



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
04.03.2020 Bulletin 2020/10

(51) Int Cl.:
B65B 13/34 (2006.01) **B65B 51/04** (2006.01)
B65B 67/02 (2006.01)

(21) Application number: **18790451.1**

(86) International application number:
PCT/JP2018/016889

(22) Date of filing: **25.04.2018**

(87) International publication number:
WO 2018/199199 (01.11.2018 Gazette 2018/44)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(30) Priority: **27.04.2017 JP 2017088485**

(54) **BINDER, AND BINDER PACKET**

(57) Provided is a binder (41) that is punched out from a binding machine (10) and that binds an object (50) to be bound, the binder (41) comprising: a plastically deformable base member (42) formed in the approximate shape of a U; and a surface member (43) provided on the surface of the base member (42).

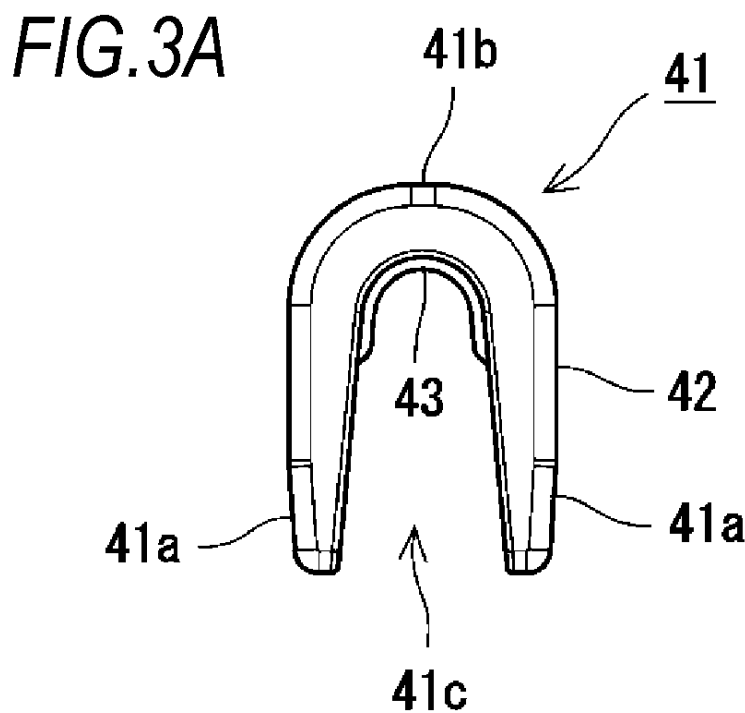


FIG.3B

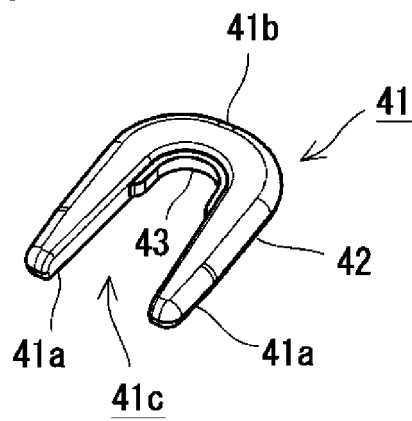
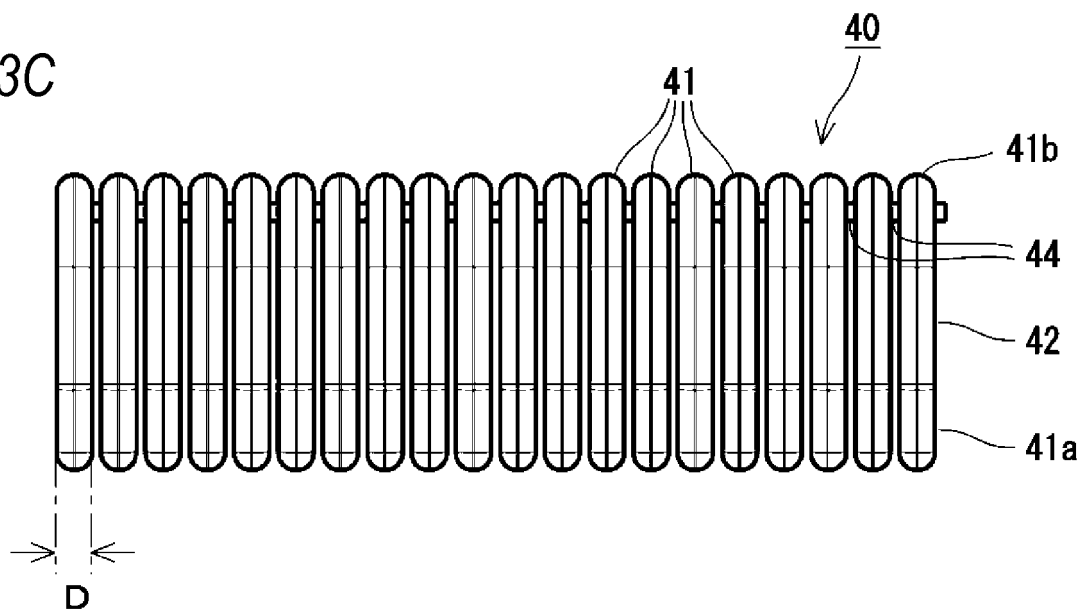


FIG.3C



Description

Technical Field

[0001] The present invention relates to a binder used when binding a harness, a bag mouth, a field wire, an attraction string and the like.

Background Art

[0002] As a binder of this type, for example, Patent Literature 1 discloses a plastic binding clip having a U-shape. This binding clip is configured such that a bound member can be bound by inserting the bound member between leg portions of the binding clip and bending the leg portions inward.

Citation List

Patent Literature

[0003] Patent Literature 1: JP-A-2004-10125

Summary of Invention

Technical Problem

[0004] The above-described conventional binder is required to bind so tightly as to bite into the bound member in order to avoid displacement of the binder. Therefore, the bound member may be damaged by such tight binding.

[0005] Accordingly, a first object of the present invention is to provide a binder capable of performing stable binding while reducing displacement even if binding strength is not as strong as causing damage to a bound member.

[0006] Further, when used at a location where vibration occurs, the above-described conventional binder may cause damage by hitting other members or may be broken by an impact from other members.

[0007] Accordingly, a second object of the present invention is to provide a binder that is less likely to damage other members or be broken even when used at a location where vibration occurs.

Solution to Problem

[0008] The present invention has been made in view of the above-described problems, and provides a binder configured to bind a bound member by being struck out from a binding machine. The binder includes a substantially U-shaped base member that is plastically deformable, and a surface member that is provided on a surface of the base member.

Advantageous Effects of Invention

[0009] The present invention is as described above, and the surface member is provided on the surface of the substantially U-shaped base member that is plastically deformable. According to such a configuration, as the surface member is provided on an inner surface and/or an outer surface of the base member, the effects such as stable binding and/or prevention of damage can be obtained.

[0010] For example, if the surface member is provided on the inner surface of the base member, the frictional resistance at a position in contact with the bound member can be improved, so that the holding force of the binder can be increased. Therefore, binding can be stably performed without displacement of the binder even if the binding strength is appropriate not as strong as causing damage to the bound member. Further, the effect of reducing impact when the binder hits other members can be expected.

[0011] If the surface member is provided on the outer surface of the base member, the buffering property at a position hitting other members can be improved. Therefore, even when the binder is used at a location where vibration occurs, damage to other members can be reduced and breakage is less likely to occur. Further, since the impact at hitting to other members is alleviated, the effect of preventing the binder from falling off by the impact can also be expected.

Brief Description of Drawings

[0012]

Fig. 1 is an external view of a binding machine in which a binder is set.

Fig. 2 is an external view immediately after binding a bound member by the binding machine.

Fig. 3A is a front view of the binder, Fig. 3B is a perspective view of the binder, and Fig. 3C is a side view of a binder packet.

Fig. 4A is an external view of the binder that binds the bound member, and Fig. 4B is a front view of the binder that binds the bound member.

Fig. 5 is a side view of the binding machine.

Fig. 6 is a cross-sectional view of the binding machine taken along a line A-A in Fig. 5.

Figs. 7A and 7B are cross-sectional views of the binding machine taken along a line B-B in Fig. 5, wherein Fig. 7A is a view before a driver is operated, and Fig. 7B is a view during operation of the driver. Figs. 8A and 8B are views of a binder according to a first modification, wherein Fig. 8A is a front view of the binder, and Fig. 8B is a perspective view of the binder.

Figs. 9A and 9B are views of a binder according to a second modification, wherein Fig. 9A is a front view of the binder, and Fig. 9B is a perspective view of

the binder.

Figs. 10A, 10B and 10C are views of a binder according to a third modification, wherein Fig. 10A is a front view of the binder, Fig. 10B is a perspective view of the binder, and Fig. 10C is a bottom view of the binder.

Figs. 11A, 11B and 11C are views of a binder according to a fourth modification, wherein Fig. 11A is a front view of the binder, Fig. 11B is a perspective view of the binder, and Fig. 11C is a bottom view of the binder.

Figs. 12A, 12B and 12C are views of a binder according to a fifth modification, wherein Fig. 12A is a front view of the binder, Fig. 12B is a perspective view of the binder, and Fig. 12C is a bottom view of the binder.

Figs. 13A, 13B and 13C are views of a binder according to a sixth modification, wherein Fig. 13A is a front view of the binder, Fig. 13B is a perspective view of the binder, and Fig. 13C is a bottom view of the binder.

Figs. 14A, 14B and 14C are views of a binder according to a seventh modification, wherein Fig. 14A is a front view of the binder, Fig. 14B is a perspective view of the binder, and Fig. 14C is a bottom view of the binder.

Figs. 15A, 15B and 15C are views of a binder according to an eighth modification, wherein Fig. 15A is a front view of the binder, Fig. 15B is a perspective view of the binder, and Fig. 15C is a bottom view of the binder.

Figs. 16A, 16B and 16C are views of a binder according to a ninth modification, wherein Fig. 16A is a front view of the binder, Fig. 16B is a perspective view of the binder, and Fig. 16C is a bottom view of the binder.

Description of Embodiments

[0013] Embodiments of the present invention are described with reference to the drawings.

[0014] A binder 41 according to the present embodiment is used by being loaded into a binding machine 10 as shown in Fig. 1, for example. The binding machine 10 binds a bound member 50 by closing an opening 41c of the binder 41. The binding machine 10 is used, for example, for binding a harness, a bag mouth, a field wire or an attraction string. In the present embodiment, a handheld type binding machine 10 will be described as an example. However, the binder 41 according to the present embodiment can be used not only for the handheld type binding machine 10 but also for a stationary type binding machine.

[0015] As shown in Fig. 1, the binding machine 10 is covered with a housing 11, and includes a motor accommodation portion 12, a grip portion 13 and an output portion 15.

[0016] The motor accommodation portion 12 is provided

at a rear portion of the binding machine 10, and a power source connection portion 12a which connects an external power source is provided at a rear end portion thereof. By receiving a voltage supply from the power source connection portion 12a, the binding machine 10 can perform various operations such as striking out the binder 41. A cord which connects to an AC [0] power source may be connected to the power source connection portion 12a, or a harness which connects to a rechargeable battery may be attached thereto. Although the binding machine 10 according to the present embodiment is of an electric type, the present invention is not limited thereto, and the binding machine 10 may be of a compressed air type. When the binding machine 10 is of the compressed air type, a connection portion which receives supply of compressed air may be provided instead of the power source connection portion 12a.

[0017] Although not shown in the drawings, a motor and a control portion are housed in the motor accommodation portion 12, so that driving of a driver 25 (described below) can be controlled.

[0018] The grip portion 13 is a portion to be gripped by a user when the binding machine 10 is used. The grip portion 13 is provided in an intermediate portion of the housing 11, and is formed in a constricted shape so as to be easily gripped by the user. An operation portion 14 is provided on an obliquely front side of the grip portion 13 at a position that can be operated with an index finger when the grip portion 13 is gripped. The operation portion 14 can be manually operated to perform a binding operation. The operation portion 13 is a swing member having a trigger shape in the present embodiment. The driver 25 (described below) is activated when the operation portion 14 is pulled.

[0019] The output portion 15 is provided in the vicinity of a tip end of the binding machine 10. At a tip end of the output portion 15, a protrusion forming portion 17 protrudes in a substantially L-shape, and an insertion opening 16 into which the bound member 50 is inserted is opened inside the protrusion forming portion 17. The driver 25 is housed in the output portion 15. A magazine portion 35 is provided on a side portion of the output portion 15.

[0020] The protrusion forming portion 17 is formed as a part of the housing 11 or is integrally fixed to the housing 11. A clincher 18 is provided on an inner surface of the protrusion forming portion 17 at a position where a tip end of the driver 25 (described below) is received. As shown in Fig. 7A, the clincher 18 and the driver 25 stand by at positions apart from each other before the binder 41 is struck out, and the insertion opening 16 is provided between the clincher 18 and the driver 25. The binding machine 10 according to the present embodiment performs binding by striking out the binder 41 toward the insertion opening 16.

[0021] The clincher 18 is configured to clinch leg portions 41a of the binder 41 struck out by the driver 25 to complete the binding. Specifically, the clincher 18 is a

plate against which the binder 41 struck out by the driver 25 is pressed. A groove for guiding the leg portions 41a of the binder 41 is formed on a surface of the clincher 18, and the leg portions 41a of the binder 41 pressed against the clincher 18 are bent inward (clinched) along the groove.

[0022] The driver 25 is an elongated plate that performs a rectilinear motion by a drive mechanism (not shown) in order to strike out the binder 41 toward the insertion opening 16. As shown in Figs. 7A and 7B, the driver 25 is slidably guided inside the housing 11, and can reciprocate in a striking direction of the binder 41. The driver 25 presses the struck binder 41 against the clincher 18 to bend the leg portions 41a of the binder 41, thereby closing the opening 41c to complete the binding.

[0023] The magazine portion 35 is configured to load a plurality of binders 41. The binding machine 10 according to the present embodiment uses a binder packet 40 as shown in Fig. 3C, and the magazine portion 35 can be loaded thereon such a binder packet 40.

[0024] The binder packet 40 is configured by coupling a plurality of binders 41 to each other. As shown in Figs. 3A and 3B, each binder 41 includes a pair of leg portions 41a and a connection portion 41b connecting the pair of leg portions 41a to be formed in a substantially U-shape. As shown in Fig. 3C, coupling portions 44 for coupling adjacent binders 41 are provided on front and back surfaces of the connection portion 41b. The coupling portion 44 is formed to be weaker and thinner than the other portions so as to be easily broken.

[0025] The opening 41c which holds the bound member 50 is formed between the pair of leg portions 41a. When the binder 41 is struck out by the driver 25 and clinched, the leg portions 41a are plastically deformed as shown in Figs. 4A and 4B such that the bound member can be held and bound.

[0026] As shown in Fig. 6, the magazine portion 35 includes a rib 35a that enters between the leg portions 41a of the binder 41 (that is, the opening 41c). A groove 35b that guides the connection portion 41b of the binder 41 is formed so as to face a tip end of the rib 35a.

[0027] The magazine portion 35 is provided with a pusher 36 slidable along a longitudinal direction of the magazine portion 35. The pusher 36 is configured to bias the binder packet 40 loaded in the magazine portion 35 forward, and is always biased forward (in a direction of sending the binder 41 to a standby portion 37 (described below)) by a spring (not shown).

[0028] The magazine portion 35 is connected to the side portion of the output portion 15, and is configured to guide the binder packet 40 inside the output portion 15. Inside the output portion 15 continuous with the magazine portion 35, the standby portion 37 is provided which makes the binder 41 stand by in a state for being struck out. The standby portion 37 is provided between the driver 25 and the insertion opening 16, and the binder 41 standing by at the standby portion 37 is struck out by the driver 25 in a direction of the insertion opening 16.

[0029] When the binder packet 40 is loaded in the magazine portion 35, as shown in Fig. 6, the binder packet 40 is loaded so as to straddle the rib 35a, so that the connection portion 41b of the binder 41 passes through the groove 35b of the magazine portion 35. When the binder packet 40 is loaded in this manner, the binder packet 40 is biased by the pusher 36 in a direction toward the standby portion 37.

[0030] When binding is performed using the binding machine 10 according to the present embodiment, the bound member 50 is first inserted into the insertion opening 16. When the operation portion 14 is operated in this state, the motor rotates and the driver 25 strikes out the binder 41 supplied to the standby portion 37 (see Fig. 7B), and the leg portions 41a of the struck binder 41 are clinched by the clincher 18 to complete the binding.

[0031] As shown in Figs. 3A to 3C, the binder 41 according to the present embodiment includes a substantially U-shaped base member 42 that is plastically deformable, and a surface member 43 provided on a surface of the base member 42.

[0032] The base member 42 is a main body of the binder 41, and holds and binds the bound member 50 by plastic deformation. As described above, the base member 42 includes the pair of leg portions 41a, the connection portion 41b connecting the pair of leg portions 41a, and the coupling portions 44 which couples adjacent connection portions 41b.

[0033] The surface member 43 is a thin portion provided on a part of the surface of the base member 42. For example, the surface member 43 is formed integrally with the base member 42 by two-layer molding. The surface member 43 is not necessarily formed integrally with the base member 42. The surface member 43 may be adhered to the base member 42, or the surface member 43 may be provided by coating the base member 42, or the surface member 43 may be assembled to the base member 42.

[0034] In the present embodiment, the base member 42 is formed of plastic, and the surface member 43 is formed of rubber. Therefore, a friction coefficient between the surface member 43 and the bound member 50 is larger than a friction coefficient between the base member 42 and the bound member 50. That is, the surface member 43 provides the effect of slip prevention. In addition, the surface member 43 has an elastic limit higher than that of the base member 42, so that the impact can be alleviated when the surface member 43 hits other members.

[0035] As shown in Figs. 3A and 3B, since the surface member 43 is provided on an inner side of the substantially U-shape of the base member 42, the surface member 43 comes into contact with the bound member 50 during binding.

[0036] According to such a configuration, a large frictional force is generated between the surface member 43 and the bound member 50, so that the displacement of the bound member 50 is reduced. Therefore, stable

binding can be obtained.

[0037] As shown in Figs. 3A to 3C, each binder 41 is coupled to other binders 41 on front and back surfaces thereof. The front and back surfaces (surfaces facing a coupling direction) of the binder 41 are not provided with the surface member 43. The surface member 43 is formed to be thinner than a thickness D (see Fig. 3C) between the front and back surfaces of the binder 41, and does not protrude from the front and back surfaces of the binder 41. Therefore, when the binder 41 is struck out by the driver 25, the surface member 43 does not contact a sliding guide surface inside the housing 11, and the frictional resistance during striking is not increased. Accordingly, the binder 41 can be struck out smoothly. Even when the surface member 43 is provided, since the thickness of the binder 41 is not affected, the pitch for connecting the binders 41 is not required to be increased, so that the size of the binder packet 40 can be kept small.

[0038] As shown in Figs. 3A to 3C, tip ends of the leg portions 41a of the binder 41 are not provided with the surface member 43. Therefore, the problem should not occur that the surface member 43 provided at tip ends of the leg portions 41a is peeled off due to friction when the leg portions 41a is clinched. In particular, as the surface member 43 is not provided at outer tip ends of the leg portions 41a, peeling of the surface member 43 during clinching can be prevented.

[0039] In the present embodiment, the surface member 43 is provided in a substantially U-shape on an inner side of the base member 42. However, the present invention is not limited thereto.

[0040] For example, as shown in Figs. 8A and 8B, surface members 43 may be respectively provided at positions facing each other on inner sides of the pair of leg portions 41a. In other words, the surface members 43 may be provided while avoiding an inner side of the connection portion 41b. In such a configuration, a smooth striking of the binder 41 can be realized while obtaining the effect of slip prevention by the surface member 43. That is, when the binder 41 is struck out, as shown in Fig. 7B, a shearing force is applied to the coupling portion 44 to break the coupling portion 44 by pressing the remaining binder packet 40 with the rib 35a while striking a leading binder 41 with the driver 25. At this time, when the surface member 43 is provided on the inner side of the connection portion 41b as shown in Figs. 3A to 3C, the surface member 43 on the inner side of the connection portion 41b contacts the tip end of the rib 35a, so that the impact applied to the coupling portion 44 is alleviated by the surface member 43, and the instantaneous shearing force for breaking the coupling portion 44 is decreased. If the coupling portion 44 is harder to break due to a decrease in the instantaneous shear force, the striking speed may be slowed down, which causes poor binding, or the coupling portion 44 may be stretched by being slowly broken, resulting in generation of burrs. In this respect, if the surface member 43 is not provided on the inner side of the connection portion 41b, buffering due

to the surface member 43 does not occur when the coupling portion 44 is broken, so that the connection portion 41b can be easily separated. In addition, since the surface members 43 are provided on the inner side of the leg portions 41a that holds the bound member 50, the surface members 43 can sandwich the bound member 50 from both directions. Therefore, the effect of preventing the bound member 50 from slipping is sufficiently enhanced.

[0041] Further, when the binder packet 40 is pushed by the pusher 36, if the rib 35a and the surface member 43 are in contact with each other in a wide range, the frictional resistance may be increased, which causes a sending failure. In this respect, if the surface member 43 is not provided on the inner side of the connection portion 41b serving as a contact portion with the rib 35a, an increase in the frictional resistance can be prevented, and the binder packet 40 can be reliably sent.

[0042] As shown in Figs. 9A and 9B, the surface member 43 may be provided on the inner side of the connection portion 41b, and the surface member 43 may not be provided at positions facing each other on the inner sides of the pair of leg portions 41a. In such a configuration, since the surface member 43 is provided on the inner side of the connection portion 41b that hits the bound member 50 when the binder 41 is struck out, the bound member 50 can be buffered and protected at a portion where the load is applied most.

[0043] As shown in Figs. 10A to 14C, the surface member 43 may be provided on an outer side of a substantially U-shape of the base member 42. By providing the surface member 43 on the outer side of the base member 42, the surface member 43 functions as a buffer when the binder 41 hits other members, so that breakage can be reduced or prevented.

[0044] A shape of a surface of the surface member 43 may have various forms, and may be determined according to the using environment and purpose. For example, as shown in Figs. 10A to 10C, the surface of the surface member 43 may be formed flat. As shown in Figs. 11A to 11C, the surface member 43 may be formed in a rib shape. As shown in Figs. 12A to 12C, the surface member 43 may be formed in a mountain shape in cross section. As shown in Figs. 13A to 13C, the surface member 43 may be formed in a concave shape in cross section. As shown in Figs. 14A to 14C, the surface member 43 may be formed to bulge in an R-shape in cross section.

[0045] As shown in Figs. 15A to 15C, the surface member 43 may be provided on both inner and outer sides of the base member 42.

[0046] As shown in Figs. 16A to 16C, the surface member 43 may be provided so as to coat the base member 42.

[0047] As described above, the binder 41 according to the present embodiment includes an elastically deformable surface member 43 on the surface of the substantially U-shaped base member 42 that is plastically deformable. According to such a configuration, as providing

the surface member 43 on the inner surface and/or the outer surface of the base member 42, the effects such as stable binding and/or prevention of breakage can be obtained.

[0048] That is, if the surface member 43 is provided on the inner surface of the base member 42, the frictional resistance at a position in contact with the bound member 50 can be improved and the holding force of the binder 41 can be increased. Therefore, binding can be stably performed without displacement of the binder 41 even if the binding strength is appropriate not as strong as causing damage to the bound member 50. Further, the effect of preventing damage when the binder 41 hits other members can also be expected.

[0049] If the surface member 43 is provided on the outer surface of the base member 42, the buffering property at a position hitting other members can be improved. Therefore, even when the binder 41 is used at a location where vibration occurs, damage to other members can be reduced and breakage of the binder 41 can be prevented. Since the impact at hitting to other members is alleviated, the effect of preventing the binder 41 from falling off by the impact can be expected.

[0050] In the above-described embodiment, the surface member 43 is provided on both the pair of leg portions 41a. However, the present invention is not limited thereto, and the surface member 43 may be provided only on one of the leg portions 41a.

[0051] This application is based on Japanese Patent Application filed on April 27, 2017 (Japanese Patent Application No. 2017-088485), the entirety of which is incorporated herein by reference.

Reference Signs List

[0052]

10 binding machine
50 housing
12 motor accommodation portion
12a power source connection portion
13 grip portion
14 operation portion
15 output portion
16 insertion opening
17 protrusion forming portion
18 clincher
25 driver
35 magazine portion
35a rib
35b groove
36 pusher
37 standby portion
40 binder packet
41 binder
41a leg portion
41b connection portion
41c opening

42 base member
43 surface member
44 coupling portion
50 bound member

Claims

1. A binder configured to bind a bound member by being struck out from a binding machine, the binder comprising:
 - a substantially U-shaped base member that is plastically deformable; and
 - a surface member that is provided on a surface of the base member.
2. The binder according to claim 1, wherein a friction coefficient between the surface member and the bound member is larger than a friction coefficient between the base member and the bound member.
3. The binder according to claim 1 or 2, wherein the surface member has an elastic limit higher than that of the base member.
4. The binder according to any one of claims 1 to 3, wherein the surface member is provided on a substantially U-shaped inner surface of the base member.
5. The binder according to claim 4, wherein the surface member is provided in a substantially U-shape on the inner surface of the base member.
6. The binder according to claim 4, wherein the base member includes a pair of leg portions and a connection portion connecting the pair of leg portions, and wherein the surface member is provided at positions facing each other on inner surfaces of the pair of leg portions.
7. The binder according to claim 4, wherein the base member includes a pair of leg portions and a connection portion connecting the pair of leg portions, and wherein the surface member is provided on an inner surface of the connection portion, and the surface member is not provided at positions facing each other on inner surfaces of the pair of leg portions.
8. The binder according to any one of claims 1 to 7, wherein the surface member is provided on a substantially U-shaped outer surface of the base member.

9. The binder according to any one of claims 1 to 8, wherein the base member is formed of plastic, and the surface member is formed of rubber.

10. A binder packet comprising:

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a plurality of binders coupled to each other, each being the binder according to any one of claims 1 to 9,

wherein each of the binders is coupled to other of the binders on front and back surfaces thereof, and

wherein the front and back surfaces of each of the binders are not provided with the surface member.

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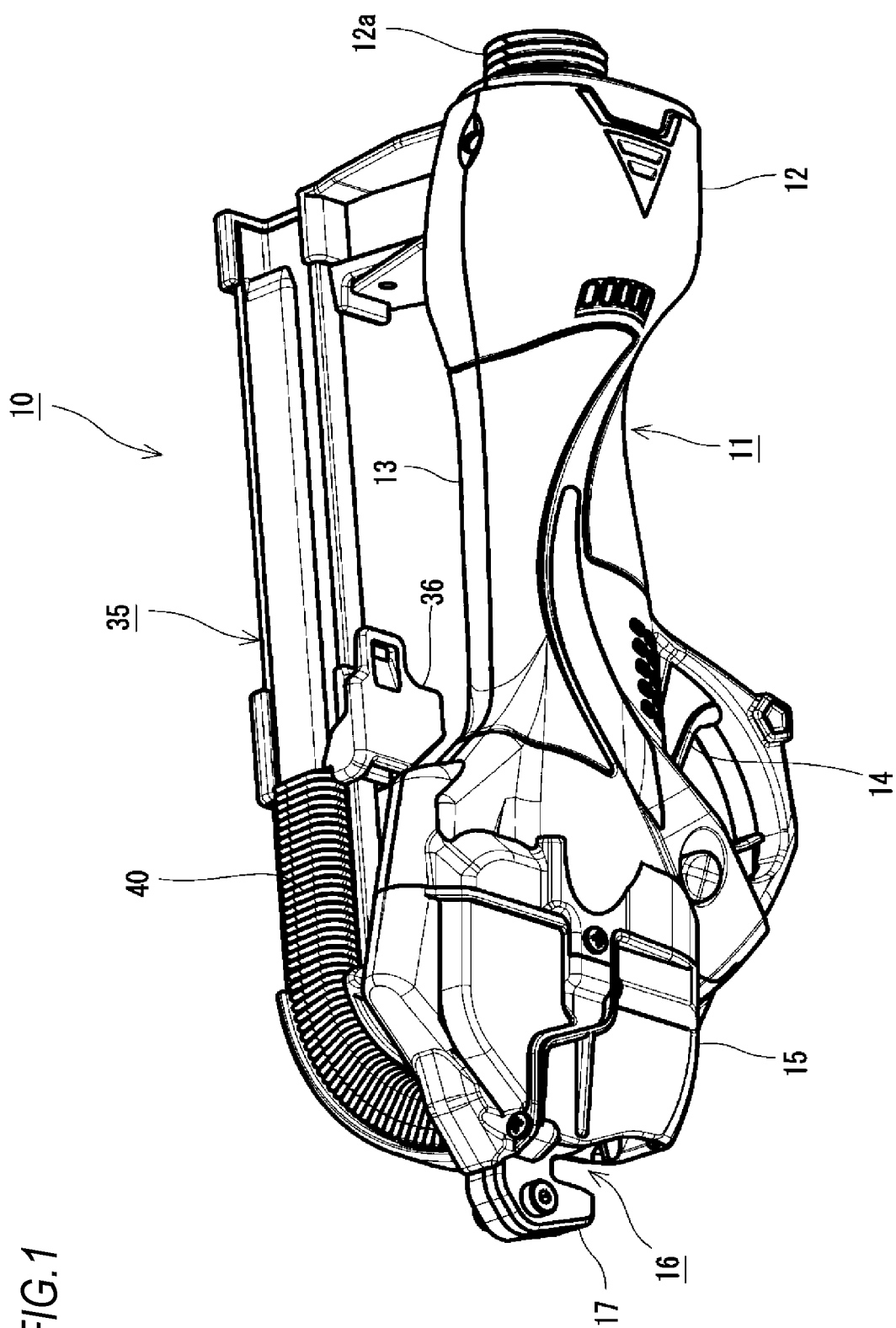


FIG. 1

FIG.2

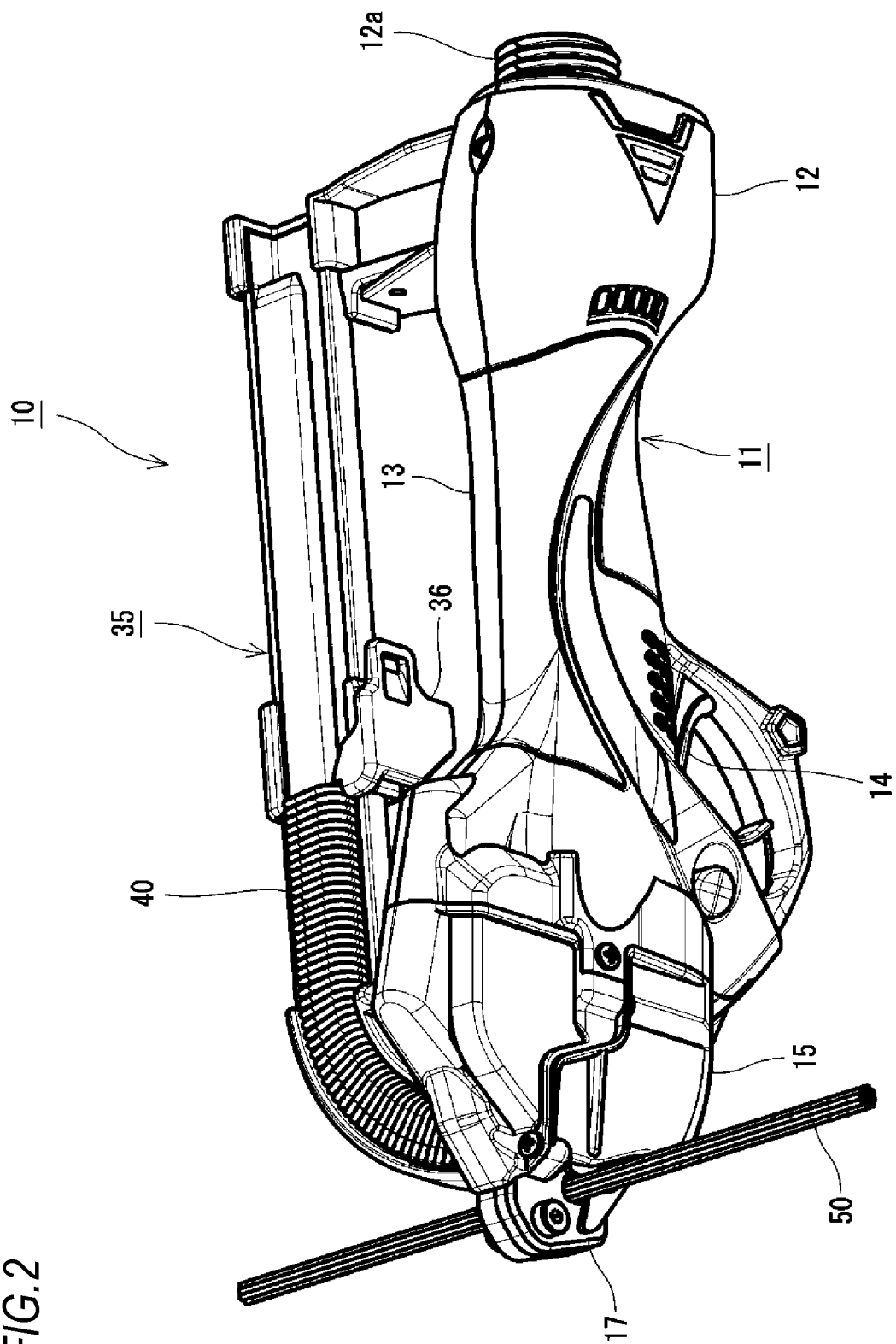


FIG.3A

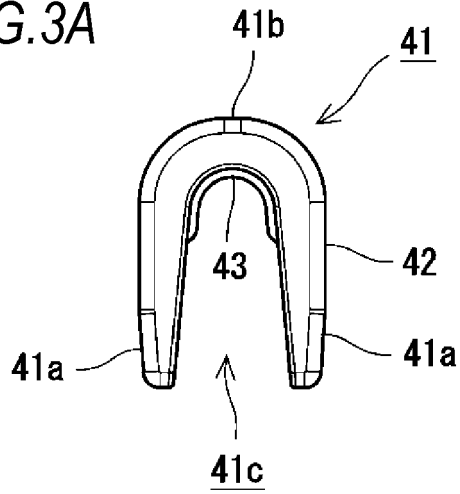


FIG.3B

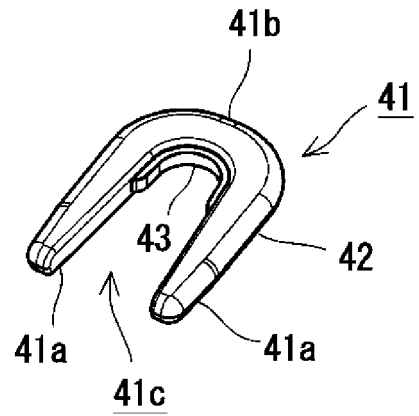


FIG.3C

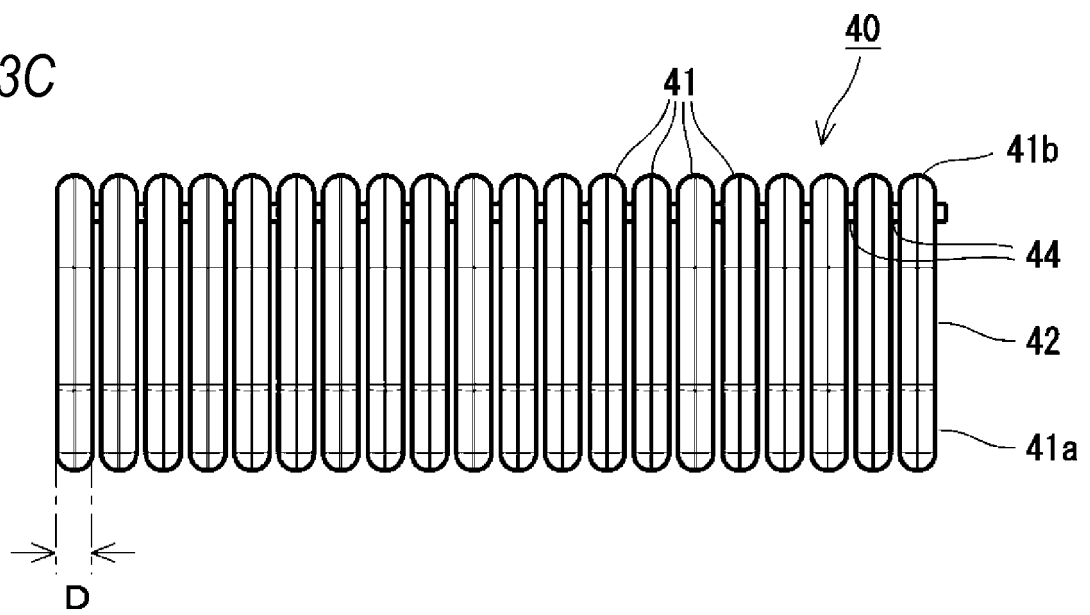


FIG.4A

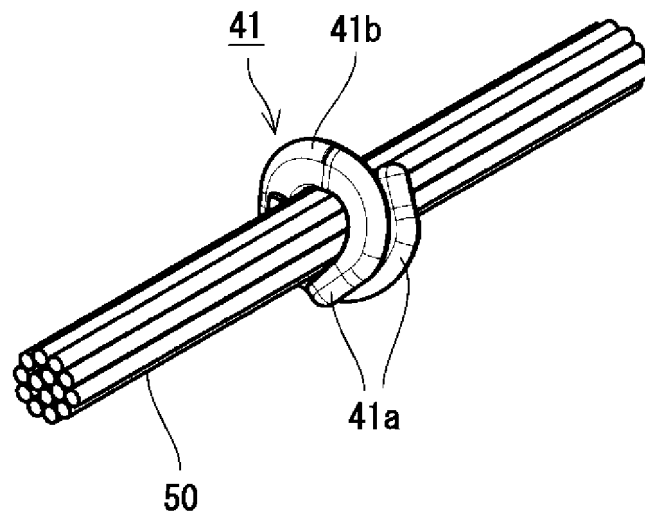


FIG.4B

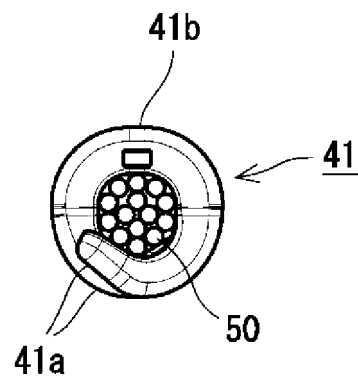


FIG.5

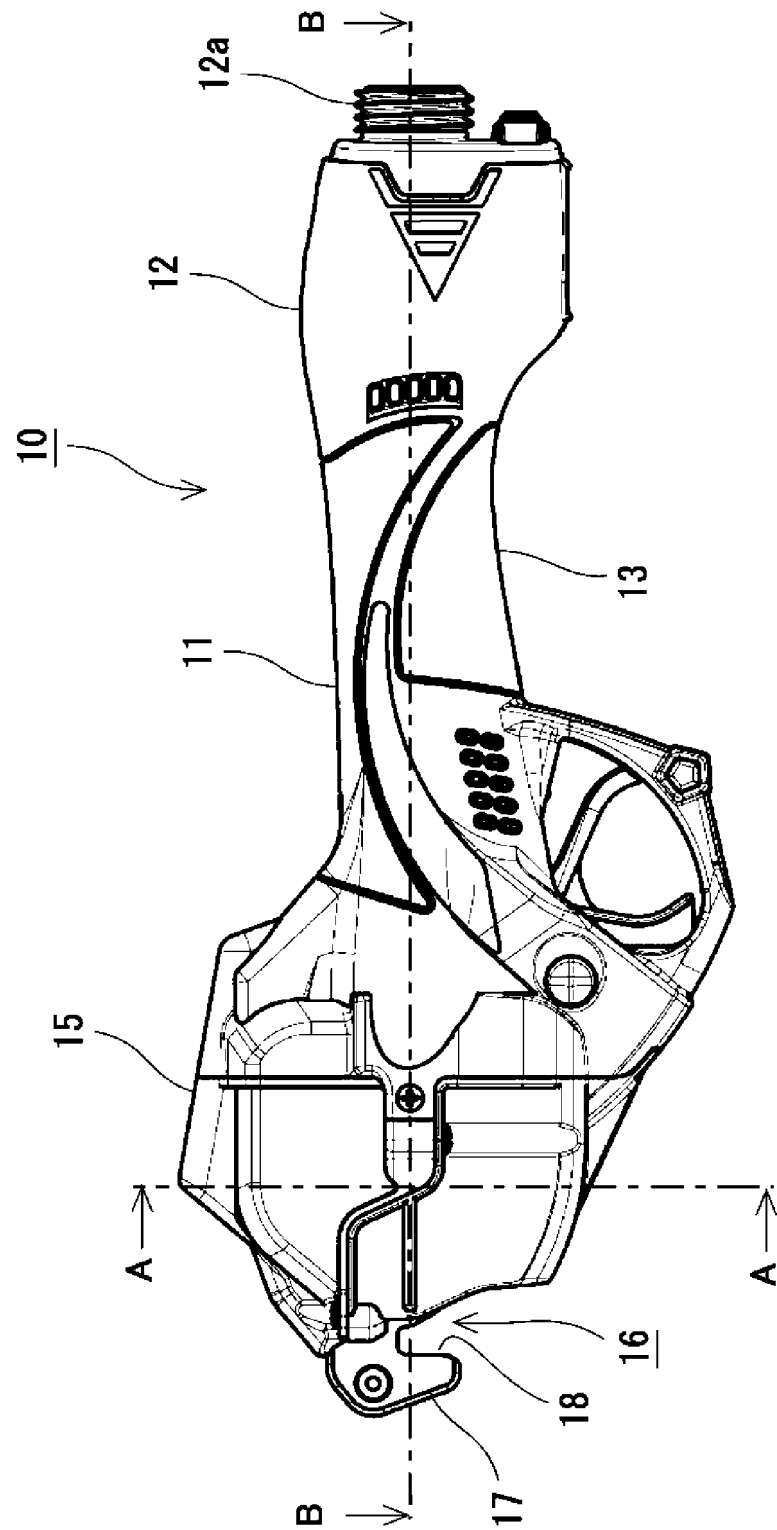


FIG.6

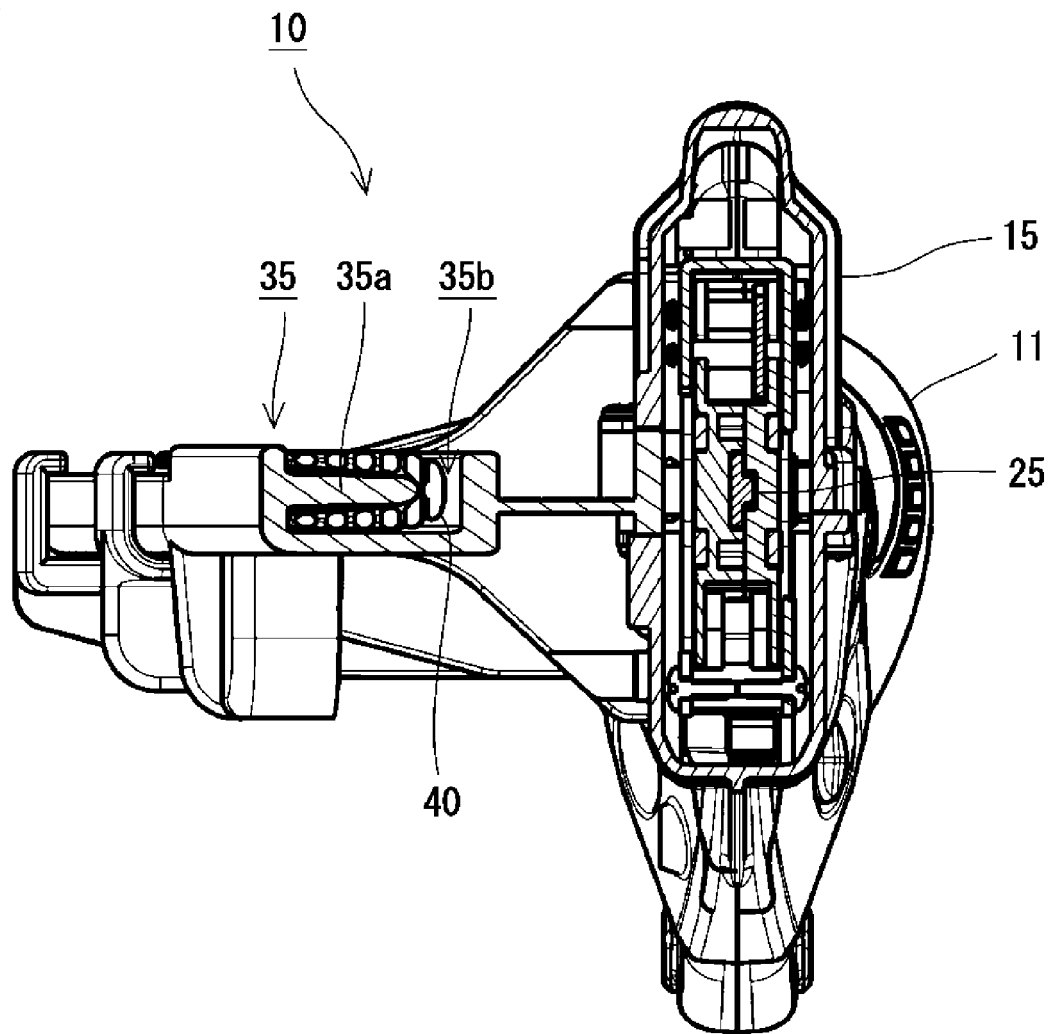


FIG. 7A

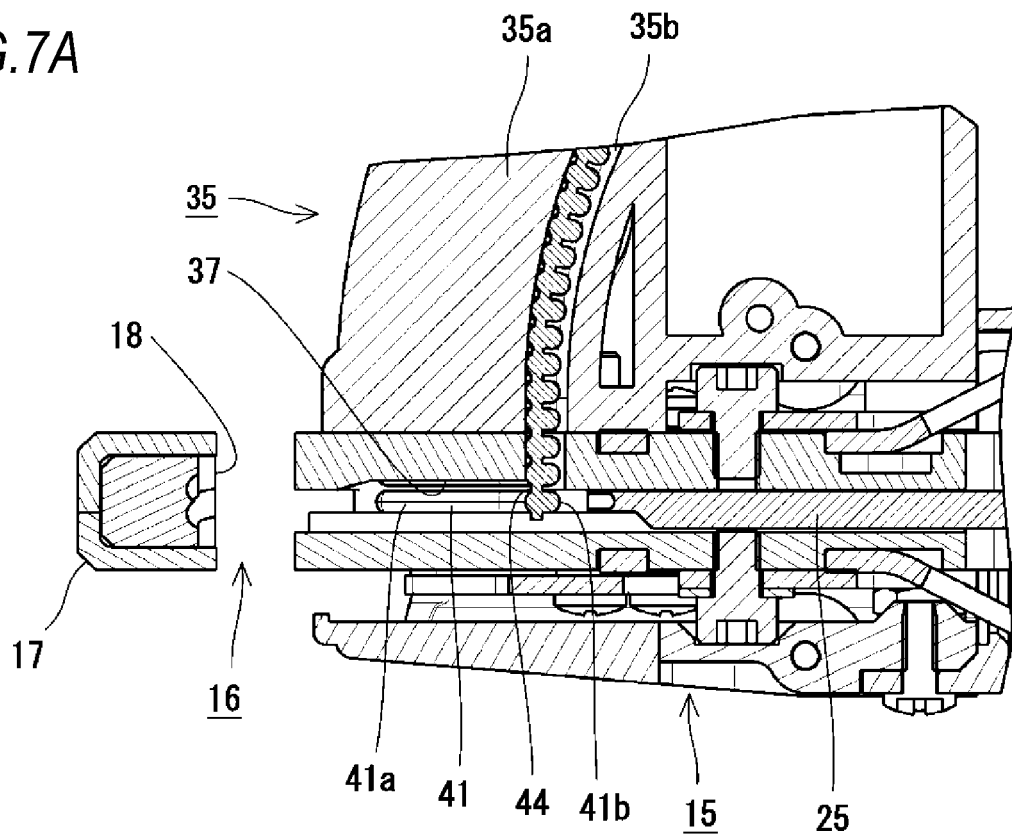


FIG. 7B

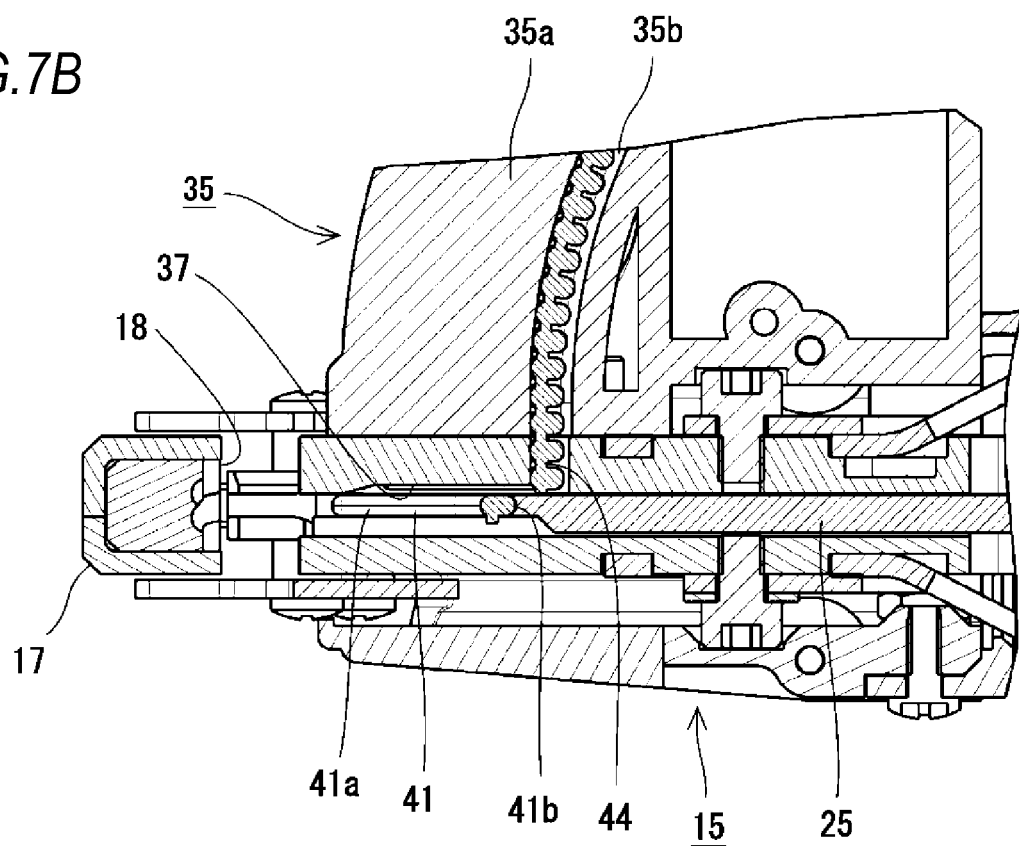


FIG. 8A

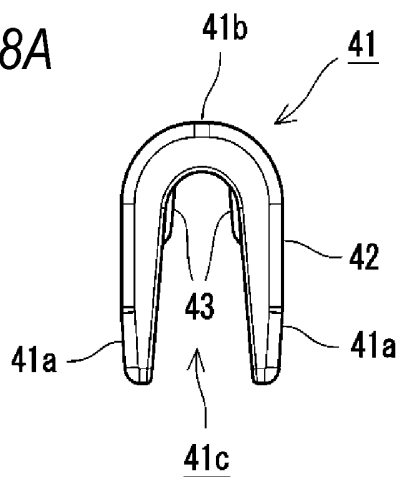


FIG. 8B

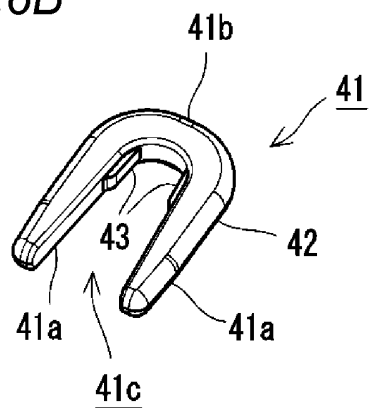


FIG. 9A

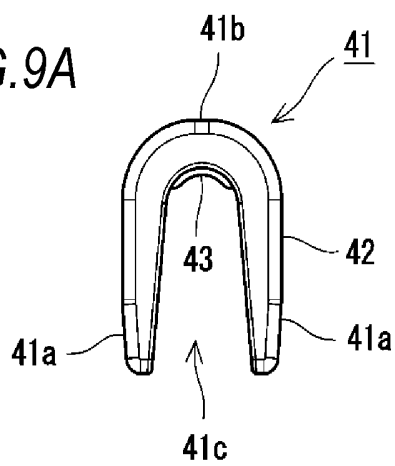


FIG. 9B

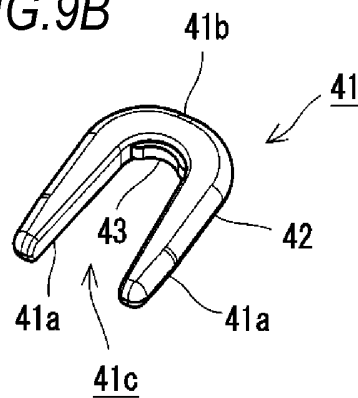


FIG. 10A

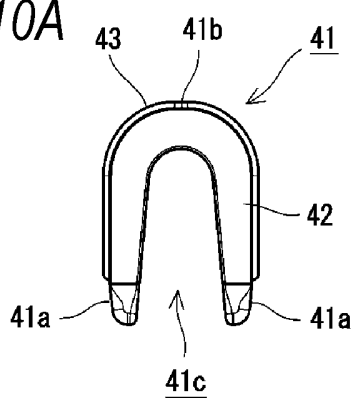


FIG. 10B

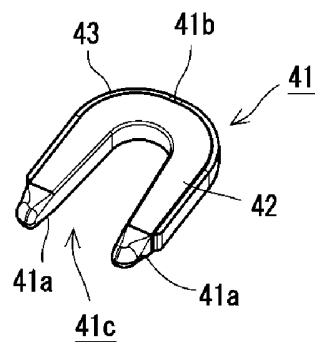
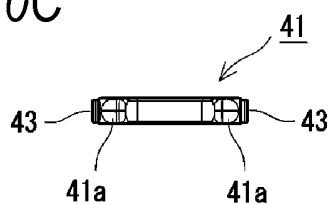


FIG. 10C



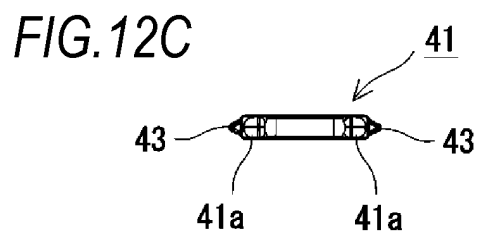
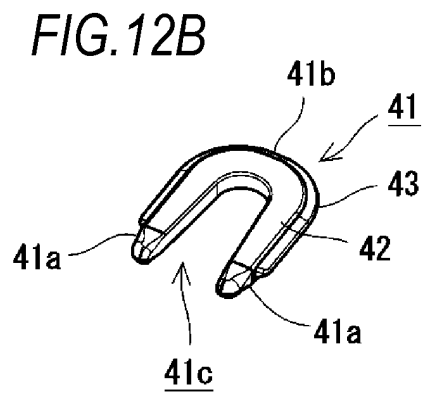
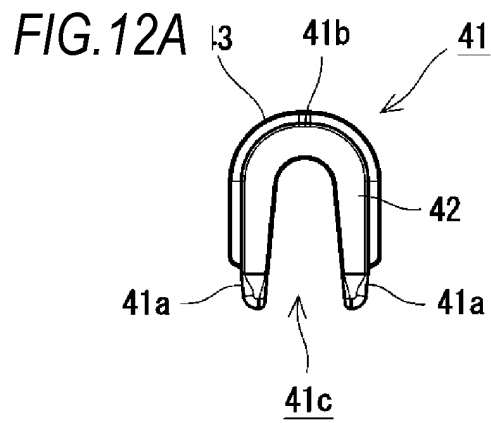
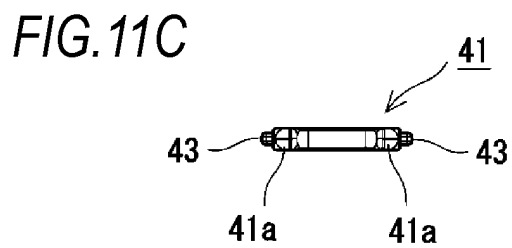
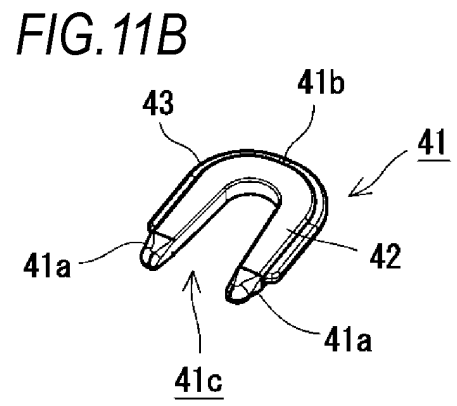
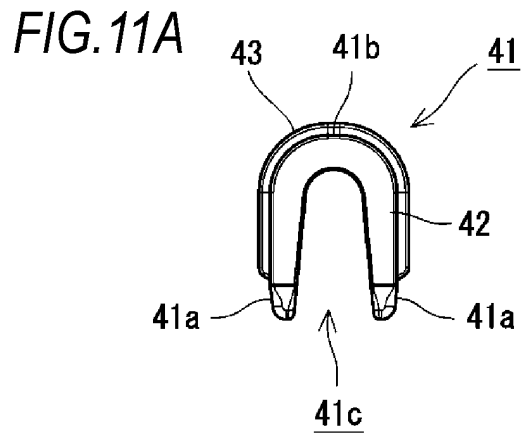


FIG.13A

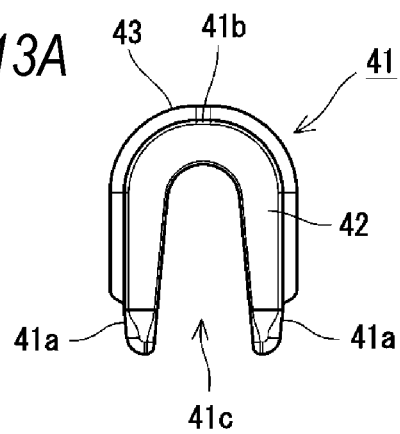


FIG.13B

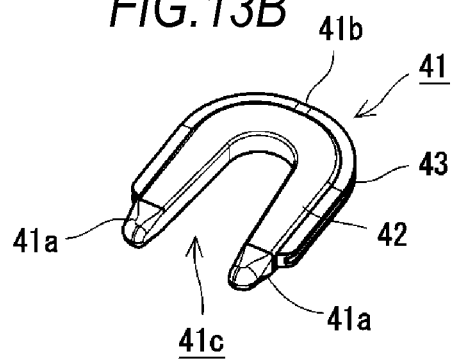


FIG.13C

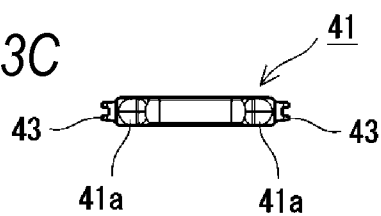


FIG.14A

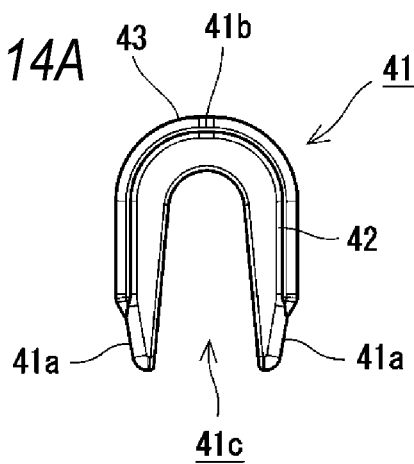


FIG.14B

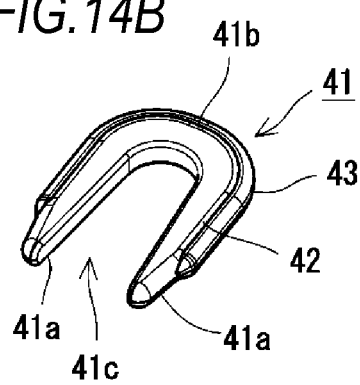
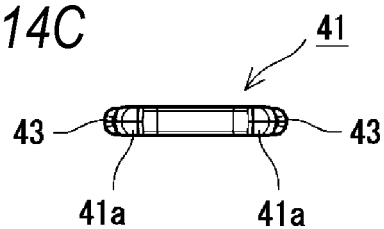
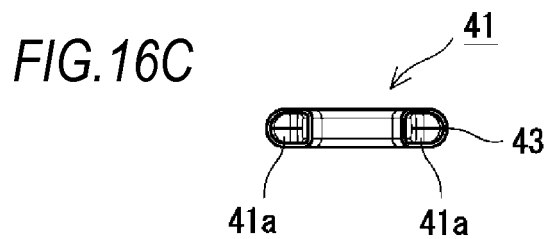
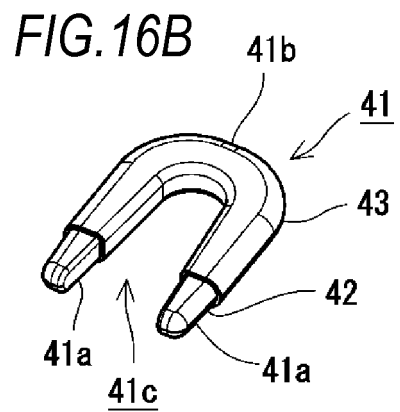
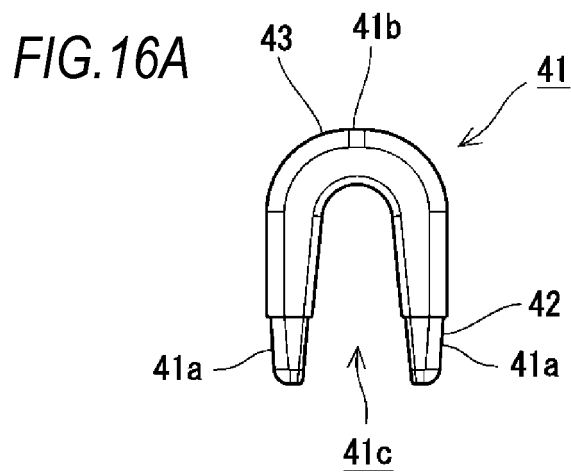
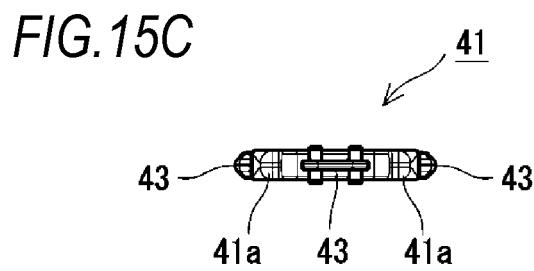
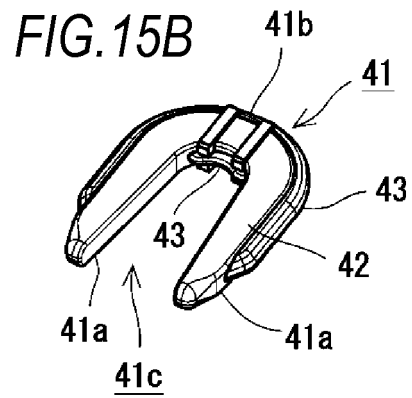
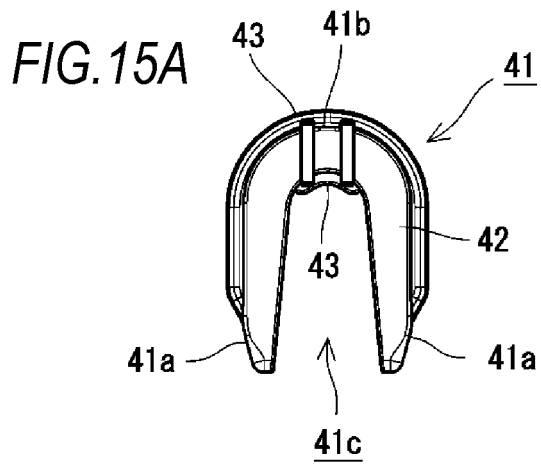


FIG.14C





INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/016889

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. B65B13/34(2006.01)i, B65B51/04(2006.01)i, B65B67/02(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. B65B13/34, B65B51/04, B65B67/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2018

Registered utility model specifications of Japan 1996-2018

Published registered utility model applications of Japan 1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 55-31502 A (MAX CO., LTD.) 05 March 1980, claims, fig. 3 (Family: none)	1-6, 8-10 7
Y A	US 3237256 A (SIGNODE CORPORATION) 01 March 1966, column 2, line 51 to column 3, line 31, fig. 1-4 & US 3197831 A & GB 1041244 A & DE 1486606 A & DE 1786478 A & CH 414448 A & NL 143872 B	1-6, 8-10 7



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search
19 June 2018 (19.06.2018)Date of mailing of the international search report
03 July 2018 (03.07.2018)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/016889

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2002-19720 A (ILLINOIS TOOL WORKS INC.) 23 January 2002, paragraph [0026], fig. 4 & US 6308745 B1 & US 2001/0054218 A1, paragraph [0029], fig. 4 & US 2001/0054451 A1 & EP 1167200 A1 & DE 60101504 D & DE 60101504 T & AU 4602101 A & BR 102386 A & AU 753347 B & CA 2351044 A & NZ 512329 A & TW 499339 B & AT 256595 T & KR 10-2002-0001523 A & CN 1330017 A & MX PA01006301 A	1-6, 8-10 7
Y A	JP 2009-287585 A (KONISHI CO., LTD.) 10 December 2009, claim 4, paragraphs [0024], [0025], fig. 2 & WO 2009/145029 A1	1-6, 8-10 7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2004010125 A [0003]
- JP 2017088485 A [0051]