(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 048 230 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.11.2000 Bulletin 2000/44

(51) Int Cl.[7]: **A24F 23/02**

(21) Application number: **99303365.3**

(22) Date of filing: **29.04.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **IMPERIAL TOBACCO LIMITED**
Southville, Bristol, BS99 7UJ (GB)

(72) Inventor: **Holloway, Stephen John**
Beeston Nottingham NG9 3FG (GB)

(74) Representative: **Marles, Alan David et al**
Stevens, Hewlett & Perkins
1 St Augustine's Place
Bristol BS1 4UD (GB)

(54) Apparatus for making resealable pouches

(57) There is provided a guide plate 18 having a lengthwise edge 17 over which a film is folded. The guide plate 18 has a lengthwise extending slot 22 parallel to the edge 17, which slot receives a resealable fastener in a closed condition between the film on both sides of the guide plate 18. The slot 22 is closed at its downstream end so as to open the fastener.

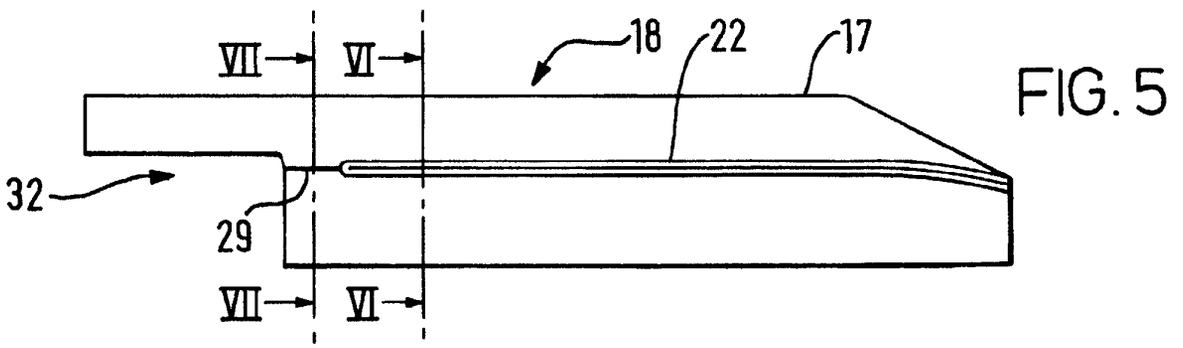

FIG. 5

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Description

[0001] The present invention relates to apparatus for making resealable pouches, such as those used for storing tobacco, which pouches comprise a pocket having a resealable fastener.

[0002] According to a first aspect of the present invention there is provided a guide plate for use in apparatus for producing a resealable pouch for tobacco, the guide plate having a lengthwise extending edge over which a thermoplastic film is folded and a lengthwise extending slot parallel to said edge for receiving a resealable fastener in a closed condition between the film on both sides of the guide plate, the slot being closed at its downstream end so as to open the resealable fastener.

[0003] Preferably, downstream of the closed end of the slot is a groove on each side of the plate for receiving respective parts of the resealable fastener. With one preferred construction there is provided a recess downstream of the oppositely disposed grooves, which recess enables the fastener to be closed at predetermined locations along its length. In a preferred arrangement the upstream ends of the groove taper to a point coinciding with the downstream end of the slot.

[0004] According to a second aspect of the present invention there is provided apparatus for producing a resealable pouch for tobacco comprising feed means for a thermoplastic film, feed means for a two-part resealable fastener, a film guide for folding the thermoplastic film over a guide plate and inside lateral guide walls, said guide plate having a lengthwise extending edge over which the film is folded and a lengthwise extending slot parallel to said edge for receiving the resealable fastener in a closed condition, the slot being closed at its downstream end so as to open the fastener, and welding heater means upstream of the end of the slot for securing the two parts of the resealable fastener to the film on respective sides of the guide plate.

[0005] In one arrangement downstream of the closed end of the slot is a lengthwise extending groove on each side of the plate for receiving respective parts of the resealable fastener. Conveniently the upstream ends of the groove taper to a point coinciding with the downstream end of the slot.

[0006] Preferably, downstream of the closed end of the slot are fastener crushers which compress and weld the ends of the fastener at predetermined intervals according to the desired length of pouch. Ideally the fastener crushers act on the fastener by virtue of a recess in the guide plate, which recess is downstream of the grooves.

[0007] In preferred arrangements downstream of the fastener crushers are side heaters for welding the sides of the pouch from the fold to the fastener and also downstream of the side heaters is a cutter for cutting along each side weld, perpendicular to the fold, to produce individual pouches.

[0008] Ideally cooling means are provided directly after the welding heater means for the fastener. Conveniently said cooling means comprise liquid cooled blocks.

[0009] A preferred feature is that there is provided transfer means for transferring the pouches to a tobacco filling head and also closing means for closing the fastener of each pouch after filling.

[0010] According to a third aspect of the present invention the closing means comprises a pivotted roller bar having an elongate operative surface adapted to progressively engage the fastener along its length and urge it closed against a portion of the transfer means. Preferably said operative surface is arcuate and the roller bar is spring biased into an initial end position and the roller bar is movable against the spring by pneumatic means.

[0011] An embodiment of the present invention will now be described in more detail. The description makes reference to the accompanying drawings in which

Figure 1 is a section through a tobacco pouch having a resealable fastener,
Figure 2 shows a general plan view of a pouch manufacturing machine,
Figure 3 is a simplified plan view of part of the figure 2 machine,
Figure 4 is a side view of a guide plate portion of the machine shown in figure 3,
Figure 5 is a side view of the guide plate,
Figures 6 and 7 are exaggerated cross-sections on lines VI-VI and VII-VII of figure 5 in use,
Figure 8 is a front view of one type of welding anvil used in the machine,
Figure 9 is a side view of a closing head, and
Figure 10 is a plan view of a fastener closer used in the closing head.

[0012] In the figures there is shown a machine 10 for producing resealable pouches 11, filling the pouches 11 with a product such as tobacco and closing the pouches 11. The pouches 11 are formed from a thermoplastic material the form of a film 12 which is capable of being welded to itself using heat, pressure or a combination of both. Some as aspects of the machine 10 are known from machines for making and filling conventional tobacco pouches.

[0013] The film 12 is delivered from a reel 13 via a series of rollers 14 to an A-frame 15 which narrows in a downstream direction to initiate a lengthwise fold 16 in the continuous film 12. Downstream of the A-frame 15 the fold 16 is supported by a lengthwise extending top edge 17 of a substantially vertical guide plate 18. The film 12 on each side of the guide plate 18 passes between a pair of vertical guide rollers 19 and is restrained by outer guide panels disposed on either side of the guide plate 18.

[0014] A continuous resealable fastener 20 is delivered at the same speed as the film 12 from another reel 21 and fed into a lengthwise extending slot 22 formed

in the guide plate 18. The main part of the slot 22 is substantially parallel to the top edge 17 of the guide plate 18 so that the fastener 20 is positioned between the film 12 on each side of the guide plate, generally parallel to the fold 16 in the film 12 although there is in this embodiment an optional, slightly arcuate lead-in to the slot 22. The fastener 20 comprises two parts 23, 24 each having an attachment surface 25 facing respective parts of the film 12 on either side of the guide plate 18. The openable/closable interconnection feature of the fastener 20 is not shown in detail.

[0015] Once the fastener 20 is in position, welding heaters 26, disposed on both sides of the guide plate 18, weld the film 12 on both sides of the guide plate to the respective attachment surfaces 25 of the fastener 20. Immediately following the welding of the fastener 20 in position the film 12/fastener 20 assembly passes through a cooling section which may comprise fluid cooled blocks 27 adjacent the laterally outermost surfaces of the film 12. In the embodiment illustrated the welding heaters and cooling blocks 26, 27 are contained in a single unit.

[0016] Downstream of the cooling blocks 27, the slot 22 is closed by way of an outwardly tapering abutment 28 which causes the two parts 23, 24 of the fastener 20 to separate, thus opening the fastener. The two parts 23, 24 of the fastener 20 are now received in respective lengthwise extending grooves 29, 30 which have cross-sections designed to receive the interlocking features of the parts 23, 24 of the fastener 20. This ensures that the film 12 remains close to the guide 18 and the two parts 23, 24 of the fastener remain in general alignment.

[0017] After separation of the two parts of the fastener 20, the film/fastener combination passes a pair of oppositely disposed zip crushing and welding stations 31 which are aligned with a recess 32 in the guide plate. Each zip crushing station 31 is pneumatically movable towards and away from the guide plate 18 and the other zip crushing station 31. The zip crushing stations 31 are adapted to heat the fastener/film ultrasonically and on one side have a pair of anvils 33 for cooperation with anvils 34 on the opposite zip crushing station. The opposed pairs of anvils 33,34 act through the recess 32 to close the fastener 20 at predetermined locations and weld the fastener 20 shut at these locations.

[0018] In practise, the operation of the machine will be timed such that the fastener 20 is welded closed at equal spaces along its length, the lengthwise distance between welds defining the mouths of the pockets of the eventual pouches. Also the welds extend a short distance below the attachment surfaces 25 of the fastener 20 for reasons which will become apparent.

[0019] The anvils 33 present to the anvils 34 a knurled surface but the anvils 34 have a generally smooth surface 35 with a horizontally extending concave groove 36 to accommodate the fastener 20. This combination of anvils 33, 34 produces a smoother finish on the front of the pack by virtue of the anvils 34.

[0020] The film/fastener combination then passes a pair of side welding stations 37 which form vertical side welds extending from the fold 16 in the film to the crush welds of the fastener 20. The extension of the crush weld a short distance below the fastener 20 ensures that the side weld is easy to form with no interference with the fastener such that the pouch is substantially air-tight.

[0021] The combination then moves to a cutter 38 which cuts down the centre of the side welds and the remainder film 12 aligned therewith to form individual pouches 11 each with a resealable fastener 20 across its open mouth.

[0022] The open pouches are then inverted and pass individually towards a filling turret 39 after an optional blast of compressed air into the pouches to eliminate any partial closing of the fastener 20 which may have occurred.

[0023] After filling, the pouches 11 are placed individually into successive grippers 40 of a fastener closing head 41 which rotates at a speed linked to the speed of the remainder of the machine. Mechanical linkages 42 cause the grippers 40 to grip the pouches 11 below the fastener 20 whilst the conventional flap 43 of the pouch folds over the rest of the pouch 11 due to its entrainment inside the guide surface 44.

[0024] A rolling fastener closer 45 acts through a gap in the guide surface 44 and closes the fastener 20 whilst the closing head 41 is momentarily stationery. The closer 45 has a pivoted roller bar 46 which engages the pouch 11 adjacent the fastener 20 and presses the fastener closed along its length against a gripper member 47 of the gripper 40.

[0025] The roller bar 46 rotates about pivot 48 and is loaded by way of a spring 49 into one of its extreme positions as shown in figure 10. The roller bar 46 is pneumatically rotated about the pivot 48 against the spring 49 in order for it to perform its fastener closing action, as shown in broken lines in figure 10.

[0026] After closure of the fastener 20 the pouch 11 is deposited on to a conveyor 50 to take it to a final wrapping station (not shown).

[0027] During the formation of the pouch 11 the film 12 is actually pulled through the guide plate area by means of vertical drive rollers 51 and a tensioning unit 52.

Claims

1. A guide plate for use in apparatus for producing a resealable pouch for tobacco, the guide plate having a lengthwise extending edge over which a thermoplastic film is folded and a lengthwise extending slot parallel to said edge for receiving a resealable fastener in a closed condition between the film on both sides of the guide plate, the slot being closed at its downstream end so as to open the resealable fastener.

2. A guide plate as claimed in claim 1 wherein , downstream of the closed end of the slot is a groove on each side of the plate for receiving respective parts of the resealable fastener.

3. A guide plate as claimed in claim 2 wherein the upstream ends of the groove taper to a point coinciding with the downstream end of the slot.

4. A guide plate as claimed in claim 2 or claim 3 wherein there is provided a recess downstream of the oppositely disposed grooves, which recess enables the fastener to be closed at predetermined locations along its length.

5. Apparatus for producing a resealable pouch for tobacco comprising feed means for a thermoplastic film, feed means for a two-part resealable fastener, a film guide for folding the thermoplastic film over a guide plate and inside lateral guide walls, said guide plate having a lengthwise extending edge over which the film is folded and a lengthwise extending slot parallel to said edge for receiving the resealable fastener in a closed condition, the slot being closed at its downstream end so as to open the fastener, and welding heater means upstream of the end of the slot for securing the two parts of the resealable fastener to the film on respective sides of the guide plate.

6. Apparatus as claimed in claim 5 wherein downstream of the closed end of the slot is a lengthwise extending groove on each side of the plate for receiving respective parts of the resealable fastener.

7. Apparatus as claimed in claim 6 wherein the upstream ends of the groove taper to a point coinciding with the downstream end of the slot.

8. Apparatus as claimed in claim 7 wherein downstream of the closed end of the slot are fastener crushers which compress and weld the ends of the fastener at predetermined intervals according to the desired length of pouch.

9. Apparatus as claimed in claim 8 wherein the fastener crushers act on the fastener by virtue of a recess in the guide plate, which recess is downstream of the grooves.

10. Apparatus as claimed in claim 9 wherein downstream of the fastener crushers are side heaters for welding the sides of the pouch from the fold to the fastener.

11. Apparatus as claimed in claim 10 wherein downstream of the side heaters is a cutter for cutting along each side weld, perpendicular to the fold, to produce individual pouches.

12. Apparatus as claimed in any one of claims 5 to 11 wherein cooling means are provided directly after the welding heater means for the fastener.

13. Apparatus as claimed in claim 12 wherein said cooling means comprise liquid cooled blocks.

14. Apparatus as claimed in any one of claims 5 to 13 wherein there is provided transfer means for transferring the pouches to a tobacco filling head and also closing means for closing the fastener of each pouch after filling.

15. Apparatus as claimed in claim 14 wherein the closing means comprises a pivotted roller bar having an elongate operative surface adapted to progressively engage the fastener along its length and urge it closed against a portion of the transfer means.

16. Apparatus as claimed in claim 15 wherein said operative surface is arcuate and the roller bar is spring biased into an initial end position and the roller bar is movable against the spring by pneumatic means.

FIG. 2

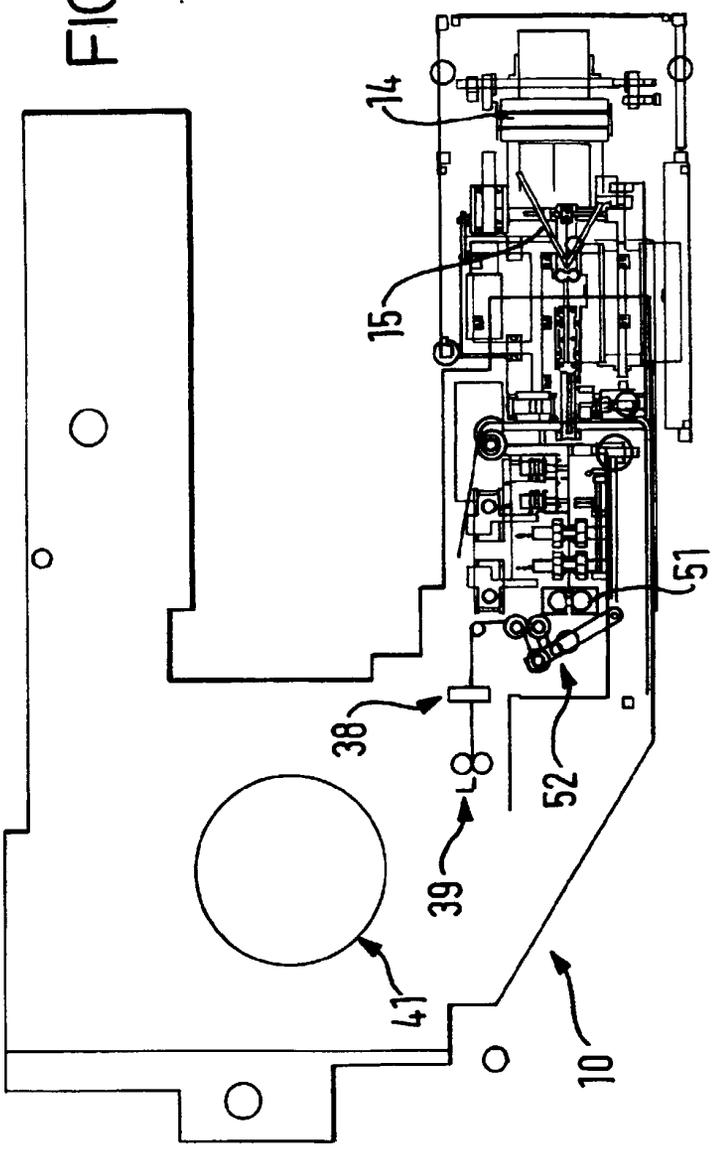


FIG. 5

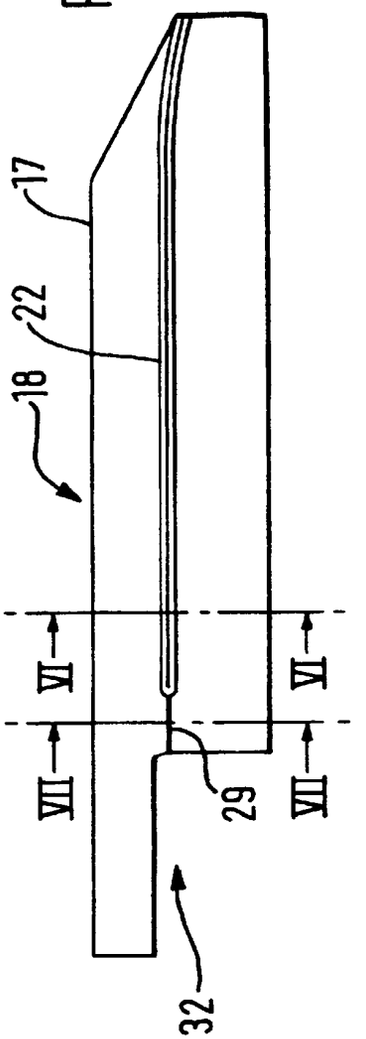
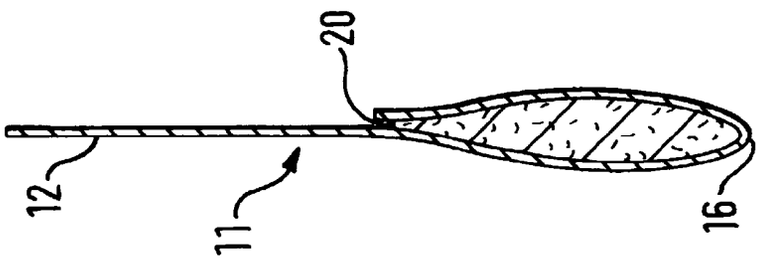


FIG. 1



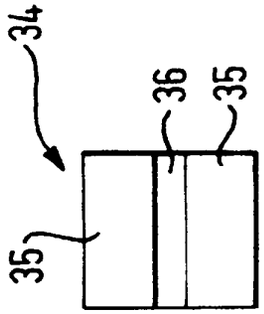


FIG. 8

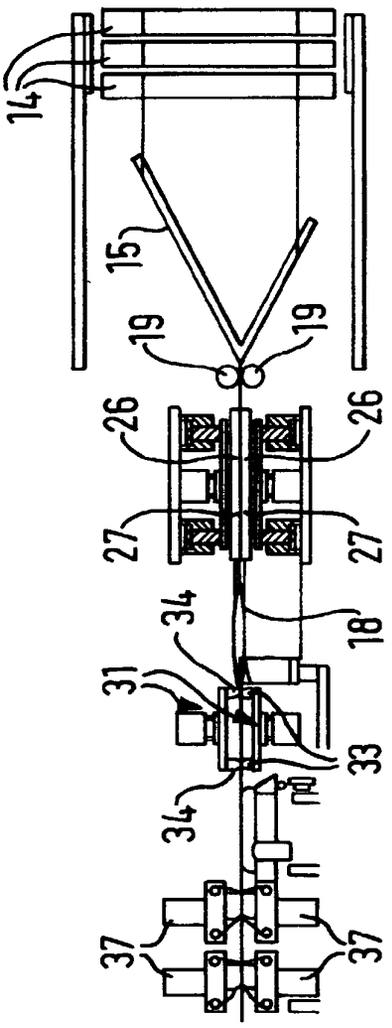


FIG. 3

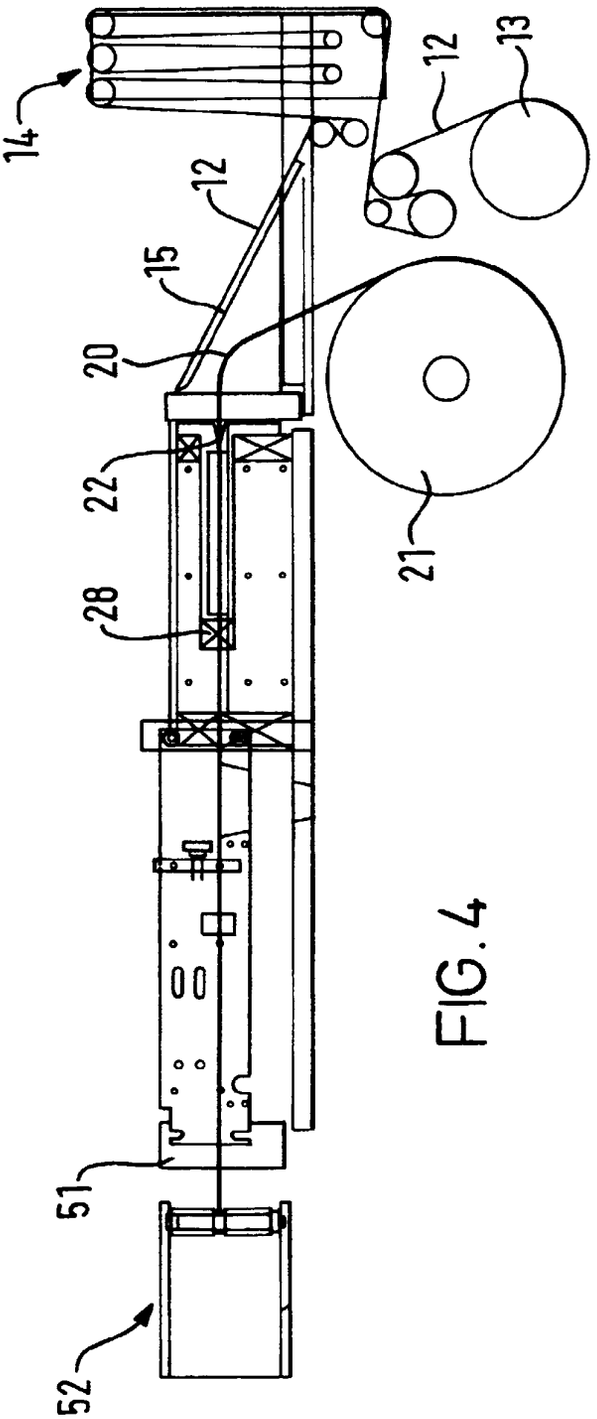


FIG. 4

FIG.9

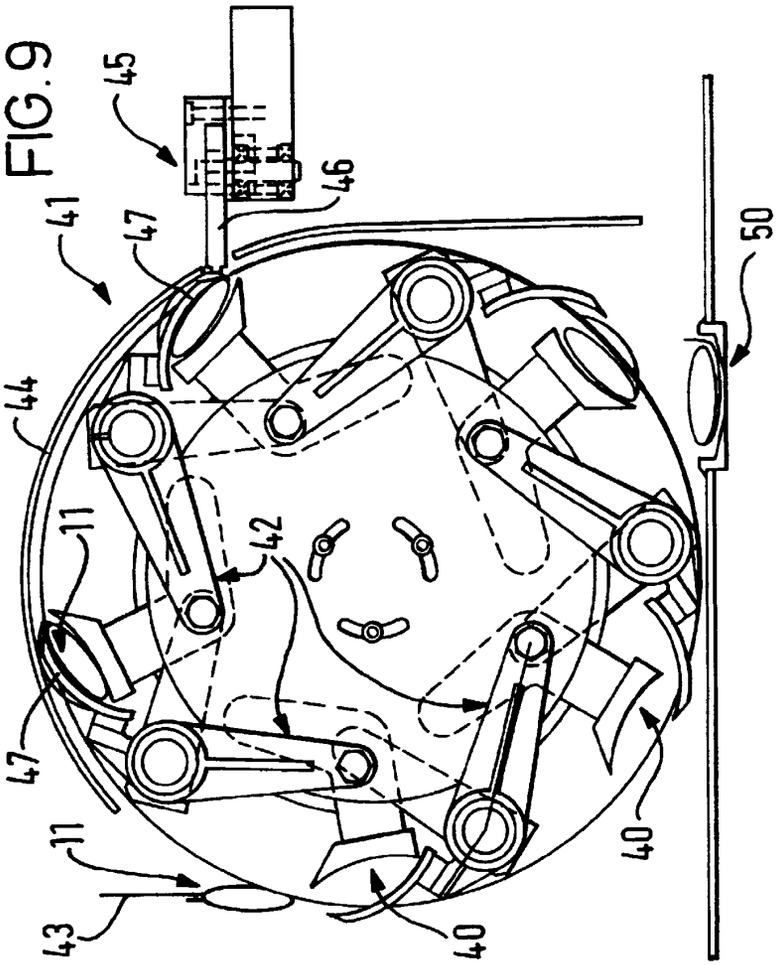


FIG.7

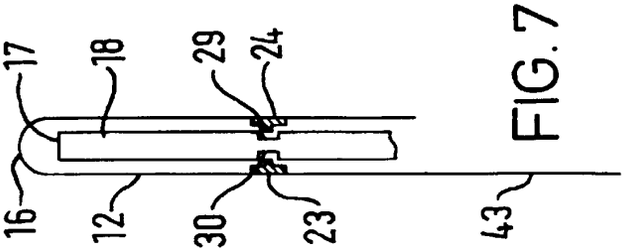


FIG.6

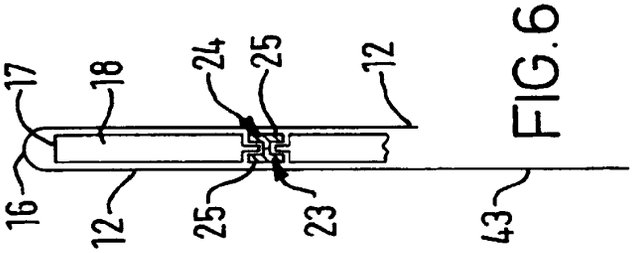
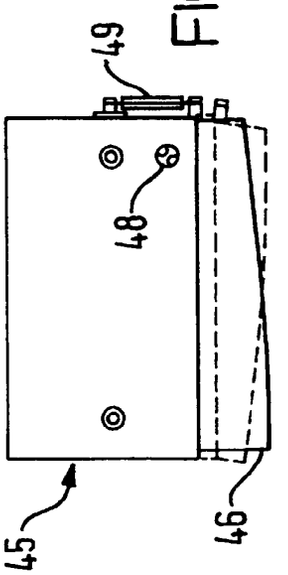


FIG.10



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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 3365

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.7)
X	EP 0 394 579 A (AUTOMATIC HANDLING INC) 31 October 1990 (1990-10-31) * column 7, line 4; figure 12 *	1	A24F23/02
A	EP 0 481 739 A (HAYSSEN MFG CO) 22 April 1992 (1992-04-22) * claims 10,24; figure 2 *	5,8,10	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A24F
B31B
B65B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	28 September 1999	Pille, S

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X : particularly relevant if taken alone
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28-09-1999

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