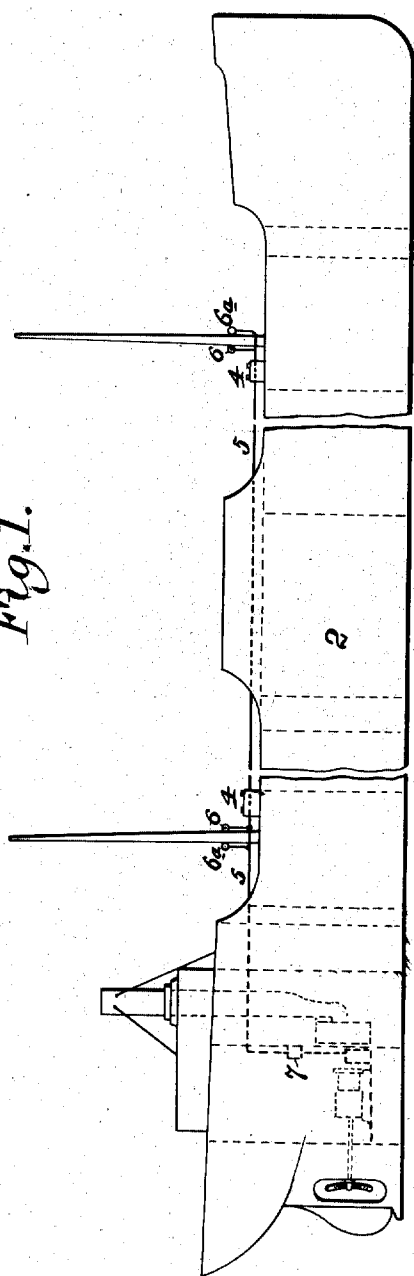


1,252,174.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 1.

Fig. 1.



Witness
Frederick W. Ely.

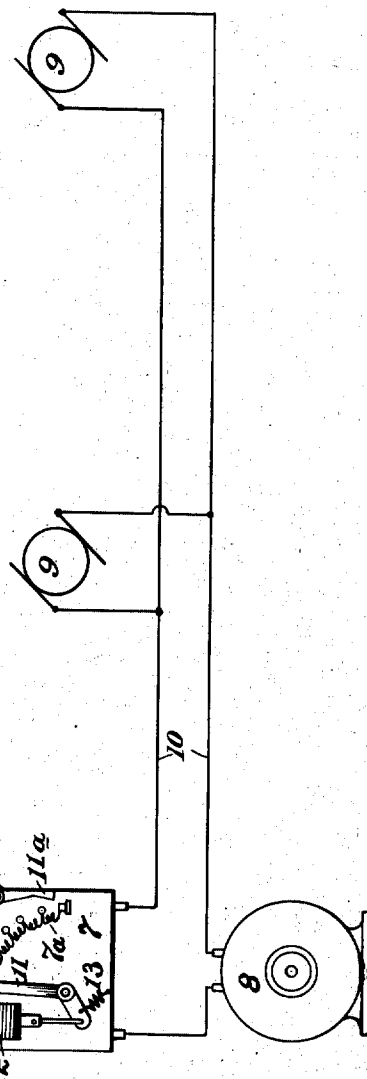


Fig. 2.

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H. V. RAMSAY.
HOISTING APPARATUS.
APPLICATION FILED APR. 14, 1917.

1,252,174.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 2.

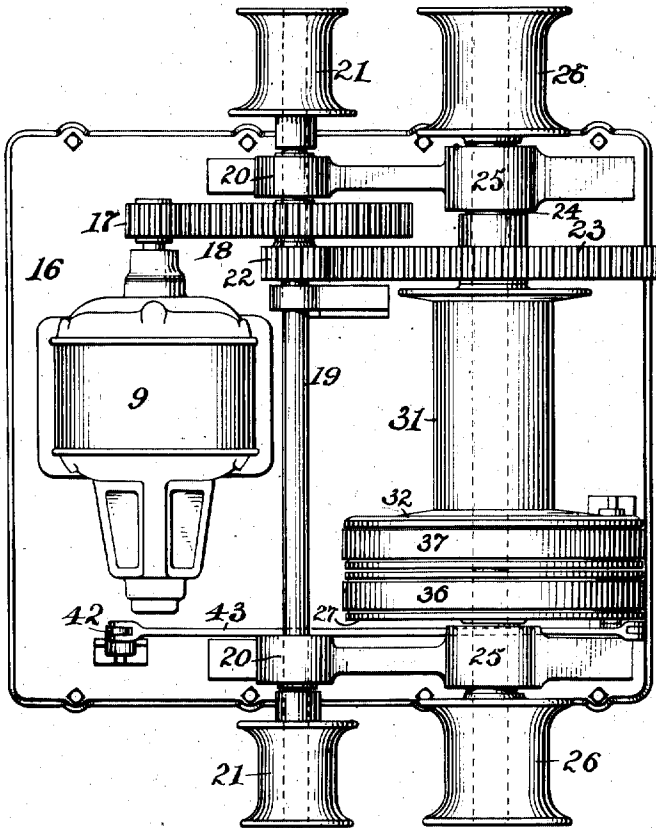
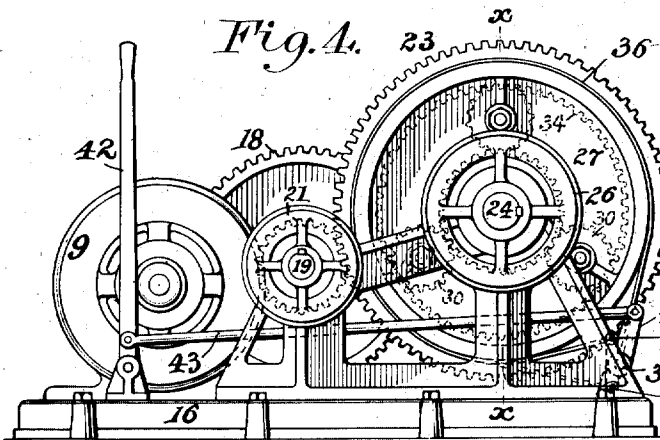
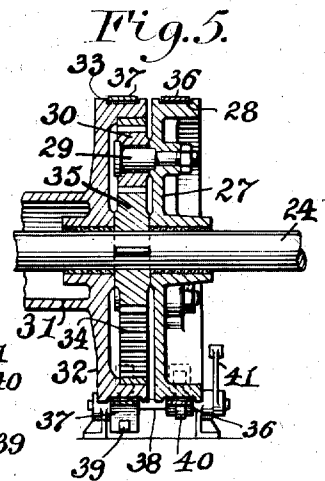


Fig. 3.



Witness

Frederick W. Ely.

Hugh Vernon Ramsay

By

[Signature]

Attorney

UNITED STATES PATENT OFFICE.

HUGH VERNON RAMSAY, OF GLOUCESTER CITY, NEW JERSEY.

HOISTING APPARATUS.

1,252,174.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed April 14, 1917. Serial No. 161,969.

To all whom it may concern:

Be it known that I, HUGH VERNON RAMSAY, a citizen of the United States, and resident of Gloucester City, county of Camden, and State of New Jersey, have invented an Improvement in Hoisting Apparatus, of which the following is a specification.

The object of my invention is to provide a suitable electrically actuated hoisting apparatus, more particularly for use on ships, whereby the danger, incident to the use of electricity in the vicinity of vapors and gases from cargoes of oil, etc., is avoided.

My object is also to so operate the electrically actuated hoisting apparatus that a constant-speed electric motor may be employed as a means of operating the hoist at a lower initial cost and without the danger from sparking due to variable speed or series-motors which have heretofore been employed on ships in work of the character to which my invention is directed.

Heretofore, in the operation of electrically actuated hoisting machinery on ships and especially those designed for carrying cargoes of oil and materials in bulk from which there is liability of the generation of combustible or explosive vapors and gases, there was a constant danger of ignition of the vapors and gases with resulting fire and in many cases, destruction of the vessel; and this danger has been due primarily to the system employed for electrically operating the hoisting machinery, and especially due to the fact that the variable speed and reversibility of the hoisting machinery depended upon the employment of variable-speed electric motors such as a series-motor controlled by a series-parallel controller and reversing switch which, in operation, produce objectionable electric arcing of a dangerous character when in the presence of the escaping vapors and gases aforesaid. In these prior uses, the controlling and reversing switch was arranged at the hoisting apparatus on the deck of the vessel, and hence, above the stored oil or combustible contents, and consequently in the direct path of the escaping gases and explosive vapors arising therefrom. More particularly, my object is to provide the hoisting apparatus with mechanically controlled devices for permitting reversal of the cables and drum and for intermittently putting the drum into and out of operation, as in manipulation of the load,

while at the same time employing a constant-speed and continuously acting and non-reversible electric motor; and moreover, eliminating all controlling switches and reversing means at the hoisting apparatus, and locating the controlling switch, for controlling the energizing of the motor circuits, in the engine room and itself operatively controlled by suitable means extending to the hoisting apparatus but devoid of all dangerous tendency of ignition to any vapors or gases which may be arising from the cargo contents.

My invention consists, therefore, in providing the deck of the vessel with one or more electrically actuated hoisting apparatus employing a constant-speed non-reversing motor, receiving its energizing current from a dynamo in the engine room of the vessel and controlled by a circuit controlling switch located in the said engine room, or other protected portion of the ship at a distance from the hoisting apparatus, the latter having capacity for being mechanically manipulated for controlling and reversing the winding drum independently of the electric drive which operates it.

My invention also consists of further improvements hereinafter described, whereby the objects and results hereinbefore recited are attained, said improvements comprising certain organization and combination of parts which are fully described hereinafter and more particularly defined in the claims.

For the purpose of illustrating my invention, I have shown in the accompanying drawings the embodiment thereof which is at present preferred by me, since the same is in form to give satisfactory and reliable results, but it is to be understood that the several instrumentalities of which my invention consists, can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities herein shown and described.

Referring to the drawings, Figure 1, represents a side elevation of an oil ship and illustrates the application of my improvements thereto; Fig. 2 is a diagram illustrating the circuits in connection with the dynamo, the motors of the hoisting apparatus and the current controlling means; Fig. 3 is a plan view of the hoisting apparatus employed in my invention; Fig. 4 is a

side elevation of the same; and Fig. 5 is a vertical section of a portion of the same taken on line $x-x$ of Fig. 4.

2 represents the hull of the ship and may be of any suitable construction, but in the more advantageous use of my improvements, such ship would be designed for carrying oil or liquid fuel, in bulk, as before stated. 3 indicates the engine and boiler room usually arranged at the stern end of the vessel. 4 represents two sets of hoisting apparatus, one adjacent to each of the masts and cranes (not shown). 5 represents the electric circuits leading from the motors of the hoisting apparatus to the engine and boiler room, wherein is located a suitable dynamo 8 and the controlling switch 7 intended for controlling the current passing from the dynamo to the electric motors of the hoisting apparatus. 6 represents devices in connection with the circuits for controlling the operation of the switch 7, said devices 6 being arranged on the deck adjacent to the hoisting devices 4. While I have indicated a plurality of hoisting devices 4 on the ship, I do not restrict myself in this regard, as one or more hoists may be employed, as required or preferred.

Referring to the diagram Fig. 2 it will be observed that the current from the dynamo 8 passes through the starting switch 7 and thence by circuits 10. The electric current is conveyed to the electric motors 9, said motors being shunt wound and of a constant-speed and preferably of non-reversible type. The starting switch 7 may be of any suitable type, such for example, as in the diagram illustrating a form having a rheostat 7^a controlled by a pivoted contact arm 11, said arm being moved to open the switch by means of a spring 13 and to close the switch by an electromagnetic motor device 12. The electromagnetic motor device may be energized by the current in the electric circuit 14 containing a secondary battery 15 and controlled by a manually operated switch 6, of which there is a similar switch adjacent to each of the hoisting apparatus 4. It will now be understood that, by closing the switch 6, the electromagnetic motor device 12 will be energized and the starting switch 7 operated to close the electric motor circuit 10 and thus put the dynamo 8 into communication with the motors 9, causing them to rotate. Thereafter, the motors 9 of the hoisting apparatus will run continuously and at constant-speed until the switch 7 is released and automatically opened. To avoid necessity of holding the switch 7 in closed condition by the electromagnetic motor device 12 after starting the motors 9, I may employ a latch 11^a to hold the contact lever 11 in closed position and actuate said latch to release the lever 11 by an electromagnet 12^a contained in a circuit 14^a con-

trolled by manually operated switches 6^a adjacent to the switch 6 before referred to. In this manner, the starting switch 7 will maintain the circuit 10 closed, and put the motors 9 into action. This condition will continue until the manually operated switch 6^a is manipulated to energize the magnet 12^a, and when such operation occurs, the latch 11^a is operated to release the lever 11, whereupon the spring 13 automatically returns the lever 11 to its open position, as indicated. The manually operated switches 6 and 6^a are normally opened, and when operated are designed to hold either the circuit 14 or 14^a temporarily closed for a limited period only, that is for closing the switch 7 or releasing the latch thereof to allow it to automatically open.

It will be seen from Fig. 2, that the two sets of motors and switches for the respective hoisting devices are connected in parallel, but this is not essential. It will be manifest that if the motor 9 and its corresponding switches 6 and 6^a at the right hand of Fig. 2 were omitted, the apparatus remaining would be a complete disclosure of my improvements, in so far as the electrical portion thereof is indicated; and it is further manifest that there may be any required duplication of such devices to correspond to as many independent hoisting apparatuses as required to suit the equipment necessary to vessels of various sizes, all receiving energy from the same electric source.

Referring more particularly to the hoisting apparatus designated by 4 in Fig. 1, and as more fully disclosed in detail in Figs. 3, 4, and 5, the following description will make the construction and mode of operation clear:—16 is the bed or base and is provided with suitable bearings 20 and 25 in which the shafts 19 and 24 are respectively journaled. The ends of the shaft 19 are provided with grooved drums 21 and the corresponding ends of the shaft 24 are provided with grooved drums 26 preferably of larger diameter than the drums 21, and of such proportion as will make their surface speeds equal those of the drums 21, this being required owing to the employment of the speed reducing gears 22 and 23 between the shafts 19 and 24. The shaft 19 is further provided with a spur gear 18 with which meshes pinion 17, the latter being driven by the electric motor 9, which is secured to the base 16. This motor 9 is a constant-speed non-reversible motor, and requires no attention on the part of the hoist-tender, as it always revolves in the same direction and at the same speed, irrespective of the manipulations of the hoist apparatus, the latter being so constructed that it is possible to employ a non-reversible constant-speed electric motor as the motive power as distinguished from the variable-speed re-

versing-motor which has heretofore been employed with a simple direct geared winding-drum. The shaft 19 is further provided with a pinion 22 which meshes with a large gear wheel 23 secured to the shaft 24 aforesaid. Loosely journaled upon the shaft 24 is a drum 31 for receiving the hoisting cable (not shown); said drum is provided with a disk-shaped head 32 at one end having upon its periphery a brake-band groove 33 which is encircled by the brake-band 37. Within the outer flange of the head is arranged an internal gear 34. Loosely journaled upon the shaft 24 and adjacent to the head 34 of the drum 31 is a flanged disk 27 also having about its perimeter a brake-band groove 28 which receives a brake-band 36. This disk 27 is further provided with three studs 29 extending toward the head 32 of the drum 31 and upon these studs are journaled pinions 30 which mesh with the internal gear 34. Keyed to the shaft 24 between the hubs of the head 32 and the disk 27 is a gear 35 which has a diameter sufficient to enable it to mesh with the three pinions 30. It will thus be understood that when the shaft 24 rotates, the gear 35 thereof will rotate the three pinions 30 and cause them to movably mesh with the internal gear 34. It will be further understood that, if the brake-band 36 is clamped to hold the disk 27 against revolution (and brake-band 37 released) the rotation of the shaft 34 will cause the drum 31 to be rotated in the opposite direction to the shaft 24 and at a relatively slower speed. If the brake-band 37 is clamped to hold the drum 31 against revolution (and the band 36 is released), the rotation of the shaft 24 will cause the pinions 30 to revolve upon their own axis while revolving about the shaft 24 within the stationary internal gear 34 and this will cause the disk 27 to revolve in the same direction with the shaft 24, but at a slower speed. The means for operating these brake-bands 36 and 37 consist of the following instrumentalities:—A rock-shaft 38 is provided with two oppositely directed arms 39 and 40, arm 39 being secured to one end of the brake-band 37, whereas the arm 40 is secured to one end of the brake-band 36. The other ends of these brake-bands may be secured to the rock-shaft 38 or held in any other suitable manner, the details being immaterial so long as the rocking of the shaft 38 will operate the brake-bands 36 and 37 alternately, that is to say, when the brake-band 36 is tightened, the brake-band 37 is loosened and vice versa. By this means, both brake-bands may be loose so that not only is the drum 31 free to rotate, but the disk 27 is also free; and further, if the brake-band 36 is tightened the disk 27 remains stationary while the drum 31 is rotated and conversely, if

the brake-band 37 is tightened the drum 31 is held against rotation while the disk 27 is free to rotate. The rock-shaft 38 is provided with an arm 41 which is connected by a link 43 with the control lever 42, whose lower end is hinged to a bracket on the bed or base 16.

The operation of this hoisting apparatus will now be understood. Assuming that a suitable cable is secured to the drum 31 and that the electric motor 9 is running freely and at constant-speed, the manipulations for raising and lowering, or for supporting the load are as follows: To elevate the load, the lever 42 is moved to the right (Fig. 4), which action clamps the brake-band 36 and causes the drum 31 to be positively rotated through the medium of the gears 35, 30 and 34. If it is desired to lower the load, then the lever 42 is moved to the position shown in Fig. 4 which loosens both the brake-bands 36 and 37 and the weight of the load will then cause the drum 31 to rotate and the cable to unwind. If the load is to be arrested in its descent the lever 42 is moved to the left (Fig. 4), which causes the brake-band 37 to tighten upon the head 32 of the drum and check its rotation, during which time the disk 27 is free to rotate. By manipulation of the lever 42, it is evident that the load may be lowered intermittently or with any gradual speed desired by controlling the brake action of the brake-band 37. It will be further understood that by suitable manipulation of the lever 42, the load may be raised or lowered with rapid changes in adjusting its position by quickly reversing the braking action of the brake-bands 36 and 37 to suit the requirements; and by this means of manipulation the load may be slightly raised or lowered to the desired degrees such as balancing it in the air during the positioning of the boom to insure proper clearing of obstructions and lowering of the load to proper place of deposit.

By reason of the special construction of hoisting apparatus and circuits for controlling the motive power thereof, herein described, the use of all control switches adjacent to the motor and the hoisting apparatus, for handling the large currents supplied thereto are omitted, and instead, switches of a simpler nature are located in a protected area down in the engine room adjacent to the dynamo, and therefore, the motor may be incased and so protected that the commutator and brushes offer no chance for igniting explosive gases or vapors which may arise from the hold and pass upward around the hoisting apparatus. Moreover, as the construction of the motor is of the constant-speed type, there is no such irregularity in the current as to produce objectionable sparking at the commutators, and furthermore, as there is no reversing switch

and series-parallel controller, or rheostat adjacent to the hoisting apparatus, the danger of explosion of gases and vapors due to the sparking or arcing of these devices is entirely obviated. The small switches 6 and 6^a, operating as they do upon a relative low potential current, do not provide any objectionable sparking, and moreover are readily incased so that danger from such cause is entirely obviated. Broadly considered, it is evident that while I have shown means for operating the rheostat or circuit-controlling switch 7 in the engine room by means of electro-magnetic devices, said switch may be operated in any other suitable manner from the hoisting apparatus; and further, said switch may, if desired, be operated by the engineer in the engine room under the direction of suitable signals put into action by the circuit-controlling switches 6 and 6^a and the devices shown; that is to say, the operation of the armatures of the electro-magnetic devices 12 and 12^a may act as a signal to the engineer.

Aside from using the hoisting apparatus and the lifting cable on the principle of a crane equipment, the drums 21 and 26 of the respective shafts 19 and 24 enable the apparatus to be used as a winch such as might be employed in operating cables leading horizontally to a distance, the cables being wound about the said drums and thereby, through frictional contact with the drums, transmitting the power to the cable. As the drums 21 and 26 have diameters inversely proportional to the speed of revolution of the respective shafts 19 and 24, it is manifest that the surface speed of the drums may, by suitable proportioning of the diameters of the drums, be made to be more or less equal and in that manner cause both drums to pull upon the cable with satisfactory results; and moreover, the employment of two drums operating upon a single cable doubles the frictional contact and enables a stronger grip upon the cable than if a single drum were employed, even though there were more turns of the cable upon it. Furthermore, by employing two drums in cooperation, aside from the frictional pull upon the cable being very efficient, the danger of the cable loops interfering by winding upon themselves is considerably reduced, and consequently the apparatus herein embodied in my improvements is more desirable than the winch construction heretofore in use.

The simplicity of the operation of the entire apparatus will be readily appreciated when it is borne in mind that there is no varying of the motive power, current, or reversing of the motor or the current therein during the operation of the hoisting devices, and consequently the hoist-tender is only required to manipulate the single lever 42 to

accomplish every handling of the load which may be required, no matter how complicated may be the required manipulations thereof.

In the case of my improvements, all of the attention to the motor is eliminated, no reversing switches are employed and the entire manipulation of the load in hoisting, lowering and suspending, is all controlled by a single lever so constructed that it is not possible to induce confusion of operation. Therefore, not only is the hoist apparatus embodying my improvements considerably simplified and more easy of operation than systems heretofore in use, but all danger of causing explosions in vessels carrying fluids or materials from which explosive gases and vapors arise, is entirely overcome.

It will now be apparent that I have devised a novel and useful construction which embodies the features of advantage enumerated as desirable, and while I have in the present instance shown and described the preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that I do not restrict myself to the details, as the same are susceptible of modification in various particulars without departing from the spirit or scope of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is: —

1. The combination with a ship of a hoisting apparatus on the deck thereof comprising a mechanically controlled manually operated hoisting device, and a constant-speed electric motor therefor, a source of electric energy for operating the motor in the engine room of the ship, a circuit leading from the source of energy to the motor, a switch in said circuit to put the motor into and out of operation located at a distance from the hoisting apparatus and its motor, and means extending from the hoisting apparatus to the switch for actuating the same whereby the hoist-tender may put the hoist and its motor into and out of operation from a position adjacent to the hoist and at a distance from the control switch therefor.

2. The combination with a ship of a hoisting apparatus on the deck thereof comprising a mechanically controlled manually operated hoisting device, and a constant-speed electric motor therefor, a source of electric energy for operating the motor in the engine room of the ship, a circuit leading from the source of energy to the motor, a switch in said circuit to put the motor into and out of operation located at a distance from the hoisting apparatus and its motor, and means extending from the hoisting apparatus to the switch for actuating the same whereby the hoist-tender may put the hoist and its

motor into and out of operation from a position adjacent to the hoist and at a distance from the control switch therefor, with said means comprising an electro-motor device
5 for operating the switch, electric circuits leading therefrom to a point adjacent the hoisting apparatus, and controlling means adjacent the hoisting apparatus for opening or closing the electric circuits.

10 3. The combination of a hoisting apparatus having manually operated means for controlling the time of action and direction of rotation of the winding drum, a constant-speed electric motor to operate the hoist-
15 ing apparatus, a source of electric energy, circuits leading from the source of energy to the motor, a circuit switch at a distance from the motor and hoisting apparatus to open or close the circuits, and means extend-
20 ing from adjacent the hoisting apparatus to the distantly located switch for opening and closing the same.

4. A ship, and a hoisting apparatus arranged upon the deck thereof and compris-
25 ing a cable drum, a constant-speed non-reversible electric motor to operate it, and manually operable devices to cause the drum to be positively rotated by the motor or re-
30 leased with freedom of rotation independent of the motor and also to be held against ro-

tation, as required, in combination with a source of electric energy, circuits leading from the source of energy to the motor, and a controlling switch for the circuits arranged at a distance from the hoisting appa- 35
ratus.

5. A ship, and a hoisting apparatus arranged upon the deck thereof and comprising a cable drum, a constant-speed non-reversible electric motor to operate it, and 40
manually operable devices to cause the drum to be positively rotated by the motor or released with freedom of rotation independent of the motor and also to be held against
rotation, as required, in combination with a 45
source of electric energy, circuits leading from the source of energy to the motor, and a controlling switch for the circuits arranged at a distance from the hoisting apparatus, and separate manually controlled 50
means for actuating the distance controlling switch from a position adjacent the hoisting apparatus.

In testimony of which invention, I hereunto set my hand.

HUGH VERNON RAMSAY.

Witnesses:

E. W. SMITH,

KATHRYN A. SUMMERS.