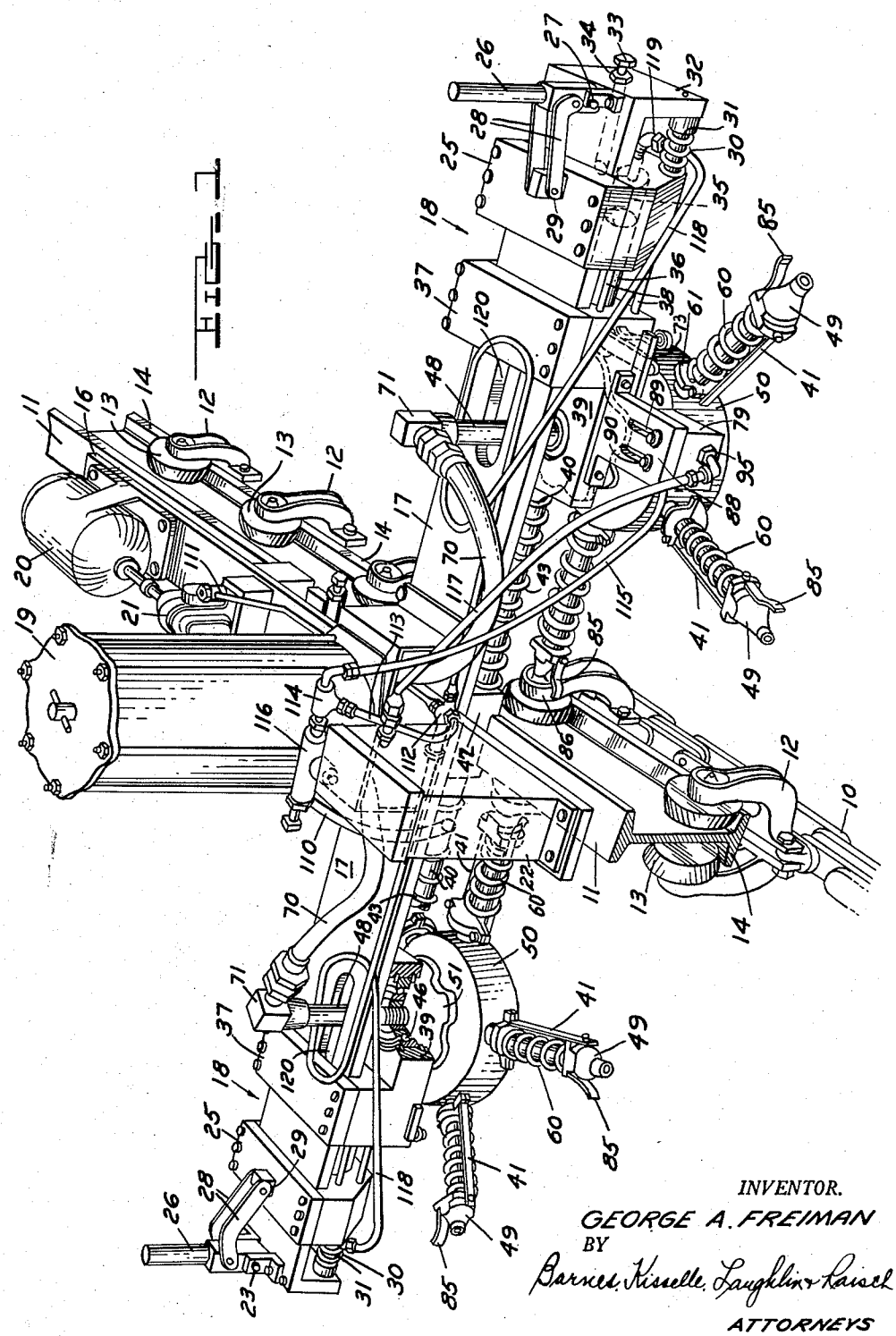
July 27, 1954 G. A. FREIMAN 2,684,733

LUBRICATING DEVICE FOR CONVEYERS

Filed Feb. 21, 1951 3 Sheets-Sheet 1



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FIG 2

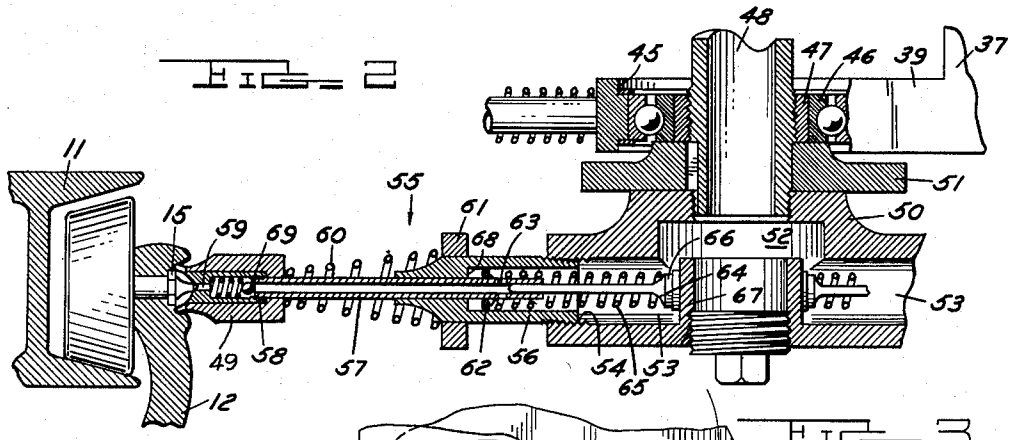


FIG 3

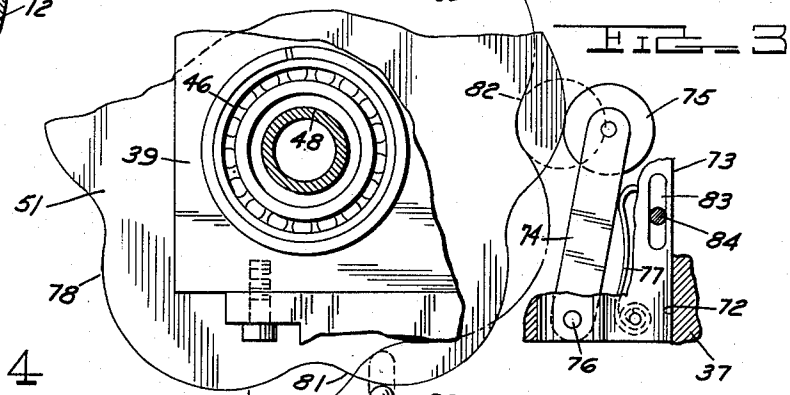
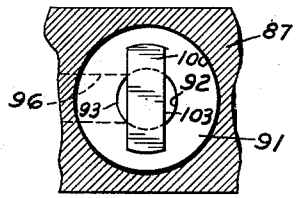


FIG 4



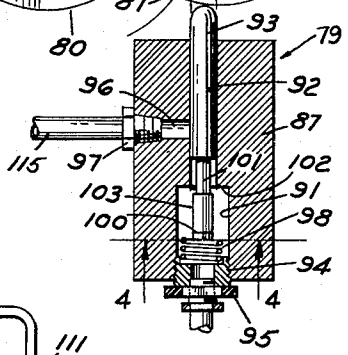
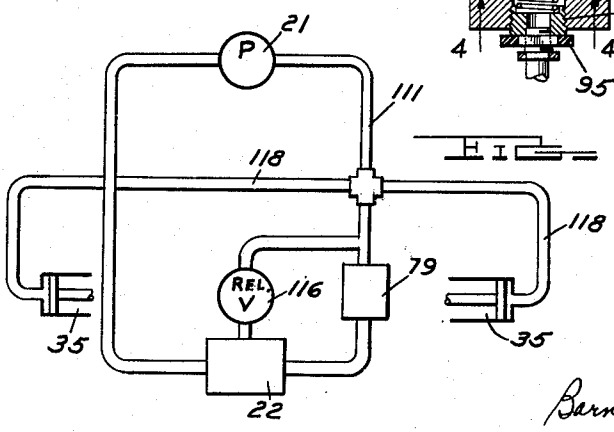


FIG 8



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LUBRICATING DEVICE FOR CONVEYERS

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FIG. 6

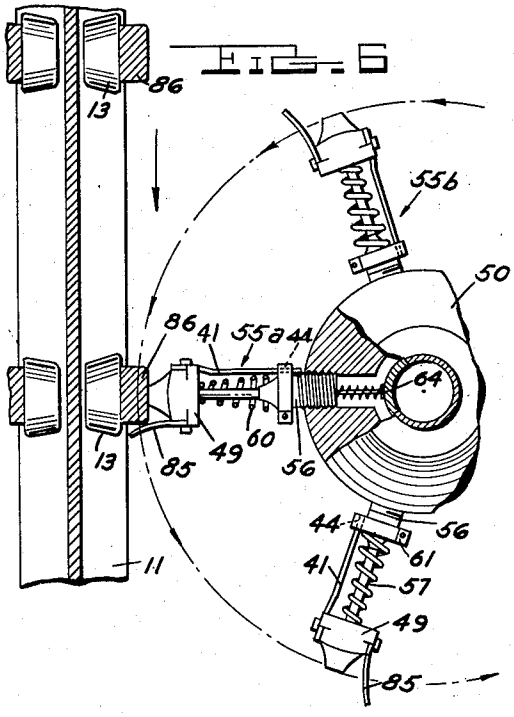


FIG. 7

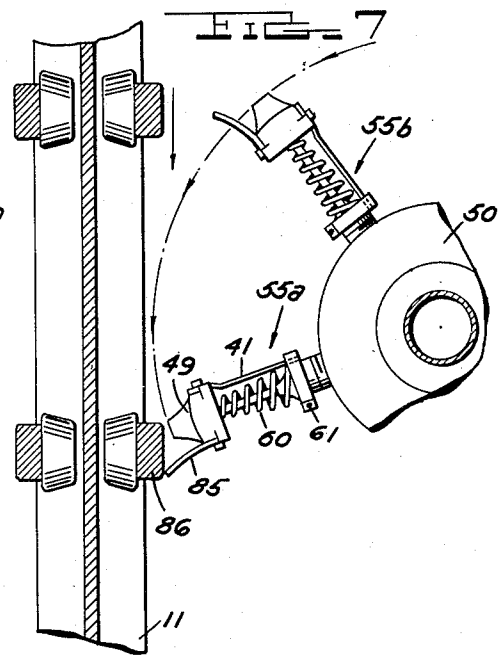
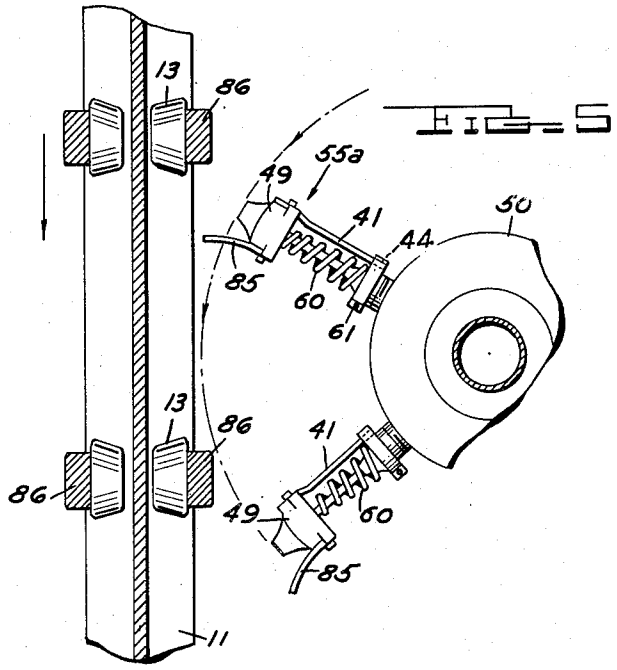


FIG. 5



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Patented July 27, 1954

2,684,733

UNITED STATES PATENT OFFICE

2,684,733

LUBRICATING DEVICE FOR CONVEYERS

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Application February 21, 1951, Serial No. 212,083

18 Claims. (Cl. 184—15)

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This invention relates to a lubricating device and more particularly to a lubricator for conveyors.

It is an object of this invention to produce a lubricator arranged to automatically apply a desired quantity of lubricant to each wheel of a conveyor as the wheels reach a lubricating station along their path of travel.

In the drawings:

Fig. 1 is a perspective view, partly in section, showing the lubricating device of this invention.

Fig. 2 is a fragmentary sectional view of the lubricating head, nozzle and conveyor.

Fig. 3 is a fragmentary view, partly in section, of the regulator valve and the adjusting means for setting the lubricating head in the desired "at rest" position.

Fig. 4 is a sectional view along the lines 4—4 in Fig. 3.

Figs. 5, 6 and 7 illustrate progressive positions assumed by the lubricating head and conveyor during the operation of lubricating the conveyor.

Fig. 8 is a diagrammatic view of the hydraulic system through which the lubricator is operated.

Referring to the drawings and particularly to Fig. 1, there is shown a conventional conveyor of the overhead type which includes a chain 10 suspended from a rail 11 by means of yokes 12 having wheels 13 journalled thereon. Rail 11 is preferably in the form of an I beam, and the wheels 13 are arranged to ride on the upper face of the lower flange 14 of beam 11. Each of the wheels 13 is provided with fittings 15 of the ball-check type for lubricating. It will be understood, of course, that at some point along the rail 11 a mechanism (not shown) is provided for driving the conveyor at the desired speed.

The present invention contemplates a device for automatically injecting a desired quantity of lubricant into the fittings 15 as each wheel passes a lubricating station at some point along the rail 11. The device includes a supporting plate 16 arranged to be positioned on a straight portion of rail 11, a support 17 which extends transversely beneath plate 16 and overhangs on opposite sides of rail 11, a pair of lubricating units 18 slidably supported on transverse support 17 on opposite sides of the rail 11, a lubricant reservoir 19, and a hydraulic mechanism including a motor 20, a liquid pump 21, and a liquid reservoir 22.

The apparatus on support 17 on the one side of rail 11 is substantially the same, except for the provision of a regulating valve described hereinafter, as the lubricating apparatus on the other side of the rail and therefore the apparatus

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on only one side will be described in detail. The lubricating units 18 each comprise a casing 25 slidably supported on the transverse slide 17. A handle 26 pivoted adjacent the end of support 17 as at 27 has a toggle connection with links 28 which are pivoted at their other ends to casing 25 as at 29. This toggle arrangement enables sliding casing 25 on support 17 to and from the operative position illustrated in Fig. 1. Casing 25 is normally biased to the operating position by coiled compression springs 30 supported on pilot pins 31 which are fixedly mounted on the depending portion 32 at each end of support 17 and which have a sliding fit with the casing 25. The action of springs 30 is opposed by an adjusting screw 33 which extends freely through the depending portion 32 of support 17 and threads into the outer face of casing 25. An adjusting nut 34 on screw 33 may be threaded in either one direction or the other to vary the position of casing 25 when under the influence of springs 30. Adjusting nut 34 engages against the outer face of depending portion 32. Casing 25 is formed with a fluid cylinder 35 in which there is slidably arranged a plunger 36. Plunger 36 is fixed on a base 37 slidably arranged on support 17. At one side base 37 is provided with pilot pins 38 which are slidably received by casing 25, and on the other side base 37 is provided with an integral lateral extension 39. A stop in the form of a rod 40 projects from a block 42 on which support 17 is fixedly arranged. Stop 40 limits the movement of base 37 in a direction towards rail 11. A coiled compression spring 43 surrounds rod 40 and acts between extension 39 and block 42 to bias base 37 in a direction away from rail 11. Spring 43 urges plunger 36 in a direction inwardly of cylinder 35. Spring 43 is weaker than spring 30.

Lateral extension 39 has a central bearing socket 45 in which is fitted a ball bearing 46. Within the inner race of bearing 46 is press fitted a bushing 47 into which is threaded a lubricant supply pipe 48. At its lower end supply pipe 48 is threaded to receive a circular head member 50. A cam plate 51 is keyed to supply pipe 48 and arranged between bearing 46 and head 50 so as to rotate with head 50. Head 50 is fashioned with a hollow central chamber 52 which communicates with a plurality of radial passages 53 which extend to the outer surface of head 50 and provide threaded sockets 54. Lubricating nozzles 55 are threadedly engaged in sockets 54 and are spaced equally around the circumference of head 50.

Each lubricating nozzle 55 includes a hollow

body part 56 (Fig. 2) which slidably receives a tubular extension 57 to the outer end of which is threaded a ball check lubricating fitting 58. A nose member 49 surrounds fitting 58 and is slidable on extension 57 in a direction towards body 56. Fitting 58 is provided with an orifice 59 through which, when the fitting engages with the conveyor fitting 15, lubricant is adapted to be injected into fitting 15. A spring 60 acts between nose 49 and a collar 61 on body 56 to bias tubular extension 57 and fitting 58 in a direction outwardly of the nozzle body 56. On the portion of extension 57 within body 56 there is secured a washer 62 which limits the movement of extension 57 in a direction outwardly of body 56. Extension 57 is transversely apertured as at 63, and a plunger or valve 64 is slidably arranged within the inner end of extension 57. A spring 65, acting between washer 62 and the head 66 of valve 64, biases valve 64 radially inwardly against the central stop 67 on head 50. Apertures 63 are positioned so that, when extension 57 is extended to its outermost position wherein the washer 62 engages against the stop face 68 of body 56, apertures 63 are open, that is, the end of valve 64 is disposed radially inwardly of these apertures. With the valve in this position, it will be noted that lubricant from pipe 48 may be forced through passage 53 and apertures 63 into extension 57 to fill that portion of the extension between the ball check 69 and the inner end of valve 64. It will also be noted that, when valve 64 and extension 57 are moved relatively towards each other, valve 64 closes apertures 63 and forces the lubricant within extension 57 past ball check 69 and into fitting 15.

Lubricant is supplied to pipe 48 from reservoir 19 which is connected with pipe 48 by a rubber hose 70 and a swivel coupling 71. Suitable means (not shown) are arranged within reservoir 19 for maintaining a continuous pressure on the lubricant so as to insure a continuous filling of the passage within extension 57 with lubricant.

The bottom face of base 37 is fashioned with a guideway 72 in which a plate 73 is slidable. An arm 74 provided with a roller 75 at the free end thereof is pivoted on the underside of plate 73 as at 76. Arm 74 is biased by a leaf spring 77 such that roller 75 engages the cam surface 78 of cam plate 51. Cam surface 78 is formed as a plurality of humps 80 separated by troughs 81 of a size such as to be snugly engaged by roller 75. The humps 80 correspond in number with the nozzles 55 and are spaced equally around the circumference of cam plate 51. The action of spring 77 is such that roller 75 serves to rotate cam plate 51 and the head member 50 to a position at rest wherein the roller 75 is disposed at the base of one of the troughs 81 such as is indicated in dotted lines 82 in Fig. 3. A slot 83 in plate 73 through which a screw 84 extends enables shifting the plate 73 in a direction longitudinally of guideway 72 so that the plate can be locked in various positions of adjustment to thereby effect various adjustments in the "at rest" position of cam plate 51 and head 50.

The importance of the above adjustment can be best appreciated from the consideration of Figs. 5 through 7 wherein it will be seen that each nozzle is provided with an extending lug 85 on the nose 49 thereof. A guide bar 41 is also fixed on nose 49. Bar 41 extends radially inwardly and slidably engages a slot 44 in collar 61 to prevent turning of nose 49. The lug 85 is disposed such as to be engaged by the hub 86 of the yoke 12 when the lubricator is set properly so that, as each wheel approaches the lubricator, the hub 86 engages the lug 85 to rotate the nozzle 55 and the head 50 to a lubricating position. In order to obtain engagement between the lug 85 and the hub 86, it is necessary to position the cam plate in the "at rest" position such that the lug 85 lies in the path of movement of hub 86. This adjustment is obtained by shifting plate 73 in either one direction or the other on base 37 so that in the "at rest" position of head 50 (Fig. 5) one nozzle 55*a* is disposed to present lug 85 as an obstruction to the hub 86 when the conveyor is moving in the direction indicated by the arrow. As the hub 86 moves into engagement with the lug 85, the nozzle 55*a* revolves in a counterclockwise direction as viewed in Fig. 5 to seat fitting 58 upon conveyor fitting 15; and the orifice 59 is aligned with the lubricant check valve on fitting 15. The hub 86 on the conveyor carries the nozzle 55 to the dead center (Fig. 6) and then continues to the position shown in Fig. 7 wherein the lug 85 disengages the hub 86. However, when this position is reached, the roller 75 is disposed on one of the inclines of a trough 81 and the action of spring 77 causes the head to continue to rotate in a counterclockwise direction to position the next adjacent nozzle 55*b* in the position occupied by nozzle 55*a* in Fig. 5 where it is arranged to be engaged by the hub 86.

For controlling the injection of lubricant during the desired time interval, there is provided a single regulating valve 79 for both heads 18. Valve 79 has a body 87 mounted on extension 39 by a bracket 88 which is provided with a pair of elongated slots 89 through which screws 90 extend and threadedly engage body 87 for adjusting the position of valve 79 relative to cam plate 51. Valve body 87 has a central bore 91 which is reduced as at 92 to form a cylindrical passage in which a plunger 93 is axially movable. Bore 91 is threaded as at 94 to receive an outlet fitting 95 and passage 92 is intersected by a passage 96 which is threaded to receive an inlet fitting 97. A spring 98 is arranged to bias plunger 93 in a direction outwardly of passage 92, and the outer end of plunger 93 is arranged to engage the cam surface 78 of cam plate 51. Spring 98 acts between outlet fitting 95 and the head 100 of plunger 93. Plunger 93 is formed with a circumferential groove 101. Spring 98 normally tends to bias plunger 93 outwardly to a position wherein the head 100 engages against the shoulder 102 in which position the annular groove 101 registers with the inlet passage 96. The rear end portion of the plunger has side flat faces 103 so that, when the groove 101 is in alignment with passage 96, fluid is permitted to flow through passage 96, around the flat faces 103 of plunger 93, into the enlarged bore 91, and out of the valve through outlet fitting 95. When the cam plate 51 is rotated, it will be noted that plunger 93 is shifted by the cam humps 80 inwardly of valve body 87 to thereby close inlet passage 96. It will also be noted that the slots 89 and screws 90 permit adjustment of the valve body 87 to vary the point at which plunger 93 closes passage 96.

The liquid pump 21 is driven by motor 20 and is provided with intake and outlet conduits 110 and 111, respectively. Outlet conduit 111 is provided at the end thereof with a four-way fitting

112 to which is connected a short conduit 113 having a T fitting 114 at the end thereof. One branch of T fitting 114 is connected to the inlet fitting 97 of valve 79 by a conduit 115 and the other branch of fitting 114 communicates with the liquid reservoir 22 through a pressure relief valve 116. The outlet fitting 95 on valve 79 is connected by a conduit 117 with reservoir 22. The other two branches of four-way fitting 112 are connected one each by conduits 118 with inlet fittings 119 on casing 25 which communicate with cylinder 35.

When it is desired to set the lubricator in operation, motor 20 is started and handles 26 are released so that the heads 18 are disposed in the operative position. Before the lubricator is actually ready for automatic operation, various adjustments must be made to obtain the desired lubrication. In the first place, the proper "at rest" position (Fig. 5) of the nozzles must be determined for the particular conveyor on which the lubricator is used. As was mentioned previously, the desired "at rest" position is obtained by adjusting plate 73 on base block 37. After the proper "at rest" position is obtained, the stroke of the nozzle is adjusted by turning adjusting nut 34 on screw 33. It will be noted that, when nut 34 is turned in one direction, the lubricator head 18 is biased by the springs 30 in a direction toward the center rail 11, and when the adjusting nut 34 is turned in the opposite direction, the head assembly 18 is moved in a direction away from center rail 11 against the tension of springs 30. Spring 43, of course, normally biases head 50 into a position abutting casing 25 so that head 50 and casing 25 are in effect moved as a unit by adjustment of nut 34. Since the stroke of the nozzle depends upon the extent to which the tubular extension 57 is moved radially inwardly of the relatively fixed valve stem 64, it will be appreciated that the amount of grease discharged from the nozzle can be varied within limits by shifting the heads 18 towards and away from the center rail 11.

Another adjustment that may be necessary is with respect to valve 79. The time element involved in building up the pressure in cylinder 35 requires a different setting of valve 79 for a fast moving conveyor as compared with a conveyor that is moving relatively slow. With a relatively rapidly moving conveyor, I have found it desirable to close valve 79 and thereby build up pressure in cylinder 35 at an earlier point in the rotation of head 50 than when the conveyor is moving at a relatively slow rate. For instance, I have found that with a relatively fast moving conveyor proper lubrication is obtained if valve 79 is adjusted to close when the operative lubricating nozzle 55 reaches a position in its rotative movement approximately 15° from dead center. When the conveyor is moving rather slowly, the pressure in cylinders 35 is permitted to build up over a longer period of time, and I have found that best results are then obtained by adjusting valve 79 such that the valve closes when the operative nozzles are from about 10° to 12° off dead center. Valve 79 is adjusted, of course, by shifting the valve in slots 89 toward and away from cam plate 51 so that the distance through which plunger 93 must move in order to close or open passage 96 is varied in accordance with the operating characteristics desired. When these adjustments are made, the lubricator is in condition for automatic operation.

As the conveyor moves in the direction indicated by the arrow in Fig. 5, the hub 86 moves into engagement with the lug 85 on the operative nozzle 55a and rotates the nozzle from the position shown in Fig. 5 to that shown in Fig. 6. As the nozzle rotates, it will be observed that extension 57 moves slightly inwardly of head 50, and in so doing, the apertures 63 are closed by the end of valve 64. The extent to which extension 57 is moved inwardly in rotating from the position shown in Fig. 5 to that shown in Fig. 6 is not, however, sufficient to provide adequate lubrication for the journals of wheels 13. This is especially true of conveyors of the type illustrated wherein the lubricant fitting 15 is disposed within a recessed hub 86 of the conveyor yoke 12. However, as the nozzles 55 rotate in the counterclockwise direction as viewed in Figs. 5 and 6, a point is reached between two positions illustrated wherein plunger 93 is moved by one of the cam humps 80 inwardly a distance sufficient to close inlet passage 96. When this occurs, the liquid from the pump is directed through conduits 111, fitting 112 and conduits 118 to the cylinders 35 in each of the casings 25. The liquid admitted to these cylinders causes the plungers or pistons 36 to move outwardly of the cylinders or in a direction towards center rail 11. Therefore the heads 50 move under the influence of the liquid pressure in cylinders 35 in a direction towards each other. Referring to Fig. 2, it will be seen that when the heads 50 move in a direction towards the center rail 11, the valve 64 is moved to the left through the passage within the extension 57 to discharge lubricant through orifice 59 and into fitting 15.

The hub 86 at each side of the conveyor continues to carry with it the operative nozzle until a point is reached in the rotation of the nozzle wherein the hub disengages the lug 85. When this position is reached (Fig. 7), the roller 75 is disposed along the leading inclined edge of one of the troughs 81, and by reason of spring 77, continues to rotate head 50 until the "at rest" position (Fig. 5) is reached, that is, to a position wherein the roller 75 is disposed at the base of the trough 81. However, as the nozzle rotates from the position shown in Fig. 6 to that shown in Fig. 7, plunger 93, at the same time, rides along the leading inclined edge of another trough 81 to open valve 79 and thereby relieve the pressure in cylinders 35 when the nozzle reaches the position illustrated in Fig. 7. The head 50 is thereby moved outwardly away from center rail 11 under the influence of spring 43 and plunger 36 moves towards the inner end of cylinders 35.

It will be noted that support 17 is slotted as at 120 to accommodate the shifting of supply pipe 48 which is fixed to head 50. At the same time, it will be observed that the nose member 49 and tubular extension 57 move under the influence of spring 50 outwardly of body 58. As extension 57 moves outwardly apertures 63 move clear of the end of valve 64 and the lubricant under pressure in pipe 48 and chamber 52 is admitted to the passage within the extension 57 through these apertures. The nozzles are thereby automatically filled with lubricant after each lubricating sequence.

It will be noted that the head assembly 18 is, by reason of springs 30 and 43, floatingly mounted on support 17. I have found that this method of mounting the head assembly is very desirable, since it reduces and practically eliminates nozzle breakage which would ordinarily arise if the head assembly were rigidly mounted on the sup-

port. It frequently happens that yokes 12 or fittings 15 on conveyors are bent or out of alignment so that perfect engagement between the nose member 58 and the lubricating fitting 15 is prevented. By arranging the springs 30 such that the whole lubricator assembly 18 is movable in a direction away from the center rail to compress these springs, I have found that regardless of the condition of yokes or the lubricating fittings on the conveyor the lubricator does not jam and the nozzles are not broken or bent.

I have also found that the provision of hydraulic actuation of the head 50 coupled with the adjustment provided for the regulating valve 59 and the indexing spring biased lever 74 accommodates the lubricator for use with various types of conveyors and enables adjusting the lubricator in accordance with the speed of the conveyor.

Another feature which is highly desirable resides in the provision of a lubricating head assembly which is shiftable by the hand lever 26 into and out of operative position without in any way affecting the various adjustments which have been made.

Although the lubricator has been described with reference to a hydraulic actuating mechanism, it will be appreciated that it can be operated by means of air as well as liquid. Hydraulic actuation is preferred because of the incompressibility of liquid as compared with air, but I have found that the lubricator will operate satisfactorily by using air pressure instead of liquid pressure. When operated pneumatically, the motor 20, pump 21 and reservoir 22 are, of course, eliminated and replaced by a source of air under pressure, not shown. Likewise, the regulator valve 79 is replaced by an air valve arranged, when actuated, by the cam plate 51 to apply air pressure to the cylinders 35.

I claim:

1. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support adapted to be positioned adjacent the conveyor to be lubricated, a rotatable head on said support movable in a direction towards and away from the conveyor, a plurality of radially arranged nozzles on said head, means for filling said nozzles with lubricant, said nozzles having a nose portion movable relative to said head and engageable with the lubricant fitting on the conveyor, plungers in said head and movable therewith to discharge lubricant from said nozzles when moved in a direction towards said conveyor, and means actuated by the rotation of said head for moving said head in a direction towards the conveyor when each nozzle is moved to a position wherein the nose portion engages the lubricant fitting on the conveyor which is traveling past said head.

2. The combination set forth in claim 1 including spring means biasing said head in a direction away from the conveyor.

3. The combination set forth in claim 1 wherein said head and said support are operatively connected by a plunger on one of said members and a cylinder on the other member in which said plunger is movable to move said head in a direction toward said conveyor, said plunger and cylinder comprising said last mentioned means and including means for admitting fluid under pressure to said cylinder when each nozzle is positioned in engagement with a lubricant fitting on said conveyor.

4. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support adapted to be positioned adjacent the conveyor, a rotatable head on said support provided with a plurality of radially arranged nozzles, said head being shiftable on said support in opposite directions transversely of said conveyor, means for rotating said head to successively rotate each nozzle to a lubricating station wherein the nozzle engages the lubricating fitting on the conveyor which is traveling past said support, and means actuated by the rotation of said head for moving said head toward said conveyor as each nozzle is rotated to said lubricating station.

5. The combination set forth in claim 4 wherein said nozzle includes a member movable with said head and a second member movable relative to said head, said nozzle members being adapted when moved relative to each other to discharge lubricant from said nozzle, said nozzle members being moved relative to each other when said head is moved toward said conveyor with a nozzle engaging a lubricant fitting on the conveyor.

6. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support adapted to be positioned adjacent the conveyor, a rotatable head on said support, a plurality of nozzles on said head arranged radially in the plane of rotation of said head, said head being rotatable to successively position each nozzle in an operative position wherein the nozzle is engaged by the portion of the conveyor passing the support to thereby rotate said head, indexing means rotatably biasing said head to successively position each nozzle in said operative position, and means for adjusting said indexing means for varying said operative position of said nozzles.

7. The combination set forth in claim 6 wherein said indexing means includes a cam plate movable with said head and having a plurality of cam surfaces thereon corresponding in number with said nozzles and including a spring biased cam follower acting on said cam surfaces and adjustably mounted on said support.

8. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support adapted to be positioned adjacent the conveyor, a rotatable head on said support, a plurality of nozzles on said head arranged radially in the plane of rotation of said head, said head being rotatable to successively position each nozzle in an operative position wherein the nozzle is engaged by the portion of the conveyor passing the support to thereby rotate said head, indexing means rotatably biasing said head to successively position each nozzle in said operative position, said indexing means including a cam plate movable with said head and having a plurality of cam surfaces thereon corresponding in number with said nozzles and also including a spring biased cam follower acting on said cam surfaces, means for moving said head on said support in a direction towards said conveyor as each nozzle moves to said operative position, and an actuating member for said last mentioned means, said actuating member comprising a cam follower positioned to engage the cam surfaces on said cam plate.

9. The combination set forth in claim 8 wherein said means for moving said head toward said conveyor comprises a cylinder and a piston movable in said cylinder to move said head toward said conveyor, said last mentioned cam follower comprising a valve for admitting liquid to said

cylinder as each nozzle rotates to said operative position.

10. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support adapted to be positioned adjacent the path of travel of the conveyor, a rotatable head on said support having a plurality of nozzles arranged radially in the plane of rotation of said head, said head being rotatable to successively position each nozzle in engagement with the lubricant fitting on the conveyor which is traveling past said support, actuating means on said support for moving said head on said support toward the conveyor in response to movement of each nozzle into engagement with a fitting on the conveyor, means responsive to the movement of said head towards the conveyor for discharging lubricant from said nozzle, said actuating means being movable on said support, and spring means acting between said support and said actuating means for yieldably resisting movement of said actuating means in a direction away from the conveyor when the actuating means move said head towards the conveyor.

11. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a main support adapted to be positioned at a point adjacent the path of travel of said conveyor, a rotatable head on said support having a plurality of nozzles arranged radially in the plane of rotation of said head, said head being rotatable to successively position each nozzle in an operative position in which the nozzle is arranged to be engaged by the lubricant fitting on the conveyor which is traveling past said head, means for rotating said head to said operative position, an auxiliary support mounted on said main support for movement toward and away from said conveyor, means responsive to rotation of said head and acting between said auxiliary support and said head for moving said head toward said conveyor as each nozzle moves into said operative position, means for discharging lubricant from said nozzle when the nozzle is engaged by a fitting on the conveyor and said head is moved toward the conveyor, and spring means acting between said auxiliary support and said main support for yieldably resisting movement of said auxiliary support in a direction away from said conveyor.

12. The combination set forth in claim 11 including spring means acting between said main support and said head and tending to move said head in a direction away from said conveyor.

13. The combination set forth in claim 11 including spring means normally biasing said head in a direction away from said conveyor, said last mentioned spring means being weaker than said first mentioned spring means.

14. The combination set forth in claim 13 including means for positively moving said auxiliary support in a direction away from said conveyor whereby said second mentioned spring means move said head in the direction away from the conveyor to an inoperative position wherein the nozzles are not engageable by the fittings on said conveyor.

15. The combination set forth in claim 13 wherein the lubricant discharged from said nozzles varies in accordance with the extent to which said head is moved toward said conveyor and including stop means for limiting the movement of said head in a direction toward the conveyor to a predetermined position and means for adjustably moving said auxiliary support in a direction toward and away from the conveyor whereby to adjust the extent to which said head is moved in a direction toward said conveyor as each nozzle moves into said operative position.

16. Apparatus for lubricating a moving conveyor provided with lubricating fittings comprising a support, a rotatable head on said support having a plurality of nozzles arranged radially in the plane of rotation of said head, said head being rotatable to successively position each nozzle in a predetermined angular position relative to the path of travel of the conveyor wherein the nozzle is disposed such as to be engaged by a fitting on the moving conveyor and rotated by the fitting as it travels past the head, said head being movable on said support in a direction toward and away from the conveyor, means for moving said head on said support in a direction towards the conveyor, a fixed stop on said support for limiting the movement of said head towards the conveyor, spring means biasing said head in a direction away from the conveyor, an adjustable stop member on said support for limiting the movement of said head in a direction away from the conveyor, and means for discharging lubricant from each nozzle as the nozzle moves into engagement with a fitting on the conveyor in an amount proportional to the extent of movement of said head toward said conveyor.

17. The combination set forth in claim 16 including spring means for indexing said head such that said nozzles successively assume said predetermined angular position relative to the path of travel of said conveyor.

18. The combination set forth in claim 17 including means for adjusting said indexing means to vary said predetermined angular position of said nozzles.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,628,512	Petersen	May 10, 1927
1,933,464	West et al.	Oct. 31, 1933
2,030,533	Pate	Feb. 11, 1936

FOREIGN PATENTS

Number	Country	Date
397,855	Great Britain	Aug. 29, 1933
440,518	Great Britain	Jan. 1, 1936