June 20, 1944. A. LODGE 2,351,772

SPINNING MACHINE

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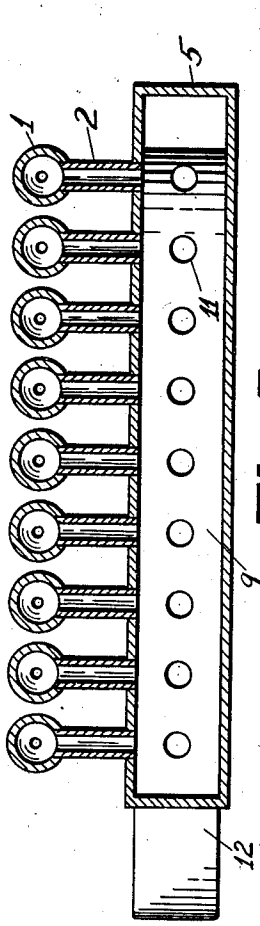


Fig-3.

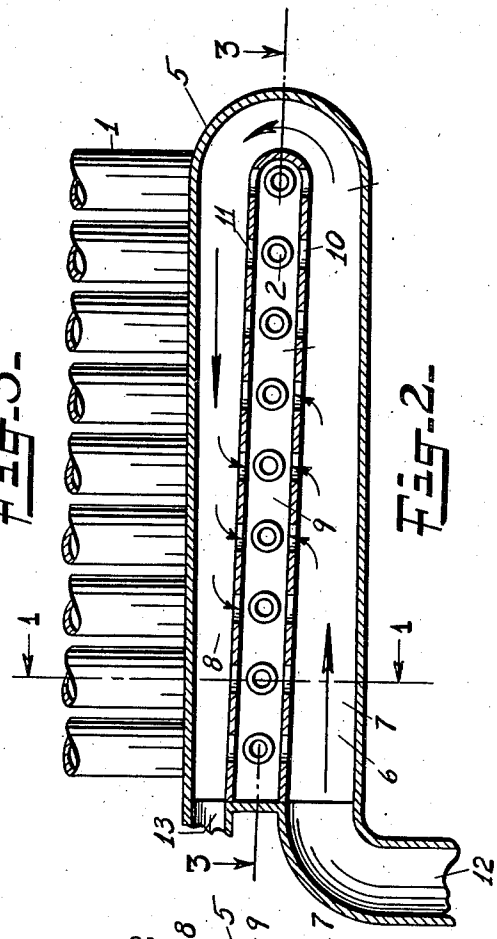


Fig-2.

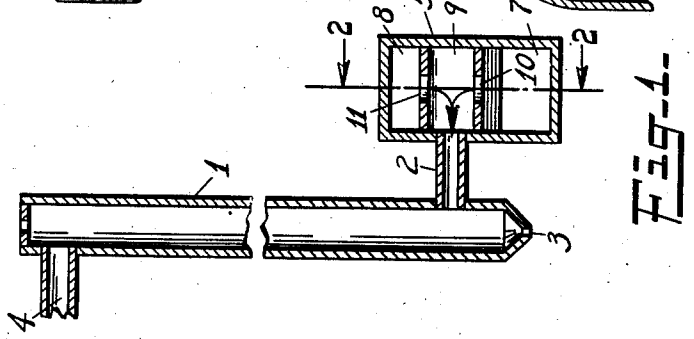


Fig-1.

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SPINNING MACHINE

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9 Claims. (Cl. 18—8)

This invention relates to improvements in spinning machines used in the formation of synthetic yarns and filaments by the dry spinning process. In the manufacture of synthetic yarns and filaments by the dry spinning process, a spinning solution is extruded into a spinning tube where the thread or filament is formed. A current of heated gaseous medium, usually air, is passed through the spinning tube during the spinning operation to remove the solvent as it is evaporated from the spinning solution. In commercial practice a large number or battery of spinning tubes is arranged in a spinning machine. In order to produce uniform yarn or filaments the temperature in the tubes and the amount of gaseous medium passing through the tubes must be maintained uniform. The tubes are heated by a heating jacket surrounding the tubes containing a heating medium or by preheating the gaseous medium passing through the tubes.

This invention has for its principal object to provide improvements in dry spinning machines whereby the conditions in the spinning tubes may be maintained uniform.

Another object of the invention is to provide improvements in means for introducing preheated gaseous medium into the spinning tubes of a dry spinning machine.

A further object of the invention is to provide improvements in means for introducing a uniform amount of preheated gaseous medium, at a uniform temperature, into each of the spinning tubes of a dry spinning machine.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawing.

In the drawing

Figure 1 is a vertical sectional view of a preferred embodiment of the invention taken on the line 1—1 in Figure 2.

Figure 2 is a vertical sectional view taken on the line 2—2 in Figure 1.

Figure 3 is a sectional view taken on the line 3—3 in Figure 2.

Where a preheated gaseous medium is distributed to the tubes of a dry spinning machine by the ordinary form of a manifold the temperature of the gaseous medium decreases as it flows through the manifold and it is not possible to introduce the gaseous medium into all the tubes at the same temperature. In accordance with the present invention, preheated gaseous medium is passed to a dry spinning machine through a long duct and is withdrawn from the duct through a plurality of openings spaced along the duct. Gaseous medium withdrawn from portions of the duct at a higher temperature is mixed with gaseous medium withdrawn from portions of the duct at a lower temperature and is introduced into the tubes of the spinning machine at a mean temperature. In a preferred embodiment of the invention, the gaseous medium is withdrawn from the openings positioned nearest the inlet end of the duct where the temperature is highest and is mixed with gaseous medium withdrawn from openings farthest from the inlet end where the temperature is lowest before being introduced into the spinning tubes.

Referring to the drawing, reference character 1 indicates one of a plurality or battery of spinning tubes arranged in a dry spinning machine. The spinning tubes are of the conventional type in each of which a spinneret is arranged adjacent the top and the yarn or filament that is formed is withdrawn through the opening 3 at the bottom. Preheated air or other gaseous medium is introduced into the spinning tubes through the pipes 2 positioned adjacent the bottom and is withdrawn through the pipes 4 positioned adjacent the top. The preheated air is distributed to the spinning tubes by the manifold generally indicated by reference character 5. The manifold comprises the continuous duct 6 having the portions 7 and 8 which communicate with the intermediate chamber 9 through the plurality of oppositely spaced openings 10 and 11 positioned along the length of the intermediate chamber. The pipes 2 are connected to the intermediate chamber through the sidewall at positions midway between the openings 10 and 11. The cross-sectional area of the duct gradually diminishes so that the velocity of the air passing through the duct will be substantially uniform and substantially the same quantity of air will pass through each of the openings 10 and 11, the duct being sufficiently large in cross-section so that the pressure drop in the duct is small in comparison with the absolute pressure.

In the operation of the invention, air or other gaseous medium, preheated to a temperature above the temperature that is desired in the spinning tubes, is introduced into the inlet 12 of the duct and passes from the portions 7 and 8 of the duct through the openings 10 and 11 to the intermediate chamber and from there through the pipes 2 to the spinning tubes. Any excess air is discharged from the duct through the outlet 13 and after reheating may be recirculated to the inlet end of the duct. As the air

passes through the duct it becomes cooled so that that in the portion 8 is at a lower temperature than that in the portion 7. Air from portions 7 and 8 of the duct on entering the intermediate chamber becomes mixed and the temperature of the air throughout the intermediate chamber is substantially uniform and enters all the spinning tubes at substantially the same temperature. As the static pressure of the air in the duct is substantially uniform throughout its length, substantially the same quantity of air flows into each of the spinning tubes. A plurality of small chambers, each communicating with a pair of openings 10 and 11, and a pipe 2 may be employed instead of the single intermediate chamber or each pair of openings 10 and 11 may lead directly into a pipe 2.

While a preferred embodiment of the invention has been shown, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing a gaseous medium to the spinning tubes, said system comprising two channel portions extending substantially from the first to the last of the spinning tubes, inlet means for introducing the medium into the channel portions so that it flows in one direction in one of the channel portions and in an opposite direction in the other, a plurality of outlets spaced along both channel portions, means for introducing the medium discharged from neighboring outlets of the two channel portions into the respective spinning tubes, and means for commingling the medium from the two channel portions prior to introduction into the spinning tubes.

2. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing a gaseous medium to the spinning tubes, said system comprising two channel portions extending substantially from the first to the last of the spinning tubes, inlet means for introducing the medium into the channel portions so that it flows in one direction in one of the channel portions and in an opposite direction in the other, a chamber intermediate of the two channel portions, a plurality of outlets spaced along both channel portions and communicating with the intermediate chamber, and spaced conduits connected to the intermediate chamber and to the respective spinning tubes.

3. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing gaseous medium to the spinning tubes, said system comprising two channel portions extending substantially from the first to the last of the spinning tubes, having decreasing cross-sectional areas, and arranged with the direction of decreasing area of one opposite to that of the other, inlet means for introducing the medium into the large ends of the channel portions, a plurality of outlets spaced along both channel portions, means for introducing the gaseous medium discharged from neighboring outlets of the two channel portions into the respective spinning tubes and means for commingling the medium from the two channel portions prior to introduction into the spinning tubes.

4. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing gaseous medium to the spinning tubes, said system comprising two channel portions extending substantially from the first to the last of the spinning tubes, having gradually decreasing cross-sectional areas, and arranged with the direction of decreasing area of one opposite to that of the other, inlet means for introducing the medium into the large ends of the channel portions, a plurality of outlets spaced along both channel portions and communicating with a common chamber, and conduit means connected to the chamber at spaced points therealong and to the respective spinning tubes.

5. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing gaseous medium to the spinning tubes, said system comprising two generally parallel channel portions extending alongside the spinning tubes, having gradually decreasing cross-sectional areas, and arranged with the direction of decreasing area of one opposite to that of the other, inlet means for introducing the medium into the large ends of the channel portions, a plurality of outlets spaced along both channel portions and communicating with a common intermediate chamber, and conduit means connected to the chamber at spaced points therealong and to the respective spinning tubes.

6. A spinning machine comprising a plurality of spinning tubes and a duct system for distributing gaseous medium to the spinning tubes, said system comprising a duct of decreasing cross-sectional area and turned back on itself to provide two generally parallel channel portions with the small end of the second portion opposite the large end of the first portion, an inlet for the medium at the large end of the duct, a chamber intermediate the two portions of the duct, outlets spaced along the two portions of the duct and communicating with the intermediate chamber, and spaced conduits connected to the intermediate chamber and to the respective spinning tubes.

7. A method of distributing a preheated gaseous medium to a plurality of positions comprising passing the medium in opposite directions through two neighboring channel portions, withdrawing gaseous medium from adjacent points of the two channel portions at spaced intervals therealong, commingling the medium thus withdrawn from the two channel portions at each interval and conducting the commingled medium to the respective positions of distribution.

8. A method of distributing a preheated gaseous medium to a plurality of positions comprising passing the medium in opposite directions through two neighboring channel portions having decreasing cross-section in the direction of flow, withdrawing gaseous medium from adjacent points of the two channel portions at spaced intervals therealong, commingling the medium thus withdrawn from the two channel portions at each interval and conducting the commingled medium to the respective positions of distribution.

9. A method of distributing a preheated gaseous medium to a plurality of spinning positions comprising passing the medium in opposite directions through two neighboring channel portions having decreasing cross-section in the direction of flow, withdrawing gaseous medium from adjacent points of the two channel portions at spaced intervals therealong, commingling the medium thus withdrawn from the two channel portions at each interval and conducting the commingled medium to the respective spinning positions.

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