United States Patent

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[33] **Germany**
[31] P 17 60 256.1 and P 18 16 001.5

[54] **HEATED GODET FOR DRAWING SYSTEMS AND CYLINDER DRYERS**
16 Claims, 3 Drawing Figs.

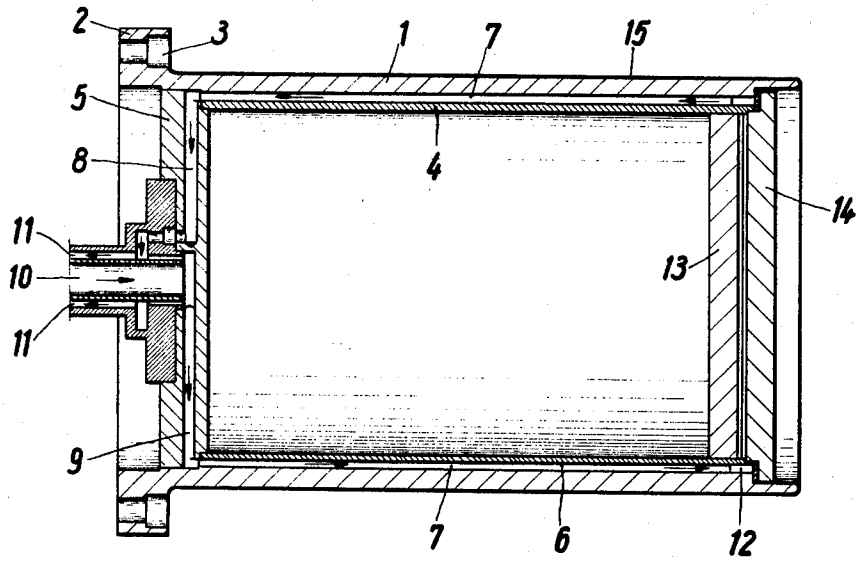
[52] **U.S. Cl.** **165/89**
[51] **Int. Cl.** **F28d 11/02**
[50] **Field of Search** 165/89, 90, 86

[56] **References Cited**
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ABSTRACT: A godet which comprises a cylindrical outer jacket and a cylindrical inner jacket provided with a front face and a rear face, said outer and inner jacket defining an annular chamber therebetween, paraxially disposed means for subdividing the annular chamber into a plurality of chambers, at least two adjacent chambers communicating with each other at the front face of the godet, and at least one supply and discharge line connected with the chambers which are in communication with each other.



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SHEET 1 OF 2

Fig.1

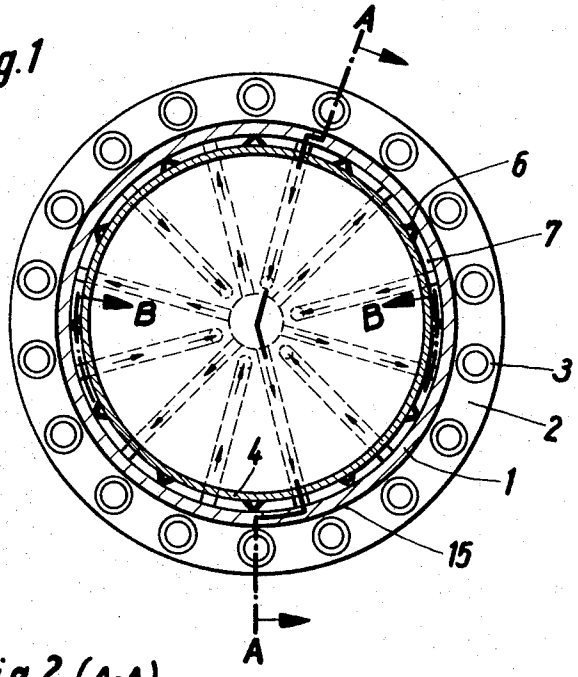
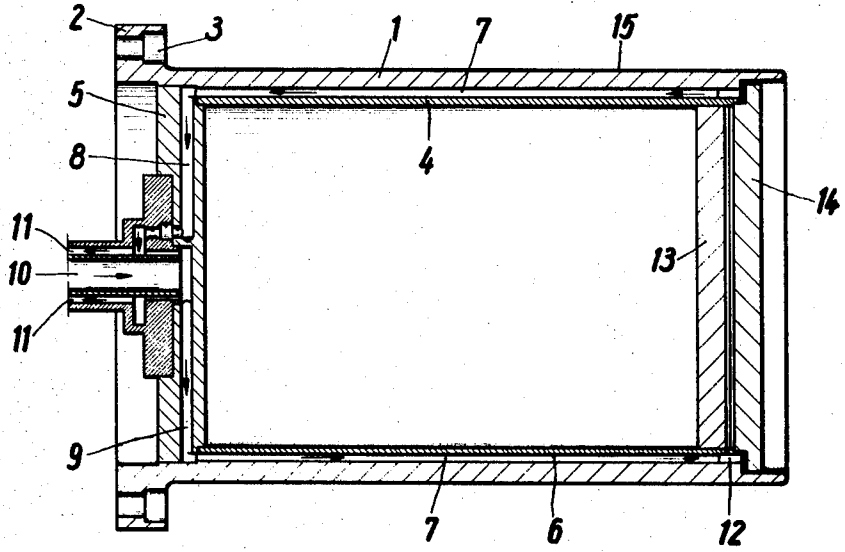


Fig.2 (A-A)



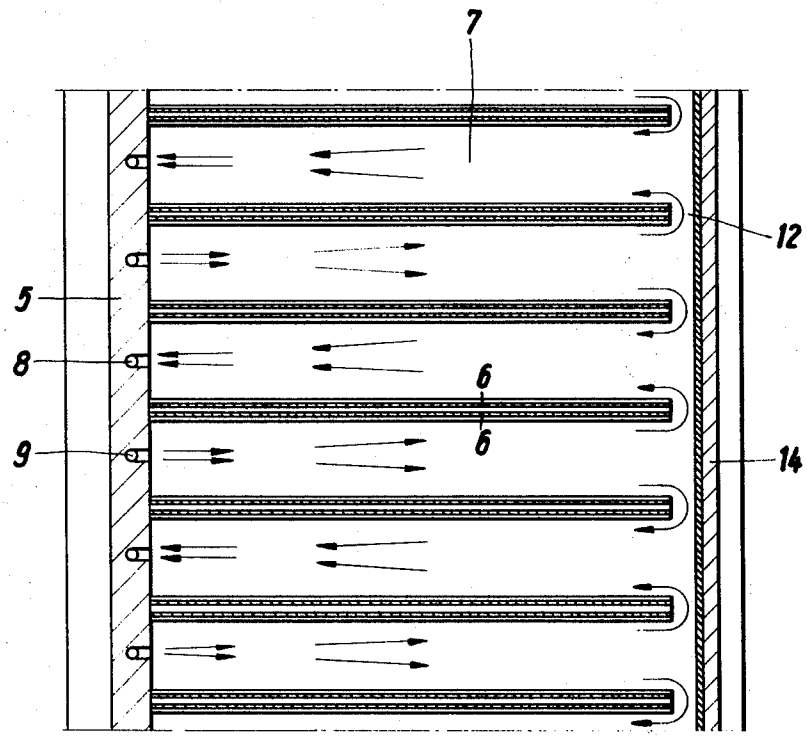
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Fig.3 (B-B)



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HEATED GODET FOR DRAWING SYSTEMS AND CYLINDER DRYERS

BACKGROUND OF THE INVENTION

The present invention relates to a godet heated with a gaseous or liquid heat carrier, such as for example steam. More particularly, the present invention is directed to a heated godet which is used particularly for drawing systems and cylinder dryers which find use in synthetic fiber plants.

Heated godets are well known. They are frequently heated with steam, whereby the steam is passed into the hollow body of the godet. The transmission of the heat to the godet takes place essentially by condensation of the steam. The condensate is discharged from the godet through a duct. However, it is also well known to heat such godets electrically. For this purpose, heating rods are arranged in the inner jacket. Electric heating incorporates the disadvantage that the temperature on the roller jacket is not uniform because of the dissipation of heat.

However, it is very important to ensure as uniform a temperature as possible over the entire godet width and/or length, particularly for synthetic fiber plants, since the fiber properties are influenced by the temperature and since fibers with different properties are obtained if the temperatures vary. For example, the coloring power may be adversely effected. Of course, it is of vital importance that the coloring power of the fibers is maintained constant.

Furthermore, godets are well known which are heated with a liquid heat carrier, for example, diphyl. However, with these godets the uniform heat distribution over the surface of the godet is very critical and very difficult to maintain.

SUMMARY OF THE INVENTION

An object of the present invention is to avoid the prior art disadvantages associated with heated godets.

Another object of the present invention is to provide a heated godet wherein a uniform temperature consistency is maintained over the entire working width of the godet.

A further object of the present invention is to provide a godet which is heated to a uniform temperature such that the coloring power of the fibers of the textile materials being treated is maintained constant.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

Pursuant to the present invention, it has been found that the above-mentioned disadvantages may be eliminated and a much improved apparatus for use in drawing systems and cylindrical dryers for synthetic fiber plants may be obtained by providing the godet with a double jacket, that is an outer and inner jacket, and by providing a positive guidance of the vaporous or liquid heat carrier between said outer and inner jacket.

It is particularly advantageous to subdivide the free space between the outer and the inner godet jacket into several chambers by means of straps which are preferably arranged paraxially, to connect at least two adjacent chambers with each other at one end and to associate at least one supply and one discharge means, for example a supply and a discharge line, to the chambers which are connected with each other for the introduction and removal of the heat carrier. For a very uniform heat distribution over the circumference of the godet, it is advantageous if the space between the inner and the outer godet jacket is subdivided into at least six, preferably 12 chambers with at least three supply lines and three discharge lines. The liquid or vaporous heat carrier flows into one chamber at one end and is passed into the adjacent chamber at the other end. After having passed this chamber the heat carrier can then be discharged or passed again into an adjacent chamber through which it flows in the opposite direction.

An effective design results if the supply and discharge lines are provided, for example, in the form of borings in one face of the godet. Preferably these borings are provided in the rear face adjoining the bearing shaft. However, it is also possible to provide the supply and discharge lines in the front face. This possibility is usually preferred if the drawing systems or cylinder dryers are fitted with godets at both sides. In that case the supply lines for the heat carrier are favorably arranged at the outer ends of the godets. If the supply and discharge lines are provided in one face, they can each be connected with one common concentrically disposed line, one of these lines being arranged as a closed circuit line around the other.

A godet of simple design is obtained if the outer jacket is provided with a mounting flange or mounting cone and if the inner jacket is connected with, for example, welded, to the rear face, or made, for example cast, in one piece with that face. The front face of such a godet may consist of at least one disc which supports the inner jacket and the outer jacket and which closes the space between the inner jacket and the outer jacket at that side, possibly by means of an additional sealing element.

The straps which subdivide the space between the inner and the outer jacket into chambers may desirably consist of spring sheets which rest against the inner and outer jackets of the godet with an initial stress. For fixing the position of these spring sheets, at least one of these jackets is provided with grooves in which the spring sheets engage. It has been found to be of advantage if the spring sheets are designed as angles. With the aforementioned design, it is also possible to temper and/or to hard-chrome plate the outer godet jacket.

A tempering of the godet jacket offers the advantage that a creep of material underneath the chrome layer, as it is usually observed after a certain time of operation, is avoided. In case of a material creep, the chrome layer sags according to the cavity on the contact surface of the steel jacket. If drawing systems are involved, the yield point may be displaced due to these cavities around the godet. At these cavities the material is not heated up sufficiently and thus filament breaks in the thread might be the result. The filament breaks increase the danger of lapping. Also, the fiber properties, for example the affinity of fibers toward dyestuffs, which are widely influenced by the drawing process, may change. A thicker chrome layer is of little help. Moreover, a chrome layer which is only a tenth of a millimeter thicker is relatively expensive.

It has been found that it is sufficient to temper only the surface of the godet jacket. The tempering depth may be less than 3 mm., preferably about 1 to 2 mm. A flame tempering can be used. By such a tempering, a creep of the material beneath the hard-chrome plating is safely avoided. The thickness of the hard-chrome plating may be reduced to approximately half of the thickness of the chrome plating of a nontempered godet.

A tempered surface without hard-chrome plating is, in many cases, not sufficient. If the surface is only tempered, there is the danger that in case of laps, which are generally removed by means of knives or hooks, the tempered surface will be damaged. By tempering the godet surface and by subsequently hard-chrome plating it, all of these disadvantages are completely eliminated. Such godets cannot only be used for drawing systems and cylinder drying machines but also for washing machines and similar devices in which synthetic filament groups and/or tows are processed under tension.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only and thus are not limitative of the present invention and wherein,

FIG. 1 is a cross section of a godet;

FIG. 2 is a longitudinal section of the godet of FIG. 1 taken along line A–A; and

FIG. 3 is a section of the godet of FIG. 1 taken along line B–B.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals are used throughout the various views to designate like parts, the apparatus of the present invention comprises an outer jacket **1** with a mounting flange **2** in which borings **3** for screwing the godet to a bearing shaft (not shown) are provided. At a distance from the outer jacket **1** an inner jacket **4** is arranged which is connected with a face **5**. Between the outer jacket **1** and the inner jacket **4**, angular spring sheets **6** are arranged which subdivide the space between the two jackets into chambers **7**. The face **5** is provided with borings **8** and **9**. The borings **9** are connected with a concentric supply line **10** and the borings **8** are connected with a closed-circuit line **11**. The liquid or vaporous heat carrier is supplied through the line **10** and flows through the borings **9** into some of the chambers **7**. Here the heat carrier flows, as indicated by the arrows, to the other face and through openings **12** into the adjacent chamber. In the adjacent chamber the heat carrier flows back in the opposite direction to the side at which the bearings are arranged and through the borings **8** into the closed-circuit line **11** through which the cooled-down heat carrier is discharged. The front face of this godet consists of a disc **13** which is arranged in the inner jacket **4** and which is preferably welded to the inner jacket and of another disc or ring **14** which rests against the inner jacket **4** as well as against the outer jacket **1**. At this side, the chambers **7** are closed absolutely steamtight and liquidtight. In FIG. **3** the liquid flow through the individual chambers **7** is illustrated again.

The hard-chrome plated surface is marked with the numeral **15** in this example. In the case of a tempered godet, it is sufficient if the chrome layer is about 40 μm. thick, whereas the chrome layer of a nontempered godet usually has a thickness of about 70 μm.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be apparent to one skilled in the art are intended to be included.

We claim:

1. A godet which comprises a substantially cylindrical outer jacket and a substantially cylindrical inner jacket provided with a front wall face and a rear wall face, said outer and inner jackets defining an annular chamber therebetween, paraxially arranged means disposed in said annular chamber for subdividing the annular chamber into a plurality of chambers, at least two adjacent chambers communicating with each other at the front wall face of the godet, and at least one supply and discharge line associated with the chambers for the introduction and removal of a heat carrier, said supply and discharge lines communicating with said chambers at the rear wall face of the godet.

2. The godet of claim **1**, wherein the paraxially disposed means subdivides the annular chamber into at least six chambers, said chambers being provided with at least three supply lines and three discharge lines.

3. The godet of claim **1**, wherein the paraxially disposed means subdivides the annular chamber into twelve chambers with at least three supply lines and three discharge lines.

4. The godet of claim **1**, wherein the supply and discharge lines are provided in the rear face adjoining the bearing shaft.

5. The godet of claim **4**, wherein the supply and discharge means are connected at the rear face with one common coaxially disposed conduit means, one of said lines being arranged as a closed circuit line concentrically around said other line.

6. The godet of claim **1**, wherein the outer jacket is provided with a mounting flange at the rear wall face.

7. The godet of claim **6**, wherein the front face comprises at least one disc which supports the inner and outer jacket and which seals the space between said jackets at this side.

8. The godet of claim **7**, wherein the front face is provided with an additional disc which functions as an additional sealing element.

9. The godet of claim **1**, wherein the paraxially disposed means are resilient spring sheets which rest against the inner and outer jackets of the godet with an initial stress, at least one of said jackets being provided with grooves in which the spring sheets engage for fixing the position of the sheets.

10. The godet of claim **9**, wherein the spring sheets are designed as angles.

11. The godet of claim **1**, wherein the outer jacket is provided with a hard-chrome plating.

12. The godet of claim **11**, wherein the outer jacket is tempered before the hard-chrome plating is applied.

13. The godet of claim **12**, wherein the tempering depth is less than 3 mm.

14. The godet of claim **12**, wherein the tempering depth is about 1 to 2 mm.

15. The godet of claim **1**, wherein at least one supply and discharge line are associated with the respective adjacent chambers which are in communication with each other.

16. A godet which comprises a substantially cylindrical outer jacket containing a mounting flange and a substantially cylindrical inner jacket, said jackets being provided with a front wall face and a rear wall face, and said outer and inner jackets also defining an annular chamber therebetween, paraxially arranged means disposed in said annular chamber for subdividing the annular chamber into a plurality of chambers, at least two adjacent chambers communicating with each other at the front wall face of the godet, and at least one supply and discharge line associated with the chambers, said supply and discharge lines being disposed at the rear wall face of the godet.