E. E. FLORA & R. J. ZORGE.

RAILWAY SIGNAL AND TRAIN CONTROLLING MECHANISM.

APPLICATION FILED MAY 13, 1908.

925,322.

Patented June 15, 1909.

6 SHEETS—SHEET 1.

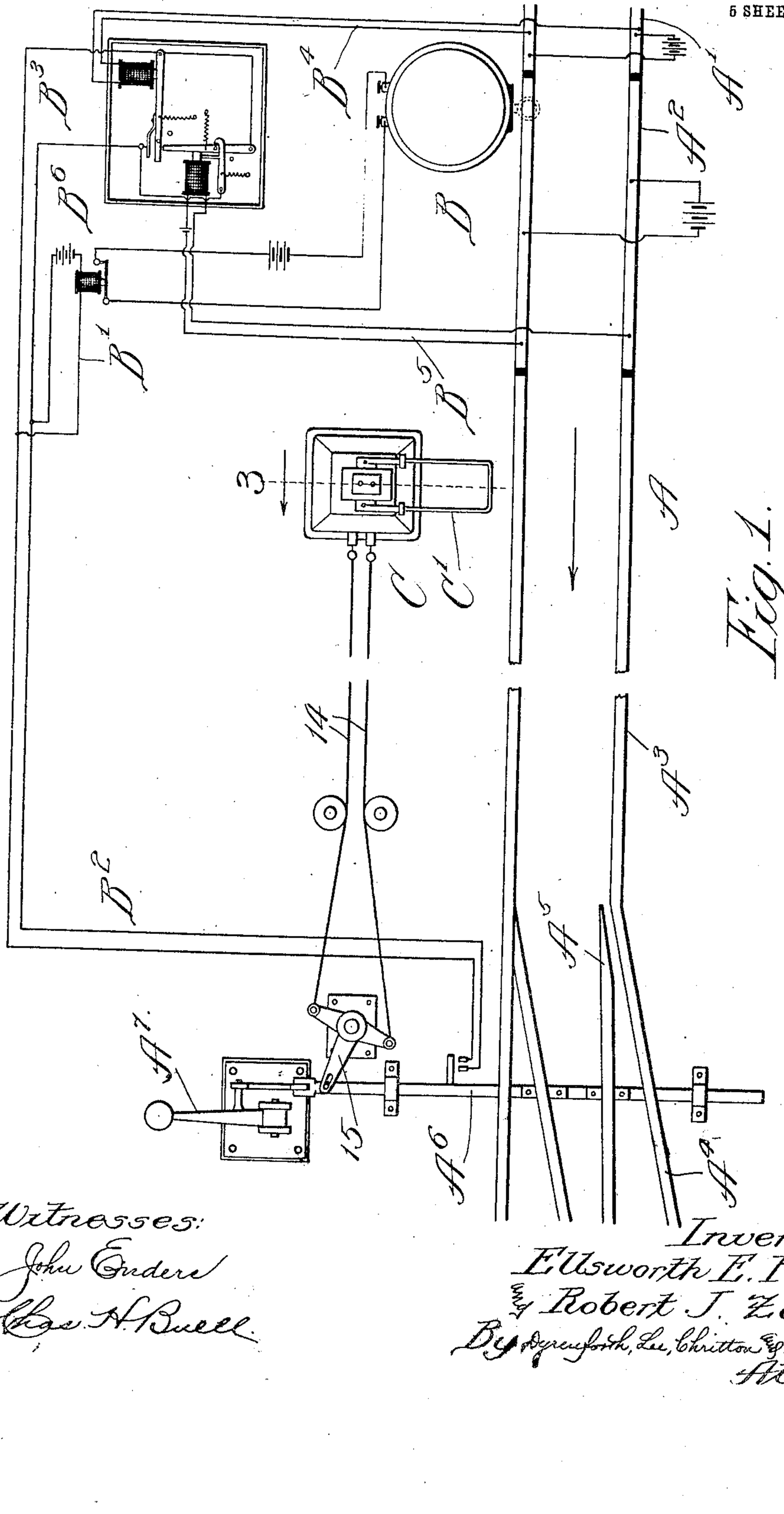

Fig. 1.

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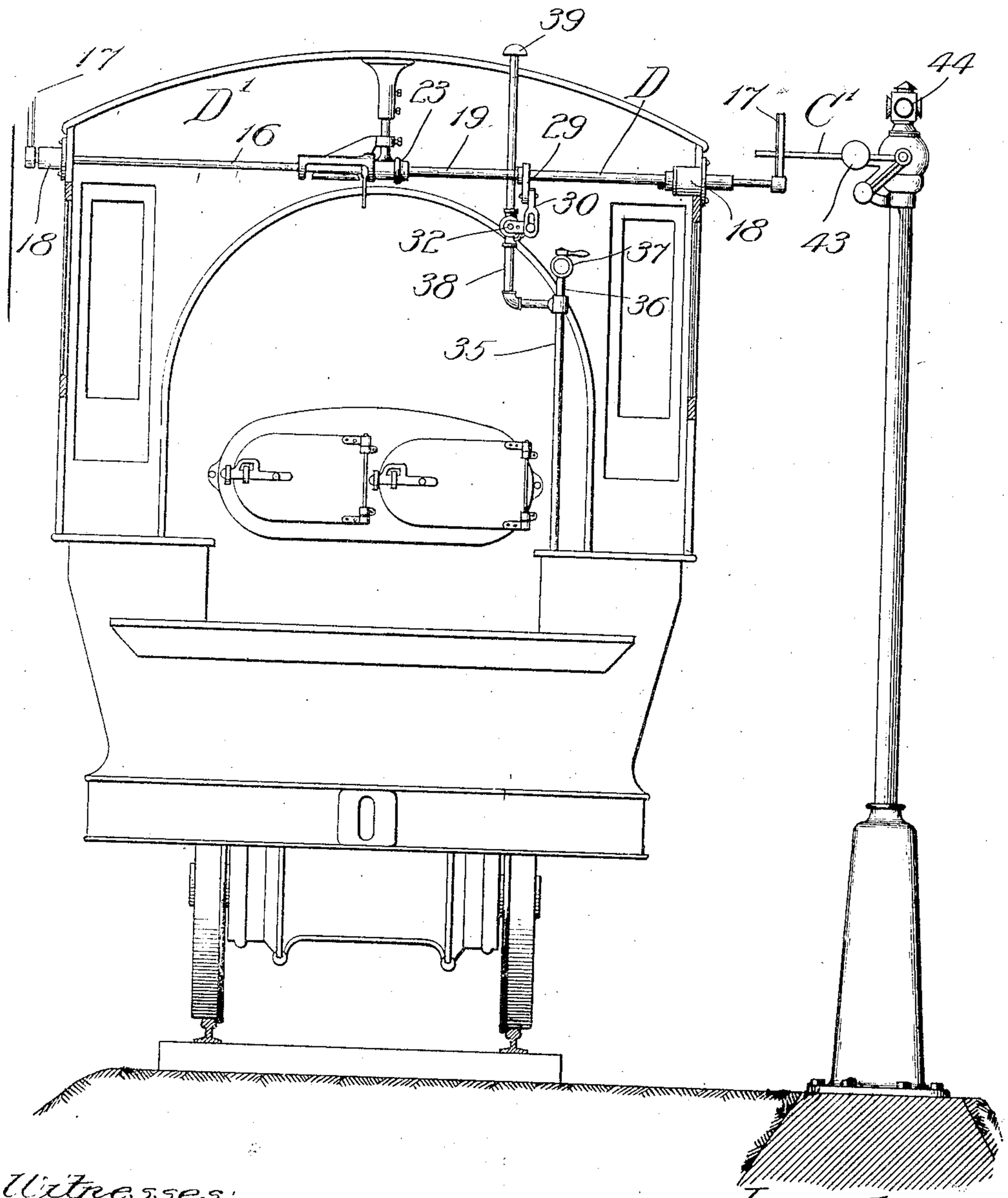
5 SHEETS—SHEET 2.

Fig. 2.



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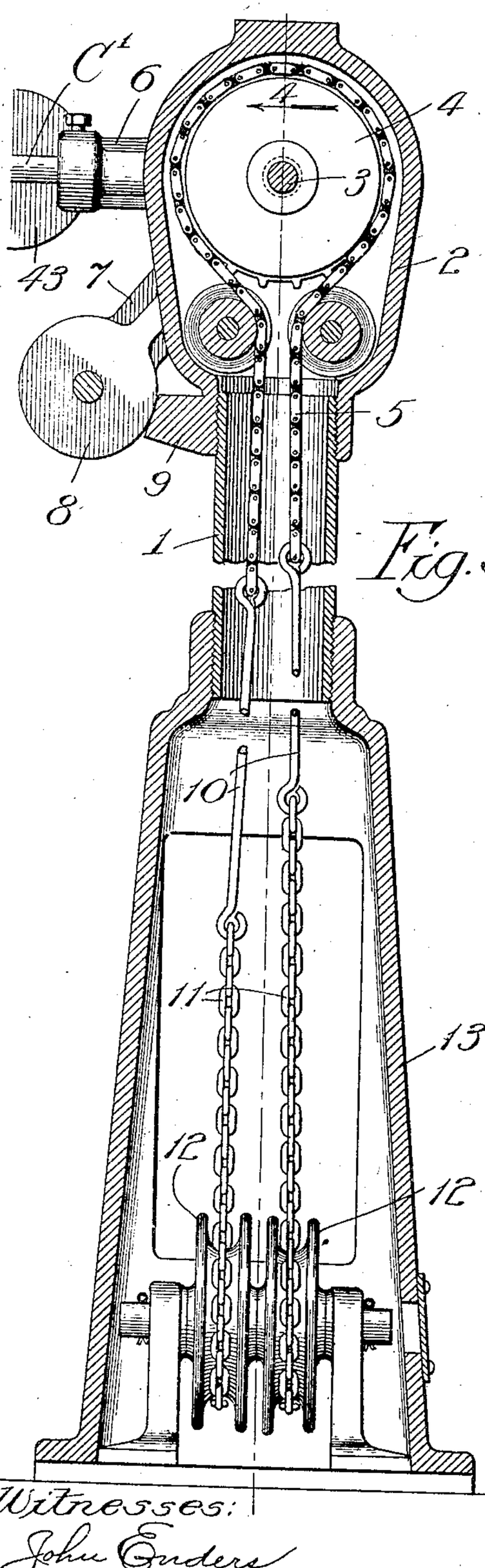

Fig. 3.

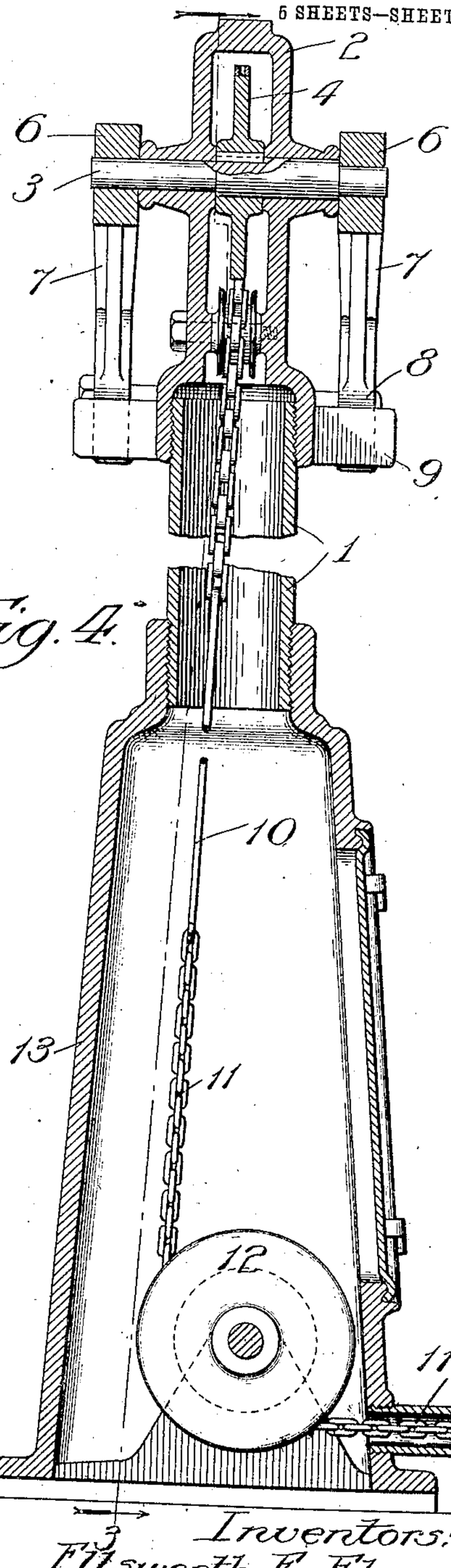

Fig. 4.

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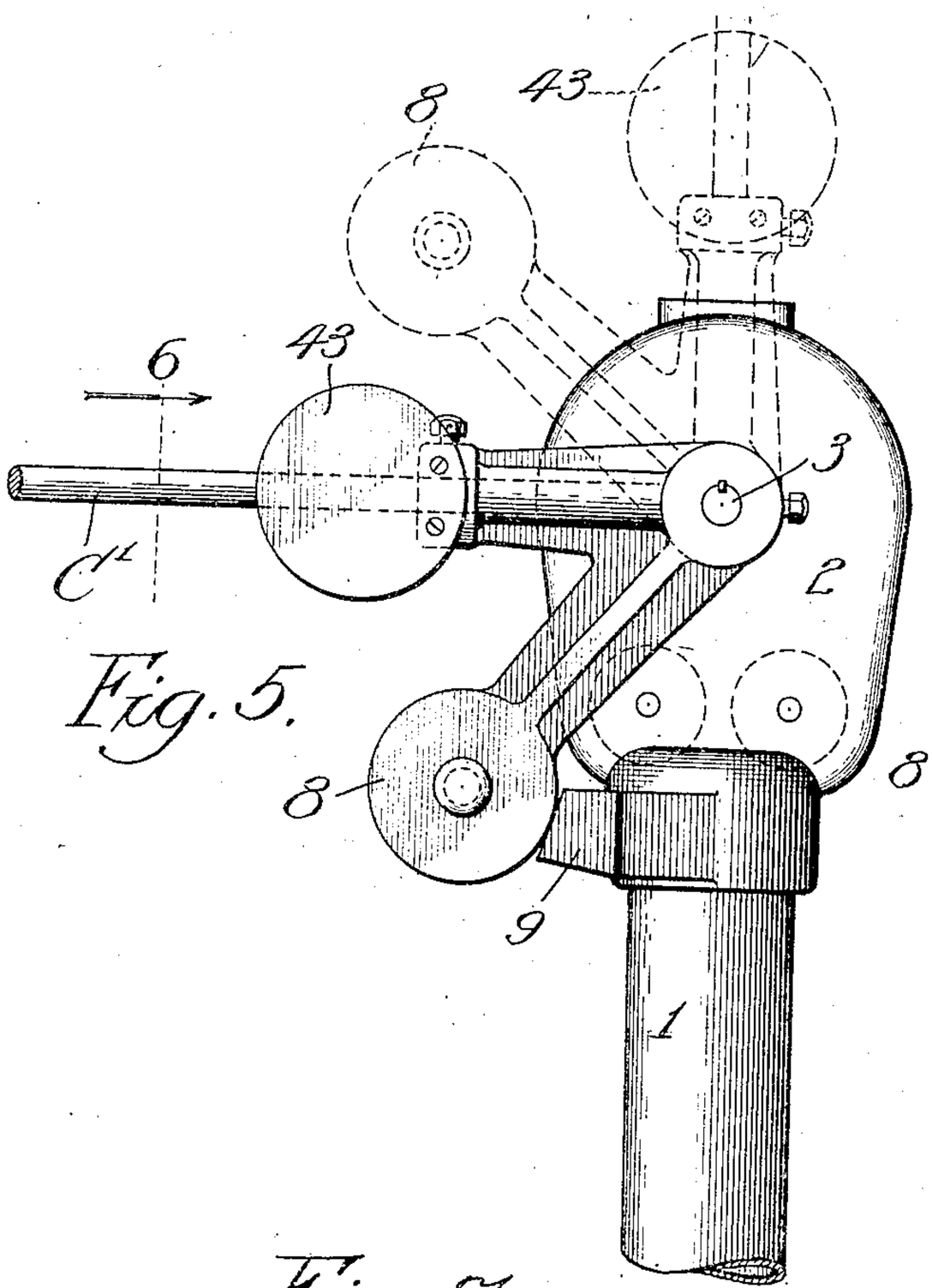


Fig. 5.

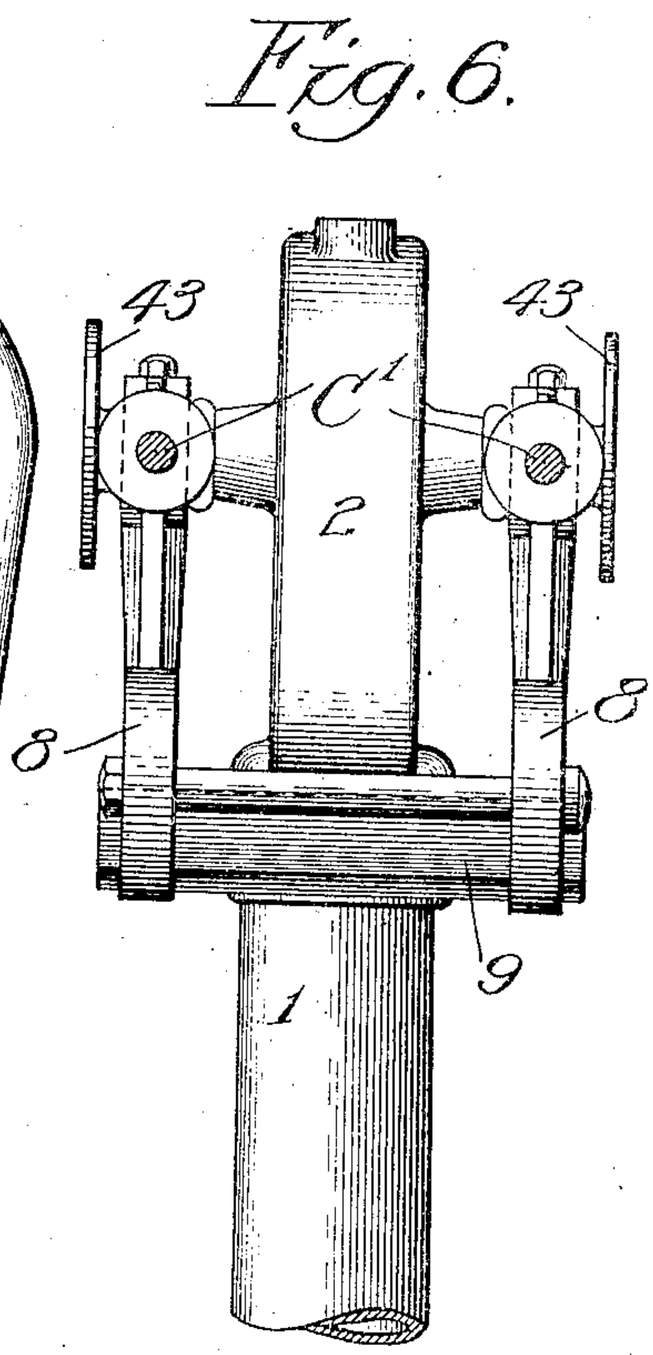
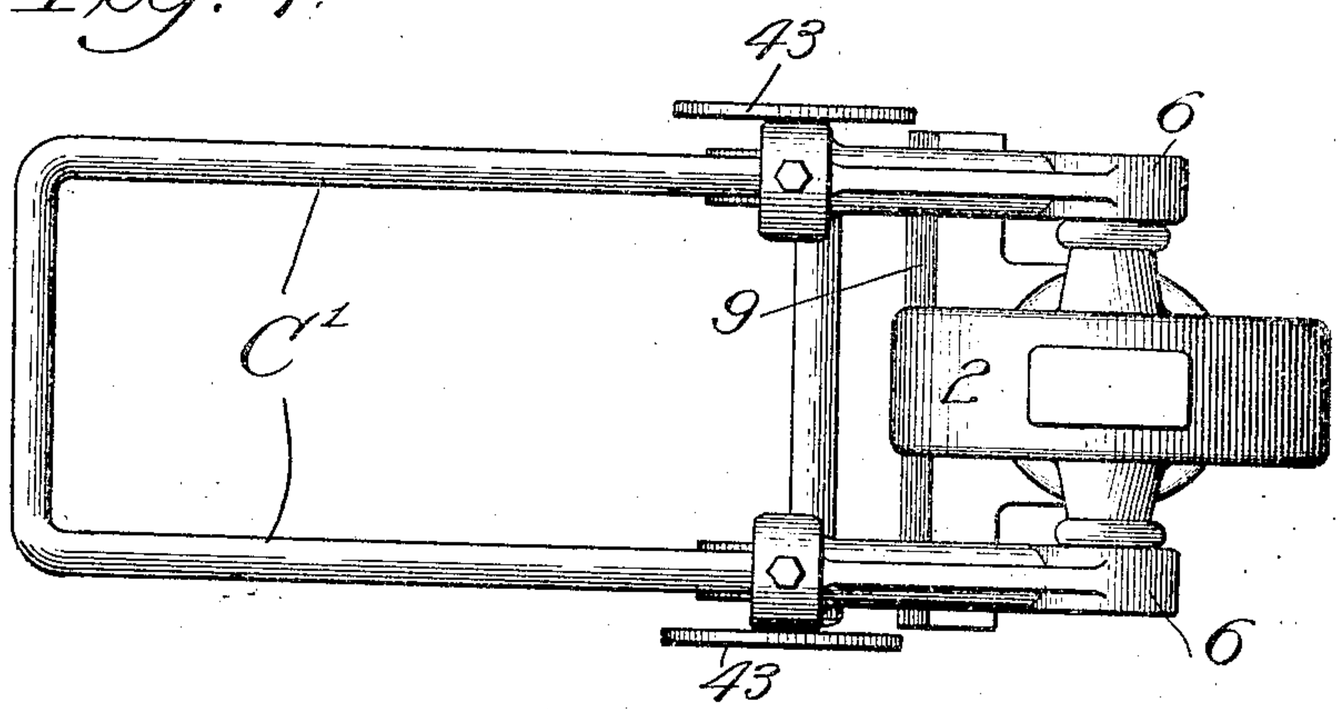


Fig. 6.

Fig. 7.



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5 SHEETS—SHEET 5.

Fig. 8.

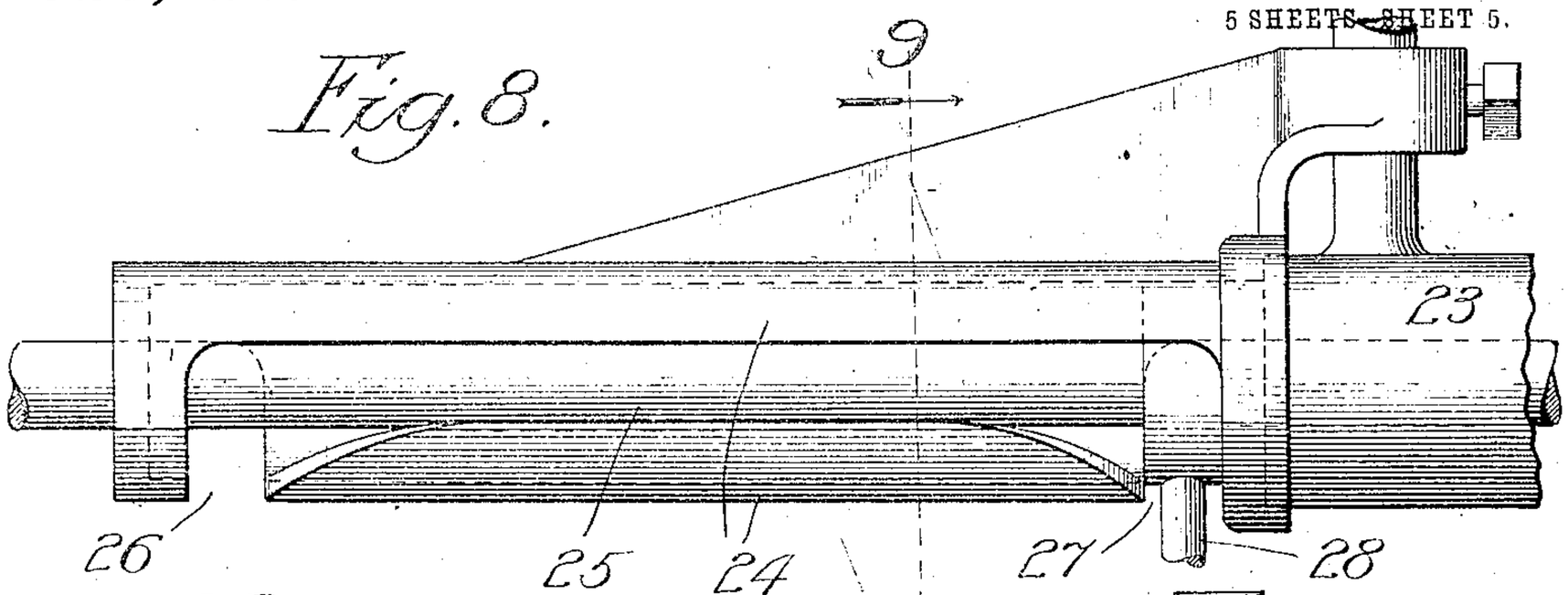


Fig. 9.

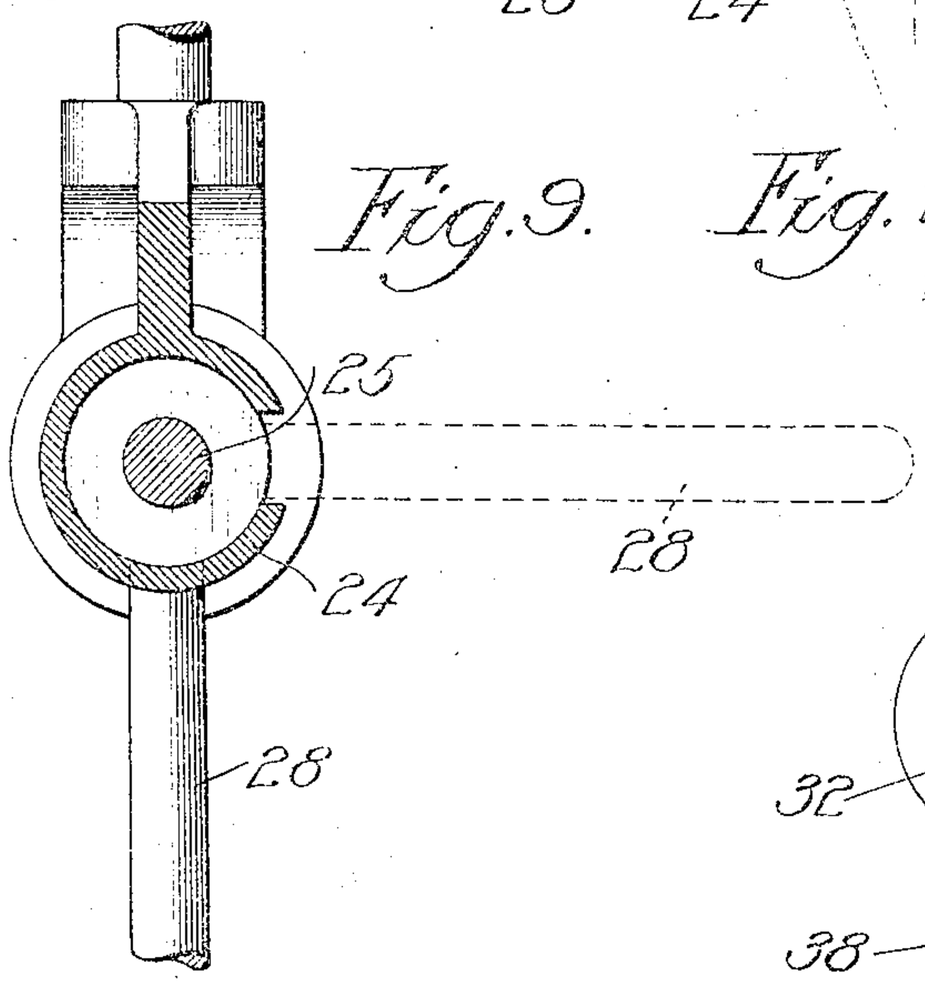


Fig. 10.

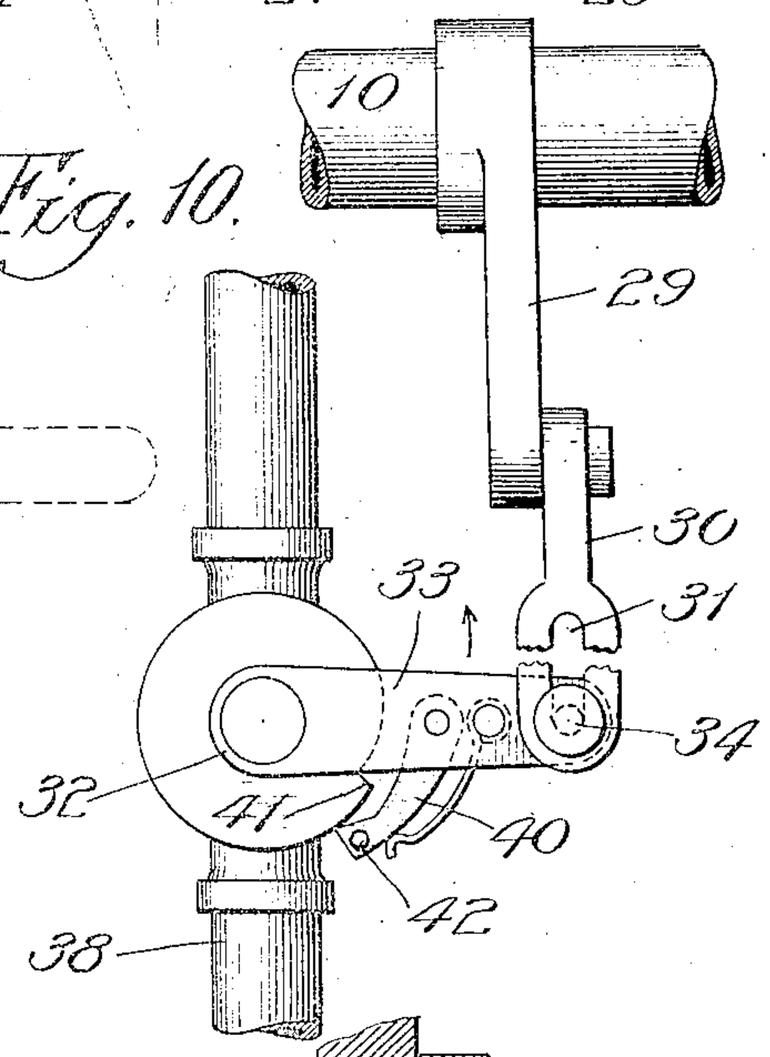
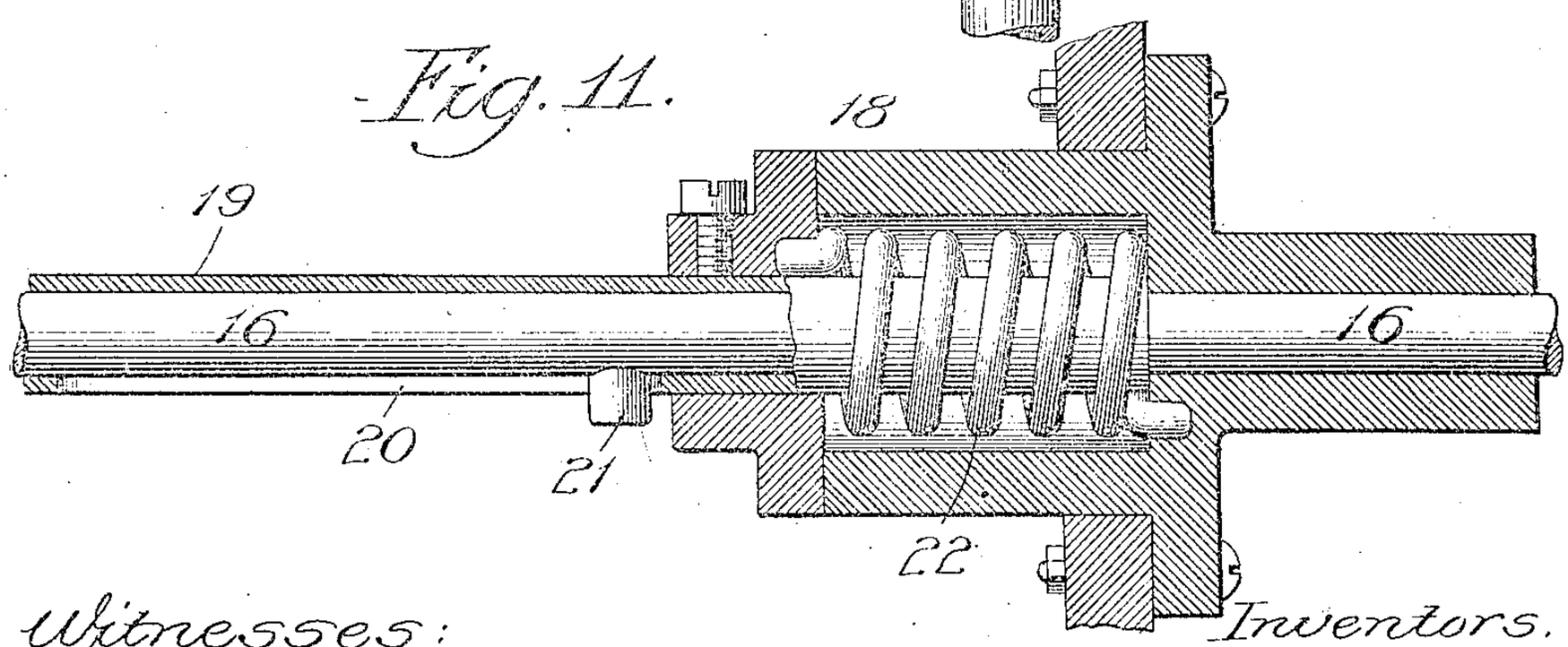


Fig. 11.



Witnesses:
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By Bakewell, Lee, Christy & Wilson
Attys.

UNITED STATES PATENT OFFICE.

ELLSWORTH E. FLORA AND ROBERT J. ZORGE, OF CHICAGO, ILLINOIS, ASSIGNORS TO ZORGE SAFETY RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RAILWAY SIGNAL AND TRAIN-CONTROLLING MECHANISM.

No. 925,322. Specification of Letters Patent. Patented June 15, 1909.

Application filed May 13, 1908. Serial No. 432,731.

To all whom it may concern:

Be it known that we, ELLSWORTH E. FLORA and ROBERT J. ZORGE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Railway Signal and Train-Controlling Mechanism, of which the following is a specification.

This invention relates particularly to means for giving warning to an engineer, or motorman, approaching an open switch, an open draw, or other danger point with his train, or car, and to means for automatically applying the brakes if the warning is not heeded.

The primary object of the invention is to provide improved apparatus for stopping a train, in the event that the alarm signal employed is not heeded; and a further object is to provide, in combination with such mechanism, means for giving an alarm signal prior to the operation of the automatic train-controlling mechanism, in order that the engineer, if he heeds the signal, may bring his train to a stop gradually under his full control.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents, by a view diagrammatic in its nature, a portion of a railway track equipped with our improvements; Fig. 2, an end elevational view of an engine, or motor-car, equipped with the train-carried portion of our mechanism for automatically stopping a train; Fig. 3, a broken sectional view taken as indicated at line 3 of Fig. 4 and showing the construction at the upper portion of a standard employed for carrying a movable stop-arm which normally occupies an inoperative position; Fig. 4, a broken section taken as indicated at line 4 of Fig. 3; Fig. 5, a broken side elevational view of the parts shown in Fig. 3; Fig. 6, a broken section taken as indicated at line 6 of Fig. 5; Fig. 7, a plan view of the parts shown in Figs. 5 and 6; Fig. 8, an enlarged broken detail view showing a construction at the central portion of the rock-shaft shown in Fig. 2; Fig. 9, a broken section taken as indicated at line 9 of Fig. 8; Fig. 10, a broken view showing on a larger scale the relief-valve and attendant parts shown in Fig. 2; and Fig. 11, a broken sectional view showing the construction at one of the bearings for the rock-shaft shown in Fig. 2.

In the construction illustrated, A represents a railway track electrically divided into sections A^1, A^2 and A^3; A^4, a side-track with a movable switch-point A^5, operated by a bar A^6 connected with the operating lever A^7 of the switch-point; B, torpedo-placing mechanism controlled by a circuit B^1 having a branch circuit B^2 connected with the switch-point or operating means therefor, and having a branch B^3 controlled by circuits B^4 and B^5 connected, respectively, with the track-sections A^1, A^2; B^6, mechanism connected with the circuits B^4 and B^5 and serving automatically to control the branch circuit B^3, said mechanism serving automatically to open the circuit B^3 when a train approaches the switch-point in the direction indicated by the arrow; C, local train-controlling mechanism located at one side of the track between the torpedo-placing mechanism B and the switch-point and equipped with a movable stop-arm C^1 operatively connected with the switch in a manner to be presently described; and D, train-carried valve-actuating mechanism mounted on the engine D^1 and serving to operate a relief-valve whose function it is to automatically set the brakes.

The details of construction of the torpedo-placing mechanism B and the means for automatically controlling the operation of the same are fully described in our application No. 379,791, filed June 19, 1907. It is sufficient to state here that when a train approaches the switch-point in the direction indicated by the arrow in Fig. 1, assuming the switch-point to be open and the branch circuit B^2 broken, the branch circuit B^3 will be opened, thereby opening the circuit immediately connected with the torpedo-placing mechanism B, whereupon the torpedo-placing mechanism will operate to project a torpedo above the adjacent track-rail; and the construction and arrangement are such that when a train passes in the opposite direction, the branch circuit B^3 will not be opened, and the torpedo mechanism will not operate.

The local train-controlling mechanism C—that is, the mechanism stationed at the side of the track, comprises, preferably, a tubular standard 1 mounted by a hollow tube 2 in which is journaled a shaft 3; a sprocket-wheel 4 fixed on the shaft 3 and serving to actuate a sprocket-chain 5; castings 6 fixed on the extremities of the shaft 3 and carrying the movable stop-arm C^1; arms 7 carried by the castings 6 and bearing weights 8 adapted to engage a buffer or stop 9 when the stop-arm C^1 is in the operative, or horizontal position; rods 10 connected with the ends of the chain 5; chains 11 connected with the rods 10 and passing about grooved wheels 12 journaled in the base 13 of the standard 1; and rods 14 connected with the chains 11 and also connected with a T-shaped lever 15 actuated by the bar A^6.

The train-carried, or transient, mechanism D which coöperates with the local movable stop C^1, is illustrated in Figs. 2, 8, 9, 10 and 11. This mechanism comprises preferably a longitudinally shiftable transversely extending rock-shaft 16 equipped at its ends with arms 17 adapted to be engaged by the local stop-arms C^1; bearings 18 supported by the engine D^1 and through which the end portions of the shaft 16 extend; a sleeve, or tubular shaft, 19 provided with a longitudinal slot 20 engaged by a lug, or stud, 21 with which the shaft 16 is equipped (Fig. 11); springs 22 within the bearings 20 and which serve to restore the rock-shaft 16 and sleeve 19 to their normal position, after the rock-shaft has been actuated through the medium of the arms C^1 and 17; a central hanger 23 through which the shaft 16 extends; a tubular keeper 24 through which the shaft 16 extends and which is connected with the hanger 23 in any suitable manner to give rigidity to the keeper 24, said keeper being provided with a longitudinal slot 25 whose ends are intersected by circumferential slots 26, 27; a shaft-shifting lever 28 rigidly connected with the shaft 16, and located normally in either the slot 26 or the slot 27, according to which of the arms 17 on the rock-shaft 16 it is desired to employ in connection with the stop-arms C^1 located along the railway track (this depending upon the direction of movement of the train in a single track system); an arm 29 rigidly connected with the tubular shaft 19 and having connected therewith a link 30 provided with a slot 31; and a relief-valve 32 having an actuating arm 33 equipped with a stud 34 engaging with the slot 31. The relief-valve 32 is connected with the relief-pipe 35 which controls the brakes. As shown in Fig. 2, the pipe 35 has a branch 36 controlled by a manually operated valve 37, and a branch 38 with which the automatically actuated relief-valve 32 is connected. The branch-pipe 38 is equipped with a whistle 39. The actuating arm 33 of the relief-valve 32 is equipped with a spring-held pawl 40 adapted to engage a notch 41 with which the casing of the valve is equipped. When the arm 33 is lifted in the direction indicated by the arrow in Fig. 10, the pawl 40 engages the notch 41, thereby locking the relief-valve in the open position. The pawl 40 is equipped with a knob 42, by means of which the pawl 40 may be released from the shoulder 41, thereby permitting the valve 32 to be closed. The valve 32 is so located that it will be necessary, in the event that the valve is automatically opened, for the engineer to leave his seat in the cab in order to close the valve and regain control of the train.

In practice, the mechanism C is located between the torpedo-placing mechanism B and the switch-point, or the point to be protected, the torpedo-placing mechanism being sufficiently in advance of the mechanism C to allow the engineer time to bring his train to a stop under control. In the event the engineer disregards the torpedo signal, the train will be automatically brought to a stop when the mechanism C is encountered.

The operation may be briefly summarized thus: The torpedo-placing mechanism B is normally held against operating by reason of the fact that the electric circuit normally connected with it is held closed by the magnet in the circuit B^1. If both branches B^2 and B^3 of the circuit B^1 are simultaneously open, the magnet in the circuit B^1 will be deënergized, and the torpedo-placing mechanism will operate to place a torpedo above the adjacent track-rail. When the switch-point A^5 is thrown to the open position shown in Fig. 1, the branch circuit B^2 is broken, and the local train-controlling mechanism C is operated to depress the movable stop-arm C^1. When a train approaches the switch-point in the direction indicated by the arrow in Fig. 1, the branch circuit B^3 will be broken, and the torpedo-placing mechanism will operate to place a torpedo. When the torpedo is exploded, the engineer brings the train to a stop, or proceeds cautiously, according to conditions. In the event that the engineer disregards the warning signal, the stop-arm C^1 will be encountered by the coöperating arm 17 of the train-carried train-controlling mechanism D. The rock shaft 16 and tubular shaft 19 will thus be rotated against the force of the springs 22, thereby lifting the arm 33 of the relief-valve 32 and opening the relief-valve. When the arm 33 of the relief-valve is raised, the pawl 40 engages the shoulder 41, thereby locking the relief-valve in the open position. When the relief-valve is operated, the result is to set the brakes in a well understood manner. The engineer may regain control of his train by releasing the

pawl 40 from the shoulder 41 and closing the relief-valve. When the switch-lever A^7 is operated to close the switch A^5, the branch circuit B^2 will be reëstablished; and, under such conditions, the magnet in the circuit B^1 will not be deënergized when the branch circuit B^3 is broken upon the approach of a train. Thus, the torpedo-placing mechanism B will not operate unless the switch-point A^5 is open. It may be stated that under ordinary conditions of service, where careful engineers are employed, the automatic train-controlling mechanism C would seldom be called upon to perform the duty of bringing the train automatically to a stop, since the engineer, upon receiving the warning signal, would bring the train to a stop under control; as above set forth. Thus, the invention provides for the operation of trains under the most economical conditions, and also provides against injury to the trains which might otherwise result from a violent application of the brakes. In the construction illustrated the movable stop C^1 is positively actuated in both directions. It may be stated, however, that even should the stop-lowering connections between the movable stop-arm and the switch-lever A^7 become broken, the movable stop-arm would nevertheless automatically fall to the operative position when the switch point was thrown open.

The stop-arm C^1 carries a shield 43, which serves, when said arm is in the elevated position, to cover a lamp 44 surmounting the part 1. The lamp may be fitted with a red glass front, so that a danger light will show when the arm C^1 is dropped to the operative position.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation should be understood therefrom.

What we regard as new, and desire to secure by Letters Patent, is—

1. The combination with a railway track, of torpedo-placing mechanism located in advance of a point to be protected, electric controlling means therefor provided with a circuit, and local train-controlling means located between the point to be protected and the torpedo-placing mechanism and comprising a movable stop-arm, mechanical actuating means therefor, and circuit-interrupting means for said circuit connected with said mechanical actuating means.

2. The combination with a railway track, and train-carried train-controlling mechanism, of local train-controlling mechanism comprising a standard, a movable stop-arm mounted thereon and having a shaft equipped with a sprocket-wheel, a sprocket-chain connected with said wheel, an actuating-lever located at a distance from said standard, and flexible connections joining the ends of said sprocket-chain and said actuating-lever, whereby said movable stop may be positively actuated in two directions.

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ROBERT J. ZORGE.

In presence of—
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L. KIRKLAND.