

M. McDONALD.
RAILWAY SIGNALING MECHANISM.
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991,339.

Patented May 2, 1911.

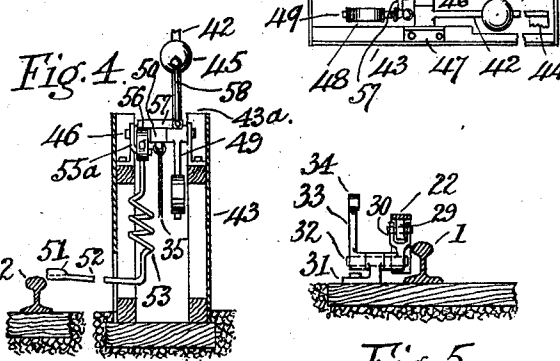
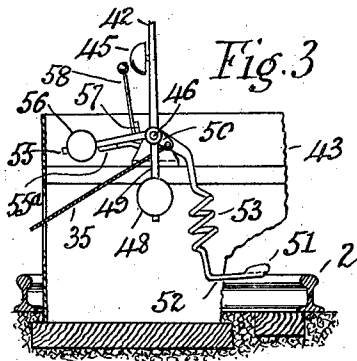
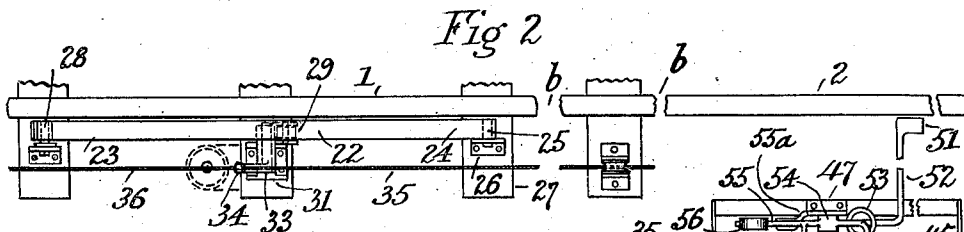
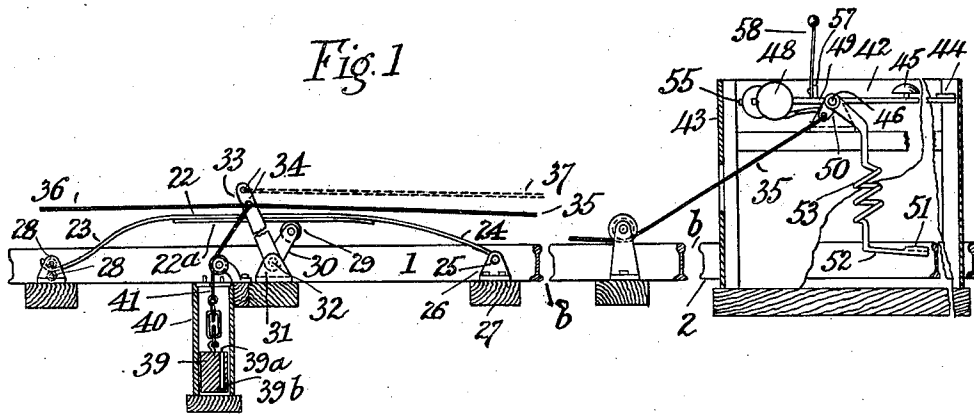
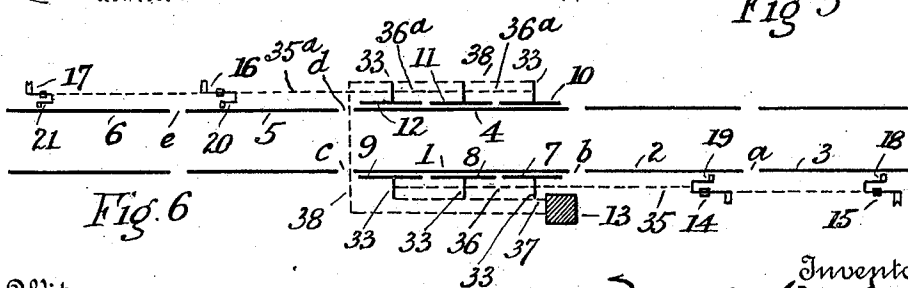


Fig. 5



Witnesses
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UNITED STATES PATENT OFFICE.

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RAILWAY SIGNALING MECHANISM.

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To all whom it may concern:

Be it known that I, MURDOCH McDONALD, a subject of the King of Great Britain and Ireland, &c., residing at Clunes, in the State of Victoria, Commonwealth of Australia, have invented certain new and useful Improvements in Railway Signaling Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Owing to the recurrence of serious railway accidents, this invention has been provided with a view to introducing improved safeguards.

My construction is of the class where the train operates signals independently of the signalman. The latter can, however, co-operate when desired by putting a predetermined "line clear" signal to danger, but cannot take the same danger signal off when a train is so positioned as to set it at danger.

The train operates, by this invention, signals which are visible, and others which are audible. The visible ones comprise movable masts, or in some cases ordinary signal arms; and the audible ones gongs or the like. The working is by mechanism connecting such arms and gongs with railway vehicle or car wheel contact members located at various points. To allow for the error of passing one danger signal improperly, I provide series of such signals (as two or more) at suitable distances apart, so that the second or third may receive attention if the first does not.

Each train when standing at a prepared position, as a passenger station, automatically protects itself both ahead and at the rear. If, in using my invention, a connecting wire breaks, the signal controlled will indicate danger, and if the wire stretches so as to affect the signal it will also do so in the direction of a danger position. These and other factors of the invention will now be explained with the aid of the accompanying drawings, to some of the details of which it will be seen, in due course, that the invention is obviously, however, not limited.

Figure 1 is a side elevation, and Fig. 2 a plan view showing parts of a railway line, any suitable distances, which may be considerable, calculated to result in safe working, being taken to exist between the parts at various breaks as at *b* shown in the rail.

Fig. 3 shows, in side elevation, a treadle and mast mechanism in the danger indicating position, and Fig. 4 shows said mechanism in end elevation, partly sectional. Fig. 5 shows in transverse section the car wheel contact mechanism, and connected parts. Fig. 6 is a diagram, not to scale, of parts of a railway line, showing how a number of my mechanisms may be advantageously located, although they may obviously also be arranged in modified positions.

Referring to these drawings, 1 to 6 are portions of rail, at any suitable parts of a railway track. Considerable distances of any suitable lengths are indicated by the breaks, *a*, *b*, *c*, *d* and *e*. I locate at each of any desired opposite or other parts 1, 4, of the track, close outside the rails, any number of car wheel contact members, as 7, 8, 9, 10, 11, 12, which by their own spring power, or by any suitable independent pressure, or both, are normally raised (except at their ends) above the rail top level, so that every train vehicle wheel passing any such point shall press the said member down. These members are sufficiently long (or numerous and close to one another) to insure the depression of one or more on each side, not only during the passing of cars, but also when a train is standing at such a part as 1 or 4. When this depression occurs in the case illustrated in Fig. 6, danger signals will be exhibited at the train rear, as at 14 and 15, and in front, as at 16 and 17, and gong treadles will be set for action as at 18 and 19 in the rear and 20 and 21 in front. Each wheel contact member has a level or straight body 22, with integral down-curving or depressed ends 23, 24, held in place as by, at one end, a pivot pin 25, in a bracket or bearings 26, having any suitable support, as sleeper 27, while the other end is suitably kept down with freedom to move longitudinally, as between a pair of rollers 28, mounted in a bracket having any suitable support. Each contact plate takes normally the position shown in Fig. 1, and is stiffened in some cases by one or more under bars as 22^a.

Bearing up under each contact member is a roller 29, or when desired more than one roller, with the accompanying parts next described. Each roller 29 is mounted in a fork or suitably on a lever arm 30, secured on a shaft 32, working in a bracket or having bearings 31, the shaft having also at any suitable distance from the railway rail

another lever arm 33 of any suitable length, extending at any suitable angle relatively to arm 30, and with one or more holes 34, or means for the connection of a wire or wires, 35 (to signal mast or arm and gong mechanisms at parts 2 and 3 of the line), 36 (to levers as 33 of other wheel contact mechanisms—see Fig. 6), and 37 (to—when required—a signalman's cabin 13 or other manual operation point). On the other side of the track construction of a similar kind is used as far as desired, as in Fig. 6, where an additional connecting wire 38 from levers 33 of the mechanisms of contact plates 10, 11, 12, extends to signal box 13 or the like. The roller 29 and arm 30 are brought to normal position, as in Fig. 1, by the action of a weight 39 housed in any suitable casing, or pit 40, or otherwise conveniently located. The weight operates connected arm 33, having connection 41 thereto, of adjustable length. The weight will be raised rapidly, but will sink slowly when desired, as explained later.

Signal mechanisms 14 to 17 comprise each a signal mast 42 (shown shortened to save space in drawing) mounted on a casing or frame 43, and so raised above the ground, with an arm standing at the usual right angle, or a disk, or other suitable danger indicator 44, a gong or the like 45, and a boss fixed to a supporting shaft 46, which can be turned in any suitable bearings or brackets 47, by pulling an arm or crank 50 projecting at any suitable angle from the said shaft and connected to the wire 35. Lever arm 50 is as in Fig. 1 when no train occupies part of line 1, 2, or 3, and the signal mast is then lowered. A weight 48 on an arm 49 projecting from the boss at the base of mast 42 tends to bring the mast to the danger position, and will do so if wire 35 breaks, or becomes sufficiently slack; but the normal pull of wire 35, see Fig. 1, keeps the mast in its "line clear" position. The raised support 43 has the advantage of being itself visible from a distance, and of allowing the use of a shorter and lighter mast than would otherwise be possible; such a mast to be effective must be raised high enough to attract the engineman's attention, and when lowered should be protected from the injury or interference to which such parts, if at the ground level, would be exposed. When the pull of arm 33 on wire 35 is slackened by the pressure of a wheel of a train vehicle, as described later, the mast will rise by the action of weight 48, and it rises if wire 37 is pulled.

51 is a treadle plate, shown short, but of any suitable length in practice. This treadle is located close outside the rail, on an arm 52 provided with a springy part or coil 53 in some cases, to mitigate shock. Arm 52 has a boss 54 loosely pivoted on

shaft 46, and therefrom an arm 55 extends at a suitable angle and for a suitable distance, carrying a weight 56 and a transverse arm 57. The latter has mounted on it also a springy arm 58 having a gong or bell striker thereon. When mast 42 is down, arm 49 is pressing up under arm 57 so that—see Fig. 1—arm 55 is kept up and treadle 51 depressed out of reach of any train wheel; if a train reaches parts 3 and 2 when the line is clear, it passes without operating the depressed treadles. On the train reaching part 1, the car wheels force down contact plates 7, 8, and 9 in turn, and so depress lever arms 30, rotate shafts 32, swing levers 33 (raising weights 39) slacken wire 35, and allow play to levers 50 and weights 48. The latter descend raising masts 42 to danger signal position (Figs. 3 and 4), and—by allowing descent of weight 56—raise treadles 51. A stop is provided to suitably limit treadle rise, as fixed arm 55^a extending under arm 55,—see Figs. 3 and 4.

So long as any train wheel keeps any contact plate or plates as 7, 8, or 9 depressed, the danger signals remain up, but when the train has passed, weights 39 sink, pull levers 33, draw up arms 30, and tighten wires 36, 35, which pull down the masts, and, by the upward pressure of arm 49 under arm 57, depress the treadles. When a train sets danger signals at its rear, it also sets like signals in advance, when these are provided as in Fig. 6 for use on single lines. When slow lowering of danger signals is caused, a train is able to travel well forward before the line at its rear is "clear." Weight 39 moves in a cylinder or chamber which allows gradual escape of air (as up past the weight sides) as the weight descends. To allow the weight to rise readily any suitable means is provided to admit air under it. Thus a hole at 39^a has a valve 39^b, which the air automatically opens downward when the weight is being raised. The valve closes on its seat when the weight begins to descend. Casing 40 has any suitable cover, and—when required—drainage means,—not shown.

If a train approach part 3 behind a train at part 1, the driver sees danger signal mast 42, and he stops; but, if he fails to stop, his train wheels depress treadles 51, and so cause gong 45 to sound repeatedly, weight 56 raising the treadle each time a wheel passes. The gong is to arrest the attention of enginemen, guard and passengers especially in foggy weather or at night; yet if the first gong does not lead to the stoppage of the train, there will be one or more additional danger signals and treadles as at part 2 still to be encountered.

A signalman at 13, by pulling wires 37, 38 will when setting signals to danger slacken wires 35, 36, also 35^a, 36^a, so allowing the

danger signals to appear; his action is the same whether semaphore signal arms be used, or masts to be raised and lowered. My construction may therefore include fixed posts with movable signal arms or danger indicators instead of movable masts.

Contact members 7 to 12 are in some cases elongated to be beneath two successive wheels of a car, or the last wheel of one car and the first of the next at the same time. I provide, where desired, suitable protective casings or guards (not shown), for various parts.

The flat top 22 of each wheel contact member affords a guard against inner lever arm 30 being swung too far (that is, up beyond the vertical); the bottom of casing 40 is arranged to support weight 39 in a position to prevent excessive pull of outer lever 33. Special stops may be added for any moving parts desired.

What I claim as my invention is:—

1. In a railway block signaling apparatus; a car wheel engaging member mounted adjacent the track, comprising a metallic strip having a straight middle portion and downwardly inclined end portions, one of said end portions being fixed and the other end thereof being movably mounted; an indicating arm pivotally mounted; means connecting said arm with the wheel engaging member whereby to move said arm; a gong carried by said indicating arm; a treadle mounted adjacent said arm and extended near the track; and a gong striker carried by said treadle and located near the gong when the latter is moved by the wheel engaging member, whereby the striker is adapted to sound the gong when the treadle is engaged by the car wheel.

2. In a railway block signaling apparatus, a car wheel engaging member mounted adjacent the track; a signaling arm pivotally mounted; a weight connected with said arm for moving same to signaling position;

means connecting said wheel engaging member with said arm operable to raise said weight and return the arm to normal position; a gong carried by said signaling arm; a treadle extended near the track, a weight carried by said treadle for moving the same to operative position; a device on said signaling arm adapted to hold said treadle in inoperative position when said arm is not in signaling position; and a striker carried by said treadle and located near the gong when the latter is moved by the wheel engaging member, whereby the striker is adapted to sound the gong when the treadle is in operative position.

3. In a railway block signaling apparatus, a plurality of car wheel engaging members mounted adjacent the track and comprising each a spring metallic strip having a straight middle portion and downwardly inclined end portions, one of said end portions being fixed and the other end thereof being movably mounted, rollers between which said movable end is mounted; signaling devices disposed on opposite sides of said wheel engaging members; casings in which said signaling devices are mounted; said signaling devices comprising each an indicator arm, a weight on said arm for throwing the same into signaling position, a gong on said signaling arm, a pivotally mounted treadle, a weight connected to said treadle and adapted to hold the same to be engaged by the car wheel, a gong striker carried by said treadle, a device on said indicator arm adapted to hold the treadle in inoperative position when said arm is out of indicating position; and a means connecting said indicator arm with said car wheel engaging member.

In witness whereof I have hereunto set my hand in the presence of two witnesses,

MURDOCH McDONALD.

Witnesses:

GEORGE G. TURRI,
ALICE M. HOLT.