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2 SHEETS—SHEET 1.



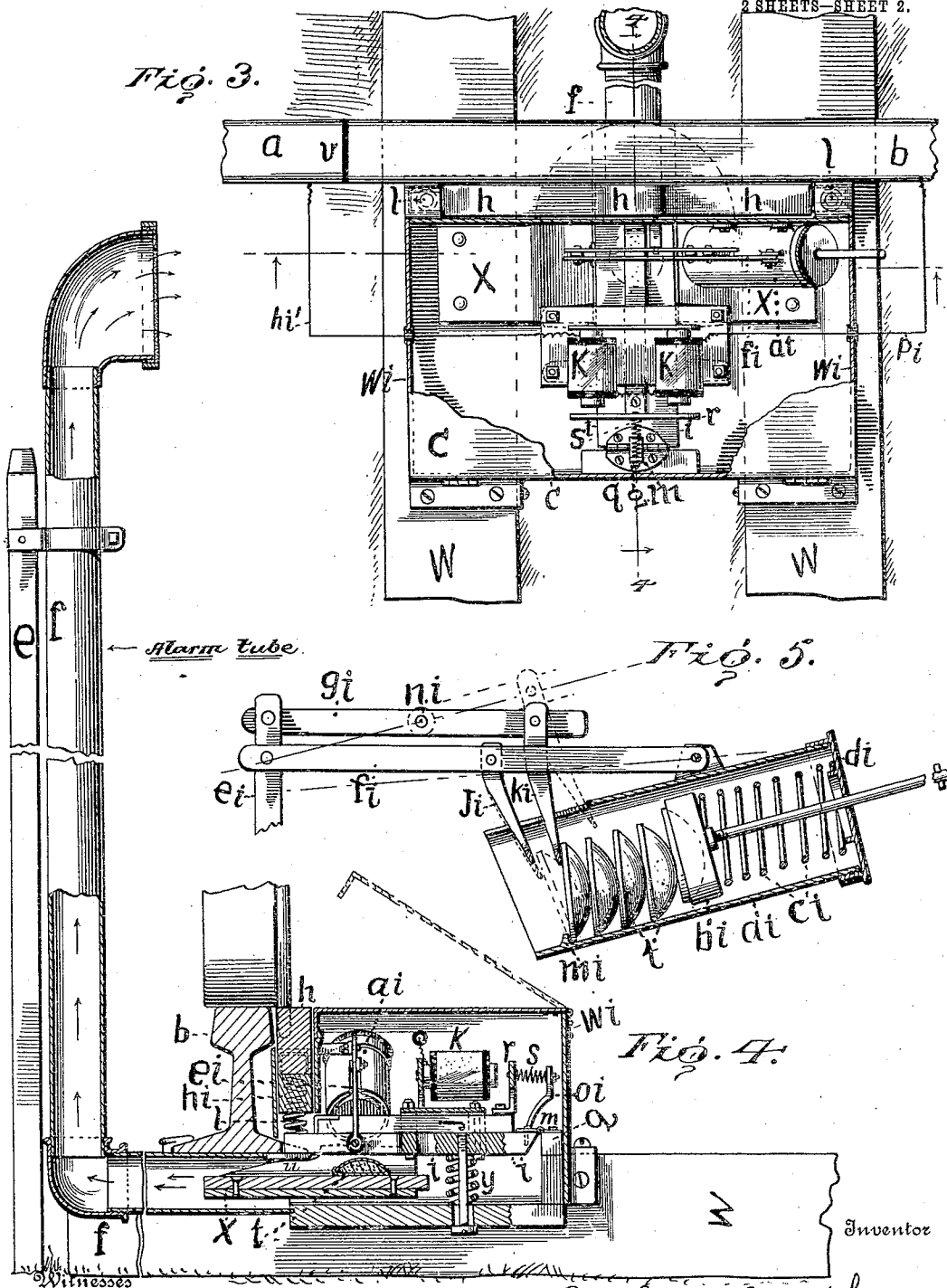
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 MECHANISM FOR DANGER SIGNALS FOR RAILROADS.
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MECHANISM FOR DANGER-SIGNALS FOR RAILROADS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROY EMRY MURPHY, a citizen of the United States, residing at Colorado Springs, in the county of El Paso and State of Colorado, have invented a new and useful Mechanism for Danger-Signals for Railroads, of which the following is a specification.

My invention relates to a danger signal for the purpose of notifying the persons in charge of an approaching train that a railroad-switch, they are approaching, is open or imperfectly closed. I attain this object by means of the mechanism illustrated in the accompanying drawing, in which—

Figure 1. is a top view of the entire mechanism connected with a section of the rail road track, which track is broken away in three places in the drawing to allow the principal parts of the drawing to be brought to a condensed position; Fig. 3. is also a top view of torpedo box C, connected with ties W, W, and rails *a* and *b*; Fig. 2 is a longitudinal sectional view of torpedo box C, dissected vertically and looking at it from a position between the rails; Fig. 4. is a vertical, lateral sectional view of torpedo box C, dissected crosswise of the rails, alarm tube *f*, and alarm post *e*; and Fig. 5. is a detailed view of a part of the mechanism in torpedo box C, showing on a larger scale, magazine *ai*, and the levers *gi*, and *fi*.

Similar letters refer to similar parts throughout the several views.

The rail tongue *p*, when pulled from rail *ae*, in opening the switch, causes the electrode bolt *n*, to connect electrodes *o, o*, thus causing a direct connection through from battery *d*, via electrodes *o, o*, wire *vi*, rail *a*, wire *hi'*, to torpedo box C, and wire *pi*, and rail *b*; wire *vi*, connects battery *d*, with rail *g*, and the two rails *b* and *g*, are insulated at *ti, ti*, so that when an engine comes onto the insulated ends of rails *b* and *g*, it makes the circuit, and causes magnet *k, k*, to attract magnet bar *r*, which being rigidly attached to pitman *j*, forces pitman *j*, under depression-rail-block *hi*, and over compression arm *i*, so that when the flange of the car wheel depresses depression rail *h*, it forces compression arm *i*, down onto torpedo *t*, lying on anvil *z*, thus exploding torpedo *t*, and the force of the explosion is then conducted out through alarm tube *f*, as designated by the arrows, to a close proximity to the engineer in cab of the engine.

At the same time that compression arm *i*, is forced down it pulls down pitman *ei*, and with it levers *gi* and *fi*, the former raising release arm *li*, and thus releasing one of the torpedoes *t*, at the top, and allowing it to tip forward from the force of piston spring *ci*, against feed piston *bi*; and at the same time when lever *fi*, is depressed it forces escapement arm *ji*, down so that it arrests the top of torpedo *t*, when it is released from release arm *li*, as the bottom of the torpedo *t*, rests against the two toe-rests *mi*, so that the torpedo *t*, is temporarily held in an inclining position till it falls forward on its flat side when released by escapement arm *ji*, being forced up by spring *y*, after the car wheel has passed over depression rail *h*. It is apparent that if the rail tongue is resting against rail *ae*, and electrodes *o, o*, are not connected, the circuit will be open and pitman *j*, will remain out from between depression rail block *hi*, and compression arm *i*, and so that the depression of depression rail *h*, by the flange of a car wheel would not disturb or move or connect with depression arm *i*, and so the torpedoes would not be molested. When escapement arm *ji*, is released and rises after the explosion, it releases torpedo *t*, which falls forward and slides down to a rest on top of anvil *z*, and remains there until exploded.

Rails *a*, and *b*, are separated by an insulation *v*, so that after the front wheel on the engine or car has passed over the torpedo box it connects rails *a*, and *g*, thus making a short circuit between the torpedo box and the switch, and leaving the torpedo box unaffected further till the wheels are all removed from between the switch and the torpedo box.

It is plain, that every car wheel that passes over the depression rail *h*, will press it down by the flange of its wheel, but as neither depression rail *h* nor its block *hi*, can touch compression arm *i*, then compression arm *i*, will not be disturbed unless the pitman *j*, is forced between depression rail block *hi*, and the compression arm *i*.

Compression arm *i*, is provided at its swing end with an iron safety flange *ii*, which comes up to contact with the under side of rail *b*, and prevents compression arm *i*, rising higher than a level position.

Magazine *ai*, is provided on the upper surface of its floor and near its exit end, with two toe-rests *mi*, which keep the torpedo *t*,

from twisting and hold it back at the bottom so that it will fall forward, with the flat side downward.

The coil springs *l, l*, force the ends of depression rail *h*, up against lugs *hl, hl*, and retain them there till they are depressed by the flange of a car wheel. Depression rail *h*, is also provided with suitable guides attached to the side of torpedo box C. Torpedo box C, has suitable fastenings by which it is attached to cross ties W, W, and is provided with a depressed base or bottom, that hangs down between the ties in the center of the torpedo box bottom. Truss X, which is constructed of a heavy iron plate, is reinforced under the anvil *z*, by another heavy iron plate, so as to sustain the shock of the explosion of a torpedo *t*. At the switch station there is also provided a suitable alarm *dl*, which may be a bell or other appliance as desired.

The electrodes *o, o*, are insulated from rail *ae*, Fig. 1. by means of blocks of wood or other suitable non-conductor, and are protected from external molestation by means of a suitable box or case *ti'*.

The insulation *v*, between rails *a*, and *b*, Fig. 1. is to be close enough to the torpedo box, to allow the first set of wheels on a car or engine to reach rail *a*, before a second set of wheels following the first set can depress depression rail *h*. This will allow the current to be carried across on the front axle from rail *a*, at *v*, to rail *g*, and short circuit the current between the switch and the torpedo box C, and thus leave the pitman *j*, out from between depression rail block *hi*, and compression arm *i*. When the switch is closed the connecting electrode bolt *n*, Fig. 1, does not connect electrodes *o, o*, and so the circuit is then open and remains so whether there is a conductor between rails *b*, and *g* or between rails *a*, and *g*, or not; and so there is no explosion of torpedoes in torpedo box C, under such circumstances, although the alarm bell *dl*, would continue to ring while the switch was open and would act as an alarm to call the attention of any one, within hearing, to the fact that the switch was open and a train was approaching on rails *a*, and *g*. This mechanism may be successfully used without the presence of alarm tube *f*, and its post support *e*, but I represent them both present in this improvement.

The alarm *dl*, is a bell operated by means of a magnet, which may be in a depot or other place where a watchman or switch man is located, and is connected with a circuit by the switch being open so as to connect electrodes *o, o*, and *n*, and also connecting rails *a*, and *g*, by a train passing upon them.

The wire *vi*, connects battery *d*, with rail *g*: *hi'*, is the lead wire connecting rail *a*,

with coil *h*: *vi*, is the wire connecting electrode *o*, and rail *a*: *pi*, is the wire connecting rail *b*, and coil *h*: *dl*, is the alarm bell at depot: *kl* is the battery for alarm bell *dl*: *fl*, are the magnet coils which attract the magnet bar *el*, thus completing the circuit of the battery *kl*, of the alarm bell *dl*: *nl, pl*, are the lead wires connecting the cores *fl*, *fl*, with the battery *kl*, and alarm bell *dl*; the circuit being completed by means of magnet bars *el*. *ml* is the release spring attached to the magnet bar *el*.

hl, hl, are lugs arresting depression rail *h*.

I claim as my invention and ask for Letters Patent for—

1. In a danger signal for railroads, the horizontal compression arm *i*, hinged permanently at its rear end and its front end actuated upwardly by means of the spiral spring *y*, and being actuated downwardly by means of a horizontal pitman *j*, which slides longitudinally on the top of the compression arm *i*, being pressed downwardly by being engaged by the under side of the depression rail *h*, being pressed downwardly by the flange of a carriage wheel of a passing train over the said depression rail *h*, pressing it down, all substantially as set forth and for the purposes specified.

2. In a danger signal for railroad switches, a metal casing box *c*, containing the magazine *ai*, for torpedoes, in combination with magnet coils *h, h*, and magnet bar *r*, rigidly attached to pitman *j*, and loosely attached to compression arm *i*, substantially as set forth and for the purposes specified.

3. In a danger signal for railroads, the torpedo magazine *ai*, containing torpedoes actuated by feed piston *bi*, forced by piston spring *ci*, which torpedoes are restrained and fed out from the exit of said magazine *ai*, by escapement mechanism consisting of arm *ji*, on lever *fi*, and release arm *ki*, on lever *gi*, which levers are actuated by pitman *ei*, connecting them with compressor *i*, in combination with magnet coils *h, h*, and pitman *j*, actuated by battery *d*, on a circuit, connected by electrodes *o, o*, which are connected by the head of bolt *n*, by opening the switch rail *p*, and being shorted by the connection of rails *b*, and *g*, by the wheels and axle of a locomotive engine or other rolling stock, between the insulations *ti, ti*, and the torpedo box *c*, substantially as set forth and for the purposes specified.

4. In a danger signal for railroads, the torpedo magazine *ai*, in combination with compression arm *i*, and pitman *j*, provided to be actuated downwardly against torpedo *t*, by means of depression rail block *hi*, and depression rail *h*, being forced downwardly by inner flange of a wheel of a passing train, and being provided to be actuated upwardly by means of a spring *y*, all substantially as set forth and for the purposes specified.

5. In danger signals for railroads, the electric alarm bell *dl*, located in the depot or station of the railroad, and connected to the battery *kl*, and to the magnet *fl*, by means of lead wires *nl* and *pl*, which said lead wires are connected directly to the cores of the magnet *fl*, which cores are connected by other wires and connections indirectly to rail *g* and rail *a*, as shown in Fig. 1, which rail *g*, may be connected to rail *b*, by the wheels and axle of a passing engine, which rail *b*, is connected by wire *pi*, with magnet coils *k*, *k*, which are connected by wires *hi*, with rail *a*, and which rail *a*, is connected by wire *ui*, and electrodes *o*, *o*, and electrode bolt *m*, and the two lead wires *zi*, with one of the magnet coils *fl*, in combination with rail tongue *p*, substantially as set forth and for the purposes specified.

6. In a danger signal for railroads, a cylindrical magazine case or tube having the cap *di*, and carrying the piston *bi*, provided with a piston rod attached thereto and projecting through the center of the said cap *di*, and said cylindrical case descending diagonally downward at its mouth or open end, and having at its inner upper surface on its floor or bottom two toe rests *mi*, *mi*, suitable to engage the lower edge of a descending torpedo in said magazine and arrest its further progress, and said piston *bi*, being actuated against said torpedo by means of the spring *ci*, all substantially as set forth and for the purposes specified.

7. In a danger signal for railroads, the combination with a suitable cylindrical magazine case *ai*, containing torpedoes *t*, *t*, flat on their front side or face and circular in shape and actuated by pressure from behind and by gravitation, of an escapement mechanism comprising two horizontal levers actuated at their common end by a common pitman working vertically and to which they are permanently hinged, said pitman being actuated by the compression arm *i*, which in turn is actuated by mechanism connecting it with the wheels of a passing train, and the lower one, *fi*, of said horizontal levers having its fulcrum at its end farthest from said pitman and there permanently hinged to the top of said magazine case *ai*, and having rigidly and adjustably attached near its center an escapement arm *ji*, projecting downwardly and into the upper part of said magazine *ai*, far enough for its lower end to engage the face or front flat side of

the said flat torpedoes *t*, *t*, and being actuated downwardly when the said pitman *ei*, is actuated downwardly, and the upper lever *gi*, having its fulcrum near its longitudinal center and being permanently hinged thereto, and having rigidly and adjustably attached to its end opposite the said pitman *ei*, a release arm *ki*, projecting downwardly into the upper part of the cavity of said magazine case *ai*, and far enough to engage the upper front face of said torpedoes *t*, *t*, and being back of the escapement arm *ji*, about the distance of the thickness of one torpedo *t*, and said release arm *ki*, being actuated upwardly when said pitman *ei*, and said escapement arm *ji*, are actuated downwardly, and downwardly when they are actuated upwardly, substantially as set forth and for the purposes specified.

8. In a danger signal for railroads, a metal tubular magazine case *ai*, having the piston *bi*, actuated by spiral spring *ci*, in combination with an escapement comprising the levers *fi*, and *gi*, actuated by the common pitman *ei*, and carrying escapement arm *ji*, and release arm *ki*, respectively, for the purposes specified and substantially as set forth.

9. In a danger signal for railroads, a torpedo box C, comprising a case containing magnets K, K, actuated by the battery *d*, connected by conducting wires, conducting rails and conducting car wheels and axles as described, and said magnets K, K, actuating the magnet bar *r*, and pitman *j*, spring *s*, withdrawing bar *r*, and pitman *j*, compression bar *i*, hinged at one end at *m*, and having at its other end a projecting lug *ii*, extending under the railroad rail, and actuated upwardly by the spiral spring *y*, and downwardly by depression rail *h*, the tubular magazine *ai*, having an escapement mechanism composed of the two levers *fi*, and *gi*, carrying adjustable thereon arms *ji*, and *ki*, to retard and release the torpedoes and a compression piston to expel the torpedoes, a truss plate *x*, beneath the compression arm *i*, all in combination with a detonation tube *f*, the generating battery *d*, the electric alarm *dl*, a railroad, a railroad switch and a passing train, all substantially as set forth and for the purposes specified.

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Witnesses:

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