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(54) Title: ASSEMBLY OF CONSTRUCTOR OR MECHANICAL MODEL ELEMENTS

(57) Abstract: The node connecting the elements of the designer or mechanical model contains the first group of parts with locking and fixing protrusions and longitudinal grooves and the second group of parts with holes for fixing the node. The first group contains two pairs of parts, each pair contains two identical parts, pairs of parts are connected crosswise by means of longitudinal grooves with the formation of the shaft. Parts of the first group contain protrusions of fixing of parts the second group, made with the possibility of bending perpendicular to the axis of the node in different directions.



## ASSEMBLY OF CONSTRUCTOR OR MECHANICAL MODEL ELEMENTS

The utility model belongs to the nodes connecting the elements of design kits, in particular for connecting fixed and moving parts in sets of three-dimensional mechanical models, and can be used in the manufacture of children's, play and souvenir design kits.

Known node of individual moving elements of a mechanical model that can move around of one axis, contains the axis and parts of the individual movable elements, which are interconnected. The node contains the first and second groups of components, where the first group of components contains at least two separate parts, and each of these individual parts of this first group contains a central hole for insertion into this central hole of the axis, each of at least two separate parts of the first group contains at least two rectangular connecting holes [UA № 95685 U, A63H 33/00, A63F 9/12, 2014].

The disadvantages of this technical solution are: insufficient reliability of the connection due to the presence of uncompensated gaps in the holes; execution of p of knot from plywood, and axes - from a tree with smaller hardness that leads to fast wear of the created knot; significant impact on the reliability of connections and the shelf life of parts of temperature and humidity indoor air.

The closest to the claimed utility model is the node connecting the elements of the designer or mechanical model, containing the first group of parts and the second group of parts. The first group of parts contains at least one separate part, which is made with at least two symmetrically arranged protrusions, and each of the individual parts of the second group contains a central hole and at least two connecting holes which are located around the central hole. The parts of the first group are made with a longitudinal groove to ensure the possibility of installing them crosswise with the entry of the longitudinal groove of one part in the longitudinal groove of the other to connect the transverse grooves of both parts of the first group and create a shaft assembly. The protrusions on the individual parts of the first group are designed to enter the holes, are made on the parts of the second group, and made with the possibility of bending in the direction of the axis of the node [EN №119137 U, A63H 33/00, 2017].

The disadvantage of this node is the lack of reliability of the connection, the rapid loss of the axiselastic and / or mechanical properties, the occurrence of backlash, malfunction of the axis of the parts, due to insufficient fixation of the parts of the second group of stops and / or protrusions, which are made with the possibility of bending in the direction of the axis at an angle of not more than 40°.

The utility model is based on the problem of reliable fixing of parts of the node in their interaction with each other, increasing the rigidity of the node, preventing backlash in all directions relative to the axis during operation, ease of assembly of parts.

The problem is solved by the fact that the node connecting the elements of the constructor or mechanical model contains the first group of parts with locking and locking protrusions and longitudinal grooves and the second group of parts with holes for fixing the node. The first group contains two pairs of parts, each pair containing two identical parts, pairs of parts are connected crosswise by longitudinal grooves to form a shaft. Parts the first group contains the protrusions of fixing the parts of the second group, made with the possibility of bending perpendicular to the axis of the node in different directions.

The node differs in that each part of the second group is fixed by at least eight fixing protrusions.

The use of two pairs of elements of the first group, which have special protrusions, made with the possibility of bending perpendicular to the direction of the axis of the node in different directions, allows you to easily and at the same time securely fasten the parts together in all directions, ensuring reliable fixing of the parts of the first and second groups among themselves, thus ensuring the rigidity and efficiency of structures, the absence of backlash and prevent their occurrence during operation.

Assembling the node is quite simple.

The essence of the utility model is explained by the drawings.

figure 1 shows parts of the first group of the connection node according to the first embodiment;

figure 2 is a detail of the second group - the washer according to the first example; figure 3 is the relative position of the parts of the first group to create a shaft of the connection node according to the first example;

figure 4 is a shaft of the connection node with a part of the second group - the washer according to the first example;

figure 5 is a connection node assembled with marked directions of bending of the protrusions for fixing the part of the second group - washers according to the first example;

figure 6 is a connection node assembly according to the first example;

figure 7 - parts of the first group of the connection node according to the second embodiment;

figure 8 - parts of the second group - wheels according to the second example;

figure 9 is the relative position of the parts of the first group to create the shaft of the connection node according to the second example;

figure 10 - shaft of the connection node with parts of the second group - wheels according to the second example;

figure 11 is a connection node assembled with marked directions of bending of the protrusions for fixing parts of the second group - wheels according to the second example;

figure 12 is a node assembly assembled according to the second example;

figure 13 parts of the first group of the connection node according to the third embodiment;

figure 14 - parts of the second group - wheel and gear according to the third example;

figure 15 is the relative position of the parts of the first group to create a shaft node compounds according to the third example;

figure 16 is a shaft of the connection node with parts of the second group - wheels and gear according to the third example;

figure 17 is a connection node assembled with the indicated directions of bending of the protrusions for fixing the parts of the second group of wheels according to the third example;

figure 18 - assembly node assembly according to the third example;

figure 19 - parts of the first group of the connection node according to the fourth example implementation;

Fig.20 - parts of the second group - gears according to the fourth example;

Fig.21 - the relative position of the parts of the first group to create the shaft of the connection node according to the fourth example;

Fig.22 is a shaft of the connection node with parts of the second group - gears according to the fourth example;

Fig.23 - connection assembly with marked directions of bending of the protrusions for fixing parts of the second group - gears according to the fourth example;

Fig. 24 is a connection node assembly according to the fourth example.

Designations in the drawings:

1 - the first detail of the first group;

2 - the second part of the first group;

3 - the third detail of the first group;

4 - the fourth detail of the first group;

5 - protrusions for emphasis of parts of the second group;

6 - longitudinal grooves of parts of the first group;

7 - protrusions of the first group to fix the parts of the second group;

8 - parts of the second group;

9 - holes of the second group for fixing the node;

10 - shaft node formed by parts of the first group.

The first group contains two pairs of parts.

The first pair contains two identical parts 1, 2, and the second pair - two identical parts 3, 4.

Pairs of parts are connected by longitudinal grooves 6 to form a shaft node 10.

Parts of the first group contain protrusions 7 for fixing parts 8 of the second groups that are made with the possibility of bending perpendicular to the axis of the node in different directions. As parts 8 of the second group can be used washers, gears, wheels, flywheels and the like.

Figure 1-6 - shows the connection node according to the first example;

in Fig.7-12 - connection node according to the second example;

in Fig.13-18 - connection node according to the third example;

in Fig.19-24 - connection node according to the fourth example.

The connection node of the elements of the designer or mechanical model is as follows. Pairs of parts 1, 2 and 3, 4 are connected crosswise with their longitudinal grooves 6 with the formation of the shaft of the node 10. The shaft 10 is connected to the parts of the second group 8 by holes 9. Next, the protrusions 7 for fixing the parts 8 of the second group are bent perpendicular to the axis of the node in different directions, obtaining the finished node 12, Fig.18, Fig.24).

The proposed utility model can be used to create assemblies of gears, washers, wheels, flywheels and other components in constructors or mechanical models of sheet metal.

## CLAIMS

1. Assembly unit of elements of the constructor or mechanical model, containing the first group of parts with locking and locking protrusions and longitudinal grooves and the second group of parts with holes for fixing the node, characterized in that the first group contains two pairs of parts, each a pair contains two identical parts, a pair of parts connected between is a cross with longitudinal grooves with the formation of the shaft, the parts of the first group contain protrusions for fixing parts of the second group, made with the possibility of bending perpendicular to the axis of the node in different directions.

2. The node according to claim 1, characterized in that each part of the second group is fixed by at least eight fixing protrusions.

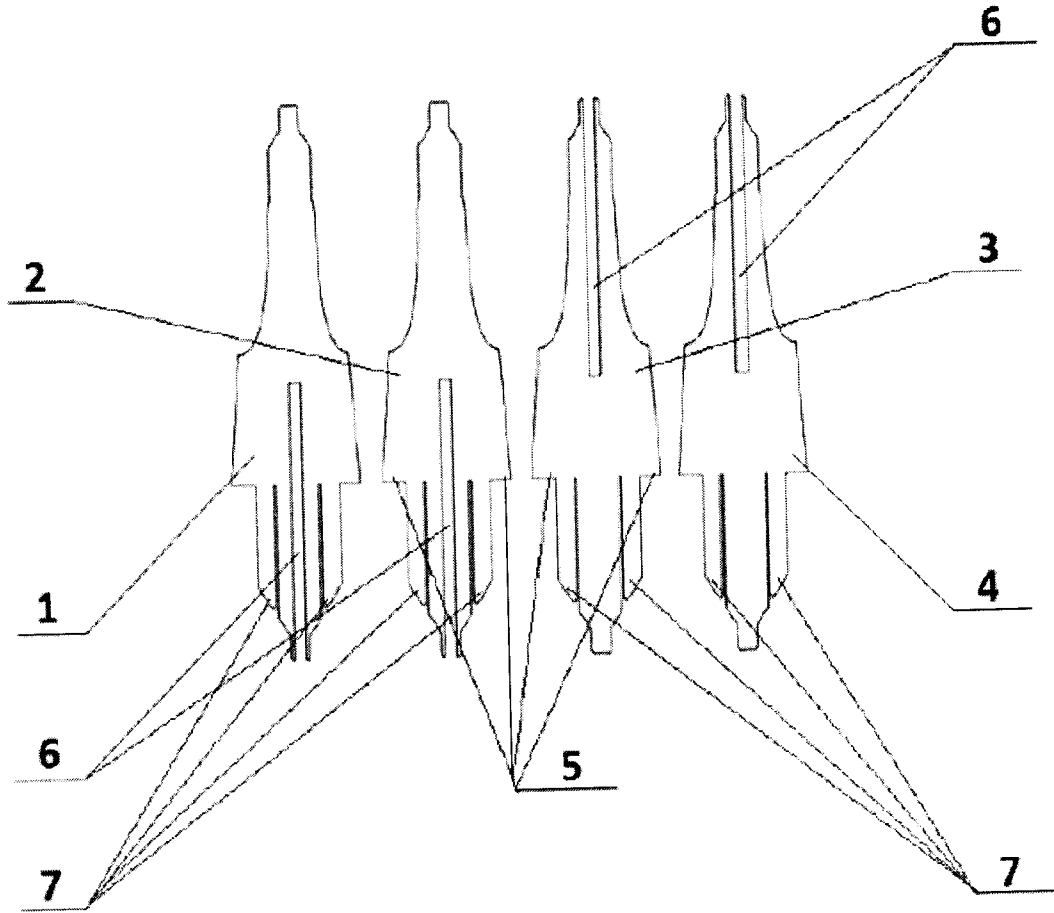


FIG. 1

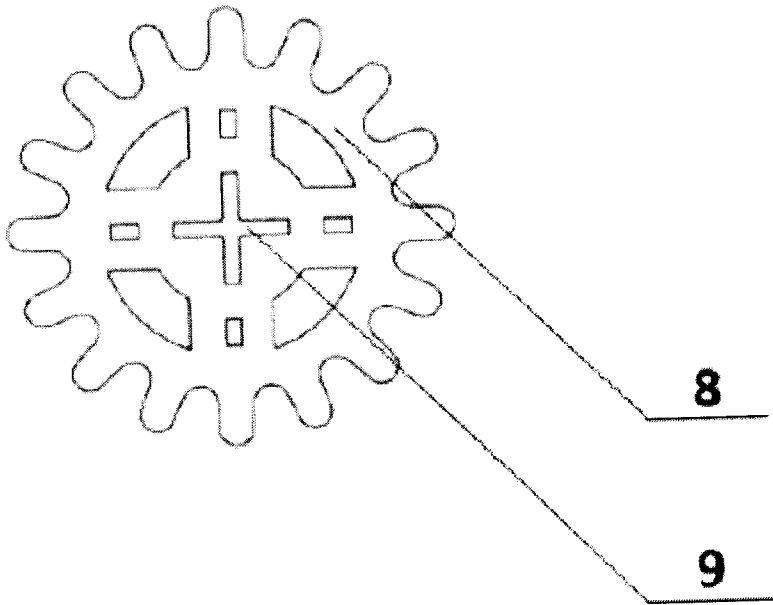


FIG.2

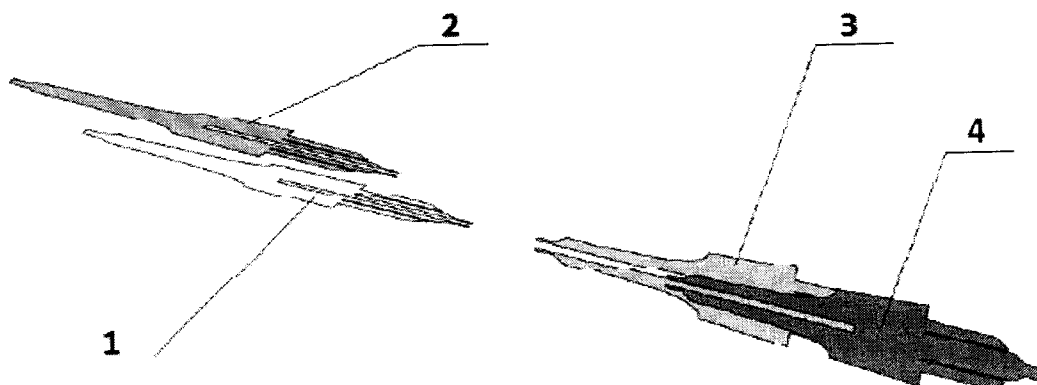


FIG. 3

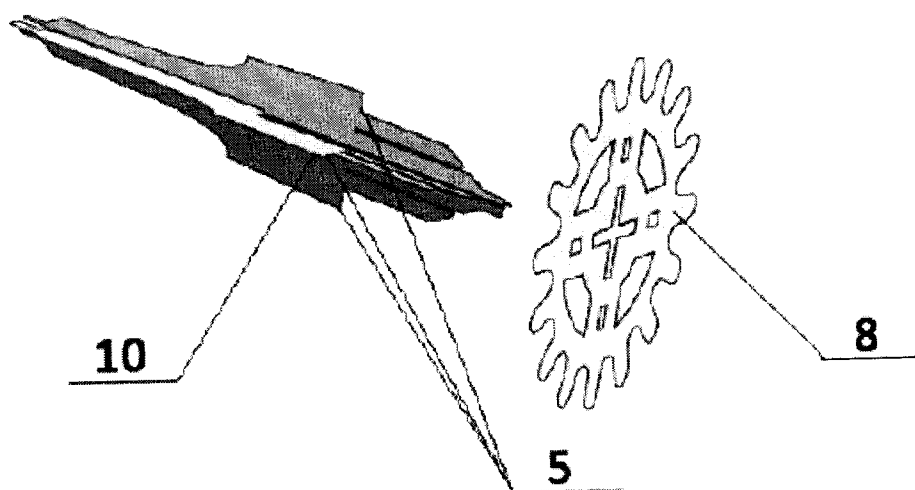


FIG. 4

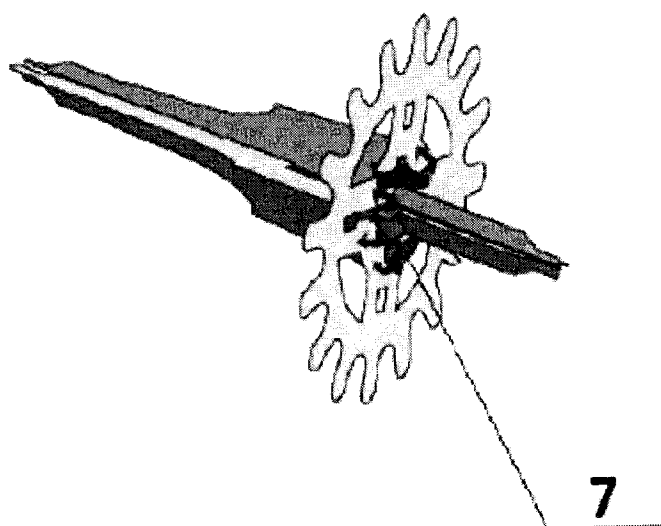


FIG. 5

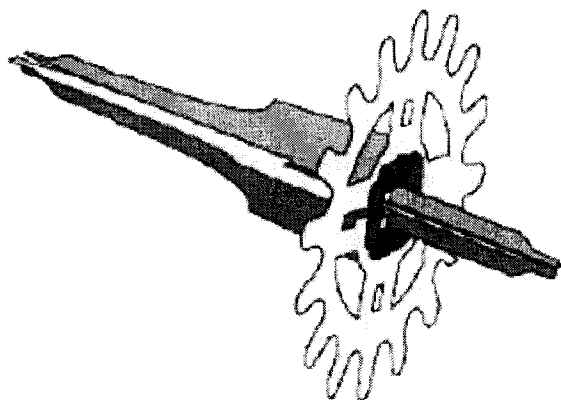


FIG. 6

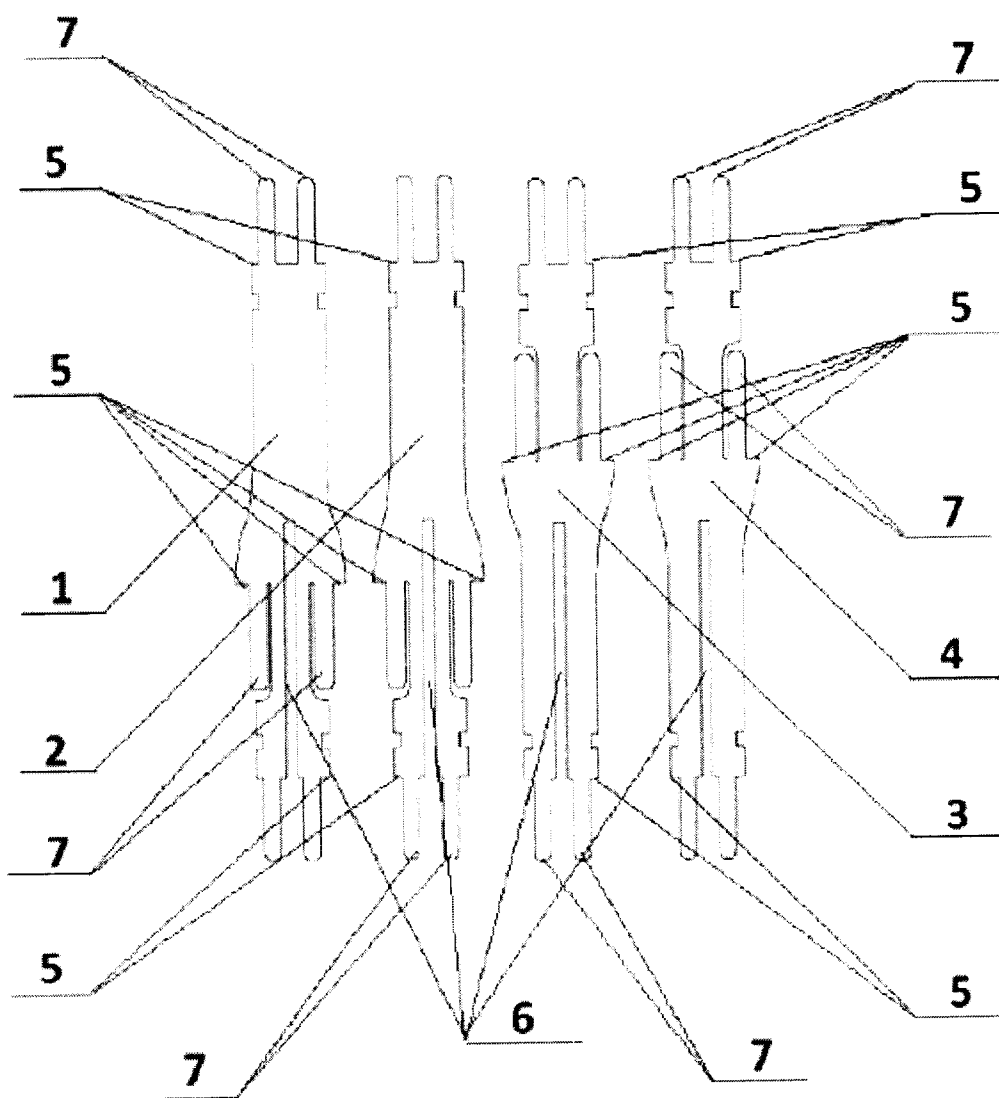


FIG. 7

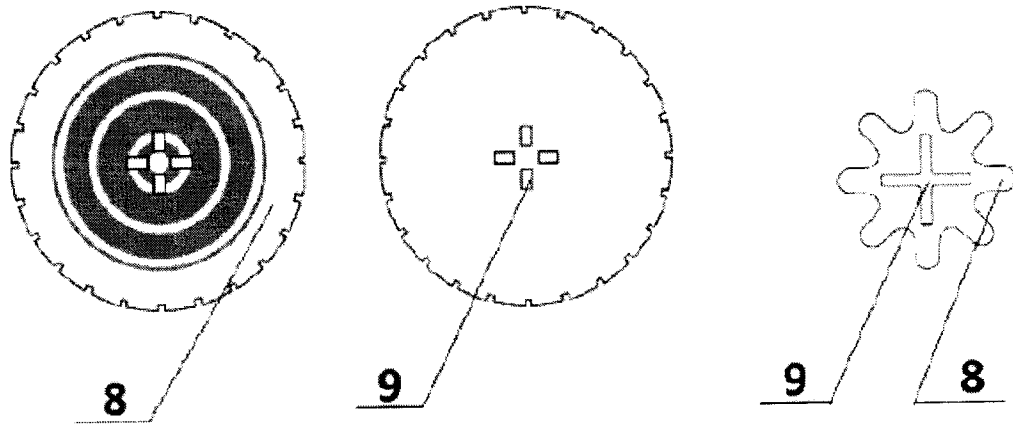


FIG. 8

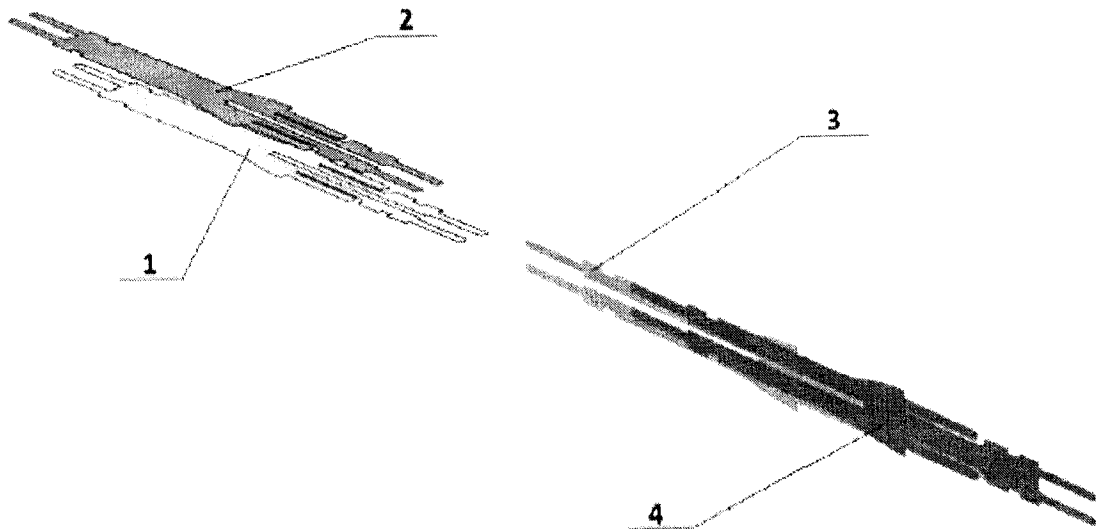


FIG. 9

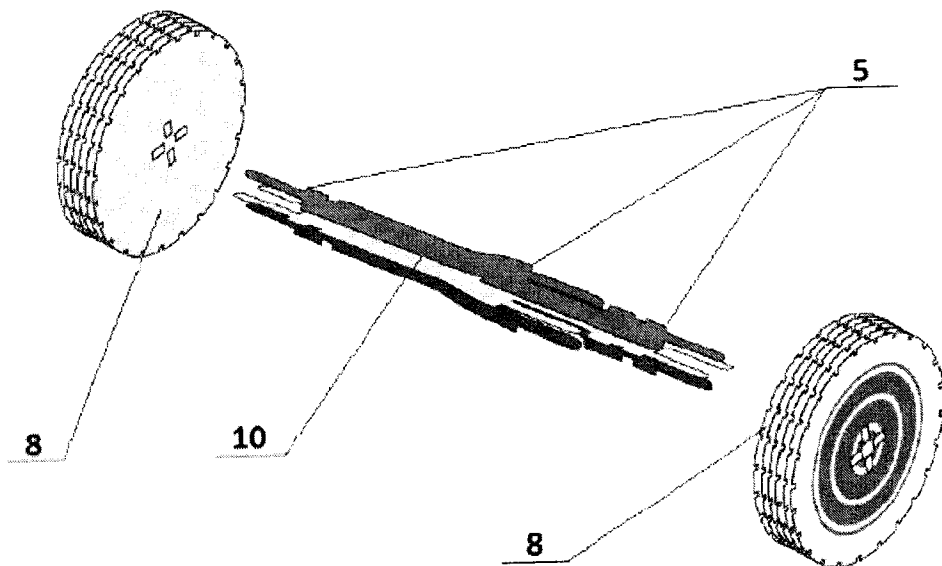


FIG. 10

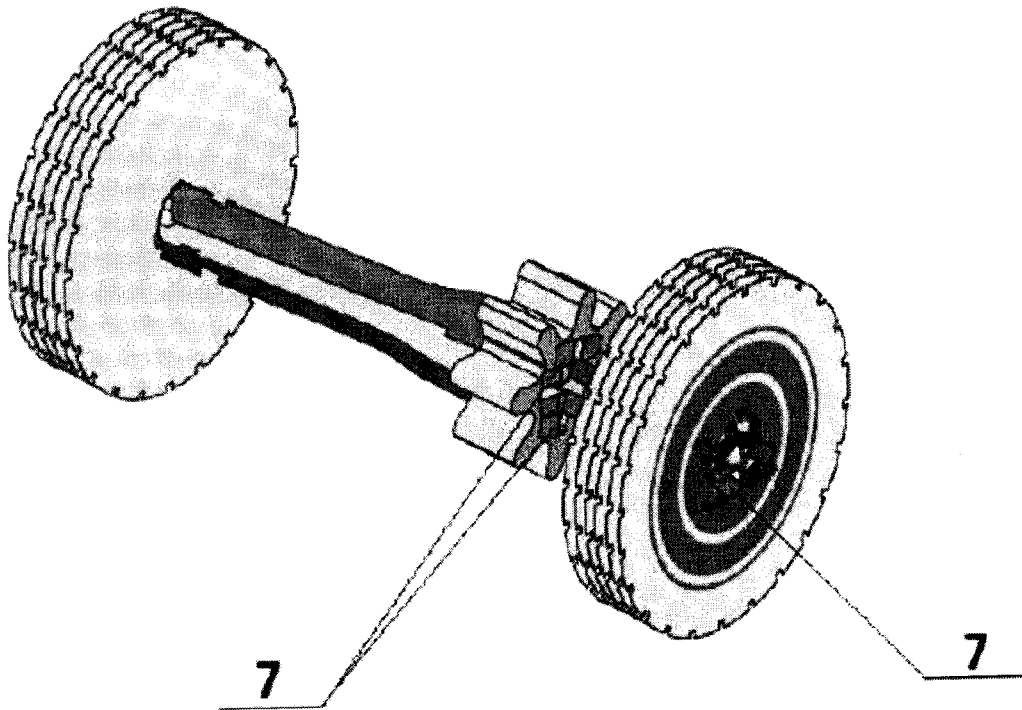


FIG. 11

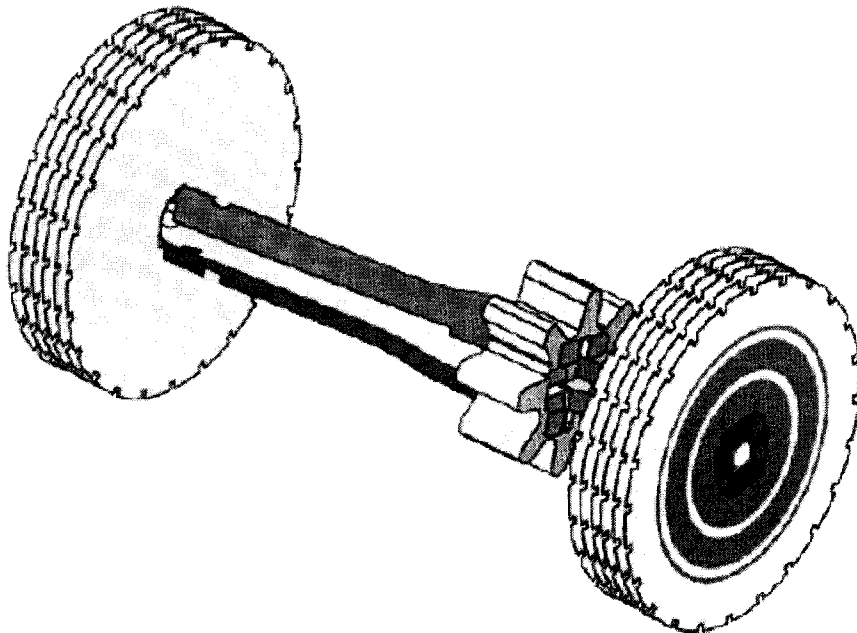


FIG. 12

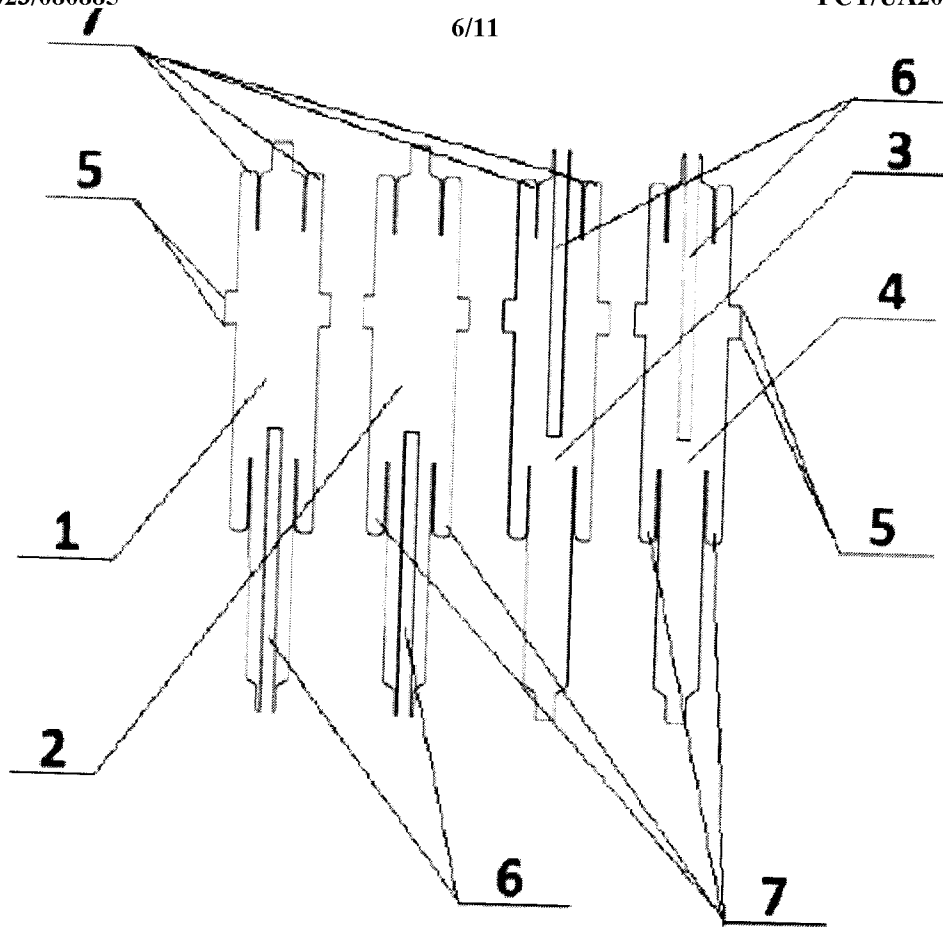


FIG. 13

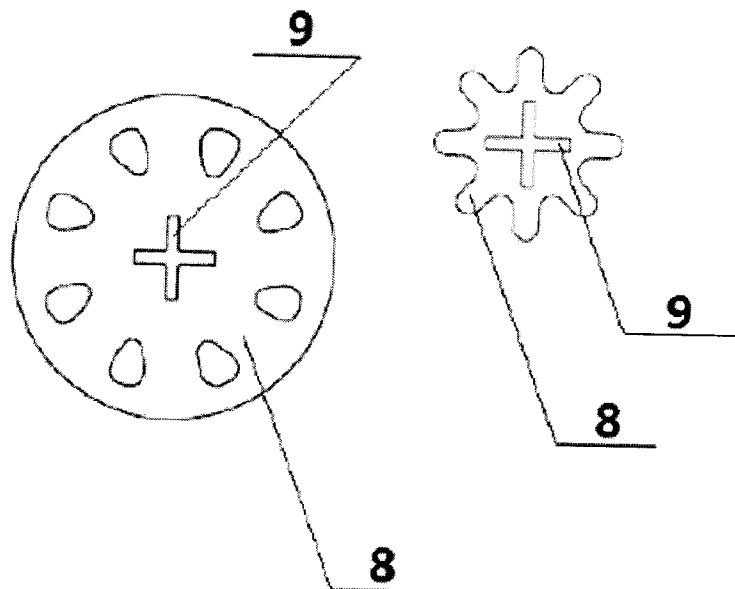


FIG. 14

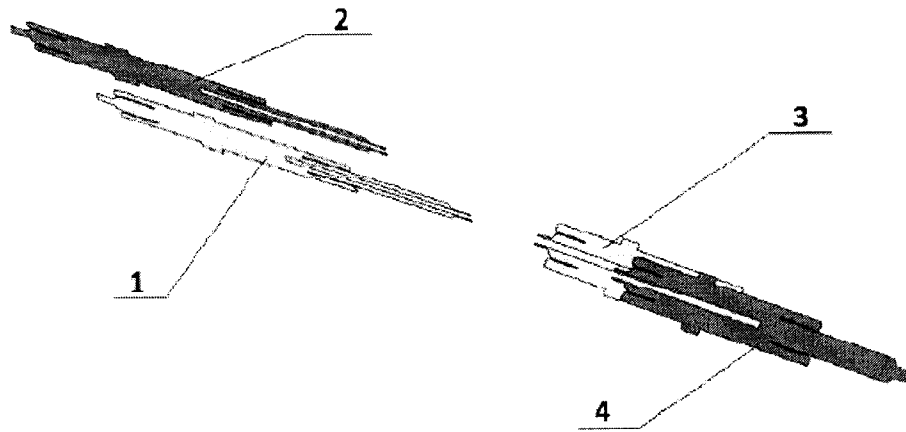


FIG. 15

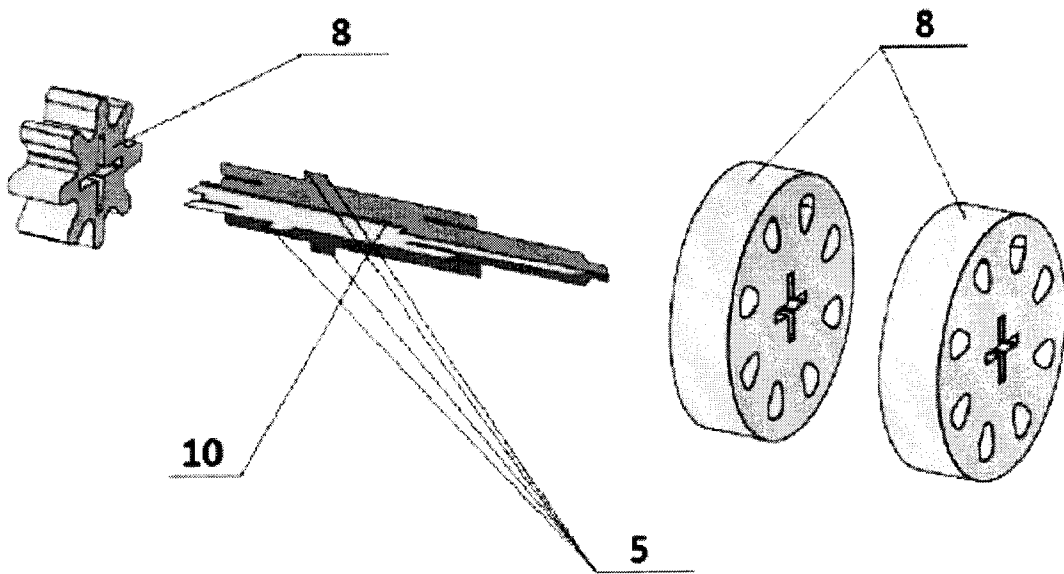


FIG. 16

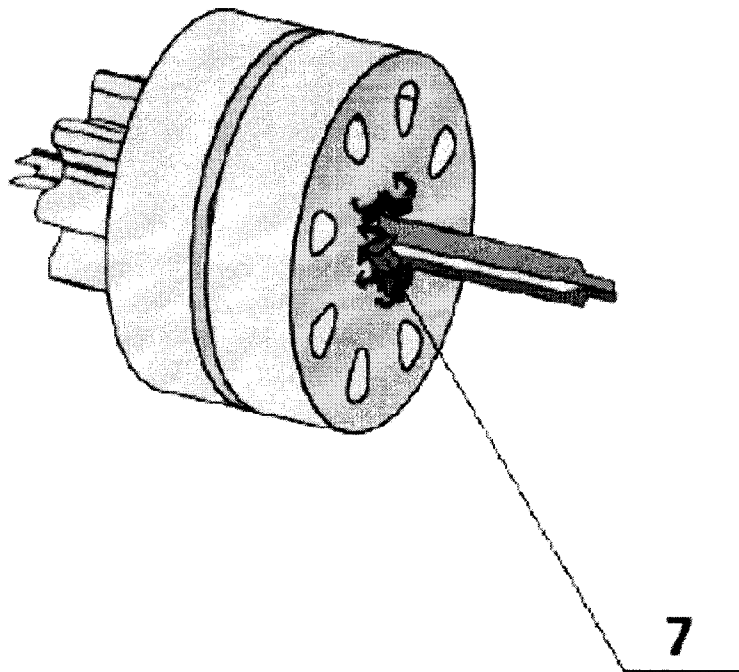


FIG. 17

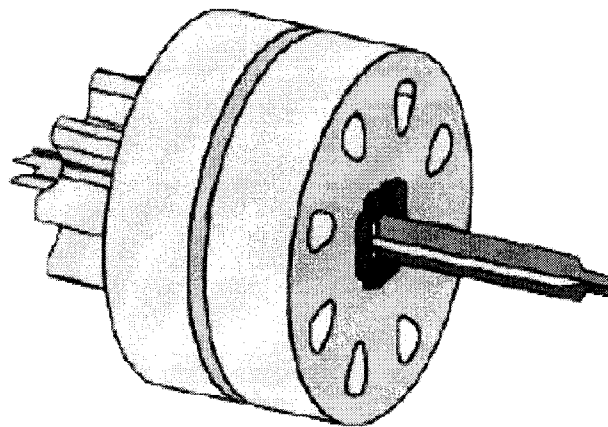


FIG. 18

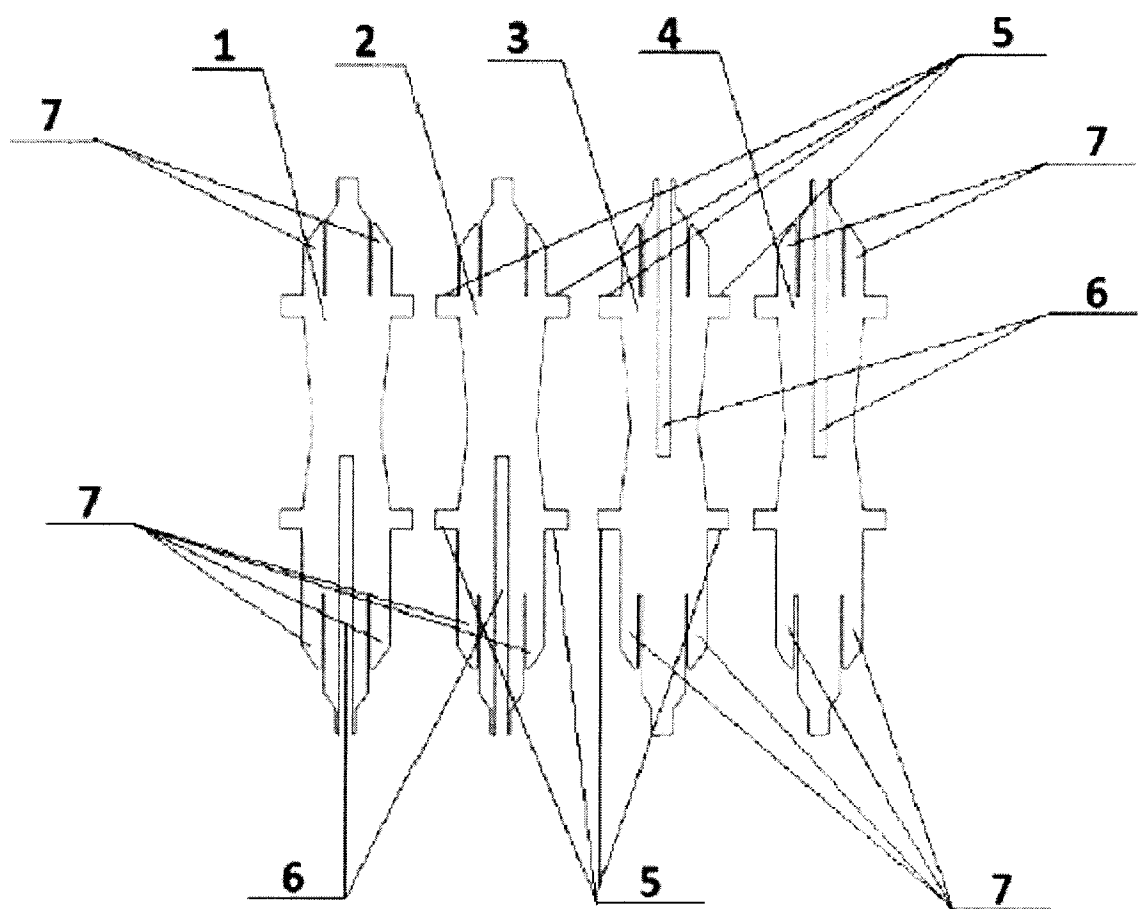


FIG.19

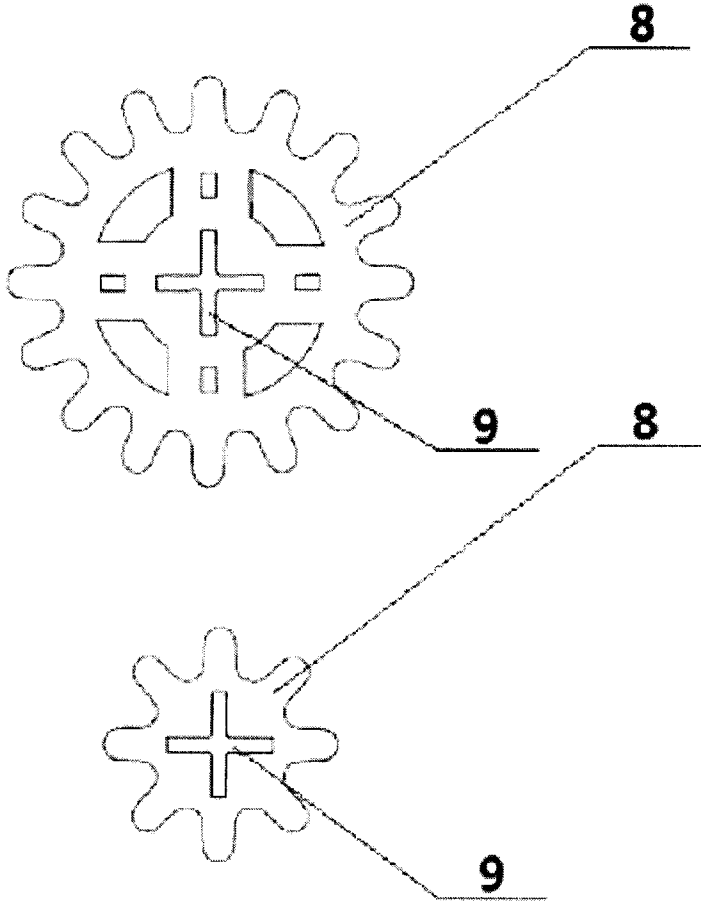


FIG. 20

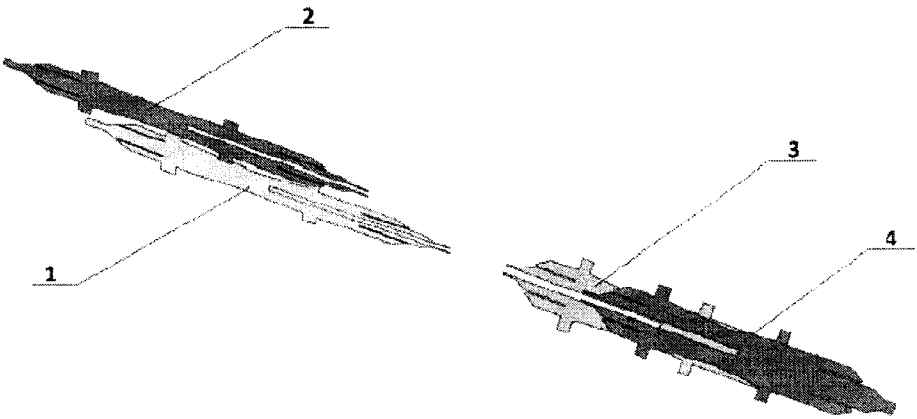


FIG. 21

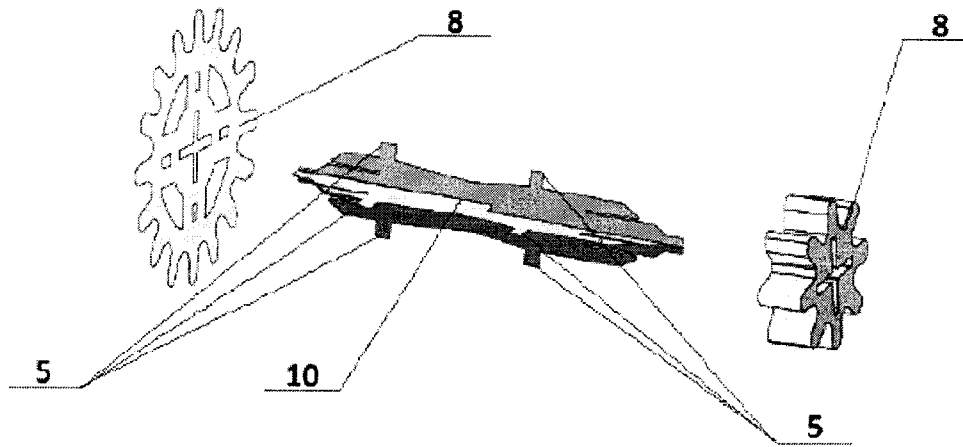


FIG. 22

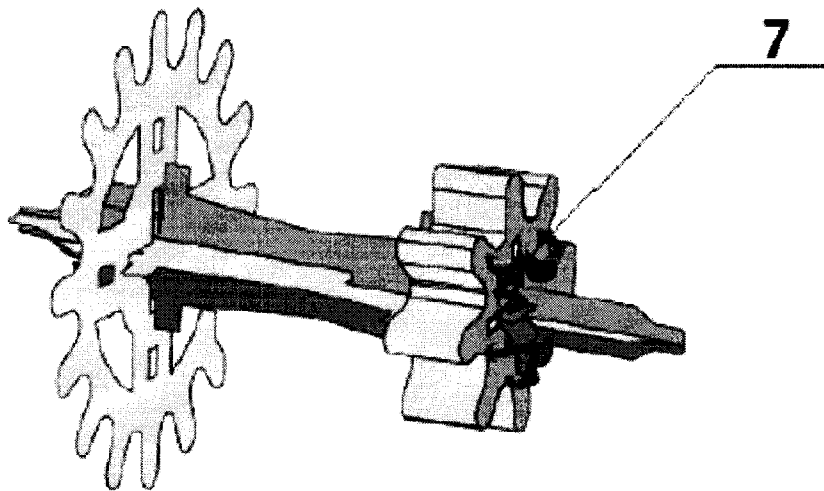


FIG. 23

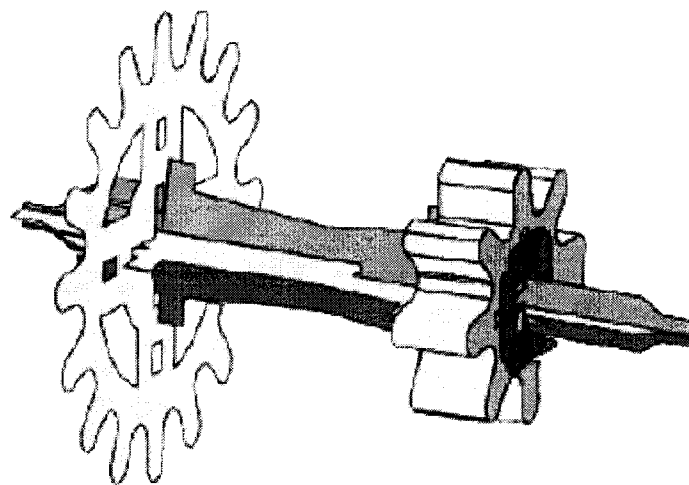


FIG. 24