

Jan. 27, 1959

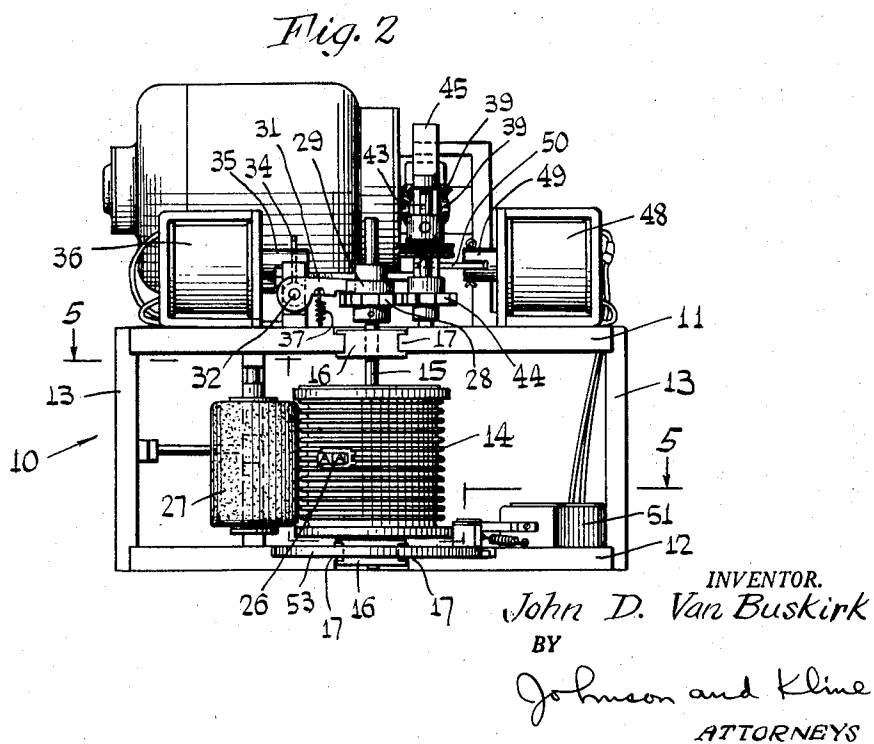
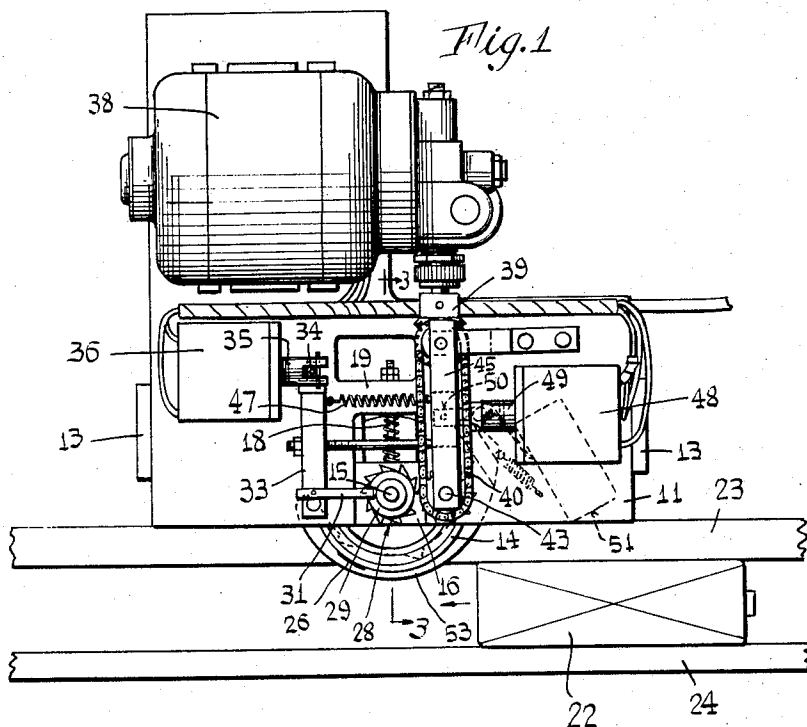
J. D. VAN BUSKIRK

2,870,702

ARTICLE MARKING

Filed July 16, 1954

2 Sheets-Sheet 1



Jan. 27, 1959

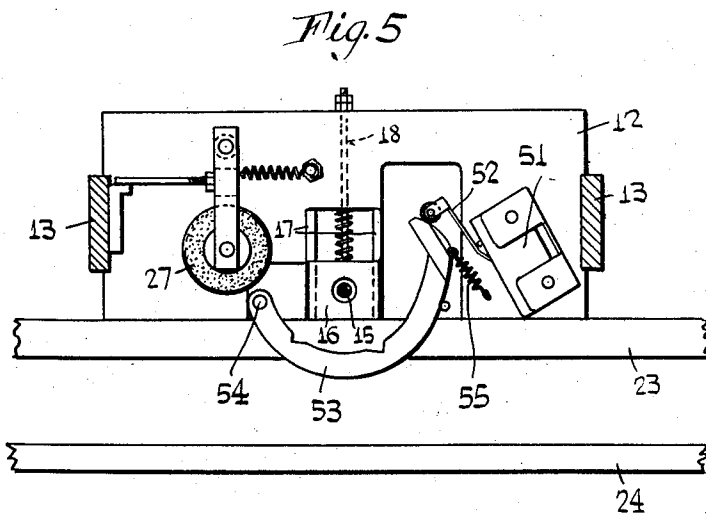
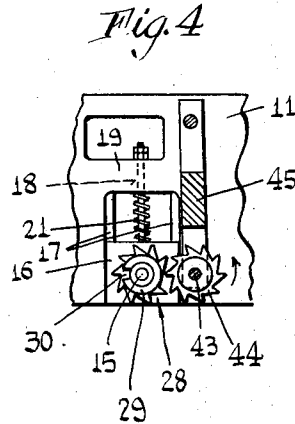
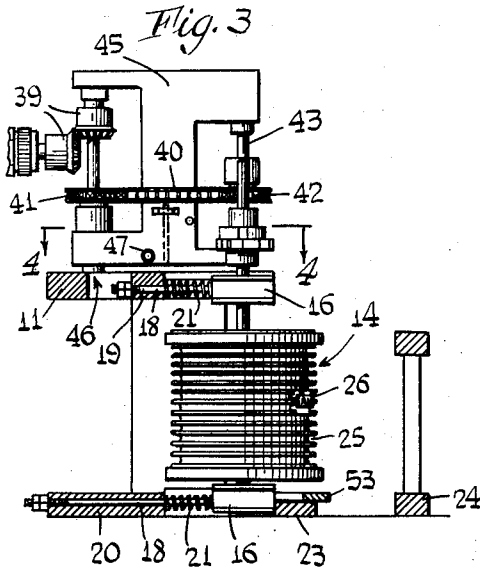
J. D. VAN BUSKIRK

2,870,702

ARTICLE MARKING

Filed July 16, 1954

2 Sheets-Sheet 2



INVENTOR.  
John D. Van Buskirk  
BY  
Johnson and Kline  
ATTORNEYS

2,870,702

## ARTICLE MARKING

John D. Van Buskirk, Southport, Conn., assignor to Van Buskirk & Company, Inc., Bridgeport, Conn., a corporation of Connecticut

Application July 16, 1954, Serial No. 443,927

13 Claims. (Cl. 101—35)

This invention relates to marking or printing on articles, and more particularly to a method and apparatus employing rotary printing or marking means actuated in response to movement past said means of the article which is to be printed or marked.

The invention is illustrated in connection with apparatus adapted to print on packages, wherein a rotary printing plate is actuated in response to movement of the package past the same. However, it should be understood that the invention is not limited to the specific embodiment or use illustrated herein, but instead has utility in connection with the printing or marking of different kinds of articles wherein movement of a rotary printing or marking means is effected with movement of the article being printed or marked.

Heretofore package printing machines have been used employing a printing drum or cylinder provided with type faces set thereon, the printing being accomplished by moving the package into engagement with and past the printing cylinder, the latter being actuated by said engagement and imprinting the desired characters on the wrapper or outer surface of the package. In this prior apparatus, upon completion of each printing operation the printing cylinder was returned to a predetermined initial or starting position by manual means. This has required time and effort on the part of the operator, and does not permit printing of any large number of packages with sufficient ease and rapidity to meet present day demands.

An object of the present invention is to provide an improved article marking method and apparatus of the like wherein the marking operations are greatly speeded up and made easier for an operator, thereby permitting a much greater number of articles to be marked or printed with less effort and in shorter time.

Another object of the invention is to provide an improved apparatus of the above type, for printing or marking on articles, wherein return of the marking means is automatically quickly carried out upon completion of a printing or marking operation, without requiring attention or effort on the part of the operator.

Another object of the invention is to provide an improved apparatus in accordance with the foregoing, wherein the marking means is returned very accurately to its initial starting or printing position.

A feature of the invention resides in the provision of improved apparatus as above set forth, which is simple and economical to fabricate and produce, and foolproof and reliable in operation.

Other features and advantages will hereinafter appear. In the accompanying drawings:

Figure 1 is a top or plan view of the improved apparatus of this invention, a package being shown advancing between guide rails to have the desired information printed on it.

Fig. 2 is an elevational view of the apparatus of Fig. 1.

Fig. 3 is a fragmentary view partly in elevation and

partly in section, the section being taken on line 3—3 of Fig. 1.

Fig. 4 is a detail partly in plan and partly in horizontal section, the section being taken on line 4—4 of Fig. 3.

Fig. 5 is a view partly in plan and partly in horizontal section taken on line 5—5 of Fig. 2.

Referring to Figs. 1 and 2 the improved printing or marking apparatus comprises a frame 10 having upper and lower base plates 11 and 12 respectively, said plates being secured together by uprights 13.

Rotatably mounted between the base plates 11 and 12 is a printing roller or cylinder 14, carried on a vertical shaft 15 passing through journals 16 which are movable horizontally in slides 17 of the bases. The journals 16 are attached to rods 18 passing through and slidable in portions 19 and 20 respectively of the upper and lower bases 11 and 12, and carry springs 21 by which the journals 16 are normally held in advanced positions shown in Fig. 1. For such positions the printing cylinder 14 is projected beyond the edges of the upper and lower bases 11 and 12 and held in a position to be engaged by a package 22 fed between rails 23 and 24. Any suitable conveying means of conventional form (not shown) may be used to move packages 22, or other articles to be marked, in a spaced series past the printing cylinder 14, the rails 23 and 24 guiding them in a path such that each in turn makes printing and cylinder rotating contact with the printing cylinder 14.

As is well understood in the printing art, the cylinder 14 may have annular grooves 25 adapted to hold type 26 by which the cylinder can carry various data set in type. An inking roller 27 is cooperable with the cylinder 14 for supplying ink to the type 26 carried thereby.

In accordance with the present invention a novel mechanism is provided by which the printing roller 14 is quickly automatically returned to an initial, at-rest or starting position each time that a printing operation has been completed, and is automatically released for rotation at the beginning of the next printing operation, thereby greatly facilitating the imprinting or marking of packages or of other articles which are fed to the printing roller 14 and which actuate the roller in response to their engagement with and movement past the same.

As shown in Figs. 1—4 the shaft 15 of the printing roller carries a toothed wheel 28 above the upper base 11, said wheel having a hub 29 provided with a locking or positioning notch or slot 30. Receivable in the notch 30 is a locking finger 31 carried on one end of a shaft 32, said shaft passing through a journal 33 and having at its other end an upstanding arm 34 operatively connected to a plunger 35 of a solenoid 36. Energization of the solenoid 36 will shift the arms 34 and 31 counterclockwise, as viewed in Fig. 2, moving the arm 31 out of the notch 30 and releasing the wheel 28 and printing roller 14 for rotative movement. An extension spring 37 continually urges the locking finger 31 downward so that whenever the solenoid 36 is de-energized and the printing cylinder 14 rotated the finger will snap into the notch 30 and lock the cylinder in its initial or starting printing position. The extremity of the locking finger 31 and slotted hub 29 constitute in effect a tongue-and-slot connection between the finger and the printed cylinder 14.

Driving of the cylinder 14 is effected by means of an electric motor 38 which powers bevel gears 39 and a chain and sprockets 40, 41 and 42, the sprocket 42 being mounted on a shaft 43 which also carries a toothed wheel 44 cooperable with the toothed wheel 28 for driving the latter. The shaft 43 and sprockets 41 and 42 are

3

carried by a vertical frame 45 pivoted on the upper base 11 at 46, the frame 45 being normally urged by an extension spring 47 to the left as viewed in Fig. 1.

Movement of the frame 45 is controlled by a solenoid 48 mounted on the upper base 11, said solenoid having a plunger 49 connected to the frame 45 by a link 50, Figs. 1 and 2. When the solenoid 48 is energized it will shift the frame 45 to the right as viewed in Figs. 1 and 2, moving the toothed wheel 44 out of driving position, i. e. the position wherein it could engage the wheel 28. When deenergized, the solenoid 48 permits the spring 47 to shift the frame 45 to the left, bringing the toothed wheel 44 into cooperable driving relationship with the wheel 28. Referring to Fig. 4 the toothed wheel 28 has a tooth missing opposite the notch 30, and when the printing cylinder 14 and wheel 28 are in the locked position shown in Figs. 1 and 4 the driving toothed wheel 44 may rotate without driving the wheel 28 or printing cylinder even though the frame 45 is in its leftmost driving position.

The toothed wheels 28 and 44 which may be held in meshing or potentially meshing positions, or may be separated to non-meshing positions also constitute in effect an externally controllable clutch or affirmatively disengageable connection in the drive mechanism between the motor 38 and the printing cylinder 14, for when the frame 45 is in its leftmost position as viewed in Fig. 1 the motor 38 can drive the cylinder 14 through part of a revolution after the marking operation has been completed, whereas whenever the frame 45 is in its rightmost position no driving whatsoever of the cylinder 14 may be effected by the motor 38 regardless of what other conditions may or may not obtain.

By an "externally controllable clutch" or "affirmatively disengageable connection," as used herein, is meant means in accordance with the foregoing explanation. This includes disconnecting means whose operation is dependent primarily upon the existence of a condition external to the drive means proper and which is producible for such disconnecting purpose, and does not include disconnecting means of the type whose operation is dependent upon a condition within the drive itself such as the angular orientation of a driving gear, the speed of rotation of a part or perhaps relative speeds of portions of the driving train (e. g. an overrunning clutch). Moreover, wheels 28, 44 may be considered as a clutch which, in addition to being externally controllable as just described, is also internally controllable in response to the rotary position of drum 14 or wheel 28 as described in the immediately preceding paragraph. Accordingly, wheels 28, 44 constitute in effect a dually controllable clutch means whose purpose will presently appear.

For the purpose of controlling the energization of the solenoids 36 and 48 an electrical switch 51 is provided, having an operating arm 52 actuated by a curved lever 53 pivoted on the lower base 12 at 54. The lever 53 is normally held in an outwardly projected position as viewed in Fig. 5 by an extension spring 55 and constitutes a biased feeler for sensing the approach and departure of articles 22. Referring to Figs. 2 and 3 the lever 53 is located adjacent the lower end of the printing cylinder 14 and in a position to be engaged and depressed by the package 22 when the latter is shifted into engagement with the cylinder 14.

Operation of the apparatus of this invention is as follows: The motor 38 is normally running, resulting in the driving toothed wheel 44 continually turning counterclockwise as viewed in Fig. 4. Because of the missing tooth of the wheel 28 no rotation of the printing cylinder 14 will occur. When the package 22 is shifted into engagement with the printing cylinder 14 it will depress the lever 53, closing the switch 51 and energizing both of the solenoids 36 and 48. The solenoid 36 will free

4

the printing cylinder 14 and the solenoid 48 will shift the driving wheel 44 out of cooperable relationship with the wheel 28, thereby maintaining inoperative the power drive for the cylinder. Continued advance of the package 22 will result in the cylinder 14 turning with the package and the desired indicia being imprinted on the package by the type carried by the cylinder. When the package 22 leaves the cylinder 14 the latter will have been rotated to some extent and the lever 53 will be disengaged, opening the switch 51. This will de-energize the solenoids 36 and 48. The locking finger 31 will now rest on the collar 29 of the toothed wheel 28 due to release of the solenoid 36, and the driving wheel 44 will be shifted to the left into driving relation with the wheel 28 due to release of the solenoid 48. The latter action will cause the wheel 28 and the printing cylinder 14 to be rotated at high speed, i. e. preferably at a surface speed of the printing cylinder 14 higher than that at which a package 22 being printed would normally drive the printing cylinder by frictional contact therewith, until the locking finger drops into the notch 30. Thereafter driving of the wheel 28 will be discontinued due to the missing tooth thereof. The printing cylinder 14 will thus automatically return to its initial printing position whenever the printing operation is completed, in readiness for the subsequent operation.

The provision of the locking finger 31 insures extremely accurate positioning of the printing cylinder 14 in the starting position. Where it is unnecessary to have such accurate repositioning of the printing cylinder 14, the locking finger 31 and solenoid 36 which actuates the same may be omitted, as well as the notch 30 in the collar 29 of the toothed wheel 28. In such event the driving wheel 44 will rotate the wheel 28 and printing cylinder 14 until it reaches the portion of the wheel 28 having the missing tooth, whereupon it will turn idly without advancing further the printing cylinder. The slight momentum of the latter will carry it only a sufficient distance to disengage the last-engaged tooth of the wheel 28 but not to engage the next succeeding tooth which is double spaced from the last-engaged tooth.

It will be seen that no attention or effort is required of the operator in returning the printing cylinder 14 to the starting position, this being accomplished automatically as soon as the package 22 disengages the cylinder 14 and lever 53. Thus the task of printing a large number of packages is greatly facilitated, resulting in a saving in both time and effort.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, premarking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an affirmatively disengageable connection in said driving train; means responsive to the presence of an article in juxtaposition to said rotary member for operating said connection to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and responsive to the removal of a marked article from proximity to said member for re-establishing said connection to drive said member from said motive power source rapidly to said predetermined starting position in readiness for the marking of another article and means,

5

responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

2. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an affirmatively disengageable connection in said driving train; means for locking the rotary member in said predetermined starting position; means responsive to the presence of an article in juxtaposition to said rotary member for rendering said locking means inoperative and for simultaneously operating said connection to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and further responsive to the removal of a marked article from proximity to said member for re-establishing said connection to drive said member from said motive source rapidly to said predetermined starting position in readiness for the marking of another article and means, responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

3. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an affirmatively disengageable connection in said driving train; means for automatically locking the rotary member in said predetermined starting position; means responsive to the presence of an article in juxtaposition to said rotary member for rendering said locking means inoperative and for simultaneously operating said connection to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and responsive to the removal of a marked article from proximity to said member for re-establishing said connection to drive said member from said motive source rapidly to said predetermined starting position in readiness for the marking of another article, and further responsive to the removal of a marked article for rendering said locking means potentially operative so as to be ready for automatic locking engagement when said predetermined starting position is reached and means, responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

4. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an externally controllable clutch in said driving train;

6

means responsive to the presence of an article in juxtaposition to said rotary member for operating said clutch to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and responsive to the removal of a marked article from proximity to said member for operating said clutch to engaged condition to drive said member from said motive power source rapidly to said predetermined starting position in readiness for the marking of another article and means, responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

5. The apparatus as defined in claim 1 in which said affirmatively disengageable connection comprises driving and driven toothed wheels adapted to mesh with each other and controllable means mounting one of said wheels for movement towards and away from meshing relationship with the other.

6. The apparatus as defined in claim 1 in which said affirmatively disengageable connection and said last-named means comprise driving and driven toothed wheels adapted to mesh with each other and controllable means mounting one of said wheels for movement towards and away from meshing relationship with the other, the driven wheel having a greater than normal spacing between one pair of adjacent teeth to provide an interruption in the drive between the wheels at said predetermined starting position, even when the controllable mounting means is positioned for normal meshing relationship of the wheels.

7. The apparatus as defined in claim 2 in which said affirmatively disengageable connection comprises driving and driven toothed wheels adapted to mesh with each other and controllable means mounting one of said wheels for movement towards and away from meshing relationship with the other, and in which said locking means includes a slotted element rotatable with said rotary member and a finger having a fixed radial location with respect to said element, said finger snugly fitting said slot and being urged in a direction to enter said slot whenever the element is rotated to a position to align its slot with said finger.

8. The apparatus as defined in claim 1 in which said affirmatively disengageable connection comprises driving and driven toothed wheels adapted to mesh with each other and controllable means mounting one of said wheels for movement towards and away from meshing relationship with the other; and which further includes electromagnetic means for positioning said controllable mounting means.

9. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an affirmatively disengageable connection in said driving train; a biased feeler positioned adjacent the path of an article passing said rotary member and movable in one direction from its normal position by the article as it is about to make contact with the rotary member and releasable by the article upon parting from said rotary member; means responsive to movement of said feeler from normal position for operating said connection to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and responsive to release of said feeler for re-establishing said connection to drive said member from said motive power source rapidly to said predetermined starting position in readiness for the

marking of another article and means, responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

10. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; an affirmatively disengageable connection in said driving train; a biased feeler positioned adjacent the path of an article passing said rotary member and movable in one direction from its normal position by the article as it is about to make contact with the rotary member and releasable by the article upon parting from said rotary member; means including an electromagnetic device responsive to movement of said feeler from normal position for operating said connection to disengaged condition to prevent rotation of said member by said motive power source when said member is in contact with said article, and responsive to release of said feeler for re-establishing said connection to drive said member from said motive power source rapidly to said predetermined starting position in readiness for the marking of another article and means, responsive to positioning of said rotary member in said starting position, for interrupting said driving train.

11. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means normally active automatically to lock said rotary member accurately in said starting position whenever it is in such position; power means to drive said member rapidly from a position in which the marking of an article is completed back to said starting position; a drive train between said power means and said member including an externally controllable clutch disengageable for rendering said power means wholly ineffective to drive said member and engageable for rendering said power means effective; means for rendering said locking means wholly inoperative upon approach to said member of an article to be marked and for rendering said locking means potentially operative upon departure from said member of a marked article; means for externally controlling said clutch to disengage the same in response to the approach toward said member of an article to be marked, and to engage the same upon departure from said member of a marked article, whereby said member is rapidly driven by said power means to said starting position and said locking means is automatically rendered operative to lock said member until said approach of another article, said clutch being also disengageable automatically in response to arrival of said member at starting position and returnable automatically to potentially engageable condition for control by said clutch controlling means whenever said member is displaced from starting position.

12. Apparatus for marking articles comprising a rotary member having exposed marking means thereon, said member and means having a predetermined, at-rest, pre-marking starting position and being engageable and rotatable by an article to be marked for effecting the marking thereof; means for moving articles one at a time past said rotary member in a path providing rolling printing contact between a surface of each article and said rotary member; means to turn said rotary member rapidly to said predetermined starting position when otherwise positioned, including a source of motive power and a driving train connecting the source with said rotary member; a dually controllable clutch means in said driving train, said clutch means being firstly externally controllable for article position control; and means responsive to the presence of an article in juxtaposition to said rotary member for externally controlling said clutch means to disengage condition to prevent rotation of said member by said motive power source when said member is in contact with said article and responsive to the removal of a printed article from proximity to said member for re-establishing said connection to return said member rapidly to said predetermined starting position in readiness for the marking of another article, said clutch means being secondly controllable in response to position of said rotary member and being automatically controlled to effect disengagement of the clutch means in response to the arrival of said member at starting position and to effect return of the clutch means to potentially engageable condition for control by said clutch controlling means whenever said member is displaced from starting position.

13. The method of rapidly and accurately marking articles arranged in traveling series in such way that the articles may have different sizes, spacings or speeds of travel, any or all of which may vary from series to series, and employing a rotary member having exposed marking means thereon, a source of high speed motive power, and means for connecting the source with the member for rotating the latter, which method comprises the following: locking said rotary member in a predetermined at-rest, pre-marking, starting position; passing an article of a series into contact with said rotary member; as the article approaches closely to said rotary member unlocking said rotary member and rendering said connecting means wholly ineffective to drive said member regardless of the speed of the article; driving said member through a marking cycle by contacting said member with the article to be marked and moving the article past the member in rolling contact therewith until it moves beyond and is freed from the member; rendering said connecting means effective as the article loses contact with the member for driving said member from said source at high speed back to said starting position; when the member arrives at said starting position, simultaneously rendering said connecting means ineffective, at least while the member is in said starting position, and relocking said member in said starting position; and repeating the foregoing steps for each article of the series.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |          |               |
|-----------|----------|---------------|
| 1,845,726 | Scott    | Feb. 16, 1932 |
| 2,001,890 | Rix      | May 21, 1935  |
| 2,691,341 | Williams | Oct. 12, 1954 |