

No. 835,097.

PATENTED NOV. 6, 1906.

C. L. CHAMBERLAIN.  
TORPEDO SETTING MECHANISM.

APPLICATION FILED APR. 19, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

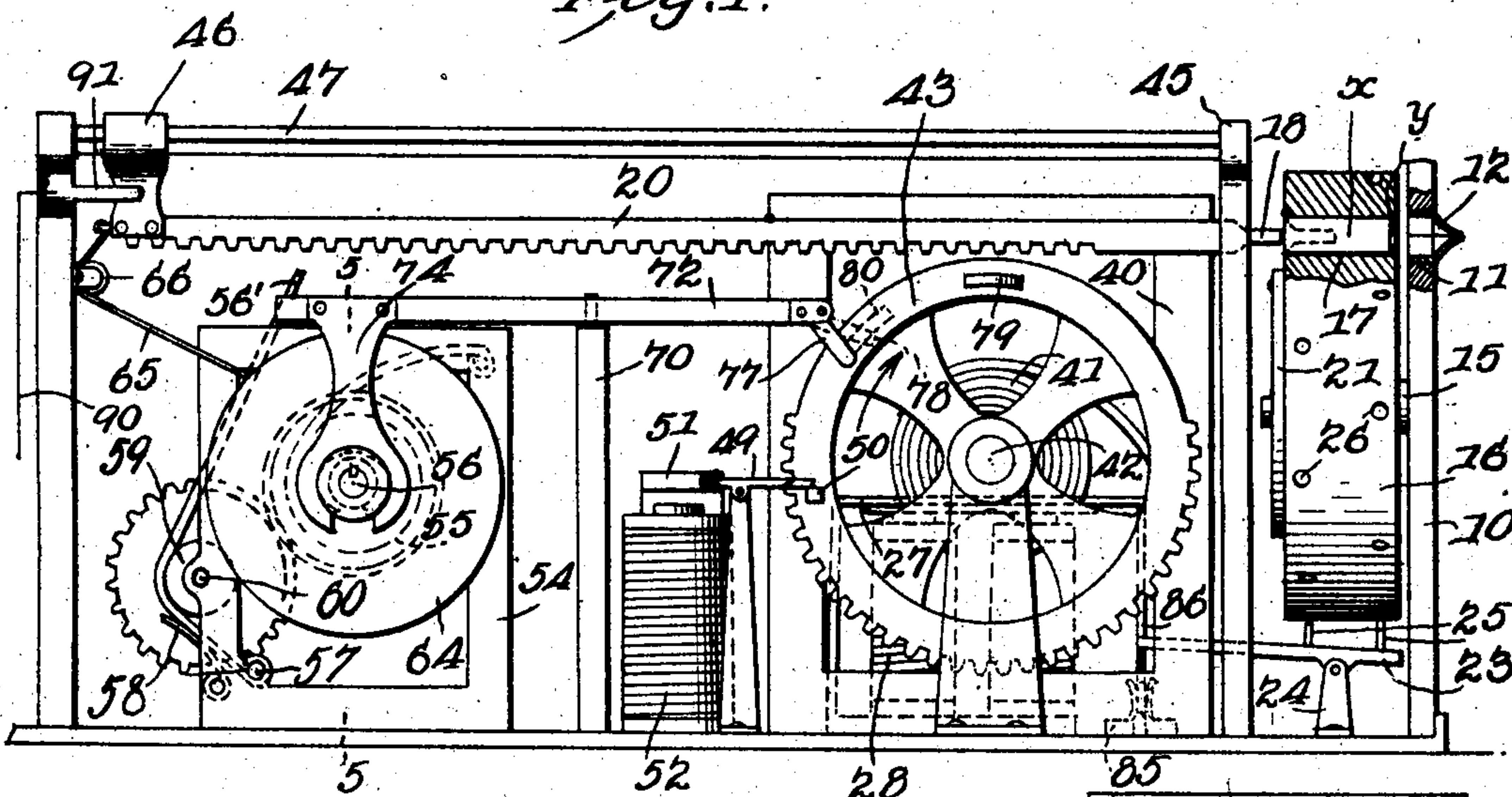
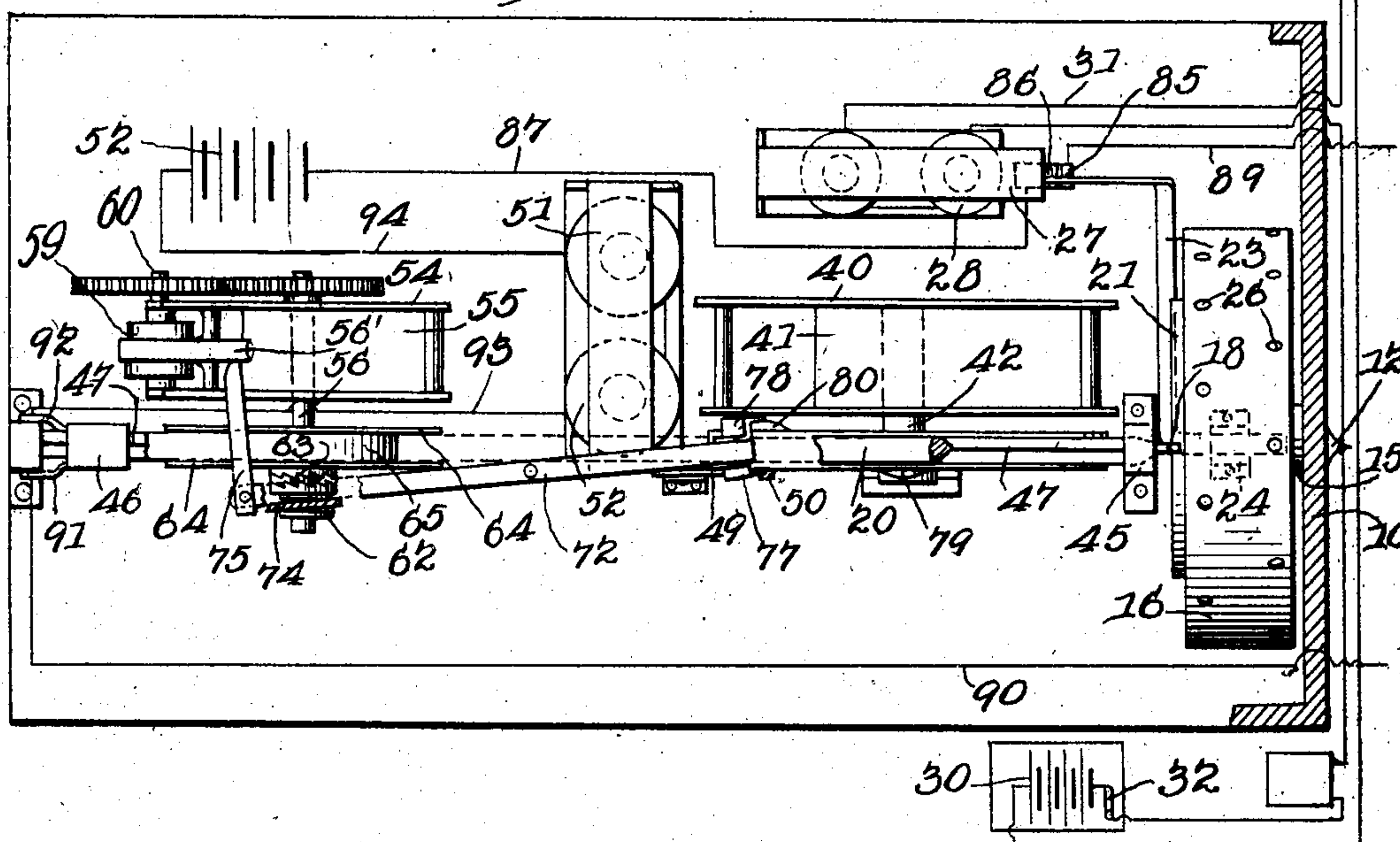


Fig. 2.



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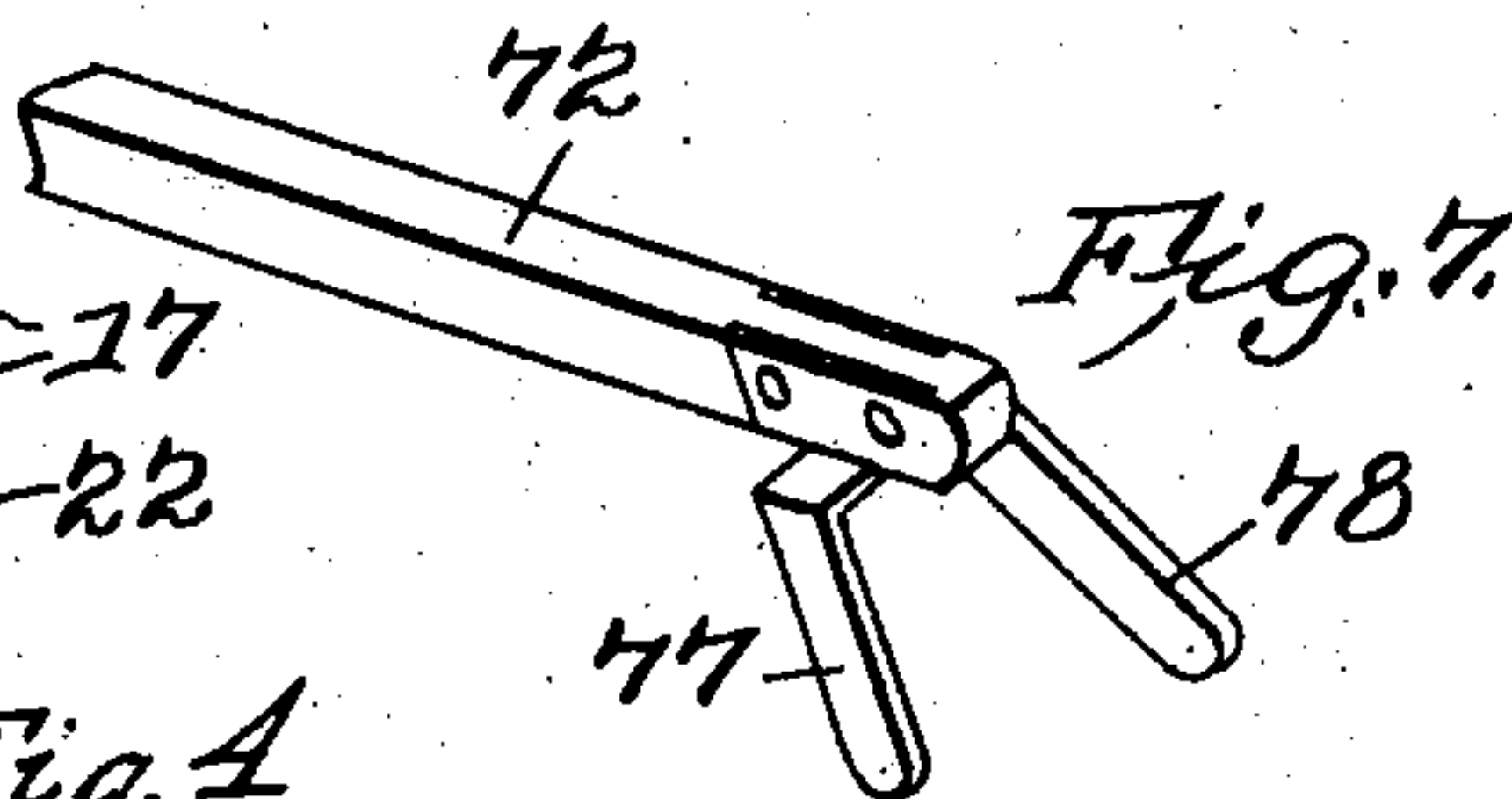
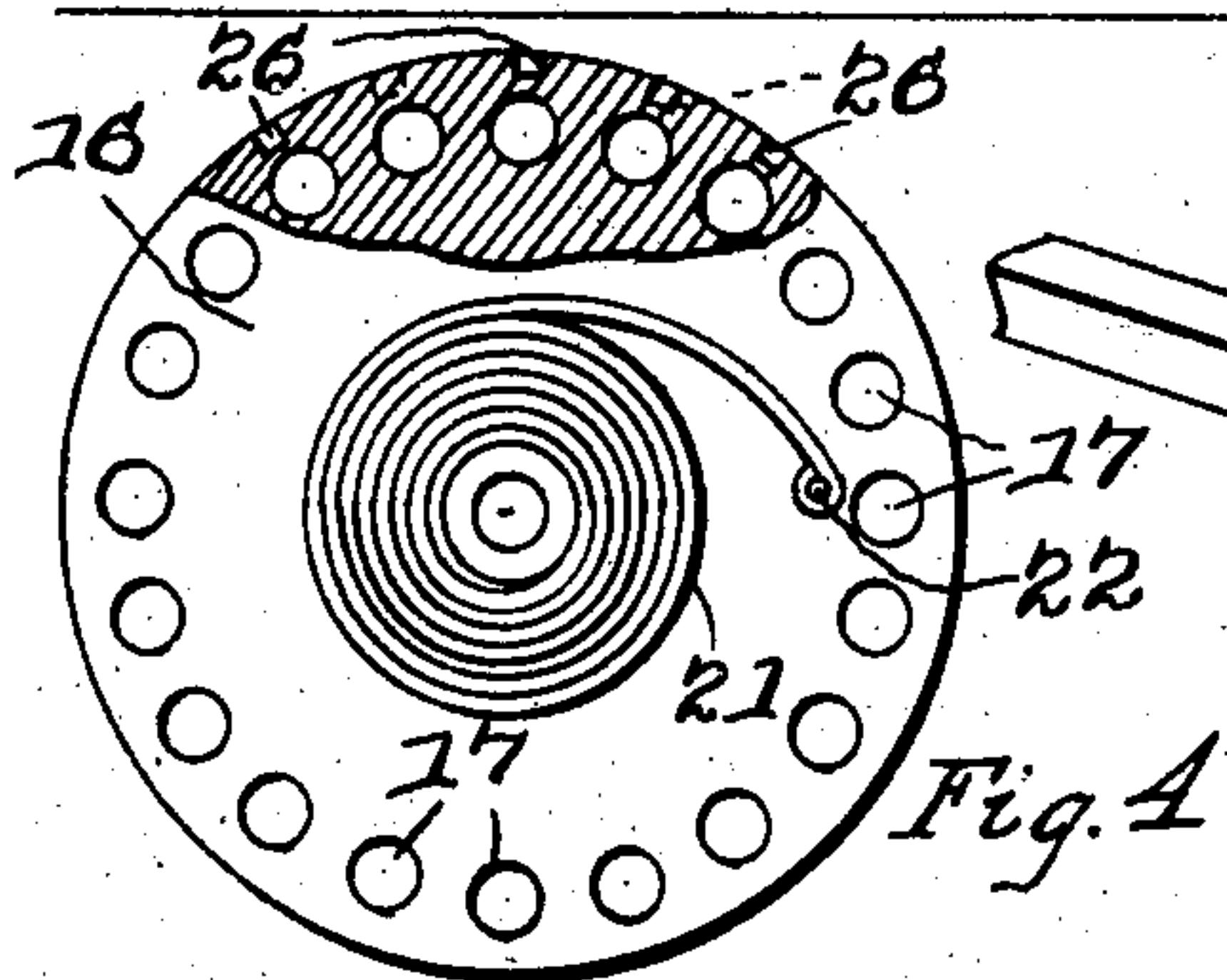
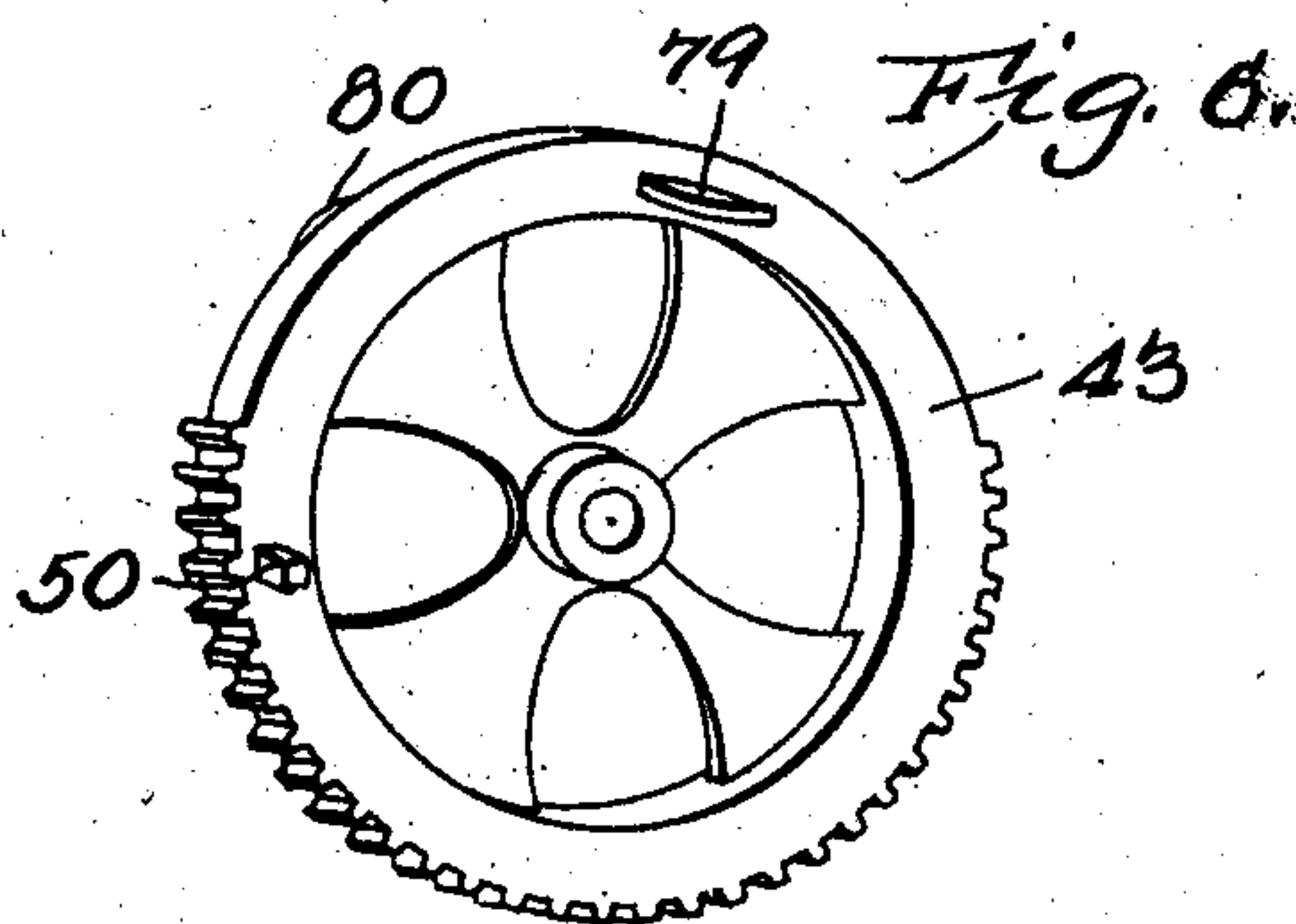
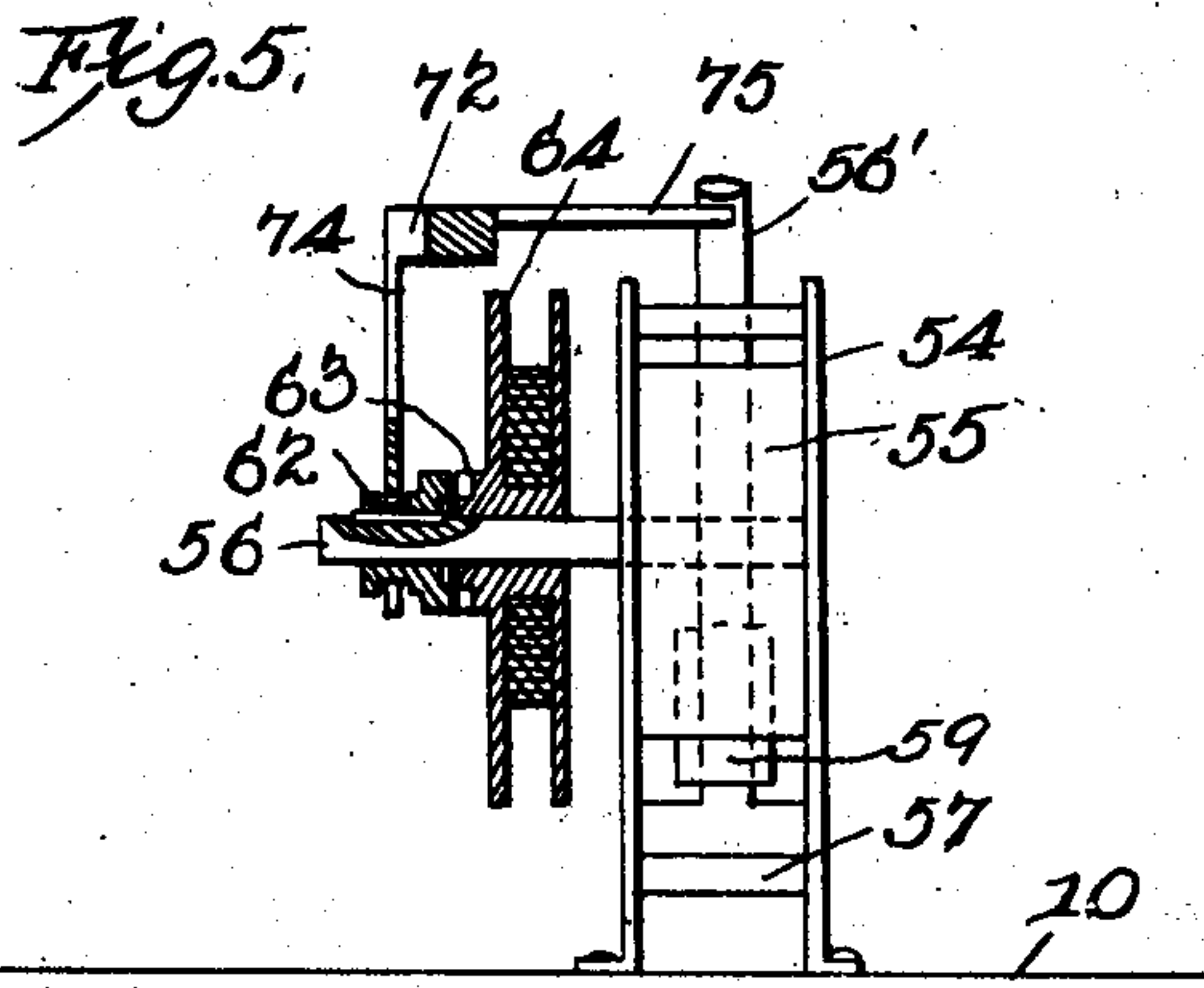
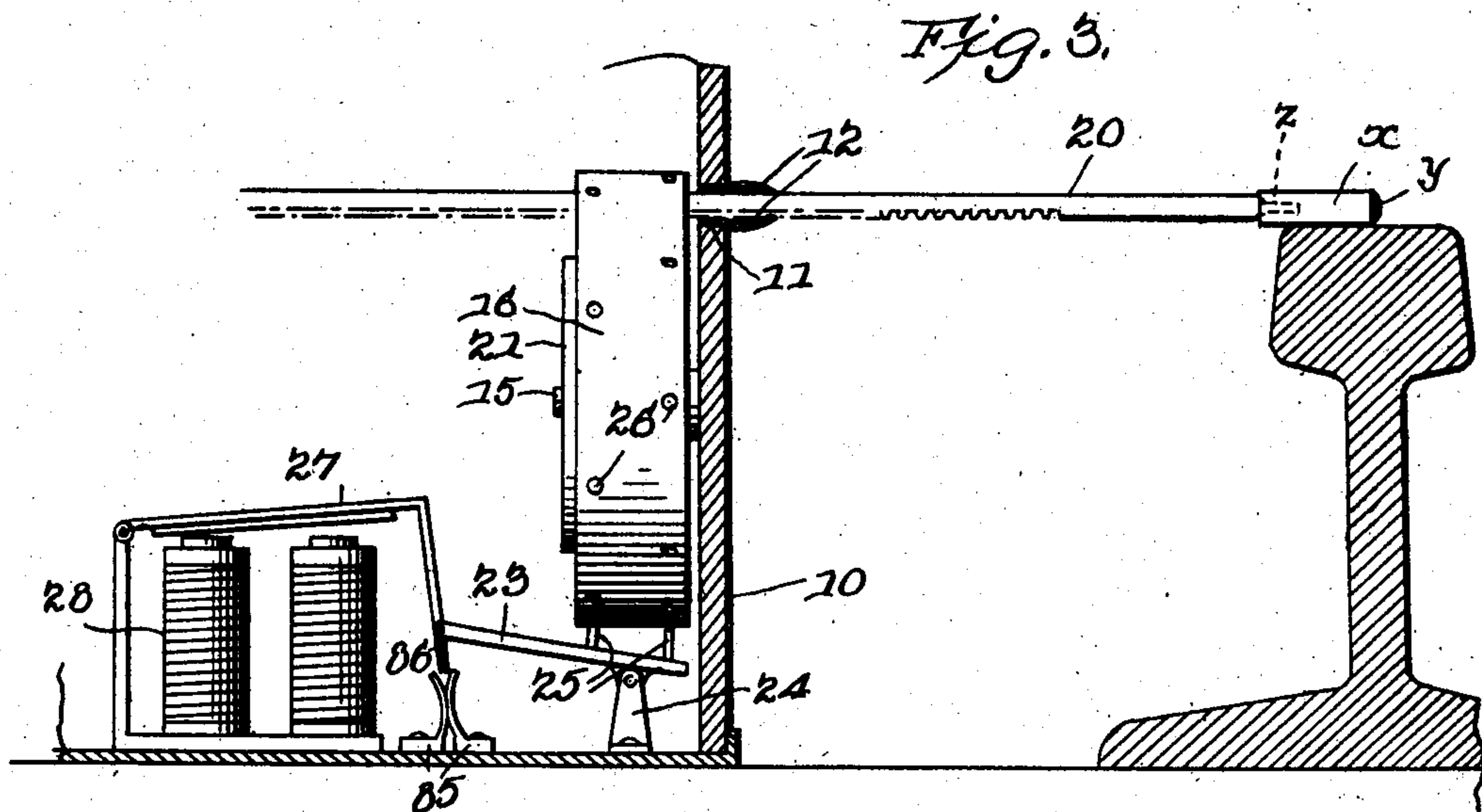
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**WITNESSES:**

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# UNITED STATES PATENT OFFICE.

CHESTER L. CHAMBERLAIN, OF LOS ANGELES, CALIFORNIA.

## TORPEDO-SETTING MECHANISM.

No. 835,097.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed April 19, 1906. Serial No. 312,640.

*To all whom it may concern:*

Be it known that I, CHESTER L. CHAMBERLAIN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Torpedo-Setting Mechanism, of which the following is a specification.

This invention relates to apparatus for placing topedoes on railway-tracks in advance of approaching trains for the purpose of warning the engineer of danger ahead.

One of the principal objects of the invention is to provide a mechanism which will operate automatically to place a torpedo on the track in advance of an approaching train in case of danger arising from any source—such, for instance, as the presence of two trains in a single block, an open drawbridge, a dangerous water-level in watercourses, a broken trestle, a broken rail, a misplaced switch, or the like.

A further object of the invention is to provide an apparatus of this nature in which a series of torpedo-setting devices are arranged at intervals alongside the track and all are placed in readiness to operate in case of accident or through the opening or closing of a switch at a station or stations, the mechanism which actually operates, however, being controlled by an approaching train.

A still further object of the invention is to provide a torpedo-setting apparatus in which an approaching train will select the apparatus to operate and will cause the same to project a torpedo over the rail in advance of the train.

A still further object of the invention is to provide a torpedo-setting mechanism that is arranged to contain a large quantity of torpedoes which are successively presented to position to be placed on the rails, so that the apparatus will not need replenishing except at long intervals.

A still further object of the invention is to provide a torpedo-setting apparatus in which the working parts and the torpedoes are inclosed in a thoroughly water and weather proof casing and will remain intact and in working condition without the necessity of examinations, repairs, or adjustment.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts herein after fully described, illustrated in the accompanying drawings, and particularly point-

ed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a vertical section of a torpedo-setting apparatus constructed in accordance with the invention. Fig. 2 is a plan view of the same, a portion of the casing being shown in section. Fig. 3 is a vertical sectional view through the torpedo-magazine, showing the releasing device for permitting step-by-step movement of the casing. Fig. 4 is an elevation of the magazine, partly in section. Fig. 5 is a transverse sectional view of a portion of the same on the line 5 5 of Fig. 1. Fig. 6 is a detail perspective view of the mutilated gear through which movement is imparted to the torpedo-projecting slide. Fig. 7 is a similar view of a portion of the mechanism which controls the return movement of the torpedo-projecting slide.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The casing 10 of the apparatus is preferably formed of iron or other metal, with joints so arranged as to be thoroughly weather and water proof, the only opening leading from the casing being in the form of an orifice 11, through which the torpedoes are projected to position on the track, and this opening being normally closed by a pair of yieldable strips 12, which come tightly together and will prevent the entrance of moisture. These members further serve as strippers during the return movement of the torpedo-projecting bar, so that any part of the torpedo which will cling to the bar will be removed as said bar slides back to its initial position.

The front wall of the casing carries an inwardly-projecting stud 15, on which a revolvable magazine 16 is mounted, said magazine being provided with a plurality of openings 17, arranged in a continuous annular series and having their axes parallel with the axis of the stud 15. These openings are designed to contain the torpedoes *x*, and the forward ends of the torpedoes are provided with tips *y*, of rubber or other waterproof material, which will prevent the passage of any moisture to the interior of the torpedo. The rear end of each torpedo has a recess *z*, which re-



ceives a pin 18, projecting from the end of the slide-bar 20.

To the inner end of the stud 15 is secured the inner end of a spiral spring 21, the outer  
 5 end of which is connected to a stud 22 on the torpedo-magazine, and said spring serves as a means for rotating the casing in order to present the different torpedoes carried  
 10 thereby into alinement with the projecting-bar 20. The rotative movement of the magazine is controlled by an escapement 23, that is pivoted on a small standard 24 and is provided with pallets 25, that are arranged  
 15 to enter recesses 26, formed in the periphery of the magazine, the recesses being disposed in staggered order, as shown in Fig. 1, so that a step-by-step movement of the magazine will be insured, and at the completion  
 20 of each movement one of the torpedo-openings of the magazine will be presented in alinement with the projecting-bar. The escapement 23 is connected at one end to an armature-lever 27, carrying an armature that is disposed within the field of force of an elec-  
 25 tromagnet 28. This magnet is connected in series with batteries 30 by a line-wire 31, and each battery 30 is arranged at a station along the line. At each station is a switch 32, said switches being closed, so that the  
 30 electromagnet is normally energized, and the electromagnet 28 is acting to draw down the armature of the lever 27.

It is to be understood that in practice a battery will be arranged at each station  
 35 along the line or at such other points as may be convenient, and in the line between the two batteries there may be two, three, or any other number of torpedo-setting mechanisms, all of which have their electromagnets 28  
 40 normally energized. The circuit, which is indicated in the form of a wire, may be made to extend through switch, along wires, over culverts, drawbridges, and the like, and so long as the circuit remains closed the electro-  
 45 magnet 28 will be held energized and the torpedo-setting mechanism will be prevented from operating. When a torpedo is to be set, the operator at either one of the stations opens the circuit by means of the switch 32,  
 50 or the circuit may be opened by the moving of a track-switch or by the opening of a draw-bridge; but in any of these events the circuit may be broken and the electromagnets 28 of the different torpedo-setting mechanisms  
 55 will be deenergized, thus permitting the movement of the escapement 23 to an extent sufficient to allow the magazine to move to such position that one of its torpedo-openings will be in alinement with the discharge-  
 60 opening 11. The remaining portion of the mechanism will then be set into operation by a passing train, so that a torpedo will be projected to position on the track.

Arranged within the casing is a frame 40,  
 65 carrying a spring-motor, which in the pres-

ent instance has been shown in the form of a spring 41. This spring tends to revolve a shaft 42, that is mounted in suitable bearings in the frame, and on the shaft is secured a mutilated gear-wheel 43, which rotates in  
 70 the direction indicated by the arrow in Fig. 1 to the extent of one complete revolution at each operation. The teeth of this gear-wheel are arranged to engage the teeth of a rack carried by the lower face of the slidable  
 75 torpedo-projecting bar 20. This bar is guided at its forward end in an opening formed in the standard 45, that constitutes a portion of the frame, and at its rear end is hung on a carrier 46, the latter being slidably mounted  
 80 on a fixed horizontal bar 47. The forward end of the projecting-bar 20 is pointed, so that it may enter the recess 2 of the torpedo, and after forcing the same out through the orifice 11 the torpedo will be carried to a po-  
 85 sition on the tread of the rail. The gear 43 is normally held from rotative movement by a lever 49, which engages a stud 50, projecting from the gear-wheel. This lever 49 is under the control of an armature 51, that is  
 90 disposed within the field of force of an electromagnet 52, the latter being connected to a local battery 52 within the casing in the manner hereinafter described, and when this local circuit is closed the armature will be  
 95 attracted and the gear-wheel will be set free and will make one complete rotation, forcing the bar 20 to project a torpedo to operative position, after which the wheel again stops with its lug 50 in contact with the lever 49.  
 100

Near the rear of the casing is a frame 54, carrying a spring-motor 55, that is provided with a shaft 56, which will be turned when the motor is set free. Normally this motor is held from movement by a brake-strip 56',  
 105 pivoted on a stud 57 and pressed by a spring 58 into engagement with a small roller 59, that is carried by a counter-shaft 60 of the motor. Feathered on the main shaft 56 is a clutch-sleeve 62, which is arranged to engage  
 110 the clutch-hub 63 of a winding-roller 64, that is normally loose on the shaft. This winding-roller 64 carries a steel tape or like flexible member 65, that passes over a guiding device 66 and is connected to the rear end of the bar  
 115 20. As the winding-roller is normally free, it will not interfere with the outward movement of the torpedo-projecting bar; but after the movement of the latter is accomplished the winding-roller is clutched to the motor-  
 120 shaft and the motor is released, turning the roller and winding up the tape, thus withdrawing the bar 20 to its initial position.

Pivoted on a standard 70 at a point between the electromagnet 52 and the roller  
 125 64 is a horizontally-disposed lever 72, the rear end of which is pivoted on a depending arm 74, that engages the clutch-sleeve 62, and this lever is provided also with a cam-shaped brake-releasing arm 75, which is arranged to  
 130



engage against the brake-bar 56' and move the latter to release position.

The brake-releasing operation is simultaneous with the clutching of the winding-roller to the motor-shaft, so that the motor may operate on the winding-roller for the purpose of withdrawing the bar 20 to its initial position.

At the front end of the lever 72 are two arms 77 and 78, which straddle the wheel 43, and said arms are arranged to be engaged by a pair of cams 79 and 80, respectively, the cam 79 acting at the end of a complete rotation of the gear-wheel 43 to shift the position of the lever for the purpose of throwing the clutch-sleeve 62 into engagement with the clutch-hub 63, and moving the arm 75 into engagement with the brake-arm 56', so that the motor mechanism may be connected to the winding-roller 64 and the tape or flexible member wound up for the purpose of withdrawing the bar 20. This operation takes place somewhat in advance of the completion of the rotative movement of the mutilated gear, and at the completion of the final movement the cam 80 acts to throw the lever 72 to the position shown in Fig. 2, thereby unclutching the winding-roller and allowing the brake to move into engagement with the roller or drum 59, stopping the operation of the spring-motor, and the parts remaining in this position in readiness for another operation.

At a point below the armature-lever 27 are two metallic contact-clips 85, which tend to move into engagement with each other, and when the electromagnet 20 is energized and the armature is down a small arm 86 of insulating material carried by the armature-lever will descend between the contact 85 and separate the latter. These clips form a part of the local primary circuit, which may be traced from the battery 52 through wire 87 to the clips 85, wire 89 to the railway-track, and from the opposite rail through wire 90 to a contact-arm 91, carried by the frame and engaging the slide or carrier 46. The circuit is completed through the slide or carrier 46 to a contact 92, carried by the frame at the opposite side of the carrier, and from thence through a wire 93 to the electromagnets 52 and back by wire 94 to the local battery.

It will be seen that under normal conditions the main-line circuit is closed and all of the electromagnets 28 along the line energized, the clips 85 of the local circuit will be separated from each other, and the circuit will be broken at this point and also at the rails. Should an accident occur to break the main-line circuit, or should the circuit be purposely opened by an operator at one of the stations, the several electromagnets 28 of all of the torpedo-setting mechanisms will

be deenergized and the magazines will be allowed to travel through the operation of the escapements until one of the torpedoes of each magazine is opposite the discharge-orifice. At the same time the insulating-arm 86 moves from between the clips 85 and closes the local circuit at this point, the local circuit, however, being held open at the tracks. If, then, a train approaches, the circuit will be completed through the wheels and axles, and the magnet 52 will be energized, allowing the mutilated gear 43 to rotate to the extent of one revolution. This attracts the bar 20 and forces a torpedo to operative position on the track. The cam 79 acts somewhat in advance of the complete rotation of the gear 43 to throw the clutch 62 into engagement with the clutching-hub 63, thus connecting the winding-drum 64 to the spring-motor 55, and at the same time the arm 75 will move the brake to release position, whereupon the winding-roller 64 is turned, winding up the tape 65 and drawing back the bar 20 to its initial position, and at the completion of the rotation of the mutilated gear 43 the cam 80 acts to disconnect the winding-drum and to allow the brake to again engage and stop the movement of the spring-motor.

It will be observed that all of the mechanisms which have been set by the breaking of the main circuit will not discharge a torpedo, but only that one in which the local circuit is closed by an approaching train, thus saving considerable waste. At the same time if the train should pass one of the torpedoes after explosion without noticing the signal it will close the local circuit of a second mechanism and a second torpedo will be projected in advance of the train, and, if necessary, a third and fourth mechanism may be brought into play until the signals are observed and obeyed.

I claim—

1. A torpedo-setting mechanism, including a pair of coöperatively-related electromagnetically-operated controlling devices, one connected in a main-line circuit and movable to adjust a torpedo in position to be engaged by the other device, said other device being in a circuit under the control of an approaching train to move the torpedo over the track.

2. In torpedo-setting mechanisms, a pair of successively-actuated electromagnetically-operated devices controlling the movement of the mechanism, one serving to adjust a torpedo into position to be engaged by the other, a main-line circuit to which the first magnet is connected, and a local circuit in which the second electromagnet is connected, the local circuit being under the control of an approaching train.

3. In combination, a plurality of torpedo-



setting mechanisms, each including a pair of successively-operated electromagnetic controlling devices, one serving to adjust a torpedo into position to be engaged by the other, a main-line circuit connected to the first  
5 electromagnet of each of said mechanisms, and an independent local circuit for each of the second electromagnets, the local circuits being under the control of approaching  
10 trains.

4. In combination, a series of torpedo-setting mechanisms, each of which includes two consecutively-operable electromagnetic controlling devices, a main circuit including a  
15 source of energy connected to the first electromagnets of all of said mechanisms, said main-line circuit being arranged to open when the track is in unsafe condition, and an independent local circuit for each of the sec-  
20 ond electromagnets, said local circuit being arranged to be closed by an approaching train.

5. In mechanism of the class described, a revoluble torpedo-magazine having a plu-  
25 rality of torpedo-receiving openings, means for imparting a step-by-step rotative movement thereto, and an independently-operable means for delivering torpedoes from the magazine.

30 6. In mechanism of the class described, a revoluble torpedo-magazine, means for imparting a step-by-step rotative movement thereto, and an independently-operable reciprocatory delivery-bar for forcing suc-  
35 cessive torpedoes from the magazine.

7. In mechanism of the class described, a revoluble torpedo-magazine, an operating means including an electric circuit under dis-  
40 tant control, a torpedo-delivery means, an electromagnet controlling the operation thereof, and a train-closed local circuit in which said electromagnet is connected.

8. A torpedo-setting device including a magazine, an electromagnet controlling the  
45 movement of the magazine to delivery position, a main-line circuit in which said electromagnet is connected, a torpedo-delivery means, a second electromagnet controlling the operation thereof, and a train-closed lo-  
50 cal circuit in which said second electromagnet is connected.

9. A torpedo-setting mechanism including a revoluble magazine, a spring tending to rotate the same, an escapement arranged to  
55 permit step-by-step movement of the magazine, an electromagnet for actuating the escapement, and a torpedo-delivery member.

10. In mechanism of the class described, a revoluble magazine having torpedo-receiving  
60 openings, and provided with a notched periphery, a spring tending to rotate the magazine, an escapement coacting with the notches to permit step-by-step rotative

movement of the magazine, an electromagnet for operating the escapement, and means  
65 for delivering a torpedo from the magazine.

11. In mechanism of the class described, a revoluble torpedo-magazine provided with a plurality of torpedo-receiving openings, a torpedo-delivery member, the magazine-  
70 openings being normally out of alinement with said delivery member, means for moving the magazine to present successive openings in alinement with the delivery member, and means for actuating said delivery mem-  
75 ber.

12. In mechanism of the class described, a torpedo-magazine, an electromagnet controlling the adjustment of the same to oper-  
80 ative position, a main-line circuit in which said electromagnet is connected, a torpedo-delivery member, a second electromagnet controlling the operating of the delivery member, and a local circuit that is in part under the control of the first electromagnet, 85  
and in which said second electromagnet is connected.

13. In mechanism of the class described, a torpedo-setting device including a reciprocatory bar, a rack on said bar, a mutilated  
90 gear through which movement is imparted to the rack in one direction, and means in part under the control of said mutilated gear for restoring the bar to initial position.

14. In torpedo-setting mechanism, a re-  
95 ciprocatory rack-bar, a mutilated gear for imparting movement to the same in one direction, a motor for actuating the gear, means for locking the gear from movement, and an electromagnet for releasing the lock-  
100 ing means.

15. In torpedo-setting mechanism, a reciprocatory rack-bar, a mutilated gear for imparting movement to the same in one di-  
105 rection, means for locking the gear from movement, a motor tending to revolve the gear, an electromagnet for releasing the locking means, and means for restoring the bar to initial position.

16. In torpedo-setting mechanism, a re-  
110 ciprocatory rack-bar, a normally locked mutilated gear for moving the same in one direction, an electromagnetically-operated lock-releasing means, a winding-drum, a flexible member extending therefrom to the rack-  
115 bar, a motor member normally distant from the drum, and means under the control of the mutilated gear for connecting the drum to its motor.

17. In mechanism of the class described, a  
120 reciprocatory rack-bar, a normally locked mutilated gear for moving the same in one direction, a winding-drum, a flexible member extending therefrom through the rack-  
125 bar, motor members for the gear and drum, means for locking the gear from movement,

an electromagnetically - actuated releasing means, a pair of cams carried by the gear, a clutch for connecting the winding-drum to its motor, and a pivotally-mounted clutch-  
5 operating lever actuated by said cams.

18. In mechanism of the class described, a revoluble carrier having openings arranged in an annular series, torpedoes disposed within the openings and having yieldable

heads of waterproof material for closing to such openings.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHESTER L. CHAMBERLAIN.

Witnesses:

JOHN HIPP,  
W. W. WHITE.