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RAILWAY SIGNALING APPARATUS.

No. 602,423. Patented Apr. 19, 1898.

Fig. 1.

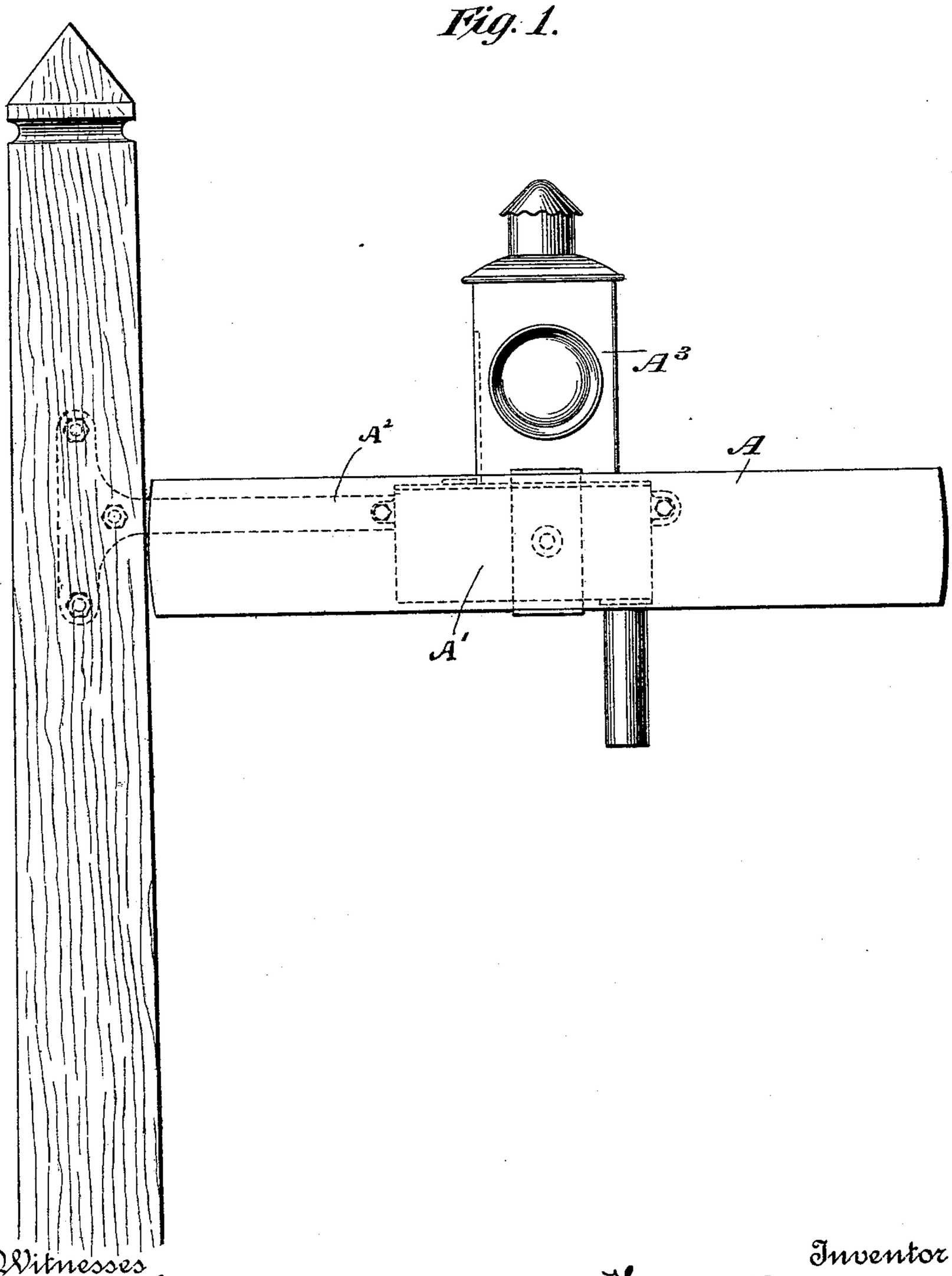

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Fig. 2.

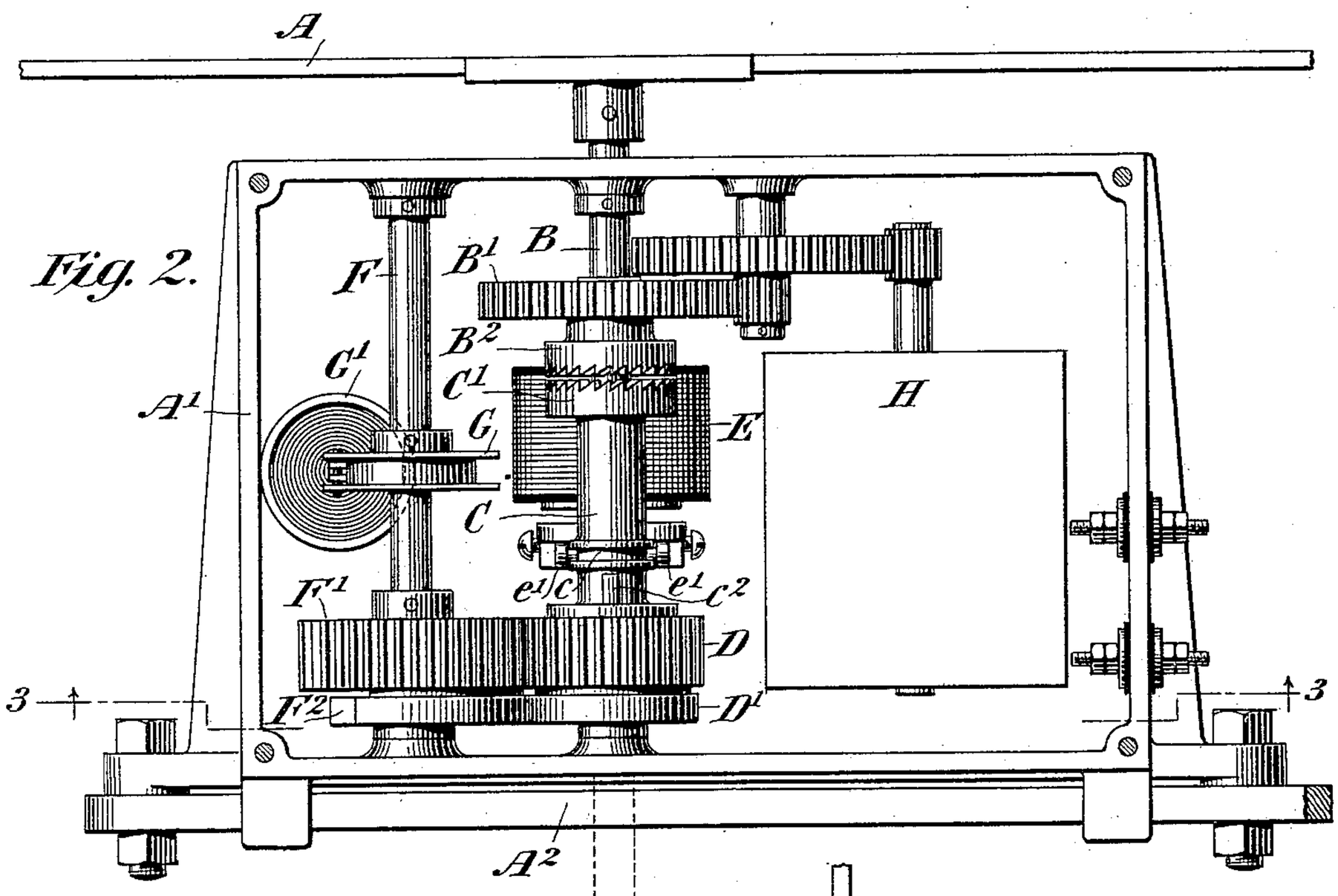

Fig. 3,

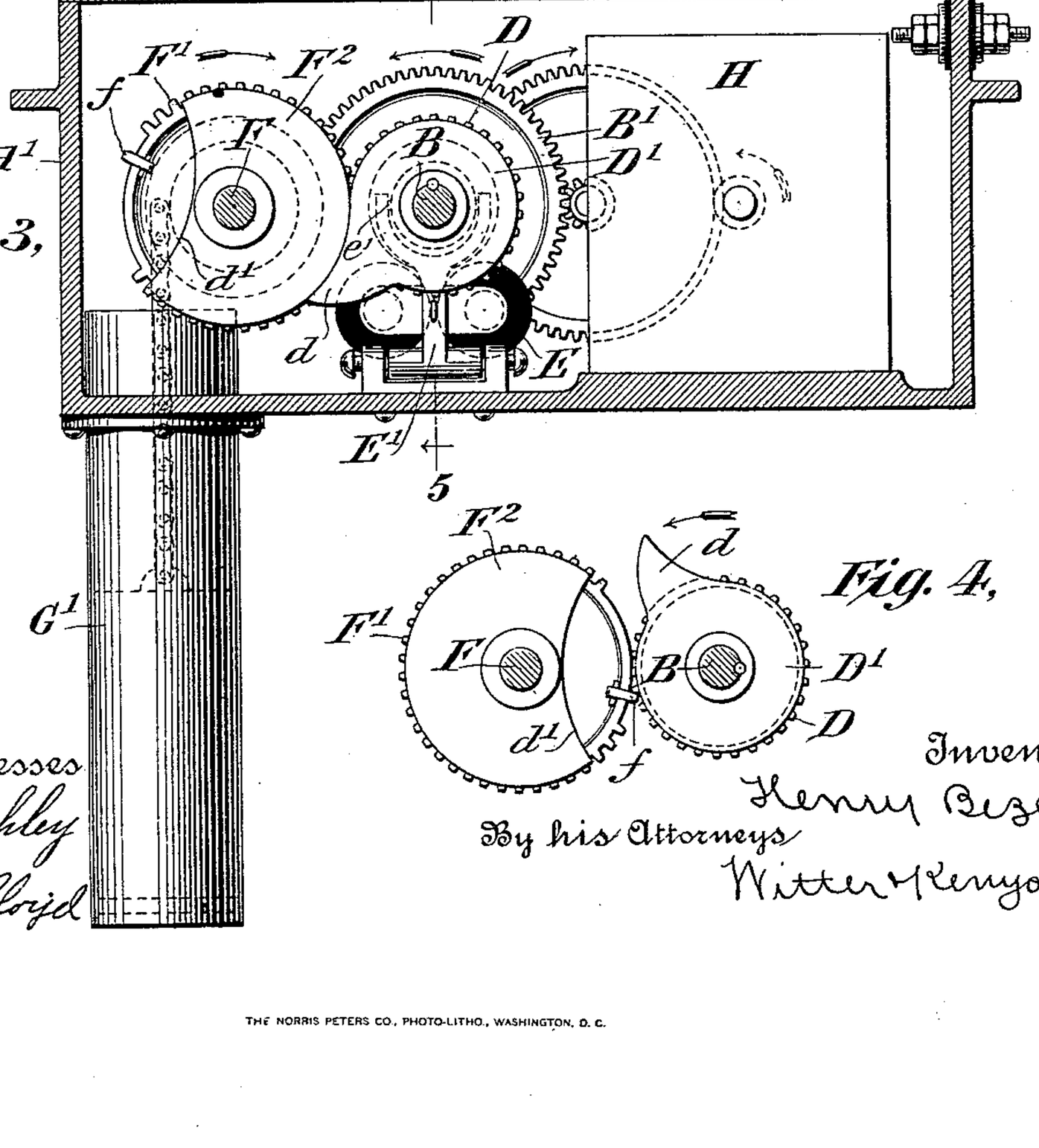

Fig. 4,

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Fig. 5.

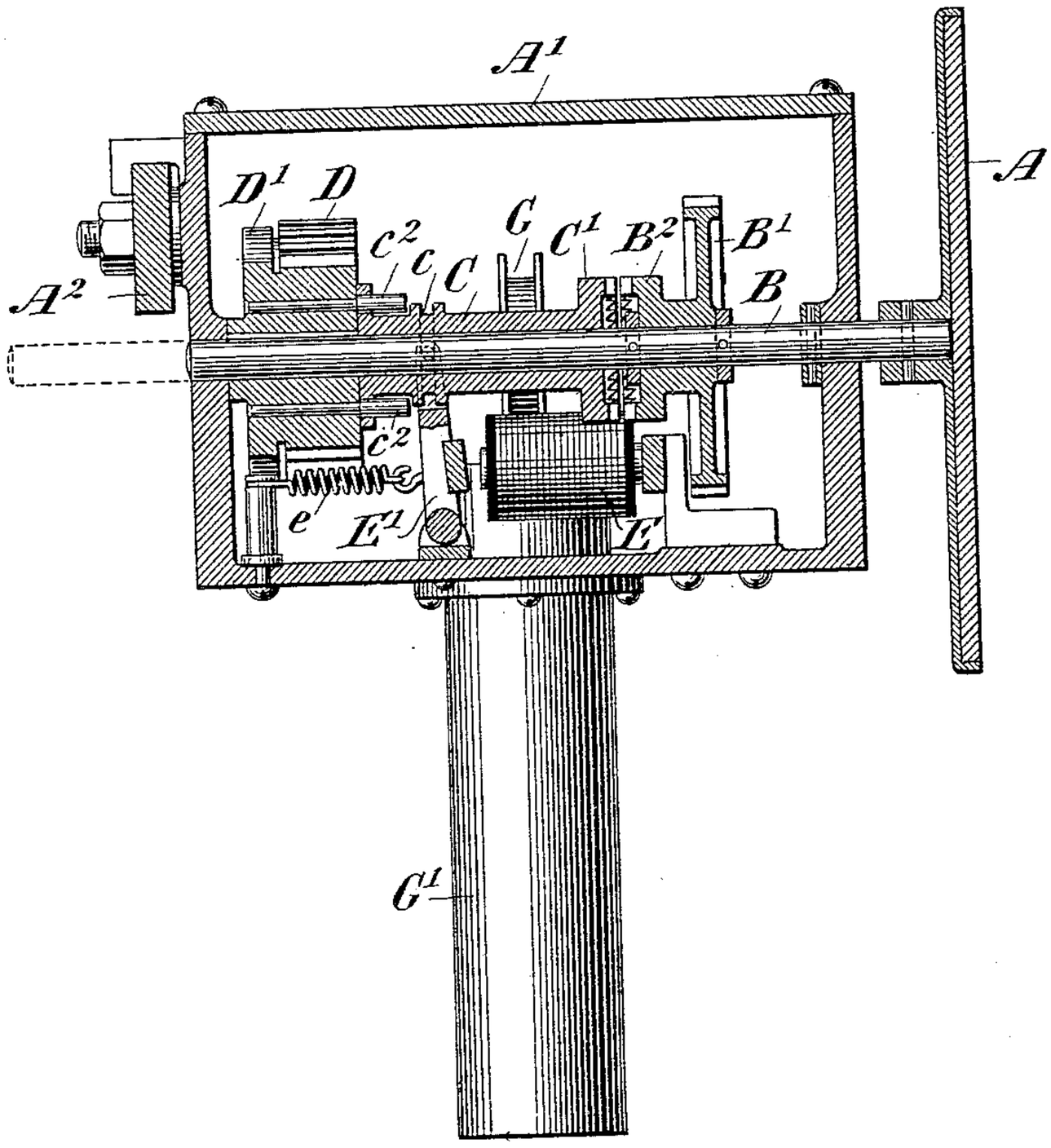

Fig. 6,

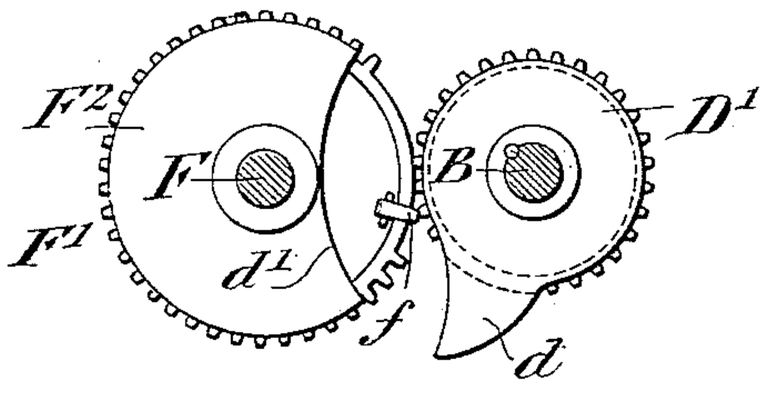

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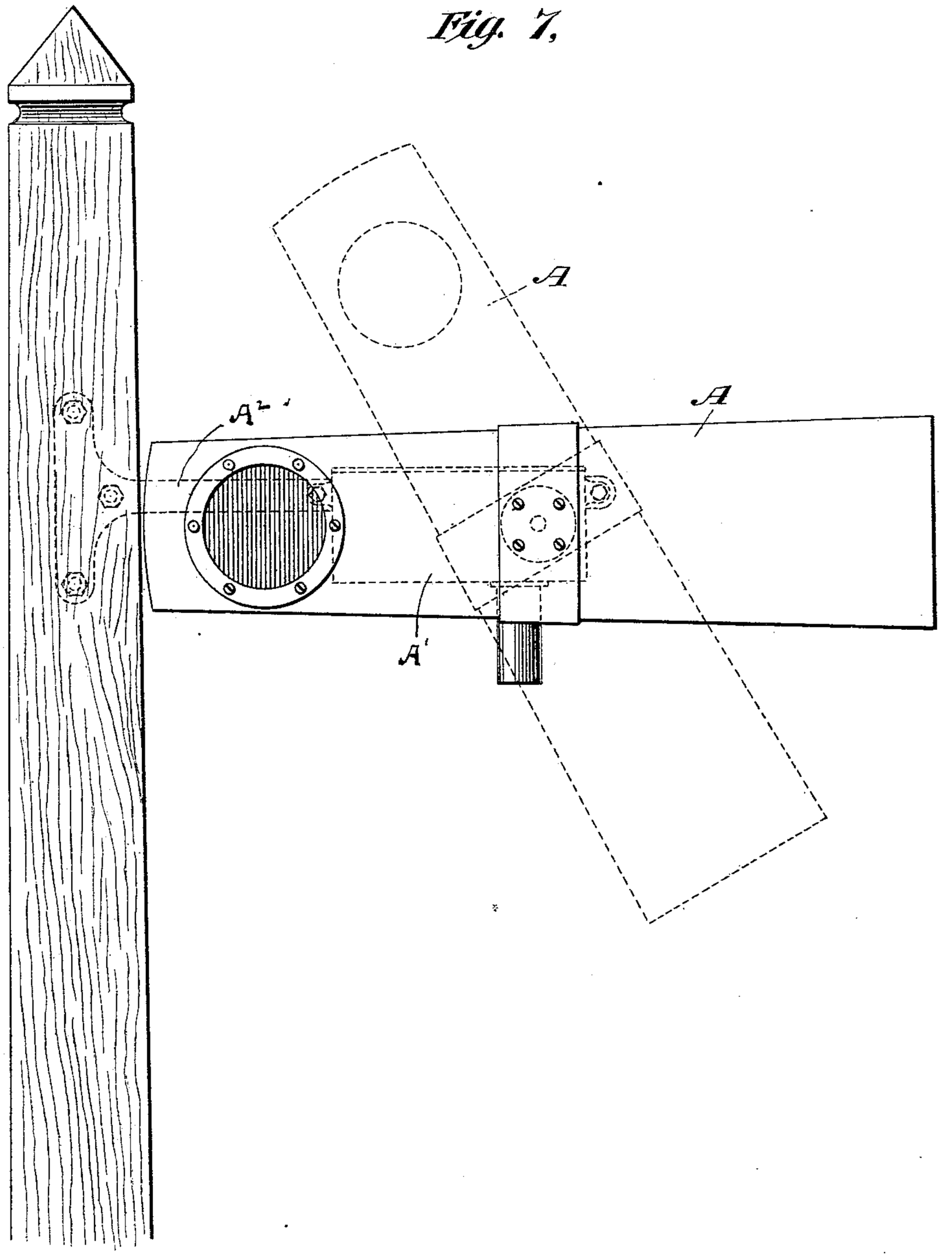
Fig. 7.



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RAILWAY SIGNALING APPARATUS.

No. 602,423. Patented Apr. 19, 1898.

Fig. 8,

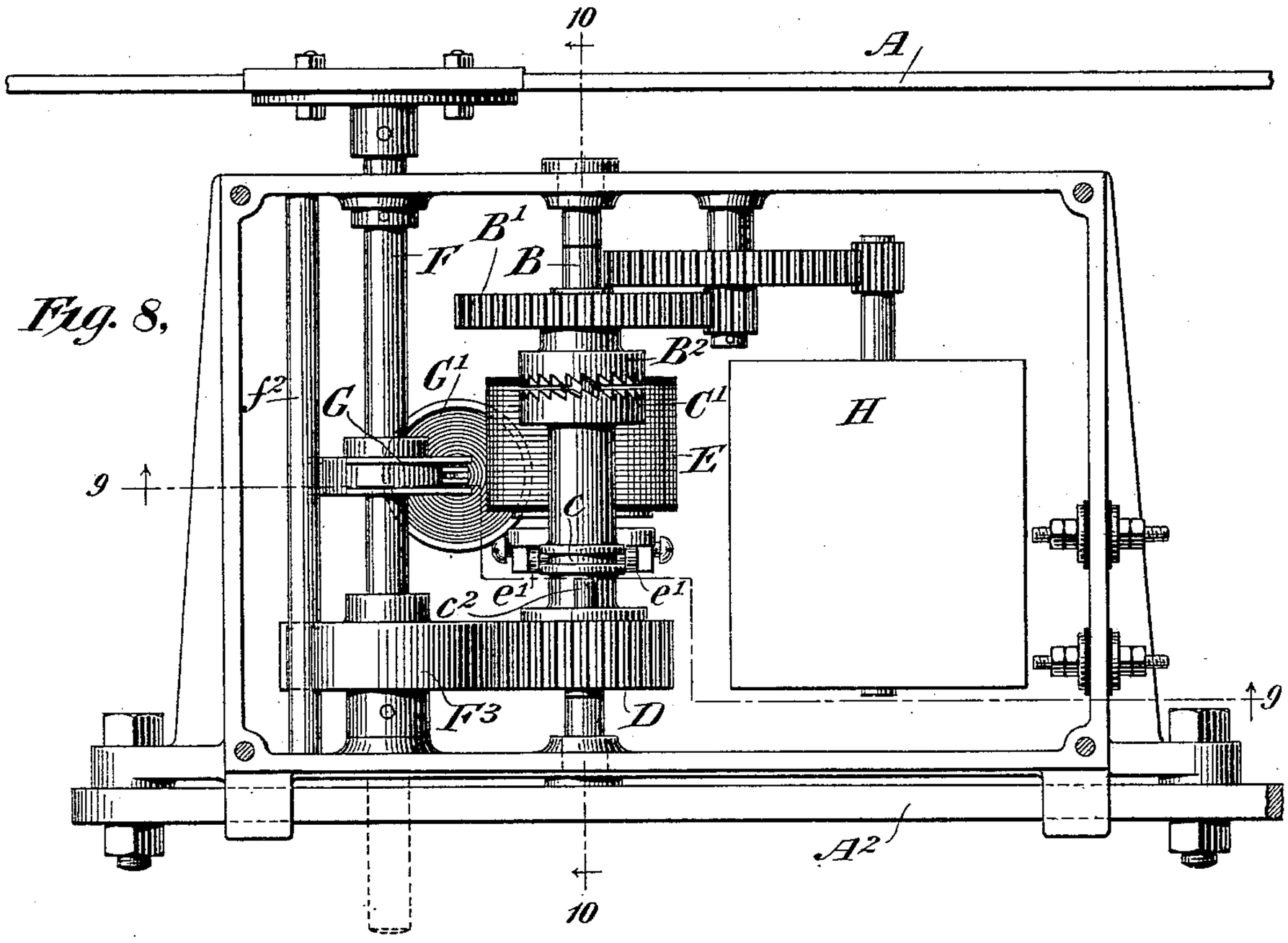

Fig. 9,

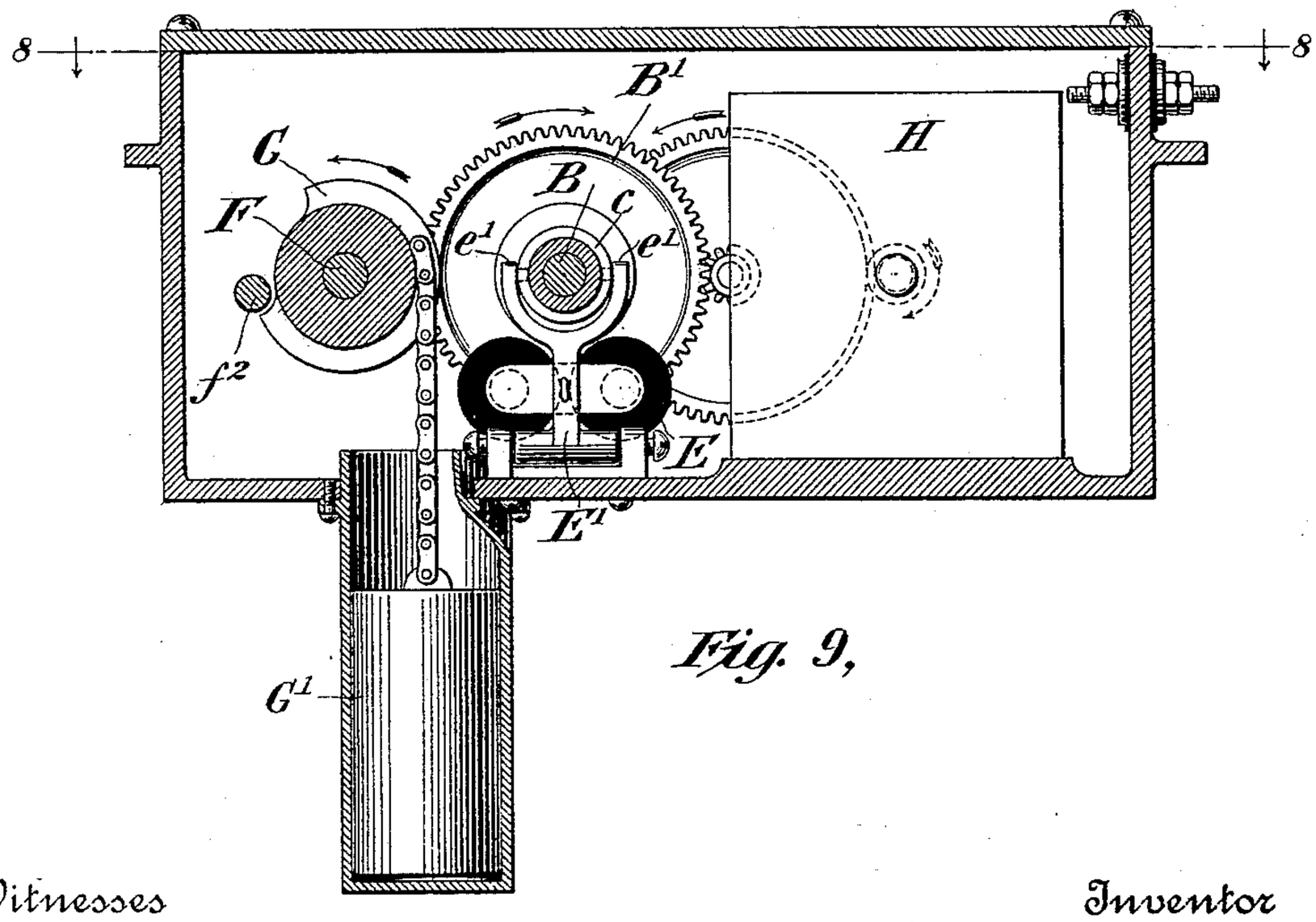

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Fig. 10.

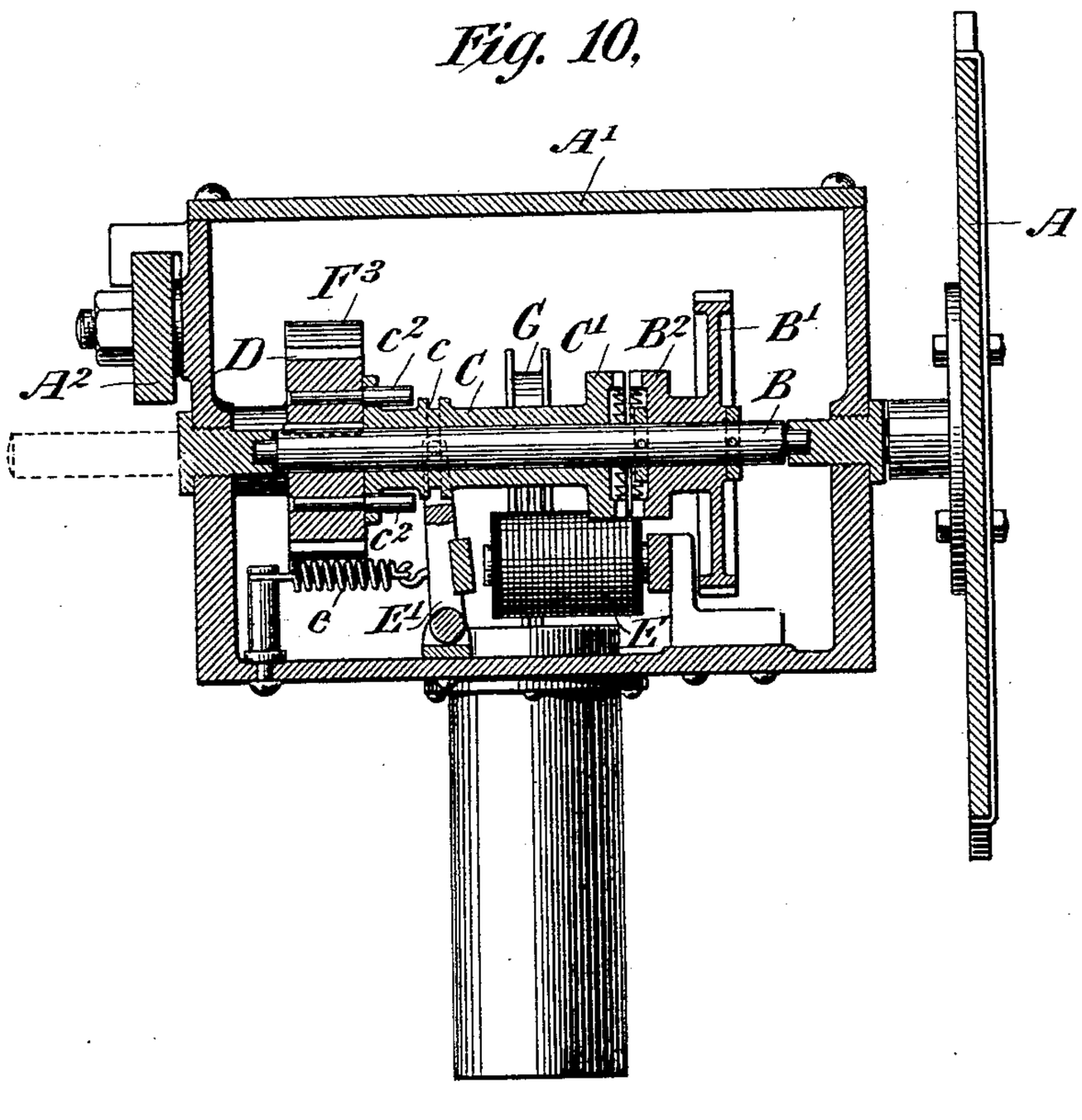


Fig. 11.

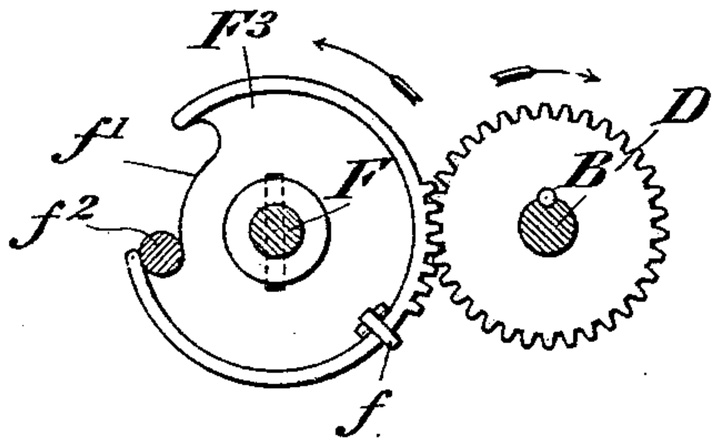


Fig. 12.

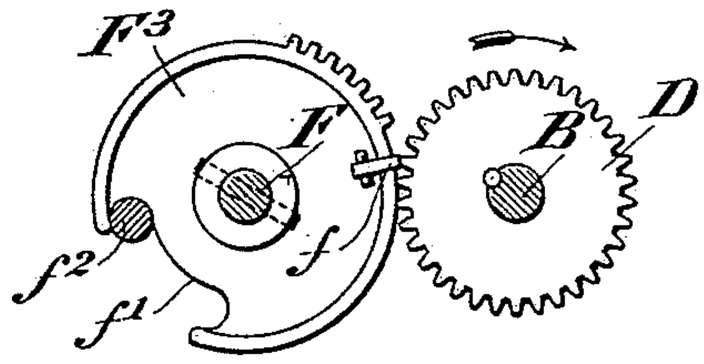
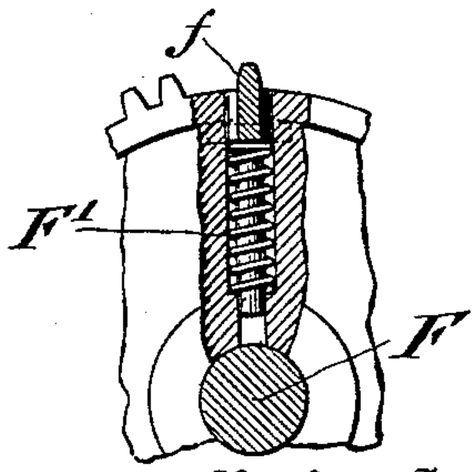


Fig. 13.



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UNITED STATES PATENT OFFICE.

HENRY BEZER, OF NEW ROCHELLE, NEW YORK.

RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 602,423, dated April 19, 1898.

Application filed August 22, 1893. Renewed September 3, 1897. Serial No. 650,534. (No model.)

To all whom it may concern:

Be it known that I, HENRY BEZER, a subject of the Queen of Great Britain and Ireland, residing at New Rochelle, in the county of Westchester, State of New York, have invented a new and useful Improvement in Railway Signaling Apparatus, of which the following is a description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a novel form of signal in which a semaphore-blade is made to revolve in a vertical plane or remain in a defined position of indication, according to the character of the information to be conveyed.

The invention also relates to certain means adapted to revolve an indicator.

The invention consists of the devices hereinafter set forth.

Referring to the drawings, in which like letters denote corresponding parts in all the views, Figure 1 is a front elevation of a signal embodying my invention in the form of a revolving signal. Fig. 2 is a plan view of mechanism for actuating the signal shown in Fig. 1. Fig. 3 is a sectional elevation taken on the line 3 3 of Fig. 2. Fig. 4 is a detail of certain parts of the gearing shown in Figs. 2 and 3. Fig. 5 is a sectional elevation of the gearing, taken on the line 5 5 of Fig. 3. Fig. 6 is a detail of the gear-wheels shown in Fig. 4, but in a different position. Fig. 7 is a front elevation of a signal embodying my invention in the form of a position-signal. Fig. 8 is a plan view of the mechanism adapted to actuate the signal shown in Fig. 7. Fig. 9 is a sectional elevation taken on the line 9 9, Fig. 8. Fig. 10 is a section view taken on the line 10 10 of Fig. 8. Figs. 11 and 12 are detail views of certain parts of the gearing shown in Figs. 8, 9, and 10, but in different positions, Fig. 11 showing the normal position. Fig. 13 is a detail of a spring-tooth of one of the gear-wheels shown in Figs. 11 and 12. The scale upon which Figs. 1 and 7 are drawn is much smaller than that upon which the other figures are drawn.

My preferred form of visual indicator is a semaphore-blade having a landscape-background, and I have shown in the drawings and shall herein describe that form of indicator.

A landscape-background I understand to be such a background as is afforded an ordinary exposed railway semaphore-blade, comprising sky, trees, ground, water, buildings, &c., excluding any artificial background especially constructed as a part of the signal and intended to throw the indicator into relief.

The semaphore-blade A is fixed to one end of a shaft B, which has its bearings in the sides of a casing A′, mounted upon one end of an arm A^2, fixed to the signal-post and extending out to one side thereof. The shaft B has loosely mounted upon it a gear-wheel B′ and one side B^2 of a clutch, integrally connected together. A sleeve C, carrying the other side C′ of the clutch, is mounted upon the shaft B and is so connected therewith by means of the splines c^2 that it may slide longitudinally on the shaft for the engagement of the clutch, but rotates with the shaft. A pinion D is rigidly fixed upon the shaft and meshes with the wheel F′, rigidly fixed upon the shaft F, which has its bearings in the sides of the casing and which also carries a drum G, to which is fixed one end of a chain, carrying at its other end the weight of a dash-pot G′. The wheel F′ is toothless for a portion of its periphery, with the exception of a single spring-tooth *f*, mounted in the otherwise toothless portion of its periphery, as clearly shown in Figs. 4 and 13. This tooth has a shank resting in a cavity in the pinion and surrounded by a coiled spring. Upon the end of the shaft B is fixed a disk D′, provided with a lug *d*, and upon the end of the shaft F is fixed a disk F^2, having a recess *d*′, corresponding with the lug *d*.

The clutch engaging and disengaging device is shown as an armature E′, having a bifurcated projection carrying lugs *e*′, which take into a groove *c* in the sleeve C. A magnet E actuates this armature. When the magnet is energized, the armature, which is normally held away from the magnet by its spring *e*, slides the sleeve C over its shaft B, so that the members of the clutch engage.

A suitable motor H, preferably electric, is geared to the wheel B′ of the shaft B.

The parts thus described being in their normal position, as shown in Figs. 1, 2, 3, and 5, in which the signal is in horizontal position, the clutch disengaged, and the weight of the dash-pot in its lowest position and the lug *d*

hugging the disk F opposite the recess d', the operation is as follows: The motor being in operation, when the magnet E is energized the clutch is thrown into engagement and the shaft B rotates and carries the semaphore with it. The shaft F is also caused to rotate by means of the meshing pinions D and F and winds up the weight of the dash-pot until the spring-tooth f of the wheel F′ engages the teeth of the pinion D. The shaft F then ceases to rotate, the teeth of the pinion D slipping past the tooth f and the lug d of the disk D′ passing within the recess d' of the disk F^2. Thus the shaft F is held stationary with the weight in elevated position, while the shaft B and semaphore-blade continue their movement. When now the magnet is deënergized and the clutch is disengaged, the weight of the dash-pot rotates the shaft F backward, causing the shaft B to rotate backward till the lug d strikes the disk F^2, when the semaphore-arm is in horizontal position and the shaft B becomes quiescent.

It is of course evident that the disengagement of the clutch permits the semaphore to be returned to normal position without interference from the momentum of the motor and permits the motor to slow down under its own momentum without any sudden shock.

The lantern A^3 is mounted upon the casing A′ or otherwise conveniently located behind the semaphore for night signaling, and when the semaphore revolves the light from the lantern is flashed, signifying the semaphore is in motion for a safety-signal. As a night signal the semaphore acts, therefore, simply as a screen, which permits the light of the lantern to throw a steady unobstructed light or a flashing light, according to the character of the information the signal is to give. This revolving signal, so mounted as to move in a vertical plane, has many advantages over the ordinary position semaphore-signal in common use. It requires a positive and continued force to set it in motion to give the safety-signal, and it is therefore much less likely to assume the safety position through accident or effects of weather. In fact, the effects of weather which tend to put the ordinary position-signal to "safety" or which tend to hold at "safety," such as a weight of snow upon the semaphore-blade or the clogging of the signal-bearings with snow or ice, always operate in the case of my signal to hold it stationary, and therefore in danger position.

I prefer to so arrange my signal that it shall occupy a horizontal position when at "danger," that being the usual danger position; but it is of course evident that any other position may be selected and the mechanism arranged to cause the signal to assume that predetermined position. It is to be noted, however, that in the event of an accidental failure, whereby any signal of a series of my improved signals is not actuated to give the safety indication or is not held in its proper predetermined position, the absence of motion will be in itself an indication either of danger or that the signal is out of order and a warning to the train-engineer, and therefore accidental failures and the harmful effect of weather affect my signal upon the side of "safety."

In the form of signal shown in Figs. 7 to 13, inclusive, the semaphore-arm is mounted upon the signal-post in the same way as the semaphore shown in Fig. 1 and is provided with operating means quite similar. In this case, however, the semaphore is a position-signal standing normally in a horizontal position and moving to a position of about sixty degrees therefrom.

I shall now describe the mechanism adapted to operate my position-signal, pointing out only those features that differentiate it from the mechanism just described. The disks D′ and F^2 of Fig. 2 are entirely omitted, and in place of the wheel F′ there is substituted a wheel F^3, having only a few teeth on its periphery, and the spring-tooth f. This wheel is recessed at f', so as to engage a pin f^2, extending across the casing A′. The semaphore-arm is mounted upon the shaft F instead of upon the shaft B, and the dash-pot chain is wound upon the shaft F in the opposite direction to that shown in Figs. 2 and 3. When the shaft C rotates, the pinion D rotates and turns the toothed disk F^3, and with it the shaft F and semaphore-arm, till the spring-tooth engages the pinion D, when the shaft B continues to rotate, but permits the shaft F to cease to rotate and holds the semaphore in its deflected position. If there should be any tendency of the pinion D to continue the rotation of the wheel F^3, the pin f^2 would prevent it by engaging the recess f' in the disk, as shown in Fig. 12. When the magnet E is deënergized, the members of the clutch disengage and the pinion D ceases to rotate, and the weight of the dash-pot rotates the shaft F and the semaphore back to normal position. The wheel F^3, moving with the shaft F, engages with its teeth the pinion D and rotates it backward with its shaft B until the pin f^2 engages the lower side of the recess f' in the disk F^3. The parts are then in their normal position and at a state of rest, the semaphore being in its normal horizontal position. This semaphore when in safety position is kept constantly moving, owing to the engagement of the spring-tooth f with the teeth of the pinion D and its slip thereon. This has the effect of helping to keep the bearings of the semaphore-shaft free from the harmful effects of snow or ice.

Although the signal when in safety position, as described, is constantly moving to a slight degree, it nevertheless is occupying a defined position. Its slight movement is entirely immaterial to the character of its indication and is hardly visible to an engineer on his approaching engine. It is the position of the signal and not its slight movement that the engineer is called upon to note.

The end of the semaphore-shaft opposite the semaphore may be extended, as shown in Figs. 2 and 10 in dotted lines, for the purpose of carrying an ordinary back light.

I prefer to include the magnet E and motor H in the same circuit; but this of course is not essential. If desired, the motor may be continuously acting and thrown into gear with the semaphore only when the magnet is energized.

Of course the semaphore may be modified, if desired. For instance, two blades placed at right angles and mounted on the semaphore-shaft could be used without departing from my invention.

In the case of a semaphore consisting of two blades arranged at right angles and used as a revolving signal the semaphore mechanism to restore the semaphore to a predetermined position might so operate as to bring either of the blades to a vertical position with the other in horizontal position or to restore the blades initially in vertical and horizontal position back to these initial positions. In the above cases the semaphore would be in the same position, and in both cases it might be said that the semaphore would be restored to a predetermined position of indication.

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

1. A signal for railways, comprising a semaphore-blade having a landscape-background adapted to make a series of continuous revolutions in a substantially vertical plane and to assume a defined predetermined position, means for continuously revolving said semaphore-blade to indicate one condition of the track and means for causing said semaphore-blade to automatically assume a defined predetermined position to indicate a different condition of the track, substantially as set forth.

2. A signal for railways comprising a semaphore-blade of opaque material adapted to make a series of continuous revolutions in a substantially vertical plane, and adapted to assume a defined predetermined position, a lantern located behind the said semaphore-blade, means for continuously revolving the semaphore-blade thereby flashing the light to indicate one condition of the track, and means for causing the semaphore-blade to automatically assume a defined predetermined position to indicate a different condition of the track, substantially as set forth.

3. A signal for railways, comprising a semaphore-blade having a landscape-background adapted to make a series of continuous revolutions in a substantially vertical plane and to assume a defined predetermined position, a motor operatively connected with the semaphore-blade for continuously revolving the semaphore-blade to indicate one condition of the track, and means for causing the semaphore-blade to automatically assume a defined predetermined position to indicate a different condition of the track substantially as set forth.

4. In mechanism for operating a signal, the combination of a primary rotatable shaft, provided with a pinion, a secondary rotatable shaft provided with a wheel having teeth around a portion of its periphery in operative connection with the pinion on the primary shaft and also provided with a spring-tooth in the otherwise toothless portion of its periphery, with means for rotating the primary shaft whereby when the primary shaft rotates the secondary shaft also rotates until its spring-tooth is engaged and whereby the secondary shaft then ceases to rotate in its initial direction, substantially as set forth.

5. In mechanism for operating a signal, the combination of a primary rotatable shaft, provided with a pinion, a secondary rotatable shaft provided with a wheel having teeth around a portion of its periphery in operative connection with the pinion on the primary shaft and also provided with a spring-tooth in the otherwise toothless portion of its periphery, with means for rotating the primary shaft whereby when the primary shaft rotates the secondary shaft also rotates until its spring-tooth is engaged and whereby the secondary shaft then ceases to rotate in its initial direction, and means for rotating the secondary shaft in reverse direction when the primary shaft ceases to rotate, whereby the primary shaft is restored to its normal position, substantially as set forth.

6. In mechanism for operating a signal, the combination of a primary rotatable shaft provided with a lug and with a pinion, a secondary rotatable shaft provided with a recessed disk adapted to engage the lug except when the recess and lug register and also provided with a wheel having teeth around a portion of its periphery in operative connection with the pinion on the primary shaft and also provided with a spring-tooth in the otherwise toothless portion of its periphery, with means for rotating the primary shaft, and means for rotating the secondary shaft in reverse direction when the primary shaft ceases to rotate, substantially as set forth.

7. In mechanism for operating signals, the combination of a primary shaft provided with a clutch, one member of which is loosely sleeved thereon, a pinion and lug fixed upon said primary shaft, a secondary shaft provided with a recessed disk adapted to engage the lug on the primary shaft except when the recess of the disk and the lug register, a wheel fixed on the secondary shaft having teeth around a portion of its periphery and a spring-tooth on the otherwise toothless portion of its periphery, engaging the pinion on the primary shaft, substantially as set forth.

HENRY BEZER.

In presence of—
W. J. MORGAN,
HOWARD P. OKIE,