(No Model.)

G. DICKSON & D. A. JONES.

METHOD OF EXTINGUISHING FIRES.

No. 458,561. Patented Sept. 1, 1891.

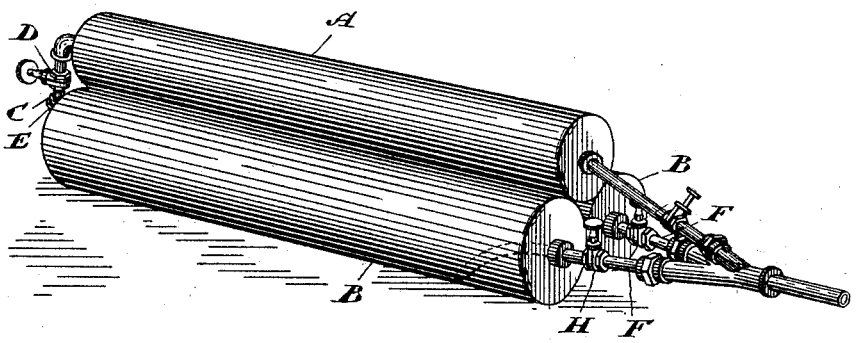

Fig. 1

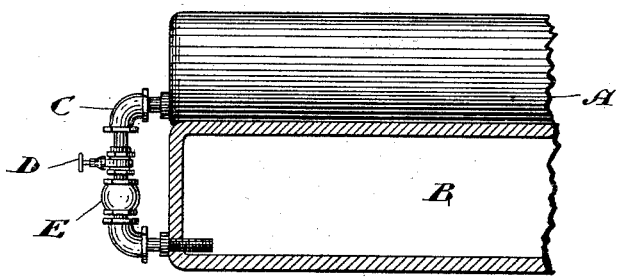

Fig. 2

Witnesses

J. Edw. Maybee

H. G. McMillan

Inventors

George Dickson

D. A. Jones

by Donald G. Rideout & Co.

Attys.

UNITED STATES PATENT OFFICE.

GEORGE DICKSON, OF TORONTO, AND DAVID ALANSON JONES, OF BEETON, CANADA, ASSIGNORS TO JOSEPH WILLIAM SPENCER, OF ATLANTA, GEORGIA.

METHOD OF EXTINGUISHING FIRES.

SPECIFICATION forming part of Letters Patent No. 458,561, dated September 1, 1891.

Application filed December 5, 1889. Serial No. 332,628. (No model.) Patented in Canada February 4, 1890, No. 33,558; in England February 12, 1890, No. 2,282; in Belgium February 28, 1890, No. 89,576; in France May 20, 1890, No. 203,888, and in Austria-Hungary July 2, 1890, No. 8,858 and No. 29,886.

To all whom it may concern:

Be it known that we, GEORGE DICKSON, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, and DAVID ALANSON JONES, of the village of Beeton, in the county of Simcoe, in the Province of Ontario, Canada, have jointly invented a new and useful Method of Extinguishing Fires, (for which we have obtained patents in the Dominion of Canada on the 4th of February, 1890, No. 33,558; in Great Britain on the 12th of February, 1890, No. 2,282; in France on the 20th of May, 1890, No. 203,888; in Belgium on the 28th of February, 1890, No. 89,576, and in Austria-Hungary on the 2d of July, 1890, under No. 8,858 and No. 29,886,) of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

The object of the invention is, first, to provide an extremely compact and powerful agent for extinguishing fire, the said agent being contained in a receptacle or receptacles, which may be either stationary or portable, and which will always hold the extinguishing agent in a condition ready for immediate use; and it consists, first, of liquefied anhydrous carbon dioxide. The receptacle or receptacles containing the liquefied anhydrous carbon dioxide is or are connected to a receptacle or receptacles containing water. The pipe or passage-way by which the liquefied gas is conveyed from its receptacle to the water-receptacles is arranged so that the said liquefied gas shall be discharged near the bottom of the water-receptacles, which are provided with suitable pipes or hose by which the mixture of liquefied carbon dioxide and water may be readily discharged when required to be used. The mixture of water and liquefied carbon dioxide upon being discharged through pipes at high pressure causes the rapid expansion of the gas and converts the mixture into spray more or less frozen, and portions of the liquid carbon dioxide are frozen, owing to its rapid expansion, and are thus thrown upon the fire in a solid state, where said frozen carbon dioxide in its further expansion not only acts to put out the fire, but cools the surface upon which it falls, and thus tends to prevent re-ignition.

Figure 1 is a perspective view or simple form of a receptacle for containing our fire-extinguishing agents. Fig. 2 is an enlarged sectional view of a portion of the receptacles, showing the connections between the receptacles.

In Figs. 1 and 2, A represents a receptacle sufficiently strong to stand a pressure of not less than a thousand pounds to the square inch.

B is a water-receptacle, which should be quite as strong as the receptacle A.

In the drawings we have shown two receptacles B and only one receptacle A; but we do not wish to confine ourselves to any particular number, nor do we wish to confine ourselves to the horizontal position in which the receptacles are shown.

C is a pipe leading from the receptacle A to a point at or near the bottom of the receptacle B.

D is a cut-off cock placed in the pipe C.

F represents a pipe through which the mixture of water and liquefied gas from the receptacle B is forced by the expansion of said liquefied gas, the said pipe taking the mixture of water and liquefied gas from the bottom of the receptacle. This pipe is provided with a suitable stop-cock H.

When our device is arranged as shown in Fig. 1, we have a pipe H for each receptacle and connect the two together, so that they discharge into the pipe common to both. The receptacle A contains liquefied anhydrous carbon dioxide. We also fill the receptacles B with water, the connection between the said receptacles being cut off by suitable stop-cocks during the period they are being filled. When we wish to use the apparatus for the purpose of extinguishing fire, we open the stop-cock D in the pipe C, leading to one of the receptacles B, whereupon, owing to the lower pressure in the cylinder B, the liquid carbon dioxide expands and rises to the top of the

cylinder A and forces the liquid carbon dioxide into the cylinder B, like the superior steam of a boiler forces the water of the boiler out when the same is tapped below the surface of the liquid. Part of the liquid carbon dioxide expands in the cylinder B, until the pressure becomes the same as in cylinder A and restores equilibrium with only a small portion of the carbon dioxide in a compressed gaseous state. Now upon opening the tap H this superior gas forces out the mixture of water and liquid carbon dioxide, which suddenly expanding causes portions of the globules of liquefied gas to be frozen, and these, being protected by a rapidly-evaporating portion of the liquefied gas, are thrown on the fire in solid particles. At the same time the water is blown into a spray, which is more or less frozen. The fire is thus rapidly extinguished by the vaporization of the carbon dioxide and water spray.

At least two receptacles are employed in order to make the action of the fire-extinguisher continuous until the fire is extinguished, and while one liquid-gas water-receptacle is being discharged upon the fire the other one may be filled with water and charged with the liquefied anhydrous carbon dioxide ready for use.

The cocks D are provided so that connection with the receptacle A may be cut off from or opened up with either of the receptacles B, as may be desired.

The impregnated water and the liquefied carbon dioxide drawn from the receptacles B reaches the fire in a colder condition than when in the receptacle, owing to the sudden expansion of the liquefied carbon dioxide when it leaves the nozzle of the hose or pipe, and renders latent a large amount of heat through their sudden expansion when discharged upon the fire, the fire also being smothered or extinguished by the action of the liberated gas.

It will of course be understood that the receptacle B may be connected to the water-main, so as to derive a constant supply of water under pressure, which water may be impregnated with the fire-extinguishing gas conveyed from the receptacle A by the pipe C, which is provided with the necessary cock, as indicated.

We are aware of the English patent, No. 4,274, of 1880, and the United States patents to Connolly, Nos. 170,820 and 181,414, and claim nothing shown or described therein, as we deem our invention as being essentially different from and an improvement over anything shown in said patents.

What we claim as our invention is—

The method herein described of extinguishing fire and cooling the burning substances, which consists in passing liquid carbon dioxide from a receiver into a water-receptacle capable of retaining said liquefied gas in a liquid state and then discharging the mixed water and liquefied gas through a nozzle upon the fire, whereby the fire is extinguished by the mixture of water spray, rapidly-volatilizing frozen carbon dioxide, and gaseous carbon dioxide, and the burning substances cooled by the reduction of temperature due to the expansion of the gases, substantially as described.

Toronto, November 9, 1889.

GEORGE DICKSON.
DAVID ALANSON JONES.

In presence of—
CHARLES CLINTON BALDWIN,
AMELIA ESTHER CUMMINGS.