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(54) **TENSIVE CUTTING ASSEMBLY**

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Description

[0001] RELATED APPLICATIONS: This application claims the priority of U.S. Application Serial Number 09/008,551, filed 16 January 1998 (16.01.98).

BACKGROUND

Technical Field

[0002] This invention relates to the cutting of food product with hydraulic food cutting according to the preamble of claim 1. An example of such an apparatus is disclosed by US 2,714,251 A.

Background of the Invention

[0003] A variety of "hydro-cutting" devices for cutting food products into slices and sticks are known in the art and typically comprise a stationary array of cutting knives with a means to propel the food product through the knife array. The food product may be conveyed through the knife array by suspending the food product in a fluid stream, such as water.

[0004] The typical hydraulic food cutting apparatus in use today has a receiving tank filled with a hydraulic carrier fluid, usually water, into which food product is dumped. A food pump draws its suction from the receiving tank, and pumps carrier fluid and the suspended food product from the tank into an inlet tube which aligns the food product before impact with a cutter assembly. Cutter blade assemblies include typically a frame and a stationary knife array typically including a plurality of individual knife blades mounted in a parallel and converging sequence to each other. If the food product is to be cut into slices, only a single such array need be utilized. However, if the food product is to be cut into sticks, such as potatoes for french fries, two such arrays are utilized with the knives in one array extending generally perpendicular to the knives in the other array.

[0005] *Cole, et. al.,* U.S. Patent 5,343,623 *Knife Assembly for Cutting a Food Product,* discloses a knife blade having a cutting portion defining a cutting edge, and holes adapted to accommodate means for attaching the knife blade to a mounting member, the centers of the mounting holes lying in the plane of the cutting edge. The knife blade is mounted in the knife assembly so that a tension force is exerted on the knife blade also in the plane of the cutting edge. The cutting edges of knives in an array are located in a common plane. *Cole, et.al.,* further discloses an apparatus for mounting a plurality of individual blades for and applying tension to the plurality of individual blades in the plane of the cutting edges.

[0006] According to the present invention a tensive cutting assembly includes the features defined in claim 1. The tensive cutting assembly may also include a means for monitoring tension during set-up of the tensive cutting assembly and monitoring tension and sensing failure or breakage of the tensionable cutting member during operation.

[0007] In one preferred embodiment of the invention, either the first edge or the second edge of the tensionable cutting member may be employed as the cutting edge of the tensionable cutting member.

[0008] The cutting edge of the tensionable cutting member may be unsharpened and the sides and edges may be rounded or otherwise treated or dressed in order to eliminate edge and surface irregularities.

[0009] In one preferred embodiment of the invention, the tensionable cutting member is formed of a hardened 301 stainless steel having a thickness of 0.008 inches (0.203 mm) and a width of 0.50 inches (12.7 mm).

[0010] The material used to form the tensionable cutting member should exhibit adequate tensile strength to perform as a tensionable cutting member and adequate ductility to allow its continuous configuration. The material used to form the tensionable cutting member should also exhibit a yield strength less than the tensile strength. The tensionable cutting member may be formed of a strip of sheet metal having a tensile strength of 175,000 psi (1206.5 MPa) to 275,000 psi (1896.0 MPa) and a yield strength of 80,000 psi (551.5 MPa) to 180,000 psi (1241.0 MPa). In one embodiment of the invention, the tensionable cutting member is formed from a hardened type 301 stainless steel having a tensile strength of approximately 185,000 psi (1275.53 MPa) and a yield strength of approximately 140,000 psi (965.26 MPa).

[0011] Materials having compositions or properties similar to the hardened 301 series stainless steel, or a type 17-4 PH stainless steel, are known to those skilled in the art and may be employed in the present invention as a tensionable cutting member.

[0012] In one preferred embodiment of the invention, various component parts of the tensive cutting head are machined of type 17-4 PH stainless steel, although other materials and forming methods known to those skilled in the art may be employed to practice the present invention.

[0013] The returns can be arranged sequentially, with an equal distance typically being observed between each of the sequential returns. Opposing sets of returns can be offset laterally from one another a distance substantially equal to the distance between two sequential tensionable cutting member leg segments. This configuration allows the tensionable cutting member to be fit over the opposing sets of returns in a manner that permits a substantially parallel arrangement of the tensionable cutting member leg segments.

[0014] The distance between sequential returns determines the distance between leg segments and therefore the cross-sectional dimension of the cut food product. In a preferred embodiment of the invention, the distance between tensionable cutting member leg segments is equal.

[0015] Each return may also be configured having a bearing face across which the tensionable cutting mem-

ber is fit. In one preferred embodiment of the invention, each return is formed having a pair of parallel faces and a radiused bearing face. Alternatively, the bearing face may be configured having an arcuate, circular or elliptical cross-section. The bearing face may also include a low friction surface against which the tensionable cutting member is fit and tensioned. The low friction face may be formed simply by polishing the bearing face of the return, by coating or treating the return, or by use of rollers. Alternately, the low friction face may be formed from a high density polymer.

[0016] The height of the bearing face should be substantially equal to or greater than the width of the tensionable cutting member so that, as the tensionable cutting member is tensioned, substantially equal tensile forces are established across the width of the tensionable cutting member.

[0017] One preferred embodiment of the invention includes a tensive cutting head first face configured having a first pairing of returns divided into opposing sets. A first opposing set of returns is formed near one peripheral edge of the tensive cutting head. A second opposing set of returns is formed on the face of a first moveable plate so that, when the first moveable plate is positioned on the tensive cutting head first face, the second opposing set of returns is positioned near an opposing peripheral edge of the tensive cutting head such that, when the tensionable cutting member is positioned about the opposing sets of returns, the leg segments of the tensionable cutting member extend across the tensive cutting head aperture.

[0018] Similarly, in the preferred embodiment of the invention, the tensive cutting head second face may be configured having a second pairing of returns divided into opposing sets rotated in a parallel plane, typically at 90° to the first pairing of returns. A third opposing set of returns may be formed near one peripheral edge of the tensive cutting head. A fourth opposing set of returns may be formed on the face of a second moveable plate so that when the second moveable plate is positioned on the tensive cutting head second face, the fourth opposing set of returns is positioned near an opposing peripheral edge of the tensive cutting head such that when the tensionable cutting member is positioned about the opposing sets of returns, the leg segments of the tensionable cutting member extend across the tensive cutting head aperture.

[0019] In this preferred embodiment of the invention, a first tensionable cutting member, removably mountable and tensionable on the first face of the tensive cutting head, presents a first array. A second tensionable cutting member, removably mountable and tensionable on the second face of the tensive cutting head, presents a second array rotated at 90° on a plane substantially parallel to the first array. This embodiment of the tensive cutting assembly, when employed within a hydraulic cutting device, renders cut food product having stick configuration.

[0020] In another preferred embodiment of the invention, the tensive cutting head may be configured having only a single or first array, which would render cut food product having a slabbed configuration. In order to produce cut food product having a stick configuration, a second tensionable cutting member affixed to a second tensive cutting head presenting a second array may be arranged in series within the in-line cutter assembly housing rotated at 90° to the first array to render cut food product having stick configuration.

[0021] The tensive cutting assembly also includes two clamping members operatively associated with the tensive cutting head for securing the ends of tensionable cutting member to the tensive cutting head.

[0022] The clamping member may comprise a variety of mechanical means so long as the clamping member is capable of restraining the tensionable cutting member end when the tensionable cutting member is tensioned. In one preferred embodiment of the invention, each end of the tensionable cutting member is positioned between a stationary cutaway portion of the tensive cutting head and a boss. The boss is a positioned so that the end of the tensionable cutting member is situated between the stationary cutaway portion of the tensive cutting head and the boss. The end of the tensionable cutting member is then secured or clamped between a lock screw and a flat of the boss.

[0023] The tensive cutting assembly also includes two tensioning members. The tensioning members are operatively associated with the tensive cutting head to apply tension to the tensionable cutting member. Alternate means for tensioning the tensionable cutting member may include means attached to and operatively associating with the tensive cutting head such as mechanical means like machine heads, levers or levered cams, or hydraulic means. Alternately, a tensioning member may be employed which is operatively associated with, but is not attached to, the tensive cutting head and which acts as a separate or stand alone unit, attaching to the tensive cutting head only during tensioning, and releasable after the tensionable cutting member is tensioned and the ends of the tensionable cutting members are secured.

[0024] According to the invention, tensioning is achieved using a pair of tension adjustment screws which adjust the distance between an opposing sets of returns. In one preferred embodiment of the invention, the first face of the tensive cutting head is configured having a first fixed set of returns and a first fixed set of returns. The tensive cutting head may be configured so that the first fixed set of returns are attached to a first movable plate which is slidingly and adjustably attached to the first face of the tensive cutting head. The tension adjustment screws may project through the first movable plate in a pair of threaded holes, with the second or distal ends of the tension adjustment screws being insertable in a pair of blind holes located in the tensive cutting head. In one preferred embodiment of the invention, the distal ends of the tension adjustment screws are configured to turn against a ball which facilitates turning of the screw. As

the tension adjustment screws are advanced in their threads, a force is exerted increasing the distance between the a first fixed set of returns and a second movable set of returns, thereby tensioning the tensionable cutting member.

[0025] The tensive cutting assembly may also include a device for monitoring tension during assembly and set-up of the tensive cutting assembly, or monitoring tension and sensing failure or breakage of the tensionable cutting member during operation. Because the tensive cutting assembly is employed primarily in the preparation of consumable food product, it is important to provide a means for sensing the integrity of the tensionable cutting member may be provided. In one preferred embodiment of the invention, a load cell assembly distributed by A. L. Design Inc. is employed to monitor tensionable cutting member tension and sense tensionable cutting member failure. The load cell assembly may be employed between a fixed face and a movable face of the tensive cutting head or between a fixed face and the distal end of an tension adjustment screw. The load cell assembly may be employed on either or both sides of the tensive cutting head to monitor tensionable cutting member tension and sense tensionable cutting member failure of either a first or a second tensive cutting member. Other means for monitoring and sensing tensionable cutting member tension are known to those skilled in the art, including strain gauges and other various transducers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

FIG. 1 is a schematic representation of a hydro-cutting system;

FIG. 2 is a representational perspective view of a first embodiment of the tensive cutting assembly;

FIG. 3 is an exploded representational perspective view of a first embodiment of the tensive cutting assembly;

FIG. 4 is a representational first side view of the tensive cutting assembly;

FIG. 5 is a representational perspective view of the tensive cutting assembly including an adapter plate; and

FIG. 6 is a representational perspective view of a second embodiment of the tensive cutting assembly.

[0027] It should be understood that the referenced drawings are not to scale and are intended as representations. The drawings are not necessarily intended to depict the functional and structural details of the invention, which can be determined by one of skill in the art by examination of the descriptions and claims provided herein.

DETAILED DESCRIPTION OF THE INVENTION

[0028] Referring now to Figures 1 through 6, the present invention will be more fully described. Referring to Figure 1, food product P, such as raw, whole potatoes, are introduced into food product tank 100. Food product tank 100 contains water in which the food product is suspended. Food product P and water are drawn through food pump 101 into inlet tube 102. At its downstream end, inlet tube 102 is hydraulically connected to tensive cutting assembly housing 103. Food product P passes through tensive cutting assembly housing 103 and is discharged in outlet tube 104. From this point, the sliced food product P is carried through processed food product discharge 105 to de-watering conveyor 106.

[0029] Referring to Figures 2 through 5, the tensive cutting assembly 10 is shown to advantage. Figure 2 shows one embodiment of tensive cutting assembly 10 including tensive cutting head 30.

[0030] Referring to Figure 3, tensive cutting assembly 10 includes first tensionable cutting member 20a removably and interchangeably mounted to first side 31 of tensive cutting head 30 and a second tensionable cutting member 20b removably and interchangeably mounted to second side 32 of tensive cutting head 30. Aperture 33 is formed through the cross section of tensive cutting head 30 allowing passage of food product through tensive cutting assembly 10.

[0031] First tensionable cutting member 20a and second tensionable cutting member 20b are formed from a strip of sheet metal and include a plurality of leg segments 23 and a plurality of bends 24 producing a continuous and generally serpentine configuration. First tensionable cutting member 20a is further configured having first end 21a and second end 22a. Second tensionable cutting member 20b is similarly configured having first end 21b and second end 22b. Either first edge 25 or second edge 26 may be employed as a cutting edge depending upon orientation when installed in tensive cutting head 30.

[0032] Referring to Figure 3, tensive cutting head 30 includes first face 31 and second face 32. First face 31 is configured having first raised portion 34 and a plurality of returns 36a. Referring to Figure 2, first face 31 is further configured having first fixed set of returns 37 and first moveable set of returns 38. First fixed set of returns 37 is formed near first face peripheral edge 44 of first raised portion 34. First face 31 is further configured having first moveable plate 45. First moveable plate 45 is held against first face 31 in a slidingly adjustable relationship to first raised portion 34 and inner face 75. The distance between inner face 75 and inner face 76 of first movable plate 45 is adjustable using first tension adjustment screw 55a (shown in Figure 3), and second tension adjustment screw 55b. As shown in Figure 4, first tension adjustment screw 55a engages first threaded hole 56a and seats in first blind hole 57a. Similarly, second tension adjustment screw 55b engages second threaded hole 56b and seats in second blind hole 57b.

[0033] First moveable plate 45 is secured in position on first face 31 by first retaining screw 73a which passes through first slot 74a and second retaining screw 73b which passes through second slot 74b. First moveable set of returns 38 is formed on the face of first moveable plate 45 near peripheral edge 46 of first moveable plate 45 such that when first tensionable cutting member 20a is positioned about first fixed set of returns 37 and first moveable set of returns 38, leg segments 23 of first tensionable cutting member 20a extend across aperture 33.

[0034] Referring to Figure 3, second face 32 is configured having second raised portion 35 and a plurality of returns 36b. Second face 32 is further configured having second fixed set of returns 39 and second moveable set of returns 40. Second fixed set of returns 39 is formed near second face peripheral edge 47 of second raised portion 35. Second face 32 is further configured having second moveable plate 48. Second movable plate 48 is held against second face 32 in a slidingly adjustable relationship to second raised portion 35 inner face 77 and the distance between inner face 77 and inner face 78 of second movable plate 48 is adjustable using third tension adjustment screw 55c and fourth tension adjustment screw 55d. As shown in Figure 3, third tension adjustment screw 55c engages third threaded hole 56c (not shown), and seats in third blind hole 57c. Similarly, fourth tension adjustment screw 55d engages fourth threaded hole 56c (not shown), and seats in fourth blind hole 57d.

[0035] Second movable plate 48 is secured in position on second face 32 by third retaining screw 73c which passes through third slot 74c and fourth retaining screw 73d which passes through fourth slot 74d. Second moveable set of returns 40 is formed on the face of second moveable plate 48 near second opposing peripheral edge]of second moveable plate 48 such that when second tensionable cutting member 20b is positioned about second fixed set of returns 39 and second moveable set of returns 40, leg segments 23 of second tensionable cutting member 20b extend across aperture 33.

[0036] In the embodiment of the invention shown in Figure 3, first tensionable cutting member 20a attached to first face 31 of tensive cutting head 30 presents first array 27a, and second tensionable cutting member 20b attached to second face 32 of tensive cutting head 30 presents second array 27b which is rotated at approximately 90° on a plane substantially parallel to first array 27a.

[0037] Referring to Figure 4, returns 36a, which are typical of the returns shown, are arranged sequentially, with an equal distance or return interval I being observed between each of the sequential returns. Opposing sets of returns have a lateral offset O substantially equal to the distance between two sequential tensionable cutting member leg segments.

[0038] Referring to Figure 4, tensive cutting head 30 also includes first clamping assembly 50a operatively associated with tensive cutting head 30 for securing first end 21a of tensionable cutting member 20a to tensive cutting head 30 and second clamping assembly 50b operatively associated with tensive cutting head 30 for securing second end 22a of tensionable cutting member 20a to tensive cutting head 30. Similarly, referring to Figure 3, tensive cutting head 30 also includes third clamping assembly 50c operatively associated with tensive cutting head 30 for securing first end 21b of tensionable cutting member 20b to tensive cutting head 30 and fourth clamping assembly 50d operatively associated with tensive cutting head 30 for securing second end 22b of tensionable cutting member 20b to tensive cutting head 30.

[0039] Referring to Figure 4, first clamping assembly 50a is typical of the clamping assemblies shown and includes stationary portion 52 of tensive cutting head 30 and cam 51. First clamping assembly 50a includes boss 51, stationary portion 52 and lock screw 53. First end 21a of tensionable cutting member 20b is secured between stationary portion 52 and cam 51 and lock screw 53 is tightened securing first end 21 a between cam 51 and lock screw 53.

[0040] Referring to Figure 4, tensive cutting assembly 10 may also include a means for monitoring tension during assembly and set-up of the tensive cutting assembly or monitoring tension and sensing tensionable cutting member failure or breakage during operation. First raised portion 34 may be configured having load cell assembly 60 removably installed within cavity 61. Load cell assembly 60 as shown in Figure 4 includes load cell 63 which is positioned at base 62 of blind hole 57b. Pin 64 is configured to cooperate with ball 65 which facilitates rotation of second tension adjustment screw 55b. Pigtail 66 is electrically connected to load button 63 for connection to a display or control circuit.

[0041] Tensive cutting assembly 10 may also include one or more face plates. Referring to Figure 5, face plate 70 is shown removably attached to tensive cutting head 30 by face plate screws 71. Face plate screws 71 pass through tensive cutting head 30 and secure face plate 70 to tensive cutting head 30 engaging face plate screw holes 72 shown in Figure 4.

[0042] In use, referring to Figures 2 and 3, first tension adjustment screw 55a, second tension adjustment screw 55b are backed out so that when first moveable plate 45 is placed on first face 31 of tensive cutting head 30, interface 75 of raised portion 34 and interface 76 of first moveable plate 45 contact one another. In those instances where load cell assembly 60 is employed, prior to inserting the tension adjustment screws in their respective blind holes, load cell 63 is placed against base 62 of blind hole 57b from the top surface of raised portion 34. Pin 64 and ball 65 are inserted into blind hole 57b as shown in Figure 4.

[0043] Referring to Figures 3 and 4, first tensionable cutting member 20a is attached to first side 31 of tensive cutting head 30 by positioning bends 24 about returns 36a. The ends of tensionable cutting member 20a are positioned so as to engage the clamping assemblies. Referring to Figure 4, with specific reference to clamping

assembly 50a, first end 21a of tensionable cutting member 20a passes between a stationary cutaway portion of raised portion 34 and the outside face of boss 51 and is secured between lock screw 53 and boss 51.

[0044] Once first tensionable cutting member 20a is positioned on first side 31 of tensive cutting head 30, first tension adjustment screw 55a and second tension adjustment screw 55b are turned so as to increase the distance between first raised portion 34 and first movable plate 45. In so doing, tensionable cutting member 20a is tensioned about first fixed set of returns 37 and first moveable set of returns 38. As first tensionable cutting member 20a tightens across bearing faces 43 of first fixed set of returns 37 and first moveable set of returns 38, a tensile force is created along first tensionable cutting member 20a which is distributed substantially equally across the width of tensionable cutting member 20a.

[0045] The procedure for installation of second tensionable cutting member 20b on second face 32 is similar to the process for installation of first tensionable cutting member 20a on first face 31.

[0046] Both first tensionable cutting member 20a and second tensionable cutting member 20b are tightened in the above manner to a point just below the yield strength of the material being employed for the tensionable cutting member. Once tensioning is complete, referring to Figure 5, face plate 70 may be attached to tensive cutting head 30 employing face plate screw 71 which engages face plate screw hold 72 as shown in Figure 4. Figure 4 also shows pig tail 66 which extends from load cell 63 for electrical connection to a display or control circuit (not shown).

[0047] Referring to Figure 1, the completed tensive cutting assembly 10 is inserted within tensive cutting assembly housing 103. Food product is introduced into food product tank 100. Food product is drawn through food pump 101 into inlet tube 102 and through tensive cutting assembly housing 103. Food product passes first against first tensionable cutting member 20a and then against second tensionable cutting member 20b before being discharged into outlet tube 104 in a stick configuration. From this point the sliced food product is carried through food processing discharge 105 to dewatering conveyor 106.

[0048] In the embodiment of the invention shown in Figure 6, tensive cutting assembly 110 is configured having tensionable cutting member 120 removably and interchangeably mounted to tensive cutting head 130. Tensive cutting head 130 includes first fixed set of returns 137 and first moveable set of returns 138. First fixed set of returns 137 is formed near first face peripheral edge 144 of raised portion 134 of tensive cutting head 130.

[0049] Tensive cutting head 130 is further configured having first moveable plate 145. First moveable plate 145 is held against first face 131 in a slidingly adjustable relationship to first raised portion 134 and the distance between raised portion 134 first movable plate 145 is adjustable using first tension adjustment screw 155a and second tension adjustment screw 155b. First moveable plate 145 is secured in position by first key 136a which slidingly engages first channel 135a and second key 136b which slidingly engages second channel 135b. First moveable set of returns 138 is formed on the face of first moveable plate 145 near first opposing peripheral edge 146 of first moveable plate 145 such that when tensionable cutting member 120 is positioned about first fixed set of returns 137 and first moveable set of returns 138, leg segments 123 of tensionable cutting member 120 extend across aperture 133.

[0050] First clamping assembly 150a and second clamping assembly 150b secure the ends of tensionable cutting member 120 and first tension adjustment screw 155a and second tension adjustment screw 155b adjust tension on tensionable cutting member 120.

[0051] The embodiment of the invention shown in Figure 6 will render cut food product having a slabbed configuration. In order to produce cut food product having a stick configuration, a second tensive cutting assembly 110 may be arranged in series within the in-line cutter assembly housing rotated at 90° to the tensive cutting assembly.

[0052] While this invention has been described with reference to the described embodiments, this is not meant to be construed in a limiting sense. Various modifications to the described embodiments, as well as additional embodiments of the invention, will be apparent to persons skilled in the art upon reference to this description, within the scope of the appended claims.

Claims

1. A tensive cutting assembly (10) for a hydraulic food cutting apparatus comprising:

   a tensive cutting head (30) including an aperture (33) formed through a cross section of the tensive cutting head (30), the tensive cutting head (30) including a first fixed set of returns (37) and an opposingly adjustable first moveable set of returns (38);

   a tensionable cutting strip (20a) including a first end (21 a) and a second end (22a), at least two leg segments (23) and a bend (24) connecting the two leg segments (23), the tensionable cutting strip (20a) positioned about the first fixed set of returns (37) and the opposingly adjustable first moveable set of returns (38), the bend (24) of the tensionable cutting strip (20a) positioned about one of the first fixed set of returns (37) or the opposingly adjustable first moveable set of returns (38) and the at least two leg segments (23) extending across the aperture (33);

   a first clamping assembly (50a) connected to the tensive cutting head (30), the first end (21a) of the tensionable cutting strip (20a) securable

by the first clamping assembly (50a) to the tensive cutting head (30) and a second clamping assembly (50b) connected to the tensive cutting head (30), the second end (22a) of the tensionable cutting strip (20a) securable by second clamping assembly (50b) to the tensive cutting head (30); and
a first tension adjustment screw (55a) and second tension adjustment screw (55b) disposed between the first fixed set of returns (37) and the opposingly adjustable first moveable set of returns (38) to adjust a distance between first fixed set of returns (37) and the opposingly adjustable first moveable set of returns (38) for adjusting a tensive force along the tensionable cutting strip (20a),

characterized by the tensionable cutting strip having a thickness in the range of 0.005 inches (0.127 mm) to 0.015 inches (0.381 mm), and a width in the range of 0.375 inches (9.52 mm) to 0.750 inches (19.05 mm).

2. The tensive cutting assembly (10) of Claim 1 wherein the tensionable cutting member further comprises a strip of material having a yield strength in the range of 80,000 psi (551.5 MPa) to 180,000 psi (1241.0 MPa).

Patentansprüche

1. Schneidanordnung (10), die mit mechanischer Spannung arbeitet (tensive), für eine hydraulische Schneidemaschine für Nahrungsmittel, aufweisend:

Einen mit mechanischer Spannung arbeitenden Schneidkopf (30) einschließend eine Öffnung (33), die durch einen Querschnitt des mit mechanischer Spannung arbeitenden Schneidkopfes (30) gebildet wird, wobei der mit mechanischer Spannung arbeitende Schneidkopf (30) einen ersten feststehenden Satz von Umkehrpunkten (37) und einen gegenüberliegenden einstellbaren ersten beweglichen Satz von Umkehrpunkten (38) einschließt;
einen spannbaren Schneidbandstreifen (20a) mit einem ersten Ende (21 a) und einem zweiten Ende (22a), wenigstens zwei Schenkelsegmenten (23) und einem die beiden Schenkelsegmente (23) verbindenden Bogen (24), wobei der spannbare Schneidbandstreifen (20a) über den ersten feststehenden Satz von Umkehrpunkten (37) und den gegenüberliegenden einstellbaren ersten beweglichen Satz an Umkehrpunkten (38) positioniert ist, wobei der Bogen (24) des spannbaren Schneidbandstreifens (20a) über entweder dem ersten feststehenden Satz von Umkehrpunkten (37) oder dem gegenüberliegenden einstellbaren ersten beweglichen Satz von Umkehrpunkten (38) positioniert ist und sich die wenigstens zwei Schenkelsegmente (23) quer zur Öffnung (33) erstrecken;
eine erste Klemmanordnung (50a) verbunden mit dem mit mechanischer Spannung arbeitenden Schneidkopf (30), wobei das erste Ende (21 a) des spannbaren Schneidbandstreifens (20a) durch die erste Klemmanordnung (50a) an dem mit mechanischer Spannung arbeitenden Schneidkopf (30) befestigbar und eine zweite Klemmanordnung (50b) mit dem mit mechanischer Spannung arbeitenden Schneidkopf (30) verbunden ist, wobei das zweite Ende (22a) des spannbaren Schneidbandstreifens (20a) durch die zweite Klemmanordnung (50b) an dem mit mechanischer Spannung arbeitenden Schneidkopf (30) befestigbar ist; und
eine erste die mechanische Spannung einstellende Schraube (55a) und eine zweite die mechanische Spannung einstellende Schraube (55b) zwischen dem ersten feststehenden Satz von Umkehrpunkten (37) und dem gegenüberliegenden einstellbaren ersten beweglichen Satz von Umkehrpunkten (38) zum Einstellen eines Abstandes zwischen dem ersten feststehenden Satz von Umkehrpunkten (37) und dem gegenüberliegenden einstellbaren ersten beweglichen Satz von Umkehrpunkten (38) zum Einstellen einer Spannungskraft (tensive force) längs der spannbaren Schneidbandstreifen (20a) angeordnet ist,
dadurch gekennzeichnet,
dass der spannbare Schneidbandstreifen eine Dicke in dem Bereich von 0,005 Zoll (0,127 mm) bis 0,015 Zoll (0,381 mm) und eine Breite in dem Bereich von 0,375 Zoll (9,52 mm) bis 0,750 Zoll (19,05 mm) besitzt.

2. Schneidanordnung (10), die mit mechanischer Spannung arbeitet, nach Anspruch 1, in welcher das spannbare Schneidelement außerdem einen Streifen aus einem Material mit einer Streckfestigkeit in dem Bereich von 80.000 psi (551,5 Mpa) bis 180.000 psi (1241,0 Mpa) aufweist.

Revendications

1. Ensemble de découpe sous traction (10) pour un appareil hydraulique de découpe d'aliments comprenant :

une tête de découpe sous traction (30) comportant une ouverture (33) formée à travers une section transversale de la tête de découpe sous traction (30), la tête de découpe sous traction

(30) incluant un premier jeu fixe de retours (37) et un premier jeu mobile réglable, en opposition, de retours (38) ;
une bande de découpe pouvant être mise en tension (20a) incluant une première extrémité (21a) et une seconde extrémité (22a), au moins deux segments de pieds (23) et un coude (24) raccordant les deux segments de pieds (23), la bande de découpe pouvant être mise en tension (20a) étant positionnée autour du premier jeu fixe de retours (37) et du premier jeu mobile réglable, en opposition, de retours (38), le coude (24) de la bande de découpe pouvant être mis en tension (20a) étant positionné autour d'un retour parmi le premier jeu fixe de retours (37) ou le premier jeu mobile réglable, en opposition, de retours (38), et les au moins deux segments de pied (23) qui s'étendent à travers l'ouverture (33) ;
un premier ensemble de pincement (50a) raccordé à la tête de découpe sous traction (30), la première extrémité (21a) de la bande de découpe pouvant être mise en tension (20a) pouvant être attachée grâce au premier ensemble de pincement (50a) sur la tête de découpe sous traction (30), et un second ensemble de pincement (50b) étant raccordé à la tête de découpe sous traction (30), la seconde extrémité (22a) de la bande de découpe pouvant être mise en tension (20a) pouvant être attachée grâce au second ensemble de pincement (50b) sur la tête de découpe sous traction (30), et
une première vis de réglage de la tension (55a) et une seconde vis de réglage de la tension (55b) disposée entre le premier jeu fixe de retours (37) et un premier jeu mobile réglable, en opposition, de retours (38) afin de régler une distance entre le premier jeu fixe de retours (37) et un premier jeu mobile réglable, en opposition, de retours (38), pour régler une force de tension le long de la bande de découpe pouvant être mise en tension (20a), **caractérisé en ce que** la bande de découpe pouvant être mise en tension (20a) a une épaisseur dans la plage de 0,005 pouces (0,127 mm) à 0,015 pouces (0,381 mm), et une largeur dans la plage de 0,375 pouces (9,52 mm) à 0,750 pouces (19,05 mm).

2. Ensemble de découpe sous traction (10) selon la revendication 1, dans lequel l'élément de découpe pouvant être mis sous tension comprend en outre une bande de matériau ayant une limite d'élasticité dans la plage de 80 000 psi (551,5 MPa) à 180 000 psi (1241,0 MPa).

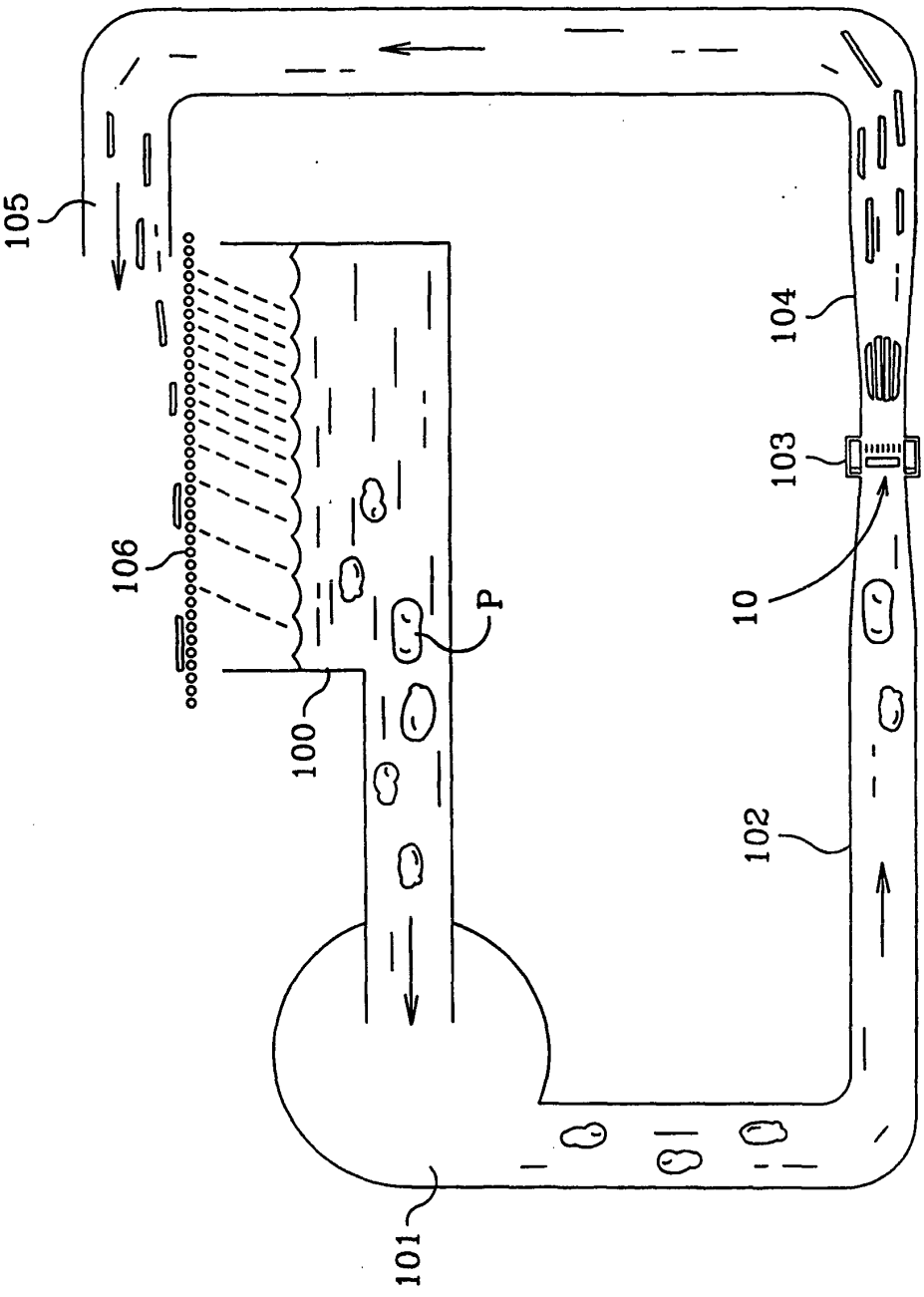

FIG. 1

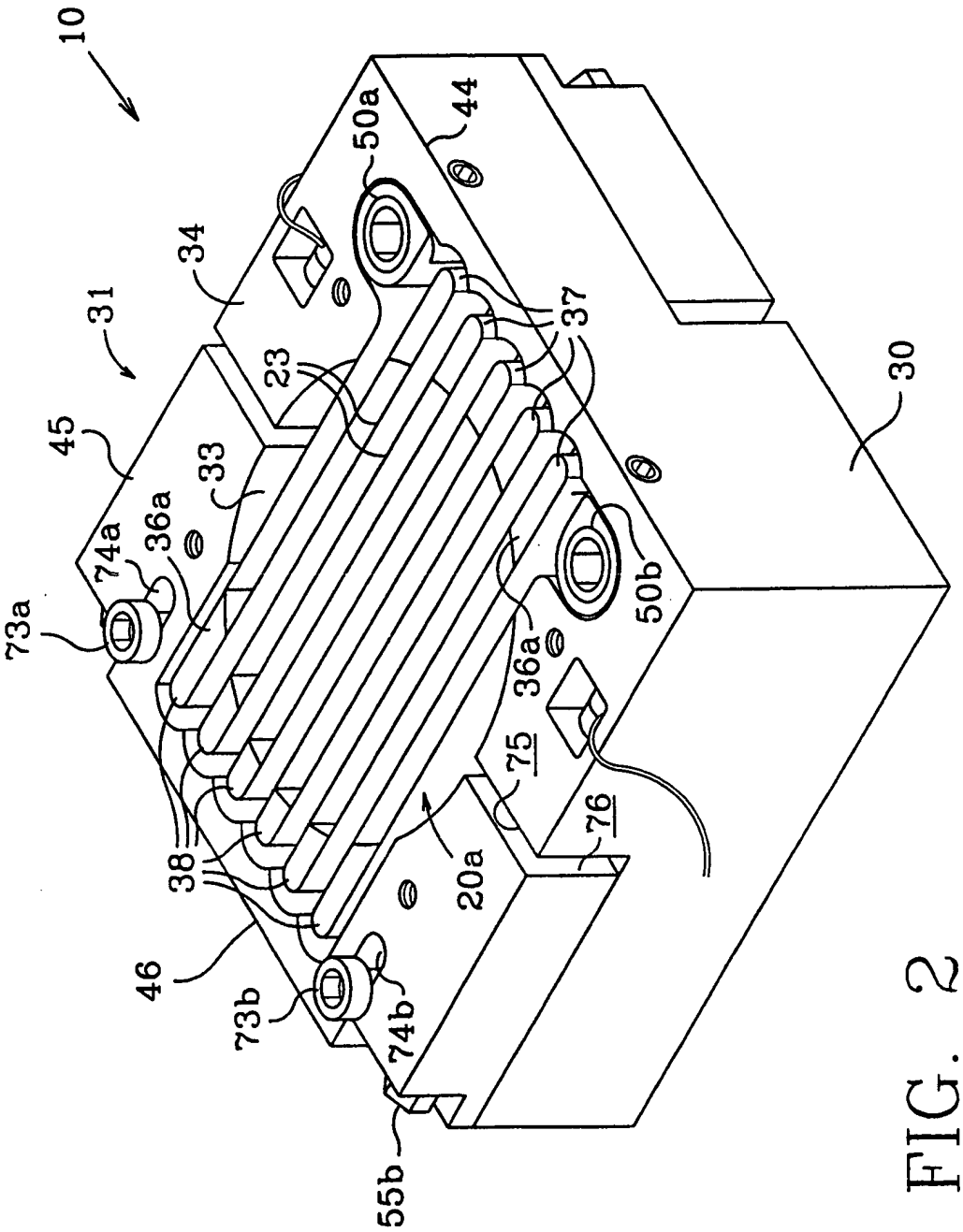
10
31
34
44
50a
37
23
30
45
33
36a
74a
73a
50b
36a
75
76
38
20a
46
73b
74b
55b

FIG. 2

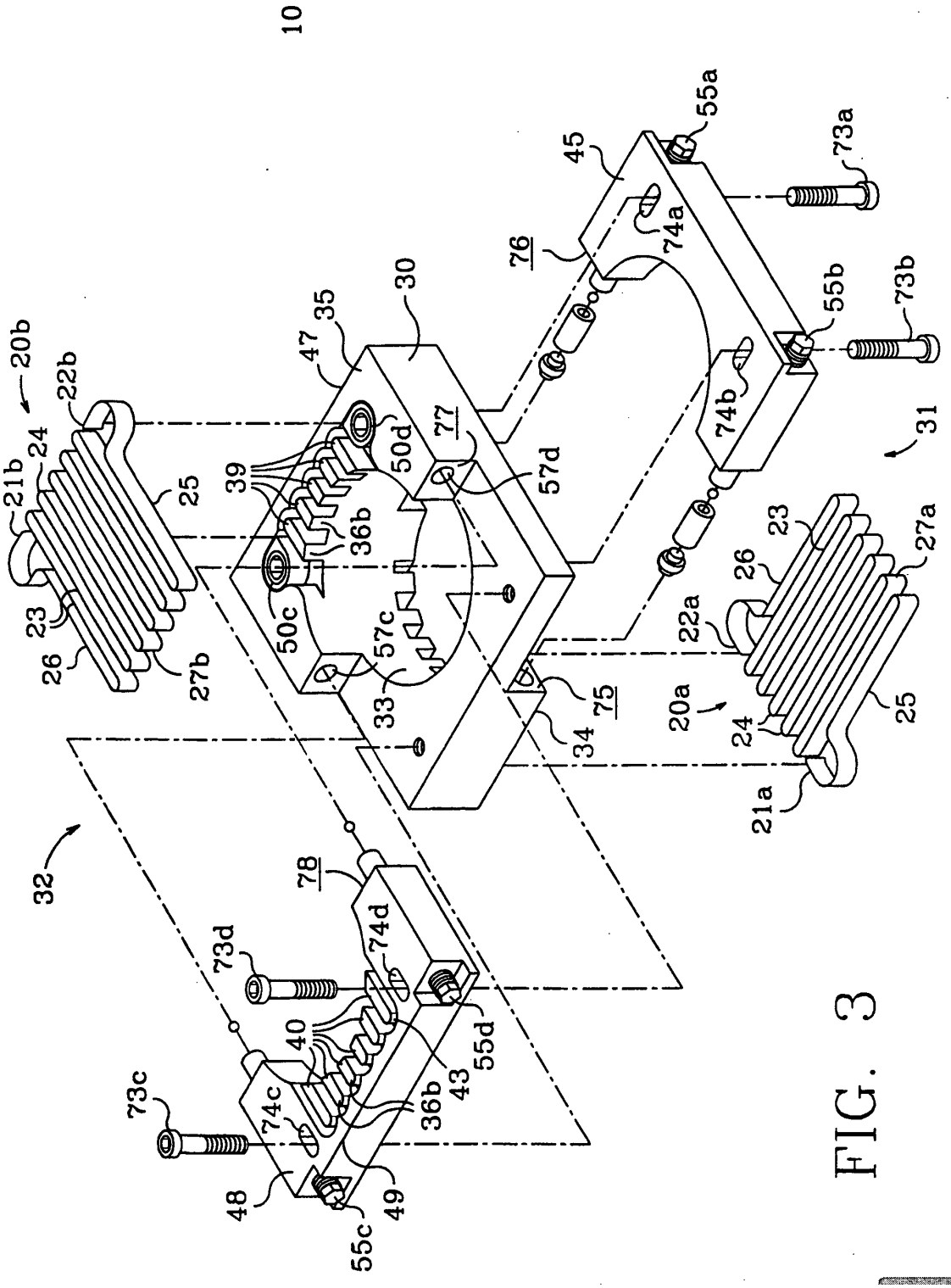
10
20b
22b
24
21b
25
23
26
27b
39
36b
50c
57c
33
50d
57d
77
47
35
30
45
55a
73a
74a
76
55b
73b
74b
31
27a
22a
20a
34
75
21a
32
78
73d
74d
40
55d
43
73c
74c
48
49
55c

FIG. 3

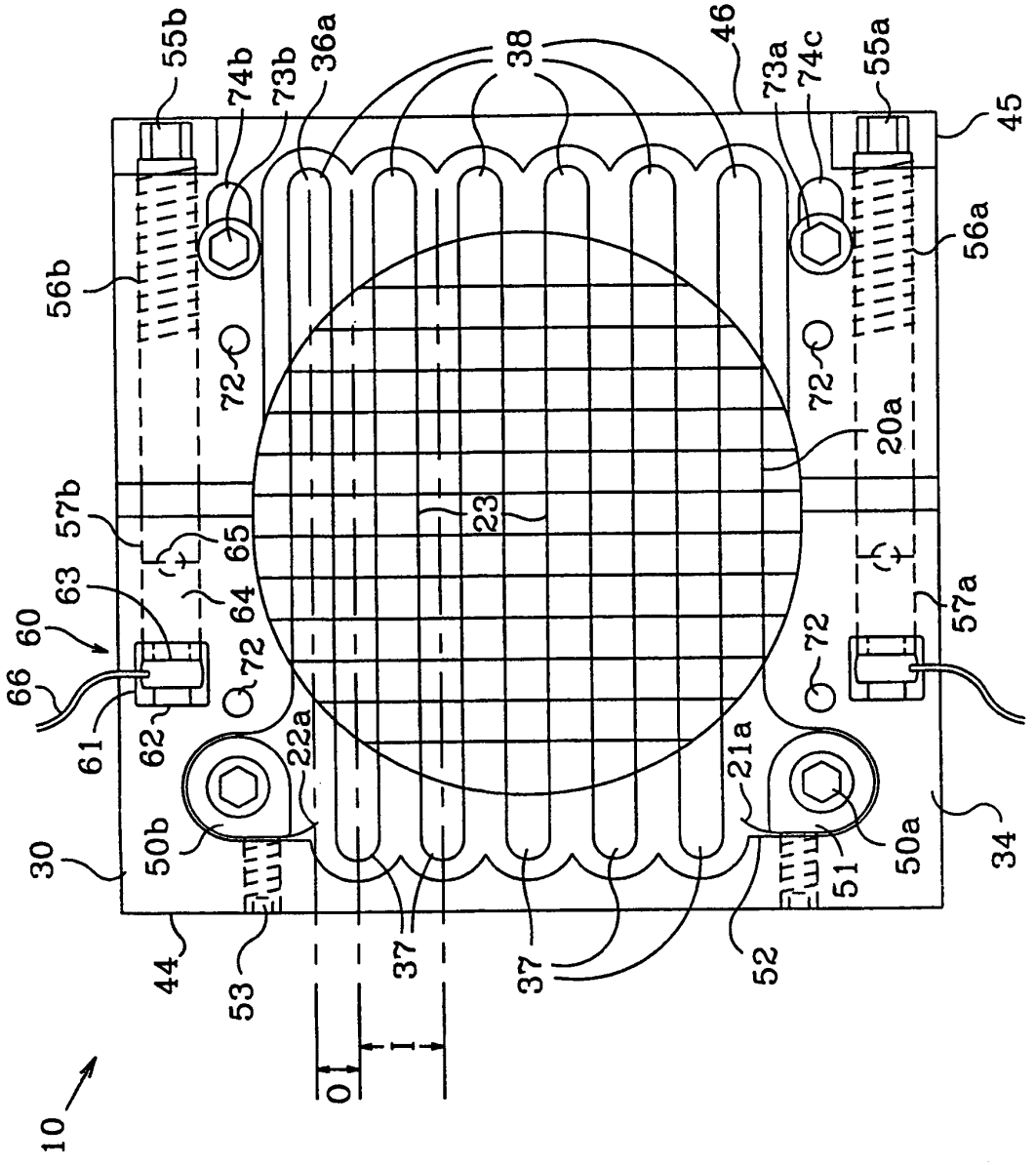
55b
74b
73b
36a
38
46
73a
74c
55a
45
56b
56a
72
20a
23
57b
65
63
64
60
66
61
62
22a
21a
50b
50a
51
30
34
44
53
37
52
10
O
I

FIG. 4

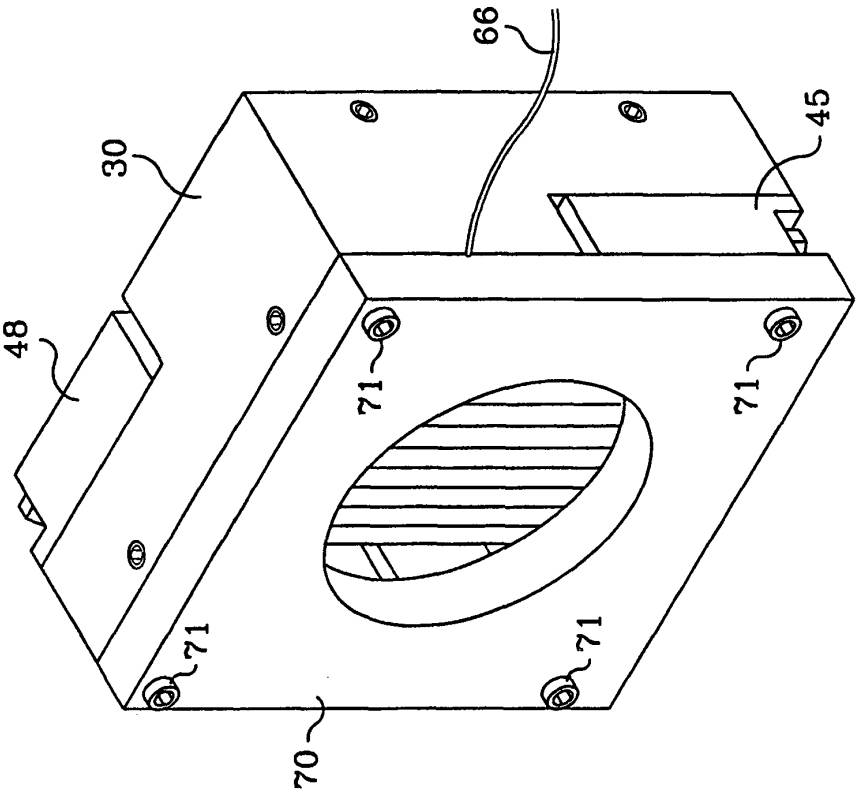

FIG. 5

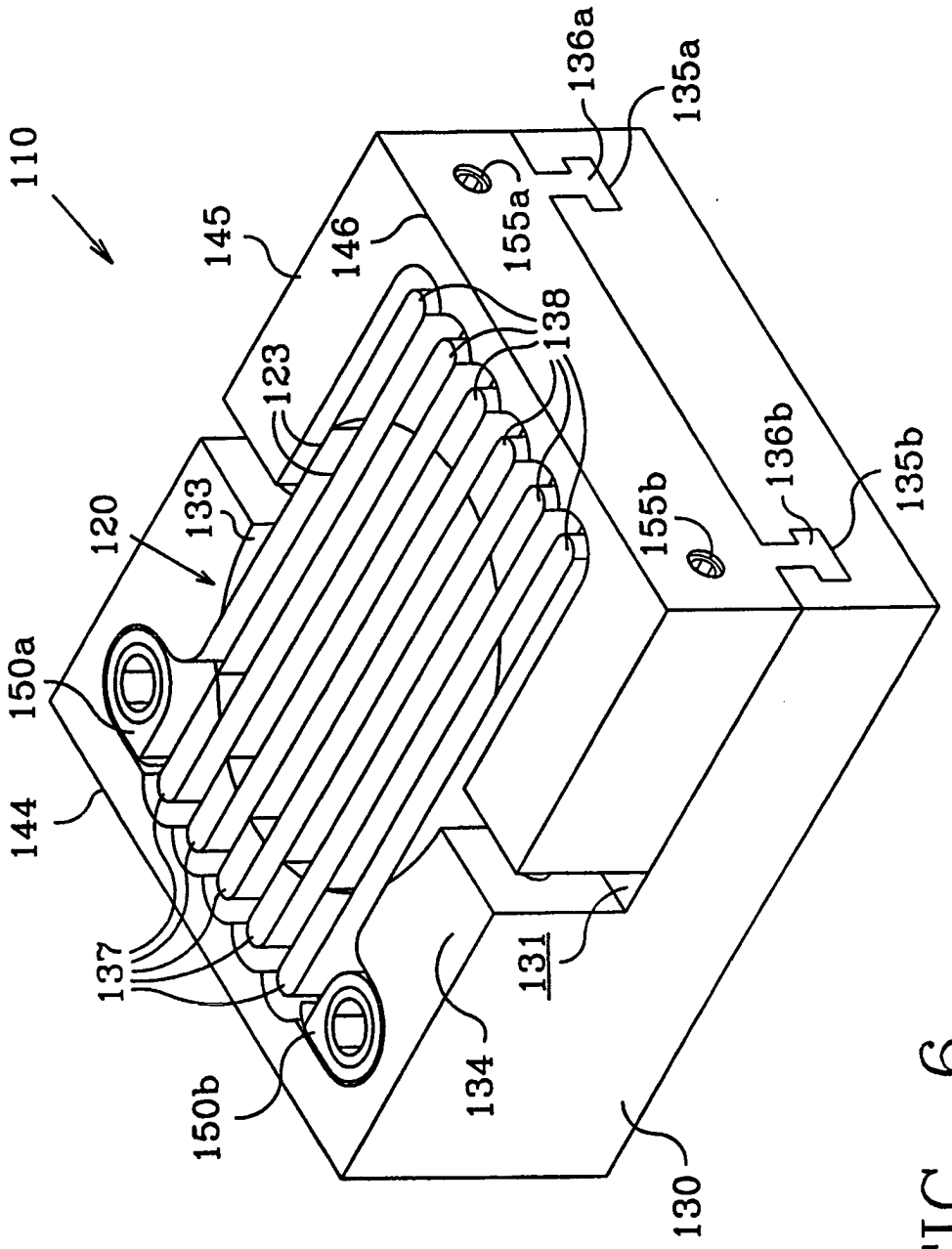
110
145
146
136a
135a
155a
138
123
133
120
136b
135b
155b
150a
144
137
131
134
150b
130

FIG. 6