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AUTOMATIC ELECTRIC GAS CUT-OFF FOR RAILROAD-CARS.

SPECIFICATION forming part of Letters Patent No. 384,676, dated June 19, 1888.

Application filed April 25, 1887. Serial No. 235,988. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK C. BROWER, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Automatic Gas Cut-Offs for Railroad-Cars, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the heating and lighting of railroad-cars by gas carried on the cars.

The object of the invention is to guard against setting the car on fire in case said car becomes derailed and capsized; and to that end my invention consists in the improved devices for automatically shutting off the gas from the burners, and thus extinguishing the flames in case of the aforesaid accident to the car, all as hereinafter fully explained, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a view of an outline of a railroad-car equipped with my improved automatic gas cut-off apparatus. Fig. 2 is an enlarged detached vertical sectional view of the automatic circuit-closer. Fig. 3 is a top plan view of the burners employed for heating the car. Fig. 4 is an enlarged detached vertical section of one of the burners, showing the electric lighter in connection therewith. Fig. 5 is a detached perspective view of my improved water-heater, and Fig. 6 illustrates a modification of said heater.

A represents a railway-car.

B denotes a water-heater, which may be of any suitable or well-known form. I have, however, devised an improved water-heater specially adapted to be heated by gas.

The improvement consists, essentially, in the combination of a series of gas-burners, water-heating conduits over said burners to be impinged by the flames thereof, a water-supply pipe communicating with said conduits, and heat-radiating pipes extending from the water-heating conduits. In connection with said devices, I prefer to employ a horizontal annular gas-duct, *m*, from which rise the burners *o o o*, as shown in Figs. 5 and 6 of the drawings, and the water-heating conduits *L L*, I arrange concentric with the annular row of burners. Said water-heating conduits may be in the form of a coiled pipe,

as represented in Fig. 6 of the drawings. However, I deem as the most efficient form the arrangement of a horizontal shallow water-chamber, *H*, extending completely across the entire series of gas burners *o o o*, annular water-chambers *L L*, arranged horizontally one above the other and above the water-chamber *H*, and pipes *K* and *K'*, connecting said chambers successively one with the other, as illustrated in Figs. 1 and 5 of drawings. A pipe, *l*, extending from the upper chamber and along the interior of the car, and carrying the heated water, serves to heat the car, and a pipe, *l'*, extending from the end of the pipe *l* back to the lower chamber of the heater *B* returns the cooled water to the heater.

Under the lower chamber of the aforesaid water-heater are arranged the series of gas-burners *o o*, (preferably of the style designated "Bunsen burners,") said burners being mounted on an annular duct, *m*, which is provided with a diametrical duct, *m'*, as shown in Fig. 3 of the drawings. To the said diametrical duct is connected the gas-supply branch pipe *n'*, extended from the main supply-pipe *n*, which communicates with the usual gas-regulator *C* and gas tank or reservoir *F*, generally secured to the under side of the car.

By means of a valve or stop-cock, *n*, connected to the branch pipe *n'*, the gas can be let on or shut off from the burners *o o* when desired. A stop-cock, *a*, is connected to the main pipe *n* between the branch pipe *n'* and gas-reservoir, and from the spigot or valve of this latter stop-cock projects laterally an arm, *b*. The stop-cock *a* is held normally closed either by a spring or by a weight, *b'*, pressing on the arm *b* in a direction which closes the stop-cock.

c represents a latch or horizontal pivoted lever, which normally rests at one end against a stop, *c'*, and is held in said position by a spring, *j*, supporting said end of the latch, and when in this position the opposite end of the latch abuts against the side of the free end of the arm *b* when raised to open the stop-cock *a*, as represented by full lines in Fig. 1 of the drawings. The detention of the arm *b* by the latch *c* serves to maintain the stop-cock *a* in its open position. In proximity to the spring-supported end of the latch *c*

is arranged a vertical guide, *d*, on which slides a weight, *D*.

Near the upper end of the guide *d* are two electro-magnets, *MM*, the armature *O* of which is suspended and provided with a hook, *o'*, which is adapted to engage and support the weight *D* when elevated on the guide *d*, as shown by full lines in Fig. 1 of the drawings.

To a suitable part of the car is rigidly secured my improved automatic gas cut-off, consisting of a mercury-containing receptacle, *T*, preferably of the form of a glass tube formed at its base with a bulb. The upper and open end of the tube *T* is clamped between an insulating-plate, *f*, and metallic plate *g*, which plates are firmly attached to the car by screws passing through the plates, or by other suitable means. A wire, *e*, is extended from the mercury up through the open end of the tube *T* and laterally between the plates *f* and *g*, and is thus in contact with the metallic plate *g*, from which either the same wire or another wire is extended to the battery *R*. Another wire, *e'*, is extended from a short distance above the mercury out through the upper end of the tube and connected with the metallic plate *g*, from whence it is extended to the magnets *MM*, which are electrically connected with the battery by a wire, *e''*. In order to cause the electric circuit to be closed in case the glass tube *T* is accidentally broken, I surround the said tube with a metallic frame, *h*, which is connected with the metallic plate *g*, and inclose the tube and frame *h* in a hard-rubber case, *i*, as shown in Fig. 2 of the drawings.

E denotes a friction electric generator employed for lighting the burners *o o* of the heater *B*, and the burners *o' o'*, by which the car is illuminated.

r is a wire extending from the generator *E* to the gas-pipe *n*, and making the ground-connection of said generator. A wire, *r'*, is extended from the generator *E* to a switch, *s*, arranged between two contact-points, *t t*, from one of which is extended a wire, *u*, to an electrode, *u'*, on one of the burners *o*, as illustrated in Fig. 4 of the drawings. From the other contact-point of the switch *s* is extended a wire, *v*, to a similar lighting device on the chandelier *I*, which has electric ground-connection by wire *v'*.

By turning the crank *w* of the generator *E*, an electric current is sent to the switch *s*, and by throwing the switch into contact with one contact-point, *t*, the electric current passes to the burner *o* and ignites the entire set of said burners, and by shifting the switch *s* onto the other contact-point, *t*, the electric current is sent to the illuminating-burners *o' o'*. This part of the apparatus is controlled by the person in charge of the car.

The operation of my automatic gas cut-off is as follows: The free end of the arm *b* is to be turned or raised to open the stop-cock *a*, and is to be brought into engagement with the latch *c*, so as to be detained thereby, and thus main-

tain the stop-cock in its opening position. The weight *D* is to be elevated and made to rest on the hook of the armature *O*. As long as the car maintains its upright position the wire *e'* will be isolated from the mercury in the tube *T*, and thus the electric circuit is broken. In case the car becomes derailed and capsized or thrown on its side the mercury of the tube *T* is caused to come in contact with the wire *e'*, thereby closing the circuit. The electric current passing through the magnets causes them to attract the armature *O* and draw the same out of engagement with the weight *D*, which is thus allowed to drop, and in its descent it strikes the spring-sustained end of the latch *c* and causes the opposite end thereof to release the arm *b*, which is then immediately actuated by the spring or weight connected therewith, so as to close the stop-cock *a*, and when this is effected the gas is shut off from the burners *o o* and *o' o'* and the flames thereof extinguished.

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

1. The combination, with a railway-car provided with gas-burners, gas-reservoir, and gas-supply pipe leading from said reservoir to the burners, a stop-cock connected with said gas-pipe and held normally closed, a latch adapted to hold said stop-cock in its open position, a tripper adapted to throw the latch out of engagement with the stop-cock, electro-magnets, an armature adapted to detain the tripper, a battery, a mercury-containing receptacle rigidly secured to the car, an electric conductor extending from the magnets into the mercury-receptacle and terminating a short distance above the mercury, and an electric conductor leading from the battery to the magnets, substantially as and for the purpose set forth.

2. The combination, with a railway-car, of a heater, gas-burners for generating the heat, a gas-reservoir, gas-supply pipes leading from said reservoir to the burners, the stop-cock *a*, arm *b*, projecting from the spigot of the stop-cock, a weight or spring actuating the said arm to automatically close the stop-cock, the latch *c*, adapted to detain the arm *b* in its open position, the vertical guide *d*, weight *D*, sliding on said guide, magnets *M*, the armature *O*, provided with a hook for supporting the weight *D*, the battery *B*, the mercury-containing tube *T*, the wire *e*, extending from the mercury to the battery, the wire *e'*, extending from above the mercury to the magnets, and the wire *e''*, extending from the magnets to the battery, substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 22d day of April, 1887.

FREDRICK C. BROWER. [L. S.]

Witnesses:

C. H. DUELL,
C. BENDIXON.