

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **84201384.9**

(51) Int. Cl.⁴: **B 07 C 5/24**

(22) Date of filing: **28.09.84**

(30) Priority: **30.09.83 NL 8303348**

(43) Date of publication of application:
08.05.85 Bulletin 85/19

(84) Designated Contracting States:
BE DE FR GB IT NL SE

(71) Applicant: **Administratie- en Automatiseringscentrum**
Vulcaan B.V.
Prof. E.M. Meijerslaan 1
NL-1183 AV Amstelveen(NL)

(72) Inventor: **Van Essen, Henk**
Rijksweg 128
NL-3784 LZ Terschuur(NL)

(72) Inventor: **Pasterkamp, Klaas**
Iepenlaan 5
NL-1272 HW Huizen(NL)

(74) Representative: **de Wit, Gerard Frederik, Ir. et al,**
Octrooi- en Merkenbureau De Wit B.V. Breitnerlaan 146
NL-2596 HG Den Haag(NL)

(54) Device for sorting objects.

(57) A sorting device in which containers (21) in dependance on a criterion value of their contents are discharged in discharge stations (28) by activating the latter with a time delay equalling the time the containers need to reach the related station, switching means (10,37-44;45-49) being present to change the discharge station or stations receiving the objects of one or more predetermined criterion values. A preferred embodiment allows to change even the destination of objects which are already on their way to the new allotted discharge station or stations.

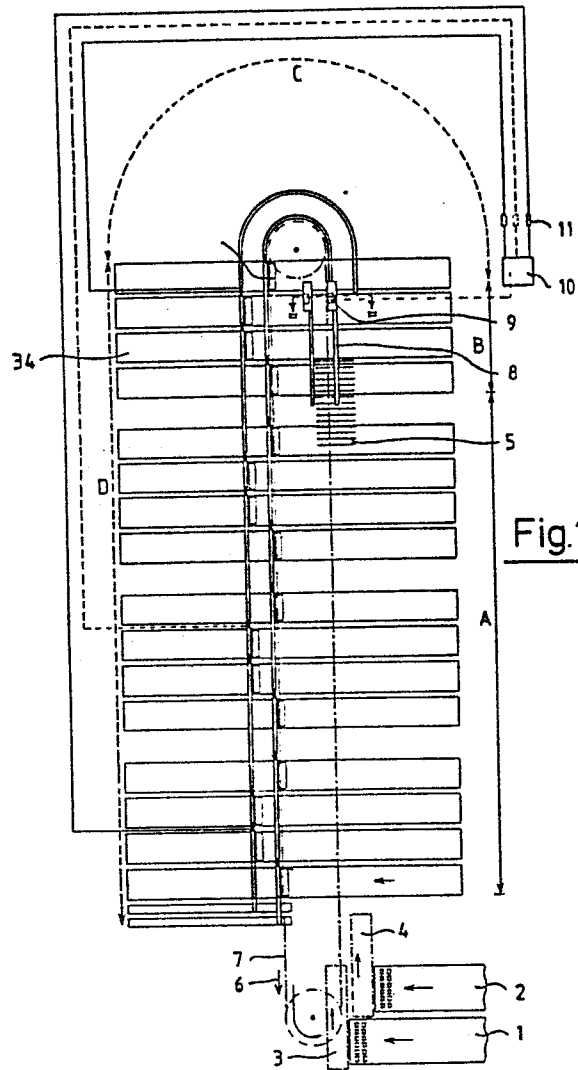


Fig.1

Device for sorting objects.

0140425

The invention relates to a device for sorting objects according to one or more criterions, such as quality and weight, provided with containers movable along a track, which containers are adapted to contain an object in part
5 of said track, a plurality of discharge stations located along said track, discharge means for causing said containers to discharge the objects they contained at the discharge stations, control means for said discharge stations, criterion indicating means for indicating a criterion value of an
10 object in a container and connected to the control means, delay means being provided in connections between the criterion value indicating means and the control means in order to make a control signal based on said criterion value available for the said control means with the same delay as
15 the object needs to travel to the control means of a discharge station allotted to the indicated criterion value.

Such a device is known from for instance the British Patent Specification GB-A-875.797.

20

This criterion value may be the weight of an object, but also a colour value may be used as is indicated in the British Patent Specification GB-A-1.602.911, whereas specially for eggs such a criterion value may be the candling
25 result.

In the said British Patent Specification GB-A-875.797 all objects are fed to the discharge stations, so that not all objects fed to a discharge station are discharged in it. On
30 the other hand sorting devices exist, vide for instance European Patent Application 0 048 525, in which only those containers, that have to be discharged in a certain discharge station, pass such a station in a position in which they can cooperate with the station, because of a predetermined height
35 position of a discharge member of the container.

The other containers pass the discharge station with another height position of their discharge member and can be consi-

dered not to be fed to such a discharge station. ~~0140425~~ion
is applicable to both types of sorting devices, to wit those
in which all containers are fed through all discharge
stations, so that only part of the containers fed to a dis-
5 charge station are discharged in that station and those in
which not all containers are fed to every discharge station,
but a container fed to a discharge station is always dis-
charged in it.

- 10 The container may be of any type of dischargeable device,
such as for instance a releasable gripper or a tiltable cup
and may be mounted to a travelling balance or not.

Also it is not necessary that it is always the same container:
15 If in any place of the device the objects are transferred to
other containers (as for instance is the case in the British
Patent Specification GB-A-875.797) the term "container"
indicates the sequence of containers containing the same
object.

20

The criterion indicating means may be mechanical, such as
travelling mechanical balances, electronical, such as
electronical weighing devices, colour detectors, automatic
candling devices or simply manually actuability, such as
25 keys to be activated by an inspector such as an egg candler.

The delay means may consist of a system of rotary switches
and relay circuits, as indicated in the cited British Patent
Specification GB-A-875.797, but preferably consist of shift
30 registers, stepped in dependence on or in accordance with
the movement of the containers, as per se is known from the
United States Patent Specification US-A-3 898 435. In case
the device is coupled to a computer, the delay means may be
incorporated in the computer, which may carry out the task
35 of delaying the signals by memorizing them during the time
period the container needs to reach the related control
means.

With devices of the indicated type the difficulty occurs,
40 that it often is desirable to change the discharge station

or stations at which the containers containing ~~objects~~ **0140425**
one or more criterion values have to be discharged. Such a
necessity may occur if a discharge station becomes out of
order, for instance if any mechanical failure occurs, it
5 has been soiled, for instance by an broken egg, or no
packings for the discharged objects are further present at
the discharge station. Further a switch can be desired if
another type of packing has to be used or for some reason
it simply is desirable to receive the objects of a certain
10 criterion value in a certain discharge station. A further
reason for changing discharge stations may be, that for a
smoother running of a discharge station receiving many
objects or even for obtaining a higher working speed of the
device, two or more discharge stations are allotted to
15 objects of one and the same criterion value.

In the known devices such a change of the discharge station
or stations allotted to one or more criterion values is
rather cumbersome and often even needs demounting and replace-
20 ment of members, such as guides determining the height
position of discharge members of the European Patent Appli-
cation EP-A- 0 048 525 or wire circuits of the British Patent
Specification GB-A-875 797.

25 The invention aims to provide a device of the depicted nature,
in which it is possible to change the discharge station or
stations allotted to one or more criterion values in a very
easy way, even without stopping the device.

30 According to the invention this aim is realized by providing
that switching means are present to modify the discharge
station or stations allotted to one or more criterion values.

In case the device has discharge stations, in which all
35 containers fed to a discharge station are discharged in it,
as in principle is known from the European Patent Application
EP-A-0 048 525, a preferred embodiment of the invention
consists in that the control means are guide switches causing
the containers to follow branched guides leading to a dis-
40 charge station allotted to the criterion value of the objects

in the said containers.

0140425

In this embodiment a very simple and easy surveyable lay out of the branched guides is obtained, if it is provided
5 that the branched guides consist of an omnibus guide, an assembling means for conducting all containers to said omnibus guide and guide switches for a branched guide for the related discharge station.

10 A preferred embodiment of the invention provides that said switching means contains distribution means adapted to allot objects of a criterion to be discharged in more than one discharge station according to a predetermined sequence pattern. This embodiment allows to distributed objects having
15 the same criterion value to more than one discharge stations, which need not to be juxtapositioned.

A further elaboration of this embodiment, which enables in many instances, specially if a certain criterion value
20 occurs many times, to obtain a further improvement of this embodiment provides that the distribution means contains cyclic divider means adapted to divide by a small integer number, for instance two, in order to enable an allotted discharge station only in case the divider means is in a
25 predetermined divider position (for instance odd or even). Because this feature guarantees that never two successive objects will be discharged in the said allotted discharge station, it allows in many cases for a higher working speed of the device.

30

Because it may be easy to allot more than one criterion value to the same object, for instance in case of eggs as a first criterion value the candling result and as second criterion value the weight, it may be easier to weigh all
35 eggs , also those which are candled out. Because, however, one criterion value may be decisive, for instance a bad egg, which should be sorted out independently of its weight, according to a further elaboration of the invention it is provided, that a discriminator means is present to make one
40 or more criterion values dominating one or more other

criterion values indicating the said container to discharge in a discharge station not allotted to the dominating criterion value. 0140425

- 5 When changing the discharge station or stations receiving the objects having one or more criterion values, the difficulty may occur, that the objects which are already on their way towards the discharge station previously allotted to them, either will nevertheless be dropped in said station, 10 or, if the station is disabled to discharge any object, not discharged at all. In that instance in many devices of the known art any non-discharged object will be discarded at a special discarding station.
- 15 In order to minimize or even avoid this disadvantage, which would occur with all objects on their way from the location corresponding to the entrance of the delay means, according to a preferred embodiment of the invention it is provided that the shift register means contains a parallel shift 20 register adapted to shift a multi-bit word, outputs of this register being present in shift locations corresponding to the locations of the control means for the discharge stations, said register outputs being connected to comparators, in which the output value of the shift register is compared 25 with a multi-bit word, the switching means (49) having means for inserting said multi-bit word in the related comparator.

It is remarked, that any computer specialist knowing the invention may be able to connect a sorting device with a 30 processor or computer specially with a machine clock input corresponding to the distance travelled by the containers, an input for the criterion values related to the separate objects and one or more outputs for controlling the control means. It is considered, that the several means such as 35 delay means and switching means can be considered to be present if it is possible by feeding instructions to the said processor or computer to change the discharge station or stations allotted to one or more criterion values.

40 In that instance the processor or computer is a means for

delaying the information corresponding to a criterion **0140425**
during a period corresponding to the time the containers
need to reach the related control means, whereas it is also
a means to switch the information corresponding to said
5 criterion value to another control means with the delay
necessary to that control means. The fact that the same
parts of the processor or computer to other jobs at other
times does not annul the fact that such means are present.

10 In the following the invention is further elucidated on
hand of the drawing, in which:

Figure 1 shows schematically a plan view of a part of a
sorting machine in which the invention has been used,

15 Figure 2 shows a view on an enlarged scale taken over the
line II-II in fig. 1,

Figure 3 elucidates schematically an embodiment of the
invention,

Figure 4 shows a scheme elucidating the switchable control
20 of the discharge stations, and

Figure 5 shows a further scheme elucidating a further
switchable control of the discharge stations.

Figure 1 shows an egg grading machine of the type shown in
25 the United States Patent Specification US-A-4 383 613, it
being schematically indicated how the invention can be
applied to this machine.

In short the working of this machine comes down to feeding
30 by means of feeding chains 1 and 2 eggs to egg transfer
devices 3 and 4, which transfer them to balances, which in
pairs are mounted to yokes 5. The yokes 5 are connected to
an endless chain 7, which is continuously driven in the
direction of the arrow 6.

35

After putting the eggs in the balances, the latter may
assume their equilibrium position in the trajectory A, which
equilibrium position by means of magnets 8 is digitalized in
a restricted number of final positions, which correspond to

0140425
a plurality of weight classes. By means of detectors 9 these final positions are detected and transferred to an electronic processor 10 which by means of shift registers 11 transmits signals belonging to the detected weight classes to the 5 discharge stations 12. In figure 1 only the connections to the first, tenth and fifteenth discharge station have been drawn.

In figure 2 on an enlarged scale a cross-section over the 10 line II-II of figure 1 has been shown. As shown each yoke 5 is supported in guides 13 and 14 by means of guide rolls, a further guide 15 restraining by means of a further guide roll transverse deviations of the yoke. Each yoke has two depending legs 16, which each in a pivot 17 support a 15 balance beam 18, which at its one end bears a counter-weight 19 and an adjustment weight 20 and at its other end a container 21. A link 22 provides a parallelogram mounting of the container 21 with respect to the leg 16. At the lower side of each container an egg gripper 23 has been mounted.

20
Other constructional details of the containers are less important for the invention. Nevertheless it is indicated that a guide roll 24 can cooperate with guides of which 25' and 25" are shown with interrupted lines in figure 2 and 25 with solid lines in figure 3. Other such guides are indicated with 33 and 35 in figure 3. Each container is provided with a part 26 which is a discharge control member, which means, that when it hits a non-travelling discharge abutment located along the track of the containers, it provokes the opening 30 of gripper 23 and a pivot movement of roll 24 away from the guide indicated with 33 in figure 3. Details of this construction can be found in the United States Patent Specification US-A-4 287 982.

35 The backside of each balance beam supports a metal sheet 27 that can cooperate with detectors 9₁.....9₉ controlled by the electro-magnetic damping caused by these sheets. The corresponding detectors at the right side of the shown balances are indicated with the references 9'₁.....9'₉.

As schematically indicated in figure 1 the signals issuing from the detectors 9 are transmitted to the shift registers 11 by means of a processor or switching device 10 to be discussed further on.

5

In figure 3 an embodiment of the invention has been shown schematically, in which all containers which by their guide roll are lead into a certain discharge station are discharged in that station. For that reason the discharge station 10 is provided with a delatching set 28, which is able to bring non shown discharge abutments in sequence on the level of the discharge member 26 of an arriving container, the location where this happens being shifted over the distance from one discharge location to the next one, so that the 15 eggs are discharged the one after the another in a row.

Such delatching sets in practice are used in a considerable amount and depicted in for instance the United States Patent Specification US-A-3 749 260. The eggs discharged are 20 received in a receiving device 29, for instance of the type depicted in the United States Patent Specification US-A-4 287 982.

The working of the device shown in figure 3 is the following:
25 When the balances come from the left, they will take positions corresponding to the dash-dot lines 8 under influence of the magnets 8, which lines due to this influence converge a little. By reason of this all balances are almost exactly in a position corresponding to a dash-dot line and not in 30 an intermediate position.

These well defined positions are further maintained by the interspaces between the detectors 9 corresponding to 9₁....9₉ of figure 2. For clarity's sake these detectors 35 9₁....9₉ are shown in figure 3 between the guides 25' and 25", but in fact they are located at the other side of the balances. After the balances have become free, their guide rolls 24 will remain on nearly the same level until they engage the upper 25' or the lower 25" of the converging 40 guides 25' and 25" after which they are conducted toward the omnibus guide 35.

In figure 1 first the so called damping region A has been indicated, followed by a region B in which the weight classes are detected, after that a region C, in which the guides are brought at the same level and finally a region D containing 5 guide switches to conduct container rollers 24 from the omnibus guide 35 to the branched guides 33 and the unlatching sets 28 of the different discharge stations. These regions to wit part of region A, regions B and C and part of region D have also been shown in figure 3.

10

In the omnibus guide 35 a number of guide switches 30 are present, which normally occupy the position shown in solid lines, but under influence of electro-magnets (not shown) they can be brought in the position shown with an interrupted 15 line, because they are pivotable about pivots 31. When a roll 24 engages a guide switch 30 in the position shown in interrupted lines it is urged downwardly until it engages in the guide 33 located below omnibus guide 35 a backward extension 32 of the switch 30. By reason of this the guide 20 switch is reset.

In figure 1 a machine has been shown having sixteen discharge stations to wit eight for the balances at the one side of the yokes 5 and eight for the balances at the other side of 25 the yokes.

According to the invention the processing unit 10 is adapted to change the interconnections between the leads from detectors 9 and those leading to the shift registers 11. 30 Figure 4 shows a basic scheme of an embodiment of such a processing unit.

Figure 4 shows the outputs 9_1-9_9 of the detectors indicated with the same references and U_1 and U_2 of two keys (not 35 shown) which indicate three different candling results to wit one when only U_1 has been activated, the second one when only U_2 has been activated and the third one, when both U_1 and U_2 have been activated. At 36 elements containing compensating delay means have been indicated. These means compen- 40 sate for the time lapse the objects need to travel from the

location where they are when the signals on U_1 or U_2 are generated to the location, where their containers cooperate with the detectors 9. A further purpose of the elements 36 is to generate and issue simultaneously well shaped pulses 15 of a predetermined duration. The elements 36 are timed by a non shown clockpulse generator which also clocks other elements of the circuit, for instance the coding device 37 still to be described and the shift registers 11.

- 10 The coding device 37 has four parallel output lines 38, which in a binary coded form carry the information indicating one out of the twelve possible criterion values, namely nine weight values and three candle results to wit U_1 activated, U_2 activated and both U_1 and U_2 activated. Further 15 coding device 37 contains comparator means to make sure that in case a candle result value is received this value overrules the weight value ascertained for the same object.

- The output of coding device 37 is carried by a multiple 20 lead to comparators 39, there being two comparators 39 present for each discharge station. A second multiple input of each comparator 39 is fed by a manually servable thumb wheel switch 40, which allows to selectively supply a control voltage to the said second multiple input of comparator 39. 25 If the thumb wheel switches 40 supply a voltage pattern corresponding to that of the output of coding device 37 a pulse is fed to an OR-gate 41. The output of the OR-gate 41 is connected to a divider circuit 42 dividing by two. This circuit 42 can be set to transmit each pulse it 30 receives on its input or only those which occur with each odd input pulse or only those which occur with each even input pulse.

- The output of divider circuit 42 is carried to a shift 35 register 11 corresponding to those of figure 1. The output of the shift register 11 is connected to an one-shot multivibrator 43 which delivers an energizing pulse for an electro-magnet 44 for activating a guide switch 30 of figure 3.

In figure 4 a pair of two thumb wheel switches ~~040425~~ ⁰⁴⁰⁴²⁵h connected to one out of a pair of comparators 39 feeding the same OR-gate 41.

5 In case it is desired to discharge only the objects having a selected criterion value, one of the thumb wheel switches is adjusted to a code value not occurring in the code values issuing from 37, which means that it will never give an output to OR-gate 41. It is also possible to set the thumb
10 wheel switches of the same group on the same code value, because an OR-gate gives also an output if both of its inputs are activated.

Divider circuit 42 is set in the position in which it trans-
15 mits each pulse it receives, so that after the delay of shift register 11 electro-magnet 44 is energized for each object having the selected criterion value.

In case it is desired to discharge the objects having two
20 different criterion values, the first and second thumb wheel switches 40 of a group are adjusted, the one to a first one of said criterion values and the second to the second one. The OR-gate 41 transmits a pulse for both these criterion values.

25

In case it is desired to discharge the objects of the same selected criterion value in two different discharge stations a comparator 39 belonging to the control circuit for the electro-magnet 44 of the one discharge station and a compa-
30 rator 39 belonging to the control circuit of the electro-magnet 44 of the other discharge station are set on the related criterion value, it being clear that the other thumb wheel switch of each pair is either set on a non existing criterion value or on the same criterion value.

35

One of the dividers 42 is set in its dividing position transmitting the odd pulse numbers and the other is set to transmit the even pulse numbers.

40 Because the pulse number, the oddity of which activates the

one divider 42, is the number of pulses corresponding **0140425**
movement of the containers equalling a step from one container
to the next, it is not so that each discharge station receives
alternately an object of the selected criterion value. Statis-
5 tically they will, however, in the long run receive almost
the same number of objects. The important result is, however,
that never two immediately succeeding objects can arrive in
the same discharge station, which allows for an important
increase of the working speed of the device.

10

When with the shown embodiment one wants to change the dis-
charge station receiving the objects of a selected criterion
value, the objects on their way from the location of the
detectors 9 to this discharge station will nevertheless be
15 dropped in that station. Of course it is possible to disable
any discharge station, for instance by preventing activation
of the related guide switch 30, but in that instance it will
be necessary either to have a free discharge station at the
end of the track travelled by the containers or to have the
20 objects discarded by the usual final discharger, such as a
permanent stop at the level of discharge member 26 of the
containers. The disadvantage is, that all the objects on
their way between detectors 9 and their previous discharge
station, will not reach the new station, and will be lost
25 in case the last discharge station is not permanently
available to receive such objects. Such an availability
occupies permanently a complete discharge station, whereas
none of the objects which have passed the detectors 9 will
be discharged in the new discharge station allotted to them.

30

The embodiment shown in figure 5 eliminates this disadvantage
in a considerable degree.

In this figure the coding device 45 corresponds to 37 of
35 figure 4, but its output 46 is connected to a parallel shift
register 47, which with each clock pulse shifts a complete
code word one step further on. Because such a code word has
to encompass twelve criterion values and possibly a
thirteenth value corresponding to no object present, a shift
40 register with four parallel tracks suffices. At the location

corresponding to the different discharge stations ~~0140425~~⁰¹⁴⁰⁴²⁵ comparators 48 are mounted. These comparators receive the code word in the related stage of the shift register and compare this word with a word set by means of a data input
5 49. Each comparator 48 corresponds to a comparator 39 of figure 4 and the same features can be used for discharging objects of two different criterion values in the same discharge station, in which instance two comparators 48 are connected to the same output of the shift register 47, each
10 connected to the same discharge station activating electromagnet 44. In case objects of one criterion value have to be dropped in two or more discharge stations, the output of the related comparator 48 has to be connected to a circuit energizing sequentially the electro-magnets of the different
15 allotted discharge stations.

Because the function of many parts, such as 45, 47, 48 and 49 can be carried out by commercially available processors or even micro-processors, it may be possible to step a
20 sixteen bits word through the shift register 47, which gives the possibility to use only one bit in each code word for each criterion value. This allows for a very simple execution of the outputs of shift register 47 and the comparators 48.

25 The embodiment of figure 5 guarantees that in case the newly allotted discharge station is aval of the previous one, all objects will reach the new one, whereas in case the new station is located amont the previous one only the objects which have already passed the newly allotted one will be
30 dropped in the previous one or if this is^{dis}/enabled, be discarded.

It is remarked that the above embodiments relate to devices in which all containers fed to a discharge station are
35 discharged in said station.

The invention is, however, also applicable to known devices, in which all containers are fed through all discharge stations, as for instance shown in the British Patent Specification
40 .GB-A-875 797. In such a device the activation of the dis-

charge stations can be treated in the same way. **0140425**

If a discharge station has a row of activable discharge locations, all controlled with a delay corresponding to
5 their location along the track of the containers, it is possible to have the switching means of the invention change the allotment of a selected criterion value from a first group of discharge locations to another group.

0140425

Claims:

1. Device for sorting objects according to one or more
criteria, such as quality and weight, provided with
containers movable along a track, which containers are
adapted to contain an object in part of said track, a
5 plurality of discharge stations located along said track,
discharge means for causing said containers to discharge
the objects they contained at the discharge stations,
control means for said discharge stations, criterion
indicating means (9,U) for indicating a criterion value of
10 an object in a container and connected to the control means,
delay means being provided in connections between the
criterion value indicating means and the control means in
order to make a control signal based on said criterion value
available for the said control means with the same delay as
15 the object needs to travel to the control means of a discharge
station allotted to the indicated criterion value, character-
ized in that switching means (10,37-44,45-49) are present
to modify the discharge station or stations allotted to one
or more criterion values.
20
2. Device according to claim 1 having discharge stations
which cause all containers entering them to be discharged
in them and in which the containers cooperate with branched
guides (35,33) characterized in that the control means are
25 guide switches (30,31,32) causing the containers to follow
branched guides leading to a discharge station allotted to
the criterion value of the objects in the said containers.
3. Device according to claim 2, characterized in that the
30 branched guides consist of an omnibus guide (35), an assem-
bling means (25',25") for conducting all containers to said
omnibus guide and guide switches (30) for branched guides
(33) for the related discharge stations (28).
- 35 4. Device according to any of the preceding claims,
characterized in that said switching means contains distri-
bution means (40-42) adapted to allot objects of a criterion
to be discharged in more than one discharge station according

0140425

to a predetermined sequence pattern.

5. Device according to claim 4, characterized in that the distribution means contains cyclic divider means (41) adapted to divide by a small integer number, for instance two, in order to enable an allotted discharge station only in case the divider means is in a predetermined divider position (for instance odd or even).
- 10 6. Device according to any of the preceding claims, in which more than one criterion value may be allotted to the same object in a container, characterized in that a discriminator means (37) is present to make one or more criterion values dominating one or more other criterion values indicating the
.15 said container to discharge in a discharge station not allotted to the dominating criterion value.
7. Device according to any of the preceding claims, in which the delay contains a shift register means, characterized in
20 that the shift register means contains a parallel shift register adapted to shift a multi-bit word, outputs of this register being present in shift locations corresponding to the locations of the control means for the discharge stations, said register outputs being connected to comparators, in
25 which the output value of the shift register is compared with a multi-bit word, the switching means (49) having means for inserting said multi-bit word in the related comparator.

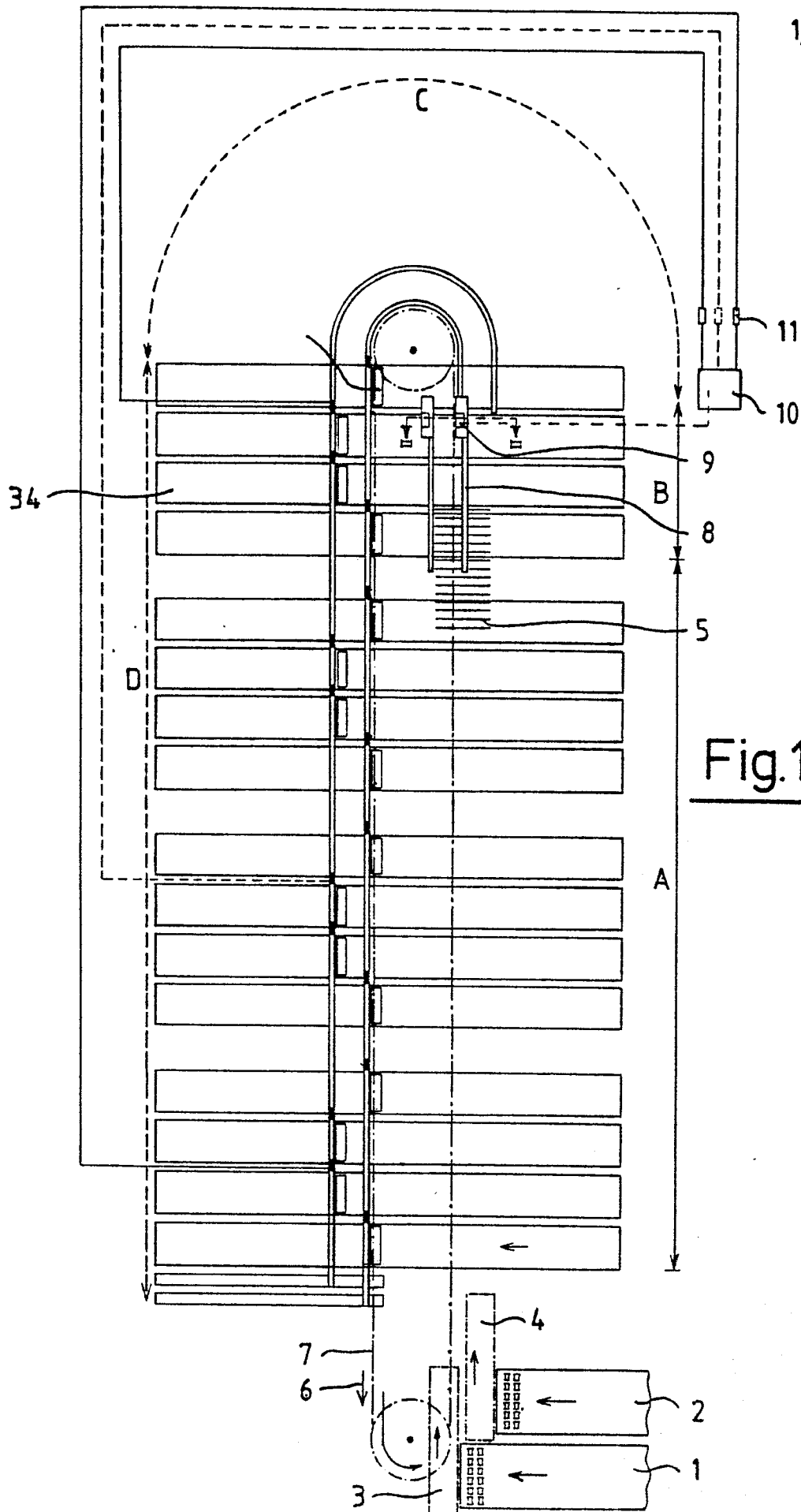
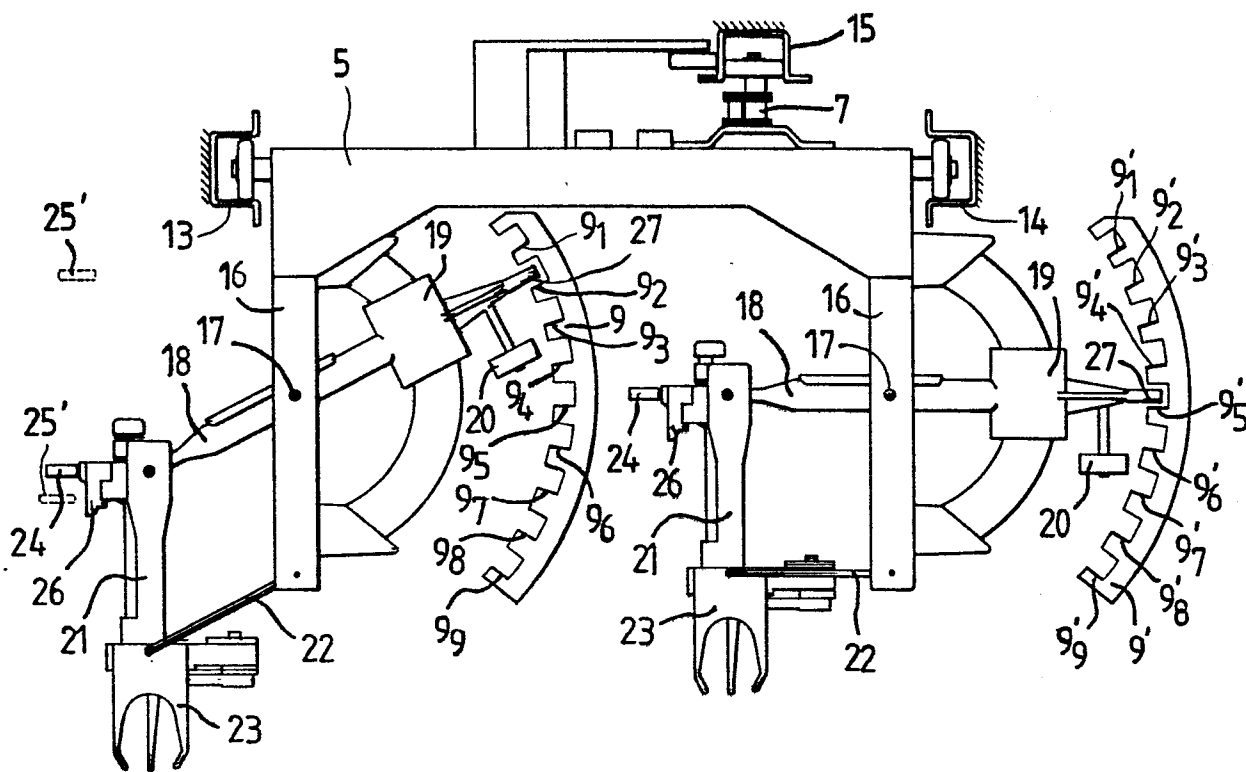
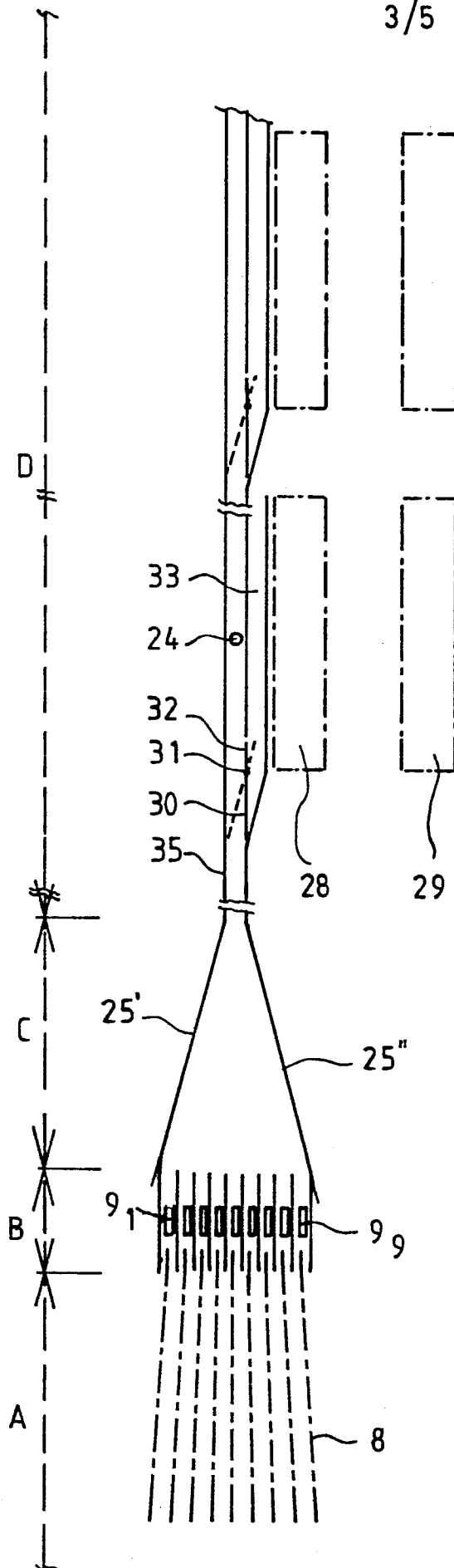


Fig.1

Fig. 2

3/5

Fig. 3

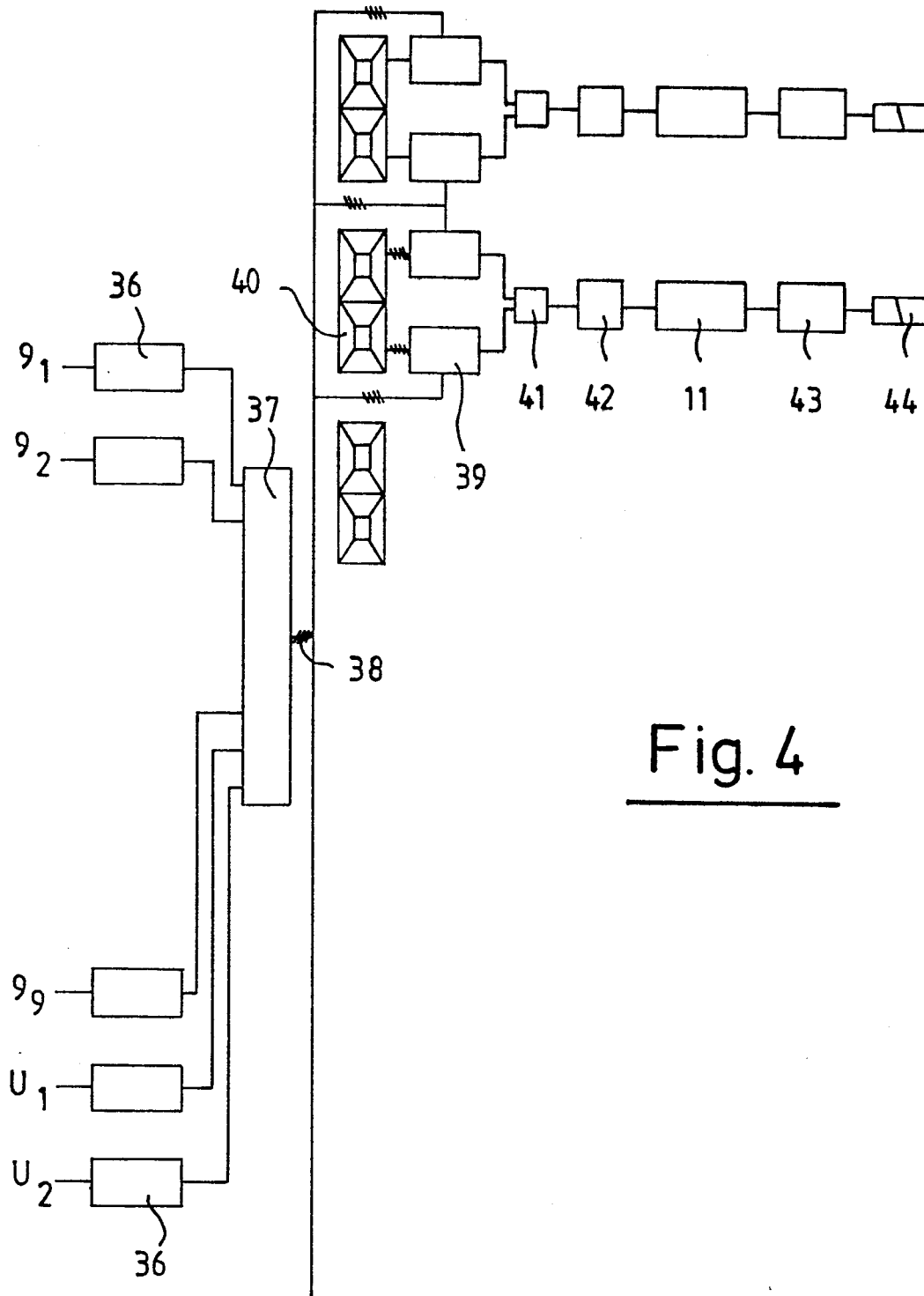
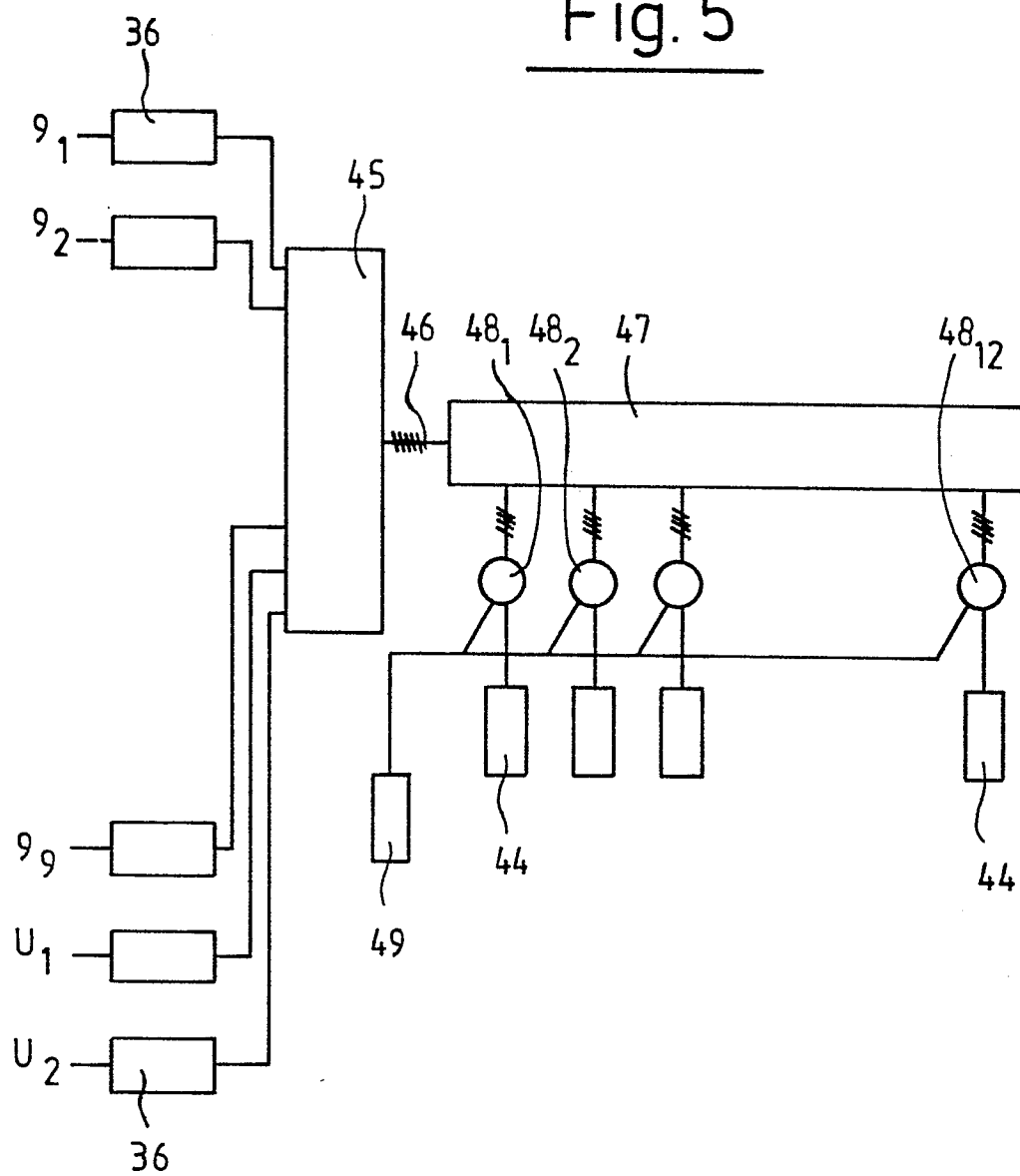
Fig. 4

Fig. 5



European Patent
Office

EUROPEAN SEARCH REPORT

0140425

Application number

EP 84 20 1384

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)
Y,D	GB-A- 875 797 (BRECKNELL DOLLMAN & ROGERS LTD.) * figures 1-13; page 1, lines 13-26 and line 35 - page 2, line 27; page 2, line 107 - page 3, line 51; page 3, line 121 - page 4, line 33; page 6, lines 63-107 *	1,4,6,7	B 07 C 5/24
Y	US-A-4 106 628 (WARKENTIN) * figures 1,2; column 1, line 46 - column 2, line 33; column 5, line 61 - column 6, line 17; column 6, lines 58-63; column 8, line 59 - column 10, line 3 *	1,4,6,7	
A,D	EP-A-0 048 525 (MOBA HOLDING BARNEVELD B.V.)	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
A,D	GB-A-1 602 911 (TAMKIN ELECTRICAL CONTROL AND SERVICES LTD.) * figures 1-8; page 5, line 122 - page 6, line 82 *	1,2,6,7	B 07 C
A,D	US-A-3 898 435 (PRITCHARD)	1,7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-01-1985	Examiner PESCHEL W.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			