No. 854,964. PATENTED MAY 28, 1907.

L. C. POND & G. C. WAGNER.

WINDMILL OILER.

APPLICATION FILED MAY 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

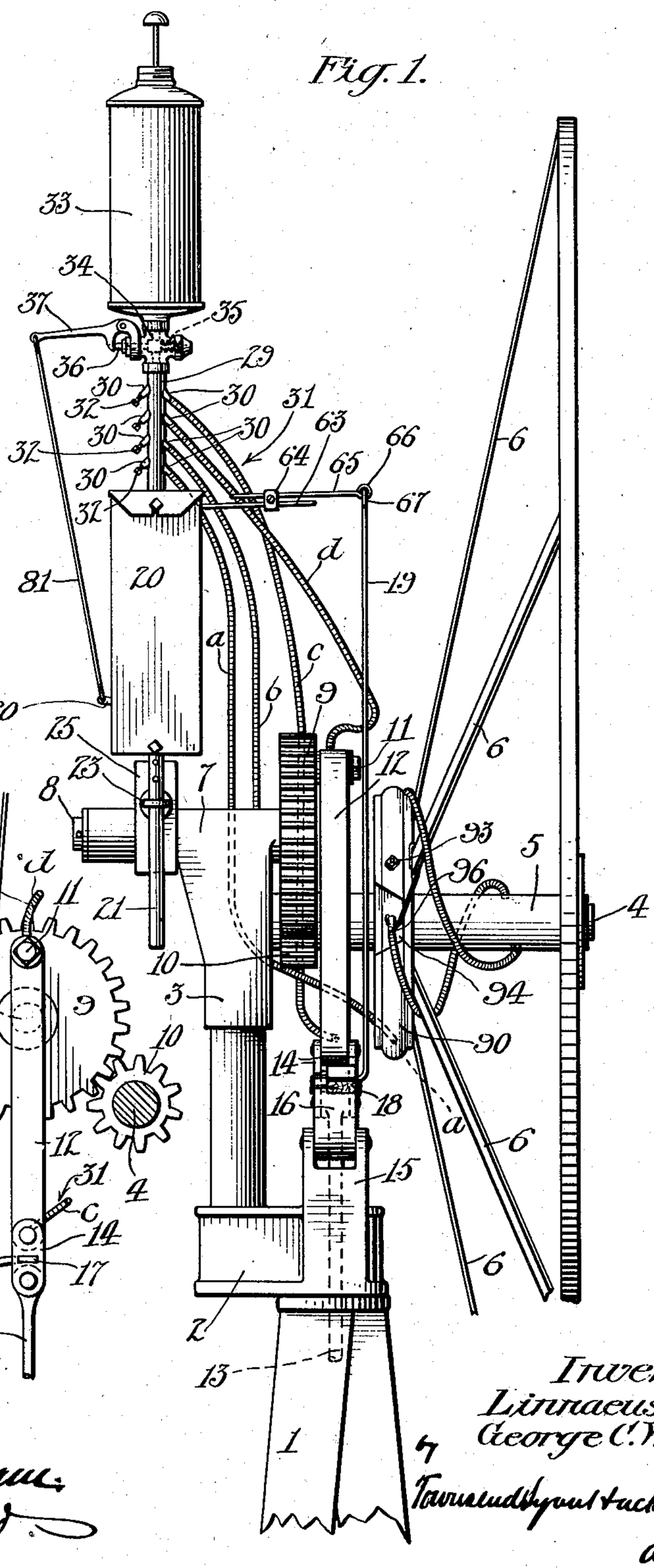

Fig. 7.

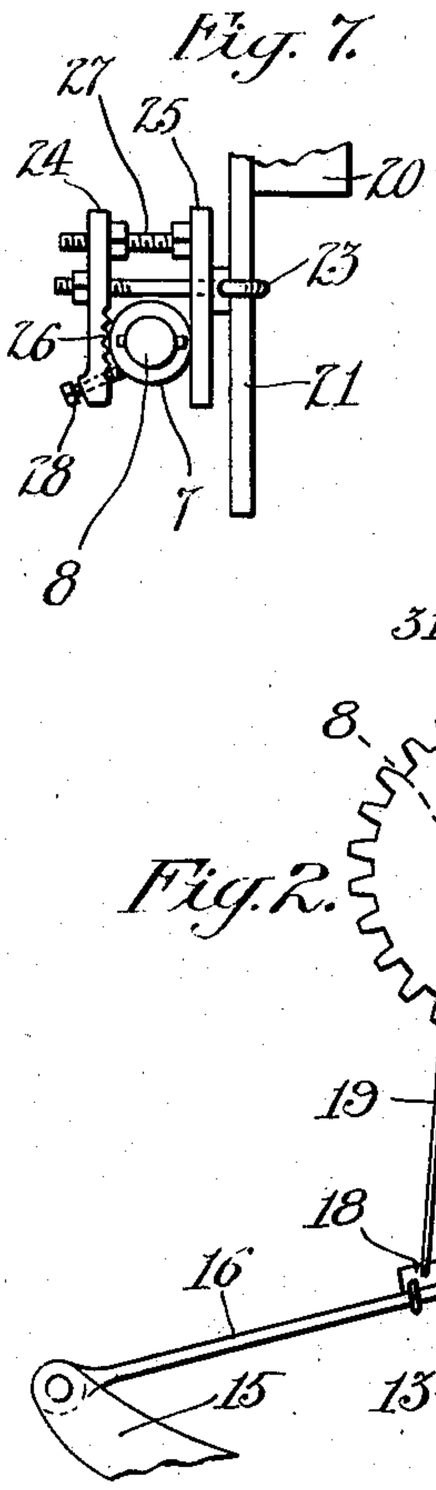

Fig. 2.

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2 SHEETS-SHEET 2.

Fig. 3.

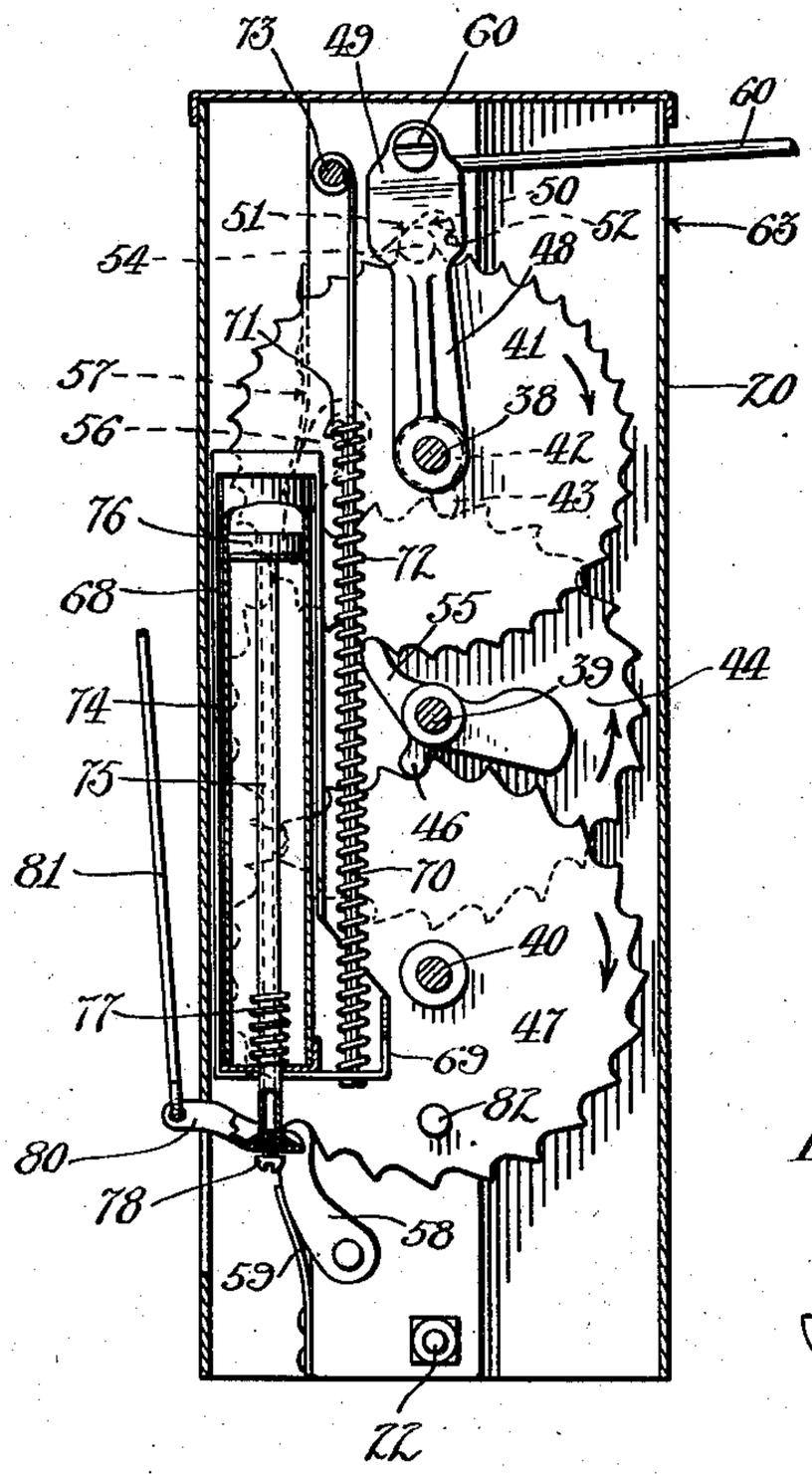


Fig. 4.

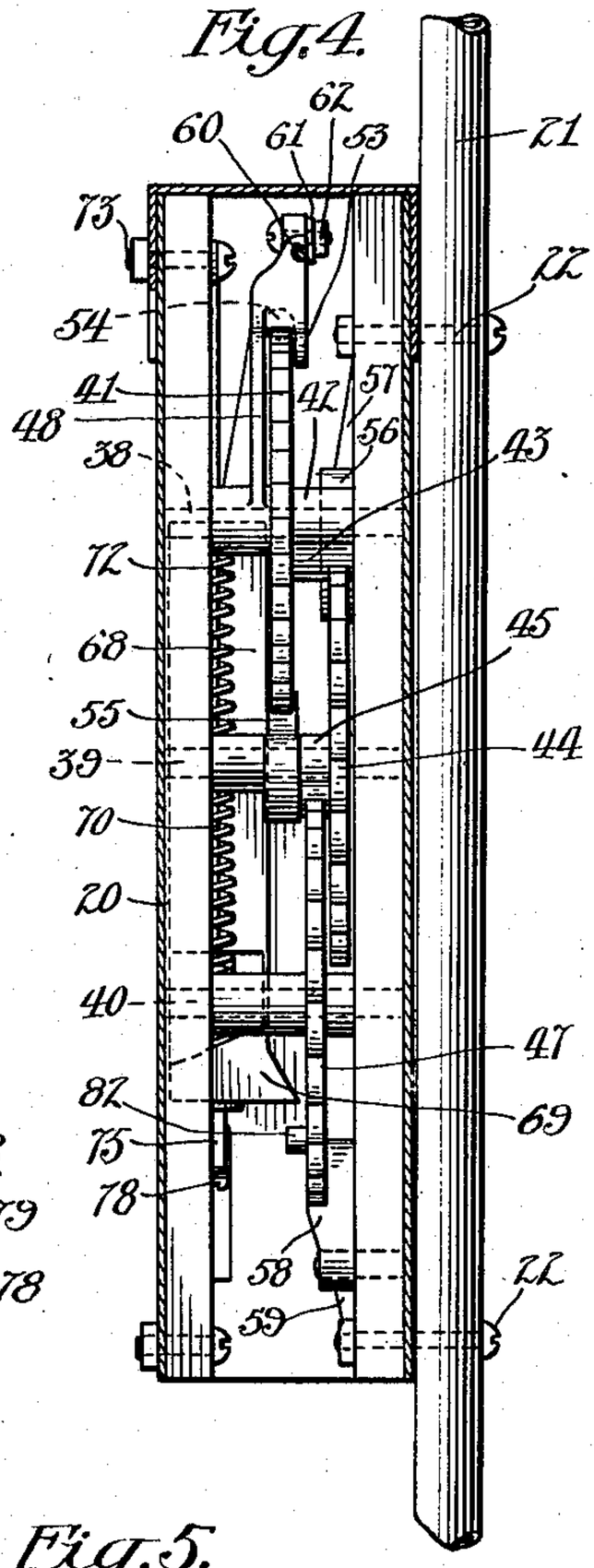


Fig. 8.

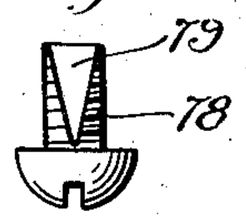


Fig. 6.

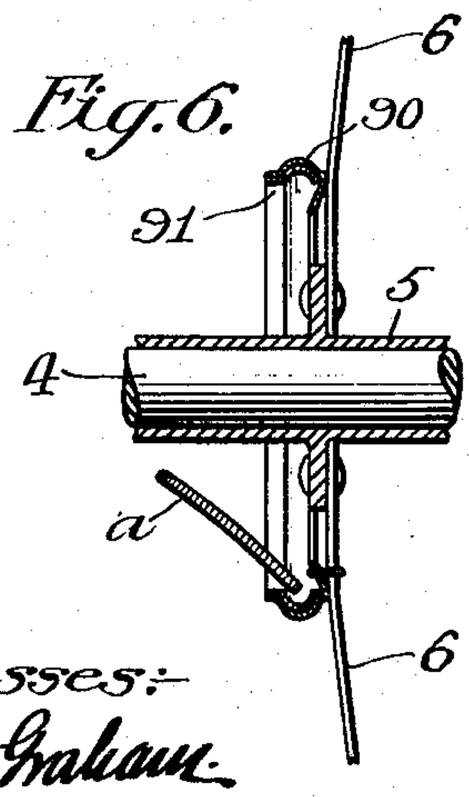
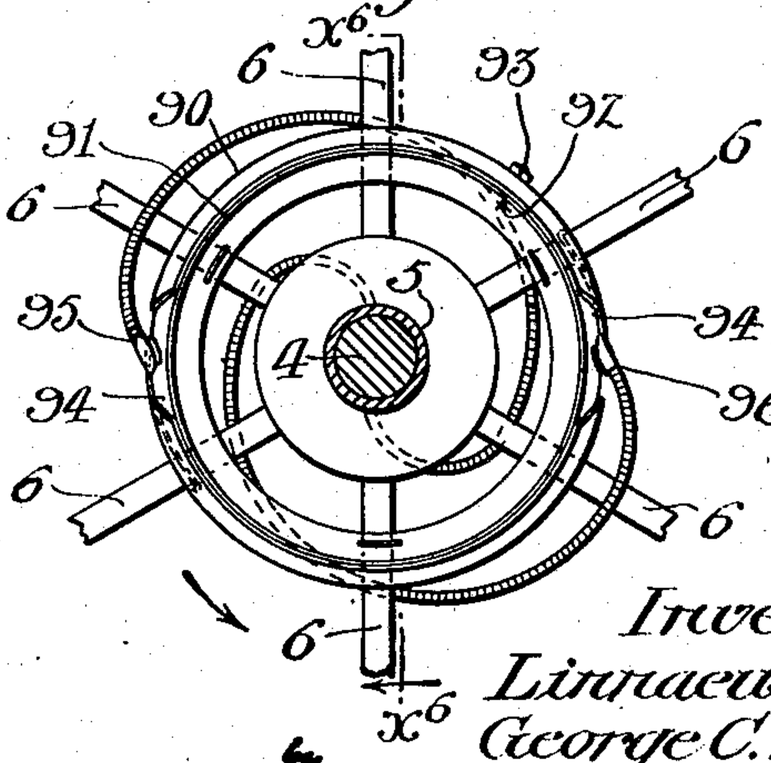


Fig. 5.



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UNITED STATES PATENT OFFICE.

LINNAEUS C. POND AND GEORGE C. WAGNER, OF LOS ANGELES, CALIFORNIA.

WINDMILL-OILER.

No. 854,964. Specification of Letters Patent. Patented May 28, 1907.

Application filed May 12, 1906. Serial No. 316,575.

To all whom it may concern:

Be it known that we, LINNAEUS C. POND and GEORGE C. WAGNER, both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Windmill-Oilers, of which the following is a specification.

In a former patent issued on March 16, 1897, to Linnaeus C. Pond, No. 579,008, is shown a distributer for lubricating the bearings of a windmill, the oil being delivered to the distributer from a reservoir from time to time by suitable valve means which was operated by hand from the ground.

The object of the present invention is to provide for automatically delivering oil periodically from the reservoir to the distributer.

A further object is to cause the oil to be delivered from the reservoir to the distributer at such periods as will properly lubricate the bearings, the delivery periods being automatically determined by the number of revolutions of the windmill, thereby securing just the amount of oil required according to the actual operation of the windmill.

The delivery of oil from the reservoir to the distributer is controlled by a valve mechanism, and a further object is to provide means whereby when a relatively thick or heavy oil is being used the valve mechanism will automatically keep the valve open for a relatively longer time than when a relatively light oil is being used, in order to give the heavy oil the longer time requisite for its relatively sluggish flow from the reservoir to the distributer.

Another object is to provide a device whereby oil may be conveyed from the stationary distributer to the rotating hub or sleeve of the wheel.

Another object is to provide a flexible oil distributing pipe which has extreme durability.

Another object is to provide for automatically positively closing the valve after it has been opened, even though the wind wheel is not operating.

The accompanying drawings illustrate the invention, and referring thereto:—Figure 1 is a side elevation of the upper part of a windmill, showing the complete apparatus forming the invention. Fig. 2 is a detail view of the gearing and adjacent parts which operate the timing mechanism. Fig. 3 is a vertical sectional view, enlarged, through the case of the timing mechanism showing the interior construction. Part of the pneumatic valve retarding mechanism is broken away to show the interior. Fig. 4 is a view similar to Fig. 3 taken at right angles to said view. Fig. 5 is a side elevation of the wheel oiling device. Fig. 6 is a sectional view on line x^6—x^6 Fig. 5. Fig. 7 is a detail view of the clamping device which supports the timing mechanism, reservoir, and distributer. Fig. 8 is a side elevation of the air regulating screw.

1 designates the upper part of the windmill tower upon which is revolubly mounted a head 2. The head 2 has a vertical arm 3 which supports a wheel spindle 4, upon which is mounted the sleeve or hub 5 of the wheel frame 6. The arm 3 has a journal 7 in which a shaft 8 is mounted carrying a gear 9 which meshes with a pinion 10 mounted on the spindle 4. The gear 9 carries a crank pin 11 which operates the pitman 12, to which the pump rod 13 is connected by links 14. The head 2 has an arm 15 to which is pivoted a rock lever 16. The end of the arm 16 has lugs 17 which project into slots in links 14. Fastened to the rock arm 16 is a block 18 to which is connected the lower end of a link 19.

20 designates the case of a timing mechanism which is fastened to a vertical rod 21 by bolts 22, as shown in Fig. 4. The rod 21 passes through an eye bolt 23, as shown in Figs. 1 and 7, and is clamped in position thereby. The eye bolt 23 is supported by a clamping frame comprising two plates 24 and 25. The plates 24 and 25 are arranged on opposite sides of the journal 7, the plate 24 having teeth 26, which bite the metal of the journal, the lower ends of the plates 24 and 25 being forced tightly against opposite faces of the journal 7, by means of a threaded stud 27 arranged above the eye bolt 23. The plate 24 may also be provided with a set screw 28, to positively lock the clamp on the journal 7.

The rod 21 may comprise a pipe, as shown, and its upper end or that portion which lies above the casing 20 of the timing mechanism is constructed to form a distributer 29. A distributer of this type forms part of the subject matter of the patent above referred to and therefore will only be described

briefly. The distributer 29 is provided with a number of discharge openings having nipples 30, which are located at definite levels. Connected to some of the nipples are oil pipes 31, which convey the oil from the distributer to the bearings to be lubricated. In the present case there are four bearings to be lubricated and consequently only four pipes 31 are employed, therefore the other nipples 30 may be closed by plugs 32. Connected to the upper end of the distributer 29 is a reservoir 33, while a valve 34 is arranged between the reservoir 33 and the discharge points of the distributer. The valve 34 is normally held closed by a spring 35, and has a stem 36 adapted to coact with a lever 37 to open the valve when the lever 37 is depressed.

As the discharge openings of the distributer are located at different levels, so that the surface of the lubricant passes them in succession, the supply of lubricant is cut off from them in succession, the quantity of oil which escapes through the discharge openings varies in proportion to their relative elevation; thus the oil pipe *q*, which supplies the wind wheel bearing which requires the greatest quantity of oil, is connected with the lowest nipple of the distributer, the pipe for supplying the bearing requiring the least amount of oil is connected with the highest nipple, and the other pipes are connected to the intermediate nipples according to the relative demands of the bearings which they supply.

As shown, one of the pipes *d* leads to the upper bearing of the pitman 12, and pipe *c* leads to the lower bearing of the pitman 12. Pipe *b* leads to the journal 7 for oiling the shaft 8, and pipe *a* conveys to a distributing ring to be described later. The construction of these oil tubes is unique. Each tube comprises a coiled wire, the coils of which lie closely together. When first used an extremely slight amount of oil works between the coils and collects dust which, being exposed to sun and wind, combines to form a skin or leathery casing which effectually seals the cracks between the coils and thus a perfectly flexible tube is formed having extreme durability.

The timing mechanism for periodically operating the valve 34, is shown in detail in Figs. 3 and 4, and is housed within the casing 20 before referred to, and within the casing are three shafts 38, 39 and 40. Loosely mounted on the shaft 38 is a ratchet wheel 41, the spaces between its teeth being formed concave as shown. The ratchet wheel 41 has a hub 42 which is provided with a single tooth or dog 43, which operates an intermediate ratchet wheel 44, which is mounted on the shaft 39. The ratchet wheel 44 has a hub 45 which is provided with a single tooth or dog 46, which is adapted to operate another ratchet wheel 47, which is loosely mounted on the shaft 40. A rock lever 48 is loosely pivoted on the shaft 38 and has a head 49, which is provided with a recess 50 forming an inclined face 51 and a ball retaining wall 52. As shown in Fig. 4, the head 49 has a flange 53 which lies behind the edge of the ratchet wheel 41, thus forming an inclosure for a ball 54. As the rock lever 48 is moved in one direction, the inclined shoulder 51 moves the ball 54 bodily with the rock arm, and the ball 54 being seated in a concave recess between two teeth of the ratchet wheel 41, thus turns the ratchet wheel 41 a distance equal to the stroke of the rock lever. When the rock lever is moved in the opposite direction the inclined face 51 moves away from the ball 54, and as soon as the retaining wall 52 strikes the ball 54 it moves the ball 54 back with the rock lever, the ball riding up over the rear tooth and passing as many teeth in this manner as the ratchet wheel has been advanced by the preceding stroke, the ball dropping by its weight behind each tooth as it passes over the tooth, so that when the rock lever has reached the end of its recovery stroke the ball is seated and ready to advance the ratchet wheel upon the next forward movement of the rock lever. As the ratchet wheel 41 is rotated its tooth 43 is moved around therewith, and it turns the wheel 44 the distance of one tooth for each complete revolution of the ratchet wheel 41. In the position shown in Fig. 3, the dog 43 is in position to operate the ratchet wheel 44 the distance of one tooth upon the next stroke of the rock lever 48. As the intermediate ratchet wheel 44 is rotated, its dog 46 operates the ratchet wheel 47 the distance of one tooth for each complete revolution of the ratchet wheel 44, and in the position shown in Fig. 3, the dog 46 is in position to operate the ratchet wheel 47 upon the next movement of the ratchet wheel 44. A weighted retaining pawl 55 is mounted on the shaft 39 for preventing backward movement of the ratchet wheel 41. The ratchet wheel 44 is prevented from reverse movement by a retaining pawl 56, which is yieldingly held in place by a flat spring 57. The ratchet 47 is held from reverse movement by a retaining pawl 58, yieldingly held in place by a flat spring 59. The head 49 of the rock lever 48, as shown in Fig. 4, has a grooved recess which receives a rod 60, the rod 60 being clamped in place in the groove by a washer 61 and bolt 62. The rod 61 extends out through an opening 63 formed in the casing 20, and fastened to the rod 60 by an adjustable clamp 64 is an extension rod 65, the end of which has an eye 66, which articulates with an eye 67 formed in the end of the operating rod 19 before referred to.

68 designates a carrier formed preferably of sheet-metal and having an extension 69.

In the present embodiment the carrier 68 is supported solely by a doubled rod 70, upon the lower end of which rests the extension 69. One end of the double rod 70 is formed with a hook 71, and a coil spring 72 is confined between the hook 71 and the extension 69, the carrier 68 being capable of an upward sliding movement on the double rod 70, the spring 72 serving to retract the carrier on the double rod 70. The other end of the rod 70 is extended to the upper part of the casing and is fastened to a stationary stud 73. Mounted on the carrier 68 is an air cylinder 74, provided with a hollow piston rod 75 and piston 76. A buffer spring 77 is arranged in the lower end of the cylinder 74 to prevent the piston 76 from striking the lower end of the cylinder. The lower end of the hollow piston rod 75 is closed by an air regulating screw 78, which is constructed as shown in detail in Fig. 8, having one face tapered off at 79. By adjusting the screw 78 up or down, the air escape opening formed by the face 79 may be increased or diminished to regulate the passage of air therethrough. Soldered or otherwise attached to the lower end of the piston rod 75 is an arm 80, to which is pivoted a link 81, the upper end of the link 81 being connected to the lever 37 before referred to. Mounted on the ratchet wheel 47 is an operating stud 82, which by the rotation of the ratchet wheel 47, is brought against the under side of the extension 69, and during further movement of the ratchet wheel 47 lifts the carrier 68 and cylinder 74, compressing the spring 72, and as the cylinder 74 is thus raised gradually, the air flows past the regulating screw 78, through the hollow piston rod 75 into the cylinder 74 above the piston 76.

After the ratchet wheel 47 has moved a further distance sufficiently to move the stud 82 out from under the extension 69, the spring 72 quickly expands and forces down the cylinder 74, and as the air is restrained in its passage by the regulating screw 78, the air is compressed to a definite degree above the piston 76, which results in forcing down the piston 76 quickly, and the latter through the piston rod 75 moves down the arm 80, and the latter draws down the link 81, which rocks the lever 37 and opens the valve 34, allowing oil from the reservoir 33 to flow past the valve 34 and fill the distributer. After the valve 34 has been opened, its spring 35 commences to react and force out the stem 36, which acts upon the lever 37 to lift the link 81 and elevate the piston 76, and as the spring 72 is stronger than the spring 35, the carrier 68 and cylinder 74 remain in their normal position, and only the piston 76 and piston rod are raised by the spring 35 at a rate proportionate to the outflow of air past the regulating screw 78. Thus if the screw 78 is adjusted to allow the air to pass freely into the hollow piston rod, the closing movement of the spring 35 will be very quick, while if the passage of air past the regulating screw is restricted to a considerable extent, the closing movement of the spring 35 will be relatively slower. It is obvious that the timing of the closing movement of the valve 34 may be regulated to a nicety by means of adjusting the regulating screw 78, so that when using a heavy oil the valve 34 will remain open a requisite length of time to allow the distributer to become filled, after which the valve 34 will be closed, while if a light oil is employed the screw 78 may be regulated to close the valve 34 after it has been open by a relatively short time. By this device the closing movement of the valve may be regulated to the proper degree suitable for any character of oil.

In order to convey oil to the sleeve 5, I provide a device illustrated in detail in Figs. 5 and 6, in which 90 designates an external ring having an internal annular concave groove, the ring 90 being secured to the arms 6 of the wind wheel. Within the ring 90 is an inner ring 91 of similar form, as shown, which is split at 92 to enable it to be contracted when being sprung into place within the ring 90. The ring 91 is detachably secured when in place by a set screw 93. The external ring 90 is cut away at diametrically opposite points to form recesses 94 which enable oil tubes 95 and 96 to be connected with the inner ring 91, as shown in Fig. 5. The other ends of the tubes 95 and 96 are respectively connected to opposite sides of the sleeve 5 and communicate with oil holes therein. Thus as the wind wheel rotates, the two rings 91 and 90 together with the oil tubes 95 and 96 rotate as an integral piece. As shown in Fig. 1, the discharge end of the oil tube *a* is arranged at a point compassed by the distributer, so that it will discharge oil into the groove within the inner ring 91, and as the wind wheel rotates the centrifugal action will hold the oil within the groove in the ring 91 and cause it to flow through the tubes 95 and 96 toward the sleeve 5. Thus this device distributes oil to the rotating oil holes of the hub 5 of the wind wheel in a perfect manner, and there being no working joints employed, there is no chance for leakage. Moreover, it will be observed that when the windwheel stops rotating, the device will cease feeding oil to the sleeve 5, owing to the absence of centrifugal force which is required to cause the oil to move through the tubes. When this device is to be used on a wind mill on which the wind wheel revolves in the direction opposite to that of the wind wheel shown in the drawings, the inner ring 91 may be removed by unscrewing the set screw 93 and then contracting the inner ring to allow it to disengage from the groove in the outer ring. The ring may then be reversed

and sprung back into place in the outer ring so that the tubes 95 and 96 will curve in the opposite direction, thus causing the oil to be forced through the tubes to the wind wheel bearing.

The rods 63 and 65 can be moved relatively to each other by means of the clamp 64 to adjust the distance of the eye 66 from the rock lever 48. If it is desired to open the valve 34 with greater frequency the eye 66 may be adjusted closer in, which will with a given stroke of the pitman operate the rock arm 49 through a greater length of stroke, thereby causing the ratchet wheel 41 and associated gearing to be more rapidly operated. By adjusting the rods 65 so that the eye 66 stands farther from the rock lever 49, the stroke of the latter will obviously be shortened and the train of gearing will be operated at a slower rate proportionate to the speed of the wind wheel so that the valve 34 will not be opened so frequently. It is manifest that by this adjustment the oiling periods may be very closely regulated. The term "period" is not here used in the sense of a certain elapsed time, but refers to a certain number of revolutions of the wind wheel which take place between each automatic opening and closing of the valve. This adjustment likewise permits of accommodating various lengths of pitman strokes as found in various sizes or types of wind mills and is an important feature for the reason that this apparatus is designed to be applied to any make or size of wind mill in use. The entire support of the apparatus is by means of the single clamping device shown in Fig. 7 which is so constructed that it can be applied to some part of a mill, even though it may not be applied to the exact part as shown in Fig. 1, while the attachment of the rod 19 can be made to any convenient part of the mill which has a reciprocating or rocking motion, while the distributer is provided with sufficient oil discharge openings to enable oil tubes to be connected to as many bearings as are ever employed.

What we claim is:—

1. An oil reservoir, a distributer below the reservoir and having discharge orifices at different horizontal levels, a wheel, and means operated by the wheel for allowing oil to flow down by gravity from the reservoir to the distributer.

2. An oil reservoir, means having a normally closed connection with the reservoir for distributing oil to the bearings, a wheel, and means operated by the wheel for periodically opening and then closing said connection thereby allowing oil to pass from the reservoir to the distributing means, and means for regulating the closing of said connection to suit the character of oil.

3. An oil reservoir, a distributer below the reservoir and having discharge orifices at different horizontal levels, a wheel, means operating automatically for releasing a definite quantity of oil from the reservoir and allowing it to flow to the distributer from the reservoir at periods regulated by the revolutions of the wheel.

4. An oil reservoir, a distributer, a valve normally preventing flow of oil from the reservoir to the distributer, a wheel, means operated by the wheel for periodically opening the valve, and means for retarding the closing of the valve.

5. An oil reservoir, a distributer, a valve normally preventing flow of oil from the reservoir to the distributer, a wheel, means operated by the wheel for periodically opening the valve, and pneumatic means for retarding the closing of the valve.

6. An oil reservoir, a distributer, a valve between the reservoir and distributer, a wheel, gearing operated by the wheel for opening the valve after a definite number of revolutions of the wheel, means for regulating said gearing to vary the ratio between the revolutions of the wheel and the opening of the valve, and means for retarding the closing of the valve.

7. In a windmill oiler, a clamping frame adapted to be attached to a part of the windmill, a rod adjustably supported by the clamping frame, an oil reservoir supported by the rod, a distributer supported by the rod, a wheel, means operated by the wheel for allowing oil to pass from the reservoir to the distributer, and means for carrying oil from the distributer to the parts of the windmill to be lubricated.

8. An oil reservoir, a distributer, a valve between the reservoir and distributer, a wheel, means operated by the wheel for opening the valve, means for closing the valve, and means for retarding the closing of the valve comprising an air cylinder, a piston therein, a connection from the piston to the valve, and means for regulating the escape of air from the piston.

9. An oil reservoir, a distributer, a valve between the reservoir and distributer, a wheel, a train of gearing operated step by step by the wheel, a carrier, an air cylinder mounted on the carrier, a piston therein, a connection from the piston to said valve, an abutment on one of the wheels of said train for lifting said carrier, means for depressing said carrier when released by said abutment, means for closing said valve, and means for regulating the escape of air from said cylinder.

10. An oil reservoir, a distributer, a valve between the reservoir and distributer, a train of ratchet gearing, a rock arm, a ball loosely carried by said rock arm for operating said gearing, a rod fixed to said rock arm, an extension rod adjustably mounted on the former rod, a wind wheel, means operated by

the wind wheel for rocking said extension rod and thereby operating said gearing, a carrier, a cylinder mounted on said carrier, a piston therein, a rod along which said carrier is adapted to slide, an abutment on said rod, a compression spring on said rod between said abutment and said carrier, a hollow piston rod connected to the piston, means for regulating the escape of air through said piston rod, an arm carried by the piston rod, a lever for operating said valve, and a link connecting said lever with said arm.

11. An oil reservoir, a distributer, a valve between the reservoir and distributer, a casing, a timing mechanism removably mounted in said casing comprising a frame, a plurality of shafts mounted in said frame, a plurality of ratchet wheels mounted on said shafts, one of said ratchet wheels having a hub with a dog adapted to drive the intermediate ratchet wheel, the hub of the intermediate ratchet wheel having a dog adapted to drive another ratchet wheel, a rock arm having a recessed head with a ball loosely confined therein for operating the first named ratchet wheel, a carrier within said casing, a double rod, one end of which is connected to said frame, the other end having a hook, a compression spring coiled around said double rod and lying between said hook and the carrier, the carrier being slidable along said double rod, a cylinder mounted on said carrier, a piston and a hollow piston rod mounted in said cylinder, valve means for controlling the passage of air through said hollow piston rod, an arm attached to the end of the piston rod and extending through the opening in said casing, a rod rigidly attached to said rock lever and extending through an opening in said casing, an extension rod adjustably connected to the first rod, a wind wheel, a pitman operated thereby, a rock lever operated by said pitman, a link connecting said rock lever with said extension rod, a lever for opening said valve, a spring for closing said valve, and a link connecting said last named lever with the arm on said piston rod.

12. A distributer, a wind wheel, an outer ring fastened to the wind wheel, the outer ring having an internal channel, a similar inner ring slit and sprung within the outer ring and detachably fastened therein, a tube connected with the distributer with its discharge end arranged to deliver oil to the channel of the inner ring, a plurality of tubes connected to the bearing of the wheel and extending to the inner ring for conveying oil from the inner ring to the bearing of the wheel.

13. A rod, a reservoir mounted at the upper end of said rod, a distributer formed in said rod, a valve between the distributer and reservoir, means for adjustably fastening said rod to the upper part of a wind mill, a casing carried by said rod below said distributer, a train of gearing in said casing, a connection from said gearing to said valve for operating the valve, means operated by the wind wheel for operating said gearing, and pneumatic means within said casing for retarding the closing of said valve.

In testimony whereof, we have hereunto set our hand at Los Angeles California this 4th day of May 1906.

LINNAEUS C. POND.
GEORGE C. WAGNER.

In presence of—
GEORGE T. HACKLEY,
ARTHUR P. KNIGHT.