(No Model.)

5 Sheets—Sheet 1.

G. H. WRIGHT.

RAILWAY SIGNAL.

No. 386,049. Patented July 10, 1888.

Fig. 1.

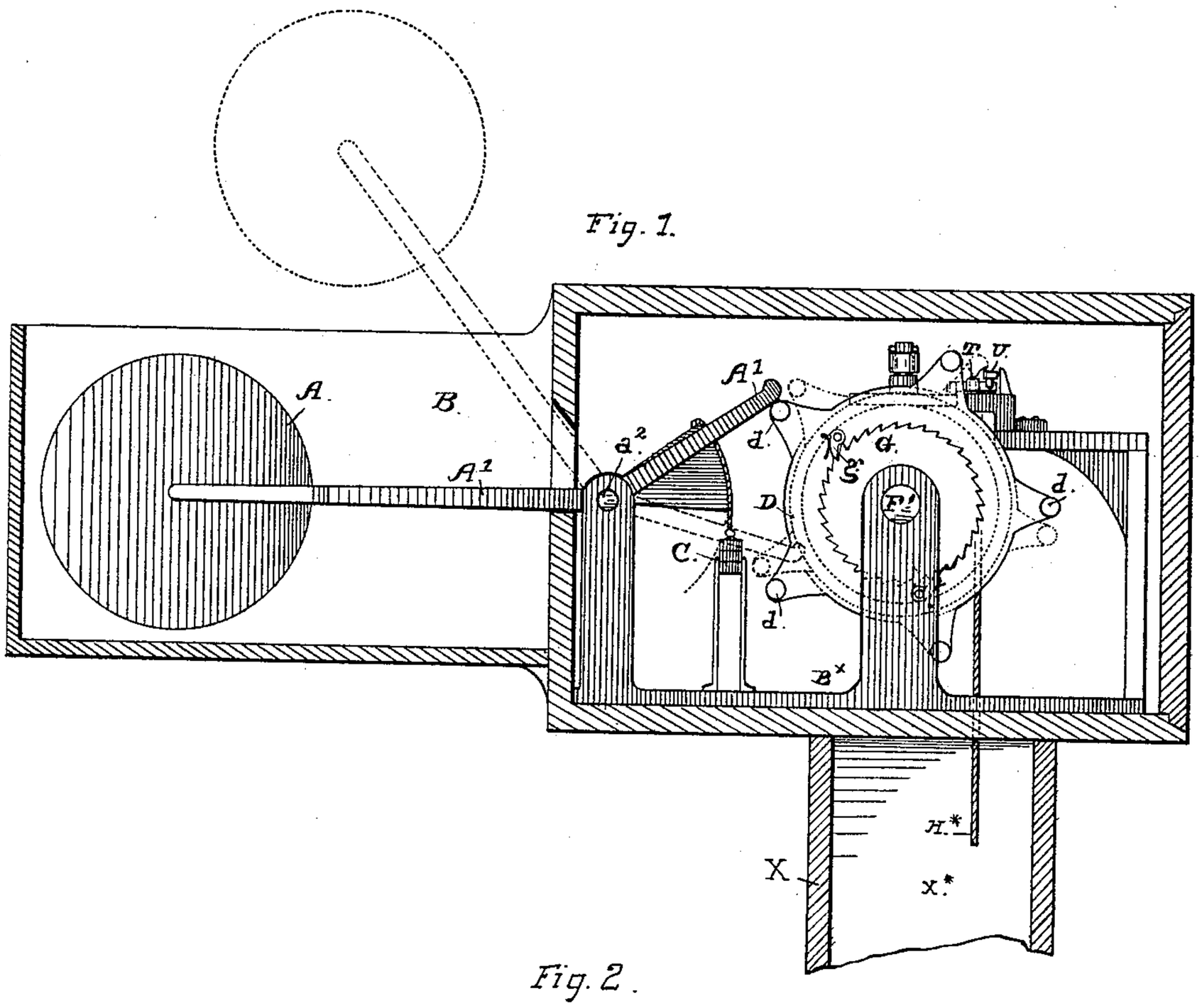
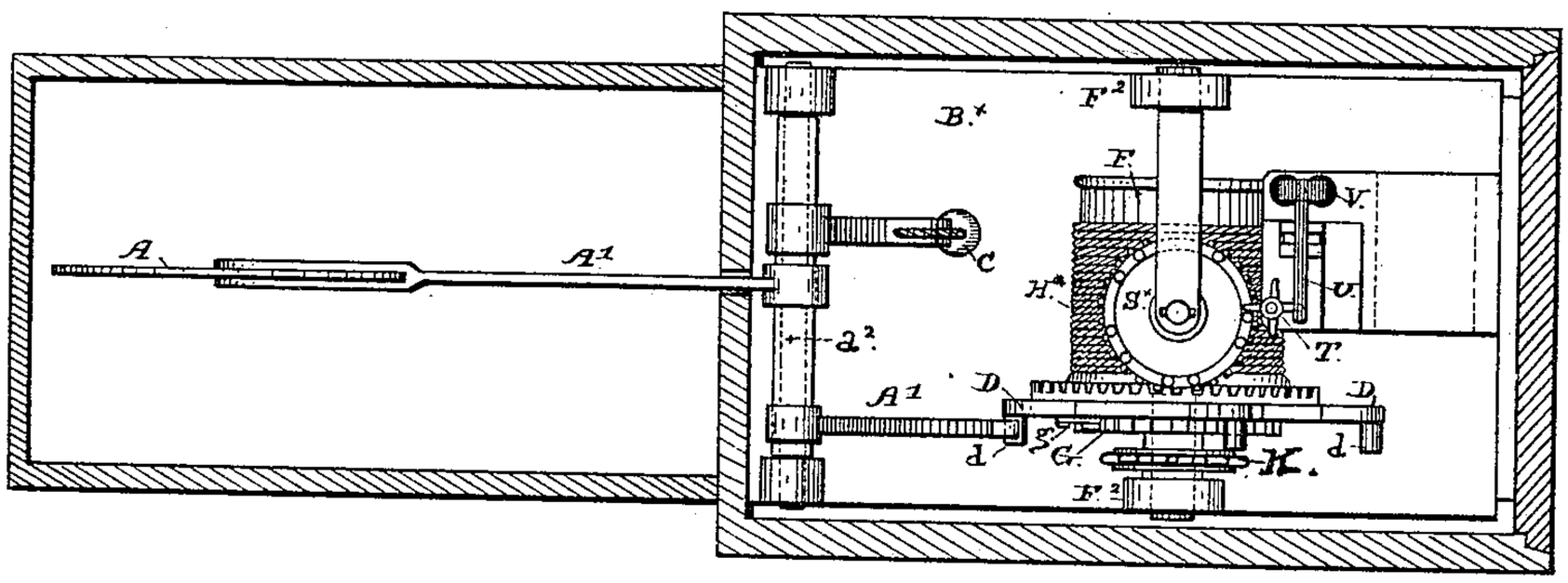


Fig. 2.



Witnesses:

Edward E. Osborn.

Joseph E. Ford.

Inventor:

George H. Wright.

by Wm. Smith,

Atty.

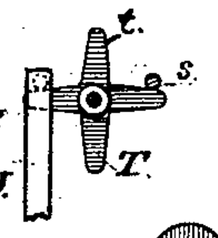
(No Model.) 5 Sheets—Sheet 2.

G. H. WRIGHT.

RAILWAY SIGNAL.

No. 386,049. Patented July 10, 1888.

Fig. 4



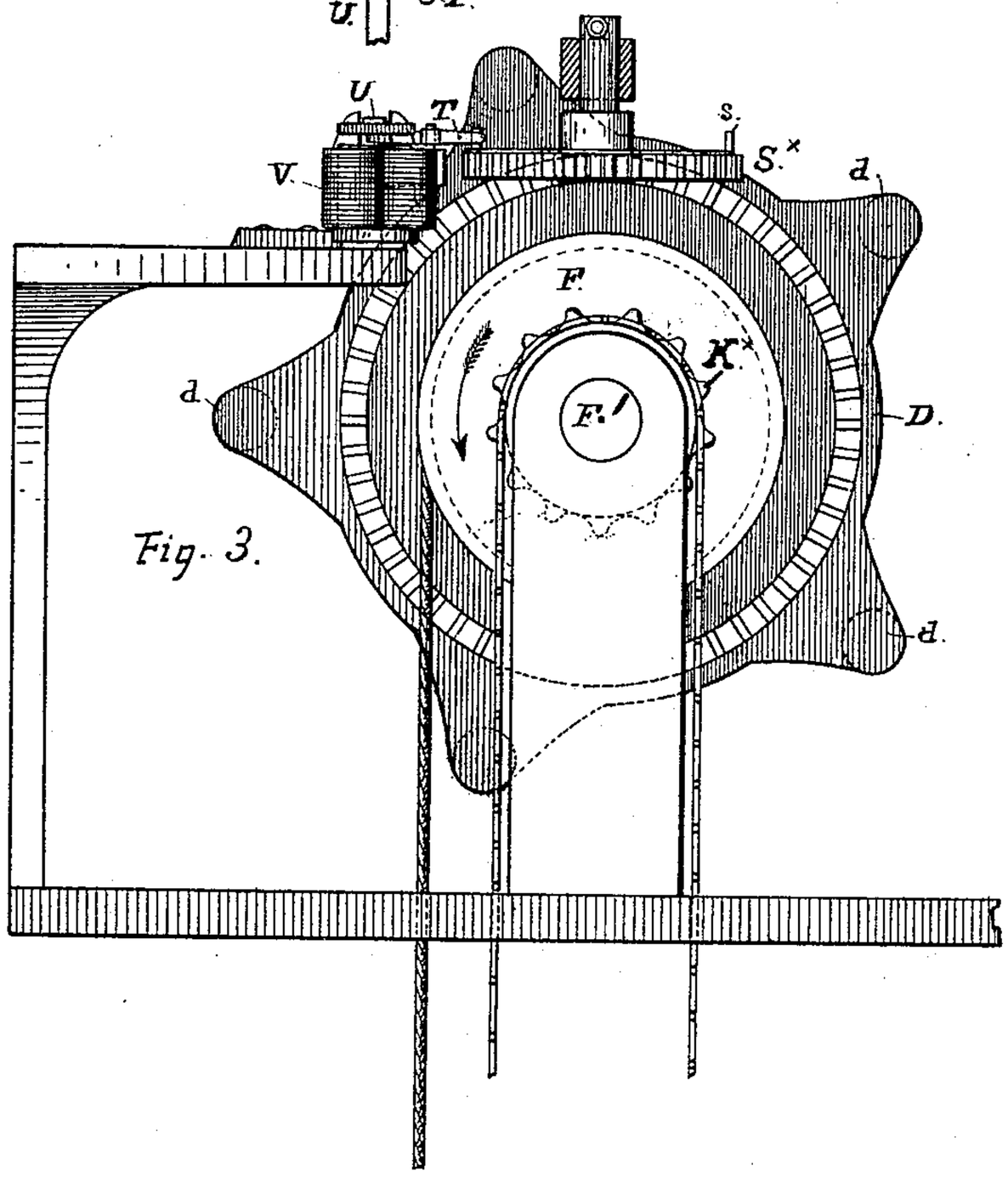
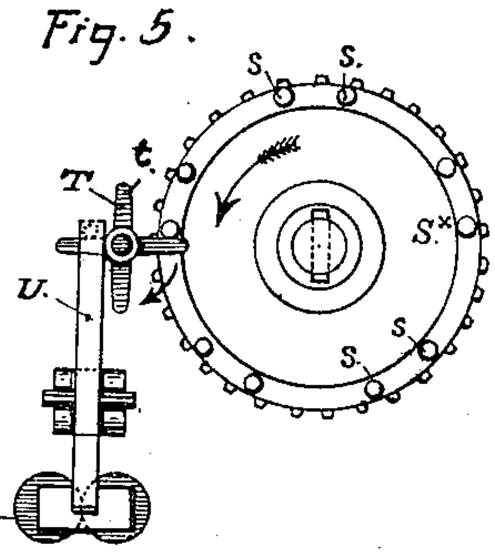


Fig. 3.

Fig. 5.



Witnesses:

Edward R. Osborn.

Joseph E. Ford.

Inventor:

George H. Wright.

By C. M. M. Smith.

Atty.

(No Model.) 5 Sheets—Sheet 3.

G. H. WRIGHT.

RAILWAY SIGNAL.

No. 386,049. Patented July 10, 1888.

Fig. 6

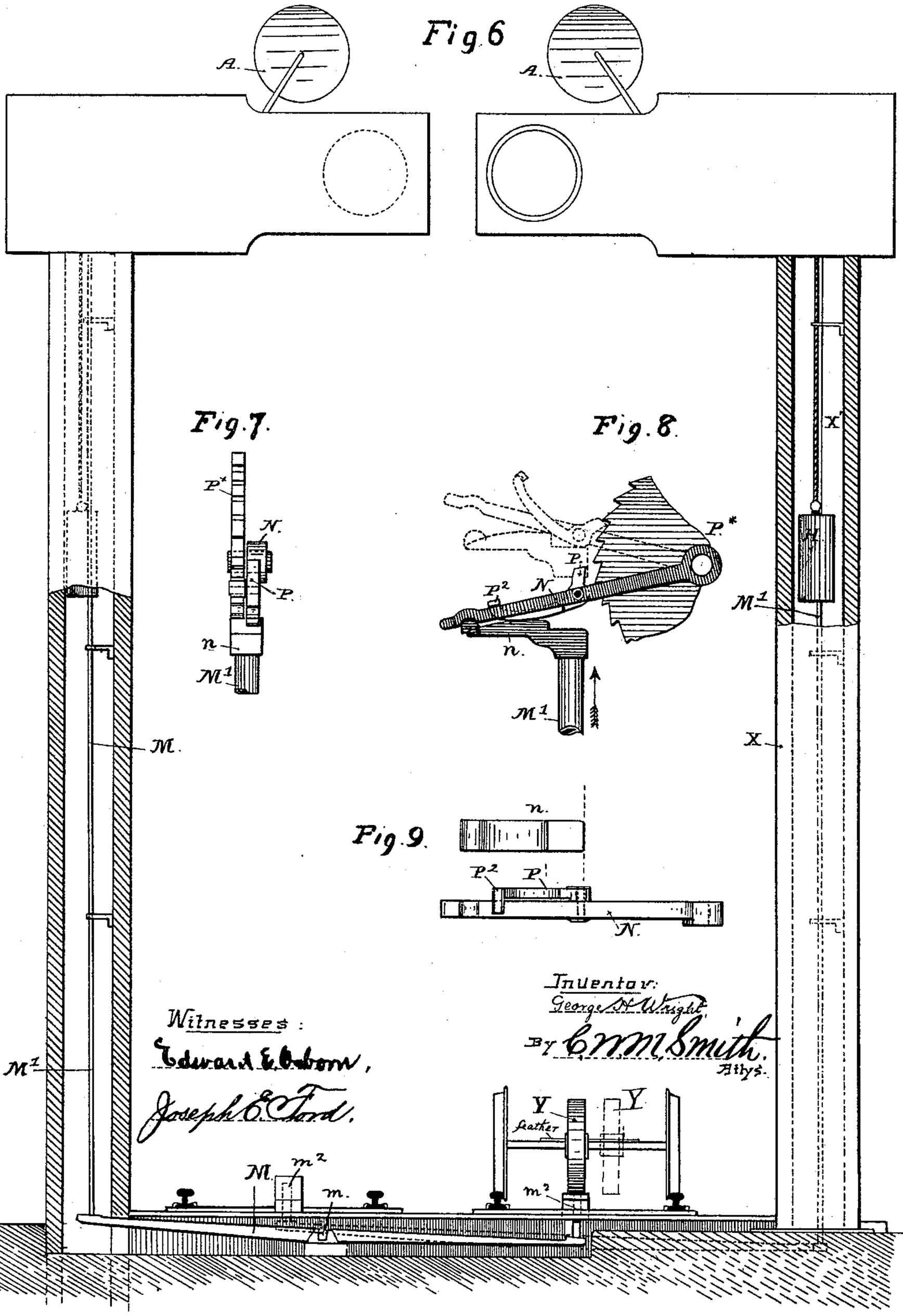


Fig. 7.

Fig. 8.

Fig. 9.

Inventor:
George H. Wright
By C. M. C. Smith.
Attys.

Witnesses:
Edward E. Osborn,
Joseph C. Ford.

(No Model.) 5 Sheets—Sheet 4.

G. H. WRIGHT.

RAILWAY SIGNAL.

No. 386,049. Patented July 10, 1888.

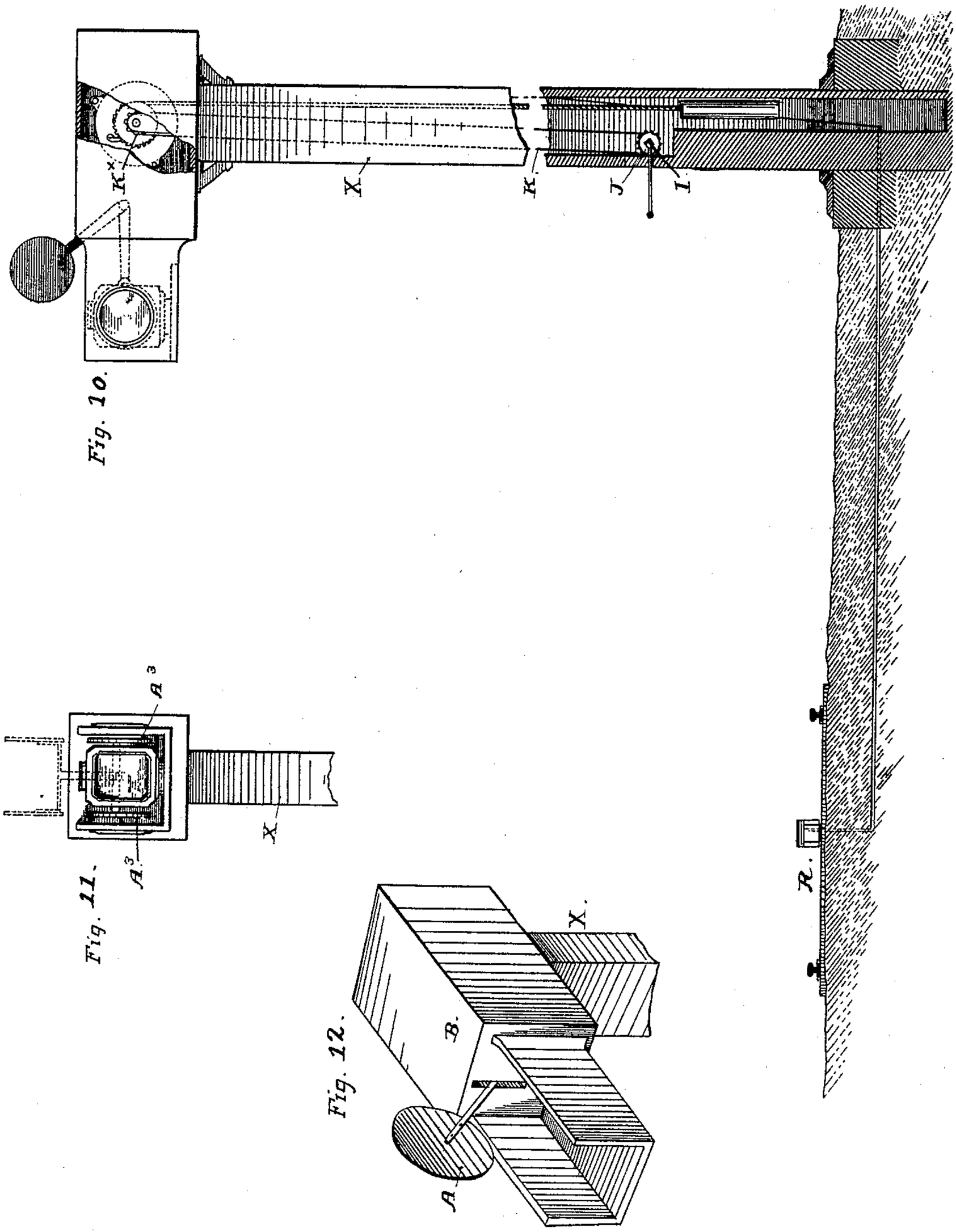


Fig. 10.

Fig. 11.

Fig. 12.

Witnesses.
Edward E. Osborn.
Joseph E. Ford.

Inventor,
George H. Wright
By his Attorney C. M. Smith

(No Model.) 5 Sheets—Sheet 5.

G. H. WRIGHT.

RAILWAY SIGNAL.

No. 386,049. Patented July 10, 1888.

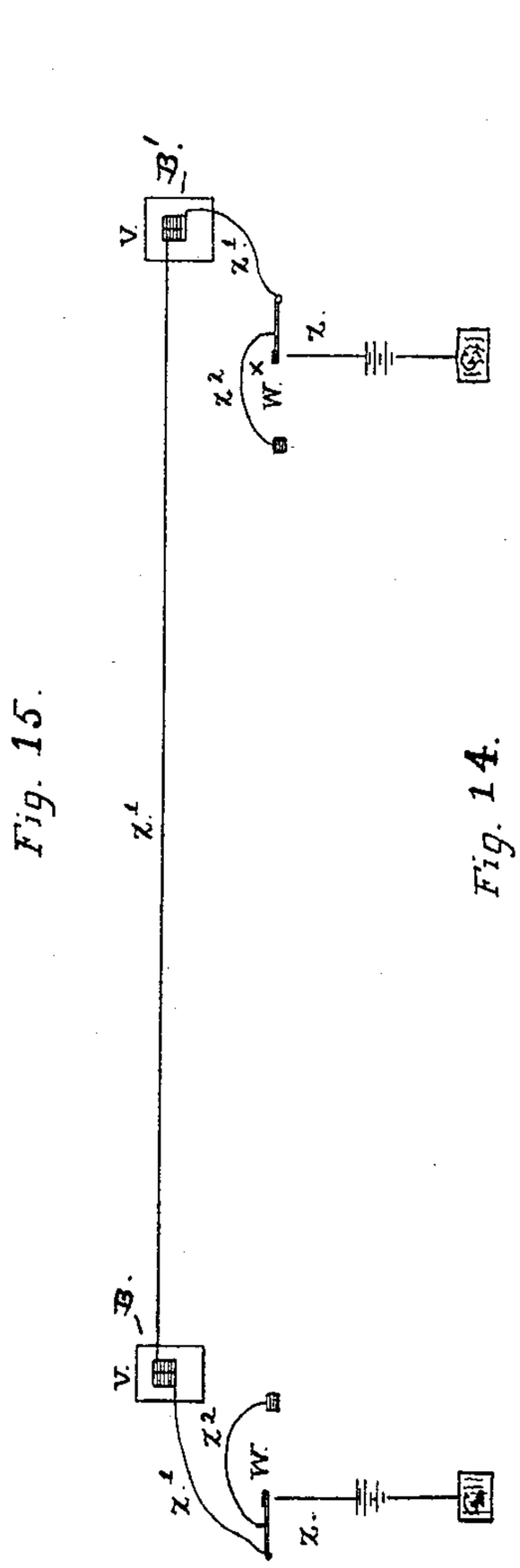


Fig. 15.

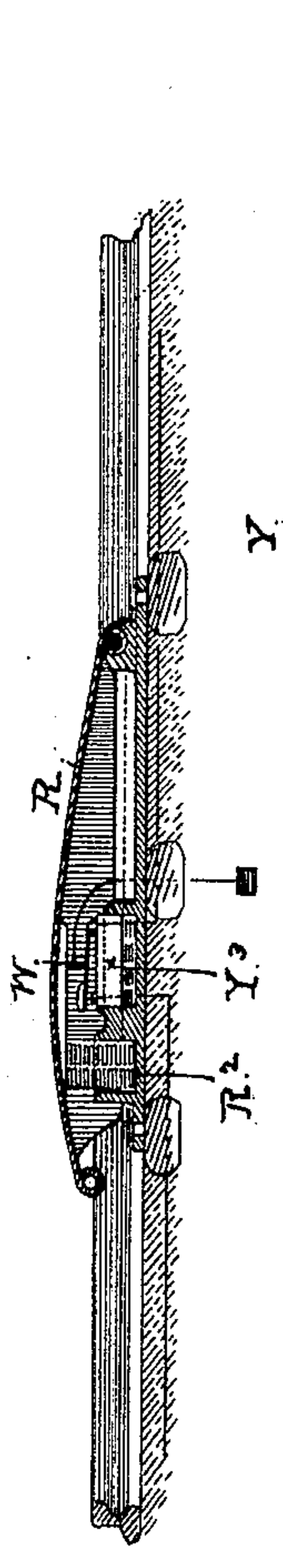


Fig. 14.

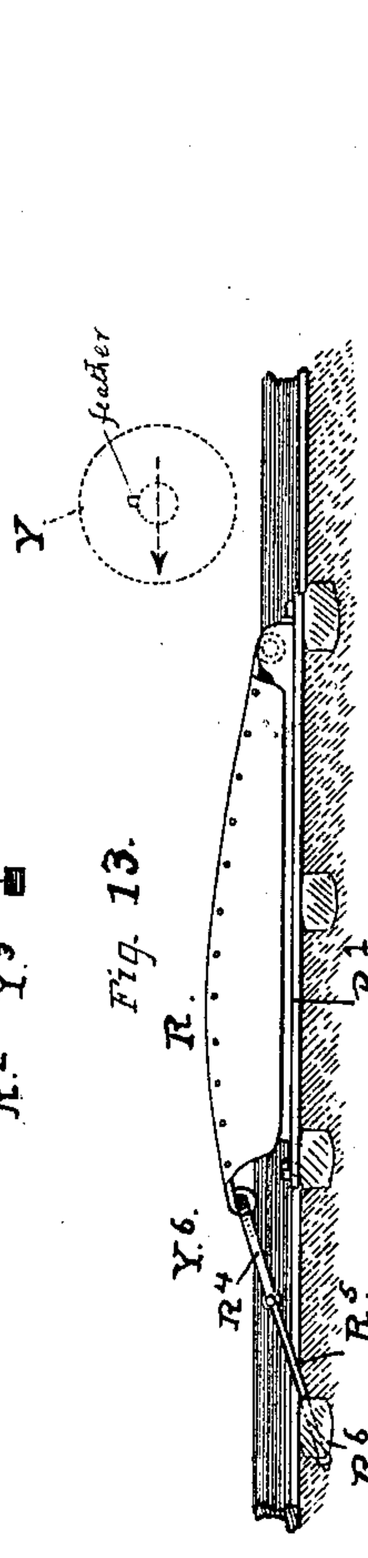


Fig. 13.

Witnesses.
Edward E. Osborn.
Joseph E. Ford.

Inventor.
George H. Wright.
By his Attorney C. W. McSmith.

UNITED STATES PATENT OFFICE.

GEORGE H. WRIGHT, OF SAN FRANCISCO, CALIFORNIA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 386,049, dated July 10, 1888.

Application filed May 10, 1887. Serial No. 237,732. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WRIGHT, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Electric Railway-Signals; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the drawings that accompany and form a part of this specification.

My invention relates to improvements in automatic railway-signals of that class which are set and controlled by or from the moving train at points along the line of road through the agency of electric circuits; and the nature of these improvements consists in certain novel construction and combination of signal-setting mechanism, stop mechanism controlled by electro-magnets in electric circuits, and a circuit-closing mechanism located in the roadway at given points along the line and adapted to vitalize the magnets when acted on or set in operation by the moving train, all as hereinafter fully described, and pointed out in the claims.

In the following description reference is had to the several figures of the drawings by letters, which indicate like parts by similar letters wherever found, and the manner in which I proceed to construct, combine, and apply my said improvements and produce an improved railway-signal is fully explained and set out therein.

Figure 1 represents a signal-box with the side removed to expose the mechanism. Fig. 2 is a top view with the box in section. Figs. 3, 4, and 5 are detail views of the setting mechanism and stop mechanism on a larger scale. Figs. 6, 7, 8, and 9 illustrate the automatic winding mechanism and the manner in which I apply it to the signal-boxes on a double line of track. Fig. 10 shows a hand winding mechanism. Figs. 11 and 12 show the signal-box as arranged for a night signal and a day signal, respectively. Figs. 13 and 14 are side views and longitudinal section, respectively, of the striking mechanism. Fig. 15 illustrates the arrangement of the boxes on a single circuit.

Letter A is a signal-disk fixed on the outer end of a swinging arm, A′, and B is a box to contain the operating mechanism and furnish also a screen to conceal the signal when out of action. The arm A′ is a lever having a free movement on a pivot, a^2, in the box, and with a weight, C, applied to it on the side of the pivot opposite to the signal-disk to overbalance the arm and disk on that side. At this weighted end the lever engages with pins or projections on the face of a revolving plate, D, that is part of the setting mechanism, and by the movements of which the end of the lever is raised up from its lowest position ready for action and is released and allowed to drop. In the first position the signal-disk at the opposite end of the lever is concealed from view, and in the second position it is thrown up into sight above the screen.

The plate D is set on the axle of a drum or barrel having a cord and weight for turning it, and while loose on this axle in one direction the plate is locked in the other direction by a ratchet wheel or disk on one and a spring-pawl on the other part.

F indicates the winding-barrel; F′, the axle, and F^2 the axle-boxes on the stand or bed-plate $B^\times$. The ratchet-disk is seen at G and the pawls at *g*, on the face of the disk. H is the weight that turns the barrel.

In ordinary situations of use the signal-box is set at considerable height above the track upon a post, X, through which a way or run, $X^\times$, for the weight is provided, and as this can be carried into the ground below the post a considerable distance, if necessary, the descending weight may be operative for some length of time before requiring to be wound up. This winding operation can be performed at intervals by mechanism accessible from the ground—such, for instance, as a crank-shaft, I, located inside the post, with a sprocket-wheel, J, fixed on it, and a chain, K, running up to and over a similar wheel, $K^\times$, on the axle, as shown in Figs. 3 and 10. In some cases I apply a winding mechanism that is set in motion to wind up the barrel a small amount each time by the passing trains; but this device is particularly applicable to roads having double tracks and signal-boxes to each track, and where there are a large number of trains using the signal daily.

The winding mechanism which I have produced for this purpose is shown in Figs. 6, 7, 8, and 9 of the drawings. It consists of a long

lever, M, having a fulcrum, at *m*, in a chamber under the track, and extending from one track across to and under the supporting-post of the signal-box of the other track. This end of the lever at the box rests under a long rod, M′, on the upper end of which is a toe-piece, *n*, that takes under a loosely-swinging lever-arm, N, that plays on the side of the winding-barrel in front of a ratchet disk, $P^{\times}$. This lever carries a pawl, P, the end of which is bent, as seen at P^2, to be caught and raised by the toe-piece. The movement of the lever in an upward direction then takes place, when the rod M′ is lifted and the pawl is thrown into action against the ratchet-disk. Such construction causes the pawl to be left out of contact after each time of action, when the lever M is dropped and the barrel is free to act in the interval. The opposite end of the lever M is furnished with a pin or post, m^2, set sufficiently above the surface of the roadway to be struck by or receive pressure from a roller, Y, on the truck of the locomotive or from the wheels of the train as they pass over it, so that the force will throw up the rod at the opposite end of the lever M and operate the winding pawl and ratchet.

On the plate D of the setting mechanism are pins or studs *d d*, projecting from the outer face, and in line with these is set the weighted end of the lever A′.

The plate when released by the stop mechanism is turned part of a revolution to throw the pin from beneath the lever, and again to bring up the next pin under and lift the arm to its highest position. The length of movements at such time is just sufficient in the first case to release the lever, and in the second case to raise it up to the highest point and hold it at rest ready for operation again. In this position the weight C is raised and the signal-disk on the opposite side of the pivot is concealed within the box.

In the first turn of the plate D, when the end of the lever slips off the pin *d* under it and drops down to the pin next below, the movement is less than that required to raise the lever, and is only sufficient to pass the pin clear of the lever. These movements are regulated and controlled by stop mechanism consisting of pins or studs *s s* on the face of a secondary disk, $S^{\times}$, a stop-wheel, T, provided with radial arms *t*, to engage with the pins *s*, and a locking-lever, U, carrying an armature, which is set in position to be acted on by an electro-magnet, V. Figs. 3, 4, and 5 of the drawings show these parts and illustrate their operation.

The magnet V is in an electric circuit, of which the generator is seen at *z* and the conducting-wires at *z′* z^2. In this arrangement and application of the circuit the signals are placed and connected in pairs, one box at each end of a section or division of the road, and both are operated simultaneously from one striking mechanism to throw one signal into action and to lower the other one, so that as the train reaches one striking-point it moves out of action the rear signal passed by the train and sets the signal ahead. For this purpose I use a striking mechanism consisting of a hinged block, R, pivoted at one end to a bed-plate, R′, that is bolted firmly down to the road-bed between the rails and having stiff springs R^2 placed under its free end.

The top of the block is curved to present a gradually-inclined face in the path of a wheel or roller, Y, fixed on some suitable part of the locomotive-truck to press down the block when running over it. Such movement of the hinged block is made to move a contact lever or key, W, and close the circuit by placing the key under the movable end of the block, and by using a three-point contact-key a "ground" is established always for the rear box of each simultaneously-operated pair, so that a single circuit can be used to work the two signals.

That part of the whole apparatus which I term the "striking mechanism," for the reason that it is struck or acted upon by some projecting part on the locomotive, is set at given points of distance along the line of road, and each one is caused to close the circuit on one electro-magnet and also to vitalize the magnet of the next signal-box by forming a "ground" for it at all other times. Fig. 15 will illustrate the two circuits by which this is accomplished. When the key $W^{\times}$, Fig. 15, is pressed, the circuit is through the wires *z z′* z^2, and the electro-magnet V at the box B′, and thence to the magnet on the box B, behind and to the ground through the key W and wire z^2; and so on in like manner, every two boxes are operated as the train passes over and presses the blocks R.

It is obvious that separate circuits and independent electro-magnets can also be employed to produce the two movements of the setting mechanism—first, to trip the lever A′, and afterward to raise the weighted end and bring down the signal; but such arrangement would not be equal in point of simplicity to my single-circuit, while it would increase the cost of constructing and maintaining the system of signals along the line.

The construction of the striking mechanism is seen in Figs. 13 and 14. The bed-plate R′ has a cavity to contain the springs R^2, and a yielding bearing-block, Y^3, for the contact-key W. The movable end of the block is limited in its movements and is held down by a yoke, R^4, and straining-bolts R^5, which are secured at Y^6 to the block and at R^6 to a tie or other firmly-anchored part in the roadway. The wheel or roller Y, carried on the locomotive or its tender, may be feathered on its axle, so that it can be set either in line with the striking-blocks or be moved to one side out of action, according as it may be necessary to work the signals or to pass them over. (See Figs. 6 and 13.)

The apparatus, as constructed and arranged for operation on a single circuit to each box, is operated by the moving train, as follows:

As the first striking-block, R, is depressed, it establishes the circuit to the electro-magnet V in the box B′ ahead of the train and also through the magnet to the first box, B, and both magnets are vitalized at the same time. By this means the revolving disks D are released to work the signal-levers. Each striking-block is thus connected to its own box and to the box ahead at the end of the section, and as the one signal ahead is displayed the one at the striker is moved out of sight. The location and movements of the train along the line are therefore indicated at all times, as one signal is not thrown out of action until the first signal on the next section of road is displayed.

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

1. The combination of the signal arm or lever A′, weight C, disk or plate D, with pins *d*, to engage said lever, winding barrel and weight F H, connected to said plate, and a stop mechanism composed of a secondary disk, S×, with stop-pins *s s*, an electro-magnet in an electric circuit, and an armature-lever adapted to control said disk, constructed and applied for operation, substantially as set forth.

2. In an electric signal for railways, the combination of the weighted arm or lever A′, carrying a signal, the revolving setting disk or plate D, with stops or pins *d d*, means, substantially as described, for moving said plate, a stop mechanism comprising a secondary disk having stop-pins adapted to control the movement of the plate, an electro-magnet in an electric circuit and controlling said stop mechanism, and a circuit-closer, W, located in position to be acted on by a moving train, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

GEORGE H. WRIGHT. [L. S.]

Witnesses:
C. W. M. SMITH,
EDWARD E. OSBORN.