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(71) Applicant:
Demak S.a.s. di Gastaldi Geom. Enzo & C.
10156 Torino (IT)

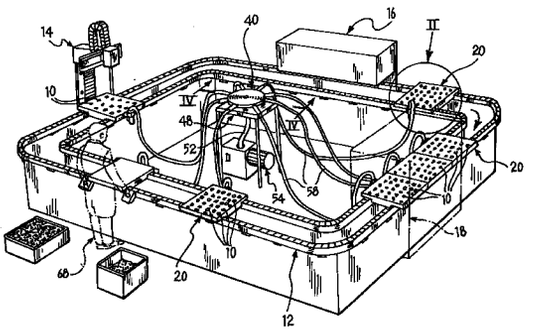
(72) Inventors:
- **VINCENZI, GIOVANNI**
  10147 Torino (IT)
- **Semeraro, Pierangelo**
  10137 Torino (IT)
- **Tozzi, Ivo**
  10091 Alpignano(Torino) (IT)

(74) Representative: **Gerbino, Angelo et al**
c/o JACOBACCI & PERANI S.p.A.
Corso Regio Parco, 27
10152 Torino (IT)

(54) Plant for coating a laminar substrate with a layer of resin

(57) The system for coating at least one laminar substrate (10) with a layer of resin comprises: a conveyor (12), at least one table (20) which can be transported by the conveyor (12) and has a bearing surface (28) which can support at least one respective laminar substrate (10), and a station (14) for the application of the resin to the laminar substrate (10) supported by the table (20). The table (20) has an internal cavity (32) which communicates with the bearing surface (28) through a plurality of holes (26) and the system comprises vacuum-generating means (54) and means for selectively connecting the vacuum-generating means to the internal cavity (32) of the table (20) so as to cause the laminar substrate (10) selectively to adhere to the bearing surface (28) of the table (20).

FIG. 1



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Description

The present invention relates to a system for coating at least one laminar substrate with a layer of resin, comprising:

- a conveyor,
- at least one table which can be transported by the conveyor and has a bearing surface which can support at least one respective laminar substrate, and
- a station for the application of the resin to the laminar substrate supported by the table, the application station being disposed along the conveyor.

If a thermosetting resin is used, the system usually also comprises an irradiation station which brings about cross-linking of the resin applied and is disposed along the conveyor, downstream of the application station.

Systems of the type indicated above are generally used for coating substrates such as, for example, labels carrying graphic representations of some kind, with a layer of transparent resin so as to protect them from the outside atmosphere and make them more glossy.

In known systems, one or more operators place a plurality of labels on each table and fix them thereto with mechanical devices before the tables pass through the resin-application and -cross-linking stations. At the output from the last of these stations, the same operators, or others, release the coated labels from the tables and unload them therefrom.

The object of the present invention is to provide a coating system in which the laminar substrates such as, for example, labels can be fixed to and subsequently released from the table more easily and quickly.

This object is achieved by means of a system of the type indicated above, characterized in that the at least one table has an internal cavity which communicates with the bearing surface through a plurality of holes, and in that the system comprises vacuum-generating means and means for selectively connecting the vacuum-generating means to the internal cavity of the table so as to cause the laminar substrate selectively to adhere to the bearing surface of the table.

In the system of the invention the fixing of the substrates to the respective tables and their subsequent release take place by a simple pneumatic effect as a result of suitable activation of the selective connection means and without the need either for precise manipulation by the operators or for the use of additional mechanical locking devices.

The system of the invention thus has advantages in terms of a reduction in the usage of labour and in the risk of damage due to the manipulation of the laminar substrates.

Further advantages and characteristics of the present invention will become clear from the following detailed description, given with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a perspective view of a system according to the invention,

Figure 2 is a perspective view showing one of the tables of the system of Figure 1, on an enlarged scale,

Figure 3 is a section taken on the line III-III of Figure 2, on an enlarged scale, and

Figure 4 is a section taken on the line IV-IV of Figure 1, on an enlarged scale.

A system (Figure 1) for coating laminar substrates such as labels 10 with a layer of resin comprises an endless conveyor 12 along which there are arranged in series a resin-application station 14 and irradiation stations 16, 18 which can bring about cross-linking of the resin applied. Both the conveyor 12 and the stations 14, 16, 18 are of conventional type and are not therefore described in detail herein.

The conveyor 12 can transport a plurality of tables 20 to which the labels 10 to be coated with resin are fixed, as will be described in detail below.

Each table 20 has a structure formed (Figures 2 and 3) by a lower plate 22 and by an upper plate 24 which has a plurality of holes 26 and can constitute a bearing surface 28 for the labels 10. A peripheral frame 30 is interposed between the plates 22 and 24. The plates 22, 24 and the frame define an internal cavity 32 which communicates with the outside atmosphere by means of a duct 34 formed in the frame 30 as well as by the holes 26 formed in the upper plate 24.

A honeycomb structure 36 disposed in the cavity 32 comprises a plurality of cells which are in communication with one another through holes 38 formed in their side walls.

A rotary vacuum distributor 40 located (Figures 1 and 4) in the centre of the loop defined by the conveyor 12 has a disc 42, fixed to the central portion of the lower face of which is a tubular appendage 44, rotatably mounted in a sleeve 46 fixed to a support structure 48. The lower end of the tubular appendage 44 is connected by means of a connector 50 and a pipe 52 to vacuum-generating means of known type, for example, a suction pump 54, while the upper end of the tubular appendage 44 communicates with a plurality of ducts 56 which extend radially towards the periphery of the disc 42.

The radially outer end of each duct 56 is connected by means of a respective flexible pipe 58 to the duct 34 (Figures 2 and 3) formed through the frame 30 of a respective table 20. A respective shut-off valve 60 is mounted on each table 20 at the mouth of the duct 34. Each shut-off valve 60 comprises (Figure 3) a body 62 in which there is a duct 64 which puts the duct 34 into

communication with the flexible pipe 58 and which can be shut off by a movable obturator 66.

The operation of the system described above takes place in accordance with a cyclic scheme and, to make it easier to understand, is described initially with reference to the operations carried out on a single table 20.

In a portion of the conveyor 12 between the resin-application station 14 and the last irradiation station 18, an operator 68 (Figure 1) places a plurality of labels 10 on the upper bearing surface 28 of the table 20 which stops in front of him at the time in question as a result of the stoppage of the conveyor 12.

During this stage, the obturator 66 of the valve 60 of this table 20 is in the open position (Figure 3) so that the suction pump 54, the pipe 52, the connector 50, the tubular appendage 44 of the disc 42, the duct 56 and the flexible pipe 58 associated with this table 20, as well as the duct 34 and the internal cavity 32 thereof, are all in free communication. The suction effect exerted by the pump 54 is thus exerted through the holes 26 in the bearing surface of the table 20 with the consequence that, as soon as the labels 10 are laid on the table, they remain adhering thereto.

Upon completion of the loading of the labels 10 onto the table 20, the operator 68 advances the conveyor 12 until the table 20 is at the station 14 where the labels 10 are coated with resin, and subsequently at the stations 16, 18 where the resin is cross-linked by irradiation. During the application and cross-linking of the resin, the labels 10 remain adhering to the bearing surface 28 of the table 20 by virtue of the suction effect which is generated by the pump 54 and continues to be exerted. The rotary mounting of the disc 42 of the distributor 40 in fact enables both the disc 42 and the flexible pipe 58 to follow the movement of the table 20 without the connection being lost between the suction pump 54 and the internal cavity 32 and the holes 26 in the table 20. Otherwise, the resin-application and cross-linking stages are substantially similar to those which take place in conventional systems.

When the table 20 is disposed in front of the operator 68 again after passing through the last cross-linking station 18, the operator stops the conveyor 12 and causes the obturator 66 of the valve 60 to move to the shut-off position, shutting off communication between the suction pump 54 and the holes 26 in the table 20. The coated labels 10 can thus be removed from the table 20 without encountering any resistance since no suction effect is exerted in the cavity 32 which is downstream of the valve 60. The table 20 will now be in the starting condition again, so that a new working cycle similar to that just described can start.

When the system is actually in operation, since the conveyor 12 transports a plurality of tables 20, the various operative stages described above, such as the loading/unloading of the labels 10 onto/from the respective table 20 and the application and cross-linking of the resin, take place simultaneously on various tables 20 all of which are thus subjected, in succession, to the same series of operations already mentioned.

Clearly, the task of the operator 68 is thus greatly facilitated since it is limited essentially to the laying of the labels 10 to be coated on the tables 20 and the unloading of the coated labels, whilst the fixing of the labels 10 to the tables 20 and their subsequent release are achieved by a simple operation of the obturator 66 of the valve 60.

The productivity of the operator 68 is thus increased and the risks of damage to the labels 10 due to manipulation thereof in order to fix them to the tables 20 is reduced.

Naturally, the principle of the invention remaining the same, the details of construction and forms of embodiment may be varied widely with respect to those described and illustrated purely by way of example, without thereby departing from the scope thereof.

Claims

1. A system for coating a laminar substrate (10) with a layer of resin, comprising:

   - a conveyor (12),
   - at least one table (20) which can be transported by the conveyor (12) and has a bearing surface (28) which can support at least one respective laminar substrate (10), and
   - a station (14) for the application of the resin to the laminar substrate (10) supported by the table (20), the application station (14) being disposed along the conveyor (12),

   the system being characterized in that the at least one table (20) has an internal cavity (32) which communicates with the bearing surface (28) through a plurality of holes (26), and in that the system comprises vacuum-generating means (54) and means for selectively connecting the vacuum-generating means to the internal cavity (32) of the table (20) so as to cause the laminar substrate (10) selectively to adhere to the bearing surface (28) of the table (20).

2. A system according to Claim 1, characterized in that it comprises a plurality of tables (20).

3. A system according to any one of the preceding claims, characterized in that the conveyor device (12) is endless.

4. A system according to any one of the preceding claims, characterized in that the at least one table (20) has a structure formed by a lower plate (22) and an upper plate (24) having the plurality of holes (26), and a peripheral frame (30) is interposed between the plates (22, 24), the plates (22, 24) and

the frame (30) defining the internal cavity (32) which is put into communication with the outside atmosphere by a duct (34) formed in the frame (30).

5. A system according to Claim 4, characterized in that a honeycomb structure (36) is disposed in the cavity (32) and comprises a plurality of cells which are in communication with one another through holes (38) formed in their side walls and with the exterior through the holes (26).

6. A system according to any one of the preceding claims, characterized in that the selective connection means comprise a rotary vacuum distributor (40) having a disc (42), to the central portion of the lower face of which is fixed a tubular appendage (44) mounted for rotating in a fixed support sleeve (46), the lower end of the tubular appendage (44) being connected to the vacuum-generating means (54) and the upper end communicating with a plurality of ducts (56) which extend radially towards the periphery of the disc (42).

7. A system according to Claim 6, characterized in that the radially outer end of each duct (56) is connected by means of a respective flexible pipe (58) to the duct (34) formed through the frame (30) of an associated table (20).

8. A system according to Claim 7, characterized in that, at the mouth of the duct (34) there is a respective shut-off valve (60) comprising a body (62) in which there is a duct (64) which puts the duct (34) into communication with the flexible pipe (58), and which can be shut off by a movable obturator (66).

9. A system according to any one of the preceding claims, characterized in that it comprises at least one station (16, 18) for the irradiation of the resin applied to the laminar substrate (10), the at least one irradiation station (16, 18) being disposed along the conveyor device (12).

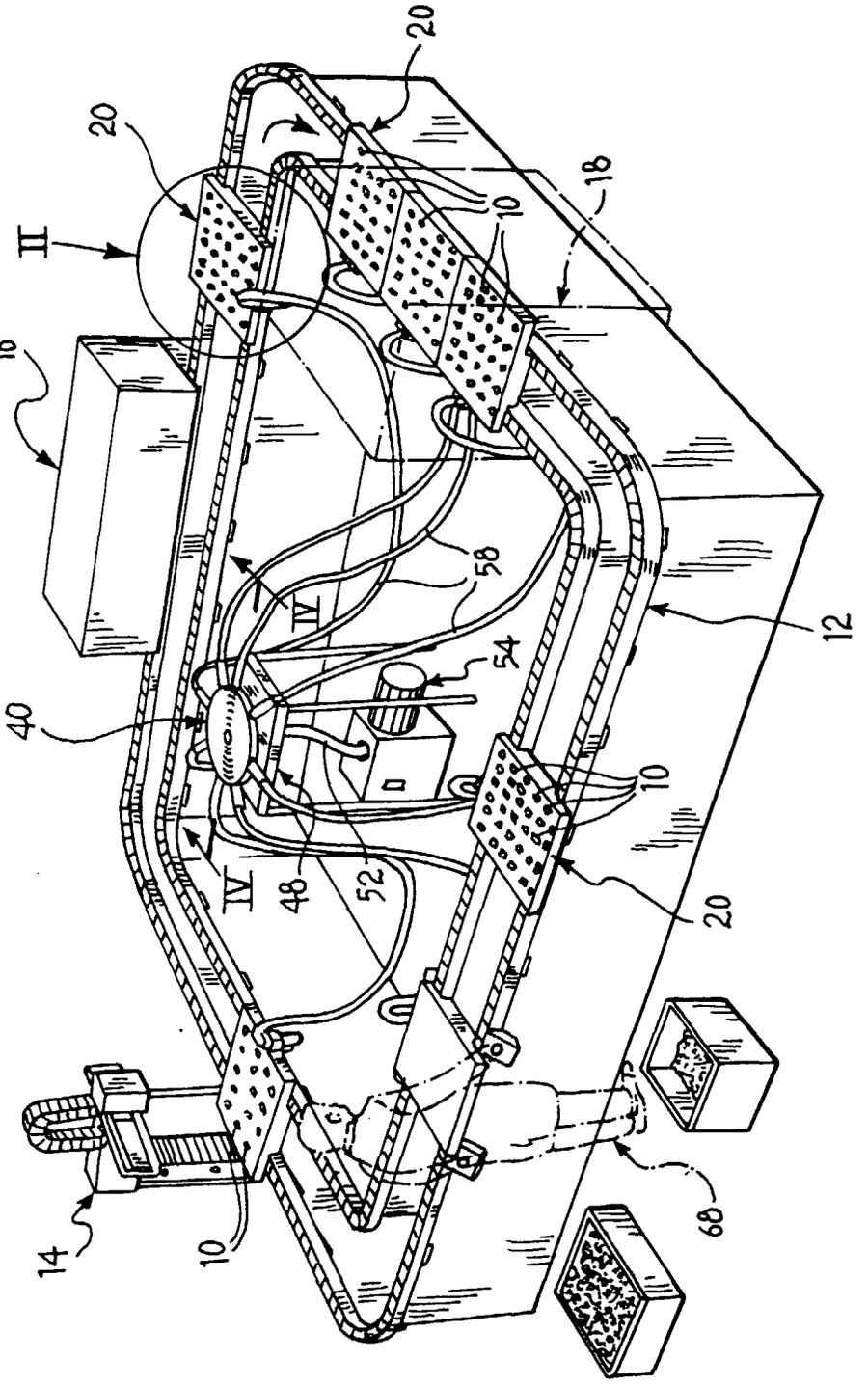


FIG. 1

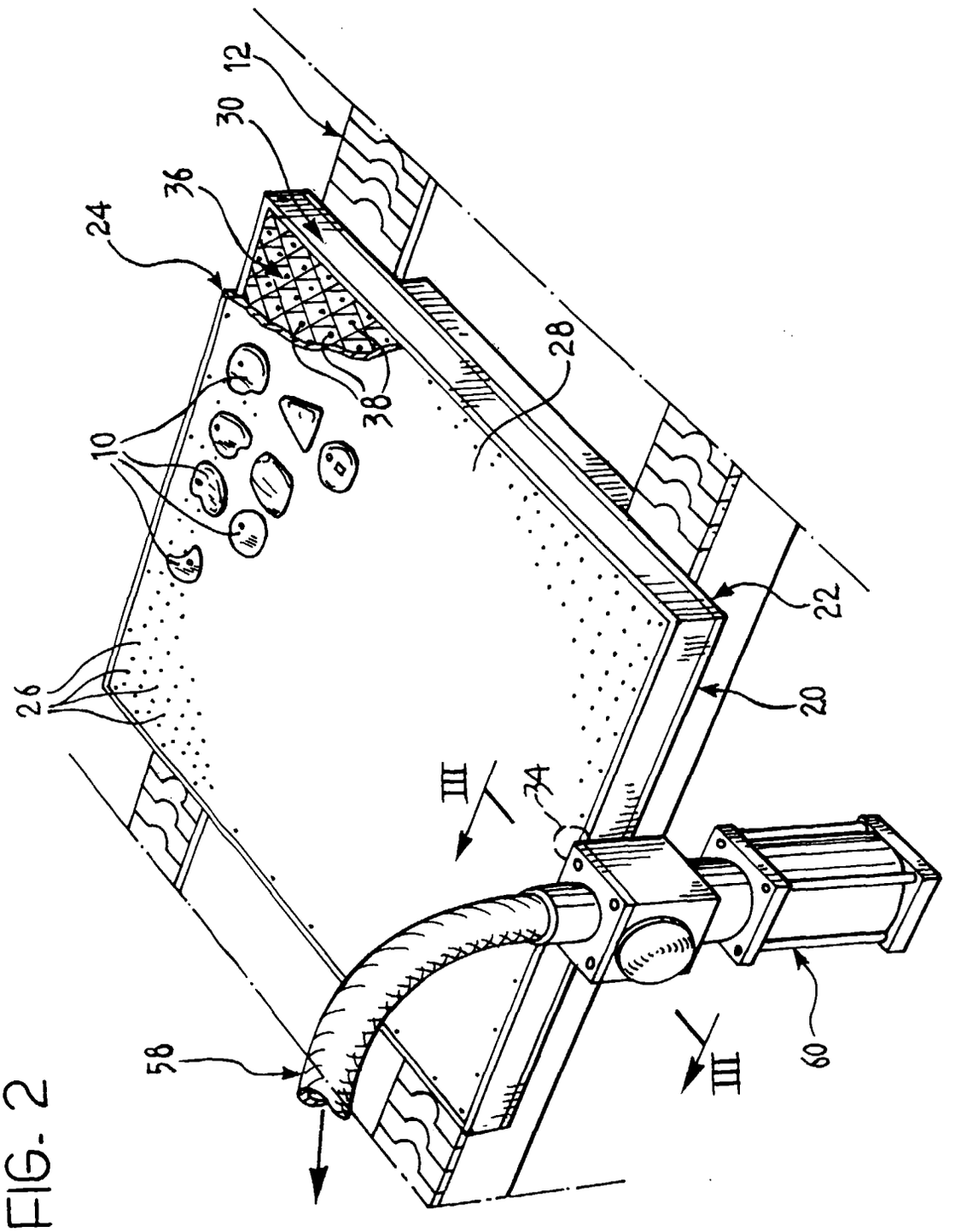
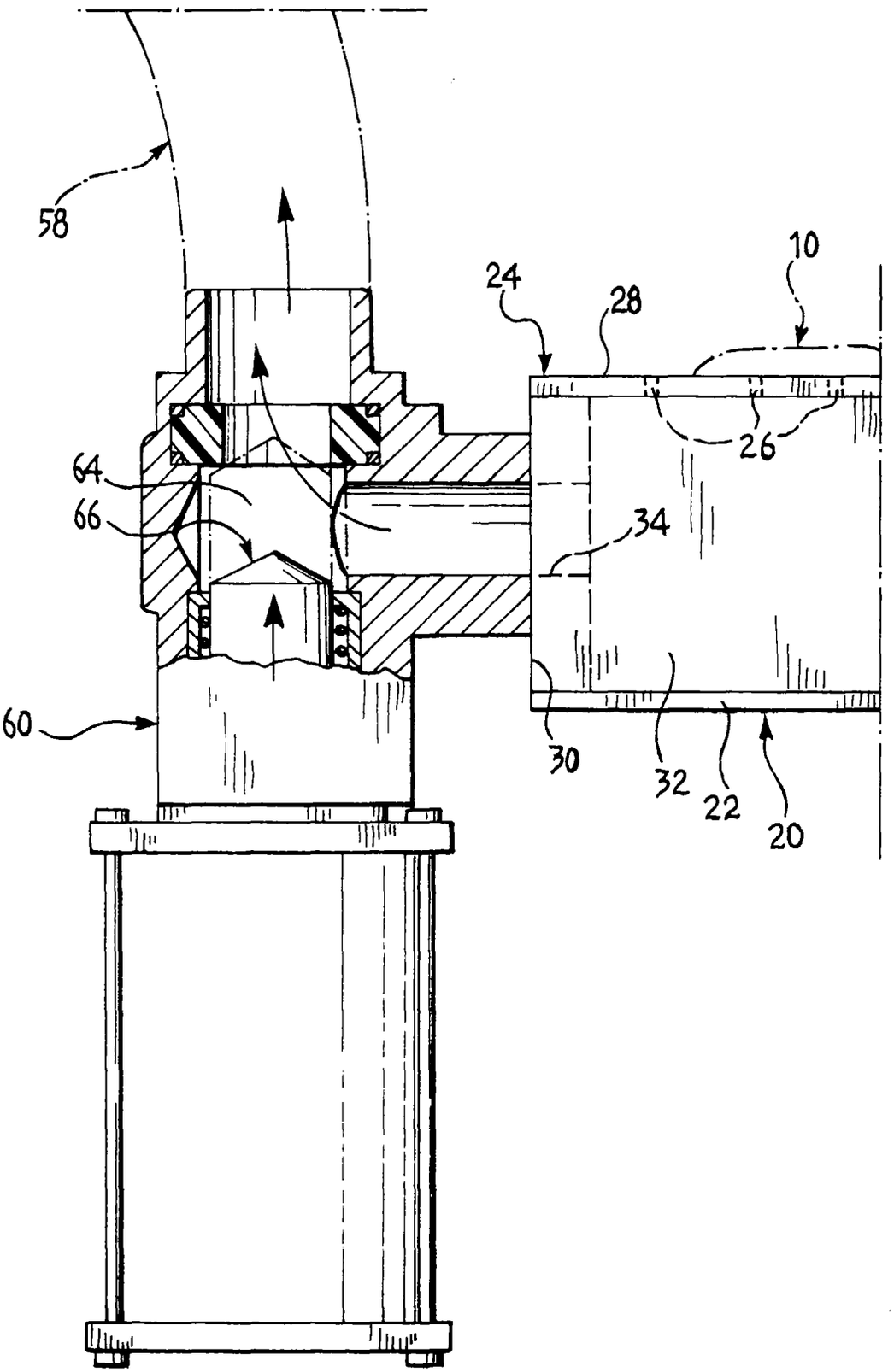


FIG. 2

FIG. 3



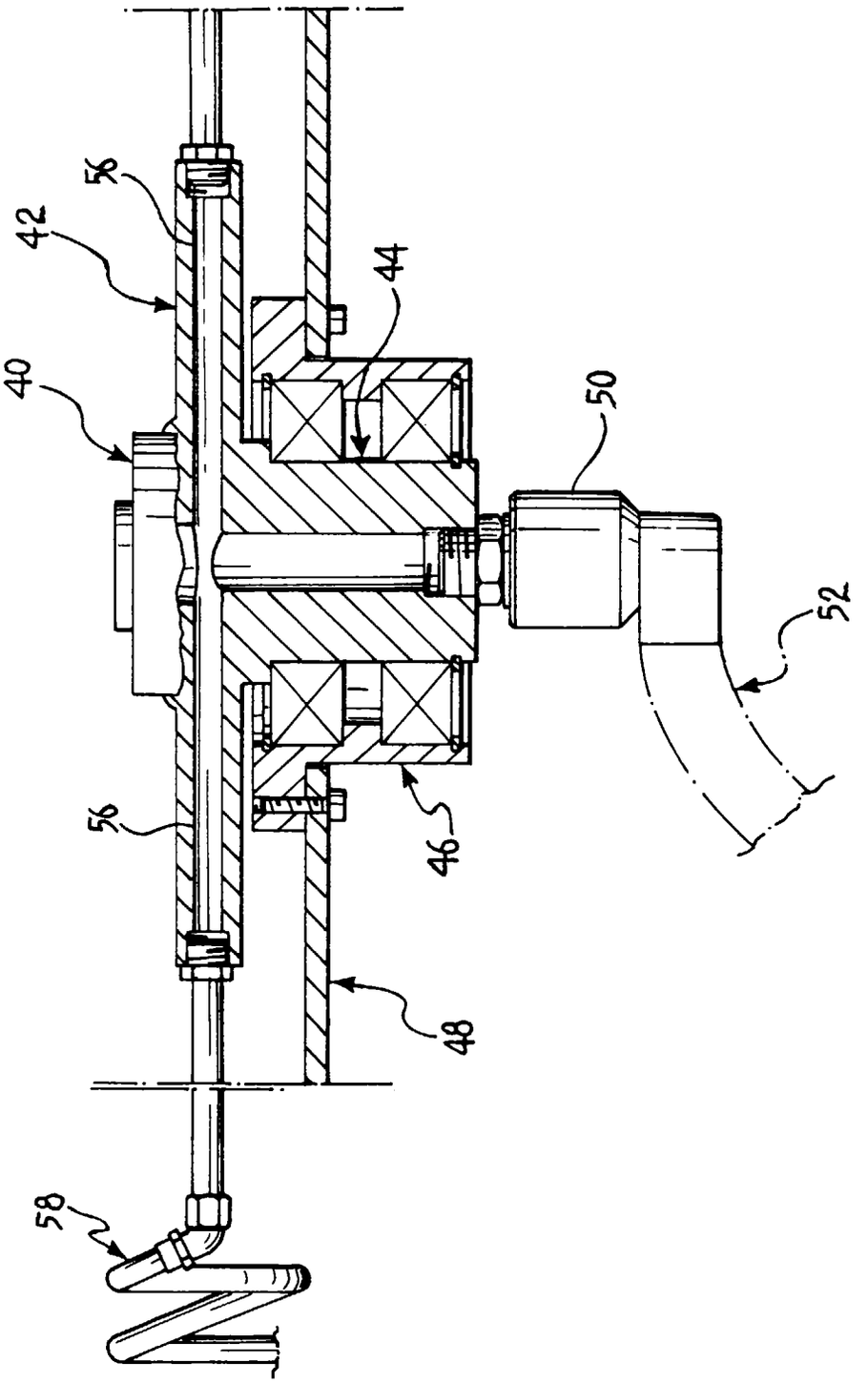


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 97 10 2835

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 558 093 A (BOK HENDRIK F) 26 January 1971 * the whole document * ---	1	B05C13/00
A	US 4 759 310 A (WILLIAMS LEE C ET AL) 26 July 1988 * the whole document * ---	1	
A	DE 33 16 421 A (GERBER SCIENTIFIC INSTR CO) 17 November 1983 * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B05C
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 May 1997	Juguet, J

CATEGORY OF CITED DOCUMENTS

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