(No Model.) 6 Sheets—Sheet 1.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

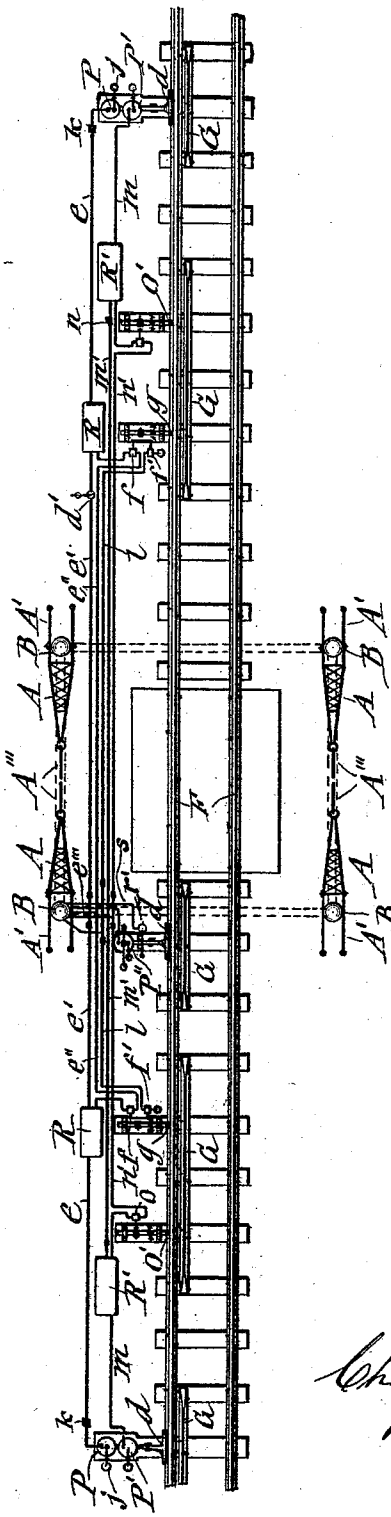


Fig. 1

WITNESSES:

E. L. Bendixon

J. J. Laass

INVENTOR:

Charles H. Sherwood

By E. Laass

his ATTORNEY

(No Model.) 6 Sheets—Sheet 2.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

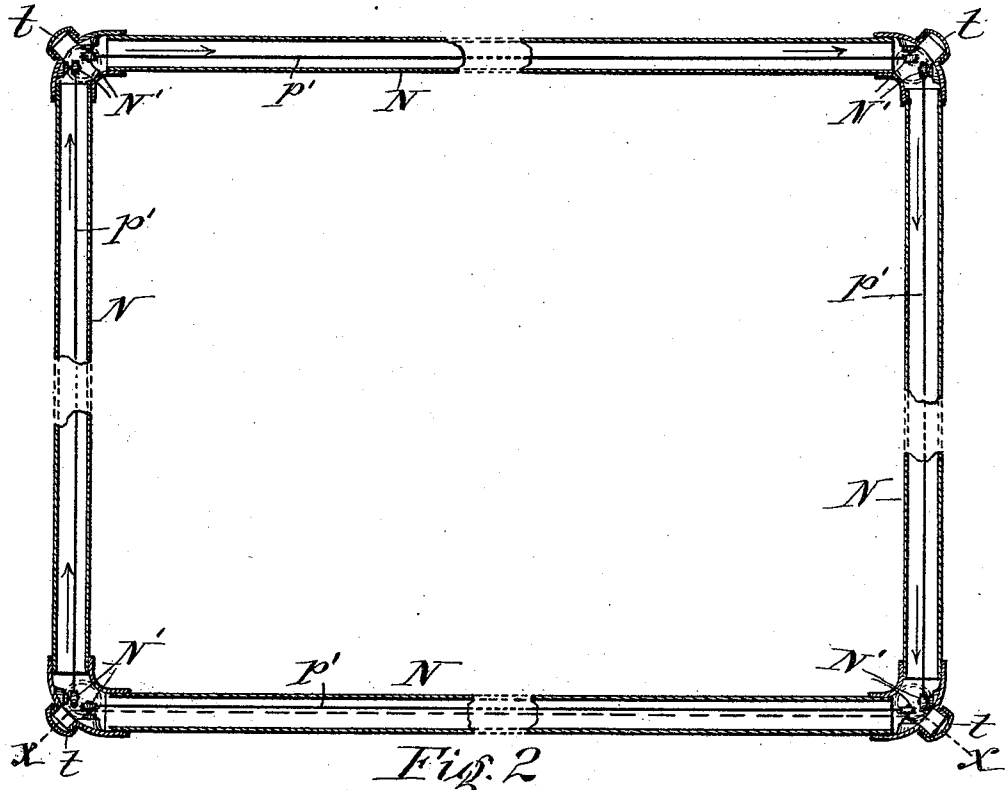


Fig. 2

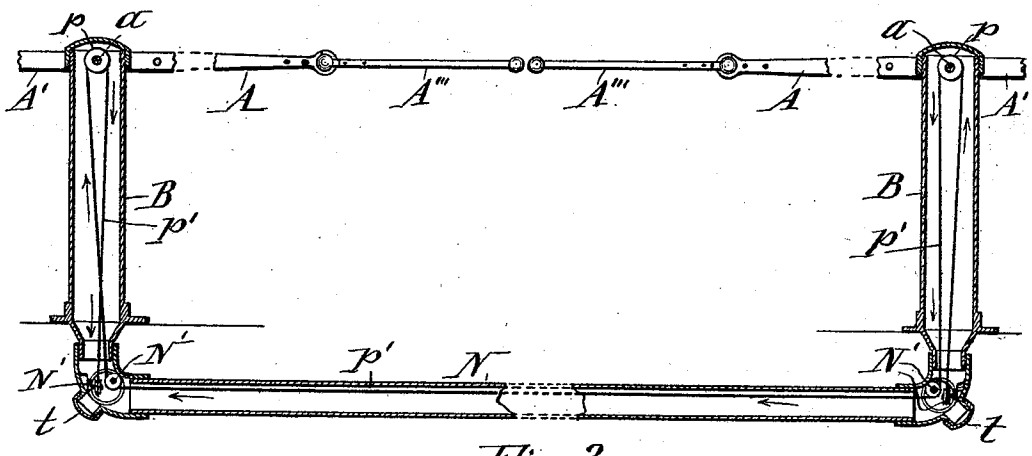


Fig. 3

WITNESSES:

C. L. Bendixon

J. J. Saasz

INVENTOR:

Charles H. Sherwood

By E. Laass

his ATTORNEY

(No Model.) 6 Sheets—Sheet 3.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

Fig. 4

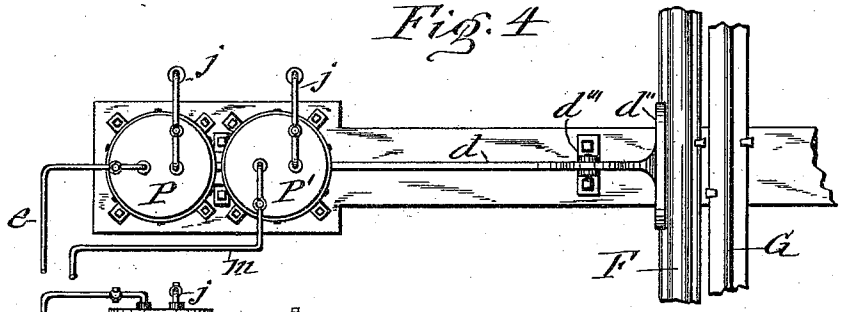


Fig. 5

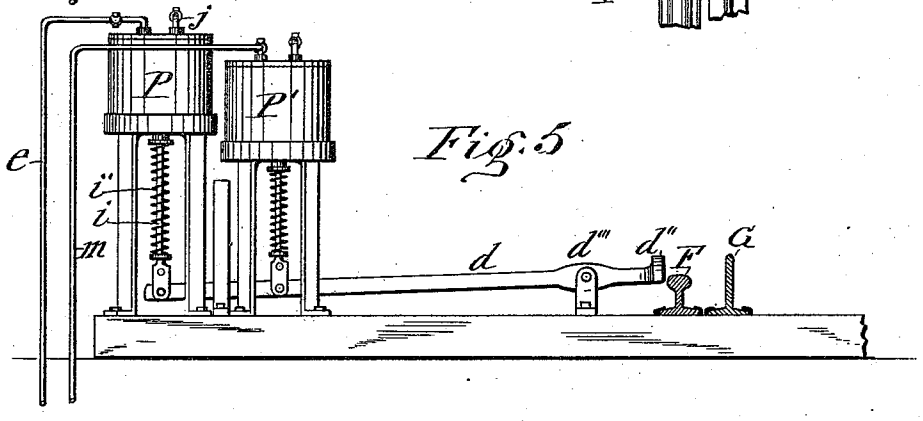


Fig. 6

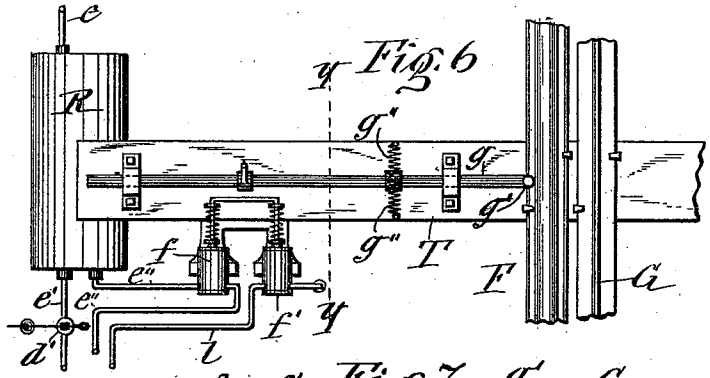
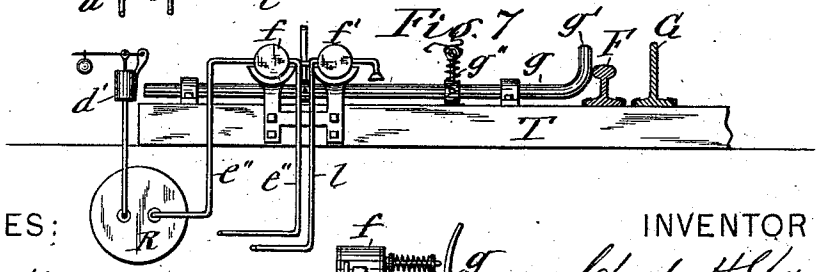


Fig. 7



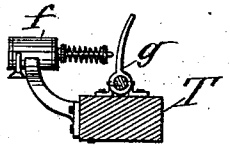


Fig. 8

WITNESSES:

E. L. Bewdixon

J. J. Saass

INVENTOR:

Charles H. Sherwood

By E. Laass

his ATTORNEY

(No Model.) 6 Sheets—Sheet 4.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

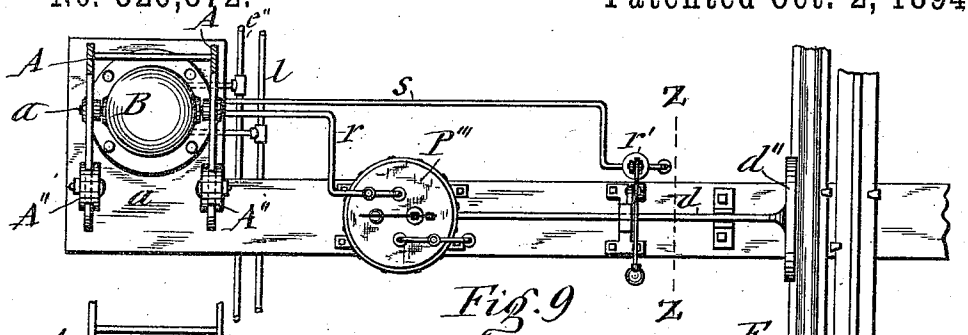


Fig. 9

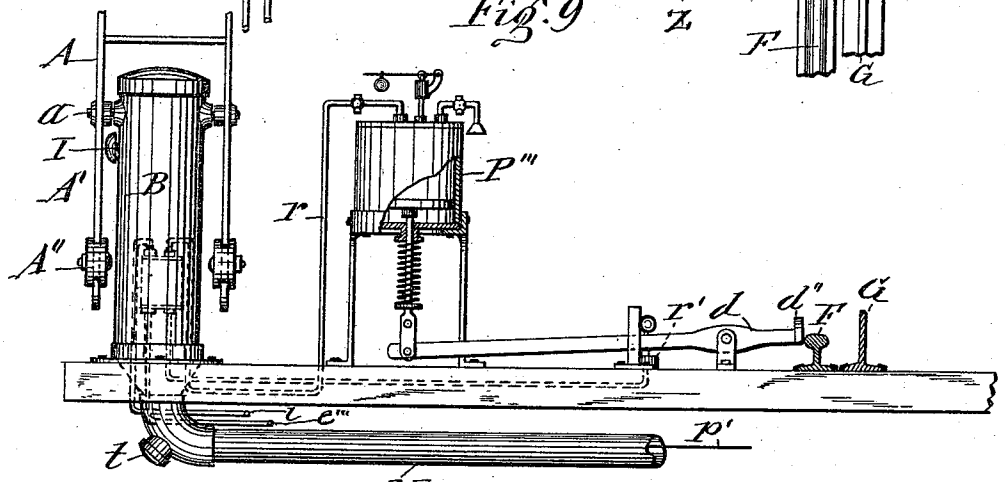


Fig. 10

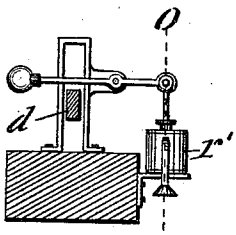


Fig. 11

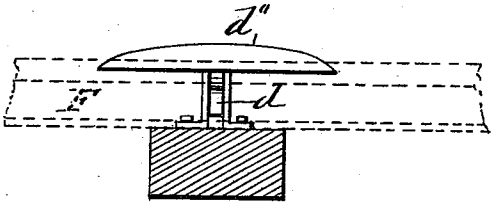


Fig. 12

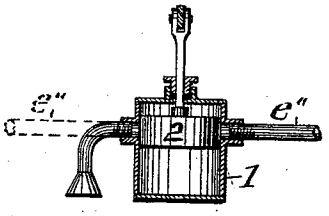


Fig. 13

WITNESSES:

E. L. Bendixon

J. J. Saass

INVENTOR:

Charles H. Sherwood

By E. Saass

his ATTORNEY

(No Model.) 6 Sheets—Sheet 5.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

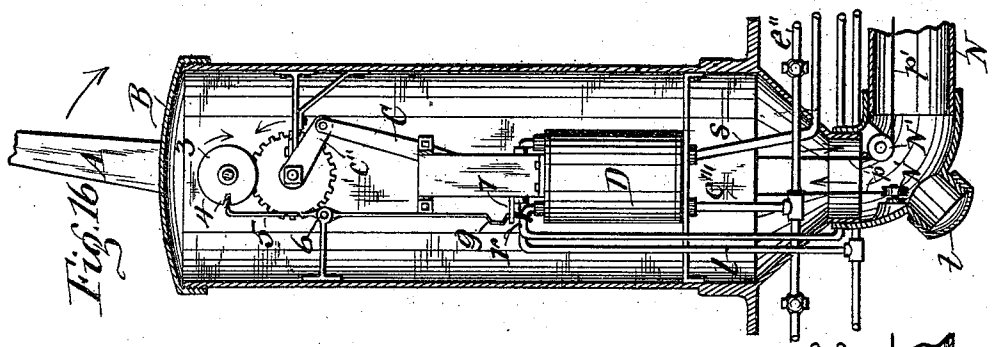


Fig. 16

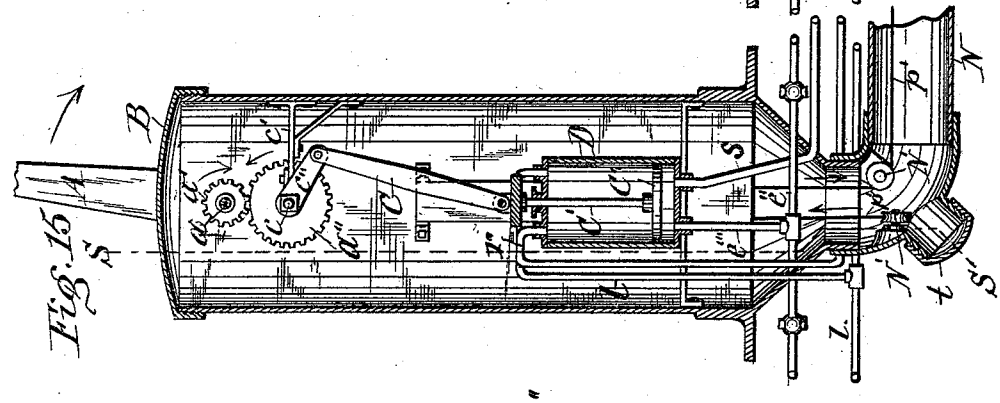


Fig. 15

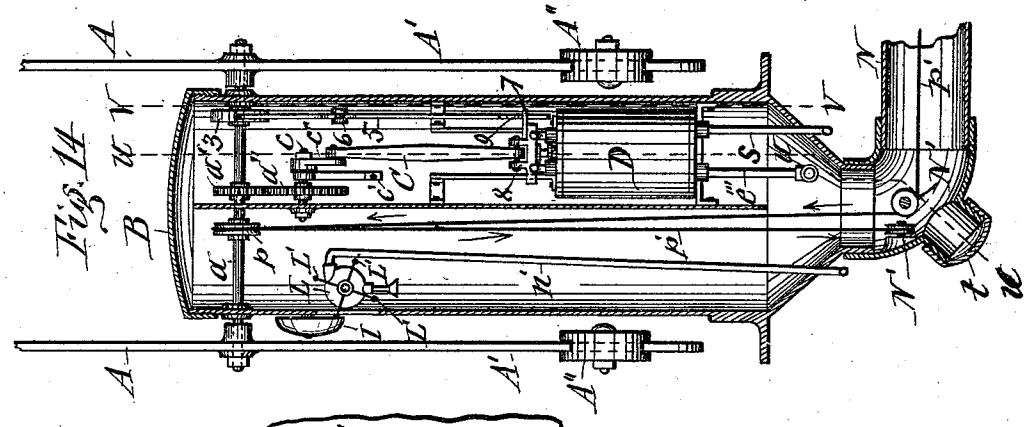


Fig. 14

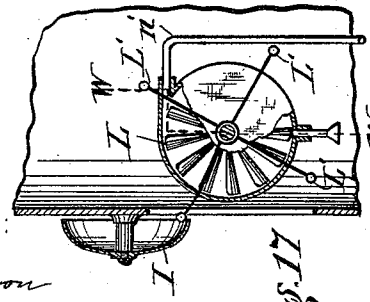


Fig. 17

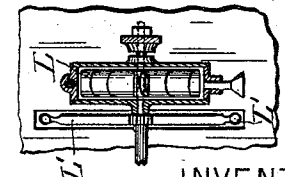


Fig. 18

WITNESSES:

C. L. Bendixon

J. J. Laass

INVENTOR:

Charles H. Sherwood

By E. Laass

his ATTORNEY

(No Model.) 6 Sheets—Sheet 6.

C. H. SHERWOOD.

AUTOMATIC PNEUMATIC RAILWAY GATE.

No. 526,872. Patented Oct. 2, 1894.

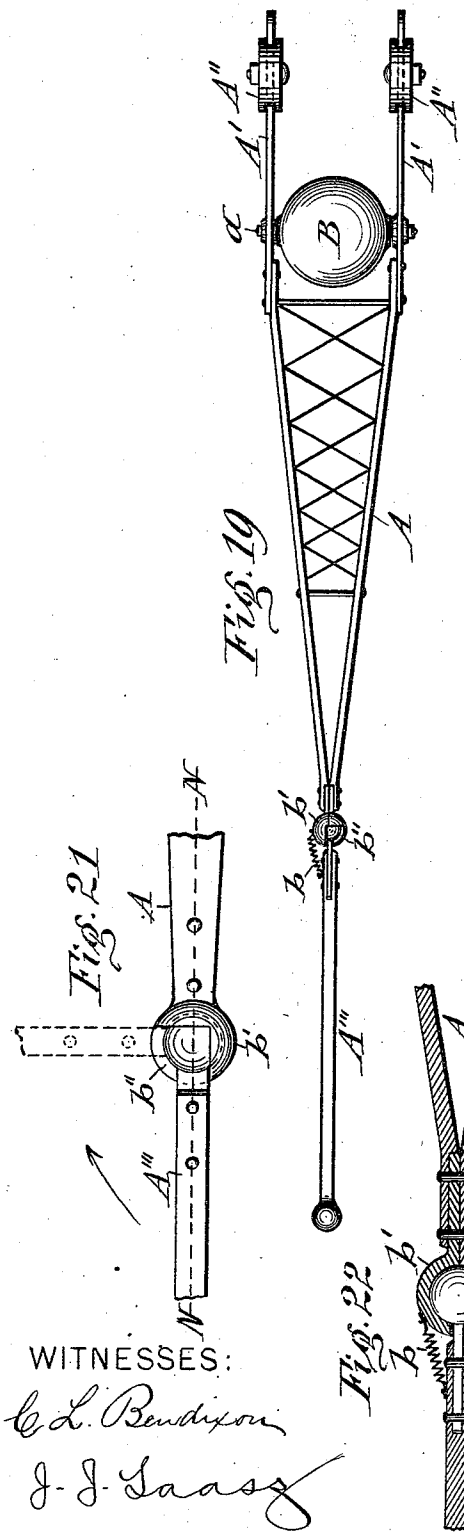


Fig. 19

Fig. 21

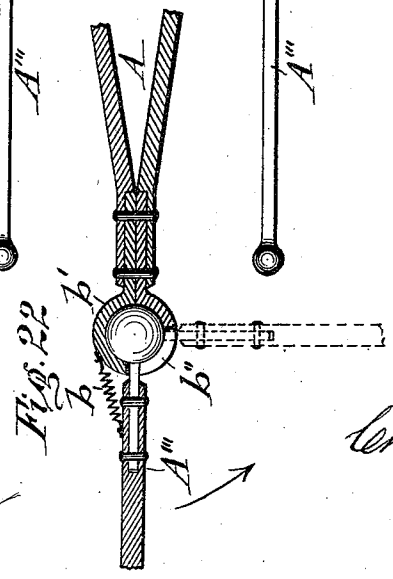


Fig. 22

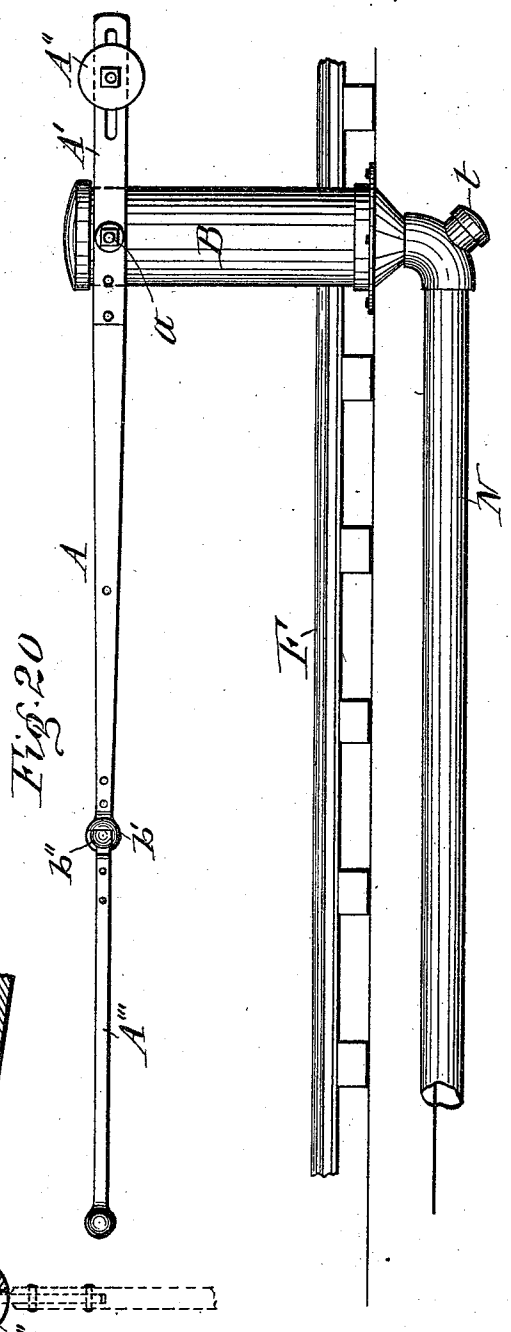


Fig. 20

WITNESSES:

C. L. Bendixon

J. J. Saass

INVENTOR:

Charles H. Sherwood

By E. Saass

his ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. SHERWOOD, OF UTICA, ASSIGNOR OF ONE-HALF TO HENRY C. LYMAN, OF SHERBURNE, NEW YORK.

AUTOMATIC PNEUMATIC RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 526,872, dated October 2, 1894.

Application filed February 17, 1894. Serial No. 500,475. (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, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of railway gates which are operated automatically by an engine or a train of cars approaching the portion of the railway guarded by said gates; and the invention consists in a novel organization of air-pumps and valves actuated by the passing engine or cars and connected by air-conduits with a cylinder, the 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; and the invention furthermore consists in certain novel features of the details of the gate all as hereinafter more fully described and set forth in the claims.

In the accompanying drawings Figure 1 is a diagrammatic plan view of a section of railway provided with my pneumatic gates. Fig. 2 is a horizontal section of the tubular frame containing the cables or chains by which the gates at opposite sides of the railway are operated in unison. Fig. 3 is a vertical transverse section on line —X—X— in Fig. 2 with the gate mounted on the aforesaid frame. Fig. 4 is an enlarged plan view of the air-pumps and track-instrument which operates said pumps and charges the compressed air-reservoirs. Fig. 5 is a side elevation of the same. Fig. 6 is a plan view of the valves and track-instrument which operates the same to permit the compressed air to close the gates. Fig. 7 is a side view of the same. Fig. 8 is a transverse section on line —Y—Y— in Fig. 6. Fig. 9 is a plan view of the air pump and track instrument operating said pump to open the gates. Fig. 10 is a side elevation of the same with a portion of the pump cylinder broken away to show the piston. Fig. 11 is a transverse section on line —Z—Z— in Fig. 9. Fig. 12 is an end view of the track instrument which operates the air pumps. Fig. 13 is an enlarged vertical section on line —O—O— in Fig. 11. Fig. 14 is an elevation of the incased mechanisms which are actuated by the compressed air and transmit motion to the gate to open the same, viewed from line S, S, in Fig. 15 in a direction at right angles to the axis of the gate. Figs. 15 and 16 are vertical sections respectively on lines —U—U— and —V—V— in Fig. 14. Fig. 17 is a vertical section of the alarm bell and its actuating fan. Fig. 18 is a transverse section on line —W—W— in Fig. 17. Fig. 19 is a plan view of one of the gates. Fig. 20 is a side view of the same. Fig. 21 is an enlarged side view of the flexible connection of the free end portion of the gate to the main arm thereof, and Fig. 22 is a transverse section on line —N—N— in Fig. 21.

Similar letters and figures of reference indicate corresponding parts.

—A—A— denote the gates each of which is mounted on a horizontal shaft —*a*— which passes through a hollow standard or case —B— and is journaled in suitable bearings in the sides of said case.

To rearward extensions —A′—A′— of the gate are connected weights —A″— which are adjustable in their distance from the fulcrum of the gate to permit the latter to be properly counterbalanced.

To guard against the danger of entrapping vehicles between the 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 portion or bar —A‴— which is held normally in line with the main portion of the gate, by means of a suitable spring —*b*— and permitted to be swung upward and outward and thus yield to pressure brought against its under side and against the side facing the railway. For this purpose I prefer to connect the end portion —A‴— to the main portion of the gate by a ball and socket joint —*b′*— the socket of which is provided with an opening —*b″*— through which the bar —A‴— passes, said opening extending upward and to one side sufficiently to permit the bar to move as aforesaid as shown in Figs. 19, 20, 21 and 22 of the drawings.

To the shaft —*a*— of the gate is fastened a pinion —*a′*— which meshes with a gear-

wheel —*a''*— fixed to a counter-shaft —*c*— mounted in brackets —*c'*—*c'*— secured to the interior of the case —B—. To this counter-shaft is secured a crank —*c''*— which is connected by pitman —C— to the piston rod —C'— of the piston —C''— in the air-cylinder —D—, said cylinder receiving and discharging compressed air to operate the piston and thus open and close the gate by means of air pumps and valves operated by track-instruments which receive motion from the engine or cars passing over the road. The general arrangement of said parts is illustrated in Fig. 1 of the drawings, in which —P—P— represent the air pumps which may be of any suitable and well known construction. These pumps are at proper distances in opposite directions from the gates —A— to allow them to be closed by the operation of the pumps before the engine or train of cars arrives at the gates.

—*d*—*d*— denote the track instruments which operate said pumps.

—R—R— are reservoirs for storing the air compressed by the pumps, which air is conducted from the pumps to the reservoirs by pipes —*e*—*e*— and in order to equalize the pressure in the two reservoirs the latter are connected with each other by an air-conducting pipe —*e'*—. Either the reservoirs or the aforesaid pipes are equipped with suitable safety-valves —*d'*— to guard against excessive air pressure.

—*f*—*f*— represent the valves which control the flow of the compressed air from reservoirs to the cylinder —D— the piston of which operates the gates as hereinbefore described.

—*f'*—*f'*— are valves which relieve the said cylinder from compressed air from one end thereof while the opposite end receives compressed air from one of the reservoirs —R— through the valve —*f*—.

—*g*—*g*— represent the track-instruments which operate the aforesaid valves and —G—G— designate guard-rails which rise from opposite ends to an elevation at their centers slightly above the top of the track-instruments to protect the latter from contact with the so-called flanger which is usually attached to an engine or car and held in contact with the track-rails to remove ice or sleet therefrom. Said guard-rail is the subject of another application for Letters Patent and needs no detail description in this case.

I will now describe more fully the construction and combination of the aforesaid air pumps, valves and their connections with the track-insturments and cylinder whose piston operates the gate.

Referring to Figs. 4 and 5 of the drawings, —F—F— denotes the track-rail, contiguous to the outer side of which is the head —*d''*— of the track-instrument —*d*— consisting of a lever fulcrumed at —*d'''*—. The head —*d''*— is elongated in the direction lengthwise of the track-rail and rises gradually from opposite ends to the center where it projects above the top of the track-rail and is thus caused to be depressed by the wheels of the engine and cars passing over it.

To the opposite end of the track-instrument or lever is connected the piston rod —*i*—of the air pump —P—. By means of a suitable spring —*i'*— the outer end of the lever —*d*— is normally depressed to cause the head —*d''*— thereof to project above the track-rail and also sustain the piston of the pump normally in one end of the cylinder, the opposite end of which is provided with an air inlet —*j*— and has also attached to it the air-pipe —*e*— which conducts the compressed air to the reservoir —R—. The successive depressions of the head —*d''*— by the wheels of the engine and cars passing over it causes the track-instrument —*d*— to impart a reciprocating motion to the piston rod —*i*— and thus actuates the air pump —P— which forces compressed air to the reservoir —R— where it is retained by a suitable check-valve —*k*— connected to the pipe —*e*— and by the normally closed valve —*f*— connected to the discharge pipe —*e''*— which extends from reservoir —R— to the corresponding reservoir —R— beyond the gates, and has a branch-pipe —*e'''*— extending from it and communicating with the base of the interior of the cylinder.

It will be observed that the two air-pumps —P— and their actuating track-instruments located in opposite directions from the gates are operated successively by the engine or train of cars in passing beyond the gates as well as in approaching the same and therefore the reservoirs —R—R— are constantly charged with compressed air.

In approaching the gates, the wheels of the engine and cars operate the track-instrument —*g*— which opens the valve —*f*— and allows the compressed air to pass from the adjacent reservoir —R— through the pipes —*e''*—*e''*— to the base of the interior of the cylinder —D— and thereby lift the piston —C''— which by means of the pitman —C—, crank —*c''*—, gear-wheel —*a''*— and pinion —*a'*— causes the gates to be swung down into a closed position as indicated by arrows in Figs. 15 and 16 of the drawings.

The valve —*f*— may be of any suitable or well known form. An exemplification of such a valve is illustrated in Fig. 13 of the drawings, which however is more particularly to be used in connection with the pump which raises the gates, and it consists simply of a case —1— tapped at opposite sides by the sections of the pipe —*e''*—, partly indicated by dotted lines, and a slide —2— in the case adapted to cover and uncover the openings through which the aforesaid pipe-sections communicate with the interior of the case. In order to allow said valve to be opened only by the engine or cars approaching the gates, I form the track-instrument of a shaft extending horizontally at right angles from the

outside of the track-rail —F— and journaled in suitable bearings secured to a sill or prolongation of the cross-tie —T— and terminated at one end with an upward extension —*g'*— which is contiguous to the outside of the track-rail and sustained normally in an upright position by suitable springs —*g''*— and projects above the track-rail so as to cause the wheels of the engine and cars to come in contact therewith and thereby turn the aforesaid shaft. The valve —*f*— is near the side of the said shaft facing toward the gates, and from the shaft projects an arm —*g''*— which is caused to push the stem of the valve inward and thereby open the valve on the approach of the engine or cars toward the gates. The arm —*g''*— is detached from the valve-stem and consequently the tilting of said arm from the valve by an engine or cars passing from the gates does not affect the aforesaid valve. To relieve the upper part of the interior of the cylinder —D— from compressed air while forcing air into the lower portion of said cylinder in the manner aforesaid, I employ the normally closed relief-valve —*f'*— which is connected to the pipe —*l*— extended from the top of the cylinder —D—. Said relief-valve is placed in proximity to the valve —*f*— and arranged to be operated in the same manner and simultaneously therewith by the track-instrument —*g*— as illustrated in Figs. 6, 7 and 8 of the drawings.

In order to give an alarm signal before closing the gates, I employ a pneumatic alarm bell —I— preferably secured to the case —B— as shown in Fig. 14 of the drawings, which bell is operated by means of a rotary fan —L— to the shaft of which are secured flexible bell-hammers —L'—, said fan being driven by the force of compressed air produced and conducted to the case of the fan automatically by the engine or cars approaching the gates. This is effected by the following means: Near the side of each pump —P— is located a similar air-pump —P'— the piston rod of which is connected to the outer end of the lever or track-instrument —*d*— and thus said two pumps are operated simultaneously and substantially alike. The pump —P'— has its discharge pipe —*m*— connected to a reservoir —R'— which is connected by a pipe —*m'*— with the corresponding reservoir —R'— beyond the gates to equalize the pressure in the two reservoirs. A suitable safety-valve —*n*—connected either to one of the reservoirs or to the pipe —*m'*— guards against excessive air-pressure. From each reservoir —R'— to the fan —L— extends a pipe —*n'*— to which is attached a normally closed valve —*o*— constructed and operated similarly to the valve —*f*—, *i. e.*, a track-instrument —*o'*— substantially like the track-instrument —*g*— is actuated to open the valve —*o*— by the wheels of the engine or cars passing over said instrument in approaching the gates. The opening of said valve allows the compressed air to pass from the reservoir —R'— to the fan —L— which is thereby revolved and the bell is sounded by the hammers attached to the shaft of the fan.

To automatically open the gates as the engine or cars leave the gates, I employ another air-pump —P''— operated by a track-instrument substantially like the instrument —*d*— hereinbefore described, and located at or near the gate with the head —*d'*— of said instrument contiguous to the outer side of the track-rail as more clearly shown in Figs. 9 and 10 of the drawings. The discharge pipe —*r*— of this pump communicates with the upper part of the interior of the cylinder —D— to cause the compressed air to depress the piston —C''— and thereby cause the gates to be lifted into their open positions.

A normally closed valve —*r'*— is arranged to be opened simultaneously by the track-instrument and is connected by a pipe —*s*— to the base of the cylinder to relieve said portion of the cylinder from compressed air while the upper part is charged by the action of the pump as aforesaid.

—3— represents a disk fastened to the shaft —*a*— of the gate —A— and provided with a notch —4— in its periphery. A detent —5— is pivoted at —6— and has its upper end bent toward the aforesaid disk and adapted to engage the notch —4— when the gate —A— is in its raised position as shown in Fig. 16 of the drawings, said engagement serving to lock the gate in its said position.

The lower end of the detent —5— is formed with a laterally projecting cam —9— which is in such a position as to cause it to come in contact with a finger —7— projecting from the cross-head —8— in the beginning of the upward movement of said cross-head. Said contact causes the detent —5— to be thrown out of engagement with the notch —4— and thus releases the disk —3—.

In order to allow the piston to move upward a sufficient distance to produce the aforesaid effect without imparting in the meantime rotary motion to the shaft —*a*—, the gear-wheel —*a''*— is mutilated or deprived of one or more teeth as shown in Fig. 15 of the drawings.

In order to cause the gates at opposite sides of the railway to open and close in unison, I attach to the shaft —*a*— of each gate either a pulley or sprocket-wheel —*p*— and attach to the base of the hollow standards or cases —B—, the tubular frame —N— in the four corners of the interior of which I pivot sheaves —N'— for guiding the chain or cable —*p'*— which runs upon the wheels or pulleys —*p*— and passes through the aforesaid frame as shown in Figs. 2 and 3 of the drawings.

To afford access to the interior of the frame —N—, I provide the four corners thereof with removable caps —*t*—*t*—.

Having described my invention, what I claim is—

1. An automatic pneumatic railway gate 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, an air-compressor remote from the gate and communicating with one end of the air-cylinder to move the gate to its closed position, an air-compressor in proximity to the gate communicating with the opposite end of the air-cylinder to move the gate to its open position, valves relieving the air-cylinder from compressed air in front of the piston, and track-instrument operating said air-compressors and valves as set forth.

2. In combination with the gate proper, gears moving said gate to and from its closed position, an air-cylinder having its piston connected to said gears to operate the same, air-compressors remote from the gate in opposite directions therefrom, air-reservoirs receiving the compressed air, pipes leading from said reservoirs to one and the same end of the aforesaid air-cylinder to move the gate to its closed position, normally closed valves connected to said pipes, track-instruments operating said compressors and valves, an air-compressor in proximity to the gate and communicating with the aforesaid air-cylinder to move the gate to its open position, a relief valve communicating with said cylinder, and track-instruments operating said air-compressors and valves as set forth.

3. In combination with the gate proper, an air-cylinder provided with a piston, mechanisms transmitting motion from said piston to the gate, air-compressors remote from the gate, reservoirs receiving the compressed air, a pressure-equalizing pipe connecting said reservoirs, pipes leading from the reservoirs to one and the same end of the aforesaid air-cylinder, normally closed valves connected to the latter pipes, normally closed relief valves communicating with the opposite end of the air-cylinder, track-instruments operating the air-compressor and actuated by the engine or car passing in either direction, and track-instruments actuating the valves only in one direction as set forth.

4. A gate having its free end-portion connected to the main portion by a ball and socket joint, and a spring sustaining the end-portion normally in line with the main portion as set forth and shown.

5. In combination with an alarm bell, a rotary fan bell-hammers attached to the axis of said fan, air-compressors remote from the bell, track-instruments operating said compressors, air-reservoirs receiving the compressed air, pipes leading from the reservoirs to the fan, normally closed valves connected to said pipes, and track-instruments opening said valves as set forth.

6. In combination with the shaft —*a*—, gate —A— and pinion —*a'*— attached to said shaft, the shaft —*c*—, mutilated gear —*a''*— and crank —*c''*— attached to the latter shaft, the piston —C'—, pitman —C—, the disk —3— provided with the notch —4—, the detent —5—, and the finger —7— throwing said detent out of engagement substantially as described and shown.

In testimony whereof I have hereunto signed my name this 25th day of January, 1894.

CHARLES H. SHERWOOD. [L. S.]

Witnesses:
D. L. ATKYNS,
IDA P. LYMAN.