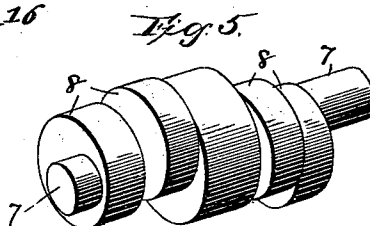
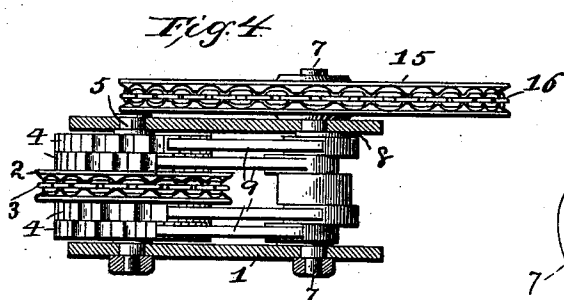
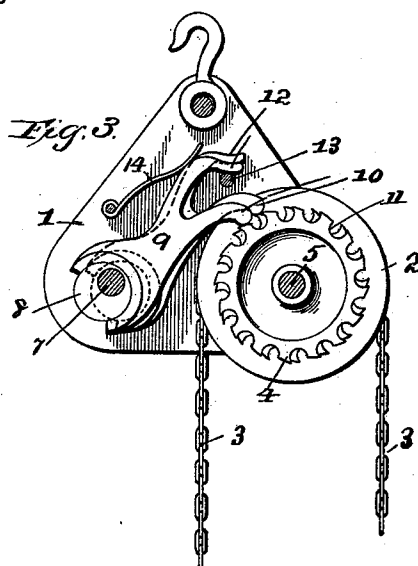
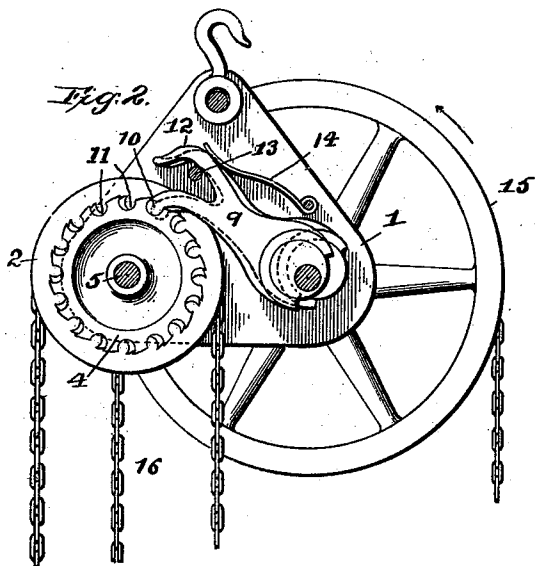
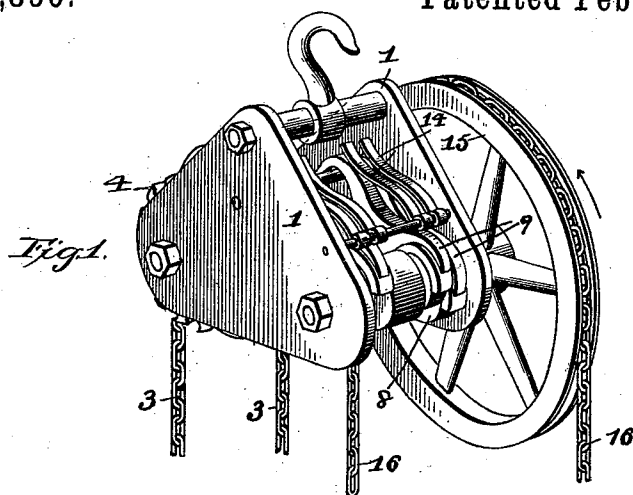


(No Model.)

H. MEIER.
HOIST.

No. 554,890.

Patented Feb. 18, 1896.



Witnesses
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By

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UNITED STATES PATENT OFFICE.

HERMAN MEIER, OF PHILADELPHIA, PENNSYLVANIA.

HOIST.

SPECIFICATION forming part of Letters Patent No. 554,890, dated February 18, 1896.

Application filed May 21, 1895. Serial No. 550,057. (No model.)

To all whom it may concern:

Be it known that I, HERMAN MEIER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hoists, of which the following is a full, clear, and exact specification.

My invention relates to a new and useful improvement in hoists, and has for its object to provide such a device which shall produce a continuous motion of the lift-chain in either its upward or downward movement by a set of reciprocating pawls, to which motion is imparted by a series of cams actuated by a hand or chain wheel.

With this end in view the invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which my invention appertains may understand how to make and use the same, I will describe its construction and operation in detail, referring by number to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective of my improved hoist; Fig. 2, a vertical section taken so as to show one set of ratchets and their pawls; Fig. 3, a similar view looking from the opposite side and showing the other set of ratchets and their pawls; Fig. 4, a sectional plan view showing the relative position of the ratchets and pawls, and Fig. 5 a detail perspective of the eccentrics.

Similar numbers denote like parts in the several views of the drawings.

1 represents the casing of any convenient form to support the several operating parts of the device, and 2 is the lift-chain wheel, having formed in its periphery a groove provided with the usual cogs, with which the lift-chain 3 is adapted to mesh in the well-known manner. Formed with or secured to this wheel are the ratchet-wheels 4, preferably four in number and set out of alignment with each other that their teeth divide the space occupied by one tooth of each wheel into four equal parts, for the purpose presently explained. This nest of wheels is jour-

naled upon the shaft 5, secured in the frame 1 by nut 6.

7 is a shaft journaled within the frame 1, and upon this shaft is formed the stepped eccentrics 8, as shown in Fig. 5, and for the purpose to be hereinafter explained.

9 are pawls, the rear ends of which are so formed as to embrace the eccentrics 8 and receive motion therefrom. At the forward end of each of these pawls is formed a nose 10, adapted to fit the circular notches 11 of the ratchet-teeth, and 12 are extensions formed with the pawls and adapted to bear against the pin 13, extending across the frame of the device. 14 are suitable springs bearing upon these extensions to hold them in their normal position.

On one end of the eccentric-shaft 7 is placed a hand chain-wheel 15, whose periphery is so formed as to be adapted to a chain 16, by which motion is imparted to the wheel. Upon operating the chain-wheel in the direction of the arrow the pawls 9 will be caused to reciprocate by the eccentrics, and this motion will be imparted to the ratchets by the engagement of the noses 10 with the teeth of said ratchet, and as the eccentricities of the eccentrics are ninety degrees apart and the teeth of the ratchets set correspondingly relative to each other it follows that first one pawl will operate upon its ratchet and when nearing the dead-center of its eccentric will slow up, permitting the pawl actuated by the next eccentric, which will be moving at a greater speed, to come into engagement with the teeth of its ratchet and carry the first-named tooth without the field of action of the first-named pawl, and this operation will be taken up and repeated by each pawl in turn, as it nears its position of fastest movement, so that the chain-wheel 2, during the revolving of the cam-shaft, will receive a continuous motion from the reciprocating pawls. Thus it will be seen that a very powerful strain may be brought to bear upon the lift-chain wheel to enable it to accomplish its function.

In reversing the movement of the wheel 2, to lower its chain or weight carried thereby, the hand chain-wheel 15 is turned in the opposite direction to the arrow, causing the pawls to be reciprocated, but lifting their rear

ends upon the first part of their stroke instead of depressing them, as is the case when the wheel 15 is turned in the direction of the arrow, as before described, and since the noses 5 10 of the pawls fit the notches 11 of the ratchets said ratchets will be moved backward by said pawls until the curved ends of the extensions 12 come in contact with and ride upon the pin 13, when said noses will be lifted clear of the 10 ratchet-teeth, as will be readily understood by reference to Fig. 3, and since the pawls do not work in unison, as before described, it follows that one or more of the noses 10 will be in engagement with the notches 11 at all 15 times, so that the ratchets will never be free to move backward faster than the pawls. By this arrangement the lift-chain wheel is enabled to sustain any weight within its capacity without backing, as the eccentricity of the 20 eccentrics is not sufficient to overcome the inertia of the eccentric-shaft wheel 15 by the thrust of the pawls thereon.

A great advantage gained by my construction is that the slack in the lift-chain may be 25 taken up until said chain is taut and the load ready to be lifted by simply pulling upon the opposite end of said chain, as the pawls will ride upon the teeth of the ratchets, thus permitting the lift-chain wheel to revolve during 30 this process; also, when it becomes desirable to lower the lift-chain rapidly the pawls may be thrown out of engagement with the ratchets by any suitable mechanism, when the lift-chain wheel will be free to revolve backward.

35 While I have shown four ratchets and pawls, it is obvious that a lesser or greater number might be used to accomplish the same result, depending upon the maximum load intended

to be lifted by the hoist, as the greater the number of ratchet-wheels, pawls, and eccen- 40 trics used the greater the capacity of the device, since the pawls would act upon the ratchets through a smaller part of their reciprocation, and that part would be when the eccen- 45 trics were nearer their dead-centers, thereby increasing their power upon said pawls.

Having thus fully described my invention, what I claim as new and useful is—

1. In a hoist, the combination of a shaft, a hand chain-wheel mounted thereon, stepped 50 eccentrics arranged on a second shaft, a ratchet having a series of teeth set out of alignment, pawls operated by the eccentrics and having noses engaging the ratchet and provided with an extension along the nose, a 55 pin on which the extension rides to elevate the noses out of engagement with the ratchet-teeth, for the purpose described.

2. In a hoist, the combination of a shaft, a hand chain-wheel mounted thereon, stepped 60 eccentrics arranged on a second shaft, a ratchet having a series of teeth set out of alignment, pawls having semicircular recesses in their ends to embrace the eccentrics and on their opposite ends a nose to engage the 65 ratchet-teeth, and a curved extension above the nose riding on a pin to elevate the nose out of engagement with the ratchet-teeth, as and for the purpose described.

In testimony whereof I have hereunto af- 70 fixed my signature in the presence of two subscribing witnesses.

HERMAN MEIER.

Witnesses:

S. S. WILLIAMSON,

E. C. WURDEMAN.