

(No Model.)

2 Sheets—Sheet 1.

G. F. MILLIKEN.
FIRE ALARM SIGNAL BOX.

No. 571,950.

Patented Nov. 24, 1896.

FIG. 1.

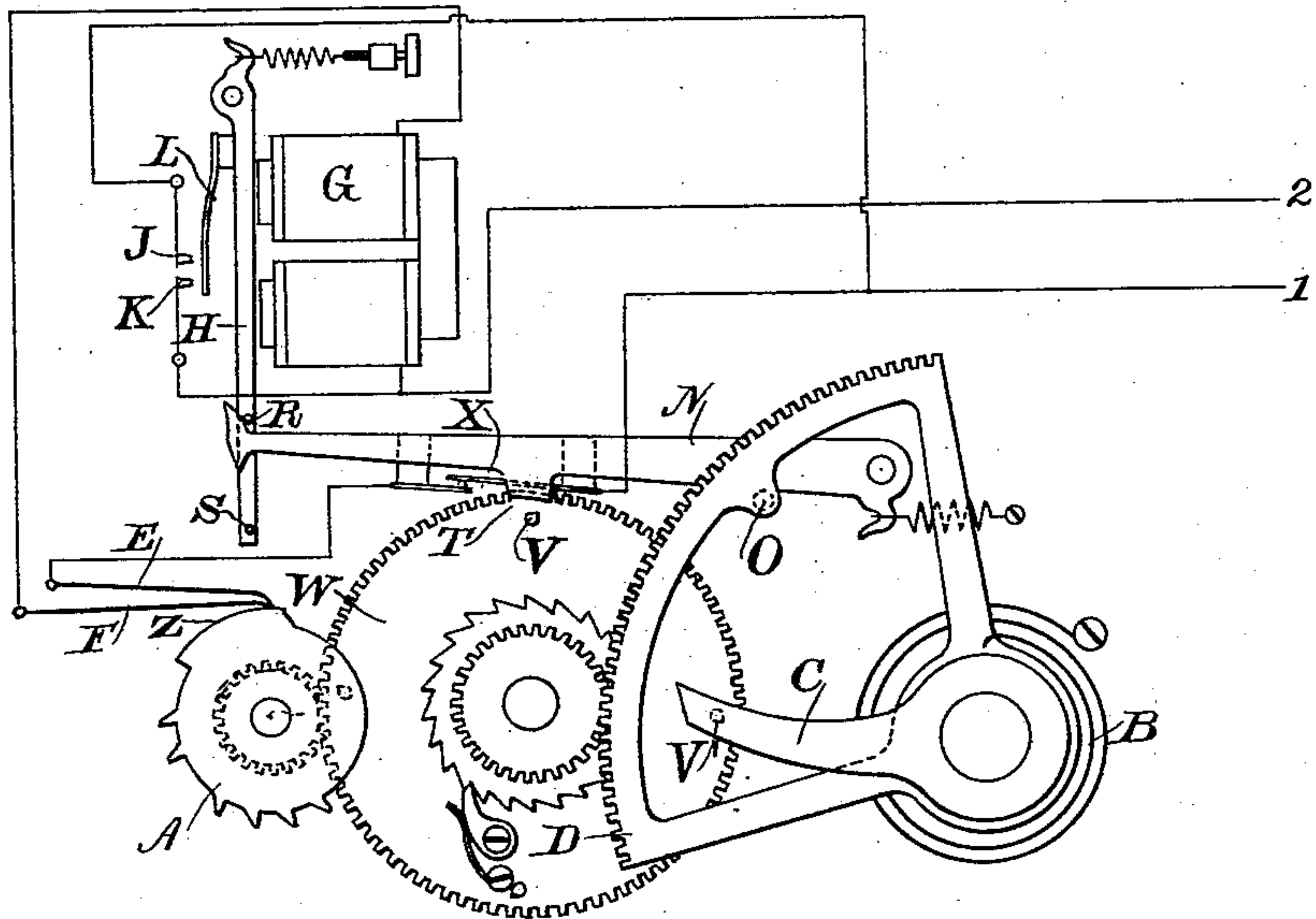
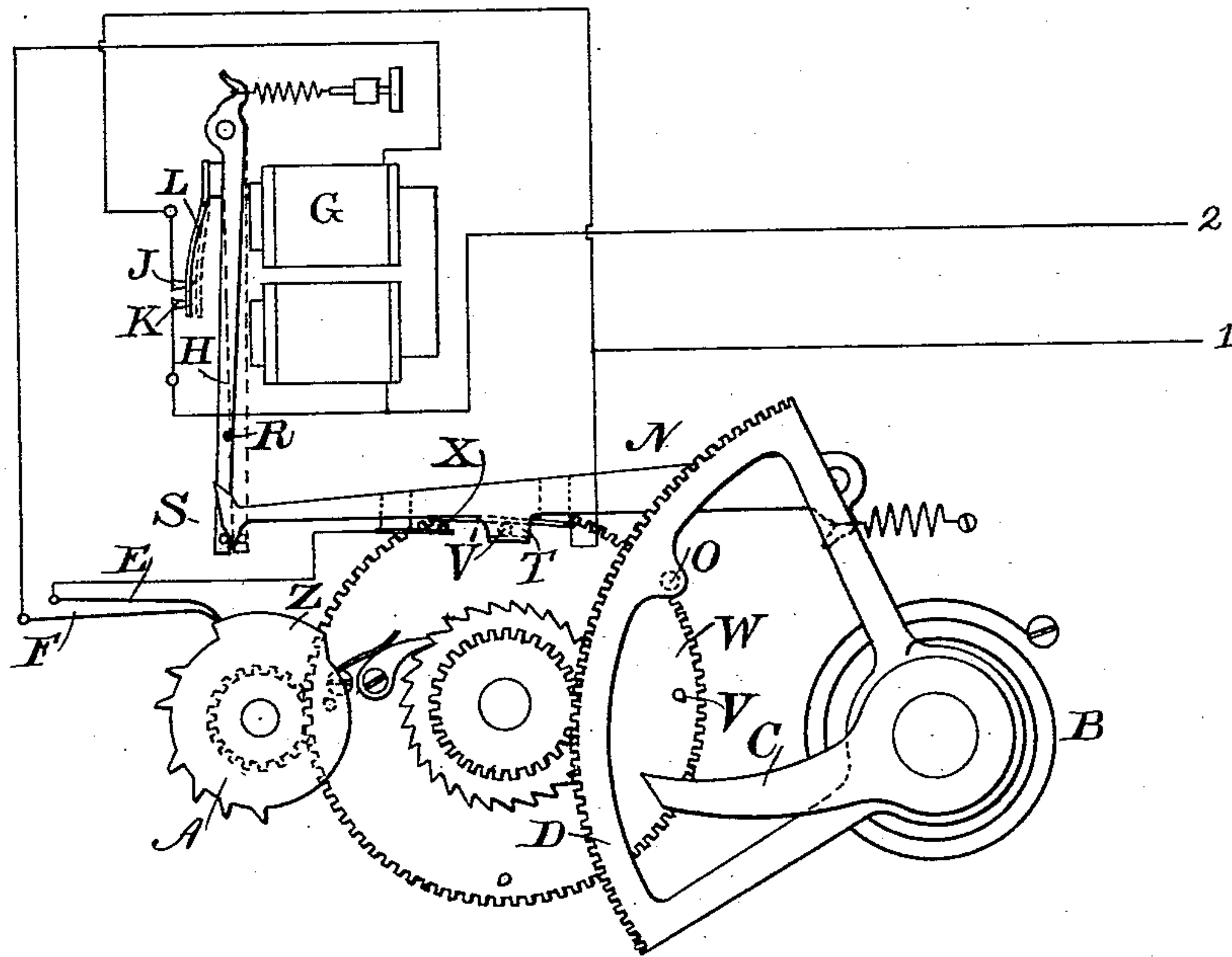


FIG. 3.



WITNESSES

C. L. Haynes
N. L. Hayes.

INVENTOR

George F. Milliken
by Bentley & Blodgett
Attys

(No Model.)

2 Sheets—Sheet 2.

G. F. MILLIKEN.
FIRE ALARM SIGNAL BOX.

No. 571,950.

Patented Nov. 24, 1896.

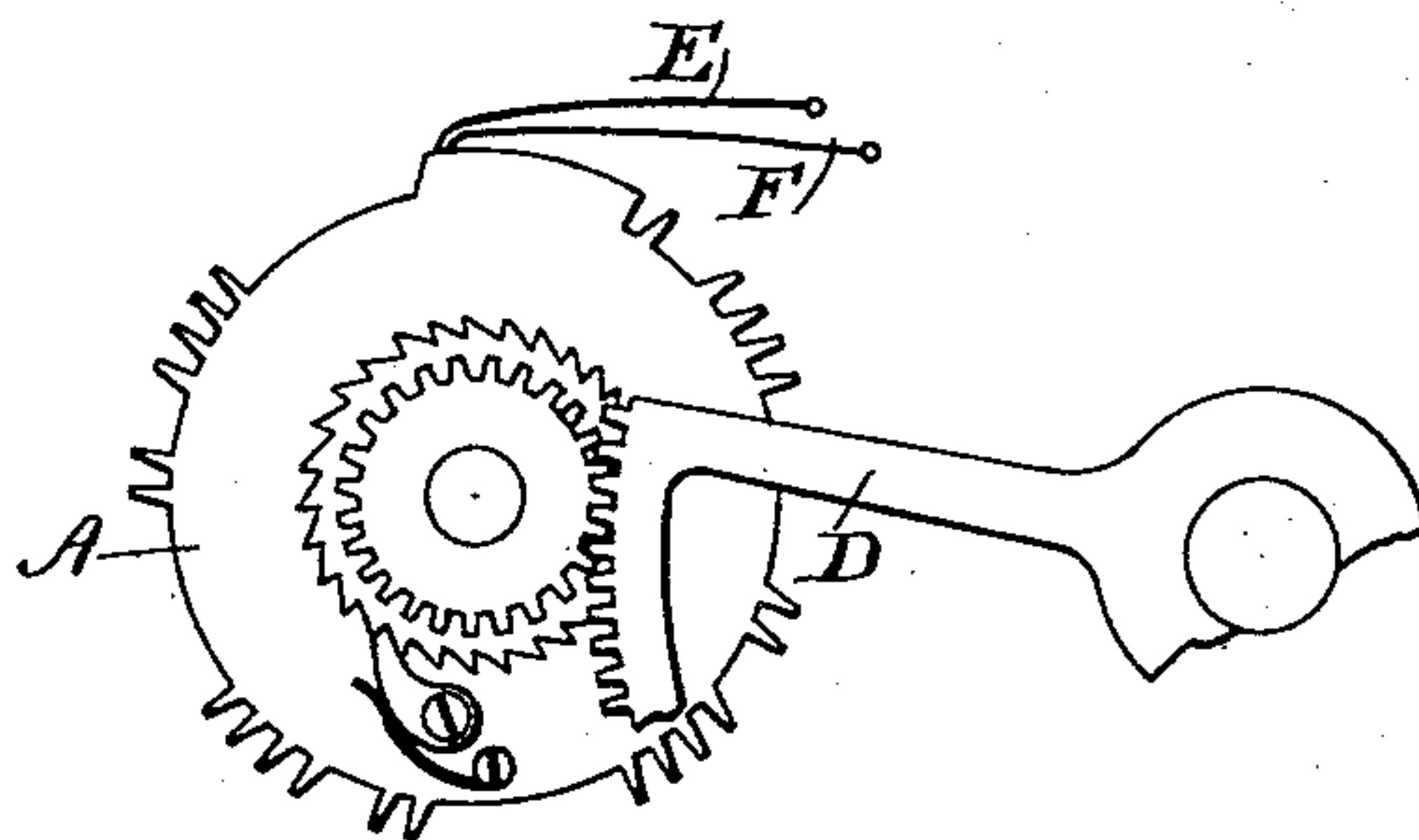
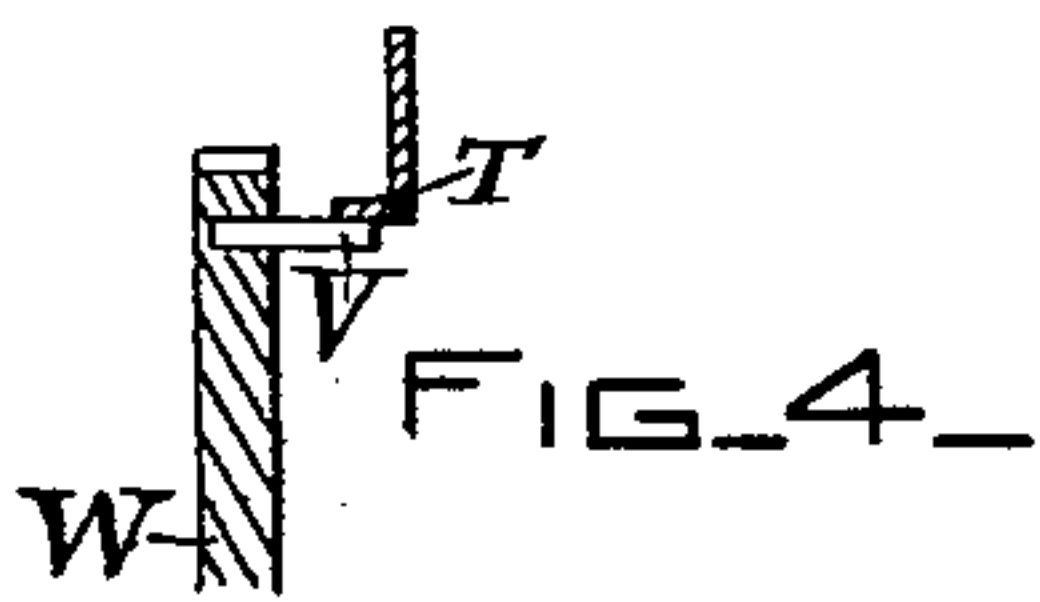
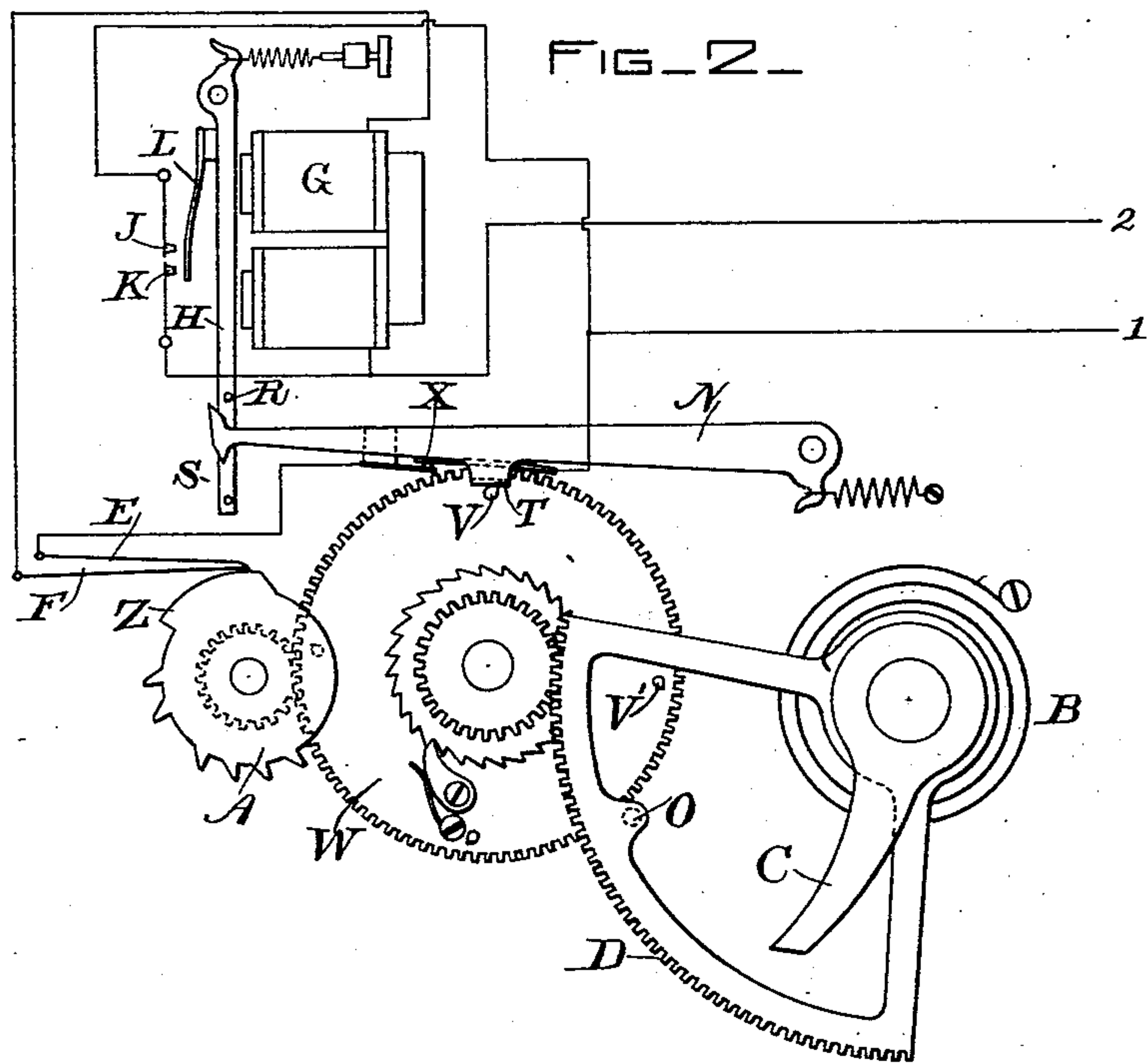


FIG. 5—

WITNESSES

C. L. Haynes
H. L. Hayes.

INVENTOR

George F. Milliken
by Bentley & Blodgett
Attys

UNITED STATES PATENT OFFICE.

GEORGE F. MILLIKEN, OF BOSTON, MASSACHUSETTS.

FIRE-ALARM SIGNAL-BOX.

SPECIFICATION forming part of Letters Patent No. 571,950, dated November 24, 1896.

Application filed December 14, 1891. Serial No. 415,062. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. MILLIKEN, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fire-Alarm Signal-Boxes, of which the following is a specification.

In so-called "non-interference" signal-boxes as heretofore constructed it is in many cases possible that an interfering-signal could be sent provided a second box was pulled at an instant when a box already in action was closing the circuit, and to prevent this a number of devices have been designed in which, whenever a box is pulled, there is a lapse of time allowed before the train is started or before it comes into signaling condition, which lapse of time is longer than the longest closed period of any signal on the line and during which it becomes disabled if another box is in action. By this means it is rendered impossible for a second box to interfere with one already in operation by chancing to start its signal during a closed period of the first signal.

My present invention is designed to accomplish this same result, but in a manner different from anything which has been heretofore proposed. I do not, as in other devices, retard the starting of the box after the hook is pulled, nor do I keep the box out of signaling condition by means of a shunt-circuit during a time longer than the longest closed period of any signal on the line; but, on the contrary, my box is always in signaling condition and the signal-wheel starts at the instant the train is set in motion, but the spaces on the signal-wheel are so arranged that the first tooth on which the contact-springs normally rest is of greater length than the others, and in consequence when the box is pulled the circuit is not opened by the signaling-wheel until after a lapse of time longer than the longest closed-circuit period of any signal, and thereby full opportunity is afforded for the non-interference magnet to act and shut the instrument out of circuit in case another box is already in action. At the same time the said long tooth is not permitted to cause, at any succeeding time during the sending of the signal, an abnormally long closure of the

circuit, since otherwise its effect in holding the circuit closed at its own box during the initial free armature period would be neutralized by the abnormally long closure which a similar tooth in a foreign box would produce during the signal.

Referring to the accompanying drawings, Figures 1, 2, and 3 show my apparatus, diagrammatically, in different positions taken during its operation. Fig. 4 is a detail; and Fig. 5 shows a form of signal-wheel which may be employed, if necessary.

In the drawings, A is a signal-wheel driven by a time-train of the usual construction, which train is started by pulling the hook C, which compresses spring B and moves sector D into the position shown in Fig. 2. The sector then recovers its original position under the stress of spring B, and in so doing rotates the gear-train and the signal-wheel A a definite number of times.

E and F are two contact-springs resting on the signal-wheel in a well-known manner.

G is the non-interference magnet, and H is its armature, which is normally attracted by the magnet, but when released by the magnet is retracted under the influence of its spring and thereby closes a circuit between the two contacts J and K by throwing spring L into contact with them both.

N is a lever normally held up in the position shown in Fig. 1 by a pin O on sector D. On the outer end of lever N are two stops adapted to engage with pins R and S on armature-lever H. The lever N is provided with a downward projection T, which normally rests, as shown in Fig. 1, a short distance above pin V on wheel W of the gear-train. When in this position, the lever N engages with pin R on armature-lever H and holds the same in its attracted position against the poles of the magnet. The lever N also carries a contact X, formed by a spring resting on a contact-point, the main-line circuit passing through this contact.

The parts normally are in the position shown in Fig. 1, the main-line circuit being from point 1, through contact X, springs E and F, magnet G, to line 2. To start a box, the hook C is pulled and the sector forced down in the position shown in Fig. 2. The first effect of this is to allow lever N to drop

till projection T rests upon pin V, as shown in Fig. 2. This releases armature H, and when the operator lets go of hook C the sector starts to return to its normal position and give the required rotation to the gear-train and signal-wheel. Before, however, the signal can be started the gear-wheel must rotate a sufficient distance to allow the broad tooth Z to pass out from under springs E and F. This is so timed as to occupy a period longer than the longest closure of any signal, while at the same time pin V moves a sufficient distance to pass out from under projection T. The action of the apparatus is then dependent upon whether the line is clear or not, and the operation will be described under each of these two conditions.

First. The line being free the circuit will remain closed and magnet G will retain its armature in its attracted position. The lever N, after the passage of pin V from under projection T, will drop a second step, as shown in Fig. 3, and will lock armature H in its attracted position, as indicated by the dotted lines in said figure. The springs E and F will then drop off tooth Z and the signal will begin. It must be remembered, however, that the long tooth Z is required only at the commencement of the signal, and it would be objectionable to have the circuit closed on the second round of the signal-wheel a length of time corresponding to the long tooth. To prevent this, it is arranged that pins V' on wheel W shall open contact X in the main line just before the tooth Z reaches the springs E and F on the second, third, and fourth round, assuming that the wheel is intended to rotate four times and repeat the signal accordingly. By this means the circuit is held open during most of the time that the long tooth Z is passing under springs E and F on every round except the first, and the effect of the long tooth is thereby the same as that of a short tooth, except at starting. In this manner the signal will be sent as usual, it simply being provided that the first break shall not occur until after a definite lapse of time.

Second. The line being occupied by another signal from a foreign box the circuit will be alternately opened and closed, so that when the lever N drops upon pin V and releases lever H the latter will be retracted when the circuit is open, and, closing the circuit at J and K, will throw the whole apparatus out of circuit, including the magnet G. Under these conditions the circuit may be traced as follows: from point 1 to contacts J and K and to line at point 2, and in consequence no signal will be sent, but the train will continue to act, allowing projection T to fall below pin V and thereby lock lever H in the position

shown by full lines in Fig. 3. After the train has run its course the pin O on sector D will lift lever N to its original position and thereby force armature-lever H into its original place against the poles of the magnet, so that the apparatus is once more in its normal condition.

It will be observed that the projection T is of the form shown in Fig. 4, so that when the lever is in its lowest position the pins V and V' will pass over the projection and the latter operate the contact X.

I have shown contact X as operated by pins V and V' on wheel W, but it is apparent that a corresponding contact may be operated by projections attached to any moving part of the apparatus and so placed as to open contact X for a portion of the time that tooth Z is under springs E and F on every round except the first.

In place of the contact X with means for opening it at such times the signal-wheel can be placed directly upon the shaft with wheel W and of such size that it may repeat a given signal the required number of times by one revolution. A wheel of this kind is shown in Fig. 5. An inspection of each figure will show that the teeth are so arranged that the signal may be duplicated, except that the long tooth Z is retained for the beginning.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a signal apparatus of a time-train, a non-interference magnet in the circuit, a signal-wheel driven by the said train having its first tooth longer than the others, and adapted to make two or more rotations to repeat the signal, and a contact in the main line operated by the time-train at times when the long tooth of the signal-wheel is under the contact-springs on all rotations succeeding the first.

2. The combination in a signal apparatus, of a time-train, a signal-wheel driven thereby and adapted to move a certain distance before interrupting the circuit, a non-interference magnet, a locking device for the armature of said magnet, adapted to release the armature while the signal-wheel is moving said certain distance, and at other times to lock said armature in either its attracted or retracted position, contact-springs resting normally on a long tooth of said wheel, and means for suppressing the effect of such long tooth on every repetition of the signals.

In witness whereof I have hereunto set my hand this 28th day of November, 1891.

GEORGE F. MILLIKEN.

Witnesses:

GEO. R. BLODGETT,
E. M. BENTLEY.