July 8, 1952 M. HIRSCHEY 2,602,393

MARKING APPARATUS

Filed April 26, 1948 2 SHEETS—SHEET 1

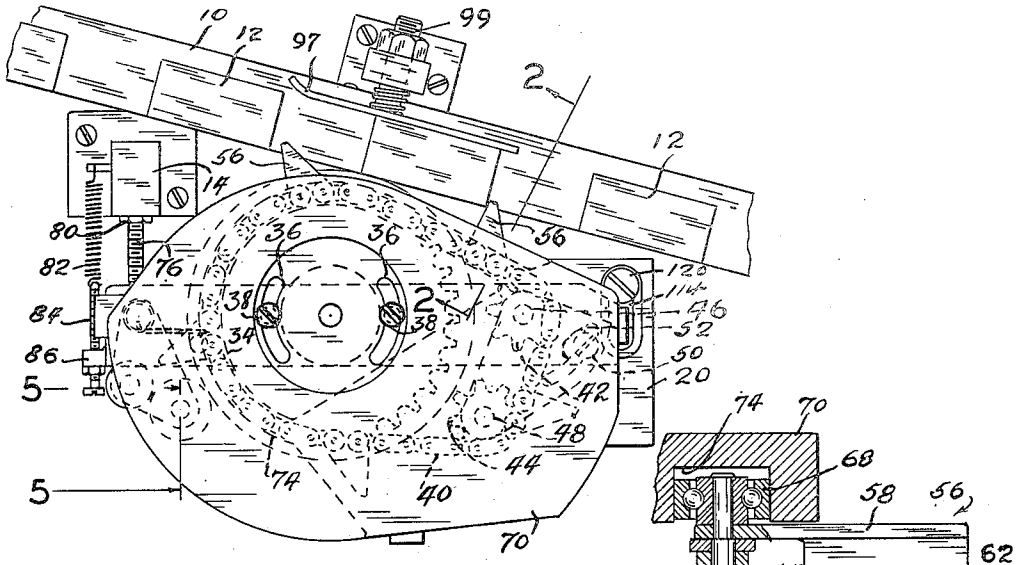


FIG.-1-

FIG.-2-

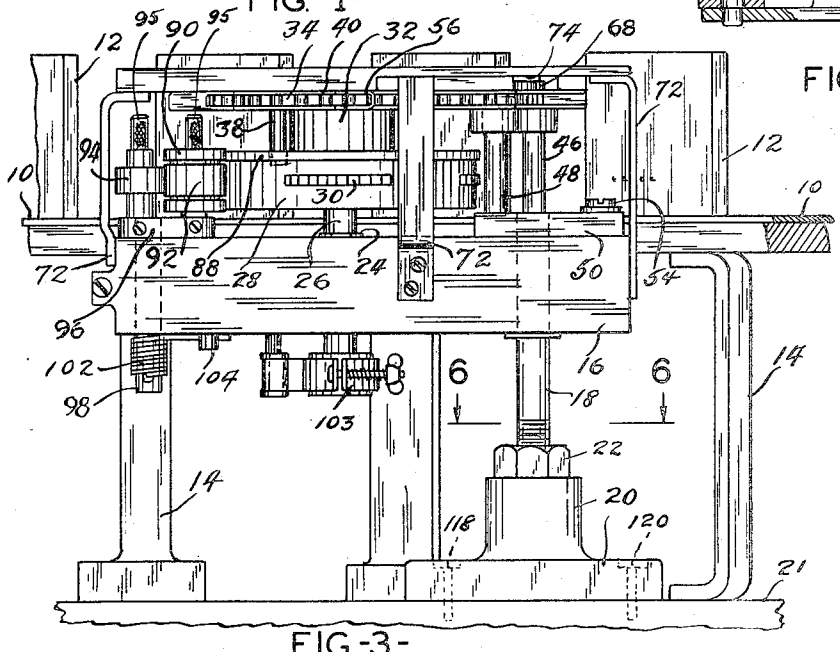


FIG.-3-

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July 8, 1952 M. HIRSCHEY 2,602,393

MARKING APPARATUS

Filed April 26, 1948 2 SHEETS—SHEET 2

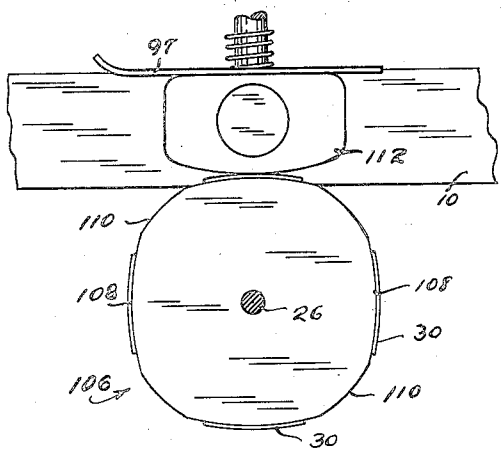


FIG.-4-

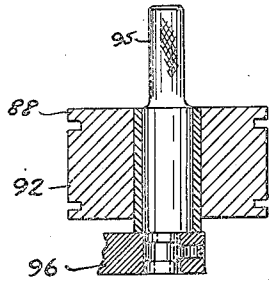


FIG.-5-

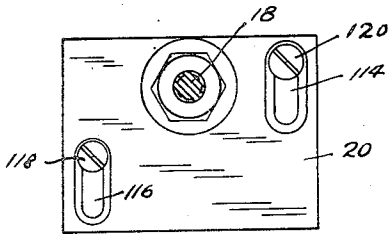


FIG.-6-

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2,602,393

MARKING APPARATUS

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Application April 26, 1948, Serial No. 23,213

17 Claims. (Cl. 101—37)

1

This invention relates to improvements in marking apparatus and is particularly directed to apparatus or devices for marking continuously moving articles.

In the marking of continuously moving articles, such as packages, bottles, cans or the like, which are moved by a conveyor to a marking station, it is important that each successively advanced article receives the complete impression and that the impression is applied to each article in approximately the same position. It is also important in the apparatus for accomplishing such marking, that the die wheel or marking element be traveling at a peripheral speed equal to the linear speed of the moving articles at the instant marking, whereby to prevent blurring of the impression. In such devices or apparatus wherein the die wheel is driven by a sprocket and chain, those elements must be remotely disposed relatively to each other, whereby not to interfere with proper contact between the die wheel and the articles to be marked. In such apparatus, the disposition of the sprocket and chain remotely from the die wheel, generally renders the apparatus very cumbersome.

One of the objects of the present invention resides in the provision of a neat compact apparatus which overcomes the objections and disadvantages of prior apparatus.

Another object resides in the provision of apparatus of the character indicated which will automatically and effectively apply desired marking in the same position on successively advanced articles without blurring of the impression.

Another object is the provision of apparatus of the character indicated wherein a driving sprocket for the die wheel is so disposed in juxtaposition to the die wheel that there will be no interference with the advancing articles.

Another object resides in the provision of means for adjusting the surface speed of the die wheel relatively to that of the articles.

A further objects resides in the provision of apparatus of the character indicated for marking various shaped articles, including flat sided articles as well as convex sided articles.

A further object resides in the provision of adjustable means for regulating the contact pressure between the die wheel and the articles.

Other and further objects of the invention will be manifest from the following description and the accompanying drawings, in which drawings:

Fig. 1 is a plan view of a marking apparatus made in accordance with the present invention;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

2

Fig. 3 is an elevational view of the apparatus of Fig. 1;

Fig. 4 is a fragmentary view of a modified form of die wheel in position adjacent a conveyor for articles to be marked;

Fig. 5 is a view taken on line 5—5 of Fig. 1; and

Fig. 6 is a view taken on line 6—6 of Fig. 3.

Referring to the drawings in detail a conveyor 10, for articles 12 to be marked, is supported on standards 14. A bracket 16, for supporting the marking device of the present invention, is pivotally mounted on a shaft 18, the lower end of which is supported in a threaded hole in a base 20. The lower end of the shaft 18 is screw threaded whereby the height of the bracket 16 may be adjusted by means of a nut 22, which nut also secures the shaft rigidly in the base 20.

By adjusting the height of the bracket 16 the vertical position of the marking on the articles can be varied.

The bracket 16 is provided with bearing members 24 for rotatably supporting a shaft 26 on which a die wheel 28 is fixed. The die wheel 28 has a plurality of impression applying elements 30 secured on its periphery, in predetermined spaced relation, by means of adhesive or any other suitable means, and has an integral hub 32 projecting from its upper face, on which a sprocket 34 of smaller diameter than the die wheel is mounted for driving the die wheel. By reason of the difference in the diameters of the die wheel and the sprocket, the die wheel will be driven at a greater surface speed than that of the advancing articles. However, as will be pointed out hereinafter, the surface speed of the die wheel will be equalized with that of the moving articles at the instant of marking. Also by reason of the die wheel diameter being greater than that of the sprocket the die wheel will engage the articles to be marked without interference from the sprocket.

The sprocket 34 and the die wheel 28 are adjustable relatively to each other, by means of arcuate slots 36, formed in the sprocket, whereby to initially bring the impression elements into register with the articles. Screws or bolts 38 pass through the slots 36 and into threaded apertures in the upper face of the die wheel to secure the sprocket and die wheel in adjusted positions. In adjusting the relative setting of the sprocket and die wheel it is merely necessary to loosen the screw or bolts 38 and rotate the sprocket and die wheel manually relatively to each other to the desired adjusted positions, after which the bolts 38 are tightened to retain the sprocket

and die wheel in their adjusted positions. It will be seen that by reason of the connection of the sprocket to the die wheel by means of the screw or bolts 38, the sprocket when driven will in turn drive the die wheel.

A sprocket chain 40 passes about the sprocket 34 and about idler sprockets 42 and 44. The latter sprockets are freely rotatable on studs 46 and 48, respectively, carried by a plate 50 on the bracket 16. The plate 50 is adjustable on the bracket 16 by means of an arcuate slot 52 therein and a screw 54, whereby the tension of the chain may be adjusted as desired.

As will be seen from Fig. 1, the periphery of the idler sprocket 42 is further removed from the conveyor 10 and the path of travel of the articles 12 than the periphery of the sprocket 34, whereby the lead of the chain adjacent the conveyor will travel at an angle to the path of travel of the articles to be marked, the purpose of which will be described hereinafter.

The chain 40 is provided with a plurality of lugs or flights 56, secured thereto in predetermined spaced relation, five of which are shown in the drawings, but any desired number may be employed depending on the length of the articles to be marked. The lugs or flights 56 comprise upper and lower walls 58 and 60, respectively, (Fig. 2) which are preferably triangular in shape and each is connected by a web 62. The upper and lower walls of each lug has a pair of apertures formed therein, adjacent to two of its angles, for the reception of pins 64 which pass through apertures in opposite ends of a single link of the chain 40 and through the leading and trailing ends of adjacent links. These pins, as will be seen from Fig. 2, constitute the connecting pivot pins of adjacent links of the chain, and each projects above the upper wall of its lug. The projecting portion of each pin has a roller bearing 68 secured thereto, and held thereon by peening over the upper end of the pin or by other suitable means. The inner race of each of the bearings, as will be seen from Fig. 2, extends below the outer race and engages the upper face of the upper wall of the lug 56.

A cover plate 70, for the sprockets and chain, is supported on the bracket 16, by angle iron supports 72, and has a track 74 formed in its underface in which the roller bearings 68 of the lugs 56 ride during the operation of the apparatus. The track 74 is concentrically disposed relatively to a portion of the periphery of the sprocket 34 and then extends in a direction tangent thereto along the edge of the cover plate adjacent the conveyor 10 and serves as a guide for one lead of the chain 40. The apex of the lugs 56 projects beyond the said edge of the cover plate and when advanced to the tangential portion of the track 74 will project partially over the conveyor 10, whereby to be engaged by the moving articles and effect driving of the chain 40 and rotation of the die wheel to bring the impression applying elements 30 into contact with the articles, as will be described in greater detail hereinafter.

Adjustable stop means, for regulating the contact pressure between the die wheel and the articles, is provided in the form of a screw 76, secured to one of the supporting standards 14 of the conveyor, whereby to project beyond the bracket 16. This screw is adjustable longitudinally of its axis and is adapted to be secured in adjusted position by a nut 80. A spring 82 is provided for retaining the bracket 16 in engagement with the end of the screw 76. One end of this spring is anchored to the standard 14 and its other end secured to a screw 84 in a lug 86 on the bracket, whereby the tension of the spring may be readily adjusted.

The die wheel 28 has a flange 88 of friction material adjacent its upper edge, which is normally in engagement with a flange 90 of an ink transfer roller 92, which in turn is normally in engagement with an inking roller 94. The rollers 92 and 94 are rotatably mounted on shafts 95 secured to a triangular plate 96 carried on a shaft 98 which in turn is pivotally mounted in the bracket 16. The shaft 98 carries a torsion spring 102, one end of which is secured thereto and the other end of which engages a pin 104 on the bracket 16, whereby the plate 96 resiliently holds the transfer roller 92 in engagement with the flange 88 and the impression elements 30 on the periphery of the die wheel 28, to effect rotation of the transfer roller and the transfer of ink to the impression elements.

At the marking station, where the marking device of the present invention is located, a guide shoe 97 is secured to the conveyor support at the side of the conveyor opposite the marking device. This shoe is adjustable transversely of the conveyor, by means of a screw 99, whereby to accommodate articles of different widths. The shoes serves to prevent lateral movement of the articles on the conveyor when the articles are engaged by the die wheel, and also serves as a guide for the articles as they are moved past the marking station.

A conventional friction brake 103 is provided on the lower end of the die wheel shaft 26 to prevent over-running of the die wheel.

As previously mentioned, one of the features of the present invention is the provision of a sprocket of smaller diameter than the die wheel, whereby the sprocket will not project into the path of the moving articles and thereby interfere with the operation of the apparatus. This arrangement provides a compact apparatus, as compared with apparatus wherein the driving sprocket for the die wheel is located at a distance above or below the moving articles whereby to be out of their path of travel. As will be understood, the provision of a sprocket of smaller diameter than the die wheel will result in the surface speed of the die wheel being greater than the speed of the moving articles, which articles, as previously mentioned, effect the driving of the sprocket through the sprocket chain. However, when the articles engage the lugs 56 and move them and the chain in a path tangent to the circular path about the die wheel, the speed of rotation of the die wheel will be reduced. This speed may be regulated by adjusting the pivoted end of the bracket 16 relatively to the conveyor, whereby to vary the angularity of the track 74 relatively to the conveyor 10 and the path of travel of the articles.

The angularity of the track 74 relatively to the path of travel of the articles is adjustable by adjusting the position of the base 20 on the machine bed 21, whereby to move the pivoted end of the bracket 16 toward or away from the conveyor as desired. As will be seen from Figs. 3 and 6, the base 20 has a pair of slots 114 and 116 and bolts 120 and 118, respectively, extending through those slots into threaded apertures in the machine bed 21. Upon loosening the screws 118 and 120, the base 20 may then be moved manually on the machine bed 21, carrying with it the supporting shaft 18 of the bracket 16, whereby the pivoted end of the

bracket 16 will be moved toward or away from the conveyor, while the opposite end of the bracket is still maintained in engagement with the stop screw 76 by the spring 82.

The adjustability of the pivoted end of the bracket 16, as will be understood from the foregoing description, provides for effecting a variation of the angular relationship of the track 74, and the lead of the sprocket chain adjacent the conveyor 10, with the path of travel of the moving articles, whereby the peripheral speed of the die wheel, during the travel of the chain in its tangential path between the sprockets 34 and 42, may be varied and equalized with the linear speed of the articles.

In operation, the articles are conveyed by the conveyor 10, in the conventional manner, to the marking station where the marking apparatus of the present invention is located. As an article approaches the station, one of the lugs or flights 56 will be projecting into its path and will therefore be engaged thereby, whereupon linear motion is imparted to the chain 40, which in turn will impart rotary motion to the die wheel through means of the sprocket 34. As the chain begins to move forward initially, the peripheral speed at which it drives the die wheel will be greater than the linear speed of the articles, due to the differential in diameters of the sprocket 34 and the die wheel 28, as previously mentioned, but the approaching article to be marked has not yet reached the die wheel. However, assuming that the angle at which the lead of the chain adjacent the conveyor travels away from the conveyor has been properly adjusted, then by the time the article has reached the die wheel, the peripheral speed of the die wheel will be equal to the linear speed of the moving articles to be marked. Accordingly, immediately before, during and immediately following the marking operation the surface speeds of the die wheel and the moving articles will be equal so that a perfect impression will be applied to the article without blurring.

As the die wheel is rotated the transfer roller 92 transfers ink from the inking roller 94 to the impression elements 30, which in turn transfers the ink to the articles in the impression provided for by the elements.

Referring to the modification shown in Fig. 4, the die wheel 106 instead of being perfectly circular, as is the die wheel of Fig. 1, is in the form of a cam having alternate cam areas comprising arcs of alternate radii. The arcs having the longer radii are substantially flat, or semi flat, while the arcs having the shorter radii are of a preceptable curve. These areas, therefore, for convenience of description, will be referred to respectively as flat areas 108 and curved areas 110. The impression elements 30 are mounted on the flat areas and are, therefore, closer to the axis of rotation of the die wheel than the curved areas. This form of die wheel is employed for marking convex sided, or the convex side of, articles such as bottles 112 shown in plan view in Fig. 4.

In this form, as in the form shown in Fig. 1, the sprocket on the die wheel 106 is of a smaller diameter than that of the die wheel 28, whereby the chain will not project into the path of the moving articles to interfere therewith.

The die wheel 106 of Fig. 4 may be substituted for the die wheel 28 of Fig. 1. In using the die wheel 106 to mark convex articles however, the angle between the path of travel of the articles and the adjacent lead of the sprocket chain may be less than when using the circular die wheel 28 to mark flat articles.

As the die wheel 106 is rotated by the sprocket chain the curved areas 110 on its periphery pass between the articles to be marked, while the flat areas 108, or at least the impression elements mounted thereon, contact the articles. By reason of the alternate flat and curved areas on the periphery of the die wheel 106, the impression element will engage and roll against the convex side of the article and when it disengages the article the curved areas will be rotated into the space between the marked article and the succeeding article, so that there will be no lateral movement of the bracket 16 away from the conveyor which will occur if a circular die wheel is employed for marking convex articles. In other words, the marking of convex articles is effected with the same smoothness of operation of the device as when flat sided articles are marked, when employing the circular die wheel 28.

It will be seen from the foregoing that the present invention provides apparatus for marking moving articles which is neat and compact and which will effectively mark moving articles, either flat or convex sided, without blurring of the impression, and wherein the impression will be applied in the same position on each of the articles.

It will also be seen that the apparatus of the present invention can be adjusted to accommodate the apparatus to the marking of various sizes of articles and to vary the surface speed of the die wheel to correspond to that of the various sizes of articles.

While I have illustrated and described preferred embodiments of my invention, it is to be understood that I do not wish to be limited to structural features and arrangement of parts of those embodiments, as obviously various changes and modifications may be made therein without departing from the spirit and scope of my invention.

What I claim is:

1. A device for marking moving articles moving along a straight path of travel comprising a rotatable impression element, an endless flexible member operatively connected to said element with a moment arm less than the radius of said element to effect rotation thereof, means carried by said member projecting into the path of travel of the moving articles for engagement thereby to effect driving of said member, and means for guiding a run of said article-driven flexible member at an angle to the path of travel of the articles, whereby to equalize the peripheral speed of the said element with the linear speed of the moving articles.

2. A device for marking moving articles moving along a straight path of travel comprising a pivotally mounted bracket, a rotatable impression element mounted thereon, a plurality of spaced apart sprockets one of which has a radius less than the radius of said element and is connected to the latter for rotation therewith, an endless sprocket chain passing over said sprockets and having a straight run, article contacting members carried by said chain and projecting into the path of the moving articles when disposed on said straight run, and guiding means for said straight run of said chain carried by the bracket and guiding said run of the chain at an angle to the path of travel of the articles to effect rota-

tion of the element at a surface speed equal to that of the moving articles.

3. Apparatus for marking articles moving along a straight path of travel comprising a rotatable drum having an impression element on the periphery thereof, an endless flexible member operatively connected to said drum and having a straight run, means carried by said flexible member projecting into the path of the moving articles for engagement thereby to drive the flexible member and effect rotation of the drum, and means guiding said driven flexible member in a circular path of smaller radius than the radius of said drum and the straight run portion thereof in a path tangent to said circular path at an angle to the path of travel of the moving articles, whereby to rotate said drum at a surface speed greater than that of the moving articles during the travel of the projecting means along said circular path and at a speed equal to that of the moving articles during the travel of the projecting means along said tangential straight run.

4. Apparatus for marking articles moving along a straight path of travel comprising a rotatable drum having an impression element on the periphery thereof, an endless flexible member operatively connected to said drum and having a straight run, means carried by said flexible member projecting into the path of the moving articles for engagement thereby to drive the flexible member and effect rotation of the drum, means guiding said driven flexible member in a circular path of smaller radius than the radius of said drum and the straight run portion thereof in a path tangent to said circular path at an angle to the path of travel of the moving articles, whereby to rotate said drum at a surface speed greater than that of the moving articles during the travel of the projecting means along said circular path and at a speed equal to that of the moving articles during the travel of the projecting means along said tangential straight run, and inking means operatively engaging said impression element.

5. Apparatus for marking articles moving along a straight path of travel comprising a rotatable drum having an impression element on the periphery thereof, an endless flexible member operatively connected to said drum and having a straight run, means carried by said flexible member projecting into the path of the moving articles for engagement thereby to drive the flexible member and effect rotation of the drum, means guiding said driven flexible member in a circular path of smaller radius than the radius of said drum and the straight run portion thereof in a path tangent to said circular path at an angle to the path of travel of the moving articles, whereby to rotate said drum at a surface speed greater than that of the moving articles during the travel of the projecting means along said circular path and at a speed equal to that of the moving articles during the travel of the projecting means along said tangential straight run, and adjustable means operatively connected to said guiding means adapted to vary the angle formed between said tangential straight run and the path of travel of the articles.

6. A device for marking articles moving along a straight path of travel comprising a die wheel having an impression element on the periphery thereof; a sprocket operatively connected to said wheel and having a radius less than that of the latter; an idler sprocket; a sprocket chain about said sprockets; means carried by said chain projecting into the path of the moving articles for engagement thereby to drive the chain and effect rotation of the wheel; said sprockets being rotatable about parallel spaced apart axes with the periphery of said idler sprocket being spaced from said path of travel a distance greater than the distance the periphery of said first mentioned sprocket is spaced from said path of travel, whereby the chain after passing in a circular path about the first mentioned sprocket will pass in a path tangential to said circular path and at an angle to the path of travel of the moving articles, to effect rotation of the said wheel at a surface speed greater than that of the moving articles during the travel of the projecting means along said circular path and at a speed equal to that of the moving articles during the travel of the projecting means along said tangential path.

7. A device for marking articles moving along a straight path of travel comprising a die wheel having an impression element on the periphery thereof; a sprocket operatively connected to said wheel and having a radius less than the radius of the latter, an idler sprocket; a sprocket chain about said sprockets; means carried by said chain projecting into the path of the moving articles for engagement thereby to drive the chain and effect rotation of the wheel; said sprockets being rotatable about parallel spaced apart axes with the periphery of said idler sprocket being spaced from said path of travel a distance greater than the distance the periphery of said first mentioned sprocket is spaced from said path of travel, whereby the chain after passing in a circular path about the first mentioned sprocket will pass in a path tangential to said circular path and at an angle to the path of travel of the moving articles to effect rotation of the said wheel at a surface speed greater than that of the moving articles during the travel of the projecting means along said circular path and at a speed equal to that of the moving articles during the travel of the projecting means along said tangential path, and means for adjusting the idler sprocket relatively to the path of the moving articles to vary the angle of the tangential path of the chain relatively to the path of the moving articles.

8. A device for marking articles moving along a straight path of travel comprising a die wheel having an impression element on the periphery thereof; a sprocket chain operatively connected to said die wheel; projecting members fixedly carried by certain of the links of said chain in predetermined spaced relation and projecting into the path of the moving articles for engagement thereby to drive the said chain whereby to effect rotation of the die wheel; rollers associated with said projecting members; and a track in which said rollers ride to guide said chain in a circular path concentric to the axis of rotation of said wheel and having a radius less than the radius of the latter and in a path tangent to said circular path at an angle to the path of travel of the moving articles, whereby the said wheel will be rotated at a surface speed greater than that of the moving articles during the travel of the projecting members along said circular path and at a speed equal to that of the moving articles during the travel of the projecting members along said tangential path.

9. A device for marking articles moving along a straight path of travel comprising a pivotally

mounted bracket; a die wheel rotatably mounted thereon for contact with the articles; a sprocket operatively connected to said die wheel and having a radius less than the radius of the latter; a sprocket chain passing about said sprocket; a plurality of lugs fixedly carried by certain links of said chain in predetermined spaced relation and projecting into the path of the moving articles for engagement thereby to drive the chain and effect rotation of the die wheel; rollers associated with said lugs; and a track receiving said rollers and guiding the lugs and chain in a path tangent to the circular path about said sprocket and at an angle to the path of travel of the moving articles, whereby the said die wheel will be rotated at a surface speed greater than that of the moving articles during the travel of the chain and lugs in a circular path and at a speed equal to that of the moving articles during the travel of the chain and lugs in the said tangential path.

10. A device for marking articles moving along a straight path of travel comprising a pivotally mounted bracket; a die wheel rotatably mounted thereon for contact with the articles; a sprocket operatively connected to said die wheel and having a radius less than the radius of the latter; a sprocket chain passing about said sprocket; a plurality of lugs fixedly carried by certain links of said chain in predetermined spaced relation and projecting into the path of the moving articles for engagement thereby to drive the chain and effect rotation of the die wheel; rollers associated with said lugs; a track receiving said rollers and guiding the lugs and chain in a path tangent to the circular path about said sprocket and at an angle to the path of travel of the moving articles, whereby the said die wheel will be rotated at a surface speed greater than that of the moving articles during the travel of the chain and lugs in a circular path and at a speed equal to that of the moving articles during the travel of the chain and lugs in the said tangential path, and means for adjusting the height of said bracket for positioning the die wheel vertically relatively to the articles.

11. A device for marking articles moving along a straight path of travel comprising a pivotally mounted bracket; a die wheel rotatably mounted thereon for contact with the articles; a sprocket operatively connected to said die wheel and having a radius less than the radius of the latter; a sprocket chain passing about said sprocket; a plurality of lugs fixedly carried by certain links of said chain in predetermined spaced relation and projecting into the path of the moving articles for engagement thereby to drive the chain and effect rotation of the die wheel; rollers associated with said lugs; a track receiving said rollers and guiding the lugs and chain in a path tangent to the circular path about said sprocket and at an angle to the path of travel of the moving articles, whereby the said die wheel will be rotated at a surface speed greater than that of the moving articles during the travel of the chain and lugs in a circular path and at a speed equal to that of the moving articles during the travel of the chain and lugs in the said tangential path; resilient means holding said bracket in juxtaposition to the moving articles; and adjustable means for regulating the contact of the die wheel with the articles.

12. A device for marking articles moving in a straight path of travel comprising an impression element; a shaft rotatably carrying said element; a plurality of spaced apart sprockets rotatable about axes parallel to the axis of rotation of said element, one of said sprockets having a radius less than the distance from the impression surface of said element to the axis of rotation of said shaft and being disposed concentric with said shaft and secured to said element for rotation with the latter; an endless sprocket chain passing over said sprockets, one run of said chain extending at an angle to the path of travel of said articles; and article contacting members carried by said chain and projecting laterally of the chain while moving along said one run of the latter into the path of travel of the moving articles to be driven thereby, the angular relation of said one run to the path of travel being such as to equalize the peripheral speed of said element with the linear speed of the moving articles.

13. A device for marking articles moving in a straight path of travel comprising a base fixedly disposed relative to said path of travel; a pivot member carried by said base; a bracket assembly mounted adjacent one end thereof on said pivot member; means engaging the other end of said bracket assembly resiliently maintaining the latter in selected position relative to said path of travel; an impression element rotatably carried by said bracket assembly intermediate the ends thereof in juxtaposition to the moving articles; a plurality of spaced apart sprockets on said bracket assembly rotatable about axes parallel to the axis of rotation of said element, one of said sprockets having a radius less than the distance between the impression surface of said element and the axis of rotation of the latter and being disposed concentric with the axis of rotation of said element and secured to the latter for rotation therewith; an endless sprocket chain passing over said sprockets, one run of said chain extending at an angle to the path of travel of the articles; and article contacting members carried by said chain and projecting laterally therefrom into the path of travel of the articles to be driven thereby while moving along said one run of said chain, the angle between said one run of the chain and the path of travel of the articles being sufficient to equalize the peripheral speed of said element with the linear speed of the moving articles.

14. A device for marking articles according to claim 13, wherein said means engaging the other end of said bracket assembly includes a spring member constantly urging said bracket assembly to pivot towards the path of travel of the articles to thereby effect contact of each successively advanced article with said impression element; and an adjustable spacing member carried by said base engaging said other end of said bracket assembly and adapted to limit the pivoting of the latter towards the path of travel to thereby control the printing pressure of said impression element upon the articles.

15. A device for marking articles according to claim 13, wherein said pivot member is movable on said base in a direction substantially at right angles to the path of travel of the articles, to thereby vary the angle that said one run of said chain forms with respect to said path of travel of the articles.

16. In combination with apparatus for continuously advancing spaced apart articles having convex surfaces along a straight path of travel to a marking station; a rotatable die wheel for marking the convex surfaces of the articles at

said marking station, said die wheel having a circumferentially spaced series of convex peripheral areas each of a radius greater than the radial distance from the axis of rotation of said wheel to the center of said convex area, the circumferential spacing between said peripheral areas being the same as the distance between the successive advancing articles, impression elements carried by said peripheral areas, and means driven by the advancing articles operatively connected to said die wheel to rotate the latter and move said impression elements successively into engagement with the advancing articles.

17. In combination with apparatus for continuously advancing spaced articles having convex surfaces along a straight path of travel to a marking station; a rotatable die wheel at said marking station for marking the convex surfaces of the advancing articles, said die wheel having a circumferentially spaced series of convex peripheral areas each of a radius greater than the radial distance from the axis of rotation of said wheel to the center of said convex area, the circumferential spacing between said peripheral areas being the same as the distance between the successive advancing articles; impression elements carried by said peripheral areas; means including a sprocket operatively connected to said die wheel and having a radius less than the radius of the latter, a sprocket chain passing over said

sprocket to follow a circular path around the latter, means guiding said chain to follow a straight lead tangential to said curved path, spaced article engaging members on said chain to project from the latter while following said straight lead into said path of travel of the advancing articles to be engaged thereby to drive the chain and effect rotation of said die wheel so that said impression elements are successively moved into engagement with the advancing articles; a bracket pivotally mounted adjacent one end and supporting said die wheel, sprocket and chain; and means for adjusting said bracket relative to said path of travel of the articles to dispose said straight lead of the chain at an angle to said path so that the peripheral speed of said impression elements is the same as the speed of the advancing articles.

MALCOLM HIRSCHEY.

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