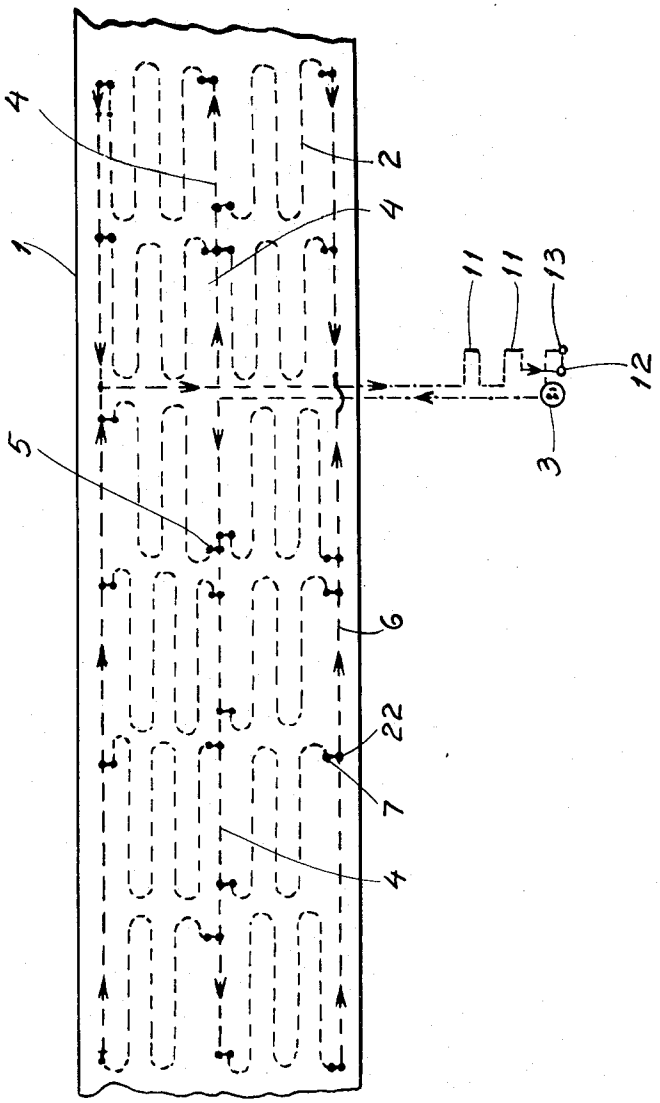
April 24, 1956 O. F. BÄCKSTRÖM 2,743,057

DEVICE TO PREVENT THE FORMATION OF ICE ON AERODROME RUNWAYS

Filed March 5, 1952 2 Sheets-Sheet 1

Fig. 1.



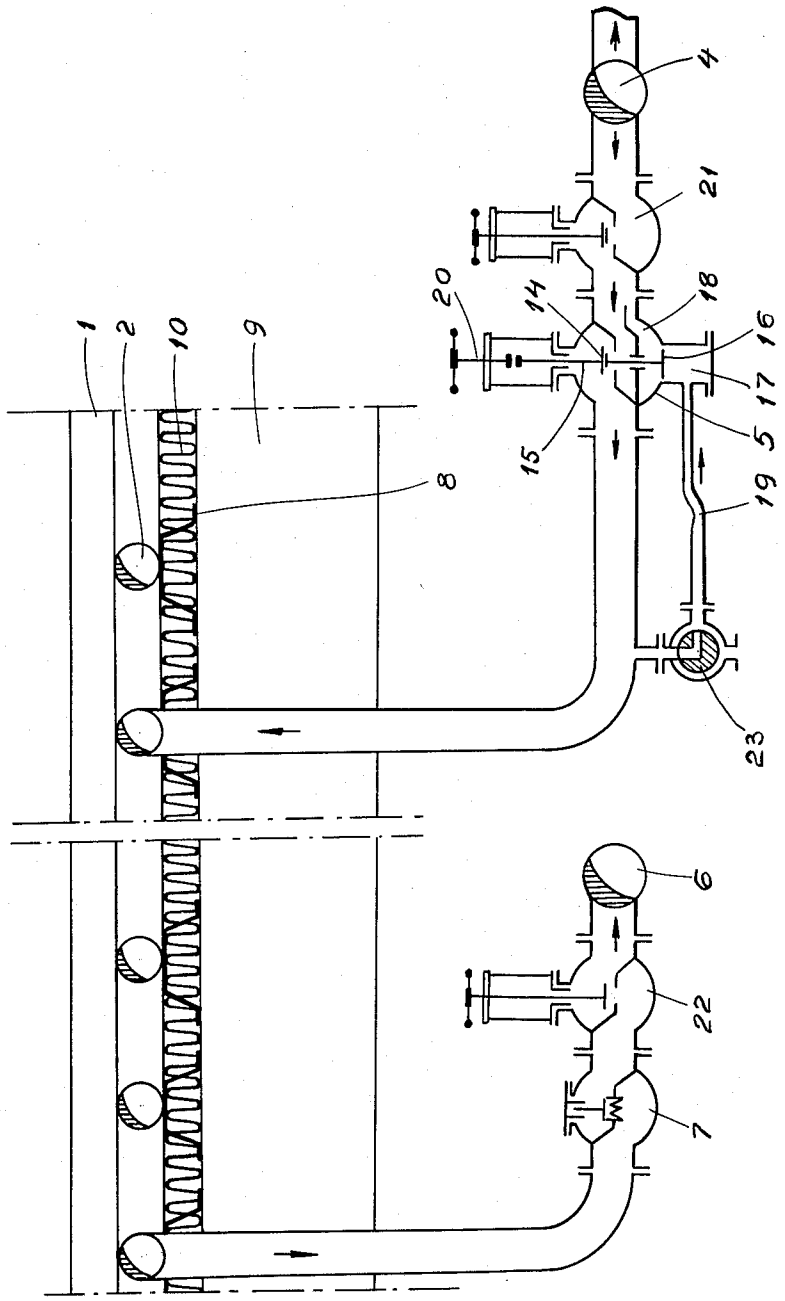
INVENTOR
Ove Fridolf Backstrom
BY Sommers & Young
ATTORNEYS

April 24, 1956 O. F. BÄCKSTRÖM 2,743,057

DEVICE TO PREVENT THE FORMATION OF ICE ON AERODROME RUNWAYS

Filed March 5, 1952 2 Sheets-Sheet 2

Fig. 2.



INVENTOR
Ove Fridolf Backstrom
BY Sommers & Young
ATTORNEYS.

United States Patent Office

2,743,057

Patented Apr. 24, 1956

2,743,057

DEVICE TO PREVENT THE FORMATION OF ICE ON AERODROME RUNWAYS

Ove Fridolf Bäckström, Goteborg, Sweden

Application March 5, 1952, Serial No. 275,004

2 Claims. (Cl. 237—69)

The present invention relates to a device serving to prevent the formation of ice on landing fields for aircrafts and to de-ice and warm such fields respectively.

The main feature of the invention is the provision of coiled pipes, connected in parallel and communicating with a steam boiler, next underneath the landing field, each pipe coil being connected to a conduit from the steam boiler by means of a valve, which is adapted to close at pipe breaks in the coiled piping, and to a return conduit to the steam boiler by means of a return valve. The coiled pipes are preferably carried by elastic or yielding supports provided upon a bed of considerably greater thickness than that of the runways. Preferably, a course of heat insulating material is provided underneath the coiled pipes. Possible heating elements in buildings etc. may be connected to the return conduit to the steam boiler.

An embodiment of the invention will be described in the following text, reference being had therein to the accompanying drawing.

Fig. 1 shows the arrangement of a pipe coil and its connection by means of valves to the pipe conduits leading from and to a steam boiler plant, the latter indicated diagrammatically in claim-dotted lines, and

Fig. 2 shows on a larger scale part of an aviation runway provided with the device.

Next underneath the top layer of the runway there are provided coiled pipes **2**, connected in parallel and communicating with a steam boiler **3**. One end of each pipe coil is connected to a pipe conduit **4** from one steam boiler by means of a valve **5**, which is adapted to close if pipe breaks occur in the pipe coil. By means of a check valve **7**, the other end of each coil is connected to a return pipe **6** leading to the steam boiler. The valves **5** and **7** will shut off the pipe coil automatically if the latter is injured by bombing.

The pipe coils **2** are carried by elastic supports **8** placed upon the bed **9**, which is considerably thicker than the runway **1**. This allows a certain springing of the runway **1** at a bomb hit and thus damps the shock.

On top of the bed **9** and beneath the pipe coils **2** is a layer **10** of heat insulating material, which prevents the downwards conduction of heat.

The heat emitting medium consists of overheated steam or water. When steam is used, the system should be balanced in such a manner that condensation cannot take place in the coils, as the steam should be overheated throughout the piping in order to prevent water deposition. When the steam has passed the pipe coils **2** underneath the runway **1**, it is conducted through the heating elements **11** in buildings or the like. The condensate is collected in a tank **12** and is pumped into the steam boiler **3** by means of a feed pump **13**.

In the valve **5** (Fig. 2), which is arranged to close at breaks in the pipe coil **2**, the spindle **15** carrying the shut-off cone **14** is equipped with a piston **16**, which is movable in a chamber **17**. Above the piston, the chamber is provided with a pipe line **18** connected to the feed pipe of the coil before the valve **5**, and below the piston the chamber is provided with a pipe line **19** connected to the feed pipe of the coil after the valve **5**. If a break occurs in the pipe coil **2**, the pressure in the pipe line **19** will become lower than the pressure in the pipe line **18** and, consequently, the piston **16** will be pressed downwards in Fig. 2 and bring the shut-off cone **14** against its seat.

The valve **5** may also be operated by hand, in which case the cone spindle **15** and the wheel spindle **20** must be interconnected by means of a hook.

In the feed pipe of each pipe coil is a manually operated valve **21** before the valve **5**, and in the discharge pipe of each pipe coil is a manually operated valve **22** after the check valve **7**.

In the pipe line **19** extending from the feed pipe of the pipe coil after the valve **5** to the chamber **17** is a three-way cock **23**. During operation of the system, said cock should be adjusted as indicated in Fig. 2. By manual adjustment of the three-way cock **23**, the part of the chamber **17** located beneath the piston **16** can be connected to the surrounding atmosphere, whereby the valve **5** is closed very rapidly.

It is to be understood that the invention is not confined to the embodiment described in the specification and illustrated by the drawing, but that said embodiment may be varied in many ways without departure from the scope and spirit of the invention.

A device according to the invention makes it possible to keep aviation places free from ice even in polar regions in winter time.

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

1. In a heated runway of an airport, the combination of a firm bed, elastic supports projecting upwardly from said bed, a pipe coil system supported on said supports above and spaced from said bed to allow limited yielding under violent shock, a relatively flexible surface layer resting on said resiliently supported pipe coil system, a steam boiler communicating with said pipe coil system for delivering superheated steam thereinto, said pipe coil system comprising a plurality of parallelly coupled pipe coils each having its respective ends connected to inlet and outlet headers, a valve in the inlet of each of said pipe coils, said valve having means responsive to the fall of pressure in the respective coil to close upon breaks in the corresponding coil, and a check valve at the outlet end of each of said pipe coils preventing return flow through the corresponding coil.

2. In a heated runway as claimed in claim 1, a layer of heat-insulating material beneath said pipe coil system.

References Cited in the file of this patent

UNITED STATES PATENTS

899,078	Salmon	Sept. 22, 1908
1,424,949	Stork	Aug. 8, 1922
1,456,946	Stork	May 29, 1923
2,505,622	McKee	Apr. 25, 1950
2,570,226	Geringer	Oct. 9, 1951