

(19)



(11)

EP 3 165 650 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
08.07.2020 Bulletin 2020/28

(51) Int Cl.:
D04B 15/06 (2006.01) D04B 35/28 (2006.01)

(21) Application number: **15193335.5**

(22) Date of filing: **06.11.2015**

(54) **SINKER EQUIPPED WITH LUBRICATION OIL CHANNELING AND SEPARATING STRUCTURE**
MIT SCHMIERÖLKANALISIERUNGS- UND -TRENNUNGSSTRUKTUR AUSGESTATTETE
NIEDERHALTERPLATINE
PLATINE ÉQUIPÉE D'UNE CANALISATION ET STRUCTURE DE SÉPARATION POUR HUILE DE
LUBRIFICATION

(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**

(43) Date of publication of application:
10.05.2017 Bulletin 2017/19

(73) Proprietor: **Pai Lung Machinery Mill Co., Ltd.**
New Taipei City (TW)

(72) Inventors:
• **CHEN, Shih-Chi**
Ruifang District, New Taipei City (TW)

• **CHIANG, Tao**
Ruifang District, New Taipei City (TW)

(74) Representative: **2K Patentanwälte Blasberg
Kewitz & Reichel
Partnerschaft mbB
Schumannstrasse 27
60325 Frankfurt am Main (DE)**

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a sinker of knitting machines and particularly to a sinker equipped with lubrication oil channeling and separating structure.

BACKGROUND OF THE INVENTION

[0002] As shown in FIGS. 1 and 2, a conventional sinker 10 on a knitting machine generally can be moved reciprocally to-and-fro by driving a nub 11 formed thereon. When the sinker 10 is in operation reciprocally for a prolonged period of time, other portions of the sinker 11 such as the push friction end 101, first driving friction end 111, second driving friction end 112 and loading friction end 121 have to be properly cooled and lubricated. The most common approach at present is applying lubrication oil. In practice the sinker 10 includes an oil sprinkling zone 14 to receive lubrication oil 71 sprinkled from an oil ejection nozzle 70, and the lubrication oil 71 flows downward after sprinkling to cool and lubricate the push friction end 101, first driving friction end 111, second driving friction end 112 and loading friction end 121. However, because the design and structure of the conventional sinker 10 often do not take into account of the lubrication oil could flow to the knitting portion 13, yarns in the knitting portion 13 could be smeared by the lubrication oil during knitting operation and result in increasing of quality defects of the knitting fabrics.

[0003] To remedy the aforesaid problem Taiwan patent No. M365935 discloses an improvement for a sinker that mainly includes a flank, a nose at an upper side of the rear end of the flank, a nose located at a upper side of a rear end of the flank, a guide portion at a lower side of the rear end, and a notch at the bottom edge of the flank that can be formed in a square, a trapezoid, an arc or other shapes. The notch also shapes the bottom edge of the flank to form a front bottom edge and a rear bottom edge. The guide portion and the flank are spaced from each other. The guide portion is jutting at a length to cover the notch, namely the jutting portion of the guide portion includes a front end formed at a size slightly greater than or equal to the location distance of the front end wall of the notch. The guide portion is located below the rear end of the flank. The sinker also includes a guiding nub at the rear side. Through the aforesaid structure when the sinker and its corresponding knitting needle are in knitting operation they can be positioned at the notch to fend off lubrication oil. However, with the notch formed at the bottom edge of the sinker, when the knitting needle corresponding to the notch is withdrawing the sinker remains moving to and fro continuously, as a result the lubrication oil remained at two sides of the notch still can smear the yarns and cause quality defects of the knitted fabrics. It is obvious that although the aforesaid conventional technique that adopts the design of the notch can

reduce the chance or amount of smearing the yarns with lubrication oil, during knitting operation the sinker still cannot fully separate the lubrication oil from the yarns or their knitting fabrics.

[0004] In view of the shortcomings of the conventional sinker how to provide improvement of the sinker to fully and effectively separate the lubrication oil from the yarns or their knitting fabrics is an issue remained to be resolved in the industry.

[0005] DE 33 25 103 A1 discloses a holding-down sinker for knitting machines which is equipped, in its front part guided in a groove, with a bearing region limited on both sides by sharp-edged steps and coordinated in its length with the length of the guide groove and with the stroke length of the holding-down sinker. Its control foot located in the middle region is connected, via narrow connecting webs formed by lower and upper edge recesses, respectively to the front sinker part and the rear sinker part, which impart elasticity to the control foot in the stroke direction of the holding-down sinker.

[0006] GB 2 134 142 A discloses a sinker for a sinker top latch needle circular knitting machine having a nose and an operating butt at opposite ends thereof, and being generally similar to a conventional sinker except that it has cut-out portions and in a bottom edge thereof between the nose and the butt. The cut-out portions provide non-continuous contact and reduced friction between the bottom edge and adjoining side faces of the sinker respectively with a bottom wall and side walls of a sinker slot in a sinker bed of the knitting machine, which slot guides the sinker for reciprocating movement during the knitting process. The cut-out portions also serve to reduce the mass of the sinker. A bi-level sinker and one with two butts are also disclosed.

[0007] US 841 678 A discloses a groove-guided and reciprocated knitting-machine member having, its rear face, notches separated by a distance less than the extent of reciprocation of said member for engaging and progressively moving foreign matter in the bottom of the groove.

SUMMARY OF THE INVENTION

[0008] The primary object of the present invention is to solve the shortcomings and problems of the conventional technique by providing a solution that can fully and effectively separate lubrication oil from yarns or knitting fabrics thereof to improve fabric quality to meet industry and market requirements.

[0009] To achieve the foregoing object the present invention provides a sinker equipped with lubrication oil channeling and separating structure. The sinker is a knitting element used on a knitting machine. The knitting machine includes at least a dial, a sinker disc, an oil ejection nozzle located above the sinker disc and a yarn feeder located above the dial and the sinker disc. The dial includes a plurality of needle troughs to hold respectively a knitting needle. The sinker disc includes a plurality of

sinker troughs corresponding to the needle troughs to hold the sinker. The sinker includes a base slidable in the sinker troughs and generating friction therewith, a driving nub located above the base, a knitting portion located at a front end of the base, an oil sprinkling zone interposed between the base and the knitting portion corresponding to the oil ejection nozzle. The sinker is characterized in that a lubrication oil channeling and separating structure is interposed between the knitting portion and the oil sprinkling zone. The lubrication oil channeling and separating structure includes a separating slot formed upward from a lower side, a flow channeling portion around the separating slot and close to the oil sprinkling zone, and an oil blocking portion around the separating slot and close to the knitting portion. The lubrication oil channeling and separating structure further includes a jutting debris push portion around the separating slot and below the flow channeling portion, wherein the oil blocking portion is interposed between the separating slot and the knitting portion, and locatable outside the sinker trough while the sinker is fully withdrawn or pushed out on the sinker ring.

[0010] In another aspect when the sinker has fully finished withdrawing movement on the sinker disc the debris push portion is fully withdrawn inside the sinker trough, and when the sinker has been fully pushed out from the sinker disc the debris push portion is exposed outside the sinker trough. According to the invention, the flow channeling portion is inclined from a top end thereof downward towards the oil blocking portion. Further, according to the invention, the oil blocking portion is interposed between the separating slot and the knitting portion, and when the sinker has fully finished withdrawing or push out movement the oil blocking portion is located outside the sinker trough.

[0011] The invention, through the construction set forth above, compared with the conventional techniques, can provide many advantages, such as: the flow channeling portion, the debris push portion and the oil blocking portion are formed around the separating slot that provide respectively different functions of flow channeling, debris pushing and oil blocking, hence the flow channeling portion and the oil blocking portion not only can fully separate lubrication oil from yarns or the knitting fabrics thereof, the debris push portion can also push out cotton debris sunk into the sinker troughs during knitting operation to improve sliding smoothness of the sinker in the sinker troughs, thereby can improve the quality of the knitting fabrics to meet industry and market requirements.

[0012] The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is a fragmentary sectional view of a conventional sinker located in a knitting machine.

FIG. 2 is a plane view of the conventional sinker according to FIG. 1.

FIG. 3 is a fragmentary enlarged perspective view of an embodiment of the invention.

FIG. 4 is a fragmentary sectional view according to FIG. 3.

FIG. 5 is a plane view of the sinker according to FIG. 4.

FIGS. 6 through 8 are schematic views of continuous operation conditions of the invention according to FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] As shown in FIGS. 3 through 5, the present invention aims to provide a sinker equipped with lubrication oil channeling and separating structure. The sinker 30 is a knitting element used in a knitting machine 20. The knitting machine 20 includes at least a cylinder 40, a sinker ring 60, an oil ejection nozzle 70 located above the sinker ring 60 to sprinkle lubrication oil 71 and a yarn feeder 80 located above the cylinder 40 and the sinker ring 60. The cylinder (40) includes a plurality of needle troughs 41 to hold respectively a knitting needle 50. The sinker ring 60 has a plurality of sinker troughs 61 corresponding to the needle troughs 41 to hold the sinker 30. The sinker 30 includes a base 32 slidable in the sinker troughs 61 to generate friction therewith, a driving nub 31 located above the base 32, a knitting portion 33 located at a front end of the base 32, and an oil sprinkling zone 34 interposed between the base 32 and the knitting portion 33 corresponding to the oil ejection nozzle 70. While the sinker 30 is driven mainly four frictional portions are generated, including a push-out friction end 310, a first driving friction end 311, a second driving friction end 312 and a loading friction end 321. The oil ejection nozzle 70 is directly located above the oil sprinkling zone 34 so that the lubrication oil 71 can enhance lubrication and cooling through the oil sprinkling zone 34 to the push-out friction end 310, the first driving friction end 311, the second driving friction end 312 and the loading friction end 321. It is to be noted that the invention also includes a lubrication oil channeling and separating structure 300 interposed between the knitting portion 33 and the oil sprinkling zone 34. The lubrication oil channeling and separating structure 300 includes a separating slot 301 formed upward from a lower side, a flow channeling portion 302 at the separating slot 301 and close to the oil sprinkling zone 34, and an oil blocking portion 304 at the separating slot 301 and close to the knitting portion 33. It is also to be noted that the lubrication oil channeling and separating structure 300 further includes a jutting debris push portion 303 located at the separating slot 301 below the flow channeling portion 302. When the sinker 30 has fully finished withdrawing movement on

the sinker disc 60 the debris push portion 303 is fully withdrawn inside the sinker trough 61, and when the sinker 30 has been fully pushed out from the sinker disc 60 the debris push portion 303 is exposed outside the sinker trough 61. Moreover, the flow channeling portion 302 is inclined from a top end downward towards the oil blocking portion 304. The oil blocking portion 304 is interposed between the separating slot 301 and the knitting portion 33, and when the sinker 30 has fully finished withdrawing or push out movement the oil blocking portion 304 is located outside the sinker trough 61.

[0015] As shown in FIGS. 4 through 8, when the invention is in use, the sinker 30 can be driven, and the driving nub 31 is driven to allow the sinker 30 to be fully pushed out from the sinker ring 60 beneath the oil ejection nozzle 70, while the oil ejection nozzle 70 continuously sprinkles the lubrication oil 71 the oil sprinkling zone 34 receive sprinkling of the lubrication oil 71 which starts to flow downward to the base 32 as shown in FIG. 4. When the sinker 30 is driven continuously and swivels to start withdrawing movement it also moves away from where the oil ejection nozzle 70 sprinkles the lubrication oil 71, hence although the oil ejection nozzle 70 continuously sprinkles the lubrication oil 71 the oil sprinkling zone 34 of the sinker 30 does not receive sprinkling of the lubrication oil 71, while the lubrication oil 71 received previously flows naturally toward the base 32 and enters the sinker trough 61 as shown in

[0016] FIG. 6. Finally, when the sinker 30 is driven and swivels and is fully withdrawn, most of the lubrication oil 71 on the sinker 30 has flown into the sinker trough 61 between the sinker trough 61 and the base 32, thereby can serve as a medium to cool temperature and perform lubrication between the sinker trough 61 and the base 32; meanwhile, the distal end of the base 32 also can push debris dropped into the sinker trough 61 outward as shown in FIG. 7. It is to be noted that, as shown in FIG. 7, while the lubrication oil 71 flows along a path from the sinker 30 toward the base 32 into the sinker trough 61 the swiveling sinker 30 in the withdrawing process generates a centrifugal force to cause deviation of the flowing path of the lubrication oil 71 that might otherwise flowing directly downward. Thus, with the lubrication oil channeling and separating structure 300 formed on the sinker 30 the flow channeling portion 302 at the separating slot 301 can accelerate flowing downward of the lubrication oil 71, and since the oil blocking portion 304 is located on an outer side of the sinker trough 61 during fully withdrawing of the sinker 30 the lubrication oil 71 cannot pass over the separating slot 301. As a result, flowing of the lubrication oil 71 to the knitting portion 33 can be averted. It is to be noted that after the sinker 30 is driven and swivels to be pushed outward again the jutting debris push portion 303 around the separating slot 301 below the flow channeling portion 302 pushes the debris dropped into the sinker trough 61 outside as shown in FIG. 8.

[0017] In summary there is disclosed a sinker being

equipped with lubrication oil channeling and separating structure and being formed to serve a knitting element of a knitting machine which includes at least a cylinder 40, a sinker ring 60, an oil ejection nozzle 70 to sprinkle lubrication oil 71 and a yarn feeder 80. The cylinder 40 includes a plurality of needle troughs 41 to hold respectively a knitting needle 50. The sinker ring 60 includes a plurality of sinker troughs 61 corresponding to the needle troughs 41 to hold the sinker 30. The sinker 30 includes a base 32 located in the sinker troughs 61, a driving nub 31 located above the base 32, a knitting portion 33 located at a front end of the base 32, an oil sprinkling zone 34 interposed between the base 32 and the knitting portion 33 corresponding to the oil ejection nozzle 70, and a lubrication oil channeling and separating structure 300 interposed between the knitting portion 33 and the oil sprinkling zone 34. The lubrication oil channeling and separating structure 300 includes a separating slot 301, a flow channeling portion 302 a jutting debris push portion (303), and an oil blocking portion 304 that are at the separating slot 301, wherein the the oil blocking portion is located outside the sinker trough (61) while the sinker (30) is fully withdrawn or pushed out on the sinker ring (60), and wherein the flow channeling portion (302) is inclined downward from a top end of the flow channeling portion (302) toward the oil blocking portion (304), the sinker

thus can fully achieve separation effect to improve quality of knitting fabrics to meet industry and market requirements.

[0018] As a conclusion, the sinker of the invention includes the lubrication oil channeling and separating structure which includes the flow channeling portion, the debris push portion and the oil blocking portion formed around the separating slot, and the flow channeling portion, the debris push portion and the oil blocking portion can provide various functions such as accelerating flow directing and downward of the lubrication oil, push out of the debris dropped into the sinker trough, and also block the lubrication oil from flowing to the knitting portion. As a result, the flow channeling portion and the oil blocking portion not only can fully separate the lubrication oil the yarns or their fabrics, the debris push portion also can push the debris dropped into the sinker trough during knitting operation to improve sliding smoothness of the sinker in the sinker trough, thereby enhance fabric quality to better meet industry and market requirements.

Claims

1. A sinker equipped with a lubrication oil channeling and separating structure and formed to serve as an element of a knitting machine which includes at least a cylinder (40), a sinker ring (60), an oil ejection nozzle (70) located above the sinker ring (60) and a yarn feeder (80) located above the cylinder (40) and the sinker ring (60), the cylinder (40) including a plurality

of needle troughs (41) to hold respectively a knitting needle (50), the sinker ring (60) including a plurality of sinker troughs (61) corresponding to the needle troughs (41) to hold the sinker (30), the sinker (30) including:

a base (32) slidable in the sinker troughs (61) to generate friction therewith,
 a driving nub (31) located above the base (32);
 a knitting portion (33) located at a front end of the base (32); and
 an oil sprinkling zone (34) interposed between the base (32) and the knitting portion (33) placeable in a position corresponding to the oil ejection nozzle (70); wherein the sinker (30) comprises a lubrication oil channeling and separating structure (300) is interposed between the knitting portion (33) and the oil sprinkling zone (34), and the lubrication oil channeling and separating structure (300) includes a separating slot (301) formed upward from a lower side, a flow channeling portion (302) at the separating slot (301) and close to the oil sprinkling zone (34), an oil blocking portion (304) at the separating slot (301) and close to the knitting portion (33), and a jutting debris push portion (303) at the separating slot (301) and below the flow channeling portion (302), wherein the oil blocking portion (304) is interposed between the separating slot (301) and the knitting portion (33), and locatable outside the sinker trough (61) while the sinker (30) is fully withdrawn or pushed out on the sinker ring (60), the sinker being **characterised in that** the flow channeling portion (302) is inclined downward from a top end of the flow channeling portion (302) toward the oil blocking portion (304).

2. The sinker equipped with lubrication oil channeling and separating structure of claim 1, wherein the debris push portion (303) is fully withdrawable into the sinker trough (61) while the sinker (30) is fully withdrawn on the sinker ring (60) and exposable outside the sinker trough (61) while the sinker (30) is being fully pushed outside the sinker ring (60).

Patentansprüche

1. Niederhalterplatine, die mit einer Schmieröl-Kanalierungs- und Trenn-Struktur ausgestattet und so ausgebildet ist, dass sie als ein Element einer Strickmaschine dient, die mindestens einen Zylinder (40), einen Platinenring (60), eine über dem Platinenring (60) angeordnete Ölausstoßdüse (70) und eine über dem Zylinder (40) und dem Platinenring (60) angeordnete Fadenzuführeinrichtung (80) umfasst, wobei der Zylinder (40) eine Vielzahl von Nadelmulden

(41) zum Halten jeweils einer Stricknadel (50) aufweist, wobei der Platinenring (60) eine Vielzahl von Platinenmulden (61) aufweist, die den Nadelmulden (41) entsprechen, um die Platine (30) zu halten, wobei die Platine (30) aufweist:

eine Basis (32), die in den Platinenmulden (61) verschiebbar ist, um Reibung damit zu erzeugen,
 eine Antriebsnuppe (31), die sich über der Basis (32) befindet;
 einen Strickabschnitt (33), der an einem vorderen Ende der Basis (32) angeordnet ist; und eine Ölbesprühungszone (34), die zwischen der Basis (32) und dem Strickabschnitt (33) angeordnet ist und in eine Position einbringbar ist, passend zu der Ölausstoßdüse (70) entspricht; wobei die Platine (30) umfasst:
 eine Schmieröl-Kanalierungs- und Tenn-Struktur (300) zwischen dem Strickabschnitt (33) und der Ölbesprühungszone (34) angeordnet ist, und die Schmieröl-Kanalierungs- und Tenn-Struktur (300) einen Abscheideschlitz (301), der von einer Unterseite nach oben ausgebildet ist, einen Strömungskanalabschnitt (302) an dem Abscheideschlitz (301) und nahe der Ölbesprühungszone (34), einen Ölsperabschnitt (304) an dem Abscheideschlitz (301) und nahe dem Strickabschnitt (33) aufweist, und einen vorstehenden Verunreinigungsstoßabschnitt (303) an dem Abscheideschlitz (301) und unterhalb des Strömungskanalabschnitts (302), wobei der Ölsperabschnitt (304) zwischen dem Abscheideschlitz (301) und dem Strickabschnitt (33) angeordnet ist, und außerhalb der Platinenmulde (61) angeordnet werden kann, während die Platine (30) auf dem Platinenring (60) vollständig herausgezogen oder herausgedrückt wird, wobei die Platine **dadurch gekennzeichnet ist, dass** der Strömungskanalabschnitt (302) von einem oberen Ende des Strömungskanalabschnitts (302) nach unten in Richtung des Ölsperabschnitts (304) geneigt ist.

2. Niederhalterplatine, die mit einer Schmieröl-Kanalierungs- und Trenn-Struktur ausgestattet ist nach Anspruch 1, wobei der Verunreinigungsstoßabschnitt (303) vollständig in die Platinenmulde (61) zurückziehbar ist, während die Platine (30) vollständig auf dem Platinenring (60) zurückgezogen ist, und außerhalb der Platinenmulde (61) freilegbar ist, während die Platine (30) vollständig aus dem Platinenring (60) herausgeschoben wird.

Revendications

1. Une platine équipée d'une canalisation et structure

de séparation pour d'huile de lubrification et formée pour servir d'élément d'une machine à tricoter qui comprend au moins un cylindre (40), une bague de platine (60), une buse d'éjection d'huile (70) située au-dessus de la bague de platine (60) et un dispositif d'alimentation en fil (80) situé au-dessus du cylindre (40) et de la bague de platine (60), le cylindre (40) comprenant une pluralité de creux d'aiguille (41) pour maintenir respectivement une aiguille à tricoter (50), la bague de platine (60) comprenant une pluralité de creux de platine (61) correspondant aux creux d'aiguille (41) pour maintenir la platine (30), la platine (30) comprenant:

une base (32) pouvant coulisser dans les creux des platine (61) pour générer une friction avec ceux-ci,
un nœud de conduite (31) situé au-dessus de la base (32) ;
une partie de tricotage (33) située à l'extrémité avant de la base (32) ; et
une zone d'arrosage d'huile (34) interposée entre la base (32) et la partie tricotage (33) pouvant être placée dans une position correspondant à la buse d'éjection d'huile (70) ; dans laquelle la platine (30) comprend
une structure de canalisation et de séparation d'huile de lubrification (300) est interposée entre la partie tricotage (33) et la zone d'arrosage d'huile (34), et la structure de canalisation et de séparation d'huile de lubrification (300) comprend une fente de séparation (301) formée vers le haut à partir d'un côté inférieur, une partie de canalisation d'écoulement (302) au niveau de la fente de séparation (301) et à proximité de la zone d'arrosage d'huile (34), une partie de blocage d'huile (304) au niveau de la fente de séparation (301) et à proximité de la partie tricotage (33), et une partie de poussée des débris en saillie (303) au niveau de la fente de séparation (301) et en dessous de la partie de canalisation de l'écoulement (302), dans laquelle la partie de blocage de l'huile (304) est interposée entre la fente de séparation (301) et la partie de tricotage (33), et pouvant être placée à l'extérieur du creux de la platine (61) tandis que la platine (30) est entièrement retirée ou poussée sur la bague de la platine (60), la platine étant **caractérisée en ce que** la partie de canalisation de l'écoulement (302) est inclinée vers le bas à partir d'une extrémité supérieure de la partie de canalisation de l'écoulement (302) vers la partie de blocage de l'huile (304).

tirée dans le creux de la platine (61) tandis que la platine (30) est entièrement retirée sur l'anneau de la platine (60) et peut être exposée à l'extérieur du creux de la platine (61) tandis que la platine (30) est entièrement poussée à l'extérieur de l'anneau de la platine (60).

2. La platine équipée d'une canalisation et structure de séparation pour d'huile de lubrification selon la revendication 1, dans laquelle la partie de poussée des débris en saillie (303) peut être entièrement re-

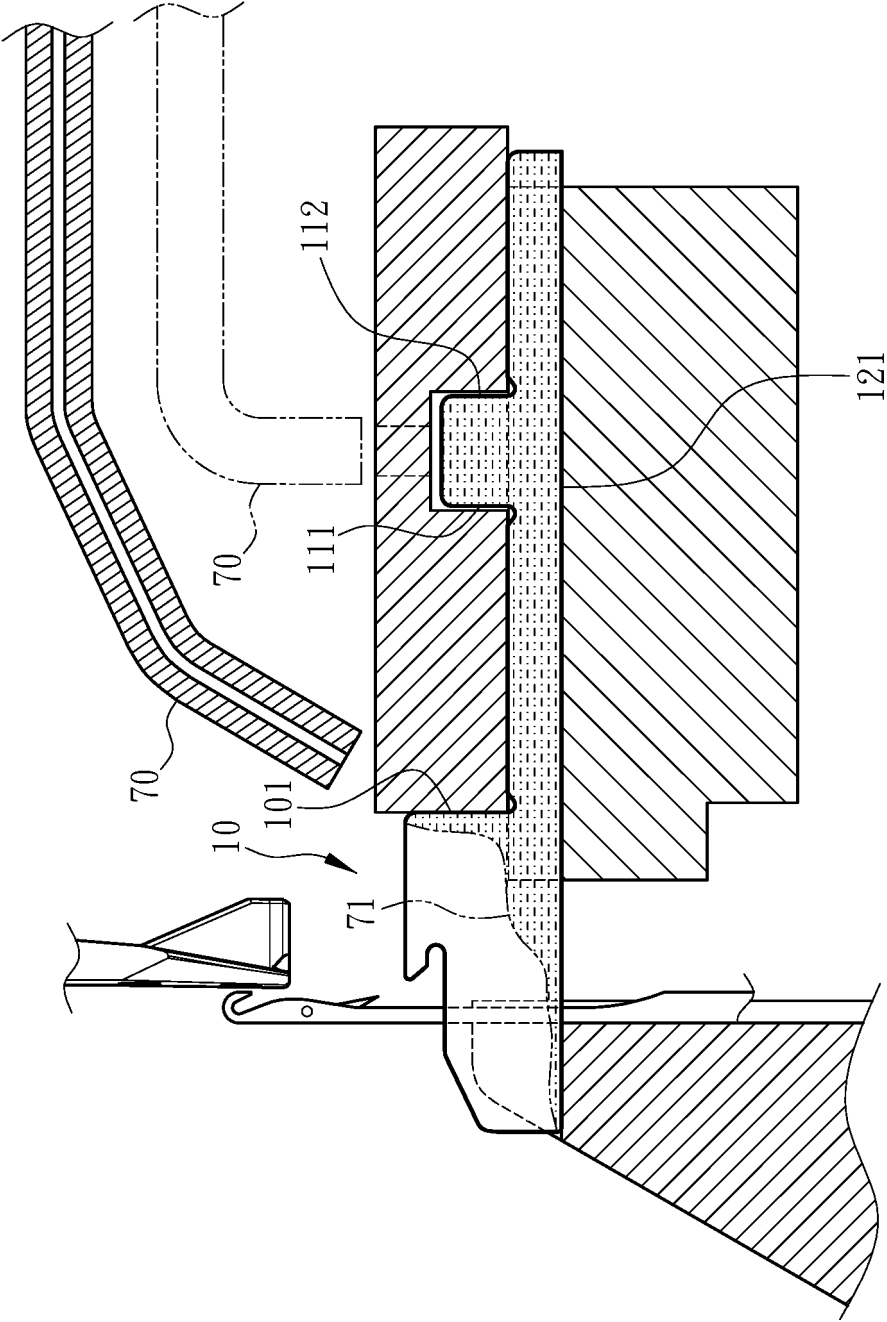


Fig. 1

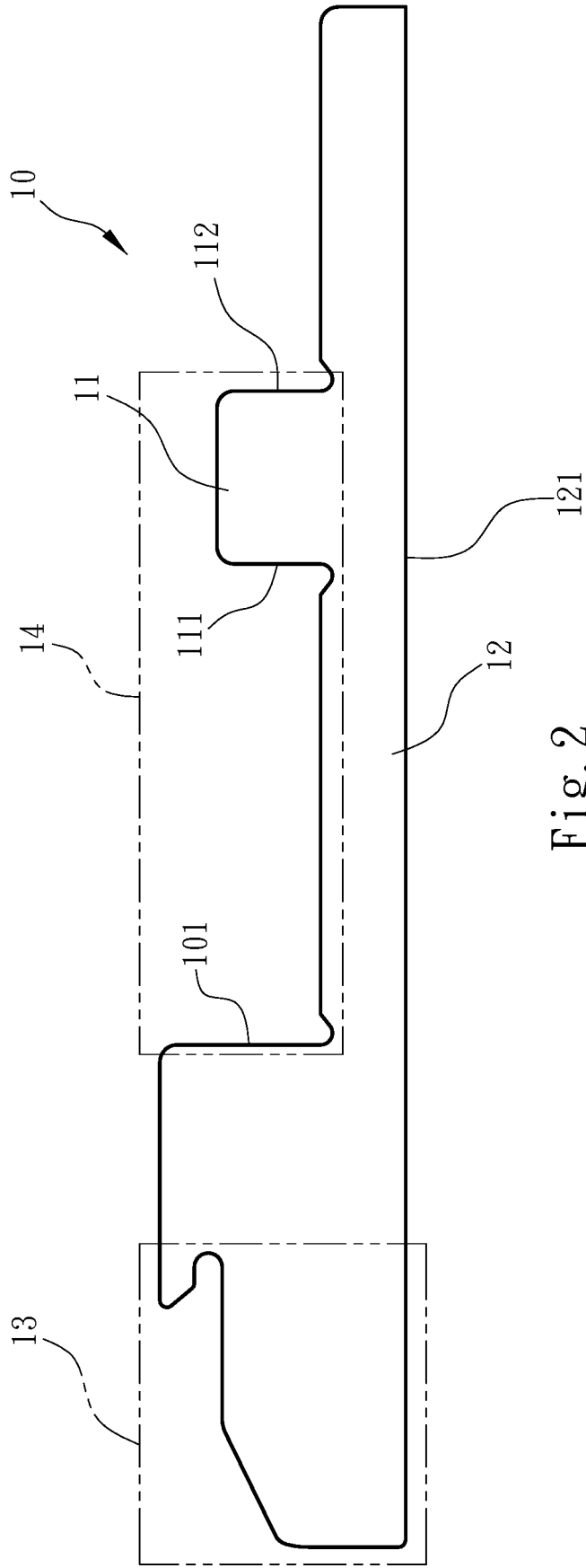


Fig. 2

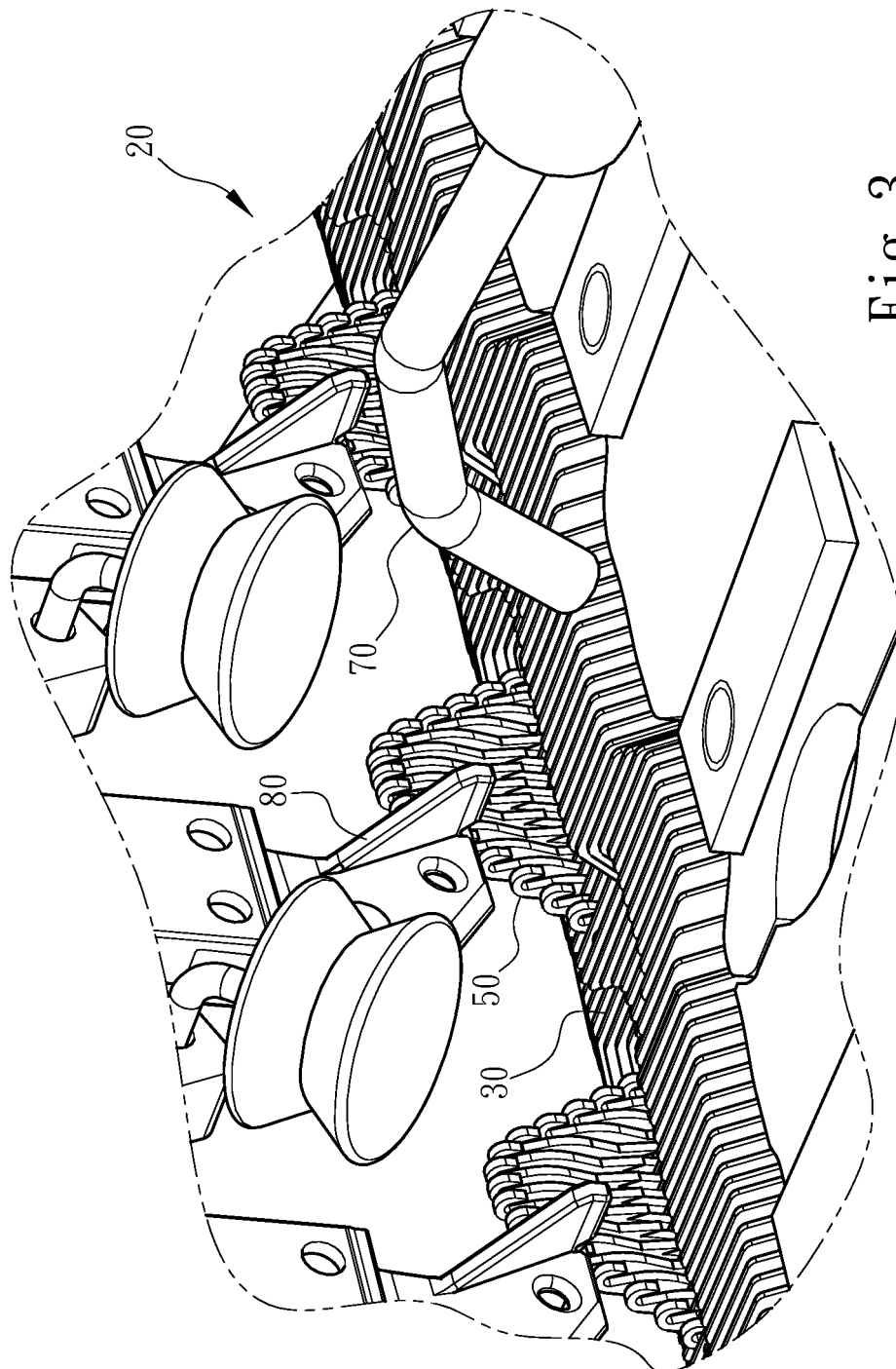


Fig. 3

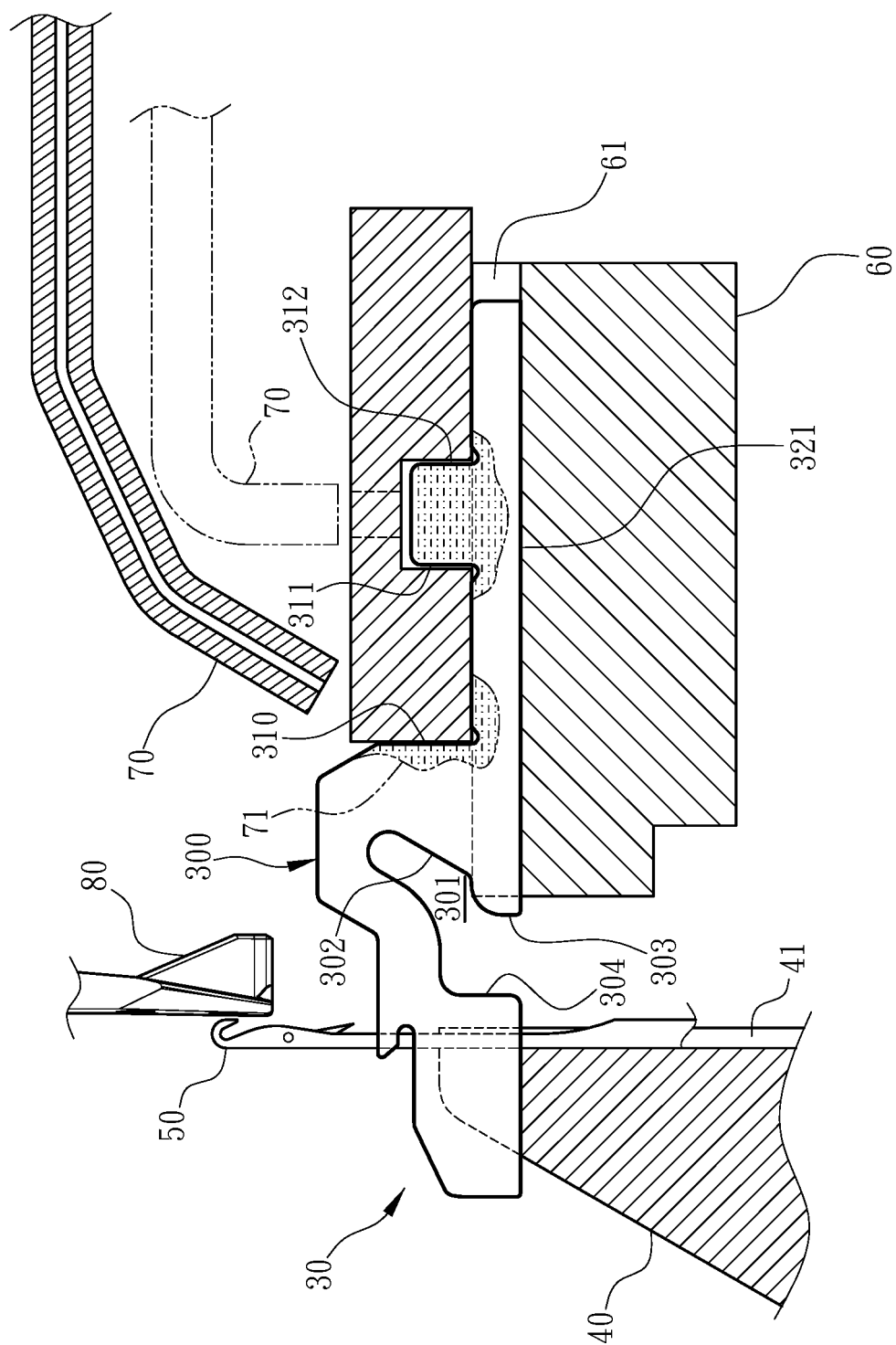


Fig. 4

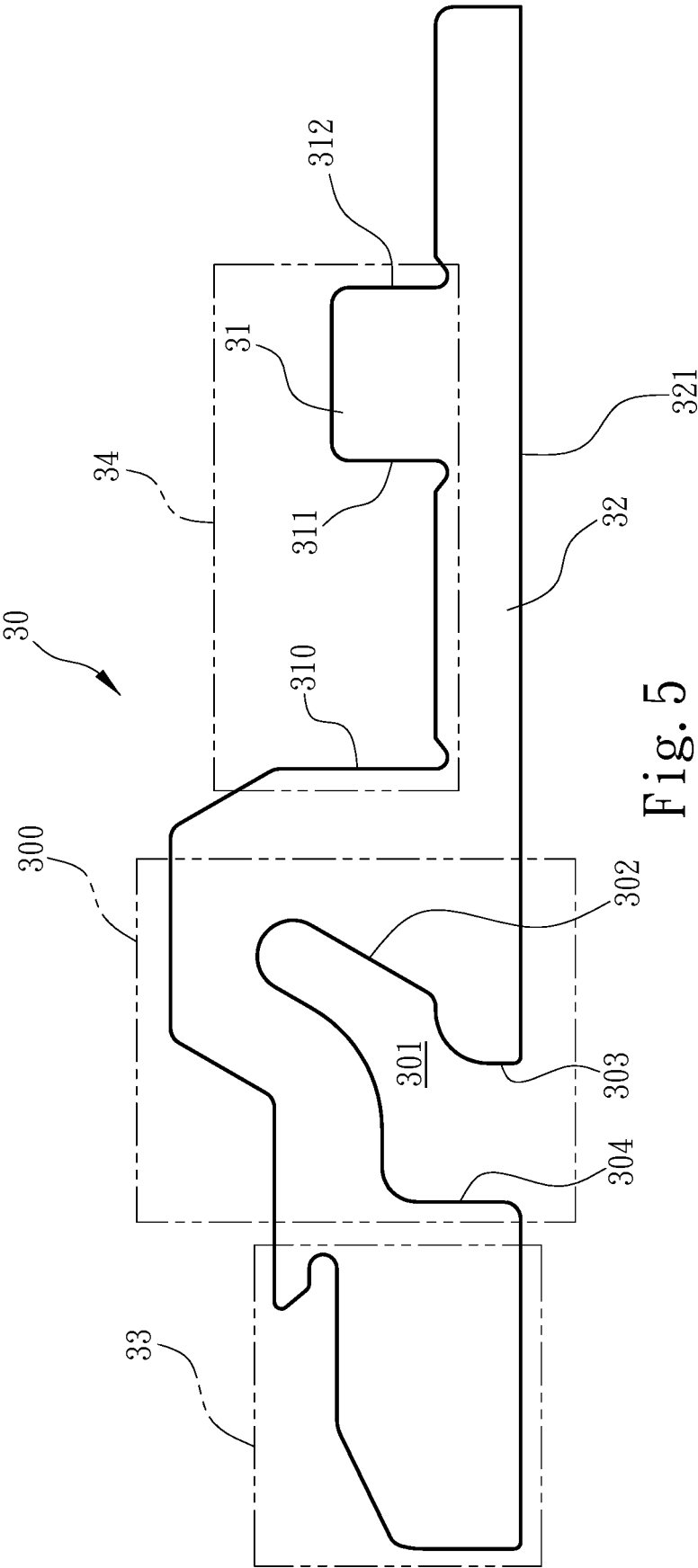
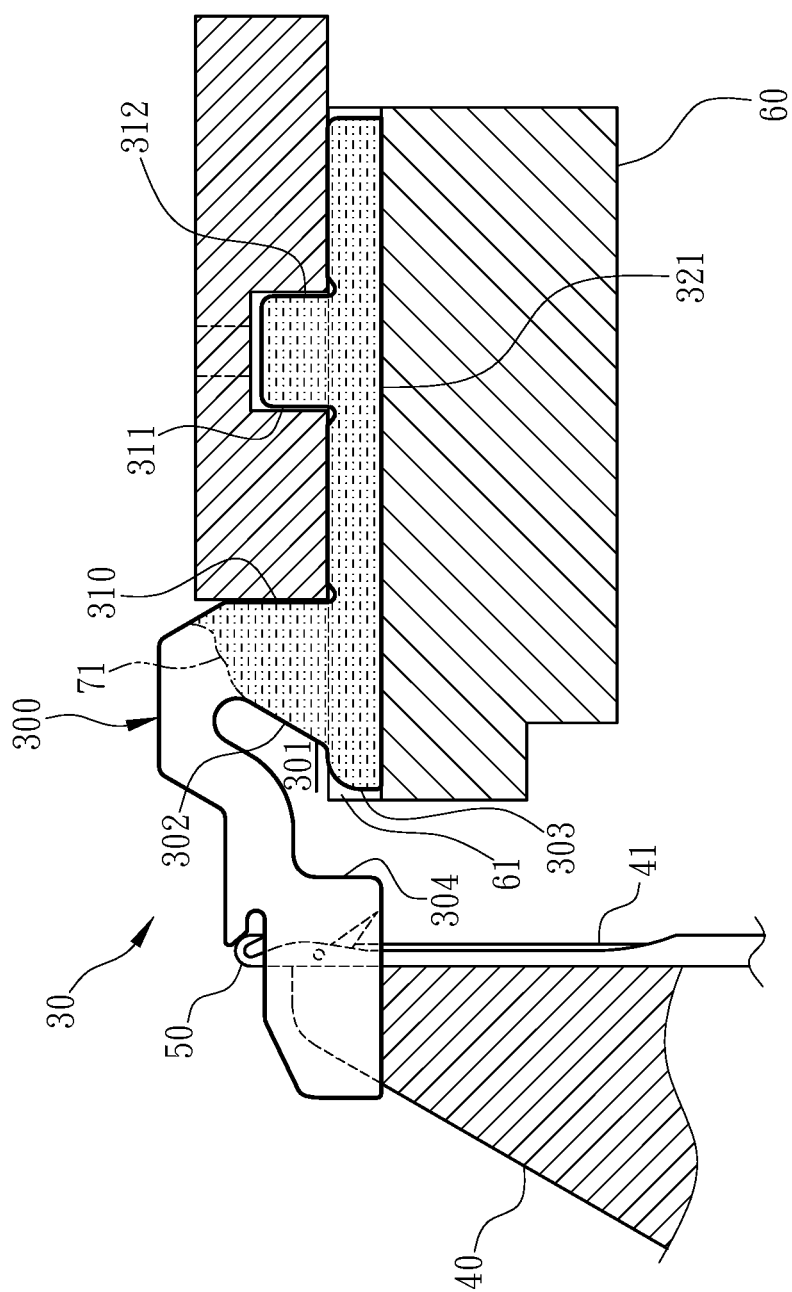


Fig. 5



Fin. 6

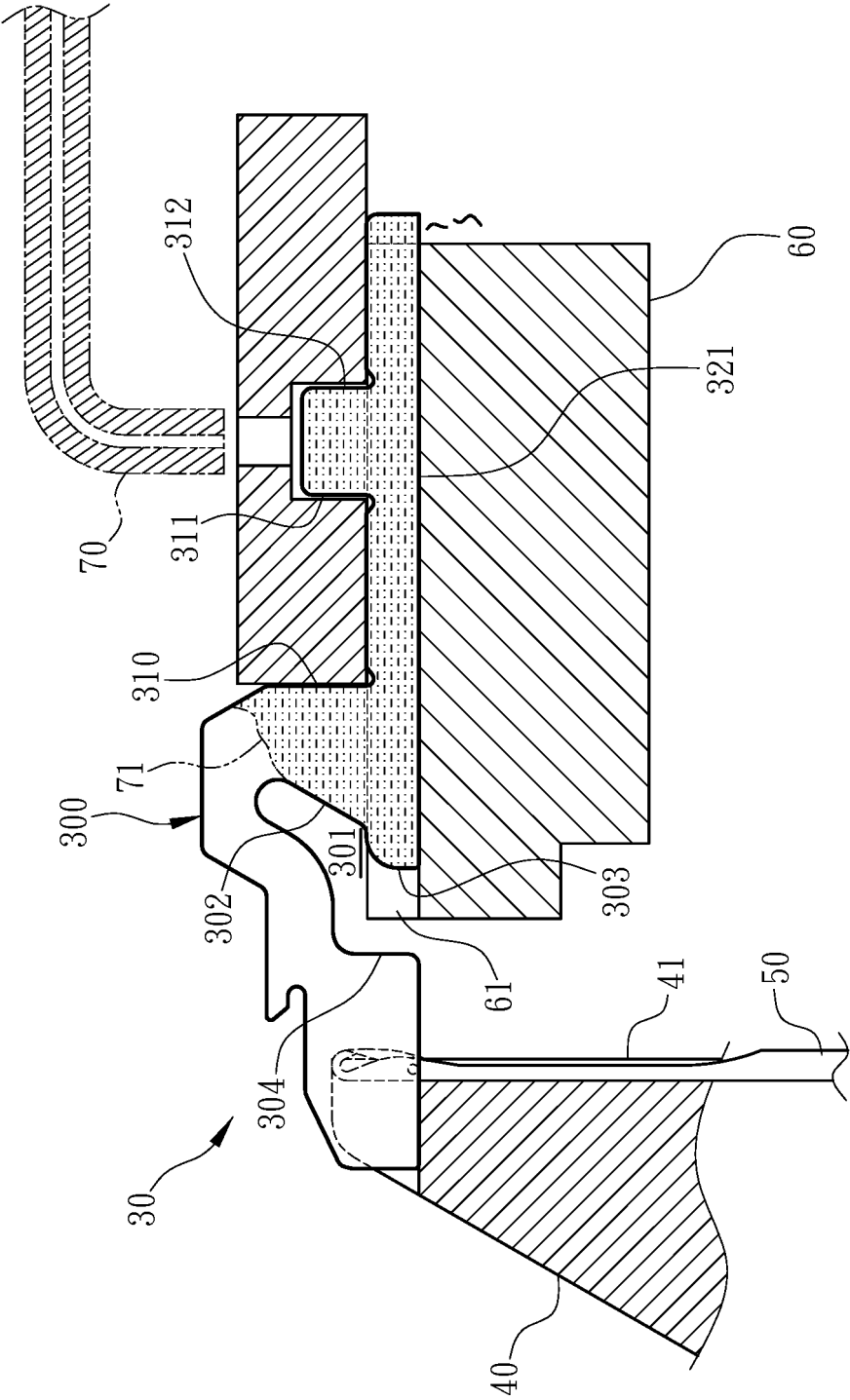
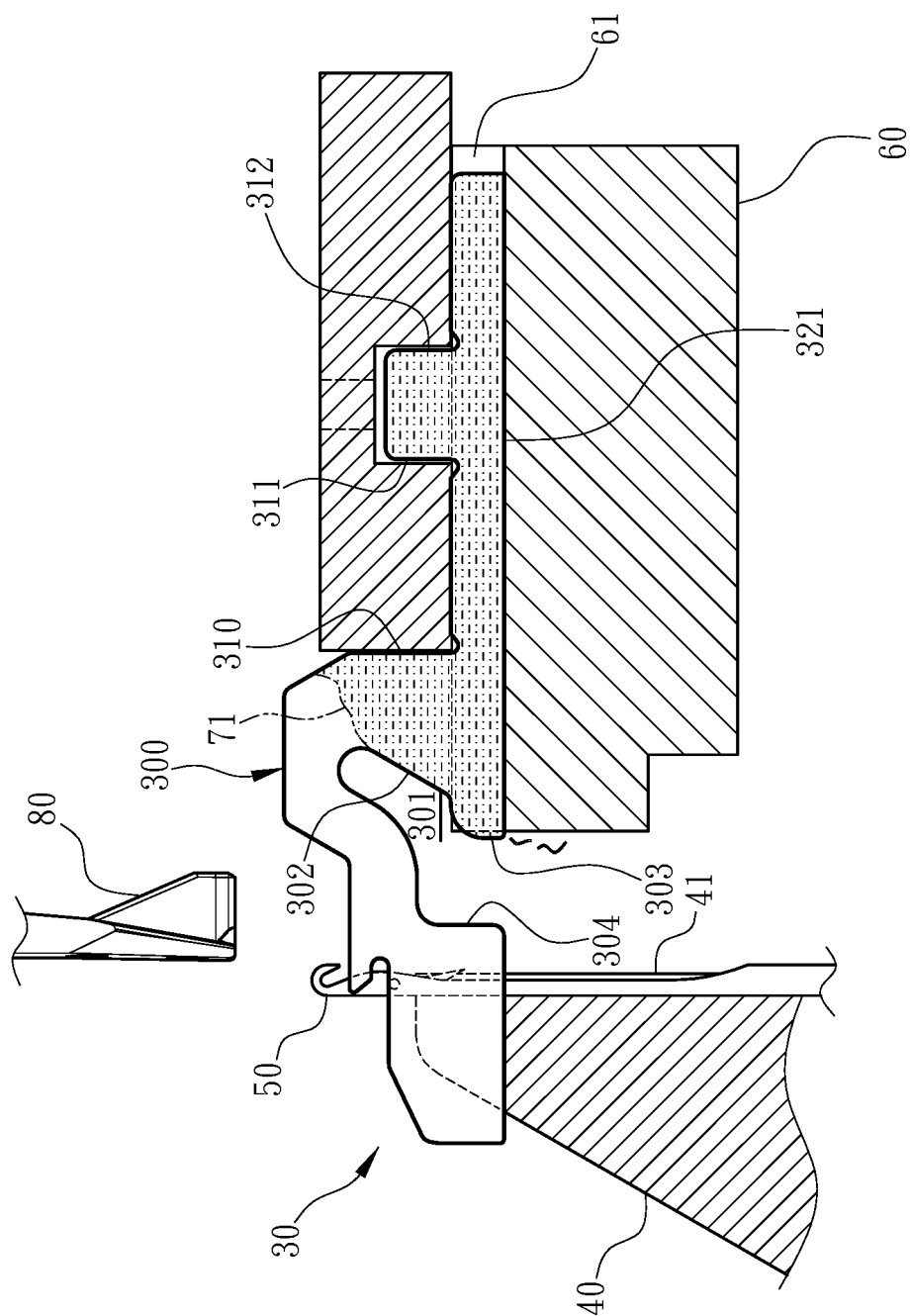


Fig. 7



Fi. 8

REFERENCES CITED IN THE DESCRIPTION

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