June 18, 1935. L. MARSDEN 2,005,629

STACKING OR ARRANGING SUBSTANTIALLY FLAT ARTICLES SUCH AS BISCUITS

Filed Dec. 7, 1933 2 Sheets-Sheet 1

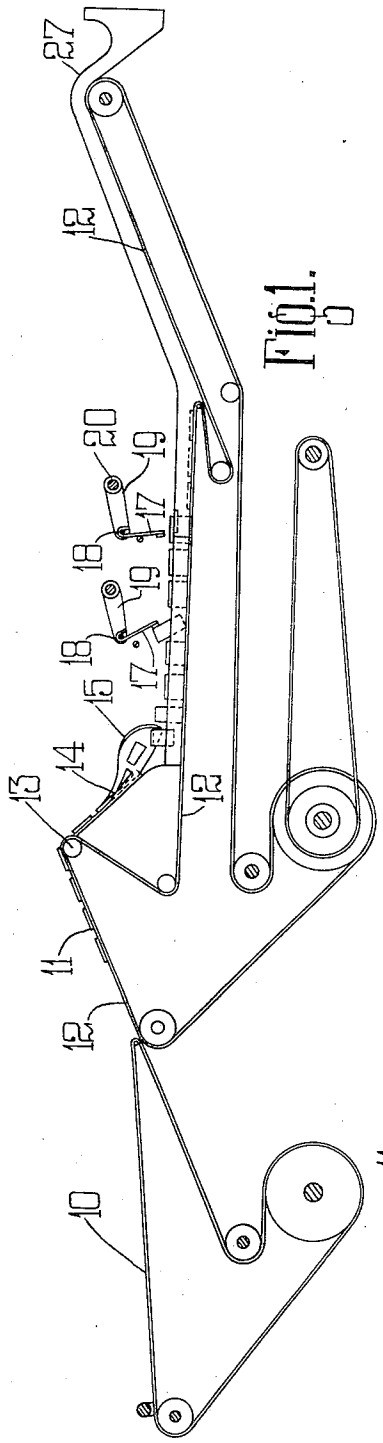


Fig.1.

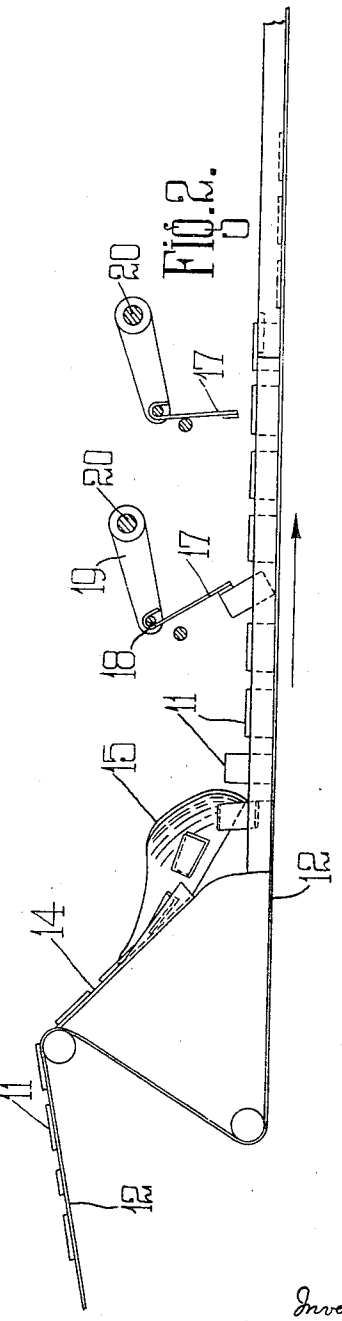


Fig.2.

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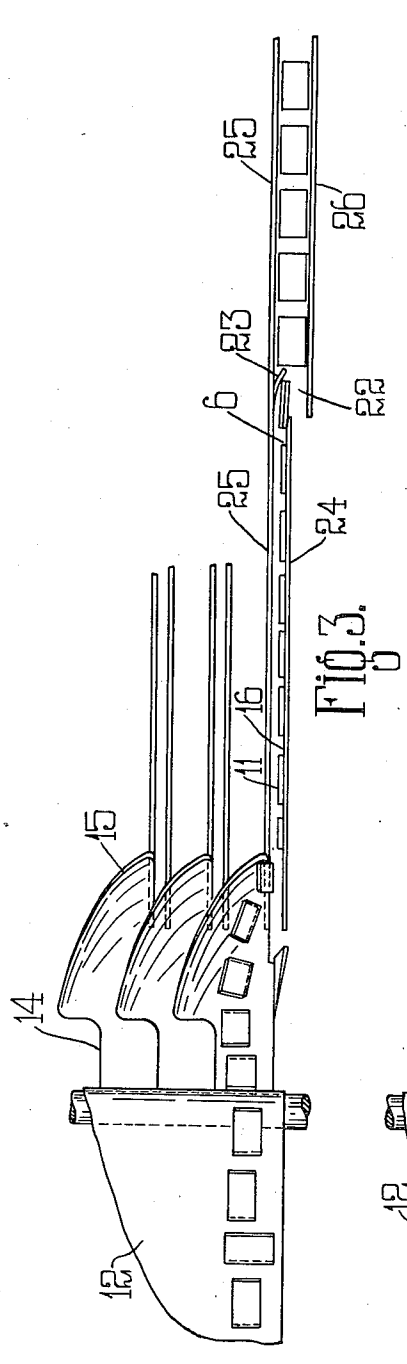


Fig. 3.

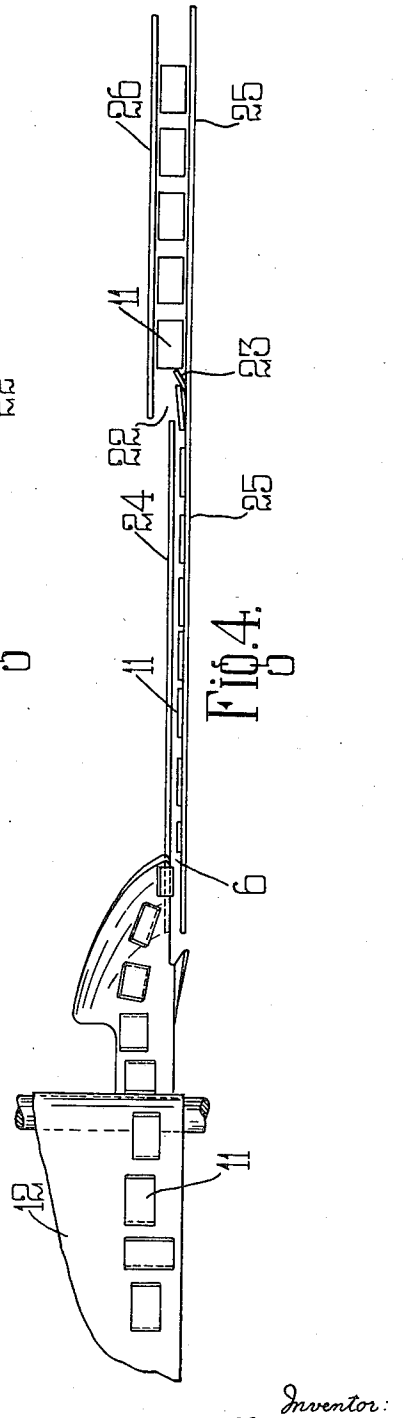


Fig. 4.

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UNITED STATES PATENT OFFICE

2,005,629

STACKING OR ARRANGING SUBSTANTIALLY FLAT ARTICLES SUCH AS BISCUITS

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Application December 7, 1933, Serial No. 701,399
In Great Britain December 17, 1932

3 Claims. (Cl. 198—33)

The present invention relates to the stacking or arranging of substantially flat articles and is particularly applicable to the stacking of biscuits or to the orderly arrangement of biscuits which, for example, may have come from an oven or a baking pan and which in being detached from the baking surface have been disarranged.

According to the present invention, in the process of stacking substantially flat articles such as biscuits or in the process of arranging such articles prior to stacking, the said articles, during a portion of their path of travel, are conveyed or caused to travel, on edge with their flat faces directed substantially in the direction of motion.

The inclusion of this step in the process has a two-fold advantage in that firstly rectangular or other articles which are longer in one direction than in a direction normal thereto can be arranged with their longer axes substantially in the direction of movement by causing those articles which are arranged with their shorter axes in or substantially in the direction of movement to engage an abutment or finger, preferably resilient, arranged at a suitable height above the surface on which the articles are supported.

The invention therefore includes a method of arranging substantially flat articles with their longer axes in a given direction which consists in conveying or causing said articles to travel on edge, with their flat faces directed substantially in the direction of motion and causing those articles which are arranged with their shorter axes in or substantially in the direction of movement to engage an abutment or finger, preferably resilient, arranged at a suitable height above the surface on which the articles are supported.

A second advantage of the process including the step of the present invention is that the articles may be allowed subsequently to assume a horizontal position flat upon a supporting surface and the direction of angular displacement of the articles from the vertical disposition into the horizontal position may be predetermined so that either one side or the other side of the articles may be caused to lie uppermost as desired.

Thus, if the articles are initially disposed horizontally with one face uppermost they may be caused to travel on edge and then to assume a horizontal position with the other face uppermost. In other words, flat articles such as biscuits may be automatically turned over by means of the present invention.

One method of predetermining the direction of angular displacement of the articles when moving from a vertical to a horizontal disposition consists in providing a deflecting finger which is adapted for engagement with the upper faces of the biscuits or other articles as they are travelling on edge to cause the biscuits to collapse into a flat position. Another method of accomplishing the same result consists in imparting to the article whilst on edge, a tendency to travel in a given direction and guiding the article above its lower edge, in a direction inclined to said given direction of travel.

The invention is more particularly described with reference to the accompanying drawings, in which:—

Figure 1 is a side elevational view of an arrangement according to the present invention.

Figure 2 is an enlarged view of the chute and guide means portion of the arrangement of Figure 1.

Figure 3 has a diagrammatic plan view of a series of chutes showing the position of one relatively to the guide means with the latter arranged in such a manner as to permit subsequent inversion of the flat articles to the position they occupied prior to descending the chutes

Figure 4 is a diagramatic plan view of a chute and guide means so disposed as to permit the flat articles to have the same face uppermost after leaving the guides as prior to their descent down the chute.

In the construction according to the drawings which is suitable for arranging biscuits after they have come from an oven or a baking pan so that such arranged biscuits may be ready for stacking, the biscuits 11 are fed from an endless conveyor 10 onto a second conveyor 12 travelling at a greater speed so that they may be spaced apart but not necessarily in co-alignment. For example, in this position on the conveyor 12 as shown in Figures 3 and 4, certain of the biscuits 11 may lie flat on the conveyor with their major axes in the direction of travel whilst others have their minor axes extending in such direction.

The conveyor 12 passes over an idler roller 13 to cause the biscuits to pass by gravity down a series of chutes 14 each of which has a wing 15 arranged helically and with its lower end substantially vertical so that by the time the biscuits again reach the conveyor 12 they are now on edge instead of lying flat.

A series of pairs of guides 24, 25, are provided above the upper horizontal run of the conveyor 12 to form a series of channels 16 fed by the chutes, adjustable fingers 17 being arranged above such channels to permit those biscuits travelling on edge with their longer axes arranged hori-

zontally to pass unimpeded beneath the fingers and yet to contact with those biscuits, the major axes of which are vertical so as to angularly incline such biscuits to make all biscuits travel on edge in a similar manner, i. e. with their longer axes horizontal.

In the particular form of construction illustrated in the drawings. a pair of adjustable fingers are provided one in reach of the other in order to ensure that the operation of turning over those biscuits which do not have their major axes horizontal shall be performed.

The fingers are preferably made resilient, each being fulcrumed about a pin 18 on a lever 19, the levers 19 in turn being pivotally mounted on shafts 20 extending transversely of the plant.

After the biscuits have passed along the channels 16 wherein they are maintained on edge, they reach a wider channel 22 in which position the biscuits are engaged by deflecting fingers 23 to cause the biscuits to fall over flat.

In the construction according to Figure 3 the fingers 23 are so positioned that when the biscuits fall flat they do so with the face originally lowermost when on the conveyor, now in an uppermost position whilst in the construction according to Figure 4 the action of the fingers 23 is such as to cause the biscuits to fall over flat with the original uppermost face again uppermost. The biscuits are then conveyed between guides 26, 25 to the stacking position along another but slightly upwardly inclined leg of the same endless travelling conveyor 12.

In order to render the machine capable of dealing with all sizes and thicknesses of biscuits or other flat articles, the guides 24 may be displaceable relatively to the guides 25 to vary the transverse width of the channels 16 whilst similarly the guides 26, 25 may also be relatively displaceable.

Although an endless travelling conveyor 12 having the usual driving pulley and idler wheels is shown for conveying the biscuits from the conveyor 10 to the stacking position at 27, more than one conveyor may be employed for this purpose if desired.

Again, it will be appreciated that instead of providing deflecting fingers 23 at the ends of the relatively narrow channels 16 for turning the biscuits into a flat position, either similar or inverted relatively to the position they occupied prior to travelling on edge, these deflecting fingers 23 may be omitted and the guide members 24, 25 positioned above the conveyor 12 but at a slight angle relatively to its longitudinal direction of travel. As a result, the biscuits, while travelling on edge, are caused to lean over slightly against one of the guides 24, 25, as the case may be and when reaching the end of the channels 16 automatically fall over on to their flat faces.

Thus, in the construction according to Figure 3 that is where the underside of each biscuit eventually is to be uppermost, the conveyor will be slightly inclined away from the guide 24 to cause the upper portions of the biscuits to rest against this guide.

In the construction according to Figure 4 where it is desired to permit the biscuits to fall flat with their original uppermost side still uppermost, then the biscuits will still be held at their upper portions against the guide 24 instead of, as shown in Figure 4, resting against the guide 25.

It will also be appreciated that in the event of the biscuits being fed by a conveyor in a direction normal to the direction of travel of the conveyor 12, the helical formation of the chutes 14 and their wings 15 may be eliminated.

I declare that what I claim is:—

1. In an apparatus for arranging flat rectangular articles such as biscuits, the combination of a single conveyor for presenting the articles indiscriminately arranged in a flat position and delivering the articles in definite arrangement, means intermediate the ends of said conveyor for turning the indiscriminately arranged articles from a flat position to a position on edge, the major and minor axes remaining indiscriminately arranged, means for holding said articles on said conveyor in their position on edge, means for selectively changing the positions of the articles on said conveyor so that all the articles are caused to have their major axes lying in the direction of movement, and means for again causing the articles to assume a flat position on said conveyor while maintaining their major axes in the direction of movement.

2. In an apparatus for arranging flat rectangular articles such as biscuits, the combination of a single conveyor having a plurality of conveying flights, one of said flights operating to convey the articles indiscriminately arranged in a flat position, a helical chute for individually receiving the indiscriminately arranged articles and for delivering the same to a lower flight of said conveyor in a position on edge with the major and minor axes indiscriminately arranged with respect to one another, guide means for holding the articles on said lower flight of said conveyor in their position on edge, means for selectively changing the positions of the articles on the lower flight of said conveyor so that all the articles are caused to have their major axes lying in the direction of movement, and means for engaging the articles to cause the same to again assume a flat position on the lower flight of said conveyor while maintaining their major axes in the direction of movement.

3. In an apparatus for arranging flat rectangular articles such as biscuits, the combination of a single conveyor having upper and lower flights, said upper flight operating to convey the articles indiscriminately arranged in a flat position, a helical chute for receiving the indiscriminately arranged articles from said upper flight and for delivering the articles to said lower flight in a position on edge by indiscriminately arranging with respect to their major and minor axes, guide means for holding said articles on the lower flight of said conveyor in their position on edge, means including depending fingers for selectively changing the positions of the articles on the lower flight of said conveyor so that all the articles are caused to have their major axes lying in the direction of movement, means including a deflecting surface at one end of said guide means for causing the articles to again assume a flat position on said conveyor, and guide rails communicating with said guide means for holding the articles in their flat position on said conveyor with their major axes lying in the direction of movement.

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