M. KAPFERER.

RATCHET DEVICE.

APPLICATION FILED NOV. 22, 1913.

1,121,507.

Patented Dec. 15, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

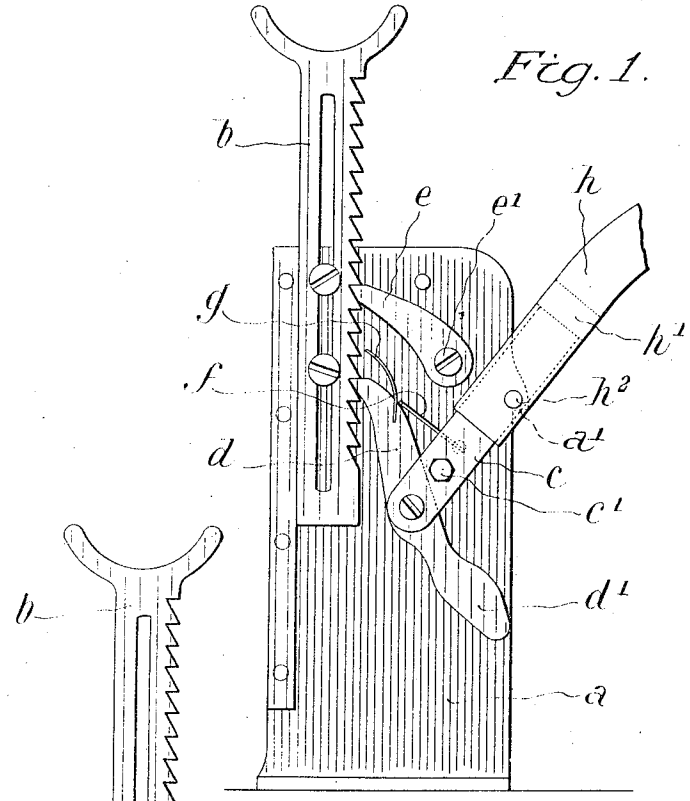
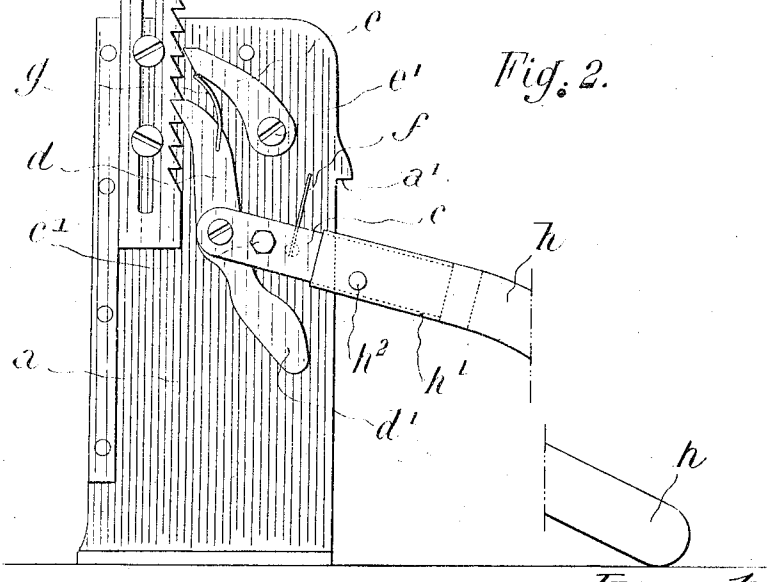


Fig. 2.



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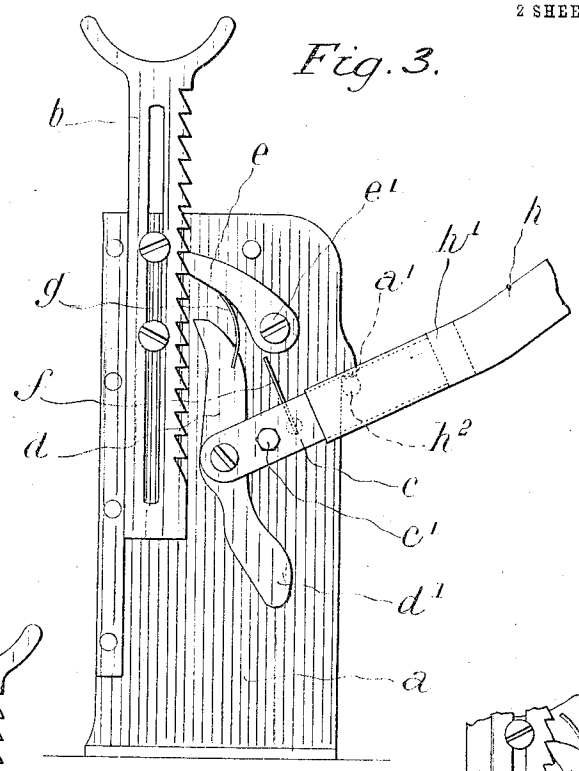
2 SHEETS—SHEET 2.

Fig. 3.



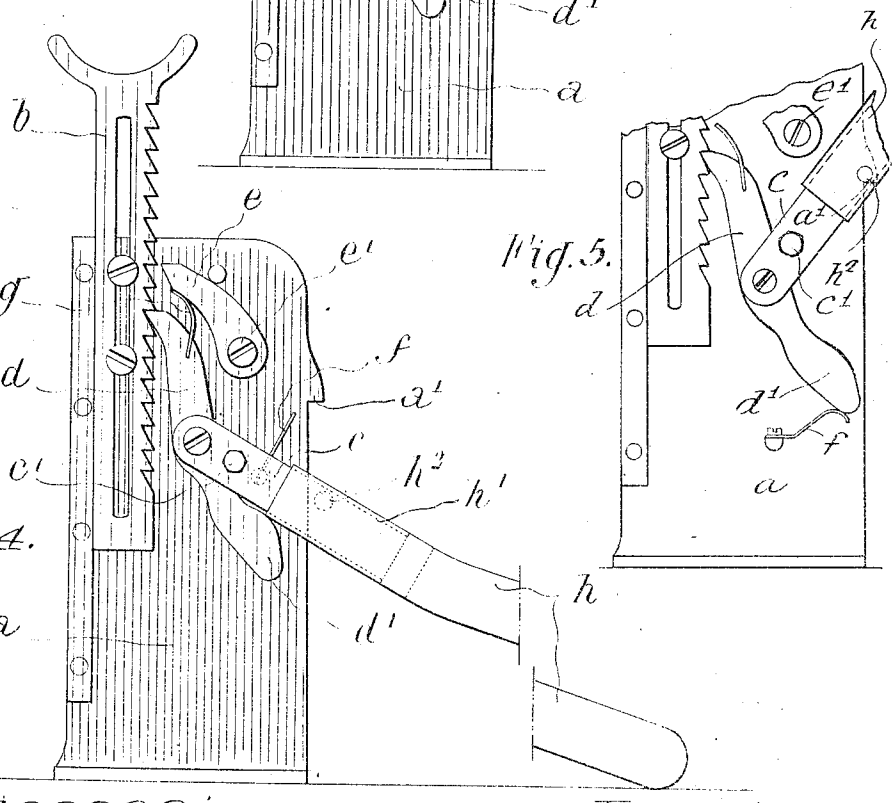


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

MAURICE KAPFERER, OF PUTEAUX, FRANCE.

RATCHET DEVICE.

1,121,507. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed November 22, 1913. Serial No. 802,470.

To all whom it may concern:

Be it known that I, MAURICE KAPFERER, residing in Puteaux, Seine, France, have invented certain new and useful Improvements in Ratchet Devices, of which the following is a specification.

This invention relates to a ratchet device adapted more particularly for use in vehicle jacks, winches, or the like, but quite generally applicable to all such arrangements in which a toothed member such as a rack supporting a load is to be moved intermittently to and fro by means of an oscillating ratchet pawl.

The drawings illustrate the invention applied to a lifting jack for automobiles, and in said drawing: Figures 1 and 2 represent the device in the two respective extreme positions during the hoisting of the load. Figs. 3 and 4 illustrate in a corresponding manner the position of the mechanism during the lowering of the load. Fig. 5 is a fragmental view showing a modified arrangement of the abutment which coöperates with the controlling pawl.

The lifting jack consists in a known manner of a frame *a* guided on which in a vertical direction is a toothed rack *b* provided with the supporting fork. Pivoted to the frame at *c'* is a lever *c* provided at the end nearest the rack *b* with a controlling pawl *d* which is pivotally secured thereon. Rotatably pivoted at *e'* in the frame *a* is a locking pawl *e* which is so arranged as to tend, for instance, by its own weight, constantly to engage with the rack *b*. A peculiar characteristic of this controlling device resides first of all in the fact that the controlling pawl *d* is under the influence of a force constantly tending to hold the pawl in the position shown in Fig. 3, that is to say, out of engagement. This is effected in the simplest manner, as shown in the drawing, by the provision thereon of a counterweight *d'*. A further peculiarity consists in that the reversal of the controlling movement is effected by a displacement of the working path of the controlling pawl *d* in order to throw this pawl into engagement in one of its extreme positions by means of an abutment, at will. As can more particularly be recognized from the positions of the lever *c*, the extreme positions maintained during hoisting (Figs. 1 and 2) are both lower than those for the lowering shown in Figs. 3 and 4.

In the lowest position (Fig. 1) the controlling pawl is brought into engagement with rack *b* by an abutment arranged either on the frame *a* or on the lever *c*. In the construction shown an elastic abutment is used in the form of a leaf-spring *f* which is represented in Fig. 1 as attached to the lever *c*, and in Fig. 5 as attached to the frame. Now when the load is hoisted the controlling pawl is held in the operative position by the back pressure or weight of the load, (Fig. 2). In the subsequent return movement the locking pawl *e* drops into engagement and holds the rack *b* in the position attained while the controlling pawl is released by the weight of the arm *d'*. During the return movement the controlling pawl remains out of engagement and only on the lowest position being reached is forced into engagement by the spring *f*. In this manner a continuous advance movement of the rack may be attained for hoisting purposes. If the movement is to be reversed the controlling pawl *d* is lowered only to such an extent that the spring *f* does not bear on it. The controlling pawl therefore remains out of engagement during the upward movement (Fig. 3). It is, however, moved to a certain extent beyond the highest position previously attained (Fig. 4). By this movement an abutment is rendered operative which at the beginning of each return movement throws the controlling pawl into engagement. At the same time the locking pawl is released by this further movement. If the locking pawl itself is used as abutment both actions may in the simplest manner be attained by an elastic member influencing both pawls. To this end a leaf-spring *g* is provided on the controlling pawl, as shown. In the position in Fig. 3, this spring is in contact with the locking

pawl *e* which is held in its position by the load and in gliding along the locking pawl effects directly the engagement of the controlling part. So soon as the latter has entered the teeth of the rack it suffices to raise the rack slightly in order to release the locking pawl and to move it away from the tooth which was previously engaged. Now in the return movement the controlling pawl is held in engagement by the pressure of the load until the locking pawl is caused again to engage, after which the controlling pawl owing to the free action of the weighted arm *d'* is automatically raised out of engagement. The movement is now reversed before the spring *f* is brought to bear on the controlling pawl. In this manner a continuous return movement of the rack or lowering of the load is attained. In the present arrangement, therefore, it suffices to add to the two pawls merely two simple elements, namely, the leaf-springs *f* and *g* which obviously could be arranged in a modified manner and if desired be replaced by abutments of any other kind adapted to attain the double controlling action. The raising of the load takes place when the controlling pawl is moved solely within the lower area of its oscillating scope and the lowering of the load when the movement is restricted to the upper area of that scope.

Now it may be desired to determine the amplitude of the operating lever *c* or of the controlling pawl *b* in both cases by appropriate stops and to this end the device is amplified in the following manner: Connected to the lever *c* is a detachable handle *h* which may be arranged in two different positions and thereby enables different abutments to become operative. The handle by preference consists of a curved or angular member *h* slipped over the lever *c* by means of a sleeve-shaped portion *h'*. During the raising of the load the member *h* is so positioned as to be inclined downwardly with regard to the lever *c*. The free end of this handle then strikes the ground, as shown in Fig. 2, on the controlling pawl being raised, at the desired time, that is to say, prior to the spring *g* coming into contact with the locking pawl *e*. In the opposite position the throw is limited by the locking pawl *e*. In order to lower the load the handle is so placed on the lever *c* as to be inclined upwardly with regard thereto, thereby enabling the spring *g* to become operative (Fig. 4), before the handle end strikes the ground. In this opposite position a stop h^2 arranged on the sleeve *h'* is caused to bear on a lug *a'* of the frame whereby the controlling pawl is held fast slightly below the position in which the spring *g* is out of action.

Obviously the abutment adapted to be rendered operative by reversing the handle *h* may be modified and more particularly the lower limit instead of being formed by the ground or floor may be constituted by an abutment actually provided on the frame. The bending or offsetting of the handle *h* is preferably so dimensioned as to cause the free end thereof in both positions to move within the same height thereby rendering the handling easier since the operation of the lever in both cases may take place in the most favorable working position.

What I claim and desire to secure by Letters Patent is:—

1. A ratchet device for load lifting jacks, comprising a controlling pawl arranged under the constant influence of a force tending to hold the said pawl out of engagement and adapted forcibly to be engaged solely in two extreme positions by means of abutments so as to act as a hoisting or lowering pawl according to its movement between one of two extreme positions and a central position.

2. A ratchet device for load lifting jacks, comprising a controlling pawl arranged under the constant influence of a force tending to hold it out of engagement, a locking pawl, a rack adapted to support the load and to engage with either or both pawls, and a lever for operating the pawls so that the controlling pawl in the hoisting movement is caused to engage with the said rack by a leaf-spring on the operating lever prior to each upward movement and that in the lowering movement prior to each downward movement another leaf-spring arranged on one of the two pawls causes the controlling pawl to engage and thereafter by its release automatically controls the locking pawl, substantially as set forth.

3. A ratchet device for load lifting jacks, comprising a controlling pawl arranged under the constant influence of a counterweight tending to hold the pawl out of engagement, a locking pawl and an operating lever carrying the said controlling pawl and provided with a reversible handle having its free end bent so that after reversing the handle the working path of the controlling pawl is displaced without varying the amplitude of movement of the handle, substantially as set forth.

4. A ratchet device for load lifting jacks, comprising a controlling pawl subjected to the constant influence of a counterweight tending to hold the pawl out of engagement, an operating lever carrying the said controlling pawl, a reversible handle on the said lever, and abutments so actuated by the reversal of the said handle that the oscillation of the lever is limited in a central position according to the controlling direction desired, substantially as set forth.

5. A ratchet device for load lifting jacks, comprising in combination a toothed rack adapted to support the load, a controlling pawl provided with a counterweight tend-

ing to hold the said pawl constantly out of engagement with the said rack, an operating lever to which the said controlling pawl is pivoted, a locking pawl pivoted independently of the said controlling pawl, a leaf-spring arranged between and adapted to coöperate with the said two pawls, a leaf-spring connected to the said operating lever and a reversible curved handle on the said lever, all substantially as described and shown.

In testimony whereof I have affixed my signature in presence of two witnesses.

MAURICE KAPFERER.

Witnesses:

PAUL BLUM,
HANSON C. COXE.