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(54) **SEATBELT RETRACTOR**

SITZGURTEINZUG

RÉTRACTEUR DE CEINTURE DE SÉCURITÉ

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Description

TECHNICAL FIELD

[0001] The present invention relates to a seatbelt retractor, and more particularly to a seatbelt retractor provided with a pretensioner for removing looseness in a seatbelt during a vehicle emergency such as a vehicle collision.

BACKGROUND ART

[0002] Recent seatbelt retractors are provided with a pretensioner that drives a spindle to retract using a gas pressure generated by exploding an explosive during a vehicle collision (see Patent Documents 1 to 3, for example).

[0003] In a retractor 100 described in Patent Document 1, as shown in Fig. 6, balls 102 serving as movable bodies are moved through a pipe 103 by a gas pressure from a gas generator 101. The moving balls 102 engage with a ring gear 104 serving as a rotary member, causing the ring gear 104 to rotate, and as a result, a spindle that rotates integrally with the ring gear 104 is rotated in a retraction direction.

[0004] Further, the retractor 100 is applied to an apparatus including an energy absorption mechanism that absorbs energy by causing a torsion bar to twist such that a seat belt is unreeled when a load of at least a set value acts on the seat belt during a vehicle collision. A final guide portion 103a of the pipe 103 is constituted to be easily deformable, and therefore, when the energy absorption mechanism is activated during an operation of the pretensioner such that the balls 102 are pushed in a direction heading back into the pipe 103, the final guide portion 103a of the pipe 103 flexes, thereby widening a passage of the balls 102. As a result, levers 104a of the ring gear 104 are prevented from catching on and stopping the balls 102.

[0005]

Patent Document 1: Japanese Patent Application Publication No. 2001-163182
Patent Document 2: Japanese Patent Application Publication No. 2002-145012
Patent Document 3: Japanese Patent Application Publication No. 2002-154405

[0006] Patent Document 1 shows a seatbelt retractor according to the preamble of claim 1. Incidentally, with the retractor 100 described in Patent Document 1, the guide portion 103a provided in a tip end portion of the pipe 103 is not fixed, and therefore the balls 102 attempt to escape from the ring gear 104 due to an engagement angle between the ball 102 and the ring gear 104 during a pretensioner operation. As a result, an engagement amount between the ring gear 104 and the ball 102 decreases, leading to a reduction in an amount of transmitted force, and therefore the ring gear 104 cannot be rotated efficiently.

DISCLOSURE OF THE INVENTION

[0007] The present invention has been designed in consideration of the circumstances described above, and an object thereof is to provide a seatbelt retractor that can prevent a reduction in an engagement amount between a rotary member and a rolling body during a pretensioner operation so that the rotary member can be rotated efficiently.

[0008] The problems pertaining to the present invention are solved by the following constitutions.

(1) A seatbelt retractor including:

a spindle for retracting a seatbelt;
a retractor frame having a pair of side plates that support the spindle to be free to rotate; and
a pretensioner that rotates the spindle in a retraction direction using a gas pressure generated when an explosive is exploded,
wherein the pretensioner includes:

gas pressure generating means for generating the gas pressure;
a rotary member that rotates integrally with the spindle;
a guide member disposed around the rotary member and to a side of a side plate of the retractor frame, the gas pressure generating means being attached to one end portion side thereof;
a piston member that is accommodated in the guide member and pushed directly by the gas pressure from the gas pressure generating means; and
a plurality of rolling bodies that are accommodated in the guide member and cause the rotary member to rotate by moving in accordance with a movement of the piston member,
the guide member includes a tubular part formed continuously from the one end portion in order to accommodate the piston member and the plurality of rolling bodies, an engagement portion where the rolling bodies engage with the rotary member and a hook portion bent to the rotary member side at the other end portion, and
a tip end part of the hook portion is fixed to the retractor frame so as to be incapable of moving relative thereto, and that the engagement portion (29) and the hook portion (30) are connected via a boundary part, and that an upper side part of the tube pipe (22) is not fixed thereby allowing the tube pipe

(22) to be pulled upward such that a force (E) acts on the boundary part which deforms in a rectilinear fashion when the gas generator is activated.

(2) The seatbelt retractor according to (1), further including a guide member cover that is attached to the side plate of the retractor frame so as to cover the guide member.

(3) The seatbelt retractor according to (1) or (2), wherein the hook portion extends along a tangent of a concentric circle with the rotary member.

(4) The seatbelt retractor according to any of (1) to (3), wherein a part of the guide member near the rotary member is cut away in the hook portion and an engagement portion where the rolling bodies engage with the rotary member.

(5) The seatbelt retractor according to any of (1) to (4), wherein the tubular part of the guide member is held such that during an operation of the pretensioner, the tubular part can be moved by a reactive force received by the rolling bodies when the rolling bodies engage with the rotary member.

[0009] With the seatbelt retractor according to the present invention, the guide member includes the tubular part formed continuously from the end portion in order to accommodate the piston member and the plurality of rolling bodies, and the hook portion bent to the rotary member side at the other end portion, and therefore, by extending the flexed part of the hook portion using the reactive force received by the rolling bodies from the rotary member, an engagement amount between the rotary member and the rolling bodies can be prevented from decreasing during an operation of the pretensioner. As a result, the rotary member can be rotated-efficiently.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 is a sectional view of a seatbelt retractor according to an embodiment of the present invention;

Fig. 2 is an exploded perspective view illustrating attachment of a tube pipe shown in Fig. 1;

Fig. 3 is a sectional view of a pretensioner taken along a III-III line in Fig. 1;

Fig. 4 is an enlarged sectional view of an engagement portion and a hook portion of the tube pipe;

Figs. 5A to 5C are views illustrating a deformation process of the tube pipe during a pretensioner operation; and

Fig. 6 is a sectional view showing a conventional seatbelt retractor.

BEST MODES FOR CARRYING OUT THE INVENTION

[0011] A preferred embodiment of a seatbelt retractor according to the present invention will be described in detail below on the basis of the drawings.

[0012] As shown in Fig. 1, a seatbelt retractor 10 according to an embodiment of the present invention includes a spindle 12 supported rotatably on a retractor frame 11 in order to retract a webbing, not shown in the drawings, a torsion bar 13 that is mounted in the spindle 12 and extends along an axial center of the spindle 12, one axial end portion thereof being joined to the spindle 12, and a tread head 14 joined to the other axial end portion of the torsion bar 13. The torsion bar 13 constitutes a force limiter mechanism that unreels the webbing while absorbing energy when a load equal to or greater than a set load acts on the webbing.

[0013] The retractor frame 11 is made of metal, and includes a first side plate 15 positioned on the left side of Fig. 1 and a second side plate 16 positioned on the right side. Thus, the retractor frame 11 has a substantially C-shaped form. A pretensioner 20 and a retraction spring device, not shown in the drawings, are attached to the first side plate 15. Locking means, not shown in the drawings, which includes sensors such as vehicle acceleration detecting means and webbing unreeling acceleration detecting means and prevents the webbing from rotating in an unreeling direction during a vehicle emergency by engaging the tread head 14 with the retractor frame 11, is provided on the second side plate 16.

[0014] As shown in Figs. 1 to 3, the pretensioner 20 includes a pinion 21 serving as a rotary member, a tube pipe 22 serving as a guide member, a resin piston ball 23 serving as a piston member, a plurality of metal balls 24 serving as rolling bodies, a gas generator (MGG) 25 serving as gas pressure generating means, and a tube cover 26 serving as a guide member cover.

[0015] The pinion 21 is permanently joined to an axial end portion of the spindle 12 by a spline engagement so as to rotate integrally with the spindle 12. Further, a plurality of hemispherical pockets 21a for accommodating the balls 24 are provided in a circumferential direction on an outer peripheral portion of the pinion 21.

[0016] The tube pipe 22 is a pressure vessel member that is disposed around the pinion 21 and to the side of the side plate 15 of the retractor frame 11, the gas generator 25 being attached to one end portion 27 thereof. The tube pipe 22 includes a tubular part 28, an engagement portion 29, and a hook portion 30. The tubular part 28 is formed continuously from the end portion 27 of the tube pipe 22 so as to accommodate the piston ball 23 and the plurality of balls 24 and hold a gas pressure generated by the gas generator 25. The engagement portion 29 is formed from a substantially plate-shaped rectilinear outside part obtained by cutting away a pinion side inside part from an opening 28a at the other end portion of the tubular part 28, and serves as a position where the balls 24 engage with the pinion 21. The hook portion 30 guides the balls 24 by flexing toward the pinion 21 side relative to the engagement portion 29 at the other end portion of the tube pipe 22.

[0017] The tubular part 28 of the tube pipe 22 includes a rectilinear part 28b that curves from the end portion 27 disposed below the side plate 15 and extends upward in a rectilinear fashion along a free end side of the side plate 15, and a curved part 28c that passes over the pinion 21 and then extends so as to return to a base end side of the side plate 15. Further, a ball stopper, not shown in the drawings, formed from a resin clip is fitted into a hole 22a formed in the tube pipe 22 on the other end portion side of the tubular part 28.

[0018] As shown in Figs. 3 and 4, the opening 28a in the tubular part 28 is formed diagonally so as to substantially follow a concentric circle X with the pinion 21. The pinion 21 is disposed close to the engagement portion 29 of the tube pipe 22 so that the balls 24 discharged through the opening 28a engage with the pinion 21. The engagement portion 29 is formed to extend substantially parallel to the rectilinear part 28b of the tubular part 28. The hook portion 30 is flexed so as to extend substantially along a tangent Y of the concentric circle X with the pinion 21. A tip end of the hook portion 30 is set in a position where a ball 24 contacting the tip end is released from the pocket 21a in the pinion 21 and a desired deformation is obtained by a force E, to be described below, in a boundary part between the engagement portion 29 and the hook portion 30.

[0019] A pair of projecting portions 30a, 30b extending to both axial direction sides are formed on the tip end part of the hook portion 30, and by inserting the respective projecting portions 30a, 30b into attachment holes 15a, 26a formed respectively in the side plate 15 of the retractor frame 11 and the tube cover 26, the hook portion 30 is fixed to the retractor frame 11 and the tube cover 26.

[0020] The tube cover 26 is fastened fixedly to the side plate 15 of the retractor frame 11 so as to cover the tube pipe 22, excluding a part near the end portion 27, by inserting fastening means, not shown in the drawings, into a plurality of fastening holes 26b, 26c, 26d, and so on. Further, a through hole 26e penetrated by the axial end portion of the spindle 12 is formed in the tube cover 26. A part 26f of the tube cover 26 provided with the fastening hole 26b is formed as a recess recessed toward the side plate 15.

[0021] Hence, the tube pipe 22 is fixed to the side plate 15 of the retractor frame 11 by the end portion 27 to which the gas generator 25 is attached, and fixed to the side plate 15 and the tube cover 26 by the tip end part of the hook portion 30. Meanwhile, the curved part 28c of the tubular part 28 is held movably by the part 26f provided with the fastening hole 26b.

[0022] The gas generator 25 is electrically connected to an MGG connector and a control circuit, not shown in the drawings, such that the gas generator 25 is ignited via the MGG connector. When an explosive is exploded such that gas is generated, the piston ball 23 is pushed directly by the gas pressure from the gas generator 25 so as to move, and the plurality of balls 24 move in accordance with the movement of the piston ball 23. Further, the balls 24 shear the ball stopper, and therefore the balls 24 are pushed out of the tube pipe 22 so as to enter and engage with the pockets 21a in the pinion 21, thereby causing the pinion 21 to rotate. Hence, the pinion 21 converts the movement of the balls 24 into a rotary motion.

[0023] A deformation process of the tube pipe 22 occurring when the balls 24 engage with the pinion 21 will now be described using Figs. 5A to 5C. As shown in Fig. 5A, when the balls 24 are pushed out through the opening 28a in the tube pipe 22, a ball 24a that engages with the pinion 21 receives a force B from a following ball 24b. Upon reception of the force B, the ball 24a pushes the pinion 21 by a force A and pushes the tube pipe 22 by a force C such that balance is achieved. As a result, the tube pipe 22 attempts to bend to the left side of the drawing.

[0024] With respect to the balance of forces in the tube pipe 22, as shown in Fig. 5B, the tube pipe 22 receives all force other than the force B, which is received by the balls 24 discharged from the tube pipe 22 when the gas generator 25 is ignited from the ball 24a that engages with the pinion 21, regardless of the shape of the tube pipe 22. Accordingly, a force D serving as a reactive force to the force B acts on the hook portion 30.

[0025] As shown in Fig. 5C, when a force acts on the tube pipe 22 in the direction of an arrow α, the tubular part 28 of the tube pipe 22 is pulled upward, and therefore the force E acts on the boundary part between the rectilinear engagement portion 29 and the hook portion 30 flexed to the pinion side. As a result, the tube pipe 22 deforms in a rectilinear fashion, as shown by dotted lines in Fig. 5C, such that engagement between the pinion 21 and the balls 24 is secured even in the vicinity of the boundary part. Further, when the balls 24 engage with the pinion 21, the force C applied by the balls 24 to cause the tube pipe 22 to separate from the pinion 21 is turned into the force E for conversely causing the tube pipe 22 to deform toward the pinion side by the force B for pushing out the balls 24, and therefore the force C and the force E cancel each other out.

[0026] When the force in the direction of the arrow α acts on the tube pipe 22, the tubular part 28 thereof is pulled in an upward direction and therefore attempts to move upward. To ensure that this movement is not obstructed, an upper side part of the tube pipe 22 is not fixed.

[0027] As described above, in the seatbelt retractor according to this embodiment, the guide member includes the tubular part 28 extending continuously from one end portion to accommodate the piston ball 23 and the plurality of balls 24 and the hook portion 30 flexed to the pinion 21 side at the other end portion, and the tip end part of the hook portion 30 is fixed to the retractor frame 11 and the tube cover 26. The flexed part of the hook portion 30 can therefore be extended using the reactive force received by the balls 24 from the pinion 21. Accordingly, a reduction in an engagement amount between the pinion 21 and the balls 24 during a pretensioner operation

can be prevented, and the engagement between the balls 24 and the pinion 21 can be held for a long time. As a result, the pinion 21 can be rotated efficiently.

[0028] Further, the hook portion 30 extends along the tangent Y of the concentric circle X with the pinion 21, and therefore the hook portion 30 can be disposed close to the pinion 21 so that engagement between the pinion 21 and the balls 24 can be secured more easily.

[0029] Furthermore, the part of the tube pipe 22 near the pinion is cut away to form the engagement portion 29, where the balls 24 engage with the pinion 21, and the hook portion 30. Hence, the hook portion 30 can be disposed close to the pinion 21, and the hook portion 30 can be deformed easily.

[0030] The curved part 28c of the tubular part 28 of the tube pipe 22 is held such that during an operation of the pretensioner 20, the curved part 28c can be moved by the reactive force received when the balls 24 engage with the pinion 21. Hence, the flexed part of the hook portion 30 can be extended by the movement of the curved part 28c.

[0031] Note that the present invention is not limited to the embodiment described above and may be subjected to appropriate modifications, amendments, and so on.

[0032] In this embodiment, the tip end part of the hook portion 30 is fixed to both the retractor frame 11 and the tube cover 26 but need only be fixed to the retractor frame .

[0033] Further, the tip end part of the hook portion 30 is preferably fixed directly to the retractor frame 11 but may be fixed indirectly relative to the retractor frame 11 using another method not described in this specification. In other words, it is sufficient for the tip end part of the hook portion 30 to be fixed either directly or indirectly to the retractor frame so as to be incapable of moving relative to a rotary axis of a rotary member (the pinion 21) that rotates integrally with the spindle 12 of the retractor main body.

[0034] Furthermore, the boundary part between the engagement portion 29 and the hook portion 30 of the tube pipe 22 may be flexed or curved. In other words, the bent shape of the boundary part may be set as desired as long as the balls 24 can be biased in a direction for engaging with the pinion 21 by a guide surface of the tube pipe 22 when force is applied.

DESCRIPTION OF REFERENCE NUMERALS

[0035]

10 seatbelt retractor
11 retractor frame
12 spindle
15 side plate
20 pretensioner
21 pinion (rotary member)
22 tube pipe (guide member)
23 piston ball (piston member)
24 ball (rolling body)
25 gas generator (gas pressure generating means)
26 tube cover (guide member cover)
27 end portion
28 tubular part
29 engagement portion
30 hook portion
X concentric circle
Y tangent

Claims

1. A seatbelt retractor (10) comprising:

a spindle (12) for retracting a seatbelt;
a retractor frame (11) having a pair of side plates (15) that support the spindle (12) to be free to rotate; and
a pretensioner (20) that rotates the spindle in a retraction direction using a gas pressure generated when an explosive is exploded,
wherein the pretensioner (20) comprises:

gas pressure generating means (25) for generating the gas pressure;
a rotary member (21) that rotates integrally with the spindle (12);
a guide member (22) disposed around the rotary member (21) and to a side of a side plate (15) of the retractor frame (11), the gas pressure generating means (25) being attached to one end portion side thereof;
a piston member (23) that is accommodated in the guide member (22) and pushed directly by the gas pressure from the gas pressure generating means (25); and
a plurality of rolling bodies (24) that are accommodated in the guide member (22) and cause the rotary member to rotate by moving in accordance with a movement of the piston member (23),
the guide member (22) comprises a tubular part (28) formed continuously from the one end portion in order to accommodate the piston member (23) and the plurality of rolling bodies (24), an engagement portion (29) where the rolling bodies engage with the rotary member (21) and a hook portion (30) bent to the rotary member (21) side at the other end portion, and **characterized by**
a tip end part of the hook portion (30) being fixed to the retractor frame (11) so as to be incapable of moving relative thereto, and
in that the engagement portion (29) and the hook portion (30) are connected via a boundary part, and that an upper side part of the tube pipe (22) is not fixed thereby al-

lowing the tube pipe (22) to be pulled upward such that a force (E) acts on the boundary part which deforms in a rectilinear fashion when the gas generator is activated.

2. The seatbelt retractor (10) according to claim 1, **characterized by** further comprising a guide member cover (26) that is attached to the side plate (15) of the retractor frame (11) so as to cover the guide member (22).

3. The seatbelt retractor (10) according to claim 1 or 2, **characterized in that** the hook portion (30) extends along a tangent of a concentric circle with the rotary member (21).

4. The seatbelt retractor (10) according to any of claims 1 to 3, **characterized in that** a part of the guide member (22) near the rotary member (21) is cut away in the hook portion (30) and an engagement portion where the rolling bodies (24) engage with the rotary member (21).

5. The seatbelt retractor (10) according to any of claims 1 to 4, **characterized in that** the tubular part of the guide member (22) is held such that during an operation of the pretensioner (20), the tubular part can be moved by a reactive force received by the rolling bodies (24) when the rolling bodies (24) engage with the rotary member (21).

Patentansprüche

1. Sitzgurteinzug (10), umfassend:

eine Spindel (12) zum Einziehen eines Sitzgurts;
einen Einzugsrahmen (11) mit einem Paar Seitenplatten (15), die die Spindel (12) tragen, damit sie sich frei drehen kann; und
einen Gurtstraffer (20), der die Spindel unter Verwendung eines Gasdrucks, der erzeugt wird, wenn ein Sprengstoff explodiert, in einer Einzugsrichtung dreht,
wobei der Gurtstraffer (20) Folgendes umfasst:

Gasdruck erzeugende Mittel (25) zum Erzeugen des Gasdrucks;
ein Drehelement (21), das sich einstückig mit der Spindel (12) dreht;
ein Führungselement (22), das um das Drehelement (21) herum und an einer Seite einer Seitenplatte (15) des Einzugsrahmens (11) angeordnet ist, wobei die Gasdruck erzeugenden Mittel (25) an einer Endabschnittsseite davon befestigt sind;
ein Kolbenelement (23), das in dem Führungselement (22) aufgenommen ist und direkt durch den Gasdruck von den Gasdruck erzeugenden Mitteln (25) geschoben wird; und
eine Vielzahl von rollenden Körpern (24), die in dem Führungselement (22) aufgenommen sind und bewirken, dass sich das Drehelement dreht, indem sie sich entsprechend einer Bewegung des Kolbenelements (23) bewegen,
wobei das Führungselement (22) einen röhrenförmigen Teil (28) umfasst, der fortlaufend von dem einen Endabschnitt aus geformt ist, um das Kolbenelement (23) und die Vielzahl von rollenden Körpern (24) aufzunehmen, einen Eingriffsabschnitt (29), in dem die rollenden Körper mit dem Drehelement (21) in Eingriff gelangen, und einen Hakenabschnitt (30), der an dem anderen Endabschnitt zur Seite des Drehelements (21) hin gebogen ist, und **dadurch gekennzeichnet,**
dass ein Spitzenendteil des Hakenabschnitts (30) an dem Einzugsrahmen (11) befestigt ist, sodass es nicht in der Lage ist, sich bezogen darauf zu bewegen, und
dass der Eingriffsabschnitt (29) und der Hakenabschnitt (30) über ein Grenzteil verbunden sind und dass ein oberes Seitenteil des Röhrenstrangs (22) nicht befestigt ist, wodurch der Röhrenstrang (22) nach oben gezogen werden kann, sodass eine Kraft (E) auf das Grenzteil wirkt, das sich geradlinig verformt, wenn der Gasgenerator aktiviert wird.

2. Sitzgurteinzug (10) nach Anspruch 1, **dadurch gekennzeichnet, dass** er ferner eine Führungselementabdeckung (26) umfasst, die an der Seitenplatte (15) des Einzugsrahmens (11) befestigt ist, um das Führungselement (22) abzudecken.

3. Sitzgurteinzug (10) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Hakenabschnitt (30) entlang einer Tangente eines mit dem Drehelement (21) konzentrischen Kreises verläuft.

4. Sitzgurteinzug (10) nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** ein Teil des Führungselements (22) nahe dem Drehelement (21) in dem Hakenabschnitt (30) und einem Eingriffsabschnitt weggeschnitten ist, wo die rollenden Körper (24) mit dem drehenden Element (21) in Eingriff gelangen.

5. Sitzgurteinzug (10) nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das röhrenförmige Teil des Führungselements (22) so gehalten

ist, dass das röhrenförmige Teil während eines Betriebs des Gurtstraffers (20) von einer Reaktionskraft bewegt werden kann, die von den rollenden Körpern (24) aufgenommen wird, wenn die rollenden Körper (24) mit dem Drehelement (21) in Eingriff gelangen.

Revendications

1. Rétracteur de ceinture de sécurité (10), comprenant :

une broche (12) pour rétracter une ceinture de sécurité ;
un cadre de rétracteur (11) présentant une paire de plaques latérales (15) qui supportent la broche (12) pour qu'elle soit libre de tourner ; et
un prétendeur (20) qui fait tourner la broche dans une direction de rétraction au moyen d'une pression de gaz générée quand un explosif explose,
le prétendeur (20) comprenant :

des moyens de génération de pression de gaz (25) pour générer la pression de gaz ;
un élément rotatif (21) qui tourne d'un seul tenant avec la broche (12) ;
un élément de guidage (22) disposé autour de l'élément rotatif (21) et sur un côté de la plaque latérale (15) du cadre de rétracteur (11), les moyens de génération de pression de gaz (25) étant attachés à un côté de portion d'extrémité de celui-ci ;
un élément de piston (23) qui est logé dans l'élément de guidage (22) et poussé directement par la pression de gaz des moyens de génération de pression de gaz (25) ; et
une pluralité de corps roulants (24) qui sont logés dans l'élément de guidage (22) et amènent l'élément rotatif à tourner en se déplaçant suivant un déplacement de l'élément de piston (23),
l'élément de guidage (22) comprenant une partie tubulaire (28) formée en continu depuis l'une portion d'extrémité afin de loger l'élément de piston (23) et la pluralité de corps roulants (24), une portion de prise (29) dans laquelle les corps roulants viennent en prise avec l'élément rotatif (21) et une portion de crochet (30) courbée vers le côté de l'élément rotatif (21) sur l'autre portion d'extrémité, et **caractérisé en ce qu'**une partie d'extrémité de pointe de la portion de crochet (30) est fixée au cadre de rétracteur (11) de façon à être incapable de se déplacer par rapport à celui-ci, et
en ce que la portion de prise (29) et la portion de crochet (30) sont raccordées par l'intermédiaire d'une partie de frontière, et en ce qu'une partie latérale supérieure de la conduite tubulaire (22) n'est pas fixée permettant ainsi à la conduite tubulaire (22) d'être tirée vers le haut de sorte qu'une force (E) agit sur la partie de frontière qui se déforme de manière rectiligne quand le générateur de gaz est activé.

2. Rétracteur de ceinture de sécurité (10) selon la revendication 1, **caractérisé en ce qu'**il comprend en outre un recouvrement d'élément de guidage (26) qui est attaché à la plaque latérale (15) du cadre de rétracteur (11) de façon à recouvrir l'élément de guidage (22).

3. Rétracteur de ceinture de sécurité (10) selon la revendication 1 ou 2, **caractérisé en ce que** la portion de crochet (30) s'étend le long d'une tangente d'un cercle concentrique avec l'élément de rotation (21).

4. Rétracteur de ceinture de sécurité (10) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce qu'**une partie de l'élément de guidage (22) près de l'élément rotatif (21) est découpée dans la portion de crochet (30) et une portion de prise dans laquelle les corps roulants (24) viennent en prise avec l'élément rotatif (21).

5. Rétracteur de ceinture de sécurité (10) selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la partie tubulaire de l'élément de guidage (22) est maintenue de sorte que pendant une opération du prétendeur (20), la partie tubulaire peut être déplacée par une force de réaction reçue par les corps roulants (24) quand les corps roulants (24) viennent en prise avec l'élément rotatif (21).

FIG. 1

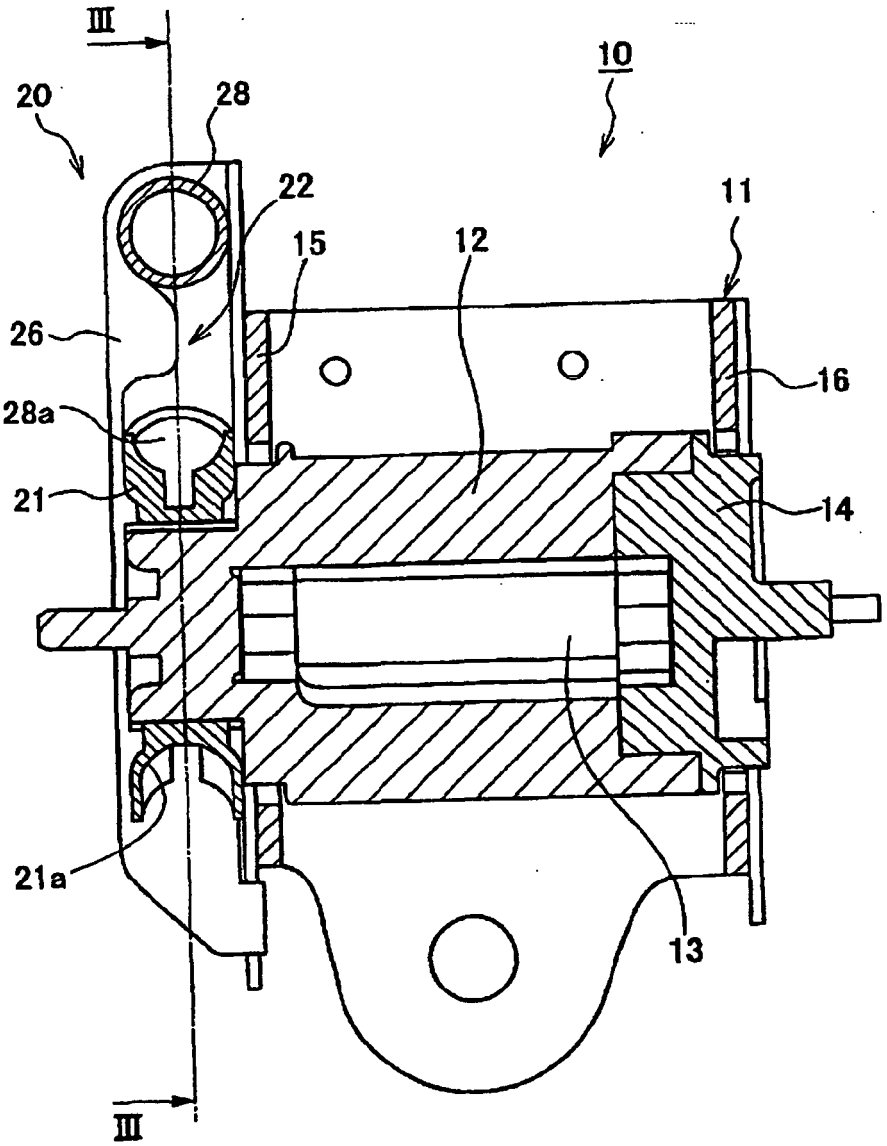


FIG. 2

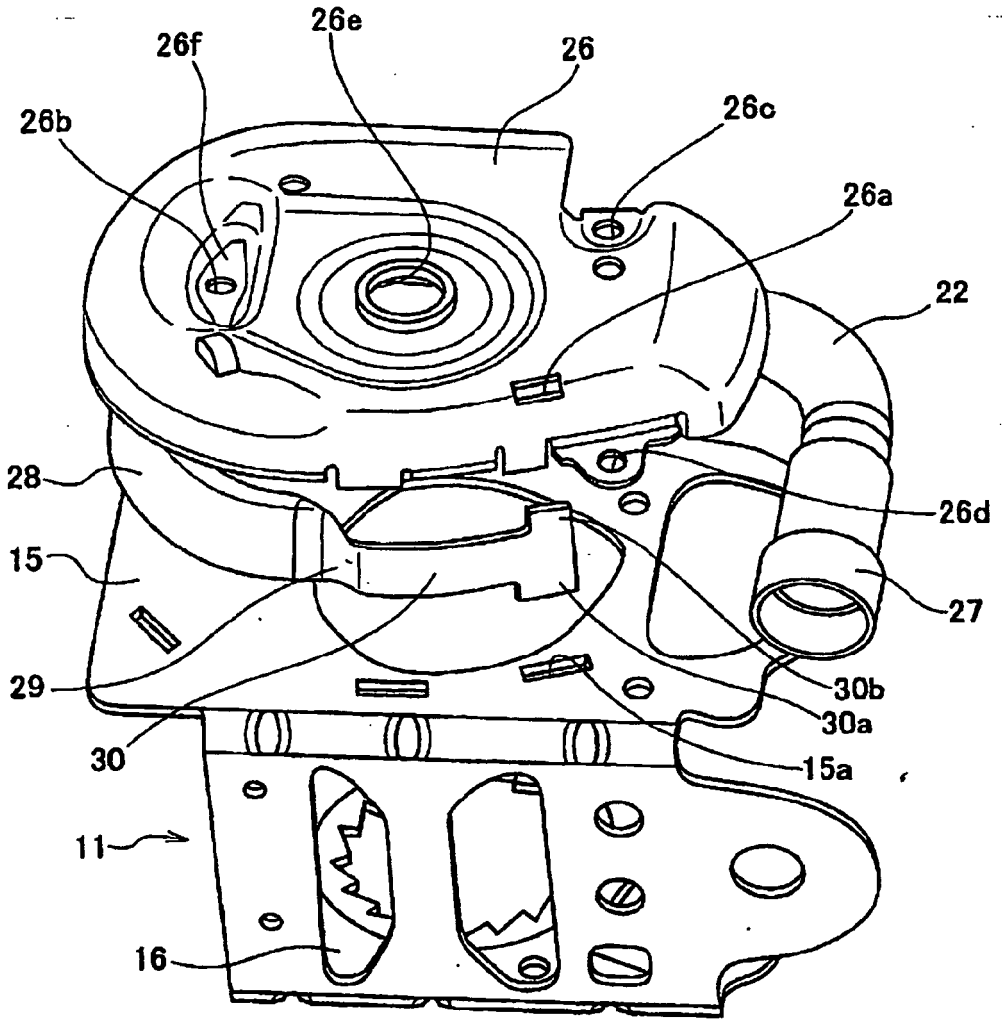


FIG. 3

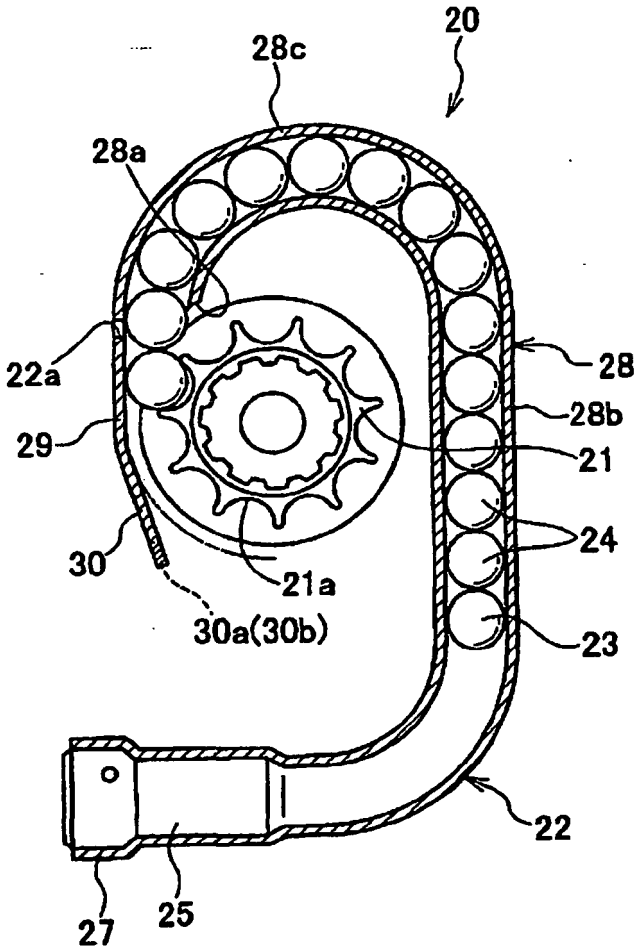


FIG. 4

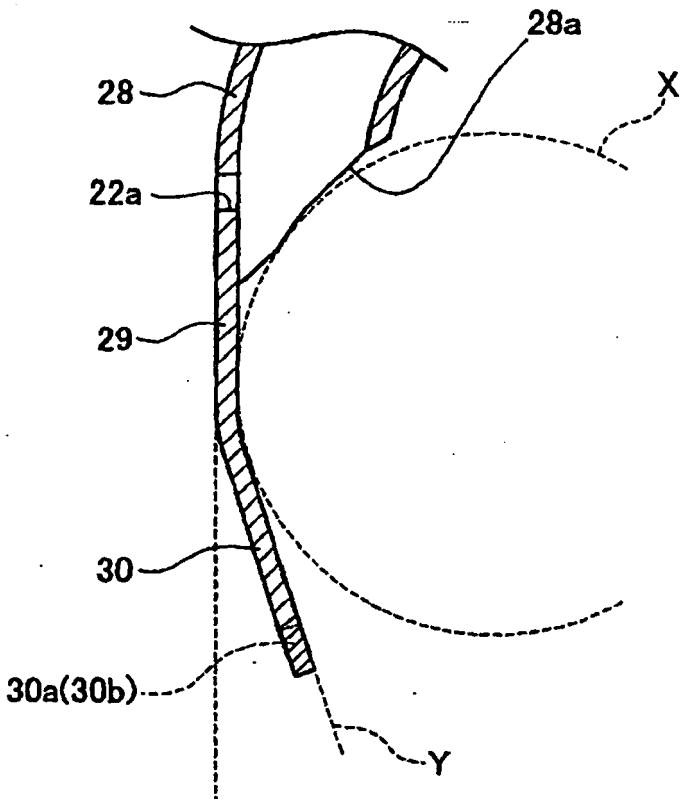


FIG. 5

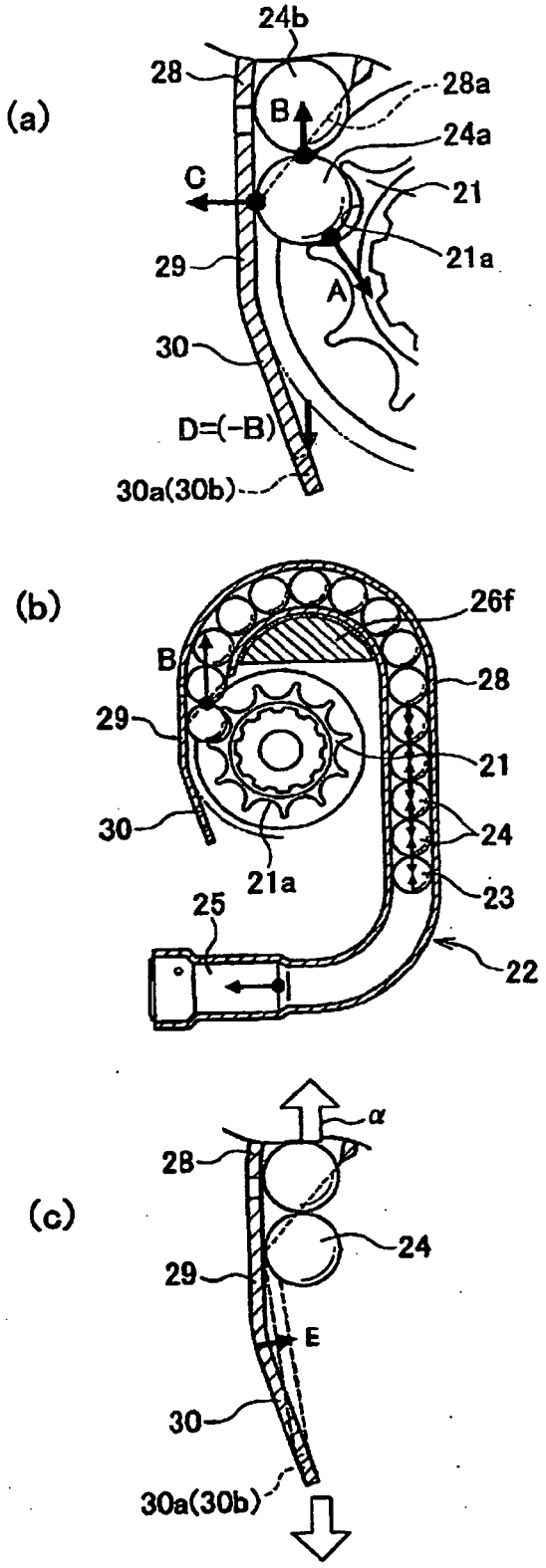
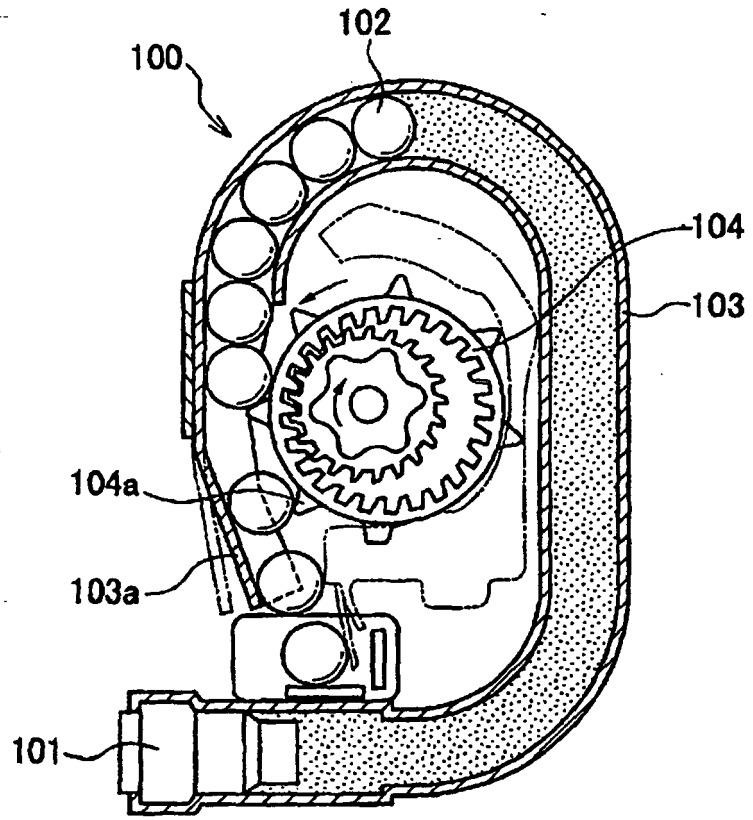

(a)
24b
28
28a
B
24a
C
21
21a
29
A
30
D=(-B)
30a(30b)
(b)
26f
B
28
29
21
30
24
21a
23
25
22
(c)
α
28
24
29
E
30
30a(30b)

FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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