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2,632,383

REPOSITIONING DEVICE FOR MARKING WHEELS

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2 SHEETS—SHEET 1

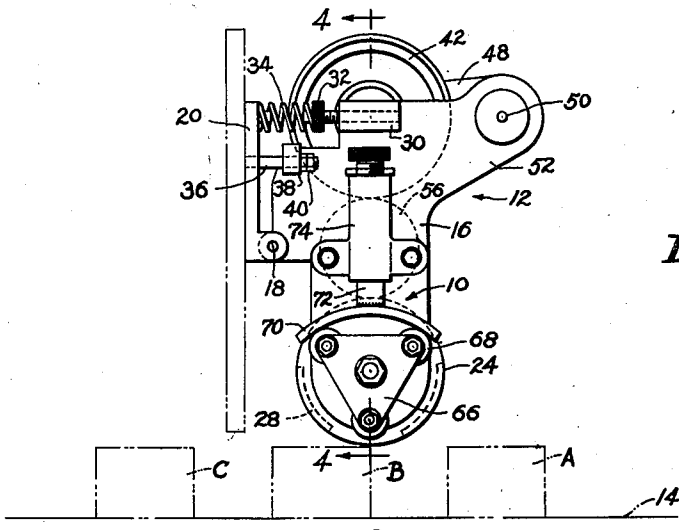


Fig. 1~

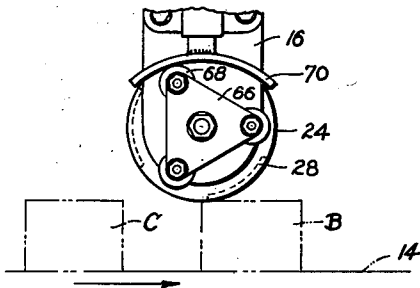


Fig. 2~

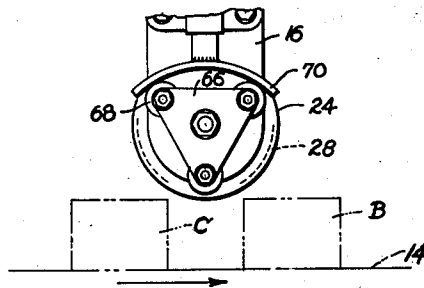


Fig. 3~

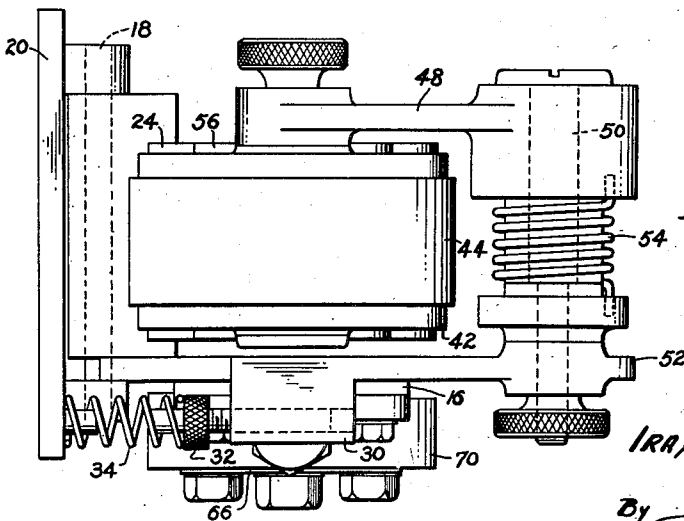


Fig. 5~

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2 SHEETS—SHEET 2

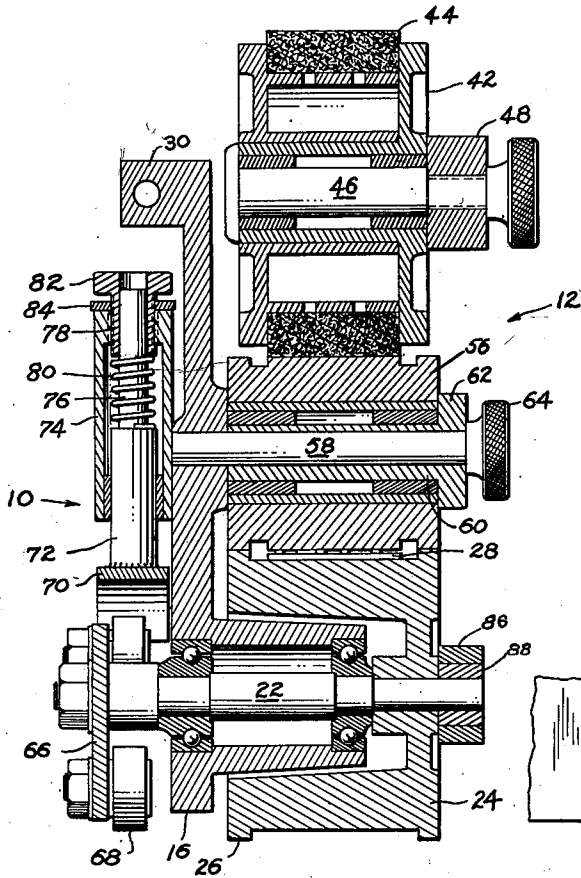


Fig. ~4~

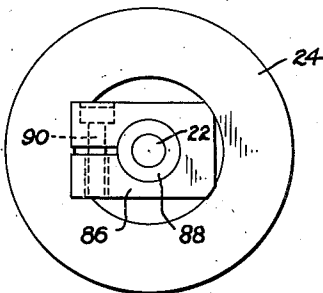


Fig. ~6~

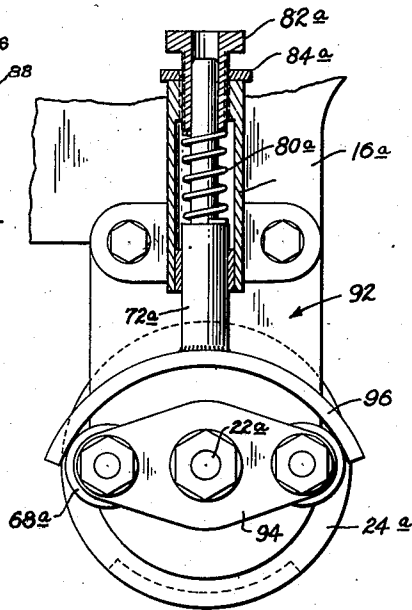


Fig. ~7~

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REPOSITIONING DEVICE FOR MARKING
WHEELS

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6 Claims. (Cl. 101—35)

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The present invention relates to re-positioning devices for marking wheels, and particularly to devices for re-positioning marking wheels that are rotated by engagement with the article to be marked.

Machines have been provided for marking successive articles carried on a conveyor and include a rotatable marking wheel located at a marking station adjacent the path of travel of the articles, to be intermittently engaged by the spaced apart moving articles and rotated thereby while effecting the marking operation. The marking wheels of such machines may have two or more marking elements arranged in circumferentially spaced relationship on the periphery thereof and it is necessary to provide some means for angularly re-positioning the wheel, during the intervals when it is not engaged by an article, so that one of the marking elements will be then positioned for marking engagement with the article next in line.

The re-positioning means heretofore provided for the above purpose have been burdened with several disadvantages. Among these disadvantages has been the failure to provide any mechanism for adjusting the speed of movement or return of the wheel to the desired position so that this speed remains constant no matter what the spacing between successive articles or the speed at which the articles are conveyed to the marking station. Further, it has been observed that these existing positioning means impose an excessive resistance against initial turning of the marking wheel when it is first engaged by an article, which resistance to turning may cause the article to slip relative to the engaged marking wheel and thus blur or distort the marked impression.

It is therefore an object of the present invention to provide re-positioning means for marking wheels of the described character constructed so that the speed at which the associated wheel is moved or returned to the desired angular position for marking may be conveniently adjusted.

Another object is to provide re-positioning means for marking wheels of the described character wherein the resistance to initial turning of the wheel from its re-positioned location is substantially diminished.

A further object is to provide re-positioning means for marking wheels of the described character constructed to afford a relatively simple and compact arrangement.

In accordance with the present invention, the

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foregoing, and other objects, features and advantages that will be apparent as this description proceeds, are accomplished by providing re-positioning means which include a re-positioning cam member rotatable with the marking wheel and carrying as many angularly spaced apart rollers at its periphery as there are marking elements on the wheel to bear against a radially movable, arcuate cam follower plate which is urged toward the center of rotation of the re-positioning cam member by an adjustable spring force and has a length sufficient to effect engagement, at all times, with at least one of the rollers on the re-positioning cam member. Since the cam follower plate is curved, the resistance to turning of the marking wheel imposed by the spring urged cam follower plate is reduced during the initial movement of a roller in engagement with the latter, and the radial distance the cam follower plate is displaced during each marking cycle is also reduced so that the structure supporting that plate may be of a compact nature. Further, since the spring force acting on the cam follower plate is adjustable and determines the speed with which the marking wheel is re-positioned, that speed may be varied to accommodate article conveyor arrangements having different speeds or spacing of articles.

In the drawings, wherein preferred embodiments of the invention are illustrated:

Fig. 1 is a side elevational view showing a re-positioning device constructed according to the present invention and in association with a marking machine for marking articles moving past the machine on a suitable conveyor, with the marking wheel shown positioned for engagement by an article to be marked;

Fig. 2 is a diagrammatical view showing the condition of the marking wheel and re-positioning device at the instant when the marking wheel is released by the marked article;

Fig. 3 is a view similar to Fig. 2, but showing the condition of the marking wheel and re-positioning device after the latter has effected the movement of the wheel to a position for marking the article next in line;

Fig. 4 is a vertical sectional view on an enlarged scale, of the re-positioning device and associated marking machine taken along the line 4—4 of Fig. 1;

Fig. 5 is a top plan view on an enlarged scale, of the re-positioning device and associated marking machine of Fig. 1;

Fig. 6 is a detail view showing an element of

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the structure provided for operatively connecting the re-positioning device to the marking wheel; and

Fig. 7 is a side elevational view, partly broken away and in section, showing another re-positioning device embodying the present invention.

Referring to the drawings in detail, and initially to Figs. 1 to 6, inclusive, thereof, a re-positioning device 10, embodying the present invention, is there shown in association with a marking machine 12. While the illustrated marking machine 12 is of the printing type for applying an inked impression to the successive articles as the latter move on a suitable conveyor past the marking station, it is to be understood that re-positioning devices constructed according to this invention may, with equal facility and usefulness, be applied to other types of marking machines, such as, machines marking by indentation or by burning, wherein the marking wheel is rotated by engagement with the moving article to be marked.

The marking machine 12 is located at a marking station adjacent the path of travel of a conveyor 14 supporting successive articles, indicated at A, B and C, for continuous movement, in the direction of the arrow of Fig. 1, to and from the marking station. The marking machine 12 includes a frame member 16 pivotally mounted at 18 on a fixed supporting bracket 20 which is preferably attached to a portion of the frame-work (shown in broken lines in Fig. 1) of a packaging machine, or other like assembly, for preparing the articles to be marked and for discharging such articles in spaced relationship onto the conveyor 14. A shaft 22 (Fig. 4) is journaled in suitable bearings adjacent the lower end of the frame 16, and at one end rotatably carries a marking wheel in the form of a printing cylinder 24 having peripheral bearing rims 26 (Fig. 4) to be engaged by the articles as the latter move past the marking station so that the cylinder 24 is intermittently rotated. Marking elements 28, having the desired characters or indicia thereon, are affixed by adhesive, or other known means, to the surface of the cylinder 24, between the bearing rims of the latter, to engage the article effecting rotation and apply the printed mark to that article.

In order to absorb the shock or impact resulting from the initial contact of the successive articles with the marking wheel, rotation of the frame 16 about its supporting pivot 18 is resiliently resisted. For this purpose, a lug 30 is provided on the frame 16 to threadedly receive an adjustable abutment member 32, and a spring 34 is interposed between the abutment member 32 and the confronting face of the supporting bracket 20 for urging the frame 16 to rotate in the direction moving the axis of the marking wheel 24 against the direction of travel of the articles on the conveyor 12. Rotation of the frame 16 in the spring urged direction is limited by an adjustable stop assembly which includes a stud 36 on the supporting bracket 20 extending slidably through a stop block 38 on the frame 16 and carrying stop nuts 40 which are engageable with the block 38 to limit the rotational movement as desired. Since the axis of the marking wheel 24, when the frame 16 is pivoted, follows a path curving toward and away from the path of the articles on the conveyor, it is apparent that the projection of the wheel into the latter path may be varied by movements of the stop nuts 40, while the contact pressure between the wheel and the articles may be varied by adjusting the posi-

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tion of the abutment 32 to increase or decrease the compression of the spring 34.

Since the marking machine 12 is of the type applying an inked impression, it further includes apparatus for supplying ink to the marking elements 28 carried on the wheel 24. This inking apparatus includes an ink fountain or reservoir roller 42 carrying the printing ink in an internal chamber and passing through suitable openings to an inking pad 44 mounted on the periphery of the roller. The ink fountain roller 42 is rotatably mounted on a shaft 46 carried by the free end of a support arm 48 which is pivoted on a pin 50 carried by an extension 52 of the frame 16. A torsion coil spring 54 (Fig. 5) extending around the pin 50 and having its opposite ends fixed to the arm 48 and the extension 52 resiliently urges the arm in the direction establishing surface contact between the fountain roller 42 and an ink transfer roller 56 which is rotatably mounted on the frame 16 for contact with the marking elements 28 on the wheel 24. In order to provide for varying the thickness of the film of ink transferred to the marking elements 28, the structure mounting the ink transfer roller 56 on the frame 16 includes a shaft 58 (Fig. 4) threaded into the frame 16 and having an eccentric sleeve 60 rotatable thereon to carry the bearings on which the roller itself rotates. A flange 62 having a knurled edge is provided on an end of the eccentric sleeve to provide for the angular adjustment of the latter so that the radial distance between the axes of rotation of the marking wheel and of the transfer roller may be conveniently varied. A head 64 is preferably formed on the end of shaft 58 to bear against the flange 62 for holding the eccentric sleeve in its adjusted position.

Since the articles advanced to the marking station along the conveyor 14 are spaced apart and effect only intermittent rotation of the marking wheel 24, it is apparent that the wheel 24 may not be properly positioned upon the release by one article for marking engagement with the article next in line on the conveyor. The re-positioning device 10 is operative to rotate the marking wheel 24 to the position, nearest to that at the conclusion of a marking cycle, at which the wheel will be properly located for the next marking cycle.

The device 10 includes a re-positioning cam member 66, fixed to the shaft 22 carrying the marking wheel 24 for rotation with the latter, and carrying rollers 68 projecting radially outward therefrom to follow an orbital path of travel as defined by the rotation of the cam member. Since the illustrated marking wheel 24 is provided with three equally spaced apart marking elements 28, three equally spaced apart rollers 68 are mounted on the cam member 66, with the latter conveniently having substantially the shape of an equi-lateral triangle to support the rollers at the corners thereof. A cam follower plate 70 is supported for movement radially toward and away from the orbital path followed by the rollers 68, in the illustrated device such radial movement being vertical, and has a length sufficient to engage at least one of the rollers at all times. The plate 70 is spring urged toward the center of rotation of the re-positioning cam member 66 to bear against the rollers 68, as the cam member is rotated with the marking wheel, and to rotate the cam member 66, when the marking wheel is freed, through the shortest angular displacement possible, to a stabilized position in which any two of the rollers 68 are engaged by the cam follower plate 70 (Fig. 1).

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By way of illustrating the above mentioned operation of the re-positioning device during a marking cycle and a subsequent re-positioning cycle, attention is directed to Figs. 1, 2 and 3 of the drawings. In Fig. 1, the cam member 66 is in a stabilized position, with the plate 70 bearing uniformly on both of the rollers 68 which it engages, and the article B is just engaging the marking wheel 24 to begin effecting rotation of the latter in a counter-clockwise direction as viewed in that figure. In Fig. 2, the cam member 66 has been rotated with the marking wheel, which is about to be freed by the article B after the latter has been marked, and the plate 70 now bears against only one roller, which has moved past top center of its orbital path of travel. With the parts in the condition of Fig. 2, the force exerted by the spring urged plate 70 imposes a turning moment on the cam member, in a counterclockwise direction as there viewed, so that the cam member and the associated marking wheel are further turned to the next stabilized position, when the marking wheel is freed by the article B, to thus re-position the marking wheel for engagement by the article C next in line on the conveyor (Fig. 3). It is apparent that if the surface of the article engaging the bearing rims 26 of the marking wheel is greater than one third the circumference of the rims, the device 10 may effect return of the cam member 66 to the nearest stabilized position, after the marking wheel is freed, by rotating the cam member in the direction counter to the direction in which the marking wheel is rotated by engagement with the moving article.

As previously mentioned, the articles are fed to the conveyor in spaced relation. However, the minimum space must be so related to the speed of travel of the conveyor as to permit the marking wheel to complete its marking operation and be released by one article before the next article reaches the marking position. The spacing of the articles fed to the conveyor may be varied as desired, but as will be understood the closer to the said minimum spacing the more articles will be marked in a given period.

Since the speed with which the re-positioning device 10 operates to return the marking wheel from its position upon being freed (Fig. 2) to the nearest stabilized position for marking the article next in line (Fig. 3) is a function of the spring force acting on the cam follower plate 70, and since this speed must be sufficient to effect return during the interval between adjacent articles on the conveyor, which interval will vary with the speed of the conveyor and the spacing of the articles on the latter, the present invention provides means for conveniently adjusting this spring force.

The support for the cam follower plate 70 includes a plunger 72 extending upwardly from the center of the plate to reciprocate within a cylindrical, open ended housing 74 (Fig. 4) which is mounted on the frame 16. The upper portion 76 of the plunger 72 is formed with a reduced diameter to provide an upwardly facing annular seat on the plunger within the housing 74. The upper part of the housing is formed with internal threads to threadably receive the threaded tubular portion of a spring compressing member 78 into which the upper portion 76 of the plunger slidably extends. A coiled compression spring 80 is disposed on the upper portion 76 of the plunger and abuts at one end against the bottom edge of the compressing member 78 and at its

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other end against the annular seat at the bottom of the portion 76 of the plunger. A knurled flange 82 is formed on the upper end of the spring compressing member to be conveniently grasped for rotating the latter to vary the compression of the spring 80 which continuously acts to move the cam follower plate 70 toward the axis of rotation of the cam member 66. Thus, the spring force acting on the cam follower plate may be conveniently varied, and a lock nut 84 is threaded on the compressing member 78 to be threaded against the top of the housing 74 for holding the spring compressing member in its adjusted position.

In order to reduce the resistance to turning of the marking wheel upon initial contact of the latter with the moving article to be marked, the cam follower plate 70 is longitudinally curved, as shown in Fig. 1, with the radius of curvature of the plate 70 being greater than the radius of the orbital path of travel of the rollers 68. Thus, when the cam member 66 is initially turned from a stabilized position (Fig. 1 or Fig. 3), the upwardly moving one of the rollers 68 engaging against the cam follower plate exerts forces against what is, in effect, an inclined plane, and the resistance to turning of the marking wheel is substantially less than that encountered when a flat plate is engaged against the rollers 68. This feature of the present invention insures turning of the marking wheel by frictional contact with the article at a peripheral speed which is the same as the speed at which the article is conveyed, so that the inked impression is not blurred by any relative movement between the article and the marking elements. The use of a longitudinally curved cam follower plate has the additional advantage of reducing the reciprocating stroke of the plunger 72 so that the housing and other associated mechanism may be compactly designed.

Since the location of the mark or inked impression on the article will depend upon the angular relationship between the marking elements 28 on the marking wheel and the rollers 68 which determine the re-positioning, it is desirable to provide convenient means for angularly adjusting the marking wheel 24 relative to the cam member 66 so that the location of the mark may be controlled with respect to the leading edge of the article first engaging the marking wheel. To provide for this adjustment in a convenient manner, a split clamp 86 (Figs. 4 and 6) is fixed to the marking wheel 24, as by welding, and engages around a bushing 88 on the shaft 22. A tightening bolt 90 extends between the split legs of the clamp to draw the legs together for gripping the bushing 88. Thus, the clamp 86 may be loosened to permit angular displacement of the marking wheel relative to the shaft 22 and hence the cam member 66.

While a three-position re-positioning device has been illustrated in Figs. 1 to 6, inclusive, that is, a device for re-positioning an associated marking wheel at any one of three locations, it is apparent that the number of stabilized positions is dependent only upon the number of rollers on the cam member rotating with the marking wheel, and that the number of these rollers may be increased or decreased depending upon the number of marking elements mounted on the marking wheel with which the re-positioning device is associated. By way of example, the adaptability of the re-positioning device embodying this invention is demonstrated by the

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device 92 of Fig. 7, wherein the parts corresponding to those described in connection with Figs. 1 to 6; inclusive, are indicated by the same reference numerals with the letter "a" affixed thereto. In the re-positioning device 92, the cam member is provided by a generally diamond-shaped member 94 fixed centrally on the marking wheel shaft 22a and having a roller 68a rotatably mounted on each end for contact with the curved cam follower plate 96 which is curved about a smaller radius than that of the plate 70 to achieve the same advantages indicated hereinabove. Thus, the re-positioning device 92 is adapted to cooperate with a marking wheel having only two marking elements on its periphery.

While the device of this invention is illustrated and described as being mounted in a vertical position above the articles to be marked whereby the marking is applied to the top of the articles; it is to be understood that the device may be mounted at either side of the conveyor and disposed in a horizontal position whereby to apply the marking to either side of the articles. It is to be understood also that if it is desired to mark the bottoms of the articles the device may be supported below the conveyor, in which event the conveyor would be of such construction as to permit engagement of the device with the bottoms of the articles.

From the foregoing, it is apparent that the present invention provides a device of the described character wherein the re-positioning speed may be controlled and varied, which imposes relatively small resistance to initial turning of the marking wheel from its re-positioned location, and yet is relatively compact and simple in construction.

While preferred embodiments of the invention have been illustrated and described in detail, it is to be understood that we do not wish to be limited to those precise embodiments, as obviously various modifications and changes may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A re-positioning device for a marking wheel having a plurality of marking elements thereon and supported to mark and be intermittently rotated by successive articles moving past the wheel in spaced apart relationship; said re-positioning device comprising a cam member adapted to rotate with the associated marking wheel and formed with as many equally spaced radial high points as there are marking elements on the latter; a longitudinally curved cam follower plate formed with a radius of curvature greater than the radius of the orbital path of travel of said high points and with a length sufficient to span between adjacent high points on said cam member; means supporting said cam follower plate for movement in the plane of rotation of the cam member toward and away from the axis of rotation of the latter for engagement with said high points, and spring means operative to continuously urge said cam follower plate toward said axis of rotation so that said cam follower plate tends to return said cam member to stabilized positions, in which two of said high points are simultaneously engaged by said plate, during the intervals when the associated marking wheel is free of the successive articles.

2. A re-positioning device for a marking wheel having a plurality of marking elements thereon and supported to mark, and be intermittently rotated by, successive articles moving past the

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marking wheel in spaced apart relationship; said re-positioning device comprising a cam member adapted to rotate with the associated marking wheel and formed with as many equally spaced radial high points as there are marking elements on the latter; a longitudinally curved cam follower plate formed with a radius of curvature greater than that of the orbital path of travel of said high points and with a length sufficient to span between adjacent high points on said cam member; means supporting said cam follower plate for radial movement toward and away from the axis of rotation of said cam member for engagement with said high points on the latter; spring means operative to continuously urge said cam follower plate toward said axis of rotation for engagement with said cam member so that said plate tends to return said cam member to stabilized positions; in which two of said high points are simultaneously engaged, during the intervals when the associated marking wheel is free of the successive articles, and means operatively associated with said spring means for varying the resilient force imposed by the latter on said cam follower plate to thereby provide for adjustment of the speed at which said cam member is returned to said stabilized positions.

3. In a re-positioning device of the described character which includes a cam member for rotation with an associated marking wheel and having as many equally spaced radial high points as there are marking elements on the wheel; means for returning said cam member to stabilized positions during the intervals when the associated marking wheel is free to rotate; said means comprising a plunger supported for reciprocation radially toward and away from the axis of rotation of the cam member, a longitudinally curved cam follower plate on said plunger to extend into the orbital path of travel of the high points on the cam member; said cam follower plate having a radius of curvature greater than that of said orbital path and a span sufficient to span between two of said high points, spring means acting on said plunger to continuously urge the latter in the direction moving said cam follower plate toward said axis of rotation so that said plate tends to return the cam member to positions in which two of said high points are simultaneously engaged, and means for varying the resilient force applied by said spring to said plunger to provide for adjustment of the speed at which the cam member is returned to said stabilized positions.

4. In combination, a conveyor for supporting spaced apart articles to be marked, a marking wheel having a plurality of marking elements thereon and rotatably supported adjacent the path of travel of articles on said conveyor to mark, and be intermittently rotated by, successive articles, and a re-positioning device for said wheel comprising a cam member mounted for rotation with said wheel and formed with as many equally spaced radial high points as there are marking elements on said wheel; a longitudinally curved cam follower plate supported for radial movement toward and away from the axis of rotation of said cam member, said cam follower plate being formed with a radius of curvature greater than that of the orbital path of said high points and having a length sufficient to span between adjacent high points on said cam member; spring means operative to continuously urge said cam follower plate toward

said axis of rotation to project into said orbital path and engage said high points so that said plate tends to return said cam member to a stabilized position in which two of said high points are simultaneously engaged by said plate, and means operatively associated with said spring means for varying the resilient force imposed by the latter on said plate to thereby provide for the adjustment of the speed at which said cam member is returned to said stabilized positions.

5. In a re-positioning device of the described character, a rotatable cam member having a plurality of radial high points thereon, a tubular, open-ended housing disposed in the plane of rotation of said cam member with its longitudinal axis extending radially from the center of rotation of said cam member, a plunger reciprocable in said housing and having a longitudinally curved cam follower plate secured to the end thereof extending toward said axis of rotation to project into the orbital path of travel of said high points, said cam follower plate having a radius of curvature greater than that of said orbital path and a length sufficient to span between adjacent high points on said cam member, and spring means in said housing acting on said plunger to continuously urge the latter in the direction toward said axis of rotation so that said cam follower plate bears against said high points and tends to return said cam member to stabilized positions in which two of said high points are simultaneously engaged by said cam follower plate.

6. In a re-positioning device of the described character, a rotatable cam member having a plurality of radial high points defined by rotatably mounted rollers, a tubular, open-ended housing disposed in the plane of rotation of said cam member with its longitudinal axis extending radially from the center of rotation of said

cam member, a plunger reciprocable in said housing and having a longitudinally curved cam follower plate secured to the end thereof extending toward said axis of rotation to project into the orbital path of travel of said rollers, said cam follower plate having a radius of curvature only slightly greater than that of said orbital path of travel of said rollers and a length sufficient to simultaneously engage two adjacent ones of said rollers, said plunger being formed with a portion of reduced diameter extending to the other end thereof and defining an annular shoulder intermediate its length, a coil spring on said reduced diameter portion and bearing at one end against said annular shoulder, and a spring compressing member threaded into the end of said housing remote from said axis of rotation to adjustably abut against the other end of said coil spring and formed with a central bore adapted to slidably receive the end of said portion of reduced diameter so that said cam follower plate is resiliently urged against the rollers to tend to return said cam member to stabilized positions in which two adjacent rollers are simultaneously engaged by said cam follower plate while said spring compressing member provides for varying the spring force applied to the cam follower plate to thereby adjust the speed of the return to said stabilized positions.

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