

No. 670,912.

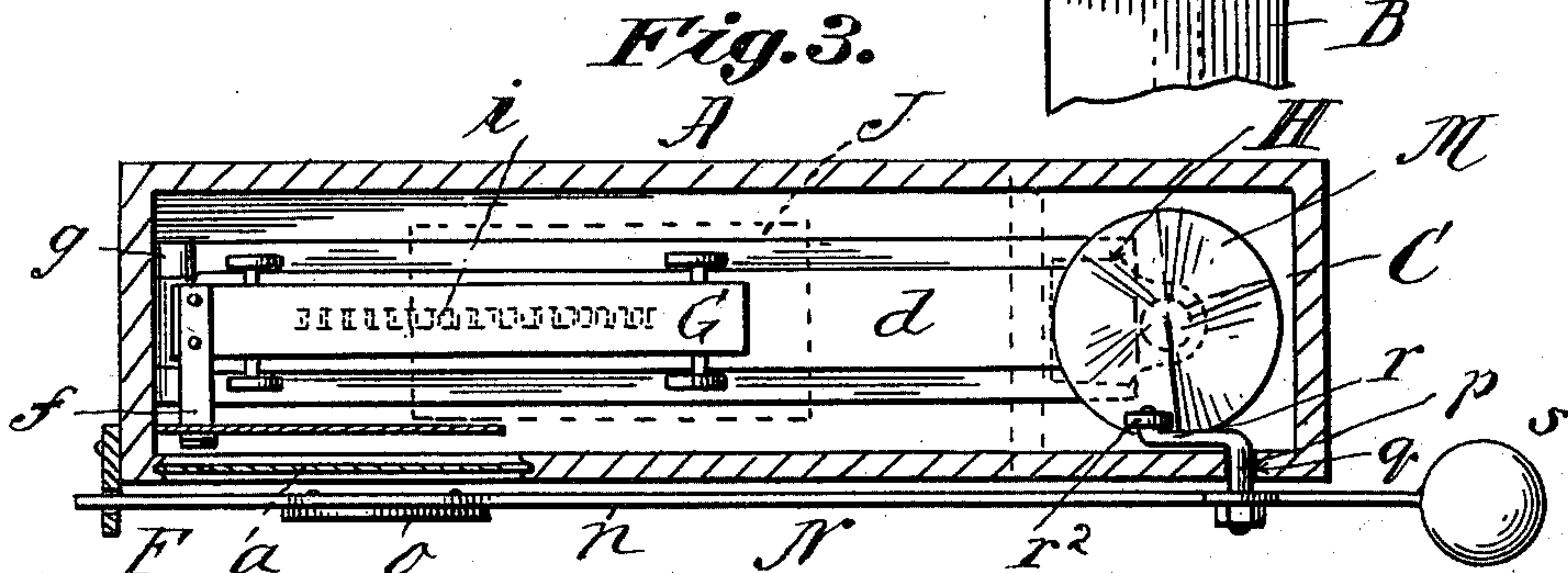
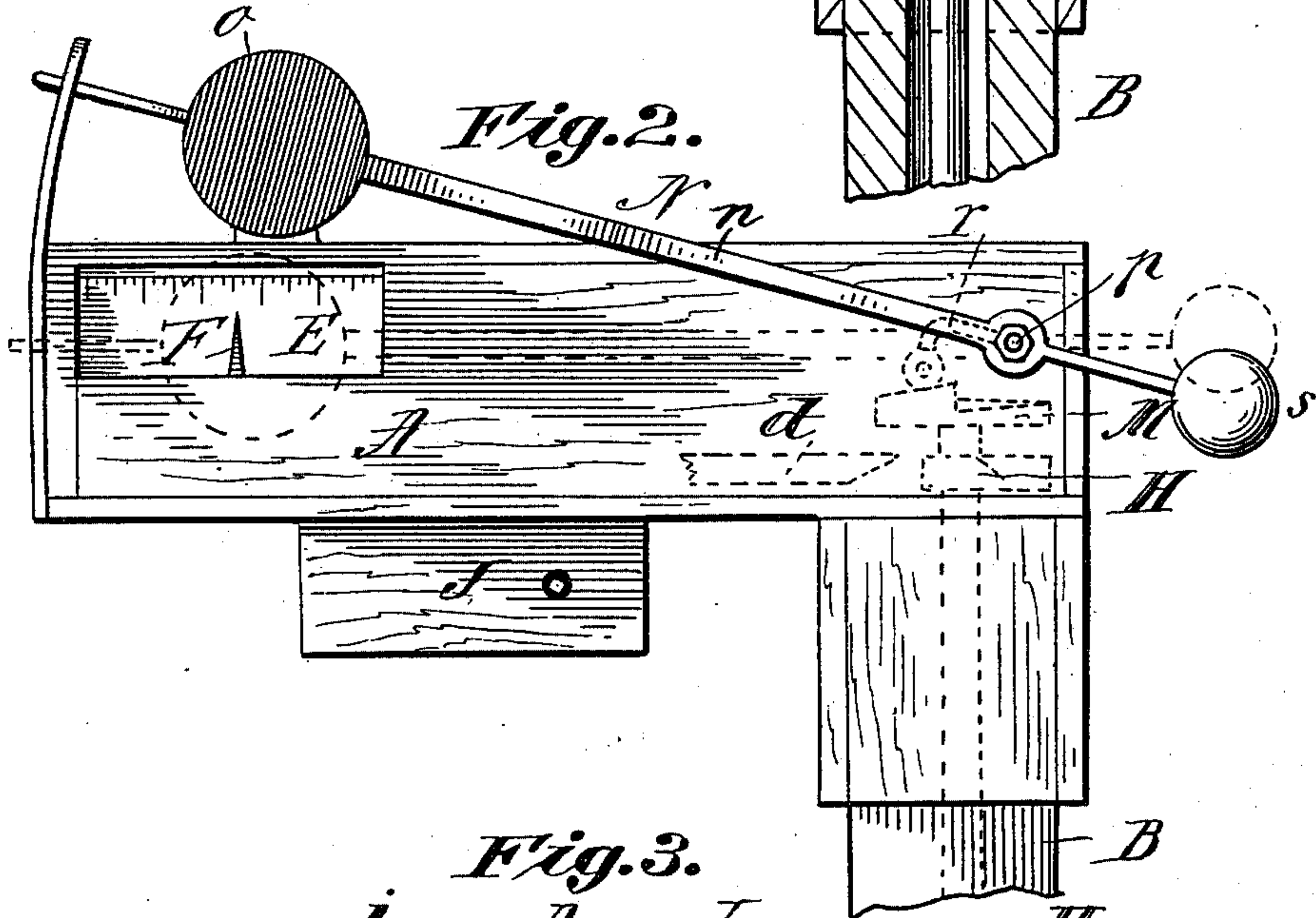
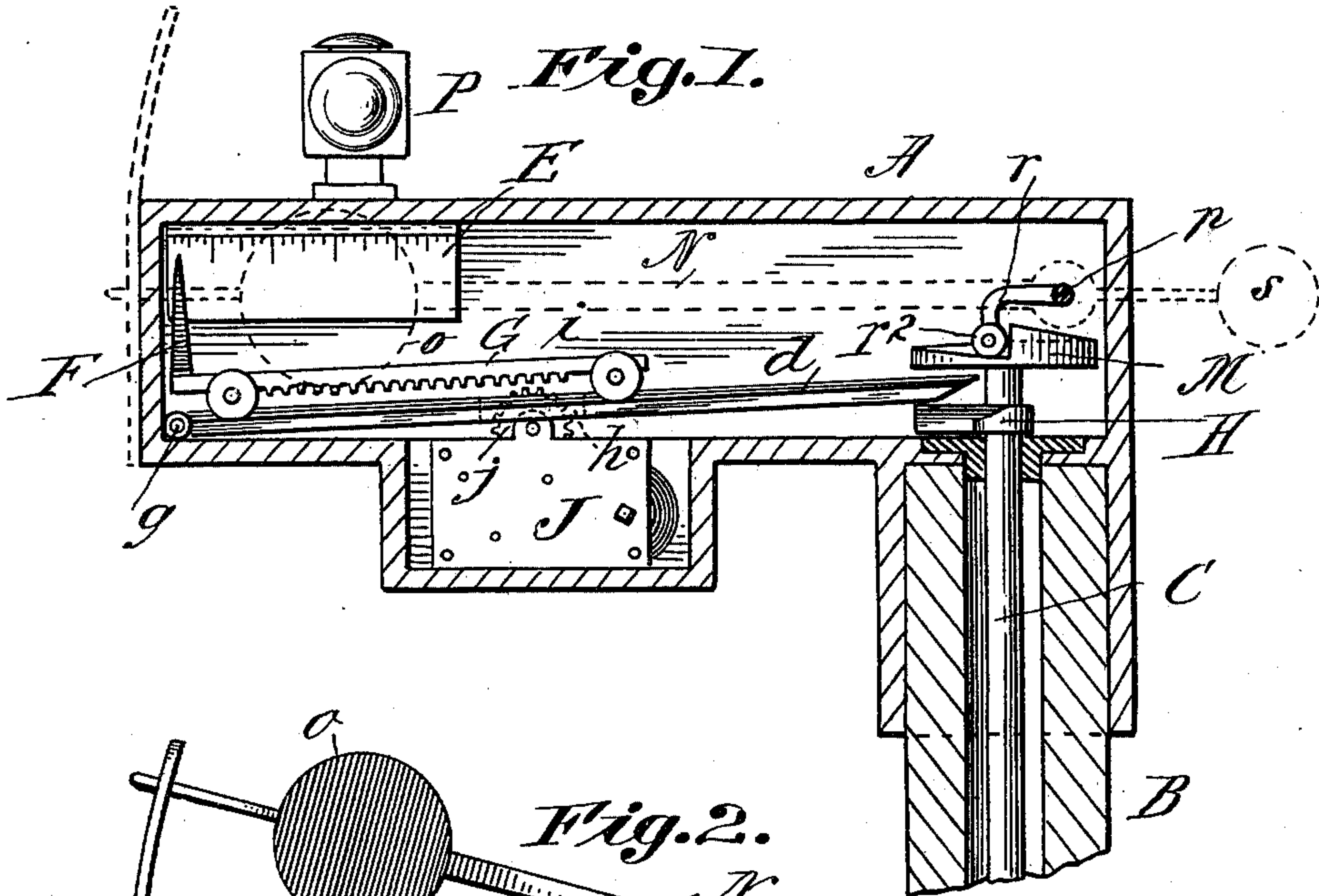
Patented Mar. 26, 1901.

P. C. BEMIS.

SIGNALING APPARATUS FOR RAILWAYS.

(Application filed Oct. 11, 1900.)

(No Model.)



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## SIGNALING APPARATUS FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 670,912, dated March 26, 1901.

Application filed October 11, 1900. Serial No. 32,754. (No model.)

*To all whom it may concern:*

Be it known that I, PORTER C. BEMIS, a citizen of the United States of America, and a resident of Russell, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Signaling Apparatus for Railways, of which the following is a full, clear, and exact description.

10 This invention relates to improvements in signaling apparatus for railways.

15 Signaling apparatuses have been employed at intervals or in "blocks" or sections along the line of the railway, each comprising a circuit, electromagnetic devices connected therein, a shaft or rod rotationally operated by the electromagnetic devices, and a disk, semaphore, or "banjo" supported by or operated by the shaft, the whole acting when the train 20 comes into a given block or circuit to rotationally move the shaft to place the disk or indicator in the "danger" position, which so remains until the train passes out of the block or circuit, whereupon the train which 25 is passing away again operates the mechanism to place the indicator in the "safety" position.

30 The object of the present invention is not only to improve the danger and safety indicating mechanism, but to provide, further, indicating mechanism whereby it may be known to the engineer on the locomotive of the passing train how long a time a preceding train has been gone out of or past the 35 block in and for which a given signal is provided; and to these ends the invention consists in the signaling mechanism comprising the constructions and combinations of parts, all substantially as hereinafter fully described, and set forth in the claims.

40 Reference is to be had to the accompanying drawings, in which the improved signaling mechanism is illustrated, and in which—

45 Figure 1 is a vertical sectional view through the signal box or case and a part of its supporting-post and a front elevation of the portions of the mechanism contained in said case. Fig. 2 is a front elevation of the signal indicating "safety," the preceding view showing 50 the parts in the positions indicating "danger." Fig. 3 is a plan view of the novel mechanism,

the box or casing being shown in horizontal section. Fig. 4 is a perspective view of a cam to be hereinafter referred to.

Similar characters of reference indicate corresponding parts in all the views.

A represents the signal box or casing, supported at the upper end of the post B, through which is vertically provided the signal-operating shaft C, which corresponds to and is 60 rotationally operated by the passing train through electromagnetic means, the same as the signal-operating shaft in signaling apparatus now in use on railways, and hence well known, and inasmuch as no novelty resides 65 in the means for imparting the rotational movements to the operating-shaft of the signal it has not been deemed necessary or desirable to bring any illustration or detailed description thereof into the case. In the ap- 70 ertured front of the signal-box is a glass *a*, behind which is the graduated scale or dial plate E.

F represents an indicator or pointer mounted on the movable support or carriage G therefor, which latter is mounted for movement on the way or track *d*, located in the bottom of the signal-case. The pointer is carried as an upward extension of a horizontal arm *f* of the carriage G, said arm projecting from the car- 80 riage below the graduated scale-plate, which is suspended from the top of the casing, and said pointer has its upstanding position in front of the scale-plate E. The trackway *d* for the carriage is comprised as a part of a 85 rail or bar normally resting on the bottom of the case, having one end hinged or fulcrumed, as seen at *g*, so that the track-rail may be swung into an inclined position.

H represents the cam or operating-button 90 on the signal-operating shaft which engages to raise and disengages to permit the lowering of the track-rail.

J represents a clockworks located below the signal-case, the same having as a part there- 95 of the upwardly-extended and exposed spur gear-wheel *j*, which protrudes upwardly through an opening therefor in the bottom of the signal-case and through an opening or slot *h* in the track-rail *d* and into engagement, 100 when such rail is in its level and lower position, with the rack-teeth *i*, provided longitu-



dinally under and along the carriage G. It being understood that the rotational, intermittent, or periodical motion is imparted to the shaft C, whereby the cam H assumes the position of engagement with the track-rail, the trackway becomes inclined, whereby the carriage will run downwardly thereon to the end of the signal-box, carrying the pointer to the initial end of the dial or scale plate, such free running movement of the carriage being permitted without obstruction by the spur gear-wheel because of the elevation of the rack-teeth on the carriage clear from the said toothed wheel. A next rotational movement of the signal-operating shaft C, whereby the cam H permits the lowering down to the level position of the track  $d$ , permits the teeth on the carriage to be brought into mesh with the spur-gear, which by the clock mechanism has a slow regular motion to cause a movement, very slowly, of the carriage G and a progression of the indicator-pointer F along in front of the scale-plate or dial.

Fig. 1 indicates the position of the cam causing the setting of the pointer F in the danger position, while in Fig. 2 is indicated that the cam has by its position permitted the lowering of the track, establishing the conditions for the propulsion of the carriage and indicating-pointer, which latter is shown as having moved forwardly, and indicating by its extent of movement across the dial-plate how long it has been moving—that is, how long a time has elapsed since the shaft C was last turned to establish the conditions for the progression of the indicator.

There is provided for conjoint operation with the time-indicator, which has been described, and with the operating-shaft C the improved danger and safety visual indicator, which will be now described.

M represents a circular face-cam mounted on the upper end of the shaft C, one half its face being flat or inactive, while the other half is a grade. The visual indicator N consists of the light-bar  $n$ , having at its free end the semaphore or disk  $o$  near the glass front of the case A, the short journal stud or shaft  $p$ , mounted to give the indicator a swinging movement through the bearing  $q$  therefor in the front wall of the case, the forwardly and downwardly extended arm  $r$ , the depending portion of which has the friction-roller  $r^2$  in contact on the cam, and a counter weight or member  $s$ , not overcoming the opposite end of the indicator, but partially counteracting the weight thereof to render the device the more sensitive.

The shaft C may be manually operated, or electromagnetically, or otherwise, and the signaling mechanism having the novel features herein described may be employed in whatever situation and for whatever manner of use may be desired.

Supposing, for instance, the signal is employed in a block system of signaling in which the passage of the train into the block closes

a circuit and causes or permits a half-turn of the shaft C, carrying the indicator F to the initial end of the dial-plate and the indicator N to its lowered position, indicating the train is in the block and regarded as a condition of "danger" so far as a following train coming into the same block might make rear-end collision possible, then the passage of the train out of the block, again closing or operating the circuit, will cause a reversal of the visual danger-signal and a starting of the pointer F in its progressive movement past the marks on the scale or dial E, and an engineer on a following train may readily know that a train is still in the block, or if it has passed out therefrom the length of time elapsed since said outward passage.

While the device is shown as being operative for the reversal of the conditions and operations on half-rotations of the signal-operating shaft C, it could be made operative for the same effects on quarter-rotations by doubling or rendering twice as frequent the cam H and the graded face or cam M.

P represents a light mounted on the top of the box A, the same being covered and invisible to the engineer on an approaching train when the disk  $o$  is in the safety position, but exposed when the disk is lowered into its danger position.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a signaling apparatus the combination with a suitable supporting-casing of a trackway therein, movable to assume level and inclined positions, an indicator F and a carrier therefor movable along the trackway, and having rack-teeth, a clock-driven toothed wheel adapted to mesh into the said rack-teeth of the carrier, and means for alternately moving the trackway into its inclined and its level positions substantially as described.

2. In a signaling apparatus the combination with a supporting-casing, of a trackway therein movable as described, a graduated plate or dial E, an indicator F, and a carrier therefor, movable along the trackway and having rack-teeth, a clock-driven toothed wheel adapted to mesh into said rack-teeth, and means for alternately moving the trackway into its inclined and level positions, for the purposes set forth.

3. In a signaling apparatus the combination with the supporting-casing, and shaft C having the cam H of the trackway  $d$  movable as described and engaged by the cam, an indicator F, and a carrier therefor, movable along the trackway, and provided with the rack-teeth, and a clockwork comprising a toothed wheel  $j$  arranged to mesh into the said rack-teeth, substantially as described.

4. In a signaling apparatus the combination with the casing A having the trackway  $d$  provided with the longitudinal slot  $h$ , and hinged or fulcrumed whereby it may have level and inclined positions, a clock mechan-



ism comprising a toothed wheel protruding through the said slot to mesh with the rack-teeth on the carriage G, the shaft C and cam H coöperating with the trackway, and an indicator F carried by the carriage, substantially as described and shown.

5. In a signaling apparatus, in combination, the casing A having an apertured glass-covered front, and a dial or graduated plate behind the glass, the end-hinged trackway *d* having the slot *h*, the carriage G having the rack-teeth in line with said slot, and carrying the indicator F extended to a position in front of the dial, the clock mechanism having wheel *j* adapted to mesh, through said slot with the rack-teeth of the carriage and the shaft C having the cam H coöperating with the trackway, substantially as described.

6. In a combined visual safety and danger and time indicating apparatus the box or casing A, the rotatable shaft having the cams, H and M, the dial E, the trackway *d*, the car-

riage G having the rack-teeth and provided with the time-indicator F, a clock mechanism having a toothed wheel adapted to mesh into the said rack-teeth, said trackway being hinged at one end, and, by its other, extended subject to the elevating and lowering action of said cam H, the visual indicator N comprising the rod *n* semaphore *o*, stud or shaft *p* transversely arranged and journaled through the casing and having the member *r* extended toward the semaphore and also downwardly projected to be subject to the action of the cam M, and said indicator being adapted to be swung above the casing and also downwardly to a position in front of said dial, all substantially as and for the purposes set forth.

Signed by me at Springfield, Massachusetts, this 6th day of October, 1900.

PORTER C. BEMIS.

Witnesses:

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J. D. GARFIELD.