June 23, 1970 W. KELLER 3,516,119

SPINNING DEVICE

Filed May 10, 1968

FIG. 1

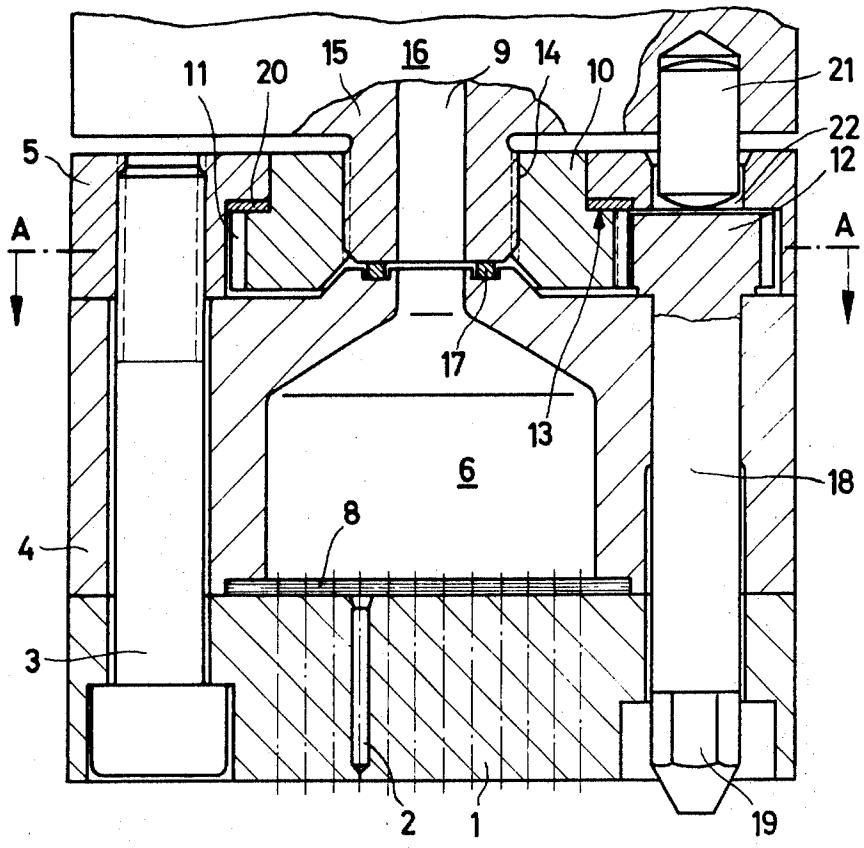
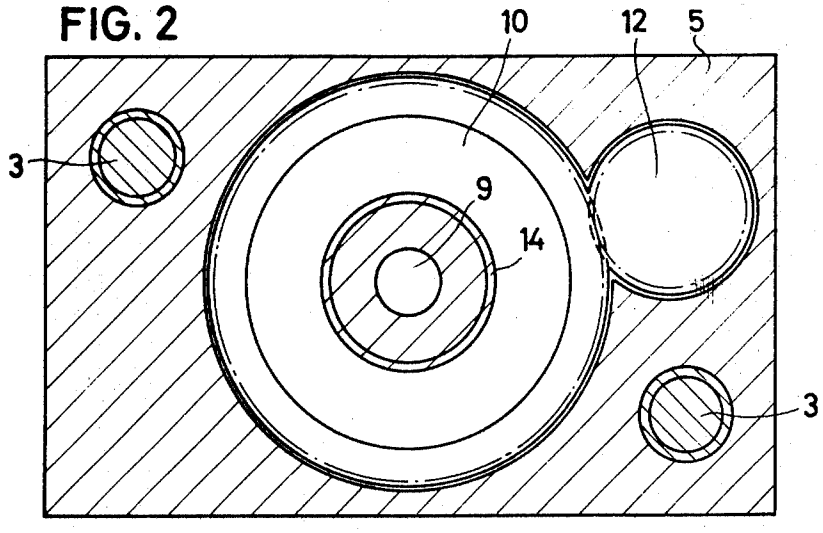


FIG. 2



INVENTOR.

BY WILLI KELLER

Bair, Freeman & Molinare

Attys.

United States Patent Office 3,516,119 Patented June 23, 1970

3,516,119

SPINNING DEVICE

Willi Keller, Offenbach am Main, Germany, assignor to Vickers-Zimmer Aktiengesellschaft Planung und Bau von Industrieanlagen

Filed May 10, 1968, Ser. No. 728,119
Claims priority, application Germany, May 22, 1967, V 33,693
Int. Cl. D01d 3/00
U.S. Cl. 18—8 6 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a spinning apparatus for the manufacture of synthetic fibers and the like from molten synthetic polymers. The spinning apparatus has an outlet for the molten synthetic material to be spun and a nozzle block operatively attached to the outlet. The nozzle block comprises a cover plate, a filter casing, and a nozzle plate, which are secured together, respectively, by a securing means. A rotatable threaded annular sleeve means is seated and retained in a recess in the cover plate. A rotating means is provided in the nozzle block for rotating the annular sleeve means which has threads on its inner annular surface to thereby secure the nozzle block to the outlet for the molten synthetic material.

The present invention relates to a nozzle block for a spinning apparatus for synthetic fibers or threads. More particularly, the present invention relates to a nozzle block which is made of spining nozzle plate, nozzle plate holder, filter casing and filter insets, which are structurally united and in which the nozzle block has feed bore for the spinning fluid.

The invention has as its underlying object the rapid mounting and dismounting of nozzle blocks of every kind. The rapid mounting and dismounting of nozzle blocks are necessary in maintenance and cleaning operations on the nozzles and on the filter inset. They are also of importance in the changing of the nozzles in a spinning apparatus to other and different nozzles.

It is a known practice in the art to group nozzle plate, filter and nozzle plate holders or filter casing together into a nozzle block which is fastened by means of a screw threaded to the spinning apparatus. However, such a practice presumes that the entire nozzle block is turnable or rotatable for the purpose of mounting or assembly. The turning of a nozzle block requires sufficient free working space around the nozzle block for the employment of a tool to apply a considerable torque needed for the turning of the great screw thread diameter. Moreover, such a construction is undesirable since the end position of the nozzle block and thus the angular position of the threads with respect to the blast air direction are not predeterminable. In order to remedy these drawbacks it has been proposed to provide a bayonet fastening instead of the screw thread. In such proposed construction after the end position of the bayonet claws has been reached, axial contact pressure and sealing forces are provided by several pressure screws distributed over the circumference of the bayonet ring. Such an arrangement likewise results in a considerable space requirement and, in addition, has the disadvantage that when the pressure screws or set screws are unevenly tightened, the nozzle plate would be crookedly set, whereby a reliable sealing between nozzle block and spinning heat is no longer assured.

It is also known to provide a nozzle block which is installed, together with the spinning pump, into the spinning apparatus through an opening at the top of the spinning apparatus. In such an embodiment, the seal between the lateral feed line and the nozzle block for the spinning melt is accomplished by lateral shifting of the nozzle block. Such a construction is not only expansive but also requires that the space above the nozzle block be freely accessible. Consequently, such a spinning device is constructed with a very large width, which is incompatible with the requirement of accommodating an ever increasing number of nozzle blocks on thet smallest possible floor area.

It is, therefore, an object of the present invention to provide a novel and improved nozzle block for spinning apparatus of synthetic fibers.

It is another object of the present invention to provide a nozzle block which avoids the disadvantages associated with the known prior art devices.

Still further objects may be gathered from a reading of the following description and claims.

In accordance with the invention, a nozzle block is provided wherein the feed bore is surrounded by a threaded sleeve carried in the nozzle block. The sleeve is attachable to the stationary part of the spinning apparatus by screwing and it is provided with a rotary means so that the sleeve can be rotated with respect to the nozzle block.

The nozzle blocks of the present invention can be made in an extraordinarily space-saving manner. It requires accessibility to the spinning apparatus from one side only, preferably from below since this space must be in any case kept free for the spinning shaft. The spinning is accomplished without rotary movement of the nozzle block, so that a plurality of rectangular nozzle blocks can be arranged adjacent each other to take up the least amount of space. The position of these nozzle blocks is also exactly predeterminable. Preferably, a rotary movement of the nozzle block is prevented or rendered impossible by a twist guard. A serial arrangement of the nozzle blocks of the invention without interspace is possible, particularly according to a further feature of the invention wherein the threaded sleeve is provided with a toothed rim which is in engagement with a pinion. The pinion has a drive shaft, housed in the nozzle block, with an end which is positioned to be accessible from the underside of the nozzle block and is equipped to receive a tool.

The nozzle block according to the invention can always be screwed into position in a perfectly straight manner since it has only a single, central clamping or fastening element in the form of the threaded sleeve.

Finally, the axial forces, which are necessary to obtain a sufficient sealing effect when the spinning melt is subjected to pressures up to 300 atmospheres, can be easily provided in accordance with a further feature of the invention wherein the toothed rim has a larger diameter than the pinion, so that a force translation is present.

An example of the apparatus of the invention will be explained below in further detail with the aid of FIGS. 1 and 2 wherein:

FIG. 1 shows a longitudinal section view through a nozzle block of the present invention; and

FIG. 2 shows a cross section through the nozzle block of FIG. 1 along line A—A.

In FIG. 1, 1 is a spinning nozzle plate having spinning nozzles 2. Only one spinning nozzle is shown in the drawing for the purposes of clarity and simplicity. The spinning nozzle plate is pressed, by means of the screws 3 against the filter casing 4 and secured to a cover plate 5. Filter casing 4 and cover plate 5 together form the so-called nozzle plate holder. The filter casing 4 contains a filter chamber 6, in which a wire screen 8 is located. Wire screen 8 serves as a carrier of a loose filter material such as, for example, sand. The wire screen 8 not only serves

as a carrier for the loose filter material but also as a means for obtaining a uniform flow of the spinning fluid across the nozzle block. The spinning fluid is supplied to the filter chamber through a feed bore **9**. The cover plate **5** has recesses for housing an annular threaded sleeve **10**. A toothed rim **11**, in engagement with a pinion **12**, forms a part of the threaded sleeve and is located at the outer circumference thereof. A circular annular surface **13** serves as pressure or bearing support for the absorption of the axial forces of the threaded sleeve, which by means of its inside thread **14** stands in engagement with a threaded connecting element **15** on the stationary element **16** of the spinning apparatus. The counter-support for the circular annular surface **13** can consist of a wearproof material which can be in the form of a bearing ring **20** on the cover plate **5**. The seal between the threaded connecting element **15** and the filter casing **4** is provided by a packing ring **17**.

The pinion **12** has a shaft **18** which is carried in the filter casing **4**. The lower end **19** of shaft **18** is in the shape of a hexagon for engagement with a tool. A pin **21** is secured to the stationary element **16**, and it is seated in a bore **22** in the cover plate **5** to prevent any twisting of the nozzle block.

The manner of assembling the nozzle block according to the invention is as follows:

Before assembling the nozzle block of the invention, the threaded sleeve **10** and the threaded connecting element **15** are out of engagement. The nozzle block as a unit is pushed toward the stationary element **16** of the spinning apparatus until the first part of thread **14** is in touch with thread connecting element **15**. The pinion **12** is then rotated through its shaft **18** by means of a wrench or an electric screwer. The rotating pinion carries the toothed rim **11** of the threaded sleeve in rotation to screw the threaded sleeve onto the counterthread of element **15** and thus tightens the nozzle block against the stationary element **16** of the spinning apparatus. This rotating motion is continued until the filter casing **4** comes to bear on the sealing ring or washer **17** on the threaded connecting element **15** with a sufficiently high sealing force. Such a sealing force can be easily obtained, for example, by a torque wrench.

It is, of course, possible to place the inside thread on the stationary element **16** and the outside thread on the threaded sleeve **10**. It is also within the scope of the invention to replace the toothed rim and pinion by a pair of cooperating elements consisting of worm wheel and worm, bevel wheels or bellwheel pinion. Similarly, it is possible to delete pinion **12** and shaft **18** if, instead of the toothed rim **11**, there are provided holes for the insertion of a lever, and a recess in the nozzle block which permits the swinging and reinsertion of the lever. However, the embodiment shown in the drawing represents the preferred form possessing a maximum of advantages, especially with respect to its minimum space requirement and shortest assembling times.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

What is claimed is:

1. In a spinning apparatus for the manufacture of synthetic fibers and the like from molten synthetic polymers, in combination, a nozzle block and an outlet means for said molten synthetic polymers on said spinning apparatus; said outlet means having screw-type threads on its exterior surface for engagement with said nozzle block; said nozzle block comprising a cover plate, a filter casing, a nozzle plate, a rotatable threaded annular sleeve means, rotating means in said nozzle block for engaging and rotating said annular sleeve means, and a securing means; said annular sleeve means having screw-type threads on its inner surface engaged with the threads on said outlet means; said cover plate having a recess therein for housing and retaining said annular sleeve means but permitting rotation and threading engagement of said annular sleeve means with said outlet means; said nozzle block being assembled by securing said cover plate, filter casing and nozzle plate, respectively, together with said securing means after said annular sleeve means and rotating means have been placed in their positions within said nozzle block; said assembled nozzle block being attached to said outlet means by rotating said annular sleeve means to cause the block to be drawn into tight engagement with the outlet means.

2. The apparatus of claim **1** further comprising a twist preventing means connected to said nozzle block and a stationary portion of said apparatus to prevent relative twisting movement between said nozzle block and said stationary portions.

3. The apparatus of claim **1** wherein said annular sleeve means having a toothed rim on its exterior surface, said rotating means being a pinion mounted on a shaft extending externally of said nozzle block, said pinion being in engagement with said toothed rim, the external end of said shaft being shaped to receive a tool for the rotation of said pinion.

4. The apparatus of claim **3** wherein said external end of said shaft being located at a point below said nozzle block in the apparatus.

5. The apparatus of claim **3** wherein said toothed rim having a diameter larger than that of said pinion.

6. The apparatus of claim **3** wherein said annular sleeve means having a bearing surface for bearing against the retaining portion of said cover plate.

References Cited

UNITED STATES PATENTS

2,792,122	5/1957	Munch et al.	18—8 X
3,461,493	8/1969	Lassman	18—8

FOREIGN PATENTS

1,406,347	6/1965	France.	

WILBUR L. McBAY, Primary Examiner

U.S. Cl. X.R.

18—12