

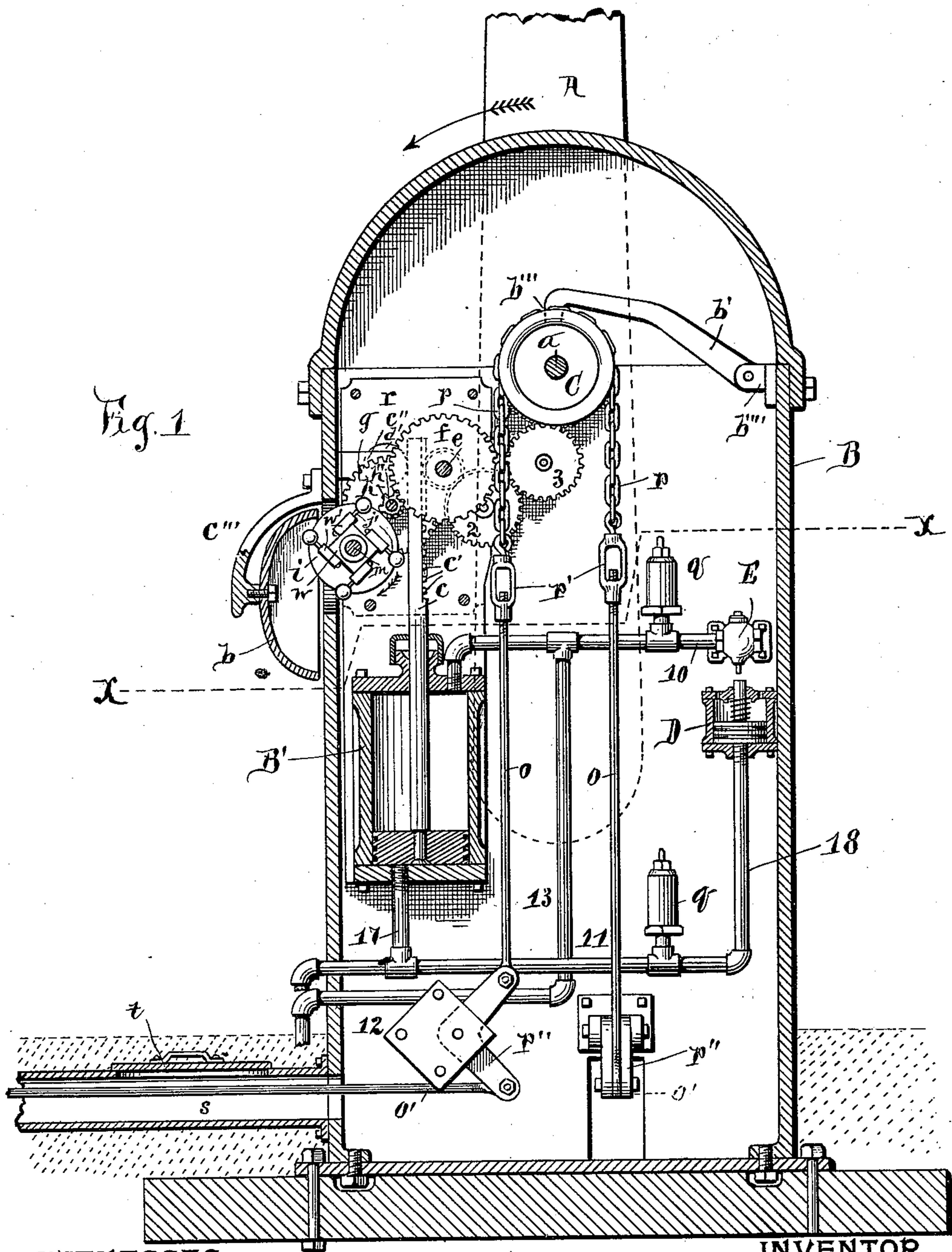
(No Model.)

4 Sheets—Sheet 1.

C. H. SHERWOOD.
AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 564,260.

Patented July 21, 1896.



WITNESSES:

St. A. Carhart
C. L. Bendixen

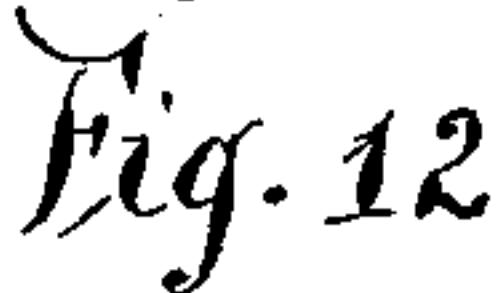
INVENTOR

Charles H. Sherwood
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4 Sheets—Sheet 2.

No. 564,260.

Patented July 21, 1896.



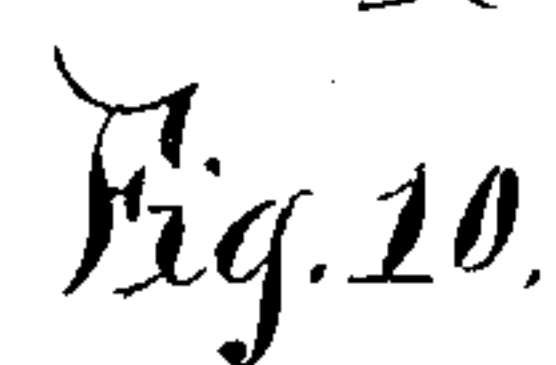
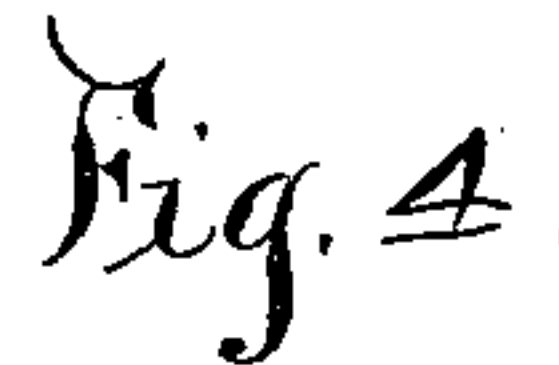
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4 Sheets—Sheet 3.

No. 564,260.

Patented July 21, 1896.



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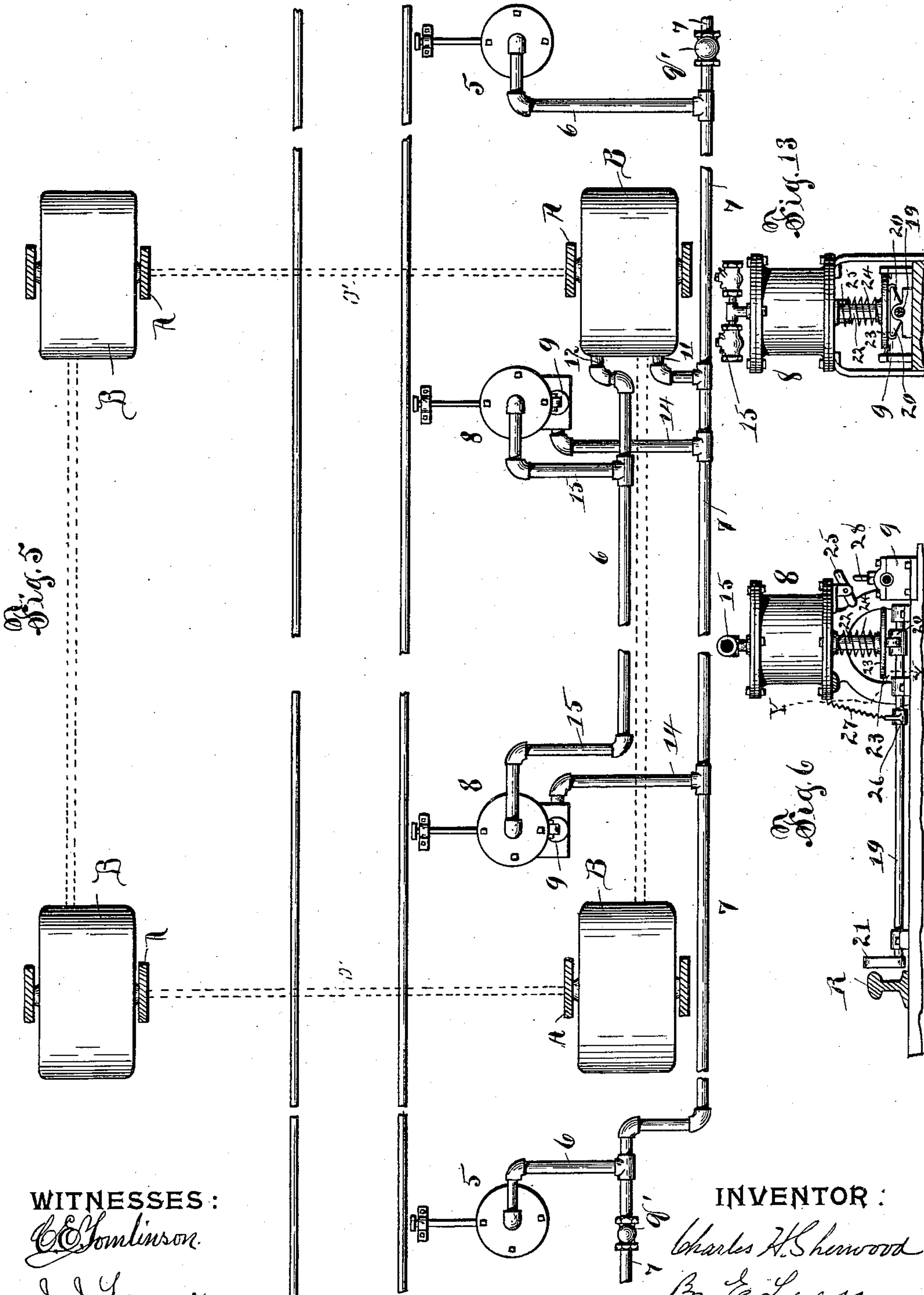
(No Model.)

4 Sheets—Sheet 4.

C. H. SHERWOOD.
AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 564,260.

Patented July 21, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC PNEUMATIC RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 564,260, dated July 21, 1896.

Application filed August 12, 1895. Serial No. 559,016. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. SHERWOOD, of Utica, in the county of Oneida, in the State of New York, have invented new and useful Improvements in Automatic Pneumatic Railway-Gates, (single-track,) of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention relates to the class of railway-gates which are operated automatically by an engine or train of cars approaching the portion of the railway guarded by said gates; and the invention has special refer-
15 ence to the gates shown and described in my Patent No. 526,872, dated October 2, 1894, which consists of air-pumps and valves actuated by the passing engine or train and connected by air-conduits with a cylinder, the
20 piston of which is operated by the pressure of the admitted air and imparts motion to mechanism which operates the gates, the whole constituting an automatic pneumatic gate.

25 My present invention consists in the novel arrangement of gears for operating the gate-arm, an air-cylinder having its piston-rod provided with teeth for actuating said gears, and the novel arrangement of the air-pumps and relief-valves which control the move-
30 ment of the piston-rod of said cylinder; and the invention also consists in providing another set of gears actuated by said piston-rod to operate the alarm-bell and in other
35 details, as hereinafter more fully described, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical transverse section of a gate-standard, showing the mechanism for operating
40 the gate-arm. Fig. 2 is a horizontal transverse section of the same. Fig. 3 is a view taken on line X X in Fig. 1, looking downward. Fig. 4 is an enlarged detail view of the gears which operate the gate-arm and
45 bell-ringing mechanism. Fig. 5 is a plan view of the four gate-standards, showing the arrangement of the air-pumps and relief-valves operated thereby and track instruments which operate the same and pipe con-
50 nection between said pumps and valves. Fig. 6 is an enlarged detail view of the

air-pump and relief-valve operated thereby and the track instrument actuating said pump. Fig. 7 is a face view of the gear
55 mounted loosely on the main shaft, to which shaft the gate-arm is secured. Fig. 8 is a view of the opposite face of said gear. Fig. 9 is a face view of a notched disk secured to said shaft adjacent to the aforesaid gear.
60 Fig. 10 is a face view of one of the gears of the bell-ringing mechanism provided with a pawl, shown in engagement with a ratchet-wheel. Fig. 11 is a plan view of the flexible
65 connection of the free end portion of the gate to the main arm. Fig. 12 is a detail view of a portion of said connection; and Fig. 13 the view on line Y Y, Fig. 6.

Similar letters and numerals of reference indicate corresponding parts.

B represents a hollow standard of the usual
70 form, extending across which is a horizontal shaft *a*, journaled in suitable bearings in the sides of said standard, and on said shaft is mounted the gate A.

To guard against the danger of entrapping
75 vehicles between gates or injuring vehicles or horses or persons passing through the gate while the latter descends to its closed position, I form the gate with a flexible end
80 portion or bar A', similar to that shown in my patent hereinbefore referred to and as shown in Fig. 11 of the drawings.

Within the standard B is arranged in ver-
85 tical position an air-cylinder B', having its piston-rod *c* provided with teeth *c'*.

On the shaft *a* is loosely mounted a gear 4, provided with a cam *e'* on its outer face and provided on its opposite face with a lug *h'*. Secured to said shaft and adjacent to said
90 gear is a disk *f'*, provided with notches *f''* and with a lug *g''* on its face adjacent to the lug *h'* on the gear 4.

Within the standard B are two vertical
95 plates *r r*, on which is supported the horizontal shaft *e*, on which are mounted the gears *d* and 1. The gear *d* meshes with the piston-rod *c*, and by means of the gear 1 and inter-
100 mediate gears 2 and 3 motion is transmitted to the gear 4, by which mechanism the gate is closed and opened in the upward and downward movement, respectively, of the piston-rod. The movement of said piston-rod is

controlled by means of air-pumps and relief-valves arranged as follows:

Remote from the gate and in opposite directions are disposed two or more air-pumps 5 5, which are operated by suitable track instruments (described in a prior application) actuated by the wheels of a passing train or engine, as shown in Fig. 6 of the drawings. Said pumps are operated only by a train approaching the gate. Adjacent to the gate on opposite sides of the street are disposed two air-pumps 8 8 and relief-valves 9 9, operated thereby. Said pumps are operated by a train moving in either direction.

Within the standard B and adjacent to the air-cylinder B' is a small cylinder D, and directly above said cylinder is a relief-valve E, having its piston-rod axially in line with the piston-rod of said cylinder, and said valve communicates with the top of the interior of the cylinder B' by means of a pipe 10.

The remote pumps 5 5 communicate with the bottom of the interior of the cylinder D by means of pipes 6, 7, and 18. The adjacent pumps 8 8 communicate with the top of the interior of the cylinder B' by means of pipes 15, 16, 12, 13, and 10, and the relief-valves 9 at said pumps communicate with the bottom of the interior of said cylinder by means of pipes 14, 7, 11, and 17, by which arrangement the movement of the piston *c* of the cylinder B' is controlled.

To the standard B is secured a support *b'''*, in which is secured a latch *b'*, provided with two hooks *b''*. One of said hooks bears on the cam *e'*, secured to the gear 4, and the other hook engages the notches *f''* of the disk *f'* adjacent to the gear 4, as hereinbefore described.

The operation of my improved gate is as follows: When a train or engine is approaching the gate from either direction and is passing the remote pumps 5 5, the track instruments thereat are actuated by the wheels of said train, which instruments operate the pumps, thereby forcing air through the pipes 6, 7, 11, and 17 into the bottom of the cylinder B' and at the same time from the pipe 11 through the pipe 18 into the bottom of the cylinder D, thereby forcing up its piston, which pushes up the stem of the relief-valve E, thereby relieving the air from the top of the interior of the cylinder B' through the pipe 10, whereby the piston of said cylinder is forced up and the piston-rod *c* thereof, provided with teeth *c'*, meshing with the gear *d* on the shaft *e*, transmits motion by the gear 1 on said shaft and gears 2 and 3 to the gear 4, mounted loosely on the shaft *a*, to which the gate-arms are secured. In the movement of the gear 4 the cam *e'*, secured thereto, raises the latch *b'* and the hook *b'''* from the notched disk *f'*. The lug *h'* on said gear engages the lug *g''* on the notched disk, which is secured to the aforesaid shaft, thereby swinging down the gate to its closed position. As the train passes the gate, the wheels thereof actuate the track instrument which operates the pump

8 adjacent to the gate, whereby air is forced through the pipes 15, 16, 12, and 13 to the top of the interior of the cylinder B'. At the same time said pump operates a relief-valve 9, which communicates by the pipes 14, 7, 11, and 17 with the bottom of the interior of said cylinder to release the air-pressure therein, whereby its piston and rod *c* is forced down and moves the aforesaid gears in the opposite direction, whereby the gate is swung to its open position. The gate is held locked in its closed position in the same manner as in its open position and the cam *e'* raises the latch in the same manner to raise said latch from the notch *f''*.

There is a lost motion between the lugs *h'* and *g''*, in order to allow the bell-ringing mechanism to operate, as hereinafter described.

The pipes 10 and 11 are provided with suitable pop-valves *q q* to relieve any excess pressure, and the pipe 7 is provided with suitable check-valves *q' q'*, as shown in Figs. 1 and 5 of the drawings.

The aforesaid mechanism and cylinders, valves, pipes, &c., are provided only in one of the four gate-standards B. Each standard is provided with the horizontal shaft *a*, and on said shaft is secured a grooved or sprocket wheel C, carrying a chain or cable *p*, connected at the ends to two vertical rods *o o* by means of turnbuckles *p' p'*. The opposite ends of each of said rods are secured to one of the arms of bell-crank levers *p'' p''*, secured to the standard B, and faced, respectively, toward the street and railway-track. To the other arms of said levers are secured two horizontal rods *o' o'*, extending, respectively, to gates across the street and railway-track, by which connection the four gates are closed and opened in unison.

The intermediate gears 2 and 3 are adjustable in their position by means of a plate 5, pivoted to one of the plates *r*, and provided with a segmental slot 6, and a bolt 7, passing through said slot and plate *r*.

One of the essential features of my invention is the bell-ringing mechanism, which consists in providing a loosely-mounted gear *f* in the shaft *e*, extending between the plates *r r*, a ratchet-wheel *k*, secured on said shaft adjacent to said gear, a pawl *k'*, secured to the face of said gear and engaging the aforesaid ratchet-wheel, and a spring *k''*, secured to the face of the gear, holding said pawl in engagement with the ratchet-wheel. On the same shaft *e* is secured the hereinbefore-mentioned gear *d*, which engages the teeth of the piston-rod *c*. The wheel *f* is thus only turned in the upward movement of the piston-rod by the pawl and ratchet-wheel, and in the downward movement of said piston-rod the pawl slides over said ratchet-wheel. The wheel *f* meshes with a small gear *h*, secured on the shaft *h''*, and on the same shaft is secured a gear *g*, which meshes with the gear *g'*, secured to the shaft *m*. On the shaft *m* is also secured a fly-wheel *i*, having secured to its face a frame *w*,

provided with the arms w' , having guides formed therein, in which slide the bell-hammers j' . By this arrangement of gears the fly-wheel and the frame with the hammers are turned, and said hammers come in contact with the bell b , secured to the outside of the standard B.

The standard is provided with an opening near the bell for the hammers j' to project through, the same being almost entirely within the standard. Over the bell and said opening is provided a shield c''' to protect the same from rain, snow, &c.

To the interior of the standard is secured a guide c'' for the piston-rod c , and in said guide is secured a roller d' , forming a bearing for said rod.

To the exterior of the standard are secured two boxes $u u$, respectively, in vertical and horizontal positions, each having a spring-cushioned rod v journaled therein, forming cushions or stops for the gate in its extreme open and closed position.

Between the gate-standards are provided conduits s , through which extend the horizontal rods o' , and said conduits are each provided with removable caps or covers t , as shown in Fig. 1 of the drawings.

The combined pump 8 and relief-valve 9 are constructed as follows: To the lower end of the piston-rod 22 of the pump 8 is secured a disk 23, and between said disk and the cylinder of said pump is interposed a coil-spring 24. From the pump to within a short distance from the railway-track R extends a rock-shaft 19, secured in suitable journal-boxes. On one end of said shaft are secured two arms 20, bearing against the under side of the disk 23, and on the opposite end of said shaft in proximity to the railway-track is secured a lever 21, to be depressed by the wheels of a passing train or engine. On said shaft is secured a collar 26, and from said collar to suitable portion of the pump 8 or cylinder extends a spring 27, by which said shaft is held in its normal position. As the train passes said pump, moving in either direction, the wheels thereof depress the lever 21, whereby the shaft 19 is rocked thereby, throwing up one of the arms 20, which pushes up the disk 23, which disk throws up the inner end of a finger 25, pivoted suitably to the pump 8 or cylinder, thereby throwing down the opposite or outer end of said finger, which pushes down the stem 28 of the relief-valve 9 for the purpose hereinbefore described.

At the pumps 5, remote from the gate, the shaft 19 is provided with one arm 20 only. Therefore the pumps are operated only by a train approaching the gate.

The remote pumps are provided with no relief-valves. The gate proper, A, is provided with a flexible end portion or bar A' by means of a ball-and-socket joint l' . To said end portion is secured a hinge m' . The socket portion of said joint is formed of two sections l'' , as shown in Fig. 12 of the drawings, se-

cured to the end of the gate proper, A, and one of said sections is formed with a guide n''' . On the hinge m' is secured a rod n'' , 70 movable in said guide and having a collar o'' secured thereon adjacent to said hinge. Between said collar and guide is a spring m'' in order to throw said flexible end portion to its normal position, as shown in Fig. 11 of 75 the drawings.

The herein-described gate is designed to be used on a single-track railroad.

I claim—

1. An automatic pneumatic railway-gate 80 comprising a vertically-swinging gate-arm, gears moving said arm to and from its closed position, an air-cylinder having its piston actuating said gears, air-pumps remote from the gate and communicating with one end of 85 the air-cylinder to move the gate to its closed position, an air-pump in proximity to the gate communicating with the opposite end of the air-cylinder to move the gate to its open position, a relief-valve relieving the air-cylinder 90 from compressed air below its piston, mechanism operating said valve and actuated by the piston-rod of said adjacent pump, a relief-valve relieving the air-cylinder from compressed air above its piston and track in- 95 struments operating said air-pumps as set forth and shown.

2. An automatic pneumatic railway-gate comprising a vertically-swinging gate-arm, gears moving said arm to and from its closed 100 position, an air-cylinder having its piston actuating said gears, air-pumps remote from the gate and communicating with one end of the air-cylinder to move the gate to its closed position, an air-pump in proximity to the gate 105 communicating with the opposite end of the air-cylinder to move the gate to its open position, a relief-valve operated by the adjacent pump relieving the air-cylinder from the compressed air below its piston, a relief-cylinder 110 in proximity to the aforesaid cylinder, a relief-valve operated by the piston of said relief-cylinder and relieving the air-cylinder from compressed air above its piston and track instruments operating said air-pumps as set 115 forth and shown.

3. In an automatically pneumatically operated railway-gate, the combination of a vertically-swinging gate-arm, gears moving said arm to and from its closed position, an 120 air-cylinder having its piston-rod provided with teeth and operating said gears, air-pumps remote from the gate and communicating with one end of the air-cylinder to move the gate to its closed position, an air- 125 pump in proximity to the gate communicating with the opposite end of the air-cylinder to move the gate to its open position, a relief-valve operated by the adjacent pump relieving the air-cylinder from compressed air be- 130 low its piston, a relief-cylinder in proximity to the aforesaid cylinder, a relief-valve operated by the piston of said relief-cylinder and relieving the air-cylinder from com-

pressed air above its piston, and track instruments operating said pumps as set forth and shown.

4. The combination with the gate-standard, of a horizontal shaft journaled thereon, a vertically-swinging gate-arm secured to said shaft, an air-cylinder within said standard having its piston-rod provided with teeth and moved by air-pressure, a set of gears actuated by said rod, means on said shaft to engage said set of gears to move the gate-arm to its closed and open position, a latch pivoted to the gate-standard and adapted to automatically engage means on the shaft to hold the same to lock the gate-arm in its closed or open position, and a cam on the shaft-gear of the aforesaid set of gears automatically operating said latch to unlock said arm as set forth.

5. In combination with the gate-standard, a horizontal shaft extending across the same, a vertically-swinging gate-arm secured on said shaft, a gear secured to said shaft, an air-cylinder within said standard having its piston-rod provided with teeth, intermediate gears between said piston-rod and aforesaid gear, air-pumps and relief-valves controlling the movement of said piston-rod, a notched disk secured to said shaft, lugs engaging each other formed on the adjacent faces of said disk and the aforesaid shaft-gear a cam formed on the outer face of said gear and a latch pivoted to the gate-standard and formed with two hooks by which it lies respectively on said cam and notched disk, said cam serving to raise the latch from said disk as shown for the purpose set forth.

6. In an automatic pneumatic railway-gate, a combination of a vertically-swinging gate-arm, a set of gears moving the said arm to and from its closed position, rotary bell-hammers, a separate set of gears for rotating said hammers, an air-cylinder having its piston-rod operating both sets of gears, air-pumps and relief-valve communicating with opposite ends of said cylinder to control the movement of said piston-rod, and track instruments actuating said pump as set forth and shown.

7. The combination with the gate-standard of a horizontal shaft extending across the same and journaled thereon, a vertically-swinging gate-arm secured to said shaft, a gear loosely mounted on said shaft, a notched disk secured to said shaft adjacent to said gear the disk and gear formed with lugs on their adjacent faces adapted to engage each other and with a lost motion between them, a set of gears operating the aforesaid gear to move the gate-arm to its closed and open position, an air-cylinder having its piston-rod provided with teeth and actuating said set of gears, a bell, rotary bell-hammers, another set of gears rotating said hammers and actuated by said piston-rod during the aforesaid lost motion before the closing of said gate-arm, a ratchet-wheel a pawl secured to one of the gears of

the latter set and engaging said ratchet-wheel, a sprocket or grooved wheel secured to the aforesaid shaft and carrying a chain or cable, two vertical rods secured at their upper ends to the ends of said chain or cable, and at the opposite ends to bell-crank levers, and two horizontal rods extending respectively to the gate-standards across the railway-track and street as set forth and shown.

8. In combination with the standard B, two vertical plates *r r* located within said standard, a horizontal shaft *e* extending between said plates, a gear *d* secured to said shaft, an air-cylinder B' disposed in vertical position within the standard and having its piston-rod *c* provided with teeth *c'* engaging the gear *d*, a gear *f* mounted loosely on the shaft *e* provided with a pawl *k'* on its inner face to engage the ratchet-wheel *k* in the upward movement of the piston-rod *c*, a shaft *l* extending between the plates *r r*, a gear *h* mounted on said plate and meshing with gear *f*, a gear *g* secured to shaft *l* and meshing with gear *g'* secured to shaft *m* and having secured thereto a frame *a''* provided with guides in which slide the bell-hammers *j* during its rotation to strike the bell B, as set forth and shown.

9. In an automatic pneumatic railway-gate, the combination of a vertically-swinging gate-arm, gears moving said arm to and from its closed position, an air-cylinder having its piston-rod provided with teeth to actuate said gears, an alarm-bell operated by another set of gears actuated by the aforesaid piston-rod, air-pumps remote from the gate communicating with one end of the air-cylinder to move the gate-arm to its closed position and operate the alarm-bell, a pump in proximity to the gate communicating with the opposite end of said cylinder to move the gate-arm to its open position, a relief-cylinder in proximity to the main air-cylinder and communicating with the remote pumps, a relief-valve operated by said cylinder, and communicating with the top of the interior of the main air-cylinder and a relief-valve operated by the adjacent air-pump and communicating with the bottom of the interior of the main air-cylinder as described and shown.

10. The combination of a bell *b*, rotary fly-wheel *i*, a frame *w* secured to said wheel and provided with a plurality of arms *w'* having guides formed therein and bell-hammers *j' j'* movable in said guides, gears rotating said fly-wheel, an air-cylinder having its piston-rod provided with teeth and actuating said gears, air-pumps and relief-valves communicating with said cylinder to control the movement of the piston-rod, and track instruments actuating said pumps as described and shown.

11. The described bell-ringing mechanism consisting of a shaft *e* having the gear *d* secured thereto, a gear *f* loosely mounted on said shaft, a ratchet-wheel *k* secured to said shaft, a pawl *k'* secured to the wheel *f*, a

spring k'' secured at one end to the wheel f and having the opposite end holding the pawl in engagement with said ratchet-wheel, a shaft m , a fly-wheel i'' secured to said latter shaft in proximity to the bell, a frame w secured to said fly-wheel and provided with bell-hammers $j' j''$, a gear g' on the shaft m , a shaft h'' , a gear g thereon meshing with the gear g' , a gear h also on the shaft h'' and meshing with the gear f , an air-cylinder B having its piston-rod c provided with teeth c' and moved by air-pressure to operate the gear g as described and shown.

12. The combination with the gate-standard B of a horizontal shaft a extending across the same, gate-arm A secured thereto, gear 4 mounted thereon and having a cam e' secured on its outer face, a notched wheel f' adjacent to the gear 4, lugs h' and g'' respectively on the adjacent faces of the gear 4 and wheel f' , a support b'''' secured to the standard B, the latch b' held in said support and formed with two hooks b''' engaging respectively the notched wheel f' and cam e' , gears operating

the gear 4 and the piston-rod c actuating said gears as set forth and shown. 25

13. The gate having the free end portion connected to the main portion by a ball-socket joint, a hinge m' secured to said free end portion, a guide n''' on the main portion, a rod n'' secured at one end to said hinge and movable in said guide, and having a collar o'' secured thereon adjacent to said hinge, a spring m'' between said collar and guide n''' for the purpose set forth. 30

14. The combination of an air-pump, a track instrument actuating said pump and operated by a train passing in either direction, a relief-valve below the pump-cylinder, mechanism operating said valve and actuated by the piston-rod of said pump as described and shown. 35

In testimony whereof I have hereunto signed my name this 16th day of April, 1895.

CHARLES H. SHERWOOD. [L. s.]

Witnesses:

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R. P. KUTSCHBACH.