Jan. 1, 1935. P. BLOMMERS 1,985,880

VENTILATOR

Filed April 13, 1932 2 Sheets-Sheet 1

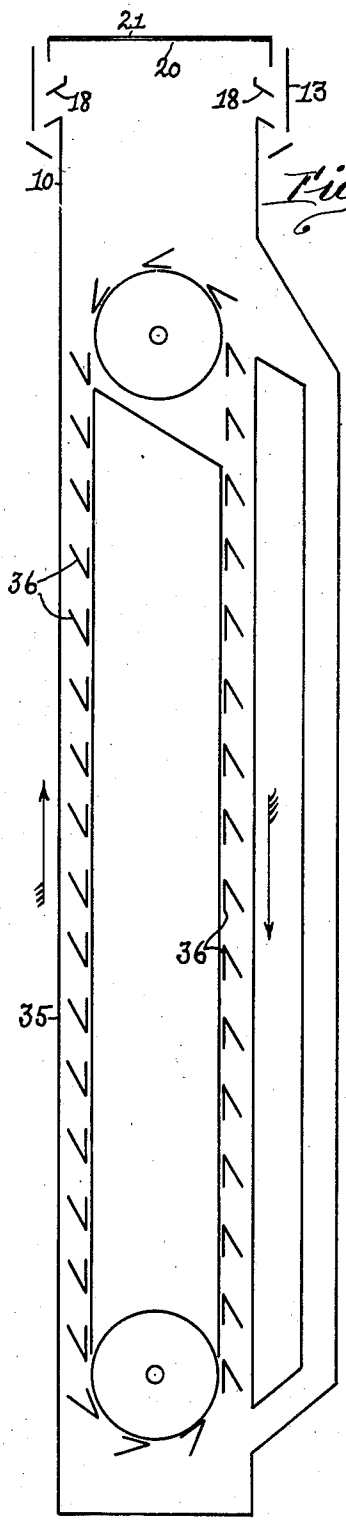


Fig. 1.

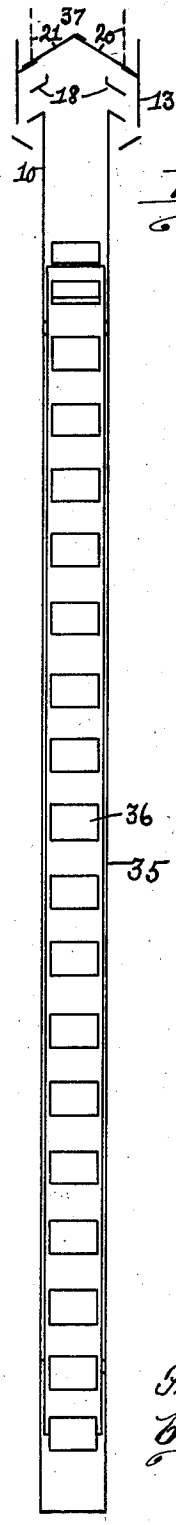


Fig. 2.

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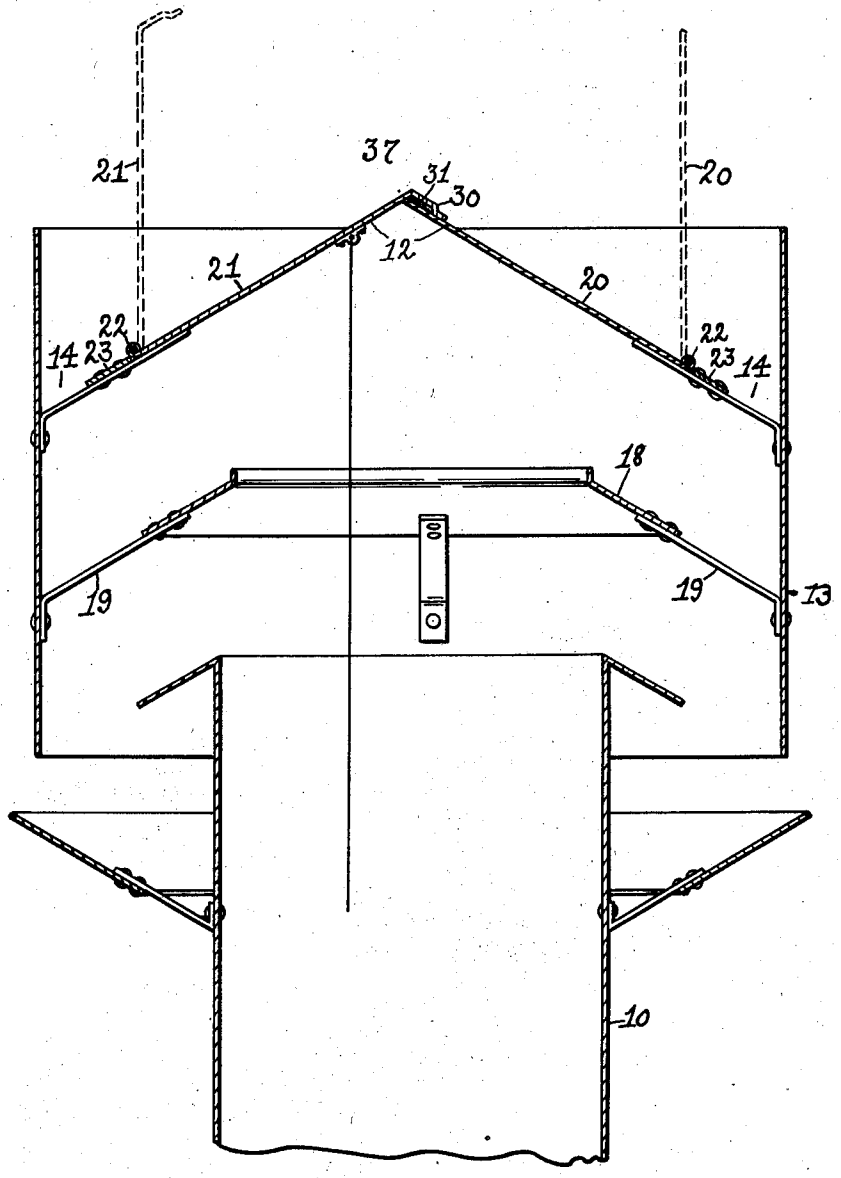


Fig. 3.

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UNITED STATES PATENT OFFICE

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VENTILATOR

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6 Claims. (Cl. 98—85)

This invention has for its object to provide a ventilator for successfully releasing built-up pressures in the stack upon which the ventilator is mounted.

Built-up pressures frequently occur in elevator legs, especially those in grain elevators, starch mills, and like buildings, and is occasioned by the accidental ignition of the fine dust in the elevator legs, which ignition may be due to a number of causes and frequently results in explosions of such severity as to cause loss of life and severe property damage.

The present invention has for its object to provide the elevator leg or other stack with a ventilator which functions to remove fine dust under normal conditions of use and thereby reduce the amount of fine dust present in the elevator leg and which is provided with an outlet, preferably of larger area than that of the elevator leg, for the built-up pressures due to ignition of fine dust in the elevator leg, which outlet of larger area is normally closed and is automatically opened by the built-up pressure within the elevator leg.

The invention further has for its object to provide a ventilator of the character described, in which the parts of the ventilator may be immovable under the influence of air currents external to the ventilator.

To these ends, the ventilator in the main may be provided with an eduction pipe, a suction or storm band and a cap member, which are and may be secured to one another and arranged with the cap member separated from the suction band to form the normal outlet for the ventilator through which fine dust passing into the ventilator from the eduction pipe, may pass out of the ventilator by suction created by external air currents under normal conditions of use.

The cap member in accordance with the present invention is constructed so as to provide an emergency outlet for abnormal pressures within the ventilator due to explosion of the fine dust within the elevator leg or stack on which the ventilator is mounted.

To this end, the cap member is preferably provided with two movable sections or parts, which are pivotally mounted at their lower ends and have their upper ends free, so that the two parts or sections of the cap member may be automatically turned from an inclined position into a substantially vertical position and leave between them an outlet passage for the ventilator which is substantially in alignment with the eduction pipe and elevator leg, and affords a direct passage from the elevator leg to the atmosphere through the ventilator.

The direct outlet passage for the best results is of materially larger area than that of the eduction pipe and elevator leg and of the normal outlet so as to reduce to a minimum damage which may be done to life and property by the dust explosion.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Fig. 1 is a diagrammatic view of an elevator leg and a ventilator embodying this invention mounted thereon;

Fig. 2, a like view at right angles to that shown in Fig. 1, with the closed position of the cap member shown by full lines and the open position thereof indicated by dotted lines, and

Fig. 3, a vertical section on an enlarged scale of the ventilator shown in Figs. 1 and 2, with the cap member in its normal or closed position shown by full lines and in its open position indicated by dotted lines.

Referring to Fig. 3, the ventilator therein shown comprises essentially an eduction pipe 10, a cap member 12 located above and in alignment with the eduction pipe 10 and separated therefrom, and a storm or suction band 13, which is made materially larger than the lower portion of the cap member, so as to form with said lower portion an outlet passage 14 for air or gases drawn through the eduction pipe 10 under normal conditions of use.

The cap member 12 under normal conditions of use is design to prevent rain from passing down into the eduction pipe in a vertical direction, and to cause air or gases drawn or sucked out of the eduction pipe by external air currents to pass out of the ventilator through the normal outlet passage 14 between the lower portion of the cap member 12 and the suction or storm band 13.

The cap member and suction or storm band are supported in any suitable manner by the eduction pipe so that these parts are in fixed relation to one another, and provision is made for preventing rain entering the eduction pipe through the outlet passage 14, and in the present instance this is accomplished by a baffle ring 18 located between the eduction pipe and cap member and secured in fixed position in any suitable manner, as for instance by braces or arms 19 attached to the suction or storm band.

A ventilator of the type thus far described is highly efficient for use on structures in which an

abnormal and sudden increase of pressure is not liable to occur.

In certain structures such as the elevator legs of grain elevators, starch mills, and the like, an abnormal pressure is liable to be created, by the ignition of fine dust present in the elevator legs.

The ignition of the fine dust may be effected by sparks created by particles or pieces of metal in the grain or by imperfection in the elevator apparatus located in the elevator leg, or by other causes.

The object of the present invention is to provide an elevator leg with a ventilator which will take care of the abnormal and destructive pressure created in the elevator leg by the ignition of the fine dust therein, and thereby reduce to a minimum loss of life and damage to property which frequently accompanies fires caused by the explosion of fine dust in the elevator legs of grain elevators, starch mills, and like structures.

The invention further has for its object to accomplish this result in a ventilator which is weatherproof and provided with an outlet for gases under normal condtions.

To this end, the ventilator is provided with an emergency outlet for abnormal pressures, which outlet is normally closed and is automatically opened by the abnormal pressure so as to afford a direct and substantially unobstructed passage out of the ventilator for said abnormal pressures.

In the present instance, the cap member 12 is provided with two parts or sections 20, 21, which are hinged or pivoted at their lower ends as at 22, to fixed portions 23 of the cap member. The movable parts or sections 20, 21 are free at their upper ends to be automatically turned into a substantially vertical position as indicated by dotted lines in Fig. 3, by the abnormal pressure within the ventilator and the elevator leg on which the ventilator is mounted.

By reference to Fig. 3, it will be observed that when the sections 20, 21 of the cap member are in their open position indicated by the dotted lines, a direct outlet passage is afforded for the built-up pressure from the elevator leg to the atmosphere through the ventilator, and this direct outlet passage may and preferably is made of larger area than the area of the eduction pipe 10 or elevator leg and also of the normal outlet 14, so as to reduce to a minimum the effects of the explosion of the fine dust in the elevator leg, and thereby avoid loss of life and property from such explosions.

By pivoting or hinging the sections 20, 21 at their lower ends and leaving the upper ends free to be moved, the ventilator is rendered sensitive to internal pressure and will respond to a minimum internal pressure.

Provision is made for rendering the cap sections weatherproof under normal conditions of use, and this may be accomplished by providing one of the sections as 21 with a flange or lip 30 which overlaps the other section 20, and affixing to the underside of the flange or lip 30 a layer 31 of felt or the like.

The ventilator shown in Fig. 3 is represented diagrammatically in Figs. 1 and 2 as mounted upon the upper end of a stack such as an elevator leg 35 of a grain elevator, starch mill or like structure, which elevator leg is usually provided with an endless chain of buckets 36 by means of which the grain, starch or like material is lifted up in the leg 35.

Under normal conditions of use, the fine dust contained in the material being lifted, passes out of the ventilator through the normal outlet 14, and at such time the emergency outlet is closed, the sections 20, 21, of the cap member 12 being in their closed position, and acting to prevent rain passing directly down into the elevator leg. When, however, an explosion occurs in the elevator leg, as for instance, in case the fine dust in the elevator leg be ignited by a spark caused by contact of metal particles in the grain or other material striking a metal bucket 36 or other part of the elevator mechanism, or caused by any other means, an abnormal pressure is built up in the elevator leg, which acts to turn the cap sections 20, 21 into the substantially vertical position indicated by dotted lines in Figs. 2 and 3, and thereby provide an emergency outlet 37 for such built up pressure, which emergency outlet affords a direct passage of larger area than the normal outlet 14 out of the ventilator for the abnormal pressures built up therein, thereby reducing to a minimum the losses from such source.

One construction of ventilator for the purpose above described is herein shown, but it is not desired to limit the invention to the particular construction shown.

What is claimed is:

1. In a ventilator, in combination, an eduction pipe, a cap member normally co-operating therewith to prevent the entrance of rain directly into the eduction pipe under normal conditions of use, and a storm band into which the said cap member is extended to form within the storm band and between it and the lower end of the cap member an outlet for the ventilator under normal conditions of use, said cap member being movable in response to abnormal pressures within the ventilator to provide an emergency outlet for said abnormal pressure in addition to said normal outlet.

2. In a ventilator, in combination, an eduction pipe, a cap member normally co-operating therewith to prevent the entrance of rain directly into the eduction pipe under normal conditions of use, and a storm band into which the said cap member is extended to form within the storm band and between it and the lower end of the cap member an outlet for the ventilator under normal conditions of use, said cap member having hinged sections movable away from each other in response to abnormal pressures within the ventilator under abnormal conditions of use to provide an emergency outlet for said abnormal pressure in addition to said normal outlet.

3. In a ventilator, in combination, an eduction pipe, a cap member normally co-operating therewith to prevent the entrance of rain directly into the eduction pipe under normal conditions of use, and a storm band forming with said cap member an outlet for the ventilator under normal conditions of use, said cap member having sections hinged at their lower ends and having their upper ends normally overlapping and movable away from each other in opposite directions in response to abnormal pressures within the ventilator under abnormal conditions of use to provide an emergency outlet for said abnormal pressures.

4. In a ventilator, in combination, an eduction pipe, a cap member normally co-operating therewith to prevent the entrance of rain directly into the eduction pipe under normal conditions of use, and a storm band into which the said cap member is extended to form within the storm band and between it and the lower end of the cap member an outlet for the ventilator under normal condi-

tions of use, said cap member having a section movable within the storm band in response to an abnormal pressure within the ventilator to provide within the storm band an emergency outlet for said abnormal pressure under abnormal conditions of use.

5. A ventilator provided with a storm band, and a cap member having a fixed relation to said storm band to form within the storm band between the lower edge of the cap member and the inner surface of the storm band a permanently open outlet for the passage of gases out of the ventilator under normal conditions of use, said cap member having sections normally overlapping at their free ends and movable away from each other to form an emergency outlet of larger area than said permanently open outlet and closed under normal conditions of use and automatically opened under abnormal conditions of use by abnormal pressures within the ventilator.

6. The combination with the elevator leg of a grain elevator, starch or like mill, of a ventilator mounted on the upper end of said elevator leg and provided with a storm band, and a cap member extended into the storm band and having a fixed relation to the said storm band to form between them within the storm band an outlet for the passage of air and gases out of the elevator leg under normal conditions of use, said cap member having a movable section forming an emergency outlet normally inactive under normal conditions of use and rendered active by abnormal pressures built up in the elevator leg under abnormal conditions of use.

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