(No Model.) 2 Sheets—Sheet 1.

A. F. ADAMS.

CALL REGISTER FOR TELEPHONES.

No. 372,247. Patented Oct. 25, 1887.

Fig. 1.

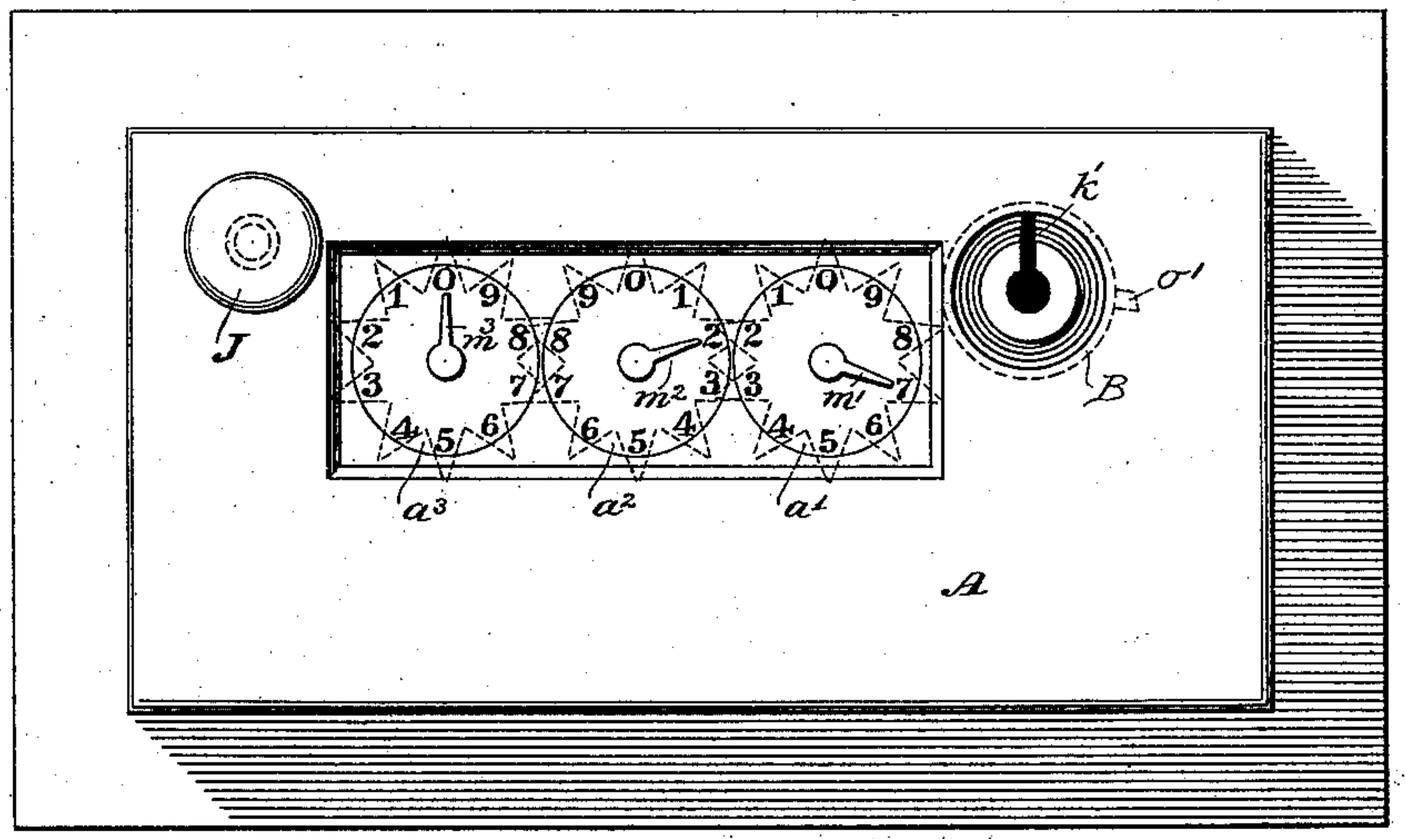
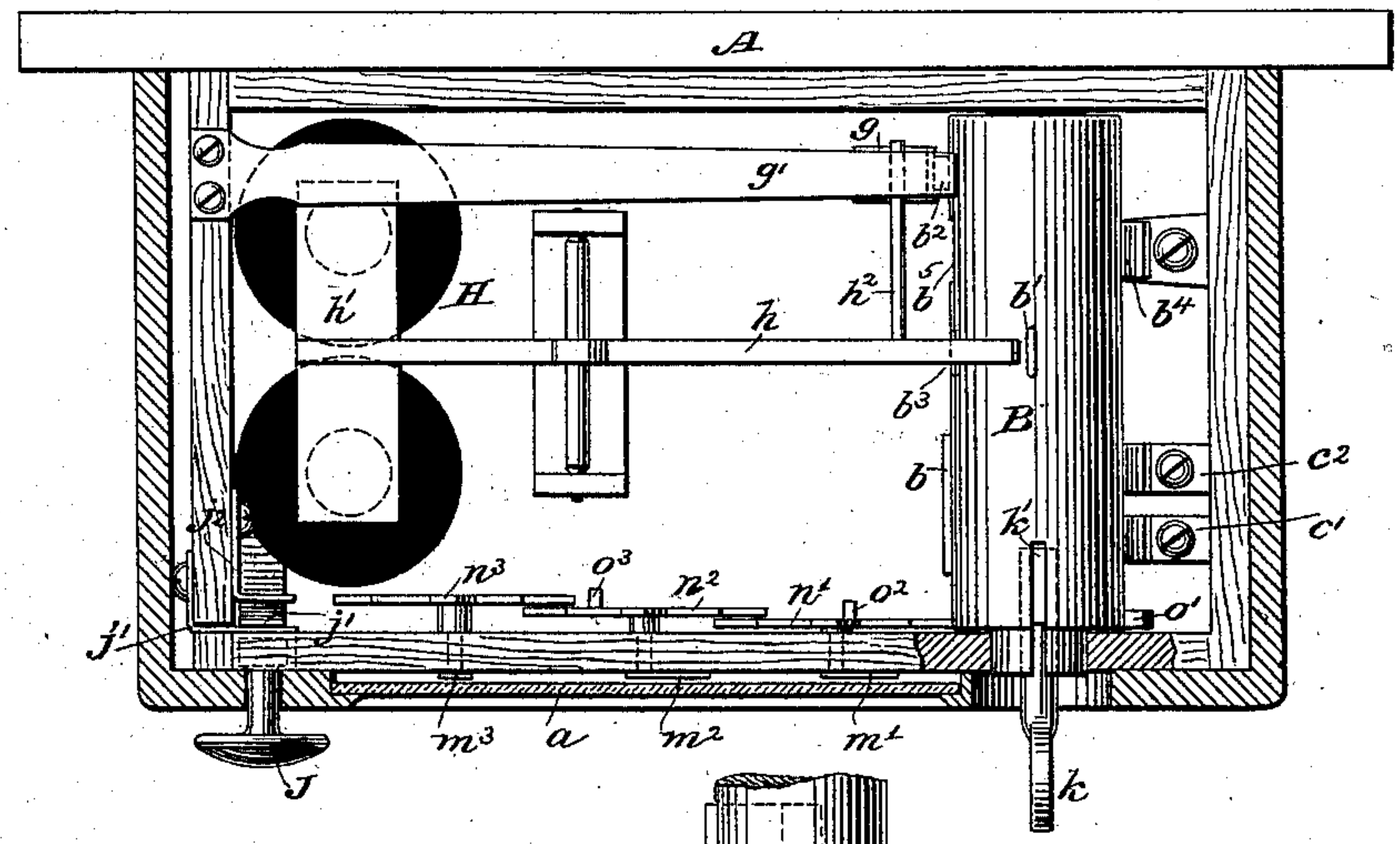


Fig. 2.



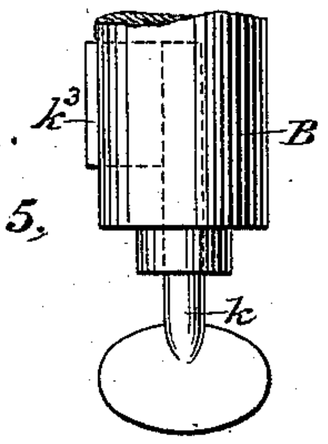


Fig. 5.

Witnesses

Geo. W. Breck.

Carrie E. Ashley

Inventor

Arthur Frank Adams

By his Attorneys

Pope & Edgecomb

(No Model.) 2 Sheets—Sheet 2.

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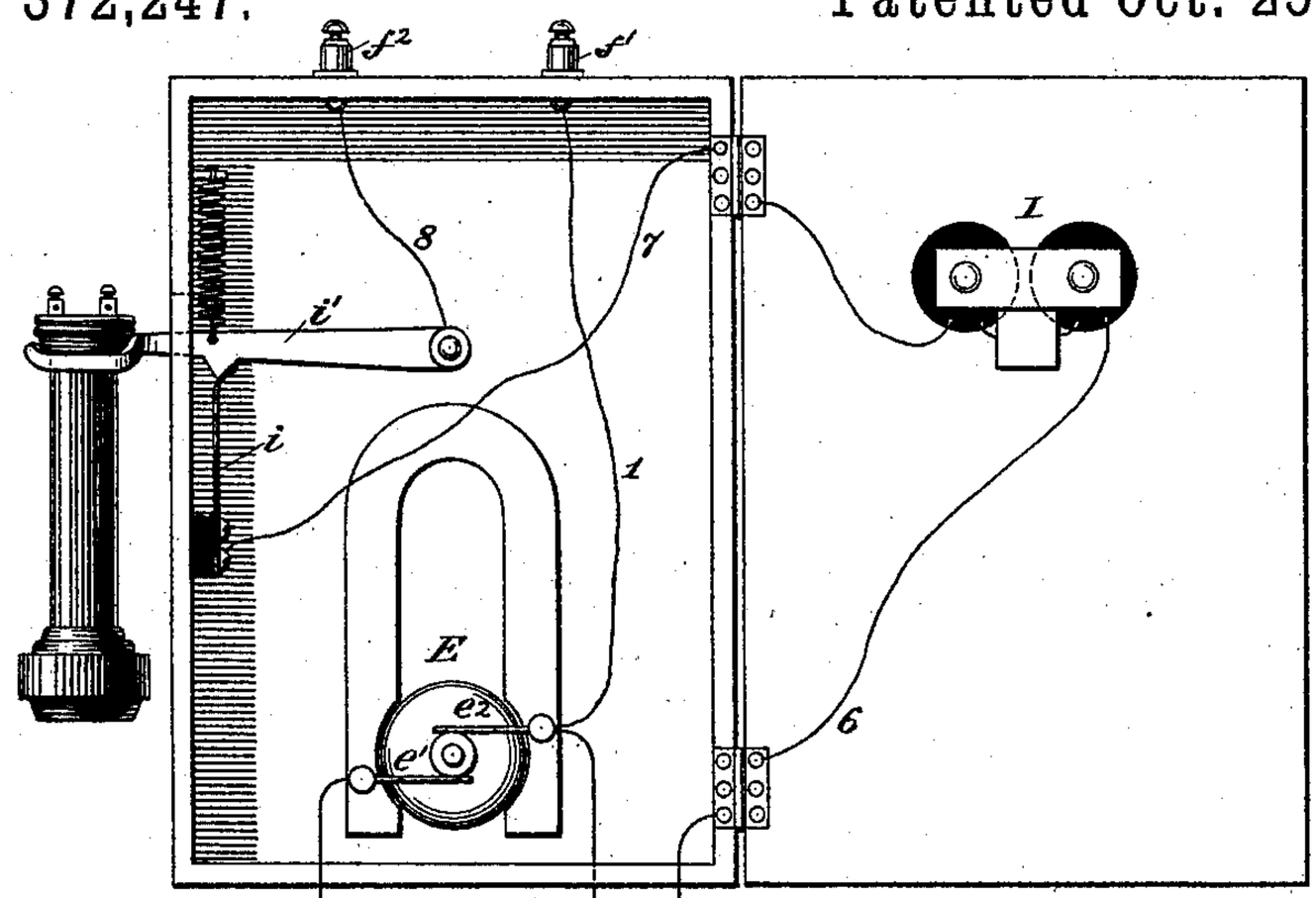

Fig. 4.

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

ARTHUR FRANK ADAMS, OF LITTLE ROCK, ARKANSAS.

CALL-REGISTER FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 372,247, dated October 25, 1887.

Application filed December 22, 1886. Serial No. 222,258. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR FRANK ADAMS, a citizen of the United States, residing in Little Rock, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Call-Registers for Telephones, of which the following is a specification.

The invention relates to the class of apparatus employed for registering the number of times a telephone or other similar instrument is used.

The object of the invention is to provide a convenient and reliable form of indicator for registering upon dials or other suitable indicating devices, which may be readily inspected, the number of calls made upon a telephone or other electrical apparatus; also, to provide means for preventing the unauthorized use of the apparatus and to guard against a repetition of the calls without registering the same.

The invention may be generally described as follows:

To the ordinary telephone-call apparatus there is applied a circuit-controlling device for the magneto generator, which must be operated when a generator is used to send a call. This circuit-controlling device, when thus operated, actuates the registering device and causes the call to be indicated thereon, and thus a record is made.

The circuit-controlling device consists, generally, of a cylinder, which is designed to be turned to a given position each time the circuit is to be closed, and when in that position it completes the connections between two contact-springs resting against the surface of the cylinder, thereby completing the circuit of the magneto-generator, so that a call may be sent. It is necessary, however, to prevent a reverse movement of the cylinder, for otherwise it might be returned to its former position without registering the call. For this purpose a locking-arm is applied to the cylinder. An electro-magnet, when vitalized, actuates a circuit-interrupting device through the lever in such a manner as to sever the normal connections of the circuit, so that a connection for the generator cannot be re-established without revolving the cylinder to its starting-point. A lug upon the cylinder operates the lever in case the electro magnet should not be vitalized. It is designed that this magnet shall be vitalized by a current from the central station when the call is received and answered; but it is necessary that it should not be vitalized by the currents from the magneto-generator in sending the call. There is therefore provided for the magnet a shunt-circuit, which may be closed by a push-button substituted for that ordinarily used for opening the shunt-circuit around the magneto-electric generator. This serves both to interrupt the shunt-circuit around the generator and to close the shunt around the electro-magnet.

The armature-lever of the electro-magnet engages with detents upon the cylinder and prevents it from being turned backward when the magnet is not vitalized, and the moment it is vitalized it interrupts its own circuit, thus effectually preventing the backward movement. A forward revolution of the cylinder to its starting-point again closes the normal circuit-connections of the electro-magnet and also registers the call upon the dial. When a call has been made and the subscriber desired cannot be reached, it may be desired to allow the person calling to return the cylinder to its normal position without registering the call. To accomplish this a current is sent from the central station through the electro-magnet. This raises the lever and permits the cylinder to revolve backward.

The invention will be described in detail in connection with the accompanying drawings, in which—

Figure 1 is a front view of the box, and Fig. 2 is a section of the same. Fig. 3 is a front view, the case being removed; and Fig. 4 illustrates the circuit-connections. Fig. 5 illustrates a modification.

Referring to the drawings, A represents the inclosing-case for the register, and a' a^2 a^3 the dials upon which the units, tens, and hundreds are to be registered. These are covered by a glass panel, *a*. Within the case there is placed a cylinder, B, which may be revolved by means of a suitable key, *k*, entering a slot, *k'*, in the end of the cylinder. When the apparatus is at rest, this cylinder is designed to stand in the position shown in the drawings; but when a call is to be sent it is turned to-

ward the right hand, approximately, one-half of a revolution, placing a contact-piece, *b*, against the contact-springs *c'* and c^2. A spring-catch, b^4, entering a notch, b^5, temporarily retains the cylinder in this position. The primary object of the cylinder is to close the circuit-connections between the two springs *c'* and c^2. The former of these is in electrical connection, by means of a conductor, 2, with one of the contact-springs, *e'*, of a magneto-electric generator, E, which usually forms a part of the equipment at a subscriber's station. The other contact-spring, e^2, is connected by a conductor, 1, with the binding-post *f'* of the instrument. The contact-spring c^2 is connected by a conductor, 3, with a contact-spring, *g*. This spring extends in a direction at right angles to the axis of the cylinder B, and is normally held away therefrom by means of a spring-catch, *g'*. At the same time the circuit is completed between the springs *g* and *g'*, the latter being connected by a conductor, 4, through the coils of an electro-magnet, H, with a conductor, 5, leading to the conductor 6. The conductor 6 includes the coils of the call-bell I, and is in turn connected with a conductor, 7, leading to a spring, *i*, and this makes contact with the telephone-switch *i'*, of well-known character, the latter being connected by conductor 8 with the binding-post f^2. The circuit is thus complete, and the generator might be operated, except that a shunt circuit is complete around it, which must first be interrupted. This shunt-circuit includes a conductor, 9, leading from the conductor 4, which leads from the electro-magnet H, to a contact-spring, *j*. This spring normally rests against a point, *j'*, which is in electrical connection, through a conductor, 10, with the conductor 1 or the brush e^2. A push-button, J, applied to the spring *j*, serves to press the latter from the point *j'* against a second point, j^2, when desired. The latter point is connected by a conductor, 11, with the conductor 5, leading from the electro-magnet H. The same operation of the push-button, therefore, interrupts the shunt around the magneto-generator and closes that around the electro-magnet H. This magnet H and its armature *h'* and lever *h* are designed to be operated by a current from the central office, which shall be sent each time the apparatus is used to interrupt the circuit-connections between the two springs *g* and *g'*, thereby preventing the circuit of the magneto-generator from being again completed until the cylinder has been again revolved. When the magnet is vitalized, an arm, h^2, extending from the lever *h*, lifts the spring *g'*, allowing the spring *g* to press forward until it strikes against the cylinder, in which position it will be separated from the spring *g'*. It cannot again be placed in contact with the spring *g'* until the cylinder is revolved back to its starting-point, whereupon a lug, b^2, presses it forward until it is caught and retained by the spring *g'*. This insures that the cylinder shall be turned before another call is sent. In order to prevent the cylinder from being turned backward to this point a catch, b^3, is placed in the cylinder, which, by engaging with the end of the armature-lever *h*, will prevent the cylinder from being turned backward. This catch consists of a notch in the cylinder, and thus does not raise the armature-lever and release the spring *g*.

To prevent an attempt being made to turn the cylinder backward from its normal position to place the lug *b* against the springs *c'* c^2, a lug, *b'*, projects from the cylinder in front of the armature-lever. This lug also serves to lift the armature-lever and release the spring *g*, and also to hold the spring *g'* back while the spring *g* is being reset. When a call has not been answered, it should not be registered, but the cylinder should be turned back to its starting-point. To permit of this the circuit is closed at the central station, and a current is sent through the circuit composed of the conductors 1 10, contact-point *j'*, spring *j*, conductor 9, coils *f*, electro-magnet H, and conductors 5, 6, 7, and 8. This permits the cylinder being turned back as the lever *h* is raised.

The registering device itself consists of a lug, *o'*, upon the cylinder B, engaging with the teeth of a ratchet-wheel, *n'*, the axis of which carries the indicator *m'* of the dial *a'*. This wheel has ten teeth, and the dial is provided with the nine digits and a cipher for indicating the revolutions of the cylinder. A spur or lug, o^2, upon the wheel *n'* engages the teeth of a second wheel, n^2, similar to the wheel *n'*. This wheel n^2 carries the index m^2 of the dial a^2, which serves to register the tens. The wheel n^2 will be actuated once for each revolution of the wheel *n'*. In like manner the hundreds are registered by an index, m^3, applied to the dial a^3 and carried upon the axis of a wheel, n^3. A lug, o^3, upon the wheel n^2 actuates the wheel n^3.

Instead of employing a lug, *b*, upon the cylinder B for closing the circuit between the springs *c'* and c^2, the key *k'* may be made with a flange, k^3, of sufficient width to project beyond the surface of the cylinder, as shown in Fig. 5. This flange, being of conducting material, will serve as a conductor for the purpose required.

The keys for the different registering devices may, if desired, be made of different patterns, so that they cannot be interchanged, or for the keys may be substituted a knob on the end of cylinder B.

To prevent any interference or tampering with the working parts by subscribers or others, the outside case, A, is secured by a lock, the key to which is retained by the agent of the company furnishing the same. The whole device may be incorporated and manufactured as a part of and in the same case with any make of magneto-electric call-bells.

I claim as my invention—

1. The combination, with a calling-circuit and a magneto-electric generator for telephone-calls, of a circuit-controlling device normally

interrupting the connections of the generator, a normally-closed shunt-circuit around said generator, means for opening said shunt-circuit, a device for operating said circuit-controlling device to complete the circuit of the generator, a registering device operated by the last-named device, an electro-magnet for interrupting the connections of said circuit when said magnet is vitalized, and means for shunting said electro-magnet.

2. The combination, with a telephone and a movable circuit-controlling support for the same, of an electric calling device, a second circuit-controlling device normally interrupting the circuit of the same, a registering device, and means for closing said circuit and simultaneously operating said registering device.

3. The combination, with a magneto-electric generator and a circuit for the same normally interrupted at a given point, of means for closing said circuit, a registering device operated by the closing of the circuit at said point, a device for interrupting said circuit at another point, an electro-magnet for operating the last-named device, a shunt-circuit around said electro-magnet, and means for closing the same when the generator is operated.

4. The combination of a magneto-electric generator, a normally-interrupted circuit for the same, a shunt-circuit normally closed around the generator, a device for closing the circuit of the generator, a register operated by said device, means for preventing a retrograde movement of the register, an electro-magnet operating, when vitalized, to interrupt the circuit of said generator, and means for interrupting the shunt-circuit around the generator and simultaneously closing the shunt-circuit around said electro-magnet.

5. The combination, in a telephone-call system, of a registering device consisting of a cylinder or its equivalent, means for revolving the same in a given direction, a registering device operated thereby, a lever serving to prevent a retrograde movement of the cylinder, an electro-magnet for actuating said lever, a circuit-interrupting device operated by the lever, and a lug upon said cylinder serving to mechanically operate said lever.

6. The combination, in a device for registering telephone-calls, of a cylinder, a circuit-closing plate upon said cylinder, serving, when in a given position, to close the calling-circuit, an electro-magnet and devices applied thereto for interrupting said calling-circuit, and a device for shunting the coils of said electro-magnet at will.

7. In a telephone-call register, the combination of one or more registering-dials, a cylinder capable of revolving in a given direction, a circuit-closing device for the calling-circuit closed by the revolution of said cylinder, and a device moving with said cylinder for actuating said dials, substantially as described.

8. In a telephone-call register, a circuit-closing device applied to the calling-circuit, a key for operating said device, a circuit-interrupting device, and a mechanical and an electrical device operating independently of each other to actuate said interrupting device each time the call is operated.

9. In a telephone-call register, the combination of a cylinder, a key for turning the same, a circuit-closing device for closing the call-circuit when said cylinder is in a given position, a circuit-interrupting device actuated by said cylinder when in another position, catches for preventing a retrograde movement of the cylinder, and a registering device operated by the revolutions of said cylinder.

10. In a call-registering device, the combination of the cylinder, contact-plates carried by the same, the springs constituting the terminals of the calling-circuit capable of being placed in electrical connection with said plate, a circuit-interrupting device for said cylinder, the lever for operating said circuit-interrupting device, the detent or catch upon said cylinder engaged by said lever and preventing a retrograde movement of the said cylinder, means for operating said lever, and thereby actuating the interrupting device once during each revolution of the cylinder, and a lug or equivalent device moving with the cylinder for re-establishing the connections through said interrupting device when the cylinder is returned to its normal position.

11. In a call-registering device, the combination, with the cylinder B, of the lug o', moving with the cylinder, the circuit-closing springs c' and c^2, the plate b', carried by the cylinder, the series of wheels actuated by said lug, the pointers moving with said wheels, and the dials to which said pointers are applied.

12. In a call-registering device, the combination of the cylinder B, the contact-springs c' c^2 and the contact-plate b applied thereto, the circuit-interrupting device g g' and the lug b^2 carried upon said cylinder for setting said interrupting device, and the lever h, for actuating the interrupting device.

In testimony whereof I have hereunto subscribed my name this 16th day of December, A. D. 1886.

ARTHUR FRANK ADAMS.

Witnesses:
AMOS M. ADAMS,
FANNIE L. KERROTT.