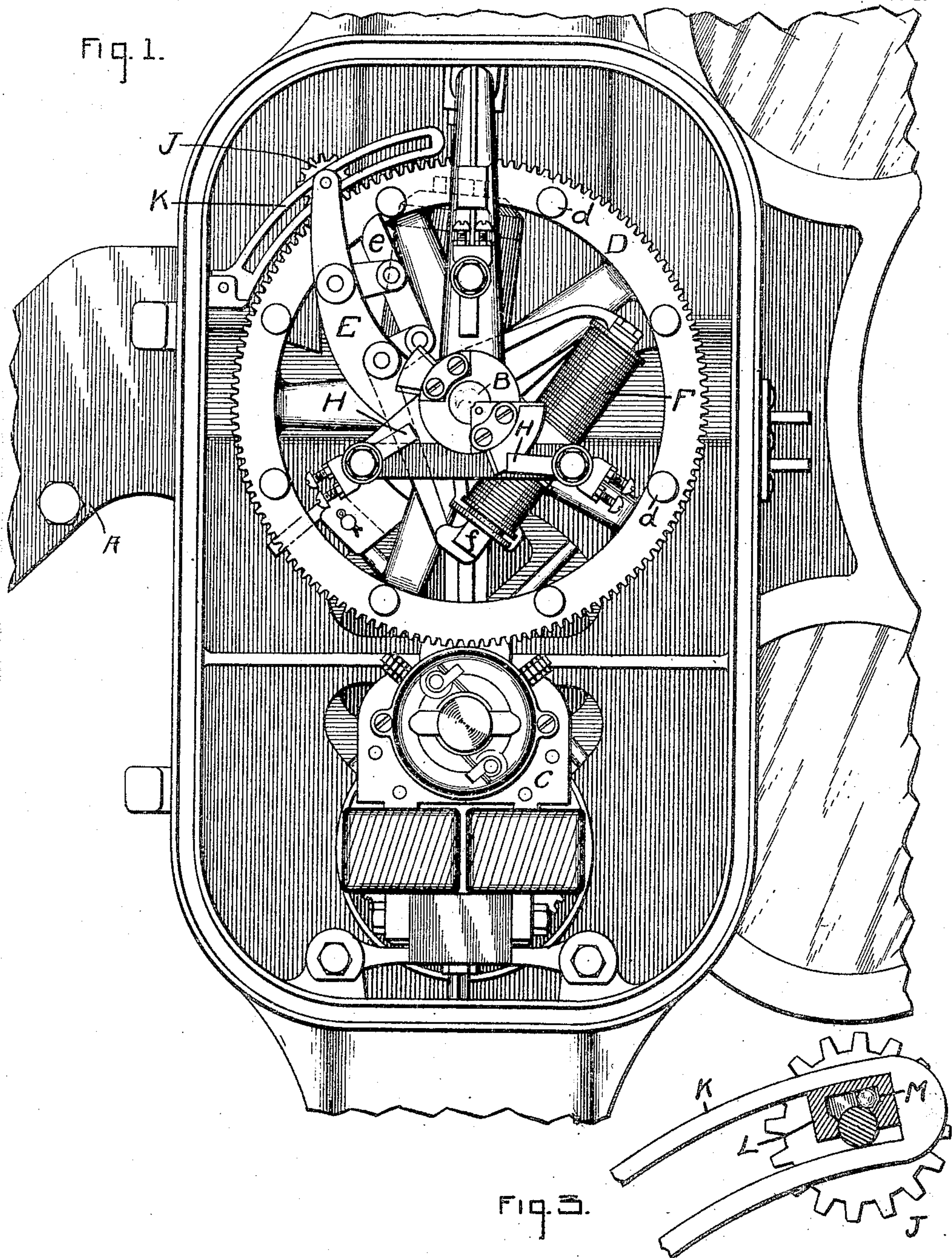


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 Patented Apr. 6, 1909.  
 2 SHEETS—SHEET 1.



WITNESSES:  
 Mr. Ray Taylor.  
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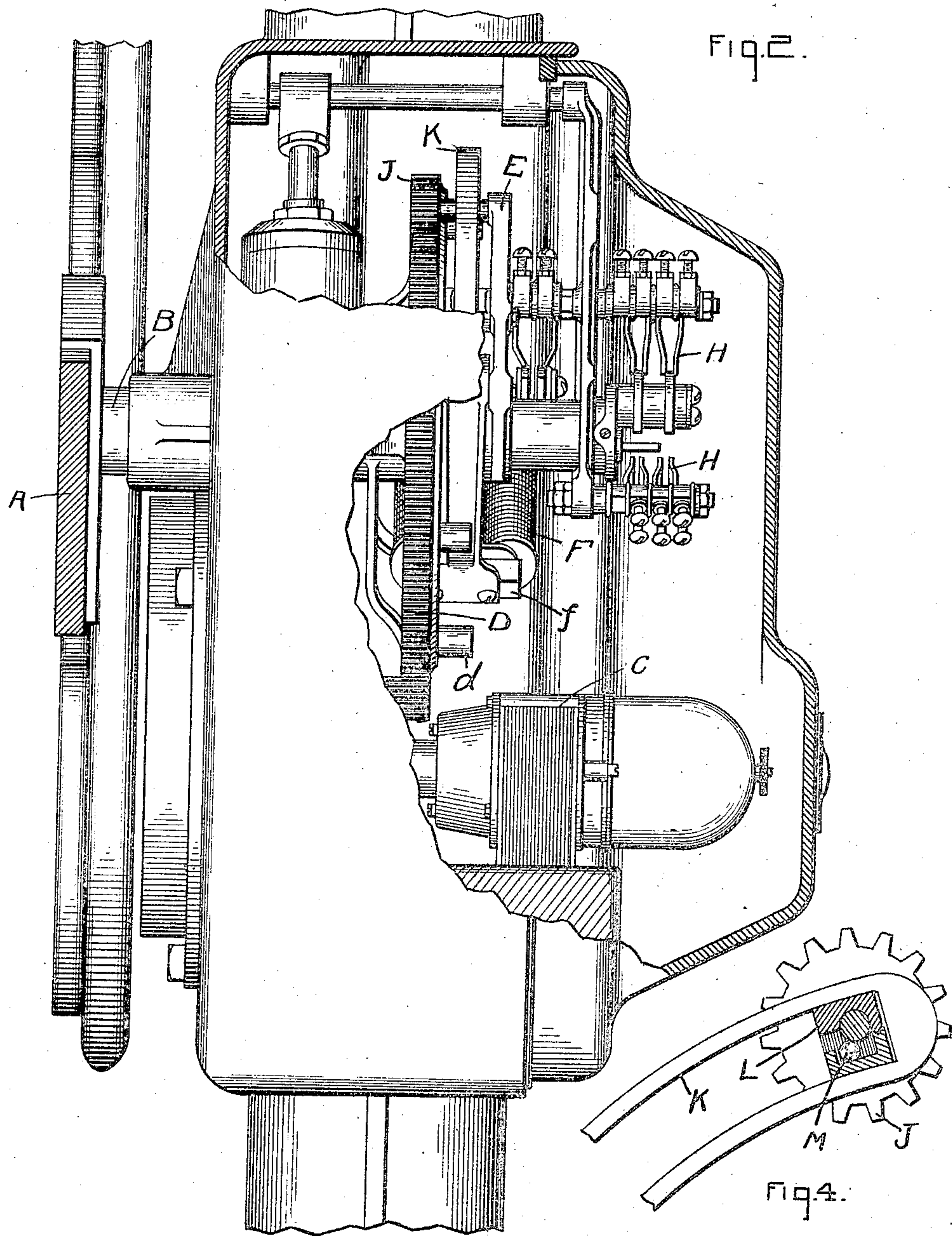
INVENTOR:  
 ARBA G. CLARK  
 BY *Wm. B. Davis*  
 ATTY



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WITNESSES:  
*W. Ray Taylor.*  
*J. Ellis Glen.*

INVENTOR:  
ARBA G. CLARK  
BY *Alfred H. Davis*  
ATTY.



# UNITED STATES PATENT OFFICE.

ARBA G. CLARK, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## SEMAPHORE-SIGNAL.

No. 917,003.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed July 31, 1908. Serial No. 446,274.

*To all whom it may concern:*

Be it known that I, ARBA G. CLARK, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Semaphore-Signals, of which the following is a specification.

My invention relates to semaphore signals, and its object is to provide a simple and reliable means for preventing the signal from moving in the direction from danger to clear, except when it is being driven by the motor.

One well known type of semaphore signal comprises a gear-wheel driven by the motor and a clutch mechanism for clutching the gear-wheel to the semaphore arm for driving the semaphore signal to clear. My invention applies especially to a signal of this type. I take advantage of the fact that, in normal operation of the signal, relative movement of gear-wheel and semaphore arm takes place in one direction only. Relative movement of gear wheel and arm in the opposite direction can occur only when the arm is pulled to clear by external means, as by hand or by the accumulation of ice and sleet on the arm.

My invention consists in providing means for locking the arm fast in position upon a slight relative movement in one direction of gear-wheel and arm, and for unlocking the arm upon a slight relative movement in the opposite direction.

More specifically stated, I provide a pinion having its axis moving with the semaphore arm and meshing with the gear-wheel, and means for permitting the free rotation of the pinion on its axis in one direction, only.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows a back elevation, with the door of the casing removed, of a signal mechanism provided with locking means arranged in accordance with my invention; Fig. 2 shows a side elevation of the same, with the casing partly broken away; Fig. 3 shows a detail view in cross-section of the locking means; and Fig. 4 shows a modified construction of the locking means.

In the drawings, A represents a semaphore arm carried by a shaft B.

C represents an electric motor which is

connected through speed-reducing gears to a gear-wheel D, loosely mounted on the semaphore shaft B.

E represents an arm fast to the semaphore shaft B, carrying the clutch mechanism. This clutch mechanism, as shown, comprises a finger or pawl *e* adapted to be engaged by any one of a series of pins *d* on the gear wheel D. The finger *e* is controlled through a lever mechanism by the armature *f* of the slot of clutch magnets F. When the magnets are energized, the finger *e* is thrown out into the path of the pins *d*, so that when the rotation of the gear wheel brings one of the pins into engagement with the finger, the gear wheel is clutched to the semaphore arm to drive it to clear.

H H represent contacts for controlling the motor and clutch magnets.

The parts are shown in an intermediate position, through which the arm is being driven by the motor to bring it from danger to clear.

The specific construction of the signal mechanism, as above described, forms no part of my present invention.

J represents a small pinion with its shaft rotatably carried in an extension of the arm E, so that the axis of the pinion moves with the semaphore arm. The pinion meshes with gear wheel D. Its axis or shaft extends through a stationary guide K, which is carried by the casing, and has an arc-shaped slot concentric with the gear wheel.

Referring to Fig. 3, L is a box-like member surrounding the shaft of pinion J, and adapted to slide freely in the slot of the guide K. The member L is so shaped as to form, with the shaft of the pinion, a wedge-shaped space, in which is a roller or ball M.

When the gear wheel is driving the semaphore arm to clear, as shown in the drawings, the arm E and gear wheel D move together, and the pinion J has no movement on its axis. When the clutch magnets F are deenergized to allow the signal to be returned to danger position by its counterweight, the arm E moves in a clockwise direction, as viewed in Fig. 1, while the gear D is stationary. This causes the pinion J to rotate on its axis in a clockwise direction, which movement of the pinion keeps the ball M in the wider part of the space between the pinion shaft and the member L. If, after the arm has returned to danger



position, the arm is pulled back toward clear position by hand or by the accumulation of ice or sleet on the arm, the gear wheel D being stationary, a slight movement of arm E in a counter-clockwise direction is produced. This causes a partial rotation of pinion J in a counter-clockwise direction, which forces the ball M into the narrow portion of the space between the pinion shaft and the member L. This pushes the member L and pinion shaft apart, forcing them tightly against the inside of the slot in the member K, and consequently locking the pinion, and therefore the semaphore arm, fast in position. When the motor again starts, driving the gear wheel D in a counter-clockwise direction, the movement of the gear wheel to bring one of the pins *d* into engagement with finger *e*, arm E being stationary until this engagement takes place, causes the pinion J to rotate in a clockwise direction, and releases the ball M from the narrow portion of the space between the pinion shaft and the member L. The pinion is thus unlocked from the guide member K, so that the semaphore arm is free to be driven to clear position by the gear wheel.

A number of modifications of the arrangement of the pinion and its locking means, which is in effect a ball-ratchet device, will readily occur to those skilled in the art. One modification is shown in Fig. 4, in which the shaft of the pinion does not touch the sides of the slots in the member K, but the member L is formed in two pieces, which for locking the pinion are pressed apart by the ball M, so as to be clamped firmly in the slot in the guide member.

I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a semaphore signal, a semaphore arm, a gear wheel, a motor, speed-reducing gearing connecting the motor and gear

wheel, a clutch mechanism adapted to clutch the gear wheel to said semaphore arm, and means for locking said arm fast in position upon a slight relative movement in one direction of said gear wheel and said arm and for unlocking said arm upon a slight relative movement in the opposite direction of said gear wheel and said arm.

2. In a semaphore signal, a semaphore arm, a gear wheel, a motor, speed reducing gearing connecting the motor and gear wheel, a clutch mechanism adapted to clutch the gear wheel to said semaphore arm, a pinion having its axis moving with the semaphore arm and meshing with said gear wheel, and means for permitting the free rotation of the pinion on its axis in one direction only.

3. In a semaphore signal, a semaphore arm, a gear wheel, a motor, speed reducing gearing connecting the motor and gear wheel, a clutch mechanism adapted to clutch the gear wheel to said semaphore arm, a pinion having its axis moving with the semaphore arm and meshing with said gear wheel, and a ball ratchet device arranged to prevent rotation of the pinion on its axis in one direction.

4. In a semaphore signal, a semaphore arm, a gear wheel, a motor, speed reducing gearing connecting the motor and gear wheel, a clutch mechanism adapted to clutch the gear wheel to said semaphore arm, a pinion having its axis moving with the semaphore arm and meshing with said gear wheel, a stationary guide having an arc-shaped slot concentric with said gear wheel into which slot the shaft of the pinion extends, a box-like member movable in said slot and surrounding said pinion shaft and forming therewith a wedge-shaped space, and a roller carried in said space.

In witness whereof, I have hereunto set my hand this 30th day of July, 1908.

ARBA G. CLARK.

Witnesses:

HELEN ORFORD,  
BENJAMIN B. HULL.