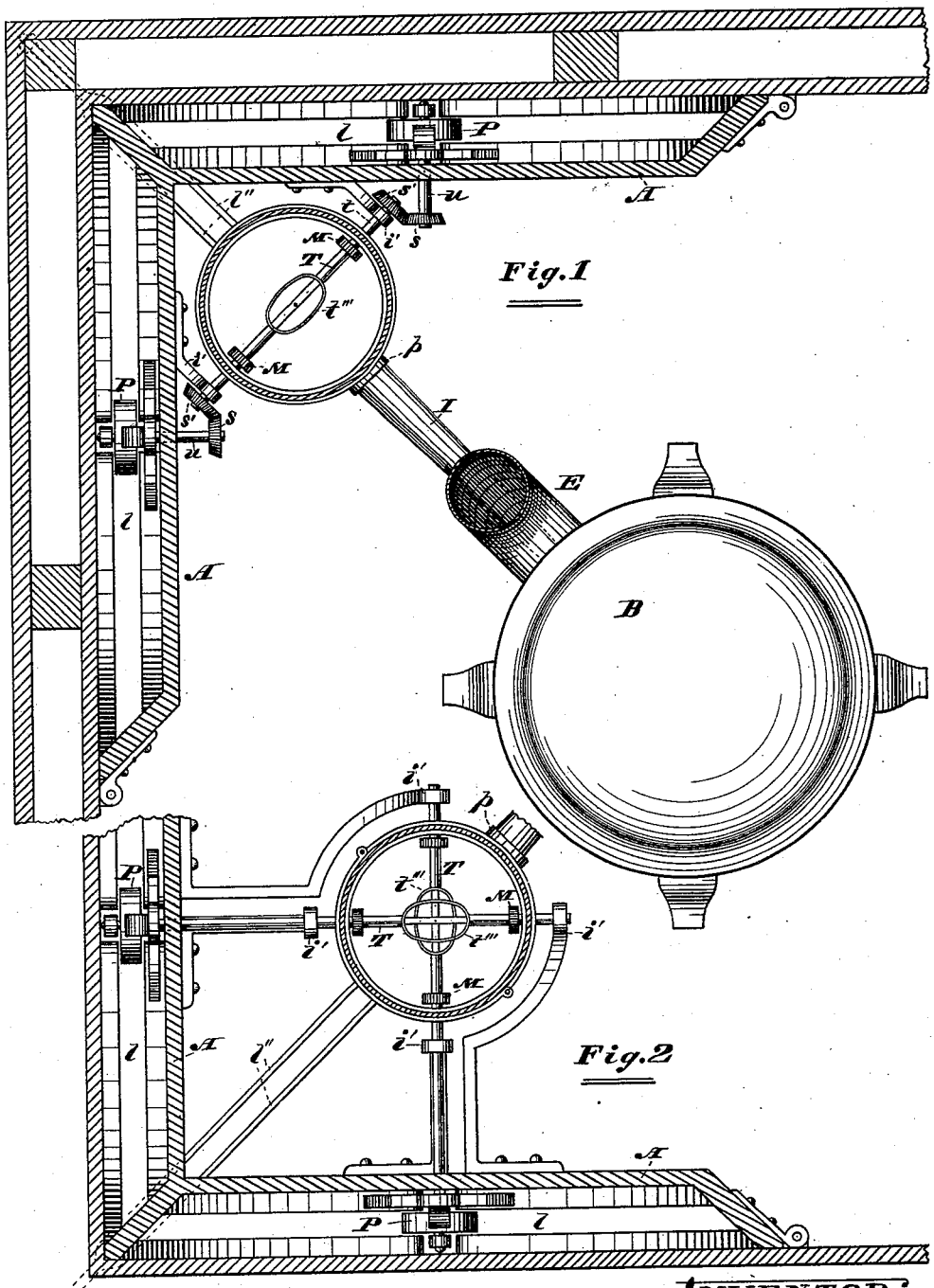
5 Sheets—Sheet 1.

J. F. GYLES.

Car-Stove and Apparatus for Extinguishing Fire Therein.

No. 207,865. Patented Sept. 10, 1878.



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R. C. Dyrenforth.

INVENTOR:

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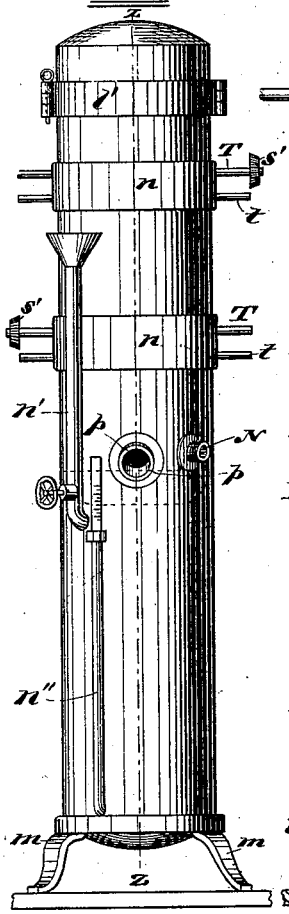
G. F. GYLES. 5 Sheets—Sheet 2.

Car-Stove and Apparatus for Extinguishing Fire Therein.

No. 207,865. Patented Sept. 10, 1878.

Fig. 3.



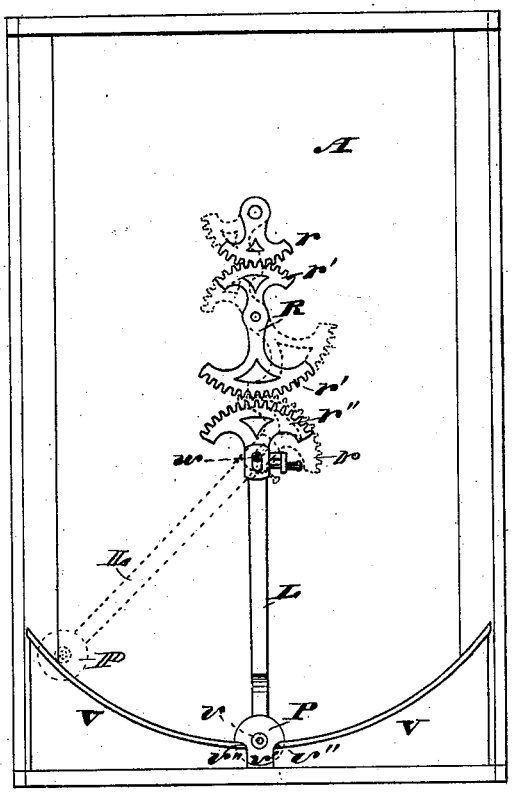


Fig. 5.

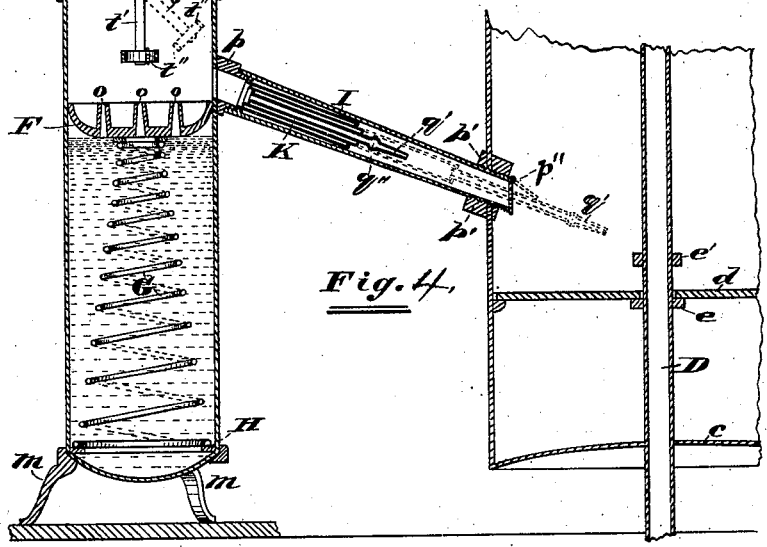


Fig. 4.

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Car-Stove and Apparatus for Extinguishing Fire Therein.

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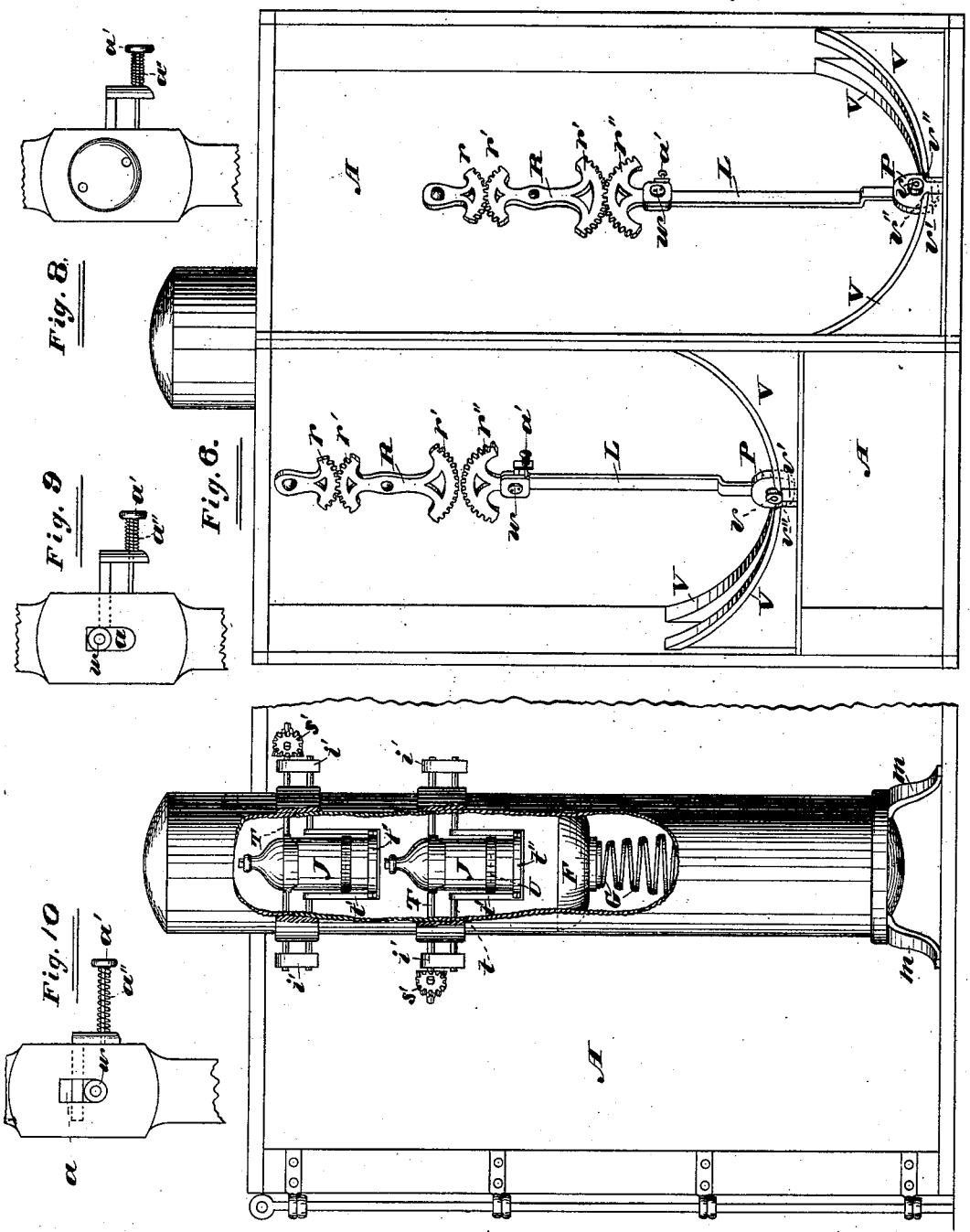

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5 Sheets—Sheet 4.

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Car-Stove and Apparatus for Extinguishing Fire Therein.

No. 207,865. Patented Sept. 10, 1878.

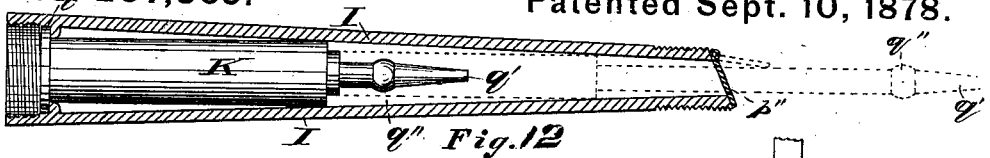

Fig. 12

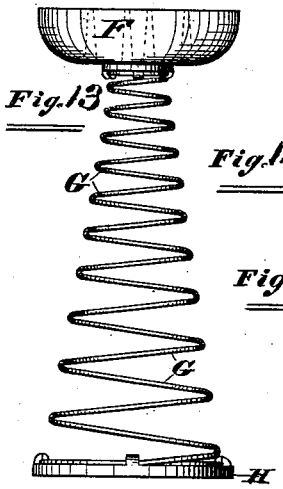

Fig. 13

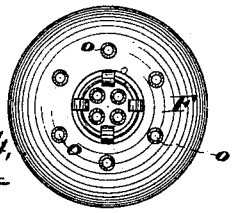

Fig. 14.

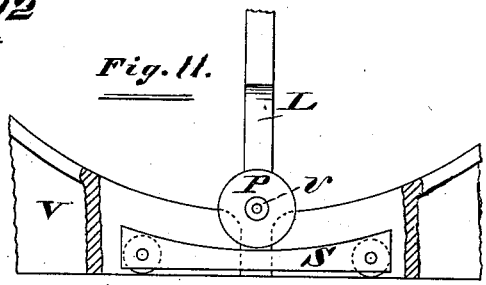

Fig. 11.

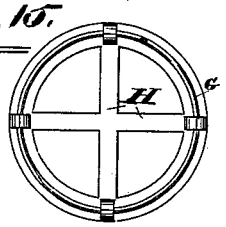

Fig. 16.

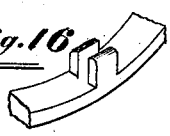

Fig. 16

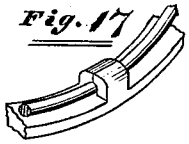

Fig. 17

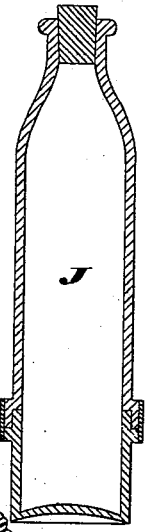

Fig. 19.

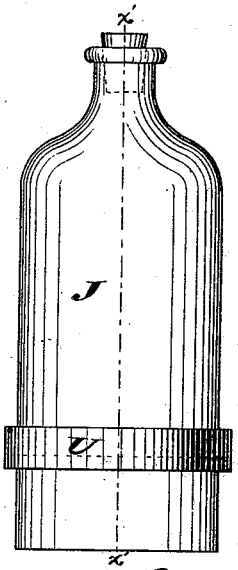

Fig. 18.

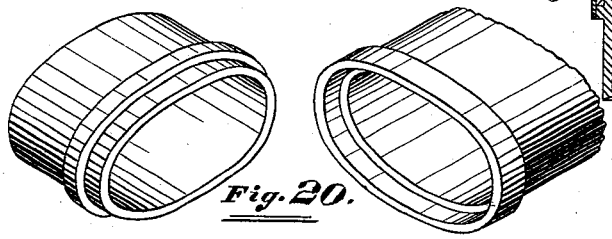

Fig. 20.

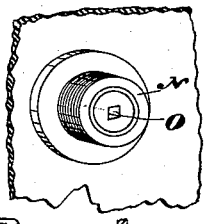

Fig. 21

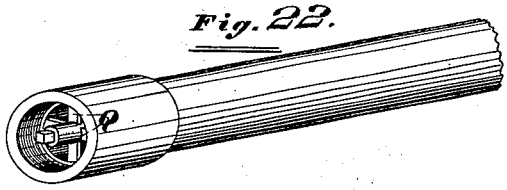

Fig. 22.

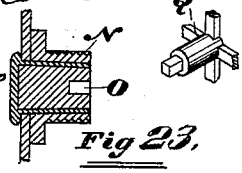

Fig 23.

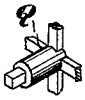

Fig. 24.

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J. F. GYLES.

Car-Stove and Apparatus for Extinguishing Fire Therein.

No. 207,865. Patented Sept. 10, 1878.

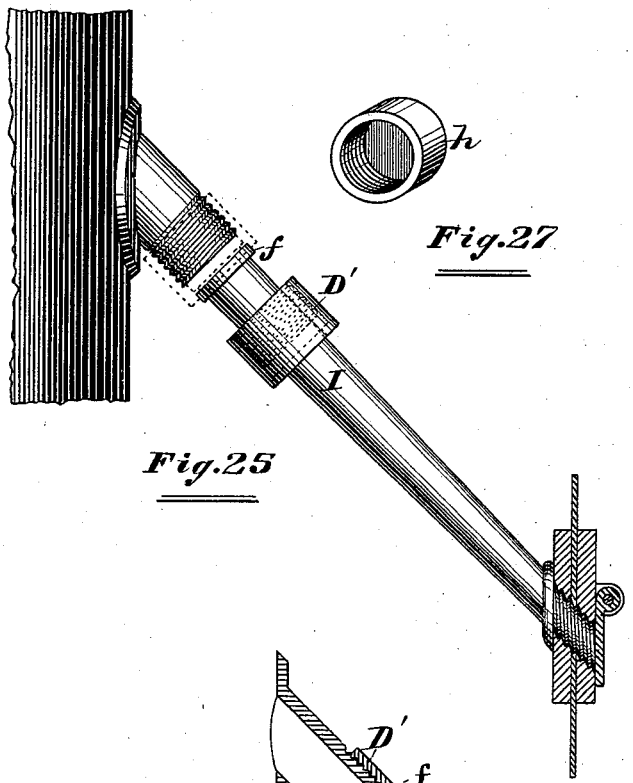

Fig.27

Fig.25

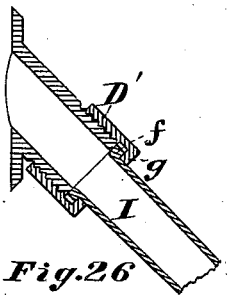

Fig.26

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A. Dyrenforth.

INVENTOR:
James F. Gyles

UNITED STATES PATENT OFFICE.

JAMES F. GYLES, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN CAR-STOVES AND APPARATUS FOR EXTINGUISHING FIRE THEREIN.

Specification forming part of Letters Patent No. **207,865**, dated September 10, 1878; application filed June 25, 1877.

To all whom it may concern:

Be it known that I, JAMES F. GYLES, of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Stoves for Heating Railroad-Cars, in combination with an Improvement in Apparatus for Extinguishing the Fire Therein, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings, of which—

Figure 1 is a plan view, partly in section, of the extinguisher attached to a stove and set in position in the corner of a car; Fig. 2, a horizontal section of the extinguishing apparatus in position as above; Fig. 3, a view of the cylinder; Fig. 4, a vertical section extending back through the connecting-tube and the stove; Fig. 5, a view of one of the walls with the pendulum and gearing and the curved planes attached; Fig. 6, an oblique view of the recessed walls of the apparatus, showing the pendulums and gearings at right angles to each other, one higher than the other, and one out of gear and the other in gear; Fig. 7, a view of the cylinder and one wall of the apparatus, the former broken away, showing the acid-bottles with their attachments and the dish and spiral spring within; Figs. 8, 9, and 10, enlarged detail views, showing the working of the spring at the fulcrum of the pendulum; Fig. 11, a detail view, showing as a modification an additional weight for throwing the pendulum into gear; Fig. 12, a section of the connecting-tube, showing the extension-tube within; Fig. 13, a view of the soda-receptacle, spiral spring, and disk; Fig. 14, a bottom view of the exterior of the soda-receptacle, showing the lugs for securing it to the top of the spiral spring; Fig. 15, a top view of the disk, showing the lugs for attaching the lower part of the spiral spring; Figs. 16 and 17, detail views of the above, showing the lugs as open, and also as closed and clasping the spring; Fig. 18, the acid-bottle in two parts, held together by a rubber band; Fig. 19, a vertical section on the line x' x', Fig. 18. Fig. 20, detached view, showing the construction of the joining parts of the acid-bottle; Fig. 21, a detached view of the hose-plug and bushing; Fig. 22, a detached view of the hose and coupling with skeleton core; Fig. 23, a central section of the plug, and Fig. 24 a detached view of the skeleton core; Fig. 25, a view of the union coupling uncoupled upon the connecting-tube between the cylinder and the stove; Fig. 26, a partial longitudinal section of the connecting tube and coupling, and Fig. 27 a view of the cap.

The object of my invention is to avert the frequent and disastrous results from fire which attend railway accidents. Where the car is heated by a stove and the former gets off the track, the stove generally becomes displaced or fractured and the fire thrown around, igniting the interior, causing a conflagration and loss of life.

It consists of an apparatus containing chemicals for generating carbonic-acid gas, secured to the floor and sides of the car, connected by metallic bands on each side and by a tube with the stove, and is so constructed that in any emergency the union of the ingredients takes place unaided by the hand, when the fluid gas forces its way through the tube into the fire-box, and extinguishes the fire the moment that the equilibrium of the car is destroyed.

I do not claim that the employment of carbonic-acid gas for this purpose is new, as the principle has been long previously understood, and is now used in the Babcock and other fire-extinguishers; but in their application of this agent an adjustment of the apparatus is necessary at the time of using it by the hand of an operator, not only to unite the contents, but likewise to open a faucet and direct the flow of the gaseous fluid upon the fire, thus rendering their method and apparatus inapplicable for the purpose specially designed in my invention, from the fact that the employment of human aid under attending circumstances within a wrecked car is impracticable, if not impossible; whereas the automatic action of the apparatus in this improvement, as hereinafter more particularly described, as well as the use of chemicals without previously being mixed with water, combined with the special method of its application in a manner and for a purpose not hitherto known or used, are features of the invention, I claim, differing from any other.

The exterior of the apparatus, which is connected to the stove for the purpose hereinbe-

fore stated, may be made of sheet-iron or wood, in form semi-cylindrical, or of any other suitable shape, but, when the stove is at either end of the car, will be most appropriate when made so as to fit into the corner of the car at the back of the stove, as shown in Fig. 1.

The actuating mechanisms hereinafter particularly described operate automatically at right angles, separate from and independent of each other, each by means of a pendulum, and gearing upon one of the exterior walls of the apparatus, which are placed next to the walls of the car, and which are for this purpose made with a suitable recess, *l*, of about three inches in breadth, as shown at Figs. 1 and 2, A A being the two walls meeting at right angles and inclosing the apparatus. Within this sheet-iron or wooden exterior are one or more copper cylinders, with convexo-concave extremities, placed vertically.

The drawings show an apparatus with but one cylinder, and this is the simplest and generally the most convenient form. If preferred, however, two cylinders may be employed, placed side by side, and each connected to the stove by a separate tube. If two cylinders are employed, the pendulum and gearing need not, of course, be placed higher on one wall than on the other, as they must with a single cylinder. The single cylinder is held in place by a band, *l'*, or by several such bands, made in two parts, which are hinged together on one side of the cylinder and arranged to clasp or lock on the other. Thus the band may be swung open and the cylinder removed at will. The band is firmly secured to the corner of the car by a suitable bolt, *l''*. The cylinders may also be made of enameled steel or iron, or of any other metallic substance of sufficient strength, being provided with external encircling sockets and feet *m m*, Figs. 3 and 4, at the lower extremities, in order that each may rest firmly on the bottom of the segment or on the floor in a vertical position. The upper end is so attached and coupled to the body, as shown at *n n*, Figs. 3 and 4, as to be readily taken off and replaced. The cylinder is intended to hold, for about two-thirds of its capacity, water, into which salt may be dissolved to prevent its freezing. Two suitable vertical tubes, *n' n''*, with a water-gage in one of them and a valve on the other, are provided in the front part of it, to indicate the quantity contained therein, as well as to admit of the liquid being replenished, if at any time necessary, without removing the upper part of the cylinder. The tube *n''*, with the water-gage. is made in two parts, the upper of which may be detached at will and a suitable tube introduced at the orifice of the lower part for the purpose of removing the liquid contents of the cylinder when desired.

A circular pewter or other metal dish, F, of corresponding diameter and required capacity, having suitable hollow cones *o o o*, or, more strictly speaking, frustums of cones, around the center of its interior circumference, open at both ends, is provided and placed within the cylinder upon the surface of the water, immediately under the connecting-tube I, hereinafter referred to, being kept in that position upon a vertical spiral spring, G, attached to a disk, H, which rests at the bottom of same. This disk is intended to lessen the agitation of the water, as well as to hold the carbonate of soda, or its equivalent, directly under the acid-receptacles J J, the contents of which, when brought into contact with the soda, as hereinafter more particularly described, force the liquid with tremendous velocity through the hollow cones *o o o*, and it becomes fully charged with the carbonic-acid gas ere passing into the connected stove for the purpose of annihilating the fire, the connection therewith being made by means of metallic tubing I from the front part of the cylinder to the back part of it, extending into the fire-box, formed in a tapering manner. The largest end is screwed into a bushing, *p*, provided upon cylinder, the smaller end being screwed into similar attachments *p'* upon the stove at the back, where it has a suitable provision to exclude the dust by means of a hinged lid, *p''*, at the extremity of it; or the tube I may be provided with a suitable collar, *f*, upon the outside extremity of the larger end, and what is known as a "union coupling," D', having a corresponding collar, *g*, on the inside, employed to attach the same to the cylinder, as shown in Figs. 25 and 26, by which means the connection of the extinguisher with the stove may be cut off, and a cap, *h*, screwed upon the bushing temporarily in the event of the hose being brought into requisition, as hereinafter set forth, or of the removal of the stove in summer. This connection may be also rendered more secure by suitable iron bands, riveted to the sides of the stove, and then bolted together with the apparatus to each side of the car.

Within the tube I is another tube, K, made in two or more sliding joints, like a telescope, of brass or any other suitable material, which, when closed, as shown in Fig. 12, will remain so until forced out by pressure from within the cylinder. At the large end of the first joint is attached, around its exterior, a flange, *q*, resting against a shoulder to prevent the displacement of same, while at the smaller extremity of the last joint is provided a steel nozzle, *q'*, or one of any other suitable metal, with a whistle attachment, *q''*, thereon, and which extends beyond the connecting-tube when the telescopic tube is sufficiently forced out of it, as shown by the dotted lines at Figs. 4 and 12. The whistle is not permanently fixed to the nozzle, but is fitted in place with sufficient tightness to remain there at least until the telescopic tube has attained its full limit, when the gaseous pressure forces it off, allowing the surcharged water to pass freely through the orifice. The whistle sounds, of course, from the time the pressure first acts upon it until it is forced off.

As shown in drawings at Figs. 1 and 2,

the exterior of the apparatus represents in form two sides of a parallelopipedon, having a suitable recess on each of the sides which are placed against the car. When placed in the center of the car, but one recessed side is attached thereto, the other standing at a right angle across from the side of the car, the pendulum and gearing thereupon being protected by an additional wall, whereas, when made semi-cylindrical, the recessed side of but one of the segments would be placed against the car and the recess in the other placed against the plane side of that one, in order to maintain at right angles the uninterrupted action of the pendulum and gearing attached thereto when circumstances of peril cause any displacement of the car.

The gearing on the recessed exterior side of the apparatus is formed by semicircular toothed attachment *r* at the upper end of it, provided upon a short horizontal projection, *u u*, working in journals attached to the side and extending through the same, having suitable beveled gearings *s* on this extremity, which work into the corresponding beveled cogs *s'* on a horizontal shaft, *t*, with crank *t'*, diametrically placed across the upper part of the vertical cylinder hereinbefore described, and as hereinafter more fully stated.

When only one cylinder is employed, as shown in the drawings, the shafts carrying the acid-receptacle, as hereinafter described, will have to work one above the other; hence, as the pendulums must, of course, be of equal length, one pendulum, together with its gearing and the curved planes, will have to be placed correspondingly higher upon one wall than upon the other, as shown in Fig. 6.

Immediately under the semicircular toothed attachment *r* above described is a vertical bar, R, attached near its center to the side of the wall or segment, having similar toothed attachments *r' r'*, at both extremities, the upper cogs of which are adjusted to work into the toothed semicircle *r*. Directly under the lower toothed extremity of the bar R (which may be designated "the fulciment") is another, L, of greater length, having a suitable pendulum-weight, P, at the extremity, with rollers *v v* on each side thereof, and being provided upon its upper end with a corresponding semicircular gearing, *r''*, with its fulcrum *w* immediately thereunder, attached also to the sides of the recess of the walls or segment, (see Figs. 5 and 6,) to operate with the gearing upon the fulciment above it, in manner and for the purpose more fully stated hereinafter.

Directly under the pendulum, at the bottom of the recess, are attached suitable parallel curved planes V V, with sufficient space between them to permit the uninterrupted passage of the pendulum-weight in either direction, while the rollers *v v* travel on the curved planes in the same direction with it, and maintain the working of the cogs hereinbefore referred to with accuracy from one end to the other. The rollers *v v* are made with a suitable flange on one side, and that is the side which is attached to the weight, in order to prevent its rubbing against the curved planes when in action.

There is likewise a recess, *v'*, crosswise in the center of the arc, to admit of the dropping down of the rollers sufficiently to disconnect the gearing *r''* of the pendulum-bar from that of the fulciment above it when inactive, and allow of a limited play of the pendulum, answering in degree to the ordinary oscillation of the car, there being an elongated aperture, *a*, and a spring attachment, *a'*, in the pendulum-bar at its fulcrum-connection *w*, to admit of this and a readjustment by the aid, if desired, of a weight, S, suitably curved inwardly at the top, running freely on rollers at the bottom of the recess between the parallel curves, as indicated in Fig. 11, though the curves *v''* at the edges of the transverse recess in the center of the arc are deemed sufficient without any such additional weight, as they may be so formed as to admit of the rollers mounting the arc at any angle which the car may assume, thus immediately forcing the pendulum-bar upward into gear, where it is retained by a spring, *a''*, provided at the said fulcrum-point *w* of the pendulum, as most clearly shown in the detail views, Figs. 8, 9, and 10. Should the spring ever become disarranged, so as to be inoperative, the pendulum would still be held in gear by the resting of the rollers on the curved planes.

As previously stated, two shafts, *t t*, having suitable cranks *t' t'* formed in their centers, are placed diametrically across the center of the upper part of the cylinder, one above the other, working in journals attached to the sides thereof, provided under the couplings, which secure the upper convex end to vertical body of same, each extremity of shaft being also secured into bearings *i' i'*, provided upon the inside of the exterior, which incases the cylinder, as before described. The ends which extend to the sides, upon the exterior of which the pendulums and gearings are placed, are provided with suitable beveled cogs *s' s'*, attached thereto, in order to work into the beveled gearing *s s* upon the horizontal projections, upon the other side of which is attached the semicircular gearing *r*, connected with fulciment and pendulum hereinbefore described, and shown in drawings at Figs. 5 and 6. Upon each crank *t'* is an oval-shaped attachment, *t''*, made in two parts, which are hinged together on one side and arranged to clasp on the other, so that the band may be opened to admit of the adjustment of the acid-receptacle. Into this the extremity of an oval-shaped bottle, J, containing sulphuric acid, is placed and securely held. Above each shaft *t* is another, T, running parallel with it and similarly secured, provided in its center with an oval-shaped aperture, *t'''*, having an apron extending a short distance downward on each side, which receives and firmly retains the upper portion of the bottle or acid-

receptacle when the lower part of same has been adjusted into the crank attachment under it, which, together with the aperture, may be made of a formation to suit the shape of any other acid-vessel.

The shafts are connected by corresponding cogs or spur-gearing M M, provided upon both ends of each, and which, when the pendulum and gearing are in operation, force the crank with its attachment, as well as the aperture upon the shaft above it, to diverge or move in opposite directions. The acid-bottle J, or other receptacle, is made in two parts, as shown in drawings, Figs. 18, 19, and 20, oval-shaped or in any convenient form, the ends that are joined being formed either with a groove and tongue or rabbeted, as shown in Figs. 19 and 20, and the parts when united held together by means of a rubber band, U, placed around same, as shown in Fig. 18.

This construction presents great advantages over the ordinary forms, in which the bottle is made intact and must be broken to permit the escape of the acid, for by it not only is the separation of the parts effected easily and at exactly the desired point, but also the bottle is preserved in as good condition as before, and needs only to be readjusted and replenished for future use.

The stopper consists of rubber or glass, with a metallic cap over it. When the bottle of acid is placed in the position provided for it, as above set forth, it will be directly above the pewter dish containing carbonate of soda or its equivalent, which may be slightly moistened before the dish is set upon the spiral spring above the surface of the water.

When, therefore, the wheels of the car lose their position on the track, and its equilibrium is so far destroyed that it must turn over in either direction, the pendulum, by the consequent disturbance of its center of gravity, also gives momentum to the rollers along the curved planes, which forces the pendulum-bar upward, and connects the gearing upon it with the gearing upon the fulciment, where it is held in position by the spring before referred to, whereby all the gearings become instantly united, and, acting simultaneously one upon the other, the separation of the acid-receptacle is effected by the divergence of the shafts upon which the upper and lower portions of it are held. Thus, without human aid, the union of the ingredients, and the consequent generating of the carbonic-acid gas, are effected, the direct force of which, acting upon the dish and spiral spring, causes the water under it to ascend through the conical apertures with great force, when it also becomes impregnated and thoroughly charged with the carbonic-acid gas, and the force by which it enters the tube connected to the stove acts upon the sliding tube within the same, and forces out in rapid succession each joint to the full extent, whereby the nozzle, extending beyond the connecting-tube, enters the stove and discharges the gas and liquid directly into the midst of the fire, the accomplishment of which, being announced by the whistle provided at its extremity, will tend to allay all apprehension of danger from conflagration whenever an accident should occur.

As hereinbefore stated, the situation of the stove may necessitate the alteration of the shape of the sheet-iron or other exterior; but in no manner can it prevent the placing of the gearing so that the accuracy of the automatic action thereof shall be maintained at right angles, as provided, and shown in the drawings at Figs. 1 and 2, whereby, if the car is turned over sidewise, one pendulum only is acted upon, while the other would become active only when the car became elevated endwise from collision.

In the cylinder a provision is made to meet any other emergency by an aperture near the tube-connection, which is provided with a bushing, N, threaded upon the outside for attaching hose-coupling, which is closed from the inside by means of a rubber plug, O, fitted to a metallic core, which has a square recess at its extremity. When not in use this plug may be protected by a cap screwed upon the bushing. The coupling is correspondingly threaded and provided with a skeleton core, Q, with a square projection in the center of the same, which fits into the recess in the core of plug, so that in attaching the hose the plug is turned around, while at the same time it is forced to recede, and, in connection therewith, may be attached to the pendulum or fulciment a cord by which the union of the ingredients can be had whenever desirable.

The apparatus may be adapted and readily attached, in the manner hereinbefore described, to any stove for the better protection of life and property under the perils of railroad travel, because, from the simplicity as well as the accuracy of the automatic combinations, and the adjustment of the pendulum the extinguishment of the fire can be effected when the car, in turning over, has attained an angle of forty-five degrees, and before the overthrow is entirely accomplished or any consequent disruption of the stove has occurred.

The manner hereinbefore described for the union of a hose-coupling also renders the invention an important improvement on the method now in use for extinguishing incipient fires by the use of carbonic-acid gas, as the breaking of the acid-bottle is avoided, as well as the use of a faucet, which, when not used for any length of time, becomes corroded, so that it can only be turned, if at all, by using a wrench or some other forcible means; and in using such force it is not unfrequently broken and rendered useless for the time being.

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

1. In a fire-extinguisher for railway-cars, the method herein described of causing the required emptying of an acid-receptacle at the proper moment when an accident occurs, which

consists in having a pendulum arranged to act through suitable gearing upon said acid-receptacle in such manner as to disconnect the parts thereof when the car tips beyond a given degree in a certain direction, as set forth.

2. The method herein described for producing the above effects when the car tips beyond a given degree in any direction, which consists in having two pendulums swinging at right angles with each other, and arranged, as described, to act each upon a separate acid-receptacle, as set forth.

3. The extension-tube K within the connecting-tube, adapted to be extended into the fire-box beyond the terminus of the said connecting-tube by the pressure of the gas, as specified.

4. The whistle q'', attached to the extension-tube at its end, and so arranged as to be sounded by the action of the gas and drop off when the said tube is extended to its full limit, as set forth.

5. The acid-holder J, made in two parts, and held together by the rubber band n, substantially as and for the purpose specified.

6. The shaft T, with aperture t''' and crank-shaft t t', one holding the upper and the other the lower part of the acid-receptacle, and so arranged, by means of suitable gearing, as to be turned in opposite directions by the swinging of the pendulum, whereby the said parts of the acid-receptacle may be forced asunder at the proper time, as described.

7. The combination of the shafts T and t, crank t', oval aperture t''', spur-gearing M, bevel-gearing s s', intermediate toothed gearing r r' r'', and pendulum-bar L, constructed and arranged to operate substantially as and for the purposes set forth.

8. The aperture t''' at the center of the shaft T, and the hinged band t'' upon the crank t', for holding the acid-receptacle, as set forth.

9. A pendulum for operating a fire-extinguisher in a railway-car, so constructed and arranged that it may, as a precautionary measure against the possible premature extinguishment of the fire, hang out of gear under ordinary conditions, and be thrown into gear by the tipping of the car beyond a given angle, as specified.

10. The combination of the curved planes V V, transverse recesses v', having rounded upper edges v'', rollers v, with flange on one side, slot a, and spring-catch a' a'', by means of which the pendulum may hang out of gear under ordinary conditions, but be forced into gear and so retained when the car tips beyond a given degree, substantially as described.

11. The circular concave soda-receptacle F, provided on its inner surface with hollow upright cones o o, open at their tops, and also, through the receptacle, at their bottoms, substantially as described.

12. The combination of the soda-receptacle F, constructed substantially as described, and the spiral spring G, attached at its base to the disk H, as set forth.

13. The skeleton core Q in the hose-coupling, having its end adapted to fit for a short distance into the metallic core of the plug, whereby the said plug is forced into the interior of the cylinder as the coupling is screwed into place upon the bushing, thus permitting the escape of the gas and liquid, substantially as specified.

14. An automatic apparatus for generating carbonic-acid gas, coupled to a railway-stove in such manner as to be readily uncoupled and used as an ordinary fire-extinguisher with hose-coupling, substantially as and for the purpose specified.

JAMES F. GYLES.

In presence of—
P. C. DYRENFORTH,
PHIL F. SCANLAN.