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F. W. CUTLER

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CONVEYING AND ALIGNING MECHANISM

Filed Nov. 4, 1930

FIG. 1

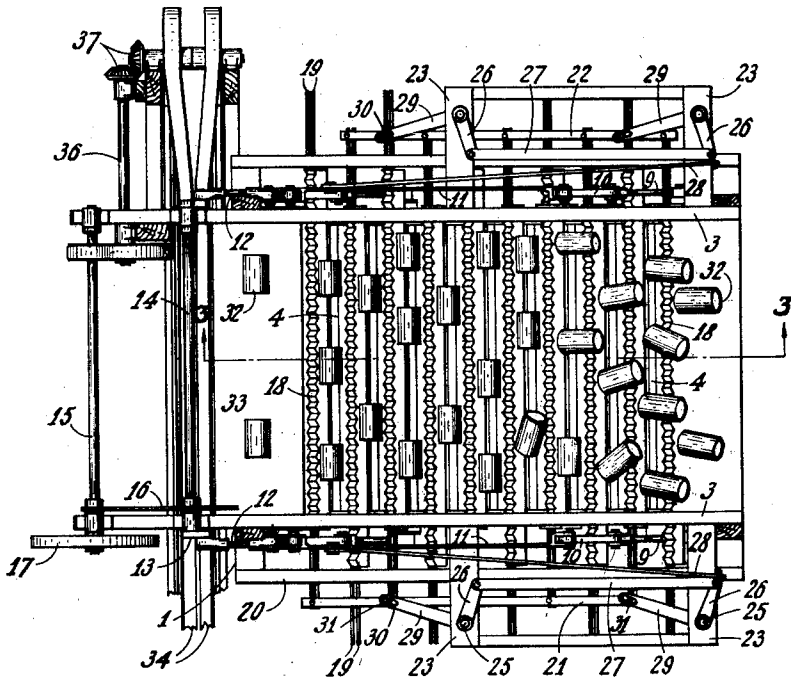


FIG. 2

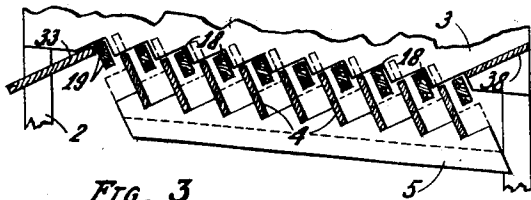
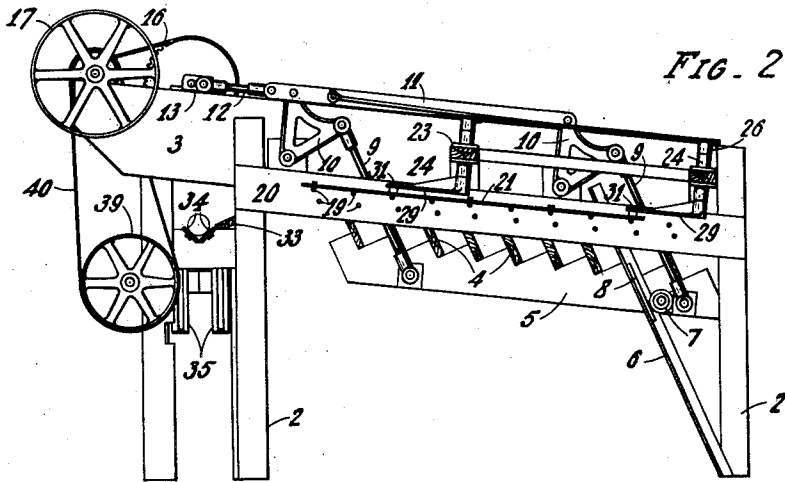


FIG. 3

INVENTOR.
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UNITED STATES PATENT OFFICE

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CONVEYING AND ALIGNING MECHANISM

Application filed November 4, 1930. Serial No. 493,417.

This invention relates to conveying and aligning mechanism and comprises an apparatus of this nature adapted to receive a mass or heap of cans, jars, fruit, vegetables, or in fact any rollable articles of elongated shape without regard to order and cause them to be rearranged so as to be discharged in single file and orderly alignment. Although as the description proceeds, a variety of uses will become manifest, for the purpose of this disclosure, I shall describe the invention with reference to its application to the handling of ordinary cylindrical cans such as commonly used to preserve many comestibles.

In the process of canning foods, numerous occasions arise when it becomes necessary to arrange the cans in single file and alignment as where they are to be fed to can handling machinery, such as cookers, coolers, labelling machines, boxing devices, etc. Such devices ordinarily depend for their successful operation upon the manner in which the cans are placed in them. For example, it is usually necessary that the cans be placed in the apparatus in the same relative positions in proper alignment in single file and in a single layer and it is with the accomplishment of these results that my invention is concerned.

As illustrative of one occasion where my invention finds a field of great usefulness, I shall describe a few of the steps carried out in many canneries.

In the process of canning foods, after the cans are closed, they are ordinarily subjected to a heating process to sterilize their contents. In many canning factories, this is accomplished by retorts or chambers wherein the cans are placed in large baskets and cooked. After the cooking process is finished, the baskets of cans are removed and cooled, whereupon the cans are ready to be boxed or labelled. Since, as pointed out above, the cans must be placed in a boxing or labelling machine in a particular manner, it has heretofore been necessary to transfer them from the baskets to the machine or a feeding device therefor, by hand one at a time, thus consuming a large amount of time, labor and expense.

My invention enables me to avoid this laborious transfer and feeding process so that

when apparatus embodying the invention is installed, it is only necessary that the cans be dumped directly from the baskets into the apparatus, without regard to orderly arrangement of any sort, whereupon the apparatus reduces the cans to a single layer, turns all the cans with their axes in the same direction and discharges them in proper alignment and in single file. The cans may then be received directly by the boxing or labelling apparatus or may be transferred thereto by any suitable feeding means such as a travelling belt or the like.

Broadly speaking, it is therefore the principal object of my invention to provide an apparatus of the character described which shall be adapted to receive a mass or heap of rollable objects of elongated or cylindrical nature without regard to orderly arrangement and cause them to be arranged in parallel relation and discharged in alignment.

More specifically, it is an object to provide an aligning apparatus which shall be composed of a series of alternately disposed reciprocating advancing bars and horizontally reciprocating aligning bars whereby rollable articles of a cylindrical or elongated shape may be advanced therethrough and at the same time turned so as to be discharged with their axes at right-angles to their path of movement over the bars.

Other objects and advantages will become apparent as the description proceeds in connection with the accompanying drawing, in which:

Figure 1 is a plan view of a preferred form of apparatus embodying my invention.

Figure 2 is a side elevation of the device illustrated in Figure 1.

Figure 3 is a sectional view taken along the line 3—3 of Figure 1 looking in the direction of the arrows.

Similar reference characters denote similar parts throughout the several views.

The numeral 1 refers to a suitable frame supported by legs 2 and upon the frame are mounted the parallel side walls 3 which serve to define the path of articles passing over the conveyor which operates between the side walls and which is now to be described.

Mounted to reciprocate up and down between the side walls are the transversely arranged advancing bars 4 which are carried upon suitable supporting rails 5 which connect them together so that they are caused to move in unison. The path of reciprocation of the advancing bars is regulated by the angle of inclination of the tracks 6, one of which is disposed adjacent each rail 5 at one end of the apparatus and upon each of which rides a roller 7 mounted upon the outside of the corresponding rail. For longitudinal adjustment of the advancing bars, the shims 8 may be removed or additional shims may be inserted. Although in the drawing I have illustrated the advancing bars as being mounted at a slight angle to the vertical, it will be apparent that they may be mounted at a greater angle or they may be mounted to operate in a vertical direction if desired. In the latter event, the working faces of the bars should preferably be provided with a slight bevel so as to cause a forward movement of articles resting thereon, as will readily be understood.

The rails 5 are supported and operated by rods 9 which have their lower ends pivotally secured thereto while their opposite extremities are pivotally connected to the bell cranks 10. The bell cranks on each side of the apparatus are connected together by tie rods 11 which are reciprocated by means of the connecting rods 12, reciprocated by cranks 13. The cranks 13 are rotated by the shaft 14, driven from shaft 15 by the chain 16, passing over suitable sprockets as shown. Power is supplied to the apparatus through the pulley 17 which may be connected to any suitable source of power, such as an electric motor or the like.

Positioned intermediate each pair of advancing bars are the aligning bars 18, every other one of which is adapted to move in an opposite direction to the others as will be explained. The working faces of the aligning bars are preferably serrated as shown, although such construction is not essential. As will be noted, each of these aligning bars is carried by a pair of metal rods 19 to which it is firmly secured. These rods extend some distance outwardly from each end of the aligning bars and pass through holes in the side rail 20, so that the bars are supported so as to allow for their reciprocation in a horizontal plane from side to side.

Half of the aligning bars or every other one of them are driven by actuating mechanism located to one side of the machine and the others are driven by a similar actuating mechanism located on the opposite side of the machine. The supporting rods 19 of alternate aligning bars are tied together by tie rod 21 fixed to their outer ends and the remaining rods are similarly tied together by the rod 22, secured to their opposite ends.

Supporting arms 23 project outwardly from the side walls 3 and serve to support bearings 24 in which are journaled the upright shafts 25 to the upper ends of which are fixed the lever arms 26. The levers 26 on each side of the apparatus are interconnected by the rods 27 and are caused to oscillate by means of the connecting rods 28 each of which is fixedly secured at one end to one of the tie rods 11 and loosely pinned to the rear lever 26 at its other end. Levers 29 are fixed to the lower ends of the shafts 25 and the outer ends of these levers are provided with slots 30 adapted to cooperate with pins 31, projecting upwardly from the rods 21 and 22, so that oscillation of the shafts 25 will cause reciprocation of the aligning bars 18.

By the construction described, it will be seen that when the levers 29 on one side of the machine are turning in a clockwise direction, those on the other side are turning in an anti-clockwise direction, thus causing alternate aligning bars to move in opposite directions so that elongated articles, such as the cans 32, if placed therein, with their axes at an angle to the bars, will be twisted around so that they are arranged in parallel relation thereto.

The cans are discharged from the conveyor upon the ramp 33, down which they roll and fall onto a suitable conveyor comprising a pair of endless belts 34, passing over pulleys 35 which are driven from shaft 36 through the agency of bevel gears 37. Shaft 36 is provided with a pulley 39 over which passes the belt 40, driven from the shaft 15. The belts 34 may extend to any suitable point of delivery.

In operation, the cans or other articles are dumped upon the conveyor over the ramp 38 in a heap, without regard to order or depth. Some of the cans will probably lie parallel to the bars while others may lie with their axes at an angle to the bars. Each of those which lie parallel to the bars will tend to roll downwardly across the inclined working faces of one of the aligning bars until it comes to rest against the side of the next adjacent aligning bars. Upon elevation of the advancing bars 4, the cans will be elevated up until they clear the top edges of the aligning bars against which they rest, whereupon they will again roll downwardly across the faces of the aligning bars until they are stopped by the next bars. As the operation is repeated, the cans are separated into aligned groups which are advanced step by step across the bars and finally deposited upon the ramp 33 down which they roll into the conveyor belts 34 which receive them in single file.

As the advancing bars are elevated and lowered to advance those cans which lie parallel to the bars, the aligning bars 18 are simultaneously reciprocated in a horizontal plane transversely to the path of the advancing

ing cans and every alternate aligning bar is reciprocated in a direction opposite to the others. The result is that those cans which lie at an angle to the bars are twisted around so that they are arranged parallel to the bars whereupon they are advanced in the manner above described. In order for a can to be twisted around in this manner, it is not necessary that it rest upon the working faces of more than one aligning bar since even if it has one end only resting upon an aligning bar, the frictional contact of the other end with one of the advancing bars, or with a side of one of the oppositely moving aligning bars, will be sufficient to accomplish the desired result.

It will be noted that both the advancing bars and aligning bars are mounted in stepped relation upwardly from the receiving end to the discharge end so that an inclined path is provided and this is for the purpose of aiding the reduction of a heap of cans several layers deep, into groups of a single layer only. Although, even if the bars are mounted on a level, the tendency is for the advancing bars to advance only those cans in contact therewith, so that any cans on top will settle down in their places, it has been found that where the path is inclined, as shown, the tendency of the cans on top to roll backwards as the cans underneath are advanced out from under them, enables the separation to take place in a shorter space, so that a shorter apparatus can be used.

The speed of reciprocation of the advancing bars and the speed of the discharge belts 34 should be so proportioned that each group of cans deposited on the discharge belts will be carried away before the next succeeding group is delivered thereto. In this manner, it is assured that no cans will be deposited on top of others already on the discharge belts.

Although I have illustrated and described 15 only one embodiment of my invention, it will be apparent to those skilled in the art that many changes and modifications may be made without departing from the spirit thereof and I wish it to be understood that I regard myself as entitled to all such changes and modifications as fall within the scope of the claims appended hereto.

Having now described my invention and in what manner the same may be used, what 25 I claim as new and desire to protect by Letters Patent is:

1. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, means for elevating and lowering said advancing bars, and means for reciprocating said aligning bars in a horizontal plane.

2. An apparatus of the class described comprising a plurality of alternately dis- 35 posed advancing bars and aligning bars,

means for elevating and lowering said advancing bars, and means for reciprocating said aligning bars in a horizontal plane in timed relation to the movement of said advancing bars.

3. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, means for reciprocating said aligning bars in a horizontal plane, and means for reciprocating said advancing bars in a plane at an angle to the horizontal. 70

4. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, means for elevating and lowering said advancing bars, and means for simultaneously reciprocating said aligning bars in a horizontal plane. 75

5. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, means for elevating and lowering said advancing bars, and means for reciprocating said aligning bars in a horizontal plane, and adapted to reciprocate alternate aligning bars in an opposite direction to the others. 80

6. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, means for elevating and lowering the advancing bars, and means for reciprocating the aligning bars in a horizontal plane in timed relation to the movement of the advancing bars, said last named means being adapted to reciprocate alternate aligning bars in opposite directions to the others. 85

7. An apparatus of the class described comprising a plurality of alternately disposed advancing bars and aligning bars, said aligning bars having serrated working faces, means for elevating and lowering the advancing bars, and means for reciprocating the aligning bars in a horizontal plane. 90

8. In a conveying and aligning apparatus, a plurality of transverse supporting members forming a support for articles resting thereon, and means for moving certain of said members laterally to cause elongated articles to be turned with their axes at right angles to their path of movement through the apparatus. 95

9. In a conveying and aligning apparatus, a plurality of transverse supporting members forming a support for articles resting thereon, means for elevating and lowering certain of said members to impart a forward movement to articles resting thereon, and means for reciprocating certain others of the members in a horizontal plane to cause elongated articles to be turned with their axes at right angles to their path of movement through the apparatus. 100

10. In a conveying and aligning apparatus, a plurality of transverse supporting 105

members forming a support for articles resting thereon, means for elevating and lowering certain of said members to impart a forward movement to articles resting thereon, and means for moving certain others of the members in a direction transverse to the path of movement of articles thereover to cause elongated articles to be turned with their axes at right angles to their path of movement over the supporting members.

11. In a conveying and aligning apparatus, a plurality of transverse advancing members, a plurality of alternately disposed transverse aligning members, means for elevating and lowering said advancing members to impart a forward movement to articles resting thereon, and means for reciprocating said aligning members in a horizontal plane.

12. In a conveying and aligning apparatus, a plurality of transverse advancing bars, a plurality of alternately disposed transverse aligning bars, means for imparting an upward movement to the advancing bars to carry their upper faces above the upper faces of the aligning bars, and means for reciprocating said aligning bars in a horizontal plane.

13. In a combined conveying and aligning apparatus, a plurality of transverse advancing bars, a plurality of alternately disposed transverse aligning bars having serrated working faces, means for elevating and lowering said advancing bars to impart a forward movement to rollable articles resting thereon, and means for reciprocating said aligning bars in a horizontal plane transversely to the path of movement imparted to articles by the advancing bars.

14. In a conveying and aligning apparatus, a plurality of transverse advancing members mounted in stepped relation so as to form an upwardly inclined way for articles advanced thereover, a plurality of alternately disposed transverse aligning members, means for elevating and lowering said advancing members to impart a forward movement to articles resting thereon, and means for reciprocating said aligning members in a horizontal plane transversely to the path of movement imparted to articles by said advancing members.

15. An apparatus of the class described comprising a plurality of advancing bars mounted in stepped relation so as to form an upwardly inclined way for articles advanced thereover, a plurality of alternately disposed aligning bars also mounted in stepped relation, means for elevating and lowering said advancing bars and means for reciprocating said aligning bars in a horizontal plane.

16. In a conveying and aligning apparatus, a plurality of transverse advancing members, a plurality of alternately disposed

transverse aligning members, means for elevating and lowering said advancing members to impart a forward movement to articles resting thereon, and means for reciprocating said aligning members in a horizontal plane in timed relation to the movement of said advancing bars and adapted to reciprocate alternate aligning bars in an opposite direction to the others.

17. In combination with a single file article receiving mechanism, means for delivering articles thereto comprising a plurality of alternately disposed advancing bars and aligning bars, means for elevating and lowering said advancing bars to impart a forward movement to articles resting thereon, and means for reciprocating said aligning bars in a horizontal plane transverse to the path of movement of articles thereover.

18. In combination with a single file article receiving mechanism, means for delivering articles thereto comprising a plurality of advancing bars mounted in stepped relation so as to form an upwardly inclined way for articles advanced thereover, a plurality of alternately disposed aligning bars also mounted in stepped relation, means for elevating and lowering said advancing bars to impart a forward movement to articles resting thereon, and means for reciprocating said aligning bars in a horizontal plane transverse to the path of movement of articles thereover.

Signed at Portland, Oregon, this 30th day of September, 1930.

FRANK W. CUTLER.