No. 860,809. PATENTED JULY 23, 1907.

D. K. KELLER.

OPERATING MECHANISM FOR CHAIN PUMPS.

APPLICATION FILED APR. 16, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

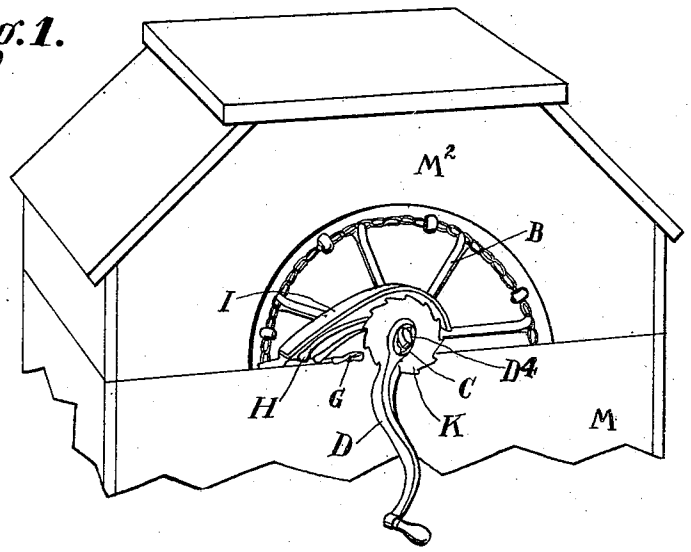


Fig. 2.

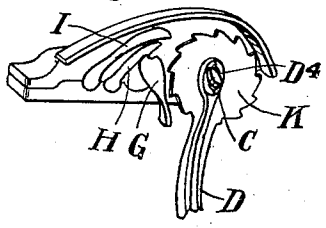


Fig. 3.

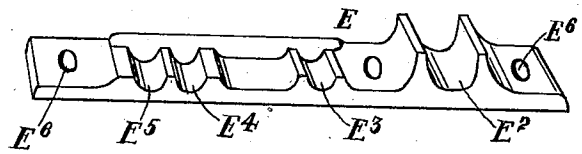


Fig. 4.

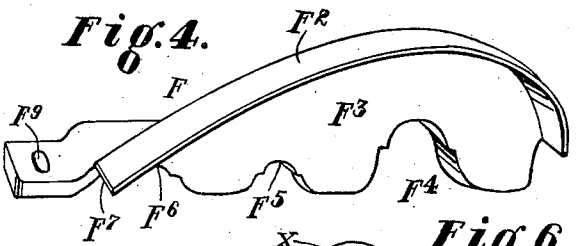


Fig. 5.

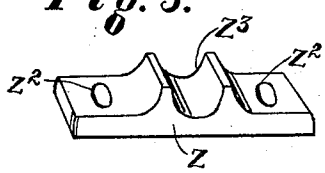
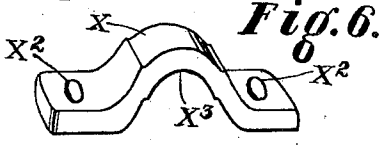


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

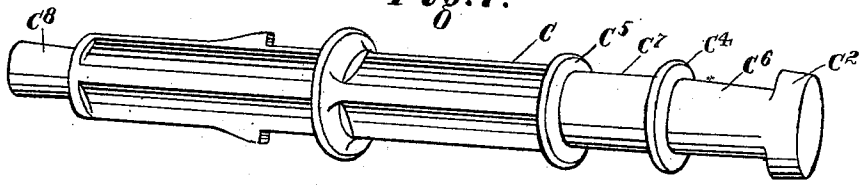


Fig. 8.

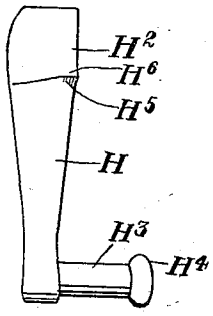


Fig. 9.

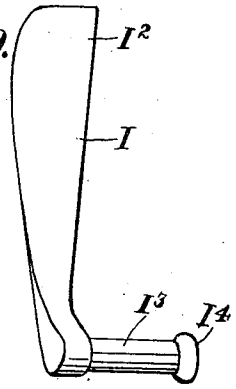


Fig. 10.

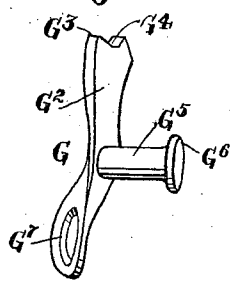


Fig. 11.

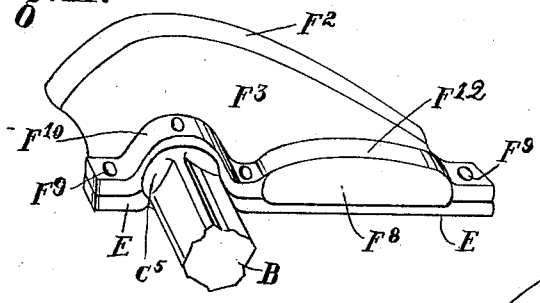


Fig. 12.

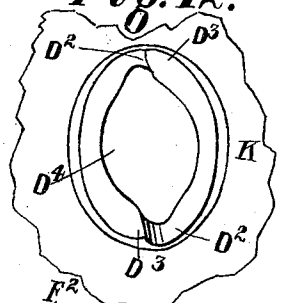


Fig. 13.

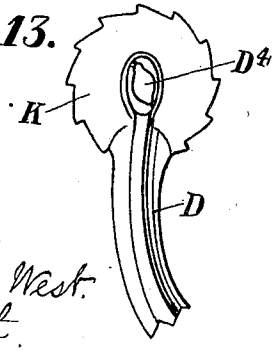
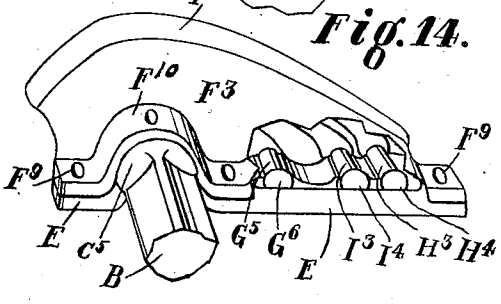


Fig. 14.



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OPERATING MECHANISM FOR CHAIN-PUMPS.

No. 860,809. Specification of Letters Patent. Patented July 23, 1907.

Application filed April 16, 1906. Serial No. 311,969.

To all whom it may concern:

Be it known that I, DAVID K. KELLER, a citizen of the United States, and a resident of the town of Montgomery, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Operating Mechanism for Chain-Pumps, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use conjointly or otherwise will be apparent from the following description and claims.

In the accompanying drawings making a part of this application,—Figure 1 is a view in perspective of the upper part of a pump box and operating mechanism illustrating my invention. Fig. 2 is a perspective view of the ratchet wheel, pawls, pawl lifting latch bar, support for the same, and the superimposed cover. Fig. 3 is a perspective view of the basal support of the pawls, their lifting latch bar and of the axle of the ratchet and sprocket wheel. Fig. 4 is a perspective view of the cover for the axles of the pawls, and of the pawl lifting latch and of the sprocket wheel axle, and of the cover for the pawls, latch and ratchet wheel. Fig. 5 is a view of the bearing for that end of the sprocket wheel axle which is opposite to the end which rests in the bearing shown in Fig. 3. Fig. 6 shows the cover of the bearing shown in Fig. 5. Fig. 7 represents the axle or spindle which carries the sprocket wheel, and the ratchet wheel and the crank. Fig. 8 is an elevation of the shorter of the two pawls employed in connection with the ratchet wheel. Fig. 9 is a view of the longer of the two pawls. Fig. 10 is a view of the pawl lifting latch and its pivot. Fig. 11 is a perspective view of the parts shown in Figs. 3 and 4, and of the adjacent parts of the axle, all in position, the view being taken of that side of said parts which face the center of the pump box. Fig. 12 is a view of the eye of the end of the shaft. Fig. 13 is a view of the crank shaft and ratchet wheel. Fig. 14 is a view similar to that of Fig. 11, but with a part of the cover and superimposed bearing broken away to exhibit the manner in which the pivot axles of the two pawls and of the pawl lifting latch are located in their respective supporting bearings.

In Figs. 2 and 13, the outer end of the crank which carries the handle has been removed for economy of space, the full handle being shown in Fig. 1.

I will now proceed to describe my invention in detail.

C indicates the axle which carries the usual sprocket wheel B. This wheel B carries the usual sprocket chain provided with the usual buckets which latter move up through the tube and lift the water into the well known delivery spout of the pump box. The eye D^4 of the crank D has two oblique bevels D^3, D^3, each ending in a shoulder D^2, D^2. The axle C has a wedge shaped boss C^2, which latter is received into the eye (aperture) D^4 of the crank. When the crank with the ratchet wheel is placed on the axle bearing or part C^6 and is turned in the direction in which it is to go, when operating the sprocket wheel and chain, it by means of the formation of its eye and that of the boss C^2 is locked in connection with the axle, and then cannot be removed, unless unlocked by turning it in a contrary direction.

The bearing plate E is provided with a bearing E^2 for the axle C, at the part C^7 of the latter, and with a bearing E^3 for the pivot G^5 of the pawl lifting latch G, with a bearing E^4 for the pivot H^3 of the shorter pawl H, and with a bearing E^5 for the reception of the pivot I^3 of the longer pawl I. When these pivots are respectively in place, they will appear as seen in Fig. 14. Each pivot has at its free end an enlargement. These enlargements are respectively marked G^6, I^4, H^4 and prevent their respective pivots from slipping out of their respective bearings. When these parts are thus in place, I locate over them the cover F^3. The part F^3 has the recesses F^4, F^5, F^6 and F^7. Recess F^4 receives an upper part of the axle C. Recess F^5 receives the upper part of the pivot G^5. Recess F^6 receives the upper part of the pivot H^3, and recess F^7 receives the upper part of the pivot I^3. This cover is duly held to the plate E below, preferably by bolts passing through the end parts F^9, F^9, of this cover.

The ratchet wheel is located on part C^6 of the axle C. The rim C^4 comes between the ratchet wheel and the bearings E^2 and F^3. The rear end C^8 of the axle is duly journaled in a lower box Z, Z^2, Z^3, and an upper box X, X^2, X^3.

The plate E is secured to its support, which latter is usually the lower half M of the box, by bolts through its end parts E^6, E^6. M^2 indicates the upper part of the pump box. I make the end parts F^9, F^9, to respectively fit upon the parts E^6, E^6, and the same bolts that secure the parts E^6, E^6, to the box are used to also secure the cover F^3 to the plate E. I extend the cover for the axle and the pivots out as shown by the parts F^{10} and F^{12}, thereby completely covering the bearing of the axle and of these pivots. I also extend a shield or cover F^8 down from the cover part F^{12}, and thereby completely cover the ends of the pivots. I thus fully protect the pivots and the axle at its bearing next the ratchet wheel.

An annular rim C^5 on the axle lies close against the edges of the parts F^{10}, and E, E^2, and assists in protecting the axle bearing from the ingress of foreign substances. I thus fully protect the pivots and the axle from dirt and frost and water.

The housing or covers F^3, F^8 and F^{12}, I preferably make integral. I also provide the part F^3 with an outlying flange F^2 which extends out over the pawls, the pawl lifter and the ratchet wheel. This flange F^2 is preferably made integral with the part F^3. On the upper side of the plate E, are the pawls I and H, and the pawl lifter G and the ratchet wheel K. This ratchet wheel K is fixed on th axle C, and as at present arranged the connection between the axle and the crank is just outside of and in front of the ratchet wheel. The cover shield F^2 protects the pawls, pawl lifter, the ratchet wheel and the joint between the crank and the axle from rain or snow falling vertically or driven against the rear side of the cover F^3, and does also to a great extent protect these parts from rain or snow driven down obliquely on the side where the pawls, pawl lifter and ratchet wheel are.

It should be mentioned that that part of the pawl lifter which engages the pawls is much heavier than that part of the lifter which is on the other side of the pivot G^5. Hence when the pawl lifter is disengaged from the pawl H, this end G^2 which carries the notch will fall down and remain in proper position, as shown in Fig. 1, until again moved by human agency.

The manner in which my mechanism operates is as follows: The two pawls I and H are dropped into engagement with the ratchet wheel. They divide the space between any two adjacent ratchet teeth, so that while one pawl engages a tooth of the ratchet wheel, the other lies halfway between two adjacent teeth of the wheel. Thus when the ratchet wheel is moved a distance equal to one half the distance between two adjacent teeth, the other pawl will engage a tooth. Thus the number of places at which the ratchet wheel can be set equals twice the number of the teeth of the said wheel. This enables a better adjustment to be made relatively for the sprocket chain and its buckets.

Whenever it becomes necessary to reverse the movement of the sprocket chain and buckets, for any reason, the pawls are lifted. This I do by means of the pawl lifter G. This pawl lifter G has a tooth G^3 and a notch G^4 in its end which is to come in contact with the shorter pawl H. In the side of this shorter pawl H is a depression H^5 followed by a shoulder H^6. The pawl lifter G is moved by pressing down the handle G^7, thus raising the other end part G^2. The latter lifts the pawl H and the tooth G^3 enters the depression H^5 of the pawl H, and below the free end H^2 of the latter, and the shoulder or tooth H^6 of the pawl H enters the notch G^4 of the pawl lifter G. Thus the pawl lifter by this engagement remains in position, holding up the pawl G. Of course, one notch in one and a depression in the opposite engaging part would be sufficient, but the mode of formation shown is preferable, and when the pawl lifter is to be disengaged from the pawl G, this disengagement is easily accomplished by reason of the beveled side of the tooth G^3.

The elevation of the pawl H out of contact with the ratchet wheel K also lifts the free end I^2 of the pawl I out of engagement with ratchet wheel K, see Fig. 2. The ratchet wheel is free to be moved in either direction and so is the sprocket wheel and its chain and buckets. When the pawls are to engage the ratchet wheel, the pawl lifter is readily disengaged therefrom and falls back into the position shown in Fig. 1. The two pawls or dogs diminish what is known as the back lash.

What I claim as new and of my invention and desire to secure by Letters Patent, is:—

1. The combination of the axle, a ratchet wheel thereon, and the two pawls, dividing the space between adjacent teeth of the ratchet wheel, the one pawl located beneath the other, and a pawl lifter adapted to lift the lower pawl, and this lower pawl adapted to lift at the same time the upper pawl, substantially as and for the purposes specified.

2. The combination of the axle, a ratchet wheel thereon, and two pawls, dividing the space between adjacent teeth of the ratchet wheel, and a pawl lifter, adapted to lift both pawls, by lifting the one nearest thereto, and means for enabling the pawl lifter to engage the adjacent pawl, and remain in engagement until disengaged by human agency, substantially as and for the purposes specified.

3. The combination of the axle, a ratchet wheel thereon, and two pawls dividing the space between adjacent teeth of the ratchet wheel, one pawl above and near the other and both pivoted in substantially the same horizontal plane, and the pivoted pawl lifter, beneath the lower pawl, and provided with a notch and shoulder, the lower pawl having a corresponding formation on the lower pawl, substantially as and for the purposes specified.

4. The combination of the axle, a ratchet wheel thereon, the pawls and the pawl lifter, each having a pivot stem, and the plate E having recess bearings E^2, E^3, E^4 and E^5, adapted to respectively receive the said pivot stems, and a superimposed plate F^3, having recess bearings adapted to respectively receive the upper parts of said pivot stems, substantially as and for the purposes specified.

5. The combination of the axle, a ratchet wheel thereon, the pawls, and the pawl lifter, each having a pivot stem, and the plate E having recess bearings E^2, E^3, E^4 and E^5, adapted to respectively receive the said pivot stems, and a superimposed plate F^3, and the cover plate F^{10}, F^{12}, integral with plate F^3, the same having recess bearings adapted to respectively receive the upper parts of the said pivoted stems, substantially as and for the purposes specified.

6. The combination of the axle, a ratchet wheel thereon, the pawls, and the pawl lifter, each having a pivot stem, whose free end has an annular rim or projection, and the plate E having recess bearings E^2, E^3, E^4 and E^5 adapted to respectively receive the said pivot stems, and a superimposed plate F^3 and the cover plate F^{10}, F^{12}, and the side plate F^8, these three plates integral, the superimposed part having recessed bearings respectively for the upper parts of said pivot stems, substantially as and for the purposes specified.

7. The combination of the axle, ratchet wheel, the pawls, the pawl lifter, said pawls and lifter having pivot stems, bearings for said stems underneath them, and a plate F^3 above, and a flange F^2 extending out over the pawls, pawl lifter, and the ratchet wheels, substantially as and for the purposes specified.

8. The combination of the axle, ratchet wheel, the pawls, the pawl lifter, said pawls and lifter having pivot stems, bearings for said stems underneath them, and a plate F^3 above, having a flange F^2 extending out over the pawls, pawl lifter, and the ratchet wheel, and a cover plate F^{12} over a part of the stems, substantially as and for the purposes specified.

9. The combination of the axle, ratchet wheel, the pawls, the pawl lifter, said pawls and lifter having pivot stems, bearings for said stems underneath them, and a plate F^3 above, having a flange F^2 extending out over the pawls, pawl lifter, and the ratchet wheel, and a cover plate F^{12} over a part of the stems, and the side plate at the end of the pivot stems, substantially as and for the purposes specified.

10. The combination of the axle, ratchet wheel, pawls, pawl lifter, the pawls and pawl lifter each having a pivot stem, a lower bearing plate for the axle, and said stems,

an upper bearing plate F^3, extension cover F^{10} and F^{12} and extension side plate F^8, for covering said axle and stems, an extension plate F^2 at the upper edge of the plate F^3, covering the pawls, pawl lifter and the ratchet wheel, substantially as and for the purposes specified.

11. The combination of the axle, a ratchet wheel thereon, and two pawls, dividing the space between adjacent teeth of the ratchet wheel, and a pawl lifter, adapted to lift both pawls, by lifting the one nearest thereto, and means for enabling the pawl lifter to engage the adjacent pawl, and remain in engagement until disengaged by human agency, that end of the pawl lifter which is adapted to engage the adjacent pawl being heavier than the other end of the lifter, substantially as and for the purposes specified.

DAVID K. KELLER.

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K. SMITH.