(No Model.)

L. WAGNER.

SAFETY DEVICE FOR GRAIN MILLS.

No. 411,404. Patented Sept. 17, 1889.

Fig. 1.

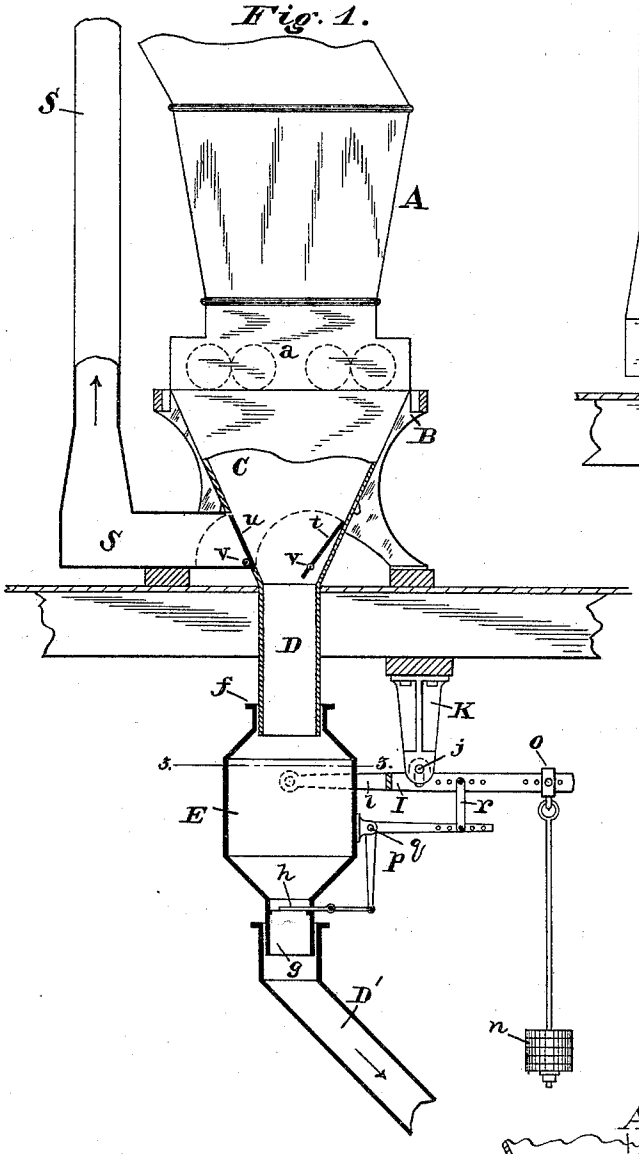


Fig. 2.

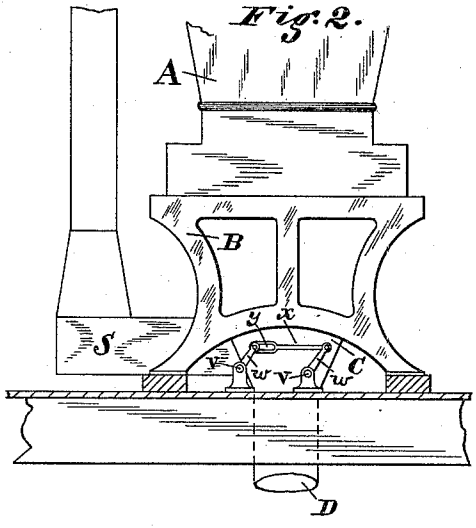


Fig. 3.

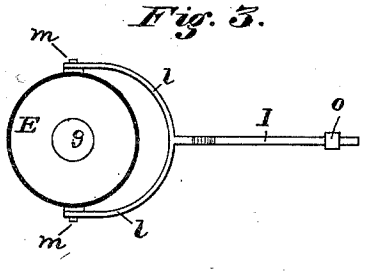
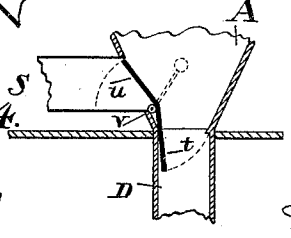


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR GRAIN-MILLS.

SPECIFICATION forming part of Letters Patent No. 411,404, dated September 17, 1889.

Application filed June 10, 1889. Serial No. 313,694. (No model.)

To all whom it may concern:

Be it known that I, LOUIS WAGNER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Safety Devices for Grain-Mills, of which the following is a specification.

This invention relates to a safety device for mills.

The object of the invention is to provide means for rendering explosions in mills harmless, and to prevent fires that usually follow such explosions. This end is accomplished by the devices illustrated in the accompanying drawings, in which—

Figure 1 is an elevation, partly sectional, of the improved safety device. Fig. 2 is a side view of a part of the apparatus. Fig. 3 is a horizontal section of same on the line 3 3, Fig. 1. Fig. 4 shows a modification of the valves.

The invention is designed to be applied to mills of any kind. In the present instance it is shown as applied to a malt-mill.

Explosions of the kind here referred to take place at the grinding parts or rollers *a* of the mill, and are believed to arise from the crushing of some metal, flint, or other foreign substance contained in the grain.

The invention comprises two distinct features—to wit, first, provision for preventing fire from passing from the mill downward, and, second, provision for the harmless escape or vent of fire in case an explosion occurs.

The letter A designates a malt-mill, of which the rollers *a* are indicated by broken lines. The frame B supports the mill. A hopper or funnel C is below the rollers, and a conduit-pipe D, leading from the funnel, serves to conduct the ground grain to an elevator or a receptacle. It is deemed unnecessary for the purposes of this description to show any other part of the mill. The conduit has two disconnected sections, one being the part D, immediately below the funnel and attached thereto, and the other the part D′, a short distance below, and which is separated from the first. Both of these sections are secured so as to be immovable or stationary. An enlarged movable section E is between the two stationary sections and serves as a union. The movable section at its top is contracted and has a throat *f*, which receives loosely but snugly the lower end of the first section D, and at its bottom is also contracted and having a nozzle *g*, which enters loosely into the upper end of the second section D′. By this construction the enlarged section E, while serving as a union, also forms a chamber that is movable up and down, but does not break its connection from the other two conduit-sections.

The vertically-movable section E at its lower part or annulus has a damper *h*, which is opened and closed by the means hereinafter described. The section E is supported by a beam I, which is pivoted at *j* to a hanger K. This beam at one end has two arms *l*, each of which takes on an opposite side of the movable section E and engages with suitable ears *m*. At the other end of the pivoted beam I a weight *n* is suspended to balance or counterpoise movable conduit-section E. This weight hangs from a loose collar or bracket *o* on the beam and is adjustable thereon. Between the damper *a*, which is in the movable section E and the pivoted beam, there is a connection which causes the damper to move whenever the beam tilts. This connection in the present instance consists of a bell-crank lever *p*, pivoted at *q* to the said movable section and having one of its arms connected with the damper *h* and its other arm with the beam I, a link *r* being used to effect the latter connection. The normal or operative adjustment of these parts is as follows: The counterpoise weight *n* must not only elevate and sustain the movable section E, but must also sustain the weight of a predetermined amount of ground grain that will accumulate therein. The damper *h* and its connection *p* must be so adjusted as to be partly open while the conduit-section E is kept elevated. By the damper *h* being kept part way open only the ground grain will not pass down the conduit as rapidly as it is ground by the mill. Consequently the ground grain will accumulate in the chamber of the section E until its weight overbalances the weight *n*, suspended

from the beam. Then the conduit-section E will descend, and thereupon the damper *h* will be fully opened and the accumulation of ground grain will be at once discharged down the conduit D′. Immediately on this discharge the conduit-section E will be raised and the damper *h* again set part way open and the accumulation of ground grain will be resumed. By this method of maintaining an accumulation or storage of ground grain in the conduit the said grain-storage will prevent fire from passing downward.

A vent-flue S is provided to allow of the harmless escape of fire or other products of explosion. This flue connects with the mill hopper or funnel C, below the rollers, and may lead therefrom in any direction to the outside of the building. The hopper or funnel is provided with two valves. One, *t*, is for closing the connection with the conduit D, and the other, *u*, for closing the connection with the vent-flue S. The two valves are connected so that when the one is open the other is closed. This connection is shown in Fig. 2. Each valve is mounted on a rock-shaft *v*, which projects through the wall of the funnel, and the exterior ends of the said shaft have arms *w*, which are connected by a rod *x*. As in the present instance, one valve *t* has a greater movement than the other. The connecting-rod *x* has a slot *y* at one end to accommodate this movement. Normally the conduit-valve *t* stands open and the vent-flue valve *u* closed. Upon the occurrence of an explosion the vent-valve will at once open and the conduit-valve close.

Any equivalent device may be used instead of the damper *h*. So far as concerns this part all that is necessary is that some device equivalent to the damper shall be used to coact with the vertically-movable section E in such manner that when the said section lowers the grain accumulated therein will at once discharge, and when the said section is raised the accumulation of ground grain will recommence.

The rock-shaft valves *t u* may be constructed in any desired way, and the connection between the valves may vary from that shown. My invention, therefore, is not limited in that particular. As an illustration of this, reference is made to Fig. 4. Here the valve *t*, which closes the conduit, and the valve *u*, which closes the vent-flue, are connected on one and the same shaft *v*. When an explosion occurs, the vent-valve will open and the conduit-valve close. An arm and weight attached to the rock-shaft *v* are indicated at *z* by broken lines, and serve to hold the valves to the position they may be placed in.

Having described my invention, I claim—

1. The combination, with the grain-mill, of a funnel, a ground-grain conduit D, and also a vent-flue S, leading from the funnel, and two valves in the funnel, each mounted on a rock-shaft, one closing connection with the conduit and the other closing connection with the vent-flue, and a connection between said two valves whereby one is opened when the other closes.

2. The combination, with a grain-mill, of a funnel, a ground-grain conduit D, and also a vent-flue S, leading from the funnel, a valve closing connection with the conduit, a valve closing connection with the vent-flue, and said valves mounted on separate rock-shafts provided with arms, and a rod connecting the arms, whereby when one valve opens the other valve will close.

In testimony whereof I affix my signature in the presence of three witnesses.

LOUIS WAGNER.

Witnesses:
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