

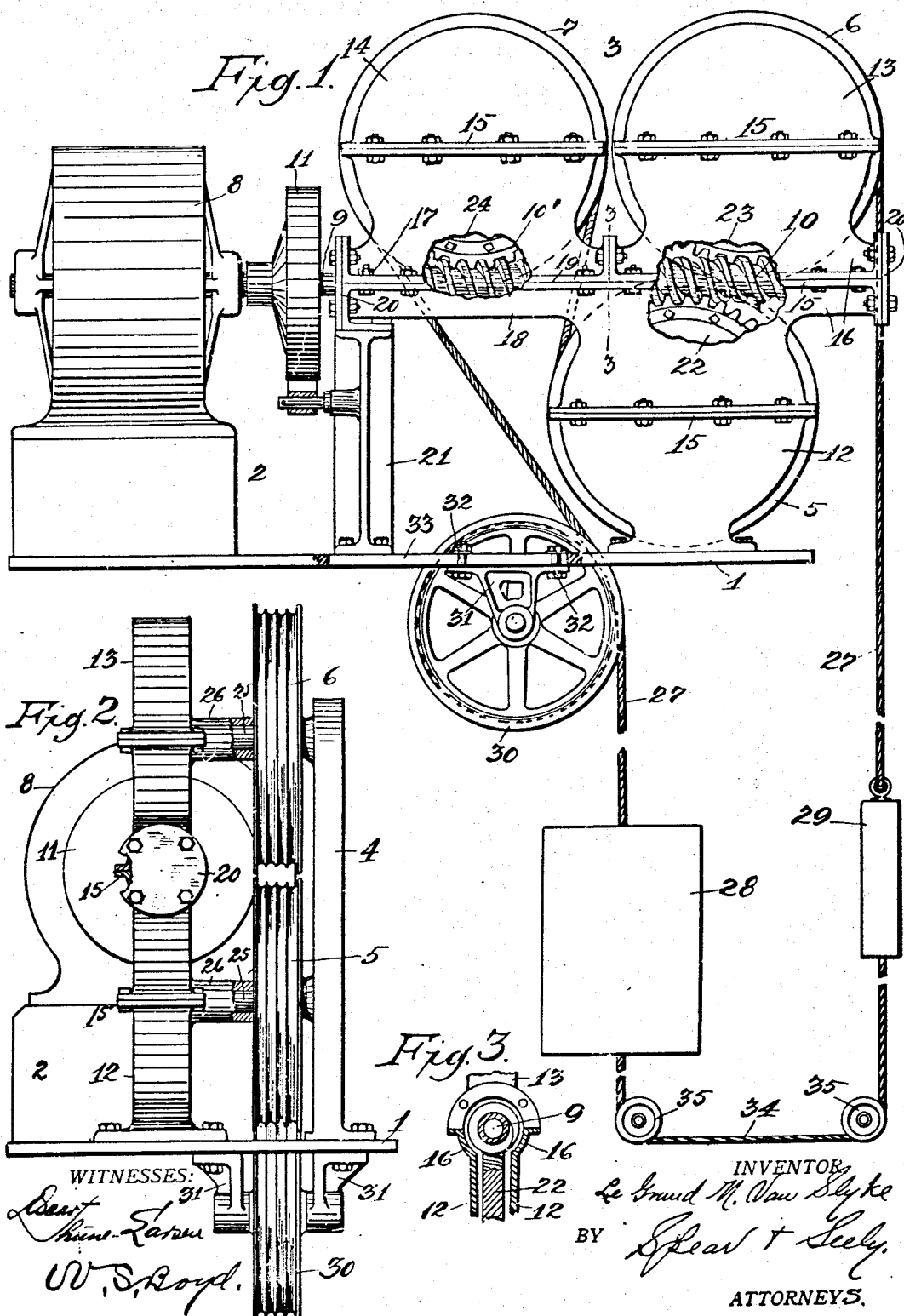
No. 855,543.

PATENTED JUNE 4, 1907.

LE GRAND M. VAN SLYKE.

ELEVATOR ENGINE.

APPLICATION FILED APR. 20, 1906.



UNITED STATES PATENT OFFICE.

LE GRAND M. VAN SLYKE, OF SAN FRANCISCO, CALIFORNIA.

ELEVATOR-ENGINE.

No. 855,543.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed April 20, 1906. Serial No. 312,820.

To all whom it may concern:

Be it known that I, LE GRAND M. VAN SLYKE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Elevator-Engines, of which the following is a specification.

In the operation of elevators by electricity great difficulty has been found in using them in tall buildings owing to the necessity of using a winding drum, which in such instances, requires to be of such a great length as to be objectionable, and in many instances, prohibitive. I obviate this difficulty by dispensing entirely with the winding drum and so arranging the supporting sheaves as to enable them to control the longitudinal movements of the hoisting cables and thereby move the elevator cage up or down the shaft. In doing this I use a plurality of sheaves and drive each of them from the motor direct and independently of the others, preferably by a worm gear, thereby securing a positive and noiseless movement as well as a very simple and efficient structure.

The invention is illustrated in the accompanying drawings in which

Figure 1 is a broken side elevation of an elevator engine with a car and a counter weight suspended therefrom. Fig. 2 is a broken end elevation of the engine. Fig. 3 is a broken cross sectional view on the line 3—3 of Fig. 1.

Referring more particularly to the drawings, 1 indicates a base which may be placed at the top, or in the loft of the elevator shaft or well. Mounted on the base are the motor support 2, the gear casing 3 and a frame 4, the frame and the casing forming a support for the sheaves, of which there are preferably three, 5, 6 and 7. The motor 8 can be of any desired construction and its shaft provided with, or extended to form a worm shaft 9, upon which are two worms 10 and 10' which are adapted to drive the sheaves at the same peripheral speed. The shaft is also provided with any suitable brake mechanism 11, the ordinary band construction being shown.

The casing 3 is formed into three compartments 12, 13 and 14, one of which, as 12, is below the shaft 9 and the others are above it, and all of them are formed in sections which are joined together by flanges 15. One of the upper cases is almost directly over the lower case and where they are united they

are provided with semi-cylindrical enlargements 16, which encircle the shaft 9 and the worm 10. The other upper case 14, is located between the case 13 and the motor 8 and is provided at the bottom with a semi-cylindrical enlargement 17 to which a semi-cylindrical extension 18 from the case 13 is secured by flanges 19 for inclosing the portion of the shaft containing the worm 10'. Suitable bearings are formed or located in the semi-cylindrical portions of the casings for the shaft and provisions are made for taking up the end thrust, preferably by ball bearings of any desired construction, not shown. The ends 20 of the cylindrical portions of the casing 3 for inclosing the outer end of the semi-cylindrical portion or encircling the shaft at the inner end are also removable for permitting access to the interior and facilitating the handling or manipulation of the casing sections.

A standard 21 from the base extends up to the extension 18 and assists in supporting the shaft intermediate its ends and also forms a convenient point of attachment for the brake band 11.

Suitable gear wheels 22, 23 and 24 are mounted in the respective compartments of the gear case 3 in position to be engaged and actuated by the worms 10 and 10' respectively, and the shaft or axle 25 of each wheel projects through a bearing formed in an extension 26 on the casing and is supported at its outer end in a suitable bearing in the frame 4. Rigidly secured to the shafts of the wheels between the ends of the extensions and the frame are the sheaves 5, 6 and 7, each of which is preferably grooved upon its periphery and over which are passed the hoisting cables 27, side by side, in the usual manner.

The cage or car 28 is suspended from one end of the cables and the counter weight 29 from the other and the intermediate portions are passed over the sheaves in the following order; commencing with the counter weight, thence up over the sheave 6, down under and around the sheave 5, up over and around the sheave 7 and then down over an adjustable guide sheave 30 to the car 28. The frame 1 is so placed at the top of the shaft that the cables from the sheave 6 down to the counter weight will hang in a vertical position and clear the periphery of the sheave 5, and the brackets 31 which support the sheave 29 are adjustable upon the base, as by means of

bolts 32 and slots 33 (only one of the slots being shown,) so that the cables in passing from said sheave to the car will hang in an absolutely vertical position.

5 I prefer to provide one or more cables 34 which are connected at one end to the bottom of the car 28 and after being passed down under one or more pulleys 35 at the bottom of the shaft are passed up to and connected at
10 the other end with the lower end of the counter weight 29. This will cause the car and counter weight to always move in unison either up or down, and it will also cause said cables to act as a counter balance for the
15 hoisting cables; that is, as the main portion of the hoisting cables pass to one side or the other of the hatchway or shaft, the lower or counter balance cables 34 will pass to the other side and thereby always keep the car
20 and counterweight in equipoise.

By constructing the engine as above described it can be located at the top of the shaft of even the tallest building where it will take up but little room owing to the absence
25 of the drum, thereby saving the valuable room in the basement that is required for the kind of engine now most generally employed. It also avoids the moisture of the basement and thereby adds to the durability of the apparatus and there is less liability in the drier
30 atmosphere of short circuiting. And less cable is required as all that will be necessary is a length substantially equal to the height of the building and as the cables are always
35 under tension with the car at one end and the counter weight at the other, there is never any slack cable with its consequent liability of getting out of the grooves or entirely off the drum and into the operating mechanism.
40 Less power is required to operate the plant owing to the slight amount of friction that results from the direct connection and operation of the driving mechanism.

The apparatus is very simple and compact and can be run at any desired rate of
45 speed in either direction noiselessly and without any lost motion, owing to the direct connection between the motor and the sheaves. By placing the sheaves as close together as
50 possible in the same plane and passing the cables around them from one to the other, each cable or strand is in actual contact at all times with at least two thirds or more of the periphery of each sheave, thereby making
55 such contact equal to or exceeding the entire periphery of two of the sheaves, which will give sufficient grippage without the drum to prevent the cables from slipping, even with any load that should be placed upon the car
60 and the cables. The location of the gear wheels and sheaves in this manner distributes the weight and strain very evenly throughout the entire structure, and by placing the two gear wheels at the outer end of the shaft
65 above and below the shaft respectively each

wheel will counteract the lateral thrust or movement of the shaft away from the other wheel and will thereby assist in supporting the end of the shaft. And by having the worms of the shaft engaging with each of the
7 gear wheels the strain upon the threads of the worm and of the teeth of the wheels will be so divided or distributed that the wear and danger of breakage of any one of them will be decreased to the minimum.

By incasing the worm shaft and gear wheels they are protected from dust and facilities are provided for supplying them with
an abundance of oil at all times for the casing 14 will hold the oil for the worm 10' and
8 casing 12 will hold it for worm 10 and wheels 22 and 23.

As the control of the engine by the switches in the car, or by the brake, or by both, may be had in any ordinary manner, and the means for effecting such control forms no part of the present invention, they have not been shown or described but it is to be understood that the use of such devices is contemplated.

What I claim is

1. In an elevator engine, a worm shaft, having two worms thereon, three worm wheels in engagement therewith, two above and one below the same, said one wheel being almost directly below one of the others and in engagement with the same worm, a sheave connected to the shaft of each worm wheel, a cable passing upwardly over one of the upper sheaves, then down around the lower sheave and then around the other upper sheave and means for rotating the shaft.

2. In an elevator engine, a base, a three compartment gear case thereon provided with bearings and semi-cylindrical enlargements and formed in sections, a frame on the base adjacent to the case and provided with bearings to register with those of the case, a shaft in each pair of bearings, a worm wheel and a sheave on each shaft, each wheel being within one of the compartments of the case and the sheaves being between the casing and the frame, and a worm shaft in the semi-cylindrical portions of the case for engaging with said wheels and rotating the sheaves at the same peripheral speed.

3. In an elevator engine, a base having a slot therein, a gear case mounted on said base, said case having a lower compartment and two upper compartments, said upper compartments being in the same horizontal plane and the lower compartment being slightly to one side of the vertical plane of the outermost upper compartment, a gear in each compartment, a motor, a shaft therefor passing through the gear case and having two worms thereon, one of which engages with the gear in one of the upper compartments and the other with the other upper gear and with the lower one, a shaft co-

connected to each gear and extending through the gear casing, a frame on the base for supporting the other end of said shafts, a sheave on each shaft between the frame and casing,
5 a guide sheave adjustably mounted on the base and having a portion projecting through the slot, said slot being adjacent to the lower worm gear and a cable passing upwardly over the outermost upper sheave, then
10 around the lower sheave, up over the other

upper sheave and down over the guide sheave.

In testimony whereof I affix my signature, in presence of two witnesses, this twelfth day of April 1906.

LE GRAND M. VAN SLYKE.

Witnesses:

W. S. BOYD,

F. M. BARTEL.