No. 886,321. PATENTED APR. 28, 1908.

K. GRZESLOWSKI.

AUTOMATIC GATE FOR RAILROAD CROSSINGS.

APPLICATION FILED MAR. 4, 1907.

4 SHEETS—SHEET 1.

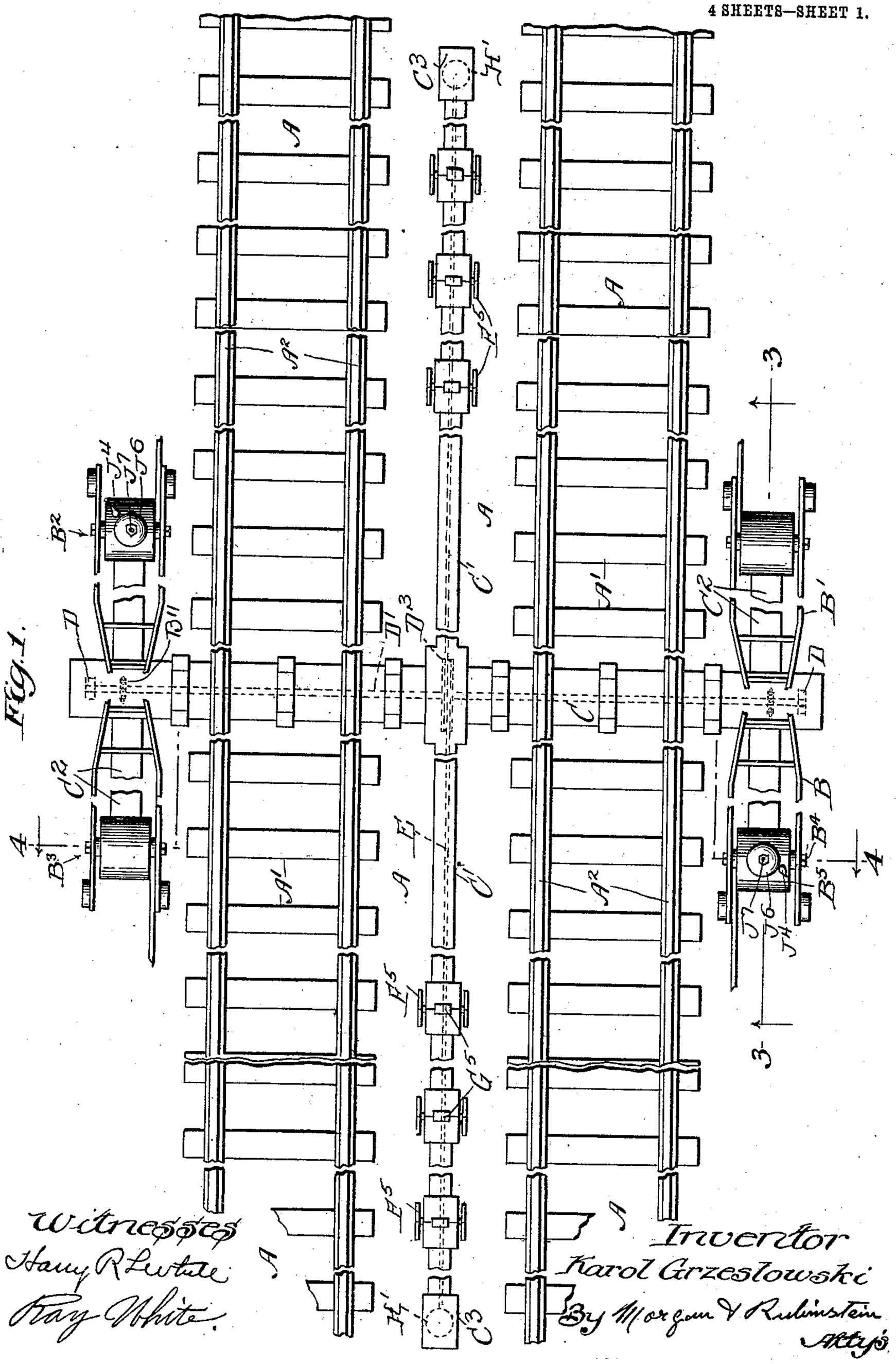

FIG. 1.

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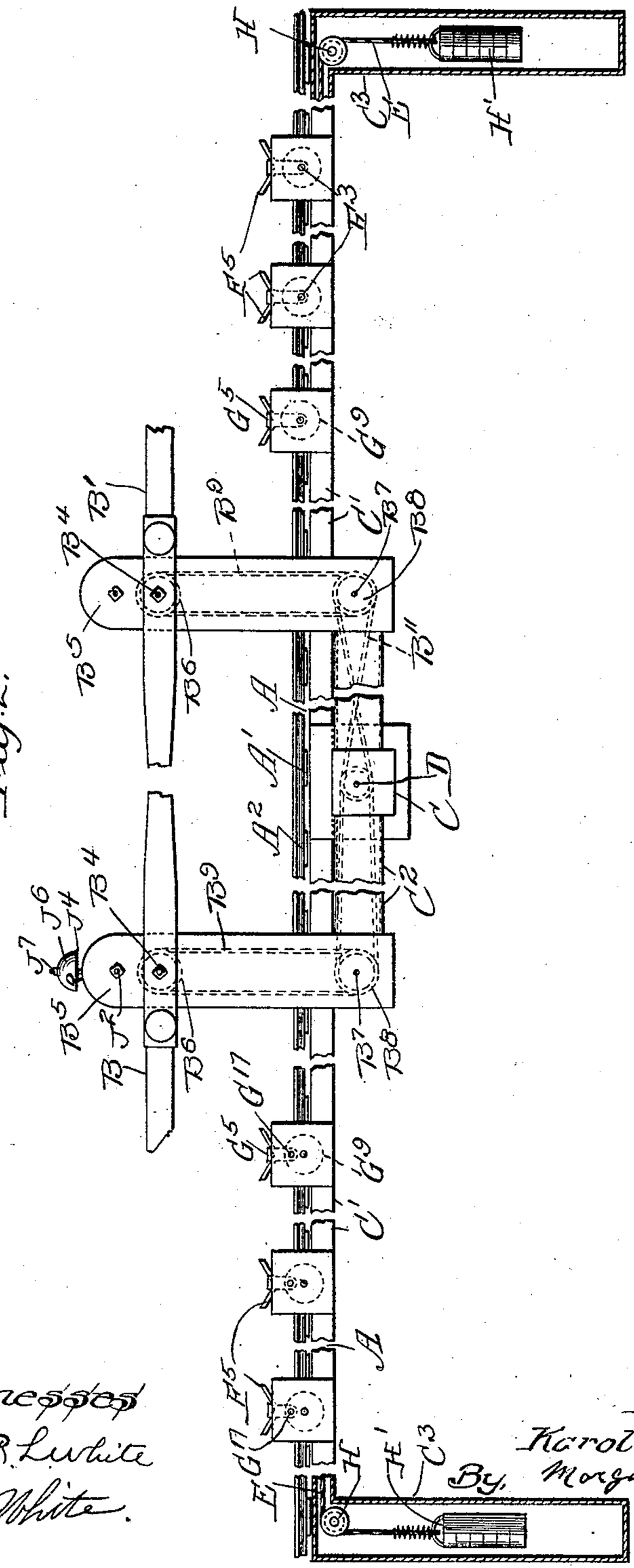
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

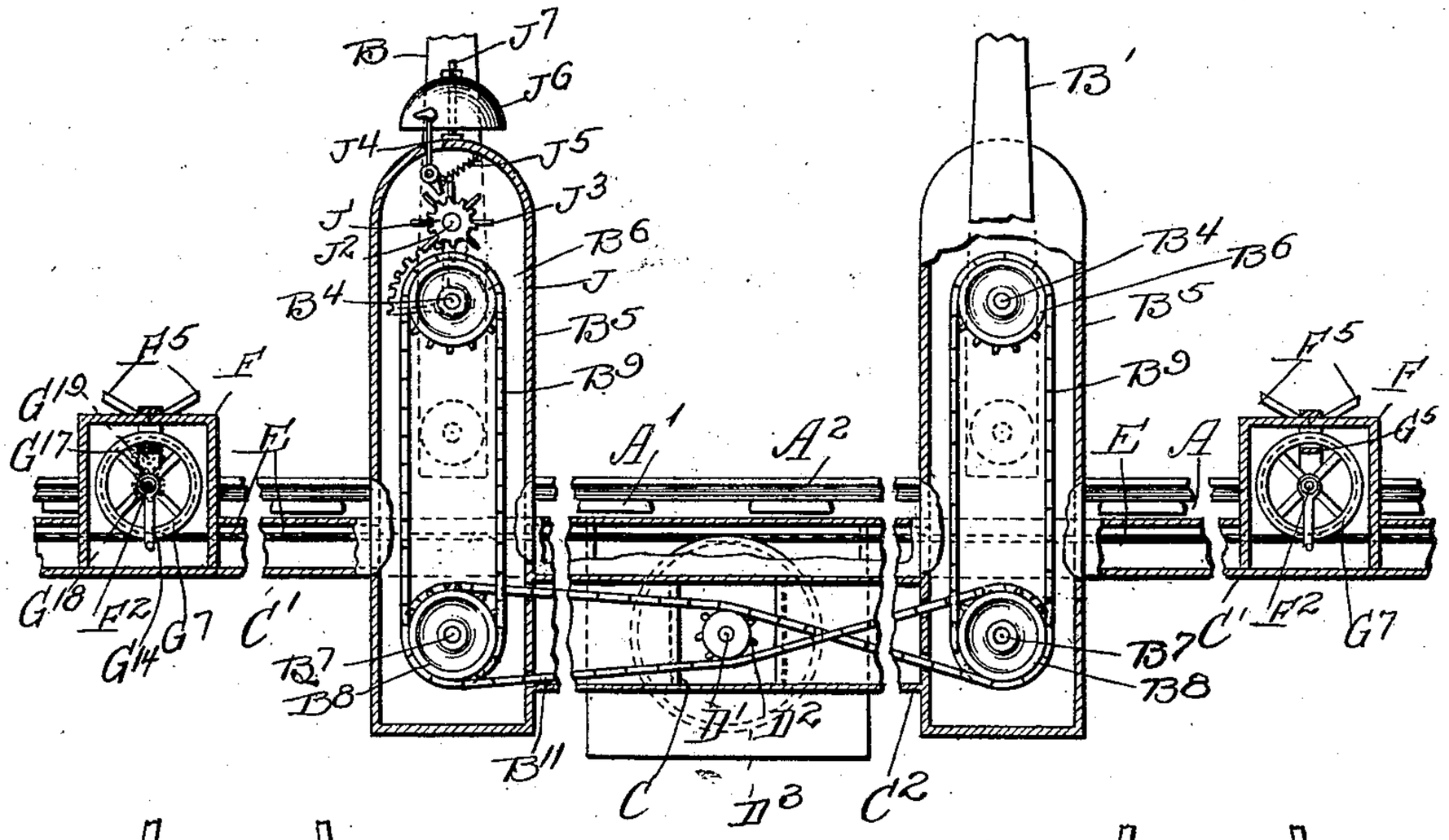
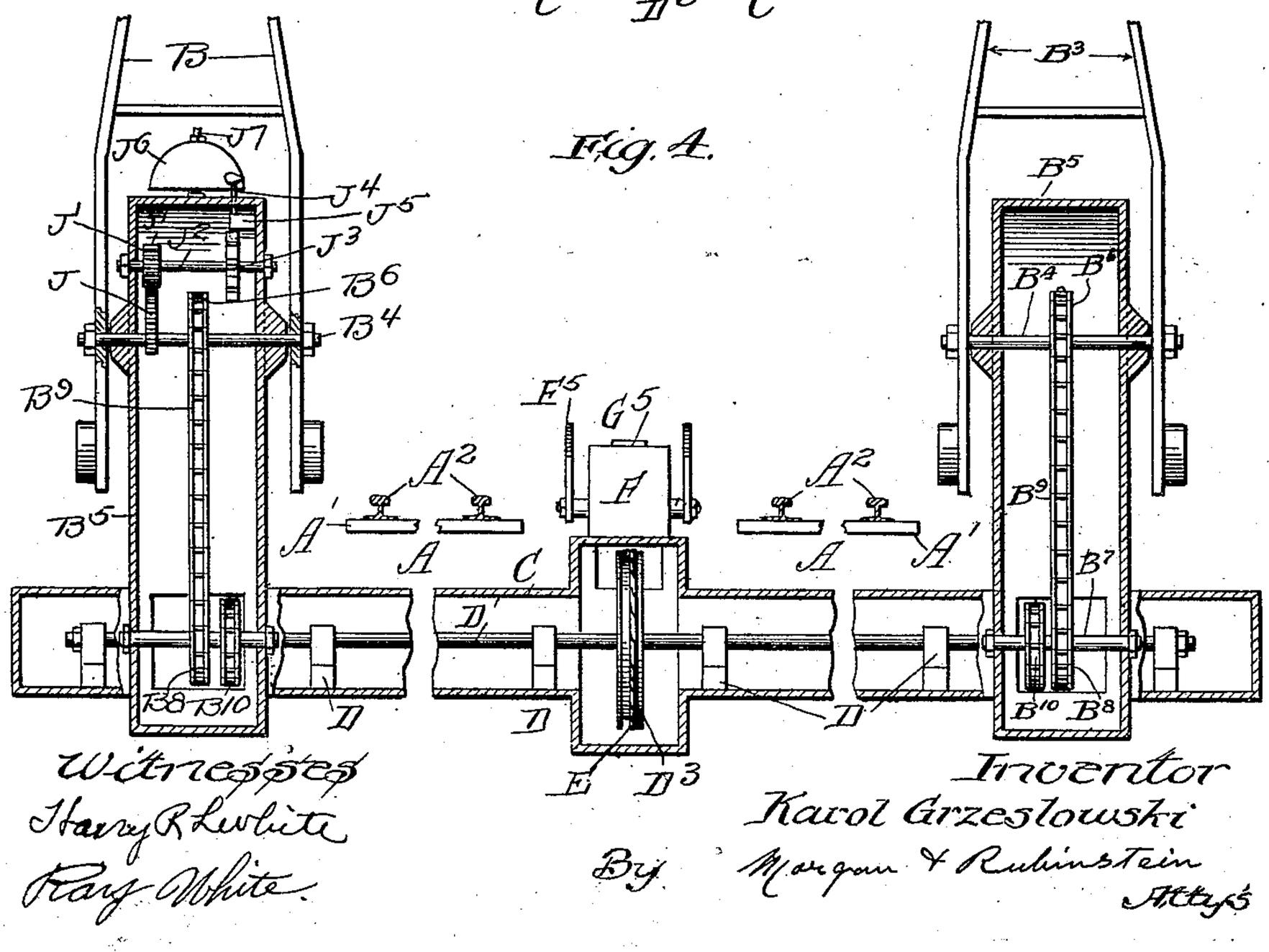


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 6

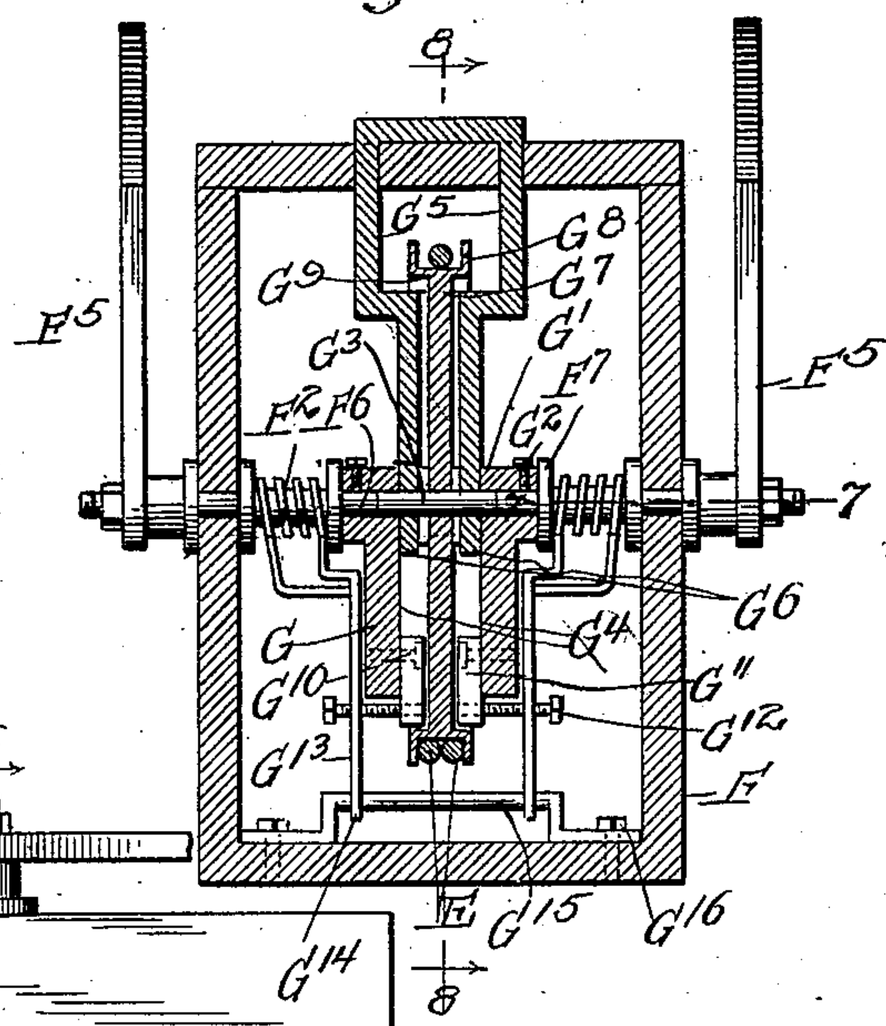

Fig. 7

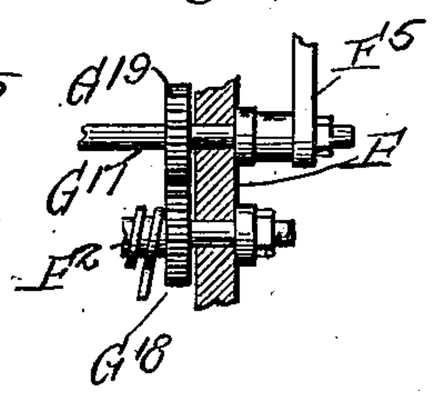

Fig. 5.

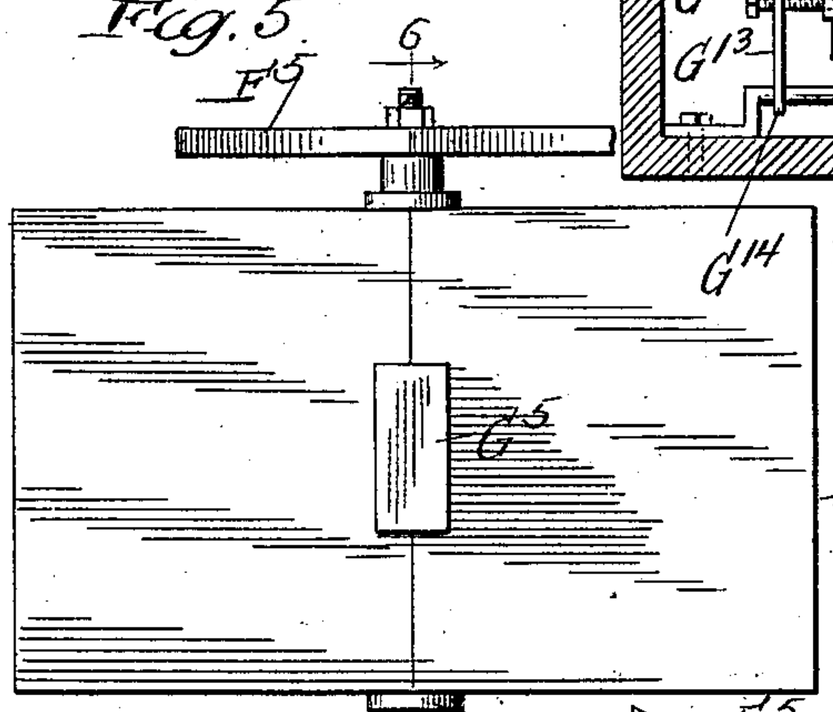

Fig. 10

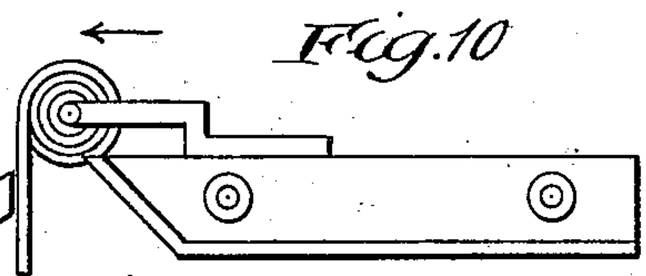

Fig. 8

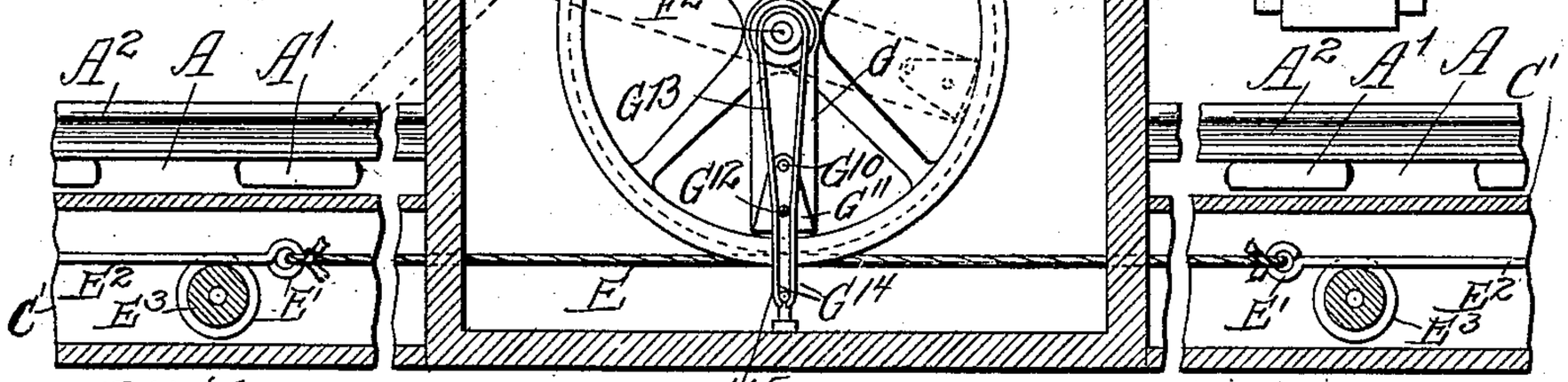

Fig. 9.

G15

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UNITED STATES PATENT OFFICE.

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AUTOMATIC GATE FOR RAILROAD-CROSSINGS.

No. 886,321. Specification of Letters Patent. Patented April 28, 1908.

Application filed March 4, 1907. Serial No. 360,617.

To all whom it may concern:

Be it known that I, KAROL GRZESLOWSKI, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Automatic Gates for Railway-Crossings, of which the following is a specification.

My invention relates to that class of gates which are operated automatically by the movement of trains, engines and cars over the railroad before and after they have passed the crossing.

The object of my invention is to secure simplicity and cheapness of construction, certainty of action and safety in operation.

The manner in which I accomplish my object is described in the following specifications and illustrated in the accompanying drawings in which:

Figure 1 is a top plan view of a double track railway, showing the gates in the closed position and the relative positions of the operative mechanism and railway tracks. Fig. 2 is a vertical side elevation, the parts being in the same relative positions shown in Fig. 1, with the additions indicated by the dotted and sectional figures which are partly beneath the roadbed. Fig. 3 is a vertical longitudinal sectional view on the line 3—3 Fig. 1 of a pair of gates in an open position and part of their connecting and operating mechanism. Fig. 4 is a vertical cross sectional view of two opposite gates and part of their connecting and operative mechanism. Fig. 5 is a top plan view of one of the boxes containing part of the operative mechanism and arms operated by the movement of trains on the tracks. Fig. 6 is a vertical cross section on the line 6—6 Fig. 5, showing the mechanism operated by the movement of the arms. Fig. 7 is a view on the same sectional line, but within the limits indicated by the line 7—7 Fig. 6 of an additional shaft and gears required for the reverse movement of the mechanism shown in Fig. 6. Fig. 8 is a longitudinal vertical sectional view on the line 8—8 Fig. 6, showing the mechanism in that figure and the cable box, cable, cable rods and cable rod rolls beneath the road bed. Fig. 9 is the striking end view of a striking bar. Fig. 10 is a longitudinal side elevation of the striking bar attached to the engine or car.

The same reference letters and numerals refer to the same parts in each of the several views, in which:

A indicates the road bed, A^1 the ties and A^2 the rails.

B and B^1 indicate the pair of gates on the near side of the roadway, the gate B containing the alarm bell mechanism.

B^2 and B^3 indicate the pair of gates on the far side of the roadway, the gate B^2 containing the bell mechanism.

C indicates the shaft box extending transversely beneath the roadbed and beneath the center line of the crossing.

C^1 indicates the cable box extending beneath the longitudinal center line of the roadbed.

C^2 indicates the box parallel with the tracks extending from gate post to gate post inclosing the connecting mechanisms.

C^3 indicates the pit box at each end of the main cable in which the balance weights are inclosed.

The gates are of ordinary construction and therefore require no detailed description. Each of these gates is mounted on a transverse shaft B^4 in the hollow gate post B^5. Within each of these posts rigidly secured on the shaft B^4 is a sprocket wheel B^6. In the lower part of each of the posts is a rotary shaft B^7 parallel with the shaft B^4. Rigidly secured on each of these shafts is a sprocket wheel B^8 corresponding in size with the wheels B^6. These sprocket wheels in each post are connected by a sprocket chain B^9.

Rigidly secured on each of the shafts B^7 is a second sprocket wheel B^{10}. These wheels in the posts supporting the gates B and B^1 are connected by a sprocket chain B^{11}, and the gates B^2 and B^3 are connected in the same way. This connection is shown in Fig. 3. This chain in passing from wheel to wheel is crossed for the purpose of operating the chains B^9 in opposite directions and of thereby moving the gates towards each other from the vertical position and back again.

Supported in the bearings D affixed in the box C is a main shaft D^1. This shaft extends transversely under the tracks and under the longitudinal center of the crossing. Near each end of this shaft and rigidly secured thereto in line with the chain B^{11} is a sprocket wheel D^2 adapted in size to engage the chain B^{11} and to operate it in either direction. The position of this wheel is between the lines of

this chain, hence the wheel is engaged with the chain at the top and bottom diameter of the wheel as shown in Fig. 3. When these wheels and chains are once adjusted, the rotation of the shaft D^1 operates all the gates simultaneously.

Rigidly secured on the central part of the shaft D^1 is a cable wheel D^3. Looped on this wheel is a cable E. The ends of this cable extend horizontally from the top of the wheel into the box C^1 as shown in Fig. 3. The ends of this cable are secured to the eyes E^1 of connecting rods E^2 which are supported at intervals on rollers E^3 rotatably secured in the box C^1 as shown in Fig. 8. Located at suitable distances from each other and from the gate crossing are a series of boxes F which contain the mechanism for operating the cable E. Six of these boxes are shown in Figs. 1 and 2, to illustrate my invention, but any suitable number may be used. One-half of the number used are located in each direction along the tracks and are connected with the cable box C^1, and the mechanism is connected with the cable E as hereinafter described. Each of these boxes projects some distance above the face of the rails. In the central part of each of the sides of these boxes is a bearing, rotatably supported in which is a shaft F^2, the axes of the shafts in each box being at right angles to the length of the tracks. The external end of each shaft is threaded and provided with a nut, and is adapted to support an arm F^5. The internal ends F^6 of each pair of shafts are spaced from each other and each is provided with a washer F^7 and adapted to support a crank G, each of which cranks has a hub G^1 into which the end F^6 of the shaft F^2 extends as shown in Fig. 6. In this hub is a set screw G^2 by which the crank is rigidly secured. Inserted into the hubs G^1 of each pair of cranks in each of the boxes F, is a shaft G^3. This shaft is free to rotate in said hubs and its axis is in the same line as that of the shafts F^2. This shaft is further supported by the parallel arms of a link bearing G^5 which hangs pendent from the top of the box F through which it extends. The ends G^6 of this link form a double bearing between the cranks for the shaft G^3 and a cable wheel G^7 which is free to be rotated on the shaft G^3 between the arms of the link G^5. The periphery of the wheel G^7 is grooved to hold the cable E and is flanged at G^9 on both sides.

Pivotally secured on the inside face of each of cranks G by the pivot stud G^{10} is a pawl G^{11}. When in a normal position of rest these pawls just clear the flange part G^9 of the cable wheel G^7 as shown in Fig. 8, secured in the outside face of each of these pawls is a stud G^{12}. These studs just clear the ends of cranks G and extend some distance beyond the outside faces thereof and are thereby adapted to be engaged by the ends of a spring G^{13}. One of these springs is coiled on each of the shafts F^2 between its bearing and the washer F^7. The two ends G^{14} of each of these springs extend downward and in touch with both sides of the studs G^{12} and are held in position by the check rail G^{15} which is secured by the screws G^{16} to the bottom of the box. The series of boxes located to one side of a crossing are provided with the mechanism herein described. The boxes on the other side of the crossing have two additional shafts G^{17} and a pair of gears G^{18} and G^{19}, as shown in Fig. 7. The gears G^{18} are secured rigidly on the shafts F^2, and the gears G^{19} on the shafts G^{17} which are supported in suitable bearings parallel with the bearings F^1. The arms F^5 are supported on the shafts G^{17} instead of in the shafts F^2, by these additional parts in which the gears G^{18} and G^{19} mesh into each other, the movement of the cranks G is the reverse of that in the other series of boxes, as will be explained hereinafter.

Looped around each of the cable wheels G^7 is part of the cable E, the end leaving the bottom of the wheel in line with the top of the wheel D^3 on the main shaft D. Interposed in the cable E between the successive boxes are rods E^2, as shown in Fig. 8. The extreme ends of the cable pass over wheels H supported in the top of the boxes C^3 and each end is connected to a balance weight H^2. In two of the four posts is an alarm mechanism which consists of a segmental gear J secured on the shaft B^4 and meshing into a gear J^1 on a shaft J^2, secure on this shaft is a spoke wheel J^3 which is adapted to engage a striker J^4 held under pressure of a spring J^5. This striker extends through the top of the post and is adapted when moved by the wheel J^3 to strike a bell J^6 secured on the screw stud J^7, in the top of the post as shown in Figs. 3 and 4.

When my device is constructed as described, its operation is as follows: The gates being in the vertical position the weights H^1 hold the cable taut and all the parts in a normal position of rest. The contact of the shoe K on an approaching engine or car with one of the arms F^5 on either side of the box F which is the end one of the series forces the arm over to the position shown by the dotted lines in Fig. 8, thereby rotating the shaft F^2, its crank G with the pawl pivoted thereon. The end of the pawl retarded by pressure of the spring engages the flange G^9 of the cable wheel G^7 and partly rotates it as shown by the dotted figure in Fig. 8. This movement of the wheel draws the cable E and its connecting rods in the direction of the movement of the wheel. In this movement of the cable all the other cable wheels G^7 in all the boxes on both sides of the crossing rotate freely on their shafts G^3 without interference by the other parts of the mechanism in the

boxes F. As the cable moves it partly rotates the cable wheel D^3 shaft D^1 sprocket wheels D^2 chains B^{11} sprocket wheels B^{10} chains B^9 wheels B^6 shafts B^4 and partly lowers the gates from the vertical position. This movement of the shafts B^4 and segmental gears operates the bell mechanism and sounds the bell on each side of the tracks. Directly the pressure of the shoe on the arm is passed, the end of the spring G^{13} which had been carried away from the check rail G^{15} by the movement of the crank and pawl, releases the pawl from the wheel and forces the crank and arm back to their normal positions leaving the cable wheel in that box free to be revolved by the next movement of the cable. The next movement of the gates occurs when the shoe strikes the arm of the next box, thereby moving the crank, pawl, spring, and wheel, which draws the cable in the same direction, operating the main shaft, and connecting chains, sounding the alarm and lowering the gates another part of the quarter circle which is the limit of their movement. As the shoe successively strikes each arm the movements of the parts in each box are repeated and the gates are lowered a little at a time. At each movement of the gates the alarm is given to the ear and the eye, at such intervals as to warn all who may be approaching or that may be on the crossing, thereby giving ample opportunity for all to place themselves in a position of safety. When the engine or car moving in the direction of the arrow in Fig. 10 has passed over the crossing and strikes the arms successively on the other side the reverse movements are made by the reverse mechanism (described and shown in Fig. 7) in each of the boxes and the gates are thereby raised to the vertical position. When the train comes from the opposite direction and moves the arms on the opposite direction, the same movement of parts results and the gates are raised and lowered in the same way.

What I claim and desire to secure by Letters Patent is:

1. In a railway gate, the combination with the posts and arms pivoted thereto on opposite sides of a railway track and of the roadway crossing said track, of sprocket gearing within each post, and chains connecting said gearing in the two posts located on the same side of the track on opposite sides of said roadway, a main shaft extending from side to side of said track journaled in suitable bearings and having a cable wheel and pair of sprocket wheels affixed thereon, said sprocket wheels being in engagement with said chains on either side of the track and adapted to operate said chains, sprocket gearing and arms, a cable lapped on said cable wheel and extending in both directions at right angles to said main shaft, under the center line of said track, a series of cable wheels supporting said cable journaled in boxes projecting above said track and spaced from each other, and operating mechanism in each of said boxes adapted to operate said wheels and said cable, and weights attached to the ends of said cable adapted to hold said cable taut.

2. In a railway gate, the combination with the posts and arms pivotally supported thereon, of a gearing in each of said posts consisting of two parallel shafts journaled in each post, arranged vertically one above the other, the upper adapted to support the arm, and having a sprocket wheel affixed thereon within the post, the lower shaft having a pair of sprocket wheels affixed thereon, one of said wheels being in a vertical line with the wheel on said upper shaft, and connected therewith by a sprocket chain, the other wheel being adapted to support a chain extending horizontally through one side of the post; a pair of sprocket chains connecting said gearing in the two posts located on the same side of the track; a transverse shaft and cable and sprocket wheels affixed thereon, said sprocket wheels being adapted to engage and operate said horizontal chains; a cable lapped on said wheel; a series of cable wheels engaged by said cable mechanism connected with and adapted to operate each of said wheels and said cable, and means for holding said cable taut.

3. In a railway gate, the combination with the posts, and gearing therein adapted to support and operate the arms of said gate; of a pair of sprocket chains located horizontally one on each side of the railway, beneath the roadway crossing said railway, and adapted to connect the gearing in both of the posts on the same side of the railway, each of said chains being crossed and thereby adapted when moved to operate the gearing in each of said posts in opposite directions; a transverse shaft and cable and sprocket wheels affixed thereon, said sprocket wheels being adapted to engage and operate said pair of chains; a cable lapped on said cable wheel; a series of cable wheels engaged by said cable, a means for operating said wheels and cable, and means for holding said cable taut.

4. In a railway gate, the combination with the post, the sprocket gearing therein and arms supported thereby and the pair of horizontal sprocket chains connecting said gearing as described; of a transverse shaft extending beneath the railway and in line with the center of the roadway crossing the railway, said shaft being journaled in suitable bearings and having a pair of sprocket wheels affixed one on each end thereof adapted to engage and operate said pair of horizontal chains, a cable wheel centrally located on said shaft and affixed thereto; the cable supported on said wheel and extending in opposite directions therefrom; a series of cable

wheels engaged by said cable and the means for operating said cable and for holding it taut, as described.

5. In a railway gate, the combination with the posts, the gearing therein the arms supported thereby and horizontal chains connecting said gearing, the shaft and gears thereon engaged with said chains, and the cable wheel on said shaft; of a cable lapped around said wheel, said cable extending at right angles to said shaft horizontally in both directions from the top of said wheel, supported on suitable roller bearings, and lapped around a series of vertical cable wheels, the horizontal line of said cable corresponding with the lowest point of the rim of said wheels; and means for operating said series of wheels and for holding said cable taut.

6. In a railway gate, the combination with the posts, the gearing therein and arms supported thereby, the pair of chains connecting said gearing, the shaft and gears thereon adapted to operate said chains, the cable wheel affixed on said shaft and the cable lapped on said wheel; of a series of cable wheels engaged by said cable, each of said wheels being inclosed in a suitable box and normally free to be rotated by said cable, each of said wheels having a peripheral flange adapted to be engaged by a pair of radial pawls and to be moved by the contact and movement of either of said pawls; and means for supporting and operating said pawls and operating said wheels and cable, and for holding said cable taut.

7. In a railway gate, the combination with the posts, the gearing therein, and arms supported thereby, the connecting chains and transverse shaft the gear wheels cable wheel thereon and the cable on said wheel the series of cable wheels engaged by said cable, and boxes inclosing said wheels; of operating mechanism supported in each of said boxes adapted to support and operate said wheels and cable, said mechanism consisting of pendent link bearings supported in the top of the box, a shaft supported in said bearings on which said cable wheel is supported and free to rotate, shafts supported in suitable bearings in sides of said box axially coincident with the shaft in said link bearings, arms affixed outside said box on said shafts, a pair of cranks affixed on said shafts and pivotally supported by the ends of said shaft in the link bearings, pawls pivotally suspended on each of said cranks in position to be moved into engagement with the flange of said cable wheel, each of said pawls having a side pin at right angles to the line of movement of said pawls, and below and projecting beyond the ends of said cranks, and a pair of pendent double ended springs, supported on said shafts and in contact with said pins and with a stop affixed on the bottom of said box, said stop being adapted to hold said springs in a normal position of rest as described.

8. In a railway gate, the combination with the posts, the sprocket gearing therein and arms thereon, the horizontal connecting sprocket chains, the transverse shaft and gears operating said chains, the cable wheel and cable adapted to operate said shaft, gearing and arms; of a double series of cable wheels and operating mechanism, the mechanism in each part constituting one of said series, consisting of an inclosing and supporting box, pendent bearings therein, a cable wheel and its shaft supported in said bearings, arms and supporting shafts rotatable in suitable bearings in said box, said shafts being axially coincident with said wheel shaft, a pair of cranks secured on the ends of said shafts and rotatably supported on said wheel shaft, pendent pawls on said cranks and springs engaging said pawls, and the mechanism in the other series having an additional pair of auxiliary bearings and shafts parallel with and above said arm shafts, and connected therewith by gears on said shafts adapted to mesh with each other, the arms on said series being affixed on the auxiliary shafts as described.

9. In a railway gate, the combination with the posts, the sprocket gearing therein and arms supported thereon, the transverse shaft and means for connecting said shaft and gearing, the cable adapted to operate said shaft, the series of cable wheels adapted to operate said cable, the mechanism in each part of said series adapted to support and operate said wheels; of the double ended arms connected with and forming part of mechanism of each part of said series, said arms being adapted to be moved by means affixed to an engine or car passing in either direction and to thereby operate said mechanism, cable wheel, cable, shaft, gearing and gate arms as described.

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