Sept. 11, 1962 H. D. FISCHER 3,053,371

METHOD OF AND APPARATUS FOR CHAIN LUBRICATION

Filed March 9, 1960 4 Sheets-Sheet 1

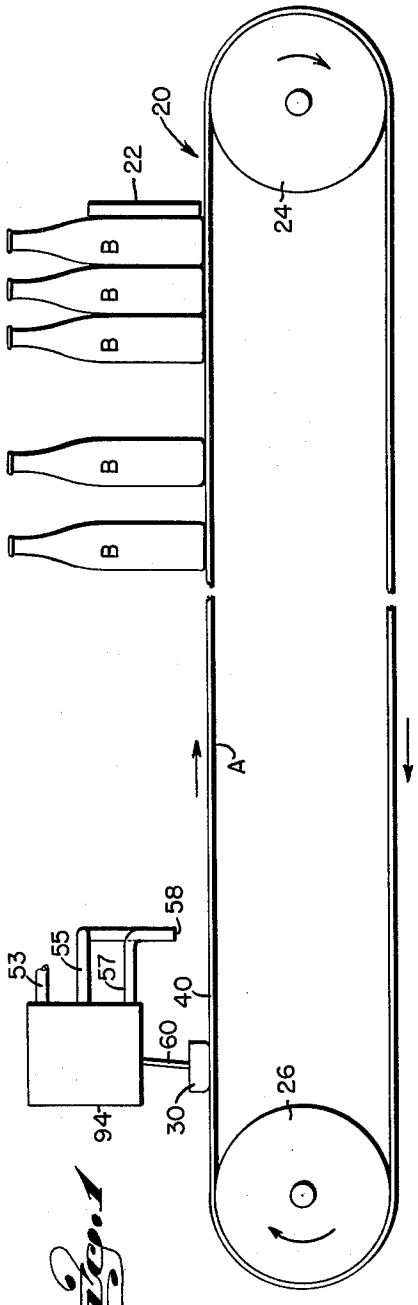


Fig. 1

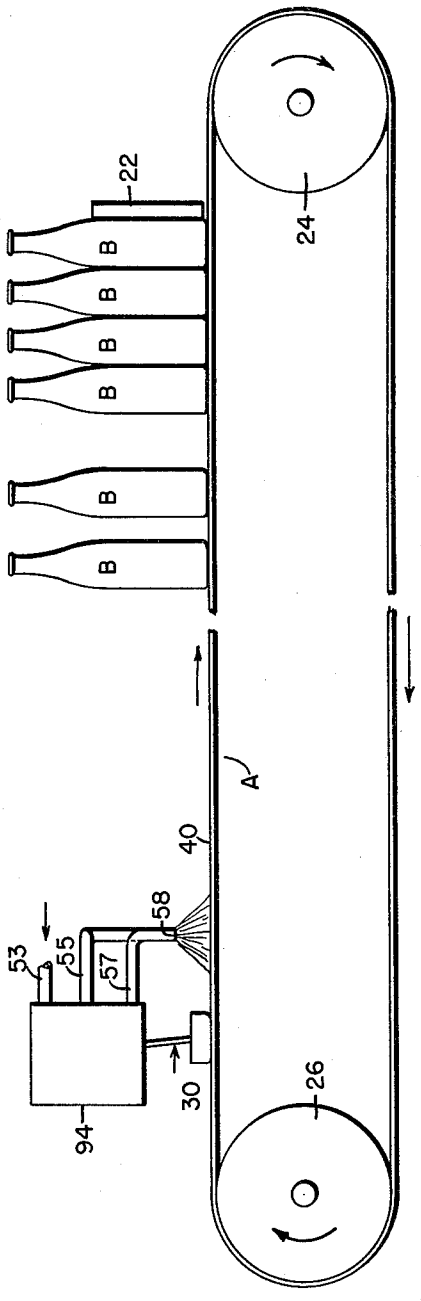


Fig. 2

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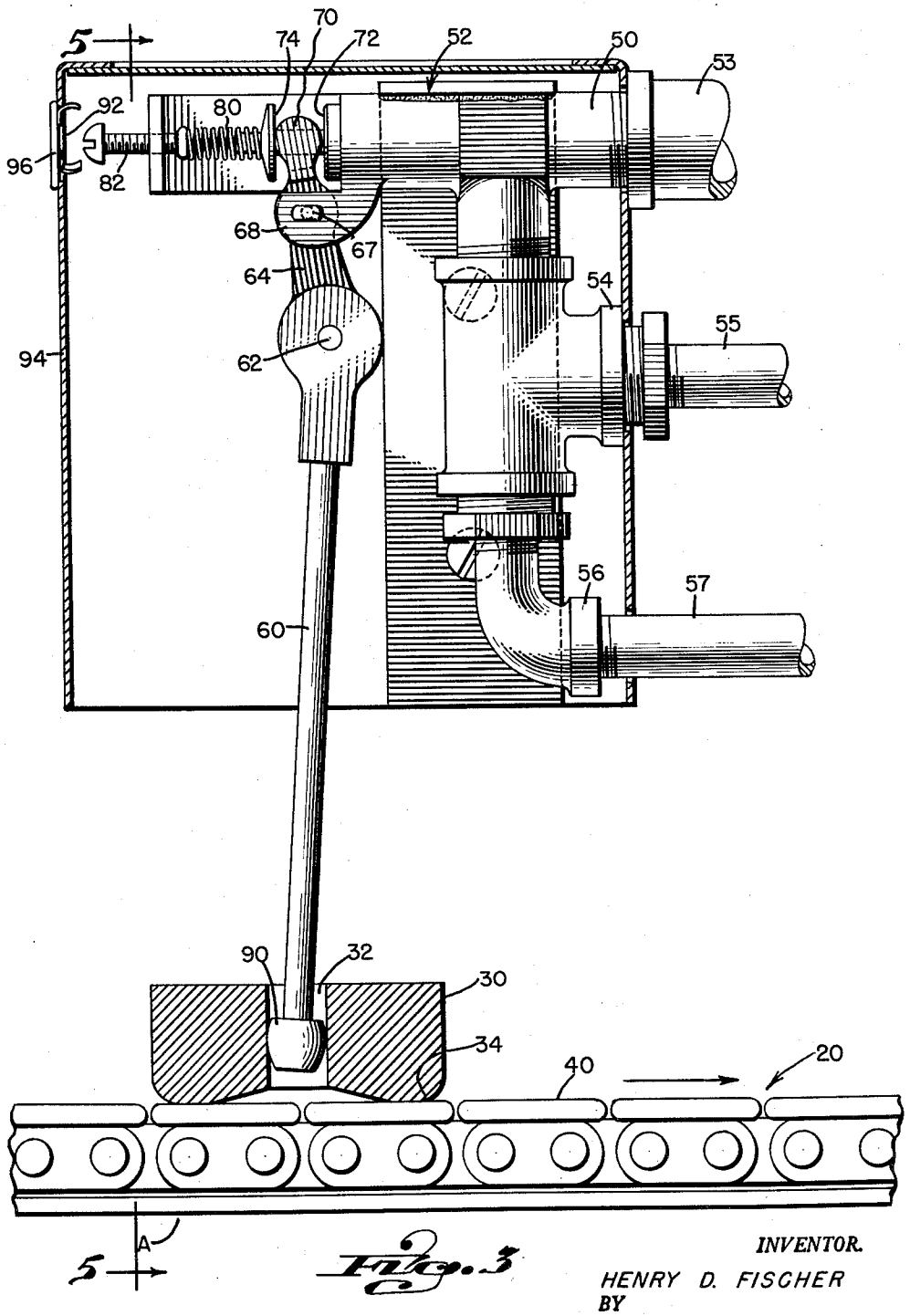


Fig. 3

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METHOD OF AND APPARATUS FOR CHAIN LUBRICATION

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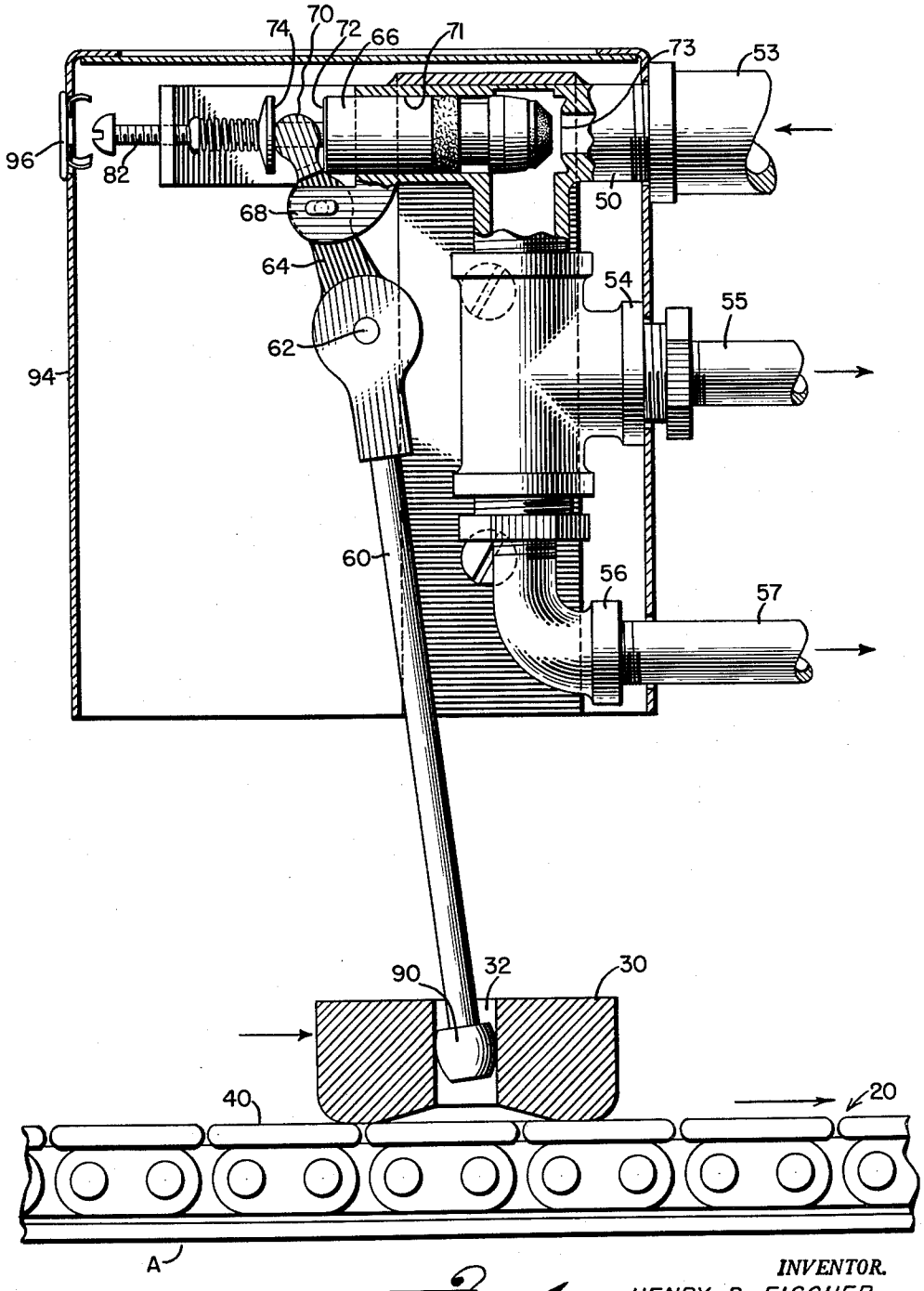


Fig. 4

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METHOD OF AND APPARATUS FOR CHAIN LUBRICATION

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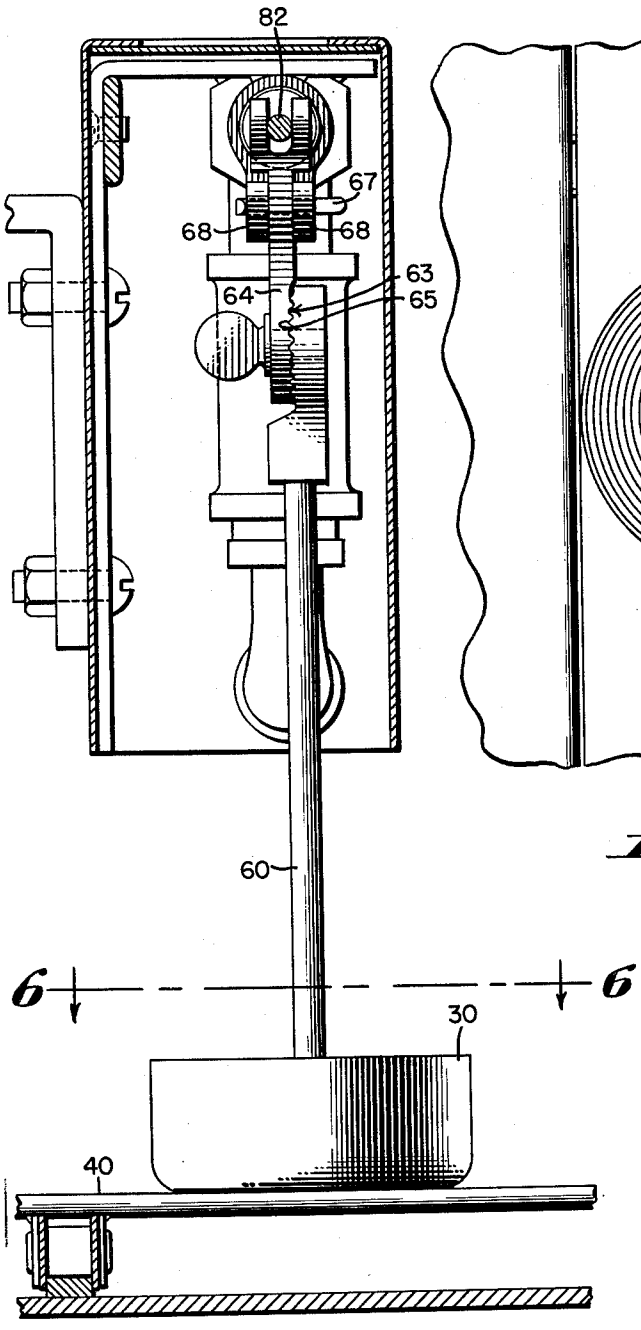


Fig. 5

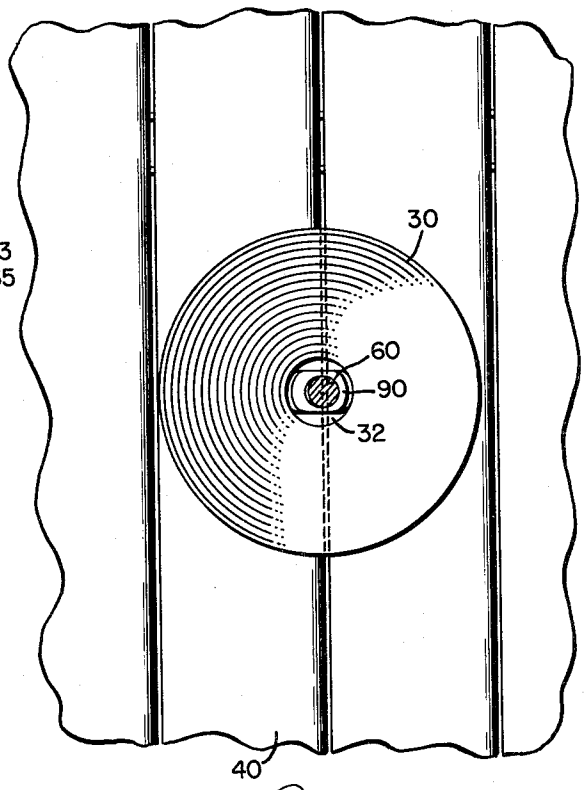


Fig. 6

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3,053,371
METHOD OF AND APPARATUS FOR CHAIN LUBRICATION

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6 Claims. (Cl. 198—1)

This invention relates to a control device, and more particularly to a device for continuously and automatically correlating the application of chain-lubricant to the upper, bottle-engaging surface of a chain-type bottle conveyor to the actual lubrication requirements of the conveyor.

An object of the invention is to provide a self-contained control unit having a sensing member which rides upon the upper surface of a chain-type bottle conveyor for controlling the application of lubricant to the surface of the moving chain conveyor, by utilizing the frictional resistance between the conveyor surface and sensing member for continuously controlling the application of lubricant to the conveyor surface.

A further object of the invention is to provide simple, highly effective means, having a minimum of moving parts, for effectively utilizing the frictional resistance between a sensing member of the said means and the supporting surface of a conveyor for effecting movement of a valve arm which controls the application or flow of a lubricant onto said conveyor.

Another object of the invention is to provide a lubricant control member having the hereinabove described characteristics which may be easily associated with existing chain-type bottle conveyors without necessitating any structural changes in the conveyors.

Still a further object of the invention is to teach a method of correlating the application of a liquid lubricant to the article-supporting surface of a conveyor in accordance with the frictional resistance of said surface.

These and other objects are attained by the means described herein and as disclosed in the accompanying drawings, in which:

FIG. 1 is a diagrammatic side view of a typical chain conveyor for bottles, illustrating the manner in which the lubricant control member of the present invention is operatively associated with said conveyor.

FIG. 2 is a view similar to FIG. 1, illustrating the relationship of the parts when the lubricant control member has been actuated to effect discharge of lubricant onto the upper surface of the conveyor.

FIG. 3 is an enlarged view, partly in cross-section, illustrating the relationship of the various structural elements which comprise the control member in conjunction with a bottle conveyor whose upper surface is adequately lubricated.

FIG. 4 is a view similar to FIG. 3, illustrating the relationship of the parts when the upper surface of the conveyor requires additional lubrication.

FIG. 5 is a sectional view taken on line 5—5 of FIG. 3.

FIG. 6 is a sectional view taken on line 6—6 of FIG. 5.

With particular reference now to FIGS. 1 and 2, the numeral 20 denotes generally to endless chain-type conveyor such as commonly used by the bottling and beverage industry for conveying bottles in an upright position. The numeral 22 denotes generally a barrier, the purpose of which is to provide for an accumulation of bottles on the upper reach A of the chain conveyor.

It will be understood that relative motion will occur between the upper surface of the endless conveyor and the lower surface of the various bottles B, particularly when said bottles are restrained, as by barrier 22, from movement with the conveyor.

Solely by way of example, and not by way of restriction, opposite ends of the conveyor pass around laterally spaced cylinders 24 and 26, one or both of which may be driven for imparting movement to the conveyor. The present invention is neither concerned with nor directed to the particular structural or operating details of conveyor 20, barrier 22, and cylinders 24 and 26, since each of said items is old and well known in the bottling art.

For many years the bottling and beverage industry has utilized chain-lubricants in the form of soaps, and the like, which have been, for the most part, continuously applied to the upper surface of chain-type bottle conveyors. The aforesaid method of operation was and is still quite unsatisfactory, since it results in the application of an excess of lubricant on the chain, which excess is transferred to the bottles, thereby creating a messy and highly unsatisfactory condition. In addition to the aforesaid undesirable, messy condition, such continuous application of lubricant resulted in waste of lubricant which was evidenced by exceptionally high operating costs.

The industry has likewise endeavored to utilize means for intermittently applying lubricant to such chain conveyors, however, the intermittent system has proven unsatisfactory since it, too, resulted in abnormal use and application of lubricant and was subject to the inherent disadvantage of either over or under lubricating the chain conveyor.

The present invention is directed to the provision of a simple, inexpensive, highly effective mechanical device having sensing means which ride upon the upper bottle-bottom-engaging, lubricated surface of a chain conveyor and which literally senses the presence or absence of sufficient lubricant as a function of the resistance between the upper lubricated surface of the conveyor and the lower surface of the sensing element which, like the bottom of a bottle, engages and rests directly upon the upper surface of the conveyor.

With particular reference now to FIGS. 3 and 4, the numeral 30 denotes a sensing member in the form of a circular block having an axial bore 32 therethrough. The lower surface is constructed whereby to comprise a continuous, annular bearing surface or area 34 which is adapted to abuttingly engage the upper surface 40 of the upper reach A of a typical chain-type bottle conveyor 20.

The numeral 50 denotes the inlet port of a valve denoted generally by the numeral 52, whereas the numerals 54 and 56 denote discharge ports. The inlet port may be suitably connected to a source of liquid lubricant, not illustrated, by means of conduit 53, and outlet ports 54 and 56 may be connected to lines 55 and 57, each of which terminates in a nozzle 58 (FIGS. 1 and 2) disposed above the upper surface 40 of the upper reach of the chain conveyor, whereby lubricant discharged through nozzle 58 will be applied directly to the upper surface of the chain conveyor in advance of bottles B and succeeding the sensing element 30.

Actuation of lubricant valve 52 is effected by means of lever 60, which is adjustably secured at 62 to valve arm 64 which is pivoted at 67 to ears 68 of the valve body. The free outer end of arm 64 terminates in a bearing portion 70 located between the adjacent, laterally spaced faces 72 and 74 of a valve element 66 mounted for axial endwise movement in housing bore 71 relative to valve seat 73. The present invention is neither directed to nor concerned with the structural details of said valve except that the application of a counterclockwise movement of actuator arm 64 to the left will move valve element 66 of FIG. 4 from a valve closing to a valve opening position for establishing a flow of lubricant through the valve to discharge pipes 56.

In the preferred embodiment of the invention the lower end of rod **60** terminates in a head portion **90** dimensioned to slidably be received within and engage axial bore **32** of sensing member **30**.

Means, such as a spring **80**, may be utilized for applying a predetermined or normal force to lever **60**, which force may, by adjustment of set screw **82**, be adjusted whereby to dispose the sensing member and lever **60** in the retracted, valve-closing position illustrated in FIG. 3 during those periods of time when sufficient lubricant is provided on the upper surface **40** of the chain conveyor. After this setting of spring **80** has been accomplished, no lubricant will be discharged onto the chain conveyor until such time as the frictional resistance between abutting faces of the sensing member and the upper surface **40** of the chain conveyor has been increased by an amount sufficient to overcome the biasing action of spring **80** which will thereby result in movement of sensing member **30** with the chain conveyor, whereby lever **60** will be actuated for opening the valve, thereby applying lubricant to the chain conveyor. The lubricant will thus be applied until such time as the frictional resistance between the sensing member and the upper surface of the conveyor has been reduced to a point where the sensing member will be shifted back to the position illustrated in FIG. 3 under the force of spring **80**.

As best illustrated in FIG. 5, it will be noted that lever **60** is adapted to be secured relative to arm **64** by reason of thumb screw **62** for the purpose of securely though releasably effecting engagement of serrated face **63** of arm **60** with serrated face **65** of arm **64**. Arm **64** is pivotally secured relative to ears **68** of the valve body by means of a pivot pin **69**.

Numeral **96** denotes a removable cover plate which is adapted to securely though releasably be received within aperture **92** provided in wall **94** of the housing for controlling access to set screw **82**.

What is claimed is:

1. An actuator for the actuator arm of the lubricant flow-control valve of a device for applying lubricant to the upper, article-supporting reach of an endless conveyor, which comprises the combination of a conveyor-contacting member having a lower bearing surface which is freely supported upon the upper reach of said conveyor, means interconnecting said member to the actuator arm of said valve whereby movement of said arm from a valve closing to a valve opening position is a function of the coefficient of friction between the contacting surfaces of said member and conveyor, and means normally and yieldably maintaining said member in a valve closing relationship relative to said arm when said upper reach is properly lubricated.

2. An actuator for the actuator arm of the lubricant flow-control valve of a device for applying lubricant to the upper, bottle-supporting reach of an endless bottle-chain conveyor, which comprises the combination of a lubricant nozzle above and adjacent the forward end of said conveyor, a conveyor-contacting member having a lower bearing surface which is freely supported upon the upper reach of said conyor in advance of said nozzle, means interconnecting said member to the actuator arm

of said valve whereby movement of said arm from a valve closing to a valve opening position is a function of the coefficient of friction between the contacting surfaces of said member and conveyor, and means normally and yieldably restraining and maintaining said member in a valve closing relationship relative to said arm when said upper reach is properly lubricated, and in a valve opening relationship relative to said arm when said member is moved forwardly against the counter-force of said restraining means due to insufficient lubrication of said conveyor.

3. An actuator for the actuator arm of the lubricant flow-control valve of a device for applying lubricant to the upper, bottle-supporting reach of an endless bottle chain conveyor, which comprises the combination of a lubricant nozzle disposed above and adjacent to the forward end of said conveyor, a conveyor contacting member having a lower being surface which is freely supported upon the upper reach of said conveyor in advance of said nozzle, a lever pivotally supported at one end above the conveyor and hanging downwardly for swinging movement in the longitudinal direction of the conveyor and operatively coupled above the supporting pivot with said actuator arm of the valve, means forming a loose coupling between the lower end of said lever and said member, said arm being movable from a valve closing to a valve opening position as a function of the coefficient of friction between the coacting surfaces of said member and conveyor, and means normally and yieldingly restraining and maintaining said member in a valve closing relationship relative to said arm when said upper reach is properly lubricated and in a valve opening relationship to said arm when said member is moved upwardly against the counter force of said restraining means due to insufficient lubrication of said conveyor.

4. The invention according to claim 4, wherein said loose coupling forming means comprises a bore formed in and opening through the top of said conveyor contacting member into which bore the lower end of said lever is loosely engaged.

5. The invention according to claim 4, wherein said loose coupling forming means comprises a cylindrical bore formed in and opening through the top of said conveyor contacting member and a head upon the lower end of the lever slidably engaged within the bore and rounded to have universal motion in the bore with respect to the member.

6. The invention according to claim 4, wherein said conveyor contacting member is in the form of a relatively thick disc in which said lower bearing surface is circular and the said loose coupling forming means comprises a cylindrical axial bore extending entirely through said disc and said lower end of said lever has a head slidably engaged within said bore and rounded to have universal motion in the bore with respect to the member.

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