(No Model.)

R. C. SMITH.

HEATER FOR COMPRESSED AIR ENGINES.

No. 491,859 Patented Feb. 14, 1893.

Fig. 1.

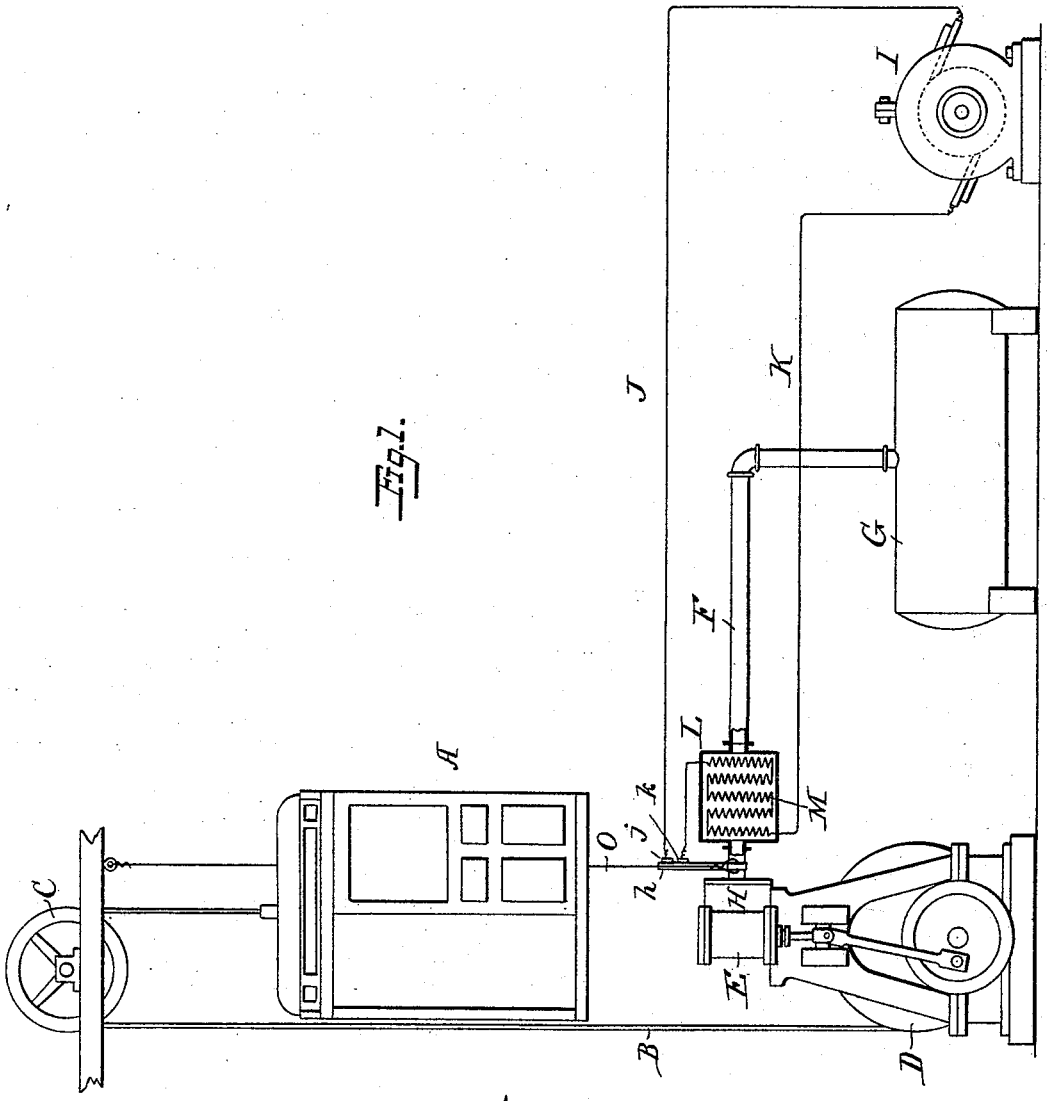
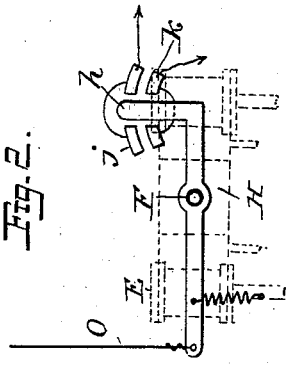


Fig. 2.



Witnesses
Jno G Hinkel
H. S. McArthur

Inventor
R. C. Smith
by Foster Freeman
Attorneys

UNITED STATES PATENT OFFICE.

RUDOLPH C. SMITH, OF YONKERS, ASSIGNOR TO THE OTIS BROTHERS & COMPANY, OF NEW YORK, N. Y.

HEATER FOR COMPRESSED-AIR ENGINES.

SPECIFICATION forming part of Letters Patent No. 491,859, dated February 14, 1893.

Application filed August 28, 1891. Serial No. 403,981. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH C. SMITH, a citizen of the United States, residing at Yonkers, county of Westchester, State of New York, have invented certain new and useful Improvements in Heaters for Compressed-Air Engines, of which the following is a specification.

My invention relates in general to the utilization of compressed air expansively in engines for operating machinery and power transmission and more especially for operating the engines of elevators, and it has for its object to provide means whereby the compressed air may be effectively utilized in operating engines and it consists in the construction and arrangement of parts substantially as hereinafter more particularly pointed out.

It is well known that compressed air may be utilized for operating engines or motors on street cars, power transmission and especially is it applicable for operating engines connected to run elevators in houses and other places. To do this an engine, which may be substantially like the ordinary steam engine, is provided and connected with the source of supply of compressed air, by means of which the engine can be operated whenever desired. It is also well known that when compressed air expands it creates an intense cold and it is found that this is apt to cause a deposit of ice, from the moisture in the air or otherwise, in or around the ports and valves of the engine so that it is practically impossible to use the compressed air expansively at ordinary temperatures.

The object of my invention is to provide a simple means whereby the compressed air passing to the engine may be heated so that as it expands it will not deposit frost or ice which will interfere with the operation of the engine.

In carrying out my invention I have shown it applied to an engine operating an elevator and in the accompanying drawings Figure 1 is a general view showing the apparatus necessary to carry out my invention, and Fig. 2 is a detail of the valve and switch mechanism.

In the drawings A, represents an elevator connected to the ordinary cables B, passing over sheaves C, C, to a drum D, connected to be driven by the engine E. This engine E, may be of any ordinary type but is shown of the well known style often used to operate elevators by steam, the only difference in construction of the engine being that when the engine is operated by compressed air expansively, the valves and ports are preferably made larger than for operation by steam. Connected to the engine is a supply pipe F, leading from the compressed-air tank G, or other source of compressed air, and H, represents a typical valve controlling the admission of compressed air at the ports of the engine.

In order that the compressed air may be raised to a proper temperature before entering the ports of the engine I provide means whereby it may be heated electrically and for this purpose I have shown an electric generator I, which may be situated at any convenient place and leading therefrom are the conductors J, K.

Arranged in some suitable position and preferably in an enlargement or cylinder L, of the compressed air pipe F, is a series of resistance coils M, and these are so arranged that the compressed air in passing to the engine will have to circulate around the coils and when these coils are properly connected in the electric circuit and become heated the temperature of the compressed air passing over them will be raised to such an extent as to preclude the danger of depositing frost or ice in the engine where the compressed air is expanded to propel the same.

In the operation of elevators it is uncommon to run them continuously and the engine is usually controlled by some suitable means from the cage and I have shown a simple hand rope O, passing through the elevator cage A, and connected to the valve controller device H, and as it is unnecessary to heat the air except at the time of using in order to prevent the waste of electric current I preferably arrange the valve controller H, so that it will close the electric circuit J, K. whenever the controller is moved to operate the engine and when it is moved to stop the engine it will break the circuit. Thus I have shown the circuit J, K, terminating in contact

plates *j*, *k*, with a contact plate *h*, on the valve controller which will close or open the circuit as the controller is moved.

While I have thus illustrated the preferred embodiment of my invention and shown a conventional form of electric heater arranged in the supply pipe for the compressed air it will be understood that other forms and arrangements may be used without departing from the spirit of my invention and I do not therefore limit myself to the precise construction and arrangement of parts illustrated and described.

What I claim is:—

The combination with an elevator and an engine for operating it of a source of compressed air connected to operate the engine, an electric heater arranged to heat the compressed air and a controlling device for the engine valve connected to be operated from the elevator, the said valve controlling device controlling the electric circuit of the heater, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RUDOLPH C. SMITH.

Witnesses:
F. L. FREEMAN,
BENJ. T. WELCH, Jr.