A. A. C. GESE.

ELECTRIC HOIST.

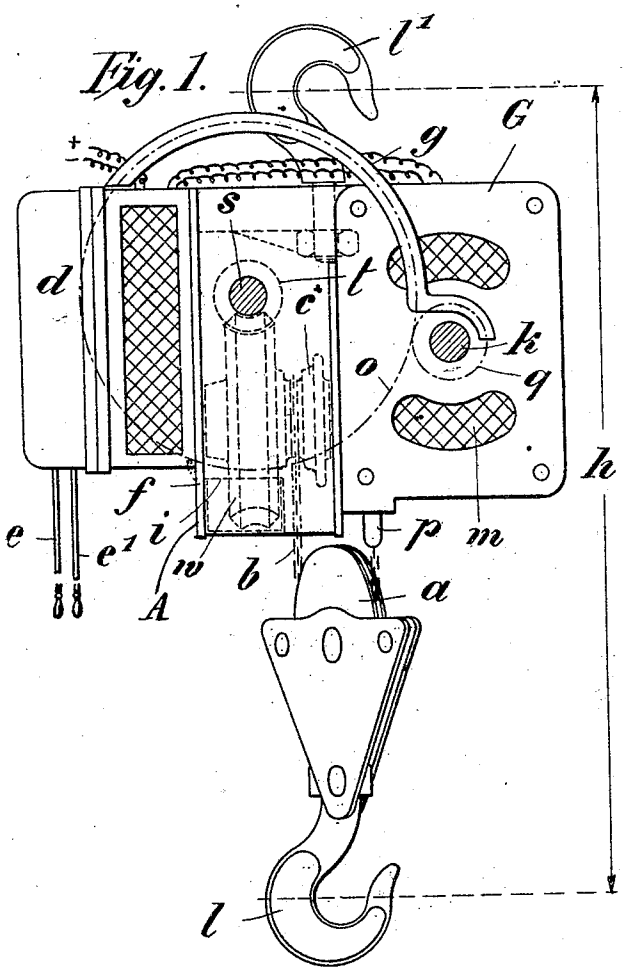
APPLICATION FILED APR. 29, 1908.

935,363.

Patented Sept. 28, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

Jesse N. Sutton.

M. J. L. Higgins.

Inventor.

Alfred August Conradin Gese

by Henry Orth & Co. Attys.

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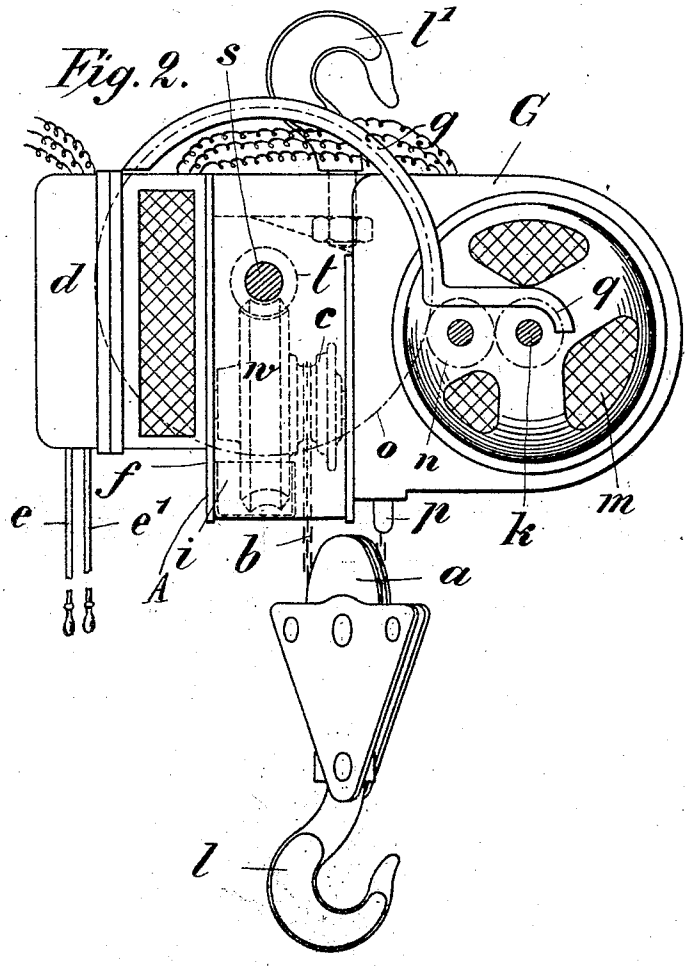
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

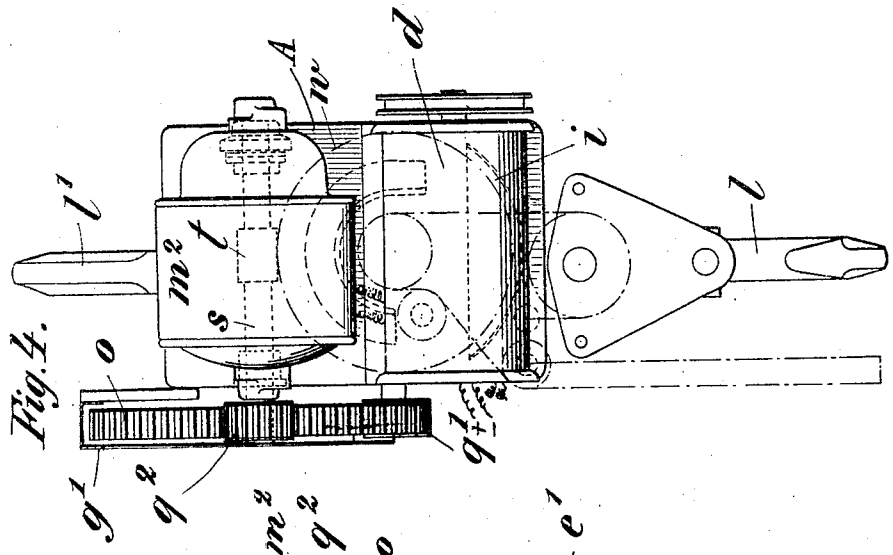
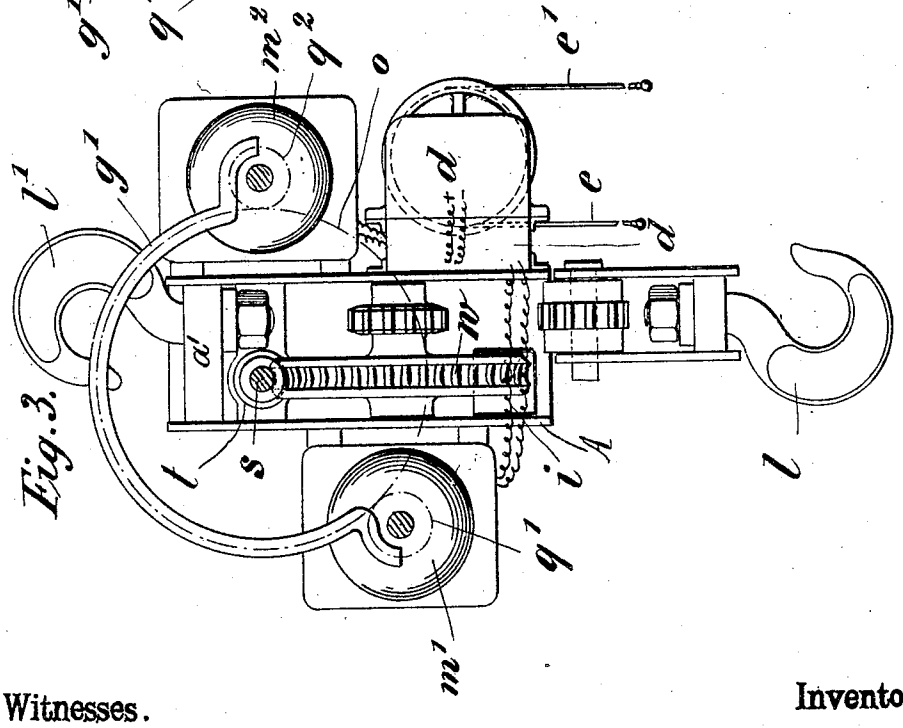


Fig. 3.



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UNITED STATES PATENT OFFICE.

ALFRED AUGUST CONRADIN GESE, OF BREMEN, GERMANY.

ELECTRIC HOIST.

935,363. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed April 29, 1908. Serial No. 430,012.

To all whom it may concern:

Be it known that I, ALFRED AUGUST CONRADIN GESE, a subject of the German Emperor, and resident of Bremen, Germany, have invented certain new and useful Improvements in Electric Hoists, of which the following is a specification.

This invention relates to improvements in electrically driven hoisting tackle or hoists and has for its object to produce a compact and well balanced structure of a height not greater than the usual hand operated hoists.

With this object in view the invention consists in mounting the hoisting drum between the controller and motor and mounting the latter so that its axis is perpendicular to the axis of the drum, which relative position of parts permits the use of a speed reducing gearing between the drum and motor and allows of a reduction in the size of the parts. The gearing consists of a worm wheel, connected with and mounted parallel to the drum, and driven by a worm which is journaled in the casing parallel to the motor shaft, said worm and shaft being connected by gear wheels.

The invention further consists in connecting the supporting hook and load hook to the hoist in a line through the center of gravity of the assembled structure so that the apparatus will remain in a horizontal position both when loaded and unloaded.

In the accompanying drawings, Figure 1 is a side elevation of my improved hoist designed for use with a direct current motor, the interior mechanism and gearing being shown in dotted lines. Fig. 2 is a like view of the hoist designed for use with an alternating three-phase current motor. Fig. 3 is a side view of a hoist provided with two direct current motors, the side plate of the casing being removed to show the interior mechanism and Fig. 4 is an end elevation of the hoist shown in Fig. 3.

Similar reference characters denote like parts throughout the several figures.

Referring more particularly to the drawings A designates the drum-casing which consists preferably of a rectangular oblong metal box in two opposite side walls of which is mounted an axle, not shown, for the support of a worm wheel *w*, the periphery of which latter dips into an oil receptacle *i* on the bottom of the casing. On the hub of said wheel is formed or otherwise connected thereto, a hoisting drum *c* suitable either for a rope, as shown in dotted lines, Fig. 1, or for a sprocket chain as shown in full lines Fig. 3. In the two other side walls of the casing above the worm wheel at right angles to the axis of the latter is journaled a shaft *s* on which is formed a worm *t* which engages the worm wheel *w*.

To one of the side walls of the casing A in which the axle of the worm wheel is mounted, is bolted or otherwise secured a casing G for the motor, and on the opposite wall of the casing A is secured a controller or governor *d* having two draw ropes *e*, *e'*. This controller is of such weight that it will counterbalance the other parts of the hoist, so that the latter will hang horizontally when unloaded.

A supporting hook *l'* is swiveled in a cross brace *a'* inside of the casing and at a point in a vertical line through the center of gravity of the assembled mechanism whereby a constructional height *h* is obtained, which is hardly as great as that of a hand-operated hoist of equal power. A load chain or rope as *b* has one end secured to the drum *c* and its other end secured to an eye *p* or equivalent device formed on or secured to the bottom of the assembled structure at a point to cause the vertical axis of a wheel or pulley *a* supported by the chain and which carries a hook *l*, to travel in said vertical line whereby the hoist will hang horizontally when loaded. This double suspension not only relieves the chain drum but also simplifies the transmission.

The motor designated by *m* has its armature shaft *k* mounted parallel to the worm shaft *s* and has fixed on one end a small gear *q* which when a continuous current motor is used, meshes directly with a large gear *o* fixed on the end of said worm shaft *s*, as shown in Fig. 1. When a three phase alternating current motor is used, which is much larger in circumference than a direct current motor, the armature shaft is necessarily a greater distance from the worm shaft, and in order to maintain the relative size of the gears *q* and *o*, the same as when the direct current motor is used, the two gears may be connected by an intermediate gear *n* as shown in Fig. 2. By using series motors the hoisting velocity regulates itself automatically, in such a manner that when raising smaller loads the velocity increases, whereas when hoisting heavier loads the velocity decreases.

The braking is effected by the usual weight pressure brake of the hoist, adapted to stop the load automatically at every height. The controller is moreover provided with special braking contacts for stopping the pull or movement when raising or lowering the load. In special cases a friction-strap-brake may be provided which may be lifted by a magnet.

Hoisting tackles or hoists with one motor can only be constructed up to a certain size or dimension, because the counter-balancing of the motor by the weight of the hoisting tackle and controller on the other side of the device is not sufficient when motors of a greater type come into question. The counter-balancing in such a case can only be effected by suitable dead weights which however increase the weight of the whole device and make the latter very unhandy. For this reason instead of one large motor two smaller motors may be employed, one motor arranged at each side of the device. An embodiment of this construction is shown in Figs. 3 and 4.

The motors m^1 and m^2 are arranged at both sides of the hoist and impart motion by means of pinions q' and q^2 to a tooth wheel o common to both of them which is mounted on the worm shaft s or said pinions may drive separate tooth wheels on this shaft. In consequence of the arrangement of two motors the hoist hangs likewise horizontally whether loaded or not, and has no greater height of construction than a hand operated hoist of equal effect.

The controller d is attached to the hoist underneath the motor m^2 and is operated by two drawing or pulling ropes e, e'. The resistance may be united with the controller or may be fastened to the other side of the device above the motor m^1. In some cases it may be advisable to arrange the controller separately from the hoist.

I claim:—

1. A portable electric hoist comprising a motor, a controller, a hoisting drum mounted between the motor and controller and having its axis perpendicular to the axis of the motor shaft, and gearing connecting the latter and hoisting drum said parts being assembled and supported in a state of stable equilibrium.

2. An electric hoist comprising a motor, a controller, a hoisting drum mounted between the motor and controller and having its axis perpendicular to the axis of the motor shaft, and gearing connecting the latter and hoisting drum, a supporting hook connected with the hoist in a line through the center of gravity of the latter, a load hook, and means to connect the latter with the hoist to permit the load hook to move in said line.

3. An electric hoist comprising a casing, a hoisting drum journaled therein, an electric motor mounted on one side of the casing having its armature shaft perpendicular to the axis of the drum, gearing connecting the drum and armature shaft, a controller mounted on the casing opposite the motor to counterbalance the weight of the latter, a supporting hook swiveled in the casing in a line through the center of gravity of the assembled parts, a load hook, and a flexible hoisting member connected to the drum and casing to permit the load hook to move in said line.

4. An electric hoist, comprising a casing, a worm wheel journaled therein, a worm shaft journaled in the casing perpendicular to the axis of the worm wheel, a hoisting drum carried by the latter, an electric motor mounted on one side of the casing and having its armature shaft parallel to the worm shaft, a gear on the latter in mesh with a gear on the armature shaft, a controller mounted on the casing opposite the motor to counterbalance the weight of the latter, a supporting hook swiveled inside the casing in a line through the center of gravity of the assembled parts, a load hook, and a flexible hoisting member connected to the drum and casing to permit the load hook to move in said line.

ALFRED AUGUST CONRADIN GESE.

Witnesses:
ERNST THUREY,
FREDERICK HOGERMANN.