

【PATENT SPECIFICATION】

【TITLE】 Improved positioning joint structure of reinforcing steel bar (cage) having infinitely extending connection

【TECHNICAL FIELD】

【0001】 The present invention relates to a positioning joint structure of reinforcing steel bars (cages), more specifically, an improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection.

【DESCRIPTION OF PRIOR ART】

【0002】 Please refer to Fig. 1. Fig. 1 is a schematic diagram of the positioning joint structure of reinforcing steel bars (cages) of the prior art;

【0003】 The positioning joint structure of reinforcing steel bars (cages) of the prior art 1 comprises a joint piece 11 and a pivot device 12 that is used for fastening and connecting the joint piece 11. The joint piece 11 of the prior art is usually made from the reinforcing steel bar 2 by the thread rolling process; the joint piece 11 produced by the thread rolling process can be fastened and connected with the pivot device 12. After each joint piece 11 and each pivot device 12 are fastened and locked to each other, the connecting form between the joint pieces 11 has been completed, forming a positioning joint structure of reinforcing steel bars having extending connection of the prior art 1.

【0004】 However, it is discovered that the positioning joint structure of reinforcing steel bars (cages) of the prior art 1 has the following deficiencies after a period of time of usage:

- 1 . Inconvenience in fastening: During the assembly of the reinforcing steel bars (cages), if the user makes any deviation at the location where the reinforcing steel bars are connected, each joint piece will not be able to fit into the pivot device easily for fastening. Therefore, the user must aim every joint piece at the inner thread of the pivot device and align them precisely in order to proceed the positioning, fastening, and connecting operations. Such operations frequently cause inconvenience in fastening to the users.
- 2 . Tensile strength limited after fastening: During the thread rolling process, the joint piece is usually made from the reinforcing steel bar by the thread rolling process directly; the thread outer diameter of the joint piece will be smaller than or equal to the diameter of the reinforcing steel bar. Therefore, after the joint piece is fastened to the pivot device, the tensile of the joint piece is limited, in some cases when the reinforcing steel bar (cage) is impacted by a strong pull strength or an external force, the form of fastening and connecting can be easily damaged by the external force.

【0005】 In view of this, the inventor of the present invention investigated the aforementioned deficiency and searched intensively for the solutions thereof based on years of experience of research and development in relevant fields. After a long period of time of research and many experiments, the present invention is completed.

【SUMMARY】

【0006】 The main objective of the present invention is to provide a positioning joint structure of reinforcing steel bars (cages), more specifically, an improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection.

【0007】 To achieve the aforementioned objective, the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention comprises a plurality of joint pieces and pivot devices,

【0008】 wherein a plurality of the aforementioned joint pieces are fastened and connected to each other through the pivot devices, and can be implemented in the positioning joint structure of building construction applications, including reinforcing steel bars (cages), diaphragm walls, steel beam columns;

【0009】 wherein the aforementioned pivot device has the inner thread corresponding to the joint piece; the thread outer diameter of the joint piece is corresponding to the thread outer diameter of the inner thread of the pivot device; and

【0010】 wherein the characteristics of the present invention are: the joint piece has a double-start thread, a triple-start thread, or a multi-start thread; the aforementioned joint piece has a guide tooth structure installed at one end of the joint piece where the joint piece is in contact with the pivot device; through the design of the double-start thread, the triple-start thread, or the multi-start thread, the efficiency of the fastening process is improved; the aforementioned double-start thread is formed by having two threads that start 180 degrees apart from each

other; the triple-start thread is formed by having three threads that start 120 degrees apart from each other; on this basis, the start angle of a multi-start thread is an angle produced by dividing 360 degrees evenly by the number of starts.

【0011】 The advantages of using the aforementioned joint piece having a double-start thread, or a triple-start thread, or a multi-start thread to screw objects are the operational enhancements with larger fastening leads and faster screw speeds for insertion or removal. For a double-start thread screw, the travelling speed can be improved to about twice that of the single-start thread screw. In other words, the distance travelled when a double-start thread screw rotates once is equivalent to that when the single-start thread screw rotates twice. For a triple-start thread screw, the travelling speed can be improved to three times that of the single-start thread screw. In other words, the distance travelled when a triple-start thread screw rotates once is equivalent to that when the single-start thread screw rotates three times. Therefore, on this basis, the design of the multi-start thread screws can effectively increase the efficiency of the fastening operation by means of multiple ratio;

【0012】 wherein the guide tooth structure comprises a guide thread portion located at the front end of the joint piece, wherein the thread outer diameter of the guide thread portion is smaller than the thread outer diameter of the joint piece; in other words, the thread outer diameter of the guide thread portion is smaller than the thread outer diameter of the inner thread of the pivot device (the thread outer diameter of the inner thread of the pivot device is corresponding to the thread outer diameter of the joint piece); therefore, when the joint piece is in

contact with the pivot device initially, the joint piece can enter the pivot device much easier through the design of the smaller thread outer diameter of the guide thread portion; thus, when the fastening operation initially starts between the joint piece and the pivot device, the user can shorten the time for aligning the inner thread of the pivot device with the corresponding thread crest or the corresponding thread root of the joint piece for fastening process; the structure is also applicable to the reinforcing steel bars (cages) assembly using the pivot devices and the joint pieces in order to help the user in fastening the joint pieces and the pivot devices much easier, thus solving the problems that occur during the fastening process due to the deviations of the corresponding positions in the prior art and increasing the efficiency of the fastening process;

【0013】 wherein the guide tooth structure also comprises an inner guide thread portion, installed inside one end of the pivot device that is in contact with the front end of the joint piece; the thread outer diameter of the inner guide thread portion is larger than the thread outer diameter of the inner thread of the pivot device; in other words, the thread outer diameter of the inner guide thread portion is larger than the thread outer diameter of the joint piece at the same time (the thread outer diameter of the inner thread of the pivot device is corresponding to the thread outer diameter of the joint piece); therefore, when the joint piece is in contact with the pivot device initially, the joint piece can enter the pivot device much easier through the inner guide thread portion; thus, when the fastening operation initially starts between the joint piece and the pivot device, the user can shorten the time for aligning the inner thread of the pivot device with the

corresponding thread crest or the corresponding thread root of the joint piece for fastening process; the structure is also applicable to the reinforcing steel bars (cages) assembly using the pivot devices and the joint pieces in order to make the joint piece to enter the pivot device much easier through the design of the inner guide thread portion due to its larger thread outer diameter; the user can fasten the joint pieces and the pivot devices much easier, thus solving the problems that occur during the fastening process due to the deviations of the corresponding positions in the prior art and increasing the efficiency of the fastening process;

【0014】 wherein the diameter of a section of the reinforcing steel bar of the joint piece can be enlarged by the cold-formed expansion front portion method before the thread is made, and then the enlarged section of the reinforcing steel bar undergoes the thread rolling process afterward; the joint piece is shaped to have an expansion thread portion, located at the front end of the joint piece and for joining parts, a shank portion that is connected to the expansion thread portion and maintains the original diameter size of the reinforcing steel bar; the thread outer diameter of the aforementioned expansion thread portion is larger than the diameter of the shank portion; therefore, the expansion thread portion has a larger thread outer diameter than the thread outer diameter of the joint piece of the prior art that is without an expansion thereto; after the expansion thread portion and the pivot device are joined and fastened, the larger thread outer diameter of the expansion thread portion can increase the tensile strength after the joint piece and the pivot device are fastened together, thus resulting in a stronger and tighter

fastening and joining effect formed between the joint piece and the pivot device;
and

【0015】 wherein, when the joint piece is fastened and joined with the pivot device, every two joint pieces are configured into a joined and fastened form with both the front ends thereof positioned against and in contact with each other after being securely screwed into the pivot device through the inner thread of the pivot device that is corresponding to the thread of the joint piece, thus resulting in stronger tensile and a tighter fastening and joining effect formed between two joint pieces through the pivot device.

【0016】 By implementing the thread form of a multi-start thread of the present invention for the fastening operation, the speed of rotating and fastening process is improved. Furthermore, when a front end of the joint piece is designed with a guide thread portion, or an inner guide thread portion is installed inside one end of the pivot device that is in contact with the front end of the joint piece, or both the guide thread portion and the inner guide thread portion are included in the design, or either of the two, the user can fasten the joint pieces and the pivot devices much easier and the efficiency of the fastening process is increased. After every aforementioned joint piece undergoes the fastening and joining process inside the pivot device, every two joint pieces are configured into a joined and fastened form with both the front ends thereof positioned against and in contact with each other after being securely screwed into the pivot device, thus resulting in a tighter fastening and joining form and creating a stronger and a tighter fastening

and joining effect on positioning the reinforcing steel bars (cages) having infinitely extending connection.

【BRIEF DESCRIPTION OF THE DRAWINGS】

【0017】 The present invention will become more fully understood from the detailed description and figures given herein below for illustration only which thus does not limit the present invention, wherein:

Fig. 1: a schematic diagram of the positioning joint structure of reinforcing steel bars (cages) of the prior art;

Fig. 2: a schematic diagram of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 3: a schematic diagram of the guide thread portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 4: a schematic diagram of the inner guide thread portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 5-1: a schematic diagram of the cold-formed expansion front portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 5-2: (other type)a schematic diagram of the cold-formed expansion front portion of the first preferred embodiment of the improved positioning joint

structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 6: a schematic diagram of the fastening operation of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

Fig. 7: a schematic diagram of the joint piece and the guide thread portion of the second preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention; and

Fig. 8: a schematic diagram of the inner guide thread portion and the fastening operation of the second preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention;

【DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS】

【0018】 The aforementioned objectives, advantages, characteristics and structures of the present invention will become more fully understood from the detailed description given herein below by way of embodiments with reference to the accompanying drawings for illustration only. Thus, the description does not limit the present invention.

【0019】 First, please refer to Fig. 2 to Fig. 4. Fig. 2 is a schematic diagram of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of

the present invention; Fig. 3 is a schematic diagram of the guide thread portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention; and Fig. 4 is a schematic diagram of the inner guide thread portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention.

【0020】 As shown in the figures, the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection 3 of the present invention comprises a plurality of joint pieces 31 and pivot devices 32,

【0021】 wherein the plurality of joint pieces 31 are fastened and connected to each other through the pivot devices 32 and can be implemented in the positioning joint structure of building construction applications, including reinforcing steel bars (cages), diaphragm walls, steel beam columns;

【0022】 wherein the aforementioned pivot device 32 has the inner thread 321 corresponding to the joint piece 31; the thread outer diameter of the joint piece 31 is corresponding to the thread outer diameter of the inner thread 321 of the pivot device 32; and

【0023】 wherein the characteristics of the present invention are: the joint piece 31 has a double-start thread, a triple-start thread, or a multi-start thread; the aforementioned joint piece 31 has a guide tooth structure 33 installed at one end of the joint piece 31 where the joint piece 31 is in contact with the pivot device 32;

through the design of the double-start thread, the triple-start thread, or the multi-start thread, the efficiency of the fastening process is improved; as an example, the joint piece 31 of the embodiment has a double-start thread; the aforementioned double-start thread is formed by having two threads that start 180 degrees apart from each other; the triple-start thread is formed by having three threads that start 120 degrees apart from each other; on this basis, the start angle of a multi-start thread is an angle produced by dividing 360 degrees evenly by the number of starts.

【0024】 The advantages of using the aforementioned joint piece 31 having a double-start thread, or a triple-start thread, or a multi-start thread to screw objects are the operational enhancements with larger fastening leads and faster screw speeds for insertion or removal. For a double-start thread screw, the travelling speed can be improved to about twice that of the single-start thread screw. In other words, the distance travelled when a double-start thread screw rotates once is equivalent to that when the single-start thread screw rotates twice. For a triple-start thread screw, the travelling speed can be improved to three times that of the single-start thread screw during the fastening process. In other words, the distance travelled when a triple-start thread screw rotates once is equivalent to that when the single-start thread screw rotates three times. On this basis, the travelling speed and the distance travelled of a multi-start thread screw can be calculated. Therefore, the design of the multi-start thread screws can effectively increase the efficiency of the fastening operation by means of multiple ratio,

【0025】 wherein, as illustrated in Fig. 2 and Fig. 3, the guide tooth structure 33 comprises a guide thread portion 331 located at the front end of the joint piece 31, wherein the thread outer diameter of the guide thread portion 331 is smaller than the thread outer diameter of the rear end of the joint piece 31; in other words, the thread outer diameter of the guide thread portion 331 is smaller than the thread outer diameter of the inner thread 321 of the pivot device 32 (the thread outer diameter of the inner thread 321 of the pivot device 32 is corresponding to the thread outer diameter of the joint piece 31); therefore, when the joint piece 31 is in contact with the pivot device 32 initially, the joint piece 31 can enter the pivot device 32 easier through the guide thread portion 331; thus, when the fastening operation initially starts between the joint piece 31 and the pivot device 32, the user can shorten the time for aligning the inner thread 321 of the pivot device 32 with the corresponding thread crest or the corresponding thread root of the joint piece 31 for fastening process; when the inner thread 321 and the joint piece 31 are applied to the reinforcing steel bars (cages) assembly, the joint piece 31 can enter the pivot device 32 much easier due to the design of the guide thread portion 331 by having a smaller thread outer diameter; thus helping the user in fastening the joint pieces 31 and the pivot devices 32 more conveniently, solving the problems that occur during the fastening process due to the deviations of the corresponding positions in the prior art, and increasing the efficiency of the fastening process; and

【0026】 wherein, as shown in Fig. 4, the guide tooth structure 33 also comprises an inner guide thread portion 332, installed inside one end of the pivot device 32 that is in contact with the front end of the joint piece 31; the thread outer

diameter of the inner guide thread portion 332 is larger than the thread outer diameter of the inner thread 321 of the pivot device 32; in other words, the thread outer diameter of the inner guide thread portion 332 is larger than the thread outer diameter of the joint piece 31 at the same time (the thread outer diameter of the inner thread 321 of the pivot device 32 is corresponding to the thread outer diameter of the joint piece 31); therefore, when the joint piece 31 is in contact with the pivot device 32 initially, the joint piece 31 can enter the pivot device 32 easier through the inner guide thread portion 332; thus, when the fastening operation initially starts between the joint piece 31 and the pivot device 32, the user can shorten the time for aligning the inner thread 321 of the pivot device 32 with the corresponding thread crest or the corresponding thread root of the joint piece 31 for fastening process; the structure is also applicable to the reinforcing steel bars (cages) assembly using the inner thread 321 of the pivot devices 32 and the joint pieces 31 in order to make the joint piece 31 to enter the pivot device 32 much easier through the design of the inner guide thread portion 332 due to its larger thread outer diameter; the user can fasten the joint pieces 31 and the pivot devices 32 more conveniently, thus solving the problems that occur during the fastening process due to the deviations of the corresponding positions in the prior art and increasing the efficiency of the fastening process.

【0027】 Please refer to Fig. 5-1. Fig. 5-1 is a schematic diagram of the cold-formed expansion front portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention,

【0028】 wherein the diameter of a section of the reinforcing steel bar 4 of the joint piece 31 can be enlarged by the cold-formed expansion front portion method before the thread is made, and then the enlarged section of the reinforcing steel bar 4 undergoes the thread rolling process afterward; the joint piece 31 is shaped to have an expansion thread portion 311, located at the front end of the joint piece 31 and for joining parts, a shank portion 312 that is connected to the expansion thread portion 311 and maintains the original diameter size of the reinforcing steel bar; the thread outer diameter of the aforementioned expansion thread portion 311 is larger than the diameter of the shank portion 312; therefore, the expansion thread portion 311 has a larger thread outer diameter than the thread outer diameter of the joint piece 31 of the prior art that is without an expansion thereto; after the expansion thread portion 311 and the pivot device 32 are joined and fastened, the larger thread outer diameter of the expansion thread portion 311 can increase the tensile strength after the joint piece 31 and the pivot device 32 are fastened, thus resulting in a stronger and tighter fastening and joining effect formed between the joint piece 31 and the pivot device 32; and

【0029】 Please refer to Fig. 5-2. Fig. 5-2 is other type of a schematic diagram of the cold-formed expansion front portion of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention,

【0030】 wherein the size of the diameter of the expansion thread portion 311 can decrease gradually toward the direction away of the shank portion 312, or

the size of the diameter can maintain unchanged, for different fastening requirements.

【0031】 Please refer to Fig. 6. Fig. 6 is a schematic diagram of the fastening operation of the first preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention; and

【0032】 wherein, when the joint piece 31 is fastened and joined with the inner thread 321 of the pivot device 32, every two joint pieces 31 are configured into a joined and fastened form with both the front ends thereof positioned against and in contact with each other after being securely screwed into the pivot device 32 through the inner thread 321 of the pivot device 32 that is corresponding to the thread of the joint piece 31, thus resulting in stronger tensile and a tighter fastening and joining effect formed between two joint pieces 31 through the pivot device 32.

【0033】 By implementing the thread form of a multi-start thread of the present invention for the fastening operation, the speed of rotating and fastening process is improved. Furthermore, when a front end of the joint piece 31 is designed with a guide thread portion 331, or an inner guide thread portion 332 (as shown in Fig. 4) is installed inside one end of the pivot device 32 that is in contact with the front end of the joint piece 31, or both the guide thread portion 331 and the inner guide thread portion 332 are included in the design, or either of the two, the user can fasten the joint pieces 31 and the pivot devices 32 more conveniently. After every aforementioned joint piece 31 undergoes the fastening and joining process inside the pivot device 32, every two joint pieces 31 are configured into a

joined and fastened form with both the front ends thereof positioned against and in contact with each other after being securely screwed into the pivot device 32, thus resulting in a very tight fastening and joining form and creating a stronger and a tighter fastening and joining effect on positioning the reinforcing steel bars (cages) having infinitely extending connection.

【0034】 Please refer to Fig. 7 and Fig. 8. Fig. 7 is a schematic diagram of the joint piece and the guide thread portion of the second preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention; Fig. 8 is a schematic diagram of the inner guide thread portion and the fastening operation of the second preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection of the present invention.

【0035】 The second preferred embodiment of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection 3 of the present invention comprises all the components of the first preferred embodiment. The difference is: the joint piece 31 has a single-start thread, instead of a multi-start thread. The joint piece 31 has a guide tooth structure 33 installed at one end of the joint piece 31 where the joint piece 31 is in contact with the pivot device 32. The guide tooth structure 33 comprises a guide thread portion 331, wherein the thread outer diameter of the guide thread portion 331 is smaller than the thread outer diameter of the rear end of the joint piece 31. The guide tooth structure 33 can also comprises an inner guide thread portion 332, having a single-start thread and installed inside one end of the pivot device 32 that

is in contact with the front end of the joint piece 31. The thread outer diameter of the inner guide thread portion 332 is larger than the thread outer diameter of the inner thread 321 of the pivot device 32 making the joint piece 31 to initially enter the pivot device 32 much easier. Due to the simple structure of the aforementioned single-start thread, the production cost of the overall structure can be reduced. On top of that, having included the guide tooth structure 33, the effectiveness in cost saving, convenience in fastening, enhancement in fastening strength and securing level can be achieved.

【0036】 In summary, the advantages of the improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection are as follows:

1. Convenience of fastening: The joint piece has a guide thread portion and the pivot device includes an inner guide thread portion, so that when the fastening operation initially starts between the joint piece and the pivot device, the user can shorten the time for aligning the inner thread of the pivot device with the corresponding thread crest or the corresponding thread root of the joint piece for fastening process.
2. Performing the fastening operation more easily: When the inner threads and the joint pieces are applied to the reinforcing steel bars (cages) assembly, position deviations often occur while aligning the corresponding components during the fastening process. The joint piece can enter the pivot device much easier during the fastening operation through the design of the smaller thread outer diameter of the guide thread portion.

3. Fastening operation with better efficiency: The joint piece has a double-start thread, or a triple-start thread, or a multi-start thread, so that the speed of rotating and tightening the thread screw of the present invention increases during the fastening process. Furthermore, having included the guide tooth structure, the joint piece can enter the pivot device much easier and the efficiency of the fastening operation can be improved.
4. Increase of the thread fastening strength: After the joint piece is enlarged by the cold-formed expansion front portion method and then the enlarged section undergoes the thread rolling process afterward to produce a thread with larger diameters of thread crests and thread roots that forms a larger tensile strength after the fastening.
5. Tighter fastening and joining effect: The inner thread of the pivot device is fastened with the corresponding joint piece. In addition, every two joint pieces are configured into a joined and fastened form with both the front ends thereof positioned against and in contact with each other after being securely screwed into the pivot device, thus resulting in stronger tensile and a tighter fastening and joining effect.

【0037】 Therefore, the present invention has made excellent progress and presented high practicality compared to other products of same categories. Meanwhile, after searching domestic and foreign publications related to the technology of this type of structure, it is concluded that no identical or similar structures exist in the patents approved prior to the submission of the application of the present invention. Thus, the present invention meets the key requirements of

“novelty”, “applicable to industrial use”, “progress” for patentability and, therefore, hereby the application is submitted in accordance with the laws and regulations.

【0038】 However, the aforementioned examples are a few preferred embodiments of the present invention. Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope.

【COMPONENT SYMBOL】

【0039】

3 improved positioning joint structure of reinforcing steel bars (cages) having infinitely extending connection

3 1 joint piece

3 1 1 expansion thread portion

3 1 2 shank portion

3 2 pivot device

3 2 1 inner thread

3 3 guide tooth structure

3 3 1 guide thread portion

3 3 2 inner guide thread portion

4 reinforcing steel bar

(Prior art)

1 positioning joint structure of reinforcing steel bars (cages) of the prior art

1 1 joint piece

- 1 2 pivot device
- 2 reinforcing steel bar

CLAIMS

What is claimed is:

1. An improved positioning joint structure of reinforcing steel bars (cages), comprising a plurality of joint pieces and pivot devices, wherein the plurality of joint pieces are fastened and connected to each other through the pivot devices and are used as the reinforcing steel bars (cages) having an extending connection;
the pivot device having an inner thread corresponding to the joint piece; wherein the joint piece that has a double or a triple-start thread and a guide tooth structure installed at one end of the joint piece where the joint piece is in contact with the pivot device;
the guide tooth structure comprising a guide thread portion located at one end of the joint piece that is in contact with the front end of the joint piece, and an inner guide thread portion installed inside one end of the pivot device;
the thread diameter of the guide thread portion being smaller than the thread diameter of the joint piece at the rear end of the joint piece; when the joint piece is in contact with the pivot device initially, such that the joint piece can enter the inner guide thread portion of the pivot device much easier through the design of the smaller thread diameter of the guide thread portion, the inner guide thread portion having a larger thread diameter than that of the inner thread of the pivot device, such that the joint piece can enter the pivot device much easier initially during the fastening process, and wherein

a diameter of a section of the reinforcing steel bar of the joint piece is enlarged by cold-formed expansion front portion method before thread is made, such that the enlarged section of the reinforcing steel bar undergoes thread rolling process afterward; the joint piece comprising an expansion thread portion, located at the front end of the joint piece and for joining parts, a shank portion that is connected to the expansion thread portion and maintains an original diameter size of the reinforcing steel bar, wherein a thread outer diameter of the expansion thread portion is larger than a diameter of the shank portion and a diameter of the expansion thread portion decreases gradually toward a direction away from the shank portion.

2. An improved positioning joint structure of reinforcing steel bars (cages), comprising a plurality of joint pieces and pivot devices, wherein the plurality of joint pieces are fastened and connected to each other through the pivot devices and are used as the reinforcing steel bars (cages) having an extending connection;
 - the pivot device having an inner thread corresponding to the joint piece; wherein the joint piece that has a single-start thread and a guide tooth structure installed at one end of the joint piece where the joint piece is in contact with the pivot device;
 - the guide tooth structure comprising a guide thread portion located at one end of the joint piece that is in contact with the front end of the joint piece, and an inner guide thread portion installed inside one end of the pivot device;

the thread diameter of the guide thread portion being smaller than the thread

diameter of the joint piece at the rear end of the joint piece; the joint piece can enter the inner guide thread portion of the pivot device much easier through the design of the smaller thread diameter of the guide thread portion, the inner guide thread portion having a larger thread diameter than that of the inner thread of the pivot device, such that the joint piece can enter the pivot device much easier initially during the fastening process and wherein

a diameter of a section of the reinforcing steel bar of the joint piece is enlarged by cold-formed expansion front portion method before thread is made, such that the enlarged section of the reinforcing steel bar undergoes thread rolling process afterward; the joint piece comprising an expansion thread portion, located at the front end of the joint piece and for joining parts, a shank portion that is connected to the expansion thread portion and maintains an original diameter size of the reinforcing steel bar, wherein a thread outer diameter of the expansion thread portion is larger than a diameter of the shank portion and a diameter of the expansion thread portion decreases gradually toward a direction away from the shank portion.