Nov. 7, 1950 R. A. CLARK 2,528,860

ARTICLE HOLDING MEANS

Filed July 5, 1949 4 Sheets-Sheet 1

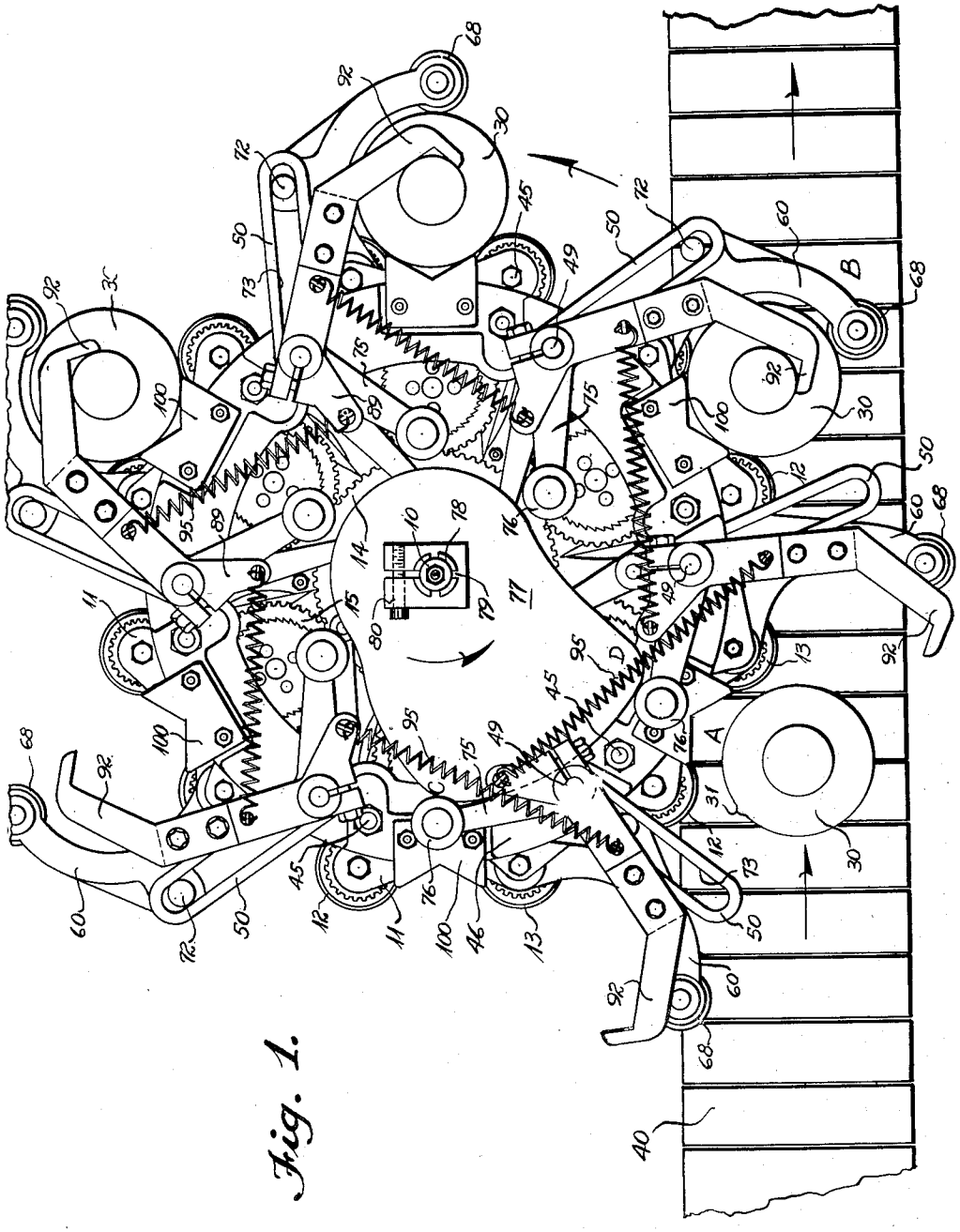

Fig. 1.

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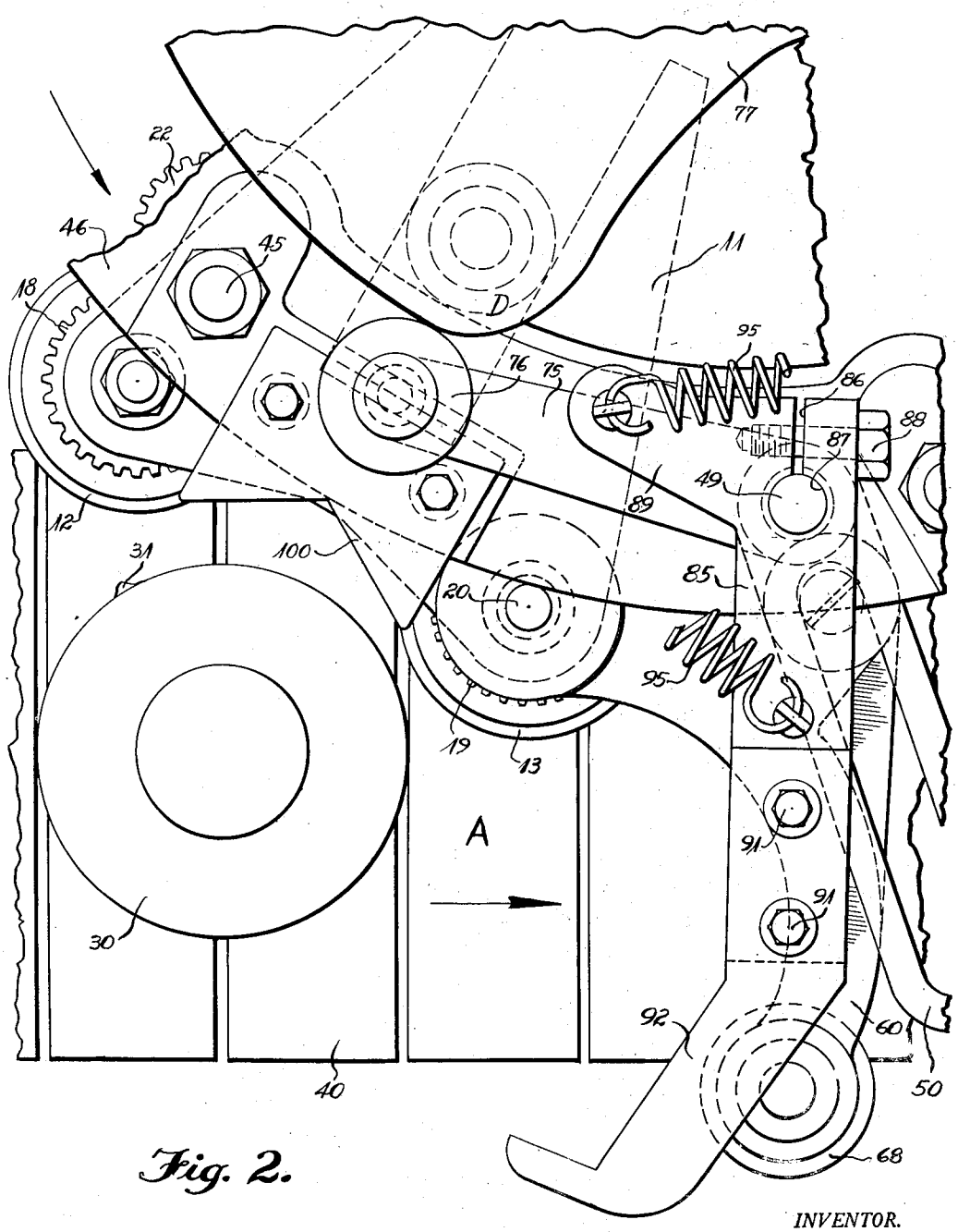

Fig. 2.

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ARTICLE HOLDING MEANS

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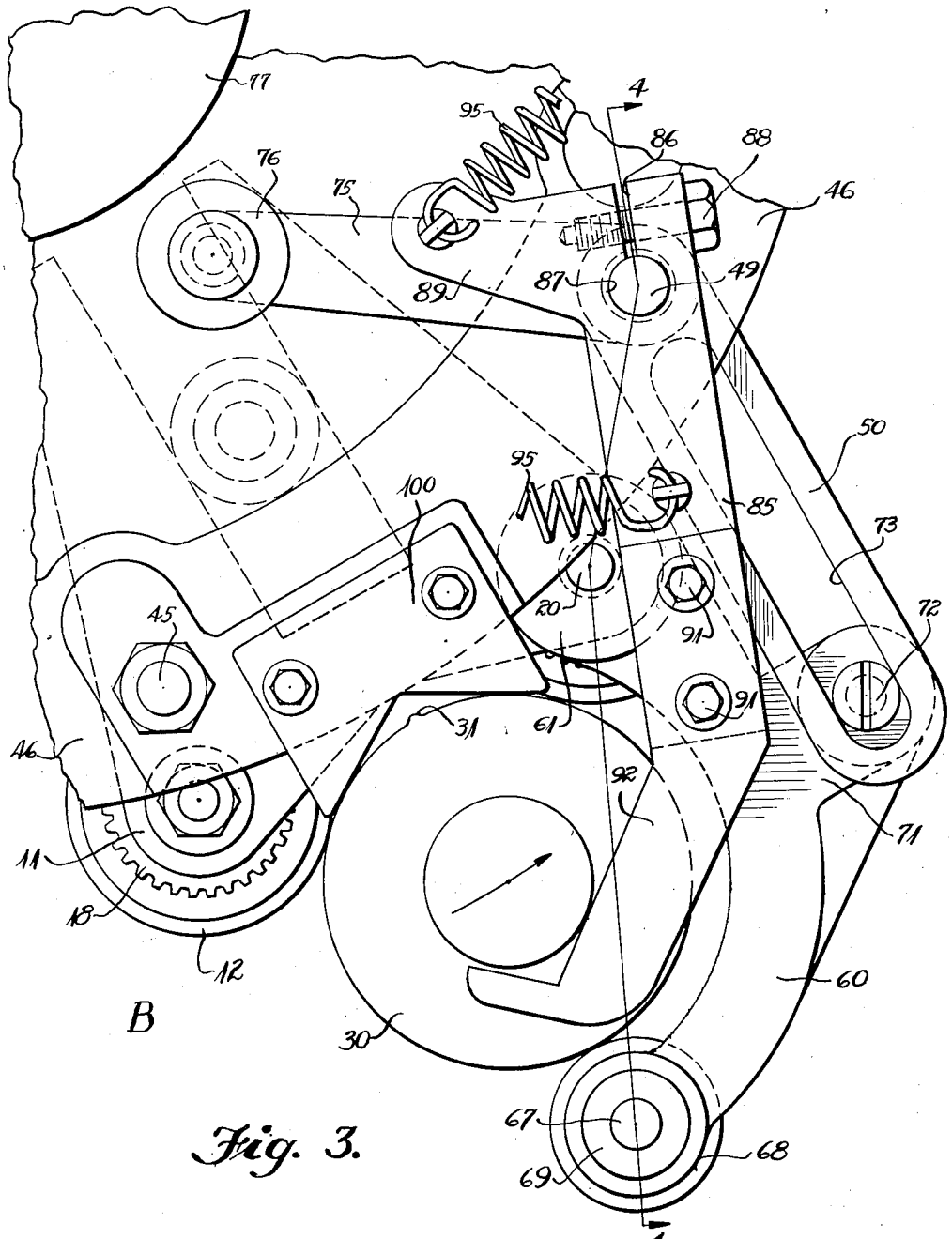

Fig. 3.

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ARTICLE HOLDING MEANS

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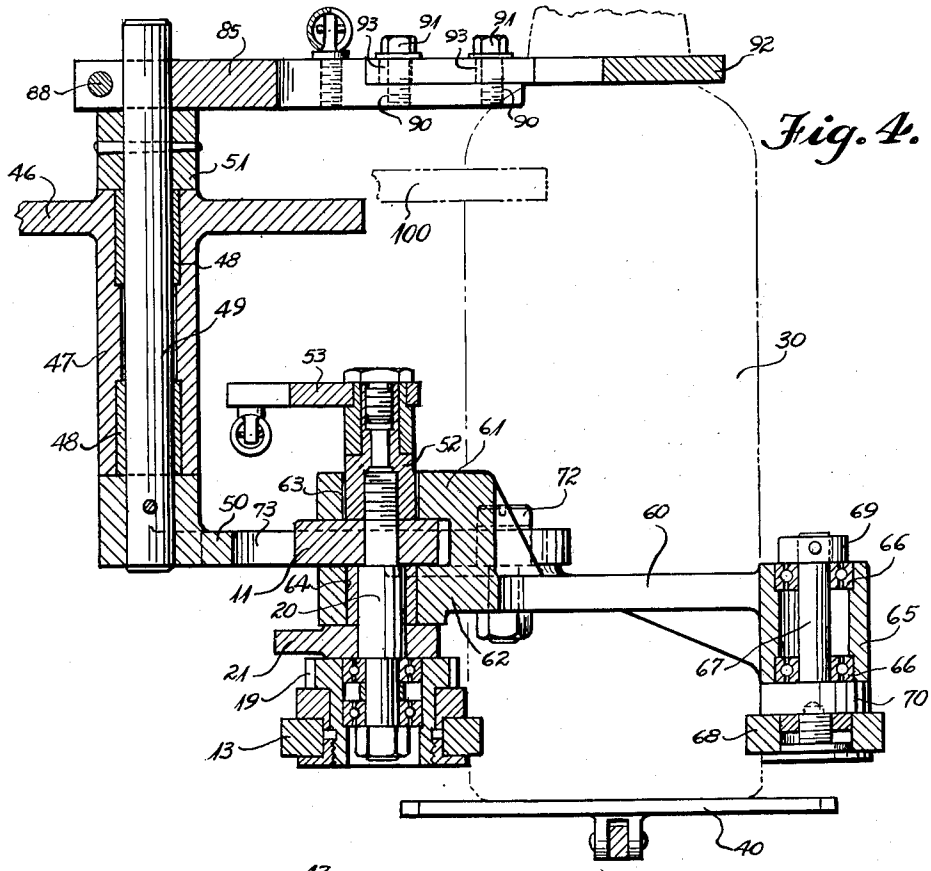

Fig. 4.

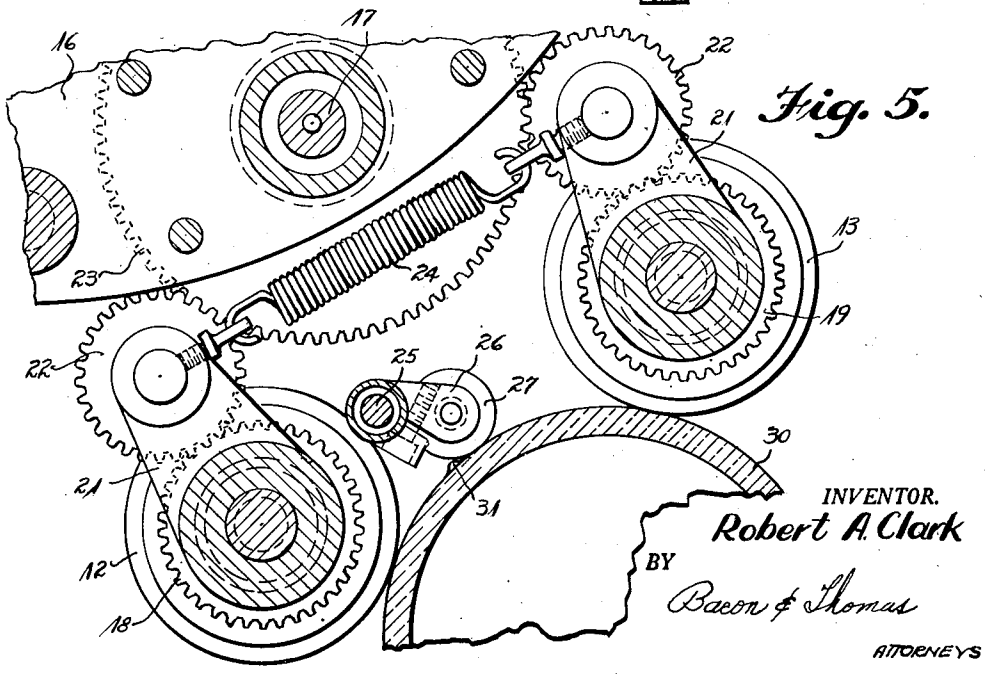

Fig. 5.

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UNITED STATES PATENT OFFICE

2,528,860

ARTICLE HOLDING MEANS

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Application July 5, 1949, Serial No. 103,097

9 Claims. (Cl. 198—33)

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This invention relates to article holding means and particularly to means for holding round or substantially round articles in a pocket of a mechanism while permitting those articles to rotate freely in said pocket about an axis.

The present invention constitutes an improvement in the mechanism described in co-pending application, Serial No. 90,812, filed on May 2, 1949, in the name of S. Rappaport and B. G. Proctor, Jr.

The mechanism described in that co-pending application comprises a rotary member or turret having a plurality of pockets on its periphery, each of said pockets being defined by a plurality of rollers. During rotation of the member on its support at least one of the rollers defining each of the pockets is positively driven to rotate a round or substantially round article held in said pocket in contact with the roller. The mechanism described therein constitutes a spotting mechanism for orienting the round articles in predetermined position with reference to some physical characteristic thereof. Articles are received in the pockets from a suitable conveyor and are oriented while being transferred to a delivery station to be delivered to a subsequent machine. During the movement of the articles from the conveyor to the delivery station they are rotated, to orient the physical characteristic referred to, then rotation is stopped and upon reaching the delivery station the articles are transferred to the subsequent machine.

The present improvement comprises generally an arm carried by the rotatable member and having a roller at its free end. The arm is pivoted to the member adjacent a pocket and is movable to bring the roller inwardly toward the pocket to engage an article therein and hold the same in the pocket against the rollers during orientation thereof and movement toward the delivery station. Suitable cam means are provided to cause movement of the roller toward the pocket at a time when the article on a conveyor is closely adjacent the open side of the pocket and to move the roller away from the article at the delivery station whereby to facilitate and make possible transfer of the article to the subsequent machine.

It is therefore an object of this invention to provide an article holding means for a mechanism of the type suggested that is simple in construction and yet positive and efficient in operation.

It is another object of this invention to provide means for holding an article in a mechanism while permitting the article to rotate freely about an axis therethrough.

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It is another object of this invention to provide an improved article holding means adaptable to specific mechanisms without interferring with the operation of that mechanism.

It is a still further object of this invention to provide means for engaging and holding round or substantially round articles in a pocket of a mechanism while permitting said articles to rotate therein and movable automatically into and out of article holding position without interrupting the normal and continuous movement of the mechanism.

Another object of this invention is to provide article holding means of the type described operable equally well, without adjustment, on articles of different size.

A still further object of this invention is to provide an article holding means and conveyor assembly so arranged that the holding means will engage and move an article into a pocket of a moving member while said article and said member are moving in substantially the same direction.

Further objects and advantages of this invention will become apparent as the description of a preferred embodiment proceeds in connection with the accompanying drawings, wherein:

Fig. 1 is a top plan view of the present invention adapted for use with a spotter mechanism;

Fig. 2 is a top plan view of a single pocket of the spotter mechanism with the improvement of the present invention shown with the parts in the relative position indicated at station A of Fig. 1;

Fig. 3 is a top plan view similar to Fig. 2 but showing the parts in the position they assume at the station indicated at B of Fig. 1;

Fig. 4 is a vertical sectional view taken substantially along the line 4—4 of Fig. 3. Certain parts of the spotter mechanism have been omitted from this view to more clearly illustrate the instant invention; and

Fig. 5 is a fragmentary horizontal sectional view, with parts omitted, illustrating the driving means for the rollers comprising the pockets of the spotter mechanism.

Referring now to Fig. 1, the improvement of the present invention will be described briefly in connection with the spotter mechanism described in the copending application previously identified. A central or main shaft 10 is fixedly and non-rotatably supported on a suitable framework or support (not shown) and rotatably

supports a carrier member 16 (Fig. 5) in the form of a circular table or the like. A plurality of radially slidable plates 11 are mounted on the carrier and are spring urged outwardly to a limiting position defined by suitable stop means. Each of the plates 11 carries at its outermost corners or extremities friction rollers 12 and 13. These rollers define therebetween a pocket for the reception of an article, such as a bottle, to be oriented and fed to a processing machine. A main gear 14 is fixedly attached, concentrically, to the shaft 10 and meshes with planetary gears 15 carried by the rotatable member. Through suitable clutch and transmission mechanism the gears 15 cause rotation of the rollers 12 and 13 during rotation of the carrier about the shaft 10.

Referring now briefly to Fig. 5, the carrier previously referred to is indicated fragmentarily at 16, and rotatably carries a shaft 17 driven by the clutch and gear mechanism previously referred to. The rollers 12 and 13 are provided with gears 18 and 19, respectively, fixed thereto and are supported for rotation on the slides 11 by means of stub shafts 20 (see Fig. 4). Rotatably carried by the stub shafts 20 are arms 21 which are provided with rotatable idler gears 22 at their free ends. The idler gears 22 are in mesh with the gears 18 and 19, respectively, and also in mesh with a driving gear 23 fixed to the shaft 17. A tension spring 24 is attached, at its opposite ends, to the arms 21 and is effective to swing the said arms to maintain the gears 22 constantly in mesh with the gear 23 as the slides 11 move radially of the carrier 16. Suitable means (not shown), as described in detail in the copending application, prevent "jamming" of the gears 22 and 23 under the influence of the spring 24.

The slides 11 also have rotatably mounted thereon a shaft or spindle 25 (see Fig. 5) carrying a crank arm 26 having a roller 27 positioned between the rollers 12 and 13. The articles for which this mechanism was designed comprise bottles 30 having projections 31 at some point on their outer peripheries. The arrangement of the rollers 12, 13 and 27 is such that as the articles 30 are rotated by the rollers 12 and 13 the roller 27 will be held closely adjacent the outer periphery of the articles 30 in a position to be engaged by the projections 31. Upon engagement of the roller 27 by the projections 31, the shaft or spindle 25 will be oscillated about its axis and actuate mechanism, described in the copending application, to disconnect the clutch previously referred to and positively lock the train of drive gears extending to the rollers 12 and 13. In this manner the articles 30 are all oriented with their projections 31 bearing a fixed and predetermined relationship to the mechanism. The articles 30 are held in the pockets defined by the rollers 12 and 13 during the orienting operation described and thereafter until the carrier 16 has rotated about the shaft 10 sufficiently to bring the articles 30 to a delivery station where suitable mechanism (not shown) receives the articles and transfers them to another machine adapted to perform some function on the articles, such as affixing a label or revenue stamp thereto.

It will be apparent that the above described orienting and transporting operation can result only if the articles 30 are held in firm frictional contact with the rollers 12 and 13 throughout the operation. The means for so holding the article constitute the subject matter of the present invention.

The mechanism thus far described constitutes the subject matter of the copending application identified above, per se, and forms no part of the present invention. The spotting mechanism has been thus briefly described merely for the purpose of establishing a suitable environment for the elements constituting the present invention.

Referring again to Fig. 1, an endless conveyor 40 of any suitable design, is arranged to transport the articles 30 to the vicinity of the spotting mechanism described. The arrangement is such that the conveyor 40 moves along a path substantially tangential to the path of movement of the pockets defined by the rollers 12 and 13. Suitable releasing means (not shown) are provided to release and position the articles 30 on the conveyor 40 so that an article will arrive opposite the spotter mechanism in timed relation to the arrival of a pocket to receive it in position adjacent the conveyor. The arrangement and timing is preferably such that the center line of one of the pockets, the center of an article 30 and the axis of the shaft 10 lie in substantially a straight line extending generally normal to the line of travel of conveyor 40. At the time those conditions prevail the holding means of the present invention are actuated to engage the articles 30 and move them radially of the conveyor 40 into firm engagement with the rollers 12 and 13. With such an arrangement it is not necessary that the articles 30 be accurately positioned laterally of the conveyor 40. The only accurate control of the position of articles on the conveyor is in their proper spacing longitudinally thereof.

Fig. 2 illustrates the parts and the relative positions they occupy a short time prior to arrival of the articles 30 in position to be moved into the pockets defined by the rollers 12 and 13. The conveyor 40 will be moving in the direction indicated by the arrow thereon and the spotting mechanism will be moving in the direction indicated by the curved arrow, with the rollers 12 and 13 moving at substantially the same linear speed as the conveyor 40. Shortly after the position shown in Fig. 2, the holding mechanism of the present invention automatically moves to the position shown in Fig. 3 to hold the articles 30 against the rollers 12 and 13.

The carrier 16, previously referred to, is provided with a plurality of upstanding posts 45 fixed thereon and attached to the top of the posts 45 is an annual ring 46 concentric to the central shaft 10 and fixedly carried for unitary rotation with the carrier 16. Between adjacent pockets of the mechanism the ring 46 is provided with sleeves 47 supporting aligned bushings 48 (see Fig. 4). A rock shaft 49 is journaled in the bushings 48 and has affixed to its lower end a radially slotted crank arm 50. A suitable collar 51 is pinned or otherwise affixed to the rock shaft 49. and in conjunction with the hub portion of the crank 50 fixes the rock shaft 49 against axial movement in the bushings 48 while permitting free rotary movement therein.

The stub shaft 20 upon which the roller 13 is journaled is held in fixed position on the slide 11 by means of a cap member 52 which acts to clamp a shoulder of the shaft 20 against the lowermost surface of the slide 11. The cap 52 rotatably supports an arm 53, comprising a part of the spotter mechanism previously described. A bushing around the portion of the shaft 20 immediately below the slide 11 and the portion of

the cap 52 adjacent the upper surface of the slide 11 constitute bearing surfaces for rotatably supporting a curved arm 60. The arm 60 is provided with ears 61 and 62, respectively above and below the slide 11, and the said ears are provided with aligned openings 63 and 64 by which the arm is rotatably supported on the bushing on the shaft 20 and on the cap 52. At its free end the curved arm 60 is provided with a hollow boss 65 having suitable anti-friction bearings 66 positioned therein. The bearings 66 support a shaft 67 for free rotation on a vertical axis and the shaft 67 has affixed thereto a friction roller 68. An enlarged portion 70 of the shaft 67 abuts the lowermost end of the boss 65 to prevent upward movement of the shaft 67 in the bearings 66, and the collar 69 prevents downward movement thereof. As shown in Fig. 4 the roller 68 carried by the arm 60 lies substantially in the plane of the article-engaging peripheral portion of the roller 13, as does roller 12.

Referring now to Fig. 3, the arm 60 is provided with a laterally extending ear 71 carrying a pin or the like 72 in fixed position thereon. The pin 72 is preferably of a diameter only slightly less than the width of the slot 73 in the crank arm 50 previously referred to. As clearly shown in Fig. 3 the pin 72 is received within the slot 73 of the crank arm 50. It will be clear from the construction and arrangement just described that clockwise rocking of rock shaft 49 about its axis will cause the crank 50 to oscillate and swing the arm 60 about the shaft 20 whereby to move the roller 68 from the position shown in Fig. 2 to that shown in Fig. 3 where it is in article-engaging position.

The collar 51, pinned to the shaft 49 previously described, is provided with a crank arm extension 75 (Figs. 2 and 3) preferably integral therewith and which extension rotatably supports a cam engaging roller 76 at its free end. Fixed to the central shaft 10 is a cam 77 arranged so that the "high" portions thereof lie in the path of movement of the rollers 76. The cam 77 may have an integral or otherwise rigidly affixed hub 78 (Fig. 1) provided with axial slots 79. A split clamp 80 is arranged to embrace the split hub 78 and to compress the same about the shaft 10 to effect rigid positioning of the cam 77 on the shaft. By loosening the clamp 80 the cam may be angularly adjusted around the shaft 10 or may be moved axially thereof, within limits, to insure the peripheral portion of the cam engaging the rollers 76. As shown in Fig. 1 the cam 77 is provided with a "high" portion extending substantially from the position marked C to the position marked D and the periphery of the cam between the points C and D extends outwardly sufficiently far to engage the rollers 76 during movement of the latter about the shaft 10, to swing the crank arms 75 outwardly and thereby rock shaft 49 and crank 50 to move the arm 60 and roller 68 outwardly to the position shown in Fig. 2. The cam 77 will be so angularly adjusted about the shaft 10 that the roller 76 will engage the point C to retract roller 68 at the delivery station, which will be well in advance of the approach of the associated pocket to the conveyor 40. Thus, the pocket defined by the rollers 12 and 13 is "opened" before that pocket reaches a position over the conveyor. The point D of the cam 77 will be so positioned that the roller 76 will hold the roller 68 in retracted position until such time as the associated pocket has passed the position indicated at A in Fig. 1 opposite an article 30 on the conveyor. A short distance past the position indicated at A in Fig. 1 the roller 76 will pass off the high point of the cam thus releasing the roller 68 and arm 60 to the action of a spring to be later described, whereby the roller is moved into position to engage the article 30 and move the said article into the pocket between rollers 12 and 13 and hold the same therein. As the carrier 16 and the article 30 are moved around the shaft 10 the roller 76 remains outwardly of the periphery of the "low" portion of the cam 77 until the article reaches the delivery station mentioned heretofore. In the specific embodiment illustrated the delivery station would be at position C of Fig. 1, where the roller 68 is moved away from the article, thus releasing the article to be transferred to a machine for performing a further process thereon. Clearly the cam 77 could be so configured that the point C would be at any desired position around the periphery of the shaft 10. The particular configuration of the cam 77 will depend upon the relationship of the mechanism herein shown to the machine to which the articles are to be delivered.

Adjacent the top of the shaft 49 and preferably immediately above the collar 51 an arm 85 having a split end 86 and a bore 87 is positioned with the said bore surrounding the shaft 49. A suitable cap screw or the like 88 acts to clamp the arm 85 to the shaft 49. The arm 85 is provided with a lateral extension 89 adjacent the shaft 49 and is further provided with a pair of threaded openings 90 (see Fig. 4) in which a pair of cap screws 91 are threadedly engaged to clamp a steadying member or hook 92 to the arm 85. The steadying member or hook 92 is provided with a pair of enlarged openings 93 through which the cap screws 91 extend. Thus, it will be apparent that the hook or steadying member 92 may be radially and angularly adjusted, within limits, on the arm 85. The free or terminal end of the member 92 is shaped in any suitable manner to lie closely adjacent the surface of the articles 30 when the latter are held in the pockets by the rollers 68. The particular size and shape of the articles 30 will determine the dimensions and configurations of the members 92. Since the members 92 and arms 85 are fixed to shafts 49 it will be clear that rocking of the shafts 49 to retract rollers 68 from the articles being held thereby will also result in the steadying or holding members 92 being retracted to the position indicated in Fig. 2.

A plurality of tension springs 95 are provided, there being one spring for each of the rollers 68 on the mechanism. As best shown in Fig. 1 each of the springs 95 is attached at one end to the free end of the extension 89 of an arm 85 and at its other end is attached to an adjacent arm 85. As is also clearly evident from Fig. 1, the points of attachment of the springs 95 to the arms 85 and their extensions 89 lie on opposite sides of the shaft 49 whereby the tension in each of two adjacent springs is cumulative on the rock shafts 49 to urge them to clockwise rotation when viewed from the top. The springs 95 constitute the means for moving the roller 68 inwardly to the position of Fig. 3 when rollers 76 pass the point D of cam 77.

It is believed that the operation of the improvement herein disclosed will be readily apparent to those skilled in the art without further detailed explanation.

If desired a suitable article steadying block or

the like 100 may be attached to the ring 46 immediately above each of the pockets formed by rollers 12 and 13 to lie adjacent the surface of an article 30 to further steady the article when being rotated or transported by the mechanism. As is evident from Fig. 4 the rollers 12, 13 and 68 are positioned to lie relatively close to the conveyor 40 and adjacent the bottom of an article 30. In most cases, it is deemed advisable to provide such steadying means as the hook 92 and/or the block 100 to prevent accidental tipping or displacement of the articles 30.

Whereas a single specific embodiment of the invention has been shown and described herein it is to be understood that many changes and modifications may be made therein without departing from the scope of the invention which is to be limited only by the appended claims.

I claim:

1. In an article handling mechanism, having a support, a member rotatable on said support, and a pair of rollers adjacent the periphery of said member defining a radially outwardly open pocket therebetween to rotatably receive and bodily move an article and means rotating one of said rollers on its axis, the improvement comprising; an arm pivoted to said member adjacent said pocket, the free end of said arm extending outwardly of said pocket and having an article-engaging idler roller thereon, and means actuated in timed relation to the rotation of said member to swing said arm and move said roller away from said pocket to release an article therein.

2. A mechanism as defined in claim 1, wherein said roller swings in a plane substantially coextensive with the plane of rotation of the rollers forming said pocket.

3. A mechanism as defined in claim 1, including a steadying member carried by said member and movable with said arm above said roller to lie adjacent the surface of an article in said pocket.

4. A mechanism as defined in claim 1 wherein said arm is pivoted on an axis coincident with the axis of one of said pocket-forming rollers.

5. A mechanism as defined in claim 1 including a cam fixed to said support and wherein said last-named means includes a cam-follower means on said member.

6. A mechanism as defined in claim 1 wherein said last-named means comprises a lever pivoted to said member, a cam fixed to said support, one portion of said lever engaging said cam and another portion of said lever engaging said arm at a point spaced from its pivot.

7. In an article handling mechanism, having a support, a member rotatable on said support, and a pair of rollers adjacent the periphery of said member defining a pocket therebetween to rotatably receive and bodily move an article, the improvement comprising; an arm pivoted to said member adjacent said pocket, the free end of said arm extending outwardly of said pocket and having an article-engaging roller thereon, a rock shaft journalled on said member, a crank fixed to said rock shaft, said crank being engageable with an intermediate portion of said arm, a second crank fixed to said shaft, a cam fixed on said support, an end of second crank being adapted as a cam follower and being swingable into position to engage said cam, and spring means urging said rock shaft to swing said arm and roller toward said pocket and said end of said second crank toward said cam.

8. A mechanism as defined in claim 7 including an article steadying hook member angularly and radially adjustable on said rock shaft.

9. A mechanism as defined in claim 7 having a plurality of said pockets, rock shafts, second cranks and associated means spaced about said rotatable member and wherein said spring means comprises a tension spring connected to each of said second cranks on one side of said rock shaft and to a next adjacent second crank on the correspondingly opposite side of said rock shaft.

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