

- [54] **APPARATUS FOR SORTING EGGS OR SIMILAR OBJECTS ACCORDING TO THEIR WEIGHT**
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- [56] **References Cited**
- UNITED STATES PATENTS**
- 2,322,862 6/1943 Malhiot209/121
- FOREIGN PATENTS OR APPLICATIONS**
- 69,960 12/1946 Denmark209/121

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[57] **ABSTRACT**

An apparatus for sorting eggs or similar objects according to their weight comprises a plurality of juxtaposed balances, of which at least the first is double-acting, said double-acting balance comprising two axial balance levers, one adapted as maximum balance, the other as minimum balance, said double-acting balance also comprising an ejector device which is only operative when the load scale is loaded with a weight which is heavier or lighter than the maximum or the minimum weight to which the balance is adjusted.

5 Claims, 6 Drawing Figures

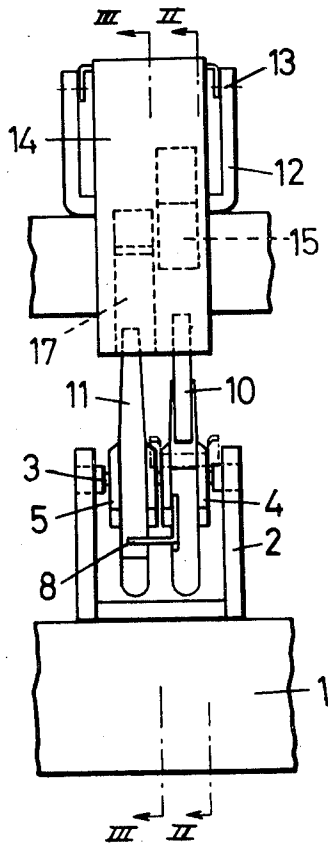


FIG 1

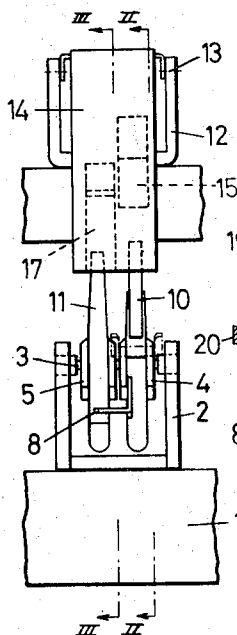


FIG.2

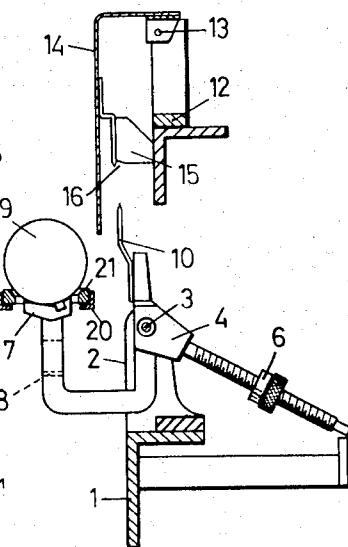


FIG 3

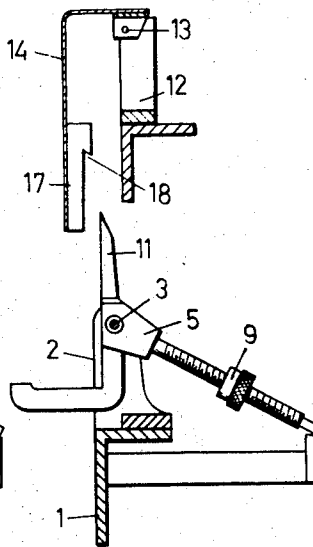


FIG.5

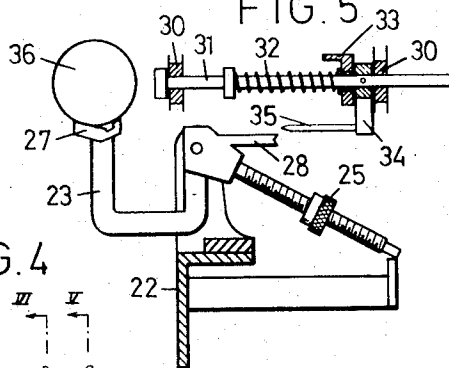


FIG.4

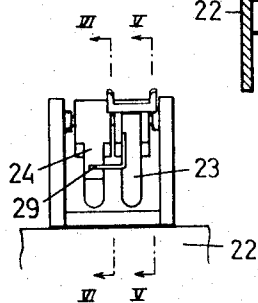
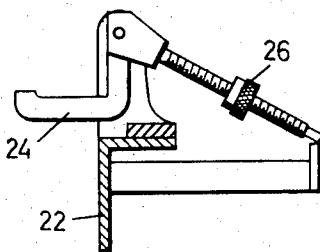


FIG.6



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APPARATUS FOR SORTING EGGS OR SIMILAR OBJECTS ACCORDING TO THEIR WEIGHT

The invention relates to an apparatus for sorting eggs or similar objects according to their weight, in which the serially supplied objects are stepwise passed over and weighed on a plurality of juxtaposed balances of which the sorting apparatus is composed.

In such a sorting apparatus, which is known in the art, an object of the supplied series of objects is discharged from each balance which tips under the load of said object by means of an ejector device associated to the balance in question. As a result, the sorting apparatus must be provided with the same number of balances as the number of weight classes according to which the objects must be sorted.

For those cases, such as in sorting eggs by their weight, in which there is no need of collecting too heavy and too light objects individually, it is an object of the invention, by improving the construction of a sorting apparatus of the present type, to reduce the length thereof, the operating time and the cost of manufacture.

To this end, a sorting apparatus according to the invention is characterized in that at least the first balance in the supply direction of the objects to be sorted is double-acting and adapted for discharging in the same station both objects having a weight exceeding an adjusted maximum and having a weight below an adjusted minimum.

A sorting apparatus based on the above principle may have several structural designs. To explain the invention, two exemplary embodiments will be described, both limited to the double-acting balance to which a plurality of conventional balance are connected in the supply direction of the objects to be sorted.

FIG. 1 shows diagrammatically a front elevational view of the first exemplary embodiment of the double-acting balance;

FIG. 2 is a section according to the line II—II in FIG. 1;

FIG. 3 is a section according to the line III—III in FIG. 1;

FIG. 4 shows diagrammatically a front elevational view of the second embodiment of the double-acting balance;

FIG. 5 is a section according to the line V—V in FIG. 4;

FIG. 6 is a section according to the line VI—VI in FIG. 4.

As is shown in FIGS. 1-3, the double-acting balance comprises a U-shaped standard 2 with a shaft 3, on which two balance levers 4 and 5 are journaled, the standard being mounted on a vertically reciprocating support rail 1. The force arm of the balance lever 4 is provided with an adjustable weight 6, while on the load arm there is mounted a load scale 7 together with a finger 8, which extends across and some distance above the extremity of the load arm of the balance lever 5, the force arm of which is provided with an adjustable weight 9. Furthermore the balance lever 4 comprises an upwardly extending pin 10 and the balance lever 5 comprises an upwardly extending pin 11.

Over the reciprocating balance there is an ejector device comprising a carrier 12 for an arm 14 mounted thereon for rocking movement by means of a shaft 13. This arm 14 has on the inner side a stop 15 with a recess 16 on the lower side, in which under certain conditions the upper end of the pin 10 of the balance lever 4 can engage, and a guide cam 17 with a recess 18, in which under certain conditions the upper end of the pin 11 of the balance lever 5 can engage.

During operation of the sorting apparatus each object 19 of a series of objects supplied by a conveyor chain 21 which is stepwise advanced over guide rails 20 is first subjected to a weighing by the double-acting balance heretofore described. When the carrier 1 is moved upwardly, the object 19 is lifted from the conveyor chain 21 by the load scale 7. If the weight of the object is less than that to which the balance lever 4 has been adjusted by means of the adjusting weight 6, the balance lever 4 will not tip and the pins 10 and 11 will maintain their initial position. As a result, upon further upward movement of the carrier 1, the pin 11 will remain clear of the guide cam 17, but the upper end of the pin 10 will penetrate into the recess of the stop 15 and subsequently swing with arm 14 to the left,

as shown in FIG. 2. This will cause the balance lever 4 to tip and the object 19 found to be too light will laterally roll from the scale 7 to be discharged from the series of objects to be sorted to a collecting center. However, if the weight of the object exceeds that to which the balance lever 5 has been adjusted by means of the adjusting weight 9, in combination with the adjustment of the balance lever 4, not only will the balance lever 4 tip till it rests with the finger 8 on the balance lever 5, but through the medium of finger 8 the balance lever 5 will tip as well. This will cause, upon upward movement of the carrier 1, the upper end of the pin 10 on the left in FIG. 2 to pass the recess 16 in the stop 15, but the pin 11 to become wedged in the recess 18 of the guide cam 17 and consequently, upon further upward movement of the carrier 1, it will laterally deflect together with the arm 14, so that also an object 19 found to be too heavy will roll beside the load scale 7, and be discharged to the collecting center which also contains the too light objects.

If an object 19 lifted by the load scale 7 has a weight ranging between the minimum and maximum weight to which the reciprocating balance has been adjusted, the two pins 10 and 11, upon upward movement of the carrier 1, will remain clear of the recess 16 in the stop 15 and the recess 18 in the guide cam 17. As a result, the object 19 remains on the load scale 7 and upon downward movement of the carrier 1 it is returned to the conveyor chain 21 to be weighed by one of the next balances of the sorting apparatus.

In the exemplary embodiment shown in FIGS. 4-6 the double-acting balance comprises two balance levers 23 and 24 journaled on a stationary carrier 22, which carriers are respectively provided with an adjustable weight 25 and 26. The balance lever 23 is provided with a load scale 27, a pin 28 constructed as a stop and a finger 29 extending across and some distance above the extremity of the balance lever 24.

Over the double-acting balance there is provided an ejector device comprising an ejector 31 slidable in sleeve bearings 30, with ejector, through the medium of a compression spring 32, is axially reciprocated by a drive means 33 reciprocable at periodic intervals. On the ejector 31 there is mounted an arm 34 with a pin 35.

During operation of the sorting apparatus the objects are first one by one put on the load scale 27 of the above double balance by a carrier, not shown, which stepwise lifts the series of objects to be sorted, moves them in the supply direction of the series and drops them on the scales of the balances appurtenant to the sorting apparatus. If the weight of an object 36 dropped on the load scale 27 is less than the weight to which the balance lever 23 has been adjusted by means of the adjusting weight 25, the balance lever 23 maintains its initial position. As a result, upon the next operating stroke of the drive means 33, the ejector 31, whose pin 35 can freely pass over the stop 28 of the balance lever 23, will push the object 36 from the load scale 27. If the weight of the object 36 placed on the load scale 27 is heavier than the weight to which the balance levers 23 and 24 have jointly been adjusted, both the balance lever 23 and, through the medium of the finger 29, the balance lever 24 will tip. Consequently, the stop 28 of the balance lever 23 will swing upwardly, so that upon the operating stroke of the drive means 33 the ejector 31, whose pin 35 then passes under the stop 28, will push the object 36 from the load scale 27. If the weight of an object 36 placed on the load scale 27 ranges between the minimum and the maximum weight to which the double-acting balance has been adjusted, only the balance arm 23 will tip, but it will come to rest with the finger 29 on balance lever 24, which maintains its initial position. As a consequence, the stop 28 will swing to such a position that its extremity comes to lie in the path of movement of the pin 35. During the operation stroke of drive means 33 the movement of the ejector 31 will be arrested in that the pin 35 strikes the stop 28, and only the compression spring will be compressed. In case of this free stroke of the drive means 33, therefore, the object 36 will remain on the load scale 27 to be brought to a next balance of the sorting apparatus.

Also in this embodiment, one balance of the usual number of balances of a sorting apparatus is saved with all the inherent advantages.

By arranging a plurality of reciprocating balances in a row it is possible to obtain a machine having a finely stepped sorting characteristic besides a relatively short end-to-end length and a low cost price.

We claim:

1. A double acting balance for sorting eggs and similar objects by their weight for selecting objects within a predetermined weight range comprising:

a pair of balance levers mounted in side-by-side relation for rotation about substantially parallel axes and having weighted force arms, a first of said levers having a load scale formed for receipt of an object to be sorted;

loss motion means connecting said levers for joint movement after an initial free stroke of said first lever; and means operatively connected to said levers and responsive to displacement thereof for ejecting from said scale objects having weights below and above said range.

2. A balance as defined in claim 1, said levers having a common pivotal axis; and

a weight mounted for longitudinal adjustment on each of said force arms for determining said weight range.

3. A balance as defined in claim 2, said loss motion means comprising a finger extending laterally from said first lever in normally spaced relation to said other lever and engageable with said second lever to provide joint rotation of said levers after a predetermined movement of said first lever.

4. A double-acting balance according to claim 3, wherein each balance lever is provided with a pin (10, 11), which is adapted to coact with a stop (16, 18) of its own mounted on the ejector device for operating said ejector device.

5. A double-acting balance according to claim 3, wherein the balance lever which is provided with the load scale and adapted as a minimum balance is provided with a pin (28) constructed as a stop, which can coact with a stop (35) mounted on the ejector device to render said ejector device inoperative.

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