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STEAM LOCOMOTIVE.

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1,184,222. Patented May 23, 1916.

Fig. 1.

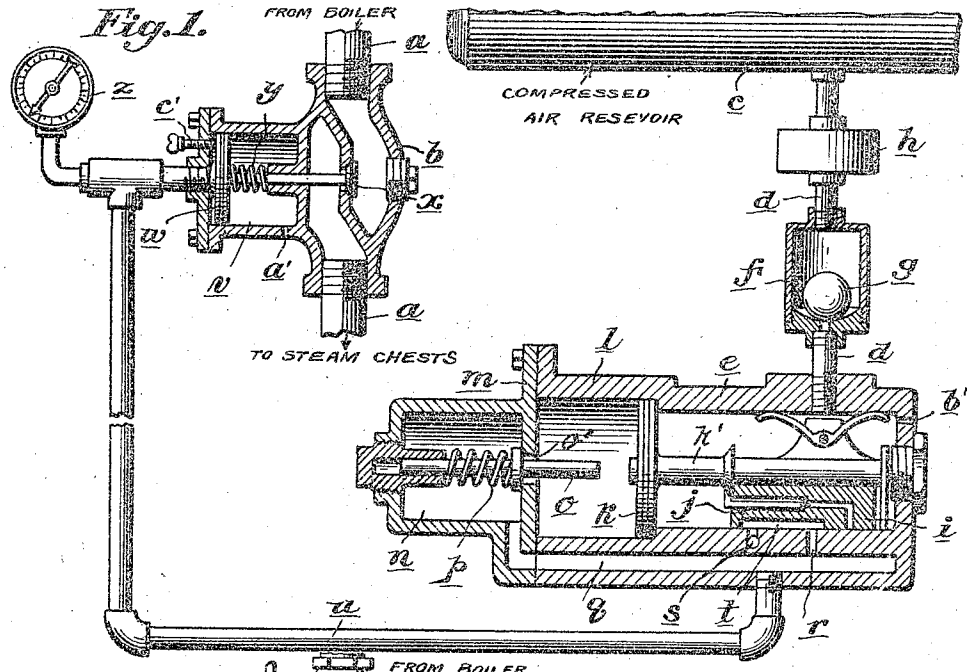
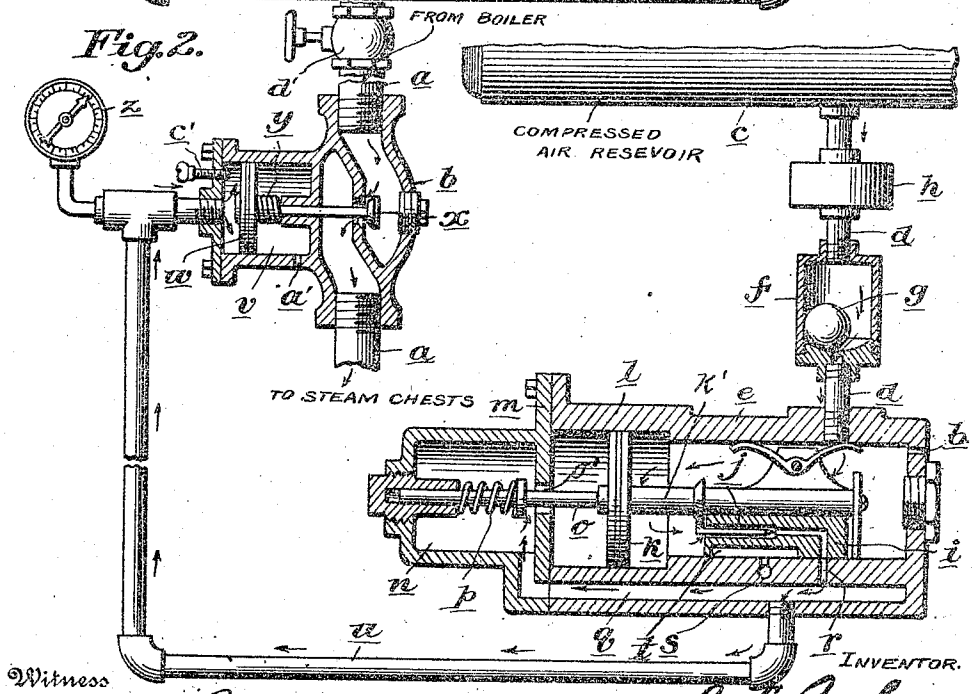


Fig. 2.



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STEAM-LOCOMOTIVE.

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To all whom it may concern:

Be it known that I, CHARLES L. ZERBE, a citizen of the United States of America, and a resident of St. Albans, county of Franklin, and State of Vermont, have invented certain new and useful Improvements in Steam-Locomotives, of which the following is a full and clear specification.

In locomotives using superheated steam, it is usual for the engineman to manually control the throttle in such manner that a small quantity of steam will be permitted to enter the steam chests while the locomotive is coasting or drifting, to thereby prevent the highly heated cylinders and pistons from carbonizing the lubricating oil.

It is the object of my invention to perform this work automatically, utilizing for this purpose the movement of the locomotive, the arrangement and construction of parts being such that while the locomotive is at rest my supplemental admission valve will be closed and while the locomotive is traveling the supplemental admission valve will be automatically held open, so that a small quantity of steam will be supplied to the steam chests, irrespective and wholly independent of the main admission valve.

In the drawings—Figure 1 is a sectional view showing the position of the parts when the locomotive is at rest; and Fig. 2 is a similar view showing the position of the parts while the locomotive is moving.

Referring to the drawings annexed by reference characters, *a* designates a live steam pipe which will connect the steam space of the boiler to the steam spaces of the steam chests by suitable piping. Inserted in this pipe at a suitable point is a steam valve *b* which is supplemental to the usual main admission valve, not shown in my drawings. It is the object of the mechanism connected to this supplemental admission valve to cause this valve to remain open during the movement of the locomotive. A preferred mechanism for accomplishing this is as follows:

c designates the usual compressed air reservoir carried on the locomotive, *d* a pipe leading therefrom to a small valve chest *e*. A valve device *f* is inserted in the pipe *d*, this valve device in this instance being provided with a ball valve *g* which, by the jarring or swaying of the locomotive, will roll about in the valve chamber sufficiently to permit air to pass through the pipe *d* almost continuously. As the air in the reservoir *c* is carried at too high a pressure to properly operate the mechanism, I will use a suitable pressure-reducing device *h*, or my device may be connected to the air-signal line and thus avoid the necessity of a reducing device.

In the chest *e* is arranged a slide valve *i* provided with a port *j* and having attached to it a piston *k* which works in a cylinder *l* connected to one end of the valve chest *e*. The outer end of the cylinder *l* is closed by a head *m* to which is connected a chamber *n*. In the chamber *n* is a rod *o* whose inner end extends into the cylinder *l* and lies in the path of the piston *k*, this rod *o* being normally forced inwardly by a spring *p*. The chamber *n* is always in communication with cylinder *l* by means of the rod hole *o'*.

The chamber *n* is connected by a passage *q* to a port *r* formed in one wall of the valve chest adjacent the working face of the valve *i*. Adjacent to the port *r* is a port *s* which is adapted to exhaust into the atmosphere, and in the working face of the valve *i* is provided a longitudinal port *t*. Connected to the passage *q* is a pipe *u* whose other end has communication with the outer end of a cylinder *v* connected to the supplemental admission valve *b*. In this cylinder *v* works a piston *w* which is connected to the stem of a valve disk *x* of said supplemental admission valve, a coil spring *y* being provided to normally hold valve *x* closed. Connected to the pipe *u* at a suitable point is a pressure indicator *z* to enable the engineman at a glance to determine whether or not the apparatus is in working order. The port *r* is controlled by a pin valve *j'* attached to stem *k'* of piston *k*, and to enable the movement of stem *k'* to open and close this valve the stem has a lost motion connection to valve *i*.

It is sometimes desirable to hold the valve *x* open whether or not the automatic devices are in operation.

The letter *c'* designates a set screw threaded through the outer head of cylinder *v* and adapted when screwed in to make contact with the piston *w* and hold the valve *x* open. When the valve is thus held open, a continuous stream of live steam will be delivered to the steam chests. This stream may be controlled by a suitable hand valve *d'* in the pipe *a* at some point between the valve *x* and the steam supply. It is desirable that

this valve be placed in a position where the engineman can conveniently manipulate it. By thus propping the valve x open and by manipulating the globe valve d', the engineman may supply sufficient steam to the chest to drive the locomotive to the round-house or other terminal without manipulating the usual throttle, when the throttle or the means for operating the same become inoperative.

It will be observed that the jarring or swaying of the locomotive will roll the ball g sufficiently to admit air into the chest e in practically a continuous stream. As the pressure builds up in the chest e, the piston k will move to the left and thus open pin valve j' and be forced against the spring-actuated rod o. When this pressure has forced the piston k far enough over for port j to register with port r, air will pass from port r through passage q and pipe u to cylinder v. When the pressure behind piston w is sufficient to open valve x against pressure of live steam, said valve x will open and a small quantity of steam will be admitted to the steam chests of the locomotive. Air will also pass from passage q into chamber n and thence through hole o' into cylinder l, and when the pressure on both sides of the piston k is equalized, coil spring p will tend to force the piston k toward the right. Thus forcing the piston k toward the right will tend to close pin valve j' and thus choke the passage of air through ports j and r and thus cause the pressure to build up in chest e sufficiently to balance the action of the coil spring p. In this way, a constantly balanced condition of the slide valve i is obtained. Should any steam leak through the head of cylinder v past the stem, it will escape in the form of steam or water through drain port a'. When the locomotive is at rest and ball g closes its port, the pressure in the valve chest e will be gradually reduced to atmosphere through a bleed port b' and thus allow the pressure on the outer face of piston k to force it inwardly a sufficient distance to bring port r into communication with exhaust port s through the valve exhaust port t and thereby relieve the pressure behind piston w and in the air gage z, thereby permitting all the parts to return to normal.

It will be observed that the essential feature of my invention lies in utilizing the movement or momentum of the locomotive to put my apparatus into operation and to keep it in operation, to the end that a small quantity of steam will always be supplied to the steam chests irrespective of the position of the main inlet valve or valves, thereby entirely eliminating the necessity on the part of the engineman of manually performing this operation every time the locomotive coasts or drifts. I have shown a valve device operable by the swaying or jarring of the locomotive, but it will be understood that it is within the scope of my invention to employ any kind or type of valve that will open while the locomotive is in motion.

Having thus described my invention, what I claim is:

1. In an apparatus of the class set forth, a supplemental steam valve for admitting steam to the steam chests of the locomotive independently of the main admission valve, and means whereby said valve is automatically maintained in an open position during the movement of the locomotive, said means embodying a pneumatic apparatus comprising a balanced slide valve, an admission valve therefor operable by the movement of the locomotive, and a fluid pressure means connected to the supplemental steam valve.

2. In an apparatus of the class set forth, a pipe for supplying steam to the steam chests of a locomotive, automatic devices for permitting steam to pass through said pipe to the chests, these devices being operable by the movement of the locomotive, means for holding said valve open irrespective of the automatic devices, and a manually operable valve in said pipe between said automatic valve and the steam supply, for the purpose set forth.

In testimony whereof I hereunto affix my signature.

CHARLES LESLIE ZERBE.