No. 840,129. PATENTED JAN. 1, 1907.

A. E. HANDY.

HOISTING MACHINE.

APPLICATION FILED MAR. 27, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

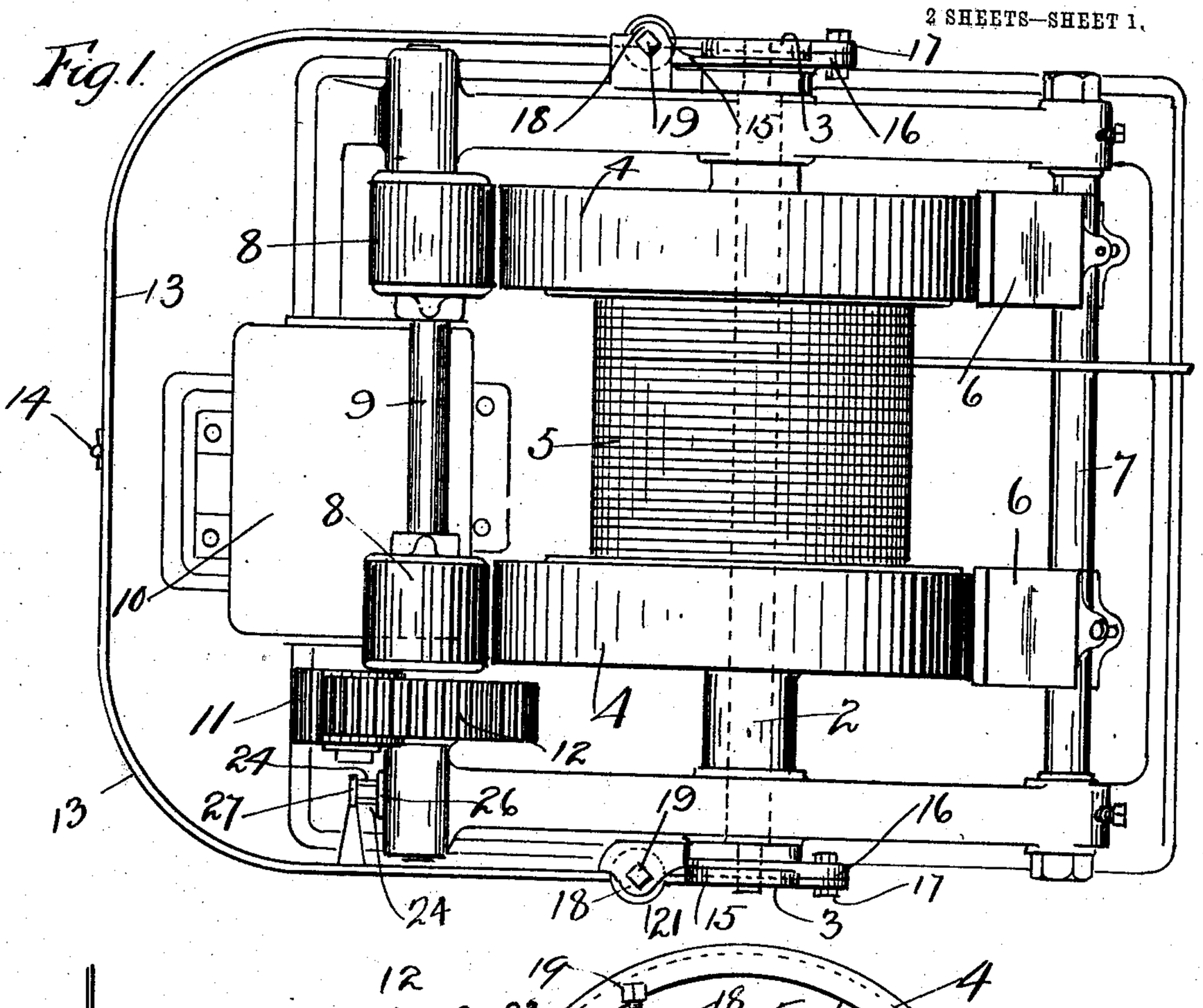

Fig. 2.

Witnesses

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2 SHEETS—SHEET 2.

Fig 4.

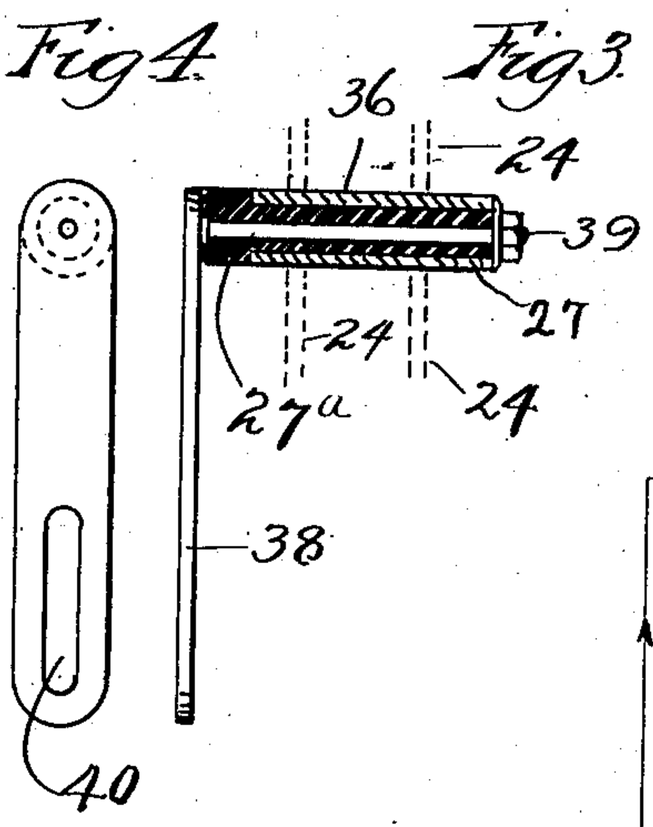

Fig 3.

Fig 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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HOISTING-MACHINE.

No. 840,129. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed March 27, 1906. Serial No. 308,252.

To all whom it may concern:

Be it known that I, ARTHUR EDWARD HANDY, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hoisting-machines, and has for its object the construction of a machine for hoisting, said machine being provided with an eccentrically-mounted drum arranged to be moved at the will of the operator by means of an operating-lever either to be rotated by engagement with a set of rotating driving-rolls or moved into engagement with a set of brake-shoes to hold said drum from turning.

A further object of the invention is that this drum shall be driven through suitable gears and friction-rolls by an electric motor, also that the motor shall start slowly and then increase its speed gradually by cutting out resistance step by step all by the movement of one operating-lever.

Another feature of the invention is that a permanent wire connection is made and maintained from the last plate of the rheostat to the pivot-point of the contact-arm for the purpose of assisting the said contact-arm in conducting the initial current when in its normal position. This permanent wire connection also renders it impossible to get an open circuit by reason of a poor contact of the said contact-arm.

With these and other objects in view the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view of the hoisting-machine. Fig. 2 is a side elevation of the same, illustrating the rheostat connection to the operating-lever. Fig. 3 is a side elevation of the contacting roll and connecting-arm, showing said roll in section. Fig. 4 is a rear view of the roll-arm, illustrating the supported portion for adjustment. Fig. 5 is a diagram view illustrating the wiring arrangements for the hoisting device.

Referring to the drawings, at 1 is the frame of the machine, that may be made in any convenient form. At 2 is the drum-shaft journaled in eccentric blocks 3 3, that are mounted to be turned in bearings in each side of said frame. The two friction-wheels 4 4 are bolted or otherwise securely fastened one to each side of the winding-drum 5, and then the whole three are mounted on the shaft 2, to be moved together longitudinally in the frame by the turning of the eccentric blocks, as hereinafter described.

The brake-shoes 6 6 are fixed to the rod 7, and thus held in a position to be engaged by the friction-wheels 4 4 when they are set back by the movement of the eccentrics 3 3, and the ends of the said rod 7 are mounted to be longitudinally adjusted in slots in the side frames.

The driving friction-rolls 8 8 are mounted on and fixed to shaft 9, which is journaled in each frame. This shaft 9 is driven by the electric motor 10 through the pinion 11 and gear 12.

Mounted on and fixed to each of the eccentrics 3 3 on either side of the machine is a frame 15, each of which extends out rearwardly from the center of the eccentric, forming an ear 16, to which the operating-lever is pivoted at 17. The frame then extends upward for a short distance on a line forward of the center of the eccentric, and at its upper end is formed a cap 18, down through which a set-screw 19 is threaded. A shelf or bracket 20 extends outward from the lower portion of this frame beneath the operating-lever to form a rest or stop for said lever to rest on. At 21 is a stiff coil-spring that is supported on the said operating-lever through the shoe 22 and receives its tension against the same by the adjusting-screw 19 through the medium of its upper plate 23, against which said screw rests. The operating-lever 13 is formed in a U shape, with its ends extending around to either side of the machine and pivotally connected at 17, as above stated, slightly in the rear of the center of the eccentric blocks 3 3, and the loop of the lever extends around in front of the machine, and to its front portion is attached the operating-cord 14. The spring 21 described and the frame in which it is contained has an exact duplication on the opposite side of the ma-

chine, the action of which springs are hereinafter described. On the forward end of the machine-frame is fixed the starting-switch, that is composed of two spring-pressed fingers 24 24, pivotally mounted at 25 on the slate base-plate 26. Connected to the operating-lever 13 in a position to engage the said starting-switch fingers 24 is the connecting roll-bar 27, the detail of which is shown in Fig. 3, which bar is for the purpose of making the connection between the two fingers to complete the circuit to the motor. This roll-bar (see Fig. 3) is constructed of a shell 36 of conducting material mounted to turn freely on a core 27^a of non-conducting material, both of which are secured to the plate 38 by the bolt 39, said plate being slotted at 40, near its lower end, to provide for vertical adjustment on the operating-lever.

On the side of the machine-frame is mounted the rheostat 28, through which the resistance to the motor may be cut out step by step by means of the movement of the contact-arm 29, that is pivoted at 30 to the frame. This contact-arm is connected to the operating-lever through the connections 31, 32, and 33. This latter connection is pivoted at 34 to the said operating-lever at a point directly over the center of the eccentric block 3, so that by the first movement of the said lever to rotate this block and start the motor there will be no movement of the contact-arm to cut out resistance.

Another feature of this construction is the wire connection 50, leading from the pivoting-point of the rheostat-arm to the last plate 51 in the rheostat. This wire is made a permanent connection between these two points and serves to assist in conducting the initial current when the rheostat-arm is in its normal position. This connection also renders it impossible to get an open circuit by reason of a poor contact being made by the said rheostat-arm while in any position on the rheostat.

The ordinarily-constructed electrically-operated hoisting-machines of the class described are usually arranged to start the load at the full speed of the motor, thereby bringing an undue strain on both the motor and the rest of the machinery. To obviate the quick starting of the machine, I have arranged to send the current to the motor through a rheostat, and after the motor has started to hoist the load the resistance is cut out step by step by raising the operating-lever, thereby starting the motor slowly and gradually increasing until it is running at its maximum speed.

When it is desired to start the machine, the first thing to be done is to close the cut-out switch 41, (see Fig. 5,) and then by raising the operating-lever 13 the connecting-bar 27 engages both of the fingers 24 24 and completes the circuit to the solenoid 44, which is thus energized to raise and close the main switch 43. The current by this action is then allowed to pass by the way of the wire 52 through the rheostat 28, arm 29, wires 45 and 46 to the motor 10, which is at once started slowly. At the same time the friction-wheels 4 4 are brought forward by a continued upward movement of the lever 13 until they engage the driving friction-rolls 8 8, when the drum 5 commences to turn, and slowly hoist the load from the motor, the current passing through the series field 47 and wire 48 out through the main switch 43 and cut-out 41.

On account of the permanent connection of the frame 15 to the eccentric blocks 3 the first upward motion of the lever pivoted thereon instead of compressing the stiff springs 21 naturally acts to rotate the blocks, and thus move the friction-wheels 4 4 from the friction-shoes to engage the driving friction-rolls 8 8, by which said wheels are started to rotate. The movement of this operating-lever either up or down so long as the springs 21 are not compressed do not affect the rheostat-arm. As before stated, the first upward movement of this lever starts the motor, connects the drum thereto through its friction-wheels, and the load is started slowly to be lifted. A further upward movement of the said lever then compresses the springs 21, sets the friction-wheels harder against the driving-rolls, and also through the connections 33, 32, and 31 causes the rheostat-arm 29 to rise and cut out the resistance step by step, thus causing the motor to speed up gradually until the maximum speed is reached.

When it is desired to stop the machine, the reverse action takes place. The resistance is first cut in again to gradually slow down the motor, then the friction-wheels are carried over against the brake-shoes to hold the load, after which the motor is stopped, and the whole is being done by the movement of but one lever. By the above arrangements the motor is called into action only when it is desired to hoist the load and is at all other times entirely disconnected from the drum by the movement of the eccentrics. The motor is also disconnected from the electric current by the withdrawing of the connecting-bar 27 as soon as the drum engages and is held by the friction brake-shoes.

This machine by its practical construction is rendered extremely simple and effective in its operation.

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

1. In a hoisting-machine, a drum, friction-rolls for driving said drum, a motor for actuating said rolls, an actuating-lever, means including said lever by the movement of which said drum is operatively connected to said

rolls and said motor and drum may be started slowly and subsequently accelerated in speed.

2. In a hoisting-machine, a drum, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said drivi. g means, a motor for rotating said driving means, an operating-lever, and means whereby the movement of said lever shall start the motor, cause the drum to rotate and subsequently accelerate the speed of the motor.

3. In a hoisting-machine, a drum, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, an operating-lever, and means whereby the movement of said lever in one direction shall first start the motor then release the drum from the brake-shoe to be rotated by said motor and subsequently accelerate the speed of said motor and drum by cutting out the resistance in the rheostat.

4. In a hoisting-machine, a drum, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, an operating-lever, and means whereby the movement of said lever in one direction will first cause the motor to start and then move the drum to be rotated by the driving means, and means for cutting out the resistance in the rheostat step by step to cause said motor to gradually increase its speed.

5. In a hoisting-machine, a drum, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, an operating-lever, means actuated by said lever for completing the circuit to start the motor, and means connected to said lever whereby the rheostat-arm will be actuated to cut out the resistance step by step after the current has been completed to start the motor and the drum connected thereto.

6. In a hoisting-machine, a drum mounted in eccentrics, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, an operating-lever pivotally connected to said eccentrics, a yieldable connection also on said lever whereby the same is allowed to continue to rise after said eccentrics have been turned to bring said drum into rotatable engagement with said driving means, and means whereby the continued upward movement of said lever cuts out the resistance in the rheostat to speed up the motor.

7. In a hoisting-machine, a drum mounted in eccentrics, fixed friction-shoes, rotatable driving means, means to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, a frame connected to each eccentric, an operating-lever pivotally connected to said frames in the rear of the eccentric centers, springs in said frames resting on said lever whereby said lever is allowed to continue to rise after said eccentrics have been turned to bring the drum into rotatable engagement with said driving means, and means whereby the continued upward movement of said lever cuts out the resistance in the rheostat to speed up the motor.

8. In a hoisting-machine, a drum mounted in eccentrics, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, a frame connected to each eccentric, an operating-lever pivotally connected to said frames in the rear of the eccentric centers, springs in said frame resting on said lever forward of said eccentric centers, a connection to said rheostat pivoted to said lever directly over the center of the eccentric when said lever is in its normal position, whereby the first raising of said lever starts the motor and rotates said eccentric, and a further upward movement of said lever compresses the spring, and raises said rheostat-arm to cut out the resistance step by step.

9. In a hoisting-machine, a drum mounted in eccentrics, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, a rheostat placed in the electric circuit, a rheostat-arm, a permanent wire connection in said rheostat to assist said arm in carrying the current, an operating-lever, and means whereby the movement of said lever in one direction will first cause the motor to start and then move the drum to be rotated by the driving means, and means for cutting out the resistance in the rheostat step by step to cause said motor to gradually increase its speed.

10. In a hoisting-machine, a hoisting-drum, friction-wheels eccentrically mounted, friction driving-rolls arranged to engage the

periphery of said wheels, means including an operating-lever and said eccentrics to move said friction-wheels into and out of engagement with said driving-rolls and said friction-shoes, and means whereby one movement of said lever will start the motor, connect the driving-drum thereto and subsequently accelerate the speed of the motor.

11. In a hoisting-machine, the combination of a hoisting-drum, friction-wheels eccentrically mounted, friction holding-shoes arranged to engage the periphery of said wheels, friction driving-rolls also arranged to engage the periphery of said wheels, means including an operating-lever for transferring said friction-wheels alternately from said shoes to said driving-rolls, an electric driving-motor, a rheostat placed in the electric circuit and means whereby one movement of the operating-arm shall first start the motor, connect the drum thereto and subsequently cut out the resistance from the rheostat step by step to increase the speed of the motor.

12. In a hoisting-machine, a drum, fixed friction-shoes, means including friction delivery-rolls for rotating said drum, means whereby said drum may be moved to be engaged and rotated by said rotating means and also moved to engage and be held by the said friction-shoes, a driving-motor and means for starting and stopping said motor gradually.

13. In a hoisting-machine, a drum, fixed friction-shoes, means including friction delivery-rolls for rotating said drum, means whereby said drum may be moved to be engaged and rotated by said rotating means and also moved to engage and be held by the said friction-shoes, and means whereby the hoisting-drum may be caused to start the load slowly and be gradually increased to its maximum speed, and means whereby said drum and load may be caused to stop gradually.

14. In a hoisting-machine, a drum, fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, a motor for rotating said driving means, an operating-lever, means whereby an upward movement of said lever shall start the motor, cause the drum to rotate and subsequently accelerate the speed of the motor, and means whereby when said lever is returned the speed of the motor is first reduced, the drum detached from the rotary means to be held by said shoes and finally the motor stopped.

15. In a hoisting-machine, a drum fixed friction-shoes, rotatable driving means, means for moving said drum whereby it will be released from said shoes to be engaged and rotated by said driving means, an electric motor for rotating said driving means, rheostat placed in the electric circuit, an operating-lever, means whereby the movement of said lever in one direction shall first start the motor then release the drum from the brake-shoe to be rotated by said motor and subsequently accelerate the speed of said motor and drum by cutting out the resistance in the rheostat, and means whereby the return movement of said lever shall first cut the resistance into the rheostat to reduce the speed of the motor then return the drum from the driving means to engage said shoes and finally stop the motor.

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

ARTHUR EDWARD HANDY.

Witnesses:

HOWARD E. BARLOW,

E. I. OGDEN.