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(54) **TRAMPOLINE SUPPORT FRAME WITH BENDABLE SUPPORT LEGS**

(57) A trampoline support frame (100) with bendable support legs comprises a frame (10) and a plurality of support legs (20). The frame (10) comprises a plurality of support tubes (11), an in-frame space (13) and a plurality of connection posts (12). Each of the support legs (20) comprises a bridging member (21), an operating sleeve (22) sleeved on the bridging member (21), a spring (23) and a post foot (24) arranged in the operating sleeve (22), wherein the spring (23) is arranged in the operating sleeve (22). When each operating sleeve (22) is stressed to compress the corresponding spring (23) to be separated from the connection post (12), each of the support legs (20) moves by a pivoting stroke (80) which allows the support leg to be folded toward the in-frame space (13). Compared with the conventional trampoline support frame, the present invention has the following characteristic: the operating sleeve (22) is matched with the spring (23), and the spring (23) is not subjected to severe deformation during the implementation, so that the spring (23) is less prone to elastic fatigue. Further, the number of times the support legs (20) are stored is increased, and the consumer has the best experience in use.

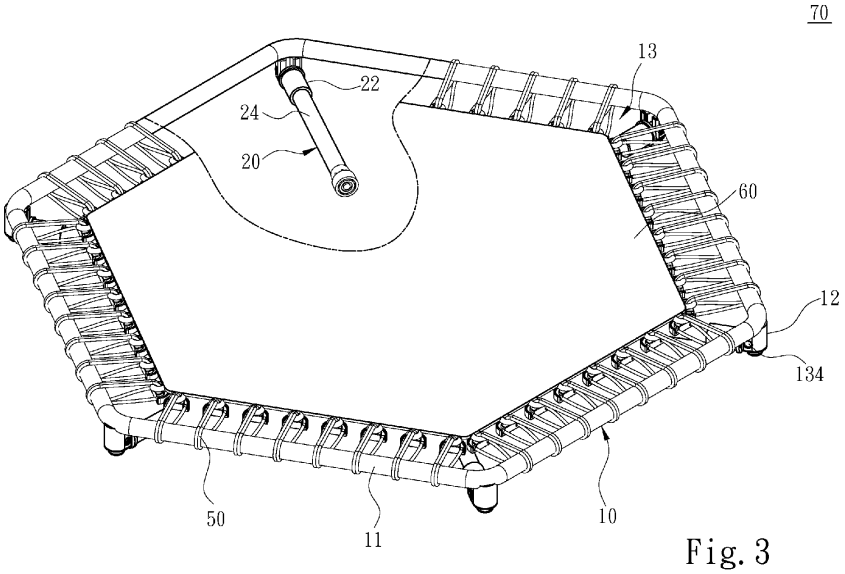

Fig. 3

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a trampoline support frame, in particular to a trampoline support frame whose trampoline support legs can be easily bent by applying a force to each operating sleeve.

BACKGROUND OF THE INVENTION

[0002] Trampoline is a kind of sports equipment that has been very popular in recent years. It can be used not only as a leisure facility for adults and children, but also as a sports facility for people to exercise. However, the modern people's home space is small, and the size of the trampoline is so large that people's willingness to buy trampolines during the shopping process declines. Therefore, many trampoline manufacturers have developed the function of folding the support legs of the trampoline, so that the support legs can be bent after the trampoline is used, thereby reducing the size of the trampoline for home storage.

[0003] US 7,094,181B provides the structure of related conventional trampoline support legs The trampoline support legs are characterized in that each of the support legs has an extension member arranged on the support leg and a spring connectable to the extension member and a trampoline base arranged on the trampoline. When each of the support legs is to be stored, the user must pull the spring to force the trampoline base to be separated from the extension member, and fold the extension member relative to the trampoline base to complete the storage. On the other hand, CN 2,367,337Y discloses that a trampoline support frame comprises a plurality of protruded posts arranged on the trampoline support frame, a spring and a plurality of support legs, wherein a positioning piece is arranged on the bottom of each of the support legs; each spring respectively hooks one of the protruded posts and the corresponding positioning piece; when the trampoline support frame is to be stored, each support leg is pulled down in an axial direction thereof to force the support leg to be separated from one of the protruded posts, and the support leg is then folded to the side of the protruded post to complete the storage. However, in the aforementioned patents, two ends of each spring are respectively disposed on the trampoline support frame and the bottom inside the space of the corresponding support leg. When the user wants to store each support leg, a very large force is applied to the support leg to separate the support leg from the trampoline support frame. In this way, the spring arranged in the support leg will be greatly deformed by the force, so that the spring is prone to elastic fatigue, so that the support leg can no longer be bent. At the same time, since the spring cannot be deformed until the user applies a large force to the spring, the user cannot have good experience in use.

SUMMARY OF THE INVENTION

[0004] In order to fulfill said objective, the present invention provides a trampoline support frame with bendable support legs, comprising: a frame and a plurality of support legs. The frame comprises a plurality of support tubes assembled in sequence, an in-frame space defined by these support tubes, and a plurality of connection posts respectively connected to one of the support tubes, each of the connection posts having a mounting gap. The support legs are respectively assembled with each connection post, wherein each of the support legs comprises a bridging member arranged in the mounting gap and pivotally connected to the corresponding connection post, an operating sleeve sleeved on the bridging member, a spring arranged in the operating sleeve and a post foot arranged in the operating sleeve and assembled with the bridging member. The operating sleeve has a limiting ring located inside the operating sleeve; the spring has a first end pressed by the limiting ring and a second end limited by the post foot; the post foot has a stop portion contacting the second end; the operating sleeve has a first state that the operating sleeve is supported by the spring to prop against the connection post and a second force in stressed to compress the spring to be separated from the connection post; each of the support legs has a pivoting stroke that allows the support leg to be folded toward the in-frame space when the operating sleeve enters the second state.

[0005] In an embodiment, the connection post has a first portion connected to one of the support tubes and a second portion extending from the first portion away from the support tube; the bridging member has a mounting piece arranged in the mounting gap, and a holding block assembled with the mounting piece and abutting against the second portion; the connection post has a first surface arranged at a terminal of the second portion; the bridging member has a second surface which is arranged at a junction of the holding block and the mounting piece to be in contact with the first surface.

[0006] In an embodiment, each connection post has a first width corresponding to the first portion, and a second width corresponding to the second portion and smaller than the first width.

[0007] In an embodiment, each connection post has two mounting walls spaced apart to define the mounting gap, and a connection block connecting the two mounting walls.

[0008] In an embodiment, the bridging member has a first thread arranged on a side away from the mounting piece; each post foot has a mounting opening assembled with the holding block, and a second thread arranged in the mounting opening and assembled with the first thread.

[0009] In an embodiment, the mounting piece has a pivoting portion connected to the holding block, and a structural reinforcing portion connected to the pivoting portion.

[0010] In an embodiment, each of the connection posts has a housing connected to one of the support tubes, and a liner arranged in the housing, wherein the mounting gap is formed in the liner; the housing has an opening corresponding to the mounting gap.

[0011] In an embodiment, the connection post has a first assembling hole communicated with the mounting gap; the bridging member has a second assembling hole corresponding to the first assembling hole; the housing has a third assembling hole corresponding to the first assembling hole.

[0012] In an embodiment, the spring is a compression spring.

[0013] According to the summary of the present invention, the present invention has the following features as compared with the conventional technology: in the present invention, by arranging the spring in the operating sleeve, the spring can deform just by applying a force to the operating sleeve by a user, so as to bend the support leg. Compared with a conventional structure, the user can store the support legs in a relatively easy manner. At the same time, the spring does not undergo severe deformation, making the spring less prone to fatigue. Therefore, the number of times that the support leg is bent can be increased, and the consumer's evaluation on the use of the product can be promoted.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is a schematic view showing the appearance of an embodiment of the present invention.

Fig. 2 is a schematic view showing the appearance in a first state of an embodiment of the present invention.

Fig. 3 is a schematic view showing the appearance in a second state of an embodiment of the present invention.

Fig. 4 is a schematic exploded view of a structure of an embodiment of the present invention.

Fig. 5 is a schematic top view of a liner of an embodiment of the present invention.

Fig. 6 is a schematic sectional view of a liner of an embodiment of the present invention.

Fig. 7 is a schematic sectional view showing a first state of an embodiment of the present invention.

Fig. 8 is a schematic sectional view showing a second state of an embodiment of the present invention.

Fig. 9 is a schematic sectional view showing a pivoting stroke of an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] The detailed description and technical contents of the present invention are described as follows in conjunction with the drawings:

Referring to Fig. 1, Fig. 2, Fig.3, and Fig. 4, the present invention provides a trampoline support frame 100. The trampoline support frame 100 is implemented with at least one elastic member 50 and trampoline mat 60 to form a trampoline 70. The trampoline mat 60 is arranged in the trampoline support frame 100 through these elastic members 50. Specifically, the trampoline support frame 100 comprises a frame 10 and a plurality of support legs 20, wherein the frame 10 comprises a plurality of support tubes 11 assembled in sequence, and a plurality of connection posts 12 respectively arranged on one of the plurality of support tubes 11. The plurality of support tubes 11 are configured to be annular or polygonal after being assembled. The shape of the frame 10 is not limited as that in the drawings. Moreover, each of the plurality of support tubes 11 can be identical in shape, and each of the plurality of connection posts 12 is arranged on one of the plurality of support tubes 11. Further, at least one of the plurality of connection posts 12 can be arranged on each of the plurality of support tubes 11, and not limited to a single one. Moreover, before the plurality of support tubes 11 are assembled, the plurality of connection posts 12 have already been arranged on the plurality of support tubes 11. That is, each of the plurality of support tubes 11 is able to combine with at least one of the plurality of connection posts 12 to form a component. Furthermore, the assembled support tubes 11 define an in-frame space 13 and the in-frame space 13 allows the trampoline mat 60 to be provided therein. In addition, the plurality of connection posts 12 of the present invention are spaced apart, and the spacing between every two adjacent connection posts 12 can be equal.

[0016] Also referring to Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5, Fig. 6, Fig. 7, Fig. 8, and Fig. 9, each of the plurality of support legs 20 is respectively assembled with one of the plurality of connection posts 12. Further, according to the present invention, the plurality of support leg 20 can move by a pivoting stroke 80 relative to the frame 10. Each of the plurality of connection posts 12 is provided with a mounting gap 121 that allows one of the plurality of support legs 20 to be arranged. Each of plurality of the support legs 20 has a bridging member 21 arranged in the mounting gap 121 and pivotally connected to the connection post 12, an operating sleeve 22 provided on the bridging member 21, a spring 23 arranged in the operating sleeve 22 and a post foot 24 that penetrates into the operating sleeve 22 and is assembled with the bridging member 21. More specifically, the bridging member 21 comprises a mounting piece 211 arranged in the mounting gap 121 and a holding block 212 connected to the mounting piece 211. The shape of the mounting piece 211 is configured to correspond to the mounting gap 121. The bridging member 21 is in a pivotal connection relationship with the connection post 12 by the mounting piece 211. Moreover, the inner diameter of the operating sleeve 22 is set to accord with or slightly larger than the diameter of the post foot 24. Further, the operating sleeve

22 has a limiting ring 221 arranged in the operating sleeve 22. When the each of the plurality of support legs 20 is assembled, one end of the spring 23 will abut against the limiting ring 221. Moreover, the post foot 24 of the present invention is assembled with the bridging member 21. In an embodiment, the bridging member 21 has a first thread 213 arranged on a side of the holding block 212 away from the mounting piece 211. The post foot 24 has a mounting opening 241 allowing the holding block 212 to be placed, and a second thread 242 arranged in the mounting opening 241 and assembled with the first thread 213. Furthermore, according to the present invention, in order to limit the spring 23, the post foot 24 further has a stop portion 243. The stop portion 243 will allow the spring 23 to be abutted against thereon, and the stop portion 243 can be formed by a change in the diameter of the post foot 24. For example, one portion of the post foot 24 which is assembled with the bridging member 21 has a diameter, and the rest of the post foot 24 has another diameter larger than the aforementioned diameter . The stop portion 243 is formed at a position where the diameter changes. In addition, the stop portion 243 can also be formed by a convex ring or a bump on the post foot 24.

[0017] The spring 23 of the present invention can be a compression spring. After the each of the plurality of support legs 20 is assembled, the spring 23 is limited by the post foot 24 and abuts against the operating sleeve 22. That is, the spring 23 of the present invention has a first end 231 that is pressed by the limiting ring 221 and a second end 232 that is limited by the post foot 24. Moreover, when the operating sleeve 22 is stressed to move along the post foot 24, the spring 23 is compressed by the displacement of the limiting ring 221. When the operating sleeve 22 is not stressed, the spring 23 is returned to the original state so that the operating sleeve 22 is pushed toward the connection post 12. Accordingly, the operating sleeve 22 of the present invention has a first state that the operating sleeve 22 is supported by the spring 23 to prop against the connection post 12 and a second state that the operating sleeve 22 is stressed to compress the spring 23 to be separated from the connection post 12. Referring to Fig. 7 and Fig. 8, the first state is referred to herein as when the operating sleeve 22 is not stressed, and the second state is when the operating sleeve 22 is stressed. Further, when the operating sleeve 22 is in the first state, the operating sleeve 22 is pushed by the spring 23and is partially inserted into the connection post 12. Thus, the support leg 20 cannot be pivotally rotated relative to the connection post 12 through the bridging member 21. That is, when the operating sleeve 22 is in the first state, the support leg 20 will be limited from rotating. On the other hand, when the operating sleeve 22 is in the second state, the operating sleeve 22 has been displaced, and the limitation to the bridging member 21 is released. Therefore, the bridging member 21 can move through the pivoting stroke 80 with respect to the connection post 12. That is, the support leg 20 can rotate against the frame 10. Accordingly, in the second state, once the operating sleeve 22 is not continuously subjected to the force of displacement toward the post foot 24, the operating sleeve 22 loses the force to compress the spring 23 since the operating sleeve 22 is pushed by the spring 23. Then, the spring 23 will return to the original state, and the spring 23 drives the operating sleeve 22 to move toward the connection post 12 upon returning.

[0018] Referring to Fig. 1, Fig. 2, and Fig. 3, the use of the trampoline support frame 100 will be described as follow. It should be noted that the trampoline support frame 100 is configured to match the trampoline mat 60 and these elastic members 50 to form the trampoline 70. The plurality of support legs 20 are in an initial state for supporting. In the initial state, the trampoline 70 can be used normally. When the operating sleeve 22 on each of plurality of the support legs 20 is not stressed and is in the first state for a long time, each of the plurality of support legs 20 cannot be bent. When the user no longer needs to use the trampoline 70, the user can operate the plurality of support legs 20 one by one. The operating sleeve 22 on each of the plurality of support legs 20 first turn to the second state from the first state, and then each of the plurality of the support leg 20 moves through the pivoting stroke 80 so that each of the plurality of support leg 20 is bent toward the in-frame space 13. The continuous schematic view of the first state and the second state are shown in Fig. 2 and Fig. 3. Furthermore, after each of the plurality of support leg 20 is bent, the user can stop applying a force to the operating sleeve 22, and the spring 23 pushes against the operating sleeve 22 to move toward the connection post 12 while the operating sleeve 22 stops being stressed. The operating sleeve 22 is pushed against the side of the connection post 12 to limit the rotation of the support leg 20. That is to say, each of the support legs 20 of the present invention cannot move freely after being bent. In this way, the trampoline 70 can be stored in a small size. Moreover, when the user wants to use the trampoline 70 that has been stored, the support legs 20 need only be operated one by one, and the operating sleeve 22 on each support leg 20 is applied force against the connection post 12, so that the operating sleeve 22 enters the second state. Next, the support leg 20 is then allowed to move through the pivoting stroke 80 until the support leg 20 returns to a state that can be used to support the trampoline 70. Thereafter, once the operating sleeve 22 is stopped being stressed, the operating sleeve 22 will return to the first state, prohibiting the support leg 20 from being bent.

[0019] As described above, according to the present invention, the trampoline 70 is stored in a small size through the aforementioned members. In addition, the arrangement manner of the spring 23 of the present invention is different from a conventional structure. In the conventional structure, an elastic assembly is placed in a leg post, wherein one end of the elastic assembly is arranged on a trampoline frame, and the other end there-

of is arranged at the bottom of the space inside the leg post; in the course of storage, the leg post needs to be pulled away from the trampoline frame by a significant distance before the storage operation is performed; as a result, the elastic assembly needs to undergo a severe deformation amount for many times, so the elastic assembly is prone to lose of original properties, resulting that the leg post cannot be reliably fixed after being stored. In contrast, according to the present invention, the operating sleeve 22 is used in conjunction with the spring 23; during use, the spring 23 does not need to undergo a severe deformation amount, thereby ensuring the service life of the spring 23, avoiding the failure of the spring 23 to occur too quickly, and damaging the reputation of the manufacturer. Moreover, the conventional structure requires the user to apply a large force to deform the elastic assembly to the extent that the leg post can be bent. However, the present invention can be completed only by switching the state of the operating sleeve 22, so that the user can implement it in a relatively easy manner.

[0020] Please refer to Fig. 4, Fig. 5 and Fig. 6. Fig. 6 is a schematic sectional view of the line A-A of Fig. 5. In order to increase the structural stability of the operating sleeve 22 propping against the connection post 12, in an embodiment, each of the connection posts 12 has a first portion 122 connected to one of the support tubes 11 and a second portion 123 extending from the first portion 122 away from the support tube 11. Further, each of the connection posts 12 further has a first width 124 corresponding to the first portion 122 and a second width 125 corresponding to the second portion 123, the second width 125 being smaller than the first width 124. That is, the connection post 12 forms a step-like shape in this embodiment. Moreover, the second width 125 needs to accord with at least the inner diameter of the operating sleeve 22. That is, the second portion 123 of the connection post 12 in this embodiment will be located in the operating sleeve 22 when the operating sleeve 22 is in the first state, and the top edge of the operating sleeve 22 props against the junction of the first portion 122 and the second portion 123. In addition, in order to increase the area of the operating sleeve 22 that can prop against the connection post 12, in an embodiment, the connection post 12 has a convex ring 126 arranged between the first portion 122 and the second portion 123.

[0021] Referring to Fig. 4, Fig. 5, Fig. 6, and Fig. 7, in an embodiment, each of the connection posts 12 is composed of two mounting walls 127 arranged at intervals to define the mounting gap 121 and a connection block 128 connecting the two mounting walls 127. Further, the shapes of the two mounting walls 127 can be the same to avoid the problem of different structures on the left and right sides. Furthermore, each of the connection posts 12 in this embodiment can be formed integrally or a plurality of members combined to form the foregoing structure according to implementation requirements.

[0022] Referring to Fig. 4, Fig. 5, Fig. 6, and Fig. 7, in an embodiment, the connection post 12 has a first surface 129 facing the bridging member 21, and the first surface 129 refers to a surface of the connection post 12 away from one side of the support tube 11. The mounting piece 211 on each of the bridging members 21 is arranged only on a portion of the holding block 212, and a portion of the holding block 212, which is not connected to the mounting piece 211 is formed with a second surface 214. When the operating sleeve 22 is in the first state, the second surface 214 will face the first surface 129, and even the second surface 214 can be in contact with the first surface 129. Furthermore, the first surface 129 and the second surface 214 may each be a curved surface, and when the first surface 129 is a convex curved surface, the second surface 214 is a concave curved surface. That is to say, the shape of the first surface 129 corresponds to that of the second surface 214. Referring to Fig. 7, in order to increase the stability of each of the bridging members 21 that drives the support leg 20 to move through the pivoting stroke 80, in another embodiment, the mounting piece 211 has a structural reinforcing portion 216 extending from the pivoting portion 215 in addition to a pivoting portion 215 that is originally assembled with the two mounting walls 127. Therefore, the contact area of the mounting piece 211 with each of the mounting walls 127 becomes an area of the pivoting portion 215 that contacts the mounting wall 127 plus an area of the structural reinforcing portion 216 that contacts the mounting wall 127.

[0023] In an embodiment, each of the connection posts 12 is composed of a housing 130 and a liner 131 arranged in the housing 130. The housing 130 and the liner 131 can be made of different materials. For example, the housing 130 may be made of metal as the support tube 11, and the liner 131 may be made of plastic. Accordingly, the housing 130 can be welded to the support tube 11, and the liner 131 can be inserted into the housing 130. Moreover, the housing 130 has an opening 132 corresponding to the mounting gap 121. Further, the housing 130 can be configured in a U shape, and a notched portion thereof is the opening 132. Furthermore, each connection post 12 has at least one first assembling hole 133 connected to the mounting gap 121, and each bridging member 21 has a second assembling hole 217 corresponding to the first assembling hole 133. The housing 130 has a third assembling hole 134 corresponding to the first assembling hole 133. The first assembling hole 133, the second assembling hole 217 and the third assembling hole 134 are identical in shape, and allow an assembling member 90 to pass through in sequence during assembly to form in a pivotal connection relationship.

Claims

1. A trampoline support frame (100) with bendable support legs, comprising:

a frame (10), comprising a plurality of support tubes (11) assembled in sequence, an in-frame space (13) defined by the plurality of support tubes (11), and a plurality of connection posts (12) respectively connected to the plurality of support tubes (11), each of the plurality of connection posts (12) comprising a mounting gap (121); and

a plurality of support legs (20), respectively assembled with one of the plurality of connection posts (12), each of the plurality of support legs (20) comprising a bridging member (21) arranged in the mounting gap (121) and pivotally connected to the plurality of connection posts (12), an operating sleeve (22) sleeved on the bridging member (21), a spring (23) arranged in the operating sleeve (22) and a post foot (24) arranged in the operating sleeve (22) and assembled with the bridging member (21),wherein the operating sleeve (22) comprises a limiting ring (221) located inside the operating sleeve (22), the spring (23) comprises a first end (231) pressed by the limiting ring (221) and a second end (232) limited by the post foot (24), the post foot (24) comprises a stop portion (243) contacting the second end (232), the operating sleeve (22) has a first state that the operating sleeve (22) is supported by the spring (23) to prop against the plurality of connection posts (12) and a second state that the operating sleeve (22) stressed to compress the spring (23) to be separated from the plurality of connection posts (12), and each of the plurality of support legs (20) comprises a pivoting stroke (80) allowing the post foot (24) to be folded toward the in-frame space (13) when the operating sleeve (22) enters the second state.

2. The trampoline support frame (100) with bendable support legs according to claim 1, wherein each of the plurality of connection posts (12) comprises a first portion (122) connected to one of the plurality of support tubes (11) and a second portion (123) extending from the first portion (122) away from the plurality of support tubes (11), the bridging member (21) comprises a mounting piece (211) arranged in the mounting gap (121), and a holding block (212) assembled with the mounting piece (211) and abutting against the second portion (123), each of the plurality of connection posts (12) comprises a first surface (129) arranged at a terminal of the second portion (123), and the bridging member (21) comprises a second surface (214) arranged at a junction of the holding block (212) and the mounting piece (211) to be in contact with the first surface (129).

3. The trampoline support frame (100) with bendable support legs according to claim 2, wherein each of the plurality of connection posts (12) comprises a first width (124) corresponding to the first portion (122), and a second width (125) corresponding to the second portion (123) and smaller than the first width (124).

4. The trampoline support frame (100) with bendable support legs according to claim 1 or 3, wherein each of the plurality of connection posts (12) comprises two mounting walls (127) spaced apart to define the mounting gap (121), and a connection block (128) connecting the two mounting walls (127).

5. The trampoline support frame (100) with bendable support legs according to claim 2, wherein the bridging member (21) comprises a first thread (213) arranged on a side away from the mounting piece (211), the post foot (24) comprises a mounting opening (241) assembled with the holding block (212), and a second thread (242) arranged in the mounting opening (241) and assembled with the first thread (213).

6. The trampoline support frame (100) with bendable support legs according to claim 2, wherein the mounting piece (211) comprises a pivoting portion (215) connected to the holding block (212), and a structural reinforcing portion (216) connected to the pivoting portion (215).

7. The trampoline support frame (100) with bendable support legs according to claim 1, wherein each of the plurality of connection posts (12) comprises a housing (130) connected to one of the plurality of support tubes (11), and a liner (131) arranged in the housing (130), wherein the mounting gap (121) is formed in the liner (131); and the housing (130) comprising an opening (132) corresponding to the mounting gap (121).

8. The trampoline support frame (100) with bendable support legs according to claim 7, wherein each of the plurality of connection posts (12) comprises a first assembling hole (133) communicated with the mounting gap (121), the bridging member (21) comprises a second assembling hole (217) corresponding to the first assembling hole (133), and the housing (130) comprises a third assembling hole (134) corresponding to the first assembling hole (133).

9. The trampoline support frame (100) with bendable support legs according to claim 1, 2, 3, 7 or 8, wherein the spring (23) is a compression spring.

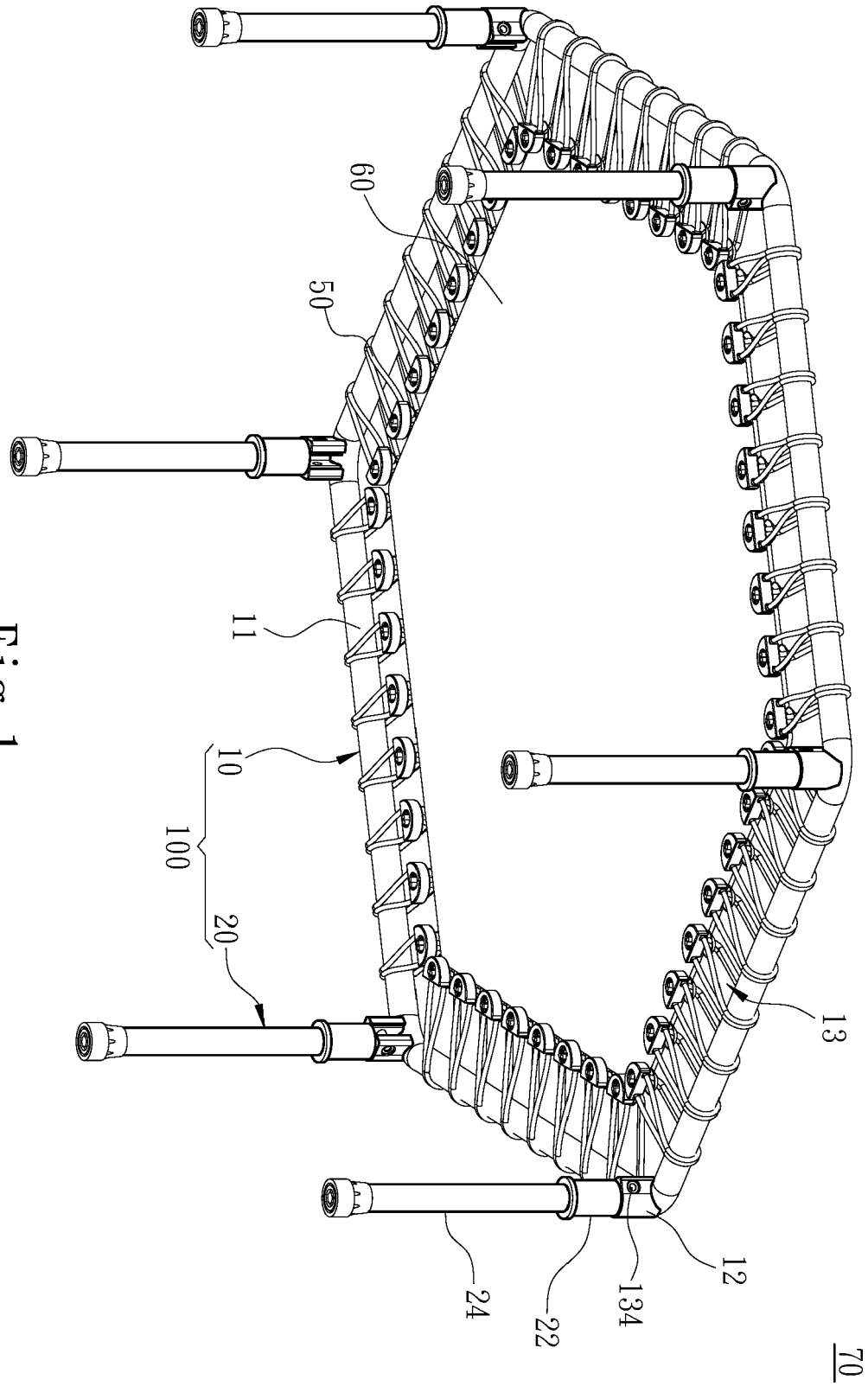

Fig. 1

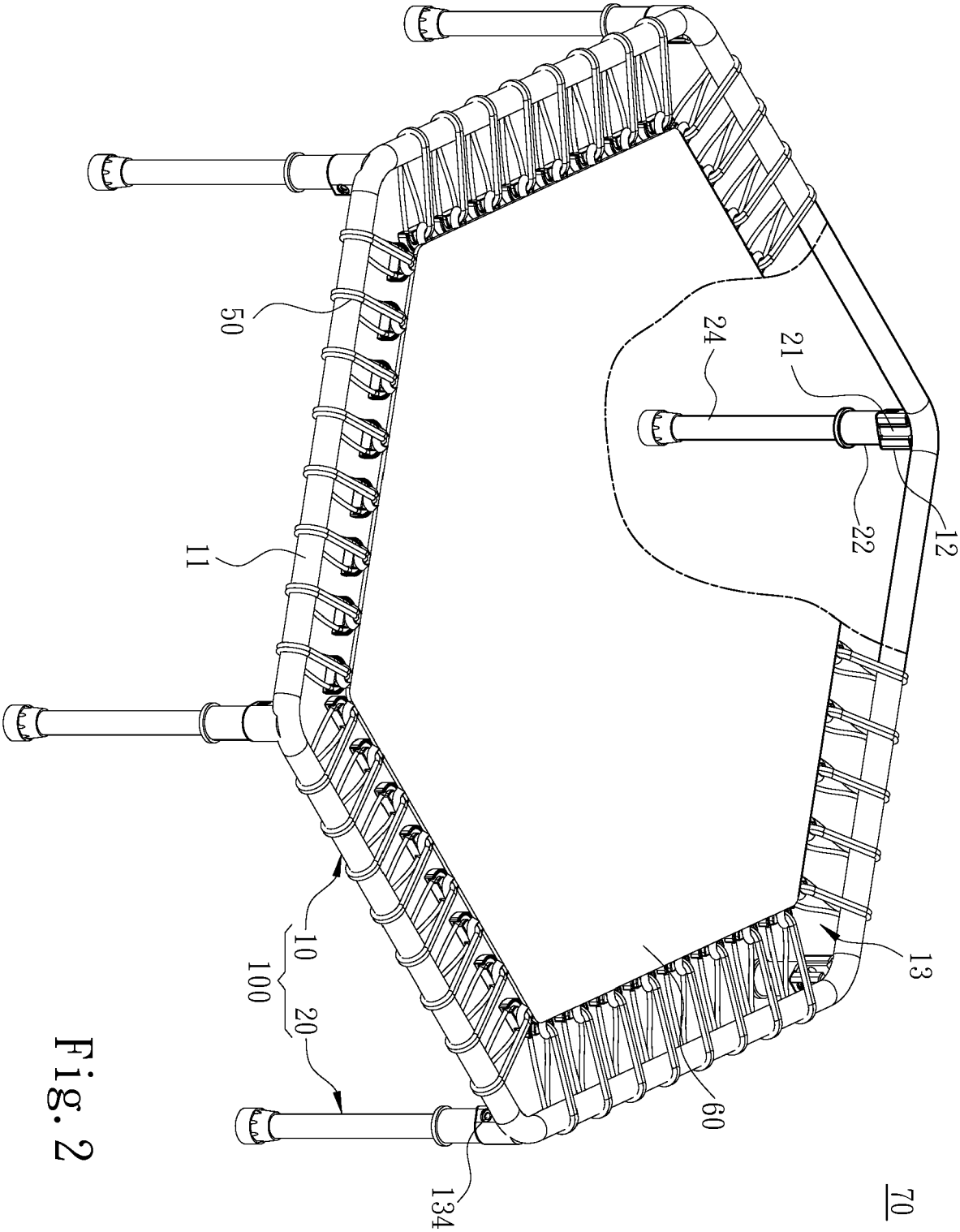

Fig. 2

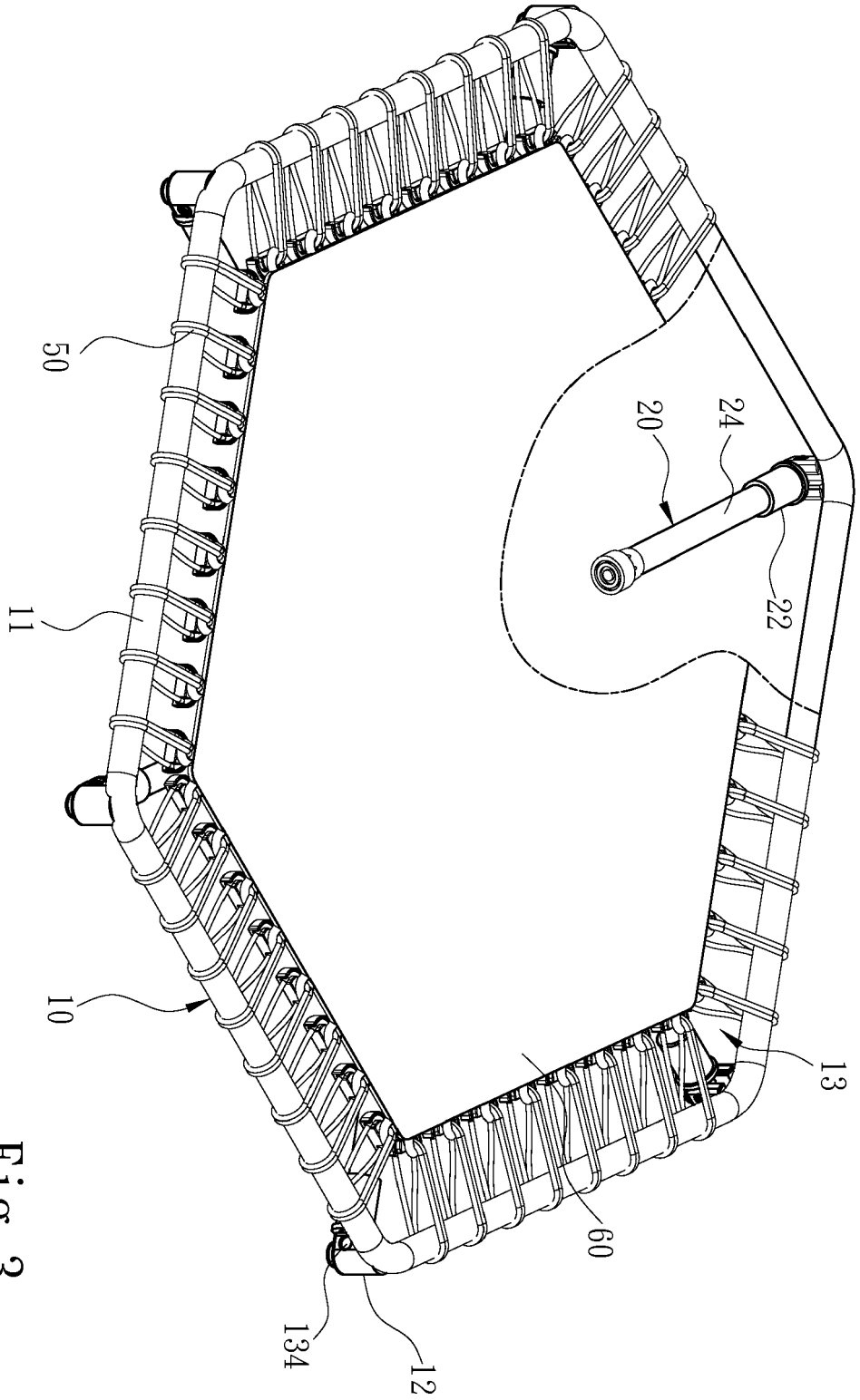

Fig. 3

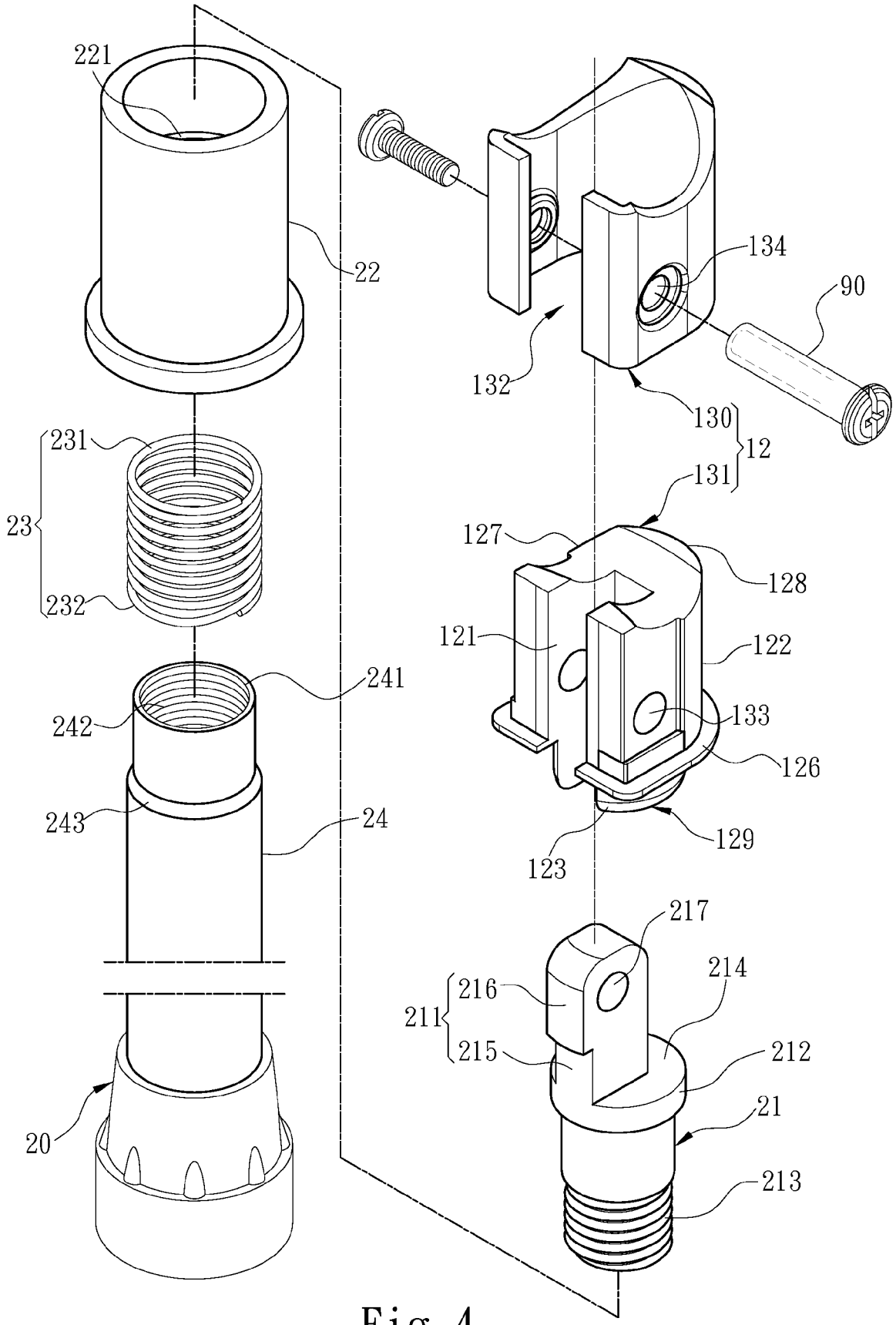
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Fig. 4

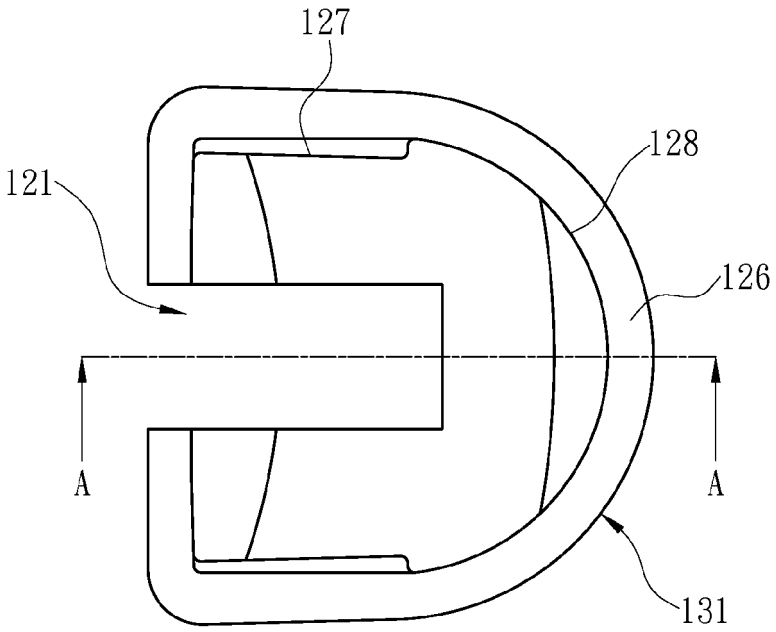

Fig. 5

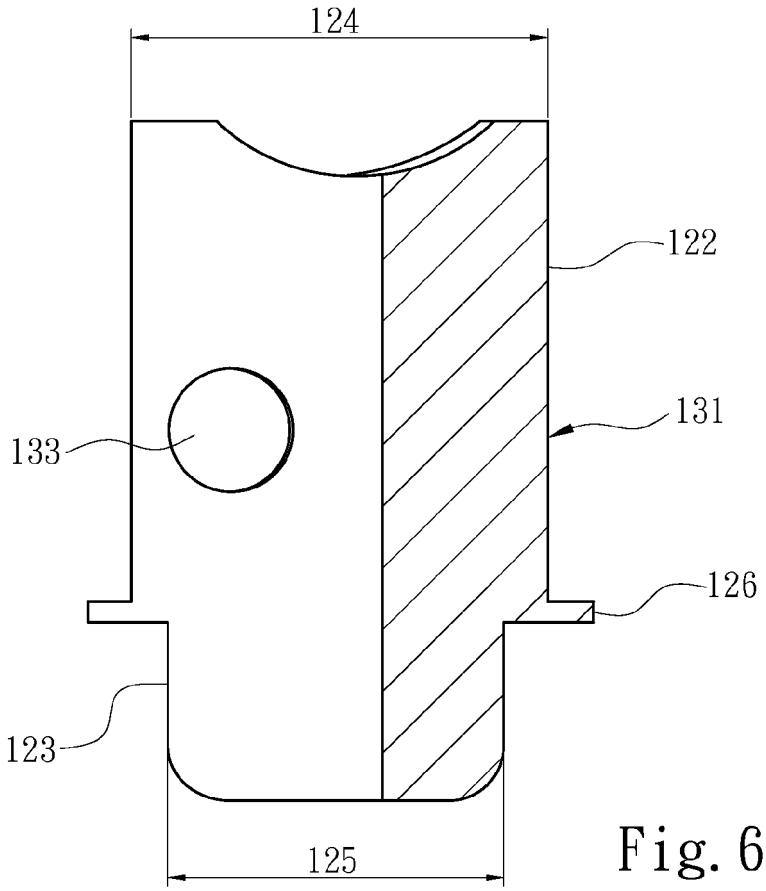

Fig. 6

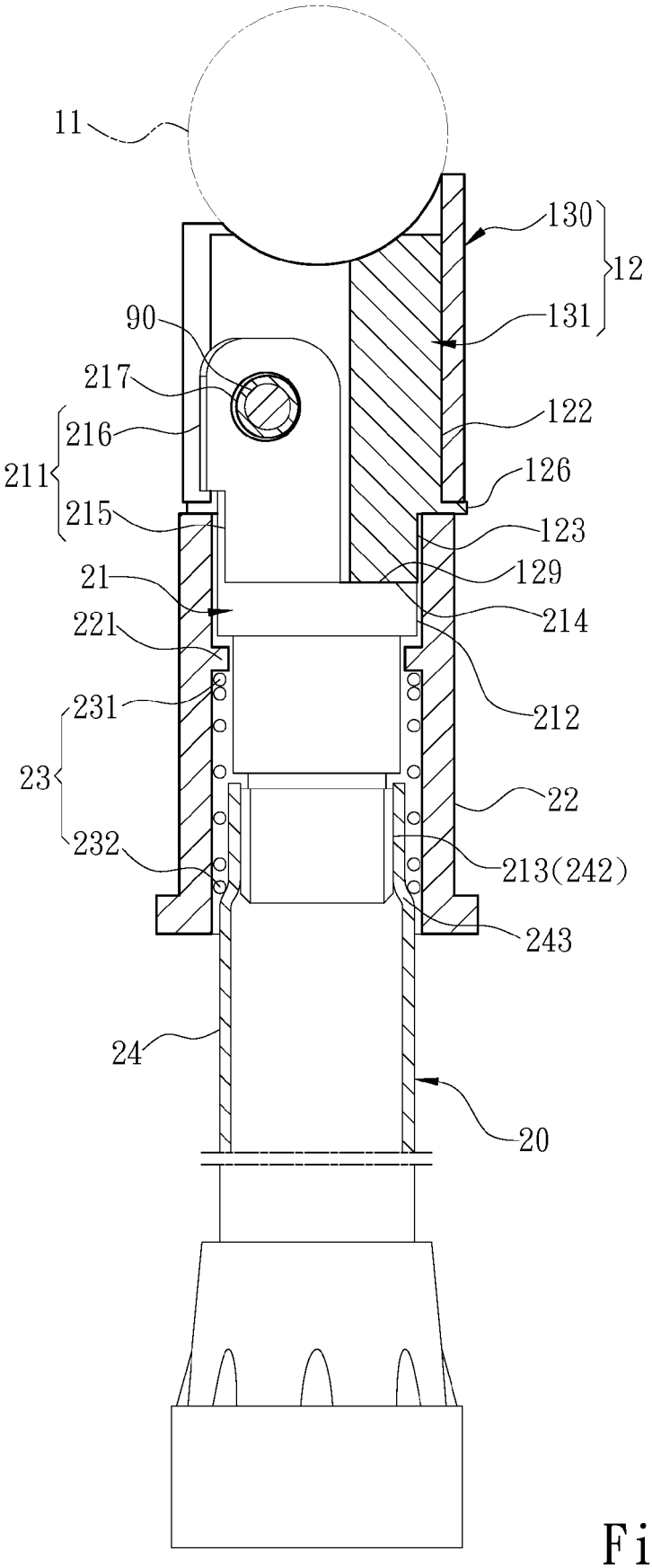
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Fig. 7

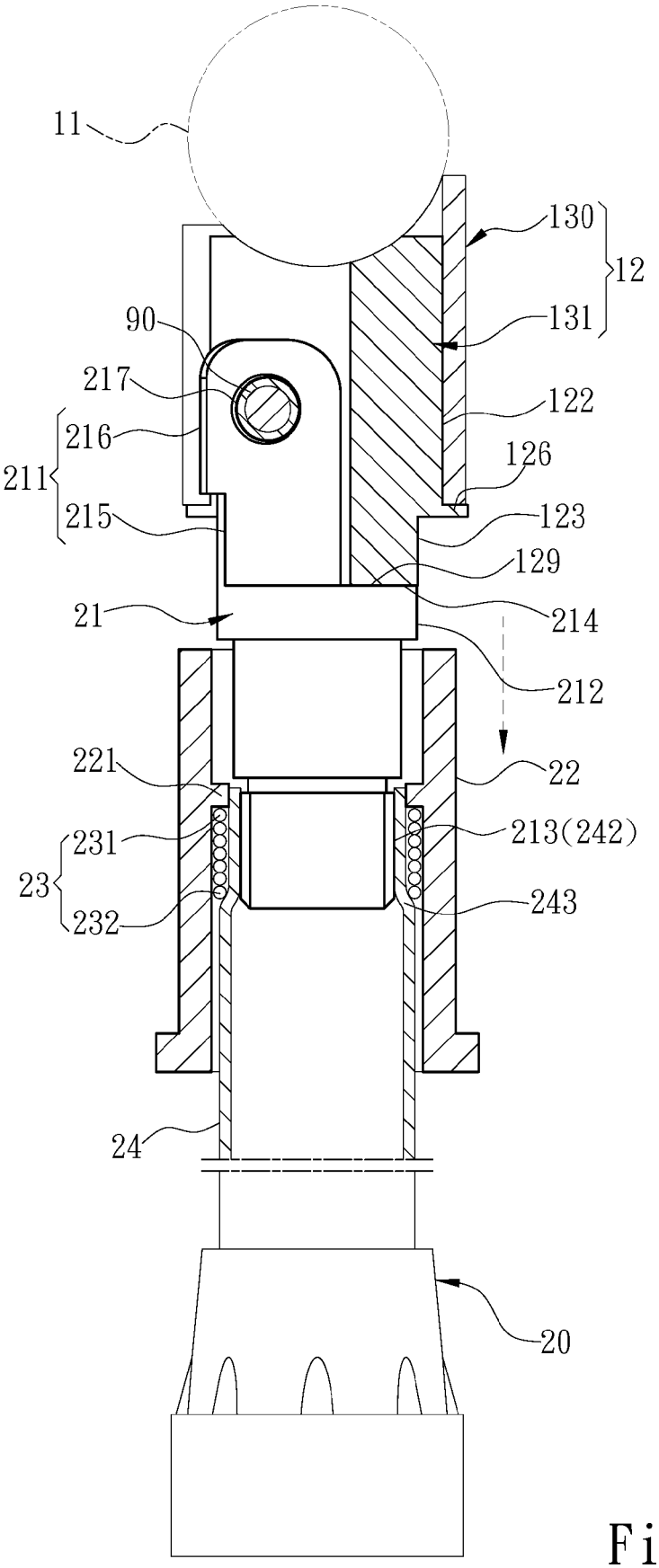
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Fig. 8

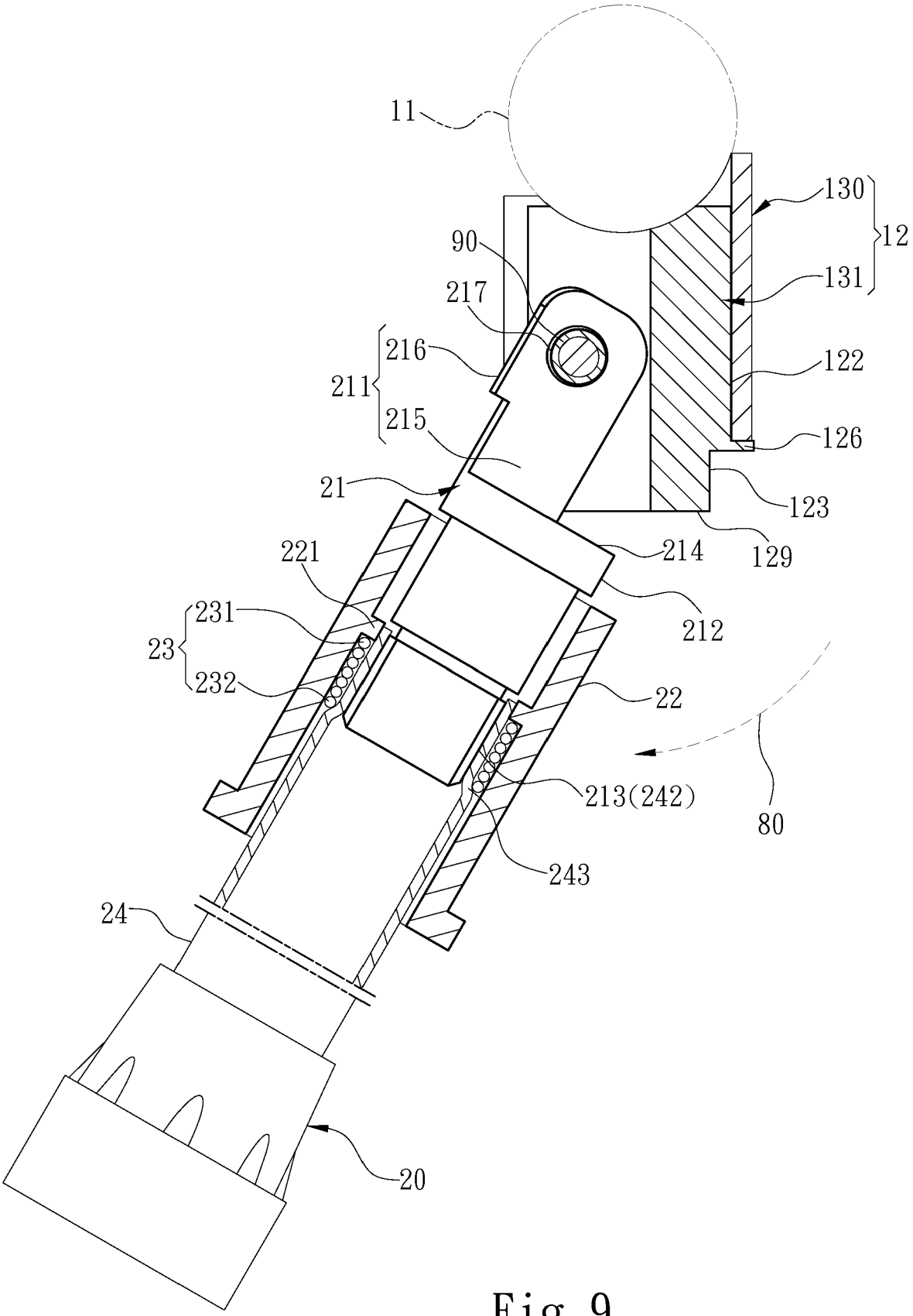
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Fig. 9

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EUROPEAN SEARCH REPORT

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Place of search	Date of completion of the search	Examiner
Munich	11 June 2019	Vesin, Stéphane

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