Sept. 5, 1939. J. L. FERGUSON 2,172,318

MARKING DEVICE

Filed Jan. 17, 1938 4 Sheets-Sheet 1

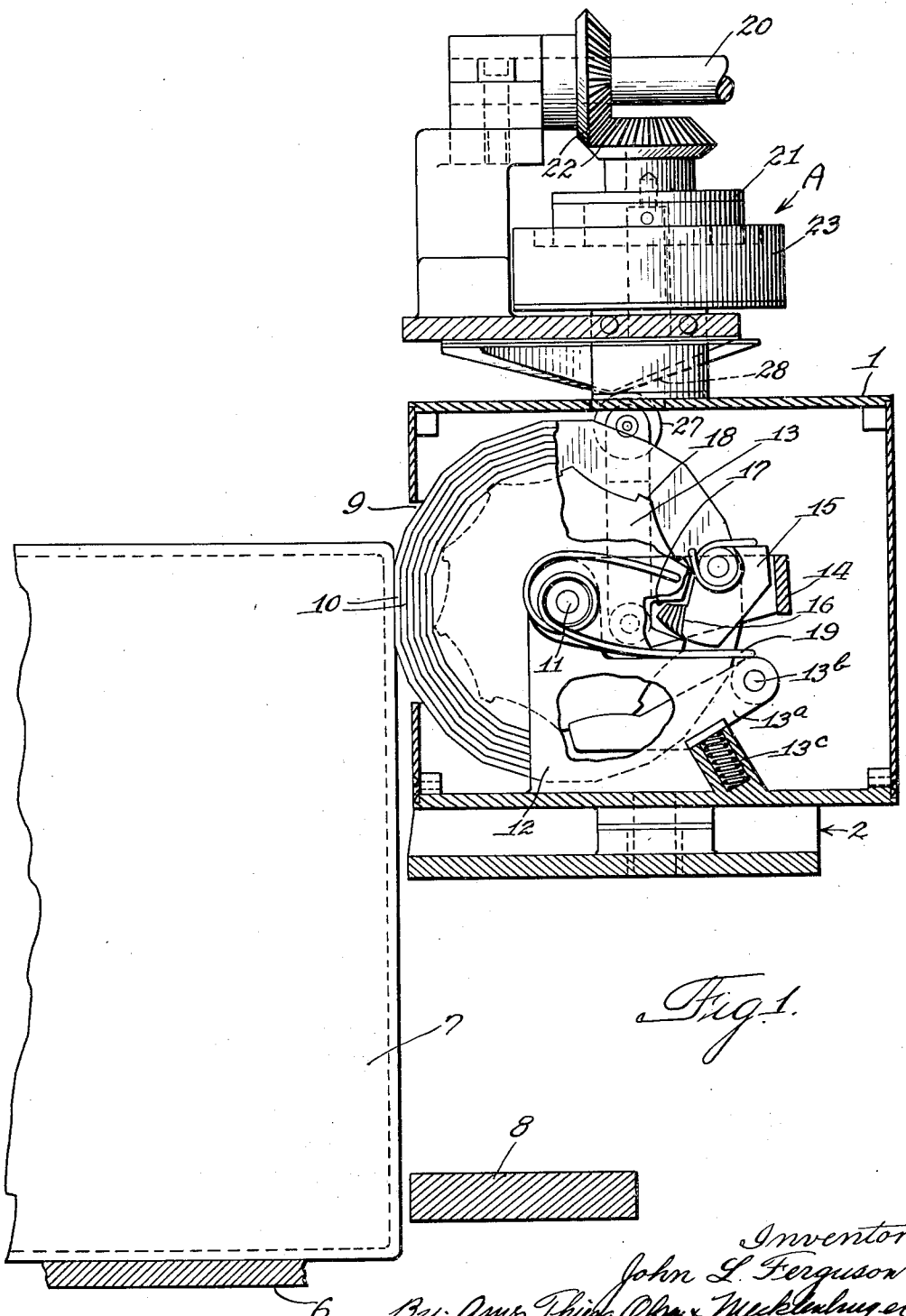


Fig. 1.

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MARKING DEVICE

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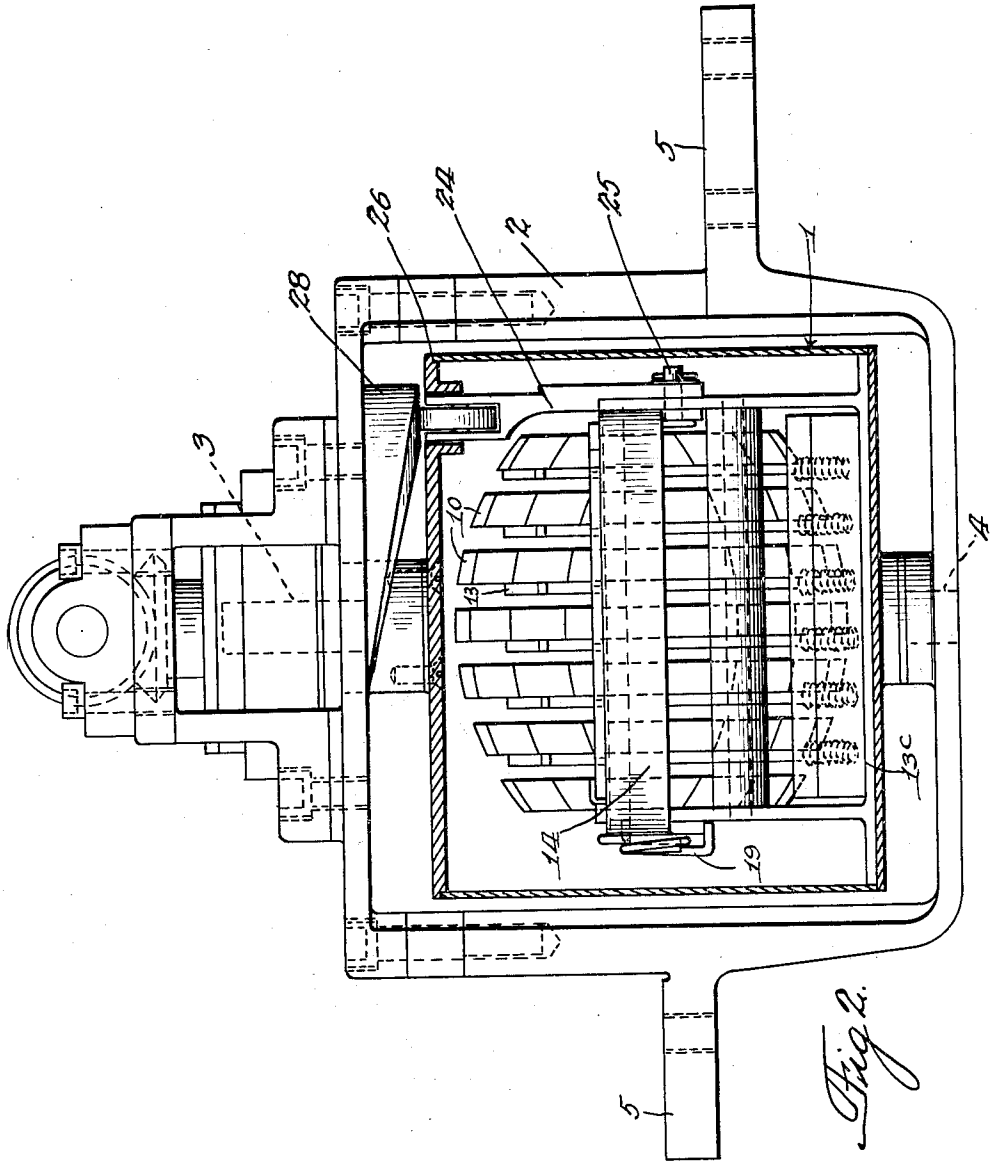


Fig 2.

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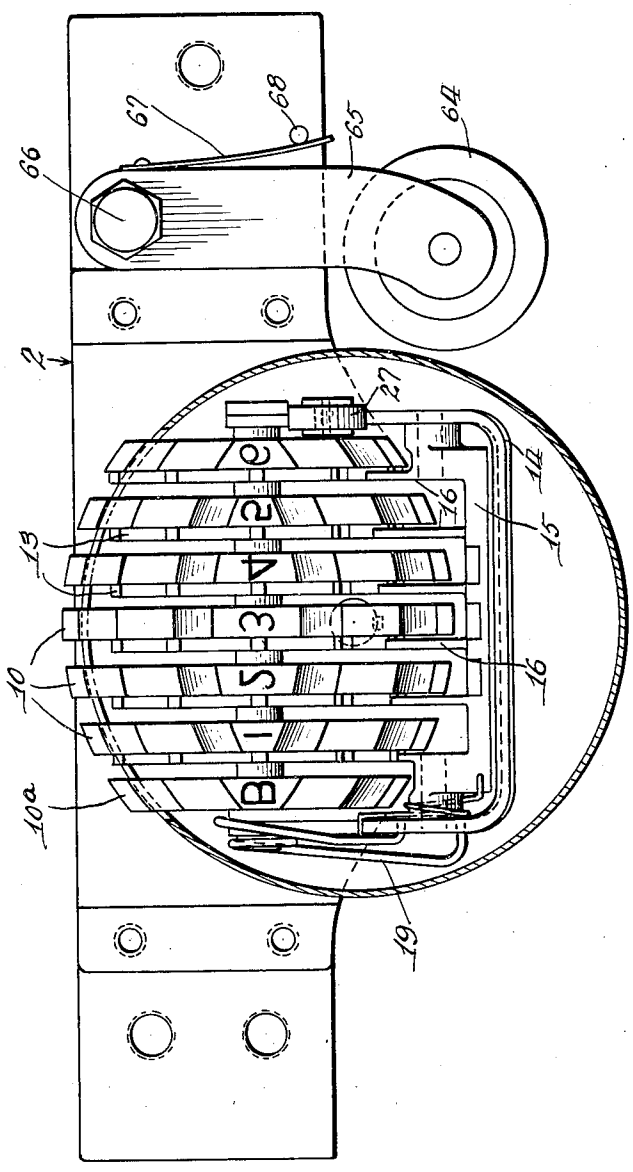


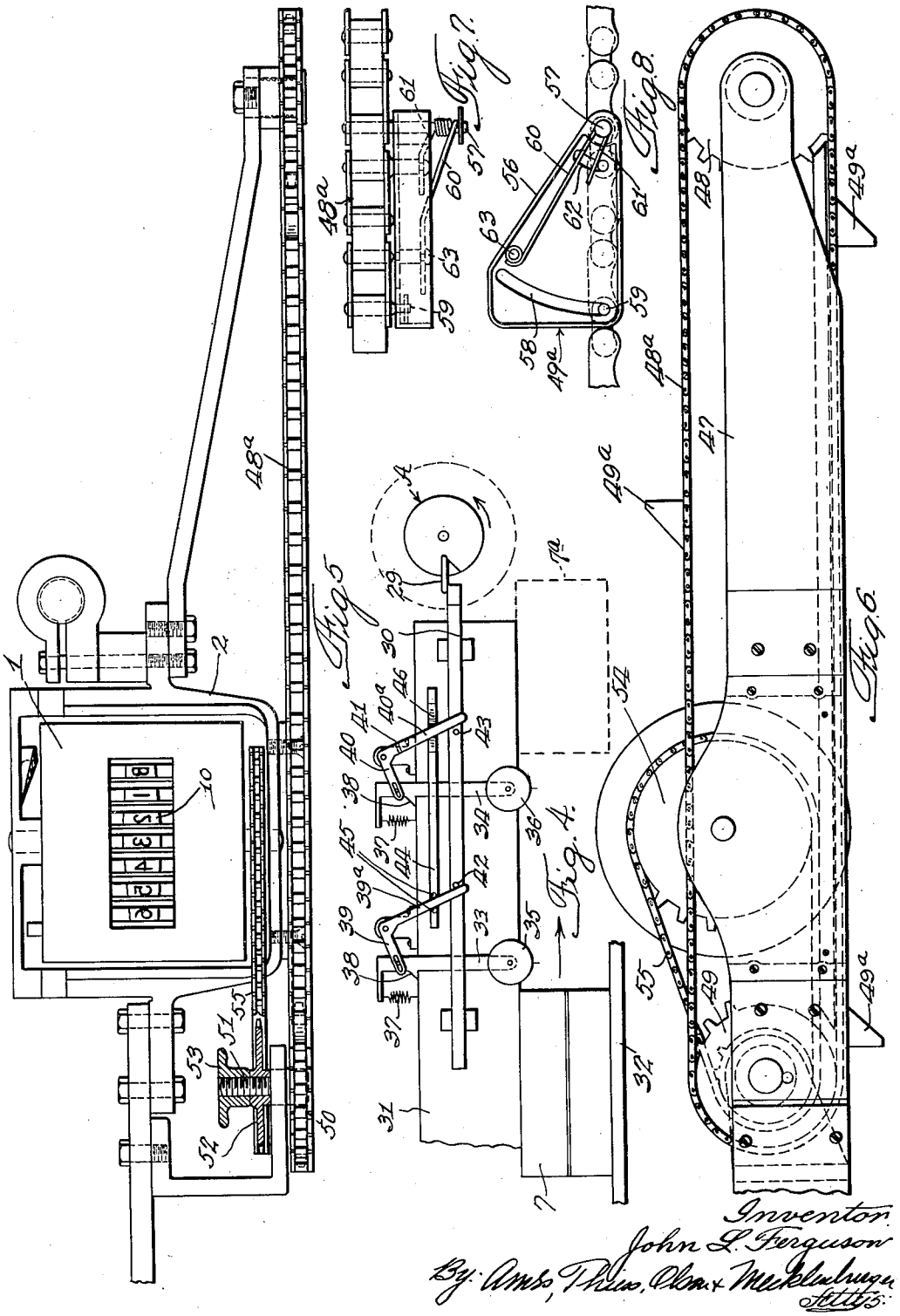
Fig. 3.

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MARKING DEVICE

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UNITED STATES PATENT OFFICE

2,172,318

MARKING DEVICE

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Application January 17, 1938, Serial No. 185,269

5 Claims. (Cl. 101—35)

This invention relates to a marking device and more particularly to a serial numbering device for applying numbers or other suitable characters to moving cases or cartons or other similar articles. The invention is adapted for use in combination with various types of packaging and casing machines or with conveyers for moving the cases or cartons. In such machines a suitable conveyor is provided having flights thereon or other suitable means whereby the cartons or containers are moved either continuously or intermittently at a predetermined speed and the present invention is adapted for use in combination with such machines and conveyors and its operation may be synchronized with the movement of the containers.

Heretofore marking devices have been unsatisfactory when used in connection with moving cartons for the reason that the material from which the cartons are made may be somewhat flexible and the pressure of a plurality of type against the side of the carton causes the carton to flex in such a manner that some of the characters are indistinct or may not be impressed sufficiently to be legible.

It is, therefore, an object of the present invention to provide a marking device in which a plurality of characters, such, for instance, as consecutive serial numbers, may be applied to moving articles and in which a uniform pressure of each type will be assured irrespective of the flexibility of the carton to which it is applied.

A further object is the provision of a marking device in which the various digits in a number will be applied consecutively to the carton with a uniform pressure against the printing surface.

The present invention also contemplates a marking device by means of which clear legible characters may be applied to moving cartons and in which the characters may be applied in a predetermined location on each carton. Also adjustment is provided whereby the position of the applied characters on the carton may be varied as desired, particularly in lengthwise relation thereon, in order to locate the characters with respect to other printed matter on the cartons or in accordance with the requirements of cartons or other articles of various sizes.

A further object is the provision of an automatic serial numbering device which may be controlled by cartons passing thereby and which may automatically be operated to print in seriatim by a suitable mechanism, the latter being controlled by consecutive cartons as they are moved in a predetermined relationship to each other and to the marking device.

The embodiment of the invention shown and described herein comprises a plurality of closely adjacent concentric type wheels bearing suitable numbers or other characters on their faces and being automatically rotatable to present a serial numbering printing face. The wheels are of different diameters and preferably polygonal and polyhedral in form to provide a printing unit having, in longitudinal cross section, a convex printing face, whereby each wheel will present a substantially flat type face to a container moving past the device with the unit in rolling contact therewith. The rolling movement of the face of the unit against a moving container will consecutively bring the printing face of each wheel into substantially parallel contact with the container.

The plurality of type wheels form a printing unit which is mounted on a support for orbital rotation in a plane coincident with the axis of the type wheel unit and perpendicular to the surface of the container. As each consecutive carton moves past the printing device, the device rotates in this orbital plane and a rolling contact is provided between the faces of the type wheels and the container.

Means is also provided by which the orbital rotation may be controlled by the consecutively moving containers and whereby the number of revolutions for each container moving past the device may be predetermined and controlled. Usually only one revolution is desirable. Means is also provided for the usual adjustment of the type wheels whereby serial printing may be accomplished.

A further object is the provision of a device of the character described which will be of comparatively few parts, cheap to manufacture, and which may be continuously operated in high speed quantity production and will not easily get out of order.

Further objects will be apparent from the specification and appended claims.

In the drawings:

Fig. 1 is a side elevation of one embodiment of the invention as applied to a container handling device, portions being broken away for purposes of illustration.

Fig. 2 is a back view of the embodiment illustrated in Fig. 1 with the housing of the printing unit shown in section.

Fig. 3 is a top view of the printing unit with

the upper portion of the supporting yoke removed and the housing in section.

Fig. 4 is a diagrammatic plan view of a mechanism for controlling the rotation of the printing device in accordance with movement of the containers.

Fig. 5 is a front elevation of a preferred form of printing unit and control.

Fig. 6 is a bottom view of the embodiment illustrated in Fig. 5.

Fig. 7 is an enlarged front elevation of one of the container engaging flights illustrated in Figs. 5 and 6.

Fig. 8 is a bottom view of the chain and flight shown in Fig. 7.

Referring to the drawings in detail, the embodiment illustrated comprises a cylindrical drum-like housing 1 supported for horizontal rotation in a yoke 2, by means of stub shafts 3 and 4 secured respectively to the top and bottom walls. The stub shafts are secured to the ends of the housing as illustrated and suitable bearings are provided in the yoke 2. The yoke may be provided with outwardly extending flanges 5 whereby the device as a unit may be supported on and secured to the frame of any suitable cooperating mechanism such as a case handling machine or container sealer or on the framework of a suitable conveyor for consecutively moving containers past the device.

In Fig. 1 the element indicated by reference character 6 may represent any suitable conveyer for moving containers 7. The containers are moved between suitable guides 8. The housing 1 may be formed of sheet metal and is provided with a side opening 9. A plurality of coaxial wheels 10 are rotatably mounted on a transverse shaft 11 to provide a printing unit and the shaft is supported in suitable bearings in a bracket 12. The shaft 11 is transverse to the axis of the casing 1 and is preferably spaced laterally therefrom so that one side of the type wheel unit extends through the opening 9 in the casing in a manner to provide an arcuate alignment of the type faces.

The type wheels are of different diameters and preferably polygonal in peripheral contour and polyhedral in form so that the exposed type face of the type wheel assembly is arcuate and preferably conforms to a circle described from the axis of the casing as a center. The type wheels may be provided with the desired characters, preferably serial numbering numerals. One of the end wheels, such as the wheel 10^a, may be provided with series indicating characters such as letters, and this wheel is preferably manually set and not serially operated as are the other type wheels. Each type wheel except the series wheel 10^a is provided with a ratchet 13 by which they may be moved to present consecutive type through the window in serial numbering relation.

A bail 14 is pivotally mounted on the shaft 11 as shown in Fig. 3 and is provided with a pawl member 15 pivoted thereon and having forwardly extending pawl arms 16; each pawl arm is adapted to engage a corresponding ratchet 13 to move the type wheels in serial relationship. The ratchets 13 and the type wheels to which they are secured are normally frictionally held in any adjusted position by means of detents 13^a pivoted at 13^b and in frictional contact with the ratchets as shown in Fig. 1. The individual detents are urged toward the ratchets by suitable springs 13^c.

The pawl arms 16 are of progressively different lengths as shown in Fig. 1 and the ratchets 13 are each provided with a clearance space 17 adjacent one of the ratchet teeth 18. The bail 14 is normally in a raised position above that shown in Fig. 1, to which raised position it is moved by a spring 19, one end of which engages the bail and the opposite end engages the bracket 12.

It will be apparent that, when all of the type wheels and ratchets thereon are in a position to start a printing series from 0 to 9, inclusive, the clearance spaces 17 will be out of alignment with the pawl arms 16 and all of the pawl arms will be out of engagement with the ratchets except the longest pawl arm, which is arranged to engage the digit wheel. Each down movement of the bail 14 will rotate the digit wheel one space until the clearance space 17 is in alignment with the pawl, and this space will then enable sufficient forward movement of the pawl member to permit the second pawl arm to engage the second ratchet 13 and move the second numeral wheel one space to set up a two numeral integer. Continued operation of the bail will move the type wheels in the usual manner for serial numbering machines. The relative operation of type wheels for serial numbering is well understood and further description is believed unnecessary.

The housing 1 may be rotated by means of a continuously running shaft 20 which may be driven from any suitable power source, preferably a part of the mechanism on which the device is mounted whereby the rotation of the numbering device may be synchronized with the movement of a container to provide the same surface speed. A clutch A is provided in the transmission between the shaft 20 and the housing and comprises a driving member 21 which is driven from the shaft 20 by means of bevel gears 22. The driving member 21 co-operates with a driven member 23, which latter is secured to the upwardly extending shaft 3 of the housing. The clutch is normally disengaged, and it will be apparent that, when engaged, the housing 1 will be rotated and, if a container 7 is moved past the casing during rotation thereof, the type faces may contact therewith at the same surface speed in substantially frictionless rolling relationship and the individual type wheels will consecutively contact the container during the printing operation.

The clutch A is preferably of the usual dog type whereby the dog arm is normally retained by a detent and may be released to cause engagement of the clutch and consequent rotation of the printing device and the dog may again be engaged by the detent to disengage the clutch when the casing has made one revolution to provide a single printing operation.

In the present embodiment it is preferable that the movement of the containers should control the engagement and disengagement of the clutch so that rotation will only take place when a container passes the printing device. Also, with each rotation the bail 14 is automatically moved downwardly and returned to its normal position in order that the type wheels may be adjusted to present serial type characters. In order to operate the bail 14, an upwardly extending bar 24 is pivotally connected to the bail at 25 and extends through the top of the casing as shown at 26. The casing may form a guide for the bar 24. The upper end of the bar is provided with a roller 27 which is arranged to engage and be forced downwardly during each revolution by a fixed cam 28. The cam 28 is mounted on the

upper portion of yoke 2 as shown in Fig. 1. It will, therefore, be apparent that consecutive rotation of the casing 1 will serially adjust the type wheels.

The present invention is particularly effective for use with a conveying device by which the containers may be consecutively moved in spaced relation and is adaptable to either continuous or intermittent movement of the containers.

In order to control the clutch A for operating the casing, a mechanism such as diagrammatically shown in Fig. 4 may be provided. As previously stated, the clutch A may be of the usual type, comprising a body portion having an outwardly extending dog arm 29 which retains the clutch disengaged as long as the arm is held in the position illustrated in Fig. 4. In order to retain the clutch disengaged when no container is passing the printing device, a bar 30 is slidably mounted on a portion 31 of the machine frame, which portion may, if desired, form one of the guides for the containers 7, the opposite sides of the containers being guided by means of a suitable member 32. The containers travel in the direction of the arrow. In order to operate the clutch controlling bar 30, transverse slide members 33 and 34 are mounted on the frame 31 and provided with rollers 35 and 36, respectively. These rollers extend into the path of the containers as shown and are consecutively engaged thereby. The members 33 and 34 are normally retained in the position shown by means of springs 37 and are provided with stops 38 to limit their inward movement.

A bell crank 39 is pivotally mounted adjacent the slide 33 and is provided with a pin and slot connection therewith so that the forwardly extending arm 39^a will be moved to the left whenever a container depresses the roller 35. The second slide 34 also controls a pivoted bell crank lever 40 pivoted adjacent thereto and provided with a similar pin and slot connection. The elongated arm 40^a of the bell crank lever 40 is hinged at 41 for vertical movement. The slide 30 is provided with pin 42 adjacent the bell crank arm 39^a and a pin 43 adjacent the bell crank arm 40^a. A slide member 44 is supported under the bell crank arms as shown and is connected to the first bell crank arm 39^a by means of pins 45 engaging opposite sides of the arm. The slide 44 extends underneath the bell crank arm 40^a and is provided with a cam portion 46 which normally retains the arm 40^a in raised position so that it is above the pin 43. It will be apparent that, with the parts in the position illustrated in Fig. 4, the clutch A will be disengaged.

The operation of the control device is as follows. When a moving container 7 engages the roller 35, the bell crank arm 39^a will be moved to the left and the slide 44 will also be moved to the left to withdraw the cam 46 from underneath the arm 40^a of the second bell crank lever and the arm will therefore be lowered to a position to engage the pin 43 when the arm is moved to the left by the engagement of the second roller by the container. The continued movement of the container 7 will cause the second roller 36 to be depressed, thereby moving the bell crank 40 so that the arm 40^a engages the pin 43 and moves the detent slide 30 out of engagement with the dog arm 29, thereby permitting engagement of the clutch and rotation of the casing. This rotation of the casing causes a printing operation on a preceding container. In the embodiment shown in Fig. 4 the containers 7 and 7^a are moved in spaced relation in the direction of the arrow by means of any suitable conveyor and the engagement of the container 7 with the rollers 35 and 36 is synchronized with the movement of the preceding container 7^a relative to the printing device. Therefore, when the container 7 causes the clutch A to be engaged the printing operation will take place on the container 7^a. It will be obvious that, if desired, the parts may be relatively positioned to enable printing on the same container which operates the tripping mechanism.

In order to prevent more than a single revolution of the printing device, the rollers 35 and 36 may be spaced so that, as soon as the roller 36 is moved outwardly to release the dog arm 29, the rear of the container will pass the roller 35, which will return to its original position, thereby causing re-engagement of the dog arm 29 by the slide 30 after one revolution. During the movement to the right of the bell crank arm 39^a to return the detent slide 30 to the position shown, the cam slide 44 will also be moved to the right to normal position to raise the arm 40^a out of the path of the pin 43 and to retain it in raised position until the container has passed the roller 36, after which the roller 36 will return to the position shown and the bell crank arm 40^a will then be in a position to drop in front of the pin 43^a during the next operation of the device.

By means of the construction just described, one rotation of the printing device may be accomplished for each container which is passed thereby and the surface speed of the type may be the same as the speed of the container, thereby providing a pressure printing operation without appreciable friction.

Although the mechanism just described ordinarily is entirely satisfactory, a preferred form of controlling mechanism is illustrated in Figs. 5 to 8, inclusive. In this embodiment the clutch A is entirely dispensed with and the casing is rotated by the containers themselves. An elongated frame 47 is mounted adjacent the path of the containers which latter are moved either continuously or intermittently by a suitable conveyor, and is provided with sprockets 48 and 49, on which is supported an endless chain belt 48^a. This chain is provided with spaced lugs or flights 49^a which are positioned in the path of the containers and are arranged to be consecutively engaged thereby to rotate the printing drum. The sprocket 49 is secured to a stub shaft 50 which is provided with a suitable bearing in the frame 47. The shaft is provided with a shoulder 51, against which is frictionally secured a sprocket 52 by means of a threaded hand wheel 53. The sprocket 52 is thereby adjustably clamped against rotation on the shaft. A sprocket wheel 54 is secured to the shaft of the housing 1, as shown, and is driven from the sprocket 52 by means of a chain 55. It will be apparent that, when a moving container engages one of the lugs 49^a, the casing 1 and printing mechanism therein will be rotated and serially operated in the manner described. The flights 49^a may be so spaced on the chain 48^a that one revolution of the printing drum occurs during the passage of each container by the device.

It is desirable that the device be adjustable to position the serial numbers in a desired location on the containers. An adjustment also may be desirable for containers of various lengths and, in order to adjust the device, it is only necessary to loosen the hand wheel 53 and move the drum 1

or the chain 48ª so that the lugs are in a desired relation to the printing device to correspond with any desired length of container or the desired location of the number thereon. The hand wheel 53 may then be tightened and the printing will be in the desired location on the containers.

The lugs 49ª are preferably mounted for resilient movement on the chain 48ª, as illustrated in Figs. 7 and 8. These lugs may comprise a substantially triangularly inverted cup-like member 56 which is pivoted on an elongated pin 57 preferably extending downwardly from the chain. The lug is provided with a slot 58, into which a pin 59 on the chain extends to limit the outward position of the lug. A spring 60 is mounted on the pin 57 and one end of the spring engages a pin 61 on the chain and which pin extends through a slot 62 in the lug. The opposite end of the spring engages a pin 63 on the lug as shown, whereby the lug is resiliently retained in its outwardly extending position as shown. This type of lug or flight is particularly desirable for containers longer than the distance between lugs or when a container is misplaced on the conveyer and the lug engages the side of the container. The resilient mounting of the lug prevents puncturing the side wall of the container.

Ink may be applied to the type faces during each revolution of the casing by means of a roller 64 (Fig. 3) which may be supplied with ink in any suitable manner and which is mounted on an arm 65 pivoted at 66. The arm is provided with a spring 67 which is in engagement with a pin 68 on the frame and which holds the ink roller resiliently in the position shown, in which position the roller will apply ink to the type faces during each rotation of the device.

The characters or numerals on the type wheels have not all been shown in the drawings, as their construction and arrangement is well understood.

Modifications may be made without departing from the spirit of the invention. It is desired, therefore, that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A serial marking device for moving containers comprising a rotatable support having a plurality of type wheels thereon in transverse axial relation to the axis of said support and having their marking faces extending outwardly for transverse marking contact with consecutively moving containers, means for serially advancing said type wheels during each rotation of said support, an endless belt, means for causing said belt to be moved only by a passing container and in timed relation thereto, and a transmission between said belt and said support whereby said support is rotated solely by said container and at the same surface speed.

2. A serial marking device for moving containers comprising a rotatable support having a plurality of type wheels thereon in transverse axial relation to the axis of said support and having their marking faces extending outwardly for transverse marking contact with consecutively moving containers, means for serially advancing said type wheels during each rotation of said support, an endless belt, flights on said belt and extending into the path of containers moving by said device and adapted to be engaged by a container to move said belt, and a transmission between said belt and said support whereby said support is rotated solely by said container and at the same surface speed.

3. A serial marking device for moving containers comprising a rotatable support having a plurality of type wheels thereon in transverse axial relation to the axis of said support and having their marking faces extending outwardly for transverse marking contact with consecutively moving containers, means for serially advancing said type wheels during each rotation of said support, an endless belt, flights on said belt and extending into the path of containers moving by said device and adapted to be engaged by a container to move said belt, and a transmission between said belt and said support whereby said support is rotated in timed relation to said container, said flights being resiliently mounted on said belt whereby they may temporarily move out of the path of the containers in response to lateral pressure.

4. A marking device for container handling machines having means for moving consecutive containers in a fixed path, comprising a rotatable member having a marking portion for contact with a container surface, an endless belt having an elongated portion adjacent and parallel to said path, spaced flights on said belt for engagement by consecutive containers, and a transmission between said belt and said rotatable member whereby the passage of each container causes one revolution of said member to contact said marking portion at a predetermined location on said container.

5. A marking device for container handling machines having means for moving consecutive containers in a fixed path, comprising a rotatable member having a marking portion for contact with a container surface, an endless belt having an elongated portion adjacent and parallel to said path, spaced flights on said belt for engagement by consecutive containers, a transmission between said belt and said rotatable member whereby the passage of each container causes one revolution of said member to contact said marking portion at a predetermined location on said container, and adjustable means associated with said transmission to predetermine said location.

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