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(54) Wrapping device for producing packets

Einwickelvorrichtung zur Herstellung von Verpackungen

Dispositif d'enveloppement pour la fabrication d'emballages

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(56) References cited:
DE-A- 3 717 621 **FR-A- 2 277 732**
US-A- 3 380 227

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Description

The present invention relates to a wrapping device for producing packets.

The present invention may be used to advantage on overwrapping machines for packets of cigarettes - to which the following description refers purely by way of example - but may equally be used to advantage on any wrapping machine on which superimposed portions of wrapping material with adhesive material in between are to be heated.

On overwrapping machines, finished packets produced on a packing machine are covered with a sheet of normally transparent heat-seal material, which is folded about the packet to form a tubular wrapping, the ends of which extend beyond the ends of the packet on to which they are folded to define a protective outer wrapping.

On overwrapping machines of the above type, the folded ends are normally stabilized by means of heat sealing devices located at one or more heat seal stations along the path of the packets, and which heat seal the packets when these are arrested at the stations.

On one known overwrapping machine of the above type, as relatively little time is available for heat sealing the folded ends of the outer wrapping, the heat sealing devices must be brought to such high temperatures as to damage the sheet of overwrapping material if for any reason the machine slows down.

One attempt to overcome the above drawback is disclosed in US-A-3 380 227 which relates to a overwrapping machine equipped with movable heat sealing devices, i.e. sealing devices which travel along with the packets along a portion of the machine, and therefore remain contacting the packets for a relatively long period of time, or at any rate long enough to permit the heat sealing devices to operate at relatively low temperatures.

A similar solution in accordance with the preamble of claim 1 is disclosed in DE-A-37 17 621, where the movable heat sealing devices include heating elements travelling with the packets and comprising heat accumulating blocks heated by induction means.

Though successfully eliminating the drawback, such solutions seriously complicates the mechanical design and circuitry of the machine, on account of the movable heat sealing devices, which normally feature electric heating systems, requiring movable brushes and electrified tracks which, in addition to complicating the design of the machine, also result in a considerable increase in manufacturing and maintenance cost.

It is an object of the present invention to provide a wrapping device designed to overcome the aforementioned drawbacks.

According to the present invention, there is provided a wrapping device for producing packets, the device comprising a conveyor having a number of equally spaced seats, and movable in steps to feed said seats along a path extending through a succession of

equally spaced holding stations at which said seats are adapted to stop; the device further comprising heating means adapted to cooperate with the end of each said packet, said heating means comprising, for each said seat, at least one heating element which is adapted to travel with said seat along said path, and is a passive element comprising a portion defining a heat accumulating block, and induction means for heating said heat accumulating blocks; characterized in that each said seat extends transversely of said path and is adapted to accommodate a respective said packet with a relevant end wall arranged at an open axial end of said seat; said induction means are located in each of at least part of said holding stations in a fixed position facing said axial end of said seats to supply heat to said accumulating blocks as they stop at said holding stations; each said accumulating block faces said axial end of its respective seat and is movable in relation to said conveyor transversely of said path and to and from a heating operating position at the axial end of the relevant seat, in which position it contacts, in use, said end wall of said packet.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a plan view, with parts removed for clarity, of a portion of a preferred embodiment of the wrapping device according to the present invention; Figure 2 shows a front view of a detail in Figure 1; Figures 3 and 4 show respective radial sections along lines III-III and IV-IV in Figure 1.

Number 1 in Figure 1 indicates a cellophaning machine comprising an overwrapping device 2 for forming a wrapping 3 of transparent material about packets 4 of cigarettes. Device 2 comprises a conveyor wheel 5 supported on a frame 6 and located between two walls 7 of frame 6 so as to rotate anticlockwise (in Figure 2) in steps about an axis 8 perpendicular to walls 7. Wheel 5 presents a number of peripheral radial seats 9 equally spaced about axis 8, and which are open at their opposite axial ends, and each receive a respective packet 4 with its longitudinal axis 10 parallel to axis 8, and with two end walls 11 of wrapping 3 perpendicular to axis 8 and located at the opposite axial ends of seat 9 facing respective walls 7.

At each step in the rotation of wheel 5 about axis 8, seats 9 are fed forward by a distance equal to that between two adjacent seats 9, and, at the end of each step, each seat 9 is arrested at a hold station 9a.

Each wrapping 3 is formed beforehand in known manner (not shown) by folding a sheet of wrapping material (not shown) about packet 4 to form a tubular wrapping (not shown), the opposite end portions (not shown) of which project beyond the respective ends of packet 4, and are folded in known manner (not shown) to form four tabs (not shown) which are folded squarely on to one another and stabilized by heat sealing as

packet 4 is fed forward by wheel 5.

For this purpose, for each seat 9, wheel 5 presents a pair of compacting members 12 movable in opposite directions to and from an operating position contacting the outer surface of respective walls 11, and each comprising a square rocker arm 13 pivoting centrally on a respective pin 14 perpendicular to axis 8, and mounted between the ears of a respective fork 15 projecting from a respective axial end surface 16 of wheel 5. Rocker arm 13 comprises two arms 17 and 18 extending on either side of pin 14, and of which arm 17 extends inside an axial through cavity 19 formed through wheel 5 radially inwards of seat 9 and separated by a wall 21 from the bottom surface 20 of seat 9. Arm 18 on the other hand extends outside respective surface 16, and is fitted integrally on its free end with a heating element 22 facing a respective axial end of respective seat 9. Each heating element 22 comprises a sealing plate 23 which, in use, is positioned contacting the outer surface of respective wall 11 when respective compacting member 12 is in the operating position; and a heat accumulating block 24 contacting the surface of plate 23 facing respective wall 7.

As shown more clearly in Figures 3 and 4, arm 17 of each compacting member 12 is connected to arm 17 of the other compacting member 12 via the interposition of a connecting rod 25, the central portion of which is hinged to the free end of the output rod 26 of a linear actuator 27 located radially inside respective cavity 19 and which provides for moving connecting rod 25 radially outwards in opposition to a spring 28 interposed between connecting rod 25 and wall 21.

In addition to wheel 5, wrapping device 2 also comprises a heating unit 29 in turn comprising a succession of pairs of induction heating members 30; and each heating member 30 - normally comprising a solenoid - in each pair is supported on frame 6 at a respective station 9a, and positioned facing and adjacent to accumulating block 24 of a respective compacting member 12 stationary in station 9a. More specifically, and as shown in Figures 3 and 4, each wall 7 is defined, on the side facing wheel 5, by a surface 31 which presents a recessed portion 32 located a greater distance from wheel 5 than surface 31, and extending over the path portion of compacting members 12 along which members 12 are maintained in the raised idle position. Surface 31 and recessed portion 32 present a number of cavities 33, each located at a station 9a, and each housing a cup-shaped casing 34 for a respective heating member 30.

Operation of wrapping device 2 is self-explanatory from the foregoing description. It should be pointed out, however, that, on the one hand, heating members 30 are fixed heating elements requiring no power supply brushes or similar; and, on the other, compacting members 12, by traveling with packets 4, may cooperate with the packets for a relatively long period of time and at such relatively low operating temperatures as to in no

way impair the material of wrappings 3.

Though described as forming part of a cellophaning machine 1, device 2 may of course also be applied to other types of machine. For example, wheel 5 may be the folding or drying wheel of a packing machine, wherein, as opposed to heat sealing, compacting members 12 provide simply for securing in position the gummed parts of the wrapping and drying the gum between the parts.

Finally, device 2 may be operated as described on sheets of wrapping material at least partly comprising metal material (e.g. foil or similar) for heat sealing the superimposed portions of the sheets.

Claims

1. A wrapping device for producing packets (4), the device (2) comprising a conveyor (5) having a number of equally spaced seats (9), and movable in steps to feed said seats (9) along a path extending through a succession of equally spaced holding stations (9a) at which said seats (9) are adapted to stop; the device (2) further comprising heating means (22, 30) adapted to cooperate with the end of each said packet (4), said heating means comprising, for each said seat, at least one heating element (22) which is adapted to travel with said seat (9) along said path, and is a passive element comprising a portion defining a heat accumulating block (24), and induction means (30) for heating said heat accumulating blocks (24); characterized in that each said seat (9) extends transversely of said path and is adapted to accommodate a respective said packet (4) with a relevant end wall (11) arranged at an open axial end of said seat (9); said induction means (30) are located in each of at least some of said holding stations (9a) in a fixed position facing said axial end of said seats to supply heat to said accumulating blocks (24) as they stop at said holding stations (9a); each said accumulating block (24) faces said axial end of its respective seat and is movable in relation to said conveyor (5) transversely of said path and to and from a heating operating position at the axial end of the relevant seat (9), in which position it contacts, in use, said end wall of said packet.
2. A device as claimed in Claim 1, characterized in that each said heating element (22) forms part of a compacting member (12) which, when the heating element (22) is in said heating operating position, cooperates, in use, with said end wall (11) of a respective packet (4) housed inside said seat (9) to compact said packet (4) transversely of said path.
3. A device as claimed in Claim 2, characterized in that each said compacting member (12) comprises an arm (18) supporting the relevant accumulating

block (24), and drive means (27) to oscillate said arm (18) about an axis (14).

4. A device as claimed in Claim 2 or 3, characterized in that each said compacting member (12) comprises a rocker arm (13) pivoting centrally about a respective axis (14) and including two arms (17, 18) extending on either side of said axis (14); one (18) of said arms (17, 18) supporting the relevant accumulating block (24), and drive means (27) being connected to the other (17) of said arms (17, 18) to oscillate said rocker arm (13) about said axis (14).
5. A device as claimed in Claim 3 or 4, characterized in that said drive means (27) are designed so as to maintain said accumulating block (24) in said heating operating position along a first portion of said path, and in a raised idle position away from the axial end of the relevant seat (9) along a second portion of said path.
6. A device as claimed in Claim 5, characterized by further comprising a fixed wall (7) arranged facing said lateral axial end of said seats (9); said fixed wall (7) being defined, on the side facing said conveyor (5), by a surface (31) having a recessed portion (32) located a greater distance from the conveyor (5) than said surface (31), and extending over said second portion of said path; said fixed wall (7) supporting, at said surface (31) and recessed portion (32), a number of induction members (30) defining said induction means (30) and each located at a respective said holding station (9a).

Patentansprüche

1. Eine Einwickelvorrichtung zur Herstellung von Verpackungen (4), wobei die Vorrichtung (2) einen Förderer (5) umfaßt, der eine Anzahl von gleich beabstandeten Sitzen (9) enthält sowie in Schritten bewegbar ist, um die genannten Sitze (9) längs einer sich durch eine Folge von gleich beabstandeten Verweilstationen (9a), in denen die genannten Sitze (9) zu einem Stillstehen imstande sind, erstreckenden Bahn zu fördern; die Vorrichtung (2) umfaßt ferner Heizeinrichtungen (22, 30), die für ein Zusammenwirken mit der Stirnfläche einer jeden erwähnten Verpackung (4) eingerichtet sind, wobei die besagten Heizeinrichtungen für jeden genannten Sitz mindestens einen Heizkörper (22), der zu einem Laufen mit dem genannten Sitz (9) längs der erwähnten Bahn imstande sowie ein passives Element ist, welches ein einen Wärmespeicherblock (24) bestimmendes Teil enthält, und Induktionsheizelemente (30) zur Beheizung der besagten Wärmespeicherblöcke (24) umfassen; dadurch gekennzeichnet, daß sich jeder genannte

Sitz (9) quer zu der erwähnten Bahn erstreckt und zur Aufnahme einer jeweiligen erwähnten Verpackung (4) mit einer relevanten Stirnfläche (11), die an einem offenen axialen Ende des genannten Sitzes (9) angeordnet ist, eingerichtet ist; daß die besagten Induktionsheizelemente (30) in jeder von mindestens einigen der genannten Verweilstationen (9a) in einer ortsfesten Position in Gegenüberlage zu dem erwähnten axialen Ende der genannten Sitze angeordnet sind, um Wärme den besagten Wärmespeicherblöcken (24), während sie in den genannten Verweilstationen (9a) stillstehen, zuzuführen; daß jeder besagte Wärmespeicherblock (24) dem erwähnten axialen Ende seines zugeordneten Sitzes gegenüberliegt und mit Bezug zu dem besagten Förderer (5) quer zu der erwähnten Bahn sowie zu und von einer Erwärmungsbetriebsposition am axialen Ende des relevanten Sitzes (9), in welcher Position er im Gebrauch die genannte Stirnfläche der erwähnten Verpackung berührt, bewegbar ist.

2. Eine Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß jeder genannte Heizkörper (22) ein Teil eines Anpreßorgans (12) bildet, welches im Gebrauch, wenn sich der Heizkörper (22) in der erwähnten Erwärmungsbetriebsposition befindet, mit der genannten Stirnfläche (11) einer zugeordneten, innenseitig des genannten Sitzes (9) aufgenommenen Verpackung (4) zusammenwirkt, um die erwähnte Verpackung (4) in Querrichtung zu der erwähnten Bahn zusammenzudrücken.
3. Eine Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß jedes erwähnte Anpreßorgan (12) einen den relevanten Speicherblock (24) tragenden Schenkel (18) sowie Antriebsmittel (27), um den genannten Schenkel (18) um eine Achse (14) herum in Schwenkbewegungen zu versetzen, umfaßt.
4. Eine Vorrichtung nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß jedes erwähnte Anpreßorgan (12) einen zentral um eine zugeordnete Achse (14) drehenden sowie zwei Schenkel (17, 18), die sich auf jeder Seite der besagten Achse (14) erstrecken, enthaltenden Schwenkarm (13) umfaßt; wobei der eine (18) der genannten Schenkel (17, 18) den relevanten Speicherblock (24) trägt und mit dem anderen (17) der genannten Schenkel (17, 18) Antriebsmittel (27) verbunden sind, um den erwähnten Schwenkarm (13) um die besagte Achse (14) herum in Schwenkbewegungen zu versetzen.
5. Eine Vorrichtung nach Anspruch 3 oder 4, dadurch gekennzeichnet, daß die genannten Antriebsmittel (27) derart ausgelegt sind, um den besagten Spei-

cherblock (24) in der erwähnten Erwärmungs-
 betriebsposition längs eines ersten Abschnitts der
 erwähnten Bahn und in einer abgehobenen, untätigen,
 vom axialen Ende des relevanten Sitzes (9)
 entfernten Position längs eines zweiten Abschnitts
 der erwähnten Bahn zu halten.

6. Eine Vorrichtung nach Anspruch 5, dadurch
 gekennzeichnet, daß sie ferner eine ortsfeste, in
 Gegenüberlage zu dem besagten querliegenden
 axialen Ende der genannten Sitze (9) angeordnete
 Wand (7) umfaßt; wobei die erwähnte ortsfeste
 Wand (7) auf der dem besagten Förderer (5) zuge-
 wandten Seite von einer Fläche (31) begrenzt wird,
 welche eine in einem größeren Abstand von dem
 Förderer (5) als die erwähnte Fläche (31) angeord-
 nete sowie sich über den genannten zweiten
 Abschnitt der erwähnten Bahn erstreckende Aus-
 sparung (32) besitzt; und wobei die erwähnte ortsfeste
 Wand (7) an der erwähnten Fläche (31) sowie
 an der Aussparung (32) eine Anzahl von Indukti-
 onselementen (30) trägt, die die besagten Indukti-
 onsheizelemente (30) bestimmen und von denen
 jedes an einer jeweiligen genannten Verweilstation
 (9a) angeordnet ist.

Revendications

1. Dispositif d'enveloppement pour produire des
 paquets (4), le dispositif (2) comprenant un trans-
 porteur (5) comportant plusieurs sièges équidis-
 tants (9) et mobiles par étapes pour faire avancer
 lesdits sièges (9) le long d'une voie passant par une
 succession de postes de retenue équidistants (9a)
 auxquels lesdits sièges (9) sont destinés à s'arrêter
 ; le dispositif (2) comprenant par ailleurs des
 moyens de chauffage (22, 30) destinés à coopérer
 avec l'extrémité de chacun desdits paquets (4), les-
 dits moyens de chauffage comprenant pour chacun
 desdits sièges au moins un élément de chauffage
 (22) qui est conçu pour se déplacer avec ledit siège
 (9) le long de ladite voie et qui est un élément passif
 comprenant une partie constituant un bloc d'accu-
 mulation de chaleur (24), ainsi qu'un moyen
 d'induction (30) pour chauffer lesdits blocs d'accu-
 mulation de chaleur (24) ; caractérisé en ce que
 chacun desdits sièges (9) est disposé transversale-
 ment par rapport à ladite voie et est conçu pour
 loger l'un, respectif, desdits paquets (4) dont une
 cloison d'extrémité particulière (11) est disposée à
 une extrémité axiale ouverte dudit siège (9) ; lesdits
 moyens d'induction (30) sont placés dans chacun
 d'au moins certains desdits postes de retenue (9a)
 à une position fixe qui fait face à ladite extrémité
 axiale desdits sièges pour alimenter en chaleur les-
 dits blocs d'accumulation (24) lorsqu'ils s'arrêtent
 auxdits postes de retenue (9a) ; chacun desdits
 blocs d'accumulation (24) fait face à ladite extrémité

axiale de son siège respectif et est mobile par rap-
 port audit transporteur (5) transversalement par
 rapport à ladite voie et pouvant s'approcher et
 s'éloigner d'une position à laquelle un chauffage est
 effectué à l'extrémité axiale du siège particulier (9),
 position à laquelle il entre en contact, à l'utilisation,
 avec ladite cloison d'extrémité dudit paquet.

2. Dispositif selon la revendication 1, caractérisé en
 ce que chacun desdits éléments de chauffage (22)
 fait partie d'un élément de tassement (12) qui, lors-
 que ledit élément de chauffage (22) est à ladite
 position à laquelle il effectue un chauffage, coopère
 à l'utilisation avec ladite cloison d'extrémité (11)
 d'un paquet respectif (4) logé à l'intérieur dudit
 siège (9) pour tasser ledit paquet (4) transversale-
 ment par rapport à ladite voie.
3. Dispositif selon la revendication 2, caractérisé en
 ce que chacun desdits éléments de tassement (12)
 comprend un bras (18) supportant le bloc d'accu-
 mulation particulier (24), ainsi qu'un moyen de com-
 mande (27) pour faire osciller ledit bras (18) autour
 d'un axe (14).
4. Dispositif selon la revendication 2 ou 3, caractérisé
 en ce que chacun desdits éléments de tassement
 (12) comprend un bras oscillant (13) pivotant cen-
 tralement autour d'un axe respectif (14) et compre-
 nant deux bras (17, 18) situés de part et d'autre
 dudit axe (14) ; l'un (18) desdits bras (17, 18) sup-
 portant le bloc d'accumulation particulier (24) et
 des moyens de commande (27) étant assemblés à
 l'autre (17) desdits bras (17, 18) pour faire osciller
 ledit bras oscillant (13) autour dudit axe (14).
5. Dispositif selon la revendication 3 ou 4, caractérisé
 en ce que lesdits moyens de commande (27) sont
 conçus pour retenir ledit bloc d'accumulation (24) à
 ladite position à laquelle il subit un chauffage et qui
 est située le long d'une première partie de ladite
 voie, ainsi qu'à une position relevée inactive qui est
 éloignée de l'extrémité axiale du siège particulier
 (9) et qui est située le long d'une seconde partie de
 ladite voie.
6. Dispositif selon la revendication 5, caractérisé en
 ce qu'il comprend par ailleurs une paroi fixe (7) dis-
 posée en face de ladite extrémité latérale axiale
 desdits sièges (9) ; ladite paroi fixe (7) étant délimi-
 tée, sur le côté qui fait face audit transporteur (5),
 par une surface (31) comprenant une partie évidée
 (32) placée à une plus grande distance du transpor-
 teur (5) que ladite surface (31) et située sur ladite
 seconde partie de ladite voie ; ladite paroi fixe (7)
 supportant sur ladite surface (31) et sur ladite partie
 évidée (32) plusieurs éléments d'induction (30)
 constituant lesdits moyens d'induction (30) et dont

chacun est placé à l'un, respectif, desdits postes de retenue (9a).

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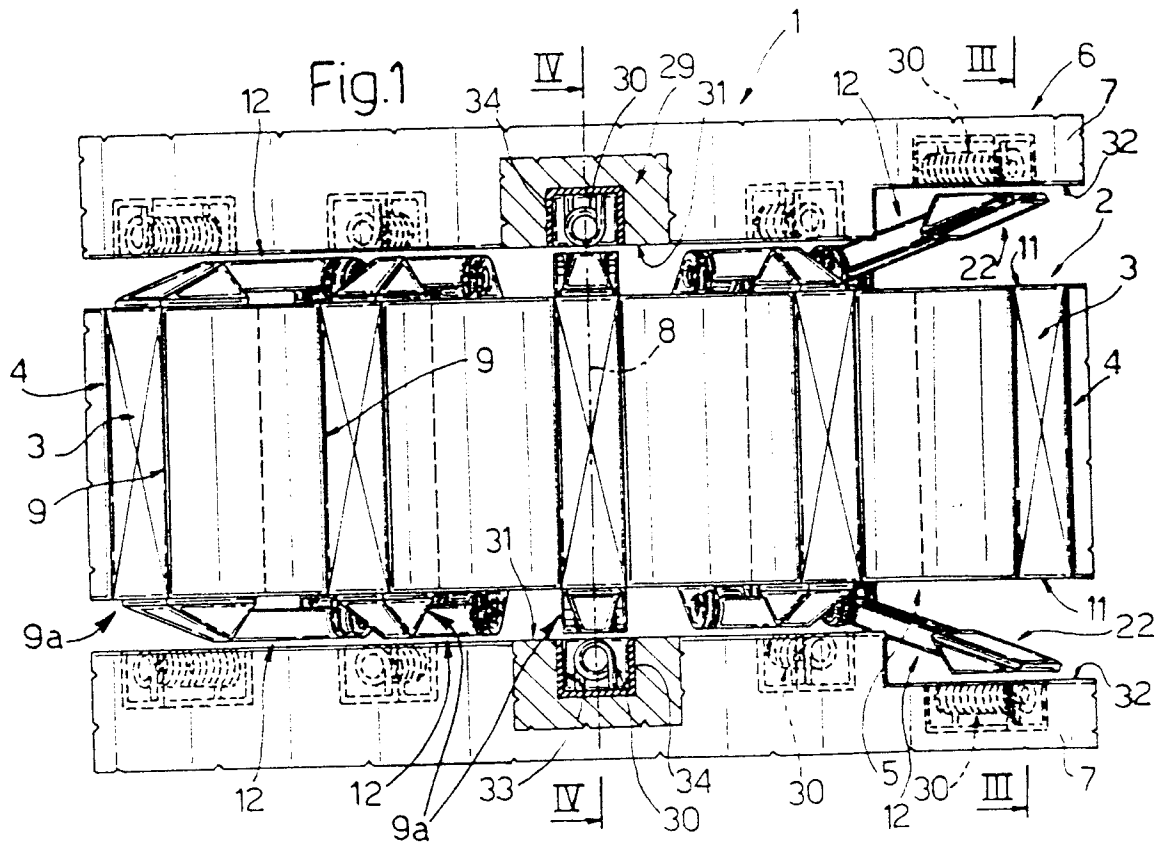
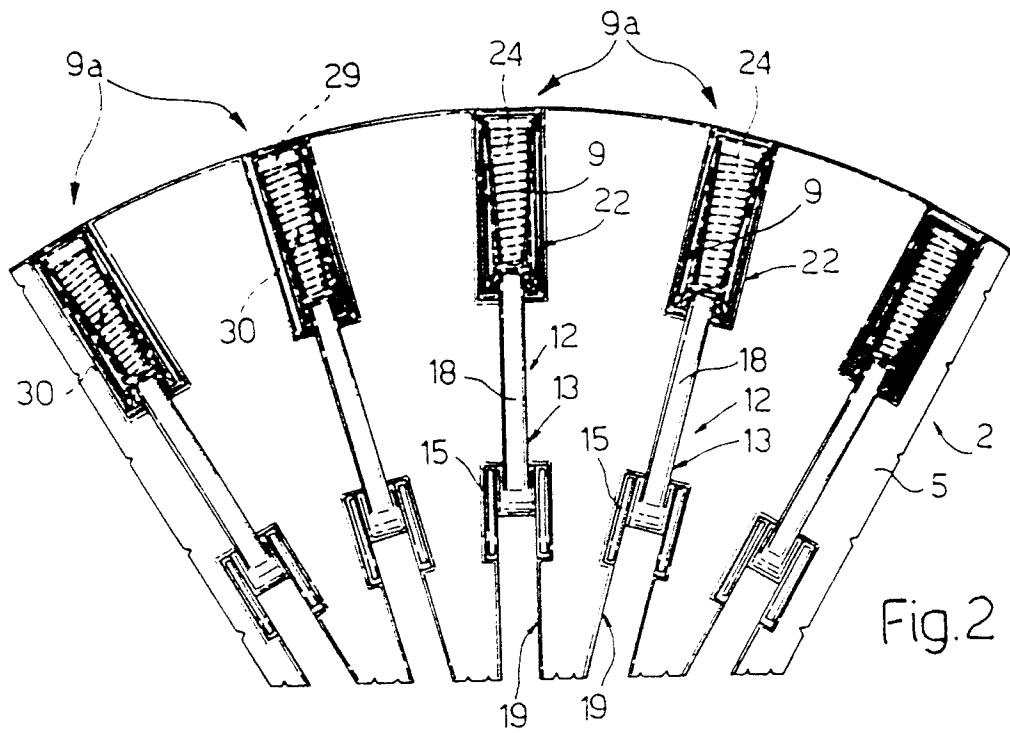
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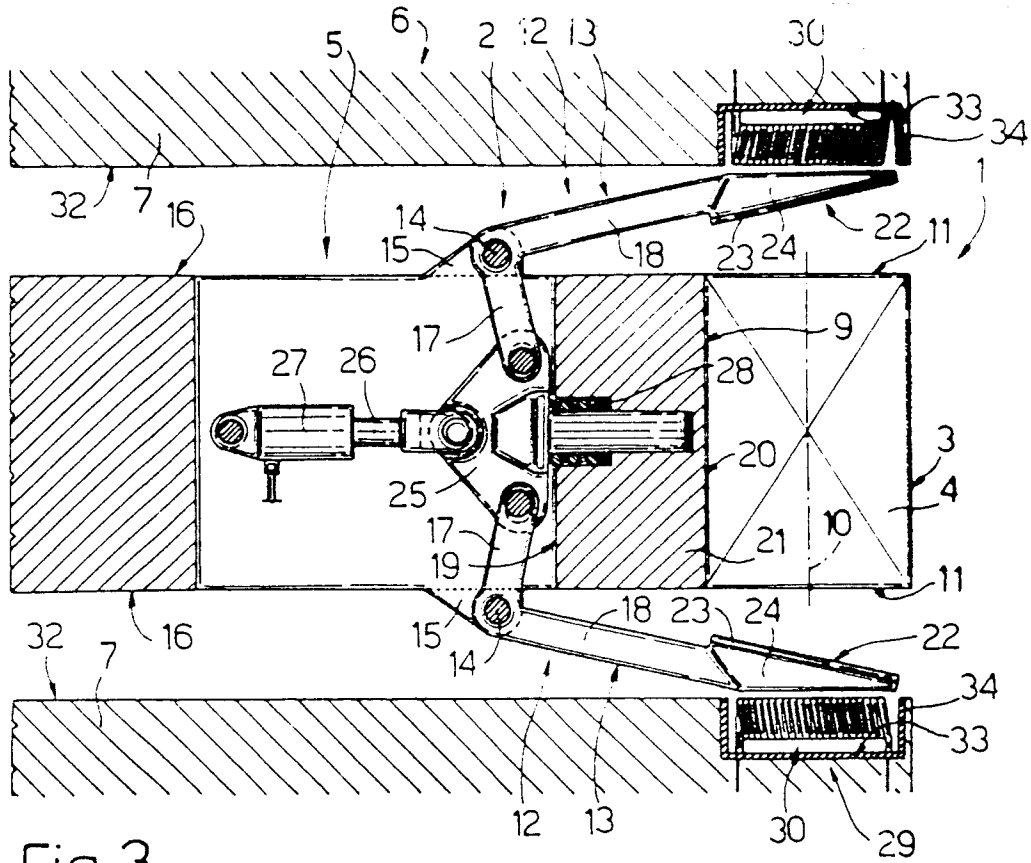


Fig. 3

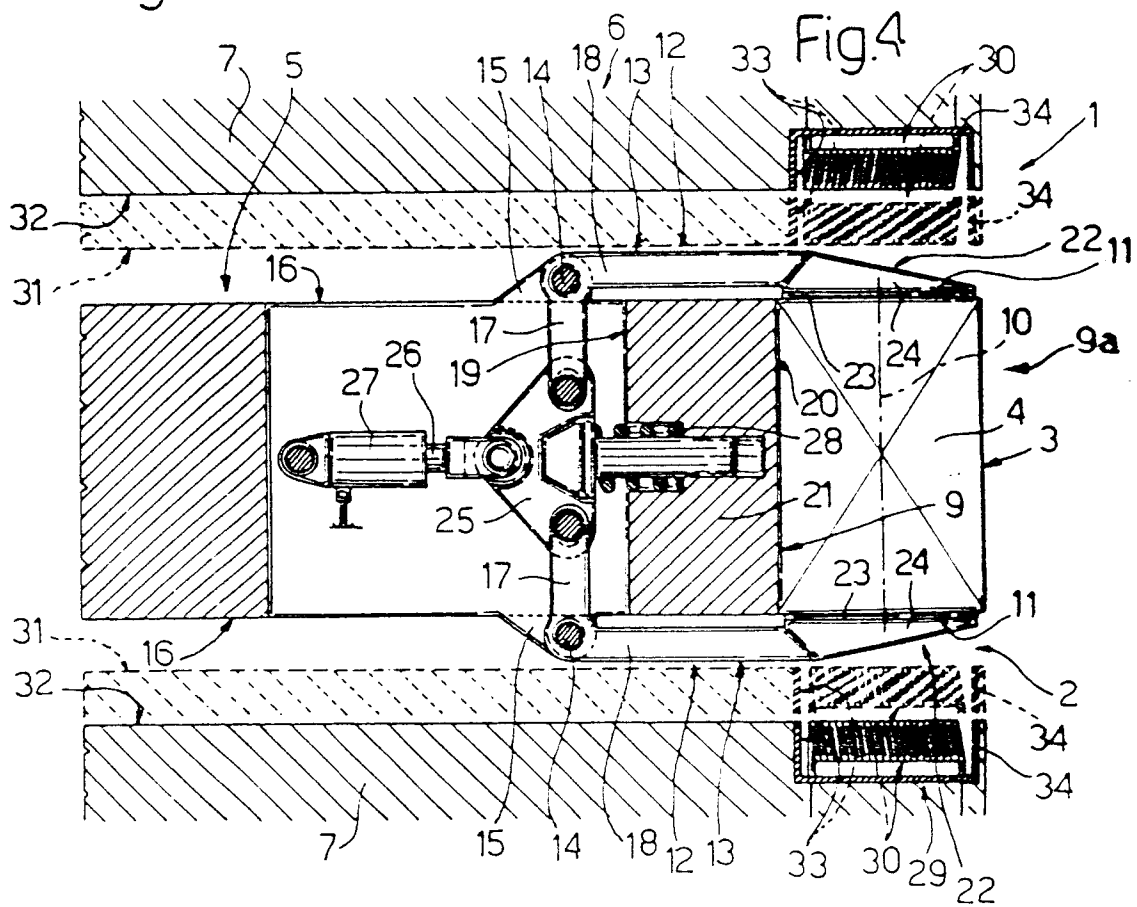


Fig. 4