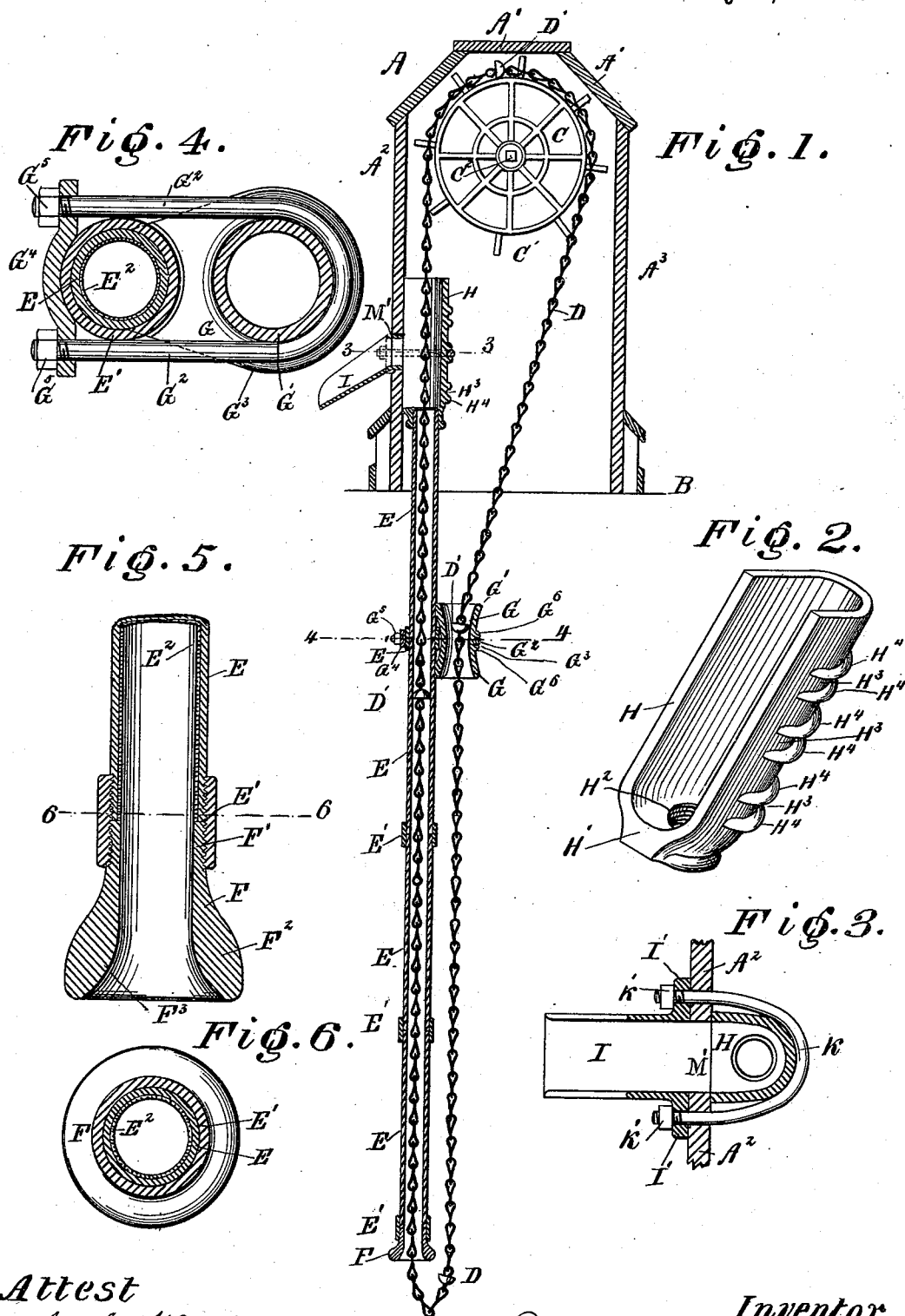


(No Model.)

D. K. KELLER.
CHAIN PUMP.

No. 478,112.

Patented July 5, 1892.



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CHAIN-PUMP.

SPECIFICATION forming part of Letters Patent No. 478,112, dated July 5, 1892.

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To all whom it may concern:

Be it known that I, DAVID K. KELLER, a citizen of the United States of America, 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 Chain-Pumps, of which the following is a specification.

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

In the accompanying drawings, making a part of this specification, and to which reference is hereby made, Figure 1 is a vertical central section from front to rear of a pump embodying my invention. Fig. 2 is a view in perspective of the water-box and showing that side or face of the said box resting against the pump-box and facing toward the spout. Fig. 3 is a horizontal section in the plane of the dotted line 3 3 of Fig. 1 and showing in section the water-box, adjacent parts of the pump-box, and the spout. This view also shows in plan the stirrup and nuts whereby said pump-box and stirrup are united together. Fig. 4 is a horizontal section taken in the plane of the dotted line 4 4 of Fig. 1 and showing in section the double-flared guide which receives the rear line of chain and the pump-pipe proper, and sleeve whereby two sections of the said pump-pipe are united together. This view also shows in plan the clamp or yoke pieces and nuts whereby the said double-flared guide is attached to the said pump-pipe. Fig. 5 is a vertical central section of the lower end of the pump-pipe and of the bell-shaped receiving-guide and of the sleeve whereby the lower end of the pump-pipe is united to the said bell-shaped receiving-guide. Fig. 6 is a horizontal section taken in the plane of the dotted line 6 6 of Fig. 5.

A indicates the pump-box, of any suitable shape and made of any desired material. One of the more common forms of pump-boxes is shown in Fig. 1 of the drawings.

A' A' A' indicate the top of the pump, A² the front wall, and A³ the rear wall thereof. This pump-box rests upon the ground B or equivalent support.

C indicates the reel, supported by and turn-

ing on the shaft C², duly journaled in the pump-box. The periphery of the reel is provided with forks C'. These forks C' in succession receive the chain and, grasping it, cause the chain to move around with the reel as the latter is rotated.

D indicates the endless chain, composed of links of any suitable shape.

E E E E respectively indicate the respective sections of pump-pipe. Each end of each section is exteriorly provided with a screw-thread, and the ends of adjacent sections are coupled together by means of the sleeve E', interiorly screw-threaded, these adjacent ends of the adjacent pipe-sections being screwed into the sleeve from opposite ends thereof, substantially as shown. These sections of pump-pipe may each be of the same length or may differ from one another in length in order that the requisite length of the pump-pipe for reaching down the requisite distance in the well may be obtained.

Heretofore it has been found impracticable to use iron pipe in chain-pumps for the following reasons: The interior surface of the pipe is necessarily, from the mode of its manufacture, more or less rough. This roughness forms an impediment to the passage of the rubber valves—such as D'—through the pump-pipe. Furthermore, the interior of the pipe D rapidly rusts, and this rusting also forms an obstacle to the further passage through the pump-pipe of the rubber valves of the chain. One feature of my invention overcomes these obstacles attending the use of iron pipe. This feature of my invention consists in applying to the interior of the pipe a vitreous lining. This lining is usually applied to the interior of the pipe by what is known as the "dry process" or what is known as the "wet process," and the lining is burned to the pipe by intense heat. This vitreous mixture thus applied forms a lining which adheres tenaciously to the inner surface of the pipe. The surface of this lining is perfectly smooth and offers no obstacle to the free and uninterrupted passage through the pipe of the rubber valve. Furthermore, the smoothness of this lining enables the valve to form a more perfect contact between its own surface and that of the interior surface of the pipe. In this way a perfect suction is

obtained and the rubber valve is elevated through the pipe E and a maximum amount of liquid from the well is drawn up through the pipe E and delivered through the spout.

5 This vitreous lining (indicated in the drawings by the character E²) also prevents the interior of the pipe from oxidation or other injury, and thereby greatly lengthens the life of the pipe and the usefulness of the
10 pump.

It is desirable to bring the rear line of chain D close to the pipe E for the following reasons: The pump is thereby rendered more compact, and the chain and the pump-pipe E
15 can be located in a well of small diameter. When the rear line of the chain is brought close to the pipe E and descends near to the same, it more readily enters the bottom of the pump-pipe E and is less liable to kink
20 and to catch upon the lower edges of the pump-pipe E than when it descends vertically from the periphery of the reel C and is at liberty to whip and thrash about in the well at the lower end of the pump-pipe E.
25 The device I employ for bringing the rear line of the chain D close to the pipe E and for keeping said rear line of the chain in proximity to the said pump-pipe E consists of the guide G. The vertical opening of this
30 guide G enlarges upwardly from the middle to the top of the said guide, and also enlarges downwardly from the middle of said guide, forming a double-flared passage-way or guide. The object of the flared opening at
35 the top of the guide is to enable the rear line of the chain D to enter the guide in an inclined position and from catching upon the top edge of the guide, and the object of the flared opening in the lower portion of
40 the guide is to prevent the rear line of the chain from catching upon the lower edges of the guide in cases where, through mistake or otherwise, the movement of the pump is reversed and the rear line of said chain is
45 moved upward instead of downward. For the purpose of the ready and convenient attachment of this guide G to the pump-pipe E, I exteriorly contract the waist of the said guide in the following manner: I provide at or
50 in the exterior surface of the guide the groove G³, and where it is undesirable to everywhere thicken the walls of the guide in order to provide for this groove I provide ribs or enlargements G⁶ G⁶, whose adjacent sides form
55 the walls of the groove G³. The curved or back end of the stirrup G² is located in the groove G³ and the guide is placed against the pipe E. Each of the ends of the stirrup is slipped through the adjacent hole of the
60 clamping-piece G⁴, which is applied at the other side of the pump-pipe E from that at which the guide G is applied. The free ends of this stirrup are screw-threaded. Nuts G⁵ G⁵ are respectively attached to the respective
65 free ends of this stirrup outside of the clamping-piece G⁴, and, being screwed up, cause the stirrup and clamping-piece to tightly clamp

the guide G against the pump-pipe E and permanently secure the said guide to the said pipe.

A desirable place on the pipe E at which the guide G is to be attached is the coupling-sleeve E', annexed to one of the sections of the pipe E. The hollow portion of the guide G nicely receives the adjacent portion of the sleeve E', and the clamping-stirrup G² G⁴
75 binds together the guide, pipe, and sleeve and strengthens the pipe E at the point where the adjacent ends of the adjacent sections are united together.

Heretofore much difficulty has been experienced in operating chain-pumps from the fact that the lower end of the chain D in entering the lower end of the pump-pipe would catch upon the lower edge of said pipe. I
85 have contrived a device whereby the chain is altogether prevented from catching on the lower edge of the pump-pipe in entering the latter. This device consists of a bell-shaped inlet-guide F F. An important feature of this device consists in the lower portion or
90 mouth thereof being flared outwardly and downwardly, as shown, and in the lower portion of the exterior surface of the same being gradually enlarged outwardly and downwardly-forming a deflecting-surface, the lower
95 edges of the inlet-guide being rounded, as shown. This inlet-guide is suitably secured to the lower end of the pump-pipe E, preferably as shown, viz: The outer peripheral surface of the guide F is screw-threaded and is
100 received into and engages a screw-thread upon the interior of the sleeve E'. The upper portion of this sleeve is screwed upon the screw-threaded end of the lower part of the pipe E,
105 thereby uniting together the inlet-guide F and the pipe E. When the rear line of the chain D descends and for any reason oscillates and strikes against the inlet-guide F, the outward-inclined surface F² deflects the rear
110 line of the chain away from the perpendicular lines of the interior surface of the pipe E and theoretically continues down beyond the mouth of the latter a sufficient distance to prevent the chain as it turns and comes upward from catching the edge of the guide F.
115 Furthermore, the flared surface of the mouth of the guide F assists in preventing the chain D from catching upon the lower end of the guide, inasmuch as it allows the chain D to enter it (the said guide) at an angle with little
120 or no frictional contact. Thus by means of the flared guide G and the inlet-guide F, formed as described, I am enabled to construct a pump wherein the chain will not in
125 any wise catch upon or be stopped by the opposing edges. By these guides and the smooth vitreous lining of the interior of the pump-pipe E, I am enabled to obtain a pump wherein the frictional resistance of the chain and valve
130 as they move down into the well and up again through the pump-pipe E is diminished to a minimum amount.

I have also provided a new and useful wa-

ter-box constructed as follows, to wit: This water-box is of metal, preferably open at the top. The bottom H' of the box H has a circular opening H², interiorly screw-threaded.

5 The upper screw-threaded end of pipe E is screwed into this opening. The water-box H and the pump-pipe E thus form a continuous conduit from the bottom of the well to the spout. The pump-box A has a spout-opening 10 M'. The spout proper (indicated by the character I) is affixed to the outer face of the front wall A² of the pump-box A. The rear part of the top of the spout and the rear part of the bottom of the box preferably enter the 15 opening M' of the pump-box, as shown.

For the convenient attachment of the spout to the pump-box each side of the spout at or near the rear end of the latter is exteriorly provided with a lug I', perforated for the passage of a bolt or screw.

20 The rear side of the water-box is provided with a groove H³, extending transversely to the axial length of the water-box. In order to save unnecessary thickening of the wall of the water-box, the groove H³ is formed by 25 casting or otherwise securing the ridges H⁴ H⁴ to the exterior rear portion of the water-box. In securing the water-box to the pump-box the rear portion of the stirrup K is placed 30 within the groove H³, and one end of this stirrup is passed through the pump-box at one side of the water-box and the other end of the said stirrup through the pump-box at the other side of the water-box. The stirrup is 35 then secured in position by nuts K' K', respectively screwed to the threaded ends of the stirrup K.

A convenient mode of securing the stirrup to the box is by passing the one end of the 40 stirrup through the box and then through the adjacent hole in the lug I' of the spout and by passing the other end of the stirrup not only through the box, but also through the hole of the adjacent lug I' of the spout. 45 The nuts K' K' being placed upon the ends of the stirrup, as aforementioned, and screwed up, the spout and the pump-box and water-box are all securely united together by one stirrup.

50 In practice it will often happen that the depth of the well is such that when the sections E of iron pipe are secured together the entire length of pipe, including the inlet-guide F, will be either a little short of the proper 55 length or a little in excess of the proper length of pipe required to properly reach the water of the well. In such event it would ordinarily be necessary to cut off a portion of one of the sections E of the said pipe and to cut on the end thereof a new screw-thread 60 in order to reunite it with either the water-box above or the inlet-guide F below, or with the adjacent end of one section of the pipe E.

65 I have provided a device whereby all cutting of the pipe E is obviated and the pipe allowed to remain intact. This device is as

follows: The water-box is of the same length, as shown, and at the exterior back portion thereof I locate two or more grooves, as H³. 70 These grooves may be formed within the wall proper of the water-box H or may be formed by means of ridges H⁴, as shown. In case the pipe E, as aforementioned, is found somewhat 75 too long, the water-box is raised and the stirrup K is placed in the lowest of the grooves H³, and the water-box is then secured by means of the stirrup K to the pump-box. In case 80 the pipe E should be found a little too short, the water-box is lowered and the stirrup K placed in the uppermost of the grooves H³, and the water-box is then secured to the pump-box by means of the stirrup K. When desired, the grooves in excess of the number 85 shown in Fig. 2 of the drawings may be employed and the length of the water-box may also be increased. I am thereby enabled to readily and quickly adjust vertically the pump-pipe E to its desired position in the well without cutting off the pipe E or forming 90 a new screw-thread thereon.

While the various features of my invention are preferably employed together, one or more of said features may be employed without the remainder, and in so far as applicable one or more of said features may be employed in connection with chain-pumps other 95 than the one herein specifically described.

What I claim as new and of my invention, and desire to secure by Letters Patent, is— 100

1. In a chain-pump, the interiorly-double-flared guide having groove G³, the exterior of the guide being narrowed at its waist, and the stirrup G², and clamp G⁴, and sleeve-coupling 105 E', and adjacent pipe-sections E E, secured by said coupling, the coupling E' fitting into the recess formed on the exterior of the guide by the contraction of its waist, the said sleeve, pump-pipe, and flared guide being all inclosed by the stirrup and clamping-piece, substantially 110 as and for the purposes specified.

2. In a chain-pump, the interiorly-double-flared guide having groove G³, the exterior of the guide being narrowed at its waist and at rear provided with groove G³, and the stirrup 115 G², and clamp G⁴, and sleeve-coupling E', and adjacent pipe-section E E, secured by said coupling, the coupling E' fitting into the recess formed on the exterior of the guide by the contraction of its waist, the back of the 120 stirrup being located in said groove G³, the said sleeve, pump-pipe, and flared guide being all inclosed by the stirrup and clamping-piece, substantially as and for the purposes specified. 125

3. In a chain-pump, the pump-pipe E and the interiorly-double-flared guide having peripheral depression, and stirrup G², and clamp G⁴, and sleeve-coupling E', fitting into the recess formed on the exterior of the guide by 130 the contraction of the waist, the said guide and pipe E being thereby secured, substantially as and for the purposes specified.

4. In a chain-pump, the pump-pipe E and the

interiorly-double-flared guide having peripheral depression and stirrup G², and clamp G⁴, and sleeve-coupling E', fitting into the recess formed on the exterior of the guide by the
5 contraction of the waist, the said guide and pipe E being thereby secured, and the water-box provided at rear with two or more grooves H³ and connected at bottom to pump-pipe E and applied to the inner side of wall A² of
10 the pump-box, and the spout I, having lugs I' I' and at rear applied to the outer face of the

water-box and stirrup K, whose rear portion is located in one of the grooves H³ and whose respective limbs pass through the pump-box and through the respective adjacent lugs I' 15 I' of the spout, and devices for retaining the stirrup in said position, substantially as and for the purposes specified.

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Attest:

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