(No Model.)

G. M. SHAW.

RATCHET APPARATUS.

No. 318,212. Patented May 19, 1885.

Fig 1.

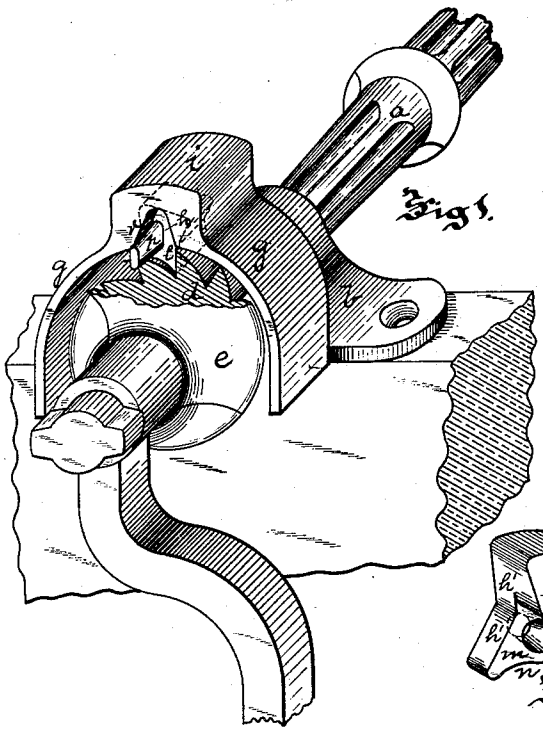


Fig 2.

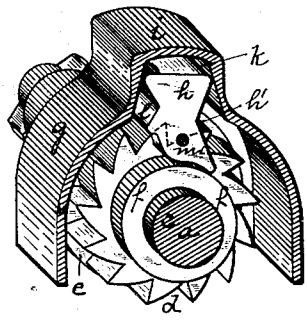


Fig 5.

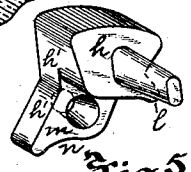


Fig 3.

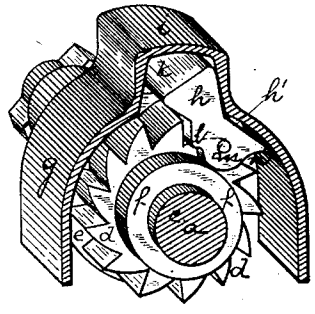


Fig 4.

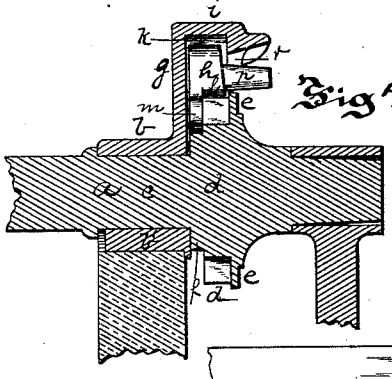
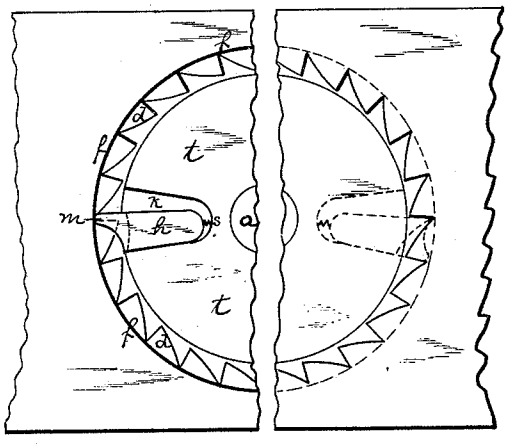


Fig 6



Witnesses.
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UNITED STATES PATENT OFFICE.

GENIO M. SHAW, OF PITTSBURG, PENNSYLVANIA.

RATCHET APPARATUS.

SPECIFICATION forming part of Letters Patent No. 318,212, dated May 19, 1885.

Application filed April 13, 1885. (No model.)

To all whom it may concern:

Be it known that I, GENIO M. SHAW, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new useful Improvement in Ratchet Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates, generally, to ratchet apparatus employed to prevent back movement of a shaft or axle to which it is applied. In the ordinary ratchet apparatus the pawl is held in contact with the ratchet-teeth either by spring or by gravity, and as a consequence as the ratchet-wheel is turned, the pawl drops or is pressed against each tooth, and so causes a "clicking" sound, more or less loud according to the size of the ratchet. This clicking sound has always been disagreeable; but it has never been overcome in ratchet and pawl devices.

The object of my invention is to provide a substantially silent ratchet device.

In consists, essentially, in providing a ratchet with a plain or friction face at one side of the toothed or ratchet face thereof, and combining therewith a pawl having a lug or tail-piece adapted to rest on said plain face, and when the shaft is turned in one direction be raised thereby, so as to hold the pawl clear of the ratchet, but where turned in the opposite direction allow the pawl to catch within the ratchet-face and hold the shaft.

It also consists in certain details of construction, hereinafter set forth.

To enable others skilled in the art to make and use my invention, I will describe the same, referring to the accompanying drawings, in which—

Figure 1 is a perspective view, partly broken away, of a pump-ratchet, illustrating my invention. Fig. 2 is a back perspective view, partly broken away, showing the position of the pawl when the shaft is turned in the right direction. Fig. 3 is a like view when the pawl catches in the ratchet and holds the shaft. Fig. 4 is a longitudinal central section showing the pawl in full lines. Fig. 5 is a view of the pawl, and Fig. 6 is a side view showing another form of my invention.

Like letters of reference indicate like parts in each.

My invention is illustrated in connection with the ratchet apparatus of chain-pump fixtures, though it is applicable to all forms of ratchet apparatus, the construction being altered according to the purpose for which it is used. In these chain-pumps the water is raised by means of cups or valves on an endless chain, which pass through a tube extending from the pump-box down into the water below the surface thereof, the chain passing over a reel mounted on the power-shaft. As the pump-tube is generally long and is filled with water when the pump is in operation, the weight of the water in the pump-tube draws back the chain when the handle is released, and it is necessary to have ratchet apparatus to hold the power-shaft and prevent the handle from flying back and injuring the person operating the pump. The shaft *a* is journaled in suitable bearing, *b*, on the pump-box or other suitable support. The power-shaft carries a reel, windlass, or other apparatus to be turned thereby. It has the bearing or neck *c*, fitting within the box *b'* of the bearing *b*, and in the construction preferred by me the ratchet-wheel *d* and disk *e* are cast with the shaft.

Between the ratchet-wheel *d* and neck *c* is the plain-faced wheel or pulley *f*, this pulley acting by friction upon the pawl to hold its tooth above the ratchet-face. The face of this pulley need not be wide, as its purpose is to form a support for a lug or tail-piece on the pawl. The disk, ratchet-wheel, and pulley may, if desired, be cast separately and secured upon the shaft.

In pump apparatus the ratchet-wheel and pulley and the pawl *h*, hereinafter referred to, are inclosed by the disk *d* and the case *g*, which is cast with and supported by the journal-bearing *b*, the case fitting closely over the top and side edges of the disk, as described in Letters Patent No. 299,171, granted to me May 27, 1884. At the top of the case is the extension *i*, the recess *k* being formed in this extension, and the pawl *h* fitting within this recess. Two forms of pawl *h* are shown in the drawings, that illustrated in Figs. 1 and 5 being the preferred form, it being a block having a pawl-tooth, *l*, and a tail-piece or lug, *m*, at the side of and extending down below it, and resting on the friction-face *f*, the lower face, *n*, of the lug corresponding in curve to the face *f*, so as to have a broad bearing therein, as shown by Fig. 2, while the lug curves

upward in front of the bearing-face *n*, so that the pawl may rock over into the position shown in Fig. 3 and permit the tooth *l* to engage with the ratchet-wheel. The back edge, *h'*, of the pawl *h* and the lug *m* correspond in shape to the inner wall of the case *g* and extension *i*, so that when the pawl engages with the ratchet it has a firm support against the wall of the inclosing-case. The recess *k* is of proper size and shape to allow the movement of the pawl as it is raised by the friction of the face *f* on the tail-piece *m*, or, on the opposite movement of the shaft, engages with the ratchet and is pressed against the opposite wall thereof. The pawl is provided with a thumb-piece, *p*, which extends out through the opening *r* in the extension *i* of the case, this thumb-piece being employed to raise the pawl to permit the back motion of the shaft. The pawl shown in Fig. 6 is tapering and fits within a tapering recess, only its point resting on the friction-face, and it engaging with the ratchet-face as it swings within its recess and is pressed out by its weight or the spring *s*. This form of pawl is illustrated in connection with another form of my invention, in which the ratchets are formed in a circle on the inner surface of a circular opening in a stationary frame, within which rotates the shaft *a*, carrying a disk, *t*, in which the pawl *h* is located, the pawl having the tail-piece *m*, which travels on the plain surface *f*, beside the ratchet-face *d*, and a spring, *s*, being placed within the recess *k* to force out the pawl.

When the ratchet apparatus is in operation, the power or reel shaft *a* is turned in the desired direction and the friction of the plain-faced pulley or surface *f* on the base of the tail-piece *m* resting thereon causes the pawl *h* to swing forward until it presses against one side wall of the recess *k*, the pawl being at the same time raised within the recess, and the pawl-tooth *l* being thus raised above the ratchet, as shown in Fig. 2, and the ratchet-wheel *d* traveling under the pawl-tooth, the friction of the plain-faced pulley or surface *f* on the lug *m* holding the pawl in this position so long as the shaft is turned in that direction, so that the apparatus is noiseless. As soon, however, as the shaft *a* is slackened up and stopped any back-pressure tending to draw the shaft in the opposite direction will, by the friction or pressure of the friction-surface *f* on the tail-piece *m*, cause the pawl to swing to the opposite side wall of the recess *k*, as shown in Fig. 3, and the pawl is thus lowered until the pawl-tooth *l* engages with the teeth of the ratchet-wheel, and so holds the shaft from back movement. As the tail-piece *m* is at one end of the base of the pawl it is evident that the weight of the pawl or the spring *s* back of the pawl assists in causing it to engage with the ratchet-wheel.

When it is desired to turn the shaft backward, the operator, simply through the thumb-piece *p*, presses the pawl into the position shown in Fig. 2, so that the pawl-tooth *l* is held above the ratchet, thus permitting the shaft to be turned back.

The apparatus is simple and strong, as the pawl is held in a strong seat, and may be made as heavy as desired, according to the purpose employed, and all pivotal pins or like bearings are done away with.

It is evident that the exact construction of the parts may be changed according to the construction of the ratchet apparatus, the essential feature of the plain face beside the ratchet-face acting to raise the pawl out of the course of the ratchet being preserved.

What I claim is—

1. In a ratchet apparatus, the combination, with the ratchet-face and pawl, of a plain surface beside said ratchet-face, adapted to press against and raise the pawl above the ratchet-face, substantially as and for the purposes set forth.

2. In ratchet apparatus, the combination of a ratchet-face, a plain surface beside it, and a pawl having an engaging-tooth and a lug or tail-piece resting against said plain surface, substantially as and for the purposes set forth.

3. In ratchet apparatus, the combination, of a ratchet-face, a plain surface beside it, and a pawl having an engaging-tooth, and a lug or tail-piece pressing against said plain surface, said pawl swinging within a recess of greater width at the base than the pawl, substantially as and for the purposes set forth.

4. In ratchet apparatus, the combination of the shaft *a*, ratchet-wheel *d*, plain-faced pulley *f*, inclosing-case *g*, having the recess *k* and opening *r*, and the pawl *h*, having the tooth *l*, tail-piece *m*, and thumb-piece *p*, substantially as and for the purposes set forth.

5. In ratchet apparatus, the combination of the ratchet-face *d*, plain surface *f*, and pawl *h*, having the tooth *l* and tail-piece *m* at the opposite sides of the base thereof, substantially as and for the purposes set forth.

In testimony whereof I, the said GENIO M. SHAW, have hereunto set my hand.

GENIO M. SHAW.

Witnesses:

JAMES I. KAY,

J. M. COOKE.