

Search query (2): [SP]: [0001] the invention is related to a high-pressure pipe, comprising an inner liner, an outer coating layer and a reinforcement layer positioned between the inner liner and the outer coating layer, said reinforcement layer comprising helically wound strips which each comprise a matrix and fibers embedded in the matrix, said fibers comprising twisted high-strength filaments.[0002] such a high-pressure pipe is generally known, e.g. from wo-a-2013/131972. the helically wound reinforcing elements, in the form of strips of said prior art pipe may comprise carbon fibers, consisting of a large number of thin filaments. carbon fibers have several advantages for instance such fibers are largely invulnerable with respect to aggressive substances such as h₂s as present in crude oil. furthermore, the carbon fibers have a high tensile strength and a high modulus of elasticity. such properties provide the pipes in question with the capacity to withstand high pressures, up to 200 bar or higher. carbon fibers per se are however problematic with respect to handling. the filaments have a high stiffness and hardness, which makes it difficult to implement such fibers directly in the pipe wall. with the aim of facilitating the handling of the carbon fibers, they can be impregnated with a matrix material and then assembled so as to form carbon fiber reinforcing elements, for instance, in the form of strips[0003] due to the circumstance that the carbon filaments are embedded in, and thereby connected to each other by, the matrix material, the reinforcing elements exhibit a relatively high bending stiffness. this relatively high bending stiffness of the fibers is not conducive for carrying out winding operations, as are for instance applied in manufacturing high-pressure pipes. this means that in the process of manufacturing high-pressure pipes, the reinforcing elements in question should have a rather limited thickness so as to limit their bending stiffness and so as to be able to wind the fibers around the inner lining. in case the reinforcing strips are thin, this means that a relatively high number of strips are to be wound around the inner lining so as to achieve the required strength and stiffness of the pipe wall.[0004] the process of winding multiple layers of strips with embedded fibers is however intricate and time-consuming. it would be preferable to complete the winding process with a limited number of strips, preferably two oppositely wound strips. the number and the thickness of the fibers in each of those strips would then have to be increased. however, the stiffness of the strips thus obtained would severely limit the possibility to wind these around the inner lining. moreover, the pipe itself would be rather stiff with respect to bending, making it almost impossible to wind the pipe onto a reel.[0005] an object of the invention is therefore to provide a high-pressure pipe of the type mentioned before which can be manufactured from a limited number of strips, and which still has the advantages associated with high-strength fibers. a further object is to provide such pipe which can be wound onto a reel of limited radius. this object is achieved in that the filaments of a fiber are sized filaments obtained by subjecting the filaments to a sizing operation before twisting them together in the step of forming fibers.[0006] the sizing operation of the filaments has the advantage that it allows for some displacement between adjacent filaments, in contrast to filaments which are fixedly adhered to each other through a stiff matrix such as a solidified resin. the filaments are twisted so as to form a fiber, possibly in the presence of additional material which promotes the cohesion of the twisted filament bundle. the filaments should still be able to displace somewhat with respect to each other in the fiber, which makes it possible to bend the fiber even in case the thickness of the fiber, and thereby the number of twisted filaments in the fiber, is relatively high.[0007] a sizing operation is well known per se in the field of textile material. a sizing operation entails for instance the use of sizing agents or chemicals, such as liquid resins, oil-type and wax-type materials.[0008] preferably, the filaments are unimpregnated filaments. typically, the filaments have a thickness of 4-100 micro m, or 4-50 micro m, or 4-10 micro m. preferably, the filaments are carbon filaments. optionally, the filaments are coated with a flexible coating, e.g. a rubber-like coating. typically, the filaments have a length which is of the same order of magnitude as the length of the fiber containing said filaments.[0009] the invention is furthermore related to a method for producing a high-pressure pipe, comprising the steps of: providing high-strength filaments, sizing said high-strength filaments, twisting said sized high-strength filaments so as to form fibers, embedding the fibers in a matrix so as to form a strip, providing a tube-shaped inner lining, helically winding strips on top of each other and with opposite winding angle around the inner lining, providing an outer coating on top of the helically wound strips.[0017] the filaments are preferably unimpregnated filaments, and preferably during the step of embedding the fibers in the matrix the unimpregnated state the filaments of the fibers is maintained. unimpregnated fibers are fibers which are not impregnated with matrix material or other materials which make the fibers adhere to each other in such a way that no or hardly no relative displacements are possible. thus it can be ensured that the filaments in an unimpregnated fiber may perform relative displacements with respect to each other so as to maintain a certain bending flexibility of the fibers. additionally, preferably the fibers and the matrix are selected from materials which exclude or inhibit adhesion between said fibers and said matrix. the lack of a (strong) adhesion between the fibers and the surrounding matrix also promotes the bending flexibility of the strips, making it further possible to wind the strips at a relatively small radius.[0018] optionally, the fibers, before embedding thereof in the matrix, may be dipped in a mixture so as to cover said fibers with a rubber-like substance.[0019] the invention will further be described with reference to the embodiments shown in the drawings. [0020] fig. 1 shows a view in perspective and in section of the high-pressure pipe.[0021] fig. 2 shows a view in perspective on a reinforcement strip for the pipe.[0022] the pipe as shown in fig. 1 consists of an inner lining 1 around which first of all the reinforcement strip 2 is helically wound. subsequently, onto said first reinforcement strip 2, the second reinforcement strip 5 is helically wound, with an opposite winding angle. next, an outer coating layer 6 is applied onto the second helically wound reinforcement strip 5.[0023] each reinforcement strip 2, 5 consists of a body of matrix material 4 and the fibers 3 embedded in the body of matrix material 4. the fibers 3 each consist of carbon filaments of which are twisted into each other. these filaments have been subjected to a sizing operation, and furthermore they are not an impregnated with the matrix material 4. as a result, the fibers have a relatively high bending flexibility. due to the circumstance that the fibers 3 are not adhered to the surrounding body of matrix material 4, the reinforcement strip itself has a relatively high bending flexibility as well.[0024] as a result, the reinforcement strips 2, 5 can be wound with a relatively small radius around the inner liner. this relatively small bending radius can even be obtained in case the fibers 3 have a relatively large thickness and thus a relatively large number of twisted carbon fibers this means that a limited number, in particular only two, of reinforcement strips 2, 5 will be sufficient for manufacturing a pipe with a high resistance against internal pressures. furthermore, the pipe itself will combine relatively high stiffness and strength against internal overpressures with a relatively low bending flexibility. thus, such pipe is suitable for winding on a reel, which greatly simplifies the production and transport of the pipes. list of reference numerals[0025] 1. internal liner 2. first reinforcement strip 3. fibers[0026] 4. body of matrix material 5. second reinforcement strip 6. coating layer [0027] while the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. in addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. therefore, it is intended that the invention not be limited to the particular and/or preferred embodiments disclosed, but that the invention will include all embodiments falling within the scope of the appended claims

Results: 12

Search history

Search PN=(W02017048117) (Results 1)

1:

Search [SP]: [0001] the invention is related to a high-pressure pipe, comprising an inner liner, an outer coating layer and a reinforcement layer positioned between the inner liner and the outer coating layer, said reinforcement layer comprising helically wound strips which each comprise a matrix and fibers embedded in the matrix, said fibers comprising twisted high-strength filaments.[0002] such a high-pressure pipe is generally known, e.g. from wo-a-2013/131972. the helically wound reinforcing elements, in the form of strips of said prior art pipe may comprise carbon fibers, consisting of a large number of thin filaments. carbon fibers have several advantages for instance such fibers are largely invulnerable with respect to aggressive substances such as h₂s as present in crude oil. furthermore, the carbon fibers have a high tensile strength and a high modulus of elasticity. such properties provide the pipes in question with the capacity to withstand high pressures, up to 200 bar or higher. carbon fibers per se are however problematic with respect to handling. the filaments have a high stiffness and hardness, which makes it difficult to implement such fibers directly in the pipe wall. with the aim of facilitating the handling of the carbon fibers, they can be impregnated with a matrix material and then assembled so as to form carbon fiber reinforcing elements, for instance, in the form of strips[0003] due to the circumstance that the carbon filaments are embedded in, and thereby connected to each other by, the matrix material, the reinforcing elements exhibit a relatively high bending stiffness. this relatively high bending stiffness of the fibers is not conducive for carrying out winding operations, as are for instance applied in manufacturing high-pressure pipes. this means that in the process of manufacturing high-pressure pipes, the reinforcing elements in question should have a rather limited thickness so as to limit their bending stiffness and so as to be able to wind the fibers around the inner lining. in case the reinforcing strips are thin, this means that a relatively high number of strips are to be wound around the inner lining so as to achieve the required strength and stiffness of the pipe wall.[0004] the process of winding multiple layers of strips with embedded fibers is however intricate and time-consuming. it would be preferable to complete the winding process with a limited number of strips, preferably two oppositely wound strips. the number and the thickness of the fibers in each of those strips would then have to be increased. however, the stiffness of the strips thus obtained would severely limit the possibility to wind these around the inner lining. moreover, the pipe itself would be rather stiff with respect to bending, making it almost impossible to wind the pipe onto a reel.[0005] an object of the invention is therefore to provide a high-pressure pipe of the type mentioned before which can be manufactured from a limited number of strips, and which still has the advantages associated with high-strength fibers. a further object is to provide such pipe which can be wound onto a reel of limited radius. this object is achieved in that the filaments of a fiber are sized filaments obtained by subjecting the filaments to a sizing operation before twisting them together in the step of forming fibers.[0006] the sizing operation of the filaments has the advantage that it allows for some displacement between adjacent filaments, in contrast to filaments which are fixedly adhered to each other through a stiff matrix such as a solidified resin. the filaments are twisted so as to form a fiber, possibly in the presence of additional material which promotes the cohesion of the twisted filament bundle. the filaments should still be able to displace somewhat with respect to each other in the fiber, which makes it possible to bend the fiber even in case the thickness of the fiber, and thereby the number of twisted filaments in the fiber, is relatively high.[0007] a sizing operation is well known per se in the field of textile material. a sizing operation entails for instance the use of sizing agents or chemicals, such as liquid

resins, oil-type and wax-type materials.[0008] preferably, the filaments are unimpregnated filaments. typically, the filaments have a thickness of 4-100 micro m, or 4-50 micro m, or 4-10 micro m. preferably, the filaments are carbon filaments. optionally, the filaments are coated with a flexible coating, e.g. a rubber-like coating. typically, the filaments have a length which is of the same order of magnitude as the length of the fiber containing said filaments.[0009] the invention is furthermore related to a method for producing a high-pressure pipe, comprising the steps of: providing high-strength filaments,sizing said high-strength filaments,twisting said sized high-strength filaments so as to form fibers,embedding the fibers in a matrix so as to form a strip,providing a tube-shaped inner lining,helically winding strips on top of each other and with opposite winding angle around the inner lining,providing an outer coating on top of the helically wound strips.[0017] the filaments are preferably unimpregnated filaments, and preferably during the step of embedding the fibers in the matrix the unimpregnated state the filaments of the fibers is maintained. unimpregnated fibers are fibers which are not impregnated with matrix material or other materials which make the fibers adhere to each other in such a way that no or hardly no relative displacements are possible. thus it can be ensured that the filaments in an unimpregnated fiber may perform relative displacements with respect to each other so as to maintain a certain bending flexibility of the fibers. additionally, preferably the fibers and the matrix are selected from materials which exclude or inhibit adhesion between said fibers and said matrix. the lack of a (strong) adhesion between the fibers and the surrounding matrix also promotes the bending flexibility of the strips, making it further possible to wind the strips at a relatively small radius.[0018] optionally, the fibers, before embedding thereof in the matrix, may be dipped in a mixture so as to cover said fibers with a rubber-like substance.[0019] the invention will further be described with reference to the embodiments shown in the drawings.[0020] fig. 1 shows a view in perspective and in section of the high-pressure pipe.[0021] fig. 2 shows a view in perspective on a reinforcement strip for the pipe.[0022] the pipe as shown in fig. 1 consists of an inner lining 1 around which first of all the reinforcement strip 2 is helically wound. subsequently, onto said first reinforcement strip 2, the second reinforcement strip 5 is helically wound, with an opposite winding angle. next, an outer coating layer 6 is applied onto the second helically wound reinforcement strip 5.[0023] each reinforcement strip 2, 5 consists of a body of matrix material 4 and the fibers 3 embedded in the body of matrix material 4. the fibers 3 each consist of carbon filaments of which are twisted into each other. these filaments have been subjected to a sizing operation, and furthermore they are not an impregnated with the matrix material 4. as a result, the fibers have a relatively high bending flexibility. due to the circumstance that the fibers 3 are not adhered to the surrounding body of matrix material 4, the reinforcement strip itself has a relatively high bending flexibility as well.[0024] as a result, the reinforcement strips 2, 5 can be wound with a relatively small radius around the inner liner. this relatively small bending radius can even be obtained in case the fibers 3 have a relatively large thickness and thus a relatively large number of twisted carbon fibers this means that a limited number, in particular only two, of reinforcement strips 2, 5 will be sufficient for manufacturing a pipe with a high resistance against internal pressures. furthermore, the pipe itself will combine relatively high stiffness and strength against internal overpressures with a relatively low bending flexibility. thus, such pipe is suitable for winding on a reel, which greatly simplifies the production and transport of the pipes.list of reference numerals[0025] 1. internal liner 2. first reinforcement strip 3. fibers[0026] 4. body of matrix material 5. second reinforcement strip 6. coating layer [0027] while the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. in addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. therefore, it is intended that the invention not be limited to the particular and/or preferred embodiments disclosed, but that the invention will include all embodiments falling within the scope of the appended claims (Results 12)

1) Family number: 11431005 (US6620471B)

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Title: COMPOSITE CARBON FIBRE BASED ARMOUR FOR FLEXIBLE PIPE

Abstract: An ultra dense composite strip for flexible pipe having armouring formed of longitudinal carbon fibers provided within a thermoplastic or thermosetting matrix in the form of a flat ribbon with a substantially rectangular cross-section, whereof at least one of the surfaces of the strip is reinforced with a film made integral with said surface, over substantially its whole width and over substantially its whole length.

Classifications:

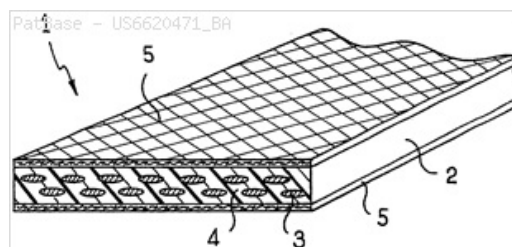
International (IPC 8-9): F16L58/16 (Advanced/Invention); F16L58/02 (Core/Invention)

International (IPC 1-7): A47G19/22 F16L11/20 F16L58/16 F16L59/02

CPC: Y10T428/1307 Y10T428/1314 F16L58/16 Y10T428/249924 Y10T428/249928 Y10T428/249929 Y10T428/24994 Y10T428/249942 Y10T428/249945 Y10T428/249947 F16L11/081

European: F16L58/16

US: 428/292.1 428/293.4 428/293.7 428/297.4 428/298.1 428/299.1 428/299.7 428/34.3 428/34.5 428/343 428/345



Family:

Publication number	Publication date	Application number	Application date
AU199921715 A1	19991018	AU19990021715	19990204
AU745945 B2	20020411	AU19990021715	19990204
BRPI9908976 A	20001205	BR1999PI08976	19990204
DK1066485 T3	20020617	DK19990901709T	19990204
EP1066485 A1	20010110	EP19990901709	19990204
EP1066485 B1	20020306	EP19990901709	19990204
FR2776358 A1	19990924	FR19980003547	19980323
FR2776358 B1	20000505	FR19980003547	19980323
US6620471 BA	20030916	US20000646024	20000912
WO9949259 A1	19990930	WO1999FR00239	19990204

Priority:

FR19980003547 19980323 WO1999FR00239 19990204

Probable Assignee: COFLEXIP

Assignee(s): (std): COFLEXIP ; DO ANH TUAN

Assignee(s): COFLEXIP SA

Inventor(s): (std): DO ANH TUAN

Inventor(s): ANH TUAN DO

Agent(s): DAVIES COLLISON CAVE; DAVIES COLLISON CAVE PTY LTD

Designated states: AT AU BE BR CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE US

2) Family number: 60134069 (CN204573360U)

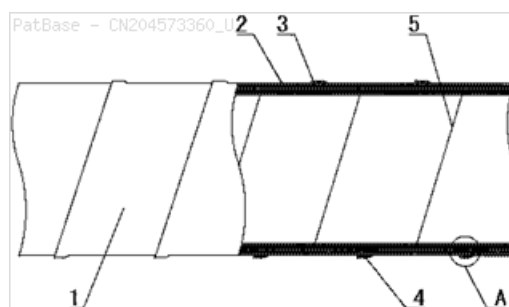
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Title: COMPOUND TUBULAR PRODUCT OF STEEL WIRE REINFORCING ULTRAHIGH MOLECULAR WEIGHT POLYETHYLENE SHEET WINDING

Abstract: The utility model provides a compound tubular product of steel wire reinforcing ultrahigh molecular weight polyethylene sheet winding, belongs to novel engineering tubular product technical field including body (1), its characterized in that: body (1) set up enhancement layer (3) compound the forming more than two-layer or two-layer between ultrahigh molecular weight polyethylene sheet layer (2) by three-layer or the ultrahigh molecular weight polyethylene sheet layer (2) more than the three-layer and interval, ultrahigh molecular weight polyethylene sheet layer (2) is formed by ultrahigh molecular weight polyethylene sheet spiral winding. The utility model discloses a compound tubular product of steel wire reinforcing ultrahigh molecular weight polyethylene sheet winding intensity is high, and the bearing capacity is strong, long service life

Classifications:

International (IPC 8-9): F16L9/16 (Advanced/Invention)



Family:

Publication number	Publication date	Application number	Application date
CN204573360 U	20150819	CN201520110050U	20150215

Priority:

CN201520110050U 20150215

Probable Assignee: SHANDONG XIANHE POLYMER MATERIALS CO LTD

Assignee(s): (std): SHANDONG XIANHE POLYMER MATERIALS CO LTD

Assignee(s): POLYMER MATERIALS CO LTD SHANDONG PRECEDENT ; SHANDONG XIANHE POLYMER MATERIALS CO

Inventor(s): (std): ZHANG JILIANG ; JIANG WENSHENG

3) Family number: 53800217 (US2013133775A)

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Title: FLEXIBLE REINFORCED PIPE AND REINFORCEMENT TAPE

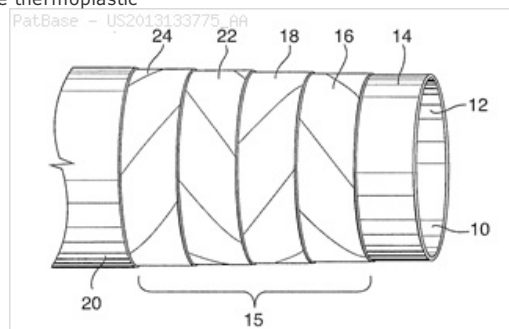
Abstract: A flexible pipe includes: an inner liner formed as a tube and having an outer surface and an inner surface defining an inner diameter; a reinforcement layer bonded to the inner liner and including at least a first ply of reinforcing tape helically wrapped in a first helical direction about the inner liner and a second ply of reinforcing tape helically wrapped about the first ply of reinforcing tape, the second ply of reinforcing tape helically wrapped in a second helical direction opposite to the first helical direction; and an outer jacket applied over and bonded to the reinforcement layer, the outer jacket including a thermoplastic. A reinforcing tape for use in the pipe or other applications includes: a plurality of reinforcing fibers and a matrix about the plurality of reinforcing fibers to hold the reinforcing fibers in the form of a tape, the matrix including thermoplastic and an additive to increase the impact resistance of the thermoplastic

Classifications:

International (IPC 8-9): B29D22/00 B32B1/08 B32B25/14 B32B27/04 B32B27/08 B32B27/12 B32B27/18 B32B27/30 B32B27/32 B32B27/34 B32B3/18 B32B5/02 B32B5/08 B32B5/12 B32B5/26 B32B7/00 B32B7/10 C08J5/10 F16L11/08 F16L11/20 F16L11/24 (Advanced/Invention)

CPC: F16L11/24 B32B1/08 B32B5/02 B32B5/08 B32B5/12 B32B5/26 B32B25/14 B32B27/08 B32B27/12 B32B27/18 B32B27/30 B32B27/306 B32B27/32 B32B27/34 B32B2260/023 B32B2262/00 B32B2262/101 B32B2270/00 B32B2307/50 B32B2307/558 B32B2307/7265 B32B2597/00 F16L11/082 F16L11/083 B32B7/03

US: 1/1 138/129 428/220 524/563 524/575 524/578 524/586



Family:

Publication number	Publication date	Application number	Application date
AR088889 AA	20140716	AR2012P104316	20121116
AU2012339553 AA	20130523	AU20120339553	20121116
AU2012339553 BB	20160512	AU20120339553	20121116
CA2854955 AA	20140508	CA20122854955	20121116
CA2854955 C	20190611	CA20122854955	20121116
DK2780159 T3	20190408	DK20120850058T	20121116
EP2780159 A1	20140924	EP20120850058	20121116
EP2780159 A4	20150527	EP20120850058	20121116
EP2780159 B1	20190109	EP20120850058	20121116
GC8227 A	20180704	GC2012P022814	20121117
US2013133775 AA	20130530	US20120679810	20121116
US2017299093 AA	20171019	US20170638089	20170629
US9726306 BB	20170808	US20120679810	20121116
WO13071449 A1	20130523	WO2012CA50827	20121116

Priority:

US20110560591P 20111116 US20120679810 20121116 WO2012CA50827 20121116
US20170638089 20170629

Probable Assignee: SHAWCOR LTD SHAWCOR LTEE

Assignee(s): (std): FLEXPipe SYSTEMS INC ; SHAWCOR LTD SHAWCOR LTEE ; SHAWCOR LTD

Assignee(s): ANDRENACCI ALFREDO ; ANDRENACCI ALFREDO34 PATH HILL PLACESCARBOROUGH01M1V 2W5CA ;

CONLEY JEFFREY RYAN ; CONLEY JEFFREY RYAN102 PANAMOUNT VILLAS NWCALGARYA1T3K 0A4CA ; DUNCAN MARK ; GUJARE NITIN ; HOLUB JIRI ; NIU HAO ; EDMONDSON STEPHEN JAMES ; GUJARE NITIN20 - 80 STRATHAVEN DRIVEMISSISSAUGAO1L5R 3V9CA ; EDMONDSON STEPHEN JAMES337 CLAREMONT CRESCENTOAKVILLE01L6J 6J9CA ; HOLUB JIRI10 AVENING DRIVEETOBICOKEO1M9V 1Y1CA ; DUNCAN MARK214 DOUGLASDALE COURT SECALGARYA1T2Z 3B4CA ; FLEXPipe SYSTEMS INC3501 - 54 AVENUE SECALGARYA1T2C 0A9CA ; NIU HAO149 TUSCANY RIDGE PARK NWCALGARYA1T3L 2H6CA

Inventor(s): (std): STEPHEN JAMES EDMONDSON ; JEFFREY RYAN CONLEY ; NITIN GUJARE ; ALFREDO ANDRENACCI ; JIRI HOLUB ; HAO NIU ; MARK DUNCAN ; NIU HAO ; GUJARE NITIN ; DUNCAN MARK ; HOLUB JIRI ; EDMONDSON STEPHEN JAMES ; ANDRENACCI ALFREDO ; CONLEY JEFFREY RYAN

Inventor(s): EDMONDSON STEPHEN JAMES337 CLAREMONT CRESCENTOAKVILLE01L6J 6J9CA ; NIU HAO149 TUSCANY RIDGE PARK NWCALGARYA1T3L 2H6CA ; CONLEY JEFFREY RYAN102 PANAMOUNT VILLAS NWCALGARYA1T3K 0A4CA ; ANDRENACCI ALFREDO34 PATH HILL PLACESCARBOROUGH01M1V 2W5CA ; GUJARE NITIN20 - 80 STRATHAVEN DRIVEMISSISSAUGAO1L5R 3V9CA ; HOLUB JIRI10 AVENING DRIVEETOBICOKEO1M9V 1Y1CA ; DUNCAN MARK214 DOUGLASDALE COURT SECALGARYA1T2Z 3B4CA

Agent(s): FB RICE ; FB RICE PTY LTD ; BENNETT JONES LLP ; VINSOME REX MARTIN ; ABU GAZALEH INTELLECTUAL PROPERTY LLC ; CALDWELL ROSEANN B ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

4) Family number: 44516299 (WO10026749A1)

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Title: METHOD OF MANUFACTURING RUBBER HOSE REINFORCED BY STEEL CORDS, RUBBER HOSE REINFORCED BY STEEL CORDS, AND COMPOSITE STRIP MATERIAL

Abstract: A method of manufacturing a rubber hose (10) reinforced by helically arranged steel cords (12). The rubber hose (10) is provided with an inner tube (11), an outer tube (24), and a laminated reinforcing layer (14) provided between the inner and outer tubes. The reinforcing layer (14) is prepared by overlaying unit layers (90-96) on each other. To form the reinforcing layer (14), a composite strip material (26) is formed by embedding reinforcing steel cords (12) in a not-yet-vulcanized rubber strip (38) so as to extend in the longitudinal direction thereof and then the strip material (26) is helically wound around the inner tube (11) and vulcanized to form the reinforcing layer (14). Each of the unit layers (90-96) is formed by helically winding the composite strip material (26) around the inner tube (11) or an already-prepared unit layer and is vulcanized after the outer tube (24) is formed around the reinforcing layer (14).

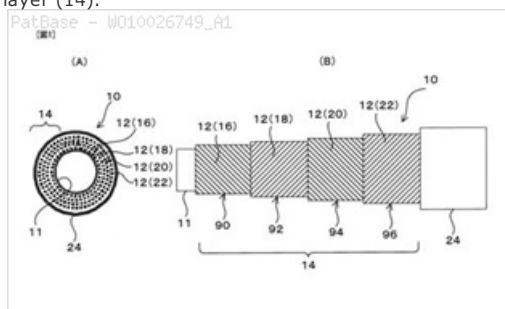
Classifications:

International (IPC 8-9): B29C53/58 B29C53/60 B29C53/66 B29C53/70 B29C53/78 B29D23/00 B29K21/00 B29L23/00 F16L11/08 (Advanced/Invention);

B29K21/00 B29L23/00 (Advanced/Non-invention); B29C53/00 F16L11/08 (Core/Invention)

CPC: B29C35/02 B29C53/582 B29C53/66 B29D23/001 B29K2305/12 B29L2009/003 B29L2023/006 F16L11/083

European: B29C53/58B2 B29C53/66 B29D23/00T F16L11/08D2 L29C35/02 L29K305/12 L29L23/00H2 L29L9/00C



Family:

Publication number	Publication date	Application number	Application date
■ CN102143833 A	20110803	CN200980134476	20090902
■ JP2010058387 A2	20100318	JP20080226821	20080904
■ JP2010058398 A2	20100318	JP20080227211	20080904
■ JP4442706 B2	20100331	JP20080226821	20080904
■ JP4442707 B2	20100331	JP20080227211	20080904
■ WO10026749 A1	20100311	WO2009JP04327	20090902
■ WO10026754 A1	20100311	WO2009JP04332	20090902

Priority:

JP20080226821 20080904 JP20080227211 20080904 WO2009JP04327 20090902

Probable Assignee: YOKOHAMA RUBBER CO LTD

Assignee(s): (std): HAMACHI YOSUKE ; NAGASE YUGO ; ONODERA AKIRA ; YOKOHAMA RUBBER CO LTD ; TORIUMI SHUICHI

Assignee(s): YOKOHAMA RUBBER CO LTD THE ; YOKOHAMA RUBBER CO ; THE YOKOHAMA RUBBER CO ; THE YOKOHAMA RUBBER CO LTD

Inventor(s): (std): HAMACHI YOSUKE ; CHOKAI SHUICHI ; YUGO NAGASE ; AKIRA ONODERA ; SHUICHI TORIUMI ; YOSUKE HAMACHI ; ONODERA AKIRA ; NAGASE YUGO ; TORIUMI SHUICHI ; HAMACHI YOSUKE

Agent(s): NODA SHIGERU

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

5) Family number: 40829300 (US2008006338A)

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Title: REINFORCING MATRIX FOR SPOOLABLE PIPE

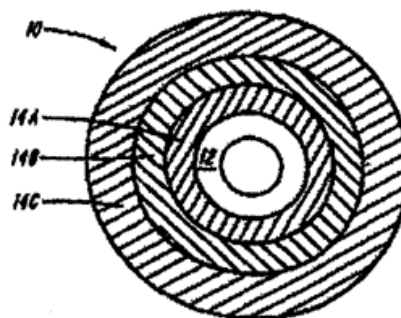
Abstract: A spoolable pipe is disclosed, the spoolable pipe having an internal pressure barrier formed about a longitudinal axis, and a reinforcing layer(s) enclosing the internal pressure barrier that includes a solid hydrocarbon matrix. The pipe can

also include an energy conductor(s) integrated with and/or located between the internal pressure barrier and/or the reinforcing layer(s).

Classifications:

International (IPC 8-9): B28B23/08 B29C53/56 B32B1/08 B32B27/28 B65H81/06 E21B17/20 F16L11/00 F16L11/02 F16L11/08 F16L11/20 F16L9/14 F16L9/147 (Advanced/Invention); B29C53/00 B32B1/00 B32B27/28 E21B17/00 F16L11/00 F16L11/08 F16L9/00 (Core/Invention)
CPC: Y10S138/07 Y10T428/1352 Y10T428/1369 Y10T428/1393 F16L11/081 B29C53/58
European: B29C53/58 F16L11/08D
US: 138/123 138/124 138/124S 138/125 138/125S 138/126 138/137 138/140 138/DIG.7 156/172 156/175 156/175S 428/35.7 428/36.3 428/36.91 428/36.910S

PatBase - US2008006338_AA



Family:

Publication number	Publication date	Application number	Application date
CA2582355 AA	20070921	CA20072582355	20070321
CA2582355 C	20140729	CA20072582355	20070321
CA2842597 AA	20070921	CA20072842597	20070321
CA2842597 C	20160524	CA20072842597	20070321
US2008006338 AA	20080110	US20070689199	20070321
US2012266996 AA	20121025	US20120456778	20120426
US8187687 BB	20120529	US20070689199	20070321

Priority:

US20060784258P 20060321 CA20072582355 20070321 US20070689199 20070321
US20120456778 20120426 CA20142582355 20140226

Probable Assignee: FIBERSPAR CORP

Assignee(s): (std): FIBERSPAR CORP ; QUIGLEY PETER A ; WIDEMAN THOMAS W

Assignee(s): RBS CITIZENS NATIONAL ASSOCIATION ADMINISTRATIVE AGENT AS ; CITIZENS BANK OF MASSACHUSETTS ; RBS CITIZENS NATIONAL ASSOCIATION ADMINISTRATIVE A ; FIBERSPAR CORP502-800 PURCHASE ST.NEW BEDFORDMA02740-6355US

Inventor(s): (std): QUIGLEY PETER A ; WIDEMAN THOMAS W

Inventor(s): QUIGLEY PETER ; WIDEMAN THOMAS ; WIDEMAN THOMAS WUS ; QUIGLEY PETER AUS

Agent(s): RICHES MCKENZIE AND HERBERT LLP; GOODWIN PROCTER LLP, PATENT ADMINISTRATOR; GOODWIN PROCTER LLP PATENT ADMINISTRATOR; GOODWIN PROCTER LLP

6) Family number: 10732336 (US6248443B)

PatBase

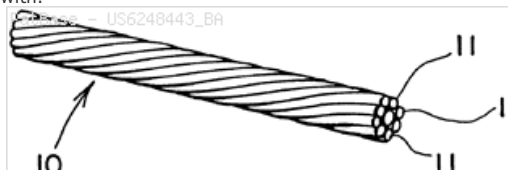
Title: PROCESS FOR THE PREPARATION OF FLEXIBLE CARBON YARN AND CARBON PRODUCTS THEREFROM

Abstract: A process for the preparation of a carbon yarn product includes the steps of pyrolyzing raw carbonaceous yarn comprising a plurality of carbon fibers, at a temperature above about 650 degrees Fahrenheit; flexing the pyrolyzed yarn to substantially break fiber-to-fiber bonding between the fibers; and, exposing the yarn to a temperature sufficient to carbonize the pre-carbonized yarn to a final and higher carbon assay. A flexible yarn element (10) includes a plurality of carbon filaments (11) wherein each filament (11) is in contact with at least one other filament 11. A sizing material at least partially coats the plurality of filaments (11), wherein the sizing material of each filament (11) is substantially separated from the sizing material of the at least one other filament (11) in contact therewith.

Classifications:

International (IPC 8-9): D01F9/16 (Advanced/Invention); D01F9/14 (Core/Invention)
International (IPC 1-7): B32B9/00 D02G3/00
CPC: Y10T428/2918 Y10T428/292 Y10T428/2933 D01F9/16
European: D01F9/16
US: 428/367 428/368 428/375

PatBase - US6248443_BA



Family:

Publication number	Publication date	Application number	Application date
DE69518831 D1	20001019	DE19956018831	19950324
DE69518831 T2	20010111	DE19956018831T	19950324
EP0753087 A1	19970115	EP19950914918	19950324
EP0753087 A4	19970618	EP19950914918	19950324
EP0753087 B1	20000913	EP19950914918	19950324
US6248443 BA	20010619	US19940218892	19940328
WO9526433 A1	19951005	WO1995US03828	19950324

Priority:

US19940218892 19940328 WO1995US03828 19950324

Probable Assignee: HITCO CARBON COMPOSITES INC

Assignee(s): (std): HITCO TECHNOLOGIES INC ; HITCO CARBON COMPOSITES INC ; HITCO CARBON COMPOSITES INC N ; BP CHEMICALS HITCO INC

Assignee(s): CIT GROUP BUSINESS CREDIT INC ; BP CHEMICAL (HITCO) INC ; BP CHEMICAL HITCO INC ; BP CHEMICAL INC ; CITICORP USA ; SGL CARBON COMPOSITES INC ; HITCO CARBON COMPOSITES INC N D GES D STAATES DEL ; HITCO CARBON COMPOSITES INC N D GES D STAATES DELAWARE GARDENA ; HITCO CARBON COMPOSITES INC NDGESD STAATES DELAWARE GARDENA ; CITICORP

Inventor(s): (std): FERNANDEZ RAMON B ; DEVANE KENNETH A ; DEVANE A ; FERNANDEZ B

Designated states: AT BE CH DE DK ES FR GB GR IE IT JP KR LU MC NL PT SE

7) Family number: 30571488 (US2004241415A)

© PatBase

Title: REINFORCING FIBER SUBSTRATE, COMPOSITE MATERIAL AND METHOD FOR PRODUCING THE SAME

Abstract: A reinforcing fiber substrate formed by at least a reinforcing fiber yarn group arranged with reinforcing fiber yarns in parallel to each other in one direction, wherein a resin material whose main constituent is a thermoplastic resin is provided at 2 to 15 percent by weight at least on one surface of the reinforcing fiber substrate, and the reinforcing fiber volume fraction V_{pf} of the reinforcing fiber substrate is in a range of 40 to 60 percent, and a composite material made therefrom. A substrate excellent in handling property and a composite material excellent in mechanical properties can be obtained.

Classifications:

International (IPC 8-9): B29C39/10 B29C70/22 B29C70/48
B29C70/54 B32B27/12 B32B5/08 B32B5/10 D03D1/00 D03D15/00
D03D15/12 D04H3/00 D04H3/002 D04H3/04 (Advanced/Invention);
D03D15/12 D04H3/00 (Advanced/Non-invention);
D03D15/12 D04H3/00 (Core/Non-invention)

International (IPC 1-7): B29C39/10 B29C70/16 B29C70/22
B29C70/48 B29C70/54 B32B27/12 B32B5/08 B32B5/10 B32B5/28
D03D1/00 D03D15/00 D03D15/12 D04H3/00 D04H3/04

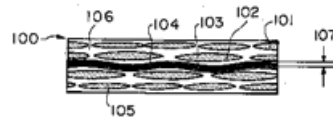
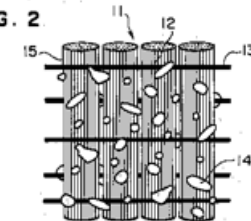
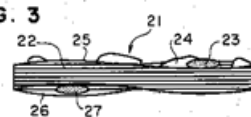
CPC: D03D15/0088 B29C70/226 B29C70/443 B29C70/547
D03D15/00 D10B2101/06 D10B2101/08 D10B2101/12 D10B2101/20
D10B2321/021 D10B2321/06 D10B2331/021 D10B2505/02
Y10T428/249942

European: B29C70/22C B29C70/44A B29C70/54E2 D03D15/00
D03D15/00O2 N10B101/06 N10B101/08 N10B101/12 N10B101/20
N10B321/021 N10B321/06 N10B331/021 N10B505/02

US: 428/298.1 428/298.100P

PatBase - US2004241415_AA

Patent Application Publication Dec. 2, 2004 Sheet 1 of 6 US 2004/0241415 A1

FIG. 1**FIG. 2****FIG. 3****Family:**

Publication number	Publication date	Application number	Application date
AU2003262050 AA	20040603	AU20030262050	20031111
AU2003262050 BB	20090702	AU20030262050	20031111
AU2009201820 AA	20090528	AU20090201820	20090506
AU2009201820 BB	20100923	AU20090201820	20090506
AU2009201821 AA	20090528	AU20090201821	20090506
AU2009201821 BB	20100826	AU20090201821	20090506
DE60340550 D1	20120606	DE20036040550	20031113
EP1419875 A1	20040519	EP20030257156	20031113
EP1419875 B1	20120411	EP20030257156	20031113
ES2385972 T3	20120806	ES20030257156T	20031113
JP2005022396 A2	20050127	JP20030383655	20031113
JP4561081 B2	20101013	JP20030383655	20031113
US2004241415 AA	20041202	US20030713819	20031114

Priority:

JP20020330409 20021114	JP20030169243 20030613	JP20030169244 20030613
AU20030262050 20031111	EP20030257156 20031113	JP20030383655 20031113
AU20090201820 20090506	AU20090201821 20090506	

Probable Assignee: TORAY IND INC**Assignee(s):** (std): TORAY IND ; TORAY IND INC A CORP OF JAPAN**Assignee(s):** TORAY IND INC A OF JAPAN CORP ; TORAY IND INC**Inventor(s):** (std): HONMA KIYOSHI ; HORIBE IKUO ; WADAHARA EISUKE ; NISHIMURA AKIRA**Inventor(s):** KIYOSHI HONMA ; WADAHARA EISUKE MASAKI CHO ; IKUO HORIBE ; HONMA KIYOSHI OMIHACHIMAN SHISHIGA ; AKIRA NISHIMURA ; EISUKE WADAHARA**Agent(s):** GRIFFITH HACK; LEINWEBER AND ZIMMERMANN; WEBSTER JEREMY MARK**Designated states:** DE ES FR GB IT**8) Family number: 23658588 (JP2002226812A)**

© PatBase

Title: ADHESION TREATMENT AGENT FOR CARBON FIBER, CARBON FIBER FOR RUBBER REINFORCEMENT AND METHOD FOR PRODUCING THE SAME

Abstract: PROBLEM TO BE SOLVED: To obtain an adhesion treatment agent which controls gum-up in an adhesion treatment process, enables an operation for many hours, contributes to improvement in productivity, has the same adhesiveness between fiber and rubber as that of a conventional adhesion treatment agent and fatigue resistance equal to that of the conventional adhesion treatment agent. SOLUTION: This adhesion treatment agent for carbon fiber comprises 100 parts.wt.

of a rubber latex and 0.1-5 parts.wt. of a lignosulfonate. This carbon fiber for rubber reinforcement is obtained by coating the surface of carbon fiber with the adhesion treatment agent. This method for producing the carbon fiber rubber reinforcement is provided.

Classifications:

International (IPC 8-9): C08J5/06 C08K9/04 C08L21/00 C09J121/02 C09J163/00 C09J197/00 D06M13/256 D06M15/00 D06M15/41 D06M15/55 D06M15/693 (Advanced/Invention); C08J5/04 C08K9/00 C08L21/00 C09J121/00 C09J163/00 C09J197/00 D06M13/00 D06M15/00 D06M15/37 D06M15/693 (Core/Invention) International (IPC 1-7): C08J5/06 C08K9/04 C08L21/00 C09J121/02 C09J163/00 C09J197/00 D06M101/40 D06M13/256 D06M15/00 D06M15/41 D06M15/55 D06M15/693

品名	単位	試験値1	試験値2	試験値3	試験値4	試験値5
ポリエポキシド (質量%) * 1)		50	50	50	40	40
ゴムラテックス (質量%) * 1)		50	50	50	60	60
ポリメチルメタクリレート (質量%) * 2)		0	3	0	0	3
カーボン粉		0	0	0	0	0
引張強さ (N/cm)		201	200	199	197	200
伸び率 (%)		90-355	90-382	90-331	90-295	90-311
弾力 (N)		1275	1276	1270	1275	1273
弾力 (cN/m)		45	44	40	45	41

* 1) エポキシドとゴムラテックスの合計量中の組成比を示す
* 2) ゴムラテックス100質量部に対する質量部を示す

Family:

Publication number	Publication date	Application number	Application date
JP2002226812 A2	20020814	JP20010027568	20010202

Priority:

JP20010027568 20010202

Probable Assignee: TORAY IND INC

Assignee(s): (std): TORAY IND ; TORAY INDUSTRIES

Assignee(s): TORAY INDUSTRIES INC ; TORAY IND INC

Inventor(s): (std): SHOJI HIROMITSU ; KOBAYASHI MASATO ; TANIGUCHI MASA HARU

9) Family number: 52578662 (US2014093729A)

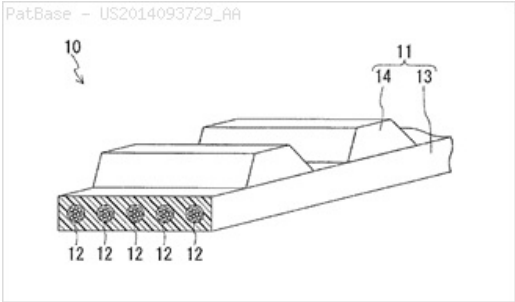
© PatBase

Title: REINFORCEMENT CORD FOR REINFORCING RUBBER PRODUCT, AND RUBBER PRODUCT USING SAME

Abstract: The reinforcing cord of the present invention includes at least one strand. The strand includes a bundle of filaments that are bundled and twisted together in one direction, and a coating layer that is formed on at least the surface of the bundle. The bundle consists essentially of carbon fiber filaments. The coating layer is a coating layer that is formed from an aqueous treatment agent containing a rubber latex and a crosslinking agent as essential components and a filler as an optional component. In the aqueous treatment agent, the total of the mass of the crosslinking agent and the mass of the filler is in a range of 1 to 50 percent of the mass of rubber in the rubber latex.

Classifications:

International (IPC 8-9): C08J5/06 C08K3/04 C08K3/36 C08K7/02 C08L21/00 D02G3/02 D02G3/36 D02G3/44 D06M10/00 D06M101/40 D06M11/74 D06M11/79 D06M13/322 D06M13/395 D06M15/55 D06M15/693 F16G1/08 F16G1/28 F16G5/06 F16G5/20 (Advanced/Invention); C08K3/36 D06M101/40 (Advanced/Non-invention) CPC: C08L21/02 C08K3/04 C08K3/36 C08K7/02 D02G3/447 D06M15/693 D06M2101/40 D10B2101/12 F16G1/08 F16G1/28 F16G5/06 F16G5/20 Y10T428/2918 C08J5/06 D02G3/02 D02G3/36 US: 428/367 474/204 474/260 523/205



Family:

Publication number	Publication date	Application number	Application date
BR112013031328 A2	20161129	BR20131131328	20120608
CN103608513 A	20140226	CN201280028046	20120608
CN103608513 B	20161102	CN201280028046	20120608
DE602012028988 D1	20170413	DE201260028988T	20120608
EP2719824 A1	20140416	EP20120796980	20120608
EP2719824 A4	20150422	EP20120796980	20120608
EP2719824 B1	20170222	EP20120796980	20120608
JP2012169207 A1	20150223	JP20130519394T	20120608
JP6034783 B1	20161130	JP20130519394T	20120608
US2014093729 AA	20140403	US20120119017	20120608
US10041194 BB	20180807	US20120119017	20120608
WO12169207 A1	20121213	WO2012JP03765	20120608

Priority:

JP20110130445 20110610 EP20120796980 20120608 WO2012JP03765 20120608

Probable Assignee: NIPPON SHEET GLASS CO LTD

Assignee(s): (std): FURUSAWA MASAMORI ; NIPPON SHEET GLASS CO LTD

Assignee(s): NIPPON SHEET GLASS COMPANY LIMITED

Inventor(s): (std): FURUSAWA MASAMORI

Inventor(s): MASAMORI FURUSAWA

Agent(s): CBDL PATENTANWALTE; HART DAVIS JASON; ABEL LAW GROUP LLP; KAMADA KOICHI ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

10) Family number: 74701761 (WO19112431A1)

© PatBase

Title: HIGH-PRESSURE PIPE WITH PULTRUDED ELEMENTS AND METHOD FOR PRODUCING THE SAME

Abstract: High-pressure flexible pipe, comprising an inner liner and a tape, wrapped around and bearing against the inner liner, wherein the tape comprises a polymer matrix and a plurality of pultruded elements embedded in the polymer matrix, wherein the pultruded elements each comprise a plurality of elongated filaments covered by polymer resin.

Classifications:

International (IPC 8-9): B29C70/52 F16L11/08 (Advanced/Invention)

CPC: F16L11/082 B29C70/32 B29C70/52 B29C70/521 B29C70/86

PatBase - WO19112431_A1

Fig. 1



Family:

Publication number	Publication date	Application number	Application date
NL2020042 B1	20190619	NL20172020042	20171208
WO19112431 A1	20190613	WO2018NL50816	20181206

Priority:

NL20172020042 20171208

Probable Assignee: PIPELIFE NEDERLAND BV

Assignee(s): (std): PIPELIFE NEDERLAND BV

Inventor(s): (std): LAAN ROBBERT PETRUS JOHANNES ; DALMOLEN LAMBERTUS GERRIT PETER ; LAMBERTUS GERRIT PETER DALMOLEN ; ROBBERT PETRUS JOHANNES LAAN

Agent(s): NEDERLANDSCH OCTROOIBUREAU NLO

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

11) Family number: 65268826 (US2018252339A)

© PatBase

Title: HIGH PRESSURE PIPE AND METHOD FOR PRODUCING SUCH PIPE

Abstract: A high-pressure pipe comprises an inner liner (1), an outer coating layer (6) and a reinforcement layer (2, 5) positioned between the inner liner and the outer coating layer. The reinforcement layer has helically wound strips (2, 5) which each comprise a matrix (4) and fibers (3) embedded in the matrix; the fibers consist of a multitude of twisted high-strength filaments. With an aim of providing a relatively high bending flexibility, the filaments of a fiber are sized filaments obtained by subjecting the filaments to a sizing operation.

Classifications:

International (IPC 8-9): D01F11/14 D01F9/16 D1F11/14 D1F9/16

F16L11/08 F16L58/16 F16L9/12 F16L9/14 (Advanced/Invention)

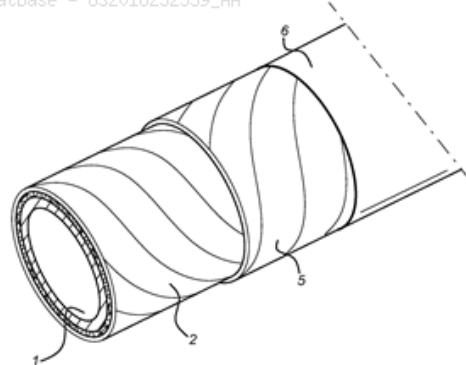
International (IPC 1-7): D01F11/14 D01F9/16 F16L11/08 F16L58/16

CPC: F16L11/082 F16L58/16 B29C53/60 B29C70/30 B29K2021/00

B29K2307/04 B29L2023/005

US: 1/1 138/132

PatBase - US2018252339_AA



Family:

Publication number	Publication date	Application number	Application date
BR112018004968 A2	20181002	BR20181104968	20160830
CA2998315 AA	20180309	CA20162998315	20160830
CN108291686 A	20180717	CN201680052978	20160830
CO20180003541 A2	20180612	CO20180003541	20180403
EP3350498 A1	20180725	EP20160767040	20160830
ID201808629 A	20180810	ID2018P0002510	20160830
IN201847013628 A	20180413	IN201847013628	20180410
NL2015434 B1	20170329	NL20152015434	20150914
RU2018113428 A	20191016	RU20180113428	20160830
US2018252339 AA	20180906	US20160759852	20160830
WO17048117 A1	20170323	WO2016NL50604	20160830

Priority:

NL20152015434 20150914

WO2016NL50604 20160830

Probable Assignee: PIPELIFE NEDERLAND BV
Assignee(s): (std): PIPELIFE NEDERLAND BV
Assignee(s): PIPELIFE NL BV ; DALMOLEN LAMBERTUS GERRIT PETER ; PAJPLAJF NEDERLAND BV
Inventor(s): (std): DALMOLEN LAMBERTUS GERRIT PETER ; LAMBERTUS GERRIT PETER DALMOLEN
Agent(s): GOWLING WLG CANADA LLP; JUAN CARLOS CUESTA QUINTERO; NEDERLANDSCH OCTROOIBUREAU; BUDI RAHMAT SH; YURIDICHESKAYA GORODISSKIJ I PARTNERY OOO FA
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

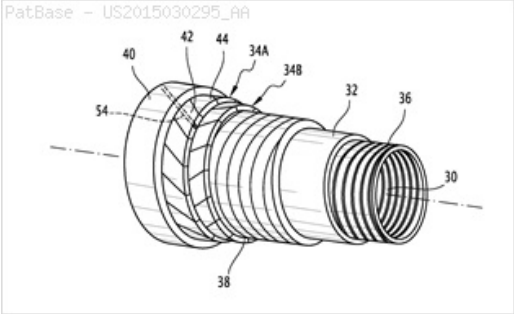
12) Family number: 54740991 (US2015030295A) © PatBase

Title: ARMOR ELEMENT FOR A FLEXIBLE LINE INTENDED TO BE PLACED IN AN EXPANSE OF WATER, AN ASSOCIATED FLEXIBLE LINE, METHOD AND PROCESS

Abstract: This element includes a plurality of longitudinal carbon fiber filaments (52) and a polymeric matrix (50) receiving the filaments (52) for binding them together, the matrix (50) forming a ribbon intended to be wound around a longitudinal body of the flexible line. The armor element (42) includes at least one optical fiber (54) received in the matrix (50), the optical fiber (54) having an elongation at break of more than 2 percent, as measured with the ASTM-D 885-03 standard.

Classifications:

International (IPC 8-9): B29C70/08 B32B1/08 C08J5/04 E21B17/01 E21B17/20 F16L11/08 F16L58/10 F16L58/16 G01M11/08 G01M5/00 G02B6/44 (Advanced/Invention)
CPC: G02B6/4494 G02B6/4416 G02B6/4415 G02B6/4432 G02B6/4486 G01M11/088 B32B1/08 B32B2262/106 E21B17/015 E21B17/206 F16L11/083 G01M5/0025 G01M11/086 G02B6/4427
US: 156/180 356/73.1 385/101 385/107



Family:

Publication number	Publication date	Application number	Application date
BR112014022140 A2	20170822	BR20141122140	20130306
DE602013008198 D1	20160714	DE201360008198T	20130306
DK2823206 T3	20160912	DK20130707650T	20130306
EP2823206 A1	20150114	EP20130707650	20130306
EP2823206 B1	20160601	EP20130707650	20130306
FR2987883 A1	20130913	FR20120052036	20120306
FR2987883 B1	20140502	FR20120052036	20120306
US2015030295 AA	20150129	US20130383400	20130306
US9658421 BB	20170523	US20130383400	20130306
WO13131972 A1	20130912	WO2013EP54530	20130306

Priority:

FR20120052036 20120306 EP20130707650 20130306 WO2013EP54530 20130306

Probable Assignee: TECHNIP FRANCE

Assignee(s): (std): TECHNIP FRANCE

Assignee(s): TECHNIP FRANCE SA

Inventor(s): (std): DO ANH TUAN ; DO AN TUAN

Inventor(s): ANH TUAN DO ; AN TUAN DO

Agent(s): BLOT PHILIPPE ROBERT EMILE; CABINET LAVOIX; OSTROLENK FABER LLP; BLOT PHILIPPE ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW