

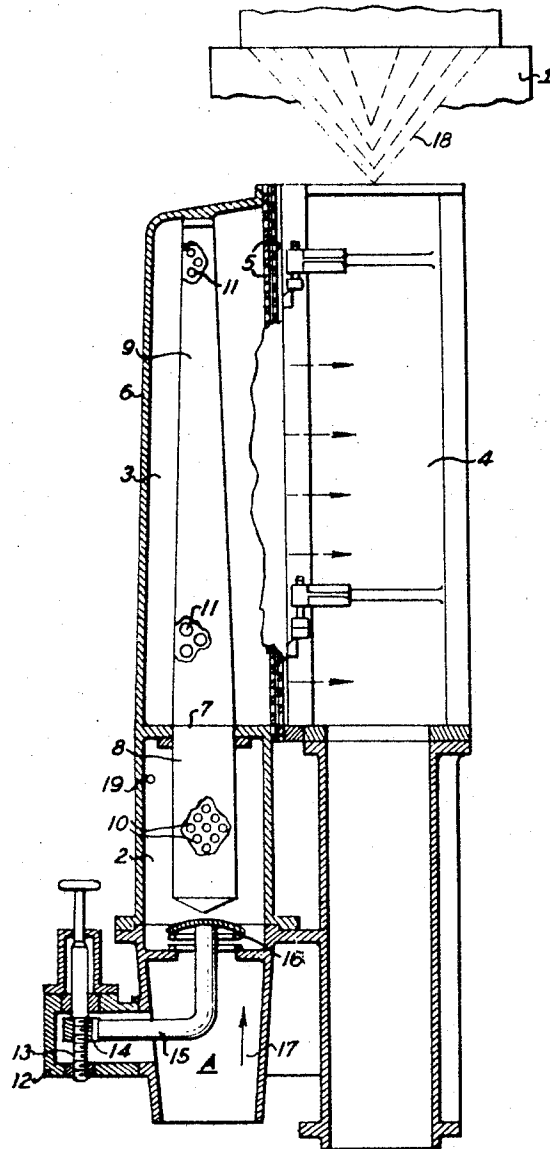
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CABINET FOR AIR-STREAM COOLING OF FILAMENT SPUN
FROM A POLYMERIC MELT IN A SPINNING MACHINE

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1

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CABINET FOR AIR-STREAM COOLING OF FILAMENT SPUN FROM A POLYMERIC MELT IN A SPINNING MACHINE

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5 Claims

ABSTRACT OF THE DISCLOSURE

A cabinet for air cooling filament spun from a polymeric melt, wherein the filament is passed through a cooling chamber which communicates with a pressure chamber via a perforate screen. A conduit is mounted inside the pressure chamber for feeding air into the cooling chamber, said conduit being provided with perforations in the portion of its surface which faces in a direction opposite the filament being spun. At least one auxiliary chamber is connected to the pressure chamber via the conduit for damping air-stream pulsation. The conduit is of variable cross-section and perforations in the pressure chamber diminish in size in a direction towards the spinning nozzle of the spinning machine. The portion of the conduit extending into the auxiliary chamber is of cylindrical construction and is perforated with holes of uniform size.

This invention relates to devices for filament formation and, more particularly, to cabinets for cooling filament by an air stream in the process of the formation thereof.

Prior art cabinets for cooling filament by an air-stream comprise a pressure chamber inside which a perforated cylindrical tube for air supply is provided, and a cooling chamber.

The known cabinets, however, are disadvantageous in that no provision is made therein for damping the air stream pulsation, moreover, they fail to provide a uniform air stream velocity over the entire height of the cooling chamber, which adversely affects the quality of the filament being spun, that is, it increases its irregularity with respect to count and reduces its tenacity.

Attempts to eliminate these disadvantages have not heretofore been effective.

It is an object of this invention to provide for damping of the air stream pulsation.

It is another object of this invention to provide a uniform air stream velocity over the entire height of the cooling chamber.

It is still another object of this invention to improve the quality of the filament being spun.

In the accomplishment of these and other objects of the invention, there is provided a cabinet for cooling filament by an air stream, which comprises a cooling chamber and a pressure chamber connected thereto and incorporating a perforated built-in conduit, an auxiliary chamber being connected to the pressure chamber through said conduit which is of variable cross-section and is perforated in its portion accommodated inside said auxiliary chamber.

It is expedient that the perforations in the conduit portion located inside the pressure chamber be of variable diameter so as to reduce in size towards the spinning nozzle of a spinning machine.

The aforesaid auxiliary chamber is equipped with a

2

valve to control the amount of air fed to the cooling chamber.

Said valve to control the air expenditure can be made in the form of an elastic spring whose lead can be smoothly varied by means of a lead screw.

For a complete understanding of the invention, a specific embodiment thereof will be described hereinbelow with reference to the appended drawing wherein a longitudinal sectional view of the cabinet according to the invention is shown.

A filament cooling cabinet according to the invention is installed on a spinning machine beyond a spinning nozzle 1, and consists of chambers 2 and 3 adapted for feeding air, and a cooling chamber 4 which is separated from chamber 3 by a screen 5.

Chambers 2 and 3 are accommodated in a common housing 6 and are separated from each other by a partition 7. The abovesaid chambers 2 and 3 are interconnected by means of a common conduit whose lower portion 8, which runs into chamber 2, is made cylindrical, while its upper portion 9 is tapered and extends into chamber 3.

Cylindrical portion 8 of said conduit is provided with holes 10 of equal diameter, spaced uniformly over the whole surface thereof.

Tapered portion 9 of the conduit is provided with holes 11 disposed only on the portion of the surface which faces the side opposite screens 5. Holes 11 vary in diameter and decrease in size in a direction from bottom to top over the entire height of the tapered portion 9 of the conduit to ensure a uniform air stream velocity through the entire height of cooling chamber 4.

The lower portion of chamber 2 is connected to a device 12 for regulating the rate of air feed to cooling chamber 4. Device 12 is constructed as a lead screw 13 on which is threaded a nut 14 coupled to an elastic spring 16 through a lever 15. Air is fed to chambers 2 and 3 from a common air main (not shown in the drawing), via a connection 17. The direction of air stream in the cabinet is indicated by arrow A.

The cabinet of the present invention functions as follows: Air from the main, having passed through connection 17 and between the coils of spring 16, is fed into chamber 2. While passing between the coils of spring 16, partial damping of the air stream pulsation takes place.

From chamber 2 the air stream runs via holes 10 into cylindrical portion 8 of the conduit, owing to which an additional damping of the air stream pulsation occurs. Thereupon, the partially dampened air stream is fed into tapered portion 9 of the conduit.

Upon escaping through holes 11, the air stream is reflected from the inner surface of housing 6 and passes through screens 5 into cooling chamber 4 where filament 18 is cooled. It is inside chamber 3 that the air pulsation is completely dampened and, owing to the appropriate arrangement of holes 11 and the variable cross-section of the conduit, a uniform exhaust velocity of the air streams is attained over the entire height of cooling chamber 4.

The quantity of air, fed into cooling chamber 4, is controlled by variation of the intercoil distance (i.e. the lead) of spring 16 by means of turning lead screw 13.

To control air expenditure, a pressure gage is connected to chamber 2 wherein an opening 19 is made for the purpose.

Thus, the cooling cabinet according to the invention makes it possible to obtain filaments of negligible irregularity with respect to count and of higher tenacity.

What we claim is:

1. A cabinet for air-stream cooling of filament spun from a polymeric melt in a spinning machine, comprising: a pressure chamber; a cooling chamber inside which filament is formed, said cooling chamber being coupled to

3

said pressure chamber; a means for interconnecting said pressure chamber and said cooling chamber; a conduit mounted inside said pressure chamber for feeding air into said cooling chamber, said conduit being provided with perforations in the portion of its surface which faces the side opposite the filament being spun; and at least one auxiliary chamber connected to said pressure chamber via said conduit for damping air stream pulsation; said conduit being of variable cross-section and its portion, extending into said auxiliary chamber, being provided with perforations.

2. A cabinet as claimed in claim 1, wherein the holes perforated in that portion of the conduit which is accommodated inside the pressure chamber are of variable diameter and diminish in size towards the spinning nozzle of the spinning machine.

3. A cabinet for air-stream cooling of filament spun from a polymeric melt in a spinning machine, comprising: a pressure chamber; a cooling chamber inside which filament is formed, said cooling chamber being coupled to said pressure chamber; a means for interconnecting said pressure chamber and said cooling chamber; a conduit mounted inside said pressure chamber for feeding air into said cooling chamber, said conduit being provided with perforations in that portion of its surface which faces the side opposite the filament being spun; at least one auxiliary chamber connected to said pressure chamber via said conduit for damping air stream pulsation; said conduit being of variable cross-section and its portion, extending into said auxiliary chamber, being provided with perforations; and means for regulating the amount of air stream fed into the cooling chamber, the latter said means being connected to said auxiliary chamber.

4. A cabinet for air-stream cooling of filament spun

4

from a polymeric melt in a spinning machine, comprising: a pressure chamber; a cooling chamber inside which filament is formed, said cooling chamber being coupled to said pressure chamber; a means for interconnecting said pressure chamber and said cooling chamber; a conduit mounted inside said pressure chamber for feeding air into said cooling chamber, said conduit being provided with perforations in that portion of its surface which faces the side opposite the filament being spun; the holes perforated in said portion of said conduit being made of variable diameter and reducing in size towards the spinning nozzle of the spinning machine; at least one auxiliary chamber coupled to said pressure chamber via said conduit for damping air stream pulsation; said conduit being of variable cross-section and its portion, extending into said auxiliary chamber, being provided with perforations; and means for regulating the amount of air fed into the cooling chamber, the latter said means being coupled to said auxiliary chamber.

5. A cabinet as claimed in claim 3, wherein the means for regulating the amount of air fed into the cooling chamber comprises an elastic spring, the lead of said spring being smoothly variable.

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