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(54) **Rod transfer apparatus**

Vorrichtung zum Überführen von Stabförmigen artikeln

Appareil de transfert de tiges

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Description

[0001] This invention relates to a rod transfer apparatus. More specifically it is concerned with a kicker apparatus for removing tobacco rods or filters from a manufacturing line.

[0002] Kickers are well known (See US-A-3 039 589) and have been used for many years, for example to pick finished tobacco rods off a rod maker and to pass them to a transfer which in turn passes them to a filter tipper. Known kickers include in-line or straight kickers which accelerate the rod in the line of the vee-rail of the rod maker on which they are formed, and helical kickers which insert a lateral component into the movement of the rod.

[0003] Modern tobacco rod makers increase production speeds by making rods as double lengths which are cut into single lengths after the transfer apparatus. Kickers have been found to be unsuitable for use with double length rods as they have a tendency to present the rods to the receiving drum of the transfer apparatus at an attitude slightly inclined to the horizontal, as a result of which the tip of the rod can foul against the corner of the receiving drum damaging the rod or inhibiting transfer. This might not matter if filter rods were being transferred as filters are more robust than tobacco rods and eventually wrapped with tipping paper concealing any damage. It is not however acceptable for tobacco rods. This has led to kickers being abandoned for double length rod makers in favour of much more complex apparatus such as the Spider made by Hauni-Korber AG of Germany. In contrast to the Hauni-Korber Spider, kickers are simple, cheap and easy to manufacture. It would be desirable to use kickers for transferring double length rods.

[0004] The invention aims to provide an improved kicker which can present double length rods to a transfer apparatus without the rod being damaged.

[0005] In its broadest form the invention resides in the provision of air to a rod on the kicker to break the suction holding the rod to the kicker and so ensure release of the rod at the correct time.

[0006] More specifically there is provided a kicker assembly for picking rods off a rod making apparatus and accelerating them to a rod receiving station, the assembly comprising: a suction housing having a suction passageway extending from its peripheral wall, and a rod release passageway extending from its peripheral wall; a kicker wheel having a flange having a plurality of holes, the kicker wheel being mounted for rotation around the suction housing such that the holes pass over the suction passageway and the rod release passageway; wherein the rod release passageway is adjacent the suction passageway and behind the suction passage such that the kicker wheel first picks rods by suction applied through the suction passageway and then releases rods through air applied through the rod passageway; and a drive for rotating the kicker wheel.

[0007] The invention further provides a kicker assembly for picking rods from the rod making apparatus and accelerating them to a rod receiving station comprising:

a drive housing for attachment to the rod making apparatus;
drive means received in the housing and having at least one rotatable shaft;
a suction housing coupled to the housing, the suction housing having a peripheral wall having a first port connected to a suction apparatus and a second port connected to an air supply; and
a kicker wheel coupled to the shaft for rotation therewith, the kicker wheel having a peripheral flange arranged around the peripheral wall of the suction housing for rotation thereabout, and having a plurality of holes positioned to pass over the first and second ports of the suction housing on rotation, each hole passing first over the first port for picking rods from the rod making apparatus and then over the second port for releasing rods to the rod receiving station.

[0008] Embodiments of the invention may have the advantage that air blown through the rod release passageway detaches rods from the kicker and breaks any residual suction enabling the rod to be released at the correct attitude for entry onto a receiving station such as a fluted drum. Consequently the risk of damage to the rod during transfer is diminished.

[0009] Preferably, the suction to the rods is cut off as the air is applied to release the rods.

[0010] The holes in the flange may be circular or elongate, in the form of through-slots.

[0011] Preferably the suction housing further comprises a suction reservoir, the suction passageway extending between the suction reservoir and the peripheral wall of the housing.

[0012] The reservoir and the suction housing ensures a constant suction is applied to the rods and counters the effect of the passageway repeatedly opening and closing as the holes in the kicker wheel pass over. This has the advantage that the assembly is capable of holding heavier rods and so is suitable for double length rods.

[0013] An embodiment of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a transfer apparatus including a kicker embodying the invention;

Figure 2 is an enlarged view of a portion of the apparatus of figure 1;

Figure 3 is a plan of a kicker assembly embodying the present invention;

Figure 4 is a front view of the assembly of figure 3 with the housing cover removed;

Figure 5 is a plan of the kicker wheel;

Figure 6 is a front view of the kicker wheel;

Figure 7 is a section on the line A-A in Figure 6;

Figure 8 is a plan of the suction housing;

Figure 9 is front view of the suction housing; and

Figure 10 is a rear view of the suction housing.

[0014] The transfer apparatus 10 of figures 1 and 2 is an example of the apparatus with which the kicker embodying the present invention could be used an is not to be constructed as limiting.

[0015] Tobacco rods 12 are formed as double length on a rod maker (now shown). The finished rods are transported on the vee-rail 14 of the rod maker to the kicker 20 which picks the rods off the rail and transfers them to the receiving drum 30 of the transfer apparatus.

[0016] The receiving drum has a cover 40 and receives rods from the kicker at high speed. The rods are received in flutes on the drum and decelerated and held by a series of suction holes along the length of the flutes. The flutes have flared ends to make it easier for the rods to be received from the kicker in the flutes.

[0017] Rods are picked from the receiving drum on to an intermediate drum 50 and then picked onto a cutting drum 60 where the rods are split into two single lengths. From there the rods are passed two a separating drum 70 which moves the individual rods of each pair apart and thence to a filter assembly drum 80 which inserts a double length filter between the separated rods. The filters are then joined to the rods and cut to form individual cigarettes in a conventional tipper such as the Hauni-Korber AG Max series tipper (not shown).

[0018] The kicker assembly comprises a main housing 100 which is mounted on the rod maker. At an end of the housing is a drive 110 which is driven from the rod maker drive via a shaft at the far end of the housing (not shown) through a timex pulley and belt (not shown). The drive transfers drive via a drive belt 112 to a kicker shaft 114. Both the drive shaft and the kicker shaft have toothed belt wheels 116 on which the drive belt is mounted. The belt 112 is retained inside a belt housing 118 to which is fixed a suction housing 120. The belt housing is pivotable about the drive 110 to set the kicker wheel at the correct height above the rod maker vee-rail. Attached to the belt housing is a bar 117 to which is fixed a guide plate 119. The guide plate is held above the vee-rail behind the kicker wheel and prevents the trailing ends of rods flicking up as the leading edge is picked up by the kicker wheel. It also acts to keep the rods in line. The suction housing is shown in figures 8 to 10 and comprises a solid flange having a central aperture 122 and a hub 124 which is connected to the belt housing. A suction passage 126 is formed in the periphery of the flange at a position between the central axis of the flange and the front face. The suction passageway passes through the flange to a suction reservoir 128 at the rear of the flange. The reservoir 128 is provided to ensure a constant suction as will be described. The reservoir 128 is connected to a suction pump (not shown).

[0019] At a position adjacent and slightly behind the suction aperture (in the direction of rod movement) is a second passageway 129. This passageway 129 is a rod release passageway and is connected to an air supply (not shown) at the rear of the flange, the rod release passage way 129 passing through the flange approximately parallel to the suction passageway. The air supply pushes air through the rod release passage way to break the suction applied by the suction passageway to release rods from the kicker.

[0020] Over the suction flange, which is static, is arranged a kicker wheel 130. The kicker wheel comprises a front face 132, a peripheral flange 134 and a hub 136. The hub passes through the central aperture 122 of the suction flange and is fixed to the kicker shaft 114 for rotation therewith. The peripheral flange is not continuous but divided into two sections of equal length by two relieved areas 138. Each flange section has a groove 140 running along its lengch with a series of equally spaced holes 142 formed at the base of the groove. In the figures the holes are shown as bing circular but they could equally well be elongate in the form of slots extending through the flange. The grooves are arranged off the centre of the flange such that they overlie the suction and rod release passageways of the suction flange, and such that when mounted on the housing, the grooves overlie the centreline 150 (fig 3) of tobacco rods on the vee-rail of the rod maker.

[0021] In use, the kicker wheel 130 rotates above the rods on the vee-rail. The suction provided through the holes in the grooves picks individual rods from the rail and the rotation of the kicker wheel accelerates the rods towards the receiving drum. The reservoir in the suction flange ensures that the suction is maintained. As the suction is communicated through holes in the groove, the suction is effectively being switched on and off as the holes pass over the suction aperture. The reservoir mitagates against a loss of suction which might cause a rod to be released from the kicker. This is particularly important with double length rods whose increased weight requires a greater suction.

[0022] A rod will be released from the kicker when a relieved portion on the kicker periphery, where there are no holes or slots, passes over the suction passageway cutting off the suction and releasing the rods. However, there is a tendency for there to be some residual suction which can lift the tip of the rod. As can be seen from figures 1 and 2, the clearance between the flutes of the receiving drum 30 and its cover 40 is small and a raised

tip could be damaged by the cover or, in the worst case, be prevented from entering the receiving drum causing the whole manufacturing line to break down.

[0023] The air blown through the rod release passageway ensures that any residual suction is broken and chat the tip of the rod is exactly parallel with the receiving drum flutes when it is released. This ensures that the rod is successfully transferred from the vee-rail to the receiving drum.

[0024] Thus the modified kicker described may be used with high speed double length rod makers enabling the advantages of low cost, simple kickers to be retained and obviating the need for complex, expensive transfer apparatus such as spiders.

[0025] Although the kicker described is a straight, in-line kicker the invention is equally applicable to any other kicker such as a helical kicker which inserts a lateral component to the rod as it is being transformed.

Claims

1. A kicker assembly (20) for picking rods (12) off a rod making apparatus and accelerating them to a rod receiving station (30), the assembly comprising:

a suction housing (120) having a suction passageway (126) extending from its peripheral wall, and a rod release (129) passageway extending from its periphery;
a kicker wheel (130) having a flange (134) having a plurality of holes (142), the kicker wheel being mounted for rotation around the suction housing such that the holes pass over the suction passageway and the rod release passageway; wherein
the rod release passageway is adjacent the suction passageway and behind the suction passage such that the kicker wheel first picks rods by suction applied through the suction passageway and then releases rods through air applied through the rod passageway; and
a drive (110) for rotating the kicker wheel.

2. A kicker assembly according to claim 1, wherein the flange of the kicker wheel is shaped to cut off suction to the rod as air is applied through the rod release passageway.

3. A kicker assembly according to claim 1 or 2, wherein the suction housing further comprises a suction reservoir, the suction passageway extending between the suction reservoir and the peripheral wall of the housing.

4. A kicker assembly according to claim 1, 2 or 3, wherein the suction passageway and the rod release passageway are parallel to one another.

5. A kicker assembly according to any preceding claim wherein the holes in the kicker wheel flange are formed in the groove in the flange.

6. A kicker assembly according to claim 5, wherein the groove is divided into first and second portions separated by a pair of relieved areas.

7. A kicker assembly according to any preceding claim, wherein the suction passageway allows the rod release passageway extend from points on the periphery of the suction housing between the central axis of the peripheral wall and an edge of the peripheral wall.

8. A kicker assembly according to any preceding claim wherein the drive is mounted in a drive housing and the function housing is coupled to the drive housing.

9. A kicker assembly according to any preceding claim wherein the kicker wheel is a straight kicker wheel which accelerates rods in the direction of rod travel along the rod maker with substantially no lateral component.

10. A kicker assembly according to claim 1 to 8, wherein the kicker wheel is a helical kicker wheel which accelerates rods in the direction of rod travel along the rod maker with a lateral component.

11. A kicker assembly (20) for picking rods (12) of rod making apparatus and accelerating them to a rod receiving station (30) comprising:

a drive housing (100) for attachment to the rod making apparatus;
drive means (110) received in the housing and having at least one rotatable shaft;
a suction housing (120) coupled to the housing, the suction housing having a peripheral wall having a first port (126) connected to a suction apparatus and a second port (129) connected to an air supply; and
a kicker wheel (130) coupled to the shaft for rotation therewith, the kicker wheel having a peripheral flange (134) arranged around the peripheral wall of the suction housing for rotation thereabout, and having a plurality of holes (142) positioned to pass over the first and second ports of the suction housing on rotation, each hole passing first over the first port for picking rods from the rod making apparatus and then over the second port for releasing rods to the rod receiving station.

12. A kicker assembly according to any preceding claim, wherein the holes in the flange of the kicker wheel are elongate slots.

Patentansprüche

1. Kicker-Baugruppe (20) zum Abnehmen von Tabakstöcken (12) von einer Tabakstockherstellungsvorrichtung und zum Beschleunigen dieser zu einer Tabakstockaufnahmestation (30), wobei die Baugruppe Folgendes umfasst:

   ein Sauggehäuse (120) mit einem Saugkanal (126), der sich von seiner Umfangswand erstreckt, und einem Tabakstockfreigabekanal (129), der sich von seinem Umfang erstreckt;
   ein Kicker-Rad (130) mit einem Flansch (134), der eine Mehrzahl von Löchern (142) hat, wobei das Kicker-Rad zur Drehung um das Sauggehäuse montiert ist, sodass die Löcher über den Saugkanal und den Tabakstockfreigabekanal passieren, wobei der Tabakstockfreigabekanal an den Saugkanal angrenzt und sich hinter dem Saugkanal befindet, sodass das Kikker-Rad zuerst mit durch den Saugkanal angelegter Saugkraft Tabakstöcke aufnimmt und dann die Tabakstöcke mittels durch den Tabakstockfreigabekanal angelegter Luft loslässt, und
   einen Antrieb (110) zum Drehen des Kicker-Rads.

2. Kicker-Baugruppe nach Anspruch 1, bei der der Flansch des Kicker-Rades zum Unterbrechen der Saugwirkung zum Tabakstock geformt ist, wenn Luft durch den Tabakstockfreigabekanal angelegt wird.

3. Kicker-Baugruppe nach Anspruch 1 oder Anspruch 2, bei der das Sauggehäuse ferner einen Saugdruckbehälter aufweist, wobei sich der Saugkanal zwischen dem Saugdruckbehälter und der Umfangswand des Gehäuses erstreckt.

4. Kicker-Baugruppe nach Anspruch 1, 2 oder 3, bei der der Saugkanal und der Tabakstockfreigabekanal parallel zueinander sind.

5. Kicker-Baugruppe nach einem der vorangehenden Ansprüche, bei der sich die Löcher im Flansch des Kicker-Rades in der Nut im Flansch befinden.

6. Kicker-Baugruppe nach Anspruch 5, bei der die Nut in einen ersten und einen zweiten Teil unterteilt ist, die durch ein Paar ausgesparter Flächen getrennt sind.

7. Kicker-Baugruppe nach einem der vorangehenden Ansprüche, bei der der Saugkanal erlaubt, dass sich der Tabakstockfreigabekanal von Punkten am Umfang des Sauggehäuses zwischen der Mittelachse der Umfangswand und einem Rand der Umfangswand erstreckt.

8. Kicker-Baugruppe nach einem der vorangehenden Ansprüche, bei der der Antrieb in einem Antriebsgehäuse montiert ist und das Funktionsgehäuse mit dem Antriebsgehäuse gekoppelt ist.

9. Kicker-Baugruppe nach einem der vorangehenden Ansprüche, bei der das Kicker-Rad ein gerades Kikker-Rad ist, das Tabakstöcke in der Richtung des Tabakstockwegs entlang der Tabakstockherstellungseinheit weitgehend ohne laterale Komponente beschleunigt.

10. Kicker-Baugruppe nach Anspruch 1 oder Anspruch 8, bei der das Kicker-Rad ein schraubenartiges Kikker-Rad ist, das Tabakstöcke in der Richtung des Tabakstockwegs entlang der Tabakstockherstellungseinheit mit einer lateralen Komponente beschleunigt.

11. Kicker-Baugruppe (20) zum Abnehmen von Tabakstöcken (12) von einer Tabakstockherstellungsvorrichtung und zum Beschleunigen dieser zu einer Tabakstockaufnahmestation (30), wobei die Baugruppe Folgendes umfasst:

   ein Antriebsgehäuse (100) zur Anbringung an der Tabakstockherstellungsvorrichtung;
   eine in dem Gehäuse aufgenommene und wenigstens eine drehbare Welle aufweisende Antriebsvorrichtung (110);
   ein mit dem Gehäuse gekoppeltes Sauggehäuse (120), wobei das Sauggehäuse eine Umfangswand mit einer ersten Öffnung (126), die mit einer Saugvorrichtung verbunden ist, und einer zweiten Öffnung (129), die mit einer Luftzuleitung verbunden ist, hat; und
   ein Kicker-Rad (130), das mit der Welle zur Drehung mit ihr verbunden ist, wobei das Kikker-Rad einen Umfangsflansch (134) hat, der um die Umfangswand des Sauggehäuses angeordnet ist zur Drehung um sie herum, und eine Mehrzahl von Löchern (142) hat, die positioniert sind, um beim Drehen über die ersten und zweiten Öffnungen des Sauggehäuses zu passieren, wobei jedes Loch erst über die erste Öffnung passiert, um Tabakstöcke von der Tabakstockherstellungsvorrichtung abzunehmen, und dann über die zweite Öffnung zum Freigeben von Tabakstöcken an die Tabakstockaufnahmestation.

12. Kicker-Baugruppe nach einem der vorangehenden Ansprüche, bei der die Löcher im Flansch des Kikker-Rades Langlöcher sind.

Revendications

1. Ensemble éjecteur (20) pour saisir des bâtonnets (12) sortant d'un dispositif de fabrication de bâtonnets et les accélérer vers un poste de réception de bâtonnets (30), l'ensemble comprenant :

   un compartiment d'aspiration (120) ayant un passage d'aspiration (126) s'étendant depuis sa paroi périphérique, et un passage de libération de bâtonnets (129) s'étendant depuis sa périphérie ;
   une roue d'éjection (120) ayant un boudin (134) ayant une pluralité de trous (142), la roue d'éjection étant montée pour tourner autour du compartiment d'aspiration de telle sorte que les trous passent par-dessus le passage d'aspiration et le passage de libération de bâtonnets ; dans lequel
   le passage de libération de bâtonnets est adjacent au passage d'aspiration et derrière le passage d'aspiration si bien que la roue d'éjection saisit d'abord les bâtonnets par aspiration appliquée à travers le passage d'aspiration puis libère les bâtonnets par application d'air à travers le passage de bâtonnets ; et
   un entraînement (110) pour faire tourner la roue d'éjection.

2. Ensemble éjecteur selon la revendication 1, dans lequel le boudin de la roue d'éjection est conformé pour couper l'aspiration allant au bâtonnet lorsque de l'air est appliqué à travers le passage de libération de bâtonnets.

3. Ensemble éjecteur selon la revendication 1 ou 2, dans lequel le compartiment d'aspiration comprend en outre un réservoir d'aspiration, le passage d'aspiration s'étendant entre le réservoir d'aspiration et la paroi périphérique du compartiment.

4. Ensemble éjecteur selon la revendication 1, 2 ou 3, dans lequel le passage d'aspiration et le passage de libération de bâtonnets sont parallèles l'un à l'autre.

5. Ensemble éjecteur selon l'une quelconque des revendications précédentes, dans lequel les trous dans le boudin de roue d'éjection sont formés dans la rainure du boudin.

6. Ensemble éjecteur selon la revendication 5, dans lequel la rainure est divisée en des première et deuxième parties séparées par une paire de zones dépouillées.

7. Ensemble éjecteur selon l'une quelconque des revendications précédentes, dans lequel le passage d'aspiration permet au passage de libération de bâtonnets de s'étendre depuis des points sur la périphérie du compartiment d'aspiration entre l'axe central de la paroi périphérique et un bord de la paroi périphérique.

8. Ensemble éjecteur selon l'une quelconque des revendications précédentes, dans lequel l'entraînement est monté dans un compartiment d'entraînement et le compartiment d'aspiration est couplé au compartiment d'entraînement.

9. Ensemble éjecteur selon l'une quelconque des revendications précédentes, dans lequel la roue d'éjection est une roue d'éjection droite qui accélère les bâtonnets dans le sens du déplacement des bâtonnets le long de l'appareil de fabrication de bâtonnets sensiblement sans aucune composante latérale.

10. Ensemble éjecteur selon la revendication 1 à 8, dans lequel la roue d'éjection est une roue d'éjection hélicoïdale qui accélère les bâtonnets dans le sens de déplacement des bâtonnets le long de l'appareil de fabrication de bâtonnets avec un composante latérale.

11. Ensemble éjecteur (20) pour saisir des bâtonnets (12) d'un appareil de fabrication de bâtonnets et les accélérer vers un poste de réception de bâtonnets (30) comprenant

    un compartiment d'entraînement (100) destiné à être fixé au dispositif de fabrication de bâtonnets ;
    un moyen d'entraînement (110) reçu dans le compartiment et ayant au moins un arbre rotatif ;
    un compartiment d'aspiration (120) couplé au compartiment, le compartiment d'aspiration ayant une paroi périphérique ayant un premier orifice (126) connecté à un dispositif d'aspiration et un deuxième port (129) connecté à une alimentation d'air ; et
    une roue d'éjection (120) couplée à l'arbre pour tourner avec lui, la roue d'éjection ayant un boudin périphérique (134) disposé autour de la paroi périphérique du compartiment d'aspiration pour tourner autour d'elle, et ayant une pluralité de trous (142) positionnés pour passer par-dessus les premier et deuxième orifices du compartiment d'aspiration en rotation, chaque trou passant d'abord par-dessus le premier orifice pour saisir des bâtonnets provenant de l'appareil de fabrication de bâtonnets puis par-dessus le deuxième orifice pour libérer les bâtonnets vers le au poste de réception de bâtonnets.

12. Ensemble éjecteur selon l'une quelconque des revendications précédentes, dans lequel les trous dans le boudin de la roue d'éjection sont des trous allongés.

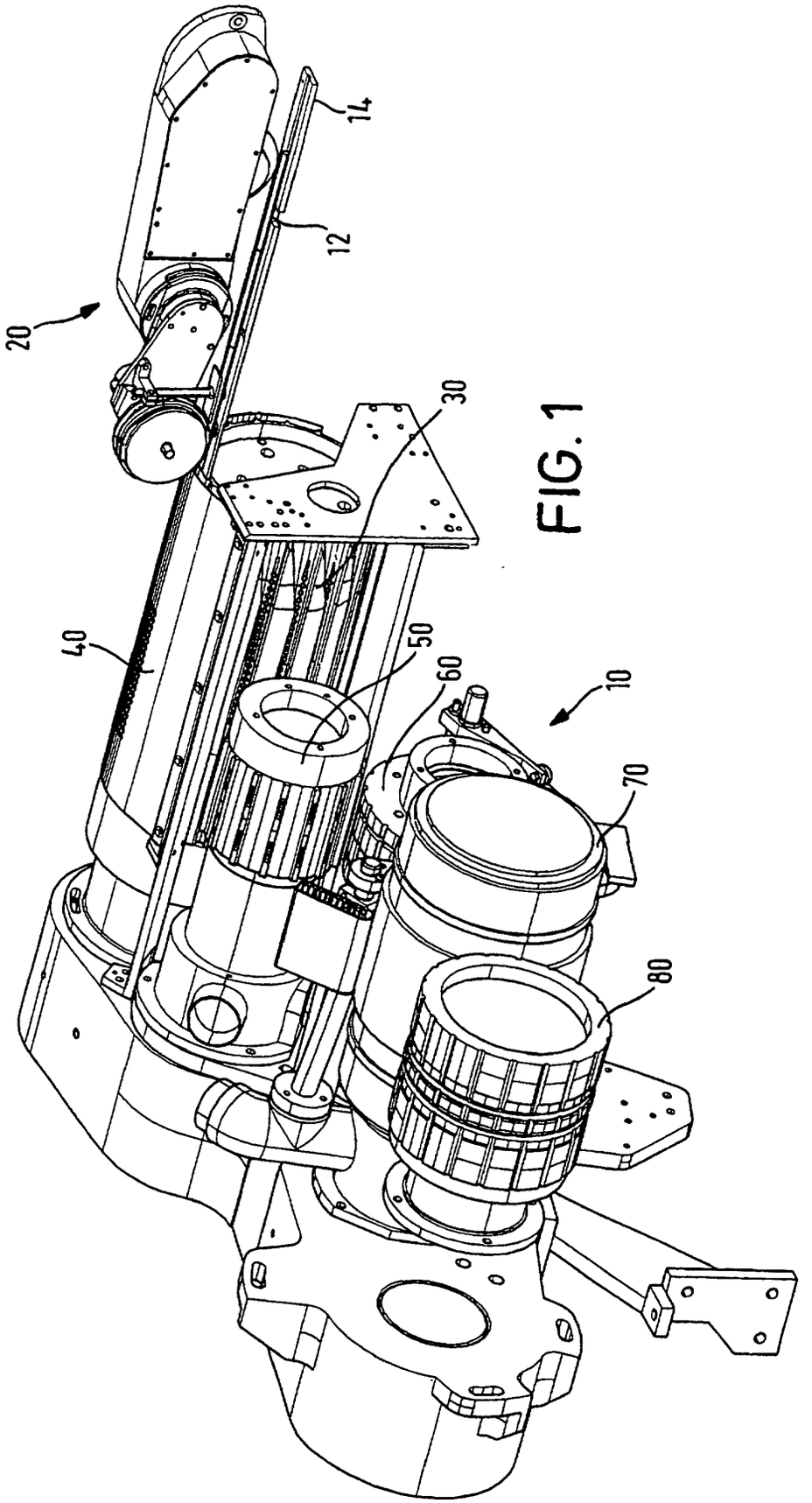

FIG. 1

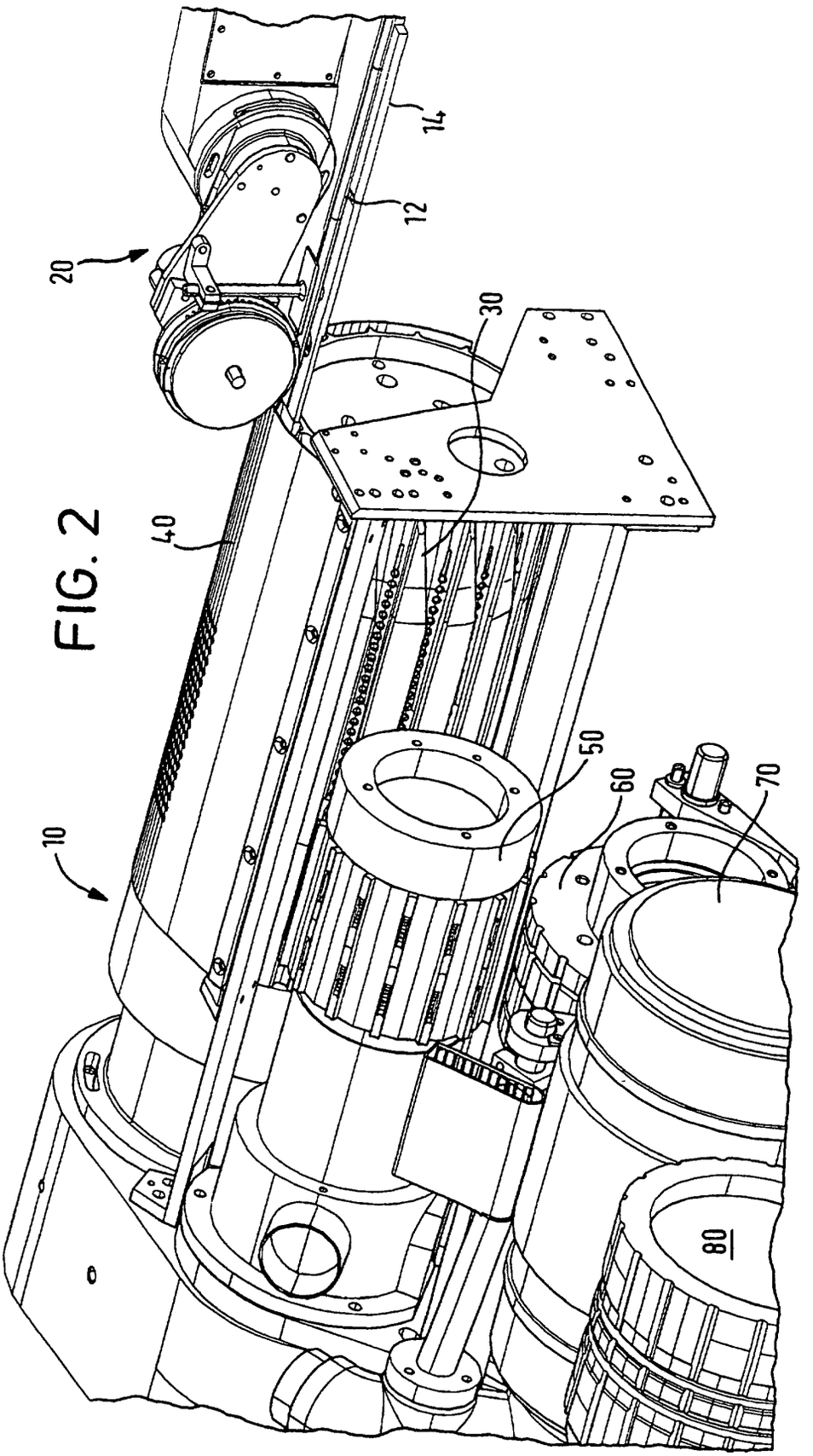

FIG. 2

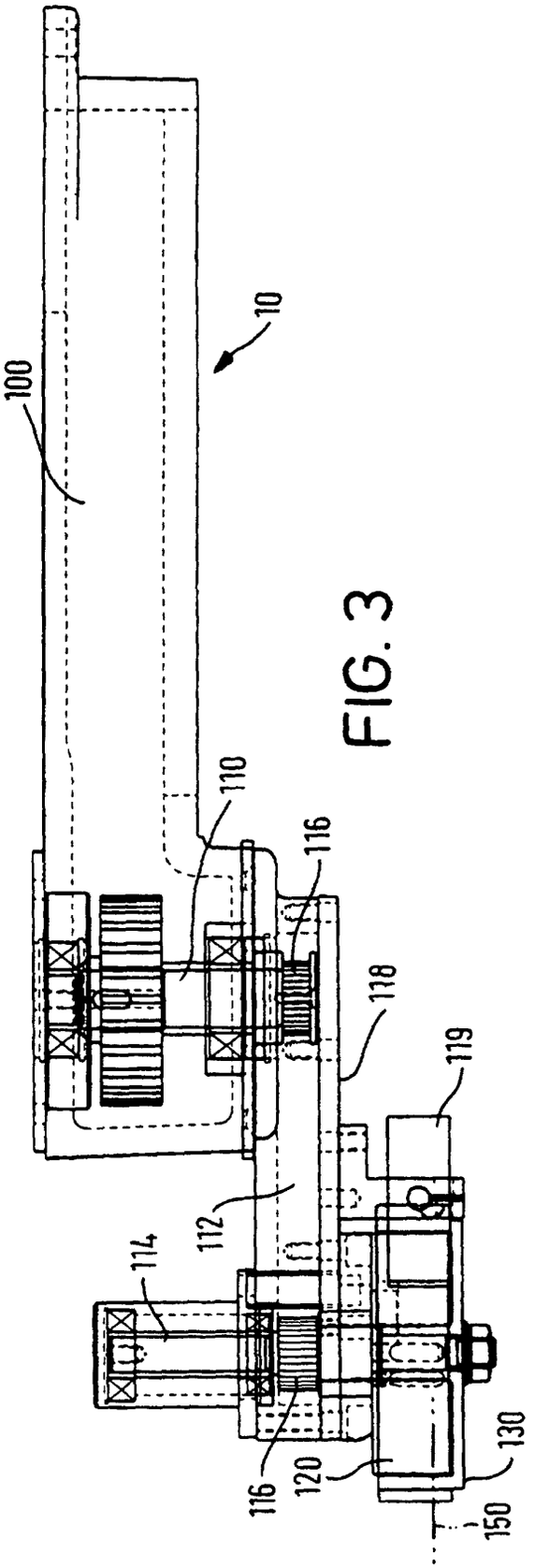
100
10
110
116
118
119
112
114
116
120
130
150

FIG. 3

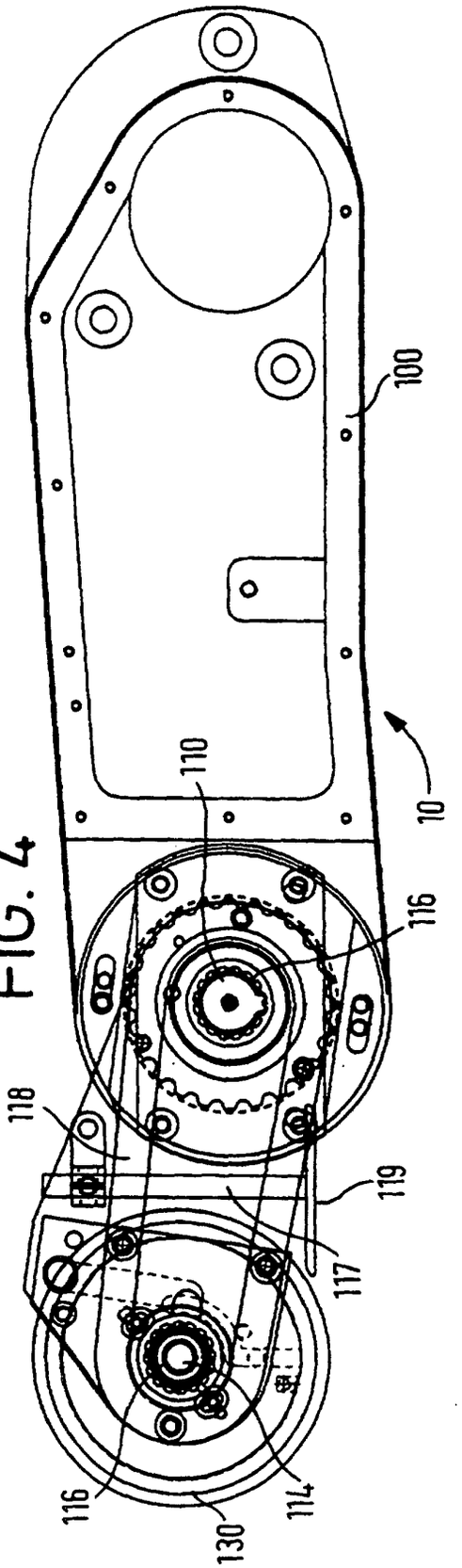
100
10
110
116
118
119
117
116
114
130

FIG. 4

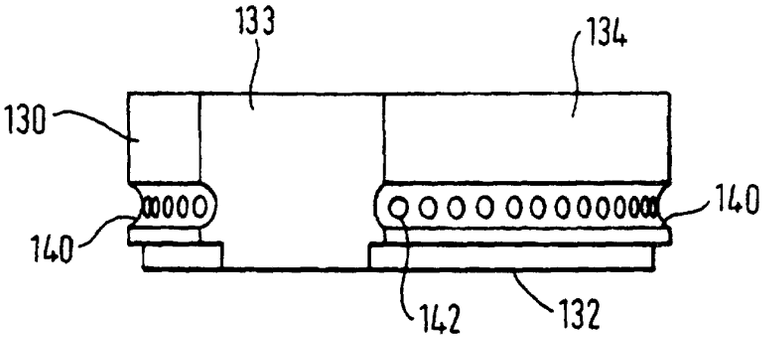

FIG. 5

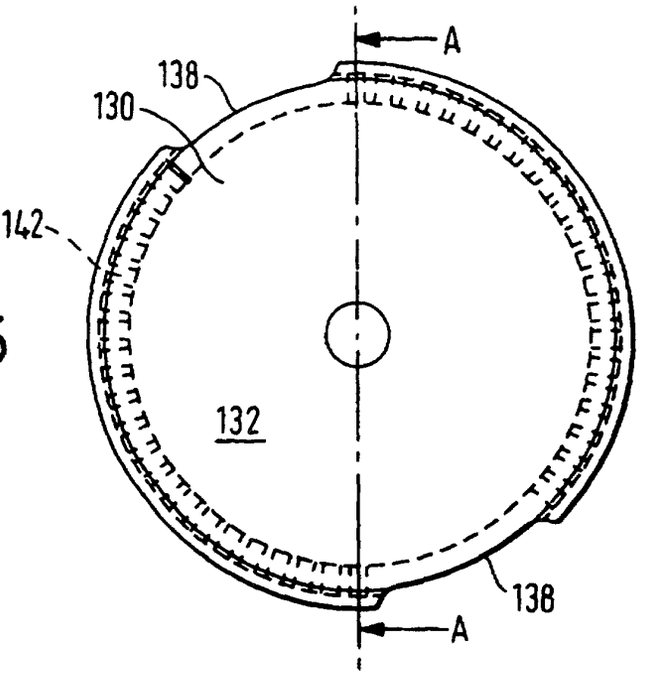

FIG. 6

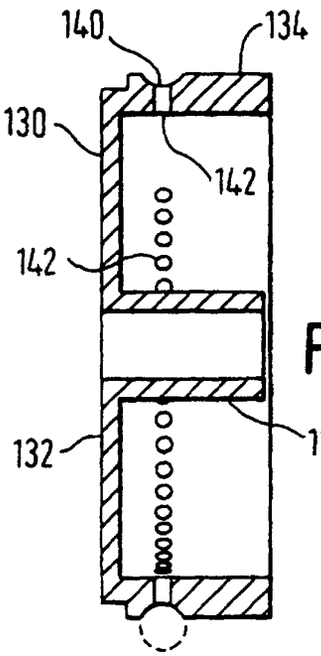

FIG. 7

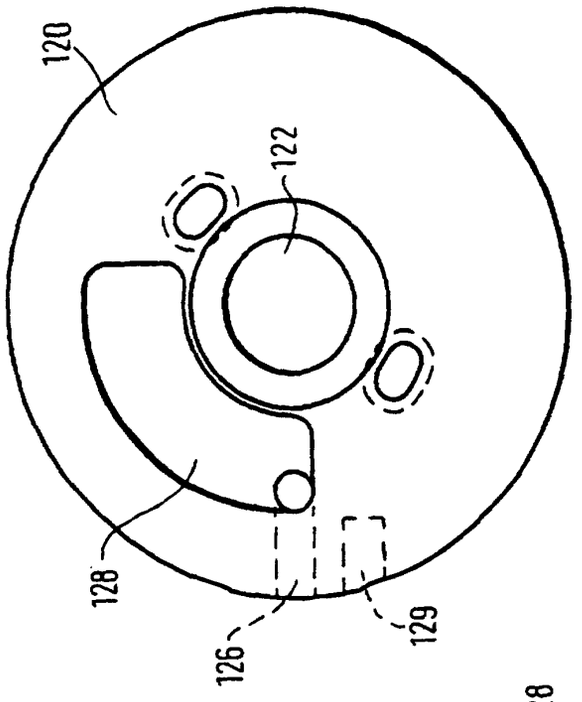

FIG. 10

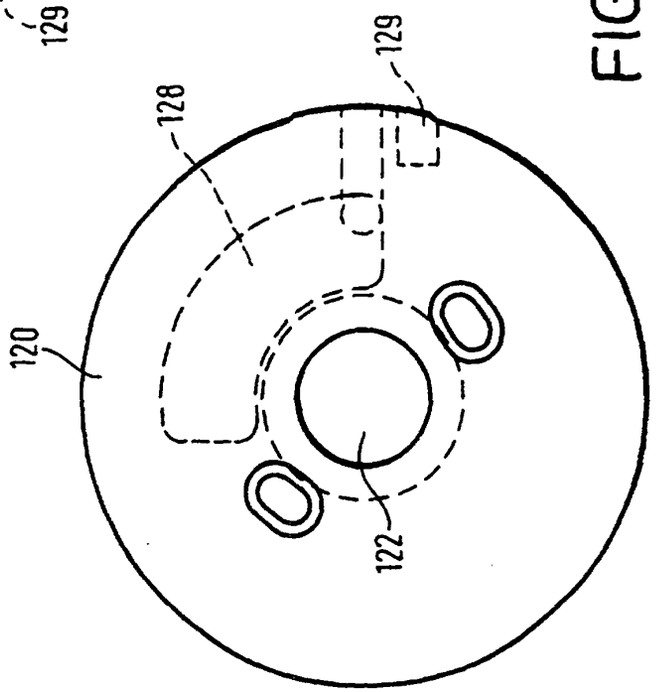

FIG. 9

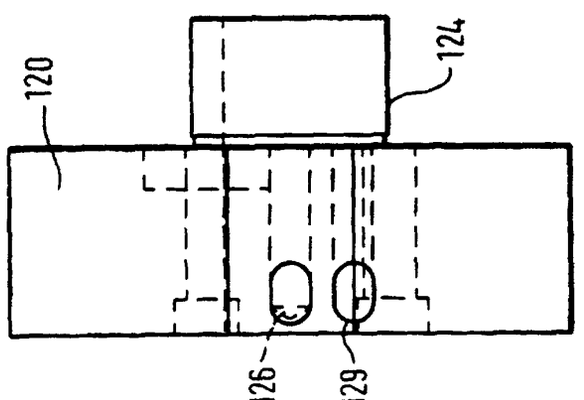

FIG. 8