APPLICATION FOR A STANDARD PATENT

YAMATO SCALE COMPANY, LIMITED

of 5-22, Saenba-cho, Akashi-shi, Hyogo-ken, JAPAN.

hereby apply for the grant of a standard patent for an invention entitled "PRODUCT FEEDING DEVICE FOR COMBINATION WEIGHING MACHINE," which is described in the accompanying provisional complete specification.

Details of basic application(s):

<table>
<thead>
<tr>
<th>Number of basic application</th>
<th>Name of Convention country in which basic application was filed</th>
<th>Date of basic application</th>
</tr>
</thead>
<tbody>
<tr>
<td>59-154924</td>
<td>JAPAN</td>
<td>July 24, 1984</td>
</tr>
</tbody>
</table>

Your address for service is care of CLEMENT HACK & CO., Patent Attorneys, 140 William Street, Melbourne, Victoria, 3000, Australia.

DATED this 2nd day of July, 1985

YAMATO SCALE COMPANY, LIMITED

To: The Commissioner of Patents.

CLEMENT HACK & CO.

Stephen Nelson

RE/App/6/84
This invention relates to a novel product feeding device for combination weighing machine. This device is especially useful to feed such product as uncooked meat, which contains oil and/or water and has a sticky feature and cannot be conveyed by vibrating conveyer troughs as used in the conventional combination weighing machines.

Claim
1. A product feeding device for a combination weighing machine having a plurality of hoppers for receiving product to be weighed from said device; comprising a plurality of rotary discs arranged side by side in partially overlapping relation, and means for distributively feeding said product onto said rotary discs; each rotary disc corresponding to each said hopper and being provided with driving means for selectively and independently rotating said disc and guide means for guiding said product moving with said disc to said corresponding hopper.
AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Short Title:

Int. Cl:

Application Number: 44536/85

Lodged:

Complete Specification-Lodged:

Accepted:

Lapsed:

Published:

Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: YAMATO SCALE COMPANY, LIMITED

Address of Applicant: 5-22, Saenba-cho,
Akashi-shi, Hyogo-ken, JAPAN.

Actual Inventor:

Address for Service: CLEMENT HACK & CO.,
140 William Street,
Melbourne, Vic. 3000.

Australia.

Complete Specification for the invention entitled: "PRODUCT FEEDING DEVICE FOR COFFEE"
This invention relates to a novel product feeding device for combination weighing machine. This device is especially useful to feed such product as uncooked meat, which contains oil and/or water and has sticky feature and cannot be conveyed by vibrating conveyer troughs as used in the conventional combination weighing machines.

As a device for feeding product to be weighed distributively to a plurality of weighing hoppers of combination weighing machine, there has been proposed such a type having a plurality of vibrating conveyer troughs disposed radially or side by side for transferring the product fed to one end thereof from a central dispersion feeder or a linear feeder to the respective weighing hoppers under the other ends thereof. Typical examples of this type of feeding device are disclosed in the opened British patent specification Nos. GB2074329A and GB2125756A. The former disclosed the radial type and the latter disclosed the linear side-by-side type.

In these examples, a conveyer trough is associated with each weighing hopper and selectively subjected to linear slanting vibration for a predetermined time for feeding about a predetermined amount of product to the weighing hopper. Although this type of vibratory feeding device is effective to feed dry product having relatively low coefficient of friction to the conveyer trough, it is inefficient and sometimes incompetent to feed wet and sticky product such as uncooked meat.

Therefore, an object of this invention is to provide a novel product feeding device for combination weighing machine, which is particularly effective and efficient to selectively feed such wet and sticky product to each hopper by a predetermined amount.

In accordance with this invention, a novel ingenious...
device is provided by including a plurality of horizontal rotating disc arranged side by side in successively overlapping fashion. Each disc is individually and selectively driven for a predetermined time to transfer product fed thereon from one end of its diameter to the other end to discharge it into a corresponding hopper thereunder. Each disc is provided with a guide for confining the product within its transfer path.

The detailed structure and operation of the inventive device will be well understood from the following description with reference to the accompanying drawings.

In the drawings:

- Figure 1 is a schematic plan view representing a radial combination weighing machine including an embodiment of product feeding device according to this invention;
- Figure 2 is a schematic sectional side view of the combination weighing machine of Figure 1, representing a rough arrangement of its structural components;
- Figure 3 is an enlarged plan view representing a part of the device of Figure 1;
- Figure 4 is a partial side view viewed along line IV-IV of Figure 3;
- Figure 5 is an enlarged plan view similar to Figure 3 representing another embodiment of this invention;
- Figure 6 is a partial side view viewed along line I-VI of Figure 5;
- Figure 7 is a schematic plan view representing a linear combination weighing machine including a further embodiment of product feeding device according to this invention; and
- Figure 8 is a schematic sectional side view of the combination weighing machine of Figure 7.

Throughout the drawings, same reference numerals are given to corresponding structural components.

Referring to Figures 1 and 2, this embodiment includes
a distributor 12. The distributor 12 is shaped conically as shown and disposed horizontally in the center of the upper surface of a platform 14. The distributor 12 is coupled at its center to a driving shaft of a driving unit 16 disposed under the platform 14 and rotated in clockwise direction as shown by arrow A in Figure 1.

A plurality of (twelve, in the drawing) rotary disc 18 are arranged circularly around the distributor 12. These discs 18 have their centers arranged at equal intervals on a circle concentric with the distributor 12 and coupled respectively to driving shafts of driving units 20 disposed under the platform 14. Each disc is rotated selectively and independently in counterclockwise direction as shown by arrow B in Figure 1 by the corresponding driving unit 20 in response to a command signal from a control section (not shown) of combination weighing machine. The discs 18 are sequentially overlapped in part upwards in counterclockwise direction and their inner edges extend under the distributor 12. As a result of such overlapping arrangement, the discs 18 are slanting slightly and their driving shafts are also slanted accordingly.

As shown in more detail in Figures 3 and 4, a cylindrical member 21 is disposed in the center of the upper surface of each rotary disc 18 to rotate with the disc. An arcuate guide member 22 extends outwards from the cylindrical member 21 across the upper surface of each disc 18 along the periphery of the overlapping adjacent disc. The guide member 22 serves a function of scraping the product to be weighed off the disc 18 and cylindrical member 21 and is fixed at its both ends to the driving shaft and the platform 14 leaving a fine gap therebetween. Each rotary disc 18 is associated with a feed hopper 24 disposed between the outer ends of adjoining guide members 22 and the outer edge of the disc 18 extends into the feed hopper 24. A weighing hopper 26 provided with a weight sensor 28 is located under each
Feed hopper 24 and a common collecting chute 30 is disposed under all the weighing hoppers 26.

In operation of this product feeding device, the distributor 12 is rotated and the product to be weighed is fed onto its center portion manually or automatically by a separate feeding device (not shown). The product is dispersed radially along the conical surface of the distributor 12 by the action of gravity and centrifugal force and delivered onto the surrounding rotary discs 18. The driving unit 20 of each rotary disc 18 is controlled by the control section (not shown) of combination weighing machine to rotate at a predetermined speed by a predetermined angle when the corresponding feed hopper has become empty. In this case, the product delivered from the distributor 12 to each disc 18 moves with the rotating disc 18 along the side wall 22a of the adjoining guide member 22 toward the outer periphery and is scraped by the opposing side wall 22b of the guide member 22 on this disc 18 to fall into the feed hopper 24. The speed and angle of rotation are selected suitably in accordance with the amount of feed to the feed hopper 24. The cylindrical member 21 serves to prevent the product from stagnating in the central portion of the disc 18. The rotation of the distributor 12 may be either constantly continuous, or intermittently synchronous with that of the rotary discs 18.

The second embodiment shown in Figures 5 and 6 is substantially similar in structure to the first embodiment, except that the cylindrical member 21 (Figures 1 to 4) is substituted with a frustoconical member 31 and that the guide member 22 is somewhat modified. The modified guide member 22 has a V-shaped guard plate 33 at the outer end, whose legs extend to both adjoining feed hoppers 24 to ensure safe feed of the product into the feed hopper 24. The frustoconical member 31 has a lower base diameter greater than the diameter of the cylindrical member 21 and increases the
In the third embodiment of this invention, as shown in Figures 7 and 8, a plurality of rotary discs 18 are arranged in a row and product to be weighed is fed to these discs 18 by a wide belt conveyor 32 moving in arrow direction C. In the drawings, 34 denotes side walls or guard plates and 36 denotes a chute disposed between the belt conveyor 32 and the rotary discs 18. This embodiment is applied to a combination weighing machine of linear side-by-side type. The structure and operation of the discs 18 are quite similar to those in the first and second embodiments.

It should be noted that various modifications and changes can be made on the above-described embodiments without departing the scope and spirit of this invention as defined in the appended claims. For example, while the cylindrical and frustoconical members 21 and 31 in the above embodiments have been illustrated as rotating with the underlying rotary discs 18, they may be incorporated with the guide member 22 in a body which is stationary regardless of the disc rotation. The rotary disc 18 need not be circular but may be polygonal in shape. Moreover, as is obvious to those skilled in the combination weighing technical field, the feed hoppers 24 may be omitted to feed product from the discs 18 directly to the weighing hoppers 26, and the distributor 12 may be stationary or vibratory type. As mentioned in the preface, the belt conveyor 32 of the third embodiment (Figures 7 and 8) may be substituted with the linear feeding device disclosed in the opened British patent specification No. GB2125756A.
8 to this
verted
ic 18,
the
shown
re ar-
these
direc-
ward
ult con-
is ap-
by-
ics 18 are
iments.
and
nts with-
as de-
the
above
he
with
regardless
be cir-
is ob-
technical
duct
6, and
pe.
the
ad with
lish
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A product feeding device for a combination weighing machine having a plurality of hoppers for receiving product to be weighed from said device; comprising a plurality of rotary discs arranged side by side in partially overlapping relation, and means for distributively feeding said product onto said rotary discs; each rotary disc corresponding to each said hopper and being provided with driving means for selectively and independently rotating said disc and guide means for guiding said product moving with said disc to said corresponding hopper.

2. The device according to Claim 1, wherein said rotary discs are arranged circularly and said distributive feeding means is disposed at the center of said circular arrangement.

3. The device according to Claim 2, said distributive feeding means includes a substantially conical rotating body.

4. The device according to Claim 1, wherein said rotary discs are arranged linearly side by side and said distributive feeding means is disposed in one side of said linear arrangement.

5. The device according to Claim 4, wherein said distributive feeding means includes a belt conveyer.

6. The device according to Claim 1, wherein said guide means includes a cylindrical or frustoconical central member disposed on said rotary disc coaxially therewith, and a radial scraper member extending from said central member to the periphery across the surface of said disc.

Dated this 2nd day of July, 1985
YAMATO SCALE COMPANY, LIMITED
By Its Patent Attorneys
CLEMENF HARK & CO.
Fellows Institute of Patent Attorneys
of Australia
DRAWINGS
FIG. 3

FIG. 4