

L. CHEVENIER.  
TACKLE.

APPLICATION FILED DEC. 23, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

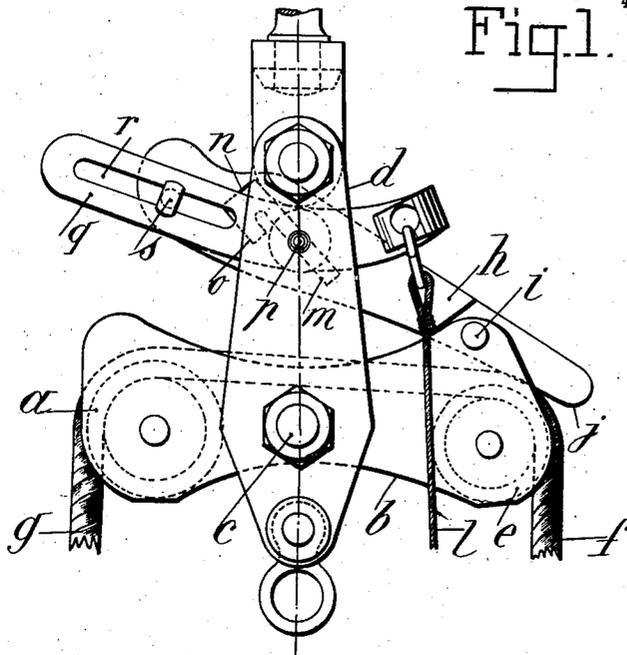


Fig. 1.

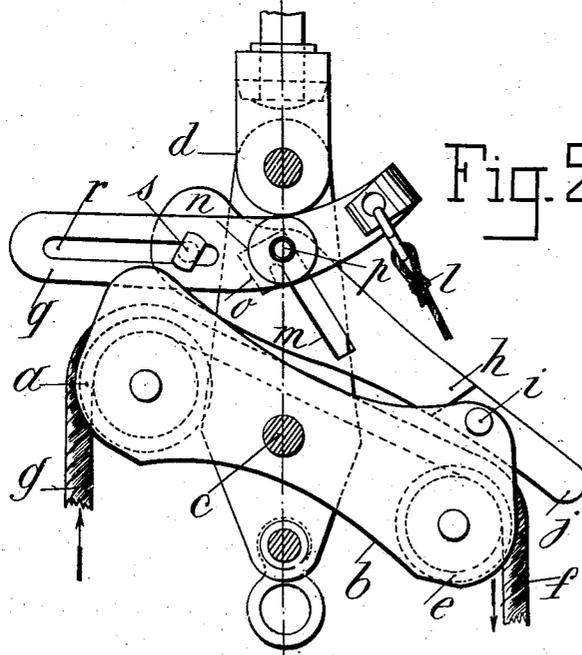


Fig. 2.

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4 SHEETS—SHEET 2.

Fig. 3.

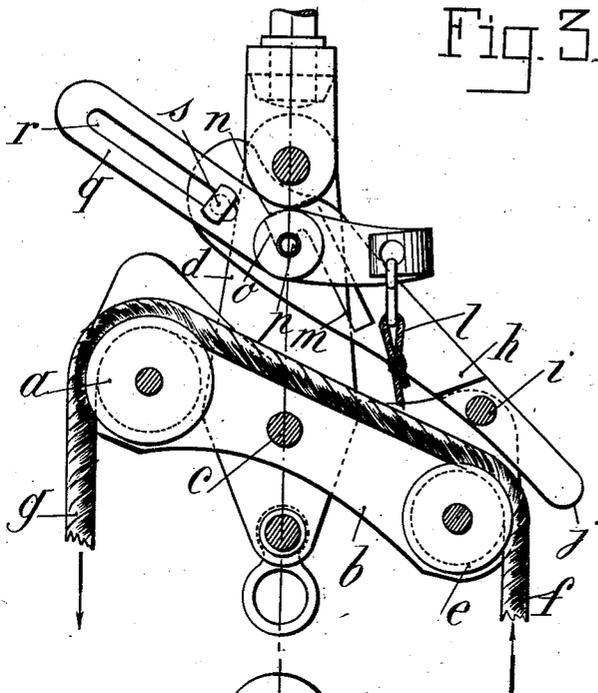
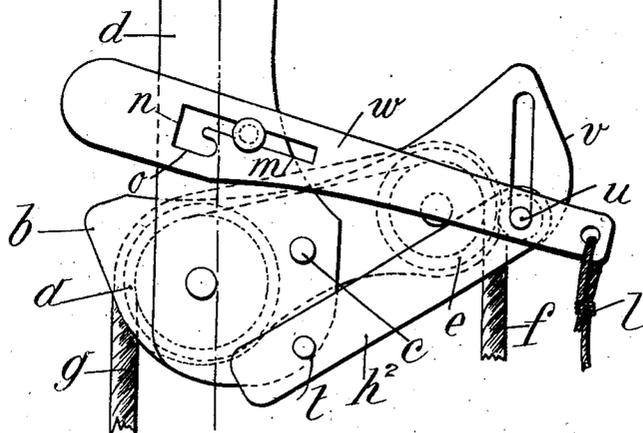


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 8.

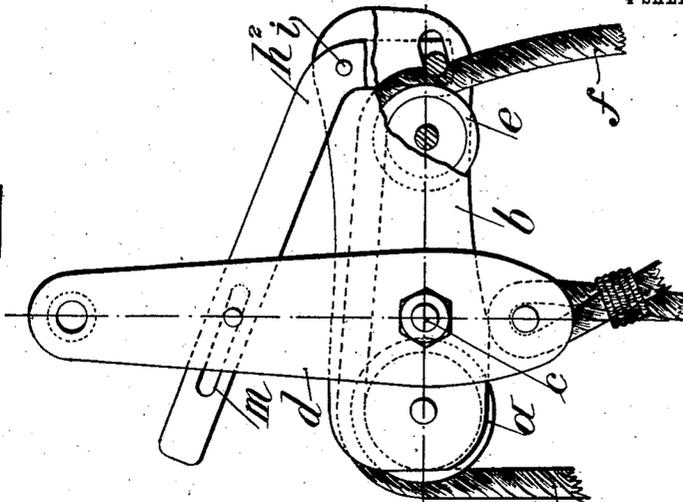


Fig. 5.

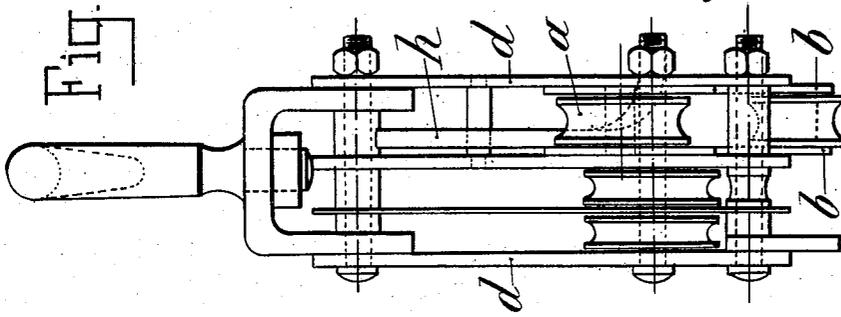
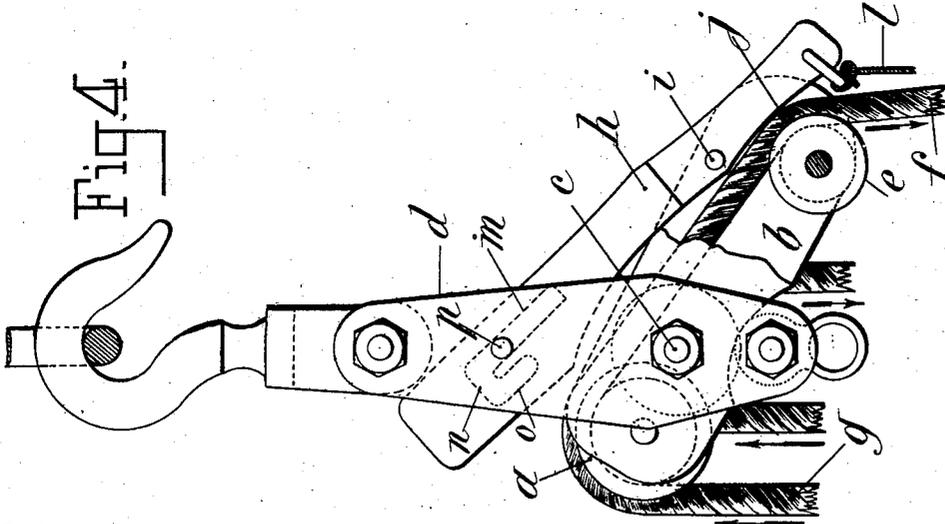


Fig. 4.



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No. 739,986.

PATENTED SEPT. 29, 1903.

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4 SHEETS—SHEET 4.

Fig. 10.

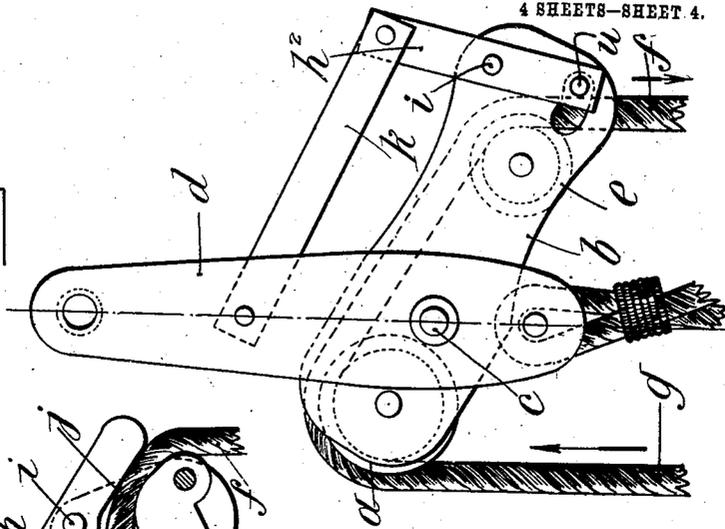


Fig. 7.

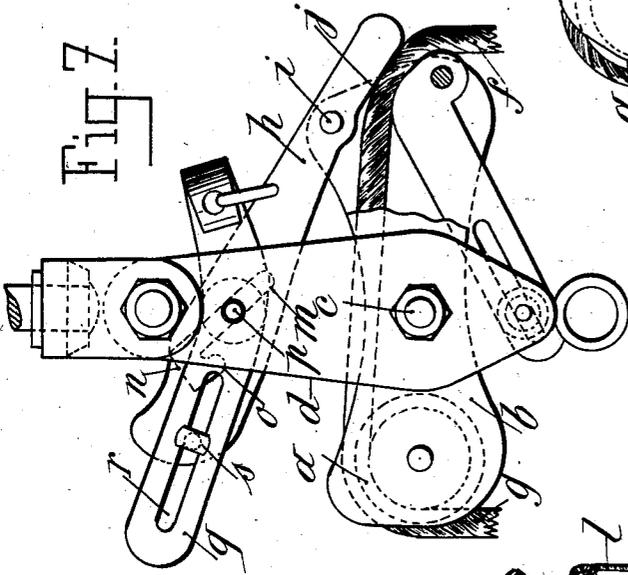
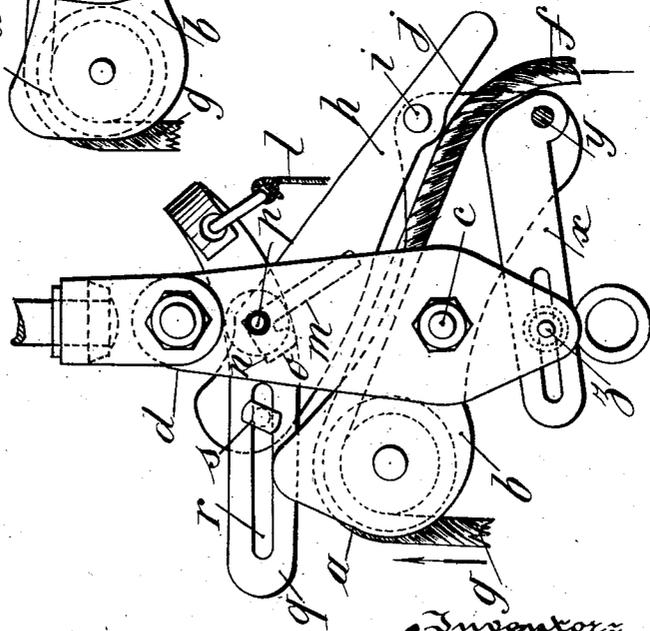


Fig. 6.



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# UNITED STATES PATENT OFFICE.

LOUIS CHEVENIER, OF ST. SYMPHORIEN DE LAY, FRANCE.

## TACKLE.

SPECIFICATION forming part of Letters Patent No. 739,986, dated September 29, 1903.

Application filed December 23, 1902. Serial No. 136,331. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS CHEVENIER, a citizen of the Republic of France, residing at St. Symphorien de Lay, Loire, in the Republic of France, have invented a new and useful Improvement in Tackle, which improvement is fully set forth in the following specification.

This invention has for its object a very simple safety apparatus which is applicable to tackle having one or several pulleys. The said safety apparatus insures that when there is no longer any strain upon the rope the load, however heavy, shall remain in suspension. For this purpose in place of mounting the last pulley of the upper set of a tackle upon a fixed axis I mount the axis at the end of the short arm of a lever of the first order, which is pivoted to the link. From this pulley the rope passes over the other end of the said lever upon which the stop mechanism acts. The strain on the hauling-rope and on the rope passing over the last pulley being substantially equal and the hauling-rope acting upon the arm of the lever, which is longer than that on which the said pulley is mounted, the oscillating lever will incline to the side of the hauling-rope when the latter is pulled. It is, on the contrary, raised when the action of the load becomes the greater from the fact that the rope is no longer hauled. This angular movement is utilized for actuating the safety arrangement, as will hereinafter be described.

In the annexed drawings the upper system of pulleys of several tackles provided with my improved arrangement are shown by way of illustration.

Figure 1 is an elevation of a system of pulleys in the position in which the rope is firmly nipped by the safety arrangement. Fig. 2 shows the same system of pulleys, the front plate of the link having been removed the position of the parts corresponds to when the load is lifted. Fig. 3 is a similar view, partly in section, of the same system of pulleys in the position they assume when the load is being lowered. Figs. 4 and 5 show, respectively, a face view, partly in section, and a side elevation of a modification of my arrangement as applied to a system of three pulleys. Figs. 6 and 7 show the two positions of another form of my safety arrangement applicable, prefer-

ably, to smooth and greasy ropes. Lastly, Figs. 8, 9, and 10 show three other modifications.

In all figures the same letters indicate the same or analogous parts.

*a* is the last pulley of the upper set of pulleys. It is mounted at the end of the short arm of the oscillating lever *b*, pivoted at *c* to the link *d*. At the other end of the lever *b* is a small auxiliary pulley *e*, Figs. 1 to 5 and 8 to 10, over which the rope *f* passes. The said pulley may be replaced by a fixed piece, a cross-bar or otherwise, or a movable part for the purpose of increasing the nip on the rope in the position of rest. (See Figs. 6 and 7.)

While the load is being lifted, the strains upon the rope *f* and upon the rope *g*, passing over the pulley *a*, are nearly equal. The lever-arm on which the pulley *e* is mounted being larger than that on which the pulley *a* is mounted, the lever *b* is tilted to the side of the rope *f*; but so soon as the pull on the rope *f* ceases the strain on the rope *g* becomes the greater and raises the oscillating lever *b*. I utilize this angular movement for actuating a stop-lever *h*, pivoted at *i* to the lever *b*. The extremity *j* of said lever nips the rope *f* so soon as the lever *b* is lifted. For this purpose the levers *b* and *h* form with the link *d*, and in some cases with a supplementary piece, (a connecting-rod *k*, Fig. 10,) a polygon, triangle, (with a sliding side,) or quadrilateral figure, which are capable of deformation. When after leaving the apparatus at rest it is wished to continue to raise the load, it is only necessary to haul upon the rope *f* in order to again tilt the lever *b*, remove the lever *h j* from the rope, and thus leave it free to move. When, on the contrary, it is desired to allow the load to descend, it is necessary, first, to place the lever *b* in its inclined position by hauling upon the rope to disengage it, and, second, to prevent the lever *b* from lifting under the influence, which is now the preponderating one, of the load.

In order to maintain the lever *b* in its lowered position, a cord *l* is made use of. It is attached to the stop-lever *h*, Figs. 4 and 5. This arrangement is, however, inconvenient, because as the lever-arm is fairly long there is always risk, on inadvertently pulling the cord, of releasing the rope when there is no strain upon it. The load being no longer re-

tained then descends and may cause grave accidents. I consequently prefer to use the arrangements shown in Figs. 1, 2, 3, 6, and 7, which are applicable more particularly to triangular apparatus capable of deformation. In this arrangement the longer arm of the stop-lever *h* is slotted at *m*, the slot being curved at *n* and provided with a short retreating portion *o*. The slot slides upon the pin *p*, fixed to the link *d*, and allows freedom of movement to the lever *h*, and consequently to the lever *b*, for so long as the said pin *p* does not penetrate into the branch *n* or into the retreating portion *o*; but when by hauling upon *f* the lever *b* is lowered to the point at which the pin *p* is opposite the bend *n* of the slot it is only necessary to lift the lever *h* for the pin to become lodged in the retreating portion *o*, and thus prevent the apparatus from returning into the stop position so soon as the charge commences to descend.

In order to lift the lever *h*, a cord *l* is provided attached to one end of a lever *g*, turning upon the pin *p*. The other arm of the said lever is provided with a slot *r*, in which moves a bolt *s*, fixed to the free end of the lever *h*. As will be seen, it is only necessary to pull the cord *l* in order to lift the lever *h*, but for this purpose it is necessary that the pin *p* shall be at the end of the slot *m*. It will be understood, therefore, that no pull upon the cord *l* can oscillate the lever *b* and disengage the rope *f*, and thus cause the unexpected descent of the load.

In the modification shown in Figs. 4 and 5 the cord *l* acts directly upon the lever *h*, which it also raises when the curved portion of the slot *m* is opposite the pin *p*. In this case again the pin *p*, becoming lodged in the retreating portion *o* of the slot, prevents the lever *b* from being lifted.

Fig. 9 shows a modified arrangement with a triangle capable of distortion in which the slot is formed in the lever *b*. The stop-lever *h*<sup>2</sup>, formed of two thin tongues, is pivoted at *t* to the bottom of the link *d*, and the tie-stud *u*, which joins together the ends of the two tongues, slides in slots *v*, formed in the oscillating lever *b*. When the latter is raised under the greater influence of the load, the pulley *e* (or the portion substituted for it) nips the rope *f* against the tie-stud *u*.

In order to enable the apparatus to be maintained in working position during the descent of the load, an auxiliary lever *w*, to which the cord *l* is attached, is jointed to the stud *u* and is provided with a slot *m*, exactly similar to that in the stop-lever *h* in Figs. 1 to 7. A similar auxiliary lever may be adapted to the quadrilateral apparatus (shown in Fig. 10) in order to produce the same effects, and the said auxiliary lever may also be raised or lowered by a small lever *q*, identical to that shown in Figs. 1, 2, and 3.

In the case in which it is necessary to use very smooth or even greasy cords it may be well to roughen either the throat of the pulley

*e* or the portion *j* of the lever *b* which nips the rope. The pulley *e* may even be replaced by a fixed portion, or, again, as shown in Figs. 6 and 7, a second stop-lever *x* may be provided, forming, with the lever *b*, a nipper, which strongly nips the rope when the oscillating lever is lifted. The lever *x*, which is of the second order, is pivoted at *y* to the lever *b* and is provided with a straight slot which slides upon a pin *z* on the link. If necessary, the rubbing portion of the lever *x* may also be roughened transversely. It will be seen that in this case there are two triangles with combined action capable of being distorted.

The details of construction may be modified.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a tackle provided with a plurality of pulleys, a block in the form of a lever of the first class supporting at its shorter end the last of said pulleys, a link from which said block is pivotally suspended, a pulley or its equivalent at the longer arm of the block, a rope arranged to pass over the pulleys at both ends of the block, and a nipping bar or lever pivoted intermediate of its ends in said link and pivoted at one end in the lever-block adjacent to the pulley in the longer arm of said block, all arranged so that when the shorter arm of the block descends under the weight of the load on the rope the longer arm rises and binds the rope against the nipping bar or lever.

2. In a tackle, a lever-block pivoted intermediate of its ends to a link or support so that the arms of said block are of varying length, a pulley over which the rope supporting the load passes, said pulley pivoted in the shorter arm of said block, a nipping pulley or piece carried by the longer arm of said block and a nipping-lever pivoted intermediate of its ends in the link or support and pivoted at one end in the longer arm of the block to form with said link and block a polygon between one angle of which the rope passes, said polygon arranged to be deformed to open or close said angle by the movement of the block in response to either the lifting-pull or the weight of the load upon said rope.

3. In a tackle wherein a rope is arranged to pass between an angle of a polygon formed by an oscillating block, a link to which said block is unsymmetrically pivoted and a nipping-lever pivoted to the link and to the longer arm of said block, a stop-lever arranged to control the movement of the nipping-bar upon its pivotal connection in said link.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS CHEVENIER.

Witnesses:

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EDWARD P. MACLEAN.