2 Sheets--Sheet 1.

J. W. KATES.

Telegraph Signal Apparatus.

No. 158,715. Patented Jan. 12, 1875.

Fig. 1.

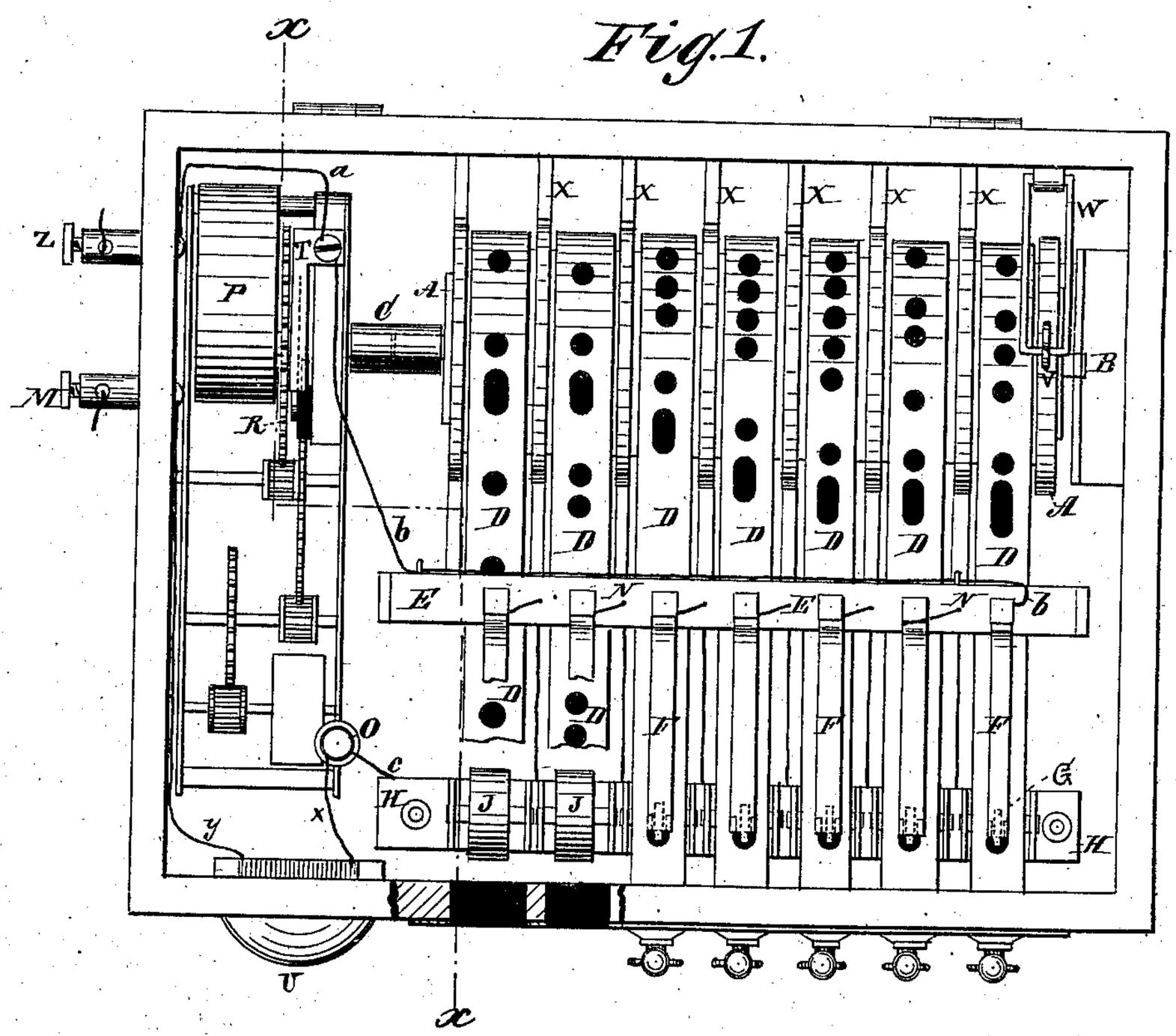
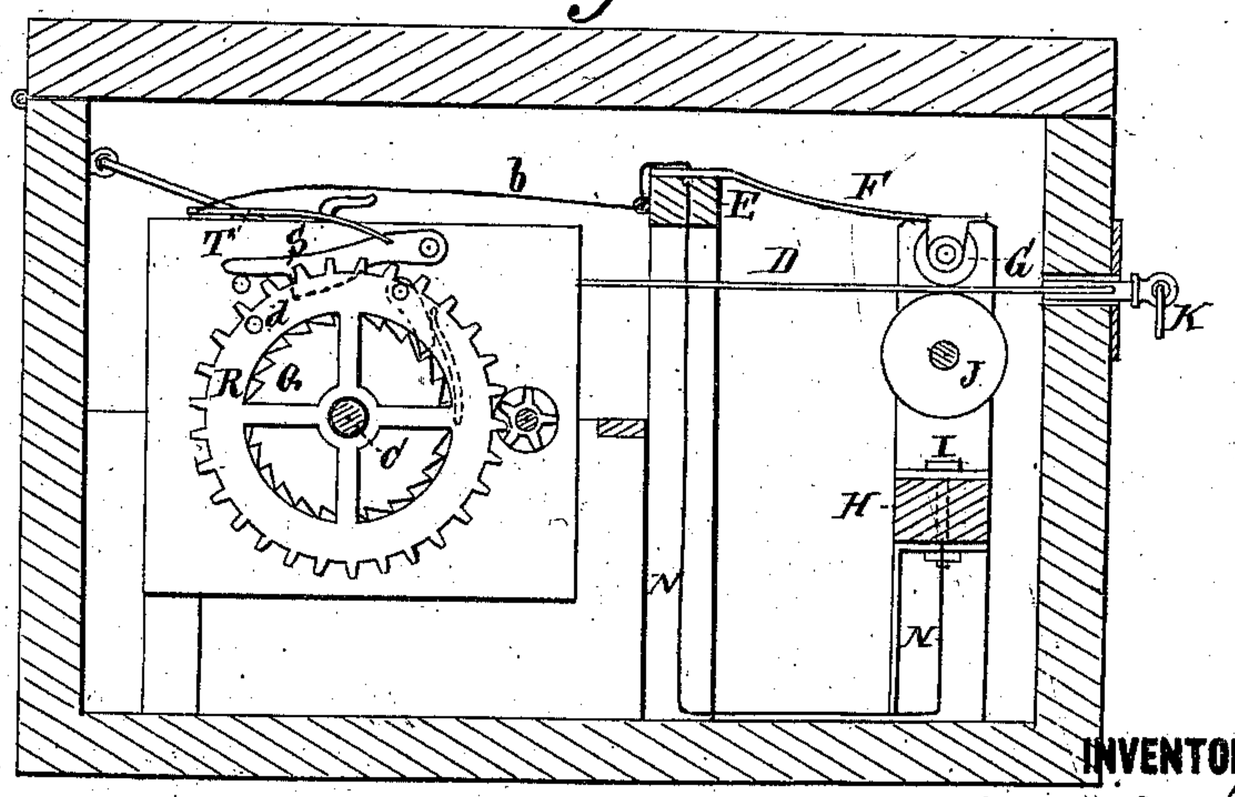


Fig. 2.



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2 Sheets--Sheet 2.

J. W. KATES.

Telegraph Signal Apparatus.

No. 158,715. Patented Jan. 12, 1875.

Fig. 3.

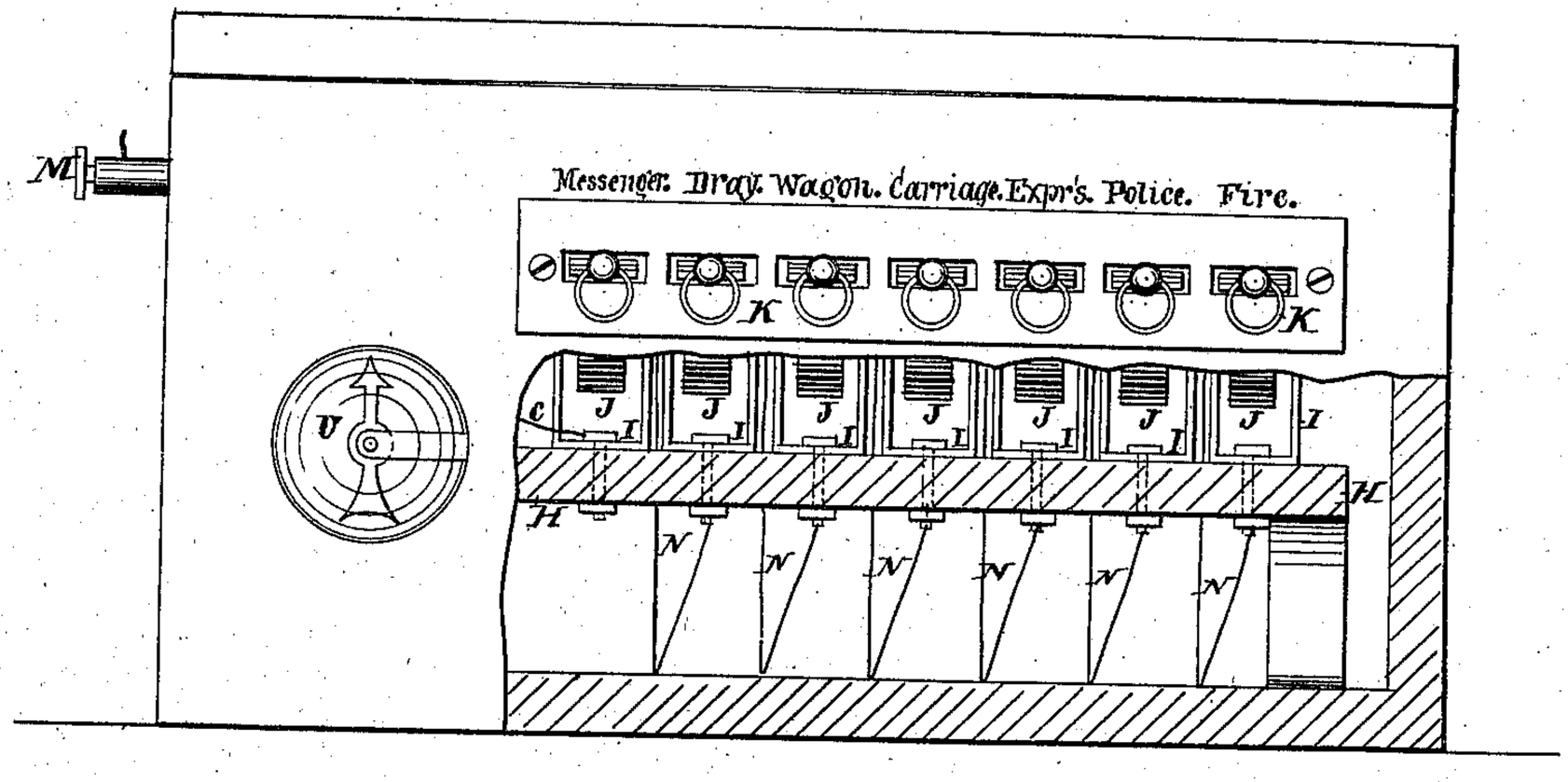
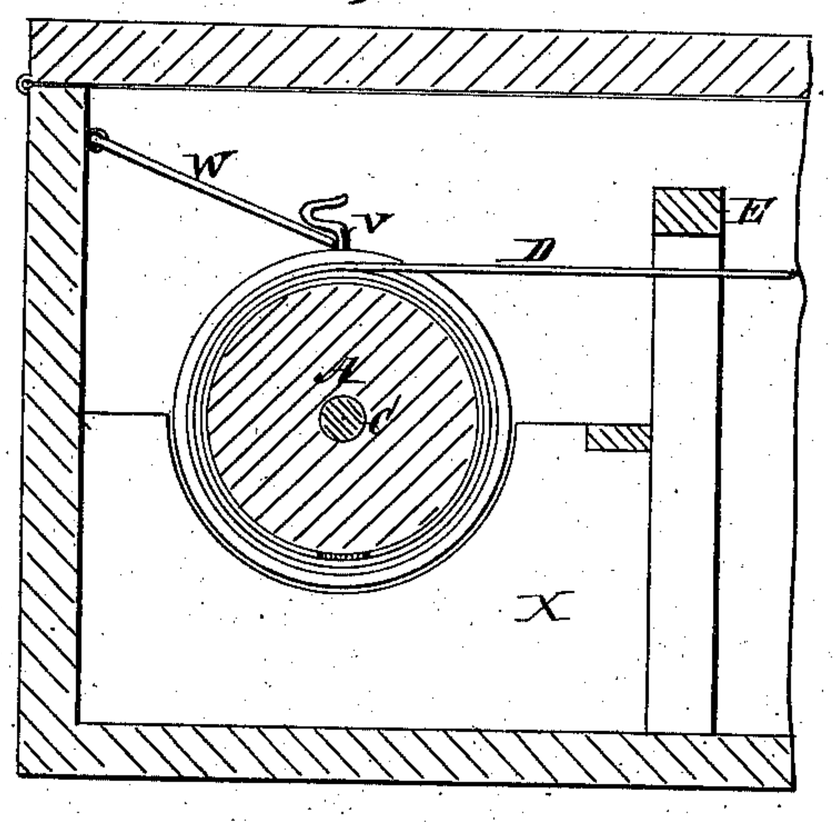


Fig. 4.



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UNITED STATES PATENT OFFICE

JOSEPH W. KATES, OF RICHMOND, VIRGINIA.

IMPROVEMENT IN TELEGRAPHIC SIGNAL APPARATUS.

Specification forming part of Letters Patent No. **158,715**, dated January 12, 1875; application filed September 28, 1874.

To all whom it may concern:

Be it known that I, JOSEPH W. KATES, of Richmond, in the county of Henrico and State of Virginia, have invented a new and Improved Automatic Signal-Telegraph; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a plan view with portion broken away; Fig. 2, vertical section through line *x x;* Fig. 3, front elevation of the box with a portion broken away; Fig. 4, vertical transverse section of the roller and appendages.

The object of this invention is to provide an automatic signal-telegraph to be used in hotels, public departments, large business establishments, and also private residences, which shall transmit to a central supply-station the most frequently recurring wants of the establishment, and whose operation shall be so simplified as to be adapted to the ordinary intelligence of persons unskilled in telegraphy.

A grooved drum rests in a bearing at one end, and connected at the other with the main shaft of a clock-gearing. Within the grooves of said drum are wound non-conducting tapes, fastened to the drum at one end, and having elongated and round perforations punched within the same, arranged to represent telegraphic letters. These tapes correspond in number to the most frequently recurring wants of the establishment, and their free ends pass between two metallic rollers or wheels. The lower set of these wheels have broad faces, the first one to the left being connected with the positive pole of the line-wire connection. The upper set of wheels are much smaller than the lower set, and are held down upon the tapes by means of springs, the first one to the right being connected with the negative pole of the line-connection.

As the tapes are pulled out by hand, and then drawn back by means of the clock-gearing, the current is alternately made and broken by the contact of the two wheels, through the perforations in the tape, and the appropriate signal transmitted to the central supply-office.

A galvanometer is placed in the apparatus, connecting with the line-wires, and indicates, by a tremulous motion, to the operator the employment of the wires by some other instrument, thus enabling him to avoid all confusion of signals. Said grooved drum is provided with a stop which limits the motion of the drum.

A loose arbor-wheel on the main shaft is also provided with a stop, which prevents the motion of the clock-gear when the tape is withdrawn, and also serves to shunt the circuit from the operating parts of the apparatus when not in use.

My invention consists in the combination of the above devices, as presented in the claims.

In the drawings, Figures 1 and 4, A represents the grooved drum, resting in a bearing, B, at one end, and attached to the main shaft C of a clock-gearing at the other. D are the tapes, fastened at one end to the drum, and wound around the same in the grooves. These tapes correspond in number to the most frequently recurring wants of the establishment, and are provided with elongated and circular perforations, arranged to represent telegraphic letters. Each one of the said tapes in the same instrument has the first letter alike to indicate the locality, the letters or numbers indicating the want being different, as A^1, A^2, A^3, &c.; the next instrument, B^1, B^2, B^3, &c. E is a non-conducting bar, upon which are fastened the springs F, containing the small wheels G. H, Fig. 2, is a second non-conducting bar, upon which are placed the metallic supports I, containing the metallic wheels J. In between these wheels J and the wheels G pass the tapes D, the latter terminating outside the box in metallic clips, containing rings K, and the said clips having shoulders which rest in slots in a metallic face-plate. Z is the line-wire connection for the incoming current, and M the line-wire connection for the outgoing current. Said post Z connects, by means of the wires *a* and *b*, Fig. 1, with the first of the springs F, and, through the wheel, with the supports I. N, Figs. 1, 2, and 3, are wires connecting the support of the first of wheels J with the spring F of the second wheel G, &c., the last of these supports I communicating with the post O upon the metallic frame of the clock-gearing through the wire *c*. P, Figs. 2 and 1, is a clock-spring, and Q a ratch-

et-wheel, made fast to the shaft C attached to the drum A. R is a loose wheel, bearing a pawl, and meshing with a spur-gear and fly. Said wheel R has a stud, *d*, which moves readily in one direction under an insulated catch, S, but is opposed by a notch in the latter when moved in an opposite direction. Said catch connects, through a spring, T, with the post Z, and serves, through stud *d*, to shunt the circuit from the operating parts when not in use. Said stud *d* opposes the motion of wheel R when the tape is withdrawn, and the shunting of the operating parts is maintained until the tape is released. U, Figs. 1 and 3, is a galvanometer, placed in the box, with a glass facing, which consists of a needle suspended longitudinally to the folds of a fine coil of wire placed adjacent to the same. One end of said coil *x* connects with post O, and the other, *y*, with the post M. V, Figs. 1 and 4, is a hook attached to the drum A, and W a link attached to the box, which, together, form a double stop for the drum, allowing it just one revolution. X are partitions, which separate the spaces beneath the grooves of the drum into recesses, which, when a signal is sent, receive the relaxed folds of the other tapes, and prevent the same from becoming displaced or tangled.

The operation of this apparatus is as follows: The instrument is supposed to be set up at a station, and to be connected at a central supply-office with a relay-magnet, Morse register, or sounder. Now, when the apparatus is not in operation the current comes in at post Z, passes along wire *a* through the metallic frame of the clock-gearing, down wire *x* through the coils of the galvanometer, and out wire *y* to the post M, the only manifestation of the same appearing in the needle of the galvanometer, which, if the current be broken by some other instrument, becomes agitated in its endeavors to dispose itself transversely to the current in the coils, obedient to certain laws of magnetism. If the needle is, therefore, in motion, to avoid confusion of signals, the operator must wait until it becomes quiet, as its tremulous motion indicates the employment of the wires by some other instrument. Now, if a carriage is wanted, and the middle tape designates the same, the middle ring is pulled out as far as it will come and then allowed to return, the hook V and link W limiting the withdrawal of the tape to one revolution of the drum. The immediate effect of the withdrawal of the tape is to rotate the drum, which, being on the same shaft with the ratchet-wheel and the spring P, winds up the latter. The wheel R, being a loose one, is held stationary by means of the stud *d* and catch S, and the shunting of the operating parts still maintained, until the tape is released and the retrograde motion commences. As soon as the tape is released the ratchet-wheel engages the pawl on the loose wheel R, stud *d* is carried away from stop S, and the electrical connection consequently broken. The current now comes in at Z and follows the wires *a b* to the first spring F, and as the upper and lower set of wheels are always in contact when the tape is wound up and at rest, the current passes down F, G, I, and J and up the wires N uninterrupted until it reaches the middle spring F, when it passes down from the wheel G to the lower one, J, between which the non-conducting perforated tape is passing, where it is broken according to the perforations designating a carriage. The current, as thus broken, is transmitted through the unbroken connection of the metallic conductors F, G, I, J, and N, out to post M through *c x y*.

Having thus described my invention, what I claim as new is—

1. The combination of the perforated non-conducting tapes D, with a grooved drum, A, placed upon one and the same shaft with the mainspring of a clock-gearing, so constructed and arranged that the withdrawal of the tapes winds up the spring, and the reaction of the spring, when the tapes are released, winds up in turn the tapes for the transmission of the signals, substantially as described.

2. The perforated non-conducting tapes D, in combination with the insulated spring-seated wheels G, the insulated wheels J, and the wires N, connecting the wheels J of one tape with the contact-wheels G of the next, substantially as and for the purpose described.

3. The combination, with the stud *d*, of the loose wheel R, the spring-seated insulated catch S, and the wire *a*, for the purpose of opposing the motion of the clock-gearing when the spring is wound up, and shunting the circuit from the operating parts until the tape, which has been drawn out, is released, substantially as described.

JOSEPH W. KATES.

Witnesses:
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W. W. GOSDEN.