This invention relates to new and useful improvements in devices for oiling the joints of conveyer chains and the like and has particular relation to devices of this character wherein discharge of the oil is effected by a plunger actuated by the mechanism to be lubricated.

The principal object of the invention is to provide a device of the character described wherein the oil or other lubricant is discharged from the device immediately upon actuation of the plunger and deposited at the chain or conveyer joint on each side of its roller.

Another object of the invention is to provide a device of the character set forth which will discharge a uniform quantity of oils irrespective of changes in the viscosity of the lubricating medium.

Another object of the invention is to provide a device of the general character described wherein the quantity of oil discharged by the device to the joints of conveyers and chains may be adjusted.

Another object of the invention is to provide a device of the character set forth for each link of the chain or conveyer to be discharged from the device. For the most part, these devices comprise a separate valve for each side of the chain, rendering them cumbersome and expensive. In addition, it is practically impossible to predeterminedly adjust or set devices of this character so that a uniform quantity of oil is discharged at all times, since changes in the viscosity of the oil or other lubricant as a result of seasonal or other fluctuations in temperature require constant adjustment of the device. Furthermore, the location of deposit of the lubricant on the chain, and the exact moment of discharge cannot be properly controlled, for example, the amount of oil which is to be discharged at each stroke of the plunger, is an exceedingly small quantity, and where the quantity of oil in the discharge conduit is comparatively large, such factors as compression and capillary attraction prevent the oil from being discharged simultaneously with each stroke of the plunger.

It has been found that by making the discharge conduits of substantially small diameter, so that the amount of oil in said conduit in proportion to the amount delivered by the plunger is not too great, a drop of oil can be discharged from said conduit instantly upon the movement of the plunger, and as a result the drop of oil or other lubricant, will be placed on the joints of the chain without fail. It will be readily seen that if the amount of oil delivered by the stroke of the plunger is exceedingly small and the amount of oil in the discharge conduit relatively large in proportion thereto, this small amount of oil will collect in the discharge end of the conduit until the drop is sufficiently big to cause its release therefrom, and as a result might be discharged anywhere along the link of a chain or conveyer.

Referring now more particularly to the drawing, successive links of a chain or conveyer are designated by the reference numeral 1 and the joints thereof are indicated at 2 adjacent each side of the rollers 3 which ride upon the customary channel or angle 4 supported by means of a substantially L-shaped bracket 5, the upper end of which extends a substantial distance above the vertical web of said channel or angle.

In the present instance the automatic oiling device which is designated generally as at A, comprises a projecting bracket portion 6 arranged to embrace the upper portion of the bracket 5 and be secured thereon by means of a collar 7 and set screw 8. The automatic oiling device A for-
there comprises a main body portion 9 of substantially cylindrical cross section shape disposed normal with respect to the longitudinal axis of travel of the conveyor as shown in Figs. 1 and 3. The vertical body portion of the oiling device A is provided with an axial bore 10 therein, the enlarged portions 11 and 12 of which are of relatively larger diameter than the central portion of said axial bore 10. A piston 13 is slidably mounted within the restricted portion of the axial bore 10 and is provided with an enlarged head 14 which engages the shoulder formed by the enlarged portion of the axial bore 111 at the upper end of the body to limit downward movement of said piston 13. In the present instance the piston 13 is compressible against the action of a coil spring 15 disposed intermediate the enlarged head 14 of said piston 13 and a closure member 161 which is threaded into the upper end of the enlarged portion 11 of the axial bore 10 in the body 9.

A second or lower piston 17 is also mounted in a portion of the axial bore 10, and is provided with the enlarged head portion 18 in the portion 12 of the axial bore 10 and projects beyond the lower end thereof as shown in Fig. 3. The piston 17 is compressible inwardly of the body 9 against the action of a spring 20 interposed between the enlarged head 18 and the shoulder formed by the diametrical difference between the central portion of the axial bore 10 and the enlarged portion 12 thereof.

In the present instance the piston 17 is actuated by means of a lever 21 pivotally mounted to a bracket 22, formed integrally with and extending laterally of the oiling device A as shown in Fig. 1. A roller 24 is rotateably mounted at the upper end of the pivot lever 21 and positioned with respect to the oiling device A so that the horizontal diametric axis thereof is substantially parallel to the longitudinal axis of travel of the chain or conveyor 1. The portion of the roller 21 above the roller 24, is made substantially level as at 25 and is provided with a raised contact element 26 which at all times engages the lower end surface 19 of the head 18 of the piston 17. This is done so that as the roller 24 in the lever 21 rides over the chain or conveyor rollers 3, the lever 21 is actuated in a substantially counterclockwise direction about the pivot point 22 resulting in the compression of the piston 17 inwardly of the body 9 against the action of the spring 20.

An inlet port 27 for the oil or other lubricant, is positioned horizontally in the body 9 and affords communication from a supply pipe 28 connected in any suitable manner to said port to the axial piston bore 10. In the present instance the relative vertical position of the inlet port 27 with respect to the device is such that when the piston 17 is not depressed by the lever 21, the upper end of said piston 17 assumes a position below the port 27, thus permitting oil to flow therefrom into the bore 10, and at the same time, is suitably positioned so that upon depression inwardly of the body of said piston 17, communication of said port 27 to the axial channel 10 is cut off to the stem of the piston. A discharge channel or port 29 extends horizontally in a direction diametrically opposite to the inlet port 27 and affords communication with the axial bore 10 to the exterior of the device. It should be noted that the relative vertical position of the port 29 is such that communication of the discharge port 29 with the axial bore 10 is normally shut off by the piston 13 when in its lowest or normal position, effected by expansion of the said spring 15, and at the same time is suitably positioned so that upon vertical upward compression movement of the piston 13 against said spring 15, communication is established between the axial bore 10 and the discharge port 29. The outer end of the discharge port 29 is finally closed by means of a thread member 30.

Discharge conduit 31 of substantially small diameter and of the character and type generally referred to as capillary tubes, are connected at each side of the discharge port 29 and extend downwardly therefrom as shown in Fig. 3, being supported by arms or brackets 32 and positioned just above and in alignment with the joints 3 of the conveyor adjacent each side of the roller 3, so that oil or other lubricant discharged therefrom will be accurately positioned on the joints in the manner shown in Figs. 1 and 3.

The usual supply tank or reservoir 33 is provided and the other end of the supply conduit 28 is secured thereto as at 34, a valve or other control means 35 being provided to permit adjustment of the quantity of lubricant permitted to pass from the reservoir 33 through the conduit 32 to the automatic oiling device A.

In operation of the device the tank or reservoir 33 is filled with oil or other lubricant and the reservoir 33 is adjusted for the proper quantity of oil desired to pass through the supply conduit 28.

The oil or lubricant passes to the oiling device by means of gravity and is also aided by suction force created by the downward stroke of the lower plunger 17, thus filling the inlet port or chamber 27 and thence intermediate the adjacent ends of the plungers 13 and 17 respectively. Upon the upward stroke of the lower plunger 17 effected by the passage of the roller 24 over the chain roller 3 and acting through the contact member or fulcrum 26, the said piston 17 shuts off communication of the inlet chamber 27 with the axial bore 10 and a column of oil or lubricant is trapped between the adjacent heads of the plungers 17 and 13 respectively. Continued upward movement or inward compression of the lower piston 17 and compression of the column of oil intermediate and the upper piston 13 acts to raise or compress the latter against the action of the spring 15, and this movement continues until the piston 13 is raised sufficiently to permit the oil thus trapped between the two plungers to be discharged into the outlet port or chamber 29, whence it is followed through the capillary tubes 31 to the joints 3 of the chain at each side of the roller 3.

In the present instance the length of the piston 13 is adjustable so that the length of the column of oil and consequently the volume thereof is trapped intermediate the adjacent heads of the plungers 13 and 17, may be varied to meet particular requirements for discharge through the capillary tubes 31 of the proper amount of oil and to enable a minimum amount to be delivered to the discharge port 29 to properly lubricate the moving parts or joints 2 with no waste of the lubricating medium.

It should be particularly noted that as the outlet port is closed by the downward movement of the piston 27 and by expansion of the spring 15, there is no leakage or discharge of oil from the capillary tubes 31 at any time other than at the instant of initial discharge of lubricant into the discharge port 29 effected by upward movement of the lower piston 17.
The device in the present instance is illustrated as applied to a specific form of chain and conveyor for the purposes of description, but it should be understood that the device may be readily applicable to chains and conveyors of numerous types and construction by merely changing the position of the capillary tubes 31 with respect to the device A so that discharge of the lubricant will be deposited in the working joints of the conveyor or chain mechanism, and certain other detail changes may be made in the construction of the actuating roller 24 and lever 21 to meet the requirements of a particular installation without departing from the spirit of the invention.

What is claimed is:

1. The combination with a conveyor chain, of a device operatively associated therewith for automatically oiling said chain, said device comprising a body portion provided with an axial bore, an inlet port and a discharge port communicating with said bore, a piston mounted in the upper end of the axial bore, the said piston in its normal position preventing communication to the discharge port, a piston mounted in the lower end of said bore and in its normal position affording communication to the axial bore from the inlet port, means operated by the conveyor to compress the last mentioned piston inwardly of the device to shut off communication to the axial bore from the inlet port and discharge oil to the discharge port of the device, and a tube or tubes of relatively small diameter having one end connected to the discharge port and the other disposed adjacent the chain to be lubricated, said tubes retaining by capillary attraction a static volume of oil and operable to intermittently discharge simultaneously a quantity of oil therefrom equal to the quantity displaced by each actuation of the piston.

2. The combination with a conveyor chain of a device operatively associated therewith for automatically oiling said chain, said device including a discharge port, piston means operable to discharge a predetermined quantity of oil to said port, and one or more tubes arranged to receive the oil displaced by said piston, said tube or tubes retaining by capillary attraction a static volume of oil and operable to intermittently discharge a quantity of oil therefrom equal to the displacement of the piston simultaneously with each actuation thereof.

3. In a device the combination with an intermittently actuated fluid pump, of one or more tubes arranged to receive the fluid displaced by said pump, said tube or tubes retaining by capillary attraction a static volume of oil and operable to discharge a quantity of oil therefrom equal to the quantity displaced by each actuation of the pump.

4. The combination with a conveyor chain of a device operatively associated therewith for automatically oiling said chain, said device including an intermittently operated pump operable to discharge a predetermined quantity of oil, and one or more tubes connected at one end to receive the oil displaced by said pump and having its other end disposed adjacent the chain to be lubricated, said tube or tubes retaining by capillary attraction a static volume of oil and operable to intermittently discharge a quantity of oil therefrom equal to the quantity displaced by each actuation of the pump.

5. The combination with a conveyor chain of a device operatively associated therewith for automatically oiling said chain, said device including a discharge port, piston means operable to discharge a predetermined quantity of oil to said port, and one or more tubes arranged to receive the oil displaced by said piston, said tube or tubes retaining by capillary attraction a static volume of oil and operable to simultaneously discharge a quantity of oil therefrom equal to the displacement of the piston simultaneously with each actuation thereof, and means adjustable at will to vary the quantity of oil displaced by said piston.

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