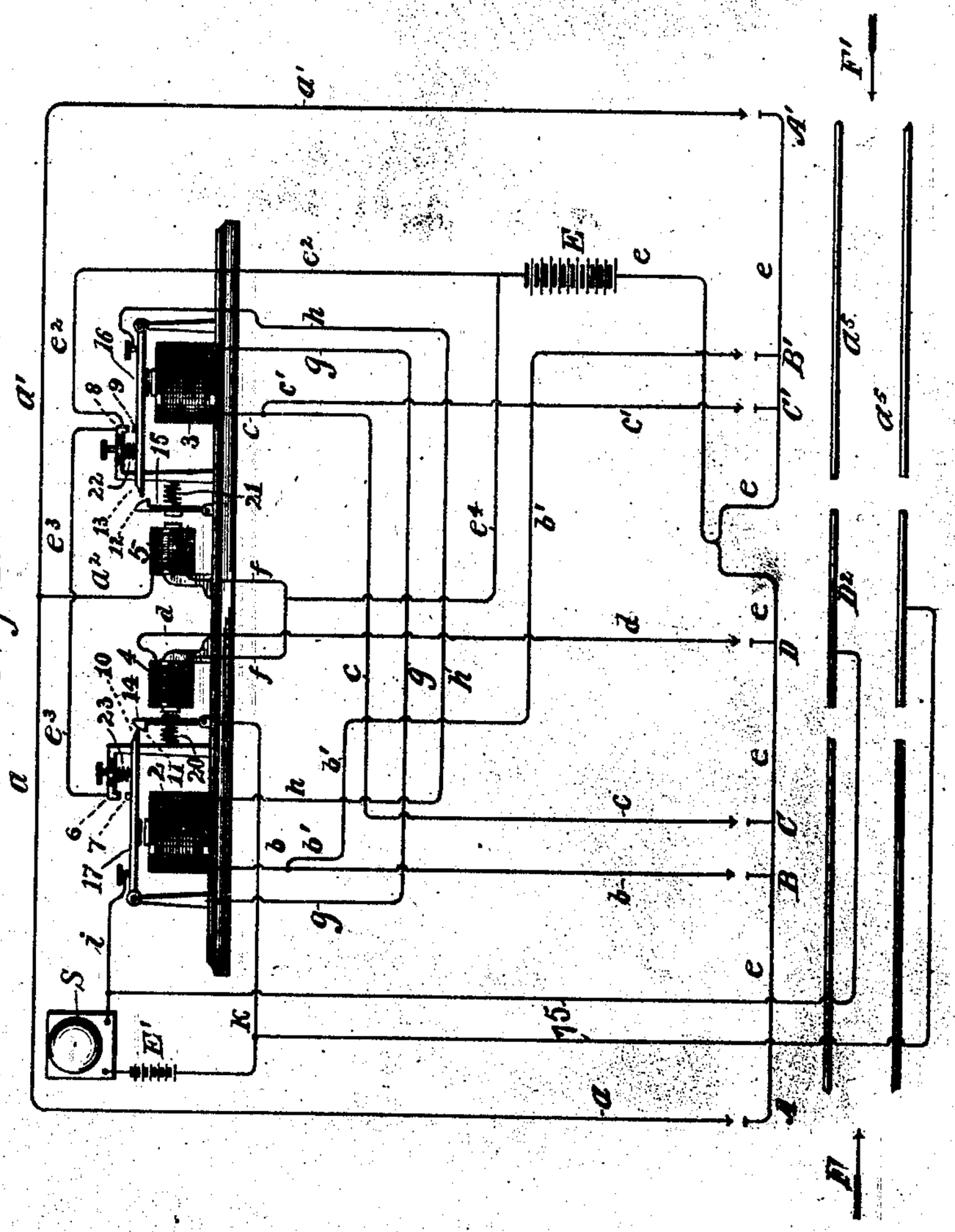
(No Model.) 2 Sheets—Sheet 1.

# C. SELDEN.

## RAILWAY CROSSING SIGNAL.

No. 578,840. Patented Mar. 16, 1897.

Fig. 1.




WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

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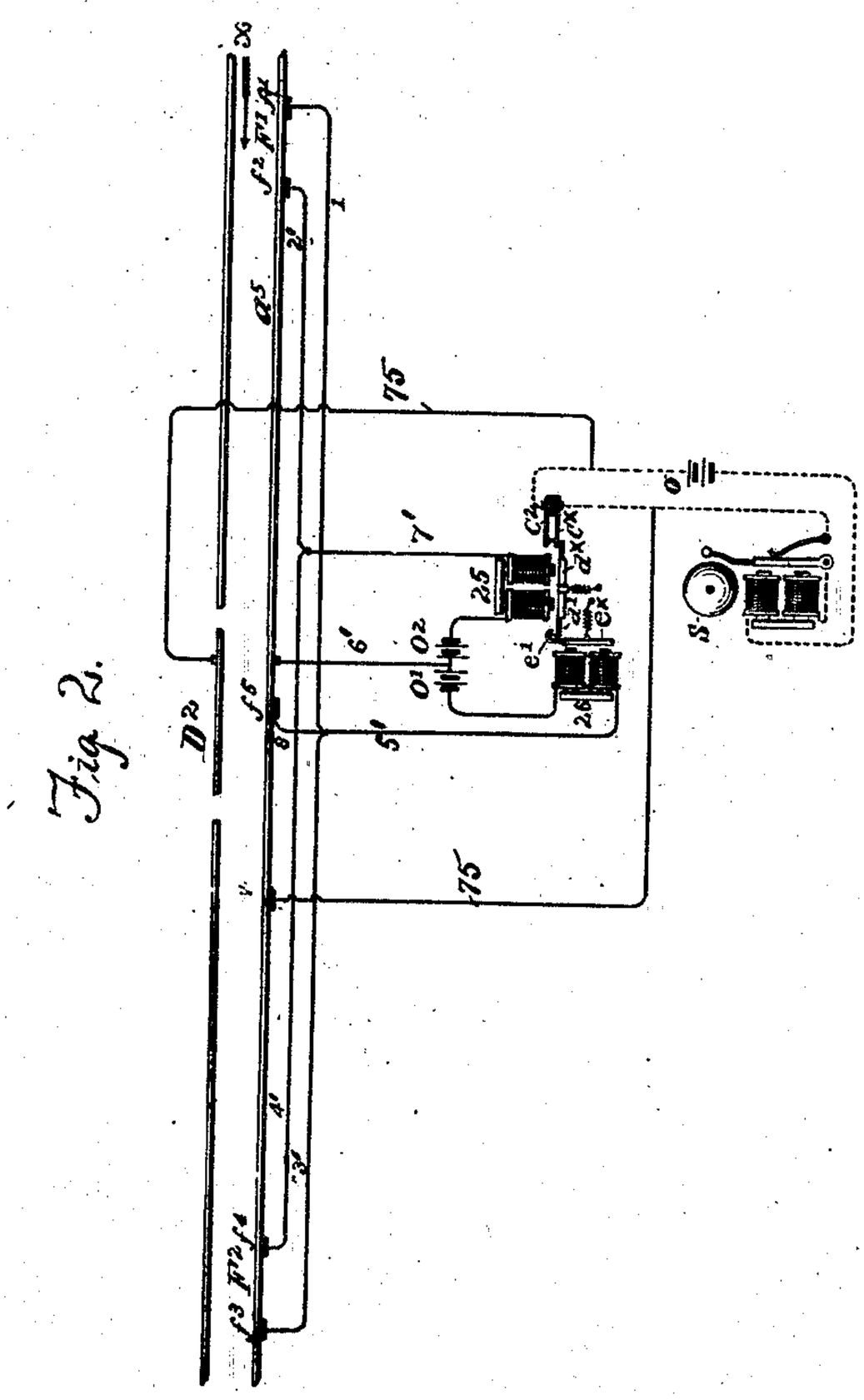
Fig 2.

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# UNITED STATES PATENT OFFICE.

CHARLES SELDEN, OF BALTIMORE, MARYLAND.

## RAILWAY-CROSSING SIGNAL.

SPECIFICATION forming part of Letters Patent No. 578,840, dated March 16, 1897.

Application filed February 11, 1897. Serial No. 622,953. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES SELDEN, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have invented a certain new and useful Railway-Crossing Signal, of which the following is a specification.

My invention relates to railway signal apparatus operated by passing trains and designed to cause an alarm to sound or a signal to be given when trains approach a certain point, as, for instance, a highway or other crossing, in either direction, and so organized that the alarm or signal will go out of action and remain unaffected as the train, moving in either direction, recedes from such given point.

In apparatus of this character it is usual to cause the alarm to stop or the signal to be thrown out of action when the first wheel or car of the train reaches the same point, such as the crossing, for movement in either direction, in order that such action may take place at relatively the same point in the movement of the train going in either direction. The objection to such arrangement is that it cannot be known to the engineer or to persons on the train whether the alarm has been properly sounded or the signal properly set as the train approaches the crossing, to obviate which objection, while at the same time leaving the apparatus free to operate in its ordinary or accustomed manner in setting and throwing off the signal, is the object of my present invention.

To this end my invention consists in the provision of a supplementary circuit-closer operated by the train and located or arranged, as herein described and shown, to keep the signal temporarily in action while the train is passing it, although the unsetting or resetting devices may have been already brought into action.

In the accompanying drawings I have illustrated my invention diagrammatically as applied to two different old organizations of apparatus having the general mode of operation above described.

Figure 1 shows the invention as applied to one form, and Fig. 2 to another.

I will first describe the apparatus as organized and operating without my invention.

Upon a suitable base are placed four electromagnets, the pole-pieces of the two marked 2 and 4 and also 3 and 5 being arranged at right angles to each other. The armature 17 of magnet 2 and 14 of magnet 4 being likewise at right angles are adapted to lock when magnet 2 is energized and unlocked when magnet 4 is energized. The same position and arrangement are provided with magnet 3 and armature 16 and magnet 5 and armature 15. When magnet 3 is energized, armature 16 is attracted and engaged at points 12 13 with armature 15, said points being disengaged when magnet 5 is energized.

S represents a signal contained in the local of signal-circuit *i* and *k*, worked by battery E′, although, as clearly evident, the main battery E could be used for this purpose by the employment of a loop from either wire *i* or *k*.

A train entering in the direction indicated by the arrow F first makes contact at track-circuit-closing device A. This establishes a circuit, and the current is then through wire *a*, wire $a^2$, magnet 5, wire *f*, wire $e^1$, battery E, and wire *e*. This has no effect upon the instrument other than to attract armature 15 and to insure that all parts are at normal previous to the arrival of train or car at circuit-closing device B. It is well to here remark that the distance between circuit-closers A and B is considerable, so as to cover the length of an unusually long train. Therefore device A is clear and electrical contact therein broken before the forward part of the car or locomotive reaches device B. Immediately upon the passage of the first wheel of the car or locomotive over device B circuit is then complete through wire B, magnet 2, wire *h*, armature 16, wire $e^2$, battery E, wire *e*, back to device B. This causes armature 17 to be attracted by magnet 2, and projection 10 on the end thereof engages lug 11 of armature 14, said armature being held in engagement therewith by retractile spring 20. This engagement of the armatures 14 and 17 completes the local or signal circuit from one pole of battery E′, wire *k*, armature 14, armature 17, wire *i*, signal S, to the other pole of the battery. Almost immediately after the passage of the forward part of train over device B, device C is reached and contact therein

made, but no circuit is established, as will be now explained. Assuming, for the sake of clearness, that all contacts were complete for this circuit, the current would then flow through wire *c*, magnet 3, wire *g*, armature 17, wires $e^3$ $e^2$ to battery; but by reason of magnet 2 having been first energized from device B and armature 17 being held in locked engagement with armature 14 the contacts 6 7 are separated, thereby rendering circuit from device C incomplete, and magnet 3 is not energized. These two devices B and C may be placed at any distance from a road-crossing that it may be desirable to give warning of the approach of a train. As the train proceeds, circuit-closer D is reached. This device is usually placed in the immediate vicinity of the signal. If it be a road-crossing bell, then at said road-crossing. A circuit is established when the contact D is made. The current is through wire *d*, magnet 4, wires *f* $e^4$ to battery E, and by wire *e* back to device D. As the train proceeds, track device C′ is reached, and immediately upon the passage of the first wheel of said train thereover a circuit is established, the current then flowing through wire *c*′, magnet 3, wire *g*, armature 17, contact 6 7, wire $e^3$, wire $e^2$, battery E, and back to device C′. This operation energizes magnet 3 and breaks circuit at 8 9 by reason of the attraction of armature 16 and the locking thereof with armature 15. Therefore when the train reaches device B′ the circuit by wire *b*, wire *h*, wire $e^2$ to battery is broken at contacts 8 9, and magnet 2 cannot be energized. Hence the signal is not operated. When the train finally passes out of the protected section and over the device A′, the circuit which is completed by wires *a*′ $a^2$ $e^4$ to battery E energizes magnet 5. This operation attracts armature 15, separating the contact at 12 13 and releasing armature 16, and by action of retractile spring 22 contacts 8 and 9 are restored, and all parts are then normal.

As will be readily understood, a train or car passing over the protected section in the opposite direction (indicated by arrow F′) the operation as above described is repeated.

Another form designed to produce the same results is as follows: S represents a signaling device, in this instance a vibrating bell included in the circuit of a local battery *o*. The connections of this battery are designed to be completed by the contact of a spring $c^\times$ with an arm $c^2$ under the influence of the pressure exerted by an armature-lever $d^\times$ of an electromagnet 25. Upon this armature-lever there is a catch *d*′, which is designed to pass behind a corresponding catch *e*′ upon an armature $e^\times$, applied to an electromagnet 26. If the electromagnet 25 be vitalized while the armature $e^\times$ is away from its magnet, the catch *d*′ will be engaged by the catch *e*′, and thus the armature $d^\times$ will be prevented from coming toward its electromagnet and closing the circuit of the battery *o*. If, however, the electromagnet 26 be first vitalized and then the electromagnet 25, then both armature-levers will be allowed to come forward and the circuit of the battery will be completed. The positions of the armatures are so adjusted that while the armature $e^\times$ can pass toward its electromagnet, provided the armature $d^\times$ be in its backward position, yet if the latter be drawn slightly forward then the detent or catch *d*′ will pass behind the hooked end of the catch *e*′ and prevent the latter from coming forward when the electromagnet 26 is vitalized, thus insuring that the armature $d^\times$ cannot close the circuit of the local battery in any event when the electromagnet 25 is vitalized first. The means whereby these electromagnets are vitalized in the proper succession are as follows: At each of two suitable points F′ and $F^2$, at the required distances from the crossing $B^2$, are placed two circuit-closers, as shown at $f'$ $f^2$ and $f^3$ $f^4$. These circuit-closers may be of any convenient form adapted to complete the connections between the rails $a^5$ of the track and the conductors 1′, 2′, 3′, and 4′, respectively, by the operation of a passing train. The conductor 1 leads from the circuit-closer $f'$ to a conductor 5′, including the coils of the electromagnet 26 and connected with one pole, say the positive, of a battery O′. The negative pole of this battery is connected by a conductor 6′ with the rails $a^5$. When, therefore, the circuit is completed between the rail and the conductor 1 by a train passing the circuit-closer $f'$, the electromagnet 26 will be vitalized and its armature-lever drawn forward. The train proceeding upon the track in the direction indicated by the arrow *x* then closes the circuit between the rail and the conductor 2′ by means of the circuit-closer $f^2$. The conductor 2′ is connected with a conductor 7′, leading through the coils of electromagnet 25 to one pole, say the negative, of a battery $O^2$. The remaining pole of this battery is connected by the conductor 6′ with the rails $a^5$. The electromagnet 25 will therefore be vitalized, and the armature $e^\times$ having been drawn out of its path the armature $d^\times$ will be drawn forward, thus closing the circuit of the battery *o* and causing the bell to be actuated. The train passing toward the crossing passes from the circuit-closer $f''$ and allows the circuit, through the electromagnet 26, to be broken and its armature-lever to fall back before the electromagnet 25 is demagnetized. The armature $e^\times$ falls behind the armature $d^\times$, thus locking it forward and causing the circuit to remain closed, even after the train has passed the circuit-closer $f^2$. When the train has reached the crossing, it is necessary that the signal should be released and the circuit of the battery *o* interrupted. For this reason a circuit-closer $f^5$ is employed, and this is connected by a conductor 8 with the conductor 5′, leading through the electromagnet 26. The train reaching the crossing closes the circuit through this device, thereby causing the electromagnet 26 to be vitalized

and its armature-lever drawn forward, thus releasing the armature $d^{\times}$, which immediately falls away from its magnet, thus opening the circuit of the battery *o*. The train continuing reaches the circuit-closer $f^4$ and completes the circuit through the magnet 25 by way of the conductor 4′, leading from the circuit-closer to the conductor 7′, but the armature $d^{\times}$ is prevented from coming forward and closing the circuit of the local battery *o* by reason of the hooked catch $e'$ upon the armature $e^{\times}$. The circuit is then closed through the magnet 26 by the circuit-closer $f^3$, which is connected by the conductor 3′ with the conductor 5′. The armature $e^{\times}$, however, is prevented from coming forward by reason of the hooked extension $e'$ being engaged by the catch $d'$ upon the armature $d^{\times}$, it being understood that the armature $d^{\times}$ is held forward by its electromagnet 25. The circuit of the battery *o*, therefore, will not be completed by the train passing from the crossing over the circuit-closers $f^3$ and $f^4$.

It is evident that a train passing in the direction opposite that indicated by the arrow *q* will first arrive at the circuit-closer $f^3$ and complete the circuit through the electromagnet 26. Then by reason of the circuit-closer $f^4$ the electromagnet 25 will be vitalized and thus operate the signaling devices in precisely the same manner as described with reference to a train passing in the direction of the arrow and operating the circuit-closers $f'$ and $f^2$. The signal will then remain actuated until the train arrives at the crossing, whereupon it is released in the manner described. The train subsequently passes the circuit-closers $f^2$ and $f'$ in succession without operating the signal. It will be observed that in both these cases as soon as the locomotive or car reaches the circuit-closer D in one arrangement or $f^5$ in the other the alarm ceases to sound, the apparatus being at that instant so set that in passing away from the signal no alarm will be given. Hence the engineer or persons on the train cannot tell whether the signal had been sounded. To obviate this objection, I apply the supplemental circuit-closer $D^2$, as indicated, consisting, preferably, of an insulated track-rail or any other track instrument that would keep a circuit closed while a train passes over it could be employed. This device is connected by suitable wires 75, as indicated, with the circuit of the alarm S, so that the alarm will sound while the train is passing despite the fact that the instrument D or $f^5$ has reset or thrown the apparatus into condition to cause it to cease sounding. At the same time the device $D^2$ does not interfere with the normal or desired operation of the device D or $f^5$, which act as usual to rest the devices controlling the circuit of S, and hence as soon as the circuit is opened at $D^2$ the signal S will go out of action, but while the train is passing the signal and instrument $f^5$ or D the signal or alarm will be in operation.

What I claim as my invention is—

The combination with a railroad-crossing signal adapted to be set from either side of the crossing and provided with resetting devices for throwing it out of action at or about the time the train reaches the crossing, of a supplemental circuit and circuit-closer operated by the train for keeping the signal temporarily in action while the train is passing said signal, as and for the purpose described.

Signed at Baltimore city, in the State of Maryland, this 6th day of February, A. D. 1897.

CHARLES SELDEN.

Witnesses:
GEO. W. HAULENBEEK,
F. J. GRIFFITH.