Jan. 7, 1964 I. S. GOTTSCHO ETAL 3,116,684

MARKING APPARATUS

Filed July 6, 1961 2 Sheets-Sheet 1

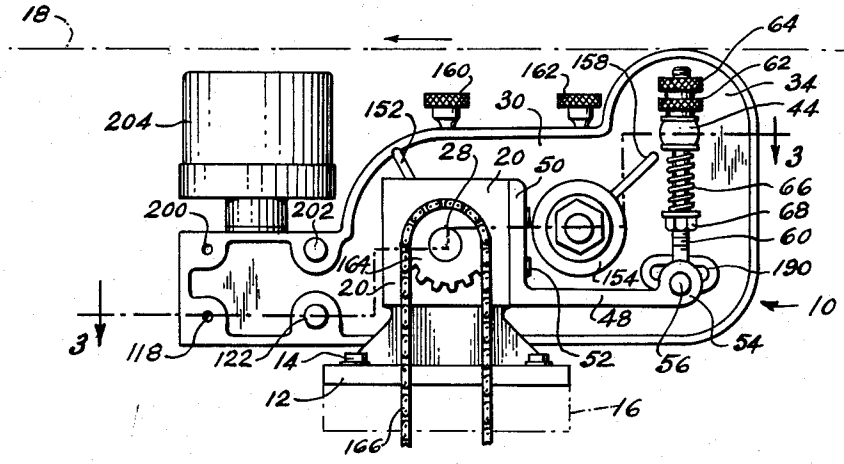


Fig. 1.

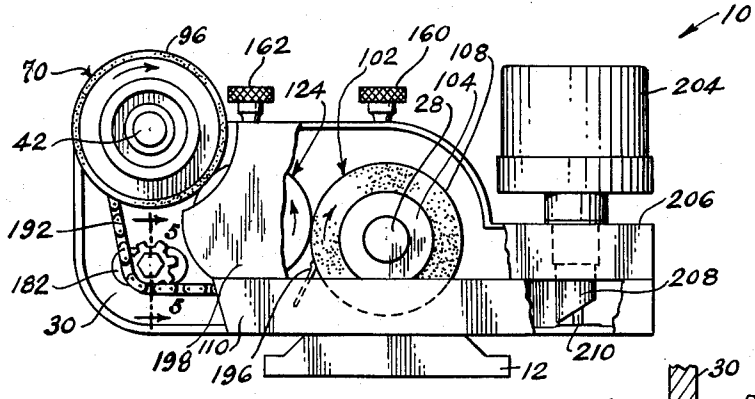


Fig. 2.

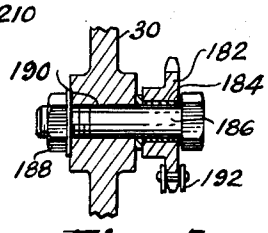
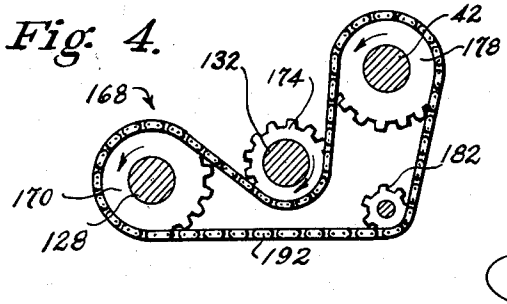


Fig. 5.

Fig. 4.



INVENTORS.
IRA S. GOTTSCHO AND
LAWRENCE J. TALARICO
BY
Ralph L. Montgomery
ATTORNEY

Jan. 7, 1964 I. S. GOTTSCHO ETAL 3,116,684

MARKING APPARATUS

Filed July 6, 1961 2 Sheets-Sheet 2

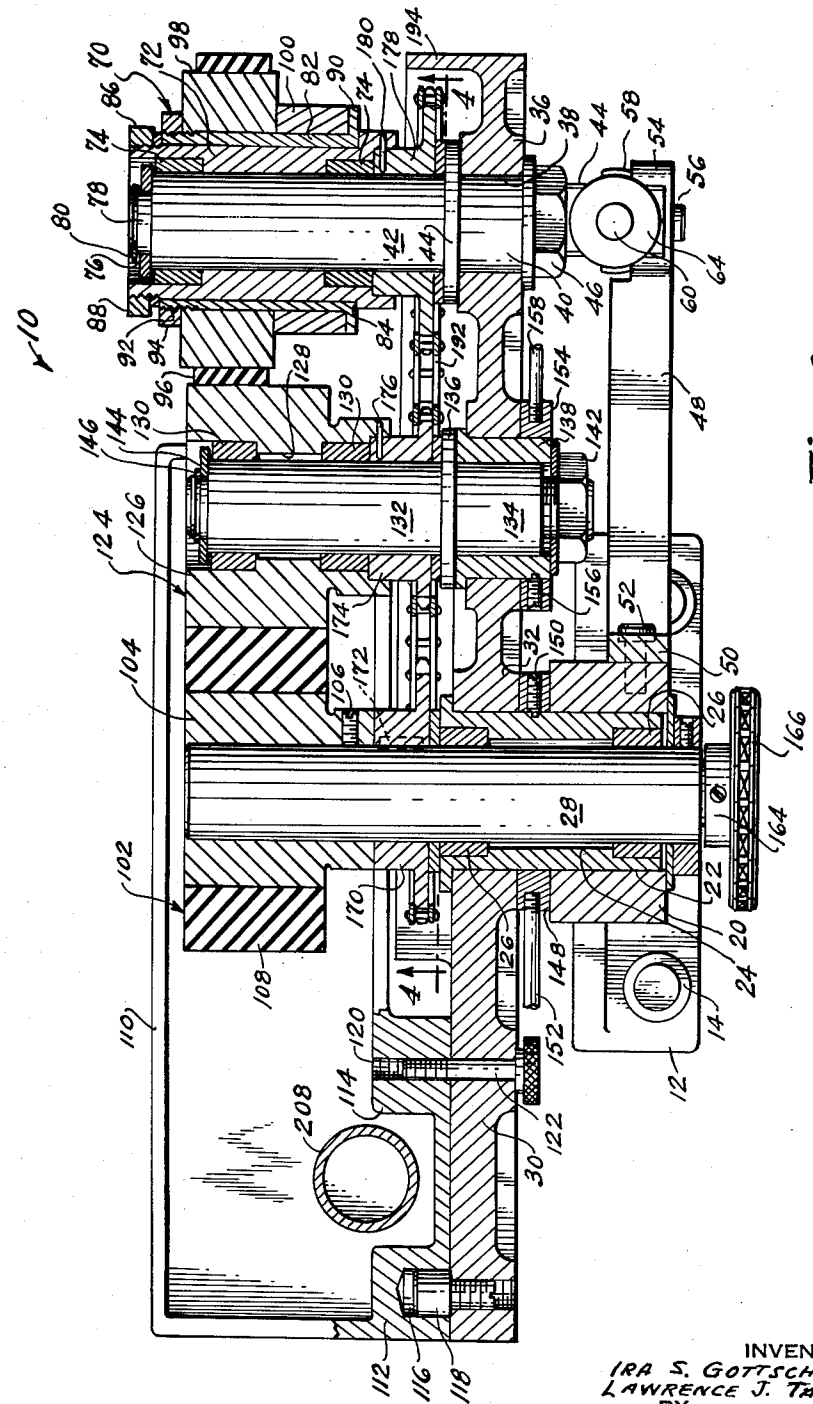


Fig. 3.

INVENTORS.
IRA S. GOTTSCHO AND
LAWRENCE J. TALARICO
BY
Jeff Montgomery
ATTORNEY

United States Patent Office 3,116,684 Patented Jan. 7, 1964

3,116,684

MARKING APPARATUS

Ira S. Gottscho, Milburn, and Lawrence J. Talarico, South Plainfield, N.J., assignors to Adolph Gottscho, Inc., Hillside, N.J., a corporation of New York

Filed July 6, 1961, Ser. No. 122,279
6 Claims. (Cl. 101—35)

This invention relates generally to marking apparatus, and more particularly is directed to an improved apparatus for applying inked impressions to horizontal surfaces of cartons, packages, articles, webs, sheets or strips as the same are conveyed past the marking apparatus.

It is an object of the invention to provide a marking apparatus of the described character in which the die wheel carrying a marking means on the periphery thereof, and the inking and metering rolls by which ink is transferred from a fountain to the marking means are rotatably carried by a support structure disposed only at one side of the marking apparatus so that such supporting structure can be mounted alongside an existing conveyor to permit the die wheel to apply markings, either from below or above, to horizontal surfaces of the conveyed cartons, articles, webs, sheets or the like without requiring alteration of the conveyor.

Another object is to provide a marking apparatus in which changing of the die wheel and inking and metering rolls, and removal of the ink fountain are greatly facilitated.

A further object is to provide a marking apparatus of the described character in which the inking system is substantially enclosed so as to reduce the rate of evaporation of the ink or of the solvent therein, and further to maintain the ink supply free of dirt or dust.

A further object is to provide a marking apparatus of the described character which is more compact than the existing apparatuses provided for the same purposes.

A still further object is to provide a marking apparatus of the described character having a simplified drive mechanism for positively effecting rotation of the die wheel and of the inking and metering rolls included in the inking system, while permitting relatively slow speed rotation of the inking roll for discouraging the throwing of ink from the periphery of the latter during high speed operation of the apparatus.

In accordance with an aspect of this invention, a marking apparatus includes a fixed support adapted to be mounted adjacent one side of a conveyor, a frame member disposed at the side of the support facing toward the conveyor and mounted for rocking relative to the support about a laterally extending axis, a rotated drive shaft substantially coaxial with said axis and projecting beyond the frame member in the direction away from the fixed support and carrying an inking roll, axles supported, at one end, in the frame member and also projecting from the latter in the direction away from the fixed support and rotatably carrying a removable metering roll and die wheel, respectively, a chain and sprocket transmission driving the metering roll and die wheel from the drive shaft, and an ink fountain removably mounted on the frame member at the side of the latter facing away from the fixed support and extending under the inking and metering rolls so that the inking roll picks up ink from the ink fountain or reservoir for transfer by the metering roll to the operative surfaces of marking means mounted on the periphery of the die wheel.

In accordance with another aspect of the invention, the frame member is resiliently and adjustably positioned relative to the fixed support about the axis of the drive shaft so as to determine the printing height of the marking means on the die wheel and the pressure of the marking means against the conveyed surfaces to be marked.

Further, in accordance with the invention, the drive shaft carrying the inking roll and the axle carrying the metering roll are preferably mounted in eccentric bearing housings or bushings so as to permit adjustment of the contact pressure between the inking and metering rolls and between the surface of the metering roll and the operative or raised surfaces of the marking means on the die wheel.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawings forming a part hereof, and wherein:

FIG. 1 is a side elevational view of a marking apparatus embodying the present invention, and which is designed to apply inked impressions or markings from below to horizontal surfaces of cartons, articles, webs, sheets or the like carried by a conveyor past the marking apparatus;

FIG. 2 is a side elevational view, partly broken away, of the marking apparatus in FIG. 1, but as viewed from the opposite side thereof;

FIG. 3 is an enlarged horizontal sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3, but on the same scale as FIGS. 1 and 2; and

FIG. 5 is an enlarged detail sectional view taken along the line 5—5 on FIG. 2.

Referring to the drawings in detail, it will be seen that a marking apparatus embodying the present invention, and there generally identified by the reference numeral 10, includes a pedestal or support 12 adapted to be fixed or secured by screws 14 to a frame or structure, as indicated in broken lines at 16 on FIG. 1, disposed adjacent one side of a conveyor (not shown) which transports cartons, articles, sheets, webs or the like past the marking apparatus 10, with the surfaces thereof to be marked travelling along a path indicated at 18. The support or pedestal 12 includes a block 20 disposed at the top thereof in the illustrated embodiment and having a bore extending laterally therethrough to receive a cylindrical bearing housing 22. The housing 22 has an internal bore 24 extending axially therethrough which is eccentric with respect to the outer cylindrical surface of housing 22 and which is counterbored at its opposite ends to receive bearings 26 in which a drive shaft 28 is rotatably journaled.

A side frame member 30 in the form of an elongated relatively flat plate is formed with a boss 32 intermediate its opposite ends having a central bore which receives the outer cylindrical surface of bearing housing 22 so that the latter pivotally mounts frame member 30 on the block 20 of pedestal 12. When the apparatus 10 is to mark from below, as in the illustrated embodiment, the back end portion of frame member 30, that is, the end portion extending in the direction opposed to the movement of the conveyed cartons, articles, sheets, webs or the like to be marked along the path 18, projects upwardly, as at 34 (FIG. 1), and has a boss 36 (FIG. 3) provided with a bore 38 to receive an end portion 40 of an axle 42. A radial flange 43 is provided between axle 42 and its end portion 40, and the latter has a reduced diameter threaded extension 44 which receives a nut 46 for securing axle 42 to frame member 30.

In order to adjustably position frame member 30 relative to fixed support or pedestal 12, apparatus 10 further includes an arm 48 (FIGS. 1 and 3) extending rearwardly from a leg 50 which is secured by screws 52 to a side of block 20. The free or back end of arm 48 is in the form of an eye 54 disposed substantially in vertical alignment with extension 44 of axle 42, and eye 54 is pivotally connected by a pin 56 to an eye 58 (FIG. 3) at the lower end of a bolt 60 extending slidably through a vertical bore formed in extension 44 which preferably has flattened

upper and lower surfaces. A knurled adjustment nut 62 and lock nut 64 (FIG. 1) are screwed on bolt 60 above extension 44 of axle 42 for adjustably limiting upward movement of the back end of frame member 30 about its pivoting axis, and a helical compression spring 66 extends around bolt 60 below extension 44 and bears, at its opposite ends, against such extension and against a nut 68 on the lower portion of bolt 60. Thus, spring 66 yieldably urges the back end portion of frame member 30 in the direction toward the path of travel 18 of the surfaces to be marked, that is, upwardly in the illustrated embodiment of the invention. The force exerted by spring 66 can be varied by moving nut 68 along bolt 60, while the extent of the movement of frame member 30 in the upward direction may be varied by adjusting nuts 62 and 64 on bolt 60.

It will be apparent that axle 42 extends laterally from frame member 30 at the side of the latter facing away from fixed support 12, and a die wheel generally identified by the reference numeral 70 is rotatably mounted on axle 42. The die wheel 70 preferably includes a hollow cylindrical body 72 (FIG. 3) which is counterbored at its opposite ends to receive bearings 74 by which body 72 is rotatably supported on axle 42. Body 72 is retained on axle 42 by a retaining ring 76 fitting around a reduced diameter end portion 78 of axle 42 and being held in position by a snap ring 80 received in an annular groove in end portion 78. A sleeve 82 fits on the outer surface of cylindrical body 72 and bears against an external radial shoulder 84 formed on body 72 adjacent the end thereof closest to frame member 30. The opposite end portion of body 72 is provided with external threads 86 to receive a ring unt 88 by which sleeve 82 is releasably held on body 72. The end of sleeve 82 bearing against shoulder 84 is provided with an external, radially directed flange 90, while its opposite end portion is formed with external threads 92 on which a ring nut 94 is screwed so as to retain a marking element or elements on sleeve 82 between flange 90 and ring nut 94. The marking element may be in the form of a logotype 96 adhesively or otherwise secured on the outer surface of a ring 98 which fits on the outer surface of sleeve 82 and is suitably located along the latter by a tubular spacer 100, as in the particular arrangement illustrated in FIG. 3, or other forms of marking elements may be secured on sleeve 82. In any case, it will be apparent that, by reason of the fact that axle 42 is supported only at one end of the latter, sleeve 82 and the marking element or elements thereon may be removed, as a unit, from body 72 merely by removal of ring nut 88, thereby facilitating rapid type or die changes.

In order to supply ink to the raised or operative surfaces of the marking element 96 at the periphery of die wheel 70, the apparatus 10 further includes an inking roll 102 made up of a cylindrical body 104 having a hub secured, as by a set screw 106, on the drive shaft 28 which projects substantially beyond frame member 30 in the direction away from support or pedestal 12. A resilient cover 108 of rubber or the like extends around the cylindrical periphery of body 104 and is intended to pick up ink from an underlying fountain or tank 110. The fountain 110 extends to the forward end of frame member 30 and, at the side of its forward portion adjacent the frame member, is formed with bosses 112 and 114 which abut against the side surface of frame member 30 (FIG. 3). Boss 112 is provided with a socket 116 which receives the head 118 of a screw extending from frame member 30 and acting as a locating button, while boss 114 has a tapped hole 120 which receives a screw 122 extending through frame member 30 to secure tank 110 to the frame member.

The inking system of apparatus 10 further has a metering roll 124 that includes a cylindrical body 126 with a hub at one end and having an axial bore 128 that is counterbored, at its opposite ends, to receive bearings 130 by which body 126 is rotatably mounted on an axle 132.

Axle 132 has an end portion 134 extending beyond a radial flange 136 and being received in an eccentric bushing 138 which is turnable in the bore of a boss 140 formed on frame member 30 intermediate bosses 32 and 36. End portion 134 of axle 132 is retained in eccentric bushing 138 by a nut 142 screwed on a reduced diameter threaded extension of end portion 134.

It will be noted that axle 132 rotatably carrying metering roll 124 also extends laterally from frame member 30 at the side of the latter facing away from support or pedestal 12, and metering roll 124 is held on axle 132 by a retaining ring 144 which is held on the free end of axle 132 by a split ring 146 engaging in an annular groove formed in the free end of the axle. Thus, metering roll 124 can be conveniently removed from its axle 132 merely by removing the split ring 146 and the retaining ring 144, thereby facilitating replacement of the metering roll.

The location of the axle 132 of metering roll 124 and the diameter of the latter are selected so that the cylindrical outer surface of body 126 will be in simultaneous rolling engagement with the cylindrical surface of the cover 108 of inking roll 102 and with the raised surfaces of the marking element or elements 96 on die wheel 70, whereby metering roll 124 will be effective to transfer ink from the inking roll to the marking element or elements during simultaneous rotation of the inking and metering rolls and the die wheel.

The eccentric bearing housing 22 supporting the drive shaft 28 and the eccentric bushing 138 supporting axle 132 are turnable within the respective bosses 32 and 140 of frame member 30 in order to adjust the distances between the parallel axes of rotation of the inking and metering rolls and the die wheel, and thereby vary the amount of ink transferred by metering roll 124 from inking roll 102 to the operative or raised surfaces of the marking element or elements 96 on the die wheel. In order to effect turning of eccentric bearing housing 22, a ring 148 (FIG. 3) is secured thereon, as by a set screw 150, between the block 20 of pedestal or support 12 and the boss 32 of frame member 30, and a handle 152 projects radially from ring 48 for manual turning thereof. Similarly, a ring 154 is secured, as by a set screw 156, on an end of eccentric bushings 138 projecting beyond boss 140 and has a handle 158 extending radially therefrom to permit manual turning of ring 154, and hence of eccentric bushing 138.

In order to prevent inadvertent turning of the eccentric bearing housing 22 and an eccentric bushing 138 from the respective adjusted positions thereof, set screws 160 and 162 (FIGS. 1 and 2) having knurled heads are screwed into tapped holes formed vertically in frame member 30 and are engaged with bearing housing 22 and eccentric bushing 138, respectively.

In the apparatus 10, the inking and metering rolls 102 and 124 and die wheel 70 are all rotatably driven in synchronism with the advancement of the surface or surfaces to be marked by the associated conveyor. Such drive is effected through a sprocket 164 fixed on an end of drive shaft 28 extending from block 20 at the side of the latter remote from frame member 30 and being driven by a chain 166 from a shaft or rotated member (not shown) of the associated conveyor. The rotation of drive shaft 28 obviously effects similar rotation of inking roll 102 thereon, and, in accordance with the invention, metering roll 124 and die wheel 70 are rotated from drive shaft 28 by a chain and sprocket transmission 168 (FIG. 4). The transmission 168 includes a sprocket 170 fixed, as by a key 172 (FIG. 3) on shaft 28 between the hub of body 104 and the adjacent flanged end of bearing housing 22, a sprocket 174 rotatable on axle 132 between the hub of body 126 of the metering roll and the flange 136 and being rotatably coupled to the hub of metering roll 124, as by a pin 176, and a sprocket 178 rotatable on axle 42 between the body 72 of die wheel 70 and flange 43 and

being rotatably coupled to the body **72** of the die wheel, as by a pin **180**.

The transmission **168** further includes an idler sprocket **182** (FIGS. 4 and 5) rotatable on a bushing **184** carried by a bolt **186** defining an axle for sprocket **182** and being adjustably secured, as by a nut **188** in a horizontally elongated slot **190** (FIG. 1) formed in frame member **30** at a location substantially below boss **36** in which axle **42** is mounted. Transmission **168** is completed by an endless chain **192** which, as shown in FIG. 4, runs around driven sprocket **170**, under sprocket **174**, and then around sprocket **178** and idler sprocket **182** so that metering roll **124** is rotated in the direction counter to the rotation of inking roll **102**, while die wheel **70** is rotated in the same direction as the inking roll. It will be apparent that the bolt **190** forming the axle of the idler sprocket **182** can be adjustably displaced along slot **190** for taking up any slack in the drive chain **192**. Further, the described transmission **168** represents a relatively simple mechanism by which the required directions and relative speeds of rotation of the inking and metering roll and the die wheel can be achieved in a relatively small space. It is to be noted that the sprocket **174** associated with metering roll **124** preferably has a smaller pitch diameter than the sprocket **170** on drive shaft **28** which carries inking roll **102**, whereby inking roll **102** is driven at a rotational speed which is less than the rotational speed of the metering roll so as to avoid the throwing of ink from the surface of the inking roll during high speed operation of marking apparatus **10**. Further, as is apparent in FIG. 3, frame member **30** preferably has a laterally directed flange **194** extending along the periphery of the frame member at the side thereof facing away from support **12** so as to safely enclose the chain and sprocket transmission **168**.

As shown in FIG. 2, a scraper **196** preferably extends from fountain or tank **110** to engage the surface of inking roll **102** at the side of the latter moving upwardly out of the fountain, thereby to return the excess ink to the latter. Further, it will be seen that the fountain **110** projects under metering roll **124** to receive any excess ink dropping from the surface of the metering roll, particularly at the line of rolling contact of the latter with the inking roll.

In accordance with the present invention, the fountain **110** and the inking and metering rolls **102** and **124** are substantially covered by a cover **198** which is removably attached to the forward end of frame member **30** by the head of a screw **200** acting as a locating pin or button received in a socket of the cover and by a clamping screw **202** (FIG. 1) received in a tapped hole of the cover, and which are similar to the screws **118** and **122** previously described in connection with the attachment of the fountain **110** to the frame member. Thus, the cover **198** can also be conveniently removed for easy access to the fountain **110** and to the inking and metering rolls during cleaning of the inking system.

Ink is preferably fed to fountain **110** from a supply container or reservoir **204** (FIGS. 1 and 2) which is removably mounted on a depressed portion **206** of cover **198** so that the top of supply container **204** lies below the level of the top of die wheel **70**. The feeding of ink from reservoir **204** to fountain **110** is preferably controlled in the manner described in detail in application Serial No. 737,393, filed May 23, 1958, by Francis C. Worth, which was issued on August 15, 1961, as U.S. Letters Patent No. 2,996,005. Briefly stated, ink is fed from reservoir **204** through a depending pipe **208** (FIG. 2) extending into fountain **110** to maintain a substantially constant level of ink in the latter. A ball valve (not shown) in pipe **208** is unseated by a pin **210** projecting upwardly into the latter from the bottom of the fountain, and such valve automatically closes to prevent leakage through pipe **208** when supply container **204** is removed from its operative position shown in the drawing.

Although the illustrated apparatus **10** is intended to mark the conveyed surface or surfaces from below, a similar apparatus embodying the invention may be provided for marking the conveyed surfaces from above merely by altering the position of the axle **42** carrying the die wheel **70** so that the latter projects downwardly below the inking and metering rolls, and by rearranging arm **48** and bolt **60** so that the latter extends upwardly from the end **44** of axle **42** to the eye **54** at the free end of arm **48**.

It will be apparent that, in the apparatus **10** embodying this invention, the entire inking system is substantially enclosed, thereby to reduce the evaporation of the ink or solvent and consequently increase the efficiency of the utilization of the ink while keeping the latter free of dust or dirt. Further, since the inking and metering rolls and the fountain or tank **110** are overhung, that is, are supported at only one side thereof, the removal of these components of the apparatus is substantially facilitated so that cleaning or replacement of such components can be conveniently accomplished. The provision of the support or pedestal **12** at only one side of the marking apparatus makes it possible to mount such apparatus in relation to a conveyor carrying cartons so that marking of the flaps of cartons or the like can be conveniently accomplished.

It is also to be noted that, since the frame member **30** is mounted for pivotal movement substantially about the axis of the drive shaft **28** carrying inking roll **102** the overall length of marking apparatus **10** is substantially reduced so as to provide a compact assembly that can be conveniently installed adjacent a conveyor without substantial modification of the conveyor structure.

Although an illustrative embodiment of the invention has been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to that precise embodiment, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defined in the appended claims.

What is claimed is:

1. An apparatus for applying inked markings to horizontal surfaces conveyed past the apparatus, comprising a fixed support adapted to be mounted at one side of the path of the conveyed surfaces, a frame member disposed at the side of said support facing toward said path, a bearing housing turnably received in said frame member and support so as to permit rocking of the frame member relative to the support about a laterally extending, horizontal axis, a rotated drive shaft journaled in said bearing housing substantially coaxial with said axis and having a cantilevered end portion projecting laterally from the frame member in the direction away from said support, a first cantilevered axle secured, at one end, in said frame and projecting from the side of said frame member facing away from said support adjacent one end of the frame member, a rotatable die wheel having marking means on its periphery and being removably mounted on said first cantilevered axle, means angularly positioning said frame member relative to said support so as to effect rolling and marking contact of said marking means on the die wheel with the conveyed surfaces, and inking roll releasably fixed on said cantilevered end portion of said rotated drive shaft, an ink fountain removably mounted on and projecting laterally from said frame member at said side of the latter and underlying said inking roll so that the latter can pick up ink from said fountain, a second cantilevered axles secured at one end in said frame member and projecting from said side of the frame member intermediate said drive shaft and first axle, a rotatable metering roll removably mounted on said second cantilevered axle to effect simultaneous rolling contact with said inking roll and marking means for transferring ink to the latter from said inking roll, and transmission means operative to drive said die wheel and metering roll from said drive shaft.

2. An apparatus as in claim 1; wherein said bearing

housing turnably received in said frame member and support and having said drive shaft journalled therein has an outer cylindrical surface which is eccentric with respect to the axis of said shaft; and further comprising an eccentric bushing turnable in said frame member and carrying said second axle so that turning of said eccentric bearing housing and said eccentric bushing is effective to vary the pressure of contact of said inking roll with said metering roll and of the latter with said marking means on the die wheel.

3. An apparatus as in claim 1; wherein said die wheel includes a cylindrical body rotatable on said first axle and having an external radial shoulder at the end thereof adjacent said frame member and external threads at the opposite end, a sleeve slidable on said body against said shoulder and carrying said marking means, and a ring nut engaging said external threads to releasably retain said sleeve on said body and thereby permit rapid exchange of said sleeve when the markings to be applied are altered.

4. An apparatus as in claim 1; wherein said frame member is in the form of an elongated relatively flat plate lying substantially in a vertical plane and having a boss intermediate its opposite ends in which said bearing housing is turnably received, and said ink fountain extends along a substantial portion of the length of said plate from the end of the latter which is remote from said one end of the frame member carrying said first cantilevered axle; and further comprising a cover removably mounted on said frame member at said side of the latter and extending over said fountain and said inking and metering rolls to reduce evaporation of ink and to maintain the latter free of dirt and dust, said cover having a portion of reduced height extending along the end portion of said plate remote from said one end carrying the

first axle, and a reservoir mounted on the portion of said cover having a reduced height to feed ink to said fountain while maintaining a relatively small overall height for said apparatus.

5. An apparatus as in claim 1; wherein said transmission means includes sprockets fixed on said drive shaft and rotatable on said first and second axles between said frame member and said inking roll, die wheel and metering roll, respectively, the sprockets on said first and second axles being rotatably coupled to said die wheel and said metering roll, respectively, and an endless chain wrapped in the same direction around the sprockets on said drive shaft and first axle and wrapped in the opposite direction around the sprocket on said second axle to rotate said die wheel in the same direction as said drive shaft and inking roll and to rotate said metering roll in the opposite direction.

6. An apparatus as in claim 5; wherein said transmission means further includes a rotatable idler sprocket adjustably mounted on said frame member at said side of the latter and engaging said chain to take-up slack in the latter.

References Cited in the file of this patent

UNITED STATES PATENTS

291,155	Compton	Jan. 1, 1884
1,683,774	Haase	Sept. 11, 1928
2,021,128	Castellane	Nov. 19, 1935
2,749,838	Stover	June 12, 1956
2,761,379	Hirschey et al.	Sept. 4, 1956
2,829,589	Alessi et al.	Apr. 8, 1958
2,835,195	Jackson	May 20, 1958
2,909,991	Farkas	Oct. 27, 1959