

Oct. 26, 1943.

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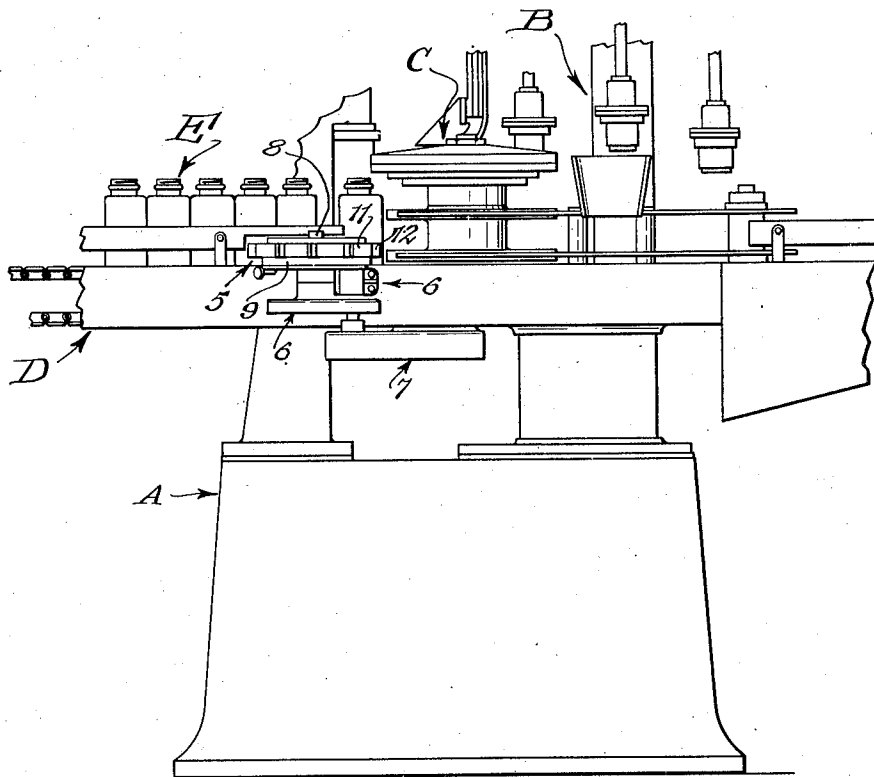
2,332,791

CONTAINER HANDLING APPARATUS

Filed July 26, 1941

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Fig. 1.



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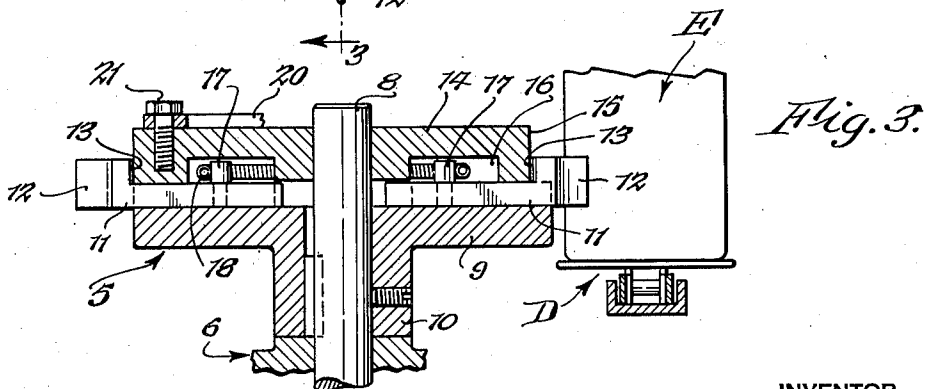
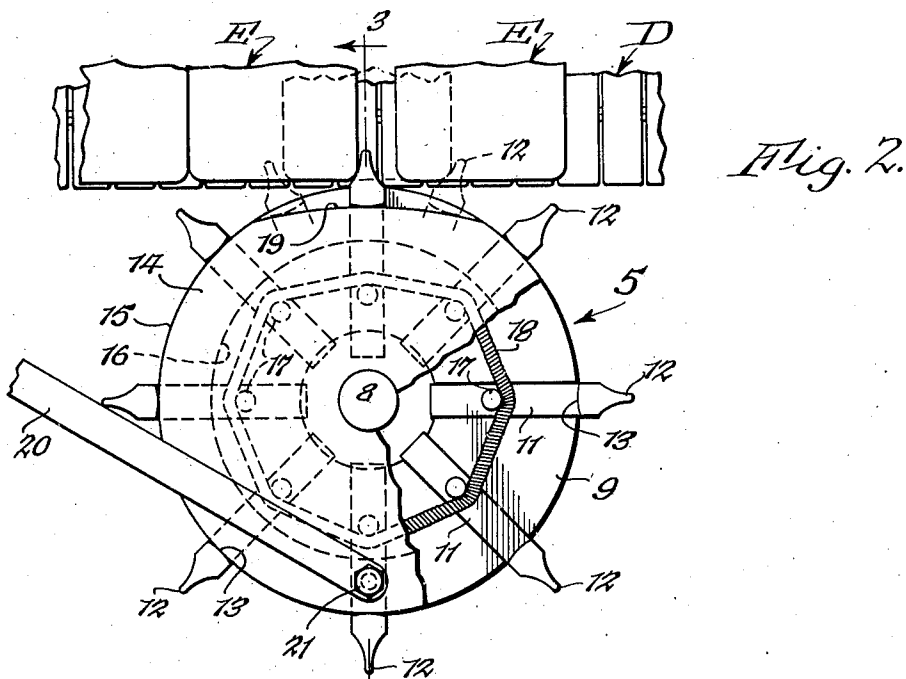
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2 Sheets-Sheet 2



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2,332,791

CONTAINER HANDLING APPARATUS

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Application July 26, 1941, Serial No. 404,807

6 Claims. (Cl. 198—34)

This invention relates to new and useful improvements in feeding mechanisms and particularly seeks to provide a novel timing wheel usable in conjunction with the feed-in conveyor of a container capping machine or the like.

Normally, capping machines include a rotary turret provided with a plurality of capping chucks which are adapted to apply caps to containers presented thereto in properly timed relation. In effecting the feed of the containers to the chucks of the rotary turret, it is known to employ devices associated with the main feed-in conveyor which are effective to cause the formation of a solid line of containers behind such timing device and to permit each successively presented leading container of the solid line of containers to be moved into engagement with a capping chuck. It is obvious that these timing devices must be operated in perfect synchronization with the rotation of the capping turret in order that containers may be properly registered therewith, and that the timing devices must also be operated at an effective linear speed somewhat less than the linear speed of the feed-in conveyor.

Prior known forms of timing devices which have been designed to perform this function include the ordinary star wheel which normally comprises merely a rotatable disk provided with a plurality of radially disposed pockets, each of which is so shaped and sized as to closely embrace a container which is to be projected into engagement with the capping elements. This solid type of star wheel has proven to be unsatisfactory for use in conjunction with certain types of containers for several reasons. It has been observed that whenever a solid type of star wheel is employed in controlling the feed of containers having elongated rectangular cross sections, the containers are apt to be mishandled or damaged. This is particularly true in those instances where lithographed or similarly finished containers are fed between the guide rails of the feed-in conveyor with the greater dimension extending parallel with the axis of the conveyor. In such cases, it has been found that the container controlling forces exerted by the solid type star wheel are initially applied to the corners of the containers at a rather sharp angle with respect to the path of travel. This results in the jamming or pressing of one corner of the container against the back rail of the conveyor guide rails and tends to cause the entire container to assume a canted position on the conveyor. Such action further results in an increase of the force required to properly control the container since

the frictional drag against the guide rails is obviously increased. It is also quite likely that the increased frictional drag between the container and the guide rails will remove or mar portions of the external finish of the containers and thus render the same unsuitable for retail merchandising.

A container feed timing device constructed in accordance with this invention overcomes the difficulties heretofore presented in connection with the use of certain prior known forms of timing wheels through the provision of a timing wheel having a plurality of radially disposed container engaging fingers which are radially movable during the time in which they are actively engaged with the containers so that the ends of the fingers assume nearly a straight line path of travel and thereby substantially avoid the application of off-line forces to the containers.

It is therefore an object of this invention to provide a timing wheel for use in conjunction with the main feed of a container capping machine or the like which is capable of effectively and uniformly controlling the feed of containers presented thereto.

It is another object of this invention to provide a device of the character stated which includes a plurality of generally radially disposed fingers movably supported upon a rotary disk for radial movement relative thereto.

Another object of this invention is to provide a device of the character stated in which the radially extending fingers normally project substantially beyond the periphery of the disk upon which they are mounted and in which means are provided for progressively retracting each of said fingers as it is brought into overlapping relation with respect to the feed conveyor and to then project each finger to its normally extended position as it ceases to overlap the feed conveyor whereby the end portion of each such finger will follow a substantially straight line path of travel during the time it overlaps the feed conveyor.

Another object of this invention is to provide a device of the character stated in which the fingers are cam projected and spring retracted.

Another object of this invention is to provide a device of the character stated which includes means for varying the time at which the projective and retractive movements of the fingers relative to the disk may be effected.

Another object of this invention is to provide a device of the character stated which is simple

in design, rugged in construction and economical to manufacture.

With these and other objects in view, the nature of which will become more apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description, and the appended claims.

In the drawings:

Fig. 1 is a somewhat fragmentary elevational view of a container capping machine with which a timing device constructed in accordance with this invention is associated;

Fig. 2 is a top plan view of the timing wheel per se and illustrates the relative position thereof with respect to the feed conveyor of the associated capping machine; and

Fig. 3 is a transverse vertical section taken along line 3—3 of Fig. 2.

Referring to the drawings in detail, the invention as illustrated is embodied in a container capping machine including a main supporting frame A, a rotary capping assembly generally indicated at B, intermediate transfer means C and a main or feed-in conveyor D including the usual guide rails and adapted to move and support a line of containers E.

A timing wheel 5 is carried adjacent the conveyor D through the medium of a mounting bracket generally indicated at 6 and is adapted to be driven from the intermediate transfer means C through driving connections generally indicated at 7. It should be noted that the mounting bracket and the driving connections are not herein illustrated in detail but are fully illustrated and described in my copending application, Serial No. 388,947, filed April 17, 1941, now Patent No. 2,304,905, issued December 15, 1942. The driven mechanisms include a vertically disposed shaft 8 journaled in the mounting bracket 6 and having its upper end projecting thereabove. A disk 9 having a depending hub 10 is rigidly affixed to the projecting portion of the shaft 8 for rotation therewith. The upper face of the disk is provided with a plurality of radially disposed slots adapted to slidably receive a plurality of container engaging fingers 11. The outer ends of the fingers are provided with double concave nose portions 12 which extend upwardly above the top face of the disk 9 to thereby provide inwardly disposed abutment or cam faces 13. A disk cam 14 having a cam face 15 is freely carried by the shaft 8 and overlies the rotary disk 9 and the fingers 11 associated therewith so that the abutment faces 13 of the fingers are disposed in opposed relation to the cam face 15. The under side of the disk cam 14 is provided with an annular groove 16. Each finger 11 is provided with an upstanding stud 17 located intermediate its ends. An endless coil spring 18 encircles the stud 17 and constantly tends to retract the fingers towards the center of the disk 9 thereby maintaining the abutment faces 13 of the fingers in contact with the cam face 15. It should be noted that the stud 17 and the associated coil spring 18 are collectively received by the groove 16 of the disk cam. The cam face 15 is provided with a flattened portion or "low" area 19 which is effective to permit a movement of retraction of each finger followed by a movement of projection thereof back to the normal fully projected position. It is obvious that in order to effect the radial movement of the fingers in this manner the disk cam 14 must be maintained stationary, and the disk 9 and its associated fingers rotated relative thereto. To this end, a link 20 has one

end pivotally connected to the disk cam 14 as by a bolt 21 and its other end connected to suitable position varying means (not shown) which may be any conventional structure for adjustably supporting the end of a member. Normally, the disk cam 14 is positioned with the low portion 19 of the cam face disposed symmetrically with respect to the normal extending from the axis of the conveyor D as shown in Fig. 2 of the drawings in order that the straight line movement of the noses 12 of the fingers will be substantially parallel to the path of travel of the containers. Obviously this may be varied by changing the contour of the low portion 19 of the cam face or by varying the position of the disk cam as a whole through the link 20.

In operation the main feed conveyor D advances a line of containers for presentation to the intermediate transfer devices C of the capping machine. As the leading container approaches the timing wheel assembly 5, one edge will be engaged by the nose portion 12 of a finger 11. At this time the abutment 13 of the finger 11 is approaching the flat portion 19 of the cam face and thereupon begins its retractive movement towards the center of the disk 9 under the influence of the spring 18. This retractive movement continues until the lowest point of the cam face portion 19 is reached and is then followed by a movement of projection until its fully projected position is again reached. The effect of this movement of retraction followed by the movement of projection is to cause the nose portion 12 of the finger to follow a substantially straight line path of travel during the time the nose portion is actively engaged with the container. Thus, the forces exerted by the finger are transmitted to the container in directions which are substantially parallel to the path of travel of the container and consequently, any tendency towards canting of the container out of parallelism with the axis of the conveyor and any tendency of the container to heavily engage the guide rails of the conveyor is minimized. In the operation of the timing wheel constructed in accordance with this invention, it should be noted that the speeds between the timing wheel and the feed-in conveyor D may be variously related. Thus, in certain types of installations the conveyor D may be operated at a linear speed greater than the peripheral speed of the timing wheel. In such instances the nose portions 12 of the fingers will first engage the leading edge of each successively presented leading container and thus retard the speed thereof and effect the formation of a solid line of containers behind the leading container. Continued rotation of the timing wheel will bring the nose portion 12 of the next succeeding finger into engagement with the trailing edge of the leading container thus effecting the insertion of such succeeding nose portion between the leading container and the next succeeding container. Obviously, after the first engaged finger has become disengaged from the leading edge of the container, the container will be free to reassume the speed of the conveyor and will consequently become properly spaced from the following container. In the instances where the linear speed of the conveyor D is less than the peripheral speed of the timing wheel, the nose portion 12 of a finger will first engage the trailing edge of the leading container and will impel the container along the conveyor upon which it is supported to thereby space the leading container from the next succeeding container in the proper

manner. Continued rotation of the timing wheel will cause the nose portion of the next succeeding finger to engage the trailing edge of the next succeeding container to thus effect its proper spacing from the line of containers following therebehind. Thus, it is obvious that a timing wheel constructed in accordance with this invention is not dependent upon any fixed speed relation with respect to the feed-in conveyor but is effective to properly space the containers of a line of containers through relatively wide ranges of feed operation.

Thus, it will be seen that the herein disclosed invention provides a novel container feed timing wheel having a plurality of radially disposed container engaging fingers which are radially movable during the time in which they are actively engaged with the containers so that the ends of the fingers assume nearly a straight line path of travel to thereby substantially avoid the application of off-line forces to the containers in which the fingers are cam projected and spring retracted and which is simple in design, rugged in construction and economical to manufacture.

It is of course to be understood that certain details of arrangement and proportions of parts may be variously modified without exceeding the scope of the appended claims.

I claim:

1. Container handling apparatus comprising a conveyor driven at a predetermined linear speed and frictionally engaging a series of containers to tend to advance said containers at the linear speed of said conveyor, timing means including a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers in a position intermediate the ends of said conveyor, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said conveyor whereby to cause said containers to form a solid line and to permit the advancement of each successively presented leading container in said solid line at the linear speed of said conveyor while retarding the remaining containers to thereby bring said containers into predetermined spaced relationship upon said conveyor and means for moving said fingers radially of said timing wheel.

2. Container handling apparatus comprising a conveyor driven at a predetermined linear speed and frictionally engaging a series of containers to tend to advance said containers in a straight line path of travel at the linear speed of said conveyor, timing means including a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers in a position intermediate the ends of said conveyor, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said conveyor whereby to cause said containers to form a solid line and to permit the advancement of each successively presented leading container in the said solid line at the linear speed of said conveyor while retarding the remaining containers to thereby bring said containers into predetermined spaced relationship upon said conveyor, and means for causing the ends of said fingers to assume nearly a straight line path of travel during the time they are projected into the path of said containers.

3. Container handling apparatus comprising a conveyor driven at a predetermined linear speed and frictionally engaging a series of containers to tend to advance said containers in a straight line path of travel at the linear speed of said conveyor, timing means including a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers in a position intermediate the ends of said conveyor, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said conveyor whereby to cause said containers to form a solid line and to permit the advancement of each successively presented leading container in said solid line at the linear speed of said conveyor while retarding the remaining containers to thereby bring said containers into predetermined spaced relationship upon said conveyor, means effective to maintain said fingers at the outermost limit of radial movement during a portion of each revolution of said wheel and to permit a radial retractive movement of each finger during a portion of each revolution of said wheel, and means for radially retracting each finger when permitted by said position maintaining means whereby the ends of said fingers will be caused to assume nearly a straight line path of travel during the time they are projected into the path of said containers.

4. In a container handling apparatus, the combination of: means for advancing a series of containers; and means for bringing said containers into predetermined spaced relationship while continuing to be advanced by said advancing means comprising, a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said advancing means whereby to cause said containers to form a solid line and to release each successively presented leading container in said solid line for advancement at the linear speed of said advancing means while retarding the remaining containers and means for moving said fingers radially of said timing wheel.

5. In a container handling apparatus, the combination of: means for advancing a series of containers in a straight line path of travel; and means for bringing said containers into predetermined spaced relationship while continuing to be advanced by said advancing means comprising, a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said advancing means whereby to cause said containers to form a solid line and to release each successively presented leading container in said solid line for advancement at the linear speed of said advancing means while retarding the remaining containers, and means for causing the ends of said fingers to assume nearly a straight line path of travel during the time they are projected into the path of said containers.

6. In a container handling apparatus, the combination of: means for advancing a series of containers in a straight line path of travel; and means for bringing said containers into

predetermined spaced relationship while continuing to be advanced by said advancing means comprising, a timing wheel having a plurality of radially extending radially movable fingers mounted thereon and projectible into the path of said containers, means for rotating said timing wheel so that the effective peripheral speed of said fingers is less than the linear speed of said advancing means whereby to cause said containers to form a solid line and to release each successively presented leading container in said solid line for advancement at the linear speed of said advancing means while retarding the re-

5 maintaining containers, means effective to maintain said fingers at the outermost limit of radial movement during a portion of each revolution of said wheel and to permit a radial retractive movement of each finger during a portion of each revolution of said wheel, and means for radially retracting each finger when permitted by said position maintaining means whereby the ends of said fingers will be caused to assume nearly a straight line path of travel during the time they are projected into the path of said containers.

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