No. 868,481. PATENTED OCT. 15, 1907.

H. N. RANSOM.

AIR BRAKE SYSTEM.

APPLICATION FILED JUNE 1, 1906.

Fig. 1

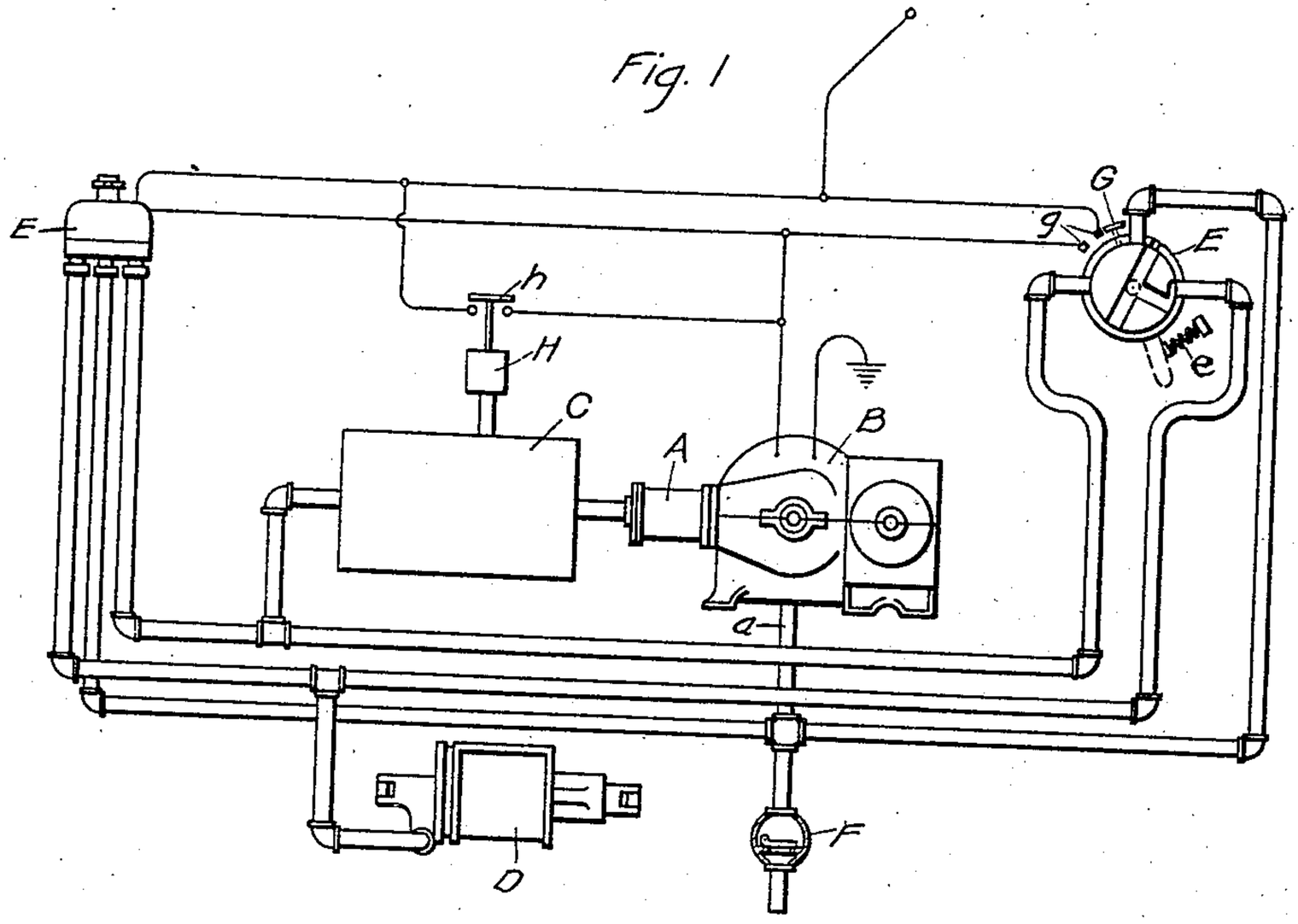
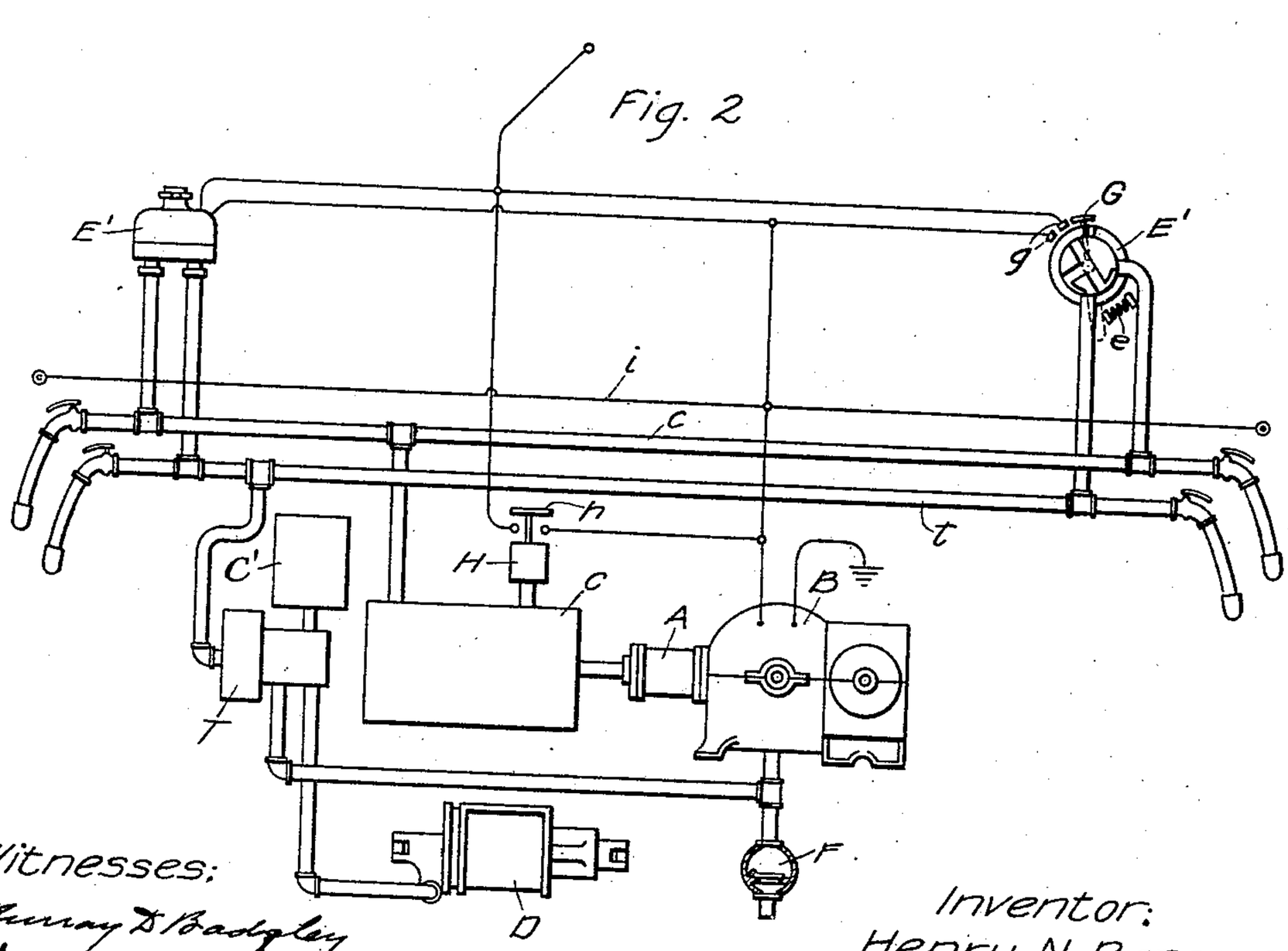


Fig. 2



Witnesses:

Murray D. Badgley

Helen Alford

Inventor:

Henry N. Ransom

By Albert G. Davis

Atty.

UNITED STATES PATENT OFFICE.

HENRY N. RANSOM, OF ALBANY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

AIR-BRAKE SYSTEM.

No. 868,481. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed June 1, 1906. Serial No. 319,762.

To all whom it may concern:

Be it known that I, HENRY N. RANSOM, a citizen of the United States, residing at Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Air-Brake Systems, of which the following is a specification.

My invention relates to air-brake systems, and its object is to provide a novel arrangement by which a great economy of air is obtained and the efficiency of such systems consequently improved.

My invention, broadly stated, consists in returning again to the source, in releasing the brakes, the air which is supplied from the source to brake-cylinder in applying the brakes, so that the same air is used repeatedly.

More specifically stated, my invention consists in the combination of an air-compressor, a reservoir supplied thereby, a brake-cylinder, pipe connections from brake-cylinder to both reservoir and to the intake of the compressor, means for controlling the flow of air from the reservoir to brake cylinder to apply the brakes, and means for controlling the operation of the compressor to return air from the brake-cylinder to reservoir to release the brakes. By means of this arrangement the air-compressor is not pumping air at atmospheric pressure into the reservoir, but takes air under pressure from the brake-cylinder. The amount of work done by the compressor is consequently reduced, so that a smaller compressor may be employed and less power consumed in driving the compressor.

My invention will best be understood by reference to the accompanying drawings, in which

Figure 1 shows diagrammatically a "straight" air-brake system arranged in accordance with my invention, and Fig. 2 shows my invention applied to an "automatic" system.

In Fig. 1, A represents an air-compressor driven by the electric motor B and supplying the reservoir C.

D represents the brake-cylinder, which is arranged to be connected through the engineer's valve E to reservoir, and which is also connected directly or through the engineer's valve to the intake pipe *a* of the compressor. An inwardly-opening check valve F connects this intake pipe to atmosphere. The engineer's valve, which is shown in running position with the handle resting against a spring stop *e*, carries a contact G adapted to bridge the stationary contacts *g* in circuit with the motor B. These contacts are in parallel with the contacts *h* controlled by the usual pressure governor H.

The operation of the system is as follows: To apply the brakes the reservoir C is connected to brake-cylinder D through the engineer's valve E in the usual manner by rotating engineer's valve E in a clockwise direction. To release the brakes, the engineer's valve is moved so as to break this connection and connect brake-cylinder to the intake pipe of the compressor, and at the same time to bring contact G into engagement with contacts *g*. This closes the circuit of motor B and starts the air-compressor to pump air out of brake-cylinder D and to return it to reservoir C, thereby releasing the brakes. In this position the handle of the engineer's valve engages and compresses the spring stop *e*, which acts to return the valve to running position when the brakes are released and the operator lets go the handle. In running position the circuit of the motor-compressor is broken and the brake-cylinder is connected to atmosphere as shown in Fig. 1.

The pressure governor H is adjusted so as not to respond to the ordinary variations in pressure in the reservoir C in braking, but in case the pressure in reservoir C falls below certain limits on account of leakage in the system, the governor H will start the compressor to supply the air lost by leakage, drawing it in through the check valve F.

Fig. 2 shows diagrammatically an automatic system similarly arranged. In this figure the triple valve T performs the function of the engineer's valve in Fig. 1,—that is, connecting the brake-cylinder either to reservoir or to the intake of the air-compressor. The triple valve may be of the usual construction, the exhaust-port being connected to the intake of the air-compressor instead of to atmosphere, in the same manner as the exhaust-port of the engineer's valve in Fig. 1 is connected to the intake of the air-compressor of that figure instead of to atmosphere. *t* represents the usual train-pipe to which all the triple valve pistons are connected, and *c* represents the reservoir line ordinarily employed where independent air-compressors are used on the several cars connecting the reservoirs together. The engineer's valve E′, which is shown diagrammatically in Fig. 2, is arranged in the usual manner to connect the train-pipe *t* to reservoir or to atmosphere. The right-hand valve E′ is shown in running position, connecting train-pipe *t* to reservoir line *c*. The brakes are applied in the usual manner by rotating engineer's valve E′ in a clockwise direction to connect train-line *t* to atmosphere so as to actuate the triple valves T to connect auxiliary reservoirs C′ to brake-cylinder. When the valve is moved to compress the spring stop *e* and to connect train-pipe *t* to reservoir again, the contact G bridges the contacts *g*, thereby starting up all the air-compressors on the train which are all connected to the train-wire *i*, at the same time that the increase of pressure in the train-pipe *t* moves the triple valves T to connect the brake-cylinders to

the intakes of the compressors. Spring stop *e* serves to return the engineer's valve to running position when released thereby stopping the motor-compressors.

It will be seen that the operation for the automatic system is in every way analogous to the operation in the "straight" air system; the principal difference being that the brake cylinder is connected to reservoir or to air-compressor directly by the engineer's valve in the "straight" air system, and by the triple valve controlled by the engineer's valve in the automatic system. The arrangement of parts and the pipe-connections may be varied in either system, as desired, and accordingly I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In an air-brake system, an air-compressor, a brake-cylinder, pipe connections from brake-cylinder to the intake of the compressor, an engineer's valve controlling the application of the brakes, and means actuated by said engineer's valve for starting and stopping said compressor.

2. In an air-brake system, an air-compressor, a reservoir supplied thereby, a brake-cylinder, pipe connections from brake-cylinder to reservoir and to the intake of the compressor, an engineer's valve controlling the flow of air from reservoir to brake-cylinder, and means actuated by said engineer's valve for starting and stopping said compressor.

3. In an air-brake system, an air-compressor, a brake-cylinder, pipe connections from brake-cylinder to the intake of the compressor, an engineer's valve for controlling the application of the brakes, means actuated by said engineer's valve for starting and stopping the compressor, and an inwardly-opening check-valve connecting the intake of said compressor to atmosphere.

4. In an air-brake system, an air-compressor, a reservoir supplied thereby, a brake-cylinder, pipe connections from brake-cylinder to reservoir and to the intake of the compressor, an engineer's valve controlling the flow of air from reservoir to brake-cylinder, means actuated by the engineer's valve for starting and stopping the compressor, and means controlled by the pressure in the reservoir for starting and stopping said compressor.

5. In an air-brake system, an air-compressor, an electric driving motor therefor, a brake-cylinder, pipe connections between brake-cylinder and the intake of the compressor, and a manually-operated controlling switch for said motor.

6. In an air-brake system, an air-compressor, an electric driving motor therefor, a reservoir supplied thereby, a brake-cylinder, pipe connections from brake-cylinder to reservoir and to the intake of the compressor, a manually-operated valve controlling the flow of air from reservoir to brake-cylinder, and switch contacts on said valve controlling said motor.

7. In an air-brake system, an air-compressor, an electric driving motor therefor, a brake-cylinder, pipe connections between brake-cylinder and the intake of the compressor, a manually-operated controlling switch for said motor, and an inwardly-opening check-valve connecting the intake of said compressor to atmosphere.

8. In an air-brake system, an air-compressor, a brake-cylinder, pipe connections from brake-cylinder to the intake of the compressor, manually-controlled means for starting said compressor to withdraw air from the cylinder, and means for automatically shifting said manually-controlled means when released to stop the compressor.

9. In an air-brake system, an air-compressor, an electric driving motor therefor, a brake-cylinder, pipe connections between brake-cylinder and the intake of the compressor, a manually-controlled switch contact controlling said motor, and a spring for automatically returning said contact to open-position when manually released.

10. In an air-brake system, an air-compressor, an electric driving motor therefor, a reservoir supplied thereby, a brake-cylinder, pipe connections from brake-cylinder to reservoir and to the intake of the compressor, a manually-operated valve controlling the flow of air from reservoir to brake-cylinder, switch contacts on said valve controlling said motor, and a spring for automatically shifting said valve when said valve is moved into position to close said contacts and manually released.

11. In an air-brake system, an air-compressor, an electric driving motor therefor, pipe connections from brake-cylinder to the intake of the compressor, an engineer's valve controlling the application and release of the brakes and having two release positions, switch contacts controlled by said valve and arranged in one release position of said valve to close the circuit of said motor, and means for automatically shifting said valve to the second release position when moved to the first release position and manually released.

12. In a "straight" air-brake system, an air-compressor, an electric driving motor therefor, a reservoir supplied thereby, an engineer's valve arranged in three different positions to connect brake-cylinder to reservoir, to atmosphere, and to the intake of the compressor, respectively, switch contacts controlled by said valve arranged to close the circuit of said motor when said valve is in the third of said positions, and means for automatically shifting said valve from the third to the second of said positions when said valve is manually released.

In witness whereof, I have hereunto set my hand this 31st day of May, 1906.

HENRY N. RANSOM.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.