No. 731,780. PATENTED JUNE 23, 1903.

W. S. JACOBS.

WAVE MOTOR.

APPLICATION FILED FEB. 13, 1903.

NO MODEL.

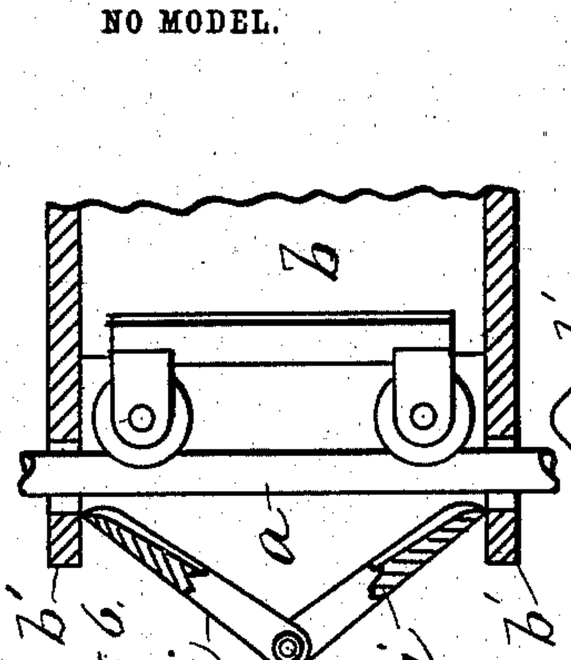

Fig. 6.

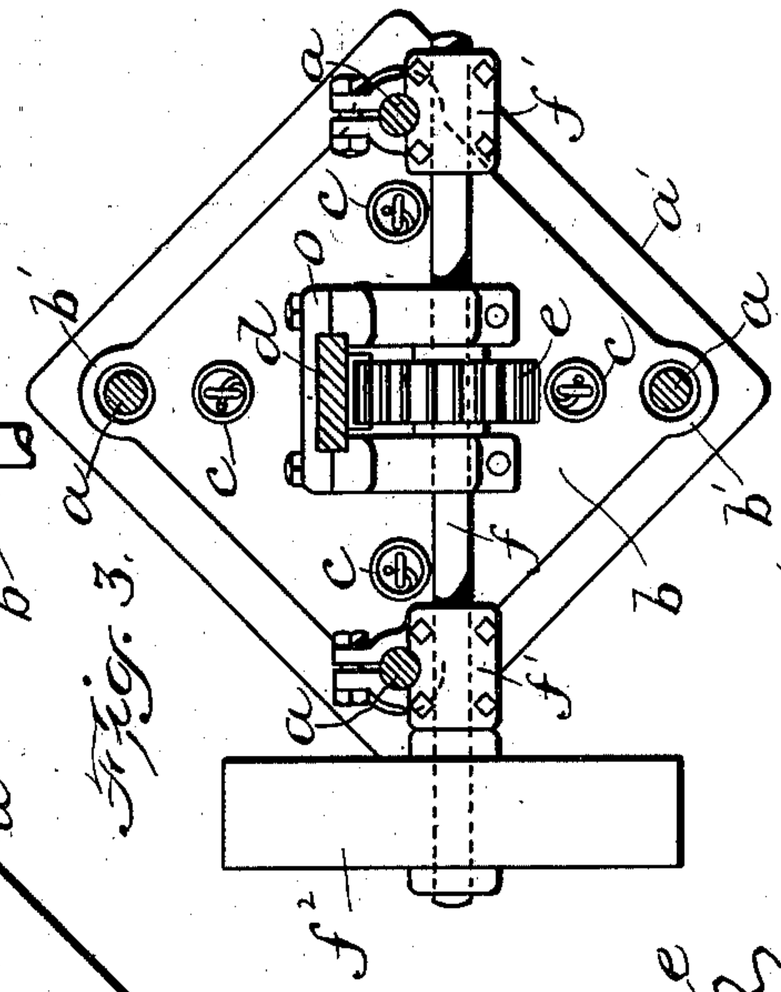

Fig. 3.

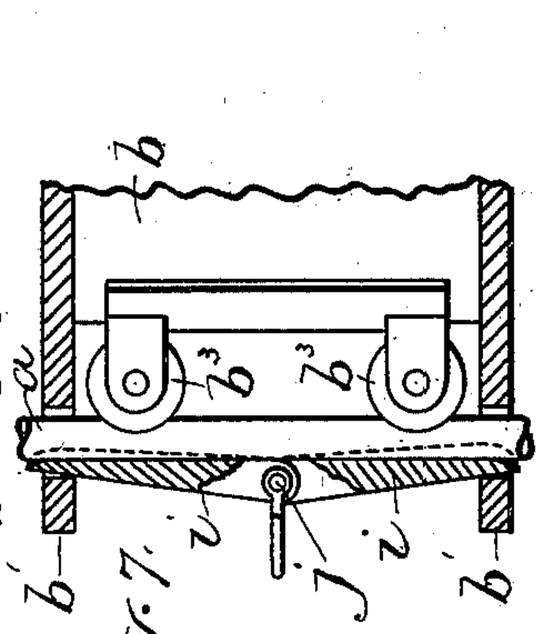

Fig. 7.

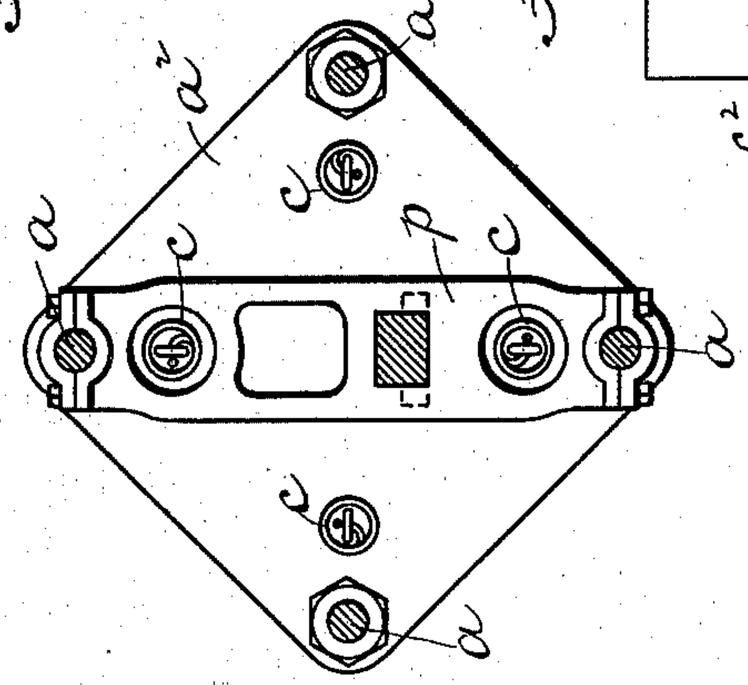

Fig. 4.

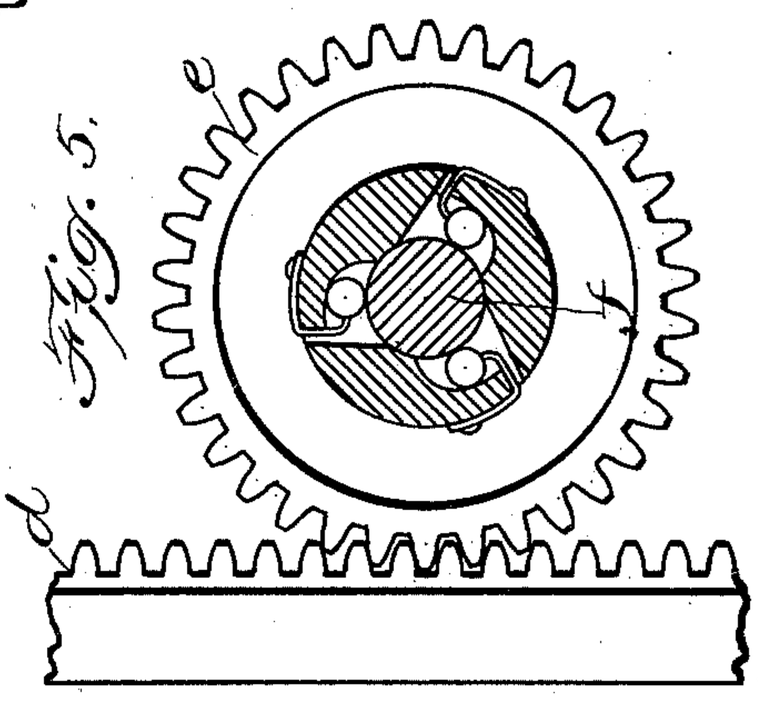

Fig. 5.

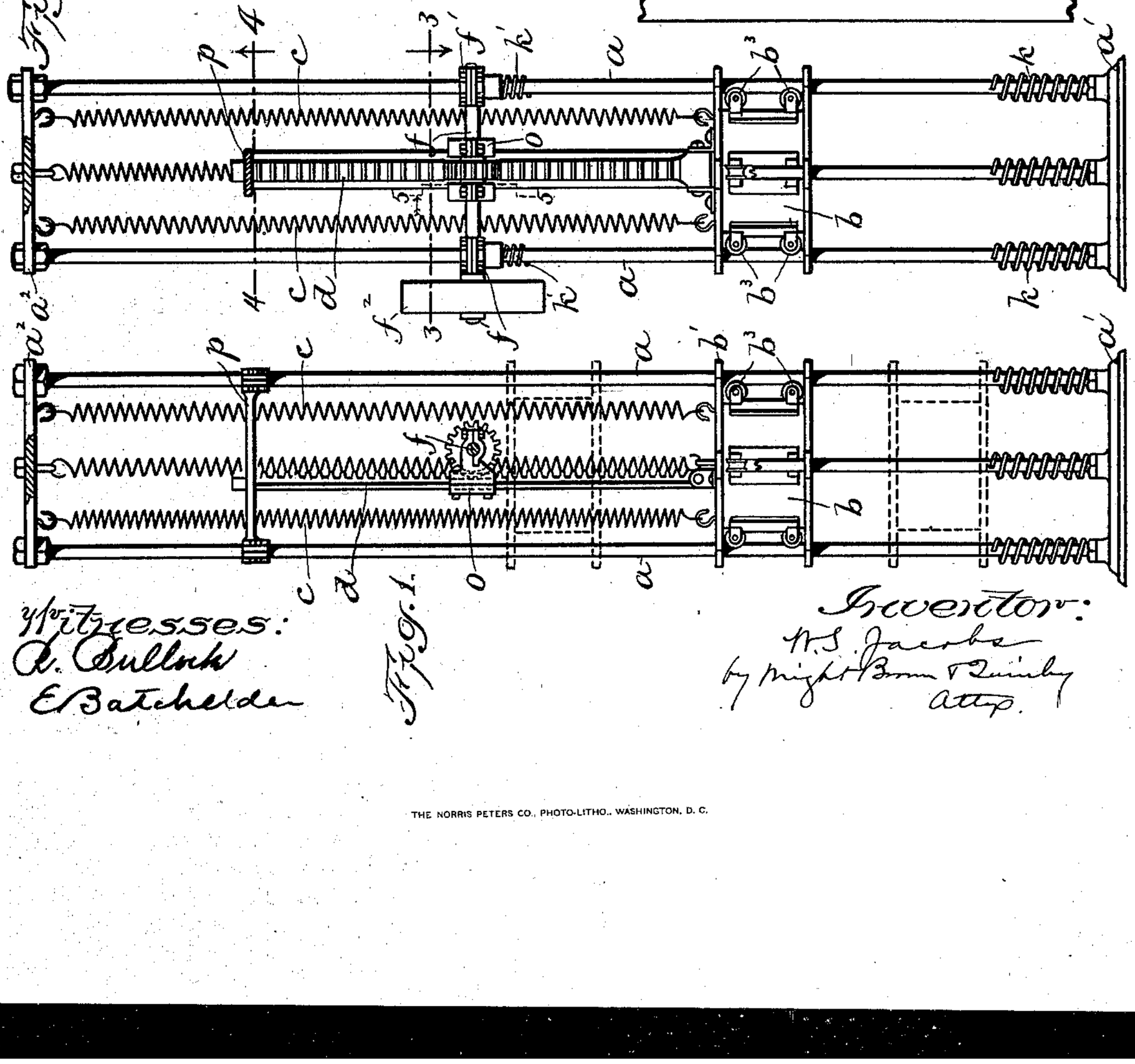

Fig. 1.

Witnesses:
A. Bullock
E. Batchelder

Inventor:
W. S. Jacobs
by Wright Brown & Quinby
Attys.

No. 731,780. Patented June 23, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM S. JACOBS, OF MALDEN, MASSACHUSETTS.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 731,780, dated June 23, 1903.

Application filed February 13, 1903. Serial No. 143,213. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. JACOBS, of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Wave-Motors, of which the following is a specification.

This invention has for its object to utilize the up-and-down movements of a floating vessel or other buoyant support; and it consists in a wave-motor comprising substantially vertical guides having means for attachment to a floating support, a weight movable on said guides, a spring or springs yieldingly supporting the weight and coöperating with the force of gravitation in reciprocating the weight on the guides when the floating support is moving up and down, and means for utilizing the motion and power thus imparted to the weight for the performance of any desired work, such as rotating a shaft, reciprocating a pump-plunger, &c.

The invention also consists in certain incidental improvements, all of which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figures 1 and 2 represent elevations of a motor embodying my invention, taken from different points of view. Fig. 3 represents a section on line 3 3 of Fig. 2. Fig. 4 represents a section on line 4 4 of Fig. 2. Fig. 5 represents a section on line 5 5 of Fig. 2. Figs. 6 and 7 represent sectional views showing means for locking the weight to the guides when it is desired to prevent the operation of the motor.

The same reference characters indicate the same parts in all the figures.

In the drawings, $a\,a$ represent substantially vertical guides, of which there may be any suitable number, four being shown in this case, affixed at their lower ends to a base a', which is adapted for attachment to a floating support, such as the deck of a vessel. The upper ends of the guides are preferably connected by a head or spider a^2.

b represents a weight which is adapted to move vertically on the guides and may be engaged therewith in any suitable way. I have here shown the weight provided with ears b' b' at its upper and lower ends, said ears having orifices through which the guide-rods pass. I have also shown the weight provided with a series of pairs of antifriction-rollers b^3 b^3, each pair bearing upon the inner side of one of the guide-rods, the rollers being preferably grooved to fit the cylindrical surfaces of the rods. Provision is thus made for an easy up-and-down movement of the weight upon the guide-rods.

$c\,c$ represent springs attached at their upper ends to the head a^2 and at their lower ends to the weight b. Said springs yieldingly support the weight and permit it to descend under the momentum imparted to it by the movement of the vessel, the springs subsequently reacting and raising the weight, so that an up-and-down movement is imparted to the weight by the conjoint action of the springs and the movements of the vessel.

I have provided means for utilizing the above-described motion of the weight, said means in the present embodiment of my invention being as follows: To the weight and projecting upwardly from it is affixed a vertical rack d, adapted to slide in a guide e. Said rack meshes with a gear e', loosely mounted upon a shaft f. Said shaft is journaled in bearings f', affixed to two of the guide-rods, and is provided with a pulley f^2 to support a belt for communicating motion from the shaft. Instead of the pulley f^2 a gear or any other suitable motion-transmitting device may be employed. The gear e', which, as above stated, is loose on the shaft f, is provided with means whereby it is locked to the shaft when rotated by the downward movement of the weight b and rack d, but rotates loosely on the shaft when the weight and rack are moved upwardly by the springs. The shaft is therefore given an intermittent rotation in one direction only, it being at rest when the weight is rising and rotated when the weight is descending. The means for making the gear alternately fast and loose on the shaft may be an ordinary coaster-brake mechanism, such as that illustrated in Fig. 5, or any other suitable mechanism may be employed for this purpose.

In Figs. 6 and 7 I show means for locking the weight against movement on the guide-rods when the operation of the motor is not desired. Said means comprise two wedges $i\,i$, jointed together at j and adapted to be inserted between one of the guide-rods a and the walls

of the orifices in the ears b', through which said guide-rod passes. When the motor is free to operate, the wedges $i\,i$ are withdrawn, as shown in Fig. 6. When it is desired to lock the motor, the wedges are pushed inwardly, as shown in Fig. 7, and are thus caused to prevent vertical movement of the weight.

$k\,k$ represent spring-buffers placed upon the guide-rods below the weight, and $k'\,k'$ represent similar buffers placed upon the guide-rods above the weight, said buffers being adapted to yieldingly arrest the downward and upward movement of the weight.

In practice I propose to employ a plurality of the above-described motors located at different parts of the vessel to take advantage of the different movements imparted to the vessel under different conditions. For instance, when the vessel is rolling motors located near the sides of the vessel at opposite sides of the keel will be advantageously operated. When the vessel is pitching, motors near the stern and bow will be in advantageous position.

The rack d is here shown as held in engagement with the gear e by means of a yoke o, supported by the shaft f, and its upper end is engaged with a cross-head p, adapted to slide on two of the guides a.

I claim—

1. A wave-motor comprising a floating support, a weight movable by gravitation relatively thereto, a spring or springs yieldingly supporting the weight and coöperating with the force of gravitation to reciprocate the weight when the floating support is moving up and down, and means for utilizing the motion thus imparted to the weight.

2. A wave-motor comprising a floating support, a weight movable by gravitation relatively thereto, a spring or springs yieldingly supporting the weight and adapted to raise the same after each downward movement thereof caused by movements of the floating support, a rack affixed to the weight, and a power-transmitting shaft journaled in bearings which are fixed relatively to the support, a gear on said shaft meshing with said rack, and connections between the gear and shaft whereby the gear is permitted to rotate loosely on the shaft when the weight is being raised by the springs and is engaged with the shaft when the weight is descending.

3. A wave-motor comprising substantially vertical guides having means for attachment to a floating support, a weight movable on said guides, a spring or springs yieldingly supporting the weight, said springs coöperating with the force of gravitation to reciprocate the weight on the guides when the floating support is moving up and down, means for utilizing the motion thus imparted to the weight, and means for locking the weight to the guides to make the weight inoperative.

4. A wave-motor comprising substantially vertical guides having means for attachment to a floating support, a weight movable on said guides, a spring or springs yieldingly supporting the weight, said springs coöperating with the force of gravitation to reciprocate the weight on the guides when the floating support is moving up and down, means for utilizing the motion thus imparted to the weight, and yielding buffers above and below the weight for yieldingly checking its movements.

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

WILLIAM S. JACOBS.

Witnesses:

C. F. BROWN,

E. BATCHELDER.