No. 769,014. PATENTED AUG. 30, 1904.

W. E. PEDLEY.

MECHANISM OR APPARATUS FOR RAISING OR CONVEYING VISCOUS LIQUIDS

APPLICATION FILED JUNE 2, 1902.

NO MODEL.

Fig. 1.

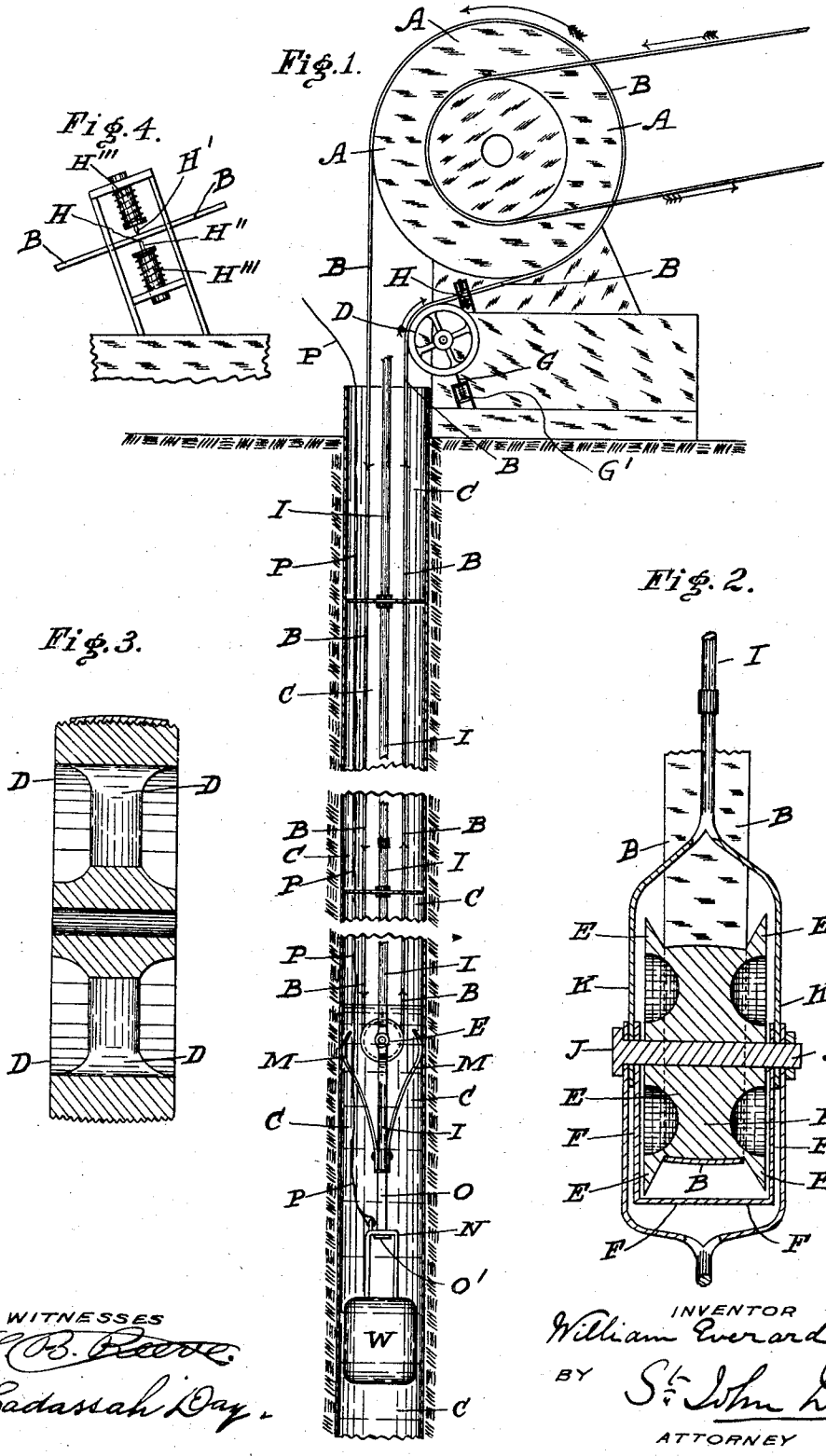


Fig. 4.

Fig. 3.

Fig. 2.

WITNESSES

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No. 769,014. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM EVERARD PEDLEY, OF RIVERSIDE, CALIFORNIA.

MECHANISM OR APPARATUS FOR RAISING OR CONVEYING VISCOUS LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 769,014, dated August 30, 1904.

Application filed June 2, 1902. Serial No. 110,006. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EVERARD PEDLEY, a subject of the King of Great Britain and Ireland and Emperor of India, and having applied to become a citizen of the United States, residing at Riverside, in the county of Riverside and State of California, have invented certain Improvements in Mechanism or Apparatus for Raising or Conveying Viscous Liquids, of which the following is a full, clear, and exact description or specification, reference being had to the annexed drawings, and to the letters marked thereon.

My said invention relates to the raising and conveying of viscous liquids generally, and is especially applicable for raising and conveying thick crude mineral oil having a large percentage of asphaltum from the wells which are sunk in the ground to reach it. With thick crude oils of this class it is found that the ordinary oil-pump will not work on account of the extremely thick viscous character of the oil, it being such that the oil will not flow readily into the barrel of an ordinary pump by suction, besides which considerable force has to be employed to press such thick viscous oil up through the discharge-pipe of a pump.

Under my present invention I utilize the viscosity of the oil as a fact or condition to be actively employed in raising such oil out of a well to the surface of the ground. I do this by letting down into the well a continuous or endless band, belt, steel tape, or rope, to which the viscous oil clings as the rope passes through it in the well, and I put scrapers to clean off the oil near the top of said band, belt, tape, or rope, as the said band, belt, tape, or rope ascends from the well with a layer of oil clinging to it by reason of its own viscosity. There are no buckets on the band, belt, tape, or rope; but the surface thereof is smooth, after the manner of a leather belt or a continuous steel band, tape, or rope.

On the annexed drawings, Figure 1 is a general diagram representing in vertical section a well sunk into oil-bearing strata of the earth and whereinto the oil ascends. Fig. 2 is a transverse vertical section, on a larger scale, of the lower pulley let down into the well and around which the lower part of the band, belt, tape, or rope travels. Fig. 3 is a vertical section, on a larger scale, of the tightener-pulley hereinafter described. Fig. 4 is an end elevation, on an enlarged scale, of the scrapers for removing the oil which has been lifted by the belt during its ascending motion up through the well-casing.

In the drawings, the pulley A at the top is a driving-pulley, rotated at any required velocity and by any suitable kind of motor. Upon this pulley A is carried the belt B, the direction of motion of which is indicated by the arrow above the pulley A, and by the arrow-points upon the band, belt, tape, or rope B. The band, belt, tape, or rope B, being continuous and endless, passes not only around the pulley A, but as it descends into the well C passes round the pulley E and ascends from the pulley E to the surface again, whence it passes round the tightener-pulley D and back to the driving-pulley A. The motive power is applied to the axle of the driving-pulley A. The pulley E is formed with flanges, as shown at Fig. 2, to prevent the belt getting off from this pulley, and it has a strap or hood F, attached to the pulley-shaft, which passes around or incloses the lower part of the pulley E, as shown in the diagram Fig. 2.

The purport of the tightener-pulley D is to keep the band, belt, tape, or rope in line, while also acting as a tightener, and it is constructed with a grooved surface, as shown in the section Fig. 3, for if formed with a smooth surface the tension of the band, belt, tape, or rope in traveling around it would squeeze off the oil from one side of the said band, belt, tape, or rope, and the oil thus squeezed off would drop back into the well, but the projecting ridges between the grooves of this tightening-pulley D open toward the layer of oil upon the band, belt, tape, or rope without squeezing it off therefrom, and the oil therefore fills the holes or grooves in the tightener-pulley D and is removed therefrom by a spring-scraper G, formed to fit the surface of the grooved pulley, by which arrangement a clean surface of the pulley D constantly meets the ascending belt, while teeth

in the spring-scraper G are pressed lightly into the grooves in the pulley B by a spring G′, which may be a spiral spring or a spring of any construction.

At the point of the band, belt, tape, or rope B (marked H in Figs. 1 and 4) there are placed two scrapers H′ H″, (shown enlarged in Fig. 4,) one above and one below the said band, belt, tape, or rope B, and there may also be a small scraper at each edge of said band, belt, tape, or rope. Each of the scrapers H′ H″ is pressed lightly against the two flat faces and the two edges of the belt, band, tape, or rope B by spiral springs H‴, as shown at Fig. 4, so that while pressing against the belt, band, tape, or rope B and scraping off the viscous material raised or conveyed thereby each of these springs H‴ can yield slightly without breaking in case any lump or rugged edge should occur on the band, belt, tape, or rope, or the viscous liquid may be cleaned off by a blast of steam or air, or may be floated off by passing downward into and through a bath of heavy liquid or metal, such as mercury, either hot or cold.

The lower pulley E is attached to rods I in the manner shown at Fig. 2 by the axis J of the pulley E passing through the two bearing branches K, attached to or forming part of the lower end of the rods I. The rods I may be of the well-known kind used as formed in sections, screwed together and lowered into a well in the manner used in boring operations for lowering perforating and other tools in a bore-hole, and this rod is guided, steadied, or fixed in the center of a well by a ring fitting loosely in the well, or by expanding the ring with a wedge or cone in the manner already well understood and practiced. The band, belt, tape, or rope B may also be held firmly and with the proper tension in the well by means of a suspended weight W, attached to the axis J of the pulley E, as shown in Figs. 1 and 2, the pulley and weight being carried by the band, belt, tape, or rope B. The weighted pulley E may be guided and prevented from twisting out of its proper working position in the well by means of four or other number of dog-springs M, two only of which are shown at Fig. 1, pressing against the sides of the well-casing.

The weight W may be raised by a separate steel rope P, so that the collar N may rest upon a round or square shank O—preferably a square shank—and by raising the weight W by the rope P and then dropping the weight W, so as to hit upon the enlarged bottom O′ of the shank O, the effect of a ram is produced, causing the pulley E and the attached dog-springs M M to descend. Should the dog-springs M M stick in the well-casing in either going down or in raising the pulley out of the well, an upward or downward blow may be struck upon the rod I or the shank O to move the apparatus upward or downward by jerking the weight W by pulling suddenly upward upon the rope B, as is well understood, in which case the blow of the weight W will be imparted to the shank O or the rod I in either an upward or downward direction.

If a wire or rope be used for operating my invention instead of a flat band, belt, or tape, then the main driving-pulley A should have some one of the well-known forms of grooved gripping-pulleys for carrying and operating the rope, and the tightening-pulley B in this case should be of the usual grooved form for rope or wire transmission; but in addition the main groove in the driving-pulley or the tightening-pulley must be constructed with similar grooving in the manner similar to the tightening-pulley shown grooved at Fig. 3. In cases where the liquid is not so viscous as I have hereinbefore considered then the band, belt, tape, or rope may merely hang from the driving-pulley without passing round the submerged pulley E, in which case the lower end of the flat band, belt, tape, or rope dips in it and runs loose in the liquid.

Having now described the nature of my said invention and the best system, mode, or manner I am at present acquainted with for carrying the same into practical effect, I desire to observe in conclusion that what I consider novel and original, and therefore claim as the invention to be secured to me by Letters Patent, is as follows:

1. Mechanism for raising viscous liquid from wells, comprising an endless traveling belt, band or rope, a driving-pulley and a tension-pulley for said belt, band or rope, means for guiding the tension-pulley engaging with the sides of the well, and such guiding means having the tension-pulley journaled therein, a hammering-weight loosely connected to the guiding means, means for lifting and releasing the hammering-weight and scraping means for scraping the liquid from the belt, band or rope, substantially as and for the purpose set forth.

2. A mechanism for raising viscous liquid from wells, comprising an endless traveling belt, band or rope, a driving-pulley and a tension-pulley for said belt, band or rope, scrapers for removing the liquid from the belt, band or rope, guiding means comprising bearings for the tension-pulley, dog-springs, on said guiding means, engaging with the sides of the well and a shank extending from the guiding means, a hammering-weight resting on said shank, but capable of being lifted therefrom, and means for lifting and releasing said weight.

3. In a mechanism for raising viscous liquid from a well, the combination with the traveling endless belt, band or rope of a driving-pulley, the grooved carrying-pulley for said belt, band or rope, scrapers applied to said belt, band or rope, and to the carrying-pulley, guiding means engaging with the sides of the

well, a hammering-weight connected to said guiding means with capability of a limited amount of relative vertical movement, means for lifting and releasing the hammering-weight and a tension-pulley for said belt, band or rope, pivoted in the aforesaid guiding means.

In testimony whereof I, the said WILLIAM EVERARD PEDLEY, have hereunto set my hand and seal, this 31st day of January, 1902, in the presence of two subscribing witnesses.

WILLIAM EVERARD PEDLEY. [L. S.]

Witnesses:
ST. JOHN DAY,
HADASSAH DAY.