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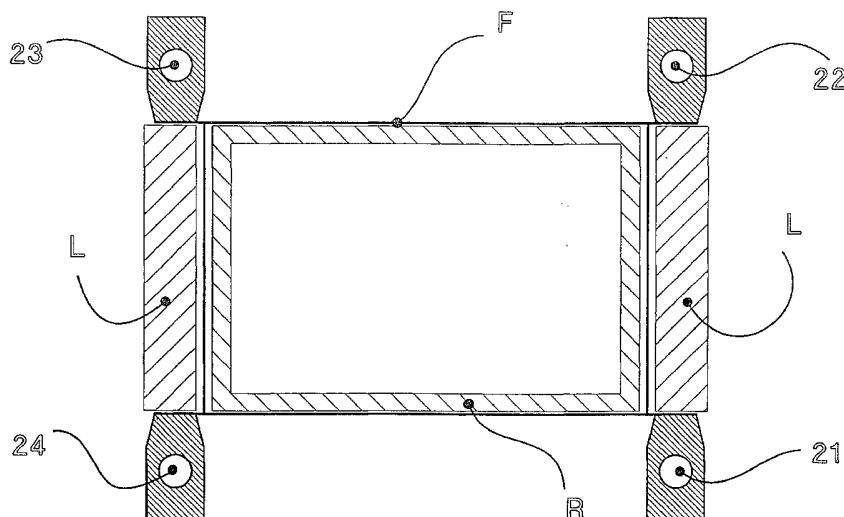
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Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: EQUIPMENT TO PACKAGE RECTANGULAR BAGS WITH RIGID CORNERS



(57) Abstract: An equipment to package rectangular bags with rigid corners, including a forming rectangular tube R provided with four small fins (1, 2, 3, 4) that are parallel and prominent laterally along the prolongation of the two parallel sides of the forming tube R. Said fins, together with two longitudinal side contrasts (L) located parallel to the two other sides of the forming tube (R), create on the film F four prominent longitudinal folds (11, 12, 13, 14), which remain even when the four short fins (1, 2, 3, 4) end to allow the intervention of four thermosealing devices (21, 22, 23, 24). Said thermosealing devices (21, 22, 23, 24), in co-operation with the side contrasts L, perform the thermosealing operations of the prominent longitudinal folds of the film F, which is wrapped around the rectangular tube R, thus realizing the stiffening of the four corners S of the bag resulting from the packaging process of the film F.

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Equipment to package rectangular bags with rigid corners**Field of the art**

The present invention refers to the technology of packaging machines and to the packages resulting from said machines. As reference classes there are the following International Classification: B65b, B65d.

State of the art

Some kind of equipment to package rectangular bags with rigid corners are already known: all the known equipment have cumbersome and expensive complexities especially when the change of format is required. In fact, when the need to change the proportioning and the dimensioning of the bag to be packaged arises, complex structural problems come along, which require difficult and expensive interventions. Said interventions also might turn out unreliable especially to regulate the operating devices which are cinematically very articulated.

The solution proposed by the present invention solves all the problems above in a surprisingly easy, reliable and affordable way.

Description

The invention is now disclosed with reference to the figures of the drawings attached as a not limiting example.

Figure 1 shows, in a section view referred to the position I - I of the figure 5 bis, the position that the film (F) takes by the four short fins (1, 2, 3, 4) of the rectangular forming tube (R), in cooperation with the side contrasts (L). It can be noticed the presence of the four fins inside the folds of film (F).

Figure 2 shows, in a section view referred to the position II-II of figure 5 bis, the position that the four folds (11, 12, 13, 14) keep even when the short fins (1, 2, 3, 4) end. It should be pointed out that the folds (11, 12, 13, 14) of the film (F) remain in

their folded stance even when the fins that had previously formed them, together with the side contrasts (L), are absent.

Figure 3 shows, in a section view referred to the position III-III still of figure (5 bis), the intervention of four thermosealing devices (21, 22, 23, 24) which thermoseal the folds (11, 12, 13, 14) of the film (F) against the side contrasts (L). It is clear that the fins (1, 2, 3, 4) are not inserted anymore in the folds (11, 12, 13, 14).

Figure 4 shows, in a section referred to the position IV-IV of the same 5bis figure, the rigid stance that the corners (S) of the film (F) take by the four corners of the rectangular forming tube (R).

Figure 5 is a prospective representation of the rectangular forming tube (R) provided with side contrasts (L). It can be noticed the presence of two fins (1, 4) prominent laterally from the forming tube (R).

Figure 5 bis is a prospective representation of the evolution of film (F) which is transformed by tube (R), by fins (1, 2, 3, 4) and by the side contrasts (L) in a rectangular package with rigid corners (S).

Figure 6 is a schematic horizontal view of the quadruplet equipment set up for a rectangular format of limited dimensions: it should be made clear that the pneumatic actuator (P) performs the positioning of the quadruplet equipment against its stop (9), which defines the side dimensions of the reduced format. It can be noticed the positioning of the four thermosealing devices (21, 22, 23, 24) by the four fins (1, 2, 3, 4) and the side contrasts (L) along the flanks of the rectangular forming tube (R). In said figure (6) it can be noticed the presence of the shaft (A) with two toothed zones (D).

Figure 6 bis is an horizontal schematic view of the same quadruplet equipment set up in a similar fashion for a rectangular format of larger dimensions defined by the

stop (9'). It can be noticed that the same quadruplet equipment (21, 22, 23, 24) finds its working position with reference to the new enlarged contrasts.

Figure 7 is a vertical view which shows the positioning against the stop (9) of the frame (8) sliding along the guides (7) fixed upon the bearing structure (10). Four racks (31, 32, 33, 34) can be noticed engaging with the four toothed zones (D) of the shaft (A).

Figure 7bis is a similar view of the figure (7) and shows the positioning of the same sliding frames (8) against the stop (9') of the enlarged format.

Figure 8 and figure 8bis highlight the function of the four springs (41, 42, 43, 44) inserted on the four racks that make slide simultaneously the frames (5) on the fixed guides (6) of the bearing structure (10). It can be noticed that the presence of the springs is crucial to calibrate the push of the thermosealing devices (21, 22, 23, 24) against the side contrasts (L).

In the figures each single detail is marked as follows:

A is the single transmission shaft.

D indicates two long toothed zones on the side of the shaft (A).

F is the thermosealable film.

L indicates the side contrasts located on the sides of the rectangular forming tube (R).

M indicates the sensitive motor that performs angular oscillations of said single shaft (A).

P indicates a pneumatic actuator which performs the sideways movements of coming and departure of said sliding frames (8) along the fixed guides (7). The working position is defined by the stops (9, 9') corresponding to the format to be packaged.

R indicates the rectangular forming tube.

S indicates the four corners of the packaged bag.

1, 2, 3, 4 indicate four short parallel fins prominent sideways along the prolongation of two parallel sides of the rectangular forming tube.

11, 12, 13, 14 indicate four longitudinal folds prominent from the film (F), which form around the fins 1, 2, 3 and 4 corresponding to the four side contrasts (L).

It should be pointed out that the four fold (11, 12, 13, 14) remain even when the four fins (1, 2, 3, 4) end.

21, 22, 23 and 24 indicate four longitudinal thermosealing devices which, in cooperation with the edges of two side contrasts L, perform the thermosealing operation of said four prominent folds at four corners of the forming rectangular tube (R).

31, 32, 33, 34 indicate four racks engaging with two long toothed zones (D) of the shaft (A). It is clear that the angular oscillations are transformed in opposed and simultaneous alternate rectilinear translations of the four thermosealing devices (21, 22, 23, 24) provided at the edges of said racks (31, 32, 33, 34).

41, 42, 43, 44 indicate the springs inserted on the racks (31, 32, 33, 34) to allow all four thermosealing devices (21, 22, 23, 24) to enter in touch with the respective side contrasts (L) to grant the calibration of the thermosealing action.

5 indicates the frames sliding along the relative fixed guiding rods 6 attached to the supporting structure (10).

6 indicates the guiding rods of the sliding frames (5).

7 indicates the guiding rods of the sliding frames (8).

8 indicates the frames sliding on the guides (7) fixed on the supporting structure (10).

9 and 9' indicate the stops to determinate the position of the formats.

10 indicate the supporting structure of the entire equipment.

The evidence of the figures highlights the simplicity and reliability of the equipment object of the present invention.

The practical realization of the present invention could of course be performed according to with different dimensioning, structural proportioning and technological choices, as long as the fundamental operational principle of realizing a quadruplet thermosealing equipment that intervenes simultaneously upon to the four corner to make stiff.

All kinds of equipment to package rectangular bags with rigid corners which will present the same characteristics as the one fundamentally described, shown and hereinafter claimed will be considered as being part of the protection sphere of the present invention.

Claims

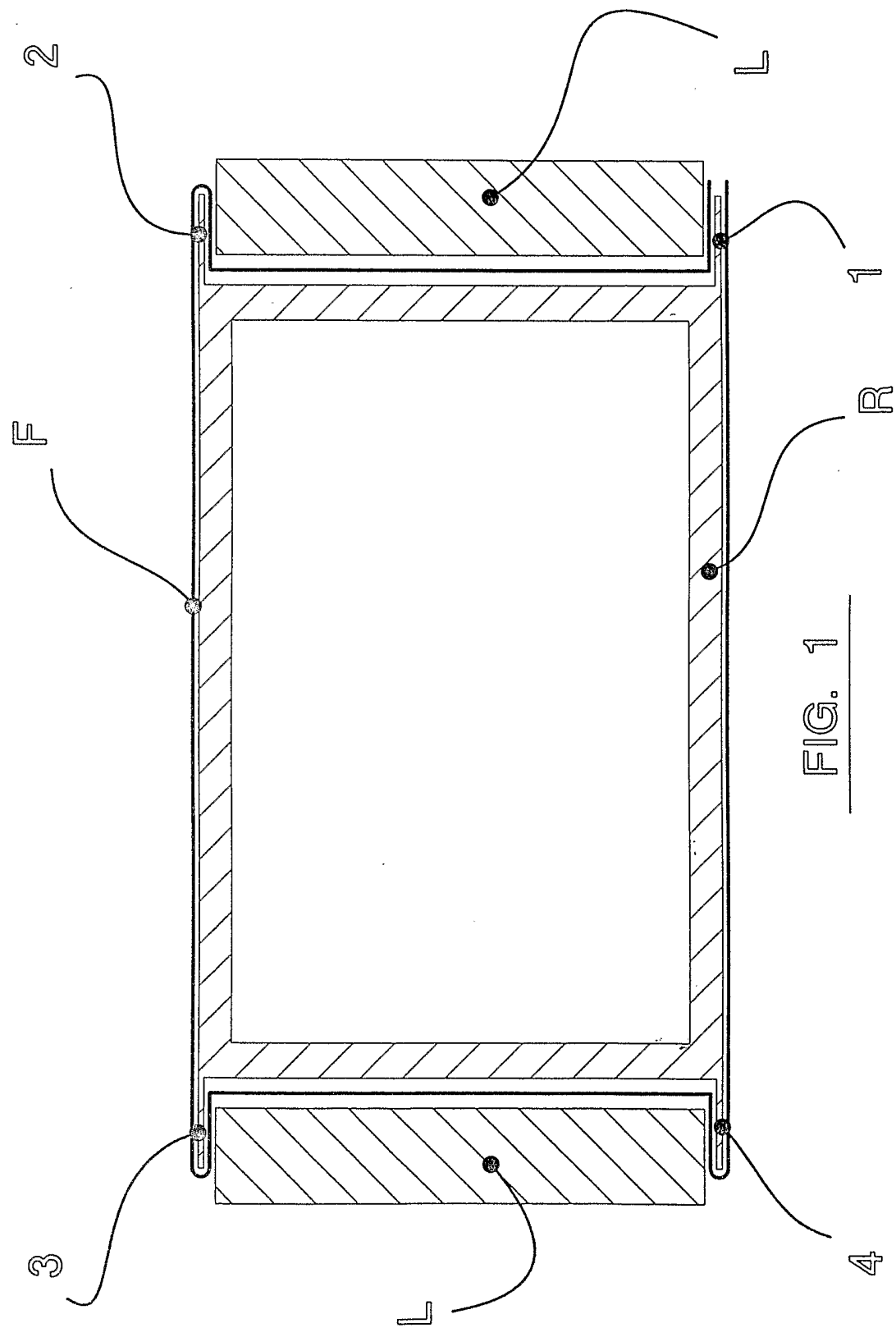
- 1) An equipment to package rectangular bags with rigid corners **characterized by the fact that** it includes a forming rectangular tube (R) provided with four small fins (1, 2, 3, 4) that are parallel and prominent laterally along the prolongation of the two parallel sides of the forming tube (R). Said fins, together with two longitudinal side contrasts (L) located parallel to the two other sides of the forming tube (R), create on the film F four prominent longitudinal folds (11, 12, 13, 14), which remain even when the four short fins (1, 2, 3, 4) end to allow the intervention of four thermosealing devices (21, 22, 23, 24). Said thermosealing devices (21, 22, 23, 24), in co-operation with the side contrasts (L), perform the thermosealing operations of the prominent longitudinal folds of the film (F), which is wrapped around the rectangular tube (R), thus realizing the stiffening of the four corners (S) of the bag resulting from the packaging process of the film (F).
- 2) An equipment to package rectangular bags with rigid corners, as in claim 1, **characterized by the fact that** it is set-up with a quadruplet thermosealing equipment (21, 22, 23, 24) whose operational movements are obtained by the single oscillation movement of the single shaft (A), along which there are two long toothed zones (D) engaging with two couple of rectilinear racks (31, 32, 33, 34) which transform the angular oscillations of the shaft (A) in opposed simultaneous rectilinear translations of said quadruplet of longitudinal thermosealing devices (21, 22, 23, 24).
- 3) An equipment to package rectangular bags with rigid corners, as in previous claims, **characterized by the fact that**, at each change of format, the positioning of four thermosealing devices (21, 22, 23, 24) occurs automatically since the sensible motor (M), upon perception of the presence of the side contrasts (L), of the forming

tube (R), records the working position of the simultaneous operations of quadruplet programmed thermosealing.

4) An equipment to package rectangular bags with rigid corners, as in previous claims, **characterized by the fact that** the four springs (41, 42, 43, 44) inserted on the four racks (31, 32, 33, 34) allow to all four thermosealing devices to get in touch with the side contrasts (L) evening out the slight but inevitable geometric differences.

5) An equipment to package rectangular bags with rigid corners, as in previous claims, **characterized by the fact that** with the regulation of the length of the angular oscillation of the single shaft (A), one can regulate automatically also the elastic give of the four springs (41, 42, 43, 44) and one can also obtain the automatic calibration of the sealing pressure of the four thermosealing longitudinal devices (21, 22, 23, 24)

6) An equipment to package rectangular bags with rigid corners, as in previous claims, **characterized by the fact that** the length of the toothed side zones D is such to allow transversal excursions of approach and departure, performed by pneumatic actuator P, of both frames 8 to regulate the sideways position of the thermosealing devices (21, 22, 23, 24) according to the size of the side contrasts (9, 9') corresponding to different dimensions of rectangular forming tubes (R).



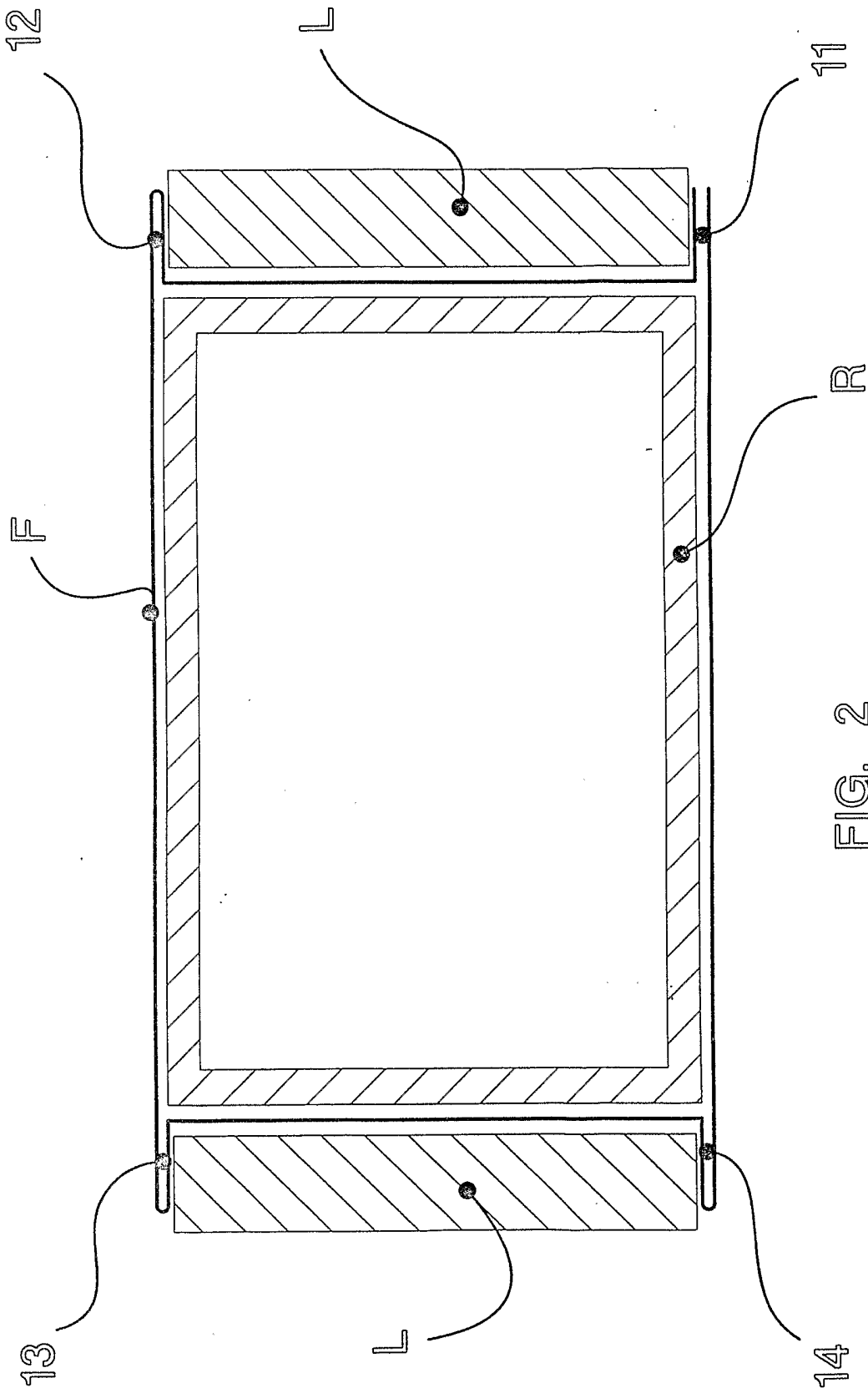
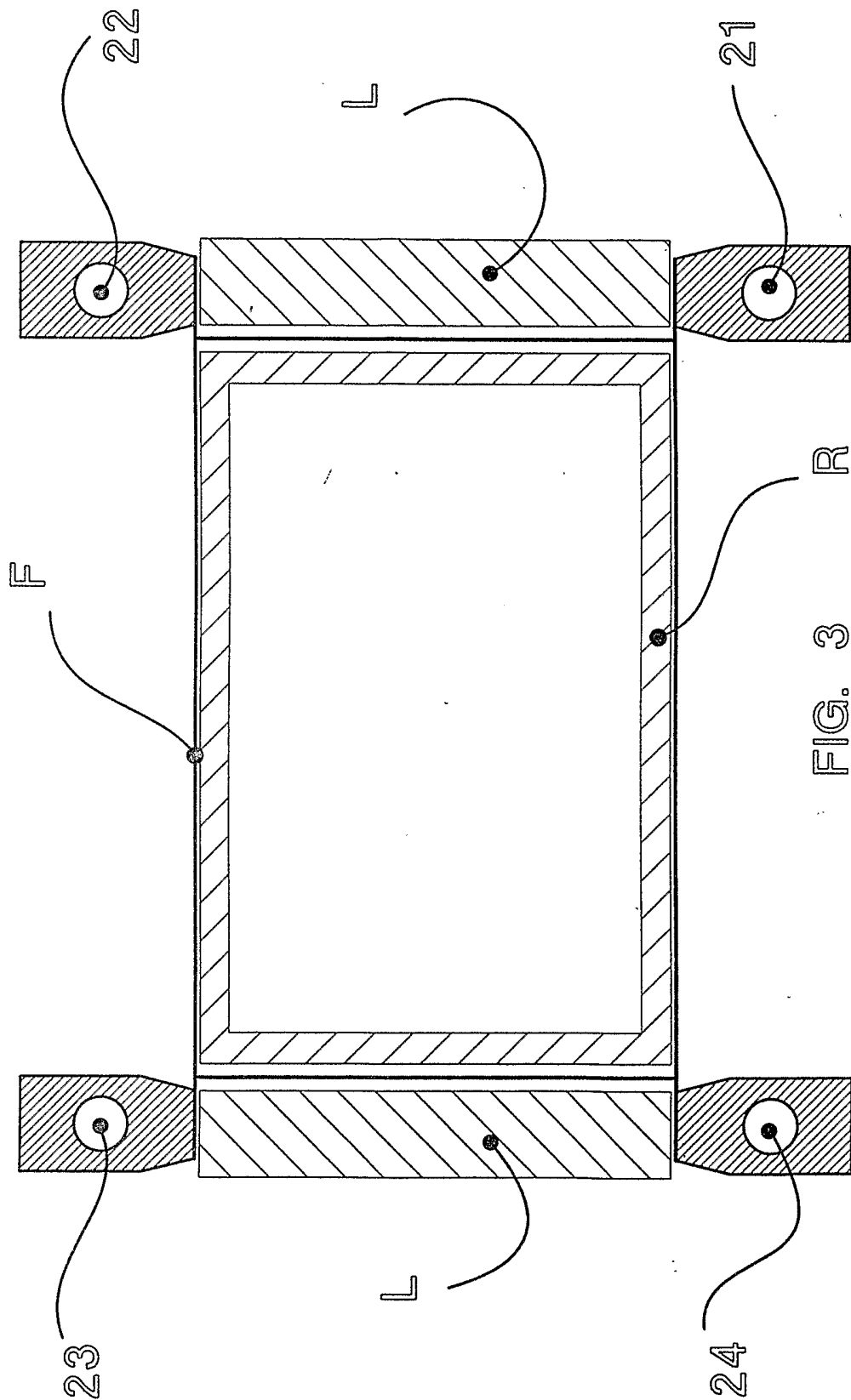


FIG. 2



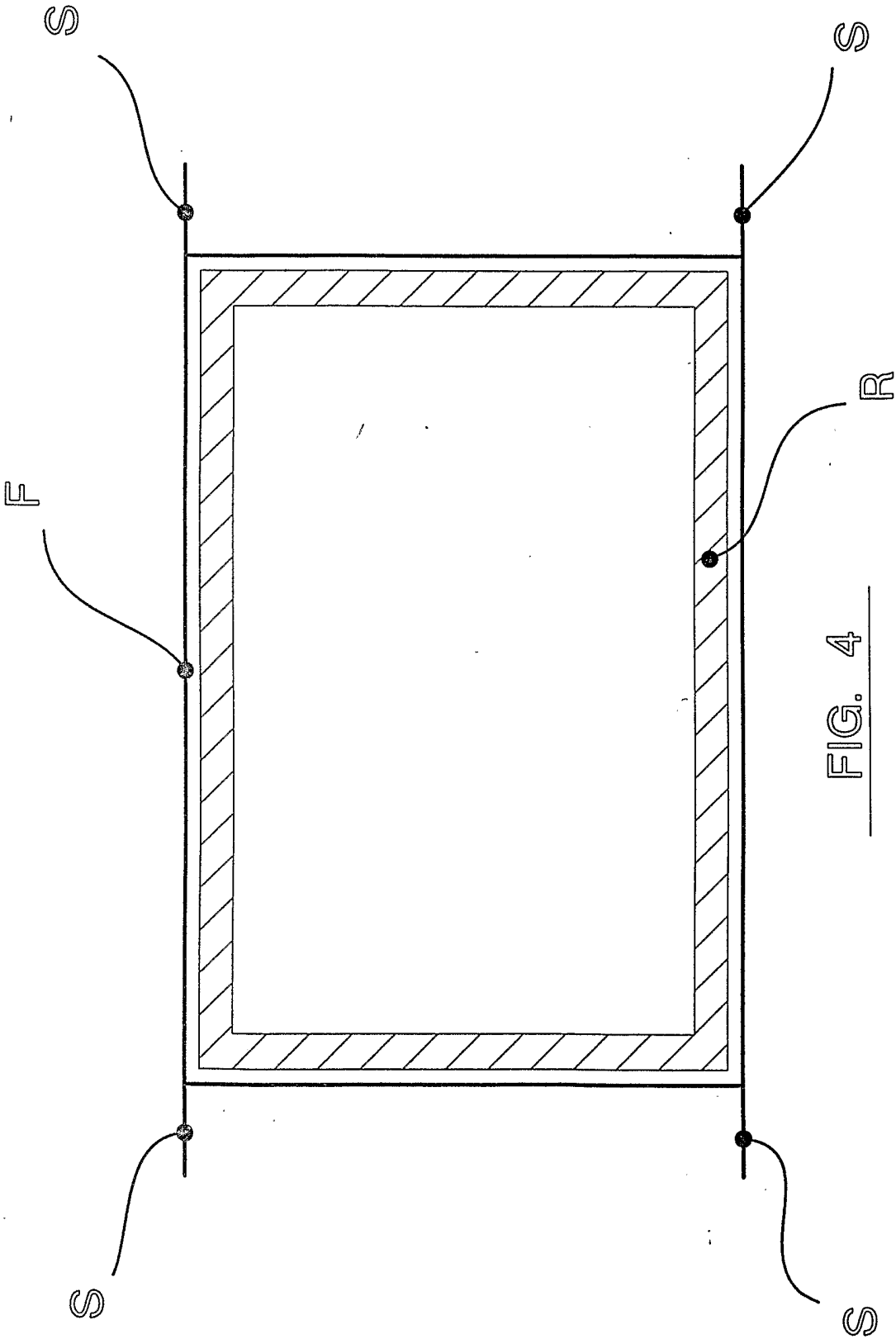


FIG. 4

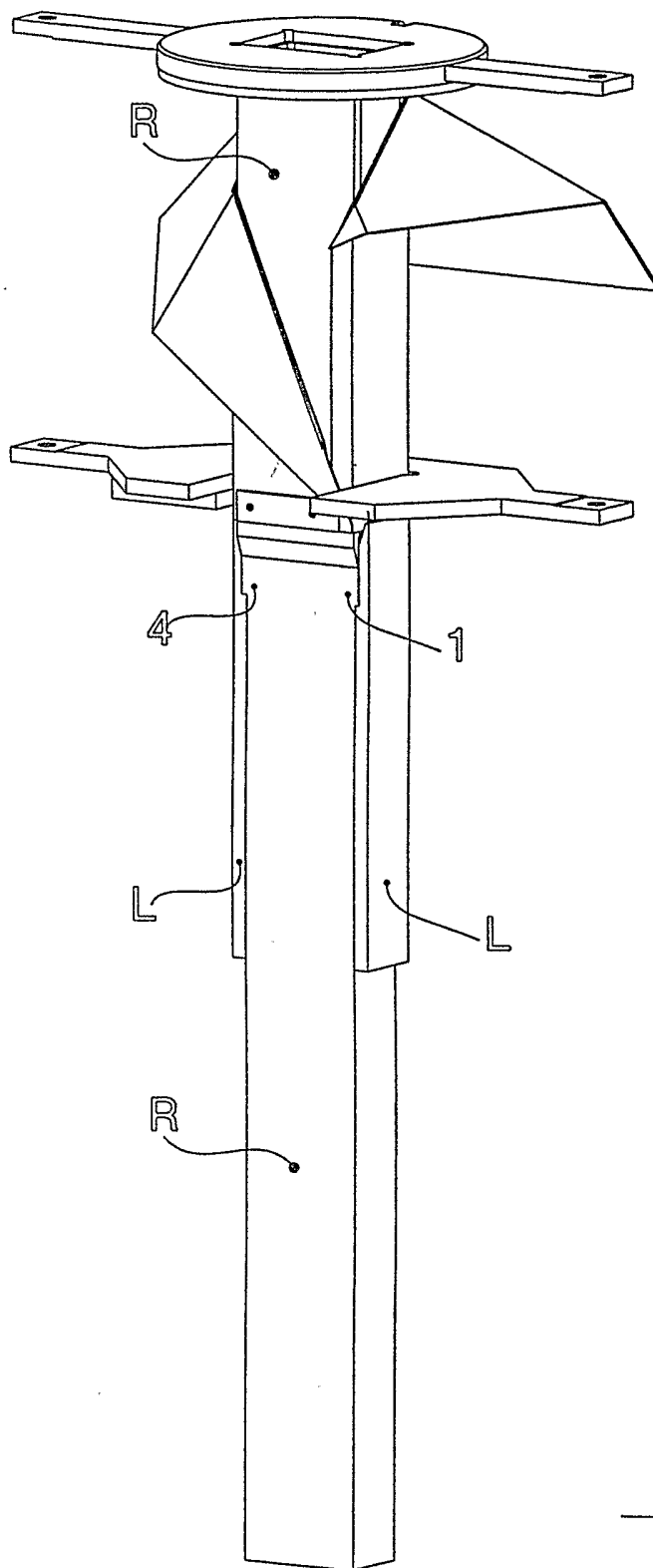
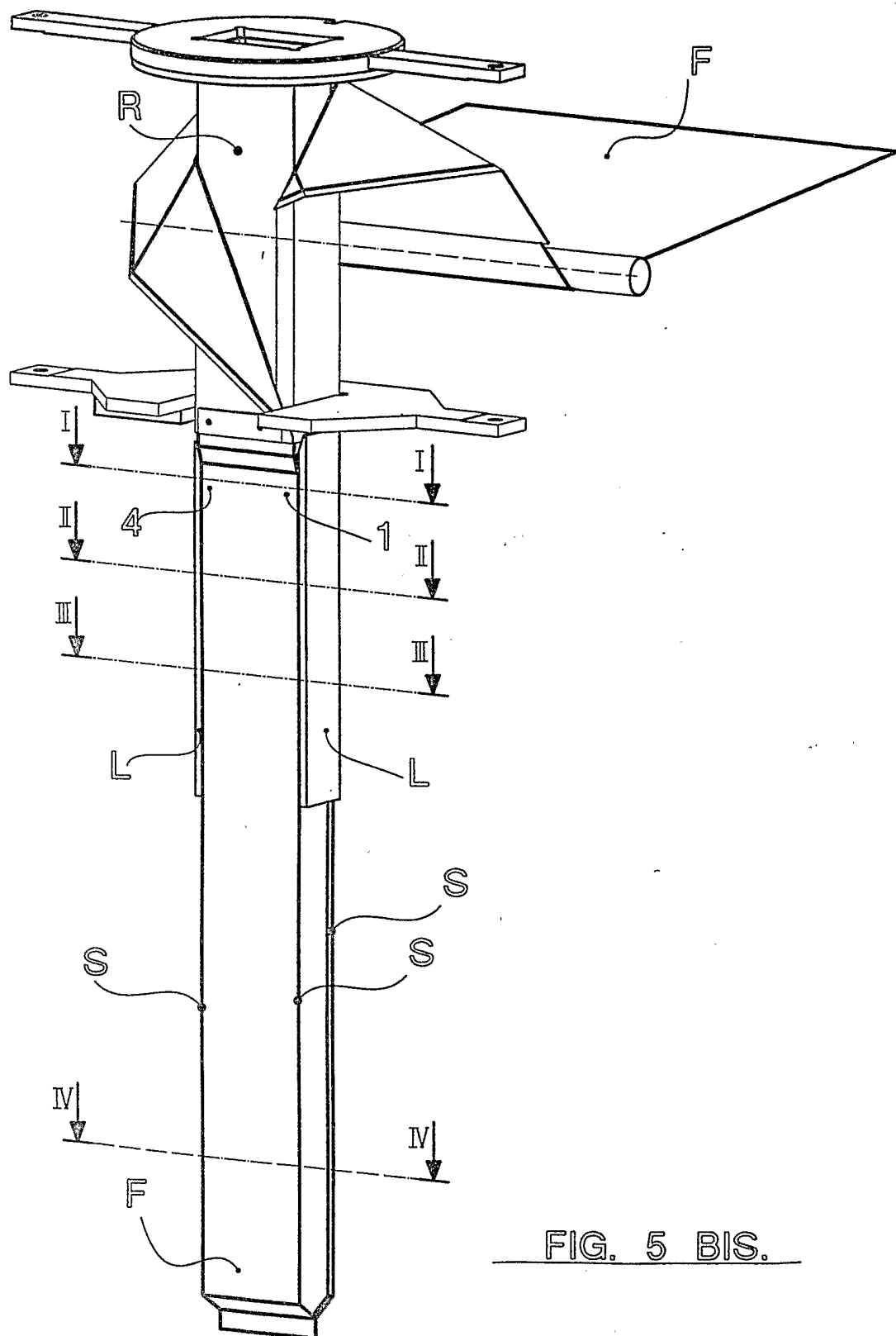


FIG. 5

FIG. 5 BIS.

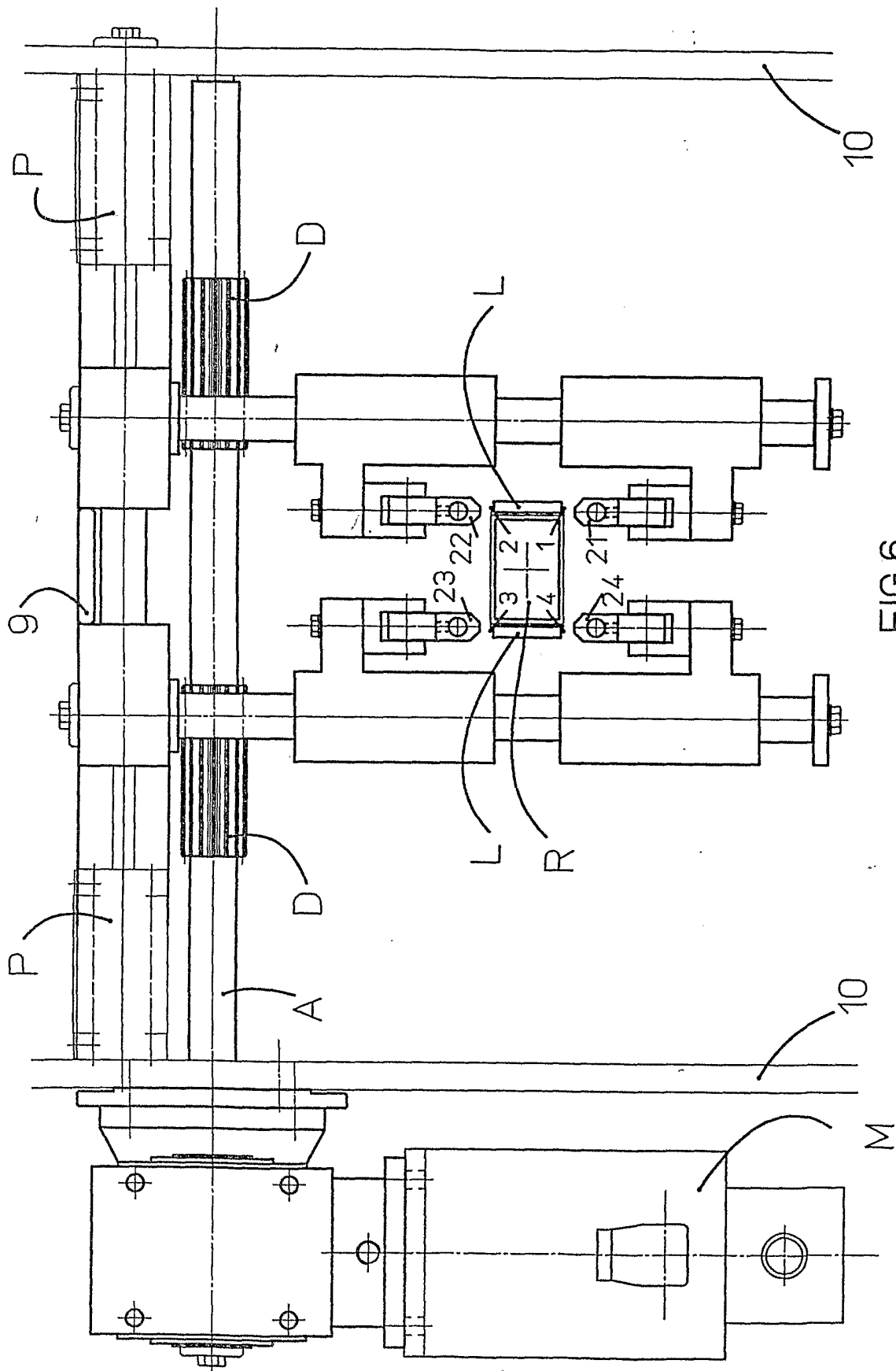


FIG. 6

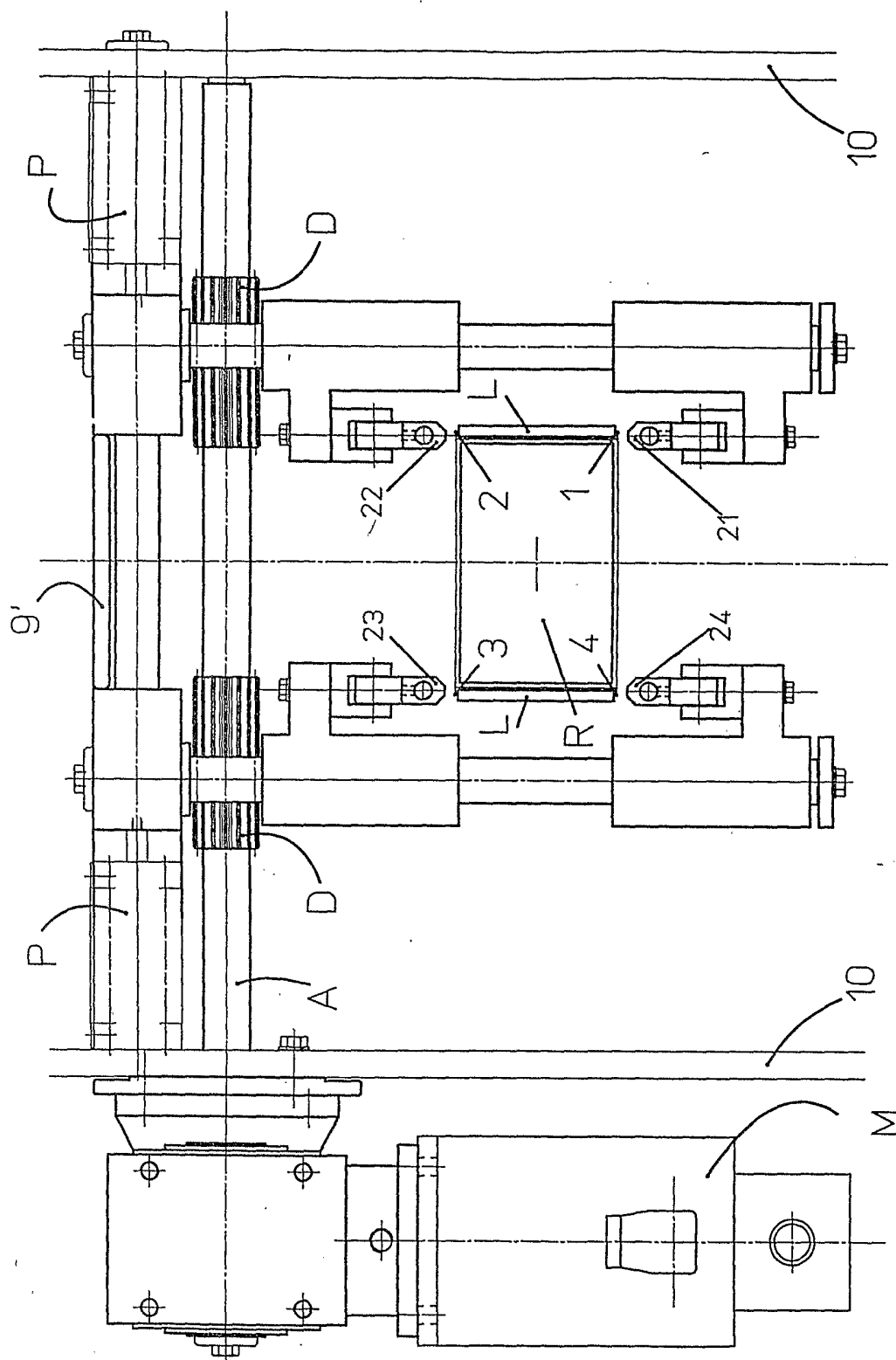
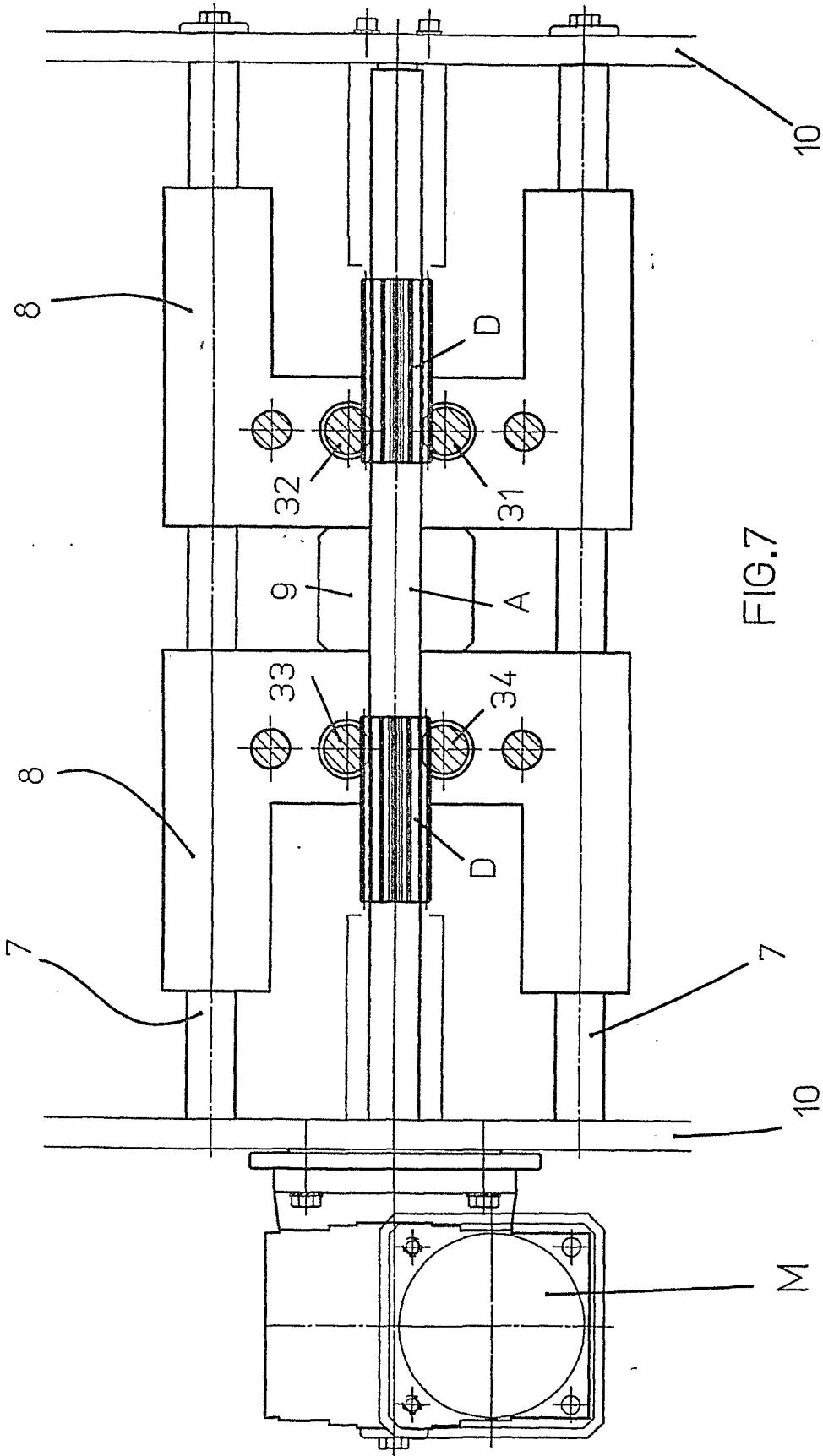
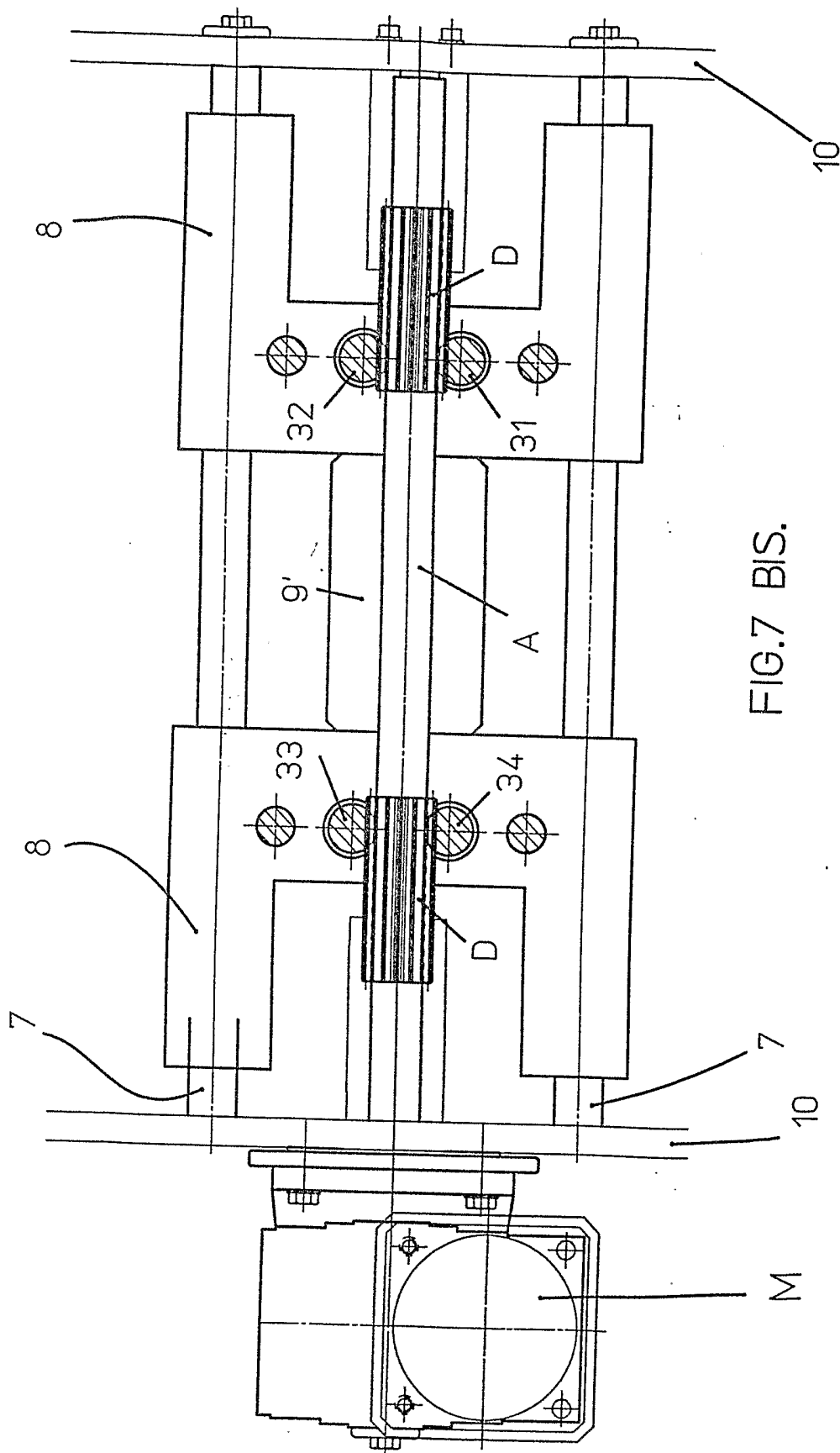


FIG. 6 BIS.





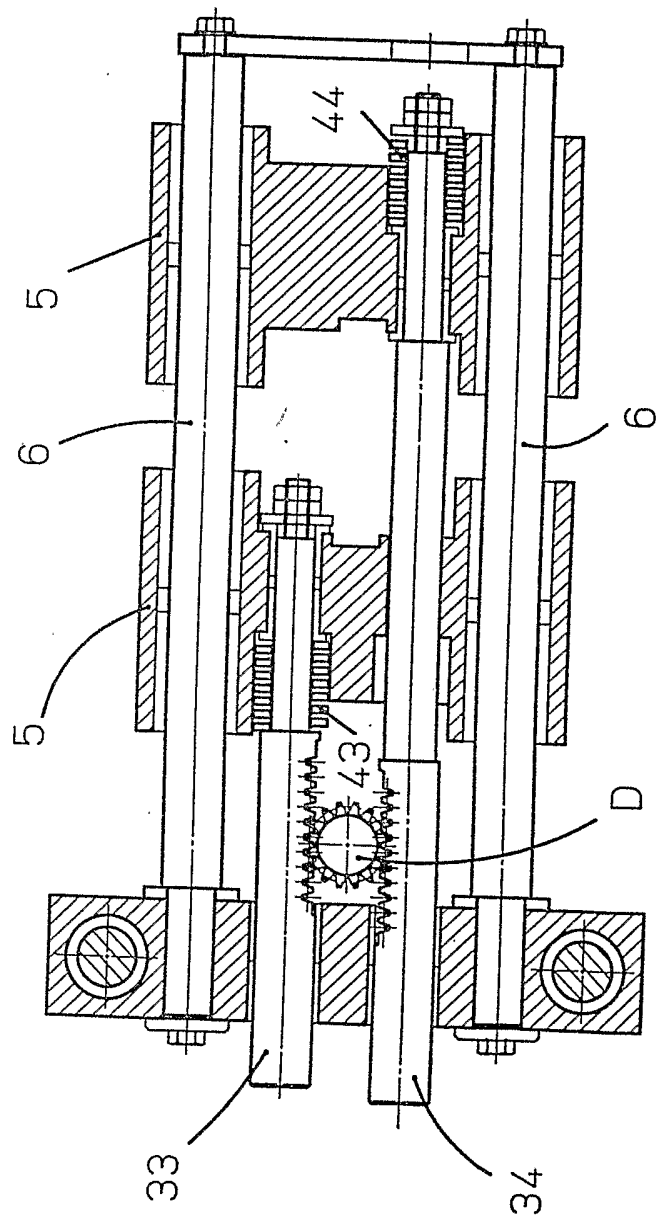


FIG. 8

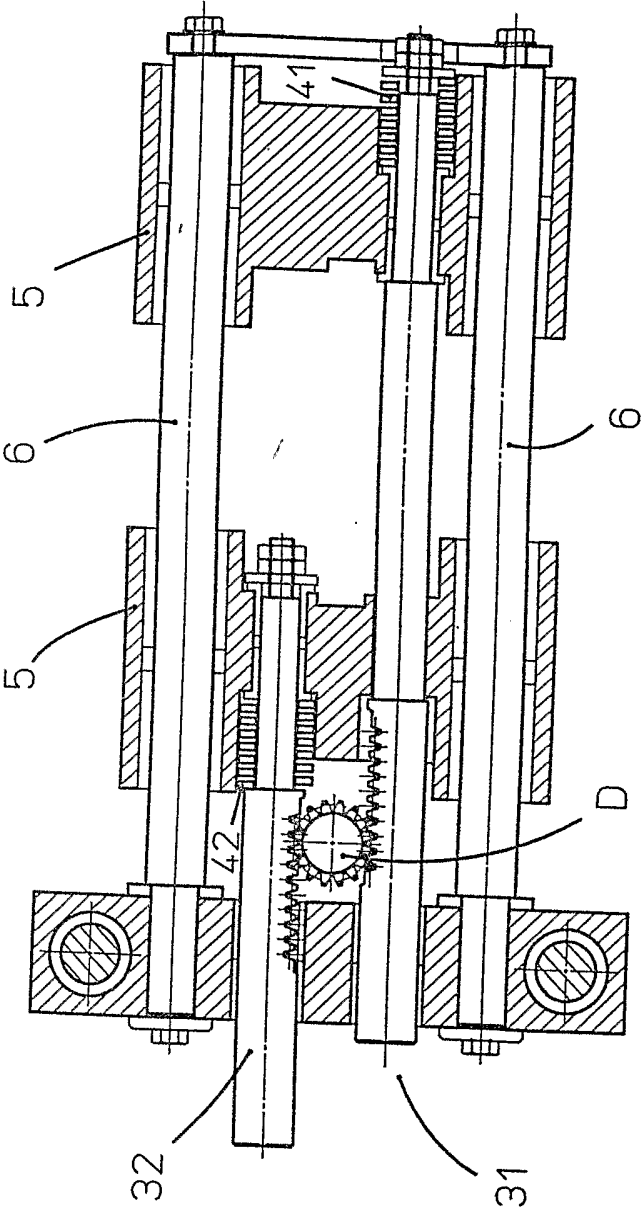


FIG.8 BIS.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/04672

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65B9/22

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65B B29C

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 199 57 891 A (ROVEMA GMBH) 7 June 2001 (2001-06-07) column 3, line 50 -column 4, line 6; figures 1-6	1
X	EP 1 167 192 A (MEGA PACKAGING AG O) 2 January 2002 (2002-01-02) column 3, line 31 -column 8, line 9; figures 1-8	1-3
Y		4,5
A		6
A	US 2002/017077 A1 (KLINKEL WOLFGANG) 14 February 2002 (2002-02-14) paragraph '0031! - paragraph '0032!; figures 1,2,5	2
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *G* document member of the same patent family

Date of the actual completion of the international search

23 March 2004

Date of mailing of the international search report

02 04. 2004

Name and mailing address of the ISA

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Authorized officer

Johne, O

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/04672

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"DIE FOLIENSCHACHTEL TFH BERLIN - MITTLER ZWISCHEN WISSENSCHAFT UND PRAXIS" VERPACKUNGS RUNDschau, VERLAG P.KEPPLER K.G. HEUSENSTAMM, DE, August 1996 (1996-08), pages 8-9, XP002950061 ISSN: 0341-7131 page 9, middle column, paragraph 2 ---</p>	3,6
Y	<p>EP 0 982 229 A (ISHIDA SEISAKUSHO) 1 March 2000 (2000-03-01) paragraph '0005! - paragraph '0006! -----</p>	4,5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 03/04672

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1,2

four sealing devices are driven by movement of a single shaft

2. Claims: 3,6

automatic positioning of the sealing devices at each change of format

3. Claims: 4,5

each of the four sealing devices comprising a spring

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 03/04672

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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			EP 0982229 A1	01-03-2000
			US 2002033006 A1	21-03-2002
			JP 2000142636 A	23-05-2000