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Lenk et al.

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[54] SPINNING APPARATUS COMPOSED OF MODULAR SPINNING UNITS ON COMMON HEATING BEAM

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[56] References Cited

UNITED STATES PATENTS

2,841,821 7/1958 Phipps 18/8 A

3,466,357	9/1969	Schippers et al.	164/176 F
2,683,073	7/1954	Pierce.....	264/176 F X
3,272,901	9/1966	Sims.....	18/8 A X

FOREIGN PATENTS OR APPLICATIONS

1,486,232 7/1965 France..... 264/176 F

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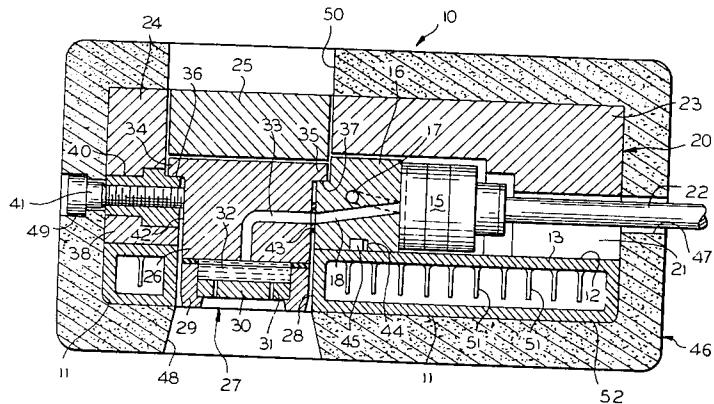
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[57]

ABSTRACT

Elongated spinning beam with elongated, hollow heating member of flat, L- or U-cross section having removable mounted thereon a plurality of side-by-side melt spinning units, each having block-like units of pumps, spinning nozzle packs, and melt-conveying connecting units; interposed block-like members with melt distribution lines including stopcocks for supplying melt along the beam to respective pumps; and upper heat-conductive distributor plates or bars above the pumps and nozzle packs for uniform heat distribution within an encapsulating, heat insulating jacket.

10 Claims, 5 Drawing Figures



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SHEET 1 OF 2

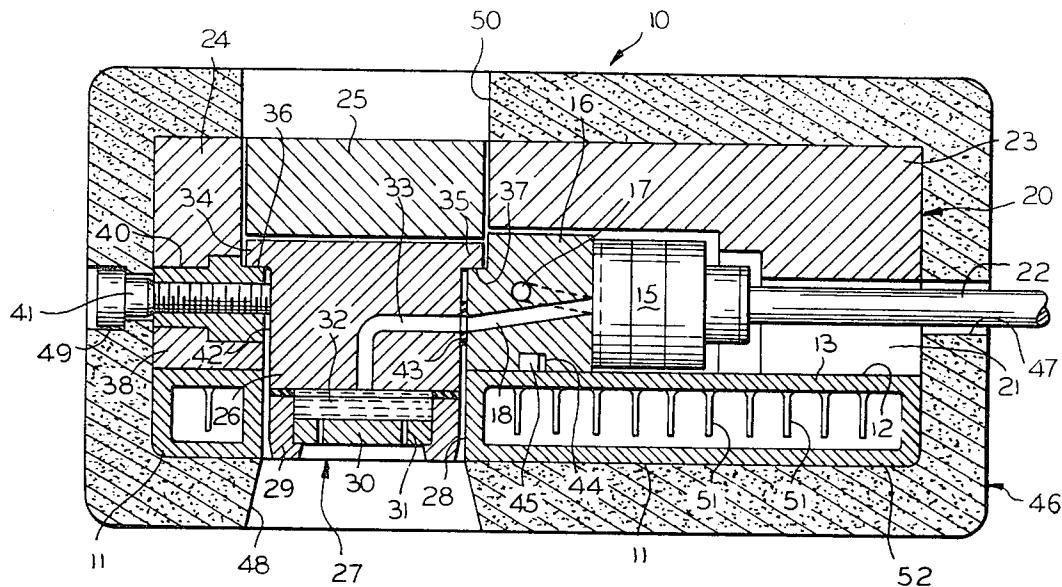


FIG.1

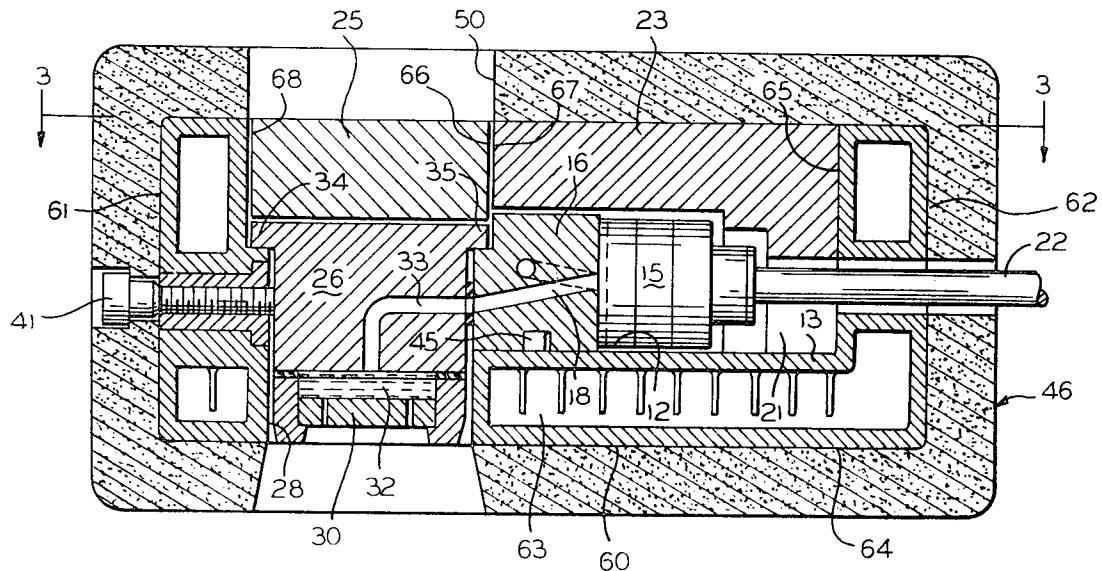


FIG.2

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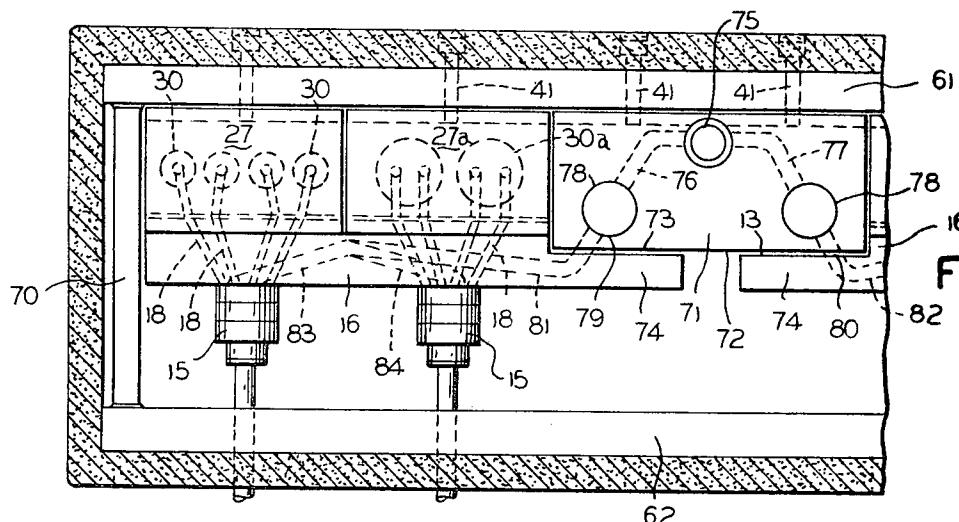


FIG. 3

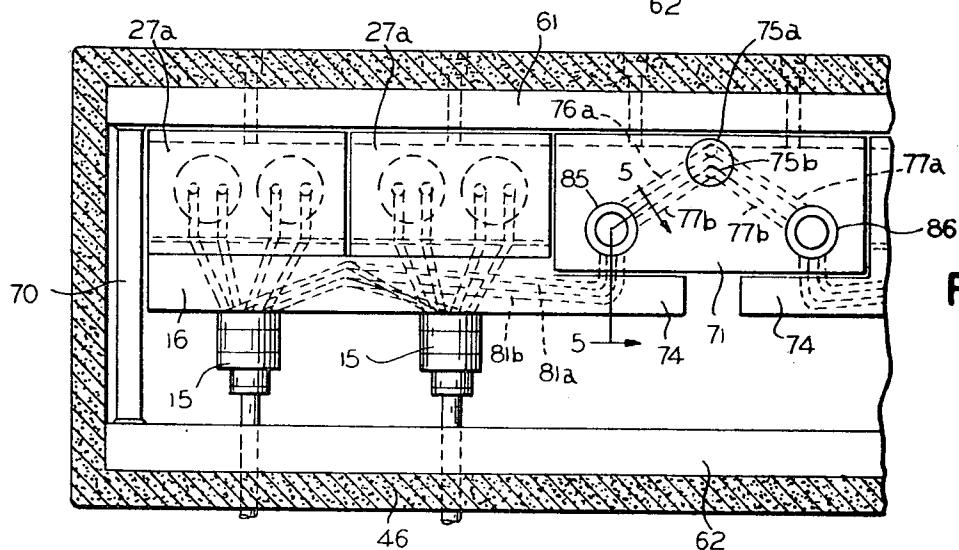
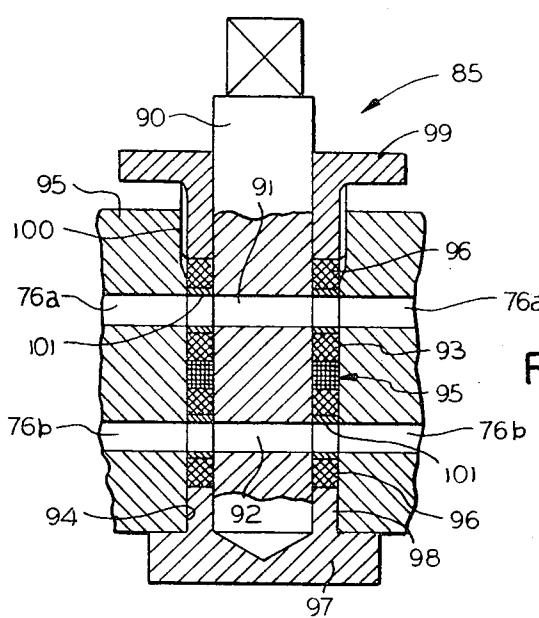


FIG. 4



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SPINNING APPARATUS COMPOSED OF MODULAR SPINNING UNITS ON COMMON HEATING BEAM

INTRODUCTION

In the spinning of filaments or like structures of synthetic polymers by the melt spinning process, the starting polymer, at first solid, is converted by heating into the molten state and thereupon supplied in a suitable manner to the spinning device proper. Known spinning devices have an elongated beam in which there are arranged numerous nozzle plates as well as the associated spinning pumps, distributor lines, blocking stop-cocks and the like. In order to avoid the solidification of the melt in the spinning units, several heating chambers are generally installed along the entire beam. They are heated in a suitable manner, mostly with the aid of a vaporous heat-transfer agent, to an elevated temperature which is governed according to the nature of the polymer to be spun and lies generally on the order of magnitude from about 250° to 310° C. The individual parts requisite for the functioning of such a known spinning beam are arranged in interfitting blocks, which can be inserted in the beam in the particular assembly desired. In such arrangement they are securely pressed against one another with the aid of clamping screws, so that the heat proceeding from the heating chambers is transmitted from block to block by conduction. Devices of this type are described, for example, in German published application 1,273,174 as well as in U.S. Pat. No. 2,841,821.

The production of such known spinning beams presents difficulties in two respects. In the first place, for as uniform as possible a heat transfer from the heating chambers to the other parts, it is important that the surfaces lying flat against one another be tooled as smoothly as possible and be planar. This requirement is by nature all the more difficult to fulfill the greater and the more complicated are the parts to be tooled. This means that the greatest difficulties from the viewpoint of machining technology arise, as a rule, in the heating chambers which extend through the spinning beam over its entire length. Precisely these parts, however, in the known devices are complicated in shape and frequently have inaccessible corners and edges.

In order to achieve the homogeneity of temperature profile sought in the entire spinning beam, it is not only necessary, however, that the surfaces of the parts lying against one another be as smooth and flat as possible, but it is also essential that all the melt-conducting parts derive their heat as directly as possible from the heating chamber, and that the possibilities for uncontrolled heat radiation be as small as possible. Also in this respect the known devices have appreciable shortcomings. Additionally these devices, in consequence of their complicated construction, have numerous packets in which melt residues can lodge. These residue deposits, on the one hand, impair heat transfer and, on the other hand, also cause sticking of the individual blocks to each other or to other parts in the beam. Both are to a considerable degree troublesome for the practical use. As a rule they make it necessary to bring to a stop spinning in the particular spinning block and to disassemble the block for cleaning the individual parts carefully, for example, by washing with solvents.

With this state of technology there exists the problem of providing a spinning beam of the above-described type, which is distinguished by as simple as possible a design embodying easily machinable shapes of the individual parts, including the heating chambers, and in which all the parts coming in contact with the melt are insofar as possible at the same temperature during the melt spinning operation.

THE INVENTION HEREIN

This problem is solved according to the invention by a heatable spinning beam with several snugly fitting unit blocks in snug, heat-conducting contact with the next adjacent block. Preferably, the blocks are pressed together by clamping screws. The blocks contain nozzle packs, melt passage lines,

spinning pumps, blocking stopcocks and the like, some of which blocks may be space-filling and heat-conducting bodies. The spinning beam takes the form of a plate or of an L-shaped or U-shaped profile and preferably is complemented by a superimposed heat-conducting plate to form a closed hollow assembly. The base of the beam is constructed as a hollow body for flow of the heating medium. On its upper, planar surface lie the individual unit blocks with large, heat-transfer, contact surfaces. The spinning beam is encapsulated on all sides, in a manner known in itself, with an insulating shell or jacket.

The heatable part of the spinning beam preferably is a double-walled, elongated, hollow member carrying the unit blocks on its planar, upper surface. It has openings for the reception of nozzle packs. If desired, this member may have heated or unheated side legs forming an L- or U-profile or cross section. In this spinning beam concept, therefore, it is not the case that one or more heating chambers are arranged with more or less complicatedly formed contact surfaces, which permeate or

pass through the heating beam and which are arranged between the individual unit parts. Rather, the invention provides a base plate or member which is heated and from which the heat is in each case directly transferred by conductance into the unit blocks mounted on it. Only the nozzle pack unit

blocks are not mounted directly on the upper surface of the heating plate. By their nature, they have to be mounted in or above the openings required for filament passage. It has proved, however, that this is of no significance for the even temperature distribution needed during the spinning operation.

The base plate or member can be machined in a simple manner by milling and polishing, without its presenting inaccessible corners and edges into which the tools cannot be introduced. In this simple and clear basic concept nothing is changed wherein the heating plate has heated or unheated side legs forming an L- or U-profile. The heating of the plate takes place in a manner known per se by introduction of a liquid or, better, a vaporous heat-transfer medium, for example, an azeotropic mixture of diphenyl and diphenyl ether, which has proved itself well for such purposes.

In order to assure a faultless transfer of the condensation heat of the heat-transfer medium to the heating chamber walls and, in particular, to prevent liquid condensate from accumulating with drop formation on the horizontal upper wall of the heating plate and in this way disturbing the uniform temperature profile, the interior of the double-walled heating plate, preferably on its upper horizontal wall, is provided with ribs extending far into the hollow space and connected with good heat conduction with the upper wall. These ribs act, on the one hand, as enlargement of the wall surface, but, above all, serve as lead-offs for the condensate so that the film forming on the upper wall has a constant minimal thickness.

In a preferred form of the invention, the unit blocks containing the spinning pumps and the product lines lie on the smooth, planar, upper surface of the heating plate. These as well as the unit blocks containing the nozzle packs are covered with a heat-conducting bridge which is indirectly in contact with the heating plate via interchangeable filler pieces or directly in contact with the heating plate. Such a heat-conducting bridge, which can extend the entire length of the spinning beam or be built up of a number of parts arranged adjacently, consists advantageously of a material with good heat-conducting properties, for example, aluminum, copper, a suitable copper alloy or the like. The heat-conducting bridge should cover the heating plate surface over as large an area as possible, so that the heat can be conducted through the unit blocks. The bridge must in no case itself rest on the unit blocks

in heat-conducting contact, but must merely assure that between the heat-conducting bridge itself and the unit blocks there exists no temperature difference or only as slight as possible to a temperature difference, whereby heat radiation from these unit blocks to the surrounding environment is minimal.

In spinning beams of the type herein, it is advantageous to be able to change the nozzle packs as easily and as rapidly as possible. For this purpose, it is most advantageous to aperture the heat-conducting bridge in the zone of the nozzle pack and to plug it by a correspondingly formed filler piece. The unit blocks containing the nozzle pack are formed in such a way that they are insertable from above into the opening of the heating plate and are seated by shoulders on opposite sides of the opening. These shoulders are disposed, at least on the side of the melt passages above these passages and rest on the shoulders of the adjacent unit blocks or a vertical leg of the heating bar. In this manner it is assured that melt can never pass into the zone of the heating plate supporting surfaces during the changing of the nozzle pack, so that the unit blocks are always easily removable and will not stick. By contact with adjacent unit blocks, heat flow into the nozzle pack unit block is assured. This is important, since the nozzle packs, unlike the other unit blocks, do not rest directly on the surface of the heating plate.

In order still better to fulfill the requirement for easy interchangeability and assurance against sticking of the unit blocks, especially of the nozzle packs, the unit blocks containing the nozzle packs fit with lateral play into the openings of the heating plate and are pressable, preferably with interposition of packings, against the unit blocks containing the melt supply passages. In this arrangement the latter blocks are held, for example, by ribs on the heating plate. This expedient has the advantage that very great contact pressures can be applied to the nozzle packs without transmittal of these forces against the more delicate spinning pumps.

Further, the invention provides distributor blocks between one or more unit blocks containing the melt passages. The distributor blocks contain melt passages, preferably for each connected unit block, a stopcock of their own and are connected with a melt supply source via a preferably flexible conduit. Such additional distributor unit blocks make possible the stopping of individual spinning pumps or spinning pump groups by themselves and to change these parts, if need be, for others. Such a measure can become necessary if malfunctions, for example coggings have occurred in one or in several nozzle packs, whereby the heat flow and melt flow of the device is disturbed.

In order to assure as universal as possible a utility of the spinning beam according to the invention, each nozzle pack, independently of the number of nozzle plates contained in it, contains as many melt passage connections with the melt supply unit blocks as corresponds to the highest number of nozzle plates to be accommodated in a nozzle pack. In the case in which a smaller number of nozzle plates is contained in a nozzle pack, two or more melt passages lead to a manifold space of a nozzle plate. The reason for this arrangement is that the individual nozzle packs are interchangeable for one another directly, independently of the number of nozzle plates contained in them, and, namely, without disturbance of the melt flow in the overall beam. If, for example, a nozzle pack with four small nozzle plates is changed for another which contains only two larger nozzle plates, the melt flow to other spinning packs need not be stopped. Two melt supply passages feed into a common manifold space of a nozzle plate. The junction points of the melt flow passages in both of the nozzle pack and also of the melt supply unit blocks are arranged with predetermined constant spacing, so that they always align with one another, independently of the nozzle plate type chosen.

It has proven that the spinning beam of the invention, in consequence of its stable heat economy, can be operated with certainty even under extremely unfavorable conditions. It can be used especially even in cases in which high demands have to be made on the heat capacity of the device. This is the case, for example, in two-component spinning or generally in multicomponent spinning. Hence in further development of the invention, the melt-conducting unit blocks have in each case two or more melt passages independent of one another. In order also in these cases to be able to change individual unit

blocks or unit block groups rapidly and without disturbance of the adjoining systems, the stopcocks arranged in the blocking unit blocks are preferably designed as double or multiple stopcocks for the simultaneous blocking of flow of all the components.

THE DRAWINGS

Preferred embodiments of the invention are illustrated in the drawings wherein:

FIG. 1 is a transverse, vertical section through one form of spinning beam having a flat, double-wall, hollow heating member;

FIG. 2 is a similar section through a second embodiment having a hollow heating member of U-shaped, transverse cross section;

FIG. 3 is a top plan view of the embodiment of FIG. 2 as viewed from plane 3—3 of FIG. 2 and with the heat distributor member removed for greater clarity;

FIG. 4 is a similar top plan view to FIG. 3 of another embodiment having melt passages for supplying two melt components to each respective spinning plate; and

FIG. 5 is a vertical section of a double stopcock taken on section plane 5—5 of FIG. 4.

THE PREFERRED EMBODIMENTS

Referring to the drawings, the elongated spinning beam 10 of FIG. 1 has as its main supporting member an elongated, substantially flat, double-walled, hollow plate or bar 11. The upper surface 12 of its top wall 13 is substantially planar. The upper surface supports the spinning pump block unit 15 and a melt supply and discharge block 16 containing within the metal block a melt supply passage 17 and a melt discharge passage 18.

The respective lower surfaces of the block units 15 and 16 are flat and of substantial area. They lie directly against the upper surface 12 of the top wall 13 to provide direct heat transfer from the heated plate or bar 11 to these block units.

A further block unit 20 has integrally formed bars, or metal filler members 21 lying flatly on the upper surface 12 for direct heat transfer therebetween. The bars or fillers 21 are spaced along the spinning beam to accommodate the drive shafts 22 of the spinning pumps 15. The remainder of the block unit 20 comprises an upper segment 23 which overlies in close proximity, but does not touch, the drive shafts 22, the spinning pumps 15 and the melt and discharge supply block 16. The segment 23, together with block segment 24 and filler block 25, constitutes an overlying heat conductance bridge adapted to absorb heat and distribute same substantially evenly along the bridge. This heat is given off by the heating plate or bar 11, the spinning pumps 15, the melt discharge and supply passage blocks 16 and the mounting blocks 26 of the spinning nozzle packs 27.

The heating plate or bar 11 is longitudinally subdivided to provide rectangular openings 28 which receive the spinning nozzle packs 27. The spinning nozzle packs 27 comprise the aforesaid mounting block 26 with one or more spinning nozzles 29 mounted on the lower surface thereof. These spinning nozzles have a spinning plate 30 with spinning orifices 31 and may have a manifold space 32 above the spinning plates whereby melt may be distributed from a common manifold space to two or more spinning plates 30.

The spinning nozzle mounting block 26 has one or more melt supply passages 33 connecting melt discharge passages 18 with the manifold space 32. The nozzle mounting blocks 26 are mounted on the spinning beam by shoulders formed on opposite sides thereof. These shoulders are formed by flanges 34 and 35 and rest on upwardly facing shoulders 36 and 37 extending longitudinally on opposite sides of the openings 28. The shoulder 37 is formed in a recess cut in the upper corner of the block 16. The shoulder 36 is similarly formed on the upper corner of the upwardly extending shank or leg 38, which is preferably an elongated integral metal bar also providing the heat distribution bridge segment 24.

The shank or leg 38 has provided therein internally threaded ears or bushings 40 which threadedly receive bolts 41. The shank ends of the bolts press against one side 42 of the nozzle mounting block 26 and press it tightly against the ring seal 43 which seals the juncture between passages 18 and 33. In order to keep this pressure from being exerted against the more delicately constructed spinning pump block units 15, the lower surface of the block 16 preferably is provided with a longitudinal groove or keyway 44, which receives a longitudinal rib or key 45 fixedly attached to or made integral with the upper wall 13 of the hollow heating member 11. This keyway structure provides an abutment or stop to limit lateral movement of the block 16 when the nozzle mounting block 26 is pressed against the seals 43.

The upper part of the nozzle mounting openings 28 preferably are filled by the metal bar 25 which is in heat-conducting contact with the bridge members 23 and 24. This bar 25 is removable so that the spinning nozzle mounting block 26 and the spinning nozzles mounted thereon may be lifted out of the opening 28 after the screws or bolts 41 are loosened. This arrangement facilitates easy removal of the spinning nozzles when it is desired to change nozzles or inspect them or clean them or the like.

To minimize heat lost to the surrounding environment, the entire heat conductance bridge is substantially encapsulated by a heat-insulating jacket 46. This jacket is provided with openings 47 for the spinning pump drive shafts 22, openings 48 for the downward emergence of the spun filaments, openings 49 for the bolts or screws 41 and openings 50 for the removal of the filler bar 25 and the spinning nozzle units 26.

The upper wall 13 of the heating member 11 preferably has a plurality of longitudinal ribs or projections 51 depending downwardly therefrom with the bases of these ribs or projections in heat-conducting contact with the wall 13. These ribs or projections are spaced sufficiently close together to prevent the formation of drops of condensed heating vapor on the lower surface of the wall 13. They extend downwardly toward the bottom wall 52 of the heating member with the lower edges thereof near, but spaced from, the bottom wall 52. If desired, the lower surface of the upper wall 13 may be provided with arches or downwardly inclined sections between ribs or projections 51 to better facilitate downward flow of condensate from the upper wall 13 onto the ribs or projections 51.

The embodiment of FIG. 2 is similar in most respects to the embodiment of FIG. 1. Where applicable, like numerals designate like parts. The embodiment of FIG. 2 differs from that of FIG. 1 essentially in the transverse cross section of the hollow heating member 60. Here the elongated heating member 60 has a U-shaped transverse cross section providing upwardly extending, hollow legs or arms 61 and 62, between which are nested the block units 15, 16 and 26 and the overlying, heat-conducting bridge elements 23 and 25. The hollow, upwardly extending legs 61 and 62 may be heated by liquid or vapor flowing therethrough, as well as through the hollow space 63 in the cross legs 64 of the U. This cross leg 64 corresponds substantially in structure and shape to the hollow heating member 11 of FIG. 1.

The sides of the bridge elements 23 and 25 are planar and parallel, whereby the side 65 of the heat-conducting bridge member 23 is in flat, direct heat-conducting contact with the inner face of the leg 62. The touching sides 66 and 67 of the bars 23 and 25 forming the overlying heat-conducting bridge are in flat, face-to-face, direct heat-conducting contact. The side 68 of the bridge element 25 lies flatly against the inner face of the leg 61.

FIG. 3 illustrates the adaptability of the subject spinning beams in terms of exchangeability of the nozzle packs 27 and 27a. The nozzle pack 27 has four spinning plates 30 whereas nozzle pack 27a has two spinning plates 30a, either of which is supplied with spinning melt through identical arrangements of melt supply passages 18 in the melt supply and discharge block or bar 16.

Where the legs 61 and 62 are heated by heating fluid flowing therethrough, they may be connected at the end of the spinning nozzle beam by a tube 70 which allows heating liquid or vapor flow to occur between the two hollow legs. Such tubes 70 further serve as bracing members to impart greater overall strength to the spinning beam.

To facilitate even melt distribution to the respective spinning packs spaced along the spinning beam, melt supply blocks 71 are interposed along the beam between spinning units. These melt supply blocks preferably are interposed between every two spinning units to assure substantially uniform melt supply to the respective spinning units. Blocks 71 are set into the spinning beam and are held therein by screws or bolts 41 which press the base 72 against the opposing faces 73 of the bar extensions 74 of the melt supply and discharge passage blocks or bars 16. Each melt supply block 71 has a nipple 75 adapted to be connected to a melt supply tube (not shown), preferably a flexible tube. The flexible tube is connected to a source under pressure of polymer melt.

The supplied melt flows from the nipple 75 through branch passages 76 and 77 in the block 71. These branches each have a stopcock 78 which can be used at any time to interrupt cut off supply of melt through the respective branch passages. The terminal ends 79 and 80 of the respective branch passages 76 and 77 communicate with respective melt passages 81 and 82 in contiguous melt supply and discharge passage blocks or bars 16, which, together with branch passages 83 and 84, supply melt to the respective spinning pumps.

The embodiment of FIG. 4 is similar in most respects to that of FIGS. 2 and 3. Where applicable, like numerals designate like parts. This embodiment differs primarily in that the melt supply block 71a has two nipples 75a and 75b, respectively, connected to branch passages 76a, 76b and 77a, 77b. These branch passages are connected in a similar manner with pairs of melt passages 81a and 81b in the bar or block 16 through double stopcocks 85 and 86. A cross section of these double stopcocks is illustrated in FIG. 5. The double stopcock has a rotatable cylindrical stem 90 which has two transverse, diametric bores or passages 91 and 92. These bores, respectively, align with the two branch passages 76a and 76b, which are positioned one above the other as shown in FIG. 5, but are shown as vertically offset in FIGS. 3 and 4 for illustration purposes only.

To prevent polymer melt flowing through the respective passages 76a and 76b from mixing the stopcock, the packing 93 is provided in the bore 94 in which the rotatable stem 90 is seated. The packing 93 preferably consists of tightly packed rings 95 of an asbestos-plastic composition or a graphite-copper sintered alloy or the like, which are embedded between softer rings 96. These rings are supported at their lower end by a metal supporting head 97, which is tightly seated in the lower end of the bore 94. They are compressed against the upper edge of the annular ring 98 by a packing nut 99 screw-threaded at 100 in the upper end of the bore 94. If desired, copper rings 101 may be inserted in the packings in alignment with the bores 91 and 92 to confine the flow of respective melts as they pass through the packings.

The invention thus provides a hollow, elongated heating beam with a plurality of spinning units mounted on the beam. Each spinning unit includes one or more spinning nozzle packs, a pump for pumping melt to one or more packs and one or more heat-conductive, melt-conveying members with melt passages therein connecting a respective pump with the spinning nozzle pack or packs. The spinning nozzle packs, pumps and melt-conveying members are mounted on the elongated, hollow heating member and encased between this member and the heat-distributing means overlying the bottom portion of the heating member.

The heat-distributing means preferably takes the form of at least one elongated, heat-conductive plate or bar positioned over the packs, pumps and melt-conveying members. The heat-distributing means may have at least one member in direct, face-to-face contact with the heating member. A heat-

insulating jacket substantially encapsulates the heating member and the heat-distributing means to reduce heat loss to the surrounding environment. Where the heat-distributing means embodies a plurality of elongated plates or bars extending longitudinally of the beam, their contiguous faces are preferably of substantial area and are in direct, face-to-face, heat-conducting contact.

The members for distributing the melt along the beam to the respective spinning pumps preferably are elongated, heat-conducting members with a plurality of longitudinal melt-conveying passages therein. The spinning nozzle packs include spinning plates mounted on elongated bars or plates with connecting passages for supplying pumped melt to the spinning plates, which contain the spinning orifices. These spinning nozzle packs preferably are removably mounted in openings or passages extending transversely through the heating member by shoulder forming means extending along the longitudinal edges of the respective transverse, vertical openings or passages in the heating member and on the spinning packs, whereby the spinning packs may be lifted out of the last-mentioned passages for replacement, cleaning, etc.

In the most preferred forms of the invention, the spinning nozzle packs comprise a heat-conductive block with melt passage means therein. The melt-conveying member for conveying melt from the pump to the block of the spinning nozzle pack preferably also is a block having an opposing face parallel to a face of the block of the nozzle pack. The opposing ends of respective melt passages are aligned. Seals are provided between the opposing faces around the opposing ends of the passages to preclude melt leakages. Bolt means are used to press the blocks together and comprise the sealing means between the opposing faces.

The elongated, heating member is an elongated, double-walled, hollow member having a wide, flat upper surface. A hollow leg or legs may project upwardly from the longitudinal edges thereof to provide an L-shaped or U-shaped transverse cross section of the heating member. The upper wall of the heating member preferably has a plurality of longitudinally extending, downwardly depending, heat-conductive fins relatively closely spaced so that drops of condensate from the heating vapor do not cling to the lower surface of the upper wall, but rather flow down the fins.

A melt manifold block may be interposed between adjacent spinning units. It has passage means therein for conveying melt to the passages of the melt-distributing members. The melt passage means in the manifold block preferably has a stopcock whereby flow of melt can be stopped when a particular spinning unit or units are to be shut down. An external melt supply line is connected to the melt passages of the manifold block. The melt passage means in the manifold blocks may include at least two separate passages for supply of the same or different types of melt independently therethrough, in which case the stopcocks also have two passages.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the forms herein disclosed being preferred embodiments for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. An elongated spinning beam useful in the melt spinning of synthetic polymers which comprises an elongated, hollow, heating member with flat upper surface; a plurality of spinning units mounted on said member, each unit including one or more spinning nozzle packs, a pump for pumping melt thereto,

- and one or more heat-conductive, melt-conveying blocks with melt-passage means therein connecting a respective pump with its respective spinning nozzle packs; said packs, pumps and blocks being in heat-conducting contact with said heating member, said pumps and blocks resting on said flat upper surface; heat-distributing means including at least one elongated, heat-conductive plate or bar positioned over said packs, pumps and blocks and encasing the latter between said plate or bar and said heating member and providing a heat-conductance bridge adapted to absorb heat and distribute it substantially evenly along the bridge; and a heat-insulating jacket substantially encapsulating said member and said plates or bars to reduce heat loss to the surrounding environment from said apparatus.
- 5 15. A beam as claimed in claim 1 wherein said heat-distributing means comprises a plurality of elongated plates or bars extending longitudinally of said member and arranged with opposed edges in direct, face-to-face, heat-conducting contact.
- 10 16. A beam as claimed in claim 1 wherein said member has a plurality of passage means extending transversely therethrough, and means removably mounting said spinning nozzle packs in respective passage means.
- 15 17. A beam as claimed in claim 1 wherein the walls of said member define a hollow space of substantially L- or U-shape in transverse cross section.
- 20 18. A beam as claimed in claim 1 wherein the walls of said member include an elongated, horizontal, upper wall and an opposing, elongated, lower wall defining with side walls connecting said upper and lower walls an elongated passage for conductance of heating medium therethrough, and a plurality of heat-conductive fins depending from the upper wall into said passage with the lower edges thereof near, but spaced from, said lower wall.
- 25 19. A beam as claimed in claim 1 wherein said heat-distributing means is an elongated, heat-conductive plate or bar extending across a plurality of said units immediately above the packs, pumps and melt-conveying members of each unit, and means on said plate or bar in heat-conducting contact with said member.
- 30 20. A beam as claimed in claim 3 wherein said spinning nozzle packs comprise a heat-conductive block with melt passage means therethrough, said block being immediately next to a second block constituting said melt-conveying member, opposing ends of the respective melt passage means of said blocks being aligned, sealing means between said opposing faces of said blocks around said opposing ends, and means pressing said blocks together to compress said sealing means between said opposing faces.
- 35 21. A beam as claimed in claim 1 wherein said apparatus has a plurality of elongated passages extending transversely therethrough, upwardly facing, shoulder-forming means on opposite, longitudinal sides of said passages above said melt passage means, and downwardly facing, shoulder-forming means on said spinning nozzle packs resting respectively on said first-mentioned shoulder-forming means, whereby said packs may be lifted out of said passages.
- 40 22. A beam as claimed in claim 1, a melt manifold block interposed between adjacent spinning units and having a flat face opposing a flat face of said first-mentioned block, respective melt passage means in said blocks being aligned at said faces, means for pressing said faces together, a stopcock in the melt passage means of said manifold block, and means for connecting an external melt supply line to said passage means of said manifold block.
- 45 23. A beam as claimed in claim 1 wherein the melt passage means in said blocks provide at least two, separate passages for supply of melt independently therethrough.

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