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

(11) Publication number: **0 225 958**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **85830313.4**

(51) Int. Cl.⁴: **B65B 35/54** , B65B 23/16

(22) Date of filing: **18.12.85**

(43) Date of publication of application:
24.06.87 Bulletin 87/26

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

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(54) **Biscuits and like products packaging machine.**

(57) Machine for the automatic introduction of biscuits (B) into flexible tray-like containers (V), including a central conveyor (22) and two lateral conveyors (16) for the respective supply of the containers and the rows of biscuits to an insertion assembly (30) having positioning means (44, 62) for the containers and two supply platforms (56) for the biscuits, with which horizontal pusher means (58) and vertical pressure means (50) are associated. Motor-driven actuator means (63-166) are provided for effecting the intermittent advance of the conveyors and the successive actuation of the positioning means, the supply platform and the pusher means in synchronism.

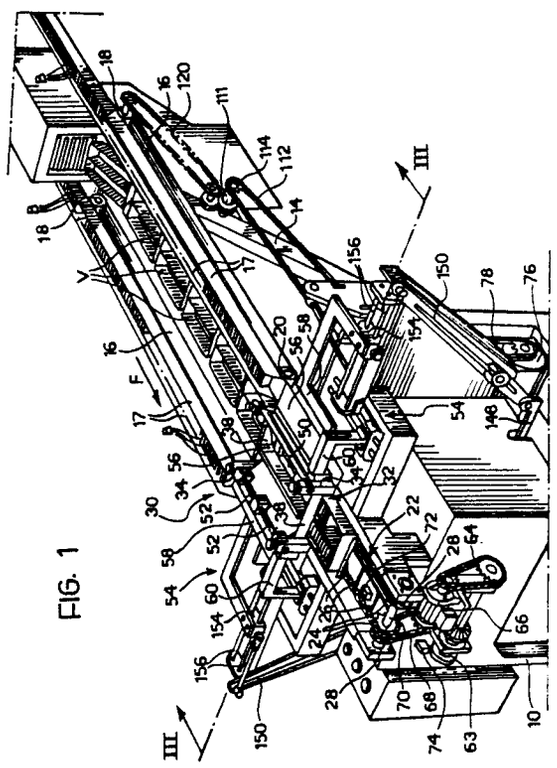

FIG. 1

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Biscuits and like products packaging machine.

The present invention relates in general to the packaging of biscuits and like products and more particularly to the introduction of these products in rows into flexible tray-like containers having two adjacent compartments separated by a longitudinal partition.

Conventionally, these operations are carried out manually, the biscuits being taken from a conveyor coming from a baking oven and being inserted into the two compartments of the containers. These manual operations are obviously inconvenient and difficult because of the instability of the shape of the tray-like containers, and are thoroughly uneconomic.

The object of the present invention is to avoid these disadvantages by providing a machine for introducing biscuits and like products into flexible containers in a totally automatic manner without the need for manual intervention and with high production rates.

The machine according to the invention is characterised in that it comprises:

-an insertion assembly comprising a central station for receiving the containers, provided with movable positioning means for holding the two compartments in the correct open position and a central abutment beneath which the said longitudinal partition of the container is disposed, and two lateral stations disposed on opposite sides of the central station and including two supply platforms which can be moved transversely towards and away from the central abutment, horizontal pusher means movable along the platforms parallel to the direction of movement thereof, and vertical presser means located above the path of movement of the platforms,

-a central conveyor for supplying the containers in succession to the central station of the insertion assembly ,

-two lateral conveyors for supplying two rows of biscuits or similar products, of predetermined length, to the platforms of the two lateral stations of insertion assembly, and

-motor-driven actuator means for effecting, in synchronism, the intermittent advance of the central conveyor and the two lateral conveyors and the successive actuation of the positioning means, the supply platforms and the horizontal pusher means, so as initially to position the rows of biscuits on the platform against the central abutment above the compartments in the container, and subsequently to insert the two rows in the compartments as a result of the withdrawal of the platforms and the action of the vertical presser means.

According to the invention, the motor-driven actuator means are operated by motor means through entirely mechanical transmission units with cam drive members.

According to a further characteristic of the invention, each platform has an associated frontal abutment which can be reciprocated along a path adjustable in dependence on the length of the rows of biscuits to be inserted in the containers.

The invention will now be described in detail with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a perspective view of an automatic machine according to the invention from the front and above,

Figure 2 is a rear perspective view of part of the machine,

Figure 3 is a schematic partial cross-sectional view taken on the line III-III of Figure 1, on an enlarged scale,

Figure 4 is a perspective view illustrating the drive mechanisms of the machine,

Figures 5 to 8 are four schematic views similar to Figure 3, illustrating the successive phases of operation of the machine, and

Figure 9 illustrates a tray-like container for filling with biscuits by the machine of the invention.

With reference to the drawings, a support casing, indicated 10, is mounted on wheels 12 and carries an elongate support appendage 14 at its rear end.

The appendage 14 supports a pair of lateral endless belt conveyors 16 extending horizontally between respective lateral containing walls 17 and driven by respective rear rollers 18 and front rollers 20.

The two conveyors 16, which are driven in a manner to be explained below, are located on opposites sides of a central conveyor 22 formed by a pair of chains 24 joined by spaced-apart cross members 26.

The chains 24 pass over rear sprockets, not illustrated, and respective front sprockets 28 located at the front of the casing 10.

The conveyors 16 and the conveyor 22 have identical directions of movement, indicated by the arrow F in Figure 1, and are intended to receive, at their respective rear ends, biscuits B deposited in contact with each other in two continuous rows and tray-like containers V coming from a loader and deposited between each pair of adjacent cross members 26.

One of the tray-like containers V is illustrated in greater detail in Figure 9. It is formed from light, flexible material such as paper, card or plastics material suitable for foods, and has a rectangular peripheral skirt with a central longitudinal partition P having a height substantially equal to that of the skirt and defining, with the lateral longitudinal walls L, two compartments S which are side by side. Clearly, these compartments S have a width equal to that of the biscuits B which, in the example illustrated, are constituted by rectangular wafers.

The two lateral conveyors 16 and the central conveyor 22 supply an insertion assembly supported by the casing 10 and generally indicated 30.

The insertion assembly 30 comprises a central station 32 which is traversed by the extreme end of the conveyor 22 and, above the conveyor path of the latter, has a support structure formed by four pillars 34 located at the vertices of a quadrilateral and interconnected at their upper ends by two longitudinal pins 36 and at their lower ends by two cross members 38.

The two cross members 38 support a longitudinal abutment 40 at their centre, the abutment having a recess 42 in its underside with a shape complementary to that of the upper edge of the longitudinal partition P of the tray-like containers V.

The central station 30 also includes an elevator device 44 beneath the conveyor 22 and comprising a support structure 46 carrying upper rests 48 for bearing against the bottoms of the containers V. The elevator device 44 is movable vertically, in the manner explained below, between a lowered position (illustrated in Figure 5) in which the tray-like container V disposed at the central station 32 rests on the chains 24 and is spaced from the abutment 40, and a raised position (illustrated in Figures 3 and 6 to 8) in which the rests 48 keep the tray-like container V in a raised condition wherein the upper edge of the partition P engages the recess 42 of the abutment 40 by form coupling.

The central station 32 also includes two presser members 50 formed by curved plates rotatably mounted on the pins 36 and subject to the action of springs 52 biassing them downwardly on opposite sides of the central abutment 40.

The insertion assembly 30 also includes two lateral stations 54 located on opposite sides of the central station 32 at the delivery ends of the two lateral conveyors 16.

Each lateral station 54, includes a horizontal supply platform 56, a pusher member 58 and a frontal abutment member 60.

The two platforms 56 are movable in a direction G (Figure 3) transverse the direction of movement F of the conveyors 16 and 22, between a withdrawn position, illustrated in Figures 5 and 8, in which they are located at the side of the container V located in correspondence with the insertion assembly 30, and a raised position, illustrated in Figures 3, 6 and 7, in which they extend above the compartments S of the container V with their facing ends located adjacent the central abutment 40. The facing ends of the two plates 56 have respective downwardly-turned edges 62 acting, as will become more apparent below, as diverging members.

The two pushers 58 are constituted by shaped rods movable on the two platforms 56 in the same direction G as the latter, between a withdrawn position illustrated in Figures 3, 5 and 6, and an advanced position illustrated in Figures 7 and 8. The movement of the two pushers 58 is independent of but synchronised with that of the two platforms 56, as will be explained below.

The two frontal abutments 60 are also constituted by two shaped rods located transversely of and above the two platforms 56, so as to constitute a barrier to the rows of biscuits B coming from the two conveyors 16. These abutments 60 are reciprocable parallel to the direction F. The advance movement occurs, in a manner explained below, in conjunction with the advance of the two lateral conveyors 16.

The components of the machine having been described, we will now turn to an explanation of the movement of these components.

The central conveyor 22 is driven intermittently and independently by means of an electric motor 63 which, through a first chain transmission 64, drives an electromagnetic friction brake assembly 66 and, through a second chain transmission 68, a shaft 70 carrying the front sprockets 28. In operation, the motor 62 is kept permanently energised and a pair of microswitches 72, 74 respectively control the deactivation and activation of the friction brake assembly 66 with the consequent stoppage and advance of the conveyor 22.

All the other movable members of the machine, except the two pressers 50 which are not motor-driven, are driven by a single electric motor 76 located at the side of the casing 10. As illustrated in greater detail in Figure 4, the motor 76, through a chain transmission 78 and a reduction gear 80, operates a transverse shaft 82 which, in its turn, drives a transverse shaft 84 through a chain transmission 86 at one end, and a longitudinal shaft 88 through a bevel gear pair 90 at the other end.

Two discs 92 are keyed to the shaft 84 and are provided with respective frontal cams 94 which are engaged by feelers 96 carried by two cranked levers 98 articulated at 100 to the casing 14. To the tops of the two cranked levers 98 are articulated two adjustable tie rods 102 rotatably connected to a transverse shaft 104 the ends of which are articulated to two more adjustable tie rods 106. The tie rods 106 are connected at 108 to two pivotable

levers 110. One of the levers 110 is anchored to one end of an open chain 112 whose opposite end is anchored to the casing 10. The chain 112 passes over a sprocket 114 (Figures 1 and 2) which, through a gear transmission with an idle wheel 116, drives a sprocket rear sprocket 122 driving the shaft 124 of the two rear return rollers 18 of the lateral conveyor 16.

To the longitudinal shaft 88 are keyed a first pair of discs 126 having respective frontal cams 128, a second pair of discs 130 having respective frontal cams 132, and a front disc 134 carrying a tangential cam 136 (Figure 3).

The frontal cams 128 of the discs 126 are engaged by respective feelers 137 carried by two cranked levers 138 to which are articulated two crossed tie rods 140 connected to two slides 142 slidable along transverse guides 144 supported by the casing 10 and carrying the two platforms 56 on their upper parts.

The frontal cams 132 of the two discs 130 are engaged by respective feelers 146 carried by two lateral rods 148 to which are articulated two rocker arms 150 connected by two tie rods 152 to two slides 154 slidable along lateral guides 156 and carrying the two pushers 58.

The tangential cam 136 of the disc 134 cooperates with a central feeler 158 acted on by a compression spring 160 and fixed to the support 46 of the elevator 44.

Finally, to the upper ends of the two pivotable levers 110 are articulated two adjustable tie rods 162 connected to a pair of slides 164 slidable along longitudinal guides 166 and carrying the two frontal abutments 60.

The parts described above are shaped so that, during operation of the motors 62 and 76, there is achieved, in synchronism with the intermittent advance of the central conveyor 22, a corresponding intermittent advance of the two lateral conveyors 16 and the activation of the two frontal abutments 60, the elevator 44, the supply platforms 56, and the pushers 58, in a cycle which will be described below.

The operating cycle is as follows.

Initially, a tray-like container V is supplied by the central conveyor 22 in correspondence with the central station 32, while the rows of biscuits B deposited on the lateral conveyors 16 simultaneously advance through the lateral stations 54 on the supply platforms 56 against the frontal stops 58. In this phase, the platforms 56 and the pushers 58 are withdrawn and the elevator 44 is kept in its lowered position (Figure 5).

The conveyors 16 and 22 are then stopped, the two platforms 56 are advanced towards the central abutment 40, and the elevator 44 is simultaneously raised (Figure 6).

Thus, the upper edge of the central partition P of the tray-like container V is engaged in the recess 42 of the abutment 40, while the diverging members 62 of the platforms 56 are inserted in the compartments S.

At this point, the pushers 58 are advanced so as to press the biscuits B supported by the platforms 56 until they bear against the central abutment 40. In this phase, the biscuits B are inserted beneath the vertical pressers 50 which are rotated upwardly against the action of their respective springs 52 (Figure 7).

Finally, the supply platforms 56 are withdrawn to the starting position, the diverging members 56 engaging the upper edges of the longitudinal walls L of the tray-like container V. Thus, the two compartments S are kept in the correct open position while the biscuits B are simultaneously introduced into them as a result of the downward movement of the pressers 50 urged by their respective springs 52.

Finally, the elevator 44 is lowered, the frontal abutments 58 are brought against the ends of the respective rows of biscuits B located on the conveyors 16, and the conveyors 16 and 22 are again activated to repeat the cycle in exactly the same way as that described above.

The containers V containing the biscuits B are removed from the conveyor 22 and may be taken from the machine manually or in a mechanical manner by a conventional delivery conveyor for transfer to subsequent packaging stations.

It will be clear from the above that the machine according to the invention has a high operating rate, together with considerable operational precision and reliability, which enables the cost of the packaging operations for the biscuits B to be reduced drastically.

Clearly, the machine according to the invention may be applied to the packaging of products different from biscuits.

Naturally, the principle of the invention remaining, the constructional details and forms of embodiment may be varied widely with respect to that described and illustrated, without thereby departing from the scope of the present invention.

Claims

1. Machine for the automatic introduction of biscuits and like products into flexible tray-like containers (V) having two adjacent compartments (S) separated by a longitudinal partition (P), characterised in that it includes:

-an insertion assembly (30) comprising a central station (32) for receiving the containers (V), provided with movable positioning means (44, 62) for

holding the containers in the correct receiving position and a central abutment (40) beneath which the longitudinal partition (P) of the container (V) is disposed, and two lateral stations (54) disposed on opposite sides of the central station (32) and including two supply platforms (56) which can be moved transversely towards and away from the central abutment (40), horizontal pusher means - (58) movable along the platforms (56) parallel to the direction of movement (G) thereof, and vertical presser means (50) located above the path of movement of the platforms (56),

-a central conveyor (22) for supplying the containers (V) in succession to the central station (32) of the insertion assembly (30),

-two lateral conveyors (16) for supplying two rows of biscuits (B) or similar products, of predetermined length, to the platforms (56), and

-motor-driven actuator means (63-166) for effecting, in synchronism, the intermittent advance of the central conveyor (22) and the two lateral conveyors (16) and the successive actuation of the positioning means (44, 62), the supply platforms (56) and the horizontal pusher means (58), so as initially to position the two rows of biscuits (B) disposed on the platform (56) against the central abutment (40) above the compartments (S) in the container (V), and subsequently to insert the two rows of biscuits (B) in the compartments (S) as a result of the withdrawal of the supply platforms (56) and the action of the vertical presser means (50).

2. Machine according to Claim 1, characterised in that the motor-driven actuators (62-166) are actuated by motor means (62, 76) through entirely mechanical transmission units with cam drive members.

3. Machine according to Claim 1, characterised in that each supply platform (56) has an associated frontal abutment reciprocable parallel to the direction of transport (F) of the conveyors (16, 22) in a path which can be adjusted in dependence on the length of the rows of biscuits (B) to be inserted in the compartments (S) of the containers (V).

4. Machine according to Claim 1, characterised in that the central abutment (40) has a recess (42) in its lower edge, the recess having a shape which is complementary to the upper edge of the central partition (P) of the containers (V), and in that the positioning means include an elevator device (44) for engaging in the recess (42) of the central abutment (40) the upper edge of the partition (P) of the container (V) supplied at any moment to the central station (32) of the insertion assembly (30), and two diverging members (62) for moving the lateral walls (L) of the container (V) away from the central partition (P) on insertion of the two rows of biscuits (B) in the compartments (S) of the container (V).

5. Machine according to Claim 4, characterised in that the diverging members (62) are carried by facing edges of the two supply platforms (56).

6. Machine according to one or more of the preceding claims, characterised in that the vertical presser means are constituted by two pivotal pushers (50) articulated above the central station (32) and urged downwardly by respective resilient members (52).

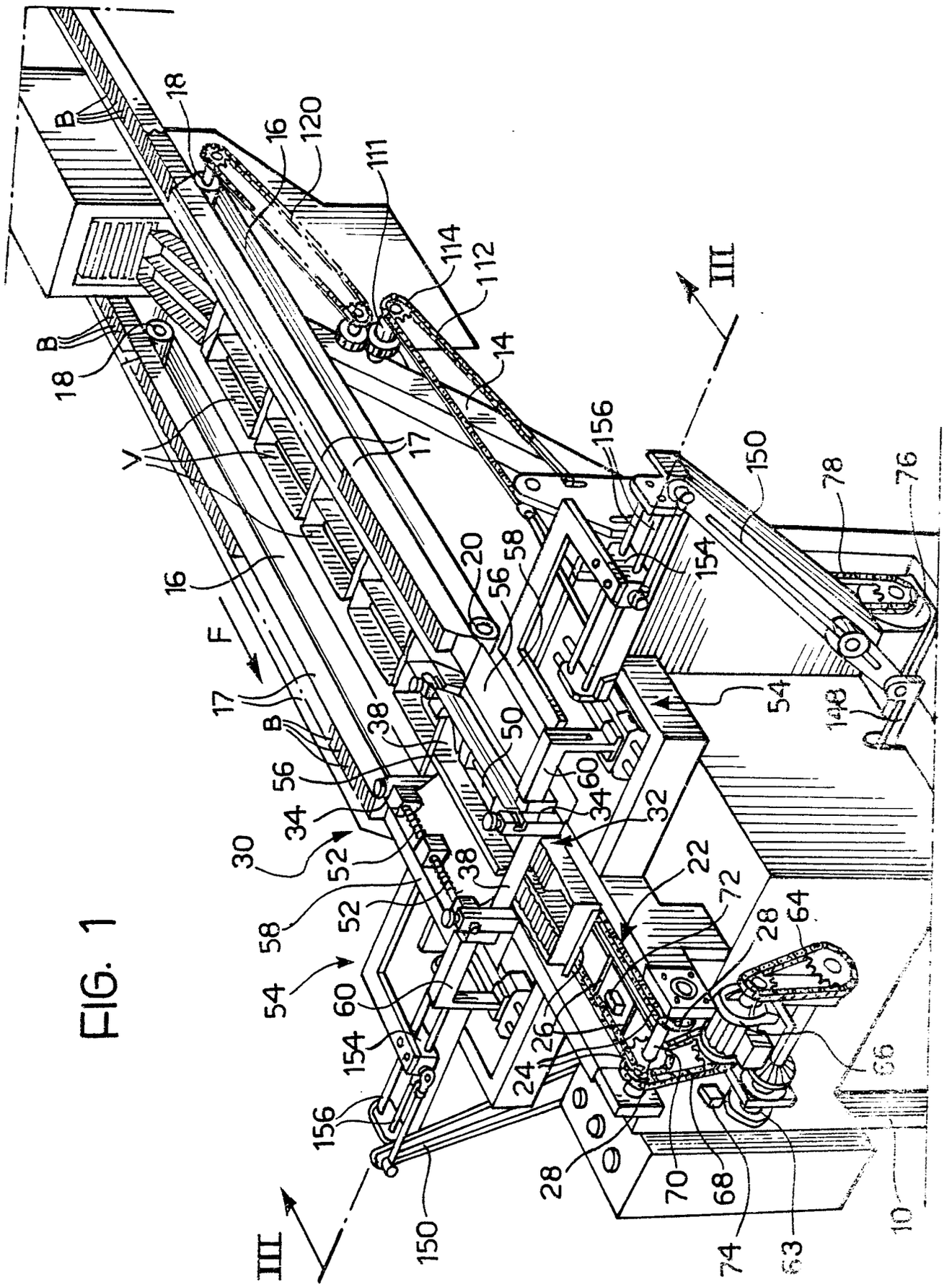
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FIG. 1

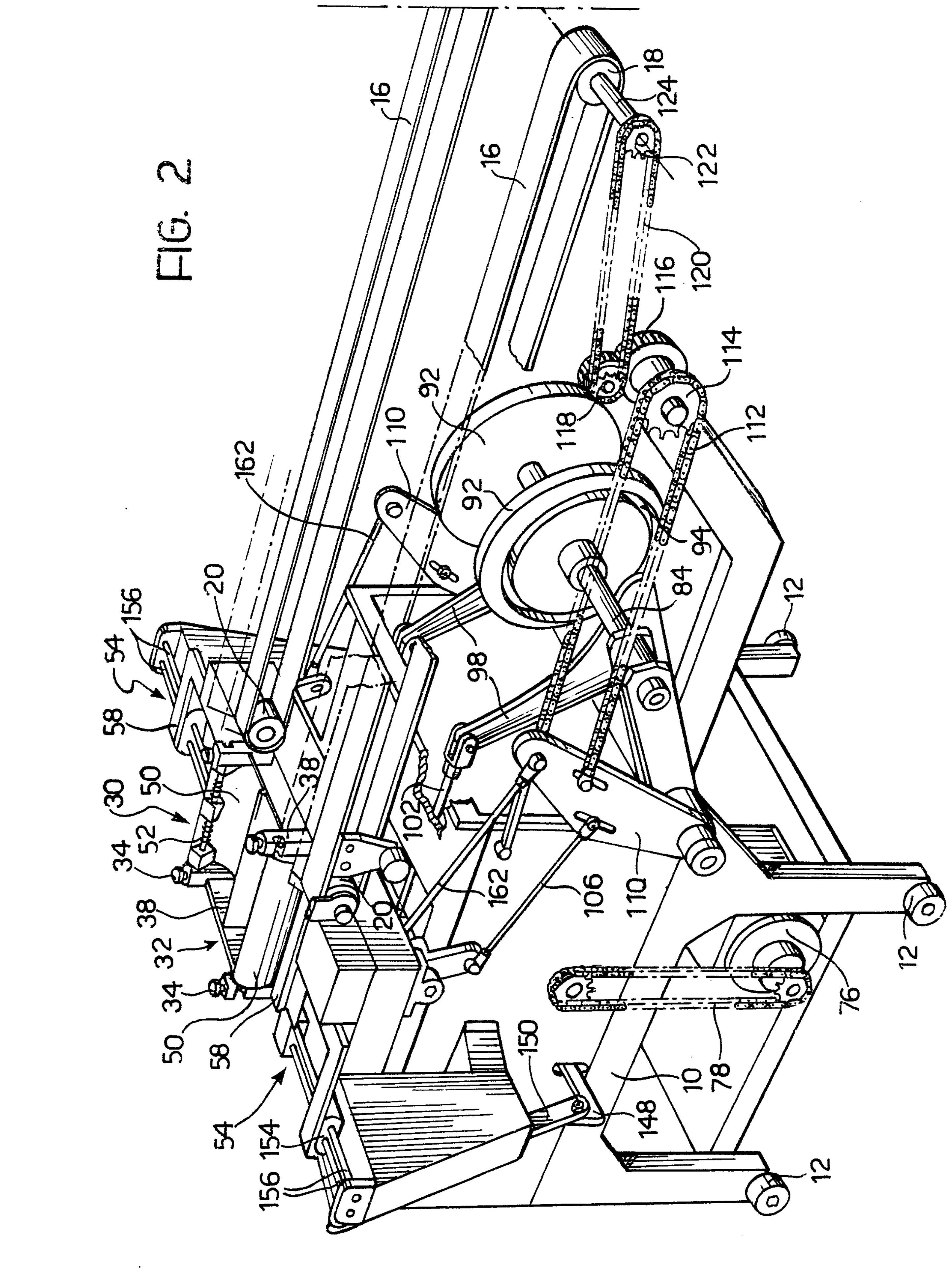
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FIG. 2

FIG. 3

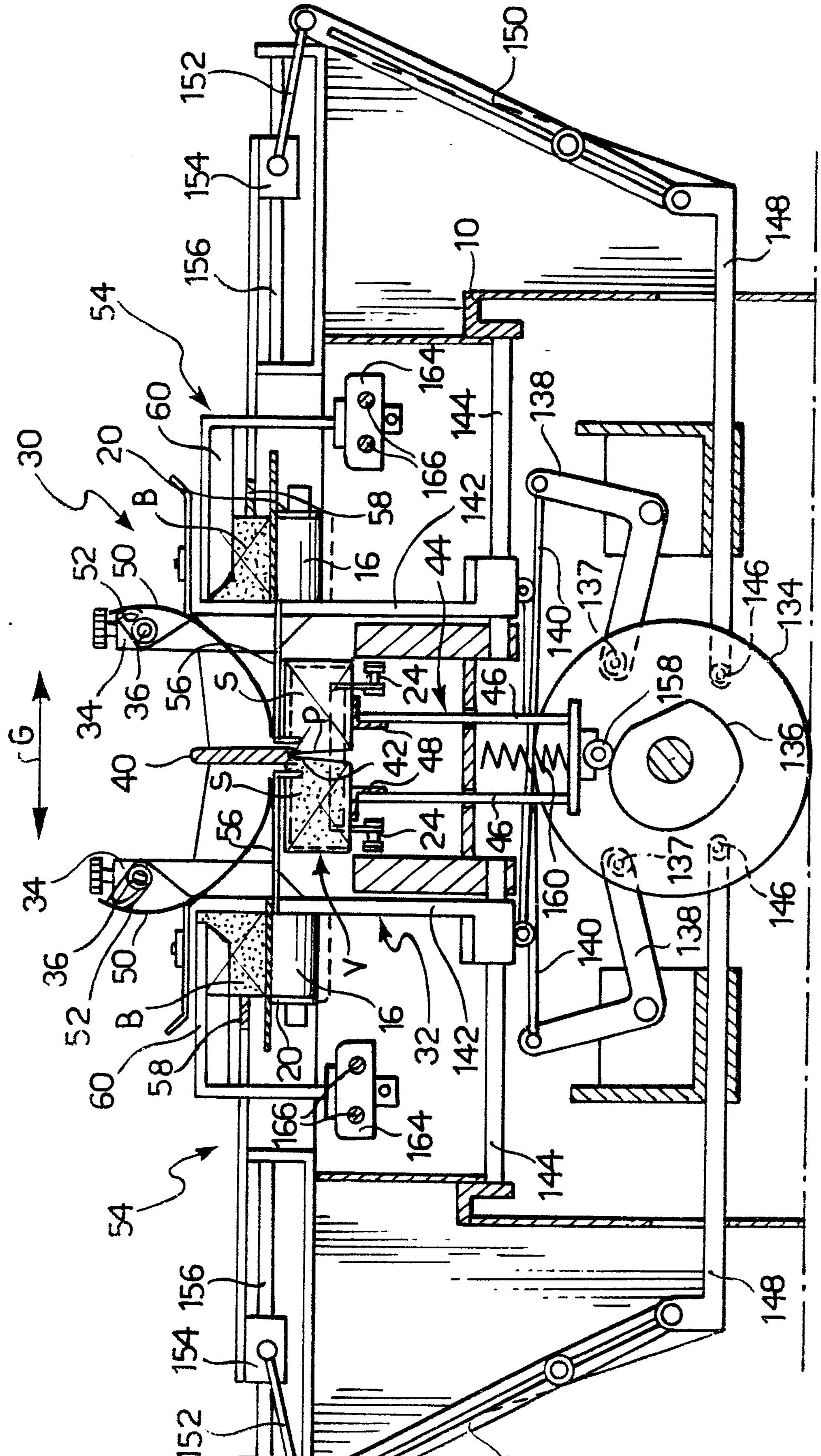
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FIG. 4

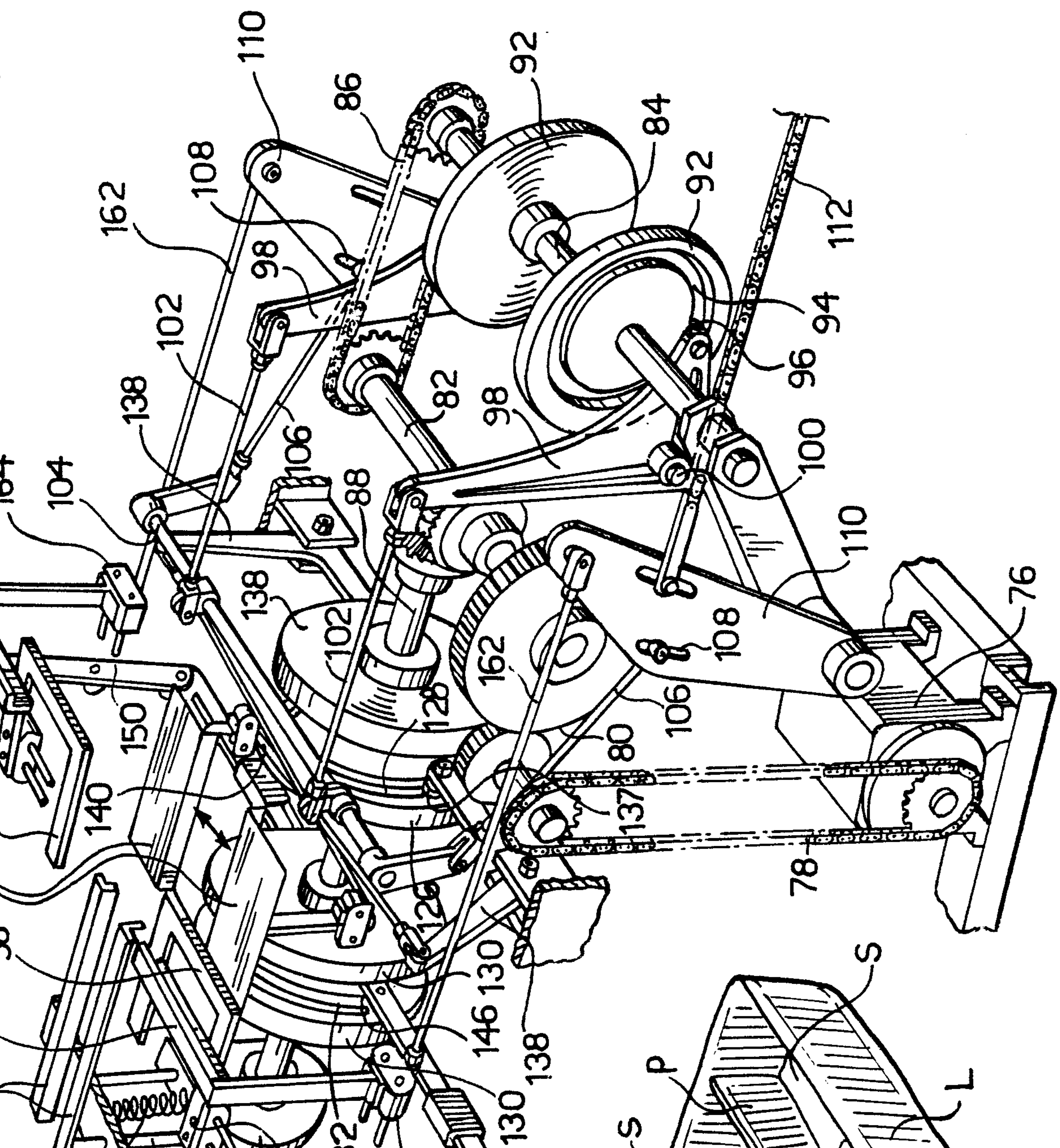

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FIG. 9

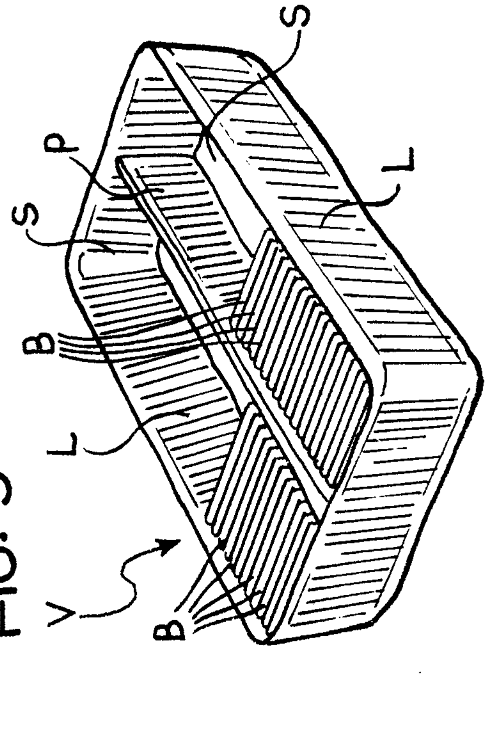

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FIG. 5

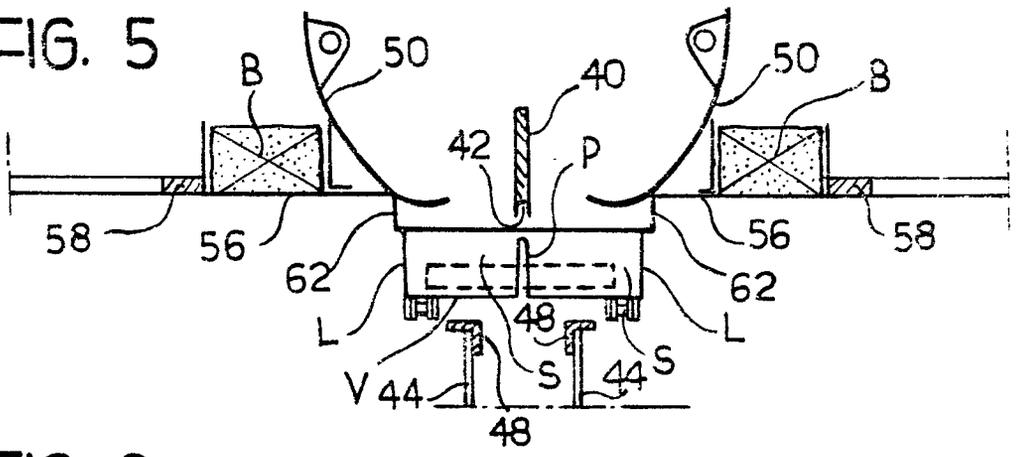


FIG. 6

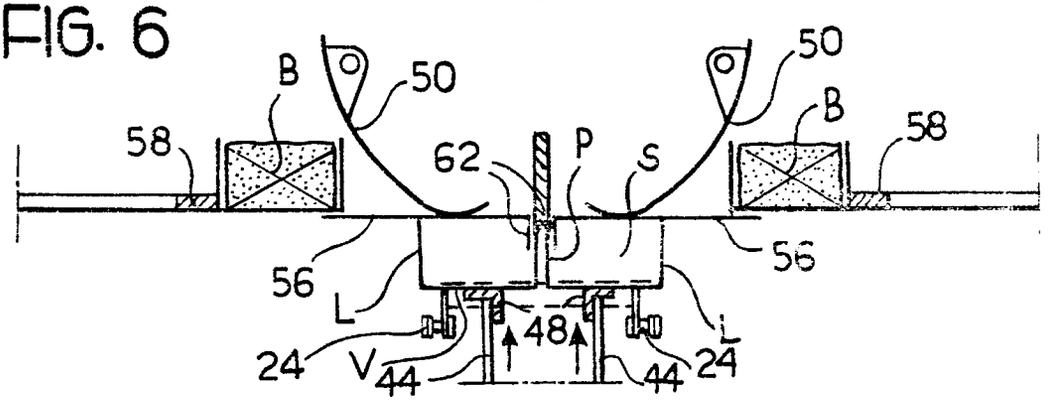


FIG. 7

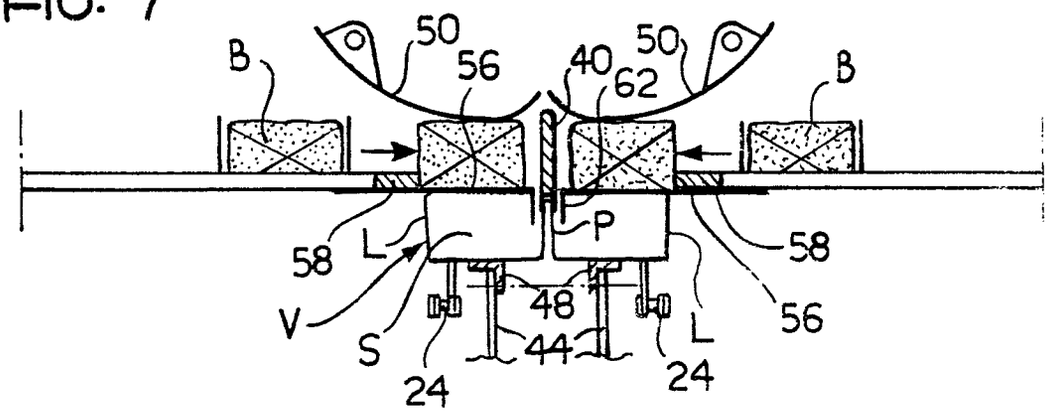
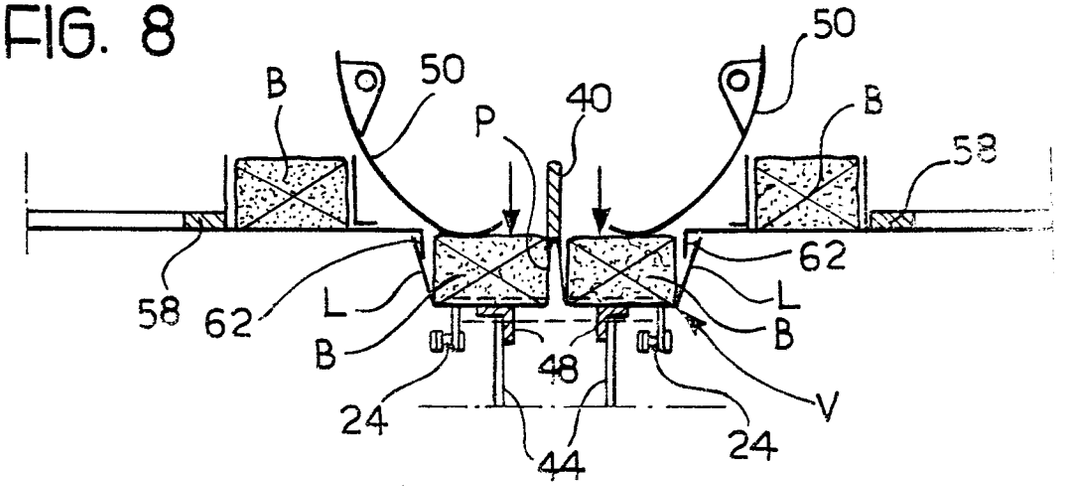


FIG. 8



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EUROPEAN SEARCH REPORT

Application number

EP 85 83 0313

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.4)
X	US-A-2 907 159 (ALLEN) * Whole document *	1,2,6	B 65 B 35/54 B 65 B 23/16
Y		3	
A	FR-A-2 142 471 (SCHWEIZERISCHE INDUSTRIE - GES.) * Figure 3 *	1	
Y	US-A-4 209 960 (SIG) * Column 3, lines 37-52; column 4, lines 21-32; figures 1,3,4 *	3	
A	DE-A-2 154 064 (FERRERO)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
B 65 B B 65 G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31-07-1986	CLAEYS H.C.M.

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