A. BONOM.

SAFETY APPARATUS FOR RAILWAYS.

APPLICATION FILED NOV. 30, 1907.

900,474.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.

FIG. 1.

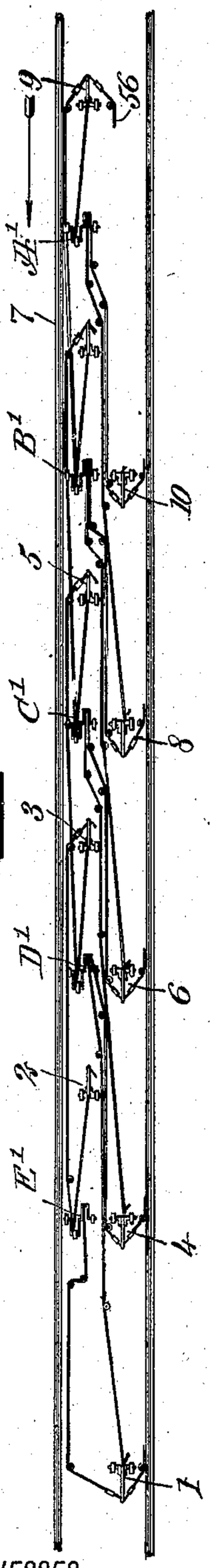


FIG. 2.

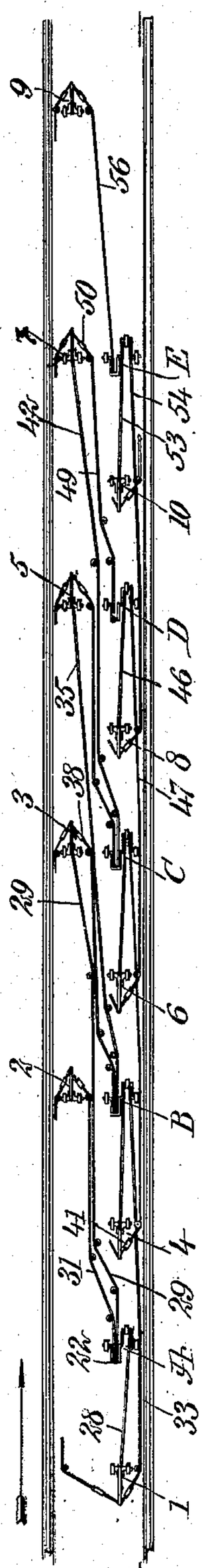
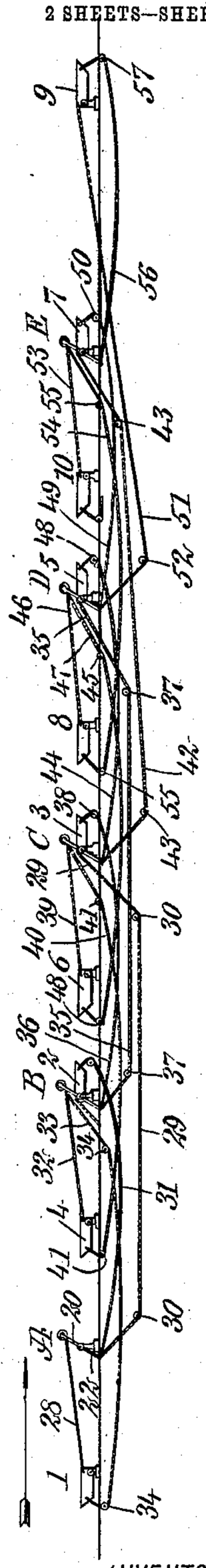


FIG. 3.



WITNESSES

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2 SHEETS—SHEET 2.

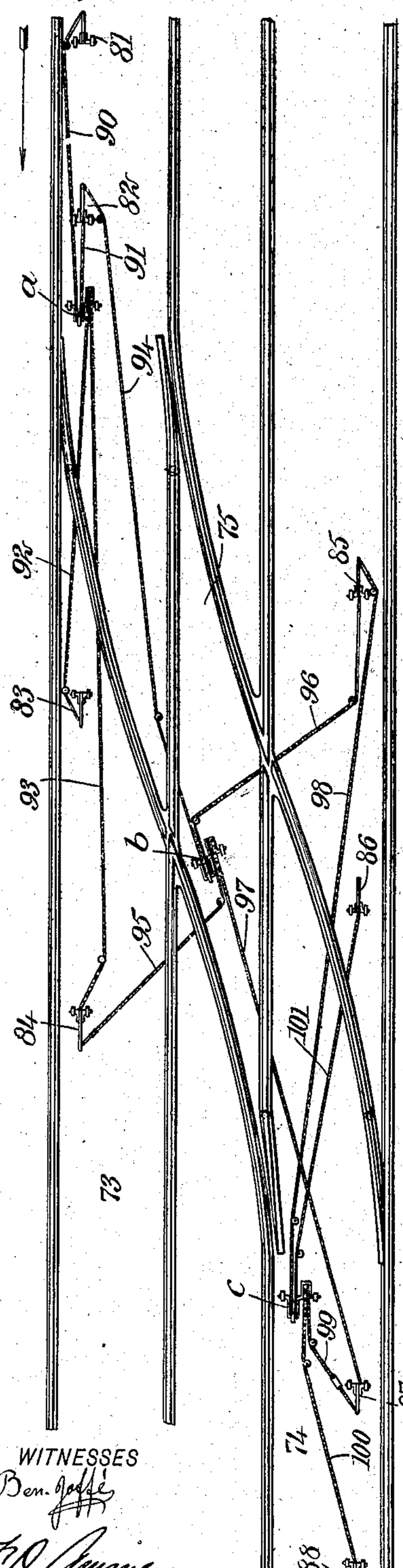

FIG. 4.

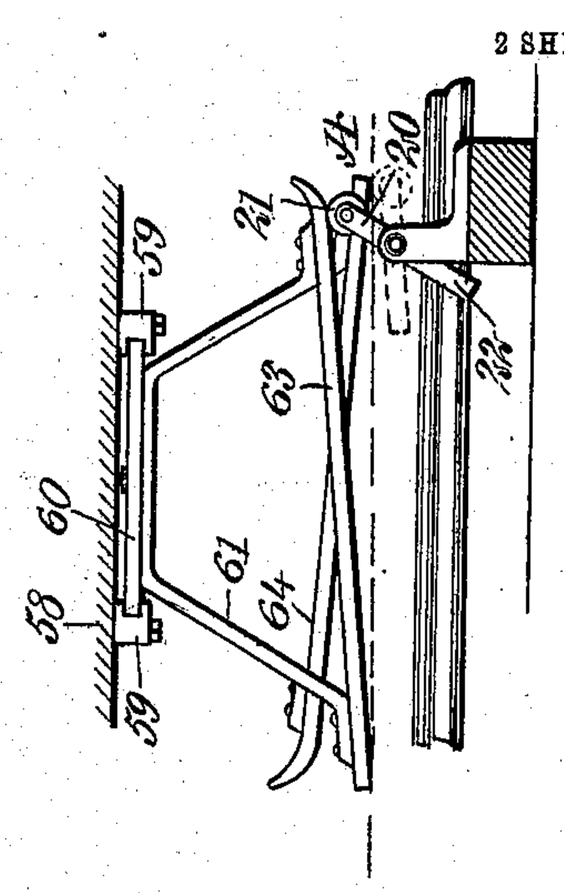

FIG. 5.

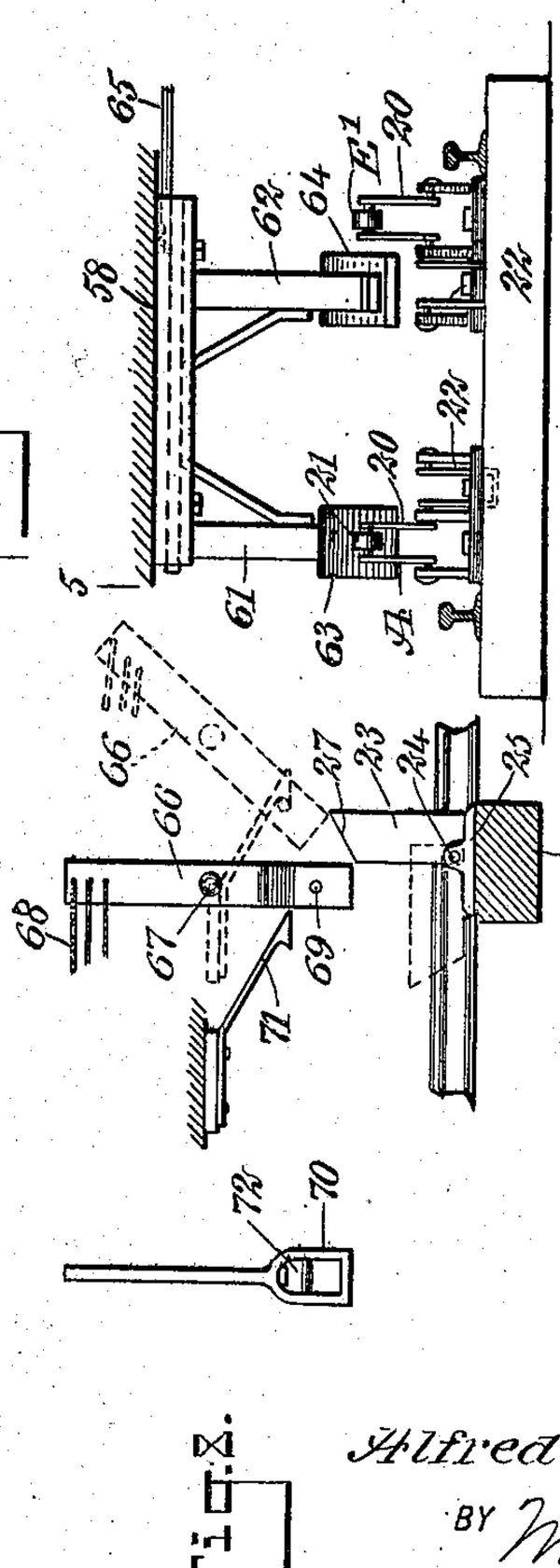

FIG. 6.

FIG. 7.

FIG. 8.

WITNESSES

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SAFETY APPARATUS FOR RAILWAYS.

No. 900,474. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed November 30, 1907. Serial No. 404,500.

To all whom it may concern:

Be it known that I, ALFRED BONOM, a subject of the King of Italy, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Safety Apparatus for Railways, of which the following is a full, clear, and exact description.

This invention relates to safety apparatus adapted to be used along railway tracks for preventing collisions.

The object of the invention is to produce safety apparatus which will operate effectively to prevent two trains from meeting when going in opposite directions on the same track, and also to provide means for preventing rear-end collisions; that is, collisions between trains going in the same direction.

More specifically, the purpose of the invention is to provide improved means for controlling the trip devices which are placed at intervals along the track, and to adapt the mechanism so that it can be used by a train going in either direction.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan of a short section of a railway track representing the safety apparatus as applied thereto and adapted for operation by trains passing from the right to the left; Fig. 2 is a view similar to Fig. 1, but showing the apparatus adapted for trains passing from left to right; Fig. 3 is a side elevation of the apparatus as shown in Fig. 2; Figs. 1, 2 and 3 are diagrammatic in their nature, and in reading them it should be understood that the longitudinal proportions of the drawing are greatly reduced; Fig. 4 is a plan of a short portion of railroad track, showing a double track having a cross-over switch provided with my safety apparatus; Fig. 5 is a side elevation partly in section on the line 5—5 of Fig. 6 showing a short portion of a rail illustrating the manner of operating the track devices; Fig. 6 is a cross section through the railroad track shown in Fig. 5, and illustrating the manner and means for operating the track devices; Fig. 7 is a side elevation illustrating a trip device and the mechanism for automatically applying the brakes to the train and shutting off the power thereof when the trip device is struck; and Fig. 8 is a front elevation of a lever shown in Fig. 7, and illustrating its structure more in detail.

Referring more particularly to the parts, and especially to Figs. 2 and 3, A, B, C, D and E indicate a plurality of track devices which are disposed at intervals along the track near the right-hand side, the direction of movement of the train being from left to right. In connection with these track devices I provide trip devices 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, the said trip devices being disposed as shown. The track devices are identical in construction, the details of which are shown in Figs. 5 and 6. Each track device constitutes a double crank comprising an upper crank or arm 20 carrying a roller 21, and a downwardly projecting crank or arm 22. The trip devices 1, 4, 6, 8 and 10 are adapted to coöperate with a train going from left to right, while the trip devices 2, 3, 5, 7 and 9 are adapted to coöperate with a train going in the opposite direction; that is, the first set of trip devices prevents rear-end collisions, while the second set prevents head-on collisions. The trip devices are identical in construction, except that those of one set face in the opposite direction from those of the other set. One of the trip devices is illustrated in Fig. 7; it consists of a rectangular stop pin or stud 23 which is connected by a pivot pin 24 at one corner to a suitable base 25 which is mounted on one of the cross ties 26, as indicated. The stop pin 23 is adapted to assume a depressed position, as indicated by the dotted lines, or it may stand erect as shown in full lines. As shown in the full lines, the upper end of the stop pin or stud presents an inclined edge 27 for a purpose which will appear more fully hereinafter. In those trip devices which coöperate with a train passing from left to right, the stop pin moves to an erect position from left to right, and the inclined edge 27 is presented toward the direction from which the train is expected to come.

The upper arm or crank 20 of the track device A is connected by a cord, chain, or wire 28 with the stop pin of the trip device 1, as illustrated in Fig. 3, so that if this arm is

depressed by a passing train, it will operate to raise the stop pin 23 from a depressed to an erect position. The distance between the trip device 1 and the track device A is supposed to be considerable, so that in this way the track device operates to place the trip device in an operative position at a safe distance toward the rear along the track.

The lower arm 22 of the track device A is connected by a cord, wire, or chain 29 with the stop pin of the trip device 3, the said cord being guided around suitable guide pulleys 30 as shown. This cord or wire 29 is attached to the trip device 3 in such a way that it will raise the trip device to its operative position when the track device A is operated, as will be readily understood. A wire, cord, or chain 31 leads also from the lower arm 22 of the track device A and connects with the stop pin of the trip device 2. This trip device is located nearer to the track device A than is the trip device 3, and both trip devices are supposed to be at a considerable distance along the track in advance of the train. The cord or wire 31 is attached to the trip device 2 in such a way that it will depress it when the track device A is operated.

The track device B has its upper arm 20 connected by a cord, wire, or chain 32 with the trip device 4 next in the rear, the connection being made in such a way as to raise the stop pin of the trip device when the track device B is operated. A similar cord or wire 33 extends rearwardly from the same arm of the track device B and is connected with the stop pin of the trip device 1 in order to depress the same, the said cord being passed around suitable guide pulleys 34 as shown.

From the lower arm 22 of the track device B a cord or wire 35 extends forwardly along the track, and is attached to the stop pin of the trip device 5 in order to raise the same when the track device B is operated. This cord 35 passes around suitable guide pulleys 37 for this purpose. Another cord 36 connects with the same arm 22 of the track device B and extends forwardly along the track to connect with the stop pin of the trip device 3 in such a way as to depress this stop pin when the track device is operated. For this purpose, near the trip device this cord passes around a suitable pulley 38.

The track device C has its upper arm connected by a suitable cord or wire 39 to the trip device 6 next in the rear, and this wire is adapted to raise the stop pin of this trip device when the track device C is operated, as will be readily understood. A second cord 40 extends rearwardly from the same arm of the track device C and connects with the stop pin of the trip device 4 to depress this stop pin. Adjacent to this trip device the cord 40 passes around a suitable pulley 41 as shown.

The lower arm of the track device C is connected by a suitable cord 42, which passes around suitable guide pulleys 43, with the stop pin of the trip device 7 so as to raise this trip device, and the lower arm of the track device C is also connected by a suitable cord 44 with the stop pin of the trip device 5, passing around a suitable guide pulley 45 adjacent to it as shown. This cord is adapted to depress the stop pin 5 when the track device is operated.

The track device D has its upper arm connected by a cord 46 with the trip device 8 just in the rear thereof in such a way as to raise this trip device to its operative position. A second cord 47 extends rearwardly down the track from this arm to the trip device 6 to depress this trip device. Adjacent to this trip device this cord passes around a suitable pulley 48. The lower arm of this track device D is connected by a cord 49 with the stop pin of the trip device 7 to lower this pin, passing around a suitable guide pulley 50 for this purpose. A similar cord 51 passes around a guide pulley 52, and connects with the stop pin of the trip device 9 to raise this trip device to its operative position.

The track device E is connected by a cord 53 with the stop pin of the trip device 10 to raise this device, and a similar cord 54 passes around guide pulleys 55 and is attached to the trip device 8 to depress the same.

From the lower arm of the track device E a cord 56 passes forwardly along the track and attaches to the trip device 9 to depress it, passing around a suitable guide pulley 57. A similar cord, not illustrated, passes further down the track to the next trip device in advance, and so on.

The mode of operation of the apparatus as illustrated in Figs. 2 and 3, will now be described: A train in passing from the left to the right, strikes the track device A so as to depress its upper arm, which, it will be observed, inclines in the direction in which the train is advancing. The operation of this track device raises trip devices 1 and 3 and depresses trip device 2. In this way the trip device 1 guards the train against a rear-end collision, while the trip device 3 guards the train against a head-on collision. The advancing train then strikes the track device B. This depresses trip devices 1 and 3 and raises trip devices 4 and 5. Striking the track device C operates to depress the trip devices 4 and 5 and raises trip devices 6 and 7. Striking the track device D raises the trip devices 8 and 9 and depresses trip devices 6 and 7, and so on. It will now be clear that in the operation of the apparatus, the track devices afford means for constantly maintaining in an erect or operative position, a trip device in the rear of the train and another in advance of the train, and as the train proceeds along the track, the track de-

vices operate automatically to raise the more advanced trip devices and depress those which have just been in operation.

The operation of the apparatus as illustrated in Fig. 1 is identical with that as shown in Figs. 2 and 3, except that the direction of movement of the train is from right to left. The apparatus has been illustrated separately for the different directions of train movement, for the purpose of clearness of the disclosure, but in practice the two apparatuses may be combined on one track so as to enable the system to operate for trains passing in either direction on the same track. In Fig. 1 the track devices have been represented from right to left respectively by the lines A′, B′, C′, D′ and E′. The trip devices have the same number and position as in Figs. 2 and 3.

Referring especially to Figs. 5 and 6, the mechanism for actuating the track devices will now be described: In Fig. 6 a track device A is represented as opposite to a track device E′, the track device A being intended to be actuated by a train passing from left to right, while the track device E′ is intended to be actuated by a train passing in the opposite direction. On the under side of the locomotive frame, indicated at 58, guides 59 are provided for a transversely movable slide 60. This slide 60 is provided with a bracket 61 on one side, and a bracket 62 on the opposite side. The bracket 61 is provided with an inclined trip plate 63 which is adapted to engage the roller 21 of the track devices A, B, etc., as indicated in Fig. 5. In other words, the forward end of this trip plate inclines upwardly, so that as the train passes, the upper arm of the track device will be depressed, as indicated by the dotted lines in Fig. 5. The bracket 62 is provided with a trip plate 64 which inclines in the opposite direction to the plate 63, but is similar to it in construction. The arrangement is such that when the trip plate 63 is in alinement with the rollers 21 of the track devices A, B, C, D, etc., the trip plate 64 will be out of alinement with the rollers of the track devices A′, B′, C′, D′, etc. From this arrangement it will be readily understood that when the train is proceeding in one direction, the slide 60 may occupy a position in which it will operate the proper track device and not operate the others; that is, it will operate the set at the right and will not operate the set at the left. When the train is going in the opposite direction, the slide 60 will be moved over to an opposite position by means of a link 65 as shown in Fig 6. The trip plate 64 will then operate the track devices A′, B′, C′, etc., and the other set of track devices will not be operated. In this way a single trip mechanism carried by the locomotive or train can be used for a train movement in either direction.

The manner in which the trip devices operate to arrest the movement of the train is illustrated in Fig. 7. For this purpose, the locomotive frame, at a suitable point, is provided with a lever 66, which is pivotally attached at 67 and provided with cords or chains 68 which operate the throttle lever and brake mechanism in such a way that when the lever is moved by a trip device, it will apply the brakes and shut off the steam or electricity which runs the train. The lower arm of this lever 66 is provided with a pin 69 arranged in a stirrup or yoke 70, as illustrated in Fig. 8. The lever is normally carried in a substantially vertical position, as indicated in the figure, and at such a height that its lower end will strike the inclined edge 27.′ In this way the lever is rotated over toward the position in which it is indicated in dotted lines at the right in Fig. 7. In doing this, the pin 69 passes under a resilient detent hook 71. In this way the lever 66 is held against returning to its normal position and the brakes of the train are held applied, the power of the train having been shut off. In this connection it should be understood that with the movement of the lever 66, the forward end of the detent or hook 71 passes through the upper portion or eye 72 of the stirrup 70, as indicated in Fig. 8.

In Fig. 4 I illustrate a form of the invention which is adapted to be used at a cross-over switch between two parallel tracks. The construction of the track devices and trip devices in this case is the same as in the preferred form, but their arrangement is especially adapted to the particular circumstances. Referring to this figure, 73 and 74 represent two parallel tracks connected by the switch 75, the direction of movement being from right to left on the cross-over switch, from the track 73 to the track 74, as indicated by the arrow at the upper portion of the figure. The track devices are indicated by the numerals *a*, *b*, *c*. When the track device *a* is struck, it operates, through a cord or wire 90, to depress the trip device 81, and through a cord 91 it raises the trip device 82, the trip devices 81 and 82 being disposed on the track 73 in the rear of the track device *a* as shown. In addition to this, the movement of the track device *a* depresses the trip device 83 by means of the cord or wire 92, and raises the trip device 84 through a cord 93. The track device *b* is disposed on the devil strip and on the cross-over switch; when it is struck, it depresses the trip device 82 by means of the cord 94 and depresses the trip device 84 by means of the cord 95; at the same time, operating the track device *b*, raises the trip device 85 by means of the cord 96, and also raises the trip device 87 by means of the cord 97. Proceeding beyond the track device *b*, the train

strikes the track device *c* which depresses the trip device 85 through the operation of the cord or wire 98, and depresses the trip device 87 through the operation of the cord 99. The operation of this trip device also raises the trip device 88 through the operation of the cord or wire 100, and also raises the trip device 86 by pulling a cord or wire 101.

It should be understood that the trip devices, while they are represented near the switch, will, in practice, be located at a considerable distance down the track.

It will be understood from the immediately foregoing description that as the train passes onto the switch, it keeps itself guarded while on the track 73, but as soon as it leaves the track 73, it places all the trip devices thereupon in an inoperative position, and begins to actuate the trip devices on the track 74.

It should be understood that the track devices and trip devices, as illustrated in Figs. 1 to 3, are placed continuously along the track, suitable intervals or spaces being left between them to insure that an approaching train may have sufficient time and space to come to a stop, and thus avoid a collision.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In apparatus of the class described, in combination, a set of trip devices adapted to arrest trains going in one direction, a second set of trip devices adapted to arrest trains going in the opposite direction, sets of track devices coöperating with each of said sets of trip devices, and a transversely movable trip bracket carried by the train and coöperating with either of said sets of track devices.

2. In apparatus of the class described, in combination, a transversely guided bracket carried by the train having two operative positions and having a trip plate operating in one direction of movement of the train, and a second trip plate operating in the opposite direction of movement.

3. In apparatus of the class described, in combination, a slide guided transversely to the track and carried by the train, a member for shifting the same, a trip plate carried by said slide and facing in one direction, and a second trip plate carried by said slide and facing in the opposite direction.

4. In apparatus of the class described, in combination, a plurality of trip devices disposed at intervals along the track, a plurality of track devices disposed along the track and having opposite arms, a pair of cords attached to one of said arms and extending rearwardly on the track, one of said cords being attached to the adjacent trip device and affording means for raising the same, the other of said cords being attached to the trip device next beyond and affording means for depressing the same, a second pair of cords attached to the opposite arm of said track device and extending forwardly along the track, one of said second pair of cords being attached to the trip device adjacent and affording means for depressing the same, the other of said cords being attached to the trip device next beyond and affording means for raising the same.

5. In apparatus of the class described, in combination, a track device having an upwardly extending arm adapted to be depressed by a passing train, and a second arm, trip devices disposed along the track at intervals apart, and cords attached to said arms and connecting the same directly with said trip devices respectively, and affording means for depressing or raising the same.

6. In apparatus of the class described, in combination, a track device having an upwardly extending arm adapted to be depressed by a passing train, a trip device disposed at a distance down the track, a second trip device disposed at a greater distance down the track, a cord connecting said track device with said first-named trip device and adapted to set said trip device, and a second cord connecting said track device with said second trip device and affording means for releasing the same.

7. In apparatus of the class described, in combination, a track device having a movable arm adapted to be struck by a passing train, a trip device disposed at a distance down the track, a second trip device disposed at a greater distance down the track, a cord connecting said track device with said first-named trip device and adapted to set said trip device, a second cord connecting said track device with said second trip device and affording means for releasing the same, a third trip device disposed at a distance up the track in an opposite direction from said first-named trip devices, a fourth trip device disposed up the track at a greater distance than said third trip device, a cord connecting said arm with said fourth trip device and adapted to set the same when said arm is struck, and another cord connecting said arm with said third trip device and adapted to release the same when said arm is struck.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED BONOM.

Witnesses:

F. D. AMMEN,

EVERARD B. MARSHALL.