July 8, 1924.

R. T. F. DODDS

1,500,610

EXPLOSION PREVENTING DEVICE

Filed March 27, 1922

Fig. 1.

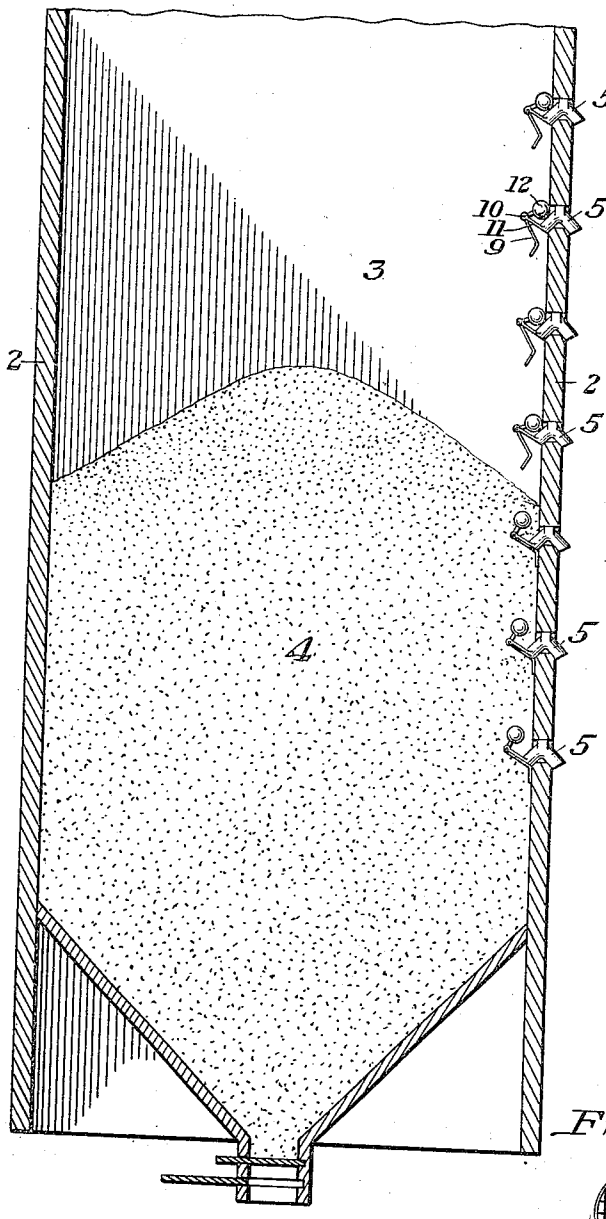


Fig. 2.

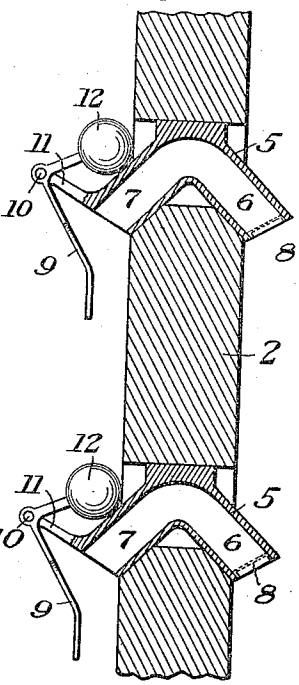
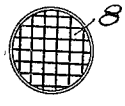


Fig. 3



INVENTOR

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Attys.

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UNITED STATES PATENT OFFICE.

ROWAN T. F. DODDS, OF STRATFORD, ONTARIO, CANADA.

EXPLOSION-PREVENTING DEVICE.

Application filed March 27, 1922. Serial No. 547,276.

To all whom it may concern:

Be it known that I, ROWAN T. F. DODDS, a citizen of the United States, residing at Stratford, Province of Ontario, Dominion of Canada, have invented a new and useful Improvement in Explosion-Preventing Devices, of which the following is a full, clear, and exact description.

The present invention relates broadly to humidifying apparatus or devices of this nature for use in connection with working areas containing dangerous combustible mixtures.

The annual loss of life and property resulting from explosions in grain elevators, grain bins, flour and feed mills, separators and the like, has stimulated considerable activity in connection with means for preventing such explosions. These explosions have universally been attributed to the existence in the working areas of dust or powder liberated from the material being handled, this dust or powder being in such proportions that an explosive mixture is produced. The actual explosion of such mixtures may be caused by any one of a large number of improper conditions. Heretofore efforts to prevent such explosions have been directed more particularly toward the elimination either of the dust or powder from the working area, or the elimination of the means responsible for the igniting or setting off of the mixture. These efforts have not overcome the danger inherent in industries where these conditions exist, and the present invention is directed, not toward the elimination either of the explosive material in the atmosphere, or of the means which bring about the explosion, but toward means for preventing an atmospheric condition capable of supporting the combustion or explosion of such mixtures.

By a series of experiments and investigations conducted under different conditions and extending over a considerable period of time, I have found that the dust or powder present in such areas possesses deliquescent properties and therefore, when it is present in sufficient quantities in a limited supply of air, will absorb all of the available moisture therefrom and thereby produce an unstable atmospheric condition which is easly ignited or exploded. As long as the air within the working area contains a predetermined minimum of water vapor, or moisture, a stable atmospheric condition is maintained, but the elimination of such vapor produces an objectionable unstable relation between the remaining constituents of the air. The present invention has for its object the prevention of explosions by maintaining at all times a predetermined minimum of water vapor in the working area whereby stable conditions exist.

The present invention embodies certain features of construction disclosed in my United States Patent No. 1,434,879 of November 7, 1922, and constitutes a continuation in part thereof. A preferred means for accomplishing the objects of this invention is illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a grain bin constructed in accordance with the present invention;

Figure 2 is a detail view, on an enlarged scale, of the construction illustrated in Figure 1, and

Figure 3 is a detail view of the protective screening for the ventilators.

Referring more particularly to the drawings, there is illustrated a portion of a grain bin or elevator having suitable walls 2 forming an enclosed working area 3 adapted to be filled with grain or similar material 4. During the filling of such bins or elevators with grain or similar material, there is liberated a considerable quantity of dust. This dust is of such nature that it floats in the air and forms a dust laden condition. Due to the deliquescent properties of the dust, the moisture vapor within the working area is rapidly absorbed, and an unstable atmospheric condition results. In order to prevent the water vapor content within such working areas from falling below the water vapor content of the atmosphere surrounding the working area, I provide at suitable points in any or all of the walls 2 a plurality of angular ventilators 5 having intersecting passages 6 and 7. The passages 6 communicate with the outside atmosphere, while the passages 7 communicate with the working area. Due to the shape of these passages the tendency of the grain to flow outwardly therethrough is largely overcome. In order to prevent birds or rodents from entering the interior of such structures, I may provide suitable screening members 8 for the outer ends of the passages 6.

It has been found that the grain, or other material, in a state of repose has compara-

tively little tendency to explode, as the dust is not liberated therefrom. It is unnecessary, therefore, after a bin or the like is filled, to keep the ventilators open. As a matter of fact, under certain conditions, open ventilators at such times might be objectionable, due to the tendency of the moisture to rot the grain. For overcoming this objection, and supplying moisture vapor only to the working area above the level of the material being handled, I may provide means for automatically stopping the passages 7. Such a means is illustrated in Figures 1 and 2 of the drawings and comprises a disc or paddle-shaped closure member 9 having a pivotal mounting 10 on an arm 11 extending upwardly from the body of the ventilators 5. These closures are normally maintained in open position to admit moisture to the working area by suitable counterweights 12 cooperating therewith. It will be apparent that the construction is such that as the level of grain rises in the bin the pressure of the grain against the closures will move the same to sealing position as illustrated by the three ventilators below the level of the grain in Figure 1. In this manner such ventilators as are no longer useful may be automatically cut out of operation.

It will be understood that changes in the details of construction and the operation of the invention may be made without departing from the spirit thereof or scope of my broader claims.

A construction such as disclosed herein is particularly adapted for use in constructing new bins or elevators, although its utility is not limited thereto, and the automatic maintenance of a stabilized atmospheric condition within the enclosed working area constitutes an important advantage of the invention.

I claim:

1. In an explosion preventing apparatus, walls enclosing a working area adapted to receive material producing dust having explosive properties whereby a dust laden area is established, an angular ventilator in one of said walls, and means operated by the material being handled for automatically closing said ventilator as the material being handled reaches the level thereof, substantially as described.

2. In an explosion preventing apparatus, an enclosing wall, an angular ventilator extending through said wall, a screen-like member in said ventilator, and means operated by the material being handled for automatically closing said ventilator under predetermined conditions, substantially as described.

3. In an explosion preventing apparatus, walls enclosing a working area adapted to receive material producing dust having explosive properties whereby a dust laden area is established, a ventilator extending through one of said walls for equalizing atmospheric conditions within and without said walls, and means automatically closing said ventilator when the level of the material being handled reaches approximately the level of the ventilator, substantially as described.

In testimony whereof I have hereunto set my hand.

ROWAN T. F. DODDS.