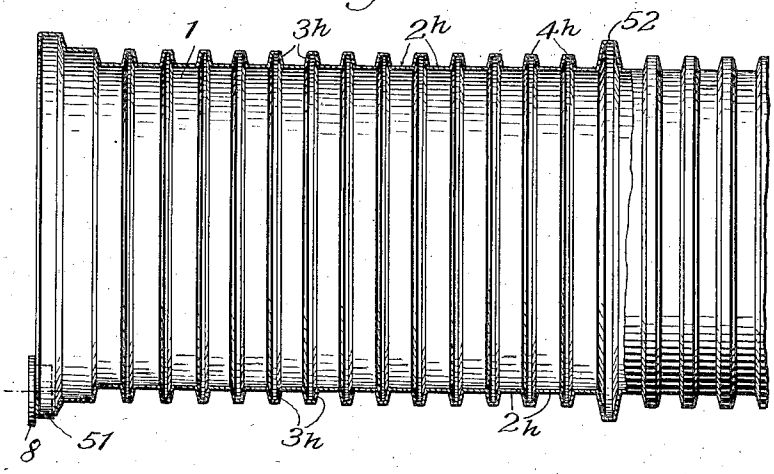


Fig. 12

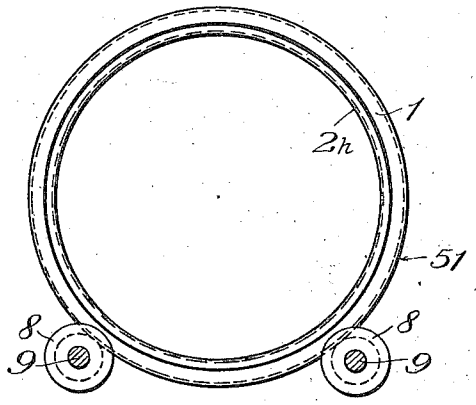
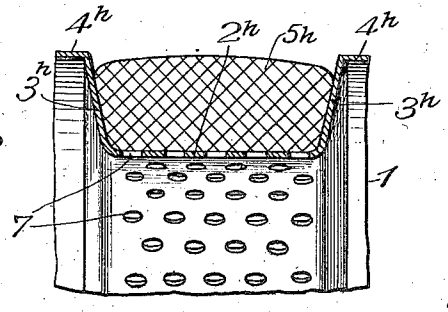


Fig. 13



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Patented Sept. 17, 1935 2,014,681

UNITED STATES PATENT OFFICE

2,014,681

RECEIVER FOR MATERIALS, SUCH AS ARTIFICIAL SILK

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Application November 15, 1933, Serial No. 698,180
In Germany November 21, 1932

10 Claims. (Cl. 242—118)

This invention relates to receivers for materials, such as artificial silk and other artificial filamentary products, particularly for the spinning process, the receiver being in the form of an annular channel or a hoop-like body provided with a circumferential groove for accommodating the material which groove has a small depth as compared to the diameter of the hoop-like body and the cross section of which is provided with raised marginal portions projecting beyond the bottom of the groove.

Owing to the diameter of the receiver being larger than usual, the receiver is adapted to accommodate a quantity of thread material equal to or greater than spools or other receivers hitherto used, even with the depth of the receiver being relatively very small, so that the efficiency of the spinning machine can be considerably increased or, if the efficiency is to remain the same, the machine can be dimensioned correspondingly smaller. The difference between the diameters of the outermost and innermost layers of windings of the thread coil accommodated in the circumferential groove of the receiver is so chosen that, in contradistinction to the usual practice, it is no longer absolutely necessary to change the rotational velocity of the receiver during the winding operation, the conoidal drives otherwise required thus being dispensed with. Due to the receiver being of a smaller width, the range of traversing movement of the thread guides is correspondingly decreased with the result that the residual kinetic energy of the reciprocating thread guiding means is reduced and therefore a lighter and simpler design can be adopted for the drive of the spinning machine.

Owing to the said range of traversing movement being decreased, the angular extent of the region through which the thread material moves between the spinning nozzle and the winding position is reduced which permits of raising the speed at which the material is wound on. Hitherto this result could only be obtained by increasing the distance between the spinning nozzle to the winding position or by intercalating special auxiliary means which, however, increased the space requirement for the spinning device or complicated the same respectively. By applying the receiver according to this invention these drawbacks are completely removed.

In the circumferential groove of the receiver, the thread material is protected against being touched by hand or other detrimental mechanical influences during handling the receiver, as for example conveying it from one working position to another, which was hitherto only the case in the can spinning process, where the artificial silk after being imparted an initial twist is led into a receiving can. The drive can be transmitted to the receiver, according to the invention, in a simple manner, merely by operative engagement of driving means with the raised marginal portions of the receiver. This driving mode, on the other hand, contributes to simplifying the attendance of the spinning machine during donning and doffing the receivers.

Furthermore, due to the very small depth of the groove as compared with the diameter of the carrier, the lengths of the inner and outer turns are substantially equal and it is, therefore, unnecessary to provide for variable speed winding as is required for ordinary receivers.

In the accompanying drawings several constructional forms of the invention are illustratively exemplified, in which:

Figs. 1 to 7 show different enlarged cross sections of the annular receiver according to this invention,

Fig. 8 shows an enlarged elevation of a further constructional form thereof,

Figs. 9 and 10 show in two views, at right angles to each other, an example of a driving arrangement for receivers similar to that shown in Fig. 8,

Fig. 11 illustrates a drum-shaped receiver partly in elevation and longitudinal section,

Fig. 12 is a side elevation of Fig. 11, and

Fig. 13 represents a fragmentary section of Fig. 11 on a larger scale.

Referring to the Figs. 1 to 10 of the drawings, 1 designates generally the receivers the largest dimension of which extends in the radial direction, so that, as will be seen in the Figs. 8 to 10, the diameters A of the bodies of the receivers is a multiple of their depth, that is, of their axial extent, thus being hoop-shaped. This hoop-shaped receiver presents an invariable space for accommodating the thread material.

The material of the receiver which may consist to advantage of lacquered aluminium, or acid- or lye-proof steel, or of ebonite, or a similar artificial mass is, as shown in Fig. 1, of a cross section having a cylindric middle portion 2 which joins the raised marginal portions 4 by means of intervening outwardly flared sides 3, the cross section thus resembling that of a channel or of a hollow wheel rim. The marginal portions 4 are formed by heading outwardly the strip of material used for making the receiver and serve for stiffening the same, so that the receiver main-

tains its circular shape permanently. By 5 the thread material applied to the receiver is designated.

In the constructional form of the invention shown in Fig. 2, the middle portion or bottom 2^a of the receiver is slightly downwardly bowed thus being still approximately cylindrical. Furthermore, in contradistinction to the previous example, the strip of material used for making the receiver is beaded inwardly at the marginal portions 4^a in the direction towards the middle portion. The sides 3^a of the groove are outwardly flared as in Fig. 1.

The constructional form of the invention as per Figs. 3 and 3^a provides for a circumferential groove of the receiver 1, for accommodating the thread material 5^b and 5^c, the cross section of which has two oppositely slanting sides 3^b or 3^c rising up at uniform inclination from the middle, where these sides merge with a narrow arcuate bottom 2^b. At the outer ends, the sides 3^b or 3^c join with exterior vertical walls 6^b and 6^c which in turn adjoin the marginal portions 4^b and 4^c, respectively.

The constructional form illustrated in Fig. 4 is distinguished from the immediately preceding one by the feature that the two outwardly flared sides 3^d of the receiving groove merge with the marginal portions 4^d directly. The shape of the bottom portion 2^d of the receiving groove is similar to that of Figs. 3 and 3^a.

The constructional form shown in Fig. 5 is developed from that disclosed in Fig. 2 and distinguishes from it in so far that the marginal portions 4^e of the receiving groove are formed by separate rings mounted on the body of the receiver. These rings are advantageously made of a material affording considerable frictional engagement for driving the receiver 1, for example rubber resistive against acids and lyes.

A similar constructional form, shown in Fig. 6, differentiates from the just described one in that the rings 4^f forming the marginal portions of the receiving groove are of a different cross section. The shape of the side portions 3^e and 3^f and the bottom portion 2^e and 2^f of the receiving grooves in Figs. 5 and 6 is similar to that of Fig. 2.

In the constructional form of the invention depicted in Fig. 7, the receiving groove has a bottom 2^g slanting downwardly towards one side thus providing for an unsymmetrical cross section.

In the modified form illustrated in Fig. 8, the groove of the receiver 1 is approximately of semi-elliptical cross section, the side walls thus rising up towards both marginal portions at increasing inclination.

All the constructional forms of the invention provide for perforations 7 distributed over the entire circumference of the groove of the receiver 1 and serving for the eduction of liquids, gases, drying air or the like.

The two marginal portions 4, 4^a, 4^b, 4^c, 4^d, 4^e, 4^f, or 4^g, of the receiver 1 serve as engaging and guiding elements for driving the receiver during its application in the spinning machine, as well as later on, in the doubling and winding machines. For this purpose the individual receivers 1 can be inserted in the machine side by side in closely spaced relation, as shown in Fig. 9. For each individual receiver 1, two points of support are provided in the machine as indicated in Fig. 10, where each receiver is set to rest with its marginal portions against two roller-like supporting members 8, which are mounted on two shafts 9 one of which at least serves as a driving shaft.

In Figure 10, the reference 10 designates the artificial silk thread passed to the receiver 1 in the direction of the arrow and wound thereabout. The drive of the receiver 1 can obviously be reversed, when it is intended to pay out the thread.

In connection with the Figs. 1, 2, 5 and 6 it is assumed that the range of traversing movement of the thread guide increases continually according to the increase in thicknes of the coil 5, 5^a, 5^e, or 5^f and in conformity to the taper of the sides of the receiver. In the Figs. 1 and 2, the shape of the coil assumed by the same, when the material shrinks during drying, is indicated by dotted lines.

The mode of winding assumed in connection with Fig. 3 provides for the range of traversing movement of the thread guide to remain constant during the winding operation, so that all the layers of thread windings 5^b are of the same width.

The mode of winding adopted in connection with Fig. 3^a differs from the one described immediately above in the respect that the range of traversing movement of the thread guide becomes gradually smaller, so that the width of the layers of thread winding 5^c decreases while the thickness of the winding increases. Instead of providing for the individual thread layers of the winding to decrease in width uniformly on both sides, as shown, the width of the winding can be gradually decreased on one side only during the winding operation by correspondingly reducing the range of traversing movement of the thread guide.

As shown in Fig. 4, the layers of thread of the winding 5^d are all disposed parallel with one of the sides 3^d of the receiving groove.

In Fig. 7 all the thread layers of the coil 5^g are shown to have the same width.

The receivers 1 as provided present an invariable space for receiving the thread material and are adapted by means of yieldable marginal portions to be pressed snugly against each other during the after treatment of the thread coils, in such manner, that these portions act as sealing faces against the passage of liquids or gases and the like during the drying. Yieldable marginal portions of this kind are provided in the form of the rings 4^e, 4^f, or 4^g situated at the exterior circumference of the receiver 1, as shown in the Figs. 5, 6 and 7. These marginal portions may obviously also serve as closing means of the receivers to the tub used for the after treatment.

It is obvious that instead of providing the sealing faces at the exterior circumference these faces may be provided at portions situated radially inwardly on the end surfaces of the receiver.

The receivers described are adapted to be conveyed to the respective working position or from one working position to the other in the empty or filled state thereof, for example by simply hanging them on to a conveyor chain or the like. The thread material applied to the receiver is at all times, also under these conditions, protected against being damaged by touching without resorting to special precautionary measures.

In the Figures 11 and 12, a plurality of hoop-like receivers 1 are shown to be united to form a drum. A detail view of the receiver used is illustrated in Fig. 13 on a larger scale. The cylindric middle portion 2^h of the receiver 1 joins with lateral inclined walls 3^h which extend up to the raised marginal portions 4^h thus completing the

receiving groove of the thread coil 5^h. The raised marginal portions 4^h of adjacent receivers 1 merge with each other to form a closed drum. The divisions between centres of the grooves are chosen to correspond to the distances between adjacent spinning nozzles, so that each groove receives the thread spun by the correlated nozzle. The diameter of the rib formed by two marginal portions is such that the rib projects beyond the finished coil 5^h, and the middle portion 2^h of the grooves is provided in usual manner with perforations 7 or other suitable passages for the after treatment liquid to penetrate through by pressure action from within the coils 5^h or by suction action from outside to inside thereof. The length of the drum is limited by practical exigencies only and can be made for example two meters.

At each end of the drum a rim 51 of a diameter somewhat larger than the diameter of the inner ribs 4^h of the receiver 1 is formed. Furthermore, certain distances apart along the length of the drum, instead of a rib 4^h rims 52 of equal diameter as the rims 51 are provided. The rims 51 and 52 serve as engagement members for driving the drum in the spinning machine as well as during the aftertreatment of the coils. The rotational or rolling motion of the drum is obtained by means of rollers 8 mounted on shafts 9.

The removal of the drums from the spinning machine and the transporting of the same to the aftertreatment shop is considerably simpler than the corresponding manipulations required for a plurality of individual receivers or spools. The economy of labour obtained is thus very considerable, it being possible to convey a larger number of hoop-like receivers spun with material conjointly by a single manipulation, or else automatically, from the spinning machine to the aftertreatment tubs. The further advantage is also obtained that the receivers need not be sealed individually at their joints, as it is only necessary to seal the ends of the drum with respect to the vessel in which the aftertreatment of the thread material is carried out. The ends of the vessel for the aftertreatment can be sealed in automatic manner, thus avoiding time-wasting and expensive manipulations and simplifying the means and the performance of the aftertreatment on the whole. The drum presents all the advantages of a single thread receiver, viz. great material-accommodating capacity, neat and but slightly cross wound disposition of the thread material in the grooves and thus elimination of the so-called overruns or "cob webs;" when spinning bands, even wide bands can be wound on the drum without distortions at the ends thereof, due to the small range of traversing movement of the thread guide provided for.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed.

What I claim is:

1. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery.

2. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said groove having a cylindrical middle portion and outwardly flaring side portions, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery, said walls joining said outwardly flared side portions of said groove.

3. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said groove having a depressed middle portion and outwardly flaring side portions merging with said middle portion, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery, said walls joining said outwardly flared side portions of said groove.

4. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said groove having a depressed middle portion and outwardly flared side portions, the end portions of said outwardly flared side portions having a greater inclination with respect to the axis of the body than the inner portions of said sides.

5. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said groove having a depressed middle portion, and having sides flaring outwardly at increasing inclination with respect to the axis of the body, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery.

6. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said body having end faces of yielding material for sealing the same during the aftertreatment of the material, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery.

7. A receiver for artificial filamentary material comprising a series of annular bodies having the general proportions of a hoop, arranged side by side to form a drum, each body having a depth very small in proportion to its diameter, each of said bodies having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery.

8. A receiver for artificial filamentary material comprising a series of annular bodies having the general proportions of a hoop, arranged side

by side to form a drum, each body having a depth very small in proportion to its diameter, each of said bodies having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery and the limiting walls of adjacent bodies merging with each other.

9. A receiver for artificial filamentary material comprising a series of annular bodies having the general proportions of a hoop, arranged side by side to form a drum, each body having a depth very small in proportion to its diameter, each of said bodies having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery, and rims of greater diameter than said limiting walls of said bodies and spaced apart along the length of said drum and providing engagement surfaces for the drive of said drum between ribs formed by the walls and rims of adjacent bodies merging with each other.

10. A receiver for artificial filamentary materials comprising an annular body having the general proportions of a hoop, the depth thereof being very small in proportion to the diameter, said body having a shallow circumferential material-receiving groove of small width relative to the diameter of the body, said groove having a depressed middle portion and outwardly flaring side portions extending from said depressed middle portion at uniform opposite inclinations, said body having outwardly extending limiting walls at its ends serving to support and drive the body at its periphery, said walls joining said outwardly flaring side portions of said grooves.

THEODOR GRAUER.